Switch-mode Soft Ultrafast Recovery Reverse Polarity Power Rectifier

MSRD620CT, NRVSRD620VCT, SSRD8620CT Series

State−of−the−art geometry features epitaxial construction with glass passivation. Ideally suited for low voltage, high frequency switching power supplies, free wheeling diode and polarity protection diodes.

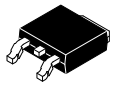
Features

- Soft Ultrafast Recovery
- Matched Dual Die Construction − May Be Paralleled for High Current Output
- Short Heat Sink Tab Manufactured − Not Sheared
- Epoxy Meets UL 94 V−0 @ 0.125 in.
- NRVSRD and SSRD8 Prefixes for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable
- These Devices are Pb−Free and are RoHS Compliant*

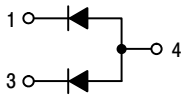
Mechanical Characteristics

- Case: Epoxy, Molded
- Weight: 0.4 Grams (Approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Max. for 10 Seconds
- ESD Ratings:
  - ♦ Machine Model = C
  - ♦ Human Body Model = 2

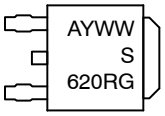
SOFT ULTRAFAST REVERSE POLARITY RECTIFIER 6.0 AMPERES, 200 VOLTS



DPAK
CASE 369C



MARKING DIAGRAM



A = Assembly Location
Y = Year
WW = Work Week
G = Pb−Free Package

ORDERING INFORMATION

Device	Package	Shipping†
NRVSRD620VCTT4RG	DPAK (Pb−Free)	2,500 / Tape & Reel

DISCONTINUED (Note 1)

MSRD620CTRG	DPAK (Pb−Free)	75 Units/Rail
SSRD8620CTRG	DPAK (Pb−Free)	75 Units/Rail
MSRD620CTT4RG	DPAK (Pb−Free)	2,500 / Tape & Reel
SSRD8620CTT4RG	DPAK (Pb−Free)	2,500 / 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

Symbol	Rating	Value	Unit
V_{RRM} V_{RWM} V_R	Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	200	V
I_O	Average Rectified Forward Current (At Rated V_R, T_C = 162°C) Per Leg Per Package	 3.0 6.0	A
I_{FSM}	Non−Repetitive Peak Surge Current (Surge Applied at Rated Load Conditions, Halfwave, Single Phase, 60 Hz) Per Package	 45	A
T_{stg}, T_c	Storage/Operating Case Temperature	−65 to +175	°C
T_J	Operating Junction Temperature	−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

Symbol	Rating	Value	Unit
$R_{\theta JC}$	Thermal Resistance − Junction−to−Case (Note 1) Per Leg	5.0	°C/W
$R_{\theta JA}$	Thermal Resistance − Junction−to−Ambient (Note 1) Per Leg	60	°C/W
$R_{\theta JA}$	Thermal Resistance − Junction−to−Ambient (Note 2) Per Leg	166	°C/W

1. Mounted with 700 mm^2 copper pad size (approximately 1 in^2) 1 oz FR4 board.
2. Mounted with pad size approximately 46 mm^2 copper, 1 oz FR4 board.

ELECTRICAL CHARACTERISTICS

Symbol	Rating	Value		Unit
V_F	Maximum Instantaneous Forward Voltage (Note 3) Per Leg	**T_J = 25°C**	**T_J = 125°C**	V
	(I_F = 3.0 A) (I_F = 6.0 A)	1.15 1.30	0.95 1.15	
I_R	Maximum Instantaneous Reverse Current (Note 3) Per Leg	**T_J = 25°C**	**T_J = 125°C**	μA
	(V_R = 200 V)	1.0	200	
t_{rr}	Maximum Reverse Recovery Time (Note 4) Per Leg (V_R = 30 V, I_F = 1.0 A, di/dt = 50 A/μs)	75		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.

