

NHPV15S600G, NHPJ15S600G

SWITCHMODE Power Rectifiers

Features

- Ultrafast 30 Nanosecond Recovery Time
- 150°C Operating Junction Temperature
- High Voltage Capability of 600 V
- ESD Ratings:
 - ◆ Machine Model = C
 - ◆ Human Body Model = 3A
- Low Forward Drop
- Low Leakage Specified @ 125°C Case Temperature
- These Devices are Pb-Free and are RoHS Compliant*
- NHPJ15S600G is Halogen-Free/BFR-Free

Mechanical Characteristics:

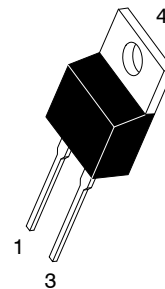
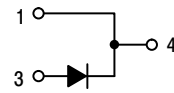
- Case: Epoxy, Molded
- Weight: 1.9 Grams (Approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes: 260°C Max. for 10 Seconds



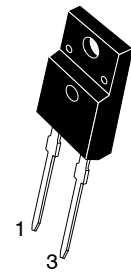
ON Semiconductor®

<http://onsemi.com>

PLANAR ULTRAFAST RECTIFIERS 15 A, 600 V

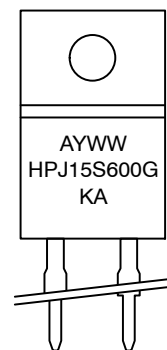
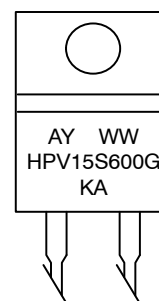


TO-220AC
CASE 221B



TO-220 FULLPAK
CASE 221AG

MARKING DIAGRAMS



A = Assembly Location
Y = Year
WW = Work Week
G = Pb-Free Package
KA = Diode Polarity

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

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

NHPV15S600G, NHPJ15S600G

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|-------------------------------------|---|------------------|
| Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage | V_{RRM} V_{RWM} V_R | 600 | V |
| Average Rectified Forward Current (Rated V_R) | TO-220AC TO-220FP $I_{F(AV)}$ | 15 A @ $T_C = 118^\circ\text{C}$ 15 A @ $T_C = 60^\circ\text{C}$ | A |
| Peak Rectified Forward Current (Rated V_R , Square Wave, 20 kHz) | TO-220AC TO-220FP I_{FRM} | 15 A @ $T_C = 110^\circ\text{C}$ 15 A @ $T_C = 40^\circ\text{C}$ | A |
| Nonrepetitive Peak Surge Current (Surge applied at rated load conditions halfwave, single phase, 60 Hz) | I_{FSM} | 150 | A |
| Operating Junction Temperature and Storage Temperature Range | T_J, T_{stg} | -55 to +150 | $^\circ\text{C}$ |

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

| Characteristic | Symbol | Value | Unit |
|--|------------------------------------|------------|--------------------|
| NHPV15S600G: Thermal Resistance Junction-to-Case Junction-to-Ambient | $R_{\theta JC}$ $R_{\theta JA}$ | 1.5 73 | $^\circ\text{C/W}$ |
| NHPJ15S600G: Thermal Resistance Junction-to-Case Junction-to-Ambient | $R_{\theta JC}$ $R_{\theta JA}$ | 4.25 75 | $^\circ\text{C/W}$ |

ELECTRICAL CHARACTERISTICS

| Characteristic | Symbol | Typ | Max | Unit |
|---|---|------------------------------|---------------------------|------------------------|
| Maximum Instantaneous Forward Voltage (Note 1) ($I_F = 15\text{ A}$, $T_C = 125^\circ\text{C}$) ($I_F = 15\text{ A}$, $T_C = 25^\circ\text{C}$) | V_F | 1.5 2.7 | 1.8 3.2 | V |
| Maximum Instantaneous Reverse Current (Note 1) (Rated DC Voltage, $T_C = 125^\circ\text{C}$) (Rated DC Voltage, $T_C = 25^\circ\text{C}$) | i_R | 46 0.1 | 800 60 | μA |
| Maximum Reverse Recovery Time ($I_F = 0.5\text{ A}$, $I_{rr} = 0.25\text{ A}$, $I_R = 1\text{ A}$) ($I_F = 1\text{ A}$, $di_F/dt = -50\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$) Current Charge Softness ($I_F = 15\text{ A}$, $di_F/dt = -200\text{ A}/\mu\text{s}$, $T_C = 125^\circ\text{C}$) | t_{rr} I_{RM} Q_{rr} S | - - 7.7 220 0.15 | 30 50 9.9 - - | ns A nC - |
| Maximum Forward Recovery Time Voltage ($I_F = 15\text{ A}$, $di_F/dt = 120\text{ A}/\mu\text{s}$, $T_C = 25^\circ\text{C}$) | t_{fr} V_{FP} | | 200 6 | ns V |

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

ORDERING INFORMATION

| Device | Package | Shipping [†] |
|-------------|-------------------------------------|-----------------------|
| NHPV15S600G | TO-220AC (Pb-Free) | 50 Units / Rail |
| NHPJ15S600G | TO-220FP (Pb-Free / 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.

