MBR4015LWTG

Switch-mode Schottky Power Rectifier

TO247 Power Package

This device employs the Schottky Barrier principle in a large area metal−to−silicon power rectifier. Features epitaxial construction with oxide passivation and metal overlay contact. Ideally suited for low voltage, high frequency switching power supplies; free wheeling diodes and polarity protection diodes.

Features

- Highly Stable Oxide Passivated Junction
- Guardring for Overvoltage Protection
- Low Forward Voltage Drop
- Dual Diode Construction; Terminals 1 and 3 May Be Connected for Parallel Operation at Full Rating.
- Full Electrical Isolation without Additional Hardware
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant*

Mechanical Characteristics

- Case: Molded Epoxy
- Epoxy Meets UL 94 V−0 @ 0.125 in
- Weight: 4.3 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

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_R	15	V
Average Rectified Forward Current (At Rated V_R, T_C = 120°C) Per Leg Per Package	I_O	 20 40	A
Peak Repetitive Forward Current, (At Rated V_R, Square Wave, 20 kHz, T_C = 95°C) Per Leg	I_{FRM}	40	A
Non−Repetitive Peak Surge Current (Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz) Per Package	I_{FSM}	120	A
Storage/Operating Case Temperature	T_{stg}, T_C	−55 to +150	°C
Operating Junction Temperature (Note 1)	T_J	−55 to +150	°C
Voltage Rate of Change, (Rated V_R, T_J = 25°C)	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.

*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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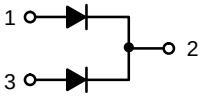
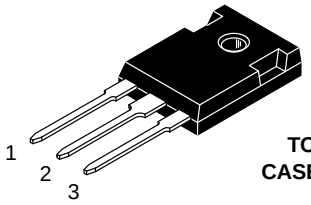
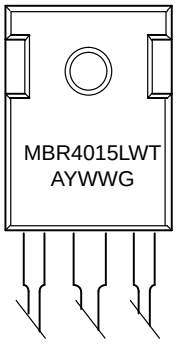
SCHOTTKY BARRIER RECTIFIER 40 AMPERES, 15 VOLTS





TO−247
CASE 340AL

MARKING DIAGRAM



MBR4015LWT = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
G = Pb−Free Package

ORDERING INFORMATION

Device	Package	Shipping
MBR4015LWTG	TO−247 (Pb−Free)	30 Units / Rail

THERMAL CHARACTERISTICS

Rating		Symbol	Value	Unit
Thermal Resistance, Junction−to−Case	Per Leg	$R_{\theta JC}$	0.57	°C/W
Junction−to−Ambient	Per Leg	$R_{\theta JA}$	55	

ELECTRICAL CHARACTERISTICS

Rating	Symbol	Value		Unit
Maximum Instantaneous Forward Voltage (Note 2), See Figure 2 Per Leg	V_F	T_J = 25°C	T_J = 100°C	V
(I_F = 20 A)		0.42	0.36	
(I_F = 40 A)		0.50	0.48	
Maximum Instantaneous Reverse Current (Note 2), See Figure 4 Per Leg	I_R	T_J = 25°C	T_J = 100°C	mA
(V_R = 15 V)		5.0	530	
(V_R = 7.5 V)		2.7	370	

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.

1. The heat generated must be less than the thermal conductivity from Junction−to−Ambient: $dP_D/dT_J < 1/R_{\theta JA}$.
2. Pulse Test: Pulse Width ≤ 250 μs, Duty Cycle ≤ 2%.

