Surface Mount Ultrafast Power Rectifier

Plastic SOD−123FL Package

NHP160SF, NRVHP160SF

This SOD−123FL 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 1.0 mm
- Small Footprint − Footprint Area of 5.94 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

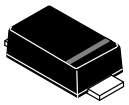
Mechanical Characteristics:

- Case: Molded Epoxy
- Epoxy Meets UL 94 V−0 @ 0.125 in
- Weight: 11.7 mg (Approximately)
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Maximum for 10 Seconds
- MSL 1

Applications

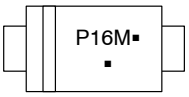
- Automotive HID Lighting
- Diesel Piezo Injection
- Power Factor Correction in Mini Adapters
- Freewheeling Diode Where Space is at a Premium

ULTRAFAST RECTIFIER
1.0 AMPERES
600 VOLTS



SOD−123FL
CASE 498

MARKING DIAGRAM



P16 = Specific Device Code
M = Date Code
▪ = Pb−Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
NHP160SFT3G	SOD−123 (Pb−Free)	10000/Tape & Reel
NRVHP160SFT3G	SOD−123 (Pb−Free)	10000/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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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 (T_L = 150°C)	I_O	1.0	A
Peak Repetitive Forward Current (Square Wave, 20 kHz, T_L = 145°C)	I_{FRM}	2.0	A
Non−Repetitive Peak Surge Current (Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz)	I_{FSM}	15	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)	$R_{\theta JA}$	86.7	°C/W
Thermal Resistance, Junction−to−Ambient (Note 3)	$R_{\theta JA}$	330	°C/W

ELECTRICAL CHARACTERISTICS

Characteristic	Test Conditions	Symbol	Typ	Max	Unit
Instantaneous Forward Voltage (Note 4)	(I_F = 1 A, T_C = 125°C) (I_F = 1 A, T_C = 25°C)	V_F	1.9 3.0	2.6 3.8	V
Instantaneous Reverse Current (Note 4)	(Rated DC Voltage, T_C = 125°C) (Rated DC Voltage, T_C = 25°C)	I_R	5 0.02	20 2.0	μA
Reverse Recovery Time Peak Reverse Recovery Current Total Reverse Recovery Charge Softness Factor	(I_F = 1 A, d_{IF}/d_t = −50 A/μs, T_C = 25°C)	t_{rr} I_{RM} Q_{rr} S	9 0.5 2.1 0.8	50 3 50 3	ns A nC –
Reverse Recovery Time Peak Reverse Recovery Current Total Reverse Recovery Charge Softness Factor	(I_F = 1 A, d_{IF}/d_t = −50 A/μs, T_C = 125°C)	t_{rr} I_{RM} Q_{rr} S	30 0.7 12 2.4	– – – –	ns A nC –

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. 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%.

