

# NTST60100CT, NTSB60100CT-1, NTSB60100CT, NTSJ60100CT



ON Semiconductor®

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## Very Low Forward Voltage Trench-based Schottky Rectifier

Exceptionally Low  $V_F = 0.36\text{ V}$  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
- Halide Free Devices Available
- These are Pb-Free Packages

### Typical Applications

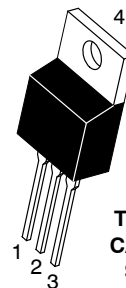
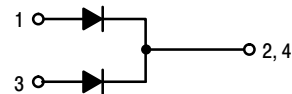
- Switching Power Supplies including Notebook / Netbook Adapters, ATX and Flat Panel Display
- High Frequency and DC-DC Converters
- Freewheeling and OR-ing diodes
- Reverse Battery Protection
- Instrumentation

### Mechanical Characteristics

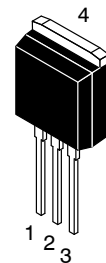
- Case: Epoxy, Molded
- Epoxy Meets Flammability Rating UL 94-0 @ 0.125 in
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes: 260°C Maximum for 10 sec

VERY LOW FORWARD VOLT-  
AGE, LOW LEAKAGE SCHOT-  
TKY BARRIER  
RECTIFIERS 60 AMPERES,  
100 VOLTS

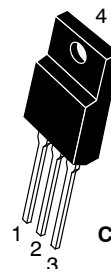
### PIN CONNECTIONS



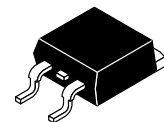
TO-220AB  
CASE 221A  
STYLE 6



I2PAK  
CASE 418D  
STYLE 3



TO-220FP  
CASE 221AH



D2PAK  
CASE 418B

### ORDERING INFORMATION

See detailed ordering and shipping information on page 6 of this data sheet.

# NTST60100CT, NTSB60100CT-1, NTSB60100CT, NTSJ60100CT

## MAXIMUM RATINGS

| Rating   | Symbol                          | Value                 | Unit             |
|--|---------------------------------|-----------------------|------------------|
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage   | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | 100                   | V                |
| Average Rectified Forward Current at Rated $V_R$<br>NTST60100CT, NTSB60100CT-1 and NTSB60100CT<br>(Rated $V_R$ , $T_C = 115^\circ\text{C}$ ) per Device<br>(Rated $V_R$ , $T_C = 125^\circ\text{C}$ ) per Diode<br>NTSJ60100CT<br>(Rated $V_R$ , $T_C = 80^\circ\text{C}$ ) per Device<br>(Rated $V_R$ , $T_C = 75^\circ\text{C}$ ) per Diode                    | $I_{F(AV)}$                     | 60<br>30<br>30<br>30  | A                |
| Peak Repetitive Forward Current (Rated $V_R$ , Square Wave, 20 kHz)<br>NTST60100CT, NTSB60100CT-1 and NTSB60100CT<br>(Rated $V_R$ , $T_C = 105^\circ\text{C}$ ) per Device<br>(Rated $V_R$ , $T_C = 120^\circ\text{C}$ ) per Diode<br>NTSJ60100CT<br>(Rated $V_R$ , $T_C = 65^\circ\text{C}$ ) per Device<br>(Rated $V_R$ , $T_C = 55^\circ\text{C}$ ) per Diode | $I_{FRM}$                       | 120<br>60<br>30<br>30 | A                |
| Nonrepetitive Peak Surge Current<br>(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           | $^\circ\text{C}$ |

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          | NTST60100CT,<br>NTSB60100CT-1,<br>NTSB60100CT | NTSJ60100CT  | Unit                      |
|---|-----------------|---|--------------|---------------------------|
| Maximum Thermal Resistance<br>Junction-to-Case<br>Per Diode<br>Per Device | $R_{\theta JC}$ | 1.10<br>0.67                                  | 3.60<br>3.17 | $^\circ\text{C}/\text{W}$ |

