WINSOURCE
ELECTRONICS

THE DATASHEET OF

NTST40120CTH

NTST40120CT, NTSJ40120CTG, NTSB40120CT-1G, NTSB40120CTG, NTSB40120CTT4G

Very Low Forward Voltage Trench-based Schottky Rectifier

Exceptionally Low V_F = 0.43 V at I_F = 5 A

Features

- Fine Lithography Trench−based Schottky Technology for Very Low Forward Voltage and Low Leakage
- Fast Switching with Exceptional Temperature Stability
- Low Power Loss and Lower Operating Temperature
- Higher Efficiency for Achieving Regulatory Compliance
- Low Thermal Resistance
- High Surge Capability
- Pb−Free and Halide−Free Packages are Available

Typical Applications

- Switching Power Supplies including Notebook/Netbook Adapters, ATX and Flat Panel Display
- High Frequency and DC−DC Converters
- Freewheeling and OR−ing Diodes
- Reverse Battery Protection
- Instrumentation

Mechanical Characteristics

- Case: Epoxy, Molded
- Epoxy Meets Flammability Rating UL 94−0 @ 0.125 in
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes: 260°C Maximum for 10 sec

ON Semiconductor®

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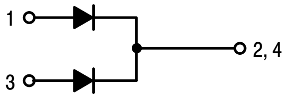
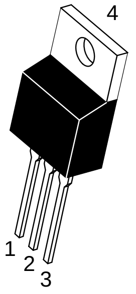
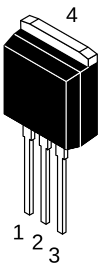
VERY LOW FORWARD VOLTAGE, LOW LEAKAGE SCHOTTKY BARRIER RECTIFIERS 40 AMPERES, 120 VOLTS

PIN CONNECTIONS

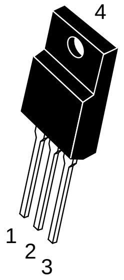




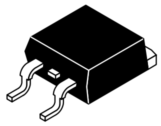
TO−220
CASE 221A
STYLE 6



I^2PAK
CASE 418D
STYLE 3



TO−220FP
CASE 221AH



D^2PAK
CASE 418B

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

September, 2014 − Rev. 6

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_R	120	V
Average Rectified Forward Current (Rated V_R, T_C = 120°C) Per Device Per Diode	$I_{F(AV)}$	40 20	A
Peak Repetitive Forward Current (Rated V_R, Square Wave, 20 kHz, T_C = 125°C) Per Device Per Diode	I_{FRM}	80 40	A
Nonrepetitive Peak Surge Current (Surge applied at rated load conditions halfwave, single phase, 60 Hz)	I_{FSM}	250	A
Operating Junction Temperature	T_J	−40 to +150	°C
Storage Temperature	T_{stg}	−40 to +150	°C
Voltage Rate of Change (Rated V_R)	dv/dt	10,000	V/μs

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

Rating	Symbol	NTST40120CTG, NTSB40120CT−1G	NTSB40120CTG	NTSJ40120CTG	Unit
Maximum Thermal Resistance per Diode					
Junction−to−Case	$R_{\theta JC}$	1.3	0.79	4.0	°C/W
Junction−to−Ambient	$R_{\theta JA}$	70	46.3	105	°C/W

ELECTRICAL CHARACTERISTICS (Per Leg unless otherwise noted)

Rating	Symbol	Typ	Max	Unit
Maximum Instantaneous Forward Voltage (Note 1)	v_F			V
(I_F = 5 A, T_J = 25°C)		0.50	−	
(I_F = 10 A, T_J = 25°C)		0.60	−	
(I_F = 20 A, T_J = 25°C)		0.78	0.91	
(I_F = 5 A, T_J = 125°C)		0.43	−	
(I_F = 10 A, T_J = 125°C)		0.53	−	
(I_F = 20 A, T_J = 125°C)		0.63	0.71	
Maximum Instantaneous Reverse Current (Note 1)	I_R			
(V_R = 90 V, T_J = 25°C)		16	−	μA
(V_R = 90 V, T_J = 125°C)		16	−	mA
(Rated dc Voltage, T_J = 25°C)		−	500	μA
(Rated dc Voltage, T_J = 125°C)		30	100	mA

