

NTST40100CTG, NTSB40100CT-1G, NTSB40100CTG, NTSJ40100CTG



ON Semiconductor®

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Very Low Forward Voltage Trench-based Schottky Rectifier

Exceptionally Low $V_F = 0.38\text{ V}$ 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

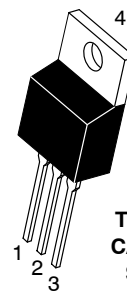
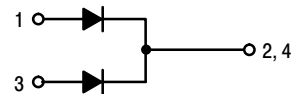
Typical Applications

- 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

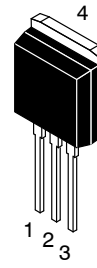
Mechanical Characteristics

- 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

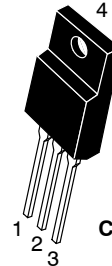
PIN CONNECTIONS



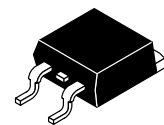
TO-220AB
CASE 221A
STYLE 6



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.

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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 , $T_C = 120^\circ\text{C}$) | $I_{F(AV)}$ | Per device 40 Per diode 20 | A |
| Peak Repetitive Forward Current (Rated V_R , Square Wave, 20 kHz, $T_C = 125^\circ\text{C}$) | I_{FRM} | Per device 60 Per diode 30 | 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 | $^\circ\text{C}$ |
| 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 | NTST40100CTG, NTSB40100CT-1G | NTSB40100CTG | NTSJ40100CTG | Unit |
|--|-----------------|---------------------------------|--------------|--------------|---------------------------|
| Maximum Thermal Resistance per Diode Junction-to-Case | $R_{\theta JC}$ | 1.3 | 0.79 | 4.0 | $^\circ\text{C}/\text{W}$ |
| Junction-to-Ambient | $R_{\theta JA}$ | 70 | 46.3 | 105 | $^\circ\text{C}/\text{W}$ |

ELECTRICAL CHARACTERISTICS (Per Leg unless otherwise noted)

| Rating | Symbol | Typ | Max | Unit |
|---|--------|--|--------------------------------------|--|
| Maximum Instantaneous Forward Voltage (Note 1) ($I_F = 5\text{ A}$, $T_J = 25^\circ\text{C}$) ($I_F = 10\text{ A}$, $T_J = 25^\circ\text{C}$) ($I_F = 20\text{ A}$, $T_J = 25^\circ\text{C}$) ($I_F = 5\text{ A}$, $T_J = 125^\circ\text{C}$) ($I_F = 10\text{ A}$, $T_J = 125^\circ\text{C}$) ($I_F = 20\text{ A}$, $T_J = 125^\circ\text{C}$) | V_F | 0.46 0.56 0.71 0.41 0.52 0.63 | - - 0.80 - - 0.68 | 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 | 12 8.0 20 20 | 1000 45 | 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