NHPV15S600G, NHPJ15S600G

TYPICAL CHARACTERISTICS

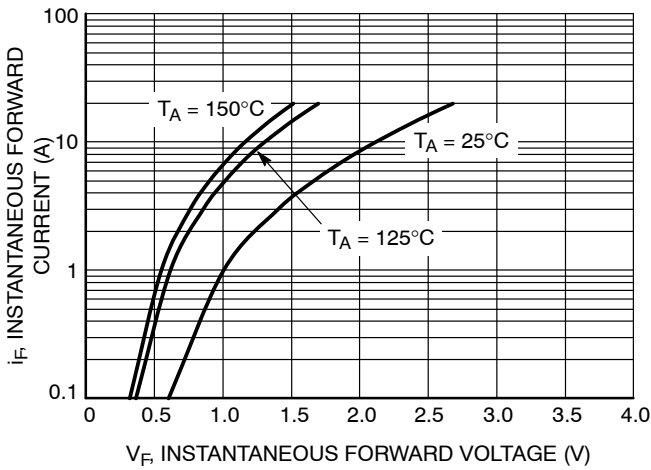


Figure 1. Typical Instantaneous Forward Characteristics

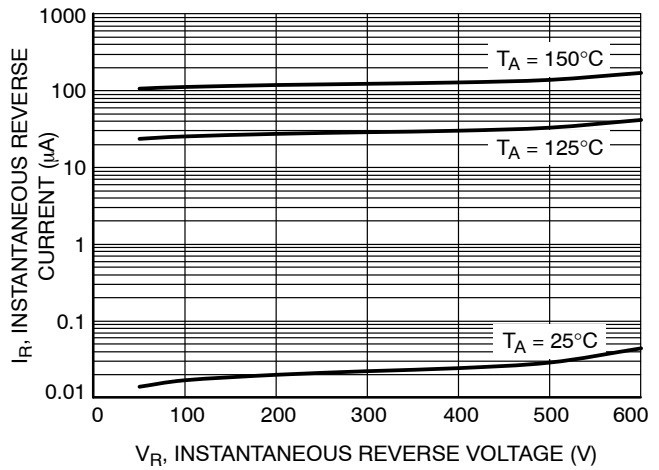


Figure 2. Typical Reverse Characteristics

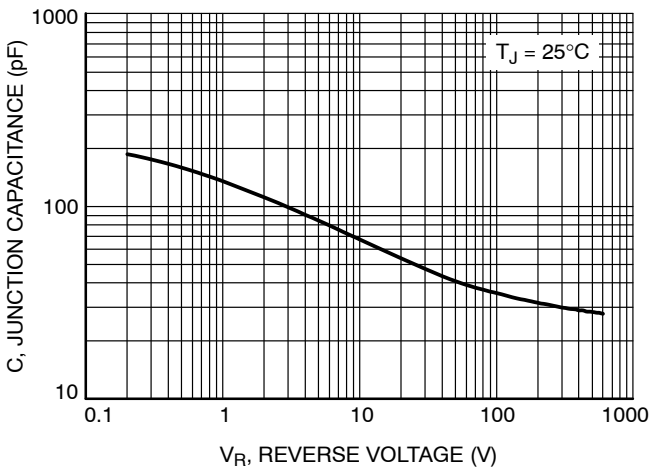


Figure 3. Typical Junction Capacitance

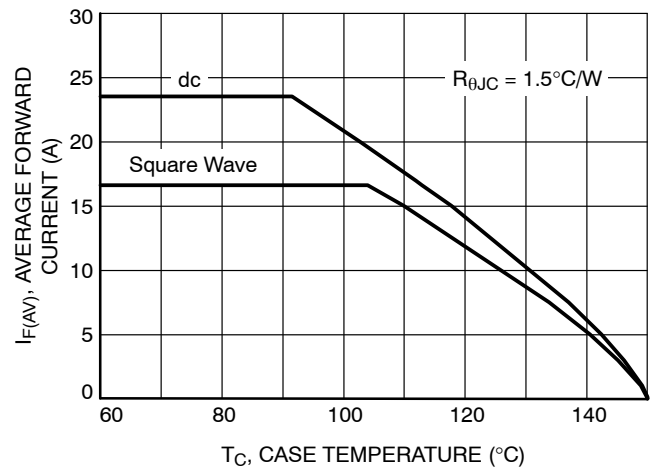


Figure 4. Current Derating TO-220AC

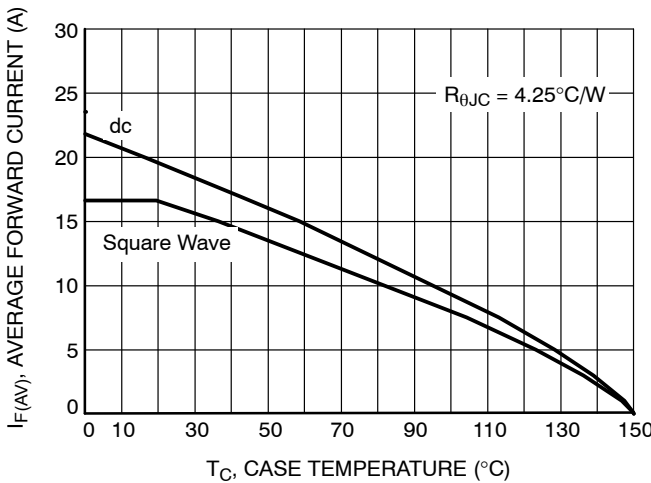


Figure 5. Current Derating TO-220 FULLPAK

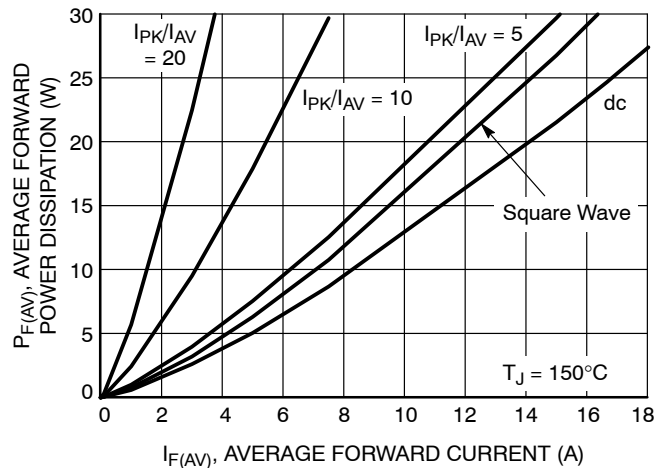
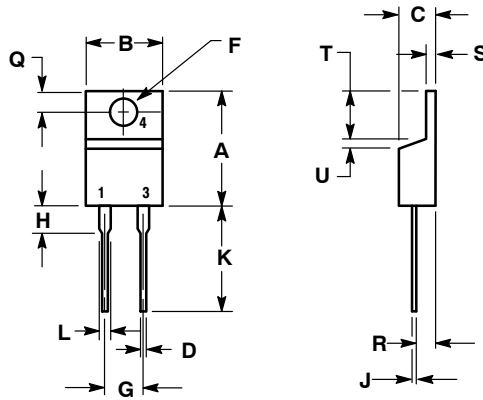


Figure 6. Forward Power Dissipation

NHPV15S600G, NHPJ15S600G

PACKAGE DIMENSIONS

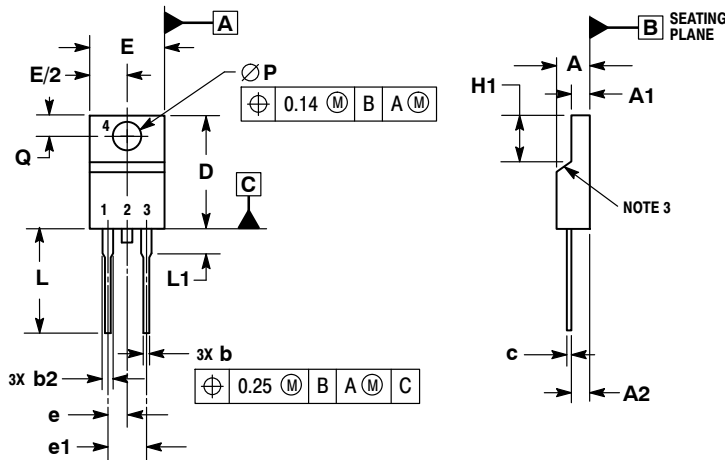
TO-220 TWO-LEAD CASE 221B-04 ISSUE E



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

| DIM | INCHES | | MILLIMETERS | |
|-----|--------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.595 | 0.620 | 15.11 | 15.75 |
