Switch-mode Power Rectifiers

DPAK−3 Surface Mount Package

MBRD620CT, NRVBD620VCT, SBRV620CT Series

These state−of−the−art devices are designed for use in switching power supplies, inverters and as free wheeling diodes.

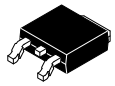
Features

- Extremely Fast Switching
- Extremely Low Forward Drop
- Platinum Barrier with Avalanche Guardrings
- NRVBD and SBRV 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

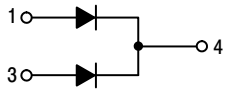
Mechanical Characteristics:

- Case: Epoxy, Molded
- Weight: 0.4 Gram (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 = 3B

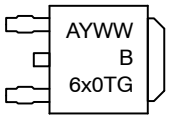
SCHOTTKY BARRIER RECTIFIERS
6.0 AMPERES, 20 − 60 VOLTS



DPAK
CASE 369C



MARKING DIAGRAM



A	= Assembly Location*
Y	= Year
WW	= Work Week
B6x0T	= Device Code
x	= 2, 3, 4, 5, or 6
G	= Pb−Free Package

* The Assembly Location Code (A) is front side optional. In cases where the Assembly Location is stamped in the package bottom (molding ejecter pin), the front side assembly code may be blank.

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

NOTE: Some of the devices on this data sheet have been **DISCONTINUED**. Please refer to the table on page 5.

MAXIMUM RATINGS

Rating	Symbol	MBRD/NRVBD/SBRV					Unit
		620CT	630CT	640CT	650CT	660CT	
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_R	20	30	40	50	60	V
Average Rectified Forward Current T_C = 130°C Per Diode Per Device	$I_{F(AV)}$			3 6			A
Peak Repetitive Forward Current, T_C = 130°C (Square Wave, Duty = 0.5) Per Diode	I_{FRM}			6			A
Nonrepetitive Peak Surge Current – (Surge applied at rated load conditions halfwave, single phase, 60 Hz)	I_{FSM}			75			A
Peak Repetitive Reverse Surge Current (2 μs, 1 kHz)	I_{RRM}			1			A
Operating Junction Temperature (Note 1)	T_J			–65 to +175			°C
Storage Temperature	T_{stg}			–65 to +175			°C
Voltage Rate of Change (Rated V_R)	dv/dt			10,000			V/μs

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 PER DIODE

Characteristic	Symbol	Value	Unit
Maximum Thermal Resistance, Junction−to−Case	$R_{\theta JC}$	6	°C/W
Maximum Thermal Resistance, Junction−to−Ambient (Note 2)	$R_{\theta JA}$	80	°C/W

2. Rating applies when surface mounted on the minimum pad size recommended.

ELECTRICAL CHARACTERISTICS PER DIODE

Characteristic	Symbol	Value	Unit
Maximum Instantaneous Forward Voltage (Note 3) i_F = 3 Amps, T_C = 25°C i_F = 3 Amps, T_C = 125°C i_F = 6 Amps, T_C = 25°C i_F = 6 Amps, T_C = 125°C	V_F	 0.7 0.65 0.9 0.85	V
Maximum Instantaneous Reverse Current (Note 3) (Rated dc Voltage, T_C = 25°C) (Rated dc Voltage, T_C = 125°C)	i_R	 0.1 15	mA

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 = 300 μs, Duty Cycle ≤ 2.0%.

