

NTST30U100CT, NTSB30U100CT-1, NTSJ30U100CTG, NTSB30U100CTG

Very Low Forward Voltage Trench-based Schottky Rectifier

Exceptionally Low $V_F = 0.42\text{ V}$ at $I_F = 5\text{ A}$

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

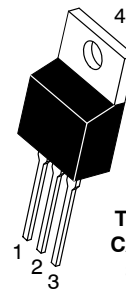
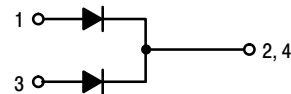


ON Semiconductor®

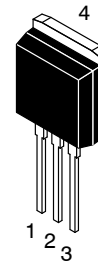
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VERY LOW FORWARD VOLT-
AGE, LOW LEAKAGE SCHOT-
TKY BARRIER
RECTIFIERS 30 AMPERES,
100 VOLTS

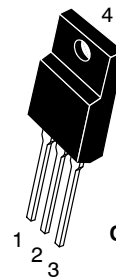
PIN CONNECTIONS



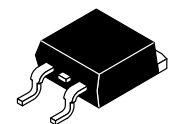
TO-220AB
CASE 221A
STYLE 6



I2PAK
CASE 418D
STYLE 3



TO-220FP
CASE 221AH



D2PAK
CASE 418B

ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.

NTST30U100CT, NTSB30U100CT-1, NTSJ30U100CTG, NTSB30U100CTG

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_R	100	V
Average Rectified Forward Current (Rated V_R , $T_C = 125^\circ\text{C}$)	$I_{F(AV)}$ Per device Per diode	30 15	A
Peak Repetitive Forward Current (Rated V_R , Square Wave, 20 kHz, $T_C = 120^\circ\text{C}$)	I_{FRM} Per device Per diode	60 30	A
Nonrepetitive Peak Surge Current (Surge applied at rated load conditions halfwave, single phase, 60 Hz)	I_{FSM}	160	A
Operating Junction Temperature	T_J	-40 to +150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 to +150	$^\circ\text{C}$
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	NTST30U100CTG, NTSB30U100CT-1G	NTSB30U100CTG	NTSJ30U100CTG	Unit
Maximum Thermal Resistance per Diode Junction-to-Case Junction-to-Ambient	$R_{\theta JC}$ $R_{\theta JA}$	2.5 70	0.93 46.5	3.81 105	$^\circ\text{C}/\text{W}$ $^\circ\text{C}/\text{W}$

ELECTRICAL CHARACTERISTICS (Per Leg unless otherwise noted)

Rating	Symbol	Typ	Max	Unit
Maximum Instantaneous Forward Voltage (Note 1) ($I_F = 5\text{ A}$, $T_J = 25^\circ\text{C}$) ($I_F = 7.5\text{ A}$, $T_J = 25^\circ\text{C}$) ($I_F = 15\text{ A}$, $T_J = 25^\circ\text{C}$) ($I_F = 5\text{ A}$, $T_J = 125^\circ\text{C}$) ($I_F = 7.5\text{ A}$, $T_J = 125^\circ\text{C}$) ($I_F = 15\text{ A}$, $T_J = 125^\circ\text{C}$)	V_F	0.47 0.52 0.66 0.42 0.48 0.60	- - 0.80 - - 0.65	V
Maximum Instantaneous Reverse Current (Note 1) ($V_R = 70\text{ V}$, $T_J = 25^\circ\text{C}$) ($V_R = 70\text{ V}$, $T_J = 125^\circ\text{C}$) (Rated dc Voltage, $T_J = 25^\circ\text{C}$) (Rated dc Voltage, $T_J = 125^\circ\text{C}$)	I_R	15 12 65 32	 675 60	μA mA μA 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 $\leq 2.0\%$

