# THE DATASHEET OF

# MAX6383XR46D2+T

www.win-source.net 0086-755-83957316

# MAX6381–MAX6390

# SC70/µDFN, Single/Dual Low-Voltage, Low-Power µP Reset Circuits

## General Description

The MAX6381–MAX6390 microprocessor (µP) supervisory circuits monitor power-supply voltages from +1.8V to +5.0V while consuming only 3µA of supply current at +1.8V. Whenever $V_{CC}$ falls below the factory-set reset thresholds, the reset output asserts and remains asserted for a minimum reset timeout period after $V_{CC}$ rises above the reset threshold. Reset thresholds are available from +1.58V to +4.63V, in approximately 100mV increments. Seven minimum reset timeout delays ranging from 1ms to 1200ms are available.

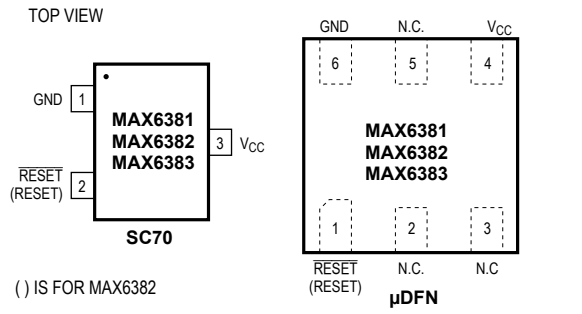
The MAX6381/MAX6384/MAX6387 have a push-pull active-low reset output. The MAX6382/MAX6385/MAX6388 have a push-pull active-high reset output, and the MAX6383/MAX6386/MAX6389/MAX6390 have an open-drain active-low reset output. The MAX6384/MAX6385/MAX6386 also feature a debounced manual reset input (with internal pullup resistor). The MAX6387/MAX6388/MAX6389 have an auxiliary input for monitoring a second voltage. The MAX6390 offers a manual reset input with a longer $V_{CC}$ reset timeout period (1120ms or 1200ms) and a shorter manual reset timeout (140ms or 150ms).

The MAX6381/MAX6382/MAX6383 are available in 3-pin SC70 and 6-pin µDFN packages and the MAX6384–MAX6390 are available in 4-pin SC70 and 6-pin µDFN packages.

## Applications

- Computers
- Controllers
- Intelligent Instruments
- Critical µP and µC Power Monitoring
- Portable/Battery-Powered Equipment
- Dual Voltage Systems

## Pin Configurations




*Pin Configurations continued at end of data sheet.*

## Features

- Factory-Set Reset Threshold Voltages Ranging from +1.58V to +4.63V in Approximately 100mV Increments
- ±2.5% Reset Threshold Accuracy Over Temperature (-40°C to +125°C)
- Seven Reset Timeout Periods Available: 1ms, 20ms, 140ms, 280ms, 560ms, 1120ms, 1200ms (min)
- 3 Reset Output Options
  - Active-Low Push-Pull
  - Active-High Push-Pull
  - Active-Low Open-Drain
- Reset Output State Guaranteed Valid Down to $V_{CC}$ = 1V
- Manual Reset Input (MAX6384/MAX6385/MAX6386)
- Auxiliary RESET IN (MAX6387/MAX6388/MAX6389)
- $V_{CC}$ Reset Timeout (1120ms or 1200ms)/Manual Reset Timeout (140ms or 150ms) (MAX6390)
- Negative-Going $V_{CC}$ Transient Immunity
- Low Power Consumption of 6µA at +3.6V and 3µA at +1.8V
- Pin Compatible with MAX809/MAX810/MAX803/MAX6326/MAX6327/MAX6328/MAX6346/MAX6347/MAX6348, and MAX6711/MAX6712/MAX6713
- Tiny 3-Pin/4-Pin SC70 and 6-Pin µDFN Packages
- AEC-Q100 Qualified, Refer to Ordering Information for the Specific /V Trim Version

## Ordering Information

| PART | TEMP RANGE | PIN-PACKAGE |
|---|---|---|
| **MAX6381**LT_ _D_+T | -40°C to +125°C | 6 µDFN |
| MAX6381XR_ _D_+T | -40°C to +125°C | 3 SC70 |
| MAX6381XR_ _D_/V+T | -40°C to +125°C | 3 SC70 |
| MAX6381XR26D3/V+T | -40°C to +125°C | 3 SC70 |
| MAX6381XR46D2/V+T | -40°C to +125°C | 3 SC70 |

***Note:*** *Insert reset threshold suffix (see Reset Threshold table) after "XR", "XS", or "LT." Insert reset timeout delay (see Reset Timeout Delay table) after "D" to complete the part number. Sample stock is generally held on standard versions only (see Standard Versions table). Standard versions have an order increment requirement of 2500 pieces. Nonstandard versions have an order increment requirement of 10,000 pieces. Contact factory for availability of nonstandard versions.*

*+Denotes a lead(Pb)-free/RoHS-compliant package.*
*/V denotes an automotive qualified part.*

