Switch-mode Power Rectifier

NHP620MFD, NRVHP620MFD

This ultrafast rectifier in the dual flag SO−8 flat lead package offers designers a unique degree of versatility and design freedom. The two devices are electrically independent and can be used separately, as common cathode, as common anode or in series as a function of board level layout. The exposed pad design provides low thermal resistance. The clip attach design creates a package with very efficient die size to board area ratio. While thermal performance is nearly the same as the DPAK package height and board footprint are less than half.

Features

- New Package Provides Capability of Inspection and Probe After Board Mounting
- Low Forward Voltage Drop
- 175°C Operating Junction Temperature
- NRV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable
- These are Pb−Free and Halide−Free Devices

Mechanical Characteristics:

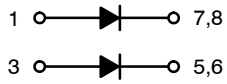
- Case: Epoxy, Molded
- Epoxy Meets Flammability Rating UL 94−0 @ 0.125 in.
- Lead Finish: 100% Matte Sn (Tin)
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Max. for 10 Seconds
- Device Meets MSL 1 Requirements

Applications

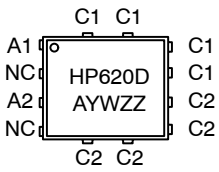
- Excellent Alternative to DPAK in Space−Constrained Automotive Applications
- Output Rectification in Switching Power Supplies
- Freewheeling Diode used with Inductive Loads

ULTRAFAST RECTIFIER
6 AMPERES (3x2), 200 VOLTS

DFN8 5x6
(SO8FL)
CASE 506BT



MARKING DIAGRAM



HP620D = Specific Device Code
A = Assembly Location
Y = Year
W = Work Week
ZZ = Lot Traceability

ORDERING INFORMATION

Device	Package	Shipping†
NHP620MFDT1G	DFN8 (Pb−Free)	1,500 / Tape & Reel
NRVHP620MFDT1G	DFN8 (Pb−Free)	1,500 / Tape & Reel
NRVHP620MFDT3G	DFN8 (Pb−Free)	5,000 / Tape & Reel

DISCONTINUED (Note 1)

NHP620MFDT3G	DFN8 (Pb−Free)	5,000 / Tape & Reel
NRVHP620MFDWT3G	DFN8 (Pb−Free)	5,000 / Tape & Reel

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

1. **DISCONTINUED:** These devices are not recommended for new design. Please contact your **onsemi** representative for information. The most current information on these devices may be available on www.onsemi.com.

MAXIMUM RATINGS (per diode unless noted)

Symbol	Rating	Value	Unit
V_{RRM} V_{RWM} V_R	Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	 200	V
$I_{F(AV)}$	Average Rectified Forward Current (Rated V_R, T_C = 167°C)	3.0	A
I_{FRM}	Peak Repetitive Forward Current, (Rated V_R, Square Wave, 20 kHz, T_C = 165°C)	6.0	A
I_{FSM}	Non−Repetitive Peak Surge Current (Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz)	80	A
T_{stg}	Storage Temperature Range	−65 to +175	°C
T_J	Operating Junction Temperature	−55 to +175	°C
E_{AS}	Unclamped Inductive Switching Energy (10 mH Inductor, Non−repetitive)	10	mJ
	ESD Rating (Human Body Model)	3B	
	ESD Rating (Machine Model)	M4	

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 (per diode unless noted)

Symbol	Characteristic	Typ	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction−to−Case, Steady State (Assumes 600 mm^2 1 oz. copper bond pad, on a FR4 board)	−	3.4	°C/W

