NHPAF220, NRVHPAF220

Surface Mount Ultrafast Power Rectifier

This SMA flat lead ultrafast rectifier provides fast switching performance with soft recovery in a compact thermally efficient package. Its compact footprint makes it ideally suited to portable and automotive applications where board space is at a premium. Its low profile makes it a good option for flat panel display and other applications with limited vertical clearance. The device offers low leakage over temperature making it a good match for applications requiring low quiescent current.

Features

- Fast Soft Switching for Reduced EMI and Higher Efficiency
- Low Profile – Maximum Height of 1.1 mm
- Small Footprint – Footprint Area of 13.5 mm^2
- NRV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC–Q101 Qualified and PPAP Capable
- These Devices are Pb–Free, Halogen Free/BFR Free and are RoHS Compliant

Mechanical Characteristics:

- Case: Molded Epoxy
- Epoxy Meets UL 94 V–0 @ 0.125 in
- Weight: 95 mg (Approximately)
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Maximum for 10 Seconds
- MSL 1

Applications

- Switching Power Supplies including Mini–adapters and Displays
- Instrumentation
- Engine Control Recirculation Diodes
- Freewheeling Diode Where Space is at a Premium

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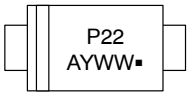
ULTRAFAST RECTIFIER
2.0 AMPERE
200 VOLTS

SMA–FL
CASE 403AA
STYLE 6

MARKING DIAGRAM



P22	= Specific Device Code
A	= Assembly Location
Y	= Year
WW	= Work Week
▪	= Pb–Free Package

ORDERING INFORMATION

Device	Package	Shipping†
NHPAF220T3G	SMA–FL (Pb–Free)	5000 / Tape & Reel
NRVHPAF220T3G	SMA–FL (Pb–Free)	5000 / 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.

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May, 2024 – Rev. 2

Publication Order Number:
NHPAF220/D

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_R	200	V
Average Rectified Forward Current (T_L = 130°C)	I_O	2.0	A
Peak Repetitive Forward Current (Rated V_R, Square Wave, 20 kHz) T_L = 125°C	I_{FRM}	4.0	A
Non−Repetitive Peak Surge Current (Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz)	I_{FSM}	60	A
Storage Temperature Range	T_{stg}	−65 to +175	°C
Operating Junction Temperature	T_J	−65 to +175	°C

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

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction−to−Lead (Note 1)	Ψ_{JCL}	29	°C/W
Thermal Resistance, Junction−to−Ambient (Note 1)	$R_{\theta JA}$	80	°C/W

1. 1 inch square pad size (1 × 0.5 inch) for each lead on FR4 board.

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Value		Unit
		T_J = 25°C	T_J = 125°C	
Maximum Instantaneous Forward Voltage (Note 2) (i_F = 2.0 A)	v_F	1.00	0.85	V
Maximum Instantaneous Reverse Current (Note 2) (V_R = 200 V)	I_R	0.5	35	μA
Reverse Recovery Time I_F = 2.0 A, V_R = 30 V, dI/dt = 50 A/μs, T_J = 25°C	t_{rr}	30		ns
Reverse Recovery Time I_F = 2.0 A, V_R = 30 V, dI/dt = 50 A/μs, T_J = 125°C	t_{rr}	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.