***Ordering Information continued at end of data sheet.***
***Typical Operating Circuit appears at end of data sheet.***
***Selector Guide appears at end of data sheet.***



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## Absolute Maximum Ratings

$V_{CC}$ to GND .....-0.3V to +6.0V
$\overline{RESET}$ Open-Drain Output.....-0.3V to +6.0V
$\overline{RESET}$, RESET (push-pull output) .....-0.3V to ($V_{CC}$ + 0.3V)
$\overline{MR}$, RESET IN .....-0.3V to ($V_{CC}$ + 0.3V)
Input Current ($V_{CC}$).....20mA
Output Current (all pins).....20mA

Continuous Power Dissipation ($T_A$ = +70°C)
3-Pin SC70 (derate 2.9mW/°C above +70°C).....235mW
4-Pin SC70 (derate 3.1mW/°C above +70°C).....245mW
6-Pin µDFN (derate 2.1mW/°C above +70°C) .....167.7mW
Operating Temperature Range..... -40°C to +125°C
Storage Temperature Range..... -65°C to +150°C
Lead Temperature (soldering, 10s) .....+300°C
Soldering Temperature (reflow).....+260°C

*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 in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.*

## Electrical Characteristics

($V_{CC}$ = full range, $T_A$ = -40°C to +125°C, unless otherwise specified. Typical values are at $T_A$ = +25°C.) (Note 1)

| PARAMETER | SYMBOL | CONDITIONS | | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|---|
| Operating Voltage Range | $V_{CC}$ | | | 1.0 | | 5.5 | V |
| $V_{CC}$ Supply Current | $I_{CC}$ | $V_{CC}$ = 5.5V, no load | | | 7 | 13 | µA |
| | | $V_{CC}$ = 3.6V, no load | | | 6 | 11 | |
| | | $V_{CC}$ = 2.5V, no load | | | 4 | 7 | |
| | | $V_{CC}$ = 1.8V, no load | | | 3 | 6 | |
| $V_{CC}$ Reset Threshold (See Reset Thresholds table) | $V_{TH}$ | $T_A$ = +25°C | | $V_{TH}$ - 1.5% | $V_{TH}$ | $V_{TH}$ + 1.5% | V |
| | | $T_A$ = -40°C to +125°C | | $V_{TH}$ - 2.5% | $V_{TH}$ | $V_{TH}$ + 2.5% | |
| Reset Threshold Tempco | $\Delta V_{TH}$/°C | | | | 60 | | ppm/°C |
| $V_{CC}$ to Reset Delay | | $V_{CC}$ falling at 10mV/µs from $V_{TH}$ + 100mV to $V_{TH}$ - 100mV | | | 35 | | µs |
| Reset Timeout Period MAX6381–MAX6389 (See Reset Timeout table) | $t_{RP}$ | D1 | | 1 | | 2 | ms |
| | | D2 | | 20 | | 40 | |
| | | D3 | | 140 | | 280 | |
| | | D5 | | 280 | | 560 | |
| | | D6 | | 560 | | 1120 | |
| | | D4 | | 1120 | | 2240 | |
| | | D7 | | 1200 | | 2400 | |
| Reset Timeout Period MAX6390 | $t_{RP}$ | $\overline{MR}$ timeout period | D4 | 140 | | 280 | ms |
| | | | D7 | 150 | | 300 | |
| | | $V_{CC}$ timeout period | D4 | 1120 | | 2240 | |
| | | | D7 | 1200 | | 2400 | |
| $\overline{MR}$ Input Voltage | $V_{IL}$ | $V_{TH}$ < 4V | | | | 0.3 x $V_{CC}$ | V |
| | $V_{IH}$ | | | 0.7 x $V_{CC}$ | | | |
| | $V_{IL}$ | $V_{TH}$ > 4V | | | | 0.8 | |
| | $V_{IH}$ | | | 2.4 | | | |

## Electrical Characteristics (continued)

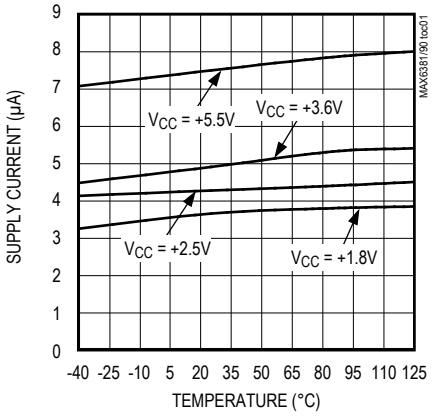
($V_{CC}$ = full range, $T_A$ = -40°C to +125°C, unless otherwise specified. Typical values are at $T_A$ = +25°C.) (Note 1)

