NHPM220, NRVHPM220

Surface Mount Ultra Fast Power Rectifier

POWERMITE® Power Surface Mount Package

This ultrafast POWERMITE provides soft recovery fast switching performance in a compact thermally efficient package. The advanced packaging techniques provide for a very efficient micro−miniature space−saving surface mount rectifier. With its unique heatsink design, the POWERMITE offers thermal performance similar to the SMA while being 50% smaller in footprint area.

Features

- Fast Soft Switching for Reduced EMI and Higher Efficiency
- Low Profile − Maximum Height of 1.1 mm
- Small Footprint − Footprint Area of 8.45 mm^2
- Supplied in 12 mm Tape and Reel
- Low Thermal Resistance with Direct Thermal Path of Die on Exposed Cathode Heat Sink
- 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:

- POWERMITE is JEDEC Registered as D0−216AA
- Case: Molded Epoxy
- Epoxy Meets UL 94 V−0 @ 0.125 in
- Weight: 16.3 mg (Approximately)
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Maximum for 10 Seconds
- MSL 1

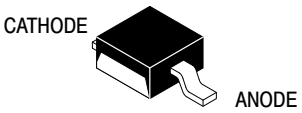
Applications

- Automotive LED Lighting
- Engine Control
- Freewheeling Diode Where Space is at a Premium
- Flat Panel Display
- Infotainment and Other Space Constrained Center−stack Applications

ON Semiconductor®

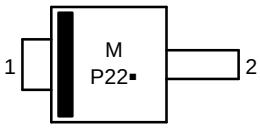
www.onsemi.com

ULTRAFAST RECTIFIER 2.0 AMPERE, 200 VOLTS



POWERMITE CASE 457

MARKING DIAGRAM



M = Date Code
P22 = Device Code
▪ = Pb−Free Package

ORDERING INFORMATION

Device	Package	Shipping†
NHPM220T3G	POWERMITE (Pb−Free)	12000 / Tape & Reel
NRVHPM220T3G	POWERMITE (Pb−Free)	12000 / Tape & Reel

†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.

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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 = 155°C)	I_O	2.0	A
Peak Repetitive Forward Current (Rated V_R, Square Wave, 20 kHz) T_L = 153°C	I_{FRM}	4.0	A
Non−Repetitive Peak Surge Current (Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz)	I_{FSM}	40	A
Storage and Operating Junction Temperature Range (Note 1)	T_{stg}, 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.

1. The heat generated must be less than the thermal conductivity from Junction−to−Ambient: $dP_D/dT_J < 1/R_{\theta JA}$.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction−to−Lead (Note 2)	Ψ_{JCL}	12	°C/W
Thermal Resistance, Junction−to−Ambient (Note 2)	$R_{\theta JA}$	75	°C/W
Thermal Resistance, Junction−to−Ambient (Note 3)	$R_{\theta JA}$	260	°C/W

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Value	Unit
Maximum Instantaneous Forward Voltage (Note 4) (I_F = 1.0 A, T_J = 25°C) (I_F = 2.0 A, T_J = 25°C) (I_F = 1.0 A, T_J = 125°C) (I_F = 2.0 A, T_J = 125°C)	V_F	 1.0 1.05 0.86 0.90	V
Maximum Instantaneous Reverse Current (Note 4) (Rated dc Voltage, T_J = 25°C) (Rated dc Voltage, T_J = 125°C)	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 = −40°C to 150°C	t_{rr}	50	ns

2. Mounted with 700 mm^2 copper pad size (Approximately 1 in^2) 1 oz FR4 Board.
3. Mounted with pad size approximately 20 mm^2 copper, 1 oz FR4 Board.
4. Pulse Test: Pulse Width ≤ 380 μs, Duty Cycle ≤ 2.0%.

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.