TYPICAL CHARACTERISTICS

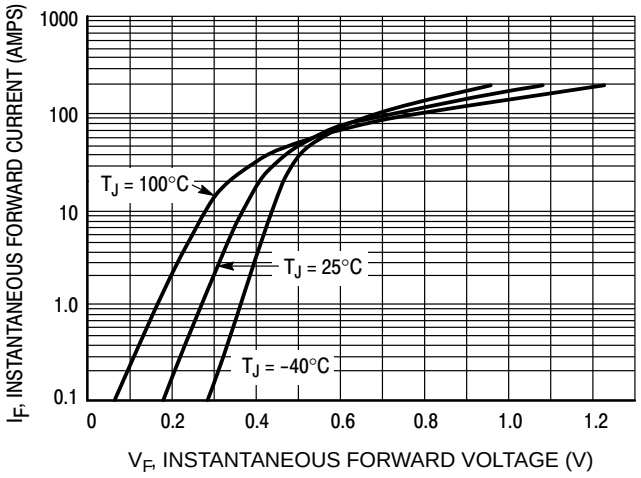


Figure 1. Typical Forward Voltage Per Leg

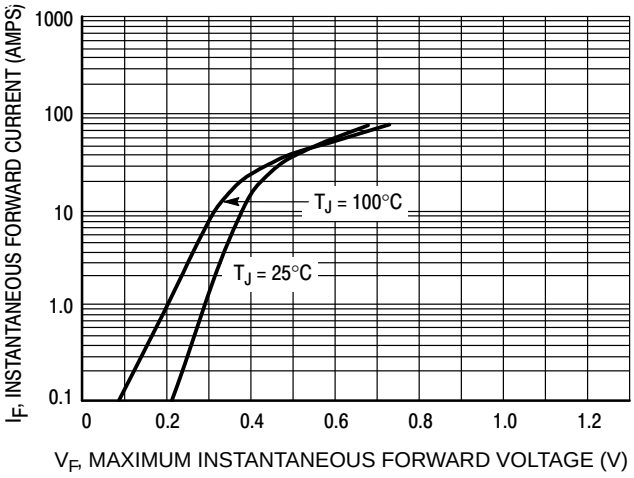


Figure 2. Maximum Forward Voltage Per Leg

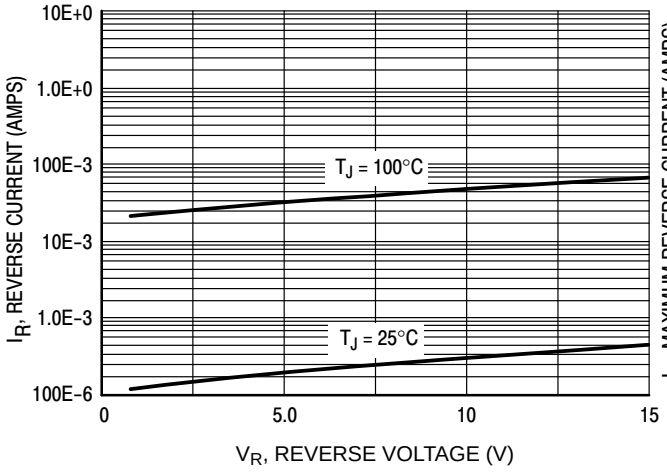


Figure 3. Typical Reverse Current Per Leg

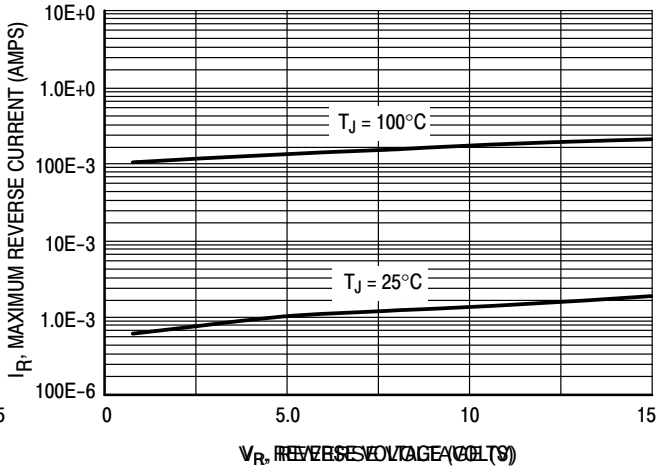


Figure 4. Maximum Reverse Current Per Leg

TYPICAL CHARACTERISTICS

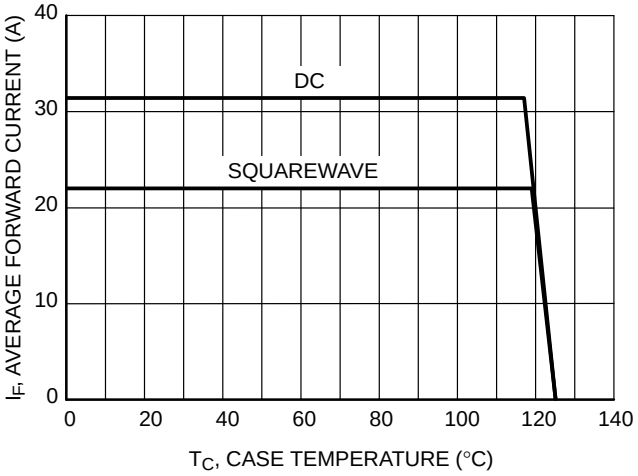


Figure 5. Current Derating Per Leg

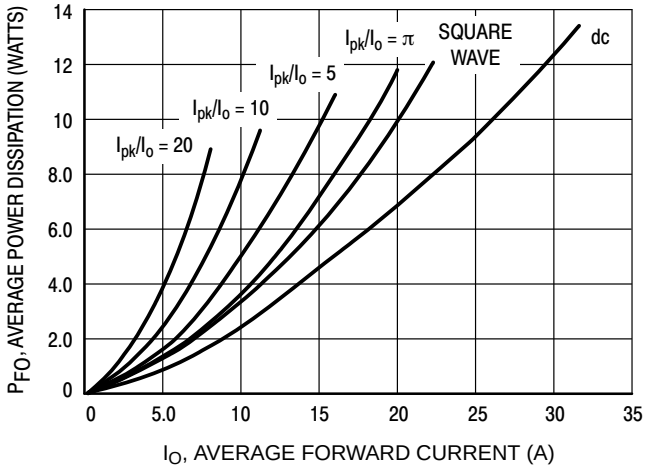


