

NTST20120CT, NTSJ20120CTG, NTSB20120CT-1G, NTSB20120CTG, NTSB20120CTT4G

Very Low Forward Voltage Trench-based Schottky Rectifier

Exceptionally Low $V_F = 0.54\text{ V}$ 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

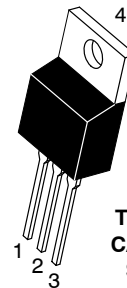
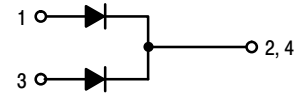


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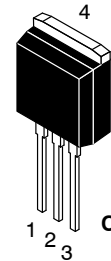
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VERY LOW FORWARD
VOLTAGE, LOW LEAKAGE
SCHOTTKY BARRIER
RECTIFIERS 20 AMPERES,
120 VOLTS

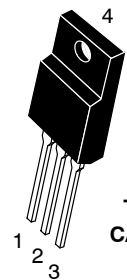
PIN CONNECTIONS



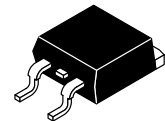
TO-220AB
CASE 221A
STYLE 6



I2PAK
CASE 418D
STYLE 3



TO-220FP
CASE 221AH



D2PAK
CASE 418B

ORDERING INFORMATION

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

NTST20120CT, NTSJ20120CTG, NTSB20120CT-1G, NTSB20120CTG, NTSB20120CTT4G

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 , $T_C = 130^\circ\text{C}$) Per device Per diode	$I_{F(AV)}$	20 10	A
Peak Repetitive Forward Current (Rated V_R , Square Wave, 20 kHz, $T_C = 135^\circ\text{C}$) Per device Per diode	I_{FRM}	40 20	A
Nonrepetitive Peak Surge Current (Surge applied at rated load conditions halfwave, single phase, 60 Hz)	I_{FSM}	120	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 Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

THERMAL CHARACTERISTICS

Rating	Symbol	NTST20120CTG NTSB20120CT-1G	NTSB20120CTG	NTSJ20120CTG	Unit
Maximum Thermal Resistance per Diode Junction-to-Case Junction-to-Ambient	$R_{\theta JC}$ $R_{\theta JA}$	2.5 70	1.43 46.8	4.42 105	$^\circ\text{C/W}$ $^\circ\text{C/W}$

ELECTRICAL CHARACTERISTICS (Per Leg unless otherwise noted)

Rating	Symbol	Typ	Max	Unit
Maximum Instantaneous Forward Voltage (Note 1) ($I_F = 5\text{ A}$, $T_J = 25^\circ\text{C}$) ($I_F = 10\text{ A}$, $T_J = 25^\circ\text{C}$) ($I_F = 5\text{ A}$, $T_J = 125^\circ\text{C}$) ($I_F = 10\text{ A}$, $T_J = 125^\circ\text{C}$)	V_F	0.62 0.90 0.54 0.64	– 1.10 – 0.72	V
Maximum Instantaneous Reverse Current (Note 1) ($V_R = 90\text{ V}$, $T_J = 25^\circ\text{C}$) ($V_R = 90\text{ V}$, $T_J = 125^\circ\text{C}$) (Rated dc Voltage, $T_J = 25^\circ\text{C}$) (Rated dc Voltage, $T_J = 125^\circ\text{C}$)	I_R	12 6 – 17	– – 700 100	μA mA μA mA