TYPICAL CHARACTERISTICS

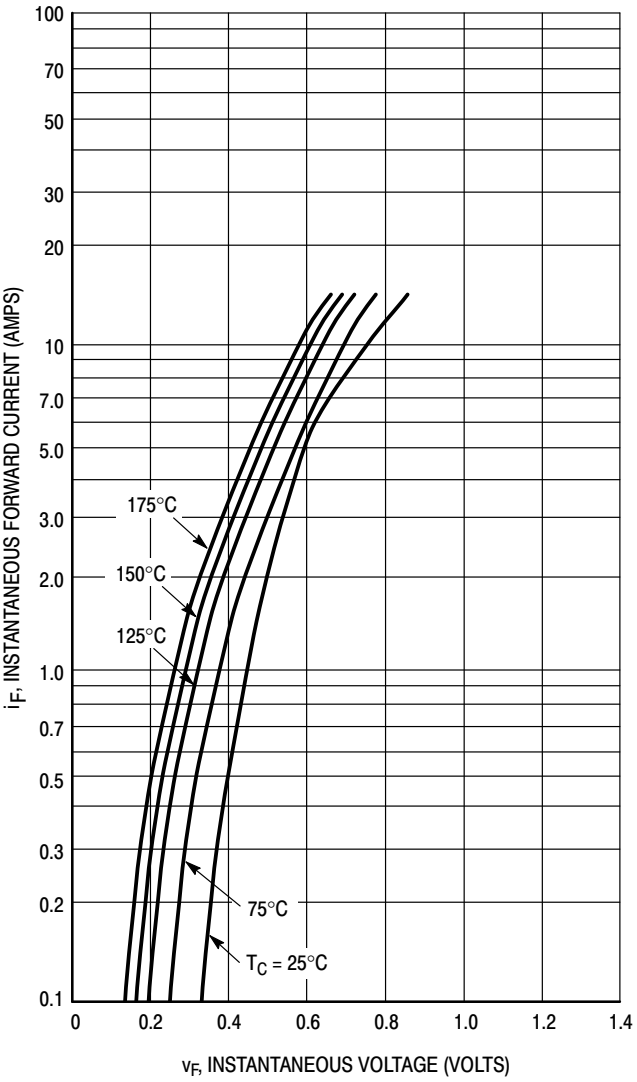
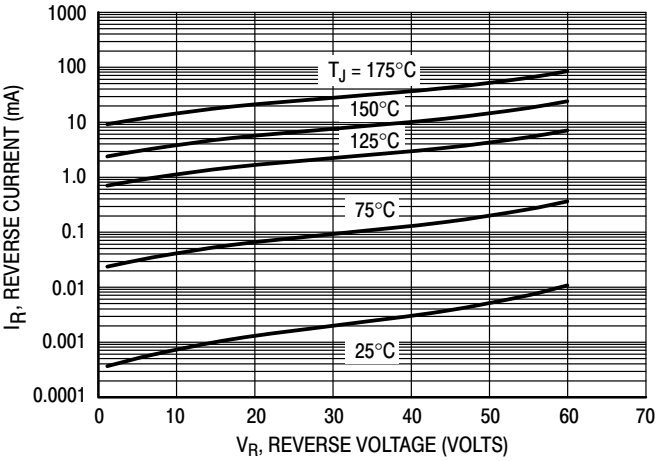


Figure 1. Typical Forward Voltage, Per Leg



*The curves shown are typical for the highest voltage device in the voltage grouping. Typical reverse current for lower voltage selections can be estimated from these curves if V_R is sufficient below rated V_R.

