

# 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



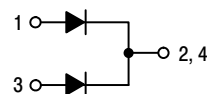
ON Semiconductor®

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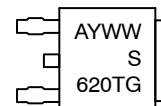
**SOFT ULTRAFAST  
RECTIFIER  
6.0 AMPERES, 200 VOLTS**



**DPAK  
CASE 369C**



### MARKING DIAGRAM



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

### ORDERING INFORMATION

| Device          | Package           | Shipping†              |
|-----------------|-------------------|------------------------|
| MSRD620CTG      | DPAK<br>(Pb-Free) | 75 Units/Rail          |
| MSRD620CTT4G    | DPAK<br>(Pb-Free) | 2,500 /<br>Tape & Reel |
| NRVSRD620VCTT4G | DPAK<br>(Pb-Free) | 2,500 /<br>Tape & Reel |
| SSRD8620CTT4G   | DPAK<br>(Pb-Free) | 2,500 /<br>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.

\*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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## MAXIMUM RATINGS

| Rating                                                                                                                      | Symbol                          | Value       | Unit             |
|-----------------------------------------------------------------------------------------------------------------------------|---------------------------------|-------------|------------------|
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage                                      | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | 200         | V                |
| Average Rectified Forward Current<br>( $T_C = 137^\circ\text{C}$ )<br>Per Leg<br>Per Package                                | $I_O$                           | 3.0<br>6.0  | A                |
| Peak Repetitive Forward Current<br>(Square Wave, Duty = 0.5, $T_C = 138^\circ\text{C}$ )<br>Per Leg                         | $I_{FRM}$                       | 6.0         | A                |
| Non-Repetitive Peak Surge Current<br>(Surge Applied at Rated Load Conditions, Halfwave, Single Phase, 60 Hz)<br>Per Package | $I_{FSM}$                       | 50          | A                |
| Storage / Operating Case Temperature                                                                                        | $T_{stg}, T_C$                  | -55 to +175 | $^\circ\text{C}$ |
| Operating Junction Temperature                                                                                              | $T_J$                           | -55 to +175 | $^\circ\text{C}$ |

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<br>Per Leg    | $R_{\theta JC}$ | 9.0   | $^\circ\text{C/W}$ |
| Thermal Resistance – Junction-to-Ambient<br>Per Leg | $R_{\theta JA}$ | 80    | $^\circ\text{C/W}$ |

## ELECTRICAL CHARACTERISTICS

| Rating                                                                                                                                                                                                                        | Symbol   | Value                    |                           | Unit          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------------|---------------------------|---------------|
| Maximum Instantaneous Forward Voltage (Note 1) (See Figure 2)<br>Per Leg<br><br>( $I_F = 3.0\text{ A}$ )<br>( $I_F = 6.0\text{ A}$ )                                                                                          | $V_F$    | $T_J = 25^\circ\text{C}$ | $T_J = 150^\circ\text{C}$ | V             |
|                                                                                                                                                                                                                               |          | 1.15<br>1.35             | 1.05<br>1.30              |               |
| Maximum Instantaneous Reverse Current (See Figure 4)<br>Per Leg<br><br>( $V_R = 200\text{ V}$ )<br>( $V_R = 100\text{ V}$ )                                                                                                   | $I_R$    | $T_J = 25^\circ\text{C}$ | $T_J = 150^\circ\text{C}$ | $\mu\text{A}$ |
|                                                                                                                                                                                                                               |          | 5.0<br>2.0               | 200<br>100                |               |
| Maximum Reverse Recovery Time (Note 2)<br>Per Leg<br>( $V_R = 30\text{ V}$ , $I_F = 1.0\text{ A}$ , $di/dt = 50\text{ A}/\mu\text{s}$ )<br>( $V_R = 30\text{ V}$ , $I_F = 3.0\text{ A}$ , $di/dt = 50\text{ A}/\mu\text{s}$ ) | $t_{rr}$ | 45<br>55                 |                           | ns            |
| Maximum Peak Reverse Recovery Current<br>Per Leg<br>( $V_R = 30\text{ V}$ , $I_F = 1.0\text{ A}$ , $di/dt = 50\text{ A}/\mu\text{s}$ )<br>( $V_R = 30\text{ V}$ , $I_F = 3.0\text{ A}$ , $di/dt = 50\text{ A}/\mu\text{s}$ )  | $I_{RM}$ | 2.0<br>3.0               |                           | A             |

1. Pulse Test: Pulse Width  $\leq 250\text{ }\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .
2.  $t_{rr}$  measured projecting from 25% of  $I_{RM}$  to ground.