1. Pulse Test: Pulse Width = 300 μs , Duty Cycle $\leq 2.0\%$

**NTST20120CT, NTSJ20120CTG, NTSB20120CT-1G, NTSB20120CTG,
NTSB20120CTT4G**

TYPICAL CHARACTERISTICS

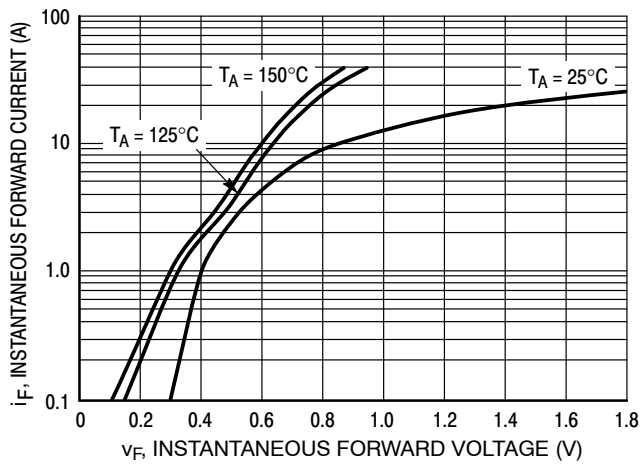


Figure 1. Typical Instantaneous Forward Characteristics

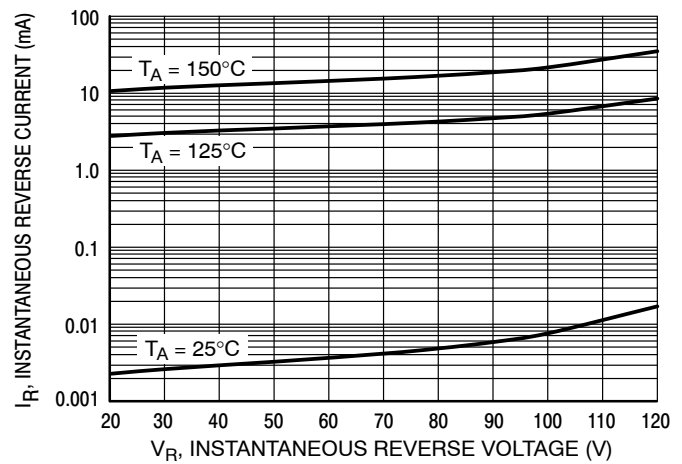


Figure 2. Typical Reverse Current Characteristics

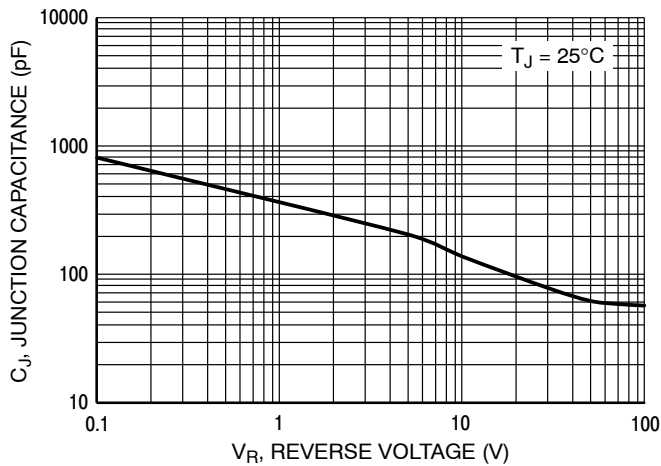


