# THE DATASHEET OF

# LM4040C25ILPRE3

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TEXAS INSTRUMENTS

LM4040A, LM4040B
LM4040C, LM4040D

SLOS456N – JANUARY 2005 – REVISED OCTOBER 2017

# LM4040 Precision Micropower Shunt Voltage Reference

## 1 Features

- Fixed Output Voltages of 2.048 V, 2.5 V, 3 V, 4.096 V, 5 V, 8.192 V, and 10 V
- Tight Output Tolerances and Low Temperature Coefficient
  - Max 0.1%, 100 ppm/°C – A Grade
  - Max 0.2%, 100 ppm/°C – B Grade
  - Max 0.5%, 100 ppm/°C – C Grade
  - Max 1.0%, 150 ppm/°C – D Grade
- Low Output Noise: 35 $\mu V_{RMS}$ Typ
- Wide Operating Current Range: 45 μA Typ to 15 mA
- Stable With All Capacitive Loads; No Output Capacitor Required
- Available in Extended Temperature Range: –40°C to 125°C

## 2 Applications

- Data-Acquisition Systems
- Power Supplies and Power-Supply Monitors
- Instrumentation and Test Equipment
- Process Controls
- Precision Audio
- Automotive Electronics
- Energy Management
- Battery-Powered Equipment

## 3 Description

The LM4040 series of shunt voltage references are versatile, easy-to-use references that cater to a vast array of applications. The 2-pin fixed-output device requires no external capacitors for operation and is stable with all capacitive loads. Additionally, the reference offers low dynamic impedance, low noise, and low temperature coefficient to ensure a stable output voltage over a wide range of operating currents and temperatures. The LM4040 uses fuse and Zener-zap reverse breakdown voltage trim during wafer sort to offer four output voltage tolerances, ranging from 0.1% (max) for the A grade to 1% (max) for the D grade. Thus, a great deal of flexibility is offered to designers in choosing the best cost-to-performance ratio for their applications.

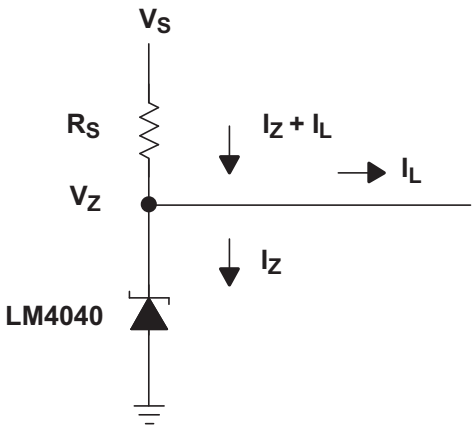
Packaged in space-saving SC-70 and SOT-23-3 packages and requiring a minimum current of 45 μA (typ), the LM4040 also is ideal for portable applications. The LM4040xI is characterized for operation over an ambient temperature range of –40°C to 85°C. The LM4040xQ is characterized for operation over an ambient temperature range of –40°C to 125°C.

**Device Information**[1]

| PART NUMBER | PACKAGE (PIN) | BODY SIZE (NOM) |
|---|---|---|
| LM4040 | SOT-23 (3) | 2.92 mm × 1.30 mm |
| | SC70 (6) | 2.00 mm × 1.25 mm |

(1) For all available packages, see the orderable addendum at the end of the data sheet.

**Simplified Schematic**

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## 4 Revision History

**Changes from Revision M (January 2015) to Revision N** **Page**

- Changed generic part number to include shorter list (LM4040A/B/C/D) ... 1
- Added Average temperature coefficient of reverse breakdown voltage footnote to all electrical tables ... 6
- Changed Thermal hysteresis in electrical characteristics tables ... 6

**Changes from Revision L (January 2009) to Revision M** **Page**

- Added *Applications*, *Device Information* table, *Pin Functions* table, *ESD Ratings* table, *Thermal Information* table, *Feature Description* section, *Device Functional Modes*, *Application and Implementation* section, *Power Supply Recommendations* section, *Layout* section, *Device and Documentation Support* section, and *Mechanical, Packaging, and Orderable Information* section. ... 1
- Deleted *Ordering Information* table. ... 1


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## Device Comparison Table(1)

| $T_A$ | DEVICE GRADE | $V_{KA}$ | ORDERABLE PART NUMBER |
|---|---|---|---|
| –40°C to 85°C | A grade: 0.1% initial accuracy and 100 ppm/°C temperature coefficient | 2.048 V | LM4040A20I |
| | | 2.5 V | LM4040A25I |
| | | 3 V | LM4040A30I |
| | | 4.096 V | LM4040A41I |
| | | 5 V | LM4040A50I |
| | | 8.192 V | LM4040A82I |
| | | 10 V | LM4040A10I |
| | B grade: 0.2% initial accuracy and 100 ppm/°C temperature coefficient | 2.048 V | LM4040B20I |
| | | 2.5 V | LM4040B25I |
| | | 3 V | LM4040B30I |
| | | 4.096 V | LM4040B41I |
| | | 5 V | LM4040B50I |
| | | 8.192 V | LM4040B82I |
| | | 10 V | LM4040B10I |
| –40°C to 85°C | C grade: 0.5% initial accuracy and 100 ppm/°C temperature coefficient | 2.048 V | LM4040C20I |
| | | 2.5 V | LM4040C25I |
| | | 3 V | LM4040C30I |
| | | 4.096 V | LM4040C41I |
| | | 5 V | LM4040C50I |
| | | 8.192 V | LM4040C82I |
| | | 10 V | LM4040C10I |
| –40°C to 85°C | D grade: 1.0% initial accuracy and 150 ppm/°C temperature coefficient | 2.048 V | LM4040D20I |
| | | 2.5 V | LM4040D25I |
| | | 3 V | LM4040D30I |
| | | 4.096 V | LM4040D41I |
| | | 5 V | LM4040D50I |
| | | 8.192 V | LM4040D82I |
| | | 10 V | LM4040D10I |
| –40°C to 125°C | C grade: 0.5% initial accuracy and 100 ppm/°C temperature coefficient | 2.048 V | LM4040C20Q |
| | | 2.5 V | LM4040C25Q |
| | | 3 V | LM4040C30Q |
| | | 5 V | LM4040C50Q |
| | D grade: 1.0% initial accuracy and 150 ppm/°C temperature coefficient | 2.048 V | LM4040D20Q |
| | | 2.5 V | LM4040D25Q |
| | | 3 V | LM4040D30Q |
| | | 5 V | LM4040D50Q |

(1) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI web site at www.ti.com.

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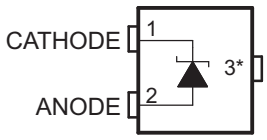
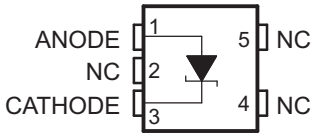
# 5 Pin Configuration and Functions

DBZ (SOT-23) PACKAGE
(TOP VIEW)




* Pin 3 is attached to substrate and must be connected to ANODE or left open.

DCK (SC-70) PACKAGE
(TOP VIEW)




NC – No internal connection

**Pin Functions**

| PIN | | | TYPE | DESCRIPTION |
|---|---|---|---|---|
| NAME | DBZ | DCK | | |
| CATHODE | 1 | 3 | I/O | Shunt Current/Voltage input |
| ANODE | 2 | 1 | O | Common pin, normally connected to ground |
| NC | — | 2, 4, 5 | I | No Internal Connection |
| * | 3 | — | I | Substrate Connection |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# 6 Specifications

## 6.1 Absolute Maximum Ratings

over free-air temperature range (unless otherwise noted)(1)

| | | MIN | MAX | UNIT |
|---|---|---|---|---|
| $I_Z$ | Continuous cathode current | –10 | 25 | mA |
| $T_J$ | Operating virtual junction temperature | | 150 | °C |
| $T_{stg}$ | Storage temperature range | –65 | 150 | °C |

(1) Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions*is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

## 6.2 ESD Ratings

| | | | VALUE | UNIT |
|---|---|---|---|---|
| $V_{(ESD)}$ | Electrostatic discharge | Human body model (HBM), per ANSI/ESDA/JEDEC JS-001, all pins(1) | ±2000 | V |
| | | Charged device model (CDM), per JEDEC specification JESD22-C101, all pins(2) | ±1000 | |

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.
(2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

## 6.3 Recommended Operating Conditions

| | | | MIN | MAX | UNIT |
|---|---|---|---|---|---|
| $I_Z$ | Cathode current | | (1) | 15 | mA |
| $T_A$ | Free-air temperature | LM4040xxxI | –40 | 85 | °C |
| | | LM4040xxxQ | –40 | 125 | |

(1) See parametric tables

## 6.4 Thermal Information

| THERMAL METRIC(1) | | LM4040 | | UNIT |
|---|---|---|---|---|
| | | DBZ | DCK | |
| | | 3 PINS | 5 PINS | |
| $R_{\theta JA}$ | Junction-to-ambient thermal resistance | 206 | 252 | °C/W |

(1) For more information about traditional and new thermal metrics, see the *Semiconductor and IC Package Thermal Metrics* application report.

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## 6.5 LM4040A20I, LM4040B20I Electrical Characteristics

at industrial temperature range, full-range $T_A$ = –40°C to 85°C (unless otherwise noted)

| PARAMETER | | TEST CONDITIONS | $T_A$ | LM4040A20I | | | LM4040B20I | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $V_Z$ | Reverse breakdown voltage | $I_Z$ = 100 μA | 25°C | | 2.048 | | | 2.048 | | V |
| $\Delta V_Z$ | Reverse breakdown voltage tolerance | $I_Z$ = 100 μA | 25°C | –2 | | 2 | –4.1 | | 4.1 | mV |
| | | | Full range | –15 | | 15 | –17 | | 17 | |
| $I_{Z,min}$ | Minimum cathode current | | 25°C | | 45 | 75 | | 45 | 75 | μA |
| | | | Full range | | | 80 | | | 80 | |
| $\alpha_{VZ}$ | Average temperature coefficient of reverse breakdown voltage (1) | $I_Z$ = 10 mA | 25°C | | ±20 | | | ±20 | | ppm/°C |
| | | $I_Z$ = 1 mA | 25°C | | ±15 | | | ±15 | | |
| | | | Full range | | | ±100 | | | ±100 | |
| | | $I_Z$ = 100 μA | 25°C | | ±15 | | | ±15 | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,min} < I_Z < 1$ mA | 25°C | | 0.3 | 0.8 | | 0.3 | 0.8 | mV |
| | | | Full range | | | 1 | | | 1 | |
| | | 1 mA < $I_Z$ < 15 mA | 25°C | | 2.5 | 6 | | 2.5 | 6 | |
| | | | Full range | | | 8 | | | 8 | |
| $Z_Z$ | Reverse dynamic impedance | $I_Z$ = 1 mA, f = 120 Hz, $I_{AC}$ = 0.1 $I_Z$ | 25°C | | 0.3 | 0.8 | | 0.3 | 0.8 | Ω |
| $e_N$ | Wideband noise | $I_Z$ = 100 μA, 10 Hz ≤ f ≤ 10 kHz | 25°C | | 35 | | | 35 | | $\mu V_{RMS}$ |
| | Long-term stability of reverse breakdown voltage | t = 1000 h, $T_A$ = 25°C ± 0.1°C, $I_Z$ = 100 μA | | | 120 | | | 120 | | ppm |
| $V_{HYST}$ | Thermal hysteresis (2) | $\Delta T_A$ = –40°C to 125°C | | | 0.08% | | | 0.08% | | — |

(1) The overtemperature limit for Reverse Breakdown Voltage Tolerance is defined as the room temperature Reverse Breakdown Voltage Tolerance ±[($\Delta V_R/\Delta T$)(max$\Delta T$)($V_R$)]. Where, $\Delta V_R/\Delta T$ is the $V_R$ temperature coefficient, max$\Delta T$ is the maximum difference in temperature from the reference point of 25°C to $T_{MIN}$ or $T_{MAX}$, and $V_R$ is the reverse breakdown voltage. The total overtemperature tolerance for the different grades in the industrial temperature range where max$\Delta T$ = 65°C is shown below:
A-grade: ±0.75% = ±0.1% ±100 ppm/°C × 65°C
B-grade: ±0.85% = ±0.2% ±100 ppm/°C × 65°C
C-grade: ±1.15% = ±0.5% ±100 ppm/°C × 65°C
D-grade: ±1.98% = ±1.0% ±150 ppm/°C × 65°C
The total overtemperature tolerance for the different grades in the extended temperature range where max $\Delta T$ = 100 °C is shown below:
C-grade: ±1.5% = ±0.5% ±100 ppm/°C × 100°C
D-grade: ±2.5% = ±1.0% ±150 ppm/°C × 100°C
Therefore, as an example, the A-grade 2.5-V LM4040 has an overtemperature Reverse Breakdown Voltage tolerance of ±2.5 V × 0.75% = ±19 mV.

(2) Thermal hysteresis is defined as the difference in voltage measured at 25°C after cycling to temperature –40°C and the 25°C measurement after cycling to temperature 125°C.


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## 6.6 LM4040C20I, LM4040D20I Electrical Characteristics

at industrial temperature range, full-range $T_A$ = –40°C to 85°C (unless otherwise noted)

| PARAMETER | | TEST CONDITIONS | $T_A$ | LM4040C20I | | | LM4040D20I | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $V_Z$ | Reverse breakdown voltage | $I_Z$ = 100 μA | 25°C | | 2.048 | | | 2.048 | | V |
| $\Delta V_Z$ | Reverse breakdown voltage tolerance | $I_Z$ = 100 μA | 25°C | –10 | | 10 | –20 | | 20 | mV |
| | | | Full range | –23 | | 23 | –40 | | 40 | |
| $I_{Z,min}$ | Minimum cathode current | | 25°C | | 45 | 75 | | 45 | 75 | μA |
| | | | Full range | | | 80 | | | 80 | |
| $\alpha_{VZ}$ | Average temperature coefficient of reverse breakdown voltage (1) | $I_Z$ = 10 mA | 25°C | | ±20 | | | ±20 | | ppm/°C |
| | | $I_Z$ = 1 mA | 25°C | | ±15 | | | ±15 | | |
| | | | Full range | | | ±100 | | | ±150 | |
| | | $I_Z$ = 100 μA | 25°C | | ±15 | | | ±15 | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,min} < I_Z < 1$ mA | 25°C | | 0.3 | 0.8 | | 0.3 | 1 | mV |
| | | | Full range | | | 1 | | | 1.2 | |
| | | 1 mA < $I_Z$ < 15 mA | 25°C | | 2.5 | 6 | | 2.5 | 8 | |
| | | | Full range | | | 8 | | | 10 | |
| $Z_Z$ | Reverse dynamic impedance | $I_Z$ = 1 mA, f = 120 Hz, $I_{AC}$ = 0.1 $I_Z$ | 25°C | | 0.3 | 0.9 | | 0.3 | 1.1 | Ω |
| $e_N$ | Wideband noise | $I_Z$ = 100 μA, 10 Hz ≤ f ≤ 10 kHz | 25°C | | 35 | | | 35 | | $\mu V_{RMS}$ |
| | Long-term stability of reverse breakdown voltage | t = 1000 h, $T_A$ = 25°C ± 0.1°C, $I_Z$ = 100 μA | | | 120 | | | 120 | | ppm |
| $V_{HYST}$ | Thermal hysteresis (2) | $\Delta T_A$ = –40°C to 125°C | | | 0.08% | | | 0.08% | | — |

(1) The overtemperature limit for Reverse Breakdown Voltage Tolerance is defined as the room temperature Reverse Breakdown Voltage Tolerance ±[($\Delta V_R/\Delta T$)(max$\Delta T$)($V_R$)]. Where, $\Delta V_R/\Delta T$ is the $V_R$ temperature coefficient, max$\Delta T$ is the maximum difference in temperature from the reference point of 25°C to $T_{MIN}$ or $T_{MAX}$, and $V_R$ is the reverse breakdown voltage. The total overtemperature tolerance for the different grades in the industrial temperature range where max$\Delta T$ = 65°C is shown below:
A-grade: ±0.75% = ±0.1% ±100 ppm/°C × 65°C
B-grade: ±0.85% = ±0.2% ±100 ppm/°C × 65°C
C-grade: ±1.15% = ±0.5% ±100 ppm/°C × 65°C
D-grade: ±1.98% = ±1.0% ±150 ppm/°C × 65°C
The total overtemperature tolerance for the different grades in the extended temperature range where max $\Delta T$ = 100 °C is shown below:
C-grade: ±1.5% = ±0.5% ±100 ppm/°C × 100°C
D-grade: ±2.5% = ±1.0% ±150 ppm/°C × 100°C
Therefore, as an example, the A-grade 2.5-V LM4040 has an overtemperature Reverse Breakdown Voltage tolerance of ±2.5 V × 0.75% = ±19 mV.

(2) Thermal hysteresis is defined as the difference in voltage measured at 25°C after cycling to temperature –40°C and the 25°C measurement after cycling to temperature 125°C.