Figure 6. Forward Power Dissipation Per Leg

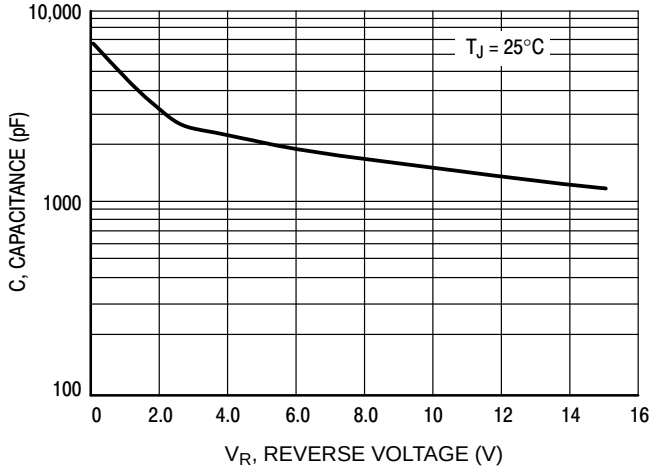


Figure 7. Capacitance Per Leg

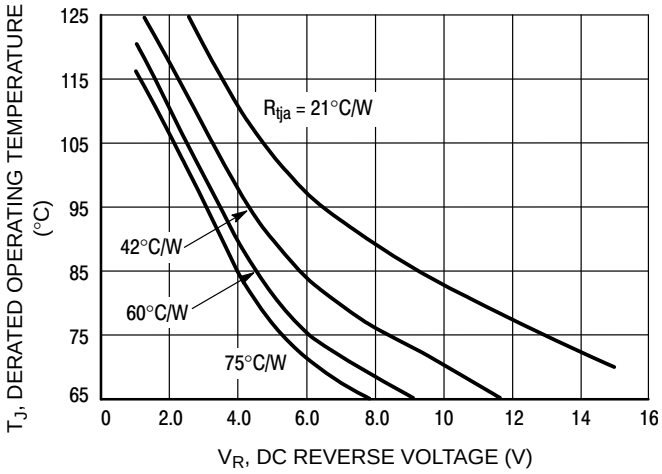


Figure 8. Typical Operating Temperature Derating Per Leg*

*Reverse power dissipation and the possibility of thermal runaway must be considered when operating this device under any reverse voltage conditions. Calculations of T_J therefore must include forward and reverse power effects. The allowable operating T_J may be calculated from the equation: $T_J = T_{Jmax} - r(t)(Pf + Pr)$ where