# MSRD620CT, NRVSRD620VCT, SSRD8620CT Series

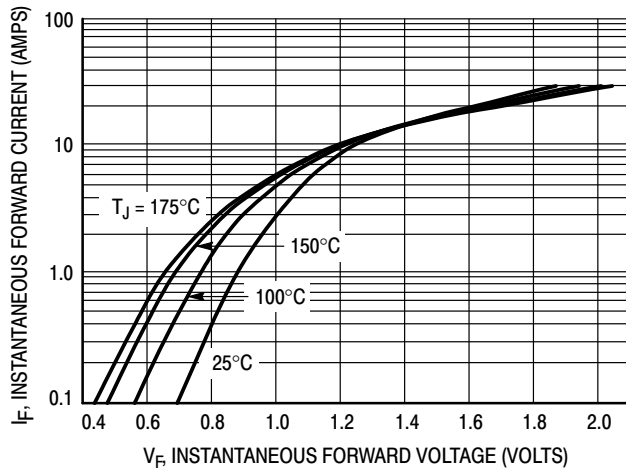


Figure 1. Typical Forward Voltage, Per Leg

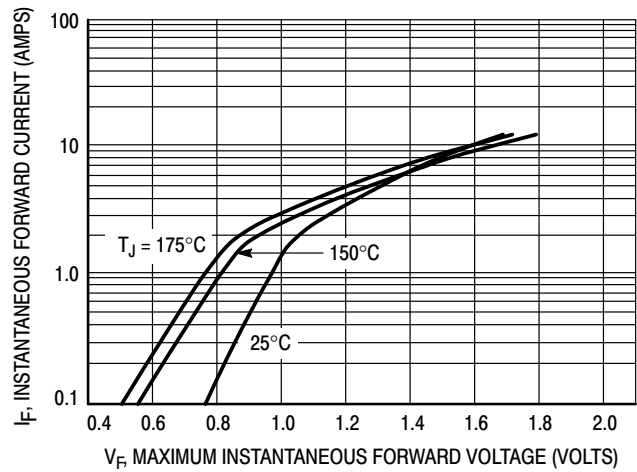


Figure 2. Maximum Forward Voltage, Per Leg

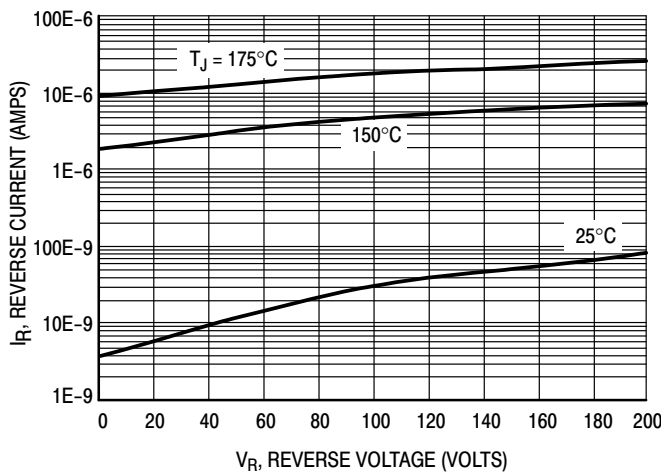


Figure 3. Typical Reverse Current, Per Leg

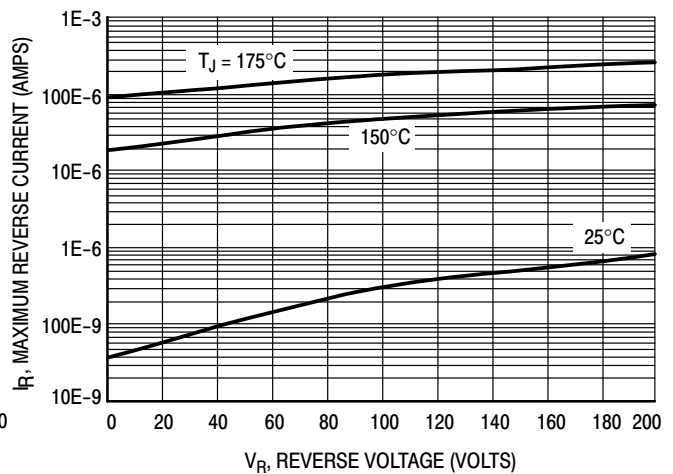


