Switch-mode Soft Ultrafast Recovery Power Rectifier

Plastic DPAK Package

MSRD620CT, NRVSRD620VCT, SSRD8620CT Series

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

Features

- Soft Ultrafast Recovery (35 ns typ)
- Highly Stable Oxide Passivated Junction
- 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

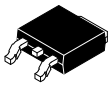
- Case: Epoxy, Molded
- Weight: 0.4 Grams (Approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Max. for 10 Seconds
- ESD Ratings:
  - Machine Model = C
  - Human Body Model =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

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

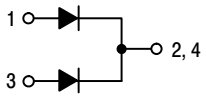
ON Semiconductor®

www.onsemi.com

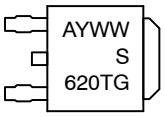
SOFT ULTRAFAST RECTIFIER 6.0 AMPERES, 200 VOLTS



DPAK
CASE 369C



MARKING DIAGRAM



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

ORDERING INFORMATION

Device	Package	Shipping†
MSRD620CTG	DPAK (Pb−Free)	75 Units/Rail
MSRD620CTT4G	DPAK (Pb−Free)	2,500 / Tape & Reel
NRVSRD620VCTT4G	DPAK (Pb−Free)	2,500 / Tape & Reel
SSRD8620CTT4G	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 Specifications Brochure, BRD8011/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_C = 137°C) Per Leg Per Package	I_O	 3.0 6.0	A
Peak Repetitive Forward Current (Square Wave, Duty = 0.5, T_C = 138°C) Per Leg	I_{FRM}	 6.0	A
Non−Repetitive Peak Surge Current (Surge Applied at Rated Load Conditions, Halfwave, Single Phase, 60 Hz) Per Package	I_{FSM}	 50	A
Storage / Operating Case Temperature	T_{stg}, T_c	−55 to +175	°C
Operating Junction Temperature	T_J	−55 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

Rating	Symbol	Value	Unit
Thermal Resistance − Junction−to−Case Per Leg	$R_{\theta JC}$	 9.0	°C/W
Thermal Resistance − Junction−to−Ambient Per Leg	$R_{\theta JA}$	 80	°C/W

ELECTRICAL CHARACTERISTICS

Rating	Symbol	Value		Unit
Maximum Instantaneous Forward Voltage (Note 1) (See Figure 2) Per Leg	V_F	**T_J = 25°C**	**T_J = 150°C**	V
(I_F = 3.0 A) (I_F = 6.0 A)		1.15 1.35	1.05 1.30	
Maximum Instantaneous Reverse Current (See Figure 4) Per Leg	I_R	**T_J = 25°C**	**T_J = 150°C**	μA
(V_R = 200 V) (V_R = 100 V)		5.0 2.0	200 100	
Maximum Reverse Recovery Time (Note 2) Per Leg (V_R = 30 V, I_F = 1.0 A, di/dt = 50 A/μs) (V_R = 30 V, I_F = 3.0 A, di/dt = 50 A/μs)	t_{rr}	 45 55		ns
Maximum Peak Reverse Recovery Current Per Leg (V_R = 30 V, I_F = 1.0 A, di/dt = 50 A/μs) (V_R = 30 V, I_F = 3.0 A, di/dt = 50 A/μs)	I_{RM}	 2.0 3.0		A