Figure 3. Typical Junction Capacitance

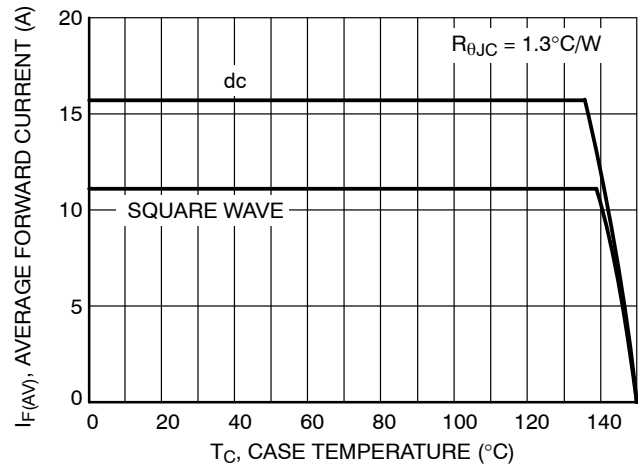


Figure 4. Current Derating per Leg

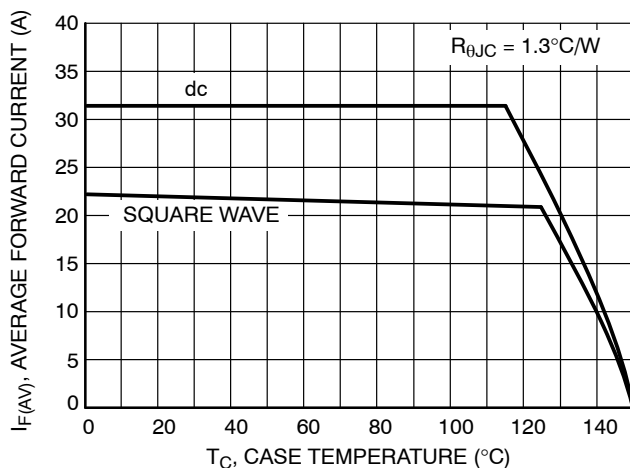


Figure 5. Current Derating

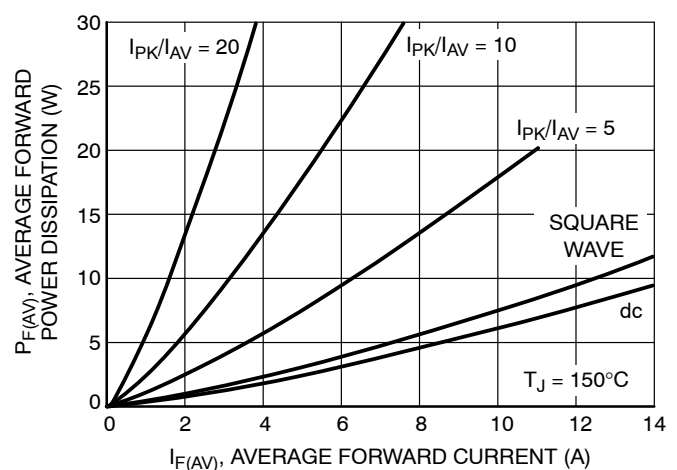


Figure 6. Forward Power Dissipation

**NTST20120CT, NTSJ20120CTG, NTSB20120CT-1G, NTSB20120CTG,
NTSB20120CTT4G**

TYPICAL CHARACTERISTICS