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. Pulse Test: Pulse Width = 300 μs, Duty Cycle ≤ 2.0%

TYPICAL CHARACTERISITICS

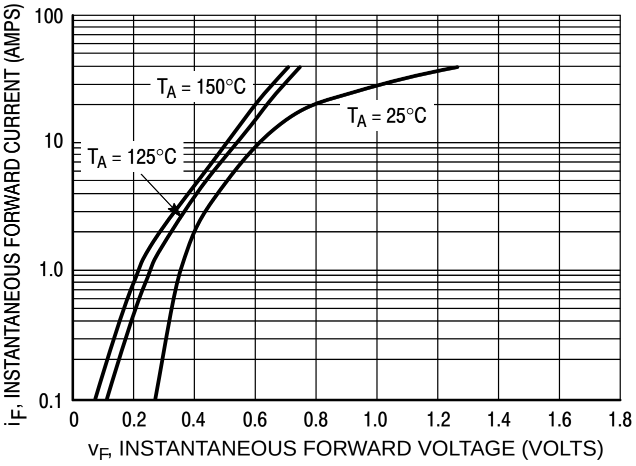


Figure 1. Typical Forward Voltage

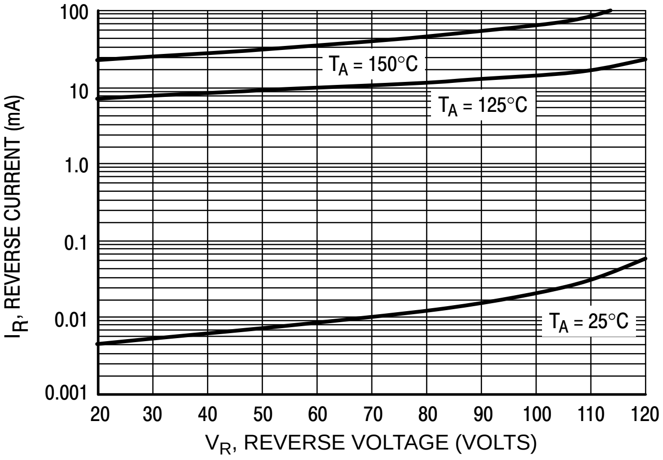


Figure 2. Typical Reverse Current

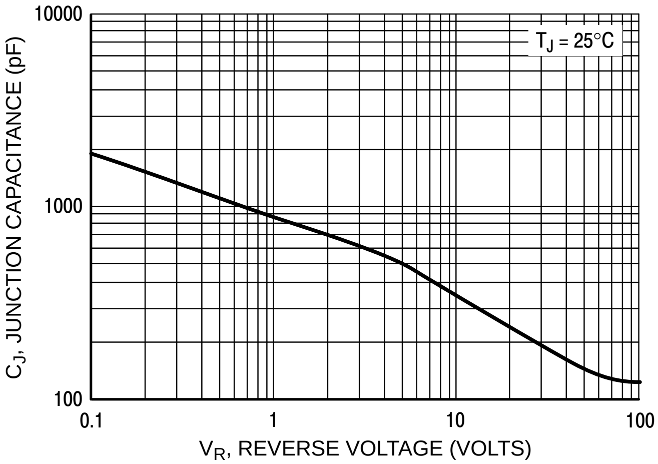


Figure 3. Typical Junction Capacitance

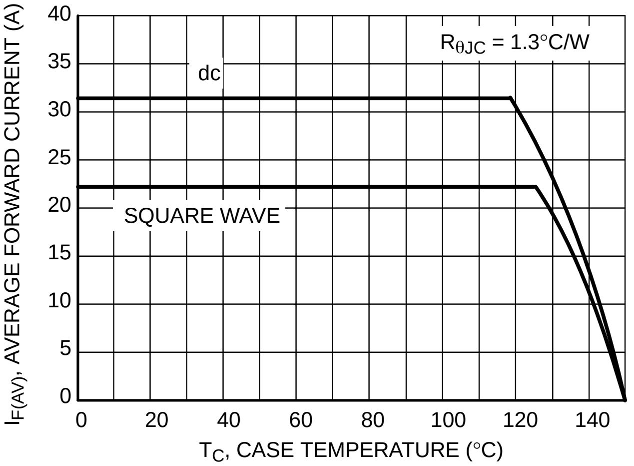


Figure 4. Current Derating per Leg