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|
| $\overline{MR}$ Minimum Input Pulse Width | | | 1 | | | µs |
| $\overline{MR}$ Glitch Rejection | | | | 100 | | ns |
| $\overline{MR}$ to Reset Delay | | | | 200 | | ns |
| $\overline{MR}$ Internal Pullup Resistance | | MAX6381–MAX6389 | 32 | 63 | 100 | kΩ |
| | | MAX6390 | 500 | 1560 | 3000 | Ω |
| RESET IN Input Threshold | $V_{THRST}$ | $T_A$ = +25°C | 1.245 | 1.27 | 1.295 | V |
| | | $T_A$ = 0°C to +85°C | 1.232 | | 1.308 | |
| | | $T_A$ = -40°C to +125°C | 1.219 | | 1.321 | |
| RESET IN to RESET Delay | | $V_{RESETIN}$ falling at 4mV/µs from $V_{THRST}$ + 40mV to $V_{THRST}$ - 40mV | | 4.5 | | µs |
| RESET IN Input Leakage Current | $I_{RESET\ IN}$ | | -50 | ±1 | +50 | nA |
| Open-Drain $\overline{RESET}$ Output Voltage | $V_{OL}$ | $V_{CC}$ ≥ 4.5V, $I_{SINK}$ = 3.2mA, reset asserted | | | 0.4 | V |
| | | $V_{CC}$ ≥ 2.5V, $I_{SINK}$ = 1.2mA, reset asserted | | | 0.3 | |
| | | $V_{CC}$ ≥ 1.0V, $I_{SINK}$ = 80µA, reset asserted | | | 0.3 | |
| Open-Drain $\overline{RESET}$ Output Leakage Current | $I_{LKG}$ | $V_{CC}$ > $V_{TH}$, $\overline{RESET}$ not asserted | | | 1.0 | µA |
| Push-Pull $\overline{RESET}$ Output Voltage | $V_{OL}$ | $V_{CC}$ ≥ 4.5V, $I_{SINK}$ = 3.2mA, reset asserted | | | 0.4 | V |
| | | $V_{CC}$ ≥ 2.5V, $I_{SINK}$ = 1.2mA, reset asserted | | | 0.3 | |
| | | $V_{CC}$ ≥ 1.0V, $I_{SINK}$ = 80µA, reset asserted | | | 0.3 | |
| | $V_{OH}$ | $V_{CC}$ ≥ 4.5V, $I_{SOURCE}$ = 800µA, reset not asserted | 0.8 x $V_{CC}$ | | | |
| | | $V_{CC}$ ≥ 2.5V, $I_{SOURCE}$ = 500µA, reset not asserted | 0.8 x $V_{CC}$ | | | |
| Push-Pull RESET Output Voltage | $V_{OH}$ | $V_{CC}$ ≥ 4.5V, $I_{SOURCE}$ = 800µA, reset asserted | 0.8 x $V_{CC}$ | | | V |
| | | $V_{CC}$ ≥ 2.5V, $I_{SOURCE}$ = 500µA, reset asserted | 0.8 x $V_{CC}$ | | | |
| | | $V_{CC}$ ≥ 1.8V, $I_{SOURCE}$ = 150µA, reset asserted | 0.8 x $V_{CC}$ | | | |
| | | $V_{CC}$ ≥ 1.0V, $I_{SOURCE}$ = 1µA, reset asserted | 0.8 x $V_{CC}$ | | | |
| | $V_{OL}$ | $V_{CC}$ ≥ 4.5V, $I_{SINK}$ = 3.2mA, reset not asserted | | | 0.4 | |
| | | $V_{CC}$ ≥ 2.5V, $I_{SINK}$ = 1.2mA, reset not asserted | | | 0.3 | |

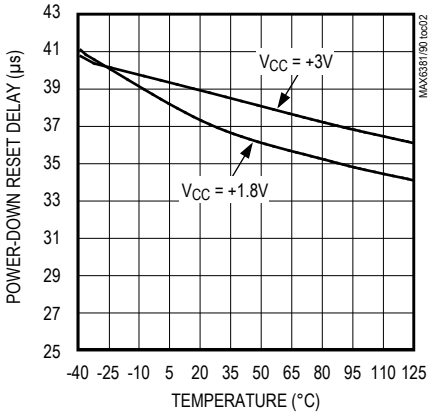
**Note 1:** Specifications over temperature are guaranteed by design, not production tested.

## Typical Operating Characteristics

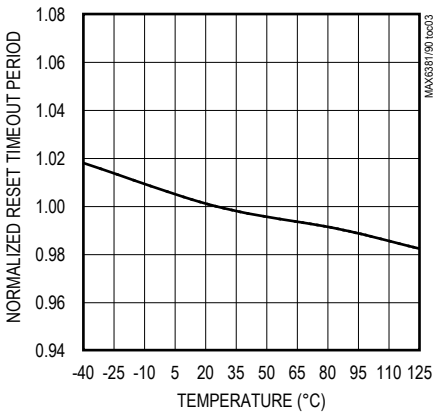
**SUPPLY CURRENT vs. TEMPERATURE (NO LOAD)**



