# 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:**

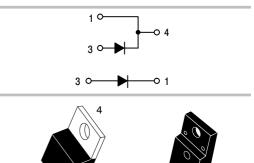
- Case: Epoxy, Molded
- Weight: 1.9 Grams (Approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes: 260°C Max. for 10 Seconds

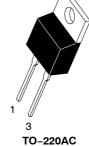


# ON Semiconductor®

http://onsemi.com

# **PLANAR ULTRAFAST RECTIFIERS 15 A, 600 V**



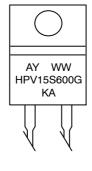




**CASE 221B** 

TO-220 FULLPAK CASE 221AG

#### MARKING DIAGRAMS





= Assembly Location

= Year ww = Work Week G = Pb-Free Package = Diode Polarity

### \*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques

#### ORDERING INFORMATION

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

Reference Manual, SOLDERRM/D.

NHPV15S600/D

# NHPV15S600G, NHPJ15S600G

#### **MAXIMUM RATINGS**

Rating		Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage		V <sub>RRM</sub> V <sub>RWM</sub> V <sub>R</sub>	600	V
Average Rectified Forward Current (Rated V <sub>R</sub> )	TO-220AC TO-220FP	I <sub>F(AV)</sub>	15 A @ T <sub>C</sub> = 118°C 15 A @ T <sub>C</sub> = 60°C	А
Peak Rectified Forward Current (Rated V <sub>R</sub> , Square Wave, 20 kHz)	TO-220AC TO-220FP	I <sub>FRM</sub>	15 A @ T <sub>C</sub> = 110°C 15 A @ T <sub>C</sub> = 40°C	Α
Nonrepetitive Peak Surge Current (Surge applied at rated load conditions halfwave, single phase, 60 Hz)		I <sub>FSM</sub>	150	А
Operating Junction Temperature and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	-55 to +150	°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 <sub>θJC</sub> R <sub>θJA</sub>	1.5 73	°C/W
NHPJ15S600G: Thermal Resistance Junction-to-Case Junction-to-Ambient	R <sub>θ</sub> JC R <sub>θ</sub> JA	4.25 75	°C/W

# **ELECTRICAL CHARACTERISTICS**

Characteristic	Symbol	Тур	Max	Unit
Maximum Instantaneous Forward Voltage (Note 1) ( $i_F = 15 \text{ A}, T_C = 125^{\circ}\text{C}$ ) ( $i_F = 15 \text{ A}, T_C = 25^{\circ}\text{C}$ )	VF	1.5 2.7	1.8 3.2	V
Maximum Instantaneous Reverse Current (Note 1) (Rated DC Voltage, $T_C = 125^{\circ}C$ ) (Rated DC Voltage, $T_C = 25^{\circ}C$ )	İR	46 0.1	800 60	μΑ
Maximum Reverse Recovery Time $ \begin{aligned} &(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}) \end{aligned} $	t <sub>rr</sub>	-	30 50	ns
Current Charge Softness ( $I_F = 15 \text{ A}, dI_F/dt = -200 \text{ A}/\mu\text{s}, T_C = 125^{\circ}\text{C}$ )	I <sub>RM</sub> Q <sub>rr</sub> S	7.7 220 0.15	9.9 - -	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 <sub>fr</sub> V <sub>FP</sub>		200 6	ns V

<sup>1.</sup> Pulse Test: Pulse Width = 300 μs, Duty Cycle ≤ 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**