TYPICAL CHARACTERISTICS

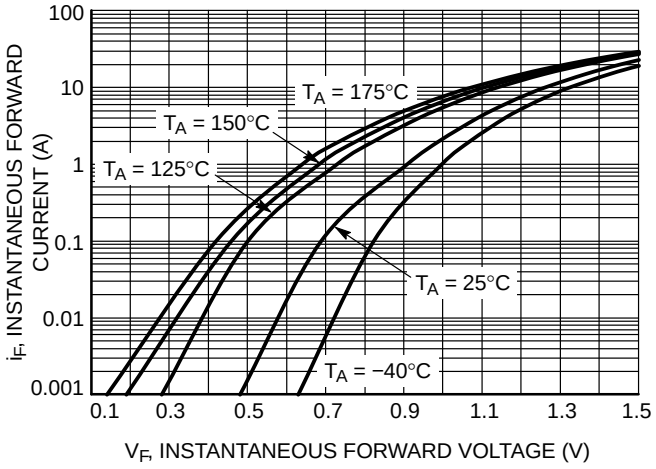


Figure 1. Typical Instantaneous Forward Characteristics

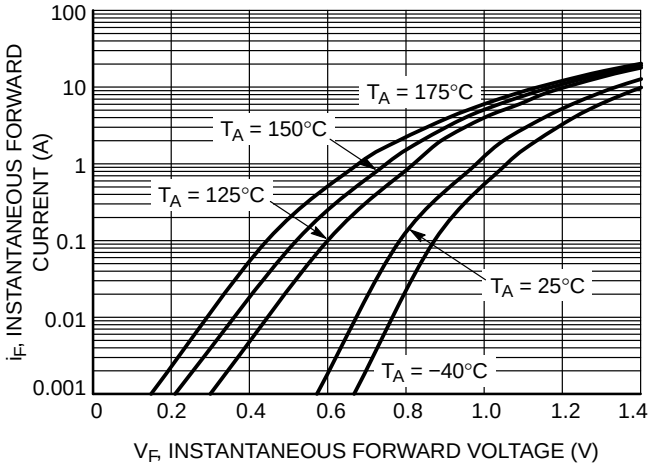


Figure 2. Maximum Instantaneous Forward Characteristics

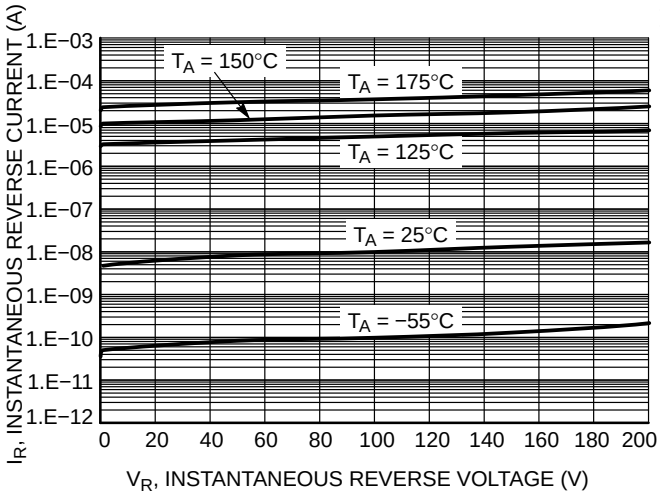


Figure 3. Typical Reverse Characteristics

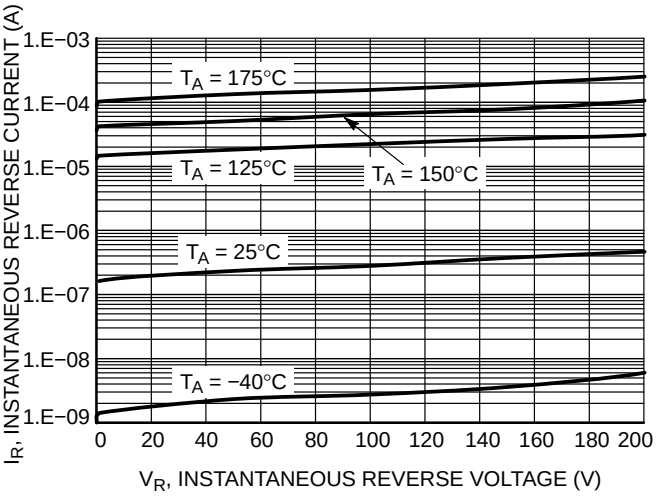


Figure 4. Maximum Reverse Characteristics