## ELECTRICAL CHARACTERISTICS (Per Leg unless otherwise noted)

| Rating  | Symbol | Typ  | Max  | Unit   |
|---|--------|--|--|--|
| Maximum Instantaneous Forward Voltage (Note 1)<br>( $I_F = 5\text{ A}$ , $T_J = 25^\circ\text{C}$ )<br>( $I_F = 10\text{ A}$ , $T_J = 25^\circ\text{C}$ )<br>( $I_F = 15\text{ A}$ , $T_J = 25^\circ\text{C}$ )<br>( $I_F = 20\text{ A}$ , $T_J = 25^\circ\text{C}$ )<br>( $I_F = 30\text{ A}$ , $T_J = 25^\circ\text{C}$ )<br><br>( $I_F = 5\text{ A}$ , $T_J = 125^\circ\text{C}$ )<br>( $I_F = 10\text{ A}$ , $T_J = 125^\circ\text{C}$ )<br>( $I_F = 15\text{ A}$ , $T_J = 125^\circ\text{C}$ )<br>( $I_F = 20\text{ A}$ , $T_J = 125^\circ\text{C}$ )<br>( $I_F = 30\text{ A}$ , $T_J = 125^\circ\text{C}$ ) | $V_F$  | 0.45<br>0.52<br>0.58<br>0.63<br>0.73<br><br>0.36<br>0.45<br>0.53<br>0.58<br>0.66 | -<br>-<br>0.63<br>-<br>0.84<br><br>-<br>-<br>0.58<br>-<br>0.70 | V  |
| Maximum Instantaneous Reverse Current (Note 1)<br>( $V_R = 80\text{ V}$ , $T_J = 25^\circ\text{C}$ )<br>( $V_R = 80\text{ V}$ , $T_J = 125^\circ\text{C}$ )<br><br>(Rated dc Voltage, $T_J = 25^\circ\text{C}$ )<br>(Rated dc Voltage, $T_J = 125^\circ\text{C}$ )  | $I_R$  | 20<br>15<br><br>40<br>30   | 500<br>20<br><br>1000<br>85                                    | $\mu\text{A}$<br>mA<br><br>$\mu\text{A}$<br>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  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$