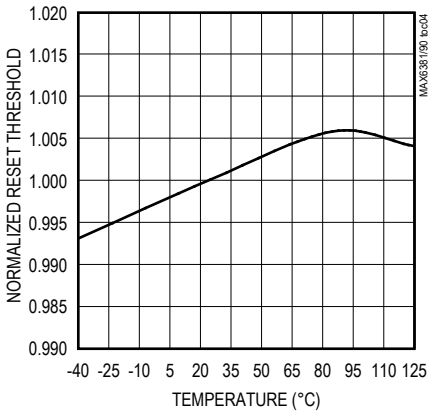

**POWER-DOWN RESET DELAY vs. TEMPERATURE**



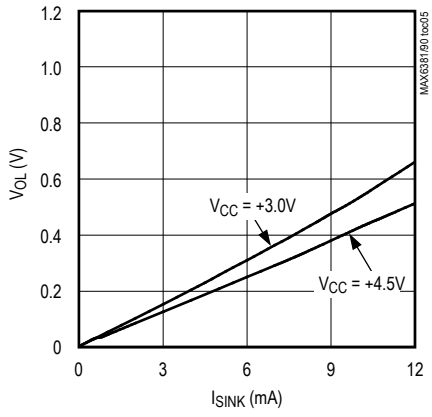

**NORMALIZED POWER-UP RESET TIMEOUT vs. TEMPERATURE**



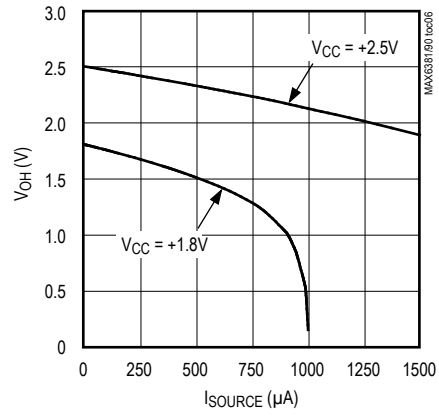

**NORMALIZED RESET THRESHOLD vs. TEMPERATURE**



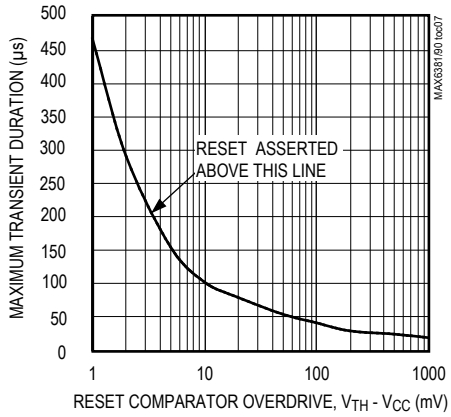

**OUTPUT-VOLTAGE LOW vs. SINK CURRENT**



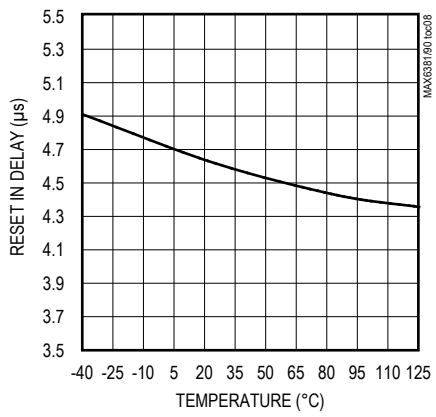

**OUTPUT-VOLTAGE HIGH vs. SOURCE CURRENT**




**MAXIMUM TRANSIENT DURATION vs. RESET COMPARATOR OVERDRIVE**




**RESET IN TO RESET DELAY vs. TEMPERATURE**



## Pin Description

| PIN | | | | | | | NAME | FUNCTION |
|---|---|---|---|---|---|---|---|---|
| µDFN | 3-PIN SC70 | | 4-PIN SC70 | | | | | |
| | MAX6381/ MAX6383 | MAX6382 | MAX6384/ MAX6386/ MAX6390 | MAX6385 | MAX6387/ MAX689 | MAX6388 | | |
| 1 (MAX6382/ MAX6385/ MAX6388) | | 2 | — | 2 | — | 2 | RESET | Active-High Push-Pull Reset Output. RESET changes from low to high when any monitored voltage ($V_{CC}$ or $V_{RESETIN}$) drops below the reset threshold or $\overline{MR}$ is pulled low. RESET remains high for the reset timeout period after monitored voltages exceed the reset thresholds or $\overline{MR}$ is released. |
| 1 (MAX6381/ MAX6383/ MAX6384/ MAX6386/ MAX6387/ MAX6390) | 2 | — | 2 | — | 2 | — | $\overline{RESET}$ | Active-Low Open-Drain/Push-Pull Reset Output. $\overline{RESET}$ changes from high to low when any monitored voltage ($V_{CC}$ or $V_{RESETIN}$) drops below the reset threshold or $\overline{MR}$ is pulled low. $\overline{RESET}$ remains low for the reset timeout period after the monitored voltages exceed the reset thresholds or $\overline{MR}$ is released. Open-drain requires an external pullup resistor. |
| 2, 3, 5 (MAX6381/ MAX6382/ MAX6383)<br>2, 5 (MAX6384–MAX6390) | — | — | — | — | — | — | N.C. | No Connection. Not Internally connected. |
| 3 (MAX6384/ MAX6385/ MAX6386/ MAX6390) | — | — | 3 | 3 | — | — | $\overline{MR}$ | Active-Low Manual Reset Input. Drive low to force a reset. Reset remains active as long as $\overline{MR}$ is low and for the reset timeout period after $\overline{MR}$ is released. Leave unconnected or connect to $V_{CC}$ if unused. $\overline{MR}$ has an internal 63kΩ (1.56kΩ for MAX6390) pullup resistor to $V_{CC}$. |
| 3 (MAX6387/ MAX6388/ MAX6389) | — | — | — | — | 3 | 3 | RESET IN | Auxiliary Reset Input. High-impedance input to the auxiliary reset comparator. Connect RESET IN to the center point of an external resistor voltage-divider network to set the reset threshold voltage. Reset asserts when either $V_{CC}$ or RESET IN falls below its threshold voltage. |
| 4 (MAX6381–MAX6390) | 3 | 3 | 4 | 4 | 4 | 4 | $V_{CC}$ | Supply Voltage for the device and input for fixed $V_{CC}$ reset threshold monitor. |
| 6 (MAX6381–MAX6390) | 1 | 1 | 1 | 1 | 1 | 1 | GND | Ground |

## Detailed Description

### RESET Output

A µP reset input starts the µP in a known state. These µP supervisory circuits assert reset to prevent code execution errors during power-up, power-down, or brownout conditions.

