

# NHPV08S600G, NHPJ08S600G

## Switch Mode Power Rectifiers

### Features

- Ultrafast 30 Nanosecond Recovery Time
- 150°C Operating Junction Temperature
- High Voltage Capability of 600 V
- Low Forward Drop
- Low Leakage Specified @ 125°C Case Temperature
- These Devices are Pb-Free and RoHS Compliant
- NHPJ08S600G is a Halogen Free/BFR Free Device

### Mechanical Characteristics:

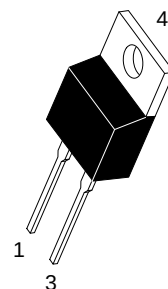
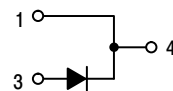
- Case: Epoxy, Molded
- Weight: 1.9 Grams (Approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes: 260°C Max. for 10 Seconds



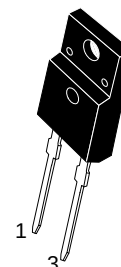
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### PLANAR ULTRAFAST RECTIFIERS 8 A, 600 V

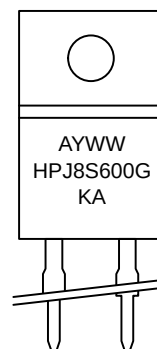
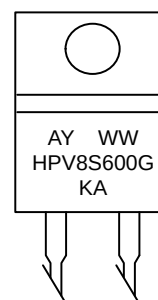


TO-220AC  
CASE 221B



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.

# NHPV08S600G, NHPJ08S600G

## 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>$V_R$ | 600                                                               | V                |
| Average Rectified Forward Current (Rated $V_R$ )<br>TO-220AC<br>TO-220FP                                   | $I_{F(AV)}$                     | 8 A @ $T_C = 130^\circ\text{C}$<br>8 A @ $T_C = 95^\circ\text{C}$ | A                |
| Peak Rectified Forward Current (Rated $V_R$ , Square Wave, 20 kHz)<br>TO-220AC<br>TO-220FP                 | $I_{FRM}$                       | 8 A @ $T_C = 125^\circ\text{C}$<br>8 A @ $T_C = 85^\circ\text{C}$ | A                |
| Nonrepetitive Peak Surge Current (Surge applied at rated load conditions<br>halfwave, single phase, 60 Hz) | $I_{FSM}$                       | 80                                                                | 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               |
|--------------------------------------------------------------|-----------------|-------|--------------------|
| NHPV08S600G: Thermal Resistance<br>Junction-to-Case (Note 1) | $R_{\theta JC}$ | 1.5   | $^\circ\text{C/W}$ |
| NHPJ08S600G: Thermal Resistance<br>Junction-to-Case (Note 1) | $R_{\theta JC}$ | 4.25  | $^\circ\text{C/W}$ |

1. Junction-to-Case shown as a typical value using a fixed  $25^\circ\text{C}$  cold plate boundary.

## ELECTRICAL CHARACTERISTICS

| Characteristic                                                                                             | Test Conditions                                                                                                                                                 | Symbol                                  | Typ                      | Max                | Unit               |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|--------------------------|--------------------|--------------------|
| Instantaneous Forward Voltage<br>(Note 2)                                                                  | ( $I_F = 8\text{ A}$ , $T_C = 125^\circ\text{C}$ )<br>( $I_F = 8\text{ A}$ , $T_C = 25^\circ\text{C}$ )                                                         | $V_F$                                   | 1.5<br>2.7               | 1.8<br>3.2         | V                  |
| Instantaneous Reverse Current<br>(Note 2)                                                                  | (Rated DC Voltage, $T_C = 125^\circ\text{C}$ )<br>(Rated DC Voltage, $T_C = 25^\circ\text{C}$ )                                                                 | $I_R$                                   | 46<br>0.1                | 400<br>30          | $\mu\text{A}$      |
| Reverse Recovery Time                                                                                      | ( $I_F = 0.5\text{ A}$ , $I_{rr} = 0.25\text{ A}$ , $I_R = 1\text{ A}$ )<br>( $I_F = 1\text{ A}$ , $dI_F/dt = -50\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$ ) | $t_{rr}$                                | –<br>–                   | 30<br>50           | ns                 |
| Reverse Recovery Time<br>Peak Reverse Recovery Current<br>Total Reverse Recovery Charge<br>Softness Factor | ( $I_F = 8\text{ A}$ , $dI_F/dt = -200\text{ A}/\mu\text{s}$ , $T_C = 25^\circ\text{C}$ )                                                                       | $t_{rr}$<br>$I_{RM}$<br>$Q_{rr}$<br>$S$ | 30<br>2.3<br>37<br>2     | 50<br>3<br>50<br>– | ns<br>A<br>nC<br>– |
| Reverse Recovery Time<br>Peak Reverse Recovery Current<br>Total Reverse Recovery Charge<br>Softness Factor | ( $I_F = 8\text{ A}$ , $dI_F/dt = -200\text{ A}/\mu\text{s}$ , $T_C = 125^\circ\text{C}$ )                                                                      | $t_{rr}$<br>$I_{RM}$<br>$Q_{rr}$<br>$S$ | 45<br>5.5<br>150<br>0.35 | –<br>–<br>–<br>–   | ns<br>A<br>nC<br>– |
| Forward Recovery Time<br>Peak Forward Recovery Voltage                                                     | ( $I_F = 8\text{ A}$ , $dI_F/dt = 120\text{ A}/\mu\text{s}$ , $T_C = 25^\circ\text{C}$ )                                                                        | $t_{fr}$<br>$V_{FP}$                    | –<br>–                   | 200<br>6           | ns<br>V            |

2. Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

## ORDERING INFORMATION

| Device      | Package                             | Shipping <sup>†</sup> |
|-------------|-------------------------------------|-----------------------|
| NHPV08S600G | TO-220AC<br>(Pb-Free)               | 50 Units / Rail       |
| NHPJ08S600G | TO-220FP<br>(Pb-Free / Halide-Free) | 50 Units / Rail       |

<sup>†</sup>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.

TYPICAL CHARACTERISTICS

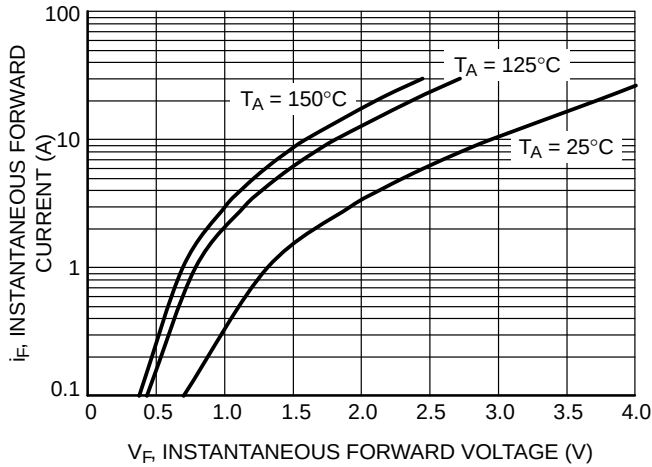


Figure 1. Typical Instantaneous Forward Characteristics

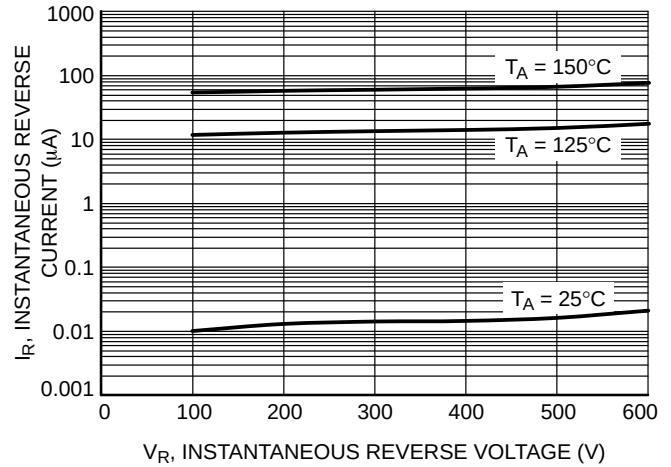