ELECTRICAL CHARACTERISTICS (per diode unless noted)

v_F	Instantaneous Forward Voltage (Note 1) (i_F = 3.0 Amps, T_J = 125°C) (i_F = 3.0 Amps, T_J = 25°C) (i_F = 6.0 Amps, T_J = 125°C) (i_F = 6.0 Amps, T_J = 25°C)	 0.76 0.935 0.86 1.02	 0.85 1.0 0.91 1.090	V
i_R	Instantaneous Reverse Current (Note 1) (Rated dc Voltage, T_J = 125°C) (Rated dc Voltage, T_J = 25°C)	 6.00 0.012	 35 0.5	μA
t_{rr}	Reverse Recovery Time I_F = 3.0 A, V_R = 30 V, dI/dt = 50 A/μs, T_J = 25°C	18	25	ns
t_{rr}	Reverse Recovery Time I_F = 3.0 A, V_R = 30 V, dI/dt = 50 A/μs, T_J = 50°C	40	50	ns

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 μs, Duty Cycle ≤ 2.0%.

TYPICAL CHARACTERISTICS

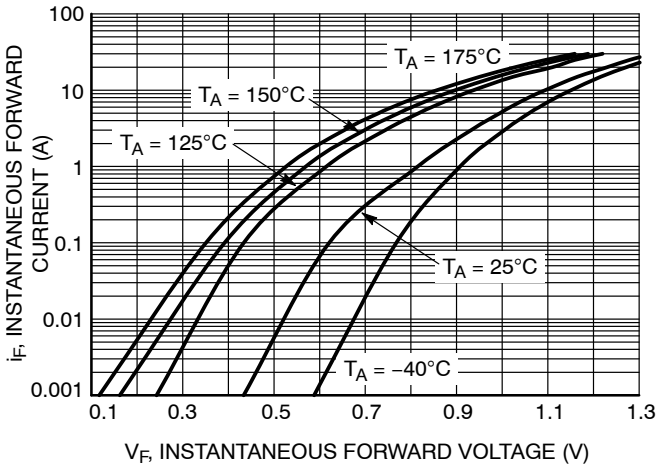


Figure 1. Typical Instantaneous Forward Characteristics

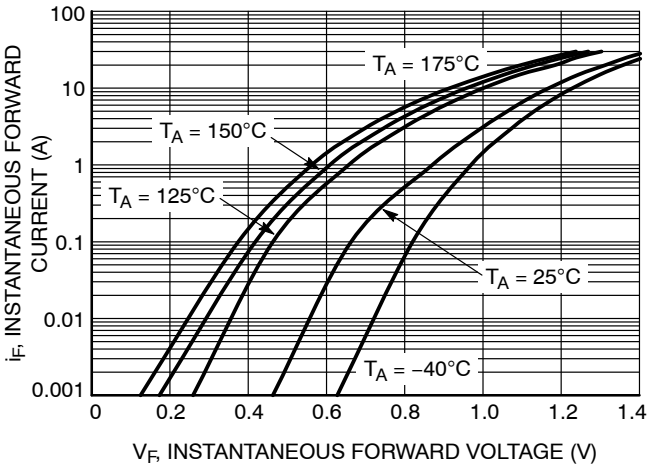


Figure 2. Maximum Instantaneous Forward Characteristics

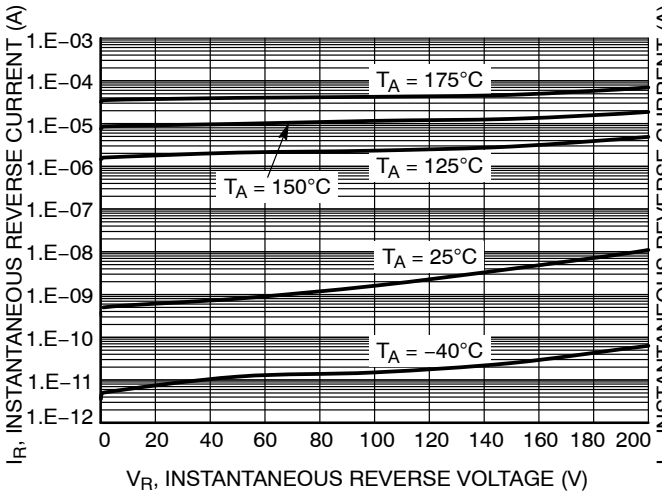


Figure 3. Typical Reverse Characteristics

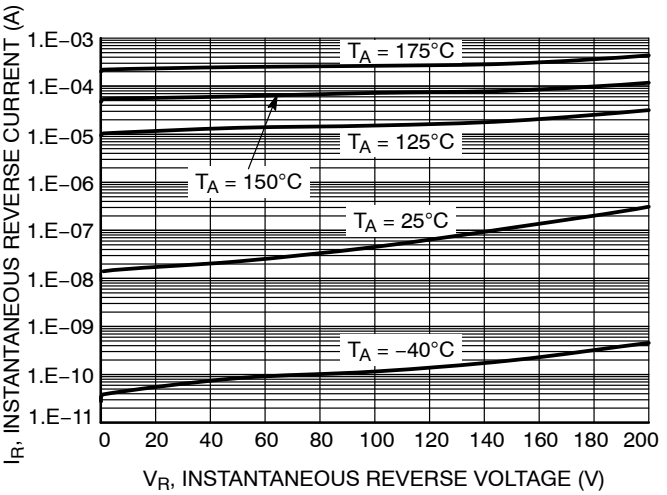


Figure 4. Maximum Reverse Characteristics

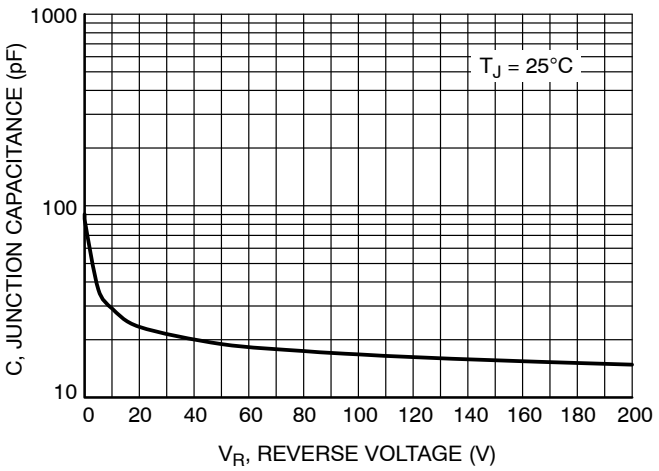


Figure 5. Typical Junction Capacitance

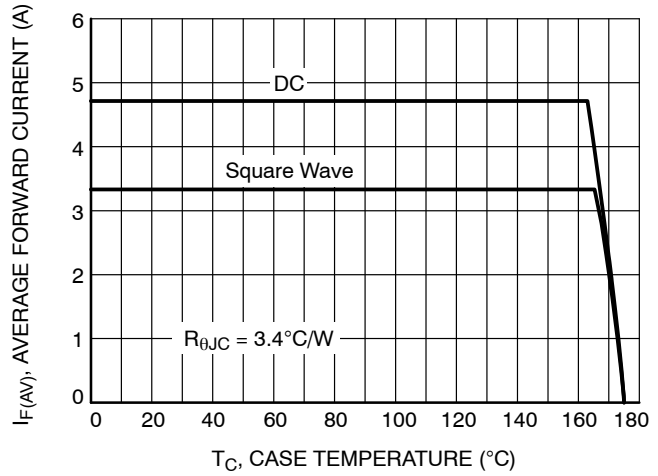


Figure 6. Current Derating

TYPICAL CHARACTERISTICS (continued)