TYPICAL CHARACTERISTICS

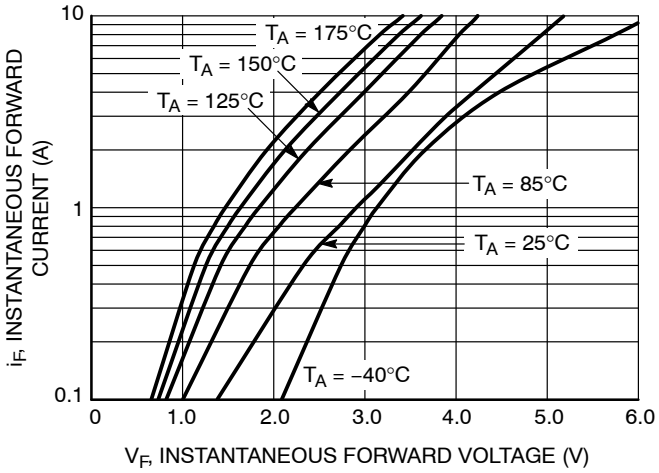


Figure 1. Typical Instantaneous Forward Characteristics

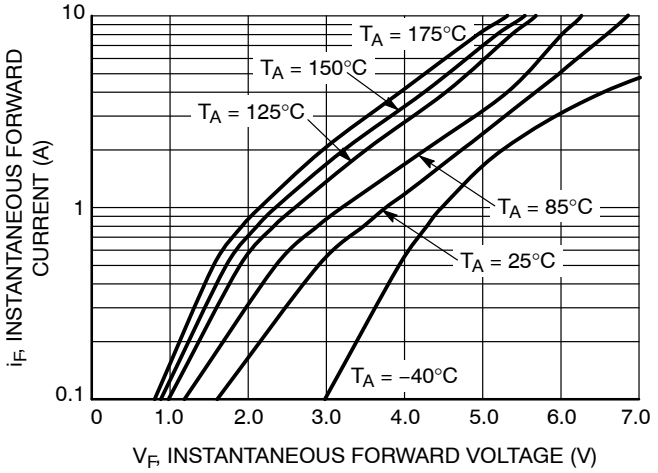


Figure 2. Maximum Instantaneous Forward Characteristics

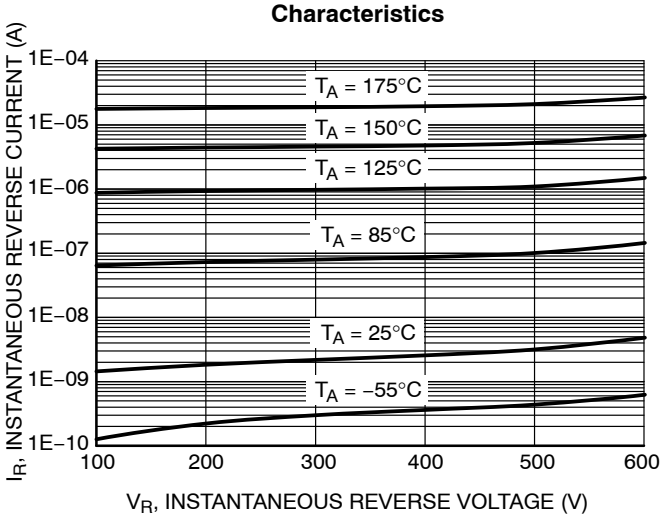


Figure 3. Typical Reverse Characteristics

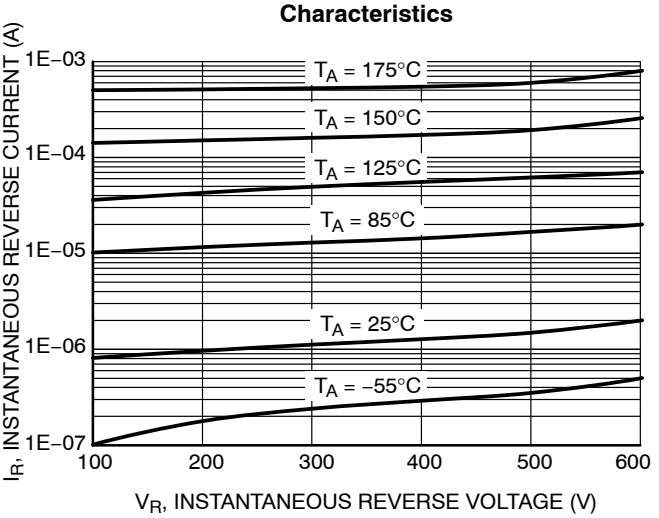


Figure 4. Maximum Reverse Characteristics