TYPICAL CHARACTERISTICS

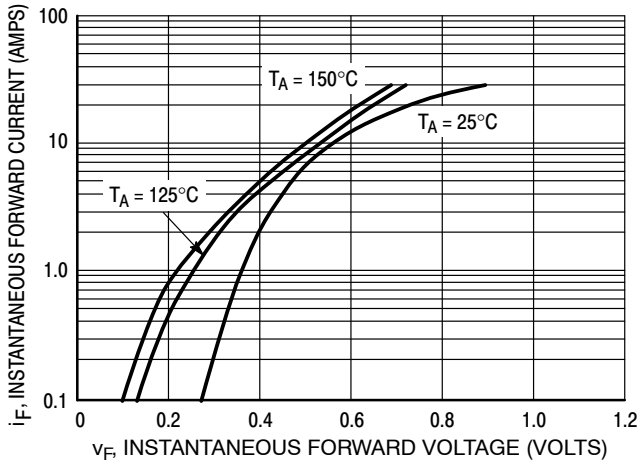


Figure 1. Typical Forward Voltage

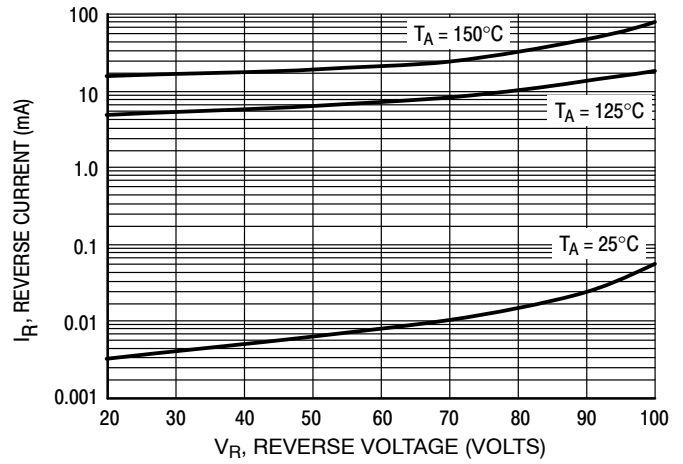


Figure 2. Typical Reverse Current

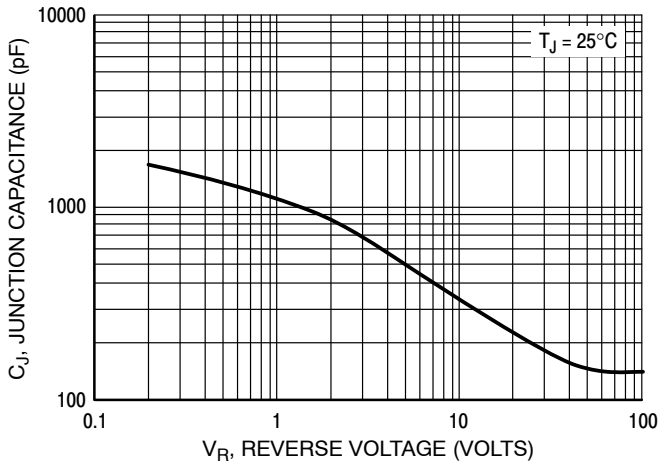


Figure 3. Typical Junction Capacitance

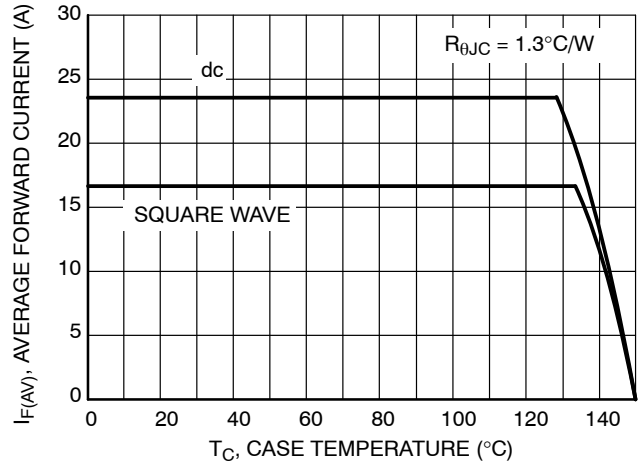


Figure 4. Current Derating per Leg