r(t) = thermal impedance under given conditions,
Pf = forward power dissipation, and
Pr = reverse power dissipation

This graph displays the derated allowable T_J due to reverse bias under DC conditions only and is calculated as $T_J = T_{Jmax} - r(t)Pr$, where r(t) = Rthja. For other power applications further calculations must be performed.

TYPICAL CHARACTERISTICS

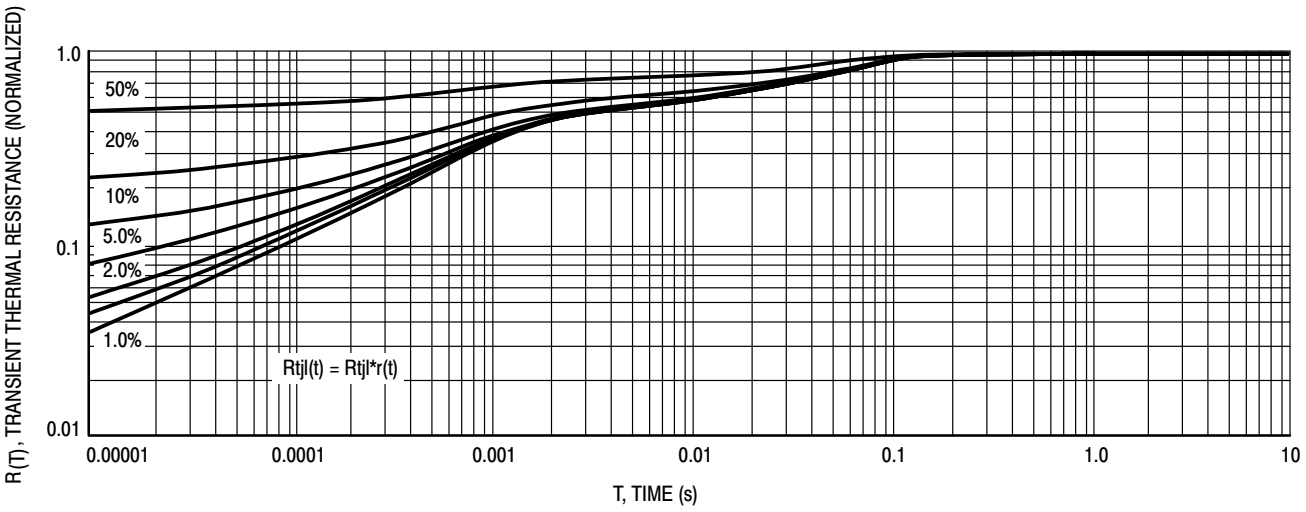


Figure 9. Thermal Response Junction to Lead (Per Leg)