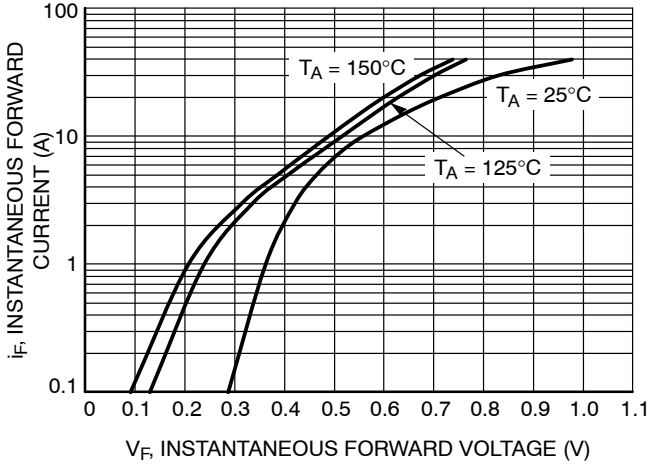


Figure 1. Typical Instantaneous Forward Characteristics

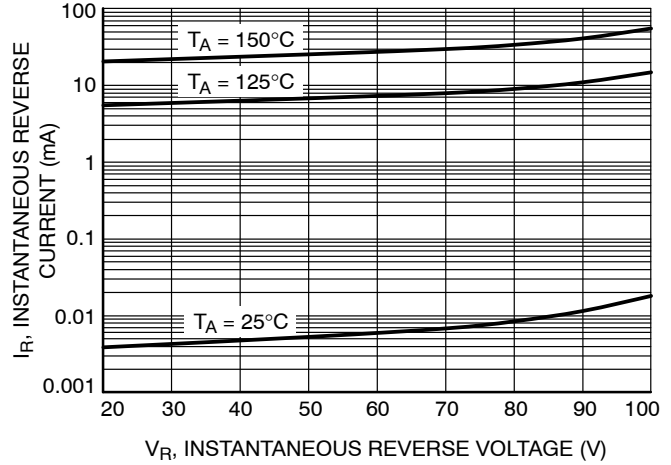


Figure 2. Typical Reverse Characteristics

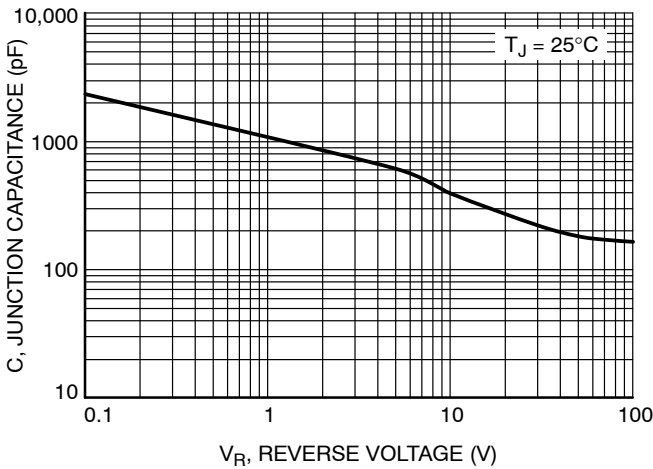


Figure 3. Typical Junction Capacitance

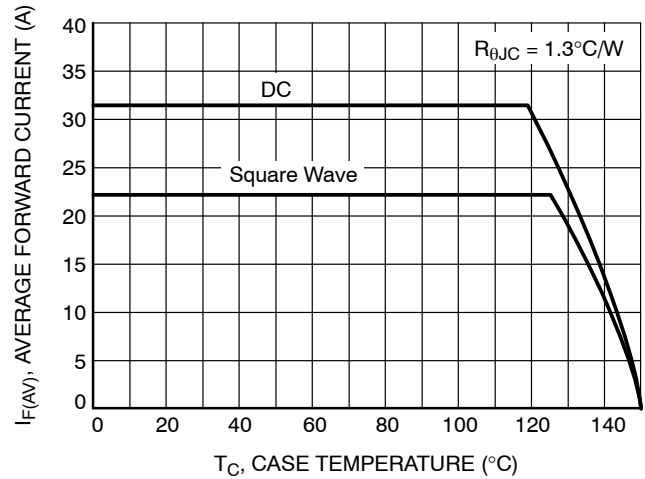