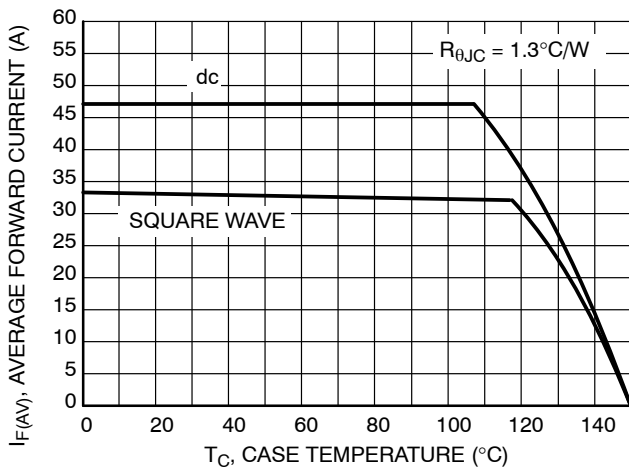


Figure 5. Current Derating, Case

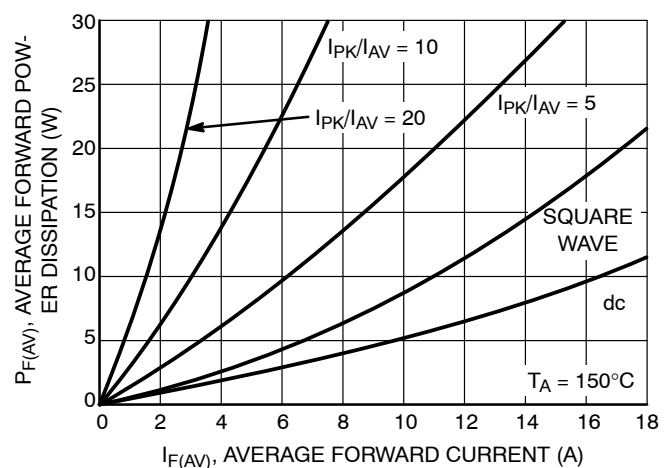


Figure 6. Forward Power Dissipation

TYPICAL CHARACTERISTICS

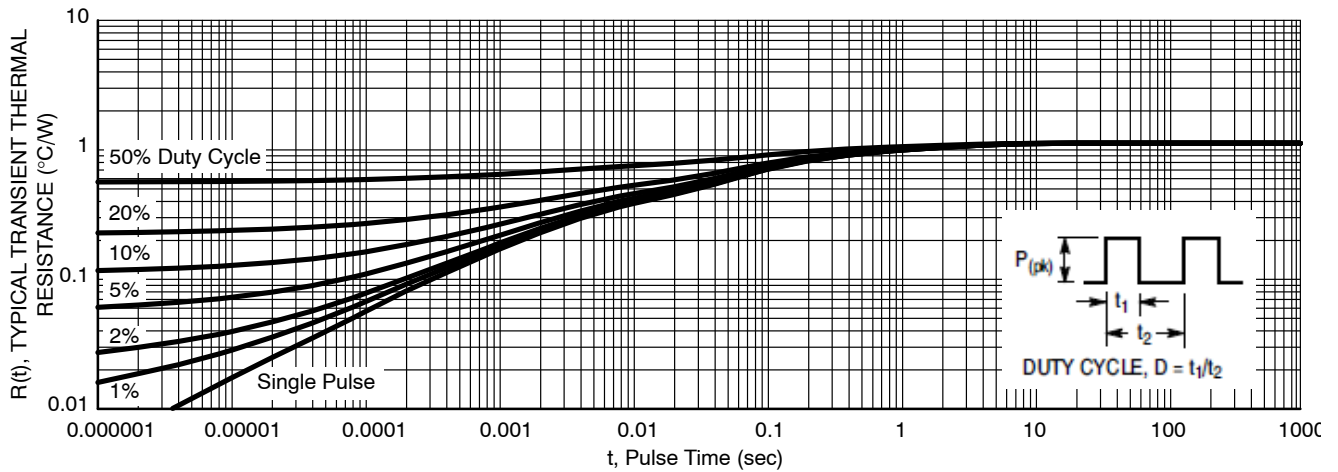


Figure 7. Typical Transient Thermal Response, Junction-to-Case for NTST30U100CT and NTSB30U100CT-1G