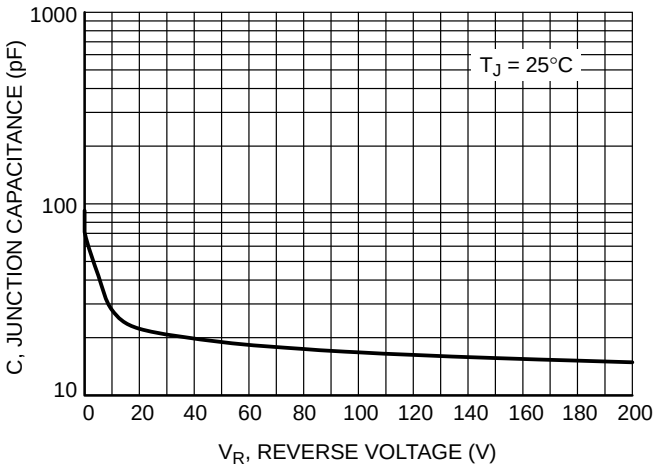


Figure 5. Typical Junction Capacitance

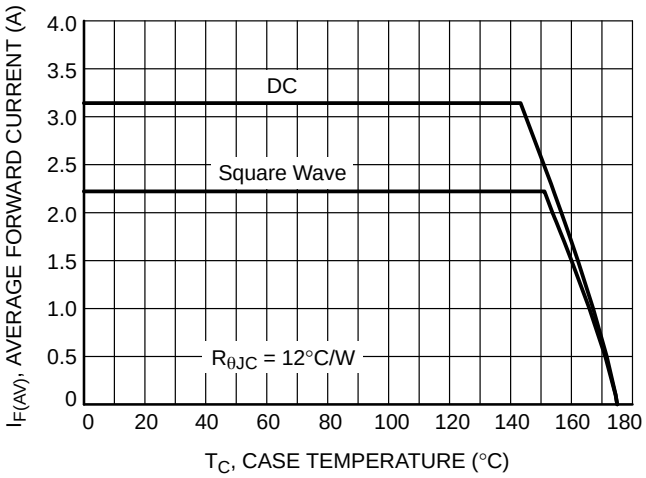


Figure 6. Current Derating

TYPICAL CHARACTERISTICS

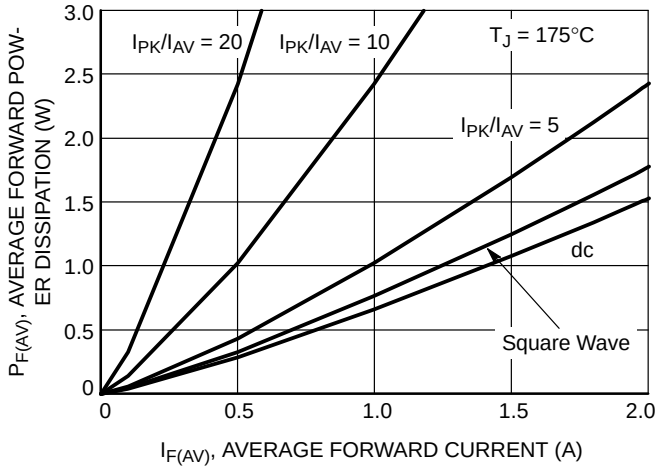


Figure 7. Forward Power Dissipation

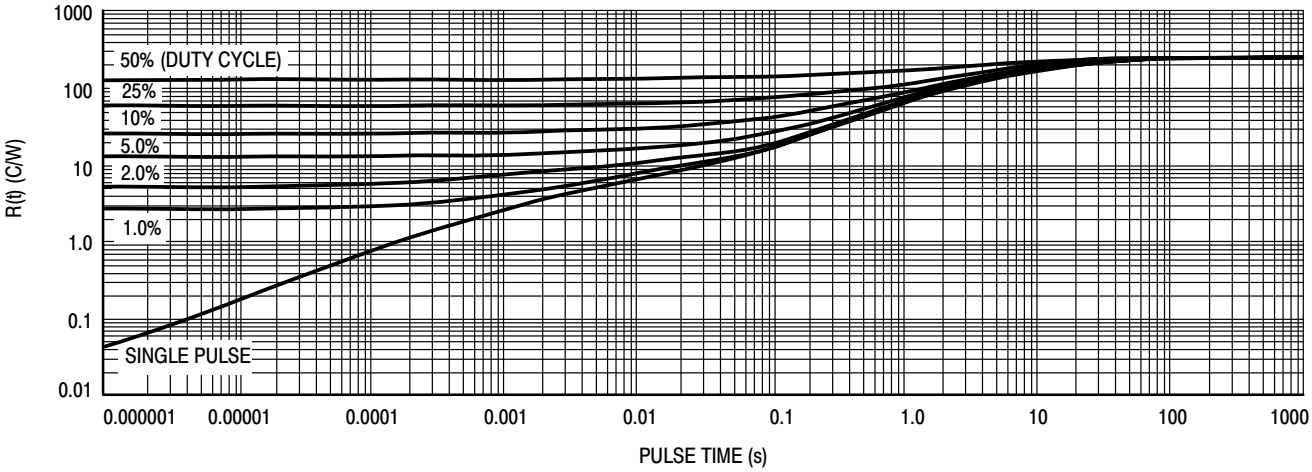


Figure 8. Thermal Response, Junction−to−Ambient (20 mm^2 pad)