Figure 4. Current Derating per Leg

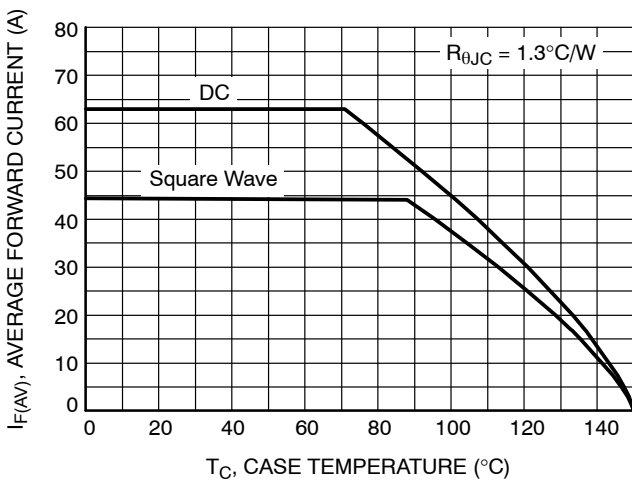


Figure 5. Current Derating

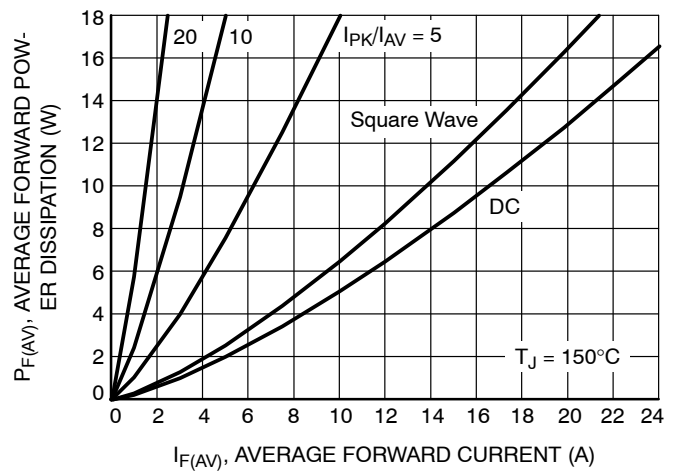


Figure 6. Forward Power Dissipation

TYPICAL CHARACTERISTICS

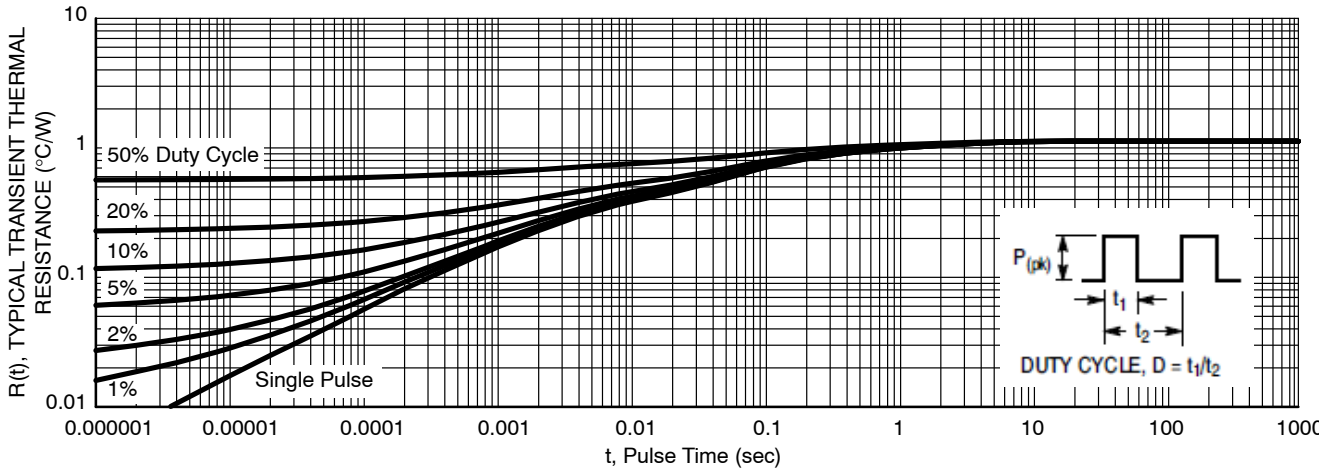


Figure 7. Typical Transient Thermal Response for NTST40100CT and NTSB40100CT-1G