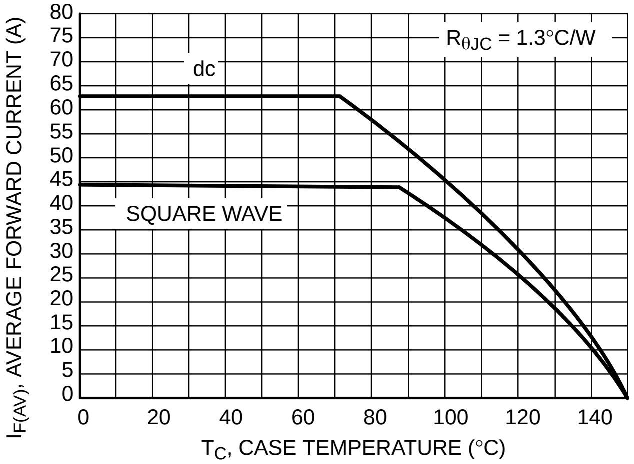


Figure 5. Current Derating, Case

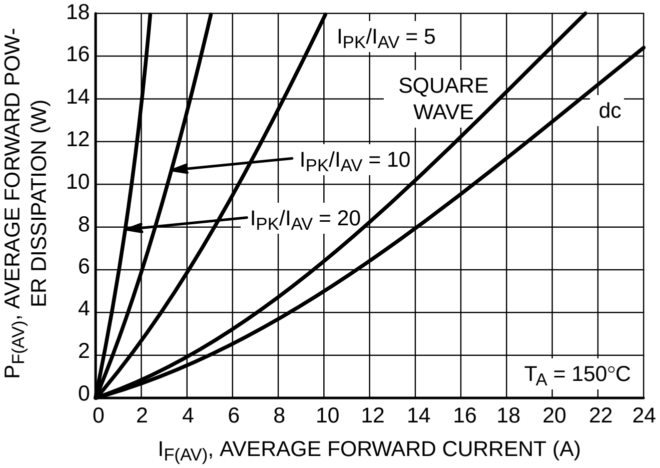


Figure 6. Forward Power Dissipation

TYPICAL CHARACTERISITICS

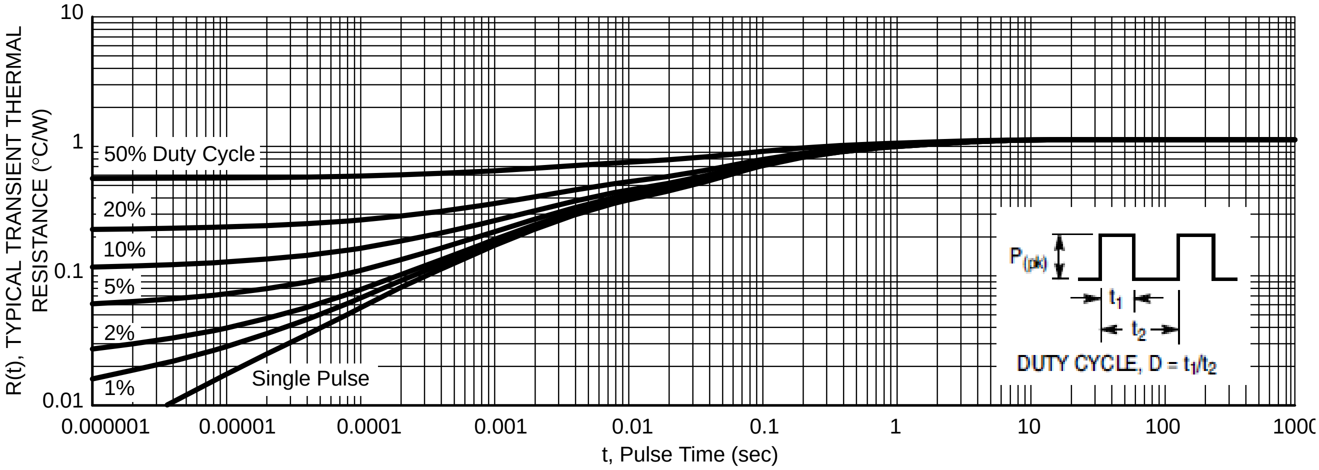


Figure 7. Typical Transient Thermal Response for NTST40120CT and NTSB40120CT−1G

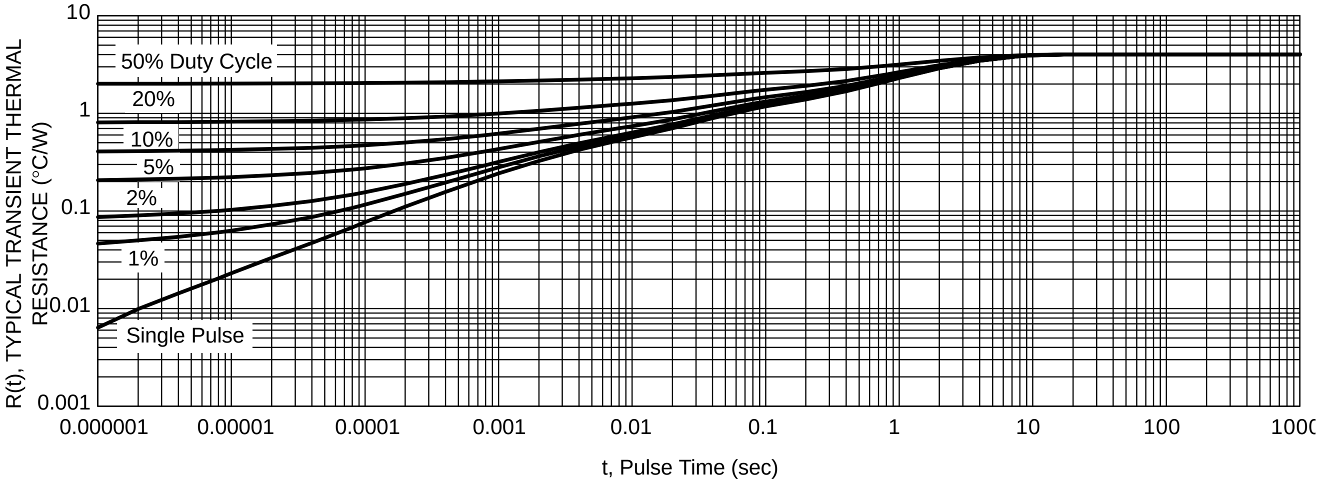


Figure 8. Typical Transient Thermal Response for NTSJ40120CTG

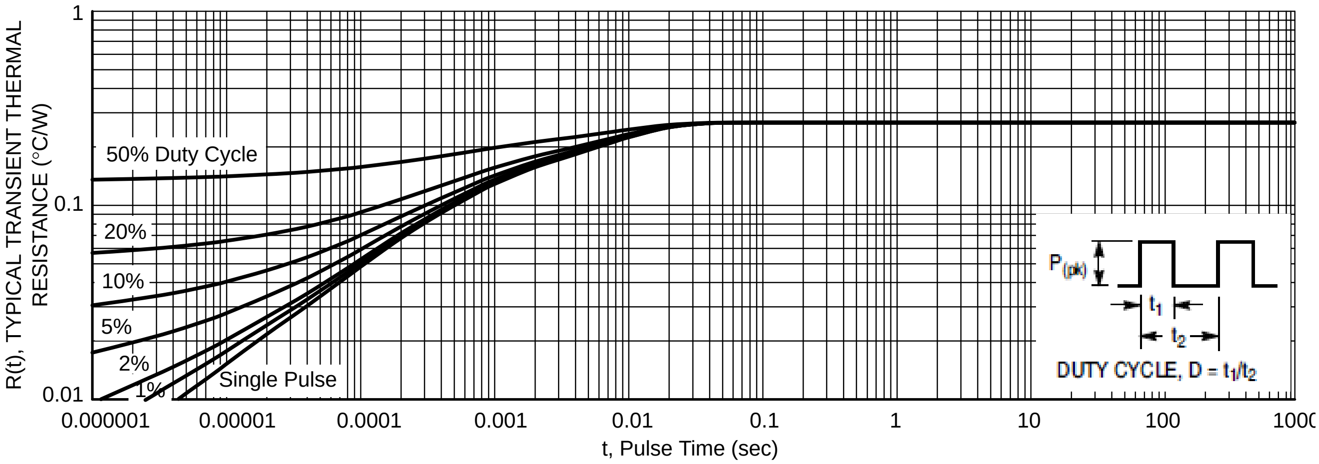


