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Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



HIGH EFFICIENCY POWER SCHOTTKY RECTIFIER

Product Summary

V _{RRM} (V)	I _O (A)	V _F (MAX) (V) @ +25°C	I _R (MAX) (mA) @ +25°C
45	2x10	0.65	0.1

Description

High efficiency dual Schottky rectifier suited for switch mode power supplies and other power converters. This device is intended for use in medium voltage operation, and particularly, in high frequency circuits where low switching losses and low noise are required.

MBR2045C is available in TO-220-3 (2) and TO-220F-3 (Option 1) packages.

Applications

- Power Supply Output Rectification
- Power Management
- Instrumentation

Features

- Low Forward Voltage: 0.65V @ +25°C
- High Surge Current Capability
- +150°C Operating Junction Temperature
- 20A Total (10A Each Diode Leg)
- Guard-Ring for Stress Protection
- TO-220-3 (2) and TO-220F-3 (Option 1)
 - **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- Available in “Green” Packages: TO-220-3 (2), TO-220F-3 (Option 1)
 - **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
 - **Halogen and Antimony Free. “Green” Device (Note 3)**

Mechanical Data

- Case: TO-220-3 (2), TO-220F-3 (Option 1)
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 [Ⓔ]
- Polarity: See Below
- Weight:
 - TO-220-3 (2) – 1.95 Grams (Approximate)
 - TO-220F-3 (Option 1) – 1.69 Grams (Approximate)



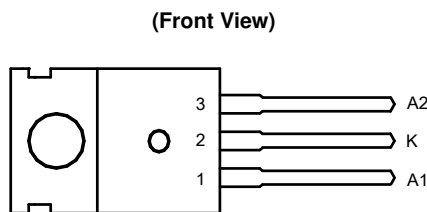
TO-220F-3 (Option 1)



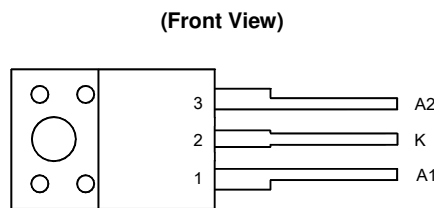
TO-220-3 (2)

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
 2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

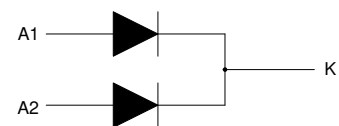
Pin Assignments



TO-220-3 (2)

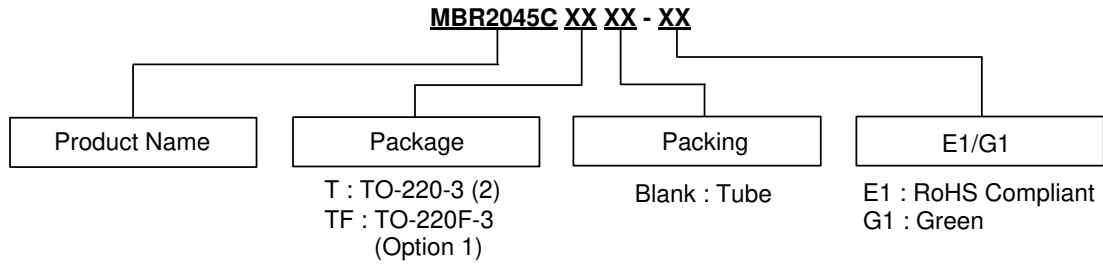


TO-220F-3 (Option 1)



Internal Structure of MBR2045C

Ordering Information

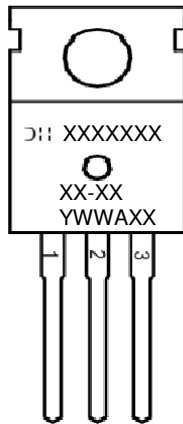


Package	Part Number	Marking ID	Packing
TO-220-3 (2)	MBR2045CT-E1	MBR2045CT-E1	50 Pieces/Tube
TO-220-3 (2)	MBR2045CT-G1	MBR2045CT-G1	50 Pieces/Tube
TO-220F-3 (Option 1)	MBR2045CTF-E1	MBR2045CTF-E1	50 Pieces/Tube
TO-220F-3 (Option 1)	MBR2045CTF-G1	MBR2045CTF-G1	50 Pieces/Tube