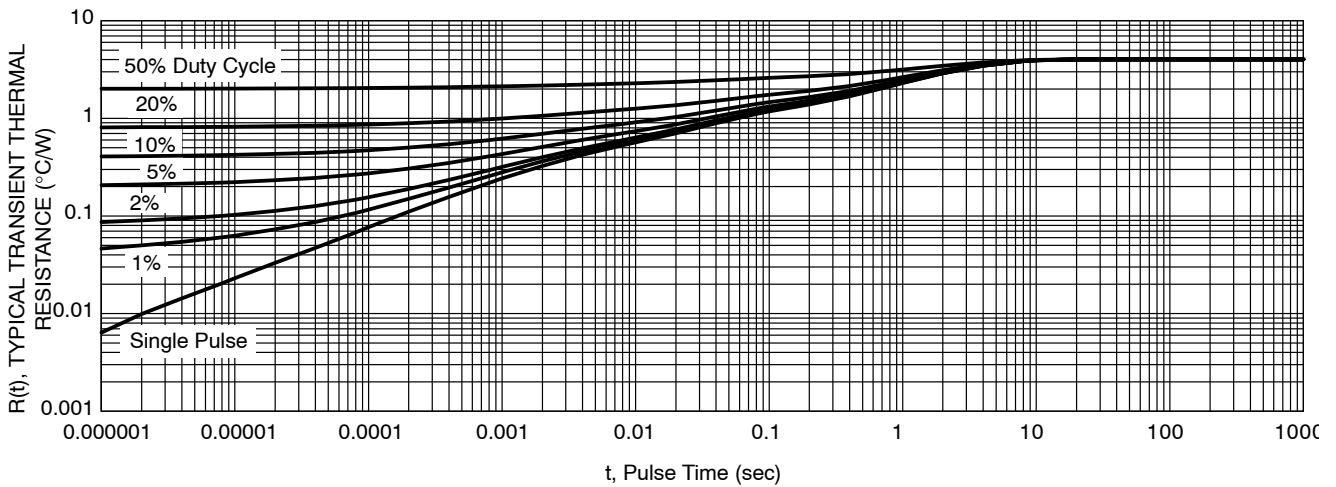


Figure 8. Typical Transient Thermal Response for NTSJ40100CTG

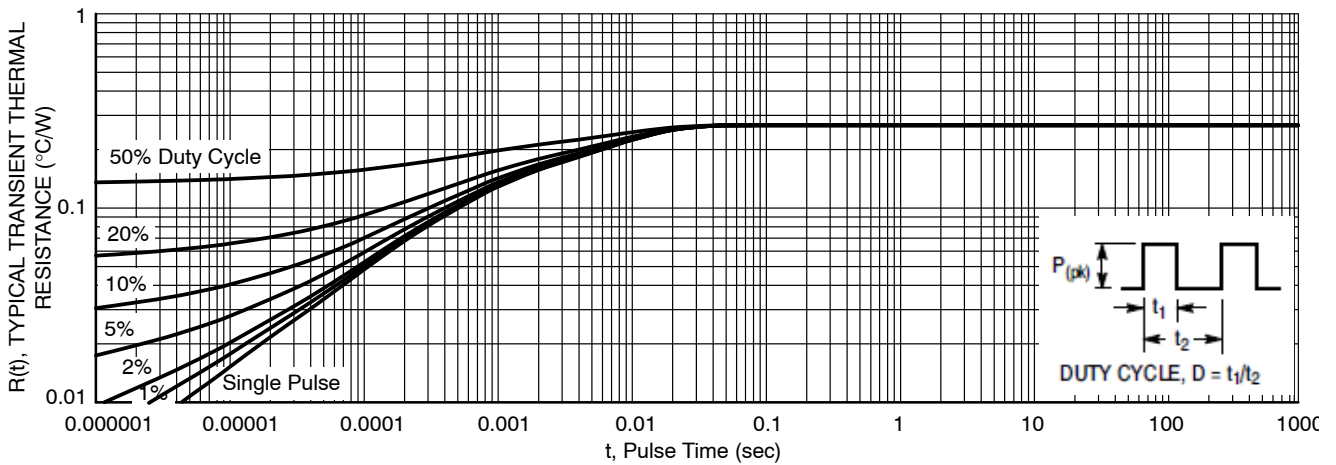


Figure 9. Typical Transient Thermal Response for NTSB40100CTG

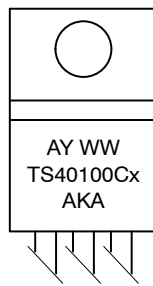
NTST40100CTG, NTSB40100CT-1G, NTSB40100CTG, NTSJ40100CTG