Figure 2. Typical Reverse Characteristics

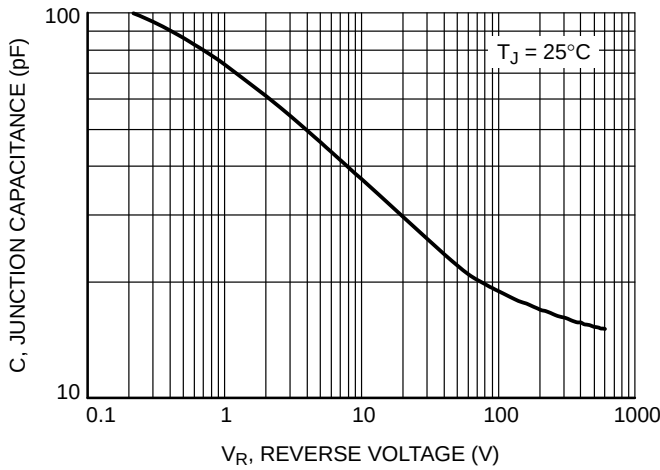


Figure 3. Typical Junction Capacitance

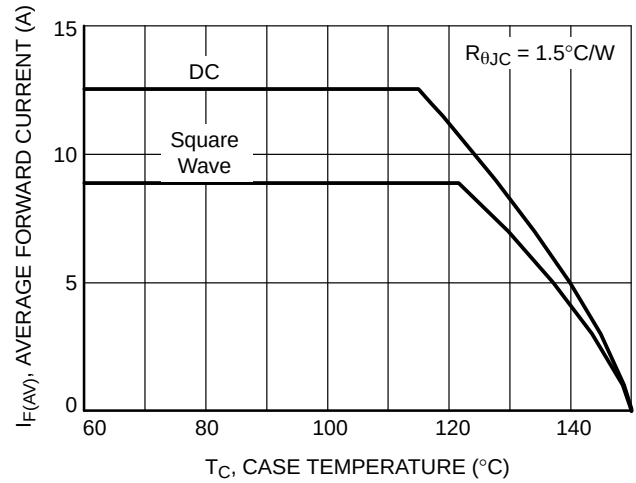


Figure 4. Current Derating TO-220AC

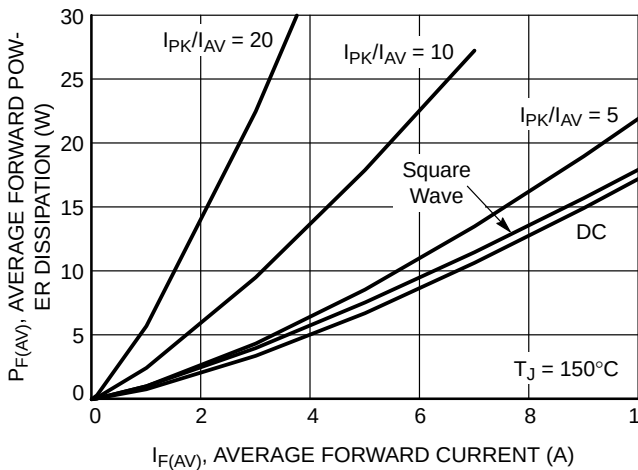


Figure 5. Forward Power Dissipation

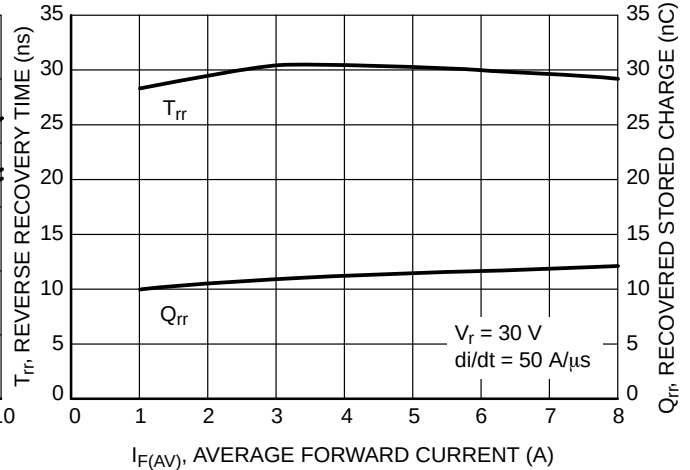
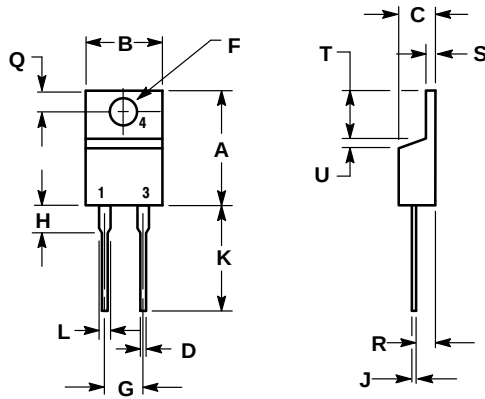


Figure 6. Typical Recovery Characteristics

# NHPV08S600G, NHPJ08S600G

## PACKAGE DIMENSIONS

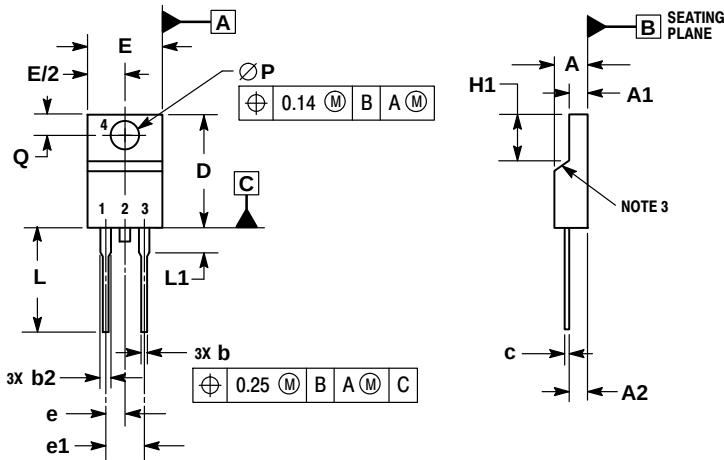
### TO-220 TWO-LEAD CASE 221B-04 ISSUE E



- 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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