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## 6.7 LM4040C20Q, LM4040D20Q Electrical Characteristics

at extended temperature range, full-range $T_A$ = –40°C to 125°C (unless otherwise noted)

| PARAMETER | | TEST CONDITIONS | $T_A$ | LM4040C20Q | | | LM4040D20Q | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $V_Z$ | Reverse breakdown voltage | $I_Z$ = 100 μA | 25°C | | 2.048 | | | 2.048 | | V |
| $\Delta V_Z$ | Reverse breakdown voltage tolerance | $I_Z$ = 100 μA | 25°C | –10 | | 10 | –20 | | 20 | mV |
| | | | Full range | –30 | | 30 | –50 | | 50 | |
| $I_{Z,min}$ | Minimum cathode current | | 25°C | | 45 | 75 | | 45 | 75 | μA |
| | | | Full range | | | 80 | | | 80 | |
| $\alpha_{VZ}$ | Average temperature coefficient of reverse breakdown voltage (1) | $I_Z$ = 10 mA | 25°C | | ±20 | | | ±20 | | ppm/°C |
| | | $I_Z$ = 1 mA | 25°C | | ±15 | | | ±15 | | |
| | | | Full range | | | ±100 | | | ±150 | |
| | | $I_Z$ = 100 μA | 25°C | | ±15 | | | ±15 | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,min} < I_Z < 1$ mA | 25°C | | 0.3 | 0.8 | | 0.3 | 1 | mV |
| | | | Full range | | | 1 | | | 1.2 | |
| | | 1 mA < $I_Z$ < 15 mA | 25°C | | 2.5 | 6 | | 2.5 | 8 | |
| | | | Full range | | | 8 | | | 10 | |
| $Z_Z$ | Reverse dynamic impedance | $I_Z$ = 1 mA, f = 120 Hz, $I_{AC}$ = 0.1 $I_Z$ | 25°C | | 0.3 | 0.9 | | 0.3 | 1.1 | Ω |
| $e_N$ | Wideband noise | $I_Z$ = 100 μA, 10 Hz ≤ f ≤ 10 kHz | 25°C | | 35 | | | 35 | | $\mu V_{RMS}$ |
| | Long-term stability of reverse breakdown voltage | t = 1000 h, $T_A$ = 25°C ± 0.1°C, $I_Z$ = 100 μA | | | 120 | | | 120 | | ppm |
| $V_{HYST}$ | Thermal hysteresis (2) | $\Delta T_A$ = –40°C to 125°C | | | 0.08% | | | 0.08% | | — |

(1) The overtemperature limit for Reverse Breakdown Voltage Tolerance is defined as the room temperature Reverse Breakdown Voltage Tolerance ±[($\Delta V_R/\Delta T$)(max$\Delta T$)($V_R$)]. Where, $\Delta V_R/\Delta T$ is the $V_R$ temperature coefficient, max$\Delta T$ is the maximum difference in temperature from the reference point of 25°C to $T_{MIN}$ or $T_{MAX}$, and $V_R$ is the reverse breakdown voltage. The total overtemperature tolerance for the different grades in the industrial temperature range where max$\Delta T$ = 65°C is shown below:
A-grade: ±0.75% = ±0.1% ±100 ppm/°C × 65°C
B-grade: ±0.85% = ±0.2% ±100 ppm/°C × 65°C
C-grade: ±1.15% = ±0.5% ±100 ppm/°C × 65°C
D-grade: ±1.98% = ±1.0% ±150 ppm/°C × 65°C
The total overtemperature tolerance for the different grades in the extended temperature range where max $\Delta T$ = 100 °C is shown below:
C-grade: ±1.5% = ±0.5% ±100 ppm/°C × 100°C
D-grade: ±2.5% = ±1.0% ±150 ppm/°C × 100°C
Therefore, as an example, the A-grade 2.5-V LM4040 has an overtemperature Reverse Breakdown Voltage tolerance of ±2.5 V × 0.75% = ±19 mV.

(2) Thermal hysteresis is defined as the difference in voltage measured at 25°C after cycling to temperature –40°C and the 25°C measurement after cycling to temperature 125°C.


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## 6.8 LM4040A25I, LM4040B25I Electrical Characteristics

at industrial temperature range, full-range $T_A$ = –40°C to 85°C (unless otherwise noted)

| PARAMETER | | TEST CONDITIONS | $T_A$ | LM4040A25I | | | LM4040B25I | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $V_Z$ | Reverse breakdown voltage | $I_Z$ = 100 μA | 25°C | | 2.5 | | | 2.5 | | V |
| $\Delta V_Z$ | Reverse breakdown voltage tolerance | $I_Z$ = 100 μA | 25°C | –2.5 | | 2.5 | –5 | | 5 | mV |
| | | | Full range | –19 | | 19 | –21 | | 21 | |
| $I_{Z,min}$ | Minimum cathode current | | 25°C | | 45 | 75 | | 45 | 75 | μA |
| | | | Full range | | | 80 | | | 80 | |
| $\alpha_{VZ}$ | Average temperature coefficient of reverse breakdown voltage (1) | $I_Z$ = 10 mA | 25°C | | ±20 | | | ±20 | | ppm/°C |
| | | $I_Z$ = 1 mA | 25°C | | ±15 | | | ±15 | | |
| | | | Full range | | | ±100 | | | ±100 | |
| | | $I_Z$ = 100 μA | 25°C | | ±15 | | | ±15 | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,min} < I_Z < 1$ mA | 25°C | | 0.3 | 0.8 | | 0.3 | 0.8 | mV |
| | | | Full range | | | 1 | | | 1 | |
| | | 1 mA < $I_Z$ < 15 mA | 25°C | | 2.5 | 6 | | 2.5 | 6 | |
| | | | Full range | | | 8 | | | 8 | |
| $Z_Z$ | Reverse dynamic impedance | $I_Z$ = 1 mA, f = 120 Hz, $I_{AC}$ = 0.1 $I_Z$ | 25°C | | 0.3 | 0.8 | | 0.3 | 0.8 | Ω |
| $e_N$ | Wideband noise | $I_Z$ = 100 μA, 10 Hz ≤ f ≤ 10 kHz | 25°C | | 35 | | | 35 | | $\mu V_{RMS}$ |
| | Long-term stability of reverse breakdown voltage | t = 1000 h, $T_A$ = 25°C ± 0.1°C, $I_Z$ = 100 μA | | | 120 | | | 120 | | ppm |
| $V_{HYST}$ | Thermal hysteresis (2) | $\Delta T_A$ = –40°C to 125°C | | | 0.08% | | | 0.08% | | — |

(1) The overtemperature limit for Reverse Breakdown Voltage Tolerance is defined as the room temperature Reverse Breakdown Voltage Tolerance ±[($\Delta V_R/\Delta T$)(max$\Delta T$)($V_R$)]. Where, $\Delta V_R/\Delta T$ is the $V_R$ temperature coefficient, max$\Delta T$ is the maximum difference in temperature from the reference point of 25°C to $T_{MIN}$ or $T_{MAX}$, and $V_R$ is the reverse breakdown voltage. The total overtemperature tolerance for the different grades in the industrial temperature range where max$\Delta T$ = 65°C is shown below:
A-grade: ±0.75% = ±0.1% ±100 ppm/°C × 65°C
B-grade: ±0.85% = ±0.2% ±100 ppm/°C × 65°C
C-grade: ±1.15% = ±0.5% ±100 ppm/°C × 65°C
D-grade: ±1.98% = ±1.0% ±150 ppm/°C × 65°C
The total overtemperature tolerance for the different grades in the extended temperature range where max $\Delta T$ = 100 °C is shown below:
C-grade: ±1.5% = ±0.5% ±100 ppm/°C × 100°C
D-grade: ±2.5% = ±1.0% ±150 ppm/°C × 100°C
Therefore, as an example, the A-grade 2.5-V LM4040 has an overtemperature Reverse Breakdown Voltage tolerance of ±2.5 V × 0.75% = ±19 mV.

(2) Thermal hysteresis is defined as the difference in voltage measured at 25°C after cycling to temperature –40°C and the 25°C measurement after cycling to temperature 125°C.

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## 6.9 LM4040C25I, LM4040D25I Electrical Characteristics

at industrial temperature range, full-range $T_A$ = –40°C to 85°C (unless otherwise noted)

| PARAMETER | | TEST CONDITIONS | $T_A$ | LM4040C25I | | | LM4040D25I | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $V_Z$ | Reverse breakdown voltage | $I_Z$ = 100 μA | 25°C | | 2.5 | | | 2.5 | | V |
| $\Delta V_Z$ | Reverse breakdown voltage tolerance | $I_Z$ = 100 μA | 25°C | –12 | | 12 | –25 | | 25 | mV |
| | | | Full range | –29 | | 29 | –49 | | 49 | |
| $I_{Z,min}$ | Minimum cathode current | | 25°C | | 45 | 75 | | 45 | 75 | μA |
| | | | Full range | | | 80 | | | 80 | |
| $\alpha_{VZ}$ | Average temperature coefficient of reverse breakdown voltage (1) | $I_Z$ = 10 mA | 25°C | | ±20 | | | ±20 | | ppm/°C |
| | | $I_Z$ = 1 mA | 25°C | | ±15 | | | ±15 | | |
| | | | Full range | | | ±100 | | | ±150 | |
| | | $I_Z$ = 100 μA | 25°C | | ±15 | | | ±15 | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,min} < I_Z < 1$ mA | 25°C | | 0.3 | 0.8 | | 0.3 | 1 | mV |
| | | | Full range | | | 1 | | | 1.2 | |
| | | 1 mA < $I_Z$ < 15 mA | 25°C | | 2.5 | 6 | | 2.5 | 8 | |
| | | | Full range | | | 8 | | | 10 | |
| $Z_Z$ | Reverse dynamic impedance | $I_Z$ = 1 mA, f = 120 Hz, $I_{AC}$ = 0.1 $I_Z$ | 25°C | | 0.3 | 0.9 | | 0.3 | 1.1 | Ω |
| $e_N$ | Wideband noise | $I_Z$ = 100 μA, 10 Hz ≤ f ≤ 10 kHz | 25°C | | 35 | | | 35 | | $\mu V_{RMS}$ |
| | Long-term stability of reverse breakdown voltage | t = 1000 h, $T_A$ = 25°C ± 0.1°C, $I_Z$ = 100 μA | | | 120 | | | 120 | | ppm |
| $V_{HYST}$ | Thermal hysteresis (2) | $\Delta T_A$ = –40°C to 125°C | | | 0.08% | | | 0.08% | | — |

(1) The overtemperature limit for Reverse Breakdown Voltage Tolerance is defined as the room temperature Reverse Breakdown Voltage Tolerance ±[($\Delta V_R/\Delta T$)(max$\Delta T$)($V_R$)]. Where, $\Delta V_R/\Delta T$ is the $V_R$ temperature coefficient, max$\Delta T$ is the maximum difference in temperature from the reference point of 25°C to $T_{MIN}$ or $T_{MAX}$, and $V_R$ is the reverse breakdown voltage. The total overtemperature tolerance for the different grades in the industrial temperature range where max$\Delta T$ = 65°C is shown below:
A-grade: ±0.75% = ±0.1% ±100 ppm/°C × 65°C
B-grade: ±0.85% = ±0.2% ±100 ppm/°C × 65°C
C-grade: ±1.15% = ±0.5% ±100 ppm/°C × 65°C
D-grade: ±1.98% = ±1.0% ±150 ppm/°C × 65°C
The total overtemperature tolerance for the different grades in the extended temperature range where max $\Delta T$ = 100 °C is shown below:
C-grade: ±1.5% = ±0.5% ±100 ppm/°C × 100°C
D-grade: ±2.5% = ±1.0% ±150 ppm/°C × 100°C
Therefore, as an example, the A-grade 2.5-V LM4040 has an overtemperature Reverse Breakdown Voltage tolerance of ±2.5 V × 0.75% = ±19 mV.

(2) Thermal hysteresis is defined as the difference in voltage measured at 25°C after cycling to temperature –40°C and the 25°C measurement after cycling to temperature 125°C.


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## 6.10 LM4040C25Q, LM4040D25Q Electrical Characteristics

at extended temperature range, full-range $T_A$ = –40°C to 125°C (unless otherwise noted)

| PARAMETER | | TEST CONDITIONS | $T_A$ | LM4040C25Q | | | LM4040D25Q | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $V_Z$ | Reverse breakdown voltage | $I_Z$ = 100 μA | 25°C | | 2.5 | | | 2.5 | | V |
| $\Delta V_Z$ | Reverse breakdown voltage tolerance | $I_Z$ = 100 μA | 25°C | –12 | | 12 | –25 | | 25 | mV |
| | | | Full range | –38 | | 38 | –63 | | 63 | |
| $I_{Z,min}$ | Minimum cathode current | | 25°C | | 45 | 75 | | 45 | 75 | μA |
| | | | Full range | | | 80 | | | 80 | |
| $\alpha_{VZ}$ | Average temperature coefficient of reverse breakdown voltage (1) | $I_Z$ = 10 mA | 25°C | | ±20 | | | ±20 | | ppm/°C |
| | | $I_Z$ = 1 mA | 25°C | | ±15 | | | ±15 | | |
| | | | Full range | | | ±100 | | | ±150 | |
| | | $I_Z$ = 100 μA | 25°C | | ±15 | | | ±15 | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,min} < I_Z < 1$ mA | 25°C | | 0.3 | 0.8 | | 0.3 | 1 | mV |
| | | | Full range | | | 1 | | | 1.2 | |
| | | 1 mA < $I_Z$ < 15 mA | 25°C | | 2.5 | 6 | | 2.5 | 8 | |
| | | | Full range | | | 8 | | | 10 | |
| $Z_Z$ | Reverse dynamic impedance | $I_Z$ = 1 mA, f = 120 Hz, $I_{AC}$ = 0.1 $I_Z$ | 25°C | | 0.3 | 0.9 | | 0.3 | 1.1 | Ω |
| $e_N$ | Wideband noise | $I_Z$ = 100 μA, 10 Hz ≤ f ≤ 10 kHz | 25°C | | 35 | | | 35 | | $\mu V_{RMS}$ |
| | Long-term stability of reverse breakdown voltage | t = 1000 h, $T_A$ = 25°C ± 0.1°C, $I_Z$ = 100 μA | | | 120 | | | 120 | | ppm |
| $V_{HYST}$ | Thermal hysteresis (2) | $\Delta T_A$ = –40°C to 125°C | | | 0.08% | | | 0.08% | | — |

(1) The overtemperature limit for Reverse Breakdown Voltage Tolerance is defined as the room temperature Reverse Breakdown Voltage Tolerance ±[($\Delta V_R/\Delta T$)(max$\Delta T$)($V_R$)]. Where, $\Delta V_R/\Delta T$ is the $V_R$ temperature coefficient, max$\Delta T$ is the maximum difference in temperature from the reference point of 25°C to $T_{MIN}$ or $T_{MAX}$, and $V_R$ is the reverse breakdown voltage. The total overtemperature tolerance for the different grades in the industrial temperature range where max$\Delta T$ = 65°C is shown below:
A-grade: ±0.75% = ±0.1% ±100 ppm/°C × 65°C
B-grade: ±0.85% = ±0.2% ±100 ppm/°C × 65°C
C-grade: ±1.15% = ±0.5% ±100 ppm/°C × 65°C
D-grade: ±1.98% = ±1.0% ±150 ppm/°C × 65°C
The total overtemperature tolerance for the different grades in the extended temperature range where max $\Delta T$ = 100 °C is shown below:
C-grade: ±1.5% = ±0.5% ±100 ppm/°C × 100°C
D-grade: ±2.5% = ±1.0% ±150 ppm/°C × 100°C
Therefore, as an example, the A-grade 2.5-V LM4040 has an overtemperature Reverse Breakdown Voltage tolerance of ±2.5 V × 0.75% = ±19 mV.

(2) Thermal hysteresis is defined as the difference in voltage measured at 25°C after cycling to temperature –40°C and the 25°C measurement after cycling to temperature 125°C.

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## 6.11 LM4040A30I, LM4040B30I Electrical Characteristics

at industrial temperature range, full-range $T_A$ = –40°C to 85°C (unless otherwise noted)

| PARAMETER | | TEST CONDITIONS | $T_A$ | LM4040A30I | | | LM4040B30I | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $V_Z$ | Reverse breakdown voltage | $I_Z$ = 100 μA | 25°C | | 3 | | | 3 | | V |
| $\Delta V_Z$ | Reverse breakdown voltage tolerance | $I_Z$ = 100 μA | 25°C | –3 | | 3 | –6 | | 6 | mV |
| | | | Full range | –22 | | 22 | –26 | | 26 | |
| $I_{Z,min}$ | Minimum cathode current | | 25°C | | 47 | 77 | | 47 | 77 | μA |
| | | | Full range | | | 82 | | | 82 | |
| $\alpha_{VZ}$ | Average temperature coefficient of reverse breakdown voltage (1) | $I_Z$ = 10 mA | 25°C | | ±20 | | | ±20 | | ppm/°C |
| | | $I_Z$ = 1 mA | 25°C | | ±15 | | | ±15 | | |
| | | | Full range | | | ±100 | | | ±100 | |
| | | $I_Z$ = 100 μA | 25°C | | ±15 | | | ±15 | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,min} < I_Z < 1$ mA | 25°C | | 0.6 | 0.8 | | 0.6 | 0.8 | mV |
| | | | Full range | | | 1.1 | | | 1.1 | |
| | | 1 mA < $I_Z$ < 15 mA | 25°C | | 2.7 | 6 | | 2.7 | 6 | |
| | | | Full range | | | 9 | | | 9 | |
| $Z_Z$ | Reverse dynamic impedance | $I_Z$ = 1 mA, f = 120 Hz, $I_{AC}$ = 0.1 $I_Z$ | 25°C | | 0.4 | 0.9 | | 0.4 | 0.9 | Ω |
| $e_N$ | Wideband noise | $I_Z$ = 100 μA, 10 Hz ≤ f ≤ 10 kHz | 25°C | | 35 | | | 35 | | $\mu V_{RMS}$ |
| | Long-term stability of reverse breakdown voltage | t = 1000 h, $T_A$ = 25°C ± 0.1°C, $I_Z$ = 100 μA | | | 120 | | | 120 | | ppm |
| $V_{HYST}$ | Thermal hysteresis (2) | $\Delta T_A$ = –40°C to 125°C | | | 0.08% | | | 0.08% | | — |

(1) The overtemperature limit for Reverse Breakdown Voltage Tolerance is defined as the room temperature Reverse Breakdown Voltage Tolerance ±[($\Delta V_R/\Delta T$)(max$\Delta T$)($V_R$)]. Where, $\Delta V_R/\Delta T$ is the $V_R$ temperature coefficient, max$\Delta T$ is the maximum difference in temperature from the reference point of 25°C to $T_{MIN}$ or $T_{MAX}$, and $V_R$ is the reverse breakdown voltage. The total overtemperature tolerance for the different grades in the industrial temperature range where max$\Delta T$ = 65°C is shown below:
A-grade: ±0.75% = ±0.1% ±100 ppm/°C × 65°C
B-grade: ±0.85% = ±0.2% ±100 ppm/°C × 65°C
C-grade: ±1.15% = ±0.5% ±100 ppm/°C × 65°C
D-grade: ±1.98% = ±1.0% ±150 ppm/°C × 65°C
The total overtemperature tolerance for the different grades in the extended temperature range where max $\Delta T$ = 100 °C is shown below:
C-grade: ±1.5% = ±0.5% ±100 ppm/°C × 100°C
D-grade: ±2.5% = ±1.0% ±150 ppm/°C × 100°C
Therefore, as an example, the A-grade 2.5-V LM4040 has an overtemperature Reverse Breakdown Voltage tolerance of ±2.5 V × 0.75% = ±19 mV.

(2) Thermal hysteresis is defined as the difference in voltage measured at 25°C after cycling to temperature –40°C and the 25°C measurement after cycling to temperature 125°C.