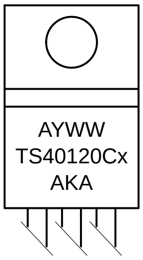
Figure 9. Typical Transient Thermal Response for NTSB40120CTG

ORDERING INFORMATION

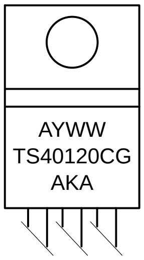
Device	Package	Shipping†
NTST40120CTG	TO−220 (Pb−Free)	50 Units / Rail
NTST40120CTH	TO−220 (Pb−Free and Halide−Free)	50 Units / Rail
NTSJ40120CTG	TO−220FP (Pb−Free and Halide−Free)	50 Units / Rail
NTSB40120CT−1G	I^{2}PAK (Pb−Free)	50 Units / Rail
NTSB40120CTG	D^{2}PAK (Pb−Free)	50 Units / Rail
NTSB40120CTT4G	D^{2}PAK (Pb−Free)	800 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

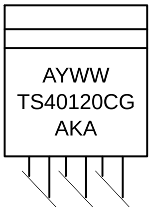
MARKING DIAGRAMS



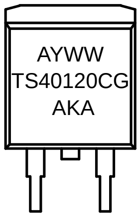
TO−220



TO−220FP



I^{2}PAK

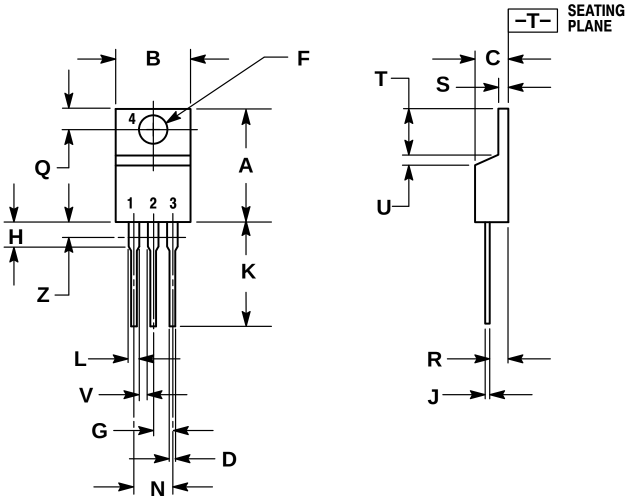


D^{2}PAK

A = Assembly Location
Y = Year
WW = Work Week
AKA = Polarity Designator
x = G or H
G = Pb−Free Package
H = Halide−Free Package