1. Pulse Test: Pulse Width ≤ 250 μs, Duty Cycle ≤ 2%.
2. t_{rr} measured projecting from 25% of I_{RM} to ground.

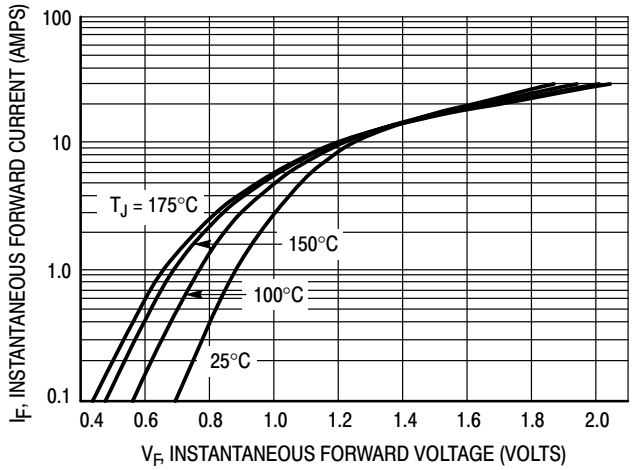


Figure 1. Typical Forward Voltage, Per Leg

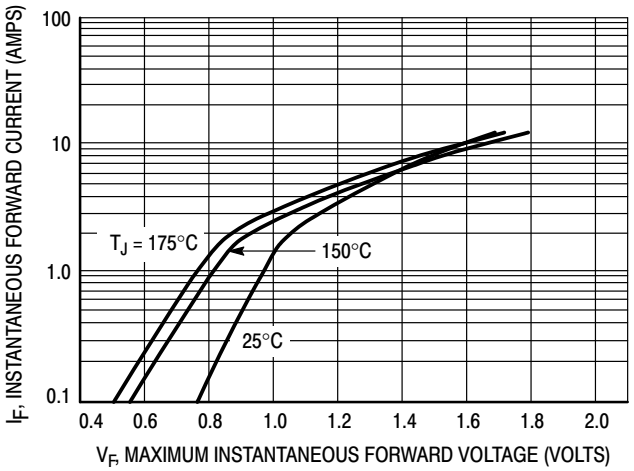


Figure 2. Maximum Forward Voltage, Per Leg

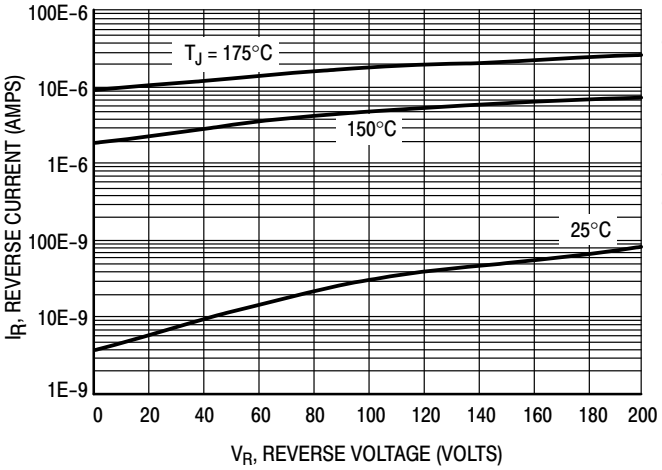


Figure 3. Typical Reverse Current, Per Leg

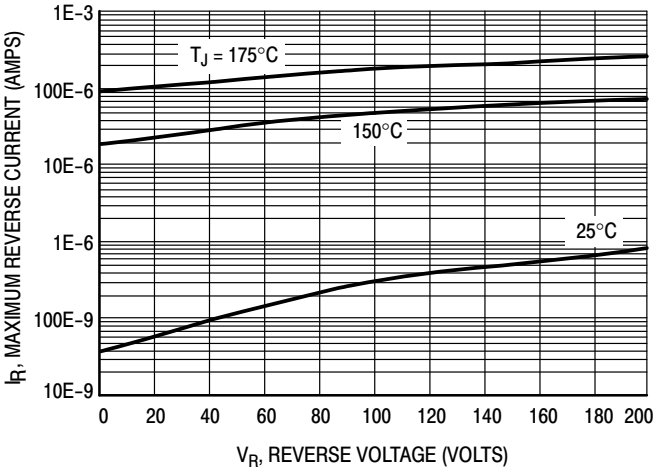


Figure 4. Maximum Reverse Current, Per Leg

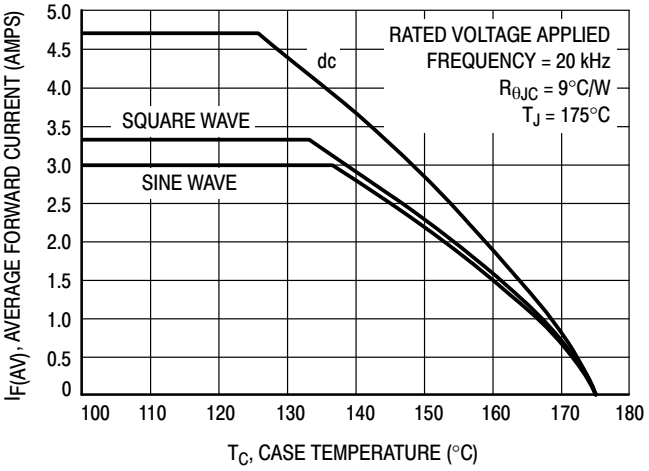


Figure 5. Current Derating, Case (Per Leg)