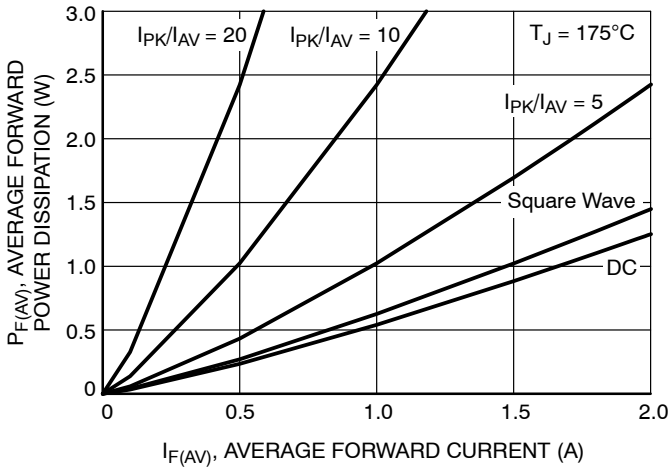


Figure 7. Forward Power Dissipation

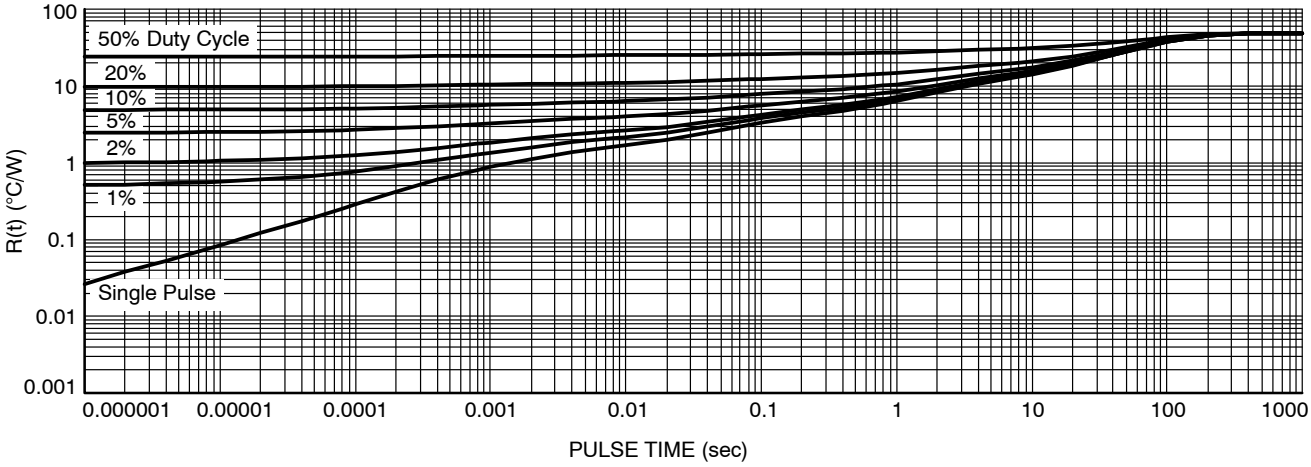
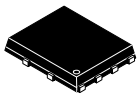


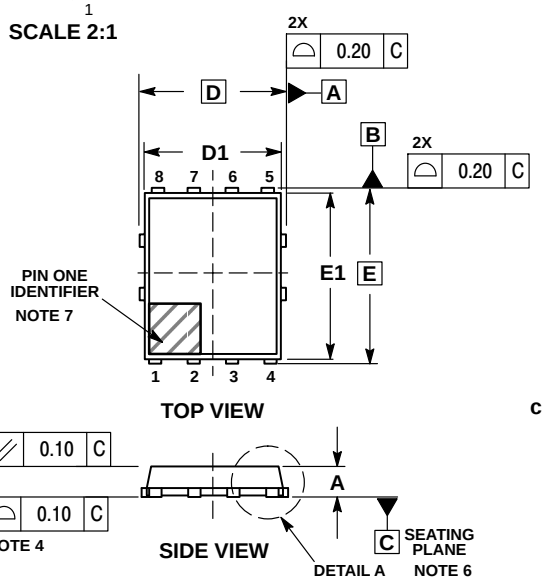
Figure 8. Thermal Response

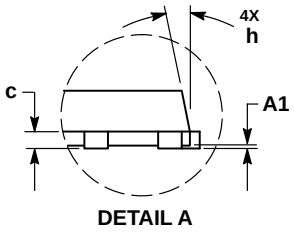
DFN8 5x6, 1.27P Dual Flag (SO8FL−Dual)
CASE 506BT
ISSUE F