Figure 4. Maximum Reverse Current, Per Leg

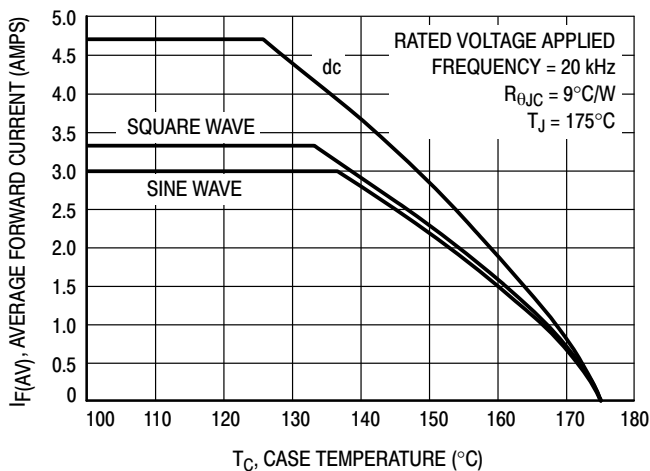


Figure 5. Current Derating, Case (Per Leg)

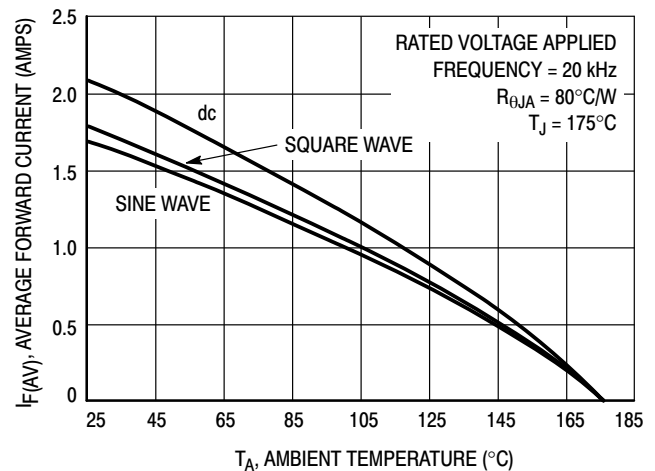


Figure 6. Current Derating, Ambient (Per Leg)

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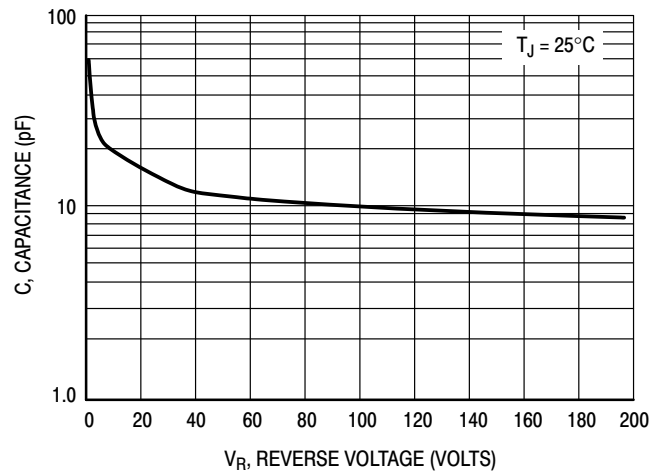


Figure 7. Typical Capacitance (Per Leg)