PACKAGE DIMENSIONS

TO−220
CASE 221A−09
ISSUE AH

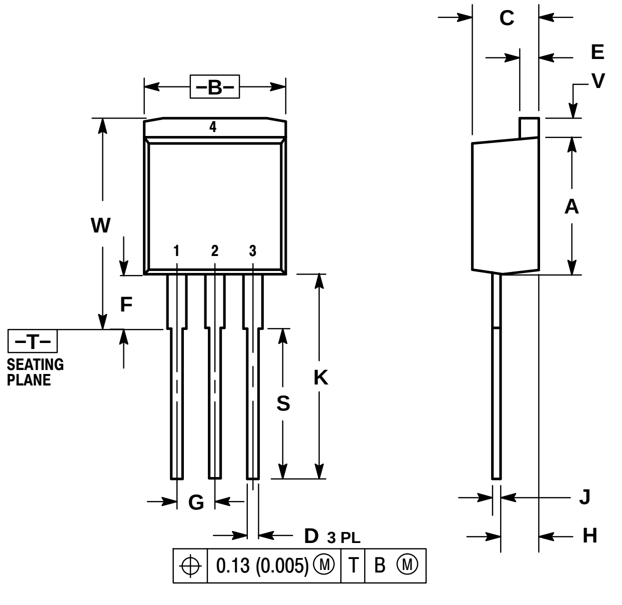


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.415	9.66	10.53
C	0.160	0.190	4.07	4.83
D	0.025	0.038	0.64	0.96
F	0.142	0.161	3.61	4.09
G	0.095	0.105	2.42	2.66
H	0.110	0.161	2.80	4.10
J	0.014	0.024	0.36	0.61
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	---	1.15	---
Z	---	0.080	---	2.04

STYLE 6:
PIN 1. ANODE
2. CATHODE
3. ANODE
4. CATHODE

I^{2}PAK (TO−262)
CASE 418D
ISSUE D



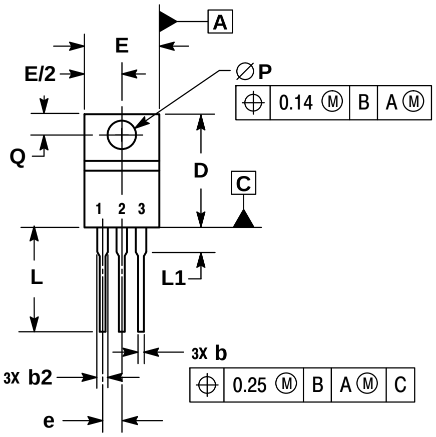
NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.335	0.380	8.51	9.65
B	0.380	0.406	9.65	10.31
C	0.160	0.185	4.06	4.70
D	0.026	0.035	0.66	0.89
E	0.045	0.055	1.14	1.40
F	0.122 REF		3.10 REF	
G	0.100 BSC		2.54 BSC	
H	0.094	0.110	2.39	2.79
J	0.013	0.025	0.33	0.64
K	0.500	0.562	12.70	14.27
S	0.390 REF		9.90 REF	
V	0.045	0.070	1.14	1.78
W	0.522	0.551	13.25	14.00

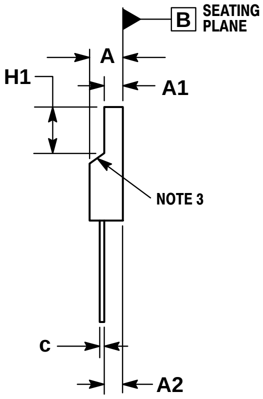
STYLE 3:
PIN 1. ANODE
2. CATHODE
3. ANODE
4. CATHODE

PACKAGE DIMENSIONS

TO−220 FULLPACK, 3−LEAD
CASE 221AH
ISSUE F



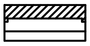
FRONT VIEW



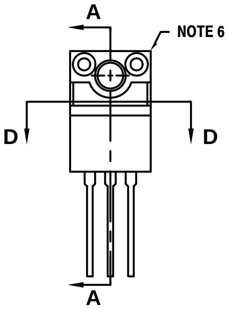
SIDE VIEW

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. CONTOUR UNCONTROLLED IN THIS AREA.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH AND GATE PROTRUSIONS. MOLD FLASH AND GATE PROTRUSIONS NOT TO EXCEED 0.13 PER SIDE. THESE DIMENSIONS ARE TO BE MEASURED AT OUTERMOST EXTREME OF THE PLASTIC BODY.
5. DIMENSION b2 DOES NOT INCLUDE DAMBAR PROTRUSION. LEAD WIDTH INCLUDING PROTRUSION SHALL NOT EXCEED 2.00.
6. CONTOURS AND FEATURES OF THE MOLDED PACKAGE BODY MAY VARY WITHIN THE ENVELOP DEFINED BY DIMENSIONS A1 AND H1 FOR MANUFACTURING PURPOSES.