| B | 0.380 | 0.405 | 9.65 | 10.29 |
| C | 0.160 | 0.190 | 4.06 | 4.82 |
| D | 0.025 | 0.035 | 0.64 | 0.89 |
| F | 0.142 | 0.161 | 3.61 | 4.09 |
| G | 0.190 | 0.210 | 4.83 | 5.33 |
| H | 0.110 | 0.130 | 2.79 | 3.30 |
| J | 0.014 | 0.025 | 0.36 | 0.64 |
| K | 0.500 | 0.562 | 12.70 | 14.27 |
| L | 0.045 | 0.060 | 1.14 | 1.52 |
| Q | 0.100 | 0.120 | 2.54 | 3.04 |
| R | 0.080 | 0.110 | 2.04 | 2.79 |
| S | 0.045 | 0.055 | 1.14 | 1.39 |
| T | 0.235 | 0.255 | 5.97 | 6.48 |
| U | 0.000 | 0.050 | 0.000 | 1.27 |

TO-220 FULLPAK, 2-LEAD CASE 221AG ISSUE O



- 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 | 14.22 | 15.88 |
| E | 9.65 | 10.67 |
| e | 2.54 BSC | |
| e1 | 5.08 BSC | |
| H1 | 5.97 | 6.48 |
| L | 12.70 | 14.73 |
| L1 | --- | 2.80 |
| P | 3.00 | 3.40 |
| Q | 2.80 | 3.20 |

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