Reset asserts when $V_{CC}$ is below the reset threshold; once $V_{CC}$ exceeds the reset threshold, an internal timer keeps the reset output asserted for the reset timeout period. After this interval, reset output deasserts. Reset output is guaranteed to be in the correct logic state for $V_{CC} \geq 1V$.

### Manual Reset Input (MAX6384/ MAX6385/MAX6386/MAX6390)

Many µP-based products require manual reset capability, allowing the operator, a test technician, or external logic circuitry to initiate a reset. A logic low on $\overline{MR}$ asserts reset. Reset remains asserted while $\overline{MR}$ is low, and for the reset active timeout period ($t_{RP}$) after $\overline{MR}$ returns high. This input has an internal 63kΩ pullup resistor (1.56kΩ for MAX6390), so it can be left unconnected if it is not used. $\overline{MR}$ can be driven with TTL or CMOS logic levels, or with open-drain/collector outputs. Connect a normally open momentary switch from $\overline{MR}$ to GND to create a manual-reset function; external debounce circuitry is not required. If $\overline{MR}$ is driven from long cables or if the device is used in a noisy environment, connecting a 0.1µF capacitor from $\overline{MR}$ to GND provides additional noise immunity.

### RESET IN Comparator (MAX6387/MAX6388/MAX6389)

RESET IN is compared to an internal +1.27V reference. If the voltage at RESET IN is less than 1.27V, reset asserts. Use the RESET IN comparator as a user-adjustable reset detector or as a secondary power-supply monitor by implementing a resistor-divider at RESET IN (shown in Figure 1). Reset asserts when either $V_{CC}$ or RESET IN falls below its respective threshold voltage. Use the following equation to set the threshold:

$$V_{INTH} = V_{THRST} (R1/R2 + 1)$$

where $V_{THRST}$ = +1.27V. To simplify the resistor selection, choose a value of R2 and calculate R1:

$$R1 = R2 [(V_{INTH}/V_{THRST}) - 1]$$

Since the input current at RESET IN is 50nA (max), large values can be used for R2 with no significant loss in accuracy.

## Reset Thresholds (-40°C to +125°C)

| SUFFIX | $V_{TH}$ (min) | $V_{TH}$ (nom) | $V_{TH}$ (max) |
|---|---|---|---|
| 46 | 4.51 | 4.63 | 4.74 |
| 45 | 4.39 | 4.50 | 4.61 |
| 44 | 4.27 | 4.38 | 4.48 |
| 43 | 4.19 | 4.30 | 4.41 |
| 42 | 4.10 | 4.20 | 4.31 |
| 41 | 4.00 | 4.10 | 4.20 |
| 40 | 3.90 | 4.00 | 4.10 |
| 39 | 3.80 | 3.90 | 4.00 |
| 38 | 3.71 | 3.80 | 3.90 |
| 37 | 3.61 | 3.70 | 3.79 |
| 36 | 3.51 | 3.60 | 3.69 |
| 35 | 3.41 | 3.50 | 3.59 |
| 34 | 3.32 | 3.40 | 3.49 |
| 33 | 3.22 | 3.30 | 3.38 |
| 32 | 3.12 | 3.20 | 3.28 |
| 31 | 3.00 | 3.08 | 3.15 |
| 30 | 2.93 | 3.00 | 3.08 |
| 29 | 2.85 | 2.93 | 3.00 |
| 28 | 2.73 | 2.80 | 2.87 |
| 27 | 2.63 | 2.70 | 2.77 |
| 26 | 2.56 | 2.63 | 2.69 |
| 25 | 2.44 | 2.50 | 2.56 |
| 24 | 2.34 | 2.40 | 2.46 |
| 23 | 2.26 | 2.31 | 2.37 |
| 22 | 2.13 | 2.19 | 2.24 |
| 21 | 2.05 | 2.10 | 2.15 |
| 20 | 1.95 | 2.00 | 2.05 |
| 19 | 1.85 | 1.90 | 1.95 |
| 18 | 1.76 | 1.80 | 1.85 |
| 17 | 1.62 | 1.67 | 1.71 |
| 16 | 1.54 | 1.58 | 1.61 |