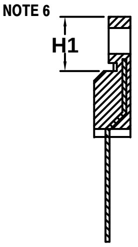
	MILLIMETERS	
DIM	MIN	MAX
A	4.30	4.70
A1	2.50	2.90
A2	2.50	2.90
b	0.54	0.84
b2	1.10	1.40
c	0.49	0.79
D	14.70	15.30
E	9.70	10.30
e	2.54 BSC	
H1	6.60	7.10
L	12.50	14.73
L1	---	2.80
P	3.00	3.40
Q	2.80	3.20



SECTION D−D



ALTERNATE CONSTRUCTION

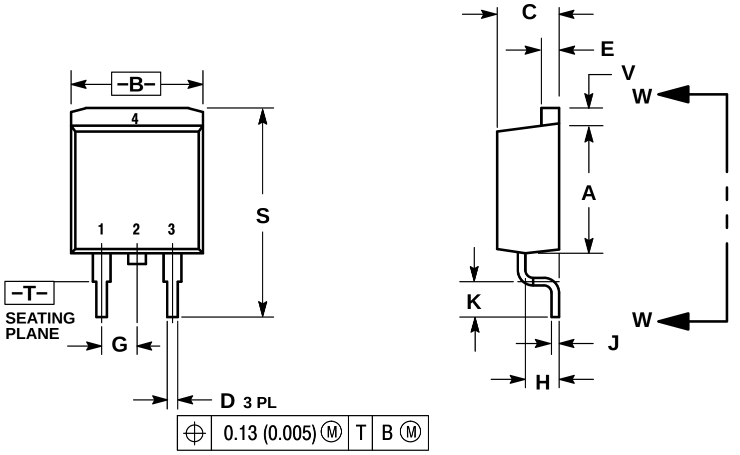


SECTION A−A

PACKAGE DIMENSIONS

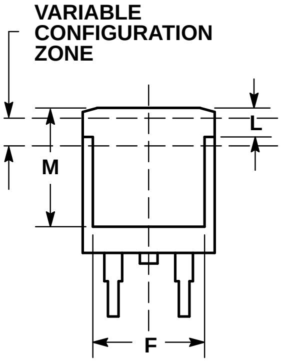
D^{2}PAK 3

CASE 418B−04
ISSUE K

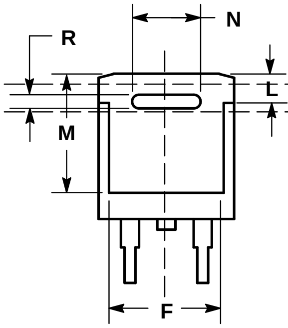


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 418B−01 THRU 418B−03 OBSOLETE, NEW STANDARD 418B−04.

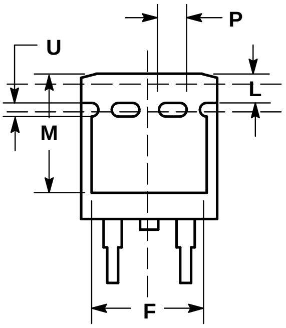
	INCHES		MILLIMETERS	
DIM	**MIN**	**MAX**	**MIN**	**MAX**
A	0.340	0.380	8.64	9.65
B	0.380	0.405	9.65	10.29
C	0.160	0.190	4.06	4.83
D	0.020	0.035	0.51	0.89
E	0.045	0.055	1.14	1.40
F	0.310	0.350	7.87	8.89
G	0.100 BSC		2.54 BSC	
H	0.080	0.110	2.03	2.79
J	0.018	0.025	0.46	0.64
K	0.090	0.110	2.29	2.79
L	0.052	0.072	1.32	1.83
M	0.280	0.320	7.11	8.13
N	0.197 REF		5.00 REF	
P	0.079 REF		2.00 REF	
R	0.039 REF		0.99 REF	
S	0.575	0.625	14.60	15.88
V	0.045	0.055	1.14	1.40



VIEW W−W
1



VIEW W−W
2



VIEW W−W
3

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