

MBRS540T3G, NRVBS540T3G

Surface Mount Schottky Power Rectifier

The MBRS540T3 employs the Schottky Barrier principle in a large area metal-to-silicon power diode. State-of-the-art geometry features epitaxial construction with oxide passivation and metal overlay contact. Ideally suited for low voltage, high frequency rectification, or as free wheeling and polarity protection diodes in surface mount applications where compact size and weight are critical to the system.

Features

- Small Compact Surface Mountable Package with J-Bend Leads
- Rectangular Package for Automated Handling
- Highly Stable Oxide Passivated Junction
- Excellent Ability to Withstand Reverse Avalanche Energy Transients
- Guard-Ring for Stress Protection
- AEC-Q101 Qualified and PPAP Capable
- NRVB Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements
- These are Pb-Free Packages*

Mechanical Characteristics

- Case: Epoxy, Molded, Epoxy Meets UL 94 V-0 @ 0.125 in
- Weight: 217 mg (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
- Polarity: Notch in Plastic Body Indicates Cathode Lead
- ESD Rating:
 - ◆ Machine Model, C (> 400 V)
 - ◆ Human Body Model, 3B (> 8000 V)
- Device Meets MSL 1 Requirements



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**SCHOTTKY BARRIER
RECTIFIER
5.0 AMPERES, 40 VOLTS**



**SMC
CASE 403
PLASTIC**

MARKING DIAGRAM



B540 = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
MBRS540T3G	SMC (Pb-Free)	2,500 / Tape & Reel
NRVBS540T3G	SMC (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.

*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 Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_R	40	V
Average Rectified Forward Current (At Rated V_R , $T_C = 105^\circ\text{C}$)	$I_{F(AV)}$	5	A
Peak Repetitive Forward Current (At Rated V_R , Square Wave, 20 KHz, $T_C = 80^\circ\text{C}$)	I_{FRM}	10	A
Non-Repetitive Peak Surge Current (Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz)	I_{FSM}	190	A
Storage Temperature Range	Tstg	-65 to +150	$^\circ\text{C}$
Operating Junction Temperature (Note 1)	T_J	-65 to +150	$^\circ\text{C}$
Voltage Rate of Change (Rated V_R)	dv/dt	10,000	V/ μs

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

- 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)	$R_{\theta JL}$	12	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	111	

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

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Value	Unit
Maximum Instantaneous Forward Voltage (Note 3) ($I_F = 5.0\text{ A}$, $T_C = 25^\circ\text{C}$)	V_F	0.50	V
Maximum Instantaneous Reverse Current (Note 3) (Rated dc Voltage, $T_C = 25^\circ\text{C}$) (Rated dc Voltage, $T_C = 100^\circ\text{C}$)	i_R	0.3 15	mA

- Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

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TYPICAL CHARACTERISTICS

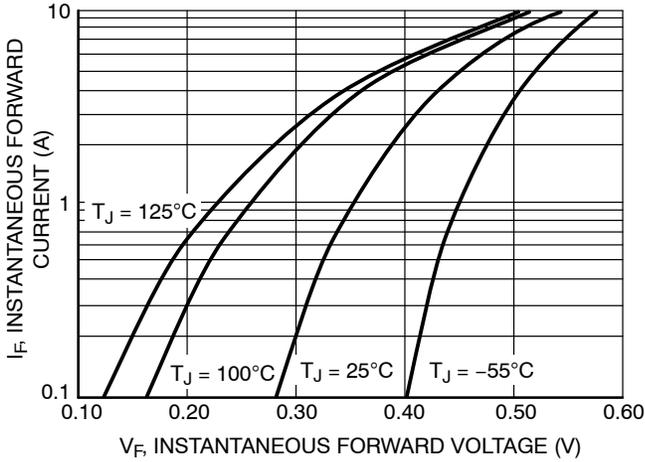


Figure 1. Typical Forward Voltage

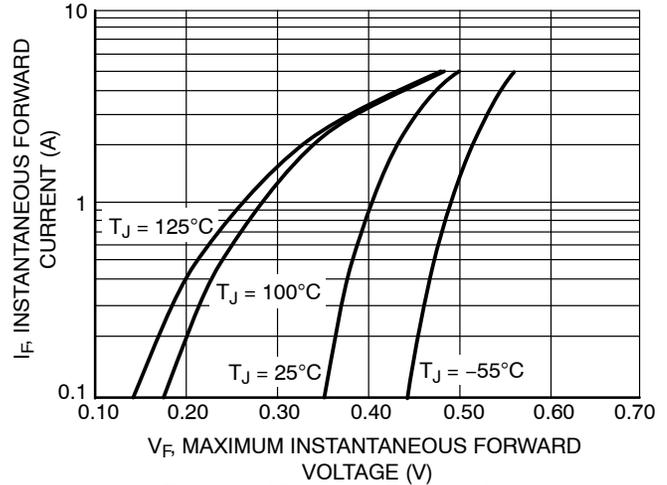


Figure 2. Maximum Forward Voltage

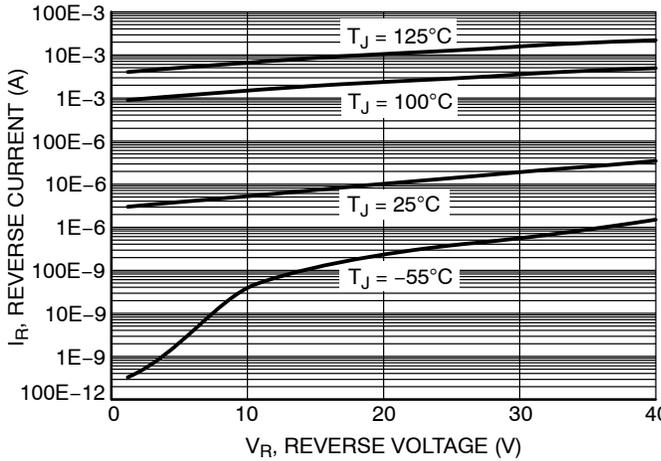


Figure 3. Typical Reverse Current

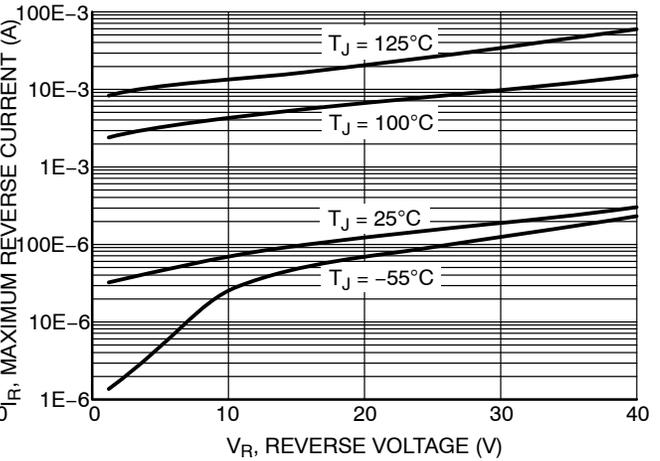


Figure 4. Maximum Reverse Current

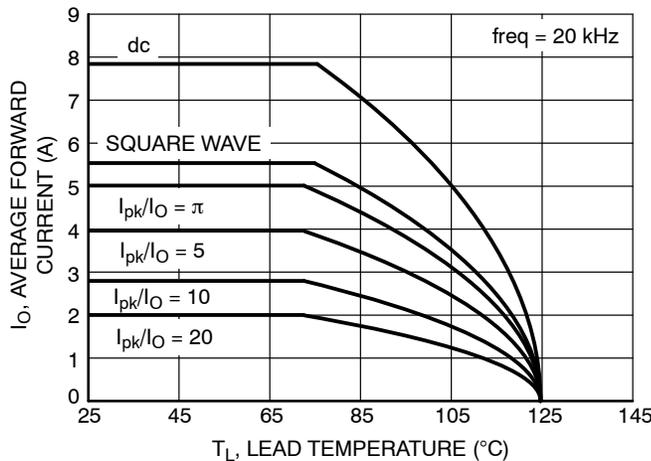


Figure 5. Current Derating

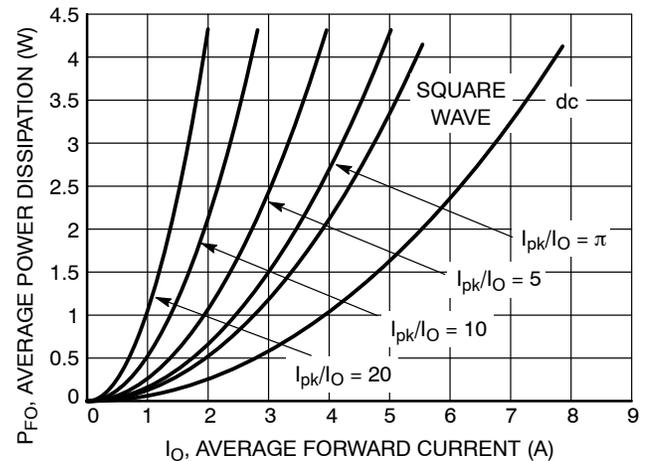


Figure 6. Forward Power Dissipation