## Applications Information

### Negative-Going $V_{CC}$ Transients

In addition to issuing a reset to the µP during power-up, power-down, and brownout conditions, the MAX6381–MAX6390 are relatively immune to short duration negative-going $V_{CC}$ transients (glitches).

The *Typical Operating Characteristics* section shows the Maximum Transient Durations vs. Reset Comparator Overdrive, for which the MAX6381–MAX6390 do not generate a reset pulse. This graph was generated using

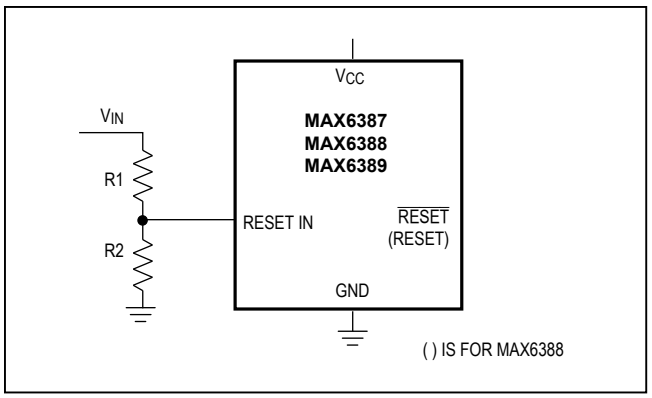



*Figure 1. RESET IN Configuration*

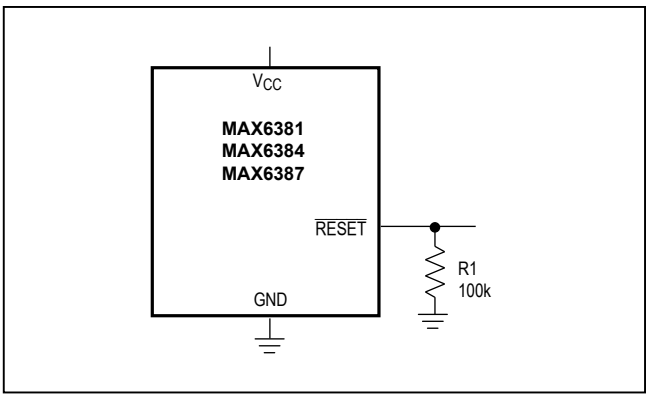



*Figure 2. RESET Valid to $V_{CC}$ = Ground Circuit*

## Reset Timeout Delay

| SUFFIX | MIN |
|---|---|
| D1 | 1ms |
| D2 | 20ms |
| D3 | 140ms |
| D5 | 280ms |
| D6 | 560ms |
| D4 | 1120ms |
| D7 | 1200ms |
| MAX6390_ _D4 | 1120/140ms* |
| MAX6390_ _D7 | 1200/150ms* |

**The MAX6390 has a 1120ms or 1200ms $\overline{RESET}$ timeout and a 140ms or 150ms manual reset timeout.*

a negative-going pulse applied to $V_{CC}$, starting above the actual reset threshold and ending below it by the magnitude indicated (reset comparator overdrive). The graph indicates the typical maximum pulse width a negative-going $V_{CC}$ transient may have without causing a reset pulse to be issued. As the magnitude of the transient increases (goes farther below the reset threshold), the maximum allowable pulse width decreases. A 0.1µF capacitor mounted as close as possible to $V_{CC}$ provides additional transient immunity.

### Ensuring a Valid RESET Output Down to $V_{CC}$ = 0V

The MAX6381–MAX6390 are guaranteed to operate properly down to $V_{CC}$ = 1V. In applications that require valid reset levels down to $V_{CC}$ = 0V, a pulldown resistor to active-low outputs (push/pull only, Figure 2) and a pullup resistor to active-high outputs (push/pull only) will ensure that the reset line is valid while the reset output can no longer sink or source current. This scheme does not work with the open-drain outputs of the MAX6383/MAX6386/MAX6389/MAX6390. The resistor value used is not critical, but it must be small enough not to load the reset output when $V_{CC}$ is above the reset threshold. For most applications, 100kΩ is adequate.