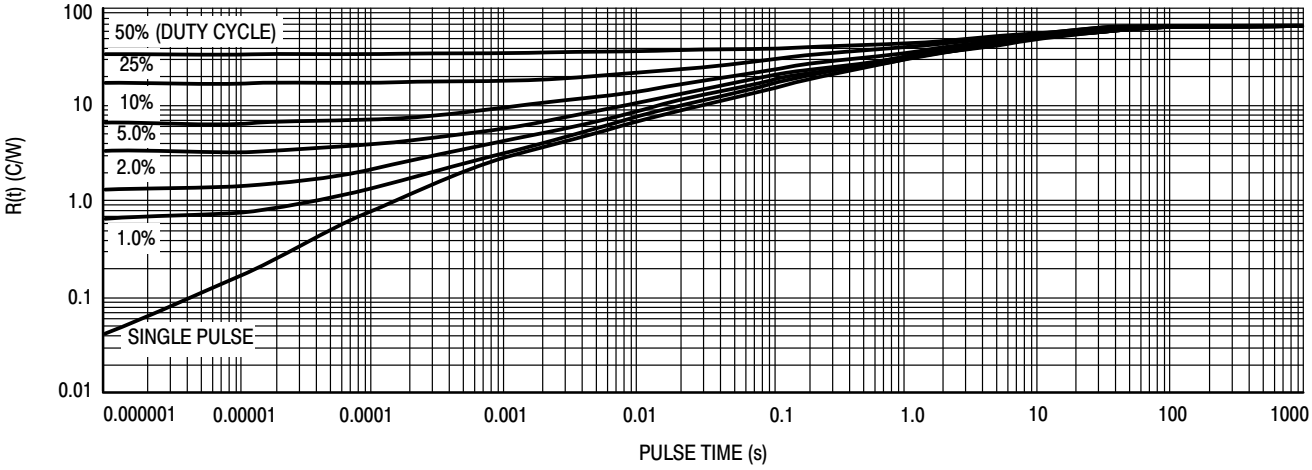
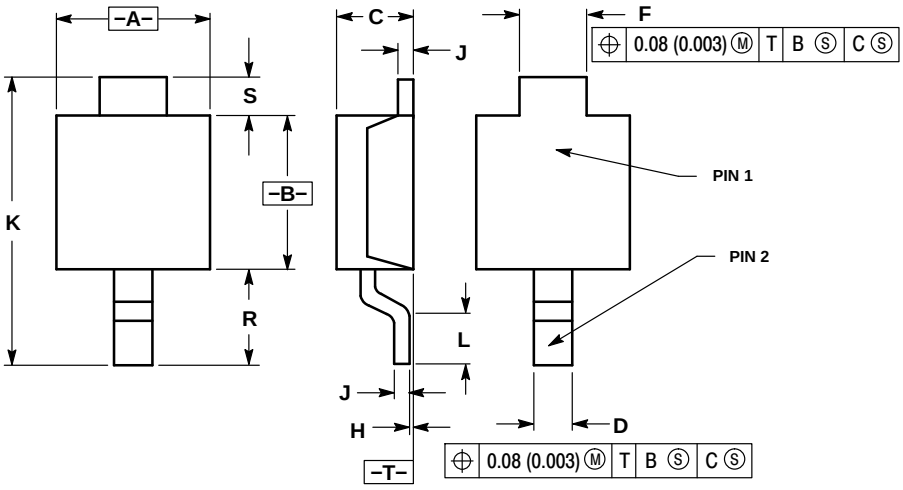


Figure 9. Thermal Response, Junction−to−Ambient (1 in^2 pad)

PACKAGE DIMENSIONS

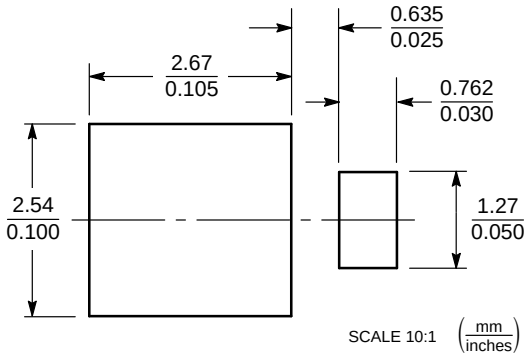
POWERMITE
CASE 457−04
ISSUE F



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	1.75	2.05	0.069	0.081
B	1.75	2.18	0.069	0.086
C	0.85	1.15	0.033	0.045
D	0.40	0.69	0.016	0.027
F	0.70	1.00	0.028	0.039
H	−0.05	+0.10	−0.002	+0.004
J	0.10	0.25	0.004	0.010
K	3.60	3.90	0.142	0.154
L	0.50	0.80	0.020	0.031
R	1.20	1.50	0.047	0.059
S	0.50 REF		0.019 REF	

SOLDERING FOOTPRINT*



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

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