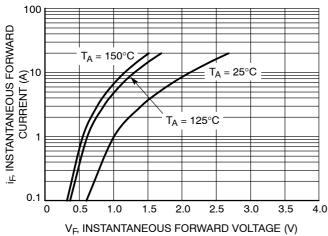


Figure 1. Typical Instantaneous Forward
Characteristics

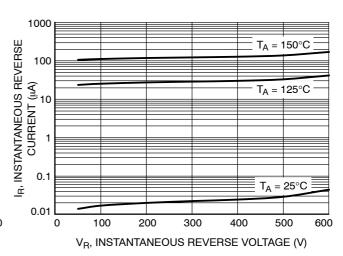


Figure 2. Typical Reverse Characteristics

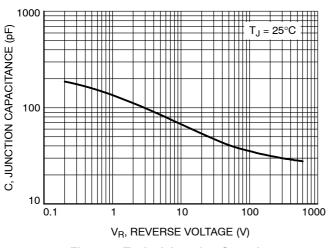


Figure 3. Typical Junction Capacitance

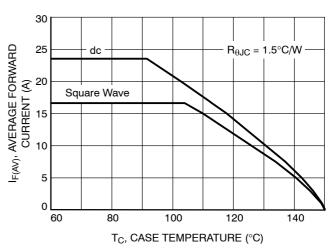


Figure 4. Current Derating TO-220AC

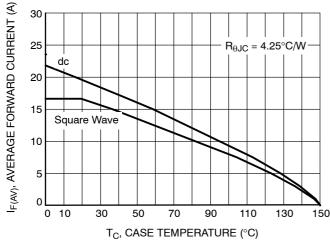


Figure 5. Current Derating TO-220 FULLPAK

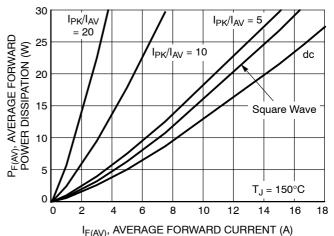
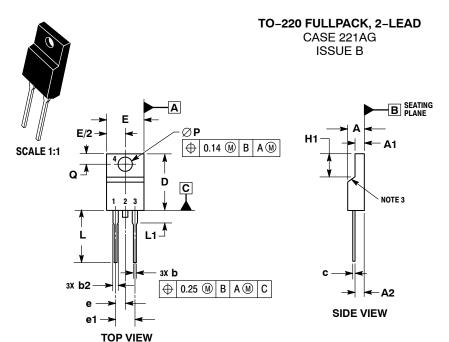
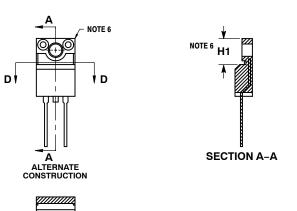


Figure 6. Forward Power Dissipation





**DATE 27 AUG 2015** 

#### NOTES:

- DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.

- Y14.5M, 1994.

  2. CONTROLLING DIMENSION: MILLIMETERS.

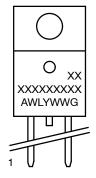
  3. CONTOUR UNCONTROLLED IN THIS AREA.

  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 AND TO BE MEASURED AT OUTERMOST EXTREME OF THE PLASTIC BODY.

  5. DIMENSION DE DOES NOT INCLUDE DAMBAR
- PROTRUSION. LEAD WIDTH INCLUDING PROTRUSION SHALL NOT EXCEED 2.00.

	MILLIMETERS		
DIM	MIN	MAX	
Α	4.30	4.70	
A1	2.50	2.90	
A2	2.50	2.90	
b	0.54	0.84	
b2	1.10	1.40	
С	0.49	0.79	
D	14.22	15.88	
Ε	9.65	10.67	
е	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\***



= Assembly Location

WL = Wafer Lot

= Year

WW = Work Week

= Pb-Free Package G

\*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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DESCRIPTION:	TO-220 FULLPACK, 2-LEAD		PAGE 1 OF 1

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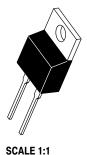
SECTION D-D

# **MECHANICAL CASE OUTLINE**

Q

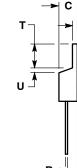
**PACKAGE DIMENSIONS** 





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

**DATE 12 APR 2013** 



# NOTES:

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

	INCHES		MILLIN	IETERS
DIM	MIN	MAX	MIN	MAX
Α	0.595	0.620	15.11	15.75
В	0.380	0.405	9.65	10.29
С	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
Н	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
Т	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

PIN 1. ANODE 2. N/A 3. CATHODE

4. ANODE

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