Marking Information

(1) TO-220-3 (2)

(Front View)

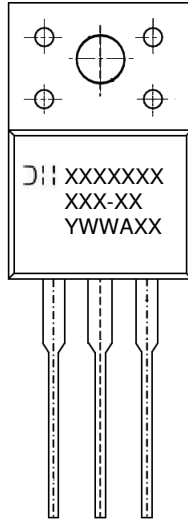


First and Second Lines: Logo and Marking ID
 (See Ordering Information)
 Third Line: Date Code
 Y: Year
 WW: Work Week of Molding
 A: Assembly House Code
 XX: 7th and 8th Digits of Batch Number

Marking Information (Cont.)

(2) TO-220F-3 (Option 1)

(Front View)



First and Second Lines: Logo and Marking ID
 (See Ordering Information)
 Third Line: Date Code
 Y: Year
 WW: Work Week of Molding
 A: Assembly House Code
 XX: 7th and 8th Digits of Batch Number

Maximum Ratings (Each Diode Leg) (Note 4)

Characteristic	Symbol	Rating	Unit
Peak Repetitive Reverse Voltage	V_{RRM}	45	V
Working Peak Reverse Voltage	V_{RWM}		
DC Blocking Voltage	V_R		
Average Rectified Forward Current (Rated V_R) $T_C = +139^\circ\text{C}$	$I_{F(AV)}$	10	A
Peak Repetitive Forward Current (Rated V_R , Square Wave, 20kHz) $T_C = +137^\circ\text{C}$	I_{FRM}	20	A
Non Repetitive Peak Surge Current (Surge Applied at Rated Load Conditions Half Wave, Single Phase, 60Hz)	I_{FSM}	150	A
Peak Repetitive Reverse Surge Current (2.0 μs , 1.0kHz)	I_{RRM}	1.0	A
Operating Junction Temperature (Note 5)	T_J	+150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-65 to +150	$^\circ\text{C}$
Voltage Rate of Change (Rated V_R)	dv/dt	10000	V/ μs
ESD (Machine Model = C)	–	>400	V
ESD (Human Body Model = 3B)	–	>8000	V

- Notes:
- Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.
 - The heat generated must be less than the thermal conductivity from Junction to Ambient: $dP_D/dT_J < 1/\theta_{JA}$.

Thermal Characteristics

Characteristic	Symbol	Rating		Unit
Maximum Thermal Resistance (Junction to Case) (Note 6)	$R_{\theta JC}$	TO-220-3 (2)	2.2	°C/W
		TO-220F-3 (Option 1)	4.5	
Maximum Thermal Resistance (Junction to Ambient) (Note 6)	$R_{\theta JA}$	TO-220-3 (2)	60	
		TO-220F-3 (Option 1)	60	

Note 6: Device mounted on heat sink, with minimum recommended pad layout per <http://www.diodes.com>

Electrical Characteristics (Each Diode Leg)

Characteristic	Symbol	Typ	Max	Rating	Test Condition
Maximum Instantaneous Forward Voltage Drop (Note 7)	V_F	0.59	0.65	V	$I_F = 10A, T_C = +25^\circ C$
		0.50	0.57		$I_F = 10A, T_C = +125^\circ C$
Maximum Instantaneous Reverse Current (Note 7)	I_R	5	15	mA	Rated DC Voltage, $T_C = +125^\circ C$
		0.01	0.1		Rated DC Voltage, $T_C = +25^\circ C$

Note 7: Short duration pulse test used to minimize self-heating effect, Pulse Test Width = 300µs, Duty Cycle < 2.0%.