TYPICAL CHARACTERISTICS

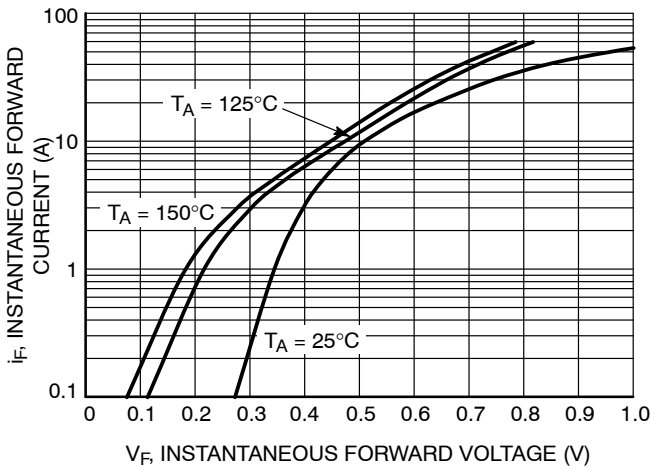


Figure 1. Typical Instantaneous Forward Characteristics

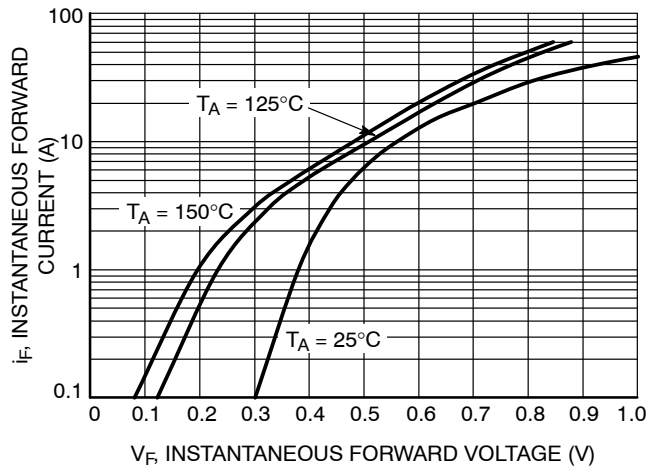


Figure 2. Maximum Instantaneous Forward Characteristics

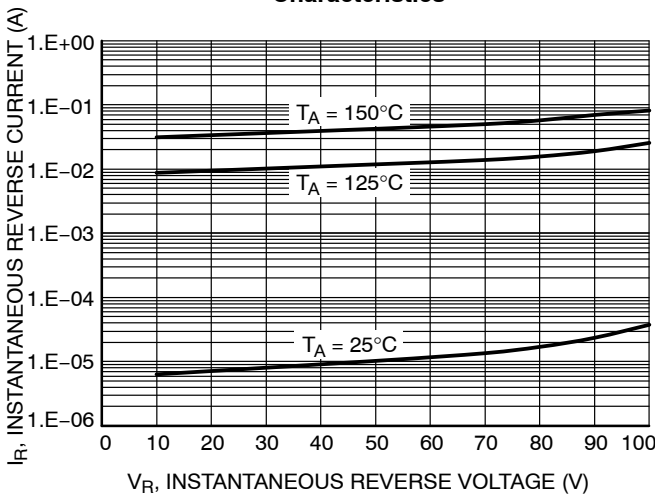


Figure 3. Typical Reverse Characteristics

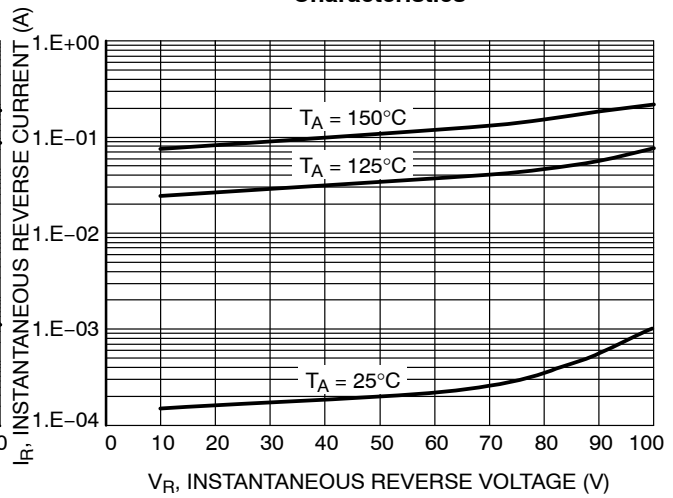


Figure 4. Maximum Reverse Characteristics

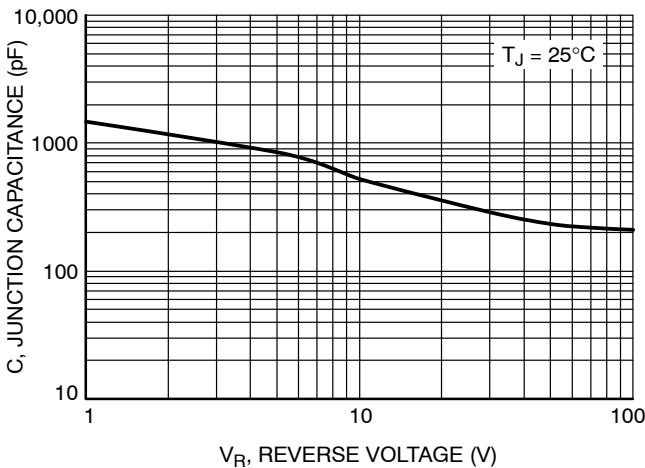


Figure 5. Typical Junction Capacitance

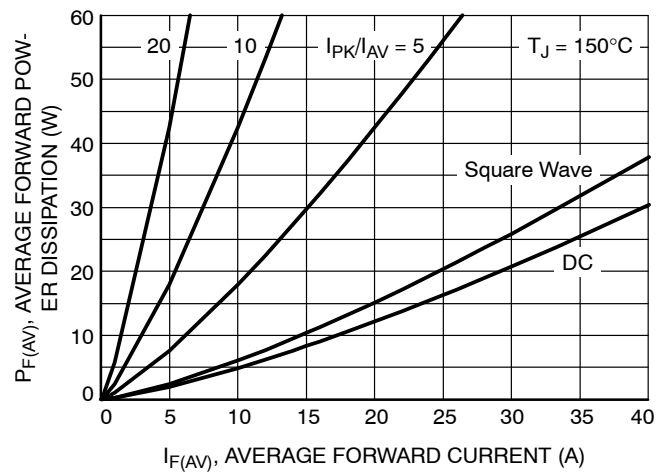


Figure 6. Forward Power Dissipation

# NTST60100CT, NTSB60100CT-1, NTSB60100CT, NTSJ60100CT

## TYPICAL CHARACTERISTICS

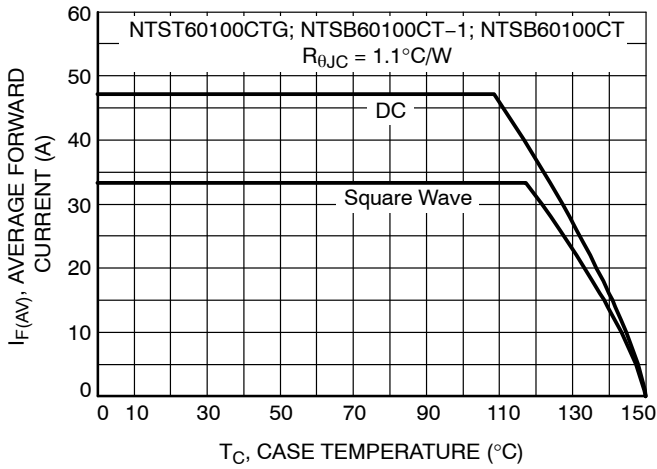


