

# 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:

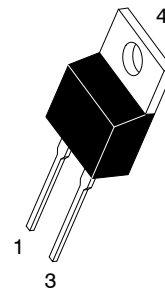
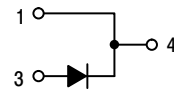
- Case: Epoxy, Molded
- Weight: 1.9 Grams (Approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes: 260°C Max. for 10 Seconds



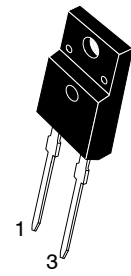
ON Semiconductor®

<http://onsemi.com>

### PLANAR ULTRAFAST RECTIFIERS 15 A, 600 V

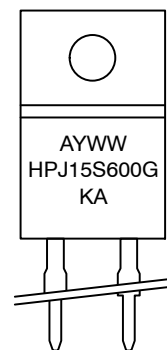
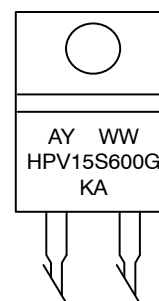


TO-220AC  
CASE 221B



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	$\mu\text{A}$
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  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

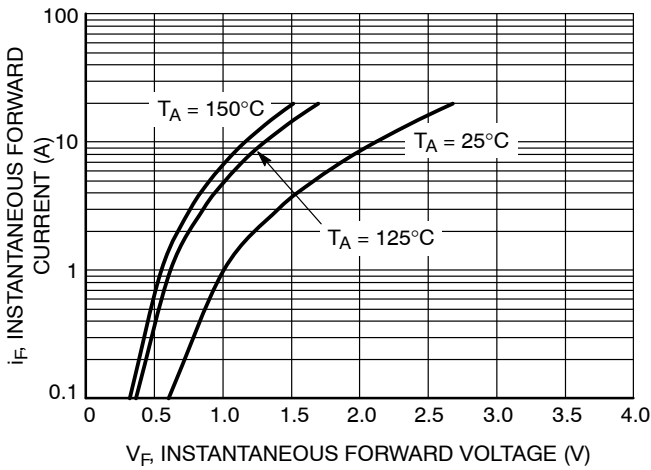
## ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
NHPV15S600G	TO-220AC (Pb-Free)	50 Units / Rail
NHPJ15S600G	TO-220FP (Pb-Free / Halide-Free)	50 Units / Rail

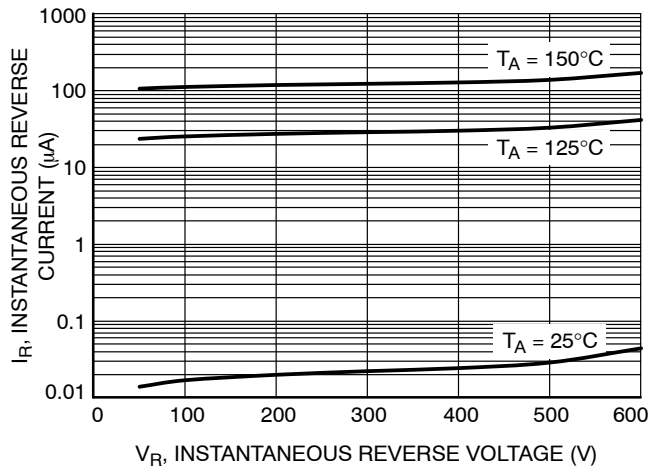
<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

# NHPV15S600G, NHPJ15S600G

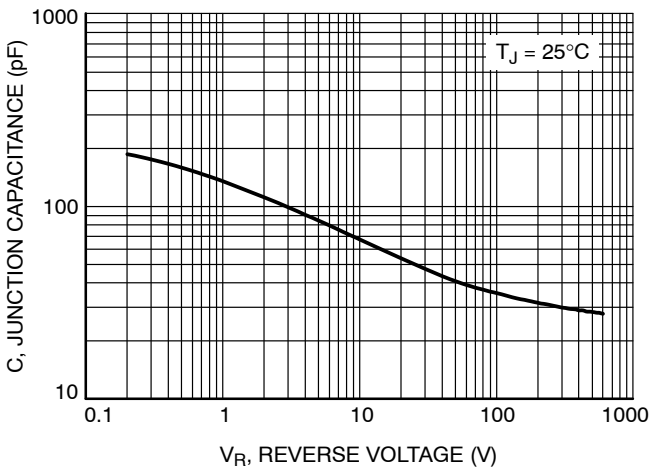
## TYPICAL CHARACTERISTICS



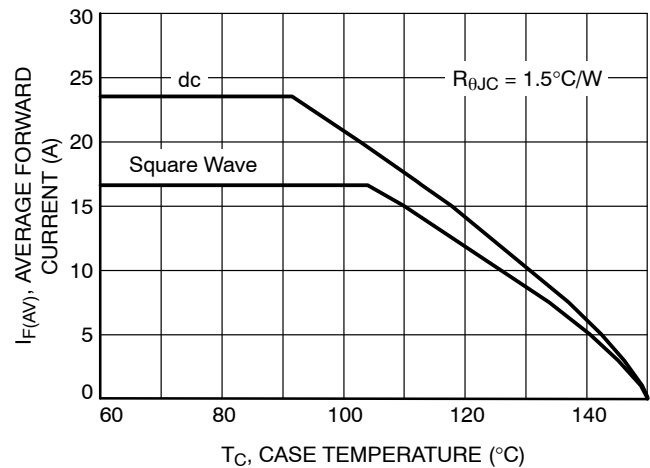
**Figure 1. Typical Instantaneous Forward Characteristics**