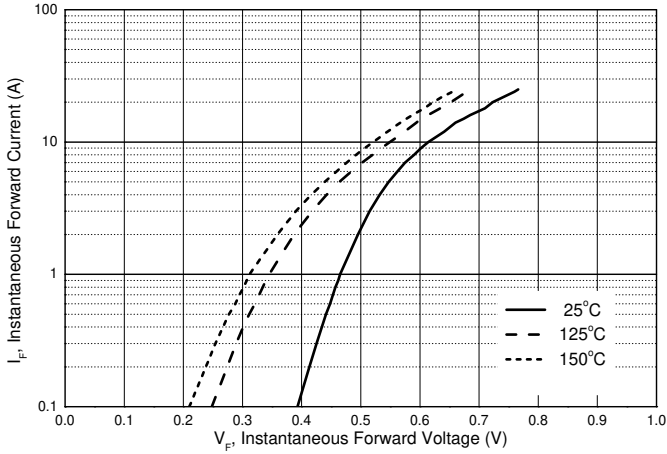


Figure 1. Typical Forward Voltage

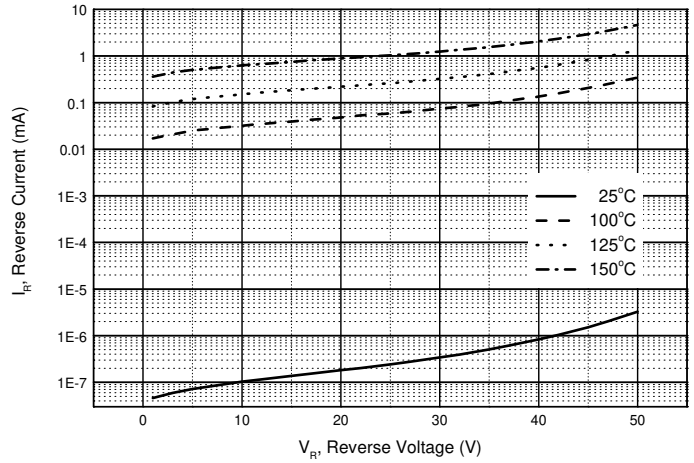


Figure 2. Typical Reverse Current

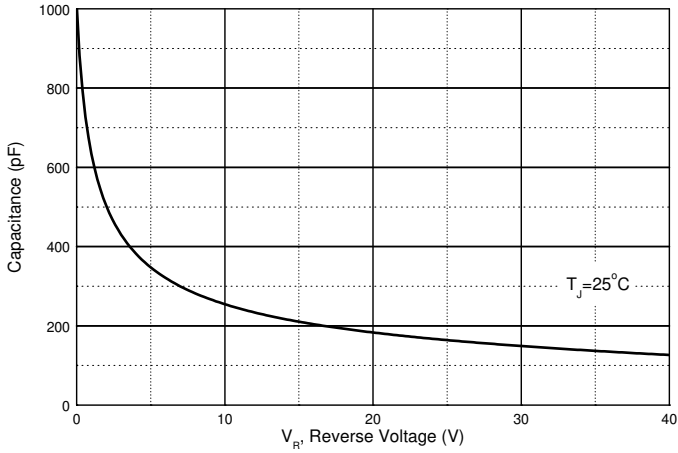