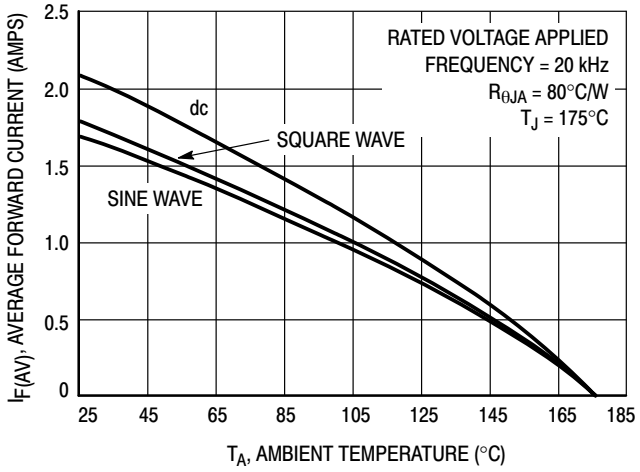


Figure 6. Current Derating, Ambient (Per Leg)

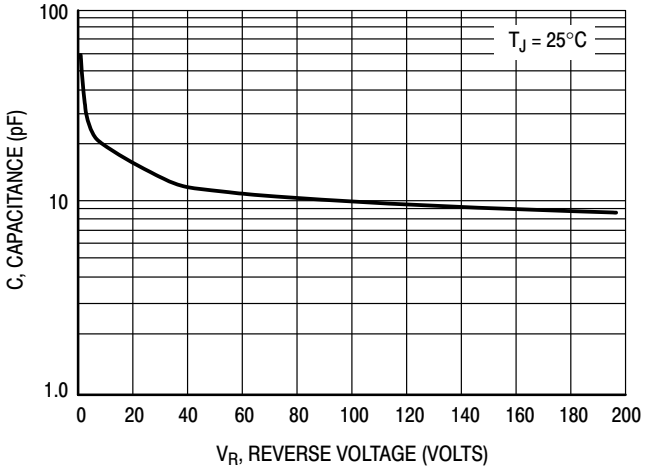


Figure 7. Typical Capacitance (Per Leg)

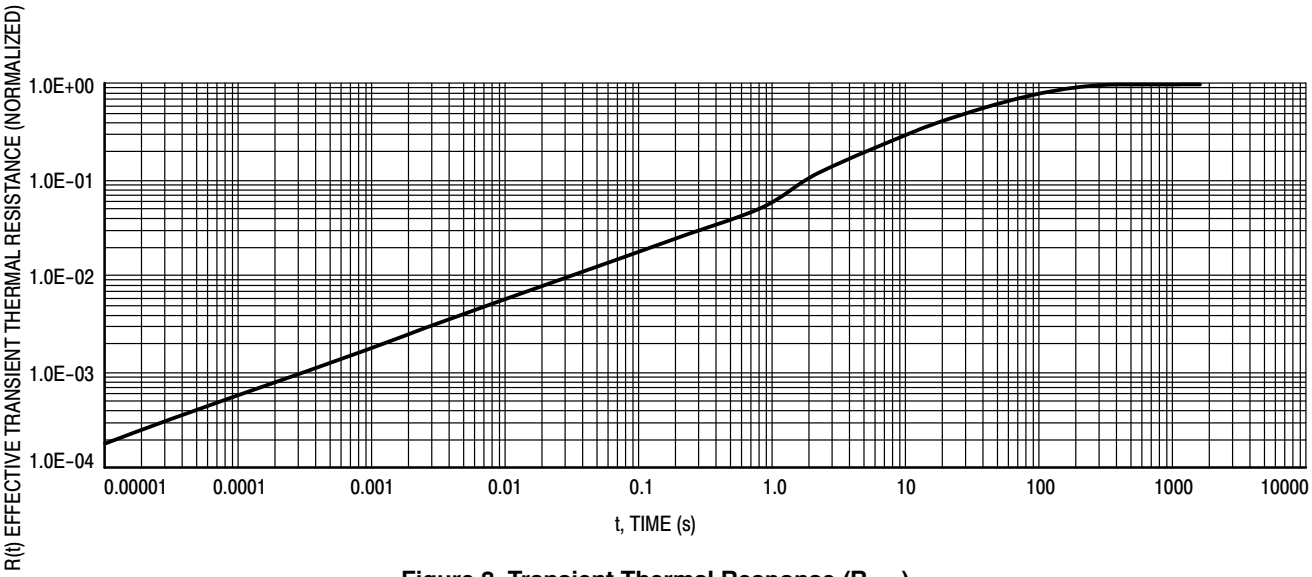


Figure 8. Transient Thermal Response ($R_{\theta JA}$)