## Standard Versions

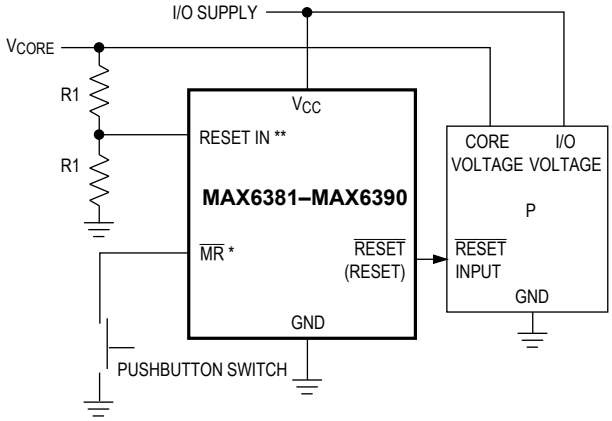
| PART | RESET THRESHOLD | RESET TIMEOUT |
|---|---|---|
| MAX638_ | 46 | D3 |
| | 44 | |
| | 31 | |
| | 29 | |
| | 26 | |
| | 23 | |
| | 22 | |
| | 17 | |
| | 16 | |
| MAX6390 | 46 | D4 |
| | 44 | |
| | 31 | |
| | 29 | |
| | 26 | |
| | 23 | |
| | 22 | |
| | 17 | |
| | 16 | |

## Selector Guide

| PART NUMBER | PUSH-PULL ACTIVE-LOW | PUSH-PULL ACTIVE-HIGH | OPEN-DRAIN ACTIVE-LOW | MANUAL RESET INPUT $\overline{MR}$ | RESET IN |
|---|---|---|---|---|---|
| MAX6381 | X | | | | |
| MAX6382 | | X | | | |
| MAX6383 | | | X | | |
| MAX6384 | X | | | X | |
| MAX6385 | | X | | X | |
| MAX6386 | | | X | X | |
| MAX6390* | | | X | X | |
| MAX6387 | X | | | | X |
| MAX6388 | | X | | | X |
| MAX6389 | | | X | | X |

**The MAX6390 offers a $V_{CC}$ reset timeout of 1120ms or 1200ms (min) and a manual reset timeout of 140ms or 150ms (min).*

## Typical Operating Circuit




**$\overline{MR}$ is for MAX6384/MAX6385/MAX6386/MAX6390*
***RESET IN is for MAX6387/MAX6388/MAX6389*
*( ) are for MAX6382/MAX6385/MAX6388*