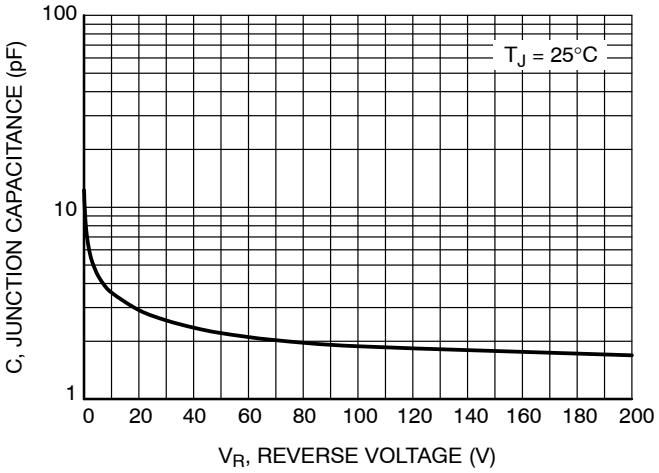


Figure 5. Typical Junction Capacitance

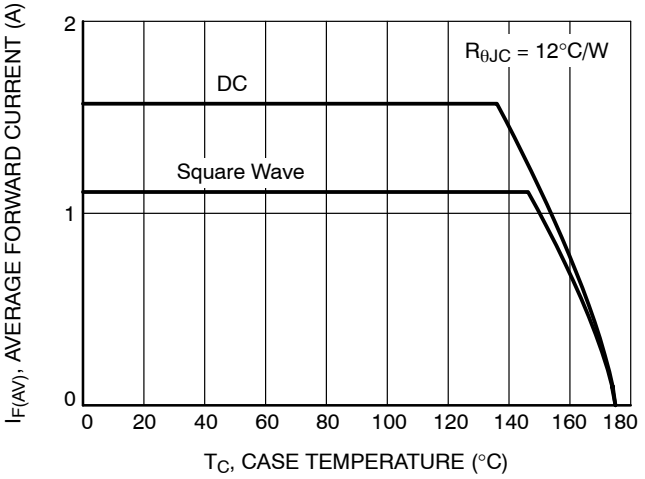


Figure 6. Current Derating

TYPICAL CHARACTERISTICS

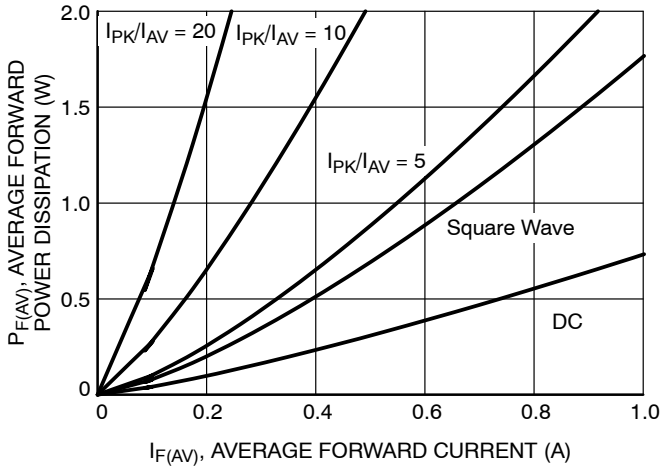


Figure 7. Forward Power Dissipation

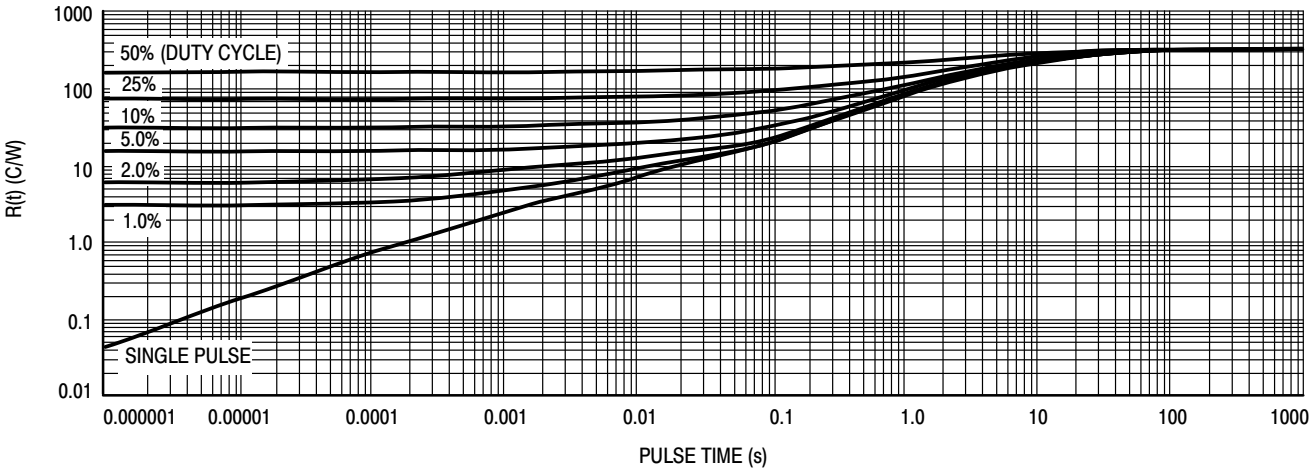


Figure 8. Thermal Response, Junction−to−Ambient (20 mm^2 pad)