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## 6.12 LM4040C30I, LM4040D30I Electrical Characteristics

at industrial temperature range, full-range $T_A$ = –40°C to 85°C (unless otherwise noted)

| PARAMETER | | TEST CONDITIONS | $T_A$ | LM4040C30I | | | LM4040D30I | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $V_Z$ | Reverse breakdown voltage | $I_Z$ = 100 μA | 25°C | | 3 | | | 3 | | V |
| $\Delta V_Z$ | Reverse breakdown voltage tolerance | $I_Z$ = 100 μA | 25°C | –15 | | 15 | –30 | | 30 | mV |
| | | | Full range | –34 | | 34 | –59 | | 59 | |
| $I_{Z,min}$ | Minimum cathode current | | 25°C | | 45 | 77 | | 45 | 77 | μA |
| | | | Full range | | | 82 | | | 82 | |
| $\alpha_{VZ}$ | Average temperature coefficient of reverse breakdown voltage (1) | $I_Z$ = 10 mA | 25°C | | ±20 | | | ±20 | | ppm/°C |
| | | $I_Z$ = 1 mA | 25°C | | ±15 | | | ±15 | | |
| | | | Full range | | | ±100 | | | ±150 | |
| | | $I_Z$ = 100 μA | 25°C | | ±15 | | | ±15 | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,min} < I_Z < 1$ mA | 25°C | | 0.4 | 0.8 | | 1.4 | 1 | mV |
| | | | Full range | | | 1.1 | | | 1.3 | |
| | | 1 mA < $I_Z$ < 15 mA | 25°C | | 2.7 | 6 | | 2.7 | 8 | |
| | | | Full range | | | 9 | | | 11 | |
| $Z_Z$ | Reverse dynamic impedance | $I_Z$ = 1 mA, f = 120 Hz, $I_{AC}$ = 0.1 $I_Z$ | 25°C | | 0.4 | 0.9 | | 0.4 | 1.2 | Ω |
| $e_N$ | Wideband noise | $I_Z$ = 100 μA, 10 Hz ≤ f ≤ 10 kHz | 25°C | | 35 | | | 35 | | $\mu V_{RMS}$ |
| | Long-term stability of reverse breakdown voltage | t = 1000 h, $T_A$ = 25°C ± 0.1°C, $I_Z$ = 100 μA | | | 120 | | | 120 | | ppm |
| $V_{HYST}$ | Thermal hysteresis (2) | $\Delta T_A$ = –40°C to 125°C | | | 0.08% | | | 0.08% | | — |

(1) The overtemperature limit for Reverse Breakdown Voltage Tolerance is defined as the room temperature Reverse Breakdown Voltage Tolerance ±[($\Delta V_R/\Delta T$)(max$\Delta T$)($V_R$)]. Where, $\Delta V_R/\Delta T$ is the $V_R$ temperature coefficient, max$\Delta T$ is the maximum difference in temperature from the reference point of 25°C to $T_{MIN}$ or $T_{MAX}$, and $V_R$ is the reverse breakdown voltage. The total overtemperature tolerance for the different grades in the industrial temperature range where max$\Delta T$ = 65°C is shown below:
A-grade: ±0.75% = ±0.1% ±100 ppm/°C × 65°C
B-grade: ±0.85% = ±0.2% ±100 ppm/°C × 65°C
C-grade: ±1.15% = ±0.5% ±100 ppm/°C × 65°C
D-grade: ±1.98% = ±1.0% ±150 ppm/°C × 65°C
The total overtemperature tolerance for the different grades in the extended temperature range where max $\Delta T$ = 100 °C is shown below:
C-grade: ±1.5% = ±0.5% ±100 ppm/°C × 100°C
D-grade: ±2.5% = ±1.0% ±150 ppm/°C × 100°C
Therefore, as an example, the A-grade 2.5-V LM4040 has an overtemperature Reverse Breakdown Voltage tolerance of ±2.5 V × 0.75% = ±19 mV.

(2) Thermal hysteresis is defined as the difference in voltage measured at 25°C after cycling to temperature –40°C and the 25°C measurement after cycling to temperature 125°C.

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## 6.13 LM4040C30Q, LM4040D30Q Electrical Characteristics

at extended temperature range, full-range $T_A$ = –40°C to 125°C (unless otherwise noted)

| PARAMETER | | TEST CONDITIONS | $T_A$ | LM4040C30Q | | | LM4040D30Q | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $V_Z$ | Reverse breakdown voltage | $I_Z$ = 100 μA | 25°C | | 3 | | | 3 | | V |
| $\Delta V_Z$ | Reverse breakdown voltage tolerance | $I_Z$ = 100 μA | 25°C | –15 | | 15 | –30 | | 30 | mV |
| | | | Full range | –45 | | 45 | –75 | | 75 | |
| $I_{Z,min}$ | Minimum cathode current | | 25°C | | 47 | 77 | | 47 | 77 | μA |
| | | | Full range | | | 82 | | | 82 | |
| $\alpha_{VZ}$ | Average temperature coefficient of reverse breakdown voltage (1) | $I_Z$ = 10 mA | 25°C | | ±20 | | | ±20 | | ppm/°C |
| | | $I_Z$ = 1 mA | 25°C | | ±15 | | | ±15 | | |
| | | | Full range | | | ±100 | | | ±150 | |
| | | $I_Z$ = 100 μA | 25°C | | ±15 | | | ±15 | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,min} < I_Z < 1$ mA | 25°C | | 0.4 | 0.8 | | 0.4 | 1.1 | mV |
| | | | Full range | | | 1.1 | | | 1.3 | |
| | | 1 mA < $I_Z$ < 15 mA | 25°C | | 2.7 | 6 | | 2.7 | 8 | |
| | | | Full range | | | 9 | | | 11 | |
| $Z_Z$ | Reverse dynamic impedance | $I_Z$ = 1 mA, f = 120 Hz, $I_{AC}$ = 0.1 $I_Z$ | 25°C | | 0.4 | 0.9 | | 0.4 | 1.2 | Ω |
| $e_N$ | Wideband noise | $I_Z$ = 100 μA, 10 Hz ≤ f ≤ 10 kHz | 25°C | | 35 | | | 35 | | $\mu V_{RMS}$ |
| | Long-term stability of reverse breakdown voltage | t = 1000 h, $T_A$ = 25°C ± 0.1°C, $I_Z$ = 100 μA | | | 120 | | | 120 | | ppm |
| $V_{HYST}$ | Thermal hysteresis (2) | $\Delta T_A$ = –40°C to 125°C | | | 0.08% | | | 0.08% | | — |

(1) The overtemperature limit for Reverse Breakdown Voltage Tolerance is defined as the room temperature Reverse Breakdown Voltage Tolerance ±[($\Delta V_R/\Delta T$)(max$\Delta T$)($V_R$)]. Where, $\Delta V_R/\Delta T$ is the $V_R$ temperature coefficient, max$\Delta T$ is the maximum difference in temperature from the reference point of 25°C to $T_{MIN}$ or $T_{MAX}$, and $V_R$ is the reverse breakdown voltage. The total overtemperature tolerance for the different grades in the industrial temperature range where max$\Delta T$ = 65°C is shown below:
A-grade: ±0.75% = ±0.1% ±100 ppm/°C × 65°C
B-grade: ±0.85% = ±0.2% ±100 ppm/°C × 65°C
C-grade: ±1.15% = ±0.5% ±100 ppm/°C × 65°C
D-grade: ±1.98% = ±1.0% ±150 ppm/°C × 65°C
The total overtemperature tolerance for the different grades in the extended temperature range where max $\Delta T$ = 100 °C is shown below:
C-grade: ±1.5% = ±0.5% ±100 ppm/°C × 100°C
D-grade: ±2.5% = ±1.0% ±150 ppm/°C × 100°C
Therefore, as an example, the A-grade 2.5-V LM4040 has an overtemperature Reverse Breakdown Voltage tolerance of ±2.5 V × 0.75% = ±19 mV.

(2) Thermal hysteresis is defined as the difference in voltage measured at 25°C after cycling to temperature –40°C and the 25°C measurement after cycling to temperature 125°C.


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## 6.14 LM4040A41I, LM4040B41I Electrical Characteristics

at industrial temperature range, full-range $T_A$ = –40°C to 85°C (unless otherwise noted)

| PARAMETER | | TEST CONDITIONS | $T_A$ | LM4040A41I | | | LM4040B41I | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $V_Z$ | Reverse breakdown voltage | $I_Z$ = 100 μA | 25°C | | 4.096 | | | 4.096 | | V |
| $\Delta V_Z$ | Reverse breakdown voltage tolerance | $I_Z$ = 100 μA | 25°C | –4.1 | | 4.1 | –8.2 | | 8.2 | mV |
| | | | Full range | –31 | | 31 | –35 | | 35 | |
| $I_{Z,min}$ | Minimum cathode current | | 25°C | | 50 | 83 | | 50 | 83 | μA |
| | | | Full range | | | 88 | | | 88 | |
| $\alpha_{VZ}$ | Average temperature coefficient of reverse breakdown voltage (1) | $I_Z$ = 10 mA | 25°C | | ±30 | | | ±30 | | ppm/°C |
| | | $I_Z$ = 1 mA | 25°C | | ±20 | | | ±20 | | |
| | | | Full range | | | ±100 | | | ±100 | |
| | | $I_Z$ = 100 μA | 25°C | | ±20 | | | ±20 | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,min} < I_Z < 1$ mA | 25°C | | 0.5 | 0.9 | | 0.5 | 0.9 | mV |
| | | | Full range | | | 1.2 | | | 1.2 | |
| | | 1 mA < $I_Z$ < 15 mA | 25°C | | 3 | 7 | | 3 | 7 | |
| | | | Full range | | | 10 | | | 10 | |
| $Z_Z$ | Reverse dynamic impedance | $I_Z$ = 1 mA, f = 120 Hz, $I_{AC}$ = 0.1 $I_Z$ | 25°C | | 0.5 | 1 | | 0.5 | 1 | Ω |
| $e_N$ | Wideband noise | $I_Z$ = 100 μA, 10 Hz ≤ f ≤ 10 kHz | 25°C | | 80 | | | 80 | | $\mu V_{RMS}$ |
| | Long-term stability of reverse breakdown voltage | t = 1000 h, $T_A$ = 25°C ± 0.1°C, $I_Z$ = 100 μA | | | 120 | | | 120 | | ppm |
| $V_{HYST}$ | Thermal hysteresis (2) | $\Delta T_A$ = –40°C to 125°C | | | 0.08% | | | 0.08% | | — |

(1) The overtemperature limit for Reverse Breakdown Voltage Tolerance is defined as the room temperature Reverse Breakdown Voltage Tolerance ±[($\Delta V_R/\Delta T$)(max$\Delta T$)($V_R$)]. Where, $\Delta V_R/\Delta T$ is the $V_R$ temperature coefficient, max$\Delta T$ is the maximum difference in temperature from the reference point of 25°C to $T_{MIN}$ or $T_{MAX}$, and $V_R$ is the reverse breakdown voltage. The total overtemperature tolerance for the different grades in the industrial temperature range where max$\Delta T$ = 65°C is shown below:
A-grade: ±0.75% = ±0.1% ±100 ppm/°C × 65°C
B-grade: ±0.85% = ±0.2% ±100 ppm/°C × 65°C
C-grade: ±1.15% = ±0.5% ±100 ppm/°C × 65°C
D-grade: ±1.98% = ±1.0% ±150 ppm/°C × 65°C
The total overtemperature tolerance for the different grades in the extended temperature range where max $\Delta T$ = 100 °C is shown below:
C-grade: ±1.5% = ±0.5% ±100 ppm/°C × 100°C
D-grade: ±2.5% = ±1.0% ±150 ppm/°C × 100°C
Therefore, as an example, the A-grade 2.5-V LM4040 has an overtemperature Reverse Breakdown Voltage tolerance of ±2.5 V × 0.75% = ±19 mV.

(2) Thermal hysteresis is defined as the difference in voltage measured at 25°C after cycling to temperature –40°C and the 25°C measurement after cycling to temperature 125°C.

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## 6.15 LM4040C41I, LM4040D41I Electrical Characteristics

at industrial temperature range, full-range $T_A$ = –40°C to 85°C (unless otherwise noted)

| PARAMETER | | TEST CONDITIONS | $T_A$ | LM4040C41I | | | LM4040D41I | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $V_Z$ | Reverse breakdown voltage | $I_Z$ = 100 μA | 25°C | | 4.096 | | | 4.096 | | V |
| $\Delta V_Z$ | Reverse breakdown voltage tolerance | $I_Z$ = 100 μA | 25°C | –20 | | 20 | –41 | | 41 | mV |
| | | | Full range | –47 | | 47 | –81 | | 81 | |
| $I_{Z,min}$ | Minimum cathode current | | 25°C | | 50 | 83 | | 50 | 83 | μA |
| | | | Full range | | | 88 | | | 88 | |
| $\alpha_{VZ}$ | Average temperature coefficient of reverse breakdown voltage (1) | $I_Z$ = 10 mA | 25°C | | ±30 | | | ±30 | | ppm/°C |
| | | $I_Z$ = 1 mA | 25°C | | ±20 | | | ±20 | | |
| | | | Full range | | | ±100 | | | ±150 | |
| | | $I_Z$ = 100 μA | 25°C | | ±20 | | | ±20 | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,min} < I_Z < 1$ mA | 25°C | | 0.5 | 0.9 | | 0.5 | 1.2 | mV |
| | | | Full range | | | 1.2 | | | 1.5 | |
| | | 1 mA < $I_Z$ < 15 mA | 25°C | | 3 | 7 | | 3 | 9 | |
| | | | Full range | | | 10 | | | 13 | |
| $Z_Z$ | Reverse dynamic impedance | $I_Z$ = 1 mA, f = 120 Hz, $I_{AC}$ = 0.1 $I_Z$ | 25°C | | 0.5 | 1 | | 0.5 | 1.3 | Ω |
| $e_N$ | Wideband noise | $I_Z$ = 100 μA, 10 Hz ≤ f ≤ 10 kHz | 25°C | | 80 | | | 80 | | $\mu V_{RMS}$ |
| | Long-term stability of reverse breakdown voltage | t = 1000 h, $T_A$ = 25°C ± 0.1°C, $I_Z$ = 100 μA | | | 120 | | | 120 | | ppm |
| $V_{HYST}$ | Thermal hysteresis (2) | $\Delta T_A$ = –40°C to 125°C | | | 0.08% | | | 0.08% | | — |

(1) The overtemperature limit for Reverse Breakdown Voltage Tolerance is defined as the room temperature Reverse Breakdown Voltage Tolerance ±[($\Delta V_R/\Delta T$)(max$\Delta T$)($V_R$)]. Where, $\Delta V_R/\Delta T$ is the $V_R$ temperature coefficient, max$\Delta T$ is the maximum difference in temperature from the reference point of 25°C to $T_{MIN}$ or $T_{MAX}$, and $V_R$ is the reverse breakdown voltage. The total overtemperature tolerance for the different grades in the industrial temperature range where max$\Delta T$ = 65°C is shown below:
A-grade: ±0.75% = ±0.1% ±100 ppm/°C × 65°C
B-grade: ±0.85% = ±0.2% ±100 ppm/°C × 65°C
C-grade: ±1.15% = ±0.5% ±100 ppm/°C × 65°C
D-grade: ±1.98% = ±1.0% ±150 ppm/°C × 65°C
The total overtemperature tolerance for the different grades in the extended temperature range where max $\Delta T$ = 100 °C is shown below:
C-grade: ±1.5% = ±0.5% ±100 ppm/°C × 100°C
D-grade: ±2.5% = ±1.0% ±150 ppm/°C × 100°C
Therefore, as an example, the A-grade 2.5-V LM4040 has an overtemperature Reverse Breakdown Voltage tolerance of ±2.5 V × 0.75% = ±19 mV.

(2) Thermal hysteresis is defined as the difference in voltage measured at 25°C after cycling to temperature –40°C and the 25°C measurement after cycling to temperature 125°C.


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## 6.16 LM4040A50I, LM4040B50I Electrical Characteristics

at industrial temperature range, full-range $T_A$ = –40°C to 85°C (unless otherwise noted)

| PARAMETER | | TEST CONDITIONS | $T_A$ | LM4040A50I | | | LM4040B50I | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $V_Z$ | Reverse breakdown voltage | $I_Z$ = 100 μA | 25°C | | 5 | | | 5 | | V |
| $\Delta V_Z$ | Reverse breakdown voltage tolerance | $I_Z$ = 100 μA | 25°C | –5 | | 5 | –10 | | 10 | mV |
| | | | Full range | –38 | | 38 | –43 | | 43 | |
| $I_{Z,min}$ | Minimum cathode current | | 25°C | | 65 | 89 | | 65 | 89 | μA |
| | | | Full range | | | 95 | | | 95 | |
| $\alpha_{VZ}$ | Average temperature coefficient of reverse breakdown voltage (1) | $I_Z$ = 10 mA | 25°C | | ±30 | | | ±30 | | ppm/°C |
| | | $I_Z$ = 1 mA | 25°C | | ±20 | | | ±20 | | |
| | | | Full range | | | ±100 | | | ±100 | |
| | | $I_Z$ = 100 μA | 25°C | | ±20 | | | ±20 | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,min} < I_Z < 1$ mA | 25°C | | 0.5 | 1 | | 0.5 | 1 | mV |
| | | | Full range | | | 1.4 | | | 1.4 | |
| | | 1 mA < $I_Z$ < 15 mA | 25°C | | 3.5 | 8 | | 3.5 | 8 | |
| | | | Full range | | | 12 | | | 12 | |
| $Z_Z$ | Reverse dynamic impedance | $I_Z$ = 1 mA, f = 120 Hz, $I_{AC}$ = 0.1 $I_Z$ | 25°C | | 0.5 | 1.1 | | 0.5 | 1.1 | Ω |
| $e_N$ | Wideband noise | $I_Z$ = 100 μA, 10 Hz ≤ f ≤ 10 kHz | 25°C | | 80 | | | 80 | | $\mu V_{RMS}$ |
| | Long-term stability of reverse breakdown voltage | t = 1000 h, $T_A$ = 25°C ± 0.1°C, $I_Z$ = 100 μA | | | 120 | | | 120 | | ppm |
| $V_{HYST}$ | Thermal hysteresis (2) | $\Delta T_A$ = –40°C to 125°C | | | 0.08% | | | 0.08% | | — |

(1) The overtemperature limit for Reverse Breakdown Voltage Tolerance is defined as the room temperature Reverse Breakdown Voltage Tolerance ±[($\Delta V_R/\Delta T$)(max$\Delta T$)($V_R$)]. Where, $\Delta V_R/\Delta T$ is the $V_R$ temperature coefficient, max$\Delta T$ is the maximum difference in temperature from the reference point of 25°C to $T_{MIN}$ or $T_{MAX}$, and $V_R$ is the reverse breakdown voltage. The total overtemperature tolerance for the different grades in the industrial temperature range where max$\Delta T$ = 65°C is shown below:
A-grade: ±0.75% = ±0.1% ±100 ppm/°C × 65°C
B-grade: ±0.85% = ±0.2% ±100 ppm/°C × 65°C
C-grade: ±1.15% = ±0.5% ±100 ppm/°C × 65°C
D-grade: ±1.98% = ±1.0% ±150 ppm/°C × 65°C
The total overtemperature tolerance for the different grades in the extended temperature range where max $\Delta T$ = 100 °C is shown below:
C-grade: ±1.5% = ±0.5% ±100 ppm/°C × 100°C
D-grade: ±2.5% = ±1.0% ±150 ppm/°C × 100°C
Therefore, as an example, the A-grade 2.5-V LM4040 has an overtemperature Reverse Breakdown Voltage tolerance of ±2.5 V × 0.75% = ±19 mV.