Figure 2. Typical Reverse Current,* Per Leg

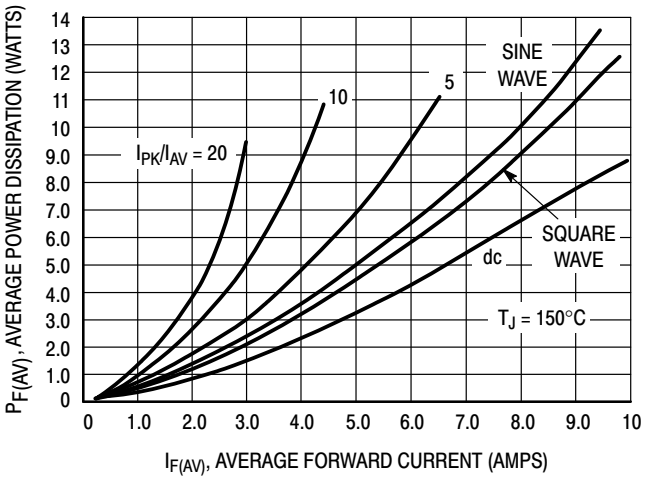


Figure 3. Average Power Dissipation, Per Leg

TYPICAL CHARACTERISTICS

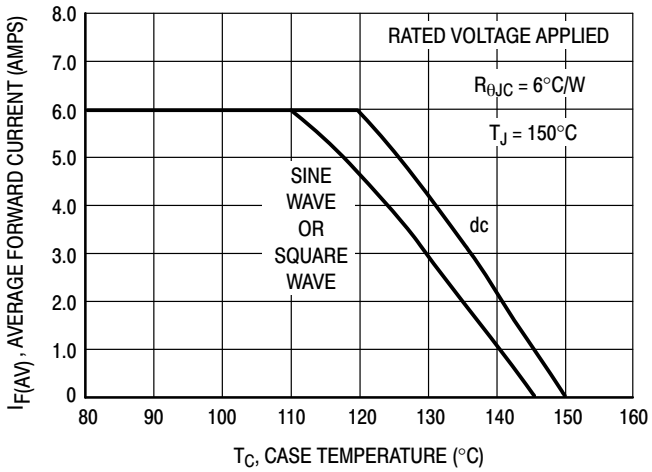


Figure 4. Current Derating, Case, Per Leg

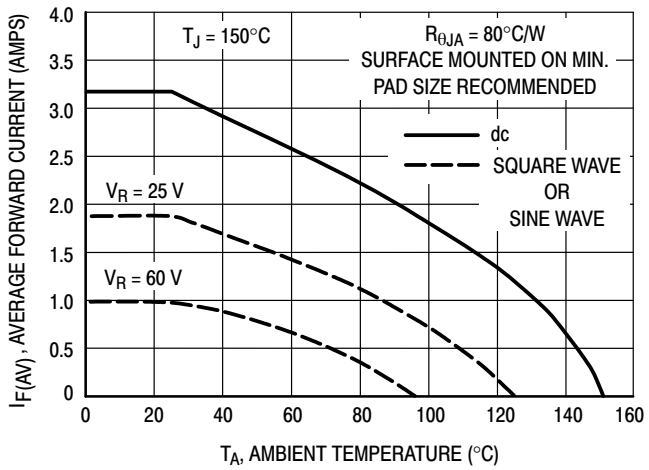


Figure 5. Current Derating, Ambient, Per Leg

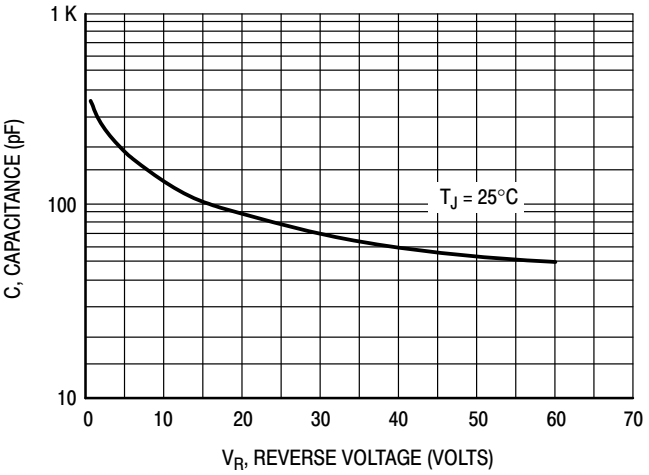


Figure 6. Typical Capacitance, Per Leg

ORDERING INFORMATION

Device	Package	Shipping†
MBRD620CTT4G	DPAK (Pb−Free)	2500 / Tape & Reel
MBRD640CTT4G		2500 / Tape & Reel
MBRD650CTT4G		2500 / Tape & Reel
MBRD660CTT4G		2500 / Tape & Reel
SBRV660VCTT4G*		2500 / Tape & Reel
SNRVBD660CTT4G*		2500 / Tape & Reel

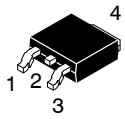
DISCONTINUED (Note 4)

MBRD630CTT4G	DPAK (Pb−Free)	2500 / Tape & Reel
MBRD640CTG		75 Units / Rail
NRVBD640CTG*		75 Units / Rail
NRVBD640CTG−VF01*		75 Units / Rail
NRVBD640CTT4G*		2500 / Tape & Reel
NRVBD640VCTT4G*		2500 / Tape & Reel
SBRV640VCTT4G*		2500 / Tape & Reel
MBRD650CTG		75 Units / Rail
NRVBD650CTG−VF01*		2500 / Tape & Reel
NRVBD650CTT4G*		2500 / Tape & Reel
NRVBD650CTT4G−VF01*		2500 / Tape & Reel
MBRD660CTG		75 Units / Rail
NRVBD660CTG*		75 Units / Rail
NRVBD660CTG−VF01*		75 Units / Rail
MBRD660CTRLG		1800 / Tape & Reel
NRVBD660CTRLG*		1800 / Tape & Reel
NRVBD660CTT4G*		2500 / 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.