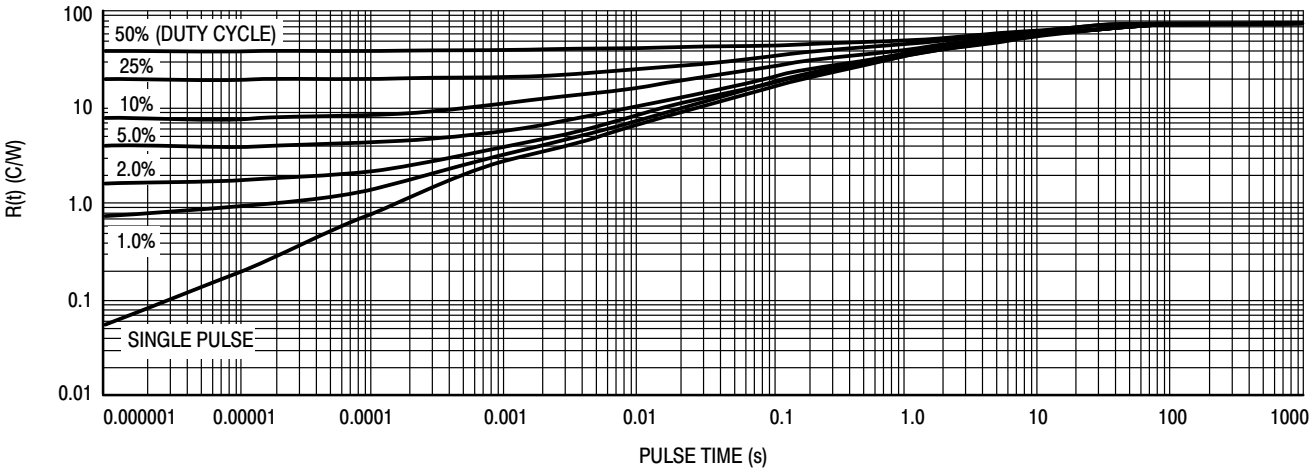
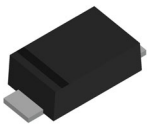
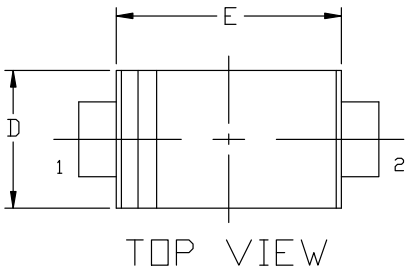


Figure 9. Thermal Response, Junction−to−Ambient (1 in^2 pad)

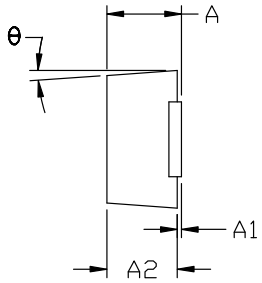


SOD−123−2 1.65x2.70x0.90
CASE 498
ISSUE E

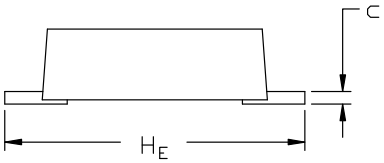
DATE 22 AUG 2023



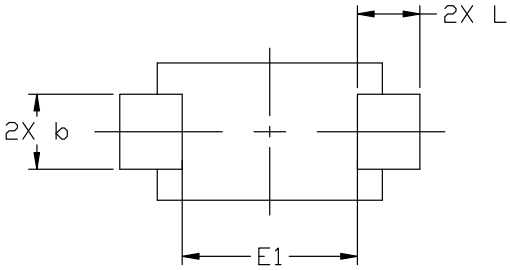
TOP VIEW



END VIEW



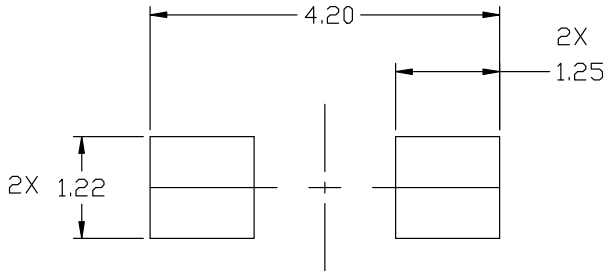
SIDE VIEW



BOTTOM VIEW

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	0.95	0.98
A1	0.00	0.05	0.10
A2	0.85	0.90	0.95
b	0.70	0.90	1.10
c	0.10	0.15	0.20
D	1.50	1.65	1.80
E	2.50	2.70	2.90
E1	1.70	2.10	2.50
H_E	3.40	3.60	3.80
L	0.55	0.75	0.95
θ	0°	---	8°

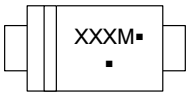
NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSIONS b AND L ARE TO BE MEASURED ON A FLAT SECTION OF THE LEAD BETWEEN 0.10 AND 0.25 FROM THE LEAD TIP.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH PROTRUSIONS, OR GATE BURRS.
5. FLAT LEAD.



RECOMMENDED
MOUNTING 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.

GENERIC
MARKING DIAGRAM*



XXX = Specific Device Code
M = Date Code
▪ = Pb−Free Package

(Note: Microdot may be in either location)

*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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