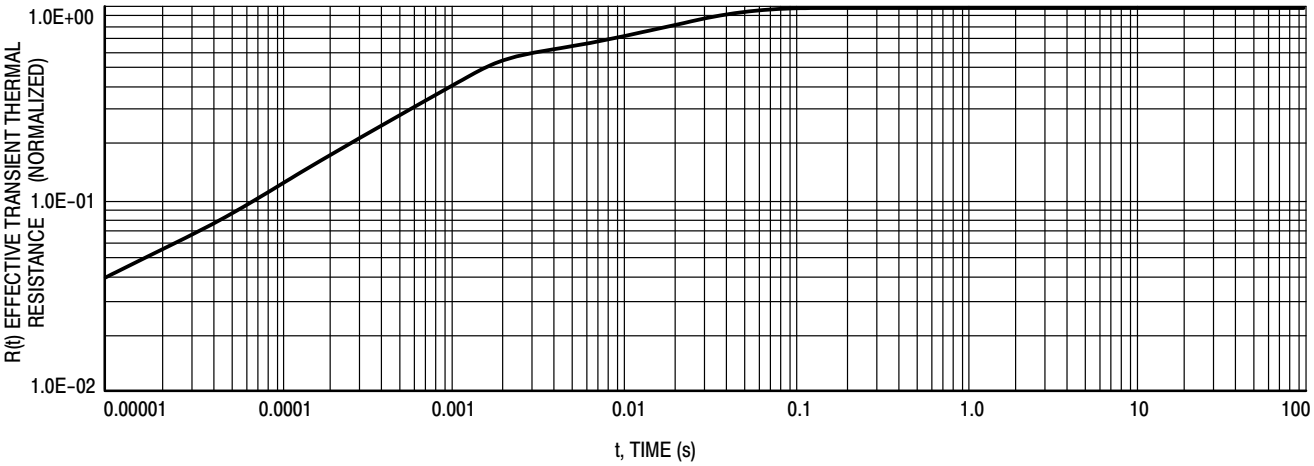
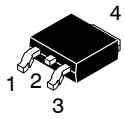


Figure 9. Transient Thermal Response ($R_{\theta JC}$)

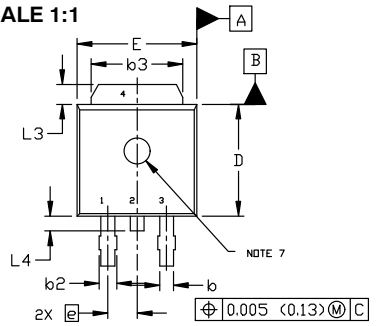
MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS



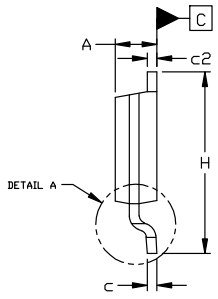
DPAK (SINGLE GAUGE)
CASE 369C
ISSUE G

DATE 31 MAY 2023

SCALE 1:1



TOP VIEW

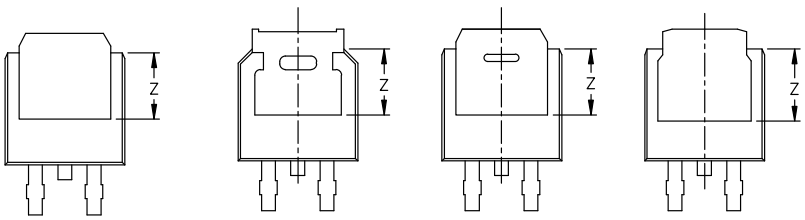


SIDE VIEW

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.

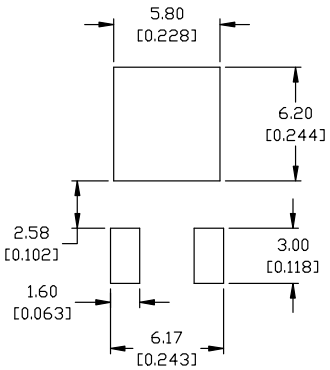
DIM	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.086	0.094	2.18	2.38
A1	0.000	0.005	0.00	0.13
b	0.025	0.035	0.63	0.89
b2	0.028	0.045	0.72	1.14
b3	0.180	0.215	4.57	5.46
c	0.018	0.024	0.46	0.61
c2	0.018	0.024	0.46	0.61
D	0.235	0.245	5.97	6.22
E	0.250	0.265	6.35	6.73
e	0.090 BSC		2.29 BSC	
H	0.370	0.410	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

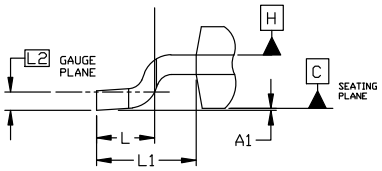
BOTTOM VIEW

ALTERNATE CONSTRUCTIONS



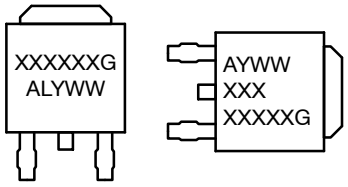
RECOMMENDED MOUNTING FOOTPRINT*

*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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