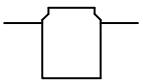
DATE 23 NOV 2021



SCALE 2:1



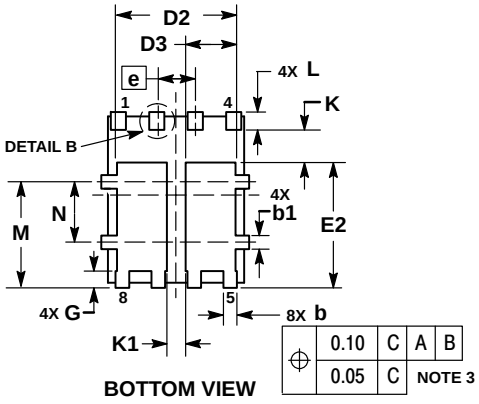




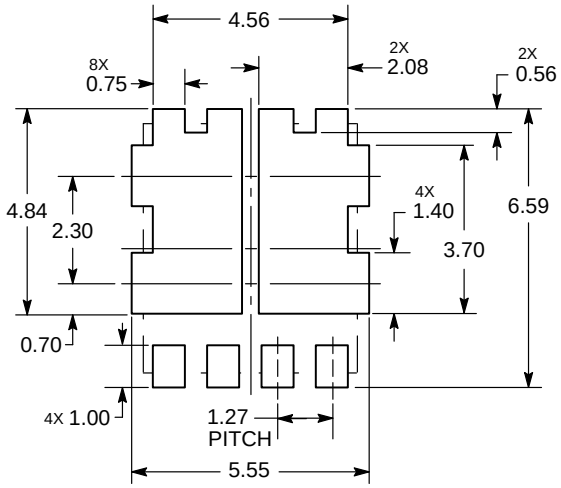
DETAIL B
ALTERNATE CONSTRUCTION

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 MM FROM THE TERMINAL TIP.
4. PROFILE TOLERANCE APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.
5. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.
6. SEATING PLANE IS DEFINED BY THE TERMINALS. A1 IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY.
7. A VISUAL INDICATOR FOR PIN 1 MUST BE LOCATED IN THIS AREA.

	MILLIMETERS		
DIM	MIN	NOM	MAX
A	0.90	–––	1.10
A1	–––	–––	0.05
b	0.33	0.42	0.51
b1	0.33	0.42	0.51
c	0.20	–––	0.33
D		5.15 BSC	
D1	4.70	4.90	5.10
D2	3.90	4.10	4.30
D3	1.50	1.70	1.90
E		6.15 BSC	
E1	5.70	5.90	6.10
E2	3.90	4.15	4.40
e		1.27 BSC	
G	0.45	0.55	0.65
h	–––	–––	12 °
K	0.51	–––	–––
K1	0.56	–––	–––
L	0.48	0.61	0.71
M	3.25	3.50	3.75
N	1.80	2.00	2.20



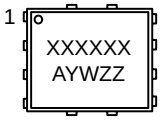
SOLDERING FOOTPRINT*



DIMENSION: MILLIMETERS

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

GENERIC MARKING DIAGRAM*



XXXXXX = Specific Device Code
A = Assembly Location
Y = Year
W = Work Week
ZZ = Lot Traceability

*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. Some products may not follow the Generic Marking.

DOCUMENT NUMBER:	**98AON50417E**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red.
DESCRIPTION:	**DFN8 5X6, 1.27P DUAL FLAG (SO8FL−DUAL)**	**PAGE 1 OF 1**

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales

◊