MBRS540T3G, NRVBS540T3G

TYPICAL CHARACTERISTICS

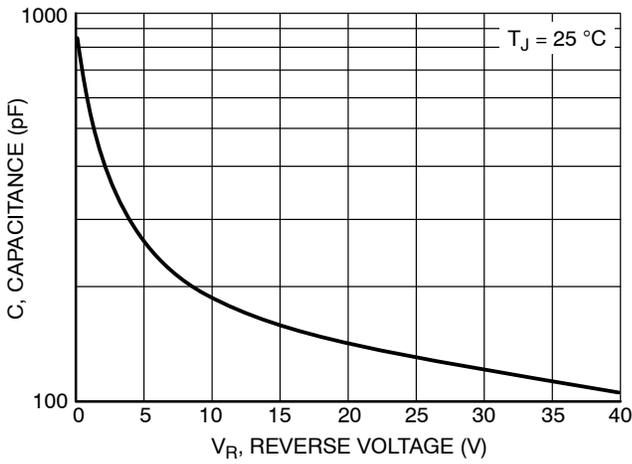


Figure 7. Capacitance

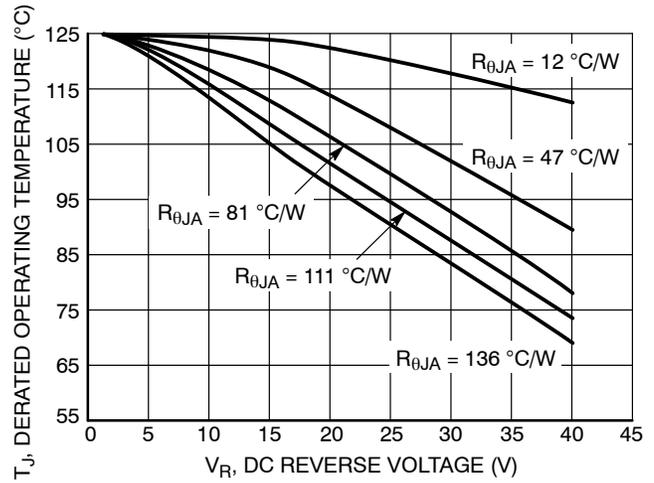


Figure 8. Typical Operating Temperature Derating

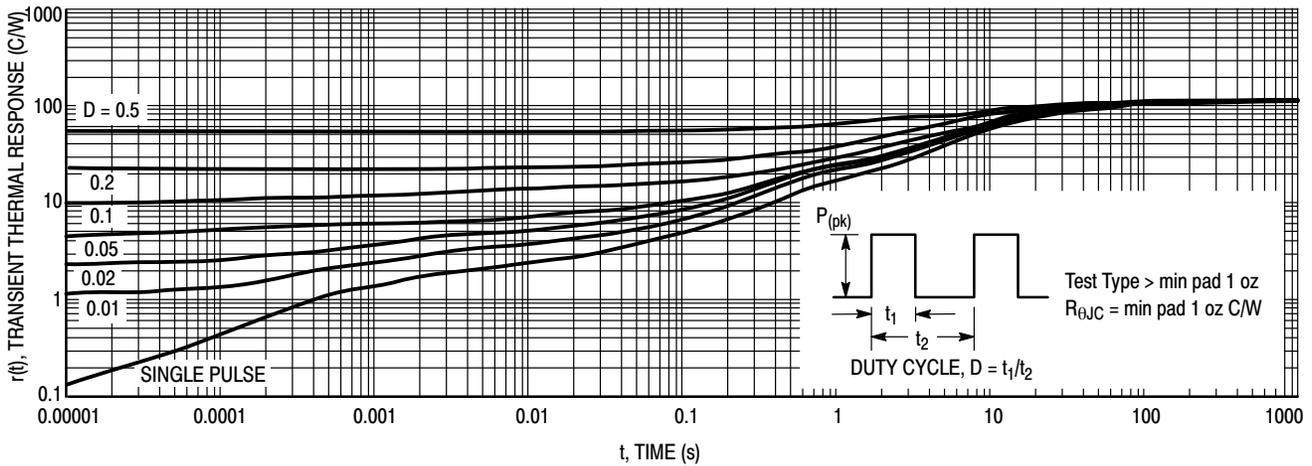


Figure 9. Thermal Response – MBRS540T3G, NRVBS540T3G on min pad

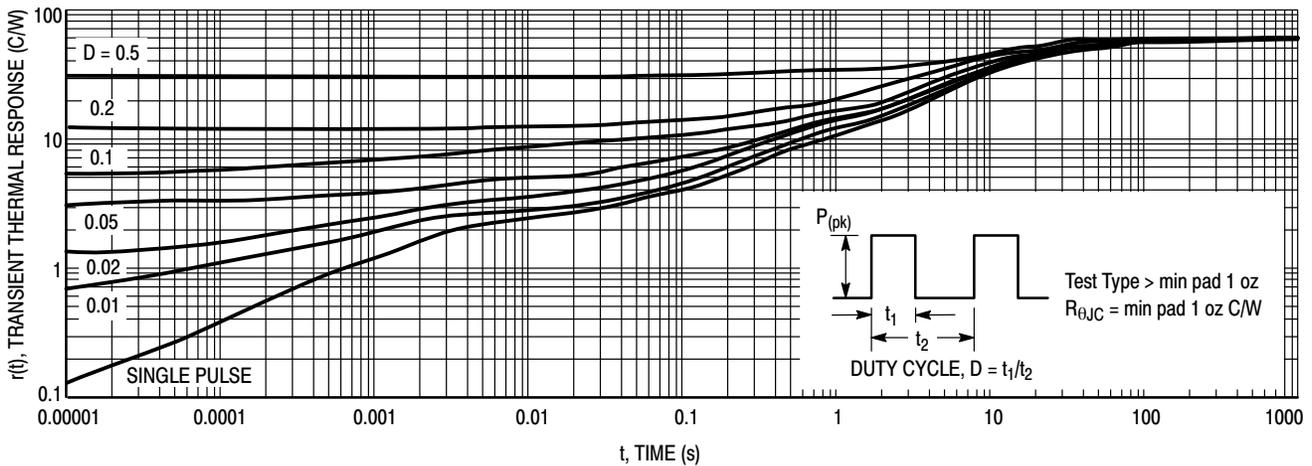
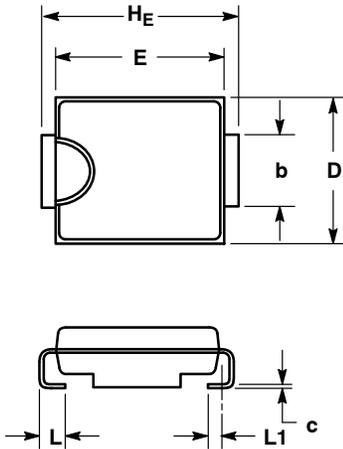


Figure 10. Thermal Response – MBRS540T3G, NRVBS540T3G on 1" pad

MBRS540T3G, NRVBS540T3G

PACKAGE DIMENSIONS

SMC
CASE 403-03
ISSUE E

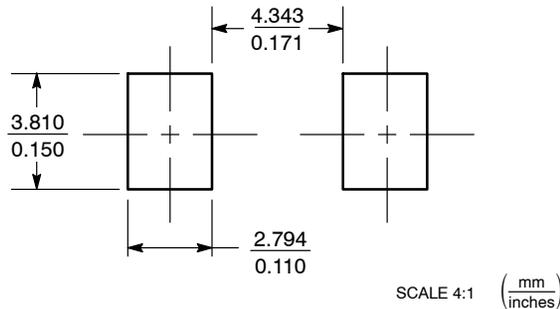


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. D DIMENSION SHALL BE MEASURED WITHIN DIMENSION P.
4. 403-01 THRU -02 OBSOLETE, NEW STANDARD 403-03.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.90	2.13	2.41	0.075	0.084	0.095
A1	0.05	0.10	0.15	0.002	0.004	0.006
b	2.92	3.00	3.07	0.115	0.118	0.121
c	0.15	0.23	0.30	0.006	0.009	0.012
D	5.59	5.84	6.10	0.220	0.230	0.240
E	6.60	6.86	7.11	0.260	0.270	0.280
HE	7.75	7.94	8.13	0.305	0.313	0.320
L	0.76	1.02	1.27	0.030	0.040	0.050
L1	0.51 REF			0.020 REF		

SOLDERING 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.

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