Figure 7. Current Derating per Diode

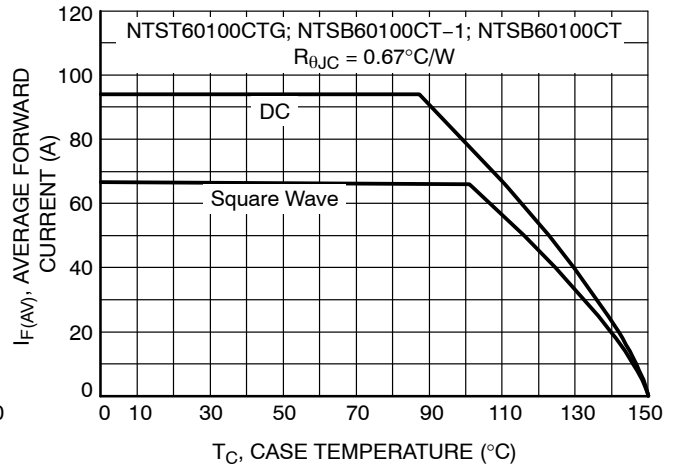


Figure 8. Current Derating per Device

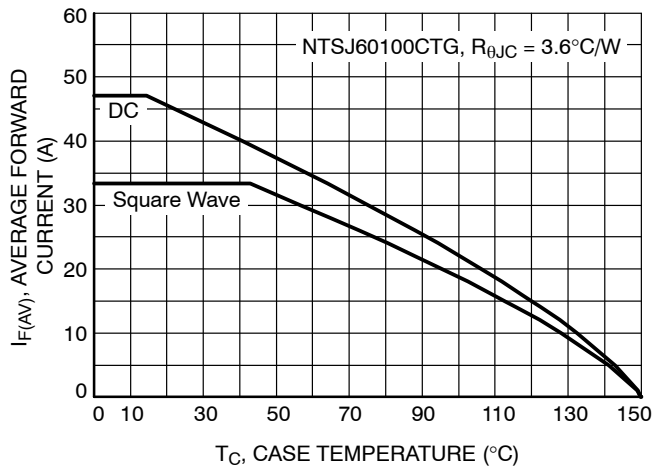


Figure 9. Current Derating per Diode

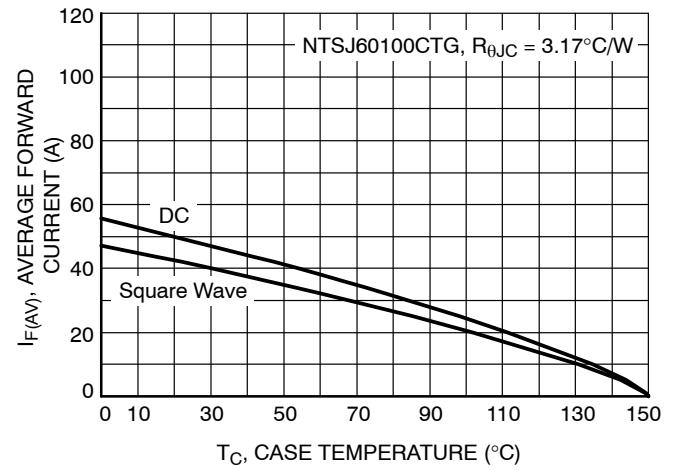


Figure 10. Current Derating per Device

# NTST60100CT, NTSB60100CT-1, NTSB60100CT, NTSJ60100CT

## TYPICAL CHARACTERISTICS

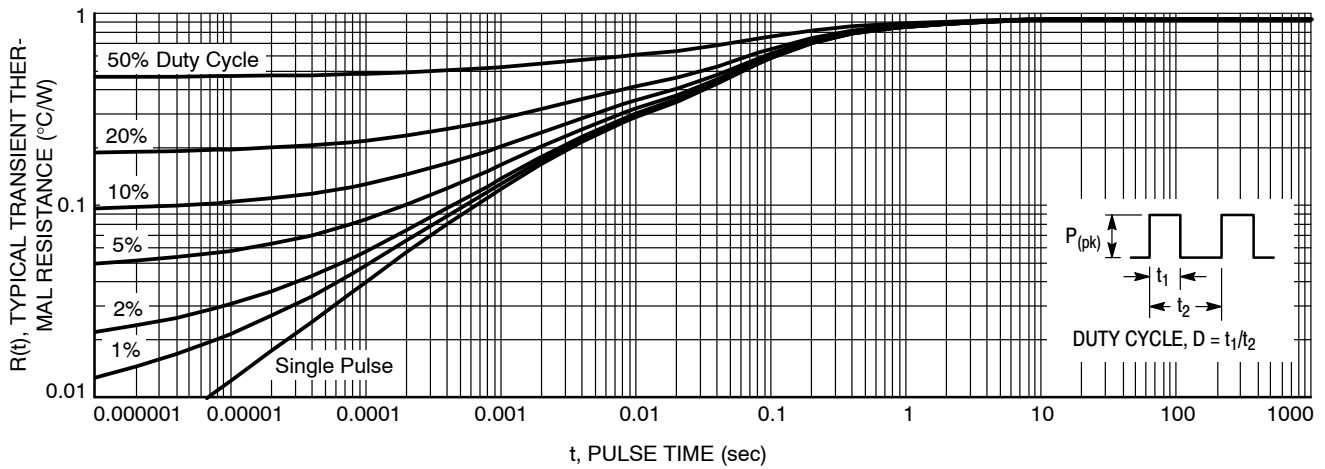


Figure 11. NTST60100CT, NTSB60100CT-1G and NTSB60100CT Typical Transient Thermal Response

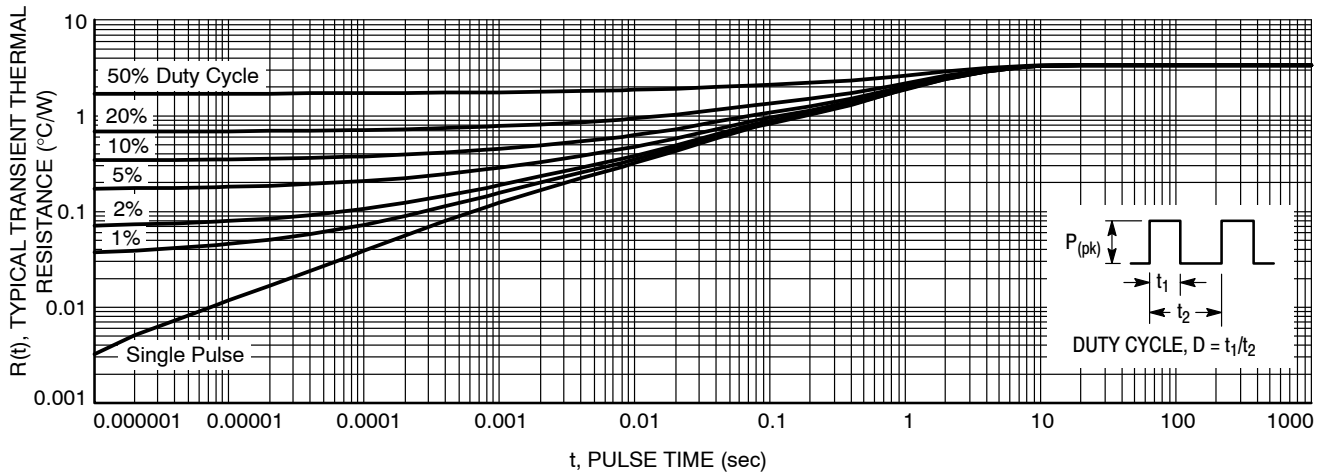


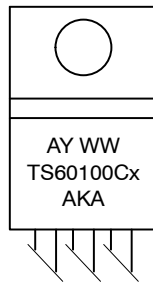
Figure 12. NTSJ60100CTG Typical Transient Thermal Response

# NTST60100CT, NTSB60100CT-1, NTSB60100CT, NTSJ60100CT

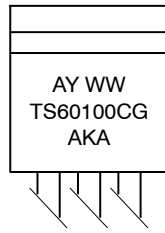
## ORDERING INFORMATION

| Device         | Package                            | Shipping          |
|----------------|------------------------------------|-------------------|
| NTST60100CTG   | TO-220AB<br>(Pb-Free)              | 50 Units / Rail   |
| NTSB60100CT-1G | I <sup>2</sup> PAK<br>(Pb-Free)    | 50 Units / Rail   |
| NTSB60100CTG   | D <sup>2</sup> PAK<br>(Pb-Free)    | 50 Units / Rail   |
| NTSB60100CTT4G | D <sup>2</sup> PAK<br>(Pb-Free)    | 800 / Tape & Reel |
| NTSJ60100CTG   | TO-220FP<br>(Halide-Free, Pb-Free) | 50 Units / Rail   |