## Ordering Information (continued)

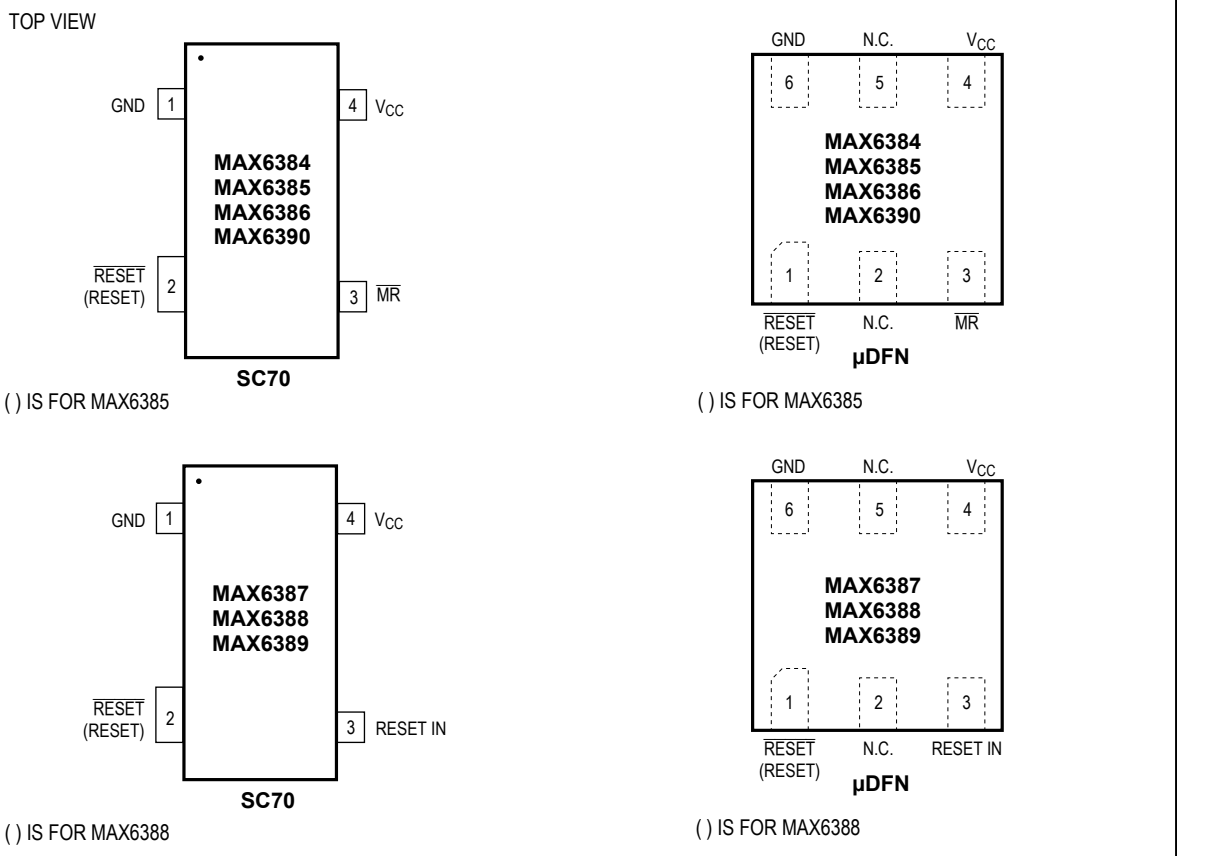
| PART | TEMP RANGE | PIN-PACKAGE |
|---|---|---|
| **MAX6382**LT_ _D_+T | -40°C to +125°C | 6 µDFN |
| MAX6382XR_ _D_+T | -40°C to +125°C | 3 SC70 |
| **MAX6383**LT_ _D_+T | -40°C to +125°C | 6 µDFN |
| MAX6383XR_ _D_+T | -40°C to +125°C | 3 SC70 |
| **MAX6384**LT_ _D_+T | -40°C to +125°C | 6 µDFN |
| MAX6384XS_ _D_+T | -40°C to +125°C | 4 SC70 |
| **MAX6385**LT_ _D_+T | -40°C to +125°C | 6 µDFN |
| MAX6385XS_ _D_+T | -40°C to +125°C | 4 SC70 |
| **MAX6386**LT_ _D_+T | -40°C to +125°C | 6 µDFN |
| MAX6386XS_ _D_+T | -40°C to +125°C | 4 SC70 |
| **MAX6387**LT_ _D_+T | -40°C to +125°C | 6 µDFN |
| MAX6387XS_ _D_+T | -40°C to +125°C | 4 SC70 |
| **MAX6388**LT_ _D_+T | -40°C to +125°C | 6 µDFN |
| MAX6388XS_ _D_+T | -40°C to +125°C | 4 SC70 |
| **MAX6389**LT_ _D_+T | -40°C to +125°C | 6 µDFN |
| MAX6389XS_ _D_+T | -40°C to +125°C | 4 SC70 |
| MAX6389XS30D2/V+T | -40°C to +125°C | 4 SC70 |
| MAX6389XS31D1/V+T | -40°C to +125°C | 4 SC70 |
| MAX6389XS32D1/V+T | -40°C to +125°C | 4 SC70 |
| **MAX6390LT**_ _D_+T | -40°C to +125°C | 6 µDFN |
| MAX6390XS_ _D_+T* | -40°C to +125°C | 4 SC70 |

***Note:*** *Insert reset threshold suffix (see Reset Threshold table) after "XR", "XS", or "LT." Insert reset timeout delay (see Reset Timeout Delay table) after "D" to complete the part number. Sample stock is generally held on standard versions only (see Standard Versions table). Standard versions have an order increment requirement of 2500 pieces. Nonstandard versions have an order increment requirement of 10,000 pieces. Contact factory for availability of nonstandard versions.*

**MAX6390 is available with D4 or D7 timing only.*

*+Denotes a lead(Pb)-free/RoHS-compliant package.*

## Pin Configurations (continued)




## Chip Information

PROCESS: BiCMOS

## Package Information

For the latest package outline information and land patterns (footprints), go to **www.maximintegrated.com/packages**. Note that a "+", "#", or "-" in the package code indicates RoHS status only. Package drawings may show a different suffix character, but the drawing pertains to the package regardless of RoHS status.

| PACKAGE TYPE | PACKAGE CODE | DOCUMENT NO. | LAND PATTERN NO. |
|---|---|---|---|
| 3 SC70 | X3+2 | 21-0075 | 90-0208 |
| 4 SC70 | X4+1 | 21-0098 | 90-0187 |
| 6 FDFN | L611+1 | 21-0147 | 90-0080 |

## Revision History

| REVISION NUMBER | REVISION DATE | DESCRIPTION | PAGES CHANGED |
|---|---|---|---|
| 0 | 10/00 | Initial release | — |
| 3 | 12/05 | Added lead-free notation to *Ordering Information*. | 1, 8 |
| 4 | 4/07 | Added µDFN package to data sheet. | 1, 2, 5, 7–13 |
| 5 | 7/12 | Added automotive package to *Ordering Information*. | 1 |
| 6 | 3/18 | Updated *Ordering Information* table | 1, 8 |

For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim Integrated's website at www.maximintegrated.com.

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