(2) Thermal hysteresis is defined as the difference in voltage measured at 25°C after cycling to temperature –40°C and the 25°C measurement after cycling to temperature 125°C.

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## 6.17 LM4040C50I, LM4040D50I Electrical Characteristics

at industrial temperature range, full-range $T_A$ = –40°C to 85°C (unless otherwise noted)

| PARAMETER | | TEST CONDITIONS | $T_A$ | LM4040C50I | | | LM4040D50I | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $V_Z$ | Reverse breakdown voltage | $I_Z$ = 100 μA | 25°C | | 5 | | | 5 | | V |
| $\Delta V_Z$ | Reverse breakdown voltage tolerance | $I_Z$ = 100 μA | 25°C | –25 | | 25 | –50 | | 50 | mV |
| | | | Full range | –58 | | 58 | –99 | | 99 | |
| $I_{Z,min}$ | Minimum cathode current | | 25°C | | 65 | 89 | | 65 | 89 | μA |
| | | | Full range | | | 95 | | | 95 | |
| $\alpha_{VZ}$ | Average temperature coefficient of reverse breakdown voltage (1) | $I_Z$ = 10 mA | 25°C | | ±30 | | | ±30 | | ppm/°C |
| | | $I_Z$ = 1 mA | 25°C | | ±20 | | | ±20 | | |
| | | | Full range | | | ±100 | | | ±150 | |
| | | $I_Z$ = 100 μA | 25°C | | ±20 | | | ±20 | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,min} < I_Z < 1$ mA | 25°C | | 0.5 | 1 | | 0.5 | 1.3 | mV |
| | | | Full range | | | 1.4 | | | 1.8 | |
| | | 1 mA < $I_Z$ < 15 mA | 25°C | | 3.5 | 8 | | 3.5 | 10 | |
| | | | Full range | | | 12 | | | 15 | |
| $Z_Z$ | Reverse dynamic impedance | $I_Z$ = 1 mA, f = 120 Hz, $I_{AC}$ = 0.1 $I_Z$ | 25°C | | 0.5 | 1.1 | | 0.5 | 1.5 | Ω |
| $e_N$ | Wideband noise | $I_Z$ = 100 μA, 10 Hz ≤ f ≤ 10 kHz | 25°C | | 80 | | | 80 | | $\mu V_{RMS}$ |
| | Long-term stability of reverse breakdown voltage | t = 1000 h, $T_A$ = 25°C ± 0.1°C, $I_Z$ = 100 μA | | | 120 | | | 120 | | ppm |
| $V_{HYST}$ | Thermal hysteresis (2) | $\Delta T_A$ = –40°C to 125°C | | | 0.08% | | | 0.08% | | — |

(1) The overtemperature limit for Reverse Breakdown Voltage Tolerance is defined as the room temperature Reverse Breakdown Voltage Tolerance ±[($\Delta V_R/\Delta T$)(max$\Delta T$)($V_R$)]. Where, $\Delta V_R/\Delta T$ is the $V_R$ temperature coefficient, max$\Delta T$ is the maximum difference in temperature from the reference point of 25°C to $T_{MIN}$ or $T_{MAX}$, and $V_R$ is the reverse breakdown voltage. The total overtemperature tolerance for the different grades in the industrial temperature range where max$\Delta T$ = 65°C is shown below:
A-grade: ±0.75% = ±0.1% ±100 ppm/°C × 65°C
B-grade: ±0.85% = ±0.2% ±100 ppm/°C × 65°C
C-grade: ±1.15% = ±0.5% ±100 ppm/°C × 65°C
D-grade: ±1.98% = ±1.0% ±150 ppm/°C × 65°C
The total overtemperature tolerance for the different grades in the extended temperature range where max $\Delta T$ = 100 °C is shown below:
C-grade: ±1.5% = ±0.5% ±100 ppm/°C × 100°C
D-grade: ±2.5% = ±1.0% ±150 ppm/°C × 100°C
Therefore, as an example, the A-grade 2.5-V LM4040 has an overtemperature Reverse Breakdown Voltage tolerance of ±2.5 V × 0.75% = ±19 mV.

(2) Thermal hysteresis is defined as the difference in voltage measured at 25°C after cycling to temperature –40°C and the 25°C measurement after cycling to temperature 125°C.


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## 6.18 LM4040C50Q, LM4040D50Q Electrical Characteristics

at extended temperature range, full-range $T_A$ = –40°C to 125°C (unless otherwise noted)

| PARAMETER | | TEST CONDITIONS | $T_A$ | LM4040C50Q | | | LM4040D50Q | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $V_Z$ | Reverse breakdown voltage | $I_Z$ = 100 μA | 25°C | | 5 | | | 5 | | V |
| $\Delta V_Z$ | Reverse breakdown voltage tolerance | $I_Z$ = 100 μA | 25°C | –25 | | 25 | –50 | | 50 | mV |
| | | | Full range | –75 | | 75 | –125 | | 125 | |
| $I_{Z,min}$ | Minimum cathode current | | 25°C | | 65 | 89 | | 65 | 89 | μA |
| | | | Full range | | | 95 | | | 95 | |
| $\alpha_{VZ}$ | Average temperature coefficient of reverse breakdown voltage (1) | $I_Z$ = 10 mA | 25°C | | ±30 | | | ±30 | | ppm/°C |
| | | $I_Z$ = 1 mA | 25°C | | ±20 | | | ±20 | | |
| | | | Full range | | | ±100 | | | ±150 | |
| | | $I_Z$ = 100 μA | 25°C | | ±20 | | | ±20 | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,min} < I_Z < 1$ mA | 25°C | | 0.5 | 1 | | 0.5 | 1 | mV |
| | | | Full range | | | 1.4 | | | 1.8 | |
| | | 1 mA < $I_Z$ < 15 mA | 25°C | | 3.5 | 8 | | 3.5 | 8 | |
| | | | Full range | | | 12 | | | 12 | |
| $Z_Z$ | Reverse dynamic impedance | $I_Z$ = 1 mA, f = 120 Hz, $I_{AC}$ = 0.1 $I_Z$ | 25°C | | 0.5 | 1.1 | | 0.5 | 1.1 | Ω |
| $e_N$ | Wideband noise | $I_Z$ = 100 μA, 10 Hz ≤ f ≤ 10 kHz | 25°C | | 80 | | | 80 | | $\mu V_{RMS}$ |
| | Long-term stability of reverse breakdown voltage | t = 1000 h, $T_A$ = 25°C ± 0.1°C, $I_Z$ = 100 μA | | | 120 | | | 120 | | ppm |
| $V_{HYST}$ | Thermal hysteresis (2) | $\Delta T_A$ = –40°C to 125°C | | | 0.08% | | | 0.08% | | — |

(1) The overtemperature limit for Reverse Breakdown Voltage Tolerance is defined as the room temperature Reverse Breakdown Voltage Tolerance ±[($\Delta V_R/\Delta T$)(max$\Delta T$)($V_R$)]. Where, $\Delta V_R/\Delta T$ is the $V_R$ temperature coefficient, max$\Delta T$ is the maximum difference in temperature from the reference point of 25°C to $T_{MIN}$ or $T_{MAX}$, and $V_R$ is the reverse breakdown voltage. The total overtemperature tolerance for the different grades in the industrial temperature range where max$\Delta T$ = 65°C is shown below:
A-grade: ±0.75% = ±0.1% ±100 ppm/°C × 65°C
B-grade: ±0.85% = ±0.2% ±100 ppm/°C × 65°C
C-grade: ±1.15% = ±0.5% ±100 ppm/°C × 65°C
D-grade: ±1.98% = ±1.0% ±150 ppm/°C × 65°C
The total overtemperature tolerance for the different grades in the extended temperature range where max $\Delta T$ = 100 °C is shown below:
C-grade: ±1.5% = ±0.5% ±100 ppm/°C × 100°C
D-grade: ±2.5% = ±1.0% ±150 ppm/°C × 100°C
Therefore, as an example, the A-grade 2.5-V LM4040 has an overtemperature Reverse Breakdown Voltage tolerance of ±2.5 V × 0.75% = ±19 mV.

(2) Thermal hysteresis is defined as the difference in voltage measured at 25°C after cycling to temperature –40°C and the 25°C measurement after cycling to temperature 125°C.

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## 6.19 LM4040A82I, LM4040B82I Electrical Characteristics

at industrial temperature range, full-range $T_A$ = –40°C to 85°C (unless otherwise noted)

| PARAMETER | | TEST CONDITIONS | $T_A$ | LM4040A82I | | | LM4040B82I | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $V_Z$ | Reverse breakdown voltage | $I_Z$ = 150 μA | 25°C | | 8.192 | | | 8.192 | | V |
| $\Delta V_Z$ | Reverse breakdown voltage tolerance | $I_Z$ = 150 μA | 25°C | –8.2 | | 8.2 | –16 | | 16 | mV |
| | | | Full range | –61 | | 61 | –70 | | 70 | |
| $I_{Z,min}$ | Minimum cathode current | | 25°C | | 67 | 106 | | 67 | 106 | μA |
| | | | Full range | | | 110 | | | 110 | |
| $\alpha_{VZ}$ | Average temperature coefficient of reverse breakdown voltage (1) | $I_Z$ = 10 mA | 25°C | | ±40 | | | ±40 | | ppm/°C |
| | | $I_Z$ = 1 mA | 25°C | | ±20 | | | ±20 | | |
| | | | Full range | | | ±100 | | | ±100 | |
| | | $I_Z$ = 150 μA | 25°C | | ±20 | | | ±20 | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,min} < I_Z < 1$ mA | 25°C | | 0.6 | 1.3 | | 0.6 | 1.6 | mV |
| | | | Full range | | | 2.5 | | | 2.5 | |
| | | 1 mA < $I_Z$ < 15 mA | 25°C | | 7 | 10 | | 7 | 10 | |
| | | | Full range | | | 18 | | | 18 | |
| $Z_Z$ | Reverse dynamic impedance | $I_Z$ = 1 mA, f = 120 Hz, $I_{AC}$ = 0.1 $I_Z$ | 25°C | | 0.6 | 1.5 | | 0.6 | 1.5 | Ω |
| $e_N$ | Wideband noise | $I_Z$ = 150 μA, 10 Hz ≤ f ≤ 10 kHz | 25°C | | 130 | | | 130 | | $\mu V_{RMS}$ |
| | Long-term stability of reverse breakdown voltage | t = 1000 h, $T_A$ = 25°C ± 0.1°C, $I_Z$ = 150 μA | | | 120 | | | 120 | | ppm |
| $V_{HYST}$ | Thermal hysteresis (2) | $\Delta T_A$ = –40°C to 125°C | | | 0.08% | | | 0.08% | | — |

(1) The overtemperature limit for Reverse Breakdown Voltage Tolerance is defined as the room temperature Reverse Breakdown Voltage Tolerance ±[($\Delta V_R/\Delta T$)(max$\Delta T$)($V_R$)]. Where, $\Delta V_R/\Delta T$ is the $V_R$ temperature coefficient, max$\Delta T$ is the maximum difference in temperature from the reference point of 25°C to $T_{MIN}$ or $T_{MAX}$, and $V_R$ is the reverse breakdown voltage. The total overtemperature tolerance for the different grades in the industrial temperature range where max$\Delta T$ = 65°C is shown below:
A-grade: ±0.75% = ±0.1% ±100 ppm/°C × 65°C
B-grade: ±0.85% = ±0.2% ±100 ppm/°C × 65°C
C-grade: ±1.15% = ±0.5% ±100 ppm/°C × 65°C
D-grade: ±1.98% = ±1.0% ±150 ppm/°C × 65°C
The total overtemperature tolerance for the different grades in the extended temperature range where max $\Delta T$ = 100 °C is shown below:
C-grade: ±1.5% = ±0.5% ±100 ppm/°C × 100°C
D-grade: ±2.5% = ±1.0% ±150 ppm/°C × 100°C
Therefore, as an example, the A-grade 2.5-V LM4040 has an overtemperature Reverse Breakdown Voltage tolerance of ±2.5 V × 0.75% = ±19 mV.

(2) Thermal hysteresis is defined as the difference in voltage measured at 25°C after cycling to temperature –40°C and the 25°C measurement after cycling to temperature 125°C.


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## 6.20 LM4040C82I, LM4040D82I Electrical Characteristics

at industrial temperature range, full-range $T_A$ = –40°C to 85°C (unless otherwise noted)

| PARAMETER | | TEST CONDITIONS | $T_A$ | LM4040C82I | | | LM4040D82I | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $V_Z$ | Reverse breakdown voltage | $I_Z$ = 150 μA | 25°C | | 8.192 | | | 8.192 | | V |
| $\Delta V_Z$ | Reverse breakdown voltage tolerance | $I_Z$ = 150 μA | 25°C | –41 | | 41 | –82 | | 82 | mV |
| | | | Full range | –94 | | 94 | –162 | | 162 | |
| $I_{Z,min}$ | Minimum cathode current | | 25°C | | 67 | 106 | | 67 | 111 | μA |
| | | | Full range | | | 110 | | | 115 | |
| $\alpha_{VZ}$ | Average temperature coefficient of reverse breakdown voltage (1) | $I_Z$ = 10 mA | 25°C | | ±40 | | | ±40 | | ppm/°C |
| | | $I_Z$ = 1 mA | 25°C | | ±20 | | | ±20 | | |
| | | | Full range | | | ±100 | | | ±150 | |
| | | $I_Z$ = 150 μA | 25°C | | ±20 | | | ±20 | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,min} < I_Z < 1$ mA | 25°C | | 0.6 | 1.3 | | 0.6 | 1.7 | mV |
| | | | Full range | | | 2.5 | | | 3 | |
| | | 1 mA < $I_Z$ < 15 mA | 25°C | | 7 | 10 | | 7 | 15 | |
| | | | Full range | | | 18 | | | 24 | |
| $Z_Z$ | Reverse dynamic impedance | $I_Z$ = 1 mA, f = 120 Hz, $I_{AC}$ = 0.1 $I_Z$ | 25°C | | 0.6 | 1.5 | | 0.6 | 1.9 | Ω |
| $e_N$ | Wideband noise | $I_Z$ = 150 μA, 10 Hz ≤ f ≤ 10 kHz | 25°C | | 130 | | | 130 | | $\mu V_{RMS}$ |
| | Long-term stability of reverse breakdown voltage | t = 1000 h, $T_A$ = 25°C ± 0.1°C, $I_Z$ = 150 μA | | | 120 | | | 120 | | ppm |
| $V_{HYST}$ | Thermal hysteresis (2) | $\Delta T_A$ = –40°C to 125°C | | | 0.08% | | | 0.08% | | — |

(1) The overtemperature limit for Reverse Breakdown Voltage Tolerance is defined as the room temperature Reverse Breakdown Voltage Tolerance ±[($\Delta V_R/\Delta T$)(max$\Delta T$)($V_R$)]. Where, $\Delta V_R/\Delta T$ is the $V_R$ temperature coefficient, max$\Delta T$ is the maximum difference in temperature from the reference point of 25°C to $T_{MIN}$ or $T_{MAX}$, and $V_R$ is the reverse breakdown voltage. The total overtemperature tolerance for the different grades in the industrial temperature range where max$\Delta T$ = 65°C is shown below:
A-grade: ±0.75% = ±0.1% ±100 ppm/°C × 65°C
B-grade: ±0.85% = ±0.2% ±100 ppm/°C × 65°C
C-grade: ±1.15% = ±0.5% ±100 ppm/°C × 65°C
D-grade: ±1.98% = ±1.0% ±150 ppm/°C × 65°C
The total overtemperature tolerance for the different grades in the extended temperature range where max $\Delta T$ = 100 °C is shown below:
C-grade: ±1.5% = ±0.5% ±100 ppm/°C × 100°C
D-grade: ±2.5% = ±1.0% ±150 ppm/°C × 100°C
Therefore, as an example, the A-grade 2.5-V LM4040 has an overtemperature Reverse Breakdown Voltage tolerance of ±2.5 V × 0.75% = ±19 mV.

(2) Thermal hysteresis is defined as the difference in voltage measured at 25°C after cycling to temperature –40°C and the 25°C measurement after cycling to temperature 125°C.