*NRVBD and SBRV Prefixes for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable.

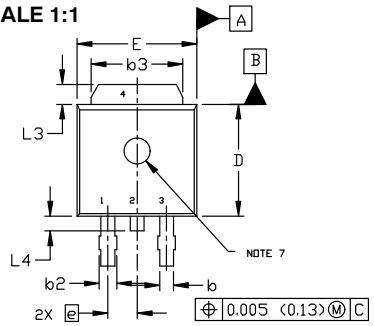
4. **DISCONTINUED:** These devices are not recommended for new design. Please contact your **onsemi** representative for information. The most current information on these devices may be available on www.onsemi.com.



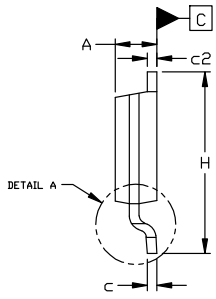
DPAK (SINGLE GAUGE)
CASE 369C
ISSUE G

DATE 31 MAY 2023

SCALE 1:1



TOP VIEW

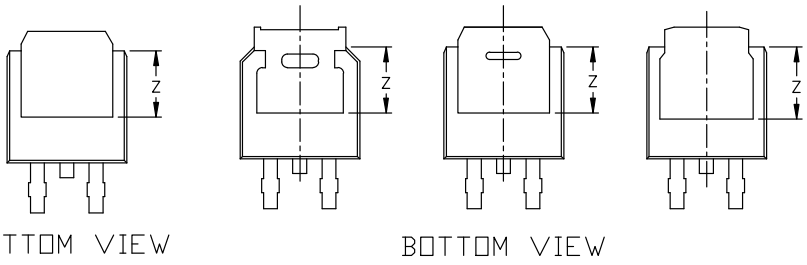


SIDE VIEW

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.

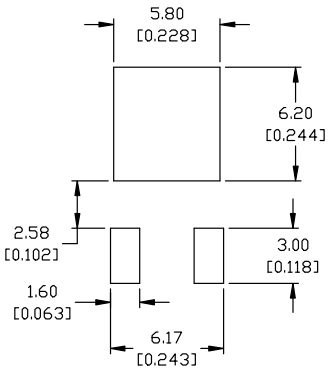
DIM	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.086	0.094	2.18	2.38
A1	0.000	0.005	0.00	0.13
b	0.025	0.035	0.63	0.89
b2	0.028	0.045	0.72	1.14
b3	0.180	0.215	4.57	5.46
c	0.018	0.024	0.46	0.61
c2	0.018	0.024	0.46	0.61
D	0.235	0.245	5.97	6.22
E	0.250	0.265	6.35	6.73
e	0.090 BSC		2.29 BSC	
H	0.370	0.410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

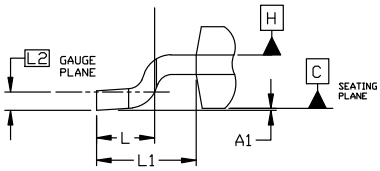
BOTTOM VIEW

ALTERNATE CONSTRUCTIONS



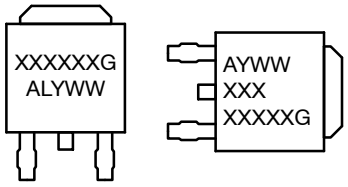
RECOMMENDED MOUNTING FOOTPRINT*

*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

DOCUMENT NUMBER:	**98AON10527D**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	**DPAK (SINGLE GAUGE)**	**PAGE 1 OF 1**

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at
www.onsemi.com/support/sales