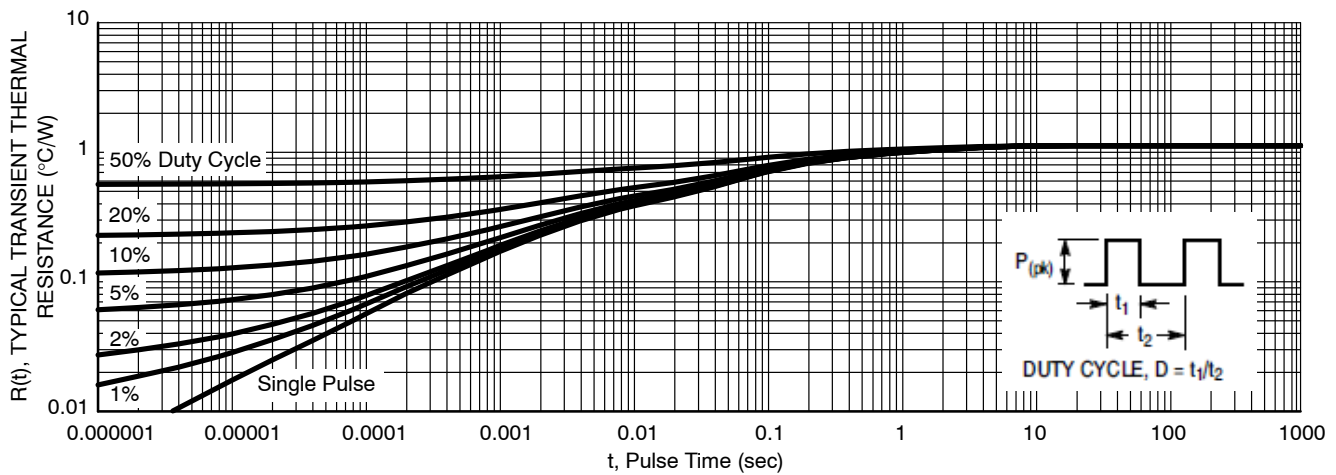


Figure 7. Typical Transient Thermal Response for NTST20120CT and NTSB20120CT-1G

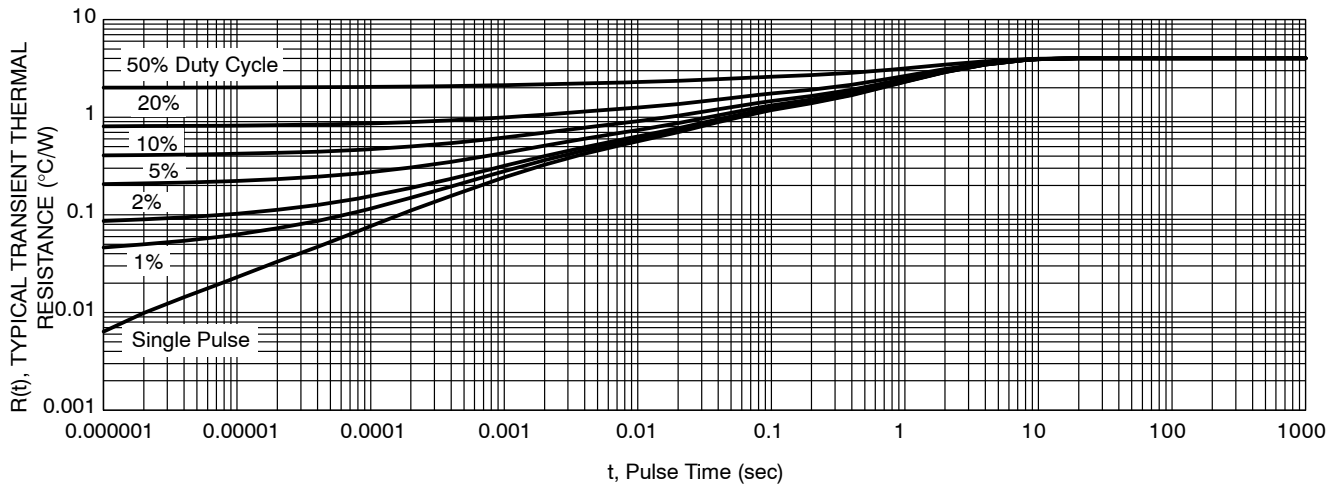


Figure 8. Typical Transient Thermal Response for NTSJ20120CTG

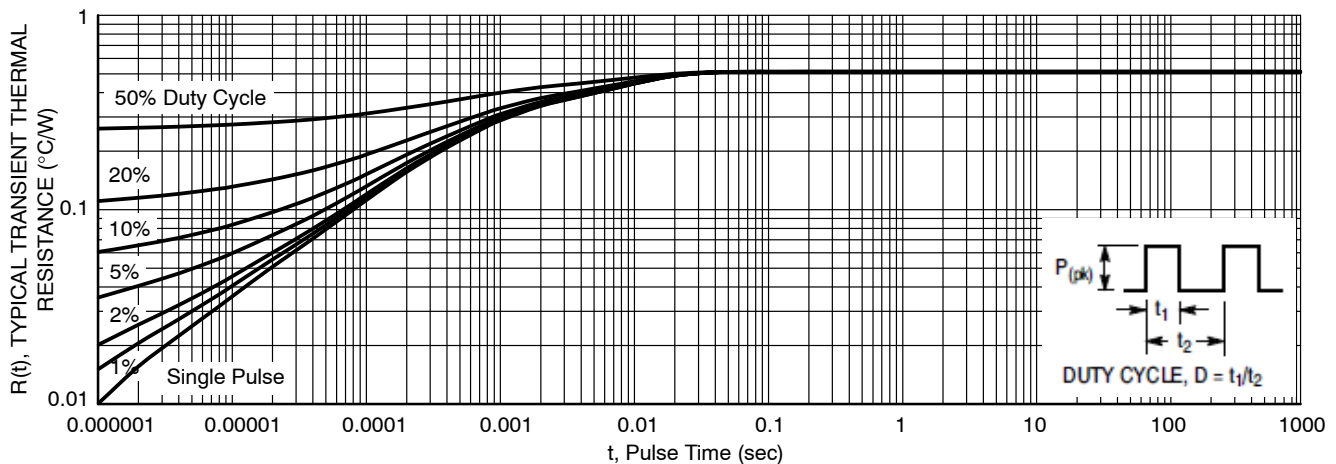


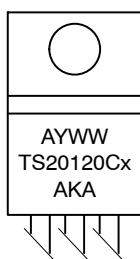
Figure 9. Typical Transient Thermal Response for NTSB20120CTG