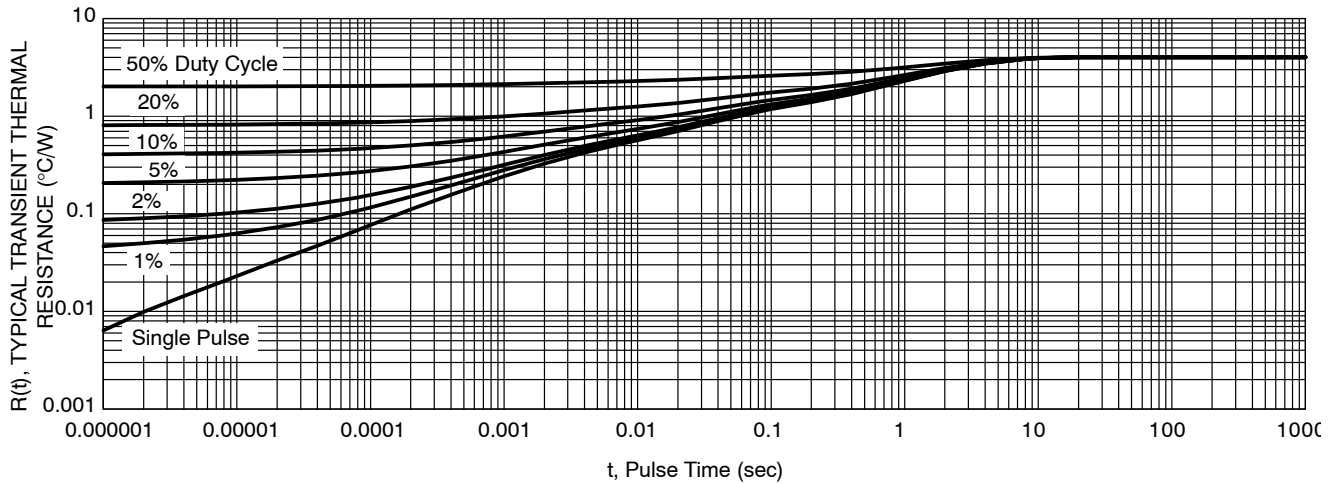


Figure 8. Typical Transient Thermal Response, Junction-to-Case for NTSJ30U100CTG

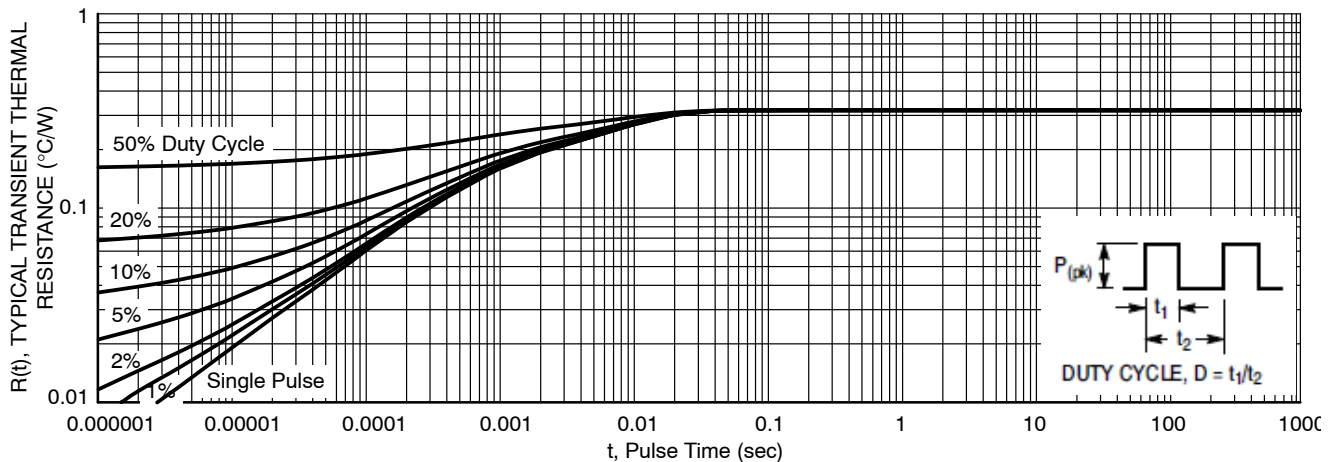


Figure 9. Typical Transient Thermal Response, Junction-to-Case for NTSB30U100CTG

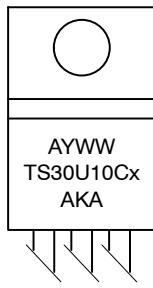
NTST30U100CT, NTSB30U100CT-1, NTSJ30U100CTG, NTSB30U100CTG

ORDERING INFORMATION

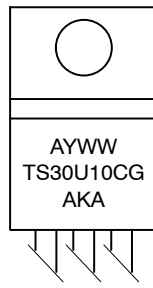
Device	Package	Shipping†
NTST30U100CTG	TO-220AB (Pb-Free)	50 Units / Rail
NTST30U100CTH	TO-220AB (Halide-Free)	50 Units / Rail
NTSB30U100CT-1G	I ² PAK (Pb-Free)	50 Units / Rail
NTSJ30U100CTG	TO-220FP (Halide-Free)	50 Units / Rail
NTSB30U100CTG	D ² PAK (Pb-Free)	50 Units / Rail
NTSB30U100CTT4G	D ² PAK (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.