2. Pulse Test: Pulse Width ≤ 380 μs, Duty Cycle ≤ 2.0%.

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TYPICAL CHARACTERISTICS

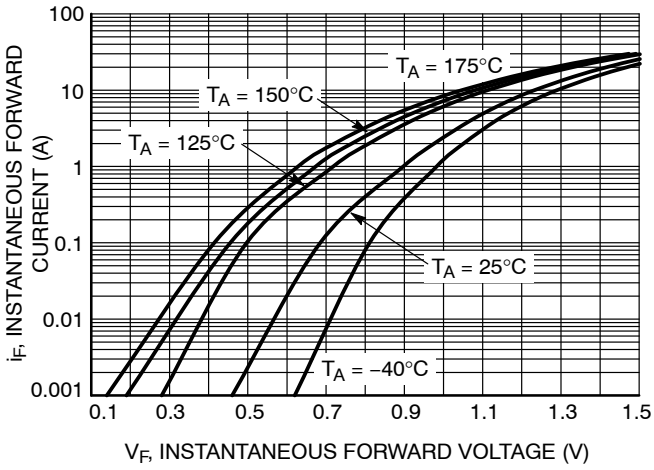

Figure 1. Typical Instantaneous Forward Characteristics

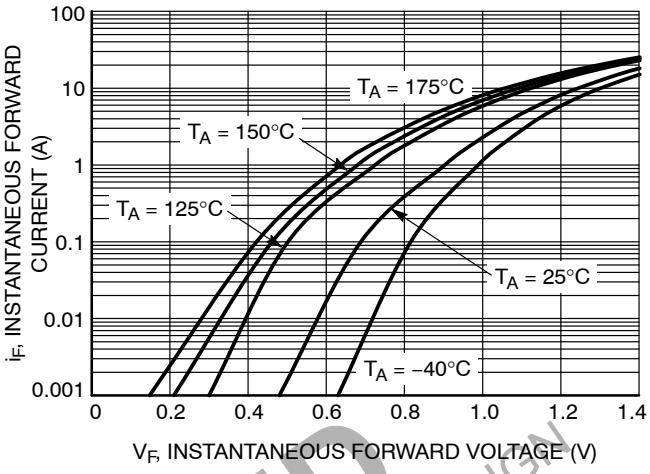

Figure 2. Maximum Instantaneous Forward Characteristics

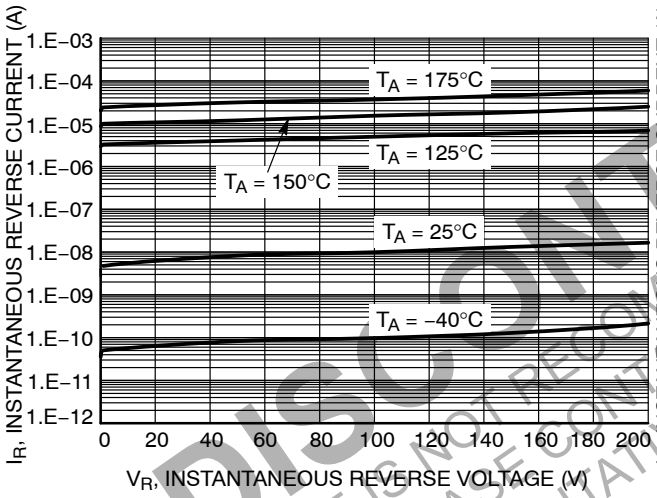

Figure 3. Typical Reverse Characteristics

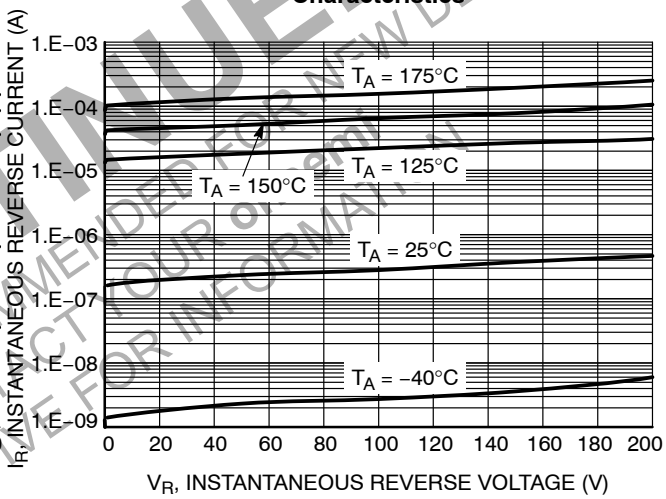

Figure 4. Maximum Reverse Characteristics

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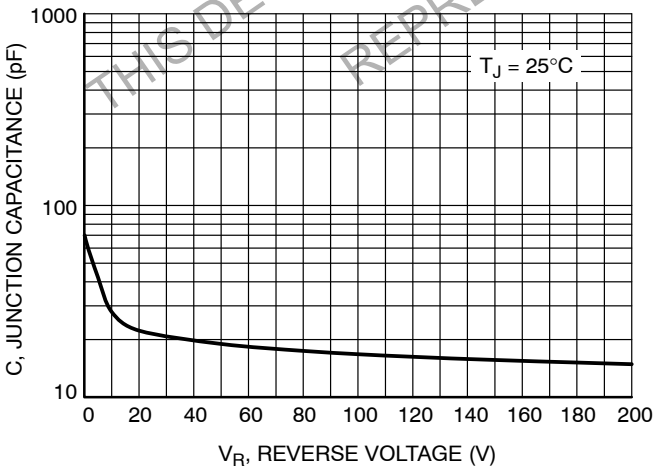