NTST20120CT, NTSJ20120CTG, NTSB20120CT-1G, NTSB20120CTG, NTSB20120CTT4G

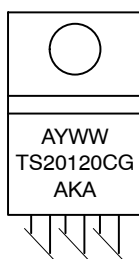
ORDERING INFORMATION

Device	Package	Shipping
NTST20120CTG	TO-220AB (Pb-Free)	50 Units / Rail
NTSJ20120CTG	TO-220FP (Halide-Free)	50 Units / Rail
NTSB20120CT-1G	I ² PAK (Pb-Free)	50 Units / Rail
NTSB20120CTG	D ² PAK (Pb-Free)	50 Units / Rail
NTSB20120CTT4G	D ² PAK (Pb-Free)	800 / Tape & Reel

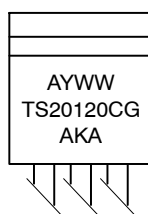
MARKING DIAGRAMS



TO-220AB



TO-220FP



I²PAK



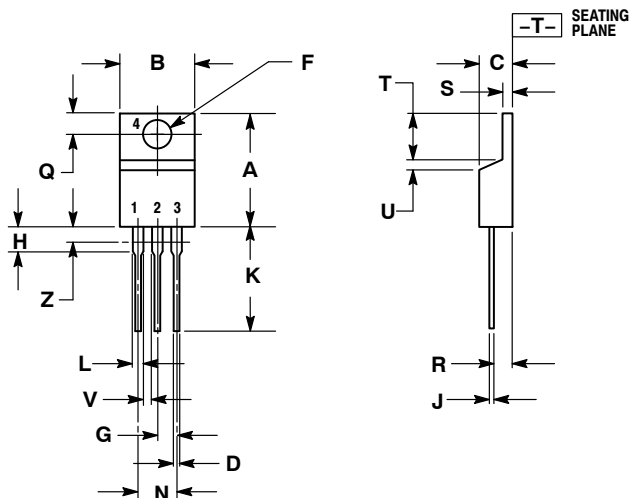
D²PAK

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

NTST20120CT, NTSJ20120CTG, NTSB20120CT-1G, NTSB20120CTG, NTSB20120CTT4G

PACKAGE DIMENSIONS

TO-220 CASE 221A-09 ISSUE AF

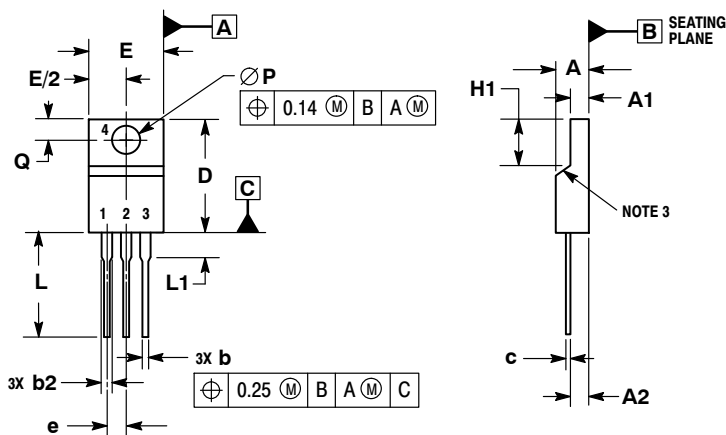


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.161	3.61	4.09
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.014	0.025	0.36	0.64
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:
1. ANODE
 2. CATHODE
 3. ANODE
 4. CATHODE

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



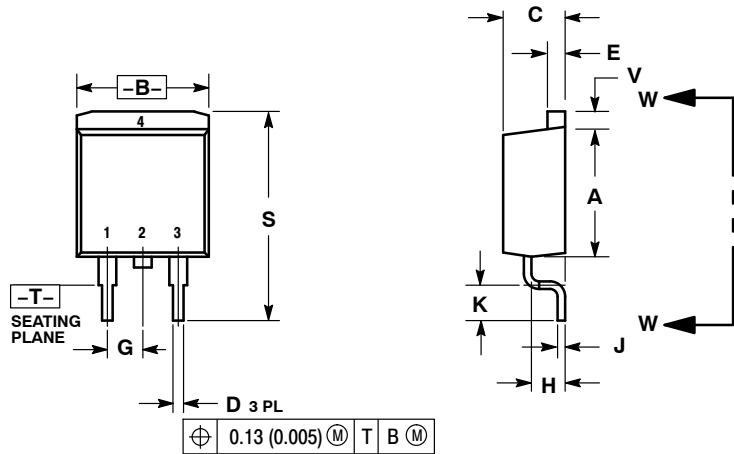
- NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
 2. CONTROLLING DIMENSION: MILLIMETERS.
 3. CONTOUR UNCONTROLLED IN THIS AREA.
 4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH AND GATE PROTRUSIONS. MOLD FLASH AND GATE PROTRUSIONS NOT TO EXCEED 0.13 PER SIDE. THESE DIMENSIONS ARE TO BE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