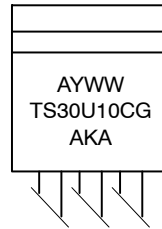
MARKING DIAGRAMS



TO-220AB



TO-220FP



I²PAK



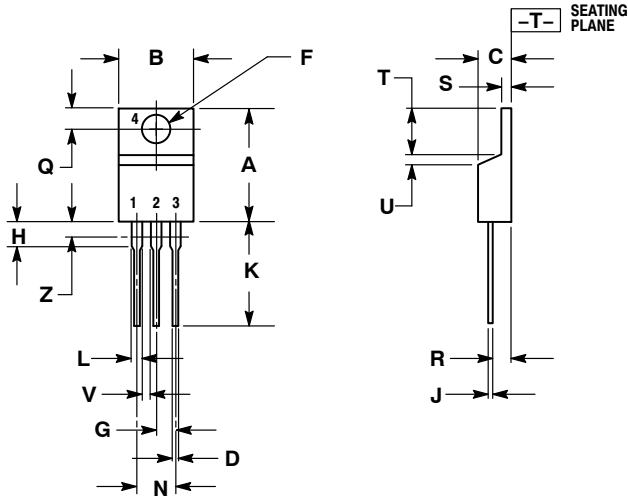
D²PAK

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

NTST30U100CT, NTSB30U100CT-1, NTSJ30U100CTG, NTSB30U100CTG

PACKAGE DIMENSIONS

TO-220 CASE 221A-09 ISSUE AH



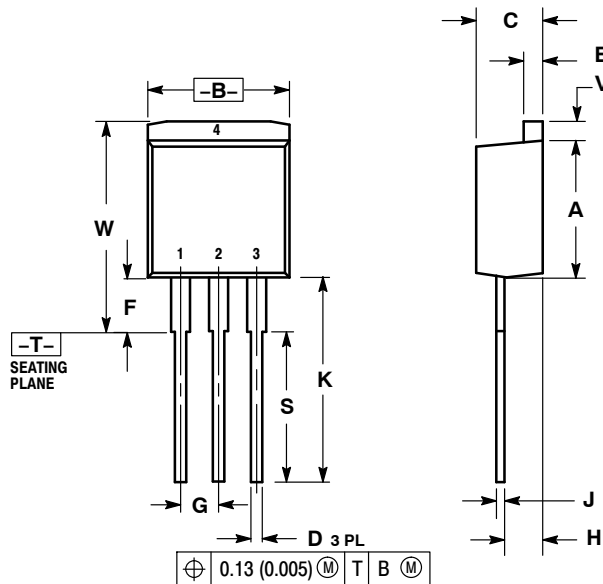
- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

DIM	INCHES		MILLIMETERS	
	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

I²PAK (TO-262) CASE 418D ISSUE D



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

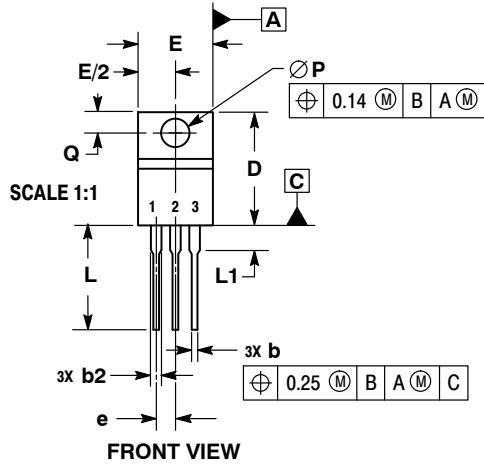
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.335	0.380	8.51	9.65
B	0.380	0.406	9.65	10.31
C	0.160	0.185	4.06	4.70
D	0.026	0.035	0.66	0.89
E	0.045	0.055	1.14	1.40
F	0.122	REF	3.10	REF
G	0.100	BSC	2.54	BSC
H	0.094	0.110	2.39	2.79
J	0.013	0.025	0.33	0.64
K	0.500	0.562	12.70	14.27
S	0.390	REF	9.90	REF
V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