Figure 5. Typical Junction Capacitance

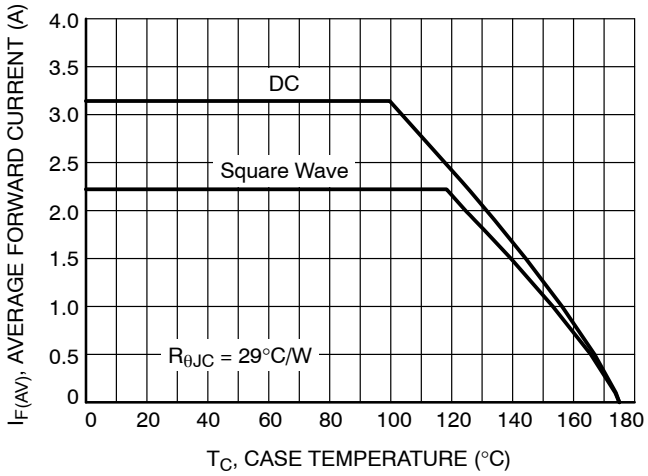

Figure 6. Current Derating

TYPICAL CHARACTERISTICS

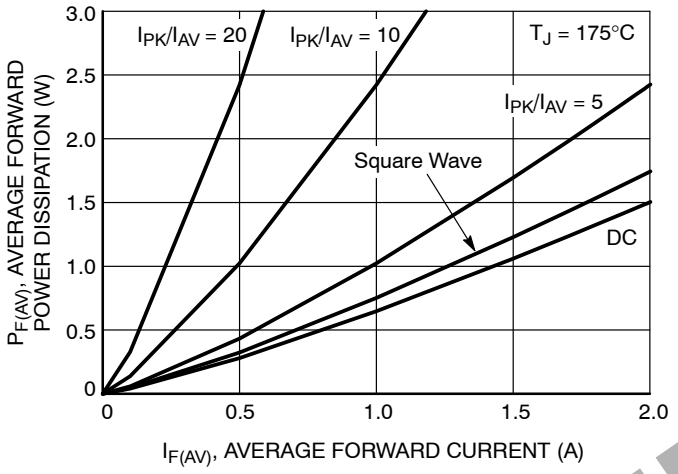

Figure 7. Forward Power Dissipation

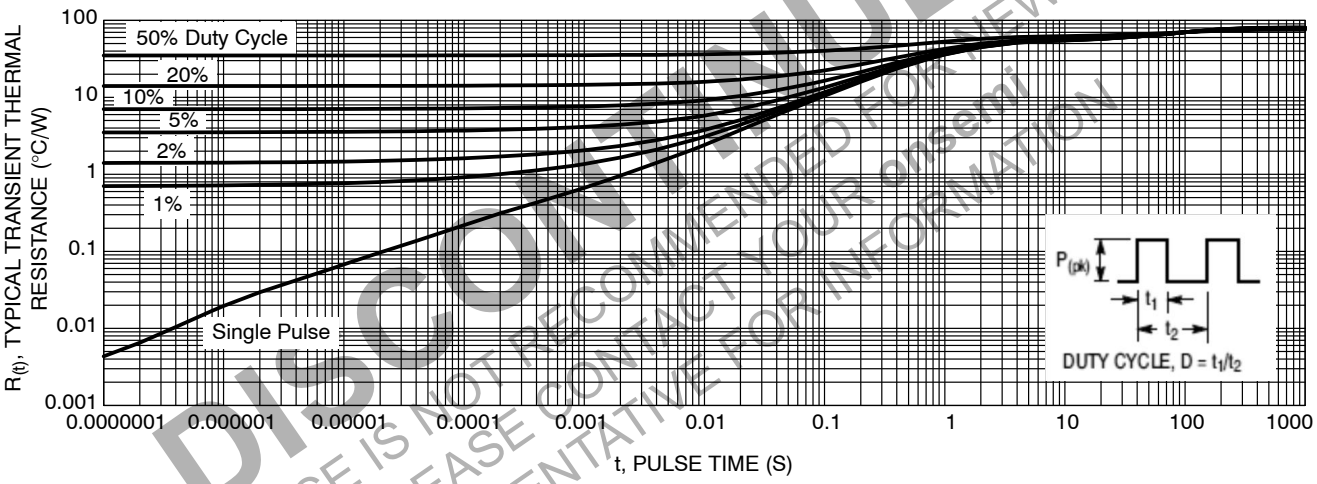

Figure 8. Typical Transient Thermal Response, Junction−to−Ambient

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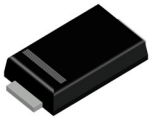
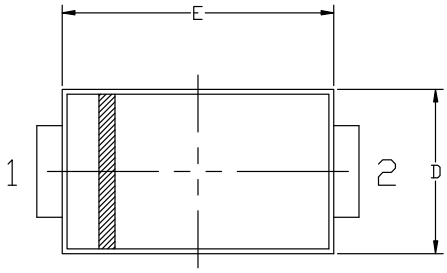
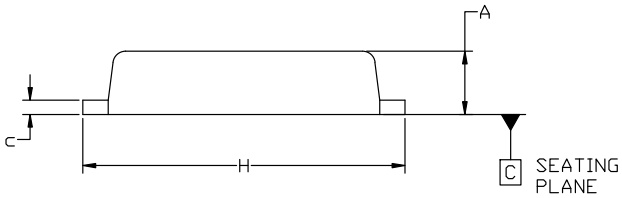


SMA 2.60x4.30x1.00
CASE 403AA
ISSUE A

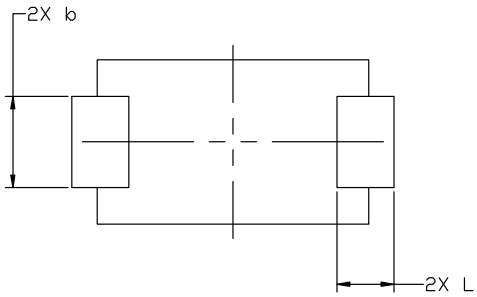
DATE 18 JAN 2024



TOP VIEW



SIDE VIEW

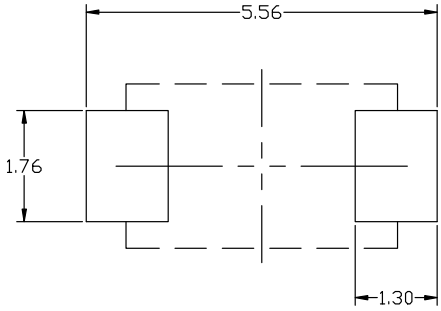


BOTTOM VIEW

NOTES:

1. DIMENSIONING AND TOLERANCING AS PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. FL

MILLIMETERS			
DIM	MIN	NOM	MAX
A	0.90	1.00	1.10
b	1.25	1.45	1.65
c	0.15	0.225	0.30
D	2.40	2.60	2.80
E	4.00	4.30	4.60
H	4.80	5.10	5.40
L	0.70	0.90	1.10



RECOMMENDED MOUNTING FOOTPRINT

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

GENERIC
MARKING DIAGRAM*

XXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
▪ = 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. Some products may not follow the Generic Marking.

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