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## 6.21 LM4040A10I, LM4040B10I Electrical Characteristics

at industrial temperature range, full-range $T_A$ = –40°C to 85°C (unless otherwise noted)

| PARAMETER | | TEST CONDITIONS | $T_A$ | LM4040A10I | | | LM4040B10I | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $V_Z$ | Reverse breakdown voltage | $I_Z$ = 150 μA | 25°C | | 10 | | | 10 | | V |
| $\Delta V_Z$ | Reverse breakdown voltage tolerance | $I_Z$ = 150 μA | 25°C | –10 | | 10 | –20 | | 20 | mV |
| | | | Full range | –75 | | 75 | –85 | | 85 | |
| $I_{Z,min}$ | Minimum cathode current | | 25°C | | 75 | 120 | | 75 | 120 | μA |
| | | | Full range | | | 125 | | | 125 | |
| $\alpha_{VZ}$ | Average temperature coefficient of reverse breakdown voltage (1) | $I_Z$ = 10 mA | 25°C | | ±40 | | | ±40 | | ppm/°C |
| | | $I_Z$ = 1 mA | 25°C | | ±20 | | | ±20 | | |
| | | | Full range | | | ±100 | | | ±100 | |
| | | $I_Z$ = 150 μA | 25°C | | ±20 | | | ±20 | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,min} < I_Z < 1$ mA | 25°C | | 0.8 | 1.5 | | 0.8 | 1.5 | mV |
| | | | Full range | | | 3.5 | | | 3.5 | |
| | | 1 mA < $I_Z$ < 15 mA | 25°C | | 8 | 14 | | 8 | 14 | |
| | | | Full range | | | 24 | | | 24 | |
| $Z_Z$ | Reverse dynamic impedance | $I_Z$ = 1 mA, f = 120 Hz, $I_{AC}$ = 0.1 $I_Z$ | 25°C | | 0.7 | 1.7 | | 0.7 | 1.7 | Ω |
| $e_N$ | Wideband noise | $I_Z$ = 150 μA, 10 Hz ≤ f ≤ 10 kHz | 25°C | | 180 | | | 180 | | $\mu V_{RMS}$ |
| | Long-term stability of reverse breakdown voltage | t = 1000 h, $T_A$ = 25°C ± 0.1°C, $I_Z$ = 150 μA | | | 120 | | | 120 | | ppm |
| $V_{HYST}$ | Thermal hysteresis (2) | $\Delta T_A$ = –40°C to 125°C | | | 0.08% | | | 0.08% | | — |

(1) The overtemperature limit for Reverse Breakdown Voltage Tolerance is defined as the room temperature Reverse Breakdown Voltage Tolerance ±[($\Delta V_R/\Delta T$)(max$\Delta T$)($V_R$)]. Where, $\Delta V_R/\Delta T$ is the $V_R$ temperature coefficient, max$\Delta T$ is the maximum difference in temperature from the reference point of 25°C to $T_{MIN}$ or $T_{MAX}$, and $V_R$ is the reverse breakdown voltage. The total overtemperature tolerance for the different grades in the industrial temperature range where max$\Delta T$ = 65°C is shown below:
A-grade: ±0.75% = ±0.1% ±100 ppm/°C × 65°C
B-grade: ±0.85% = ±0.2% ±100 ppm/°C × 65°C
C-grade: ±1.15% = ±0.5% ±100 ppm/°C × 65°C
D-grade: ±1.98% = ±1.0% ±150 ppm/°C × 65°C
The total overtemperature tolerance for the different grades in the extended temperature range where max $\Delta T$ = 100 °C is shown below:
C-grade: ±1.5% = ±0.5% ±100 ppm/°C × 100°C
D-grade: ±2.5% = ±1.0% ±150 ppm/°C × 100°C
Therefore, as an example, the A-grade 2.5-V LM4040 has an overtemperature Reverse Breakdown Voltage tolerance of ±2.5 V × 0.75% = ±19 mV.

(2) Thermal hysteresis is defined as the difference in voltage measured at 25°C after cycling to temperature –40°C and the 25°C measurement after cycling to temperature 125°C.


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## 6.22 LM4040C10I, LM4040D10I Electrical Characteristics

at industrial temperature range, full-range $T_A$ = –40°C to 85°C (unless otherwise noted)

| PARAMETER | | TEST CONDITIONS | $T_A$ | LM4040C10I | | | LM4040D10I | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $V_Z$ | Reverse breakdown voltage | $I_Z$ = 150 μA | 25°C | | 10 | | | 10 | | V |
| $\Delta V_Z$ | Reverse breakdown voltage tolerance | $I_Z$ = 150 μA | 25°C | –50 | | 50 | –100 | | 100 | mV |
| | | | Full range | –115 | | 115 | –198 | | 198 | |
| $I_{Z,min}$ | Minimum cathode current | | 25°C | | 75 | 120 | | 75 | 130 | μA |
| | | | Full range | | | 125 | | | 135 | |
| $\alpha_{VZ}$ | Average temperature coefficient of reverse breakdown voltage (1) | $I_Z$ = 10 mA | 25°C | | ±40 | | | ±40 | | ppm/°C |
| | | $I_Z$ = 1 mA | 25°C | | ±20 | | | ±20 | | |
| | | | Full range | | | ±100 | | | ±150 | |
| | | $I_Z$ = 150 μA | 25°C | | ±20 | | | ±20 | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ | Reverse breakdown voltage change with cathode current change | $I_{Z,min} < I_Z < 1$ mA | 25°C | | 0.8 | 1.5 | | 0.8 | 2 | mV |
| | | | Full range | | | 3.5 | | | 4 | |
| | | 1 mA < $I_Z$ < 15 mA | 25°C | | 8 | 14 | | 8 | 18 | |
| | | | Full range | | | 24 | | | 29 | |
| $Z_Z$ | Reverse dynamic impedance | $I_Z$ = 1 mA, f = 120 Hz, $I_{AC}$ = 0.1 $I_Z$ | 25°C | | 0.7 | 1.7 | | 0.7 | 2.3 | Ω |
| $e_N$ | Wideband noise | $I_Z$ = 150 μA, 10 Hz ≤ f ≤ 10 kHz | 25°C | | 180 | | | 180 | | $\mu V_{RMS}$ |
| | Long-term stability of reverse breakdown voltage | t = 1000 h, $T_A$ = 25°C ± 0.1°C, $I_Z$ = 150 μA | | | 120 | | | 120 | | ppm |
| $V_{HYST}$ | Thermal hysteresis (2) | $\Delta T_A$ = –40°C to 125°C | | | 0.08% | | | 0.08% | | — |

(1) The overtemperature limit for Reverse Breakdown Voltage Tolerance is defined as the room temperature Reverse Breakdown Voltage Tolerance ±[($\Delta V_R/\Delta T$)(max$\Delta T$)($V_R$)]. Where, $\Delta V_R/\Delta T$ is the $V_R$ temperature coefficient, max$\Delta T$ is the maximum difference in temperature from the reference point of 25°C to $T_{MIN}$ or $T_{MAX}$, and $V_R$ is the reverse breakdown voltage. The total overtemperature tolerance for the different grades in the industrial temperature range where max$\Delta T$ = 65°C is shown below:
A-grade: ±0.75% = ±0.1% ±100 ppm/°C × 65°C
B-grade: ±0.85% = ±0.2% ±100 ppm/°C × 65°C
C-grade: ±1.15% = ±0.5% ±100 ppm/°C × 65°C
D-grade: ±1.98% = ±1.0% ±150 ppm/°C × 65°C
The total overtemperature tolerance for the different grades in the extended temperature range where max $\Delta T$ = 100 °C is shown below:
C-grade: ±1.5% = ±0.5% ±100 ppm/°C × 100°C
D-grade: ±2.5% = ±1.0% ±150 ppm/°C × 100°C
Therefore, as an example, the A-grade 2.5-V LM4040 has an overtemperature Reverse Breakdown Voltage tolerance of ±2.5 V × 0.75% = ±19 mV.

(2) Thermal hysteresis is defined as the difference in voltage measured at 25°C after cycling to temperature –40°C and the 25°C measurement after cycling to temperature 125°C.

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## 6.23 Typical Characteristics

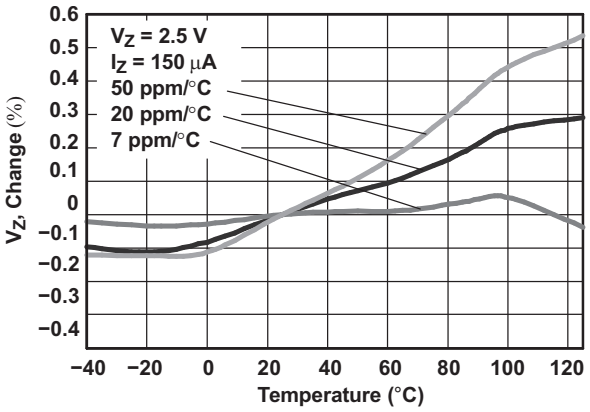


**Figure 1. Temperature Drift for Different Average Temperature Coefficients**

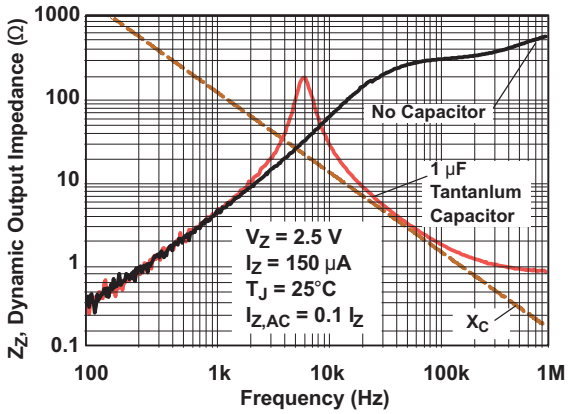


**Figure 2. Output Impedance vs Frequency**

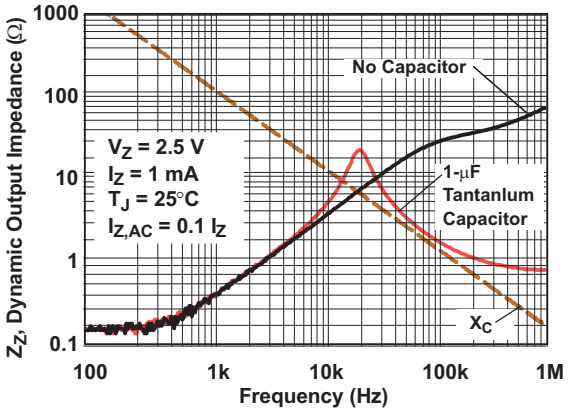


**Figure 3. Output Impedance vs Frequency**

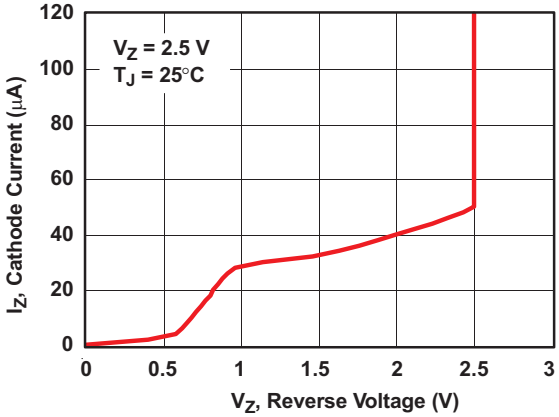


**Figure 4. Temperature Drift for Different Average Temperature Coefficient**

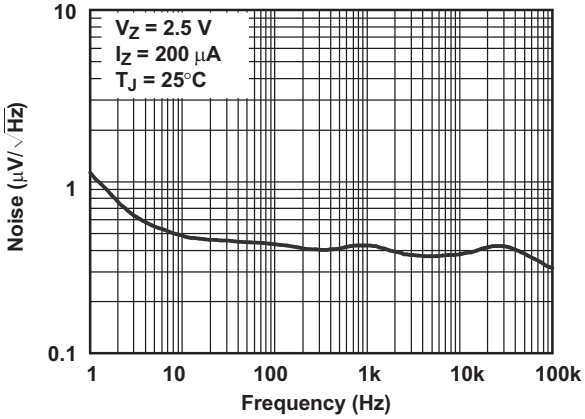


**Figure 5. Noise Voltage vs Frequency**


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# 7 Detailed Description

## 7.1 Overview

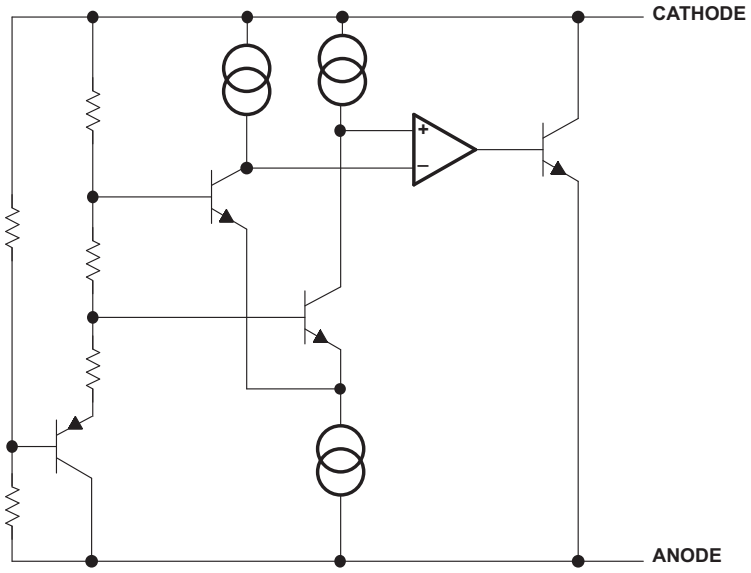
The LM4040 is a precision micro-power curvature-corrected bandgap shunt voltage reference. The LM4040 has been designed for stable operation without the need of an external capacitor connected between the "+" pin and the "−" pin. If, however, a bypass capacitor is used, the LM4040 remains stable.

LM4040 offers several fixed reverse breakdown voltages: 2.048 V, 2.500 V, 3.000 V, 4.096 V, 5.000 V, 6.000, 8.192 V, and 10.000 V. The minimum operating current increases from 60 μA for the LM4040-N-2.048 and LM4040-N-2.5 to 100 μA for the 10.0-V LM4040. All versions have a maximum operating current of 15 mA.

Each reverse voltage options can be purchased with initial tolerances (at 25°C) of 0.1%, 0.2%, 0.5% and 1.0%. These reference options are denoted by A (0.1%), B (0.2%), C (0.5%) and D for (1.0%).

The LM4040xxxI devices are characterized for operation from –40°C to 85°C, and the LM4040xxxQ devices are characterized for operation from –40°C to 125°C.

## 7.2 Functional Block Diagram




## 7.3 Feature Description

A temperature compensated band gap voltage reference controls high gain amplifier and shunt pass element to maintain a nearly constant voltage between cathode and anode. Regulation occurs after a minimum current is provided to power the voltage divider and amplifier. Internal frequency compensation provides a stable loop for all capacitor loads. Floating shunt design is useful for both positive and negative regulation applications.

## 7.4 Device Functional Modes

### 7.4.1 Shunt Reference

LM4040 will operate in one mode, which is as a fixed voltage reference that cannot be adjusted. LM4040 does offer various Reverse Voltage options that have unique electrical characteristics detailed in the *Specifications* section.

In order for a proper Reverse Voltage to be developed, current must be sourced into the cathode of LM4040. The minimum current needed for proper regulation is denoted in the *Specifications* section as $I_{Z,min}$.

# 8 Applications and Implementation

**NOTE**

Information in the following applications sections is not part of the TI component specification, and TI does not warrant its accuracy or completeness. TI's customers are responsible for determining suitability of components for their purposes. Customers should validate and test their design implementation to confirm system functionality.

## 8.1 Application Information

LM4040 is a well known industry standard device used in several applications and end equipment where a reference is required. Below describes this device being used in a data acquisition system. Analog to Digital conversion systems are the most common applications to use LM4040 due to its low reference tolerance which allows high precision in these systems.

## 8.2 Typical Applications

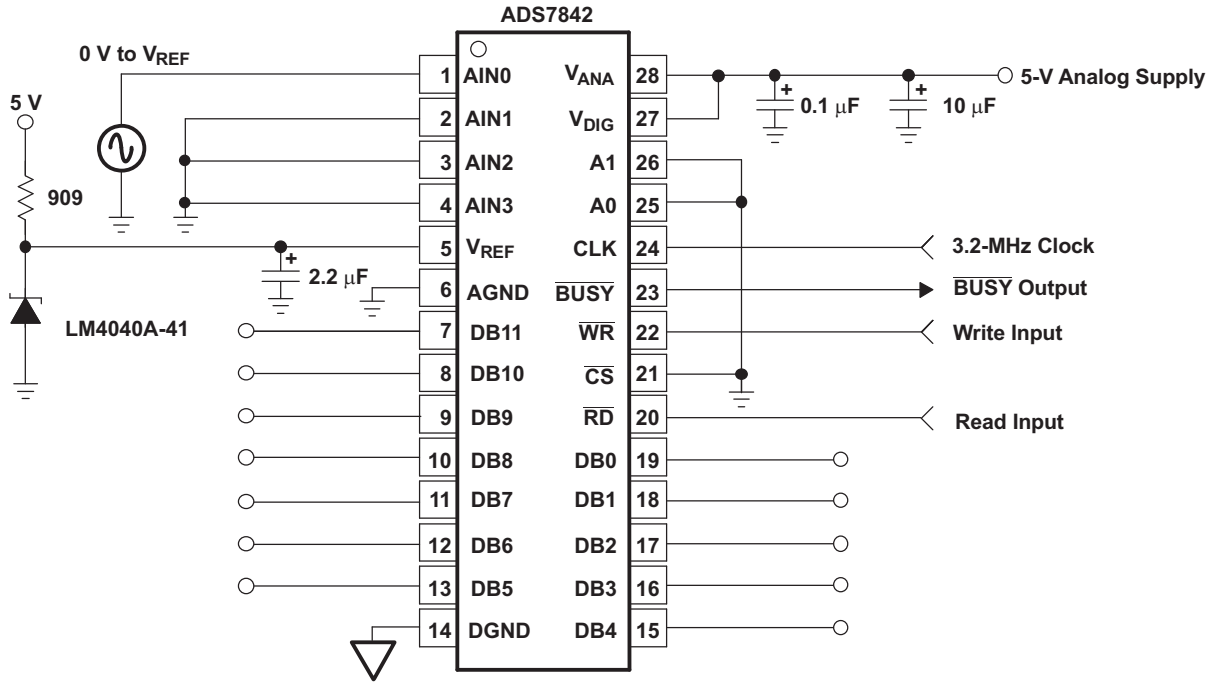



**Figure 6. Data-Acquisition Circuit With LM4040x-41**

### 8.2.1 Design Requirements

For this design example, use the parameters listed in Table 1 as the input parameters.

**Table 1. Design Parameters**

| DESIGN PARAMETER | EXAMPLE VALUE |
|---|---|
| ADC FSR (Full Scale Range) | 4.096 |
| ADC Resolution | 12 Bits |
| Supply Voltage | 5 V |
| Cathode Current (Ik) | 100 µA |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### 8.2.2 Detailed Design Procedure

When using LM4040 as a comparator with reference, determine the following:

- Input voltage range
- Reference voltage accuracy
- Output logic input high and low level thresholds
- Current source resistance

#### *8.2.2.1 LM4040 Voltage and Accuracy Choice*

When using LM4040 as a reference for an ADC, the ADC's FSR (Full Scale Range), Resolution and LSB must be determined. LSB can be determined by:

$$\textbf{LSB=FSR/(2}^{\textbf{N}}\textbf{-1)}$$

With N being the resolution or Number of Bits. FSR and Resolution can be determined by the ADC's datasheet.

Vref can be determined by:

$$\textbf{Vref=FSR+LSB}$$

Though modern data converters use calibration techniques to compensate for any error introduced by a Vref's inaccuracy, it is best to use the highest accuracy available. This is due to errors in the calibration method that may allow some non-linearities introduced by the Vref's initial accuracy.

A good example is the LM4040x-41 that is designed to be a cost-effective voltage reference as required in 12-bit data-acquisition systems. For 12-bit systems operating from 5-V supplies (see Figure 6), the LM4040A-41 (4.096 V, 0.01%) only introduces 4 LSBs (4mV) of possible error in a system that consists of 4096 LSBs.