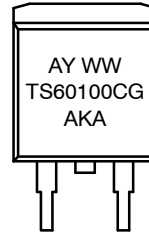
## MARKING DIAGRAMS



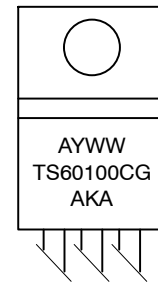
TO-220AB



I<sup>2</sup>PAK



D<sup>2</sup>PAK



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

# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

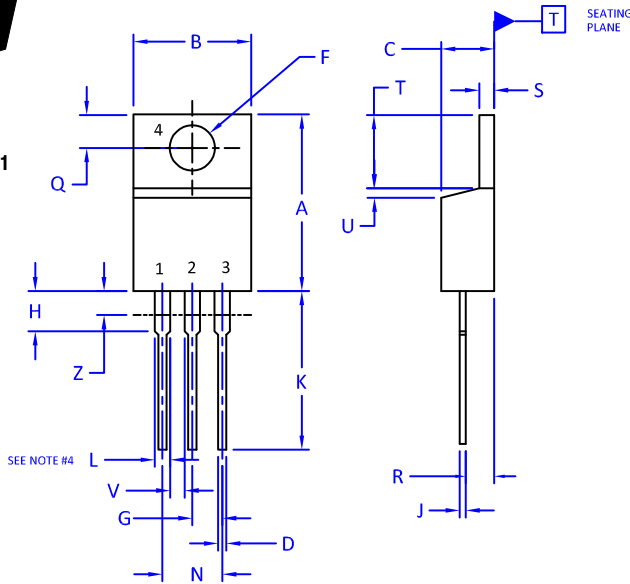
ON Semiconductor®



SCALE 1:1

### TO-220 CASE 221A-09 ISSUE AJ

DATE 05 NOV 2019



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 2009.
2. CONTROLLING DIMENSION: INCHES
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.
4. MAX WIDTH FOR F102 DEVICE = 1.35MM

| 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 | 3.60        | 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        | 1.41  |
| 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 1:

- PIN 1. BASE
- 2. COLLECTOR
- 3. EMITTER
- 4. COLLECTOR

STYLE 2:

- PIN 1. BASE
- 2. EMITTER
- 3. COLLECTOR
- 4. EMITTER

STYLE 3:

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

STYLE 4:

- PIN 1. MAIN TERMINAL 1
- 2. MAIN TERMINAL 2
- 3. GATE
- 4. MAIN TERMINAL 2

STYLE 5:

- PIN 1. GATE
- 2. DRAIN
- 3. SOURCE
- 4. DRAIN

STYLE 6:

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

STYLE 7:

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

STYLE 8:

- PIN 1. CATHODE
- 2. ANODE
- 3. EXTERNAL TRIP/DELAY
- 4. ANODE

STYLE 9:

- PIN 1. GATE
- 2. COLLECTOR
- 3. EMITTER
- 4. COLLECTOR

STYLE 10:

- PIN 1. GATE
- 2. SOURCE
- 3. DRAIN
- 4. SOURCE

STYLE 11:

- PIN 1. DRAIN
- 2. SOURCE
- 3. GATE
- 4. SOURCE

STYLE 12:

- PIN 1. MAIN TERMINAL 1
- 2. MAIN TERMINAL 2
- 3. GATE
- 4. NOT CONNECTED

|                         |                    |  |
|-------------------------|--------------------|--|
| <b>DOCUMENT NUMBER:</b> | <b>98ASB42148B</b> | Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red. |
| <b>DESCRIPTION:</b>     | <b>TO-220</b>      | <b>PAGE 1 OF 1</b>   |