Figure 3. Capacitance vs. V_R , Reverse Voltage

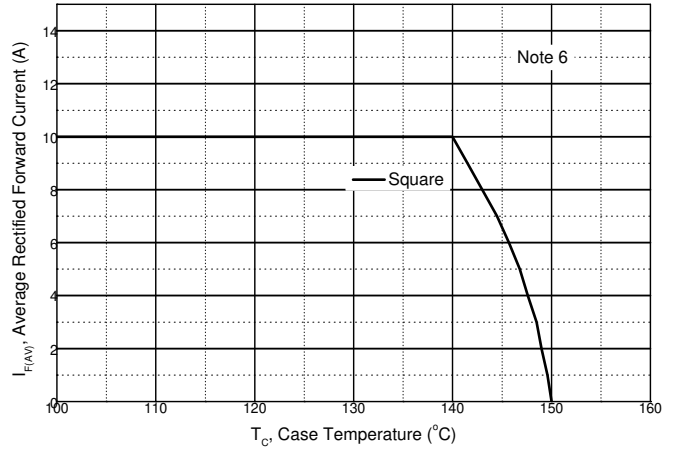
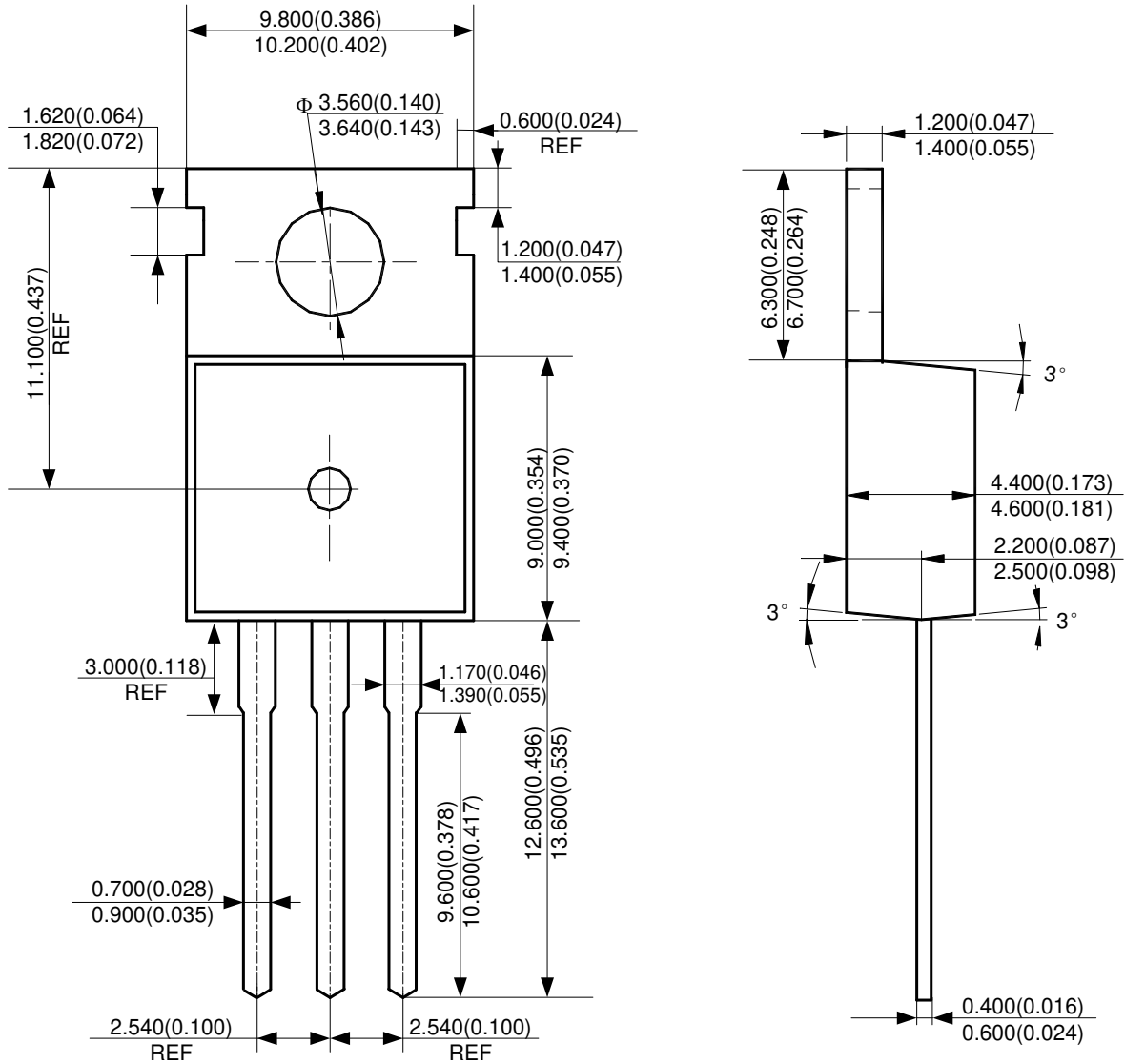


Figure 4. Average Rectified Forward Current vs. Case Temperature (Square, Each Diode)