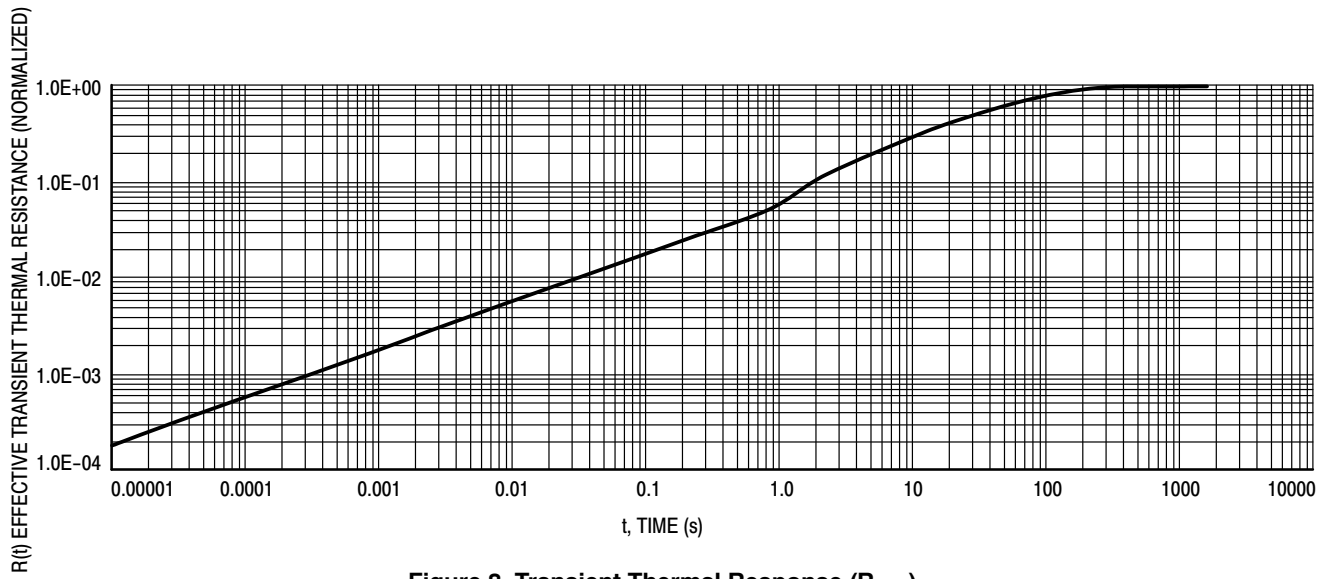


Figure 8. Transient Thermal Response (R<sub>θJA</sub>)

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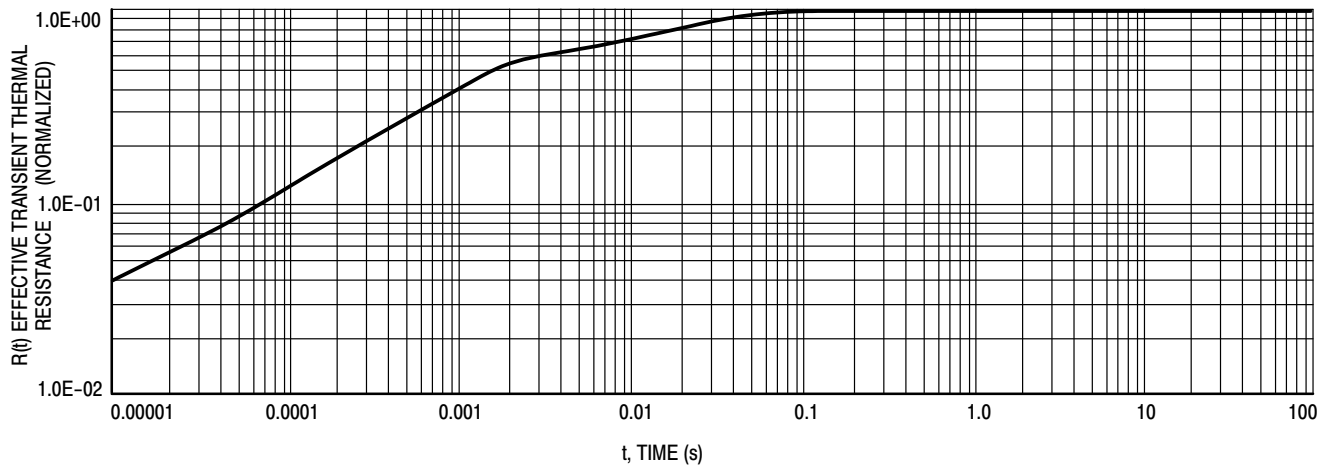


Figure 9. Transient Thermal Response ( $R_{\theta JC}$ )

# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



## DPAK (SINGLE GAUGE) CASE 369C ISSUE G

DATE 31 MAY 2023

SCALE 1:1



TOP VIEW



SIDE VIEW



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, SOLDERM/D.

#### 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

### NOTES:

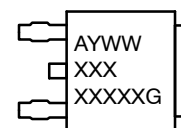
1. DIMENSIONING AND TOLERANCING ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES
3. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS b3, L3, AND Z.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.006 INCHES PER SIDE.
5. 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        | ---   |

### 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.

|                  |                     |                                                                                                                                                                                     |
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