#### *8.2.2.2 Cathode and Load Currents*

In a typical shunt-regulator configuration (see Figure 7), an external resistor, $R_S$, is connected between the supply and the cathode of the LM4040. $R_S$ must be set properly, as it sets the total current available to supply the load ($I_L$) and bias the LM4040 ($I_Z$). In all cases, $I_Z$ must stay within a specified range for proper operation of the reference. Taking into consideration one extreme in the variation of the load and supply voltage (maximum $I_L$ and minimum $V_S$), $R_S$ must be small enough to supply the minimum $I_Z$ required for operation of the regulator, as given by data-sheet parameters. At the other extreme, maximum $V_S$ and minimum $I_L$, $R_S$ must be large enough to limit $I_Z$ to less than its maximum-rated value of 15 mA.

$R_S$ is calculated according to Equation 1:

$$R_S = \frac{(V_S - V_Z)}{(I_L + I_Z)} \tag{1}$$

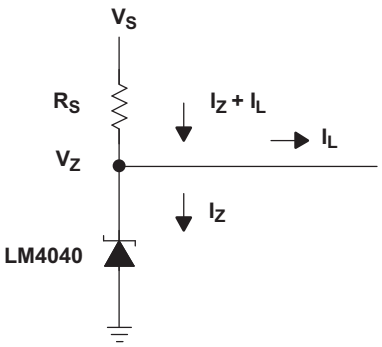


**Figure 7. Shunt Regulator**

#### *8.2.2.3 Output Capacitor*

The LM4040 does not require an output capacitor across cathode and anode for stability. However, if an output bypass capacitor is desired, the LM4040 is designed to be stable with all capacitive loads.

#### 8.2.2.4 SOT-23 Connections

There is a parasitic Schottky diode connected between pins 2 and 3 of the SOT-23 packaged device. Thus, pin 3 of the SOT-23 package must be left floating or connected to pin 2.

#### 8.2.2.5 Start-Up Characteristics

In any data conversion system, start-up characteristics are important, as to determine when it is safe begin conversion based upon a steady and settled reference value. As shown in Figure 9 it is best to allow for >20µs from supply start-up to begin conversion.

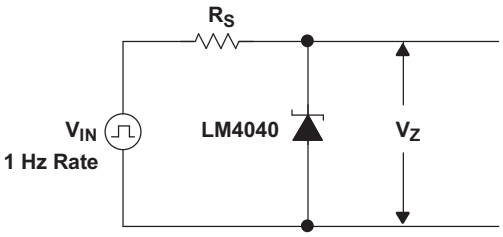


**Figure 8. Test Circuit**

### 8.2.3 Application Curve

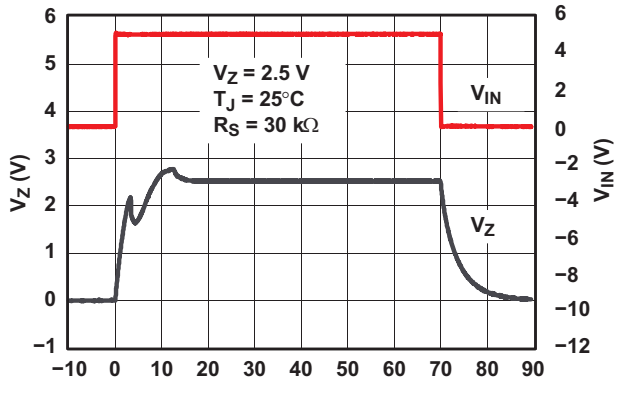


**Figure 9. Startup Response**


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# 9 Power Supply Recommendations

In order to not exceed the maximum cathode current, be sure that the supply voltage is current limited.

For applications shunting high currents (15 mA max), pay attention to the cathode and anode trace lengths, adjusting the width of the traces to have the proper current density.

# 10 Layout

## 10.1 Layout Guidelines

Figure 10 shows an example of a PCB layout of LM4040XXXDBZ. Some key $V_{ref}$ noise considerations are:

- Connect a low-ESR, 0.1-μF ($C_L$) ceramic bypass capacitor on the cathode pin node.
- Decouple other active devices in the system per the device specifications.
- Using a solid ground plane helps distribute heat and reduces electromagnetic interference (EMI) noise pickup.
- Place the external components as close to the device as possible. This configuration prevents parasitic errors (such as the Seebeck effect) from occurring.
- Do not run sensitive analog traces in parallel with digital traces. Avoid crossing digital and analog traces if possible and only make perpendicular crossings when absolutely necessary.

## 10.2 Layout Example

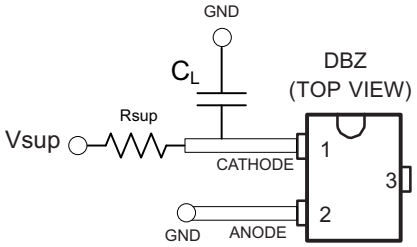


**Figure 10. DBZ Layout example**

# 11 Device and Documentation Support

## 11.1 Related Links

The table below lists quick access links. Categories include technical documents, support and community resources, tools and software, and quick access to order now.

**Table 2. Related Links**

| PARTS | PRODUCT FOLDER | ORDER NOW | TECHNICAL DOCUMENTS | TOOLS & SOFTWARE | SUPPORT & COMMUNITY |
|---|---|---|---|---|---|
| LM4040A | Click here | Click here | Click here | Click here | Click here |
| LM4040B | Click here | Click here | Click here | Click here | Click here |
| LM4040C | Click here | Click here | Click here | Click here | Click here |
| LM4040D | Click here | Click here | Click here | Click here | Click here |

## 11.2 Trademarks

All trademarks are the property of their respective owners.

## 11.3 Electrostatic Discharge Caution

These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

## 11.4 Glossary

SLYZ022 — *TI Glossary*.

This glossary lists and explains terms, acronyms, and definitions.

# 12 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.


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## PACKAGING INFORMATION

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LM4040A10IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NQ3, 4NQU) | Samples |
| LM4040A10IDBZRG4 | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NQ3, 4NQU) | Samples |
| LM4040A10IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NQ3, 4NQU) | Samples |
| LM4040A10IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PHU | Samples |
| LM4040A10ILPR | PREVIEW | TO-92 | LP | 3 | 2000 | TBD | Call TI | Call TI | -40 to 85 | | |
| LM4040A20IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4MC3, 4MCU) | Samples |
| LM4040A20IDBZRG4 | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4MC3, 4MCU) | Samples |
| LM4040A20IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4MC3, 4MCU) | Samples |
| LM4040A20IDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4MC3, 4MCU) | Samples |
| LM4040A20IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | MSU | Samples |
| LM4040A25IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NG3, 4NGU) | Samples |
| LM4040A25IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NG3, 4NGU) | Samples |
| LM4040A25IDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NG3, 4NGU) | Samples |
| LM4040A25IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | P2U | Samples |
| LM4040A30IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M63, 4M6U) | Samples |
| LM4040A30IDBZRG4 | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M63, 4M6U) | Samples |
| LM4040A30IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M63, 4M6U) | Samples |

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LM4040A30IDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | TBD | Call TI | Call TI | -40 to 85 | (4M63, 4M6U) | Samples |
| LM4040A30IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | P9U | Samples |
| LM4040A30IDCKRE4 | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | P9U | Samples |
| LM4040A41IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M23, 4M2U) | Samples |
| LM4040A41IDBZRG4 | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M23, 4M2U) | Samples |
| LM4040A41IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M23, 4M2U) | Samples |
| LM4040A41IDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M23, 4M2U) | Samples |
| LM4040A41IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | P4U | Samples |
| LM4040A50IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NA3, 4NAU) | Samples |
| LM4040A50IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NA3, 4NAU) | Samples |
| LM4040A50IDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NA3, 4NAU) | Samples |
| LM4040A50IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | N5U | Samples |
| LM4040A82IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NL3, 4NLU) | Samples |
| LM4040A82IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NL3, 4NLU) | Samples |
| LM4040A82IDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NL3, 4NLU) | Samples |
| LM4040A82IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PDU | Samples |
| LM4040B10IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NR3, 4NRU) | Samples |
| LM4040B10IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NR3, 4NRU) | Samples |

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LM4040B10IDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NR3, 4NRU) | Samples |
| LM4040B10IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PJU | Samples |
| LM4040B10ILPR | PREVIEW | TO-92 | LP | 3 | 2000 | TBD | Call TI | Call TI | -40 to 85 | | |
| LM4040B20IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4MD3, 4MDU) | Samples |
| LM4040B20IDBZRG4 | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4MD3, 4MDU) | Samples |
| LM4040B20IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4MD3, 4MDU) | Samples |
| LM4040B20IDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4MD3, 4MDU) | Samples |
| LM4040B20IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (MTS, MTU) | Samples |
| LM4040B25IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NH3, 4NHU) | Samples |
| LM4040B25IDBZRG4 | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NH3, 4NHU) | Samples |
| LM4040B25IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NH3, 4NHU) | Samples |
| LM4040B25IDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NH3, 4NHU) | Samples |
| LM4040B25IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | P3U | Samples |
| LM4040B30IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M73, 4M7U) | Samples |
| LM4040B30IDBZRG4 | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M73, 4M7U) | Samples |
| LM4040B30IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M73, 4M7U) | Samples |
| LM4040B30IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PAU | Samples |
| LM4040B41IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M33, 4M3U) | Samples |

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LM4040B41IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M33, 4M3U) | Samples |
| LM4040B41IDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M33, 4M3U) | Samples |
| LM4040B41IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | P5U | Samples |
| LM4040B50IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NB3, 4NBU) | Samples |
| LM4040B50IDBZRG4 | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NB3, 4NBU) | Samples |
| LM4040B50IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NB3, 4NBU) | Samples |
| LM4040B50IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | MXU | Samples |
| LM4040B82IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NM3, 4NMU) | Samples |
| LM4040C10IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NS3, 4NSU) | Samples |
| LM4040C10IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NS3, 4NSU) | Samples |
| LM4040C10IDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NS3, 4NSU) | Samples |
| LM4040C10IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PKU | Samples |
| LM4040C10ILP | ACTIVE | TO-92 | LP | 3 | 1000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFC10I | Samples |
| LM4040C10ILPR | ACTIVE | TO-92 | LP | 3 | 2000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFC10I | Samples |
| LM4040C20IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4MQ3, 4MQU) | Samples |
| LM4040C20IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4MQ3, 4MQU) | Samples |
| LM4040C20IDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4MQ3, 4MQU) | Samples |
| LM4040C20IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | MVU | Samples |

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LM4040C20ILP | ACTIVE | TO-92 | LP | 3 | 1000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFC20I | Samples |
| LM4040C20ILPE3 | ACTIVE | TO-92 | LP | 3 | 1000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFC20I | Samples |
| LM4040C20ILPR | ACTIVE | TO-92 | LP | 3 | 2000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFC20I | Samples |
| LM4040C20QDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (4MW3, 4MWU) | Samples |
| LM4040C20QDBZRG4 | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (4MW3, 4MWU) | Samples |
| LM4040C20QDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (4MW3, 4MWU) | Samples |
| LM4040C20QDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (4MW3, 4MWU) | Samples |
| LM4040C25IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4MU3, 4MUU) | Samples |
| LM4040C25IDBZRG4 | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4MU3, 4MUU) | Samples |
| LM4040C25IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4MU3, 4MUU) | Samples |
| LM4040C25IDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4MU3, 4MUU) | Samples |
| LM4040C25IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | MUU | Samples |
| LM4040C25IDCKT | ACTIVE | SC70 | DCK | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | MUU | Samples |
| LM4040C25IDCKTE4 | ACTIVE | SC70 | DCK | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | MUU | Samples |
| LM4040C25ILP | ACTIVE | TO-92 | LP | 3 | 1000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFC25I | Samples |
| LM4040C25ILPR | ACTIVE | TO-92 | LP | 3 | 2000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFC25I | Samples |
| LM4040C25QDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (4MA3, 4MAU) | Samples |
| LM4040C25QDBZRG4 | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (4MA3, 4MAU) | Samples |

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LM4040C25QDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (4MA3, 4MAU) | Samples |
| LM4040C25QDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (4MA3, 4MAU) | Samples |
| LM4040C30IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M83, 4M8U) | Samples |
| LM4040C30IDBZRG4 | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M83, 4M8U) | Samples |
| LM4040C30IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M83, 4M8U) | Samples |
| LM4040C30IDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M83, 4M8U) | Samples |
| LM4040C30IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PBU | Samples |
| LM4040C30ILP | ACTIVE | TO-92 | LP | 3 | 1000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFC30I | Samples |
| LM4040C30ILPE3 | ACTIVE | TO-92 | LP | 3 | 1000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFC30I | Samples |
| LM4040C30ILPR | ACTIVE | TO-92 | LP | 3 | 2000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFC30I | Samples |
| LM4040C30QDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (4NJ3, 4NJU) | Samples |
| LM4040C30QDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (4NJ3, 4NJU) | Samples |
| LM4040C41IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M43, 4M4U) | Samples |
| LM4040C41IDBZRG4 | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M43, 4M4U) | Samples |
| LM4040C41IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M43, 4M4U) | Samples |
| LM4040C41IDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M43, 4M4U) | Samples |
| LM4040C41IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | P6U | Samples |
| LM4040C41ILP | ACTIVE | TO-92 | LP | 3 | 1000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFC41I | Samples |

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LM4040C41ILPR | ACTIVE | TO-92 | LP | 3 | 2000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFC41I | Samples |
| LM4040C50IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NC3, 4NCU) | Samples |
| LM4040C50IDBZRG4 | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NC3, 4NCU) | Samples |
| LM4040C50IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NC3, 4NCU) | Samples |
| LM4040C50IDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NC3, 4NCU) | Samples |
| LM4040C50IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | MZU | Samples |
| LM4040C50ILP | ACTIVE | TO-92 | LP | 3 | 1000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFC50I | Samples |
| LM4040C50ILPE3 | ACTIVE | TO-92 | LP | 3 | 1000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFC50I | Samples |
| LM4040C50ILPR | ACTIVE | TO-92 | LP | 3 | 2000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFC50I | Samples |
| LM4040C50QDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (4NE3, 4NEU) | Samples |
| LM4040C50QDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (4NE3, 4NEU) | Samples |
| LM4040C50QDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (4NE3, 4NEU) | Samples |
| LM4040C82IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NN3, 4NNU) | Samples |
| LM4040C82IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PFU | Samples |
| LM4040C82ILP | ACTIVE | TO-92 | LP | 3 | 1000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFC82I | Samples |
| LM4040C82ILPR | ACTIVE | TO-92 | LP | 3 | 2000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFC82I | Samples |
| LM4040D10IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NT3, 4NTU) | Samples |
| LM4040D10IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NT3, 4NTU) | Samples |

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LM4040D10IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PLU | Samples |
| LM4040D10ILP | ACTIVE | TO-92 | LP | 3 | 1000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFD10I | Samples |
| LM4040D20IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4MV3, 4MVU) | Samples |
| LM4040D20IDBZRG4 | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4MV3, 4MVU) | Samples |
| LM4040D20IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4MV3, 4MVU) | Samples |
| LM4040D20IDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4MV3, 4MVU) | Samples |
| LM4040D20IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | MWU | Samples |
| LM4040D20ILPR | ACTIVE | TO-92 | LP | 3 | 2000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFD20I | Samples |
| LM4040D20ILPRE3 | ACTIVE | TO-92 | LP | 3 | 2000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFD20I | Samples |
| LM4040D20QDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (4MY3, 4MYU) | Samples |
| LM4040D20QDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (4MY3, 4MYU) | Samples |
| LM4040D20QDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (4MY3, 4MYU) | Samples |
| LM4040D25IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4ME3, 4MEU) | Samples |
| LM4040D25IDBZRG4 | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4ME3, 4MEU) | Samples |
| LM4040D25IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4ME3, 4MEU) | Samples |
| LM4040D25IDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4ME3, 4MEU) | Samples |
| LM4040D25IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | MEU | Samples |
| LM4040D25IDCKRG4 | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | MEU | Samples |

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LM4040D25IDCKT | ACTIVE | SC70 | DCK | 5 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | MEU | Samples |
| LM4040D25ILP | ACTIVE | TO-92 | LP | 3 | 1000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFD25I | Samples |
| LM4040D25ILPR | ACTIVE | TO-92 | LP | 3 | 2000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFD25I | Samples |
| LM4040D25QDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (4MB3, 4MBU) | Samples |
| LM4040D25QDBZRG4 | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (4MB3, 4MBU) | Samples |
| LM4040D25QDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (4MB3, 4MBU) | Samples |
| LM4040D25QDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (4MB3, 4MBU) | Samples |
| LM4040D30IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M93, 4M9U) | Samples |
| LM4040D30IDBZRG4 | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M93, 4M9U) | Samples |
| LM4040D30IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M93, 4M9U) | Samples |
| LM4040D30IDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M93, 4M9U) | Samples |
| LM4040D30IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PCU | Samples |
| LM4040D30ILP | ACTIVE | TO-92 | LP | 3 | 1000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFD30I | Samples |
| LM4040D30ILPR | ACTIVE | TO-92 | LP | 3 | 2000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFD30I | Samples |
| LM4040D30ILPRE3 | ACTIVE | TO-92 | LP | 3 | 2000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFD30I | Samples |
| LM4040D30QDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (4NK3, 4NKU) | Samples |
| LM4040D30QDBZRG4 | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (4NK3, 4NKU) | Samples |
| LM4040D41IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M53, 4M5U) | Samples |

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LM4040D41IDBZRG4 | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M53, 4M5U) | Samples |
| LM4040D41IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M53, 4M5U) | Samples |
| LM4040D41IDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4M53, 4M5U) | Samples |
| LM4040D41IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | P7U | Samples |
| LM4040D41ILP | ACTIVE | TO-92 | LP | 3 | 1000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFD41I | Samples |
| LM4040D41ILPE3 | ACTIVE | TO-92 | LP | 3 | 1000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFD41I | Samples |
| LM4040D41ILPR | ACTIVE | TO-92 | LP | 3 | 2000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFD41I | Samples |
| LM4040D50IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4ND3, 4NDU) | Samples |
| LM4040D50IDBZRG4 | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4ND3, 4NDU) | Samples |
| LM4040D50IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4ND3, 4NDU) | Samples |
| LM4040D50IDBZTG4 | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4ND3, 4NDU) | Samples |
| LM4040D50IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | M4U | Samples |
| LM4040D50IDCKRG4 | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | M4U | Samples |
| LM4040D50ILP | ACTIVE | TO-92 | LP | 3 | 1000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFD50I | Samples |
| LM4040D50ILPR | ACTIVE | TO-92 | LP | 3 | 2000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFD50I | Samples |
| LM4040D50ILPRE3 | ACTIVE | TO-92 | LP | 3 | 2000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFD50I | Samples |
| LM4040D50QDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (4NF3, 4NFU) | Samples |
| LM4040D50QDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (4NF3, 4NFU) | Samples |