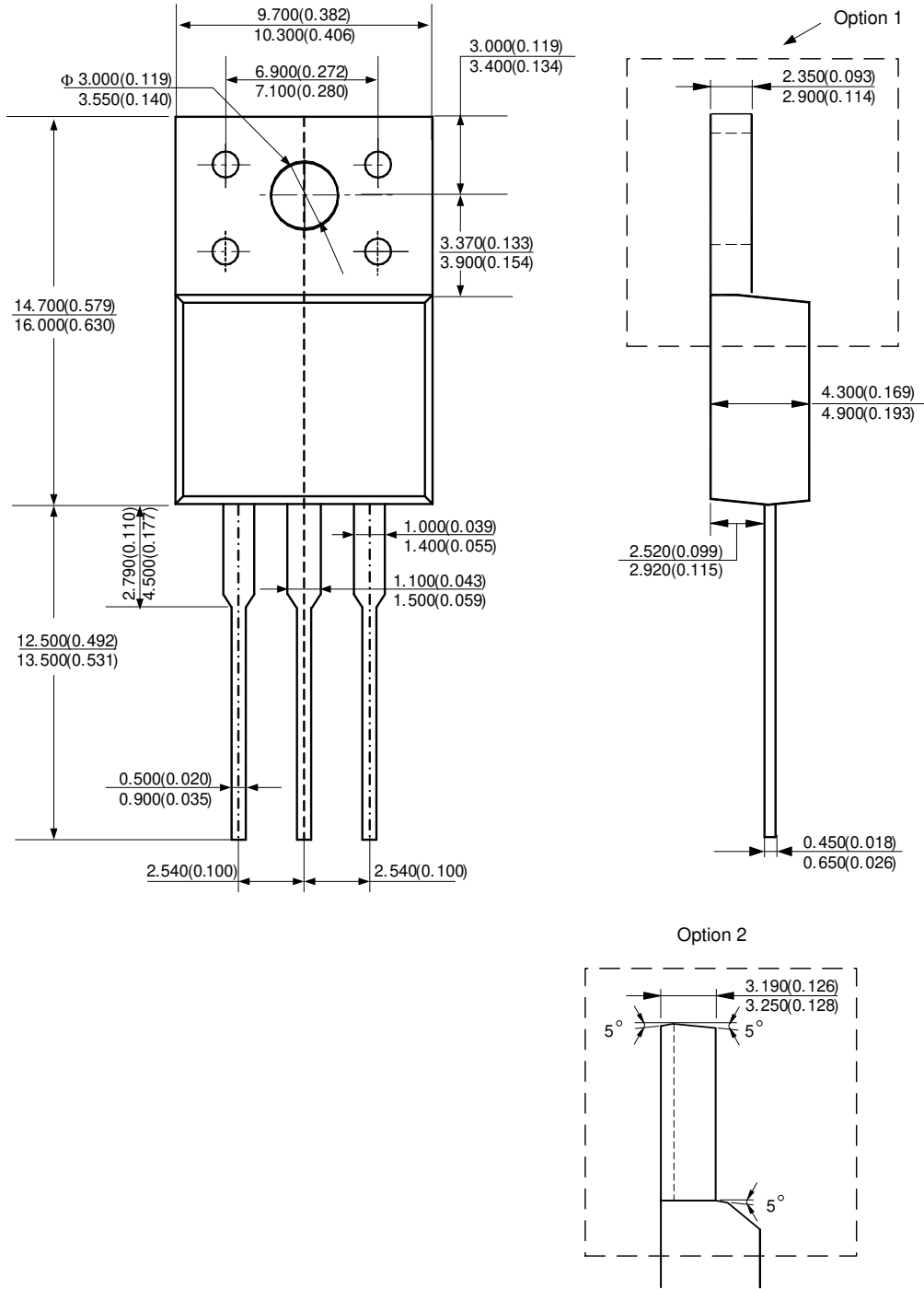
Package Outline Dimensions (All dimensions in mm(inch).)

(1) Package Type: TO-220-3 (2)



Package Outline Dimensions (Cont. All dimensions in mm(inch).)

(2) Package Type: TO-220F-3



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