3. Pulse Test: Pulse Width ≤ 380 μs, Duty Cycle ≤ 2%.
4. t_{rr} measured projecting from 25% of I_{RM} to ground.

TYPICAL CHARACTERISTICS

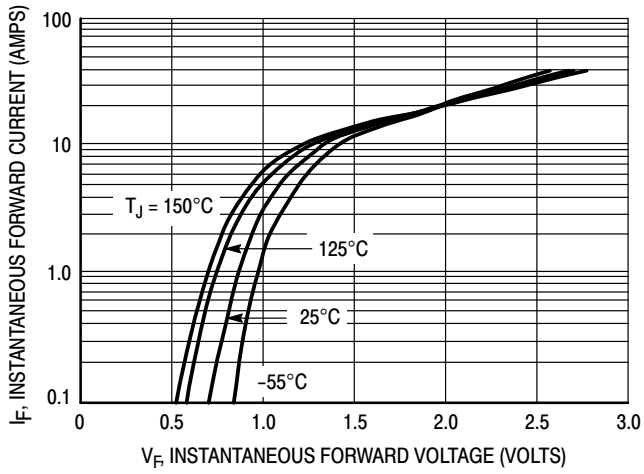


Figure 1. Typical Forward Voltage, Per Leg

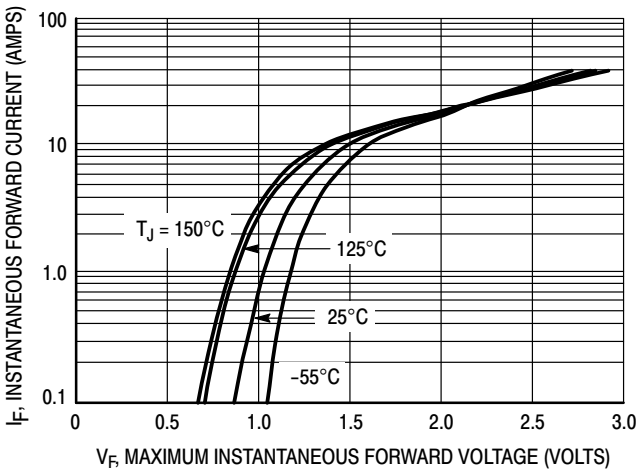


Figure 2. Maximum Forward Voltage, Per Leg

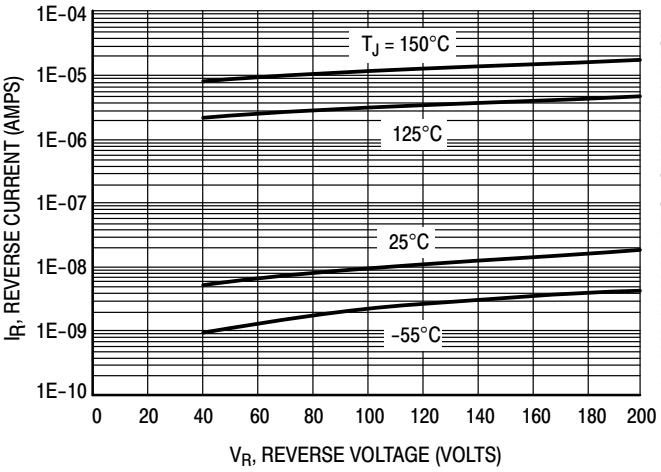