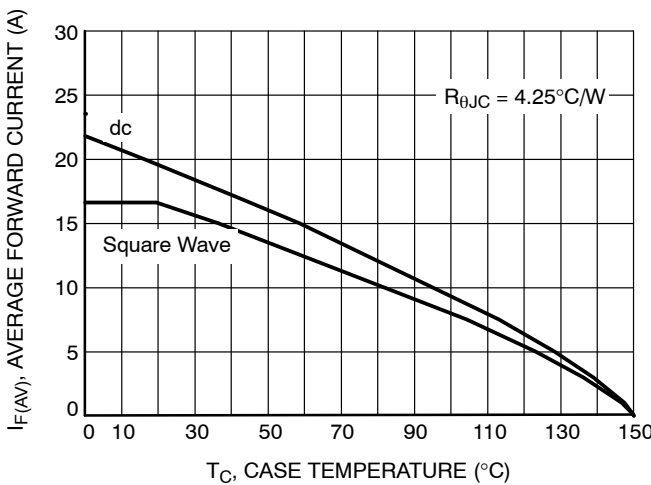
**Figure 2. Typical Reverse Characteristics**



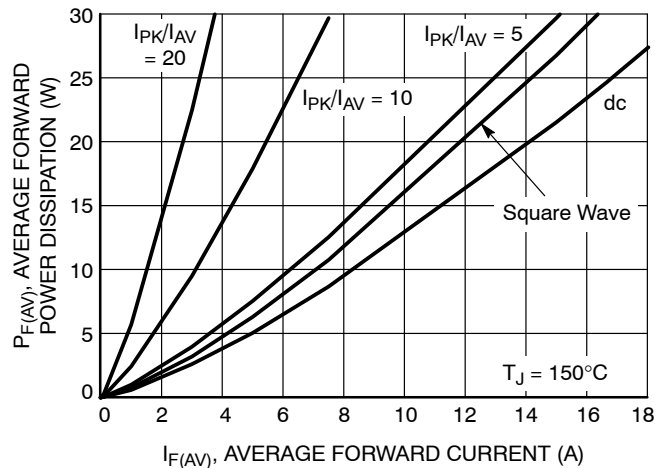
**Figure 3. Typical Junction Capacitance**



**Figure 4. Current Derating TO-220AC**



**Figure 5. Current Derating TO-220 FULLPAK**



**Figure 6. Forward Power Dissipation**

# MECHANICAL CASE OUTLINE

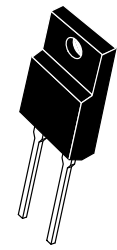
## PACKAGE DIMENSIONS

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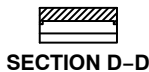
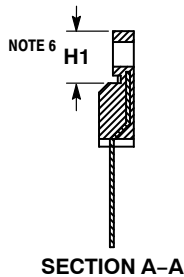
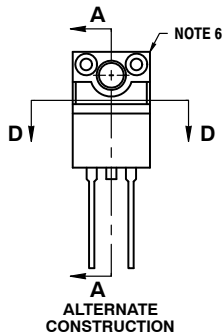
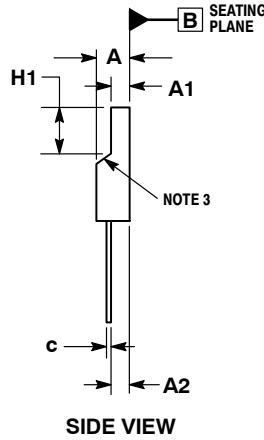
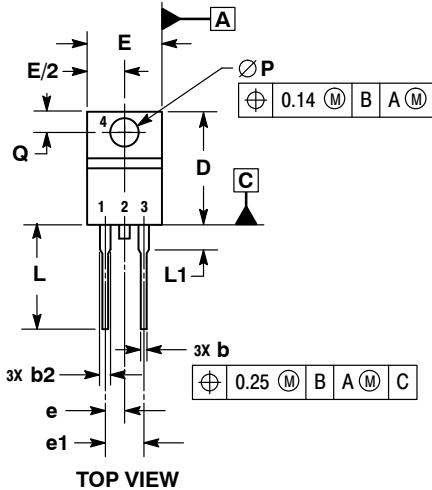


### TO-220 FULLPACK, 2-LEAD CASE 221AG ISSUE B

DATE 27 AUG 2015



SCALE 1:1

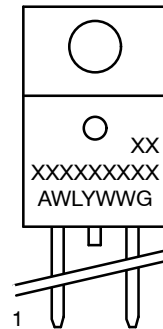


NOTES:

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	2.90
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	6.40	6.90
L	12.70	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.

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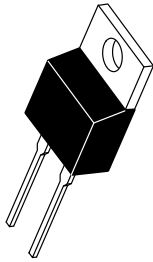
# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

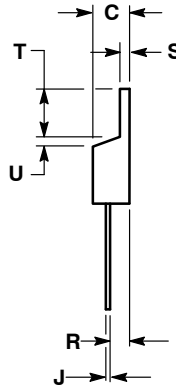
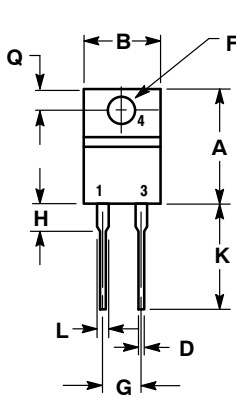


### TO-220, 2-LEAD CASE 221B-04 ISSUE F

DATE 12 APR 2013



SCALE 1:1



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	0.039	0.64	1.00
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

STYLE 1:  
PIN 1. CATHODE  
2. N/A  
3. ANODE  
4. CATHODE

STYLE 2:  
PIN 1. ANODE  
2. N/A  
3. CATHODE  
4. ANODE

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