ORDERING INFORMATION

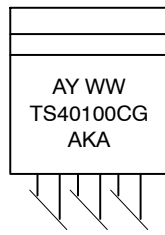
| Device | Package | Shipping† |
|----------------|---------------------------------|-------------------|
| NTST40100CTG | TO-220AB (Pb-Free) | 50 Units / Rail |
| NTSB40100CT-1G | I ² PAK (Pb-Free) | 50 Units / Rail |
| NTSB40100CTG | D ² PAK (Pb-Free) | 50 Units / Rail |
| NTSB40100CTT4G | D ² PAK (Pb-Free) | 800 / Tape & Reel |
| NTSJ40100CTG | TO-220FP (Halide-Free) | 50 Units / Rail |

†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.

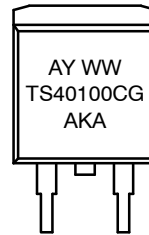
MARKING DIAGRAMS



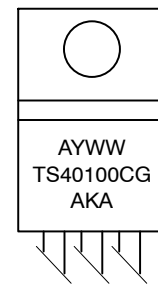
TO-220AB



I²PAK



D²PAK



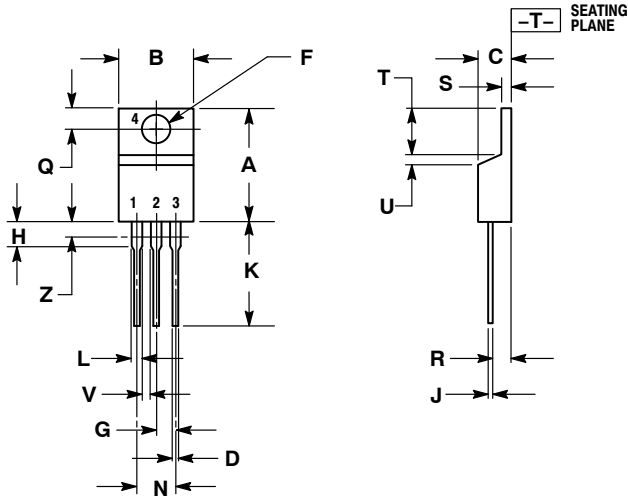
TO-220FP

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

NTST40100CTG, NTSB40100CT-1G, NTSB40100CTG, NTSJ40100CTG

PACKAGE DIMENSIONS

TO-220 CASE 221A-09 ISSUE AH



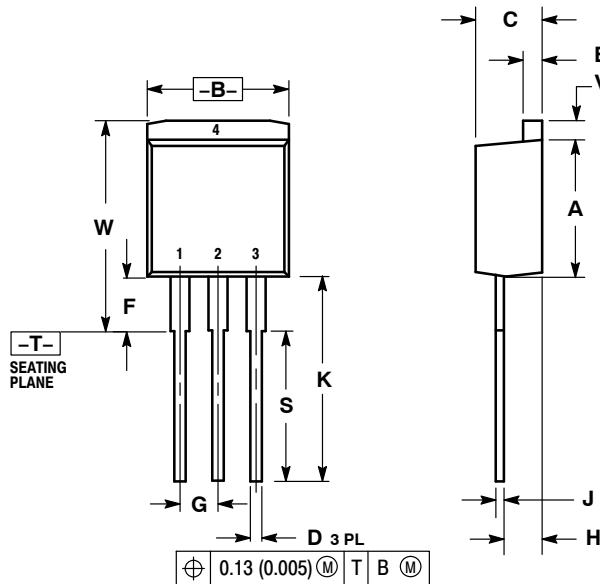
- NOTES:
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

| 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

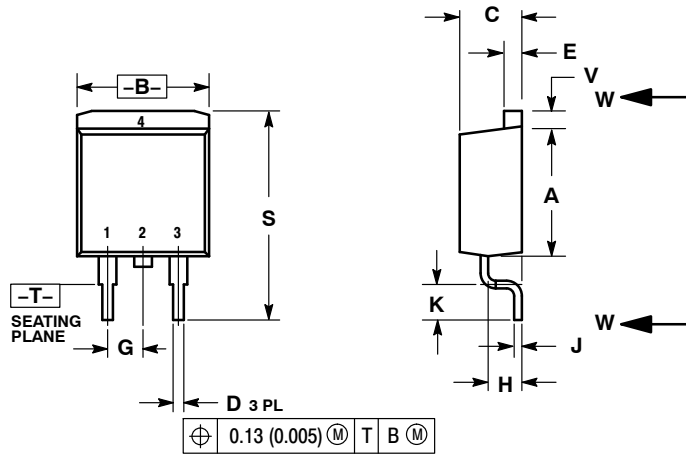


- NOTES:
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.