Figure 3. Typical Reverse Current, Per Leg

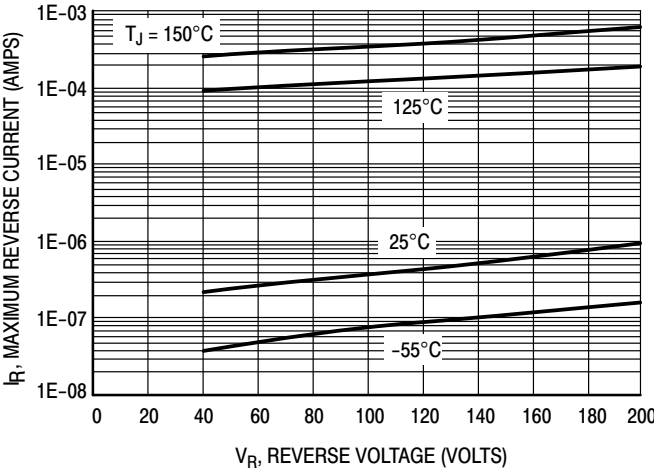


Figure 4. Maximum Reverse Current, Per Leg

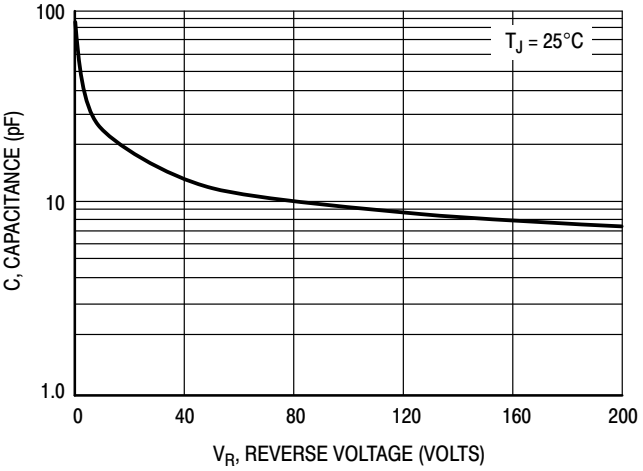


Figure 5. Typical Capacitance

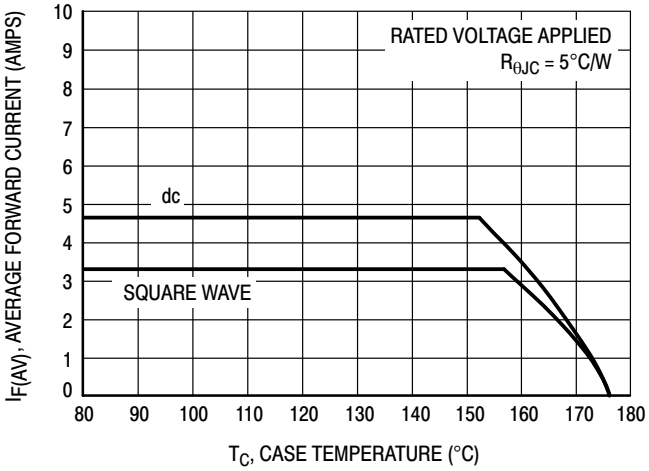


Figure 6. Typical Current Derating, Case (Per Leg)

TYPICAL CHARACTERISTICS (continued)