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# MECHANICAL CASE OUTLINE

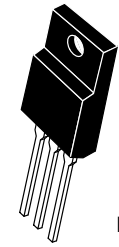
## PACKAGE DIMENSIONS

ON Semiconductor®

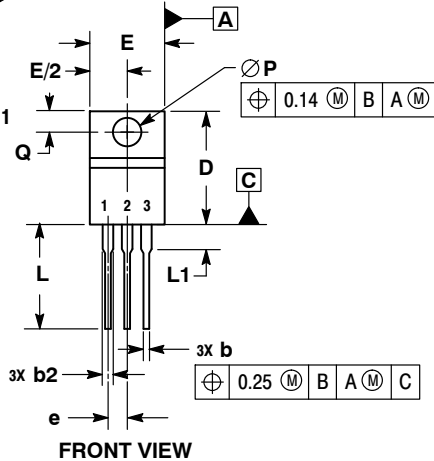


### TO-220 FULLPACK, 3-LEAD CASE 221AH ISSUE F

DATE 30 SEP 2014



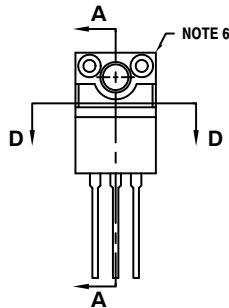
SCALE 1:1



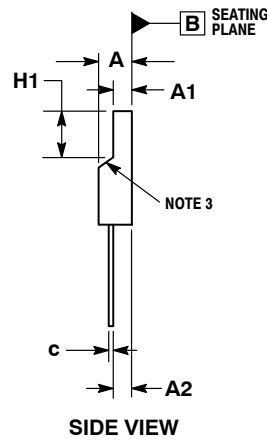
FRONT VIEW



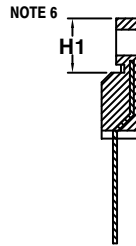
SECTION D-D



ALTERNATE CONSTRUCTION



SIDE VIEW



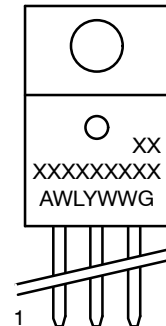
SECTION A-A

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  |

#### GENERIC MARKING DIAGRAM\*



- A = Assembly Location
- WL = Wafer Lot
- Y = Year
- WW = Work Week
- G = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present.

STYLE 1:

1. MAIN TERMINAL 1
2. MAIN TERMINAL 2
3. GATE

STYLE 2:

1. CATHODE
2. ANODE
3. GATE

|                  |                         |  |
|------------------|-------------------------|--|
| DOCUMENT NUMBER: | 98AON52577E             | Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red. |
| DESCRIPTION:     | TO-220 FULLPACK, 3-LEAD | PAGE 1 OF 1  |

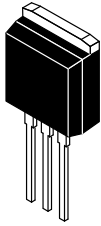
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# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

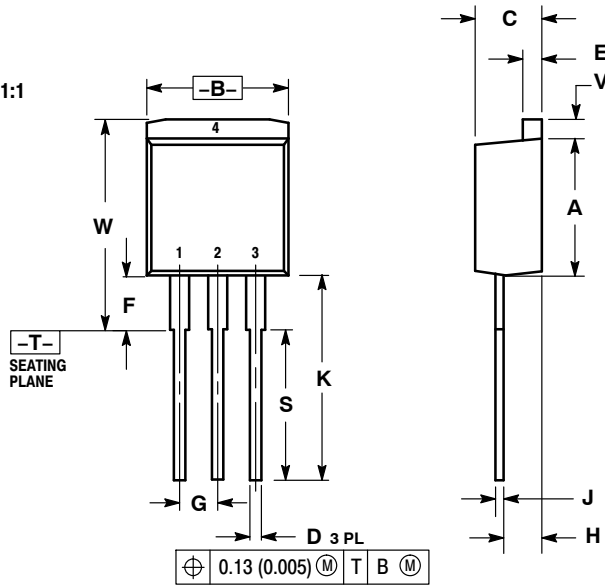
ON Semiconductor®



SCALE 1:1

I<sup>2</sup>PAK (TO-262)  
CASE 418D-01  
ISSUE D

DATE 16 OCT 2007



- 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 1:

- PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

STYLE 2:

- PIN 1. GATE
2. DRAIN
3. SOURCE
4. DRAIN

STYLE 3:

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

STYLE 4:

- PIN 1. GATE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

|                         |                                  |   |
|-------------------------|----------------------------------|---|
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| <b>DESCRIPTION:</b>     | <b>I<sup>2</sup>PAK (TO-262)</b> | <b>PAGE 1 OF 1</b>  |

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# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