DIM	MILLIMETERS	
	MIN	MAX
A	4.30	4.70
A1	2.50	2.90
A2	2.50	2.70
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	6.70	7.10
L	12.70	14.73
L1	---	2.80
P	3.00	3.40
Q	2.80	3.20

NTST20120CT, NTSJ20120CTG, NTSB20120CT-1G, NTSB20120CTG,
NTSB20120CTT4G

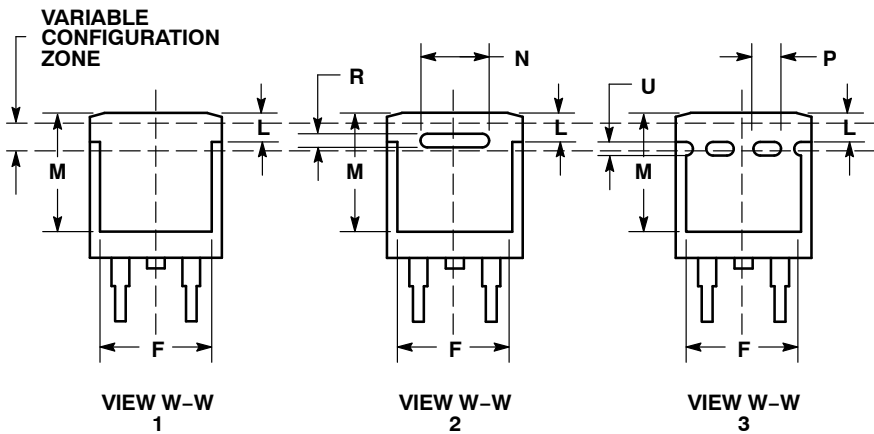
PACKAGE DIMENSIONS

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.

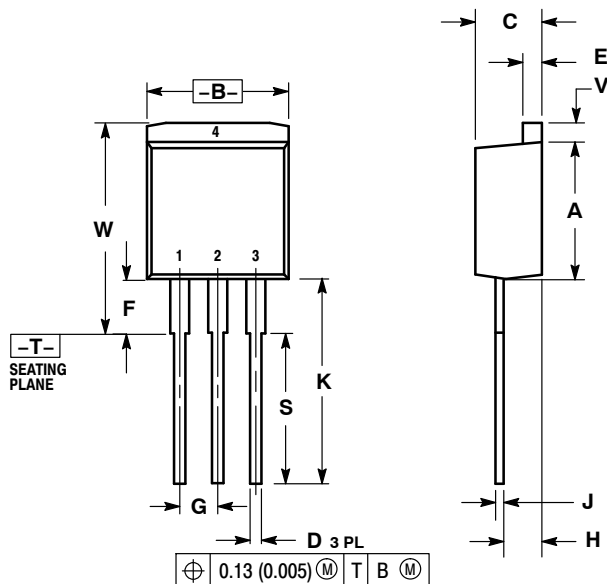
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.340	0.380	8.64	9.65
B	0.380	0.405	9.65	10.29
C	0.160	0.190	4.06	4.83
D	0.020	0.035	0.51	0.89
E	0.045	0.055	1.14	1.40
F	0.310	0.350	7.87	8.89
G	0.100 BSC		2.54 BSC	
H	0.080	0.110	2.03	2.79
J	0.018	0.025	0.46	0.64
K	0.090	0.110	2.29	2.79
L	0.052	0.072	1.32	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



NTST20120CT, NTSJ20120CTG, NTSB20120CT-1G, NTSB20120CTG, NTSB20120CTT4G

PACKAGE DIMENSIONS

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

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NTST20120CT/D