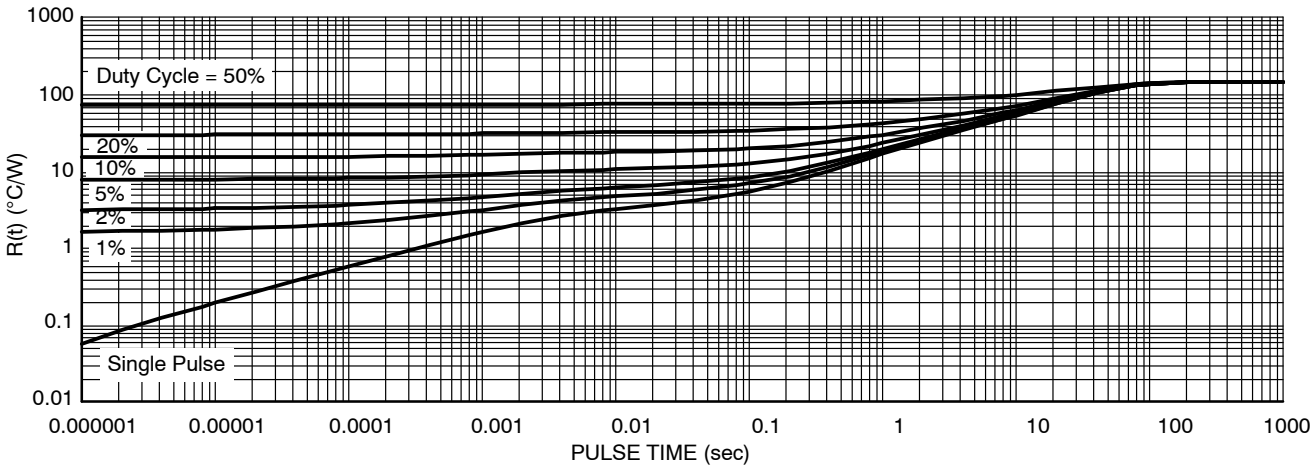


Figure 7. Thermal Response, Junction−to−Ambient (46 mm^2 pad)

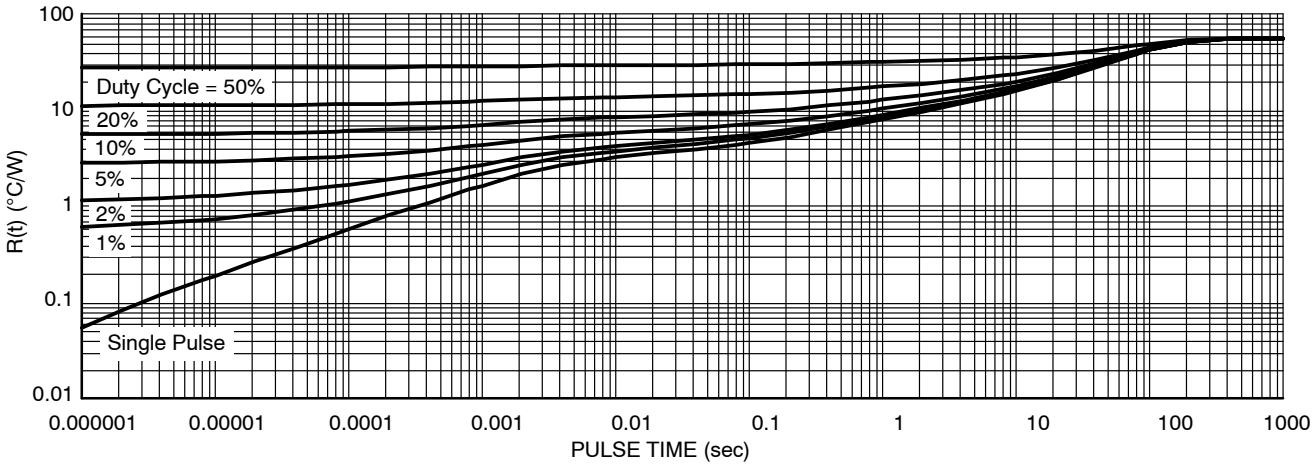
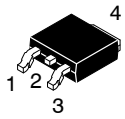


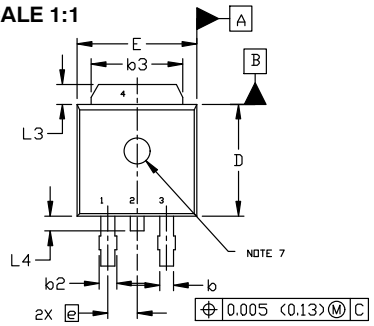
Figure 8. Thermal Response, Junction−to−Ambient (1 in^2 pad)



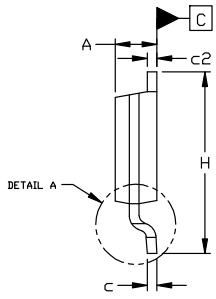
DPAK (SINGLE GAUGE)
CASE 369C
ISSUE G

DATE 31 MAY 2023

SCALE 1:1



TOP VIEW

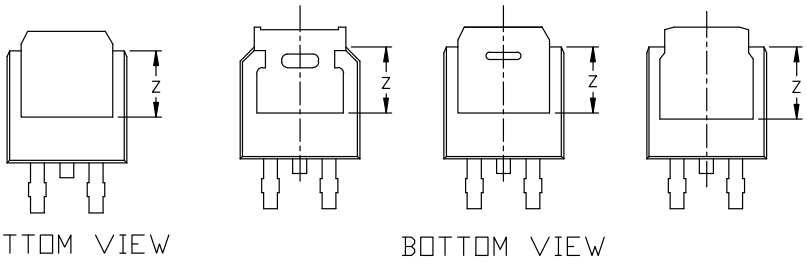


SIDE VIEW

NOTES:

1. DIMENSIONING AND TOLERANCING ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES
3. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS b3, L3, AND Z.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.006 INCHES PER SIDE.
5. DIMENSIONS D AND E ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
6. DATUMS A AND B ARE DETERMINED AT DATUM PLANE H.
7. OPTIONAL MOLD FEATURE.

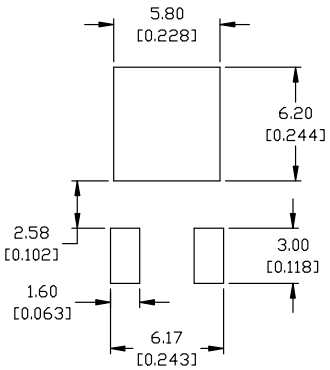
DIM	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.086	0.094	2.18	2.38
A1	0.000	0.005	0.00	0.13
b	0.025	0.035	0.63	0.89
b2	0.028	0.045	0.72	1.14
b3	0.180	0.215	4.57	5.46
c	0.018	0.024	0.46	0.61
c2	0.018	0.024	0.46	0.61
D	0.235	0.245	5.97	6.22
E	0.250	0.265	6.35	6.73
e	0.090 BSC		2.29 BSC	
H	0.370	0.410	9.40	10.41
L	0.055	0.070	1.40	1.78
L1	0.114 REF		2.90 REF	
L2	0.020 BSC		0.51 BSC	
L3	0.035	0.050	0.89	1.27
L4	----	0.040	---	1.01
Z	0.155	----	3.93	---



BOTTOM VIEW

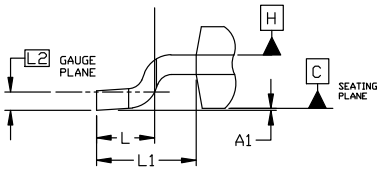
BOTTOM VIEW

ALTERNATE CONSTRUCTIONS



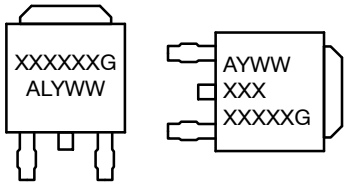
RECOMMENDED MOUNTING FOOTPRINT*

*FOR ADDITIONAL INFORMATION ON OUR PB-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.



DETAIL A
ROTATED 90° CW

GENERIC MARKING DIAGRAM*



IC **Discrete**

XXXXXX = Device Code
A = Assembly Location
L = Wafer Lot
Y = Year
WW = Work Week
G = 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.

STYLE 1:
PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

STYLE 2:
PIN 1. GATE
2. DRAIN
3. SOURCE
4. DRAIN

STYLE 3:
PIN 1. ANODE
2. CATHODE
3. ANODE
4. CATHODE

STYLE 4:
PIN 1. CATHODE
2. ANODE
3. GATE
4. ANODE

STYLE 5:
PIN 1. GATE
2. ANODE
3. CATHODE
4. ANODE

STYLE 6:
PIN 1. MT1
2. MT2
3. GATE
4. MT2

STYLE 7:
PIN 1. GATE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

STYLE 8:
PIN 1. N/C
2. CATHODE
3. ANODE
4. CATHODE

STYLE 9:
PIN 1. ANODE
2. CATHODE
3. RESISTOR ADJUST
4. CATHODE

STYLE 10:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. ANODE

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DESCRIPTION:	**DPAK (SINGLE GAUGE)**	**PAGE 1 OF 1**

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