STYLE 3:

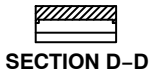
- PIN 1. ANODE
2. CATHODE
3. ANODE
4. CATHODE

PACKAGE DIMENSIONS

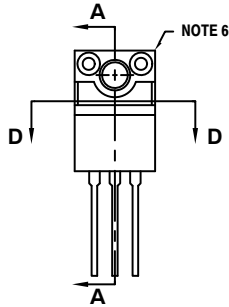
TO-220 FULLPACK, 3-LEAD
CASE 221AH
ISSUE F



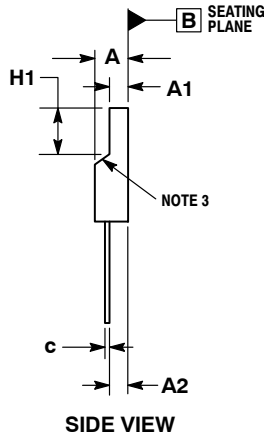
FRONT VIEW



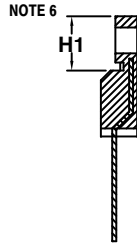
SECTION D-D



ALTERNATE CONSTRUCTION



SIDE VIEW



SECTION A-A

NOTES:

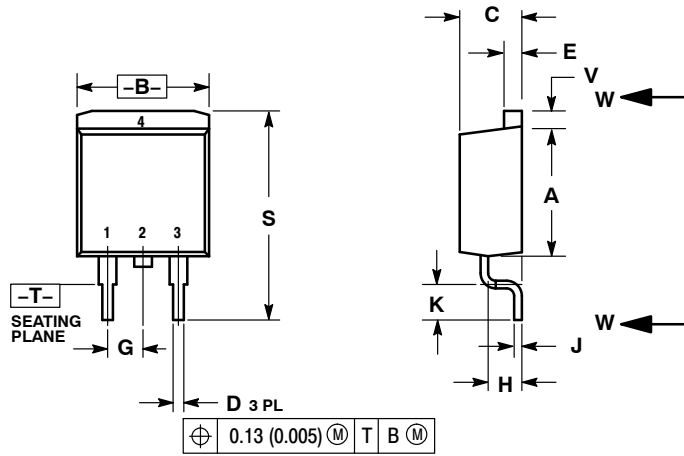
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. CONTOUR UNCONTROLLED IN THIS AREA.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH AND GATE PROTRUSIONS. MOLD FLASH AND GATE PROTRUSIONS NOT TO EXCEED 0.13 PER SIDE. THESE DIMENSIONS ARE TO BE MEASURED AT 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 ENVELOPE 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

NTST30U100CT, NTSB30U100CT-1, NTSJ30U100CTG, NTSB30U100CTG

PACKAGE DIMENSIONS

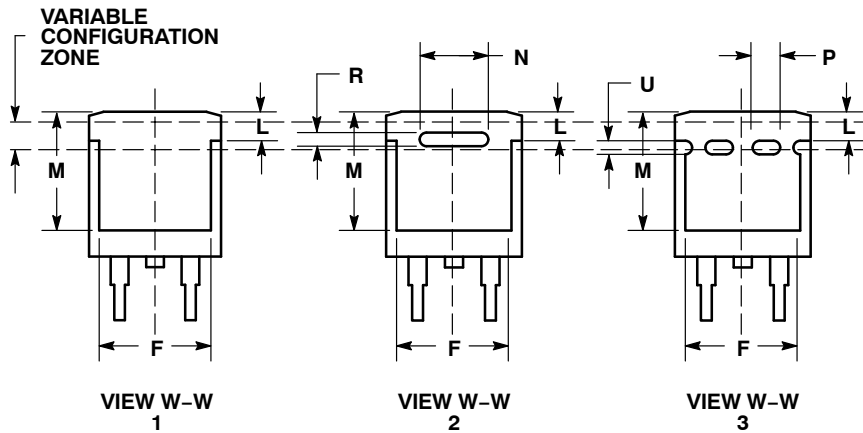
D²PAK 3 CASE 418B-04 ISSUE K



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.

DIM	INCHES		MILLIMETERS	
	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



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