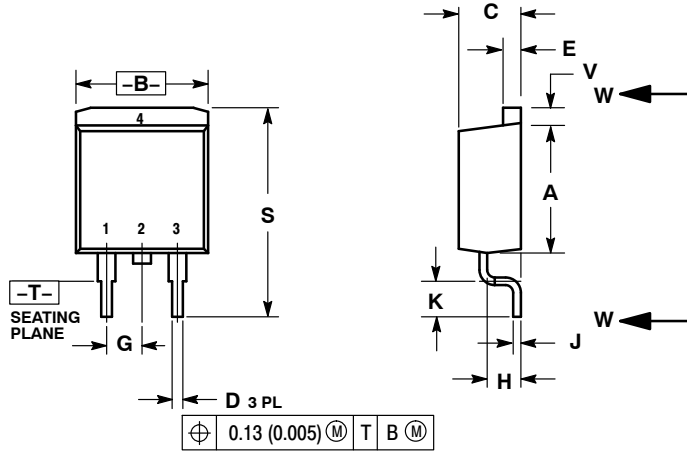
ON Semiconductor®



**D<sup>2</sup>PAK 3**  
CASE 418B-04  
ISSUE L

DATE 17 FEB 2015

SCALE 1:1

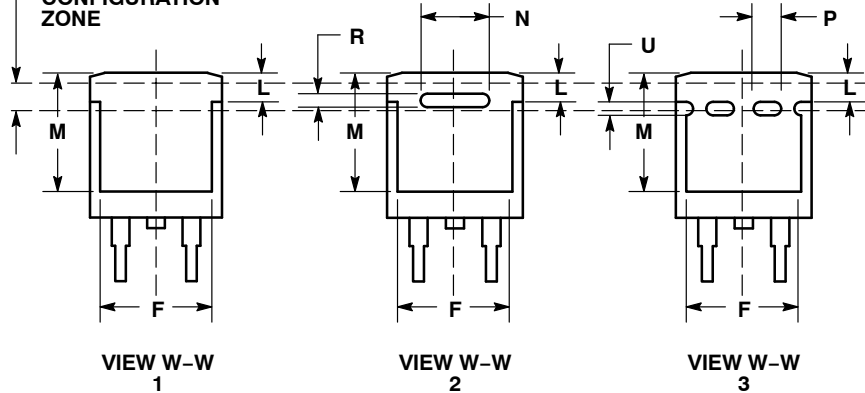


**NOTES:**

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  |

**VARIABLE CONFIGURATION ZONE**



- |  |   |   |  |   |  |
|--|---|---|--|---|--|
| <b>STYLE 1:</b><br>PIN 1. BASE<br>2. COLLECTOR<br>3. EMITTER<br>4. COLLECTOR | <b>STYLE 2:</b><br>PIN 1. GATE<br>2. DRAIN<br>3. SOURCE<br>4. DRAIN | <b>STYLE 3:</b><br>PIN 1. ANODE<br>2. CATHODE<br>3. ANODE<br>4. CATHODE | <b>STYLE 4:</b><br>PIN 1. GATE<br>2. COLLECTOR<br>3. EMITTER<br>4. COLLECTOR | <b>STYLE 5:</b><br>PIN 1. CATHODE<br>2. ANODE<br>3. CATHODE<br>4. ANODE | <b>STYLE 6:</b><br>PIN 1. NO CONNECT<br>2. CATHODE<br>3. ANODE<br>4. CATHODE |
|--|---|---|--|---|--|

**MARKING INFORMATION AND FOOTPRINT ON PAGE 2**

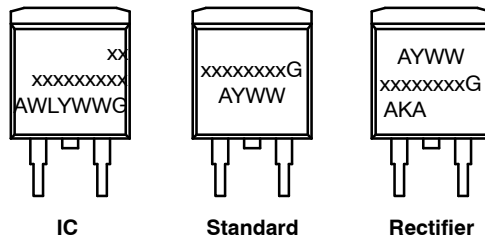
|                         |                           |  |
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**D<sup>2</sup>PAK 3**  
CASE 418B-04  
ISSUE L

DATE 17 FEB 2015

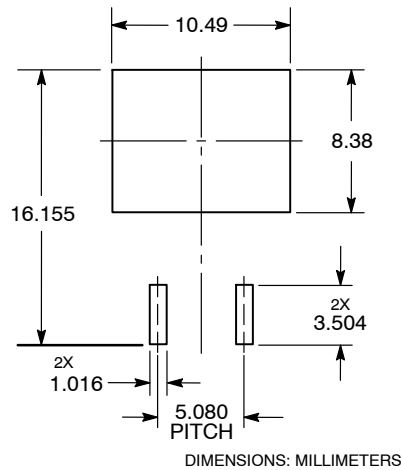
**GENERIC  
MARKING DIAGRAM\***



- xx = Specific Device Code
- A = Assembly Location
- WL = Wafer Lot
- Y = Year
- WW = Work Week
- G = Pb-Free Package
- AKA = Polarity Indicator

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present.

**SOLDERING FOOTPRINT\***



\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

|                         |                           |  |
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