| 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 |

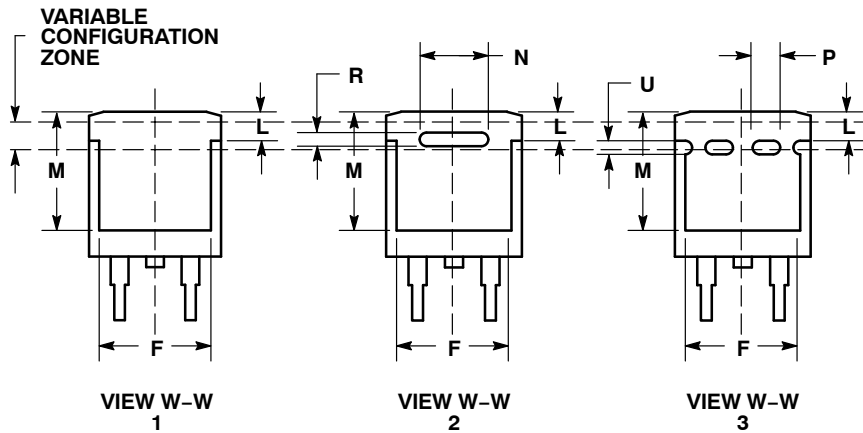
PACKAGE DIMENSIONS

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.

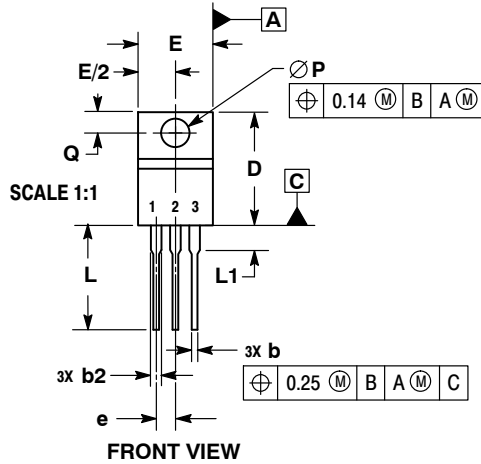
| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.340 | 0.380 | 8.64 | 9.65 |
| B | 0.380 | 0.405 | 9.65 | 10.29 |
| C | 0.160 | 0.190 | 4.06 | 4.83 |
| D | 0.020 | 0.035 | 0.51 | 0.89 |
| E | 0.045 | 0.055 | 1.14 | 1.40 |
| F | 0.310 | 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 |



NTST40100CTG, NTSB40100CT-1G, NTSB40100CTG, NTSJ40100CTG

PACKAGE DIMENSIONS

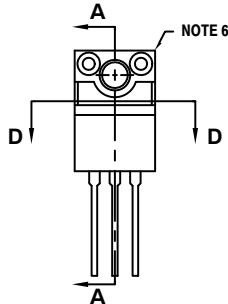
TO-220 FULLPACK, 3-LEAD CASE 221AH ISSUE F



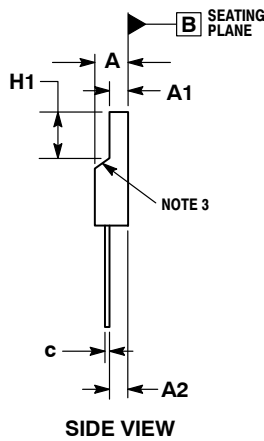
FRONT VIEW



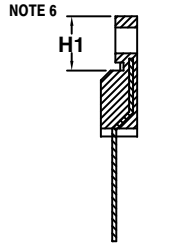
SECTION D-D



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 |

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