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LM4040D82IDBZR | ACTIVE | SOT-23 | DBZ | 3 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NP3, 4NPU) | Samples |
| LM4040D82IDBZT | ACTIVE | SOT-23 | DBZ | 3 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (4NP3, 4NPU) | Samples |
| LM4040D82IDCKR | ACTIVE | SC70 | DCK | 5 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | PGU | Samples |
| LM4040D82ILP | ACTIVE | TO-92 | LP | 3 | 1000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFD82I | Samples |
| LM4040D82ILPR | ACTIVE | TO-92 | LP | 3 | 2000 | Pb-Free (RoHS) | CU SN | N / A for Pkg Type | -40 to 85 | NFD82I | Samples |

(1) The marketing status values are defined as follows:
**ACTIVE:** Product device recommended for new designs.
**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.
**OBSOLETE:** TI has discontinued the production of the device.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".
**RoHS Exempt:** TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.
**Green:** TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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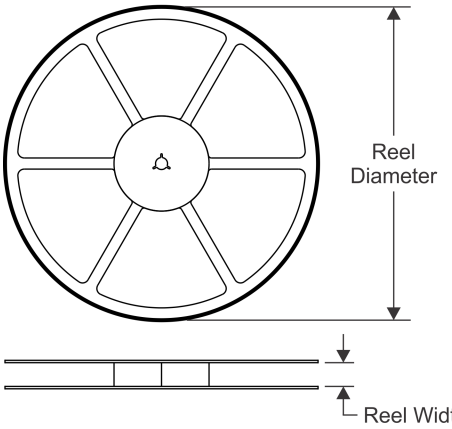
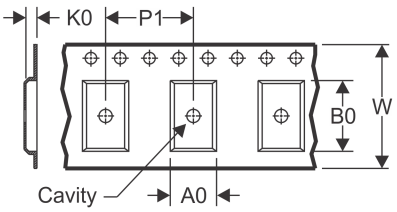
## TAPE AND REEL INFORMATION

**REEL DIMENSIONS**

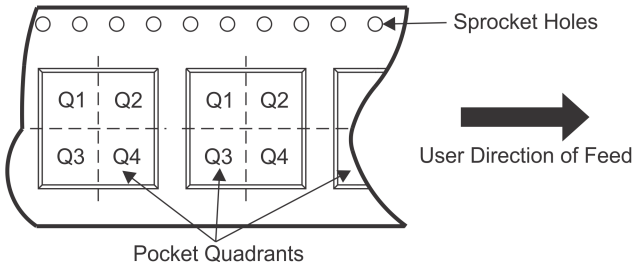



**TAPE DIMENSIONS**




| | |
|---|---|
| A0 | Dimension designed to accommodate the component width |
| B0 | Dimension designed to accommodate the component length |
| K0 | Dimension designed to accommodate the component thickness |
| W | Overall width of the carrier tape |
| P1 | Pitch between successive cavity centers |

**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**




*All dimensions are nominal

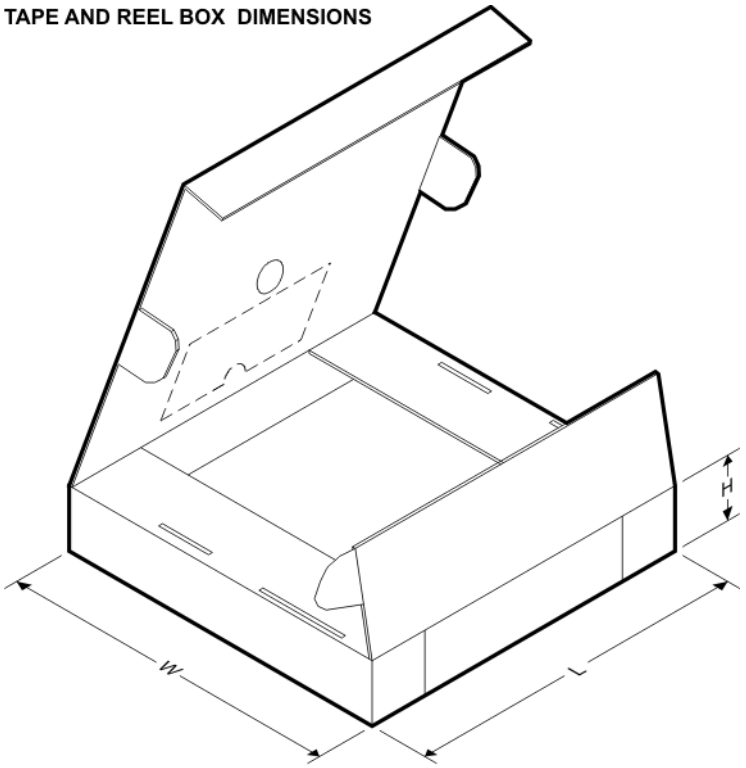
| Device | Package Type | Package Drawing | Pins | SPQ | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LM4040A10IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040A10IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040A20IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040A20IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040A20IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040A25IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040A25IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040A25IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040A30IDBZR | SOT-23 | DBZ | 3 | 3000 | 179.0 | 8.4 | 3.15 | 2.95 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040A30IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040A30IDBZT | SOT-23 | DBZ | 3 | 250 | 179.0 | 8.4 | 3.15 | 2.95 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040A30IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040A30IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040A41IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040A41IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040A41IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040A50IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040A50IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |

| Device | Package Type | Package Drawing | Pins | SPQ | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LM4040A50IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040A82IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040A82IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040A82IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040B10IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040B10IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040B10IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040B20IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040B20IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040B20IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040B20IDCKR | SC70 | DCK | 5 | 3000 | 180.0 | 8.4 | 2.47 | 2.3 | 1.25 | 4.0 | 8.0 | Q3 |
| LM4040B25IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040B25IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040B25IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040B30IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040B30IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040B30IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040B41IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040B41IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040B41IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040B50IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040B50IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040B50IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040B82IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040C10IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040C10IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040C10IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040C20IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040C20IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040C20IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040C20QDBZR | SOT-23 | DBZ | 3 | 3000 | 179.0 | 8.4 | 3.15 | 2.95 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040C20QDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040C20QDBZT | SOT-23 | DBZ | 3 | 250 | 179.0 | 8.4 | 3.15 | 2.95 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040C20QDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040C25IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040C25IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040C25IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040C25IDCKT | SC70 | DCK | 5 | 250 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040C25QDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040C25QDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040C30IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040C30IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040C30IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |

| Device | Package Type | Package Drawing | Pins | SPQ | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LM4040C30QDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040C30QDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040C41IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040C41IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040C41IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040C50IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040C50IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040C50IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040C50QDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040C50QDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040C82IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040C82IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040D10IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040D10IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040D10IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040D20IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040D20IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040D20IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040D20QDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040D20QDBZR | SOT-23 | DBZ | 3 | 3000 | 179.0 | 8.4 | 3.15 | 2.95 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040D20QDBZT | SOT-23 | DBZ | 3 | 250 | 179.0 | 8.4 | 3.15 | 2.95 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040D20QDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040D25IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040D25IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040D25IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040D25IDCKT | SC70 | DCK | 5 | 250 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040D25QDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040D25QDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040D30IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040D30IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040D30IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040D30QDBZR | SOT-23 | DBZ | 3 | 3000 | 179.0 | 8.4 | 3.15 | 2.95 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040D30QDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040D41IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040D41IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040D41IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040D50IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040D50IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040D50IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| LM4040D50QDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040D50QDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040D82IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| LM4040D82IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |

| Device | Package Type | Package Drawing | Pins | SPQ | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LM4040D82IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |

**TAPE AND REEL BOX DIMENSIONS**




*All dimensions are nominal

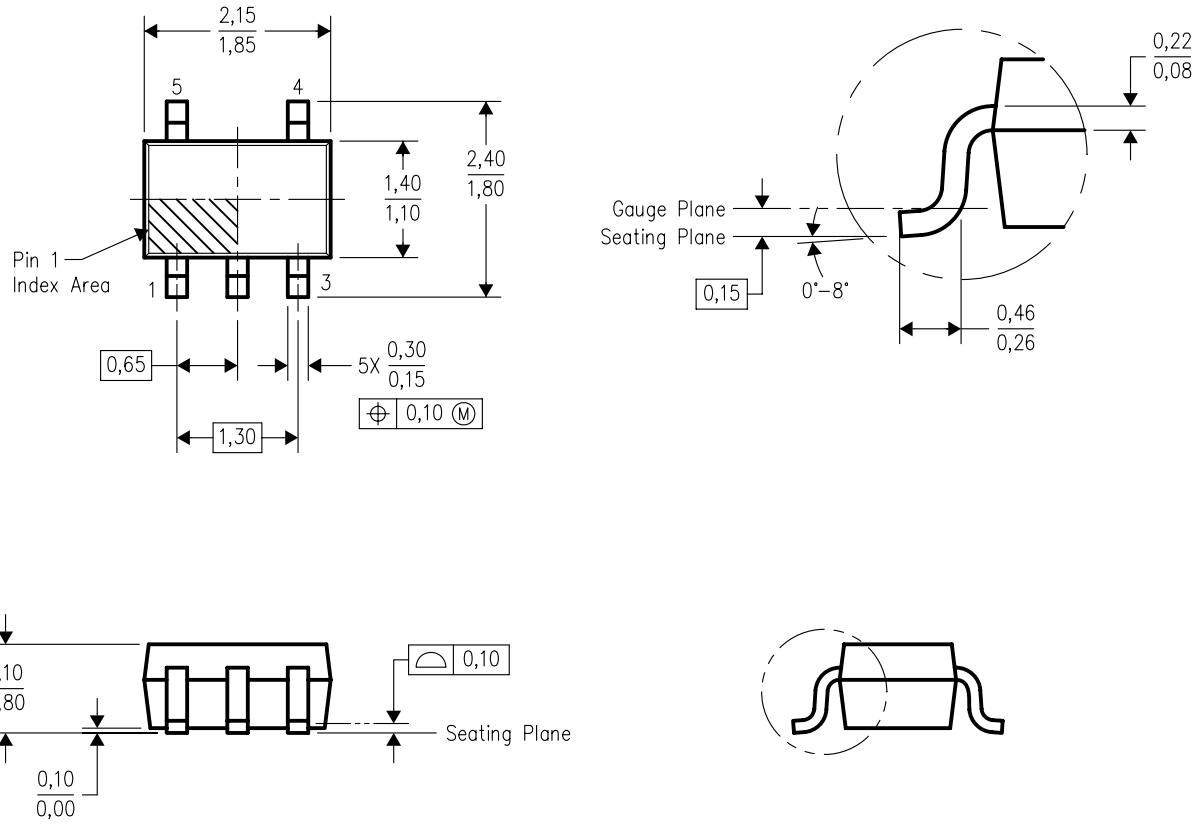
| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|---|---|---|---|---|---|---|---|
| LM4040A10IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040A10IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040A20IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040A20IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040A20IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040A25IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040A25IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040A25IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040A30IDBZR | SOT-23 | DBZ | 3 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040A30IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040A30IDBZT | SOT-23 | DBZ | 3 | 250 | 203.0 | 203.0 | 35.0 |
| LM4040A30IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040A30IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040A41IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040A41IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040A41IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|---|---|---|---|---|---|---|---|
| LM4040A50IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040A50IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040A50IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040A82IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040A82IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040A82IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040B10IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040B10IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040B10IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040B20IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040B20IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040B20IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040B20IDCKR | SC70 | DCK | 5 | 3000 | 202.0 | 201.0 | 28.0 |
| LM4040B25IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040B25IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040B25IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040B30IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040B30IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040B30IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040B41IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040B41IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040B41IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040B50IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040B50IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040B50IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040B82IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040C10IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040C10IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040C10IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040C20IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040C20IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040C20IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040C20QDBZR | SOT-23 | DBZ | 3 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040C20QDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040C20QDBZT | SOT-23 | DBZ | 3 | 250 | 203.0 | 203.0 | 35.0 |
| LM4040C20QDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040C25IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040C25IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040C25IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040C25IDCKT | SC70 | DCK | 5 | 250 | 203.0 | 203.0 | 35.0 |
| LM4040C25QDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040C25QDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040C30IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040C30IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|---|---|---|---|---|---|---|---|
| LM4040C30IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040C30QDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040C30QDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040C41IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040C41IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040C41IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040C50IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040C50IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040C50IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040C50QDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040C50QDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040C82IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040C82IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040D10IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040D10IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040D10IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040D20IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040D20IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040D20IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040D20QDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040D20QDBZR | SOT-23 | DBZ | 3 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040D20QDBZT | SOT-23 | DBZ | 3 | 250 | 203.0 | 203.0 | 35.0 |
| LM4040D20QDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040D25IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040D25IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040D25IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040D25IDCKT | SC70 | DCK | 5 | 250 | 203.0 | 203.0 | 35.0 |
| LM4040D25QDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040D25QDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040D30IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040D30IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040D30IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040D30QDBZR | SOT-23 | DBZ | 3 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040D30QDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040D41IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040D41IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040D41IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040D50IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040D50IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040D50IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| LM4040D50QDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040D50QDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| LM4040D82IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| LM4040D82IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|---|---|---|---|---|---|---|---|
| LM4040D82IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |

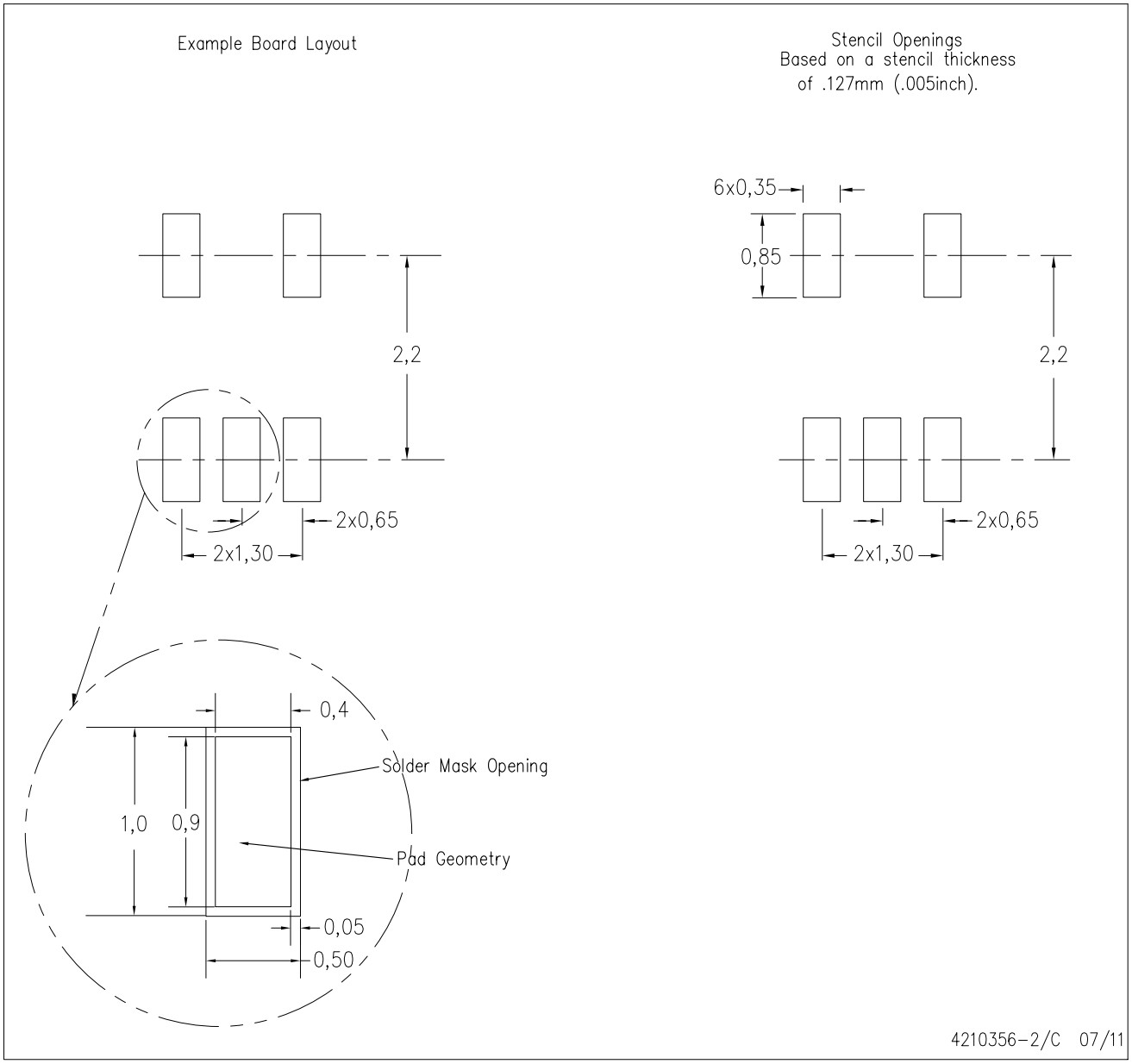
## DCK (R–PDSO–G5) PLASTIC SMALL–OUTLINE PACKAGE




4093553–3/G 01/2007

NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.
D. Falls within JEDEC MO–203 variation AA.

DCK (R–PDSO–G5) PLASTIC SMALL OUTLINE

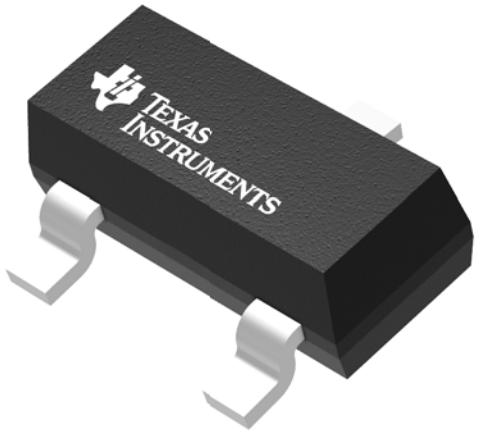



NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
D. Publication IPC–7351 is recommended for alternate designs.
E. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Example stencil design based on a 50% volumetric metal load solder paste. Refer to IPC–7525 for other stencil recommendations.

# GENERIC PACKAGE VIEW

## DBZ 3 SOT-23 - 1.12 mm max height

SMALL OUTLINE TRANSISTOR



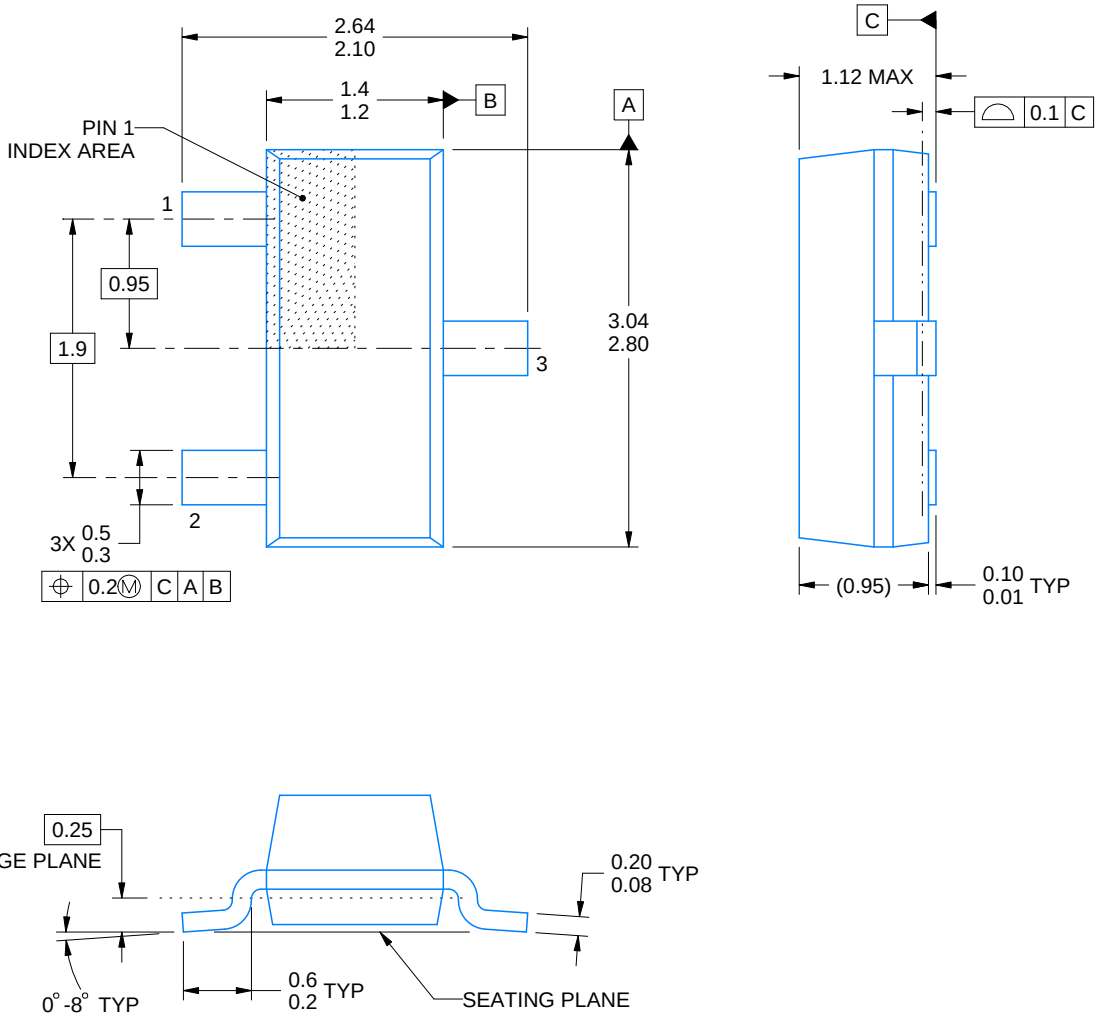

Images above are just a representation of the package family, actual package may vary.
Refer to the product data sheet for package details.

# PACKAGE OUTLINE

## DBZ0003A

## SOT-23 - 1.12 mm max height

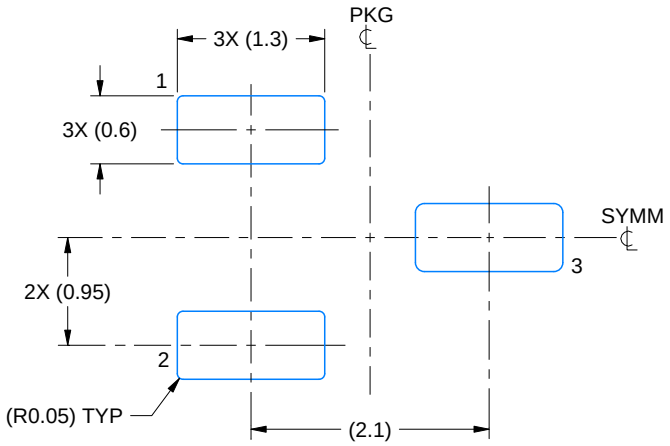
SMALL OUTLINE TRANSISTOR



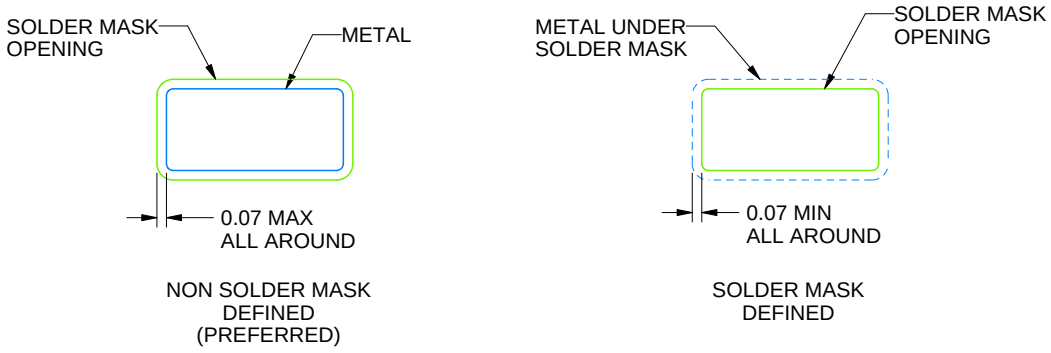

4214838/C 04/2017

NOTES:

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Reference JEDEC registration TO-236, except minimum foot length.




LAND PATTERN EXAMPLE
SCALE:15X

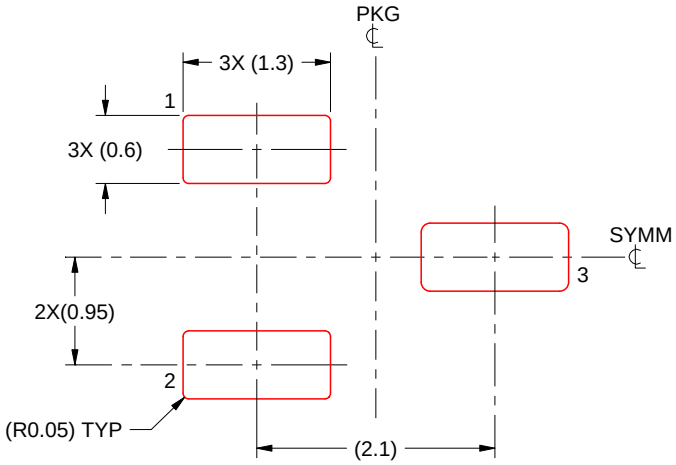



SOLDER MASK DETAILS

4214838/C 04/2017

NOTES: (continued)

4. Publication IPC-7351 may have alternate designs.
5. Solder mask tolerances between and around signal pads can vary based on board fabrication site.




SOLDER PASTE EXAMPLE
BASED ON 0.125 THICK STENCIL
SCALE:15X

4214838/C 04/2017

NOTES: (continued)

6. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
7. Board assembly site may have different recommendations for stencil design.

# LP 3 TO-92 - 5.34 mm max height

TRANSISTOR OUTLINE

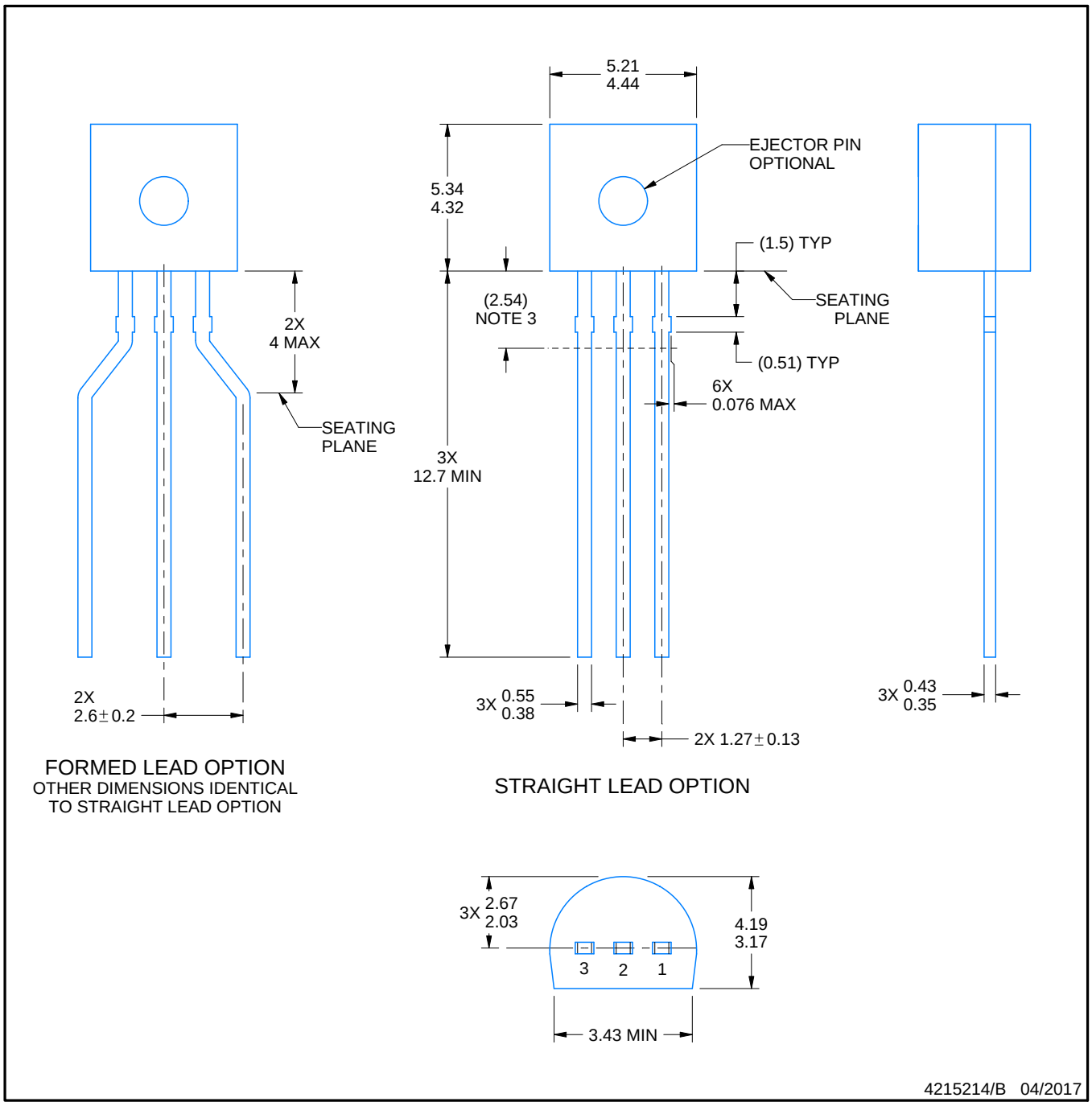
Images above are just a representation of the package family, actual package may vary.
Refer to the product data sheet for package details.

# LP0003A

# PACKAGE OUTLINE

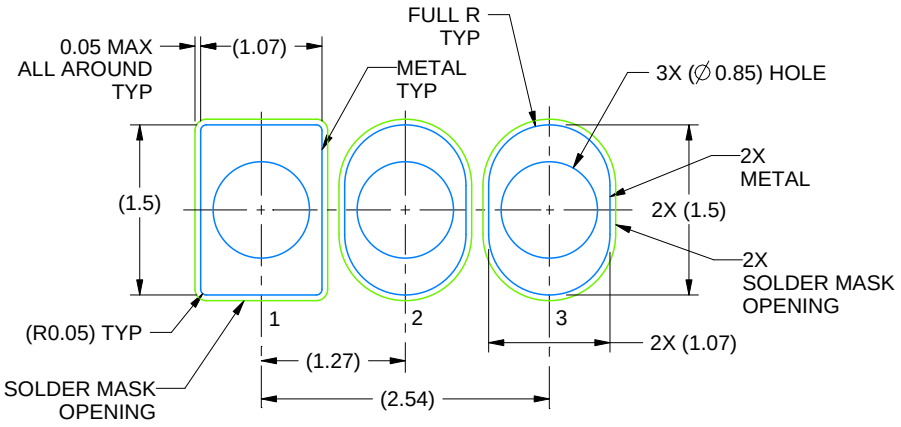
## TO-92 - 5.34 mm max height

TO-92

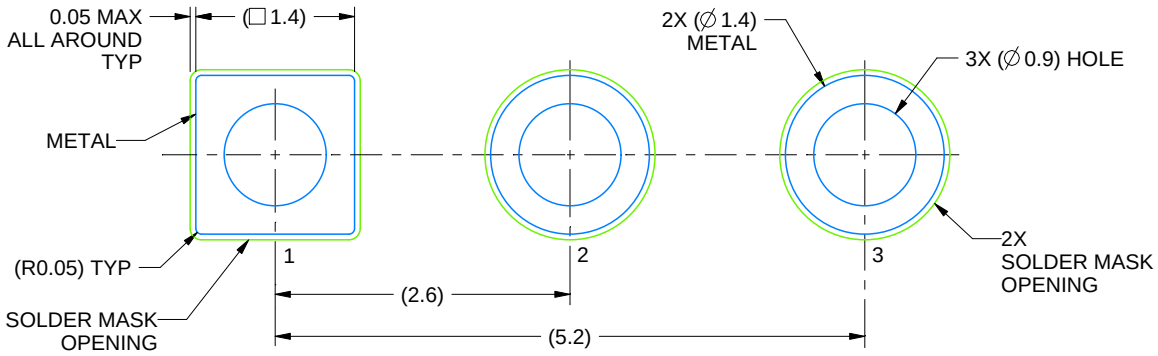



NOTES:

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Lead dimensions are not controlled within this area.
4. Reference JEDEC TO-226, variation AA.
5. Shipping method:
   a. Straight lead option available in bulk pack only.
   b. Formed lead option available in tape and reel or ammo pack.
   c. Specific products can be offered in limited combinations of shipping medium and lead options.
   d. Consult product folder for more information on available options.




LAND PATTERN EXAMPLE
STRAIGHT LEAD OPTION
NON-SOLDER MASK DEFINED
SCALE:15X




LAND PATTERN EXAMPLE
FORMED LEAD OPTION
NON-SOLDER MASK DEFINED
SCALE:15X

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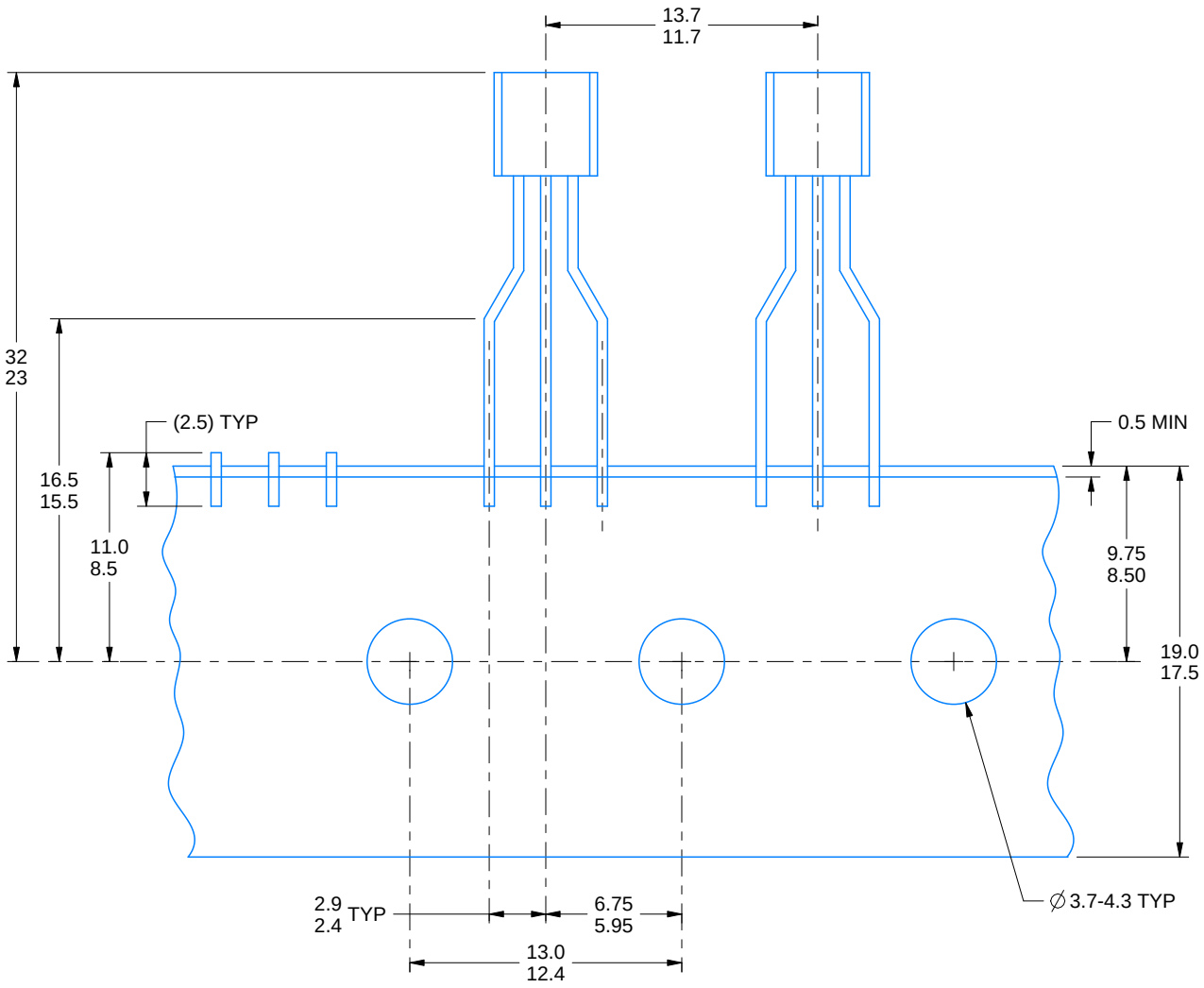
# LP0003A

## TO-92 - 5.34 mm max height

TO-92




FOR FORMED LEAD OPTION PACKAGE

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