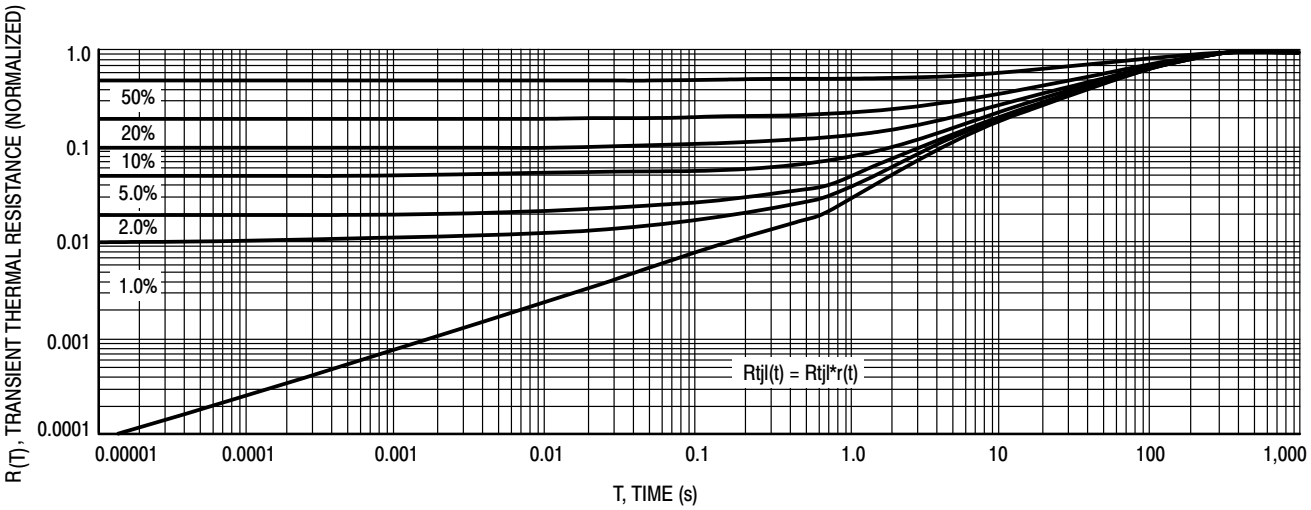


Figure 10. Thermal Response Junction to Ambient (Per Leg)

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

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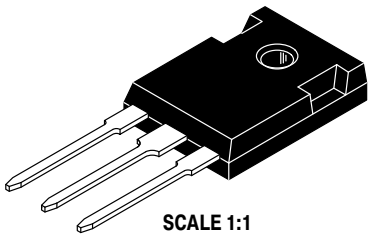
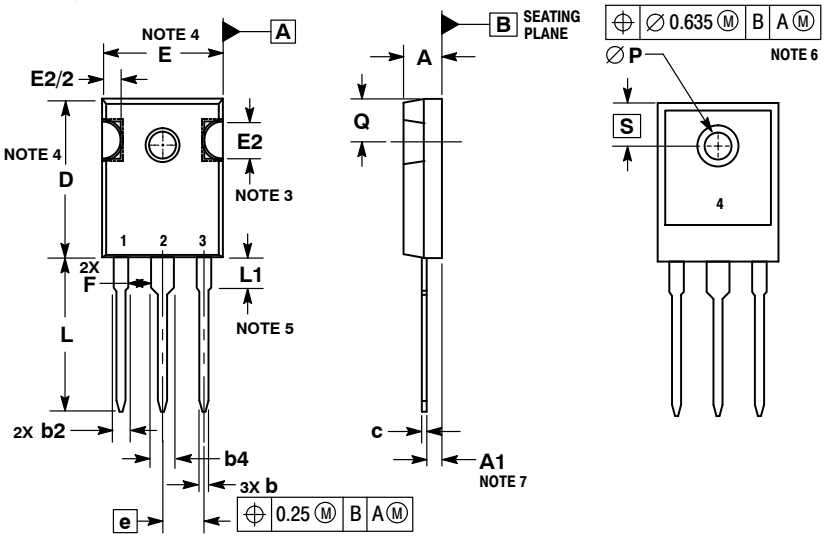


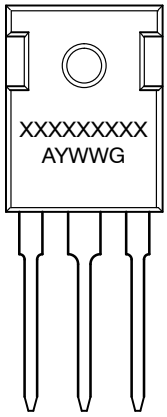
SCALE 1:1



NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. SLOT REQUIRED, NOTCH MAY BE ROUNDED.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.13 PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREME OF THE PLASTIC BODY.
5. LEAD FINISH IS UNCONTROLLED IN THE REGION DEFINED BY L1.
6. ∅P SHALL HAVE A MAXIMUM DRAFT ANGLE OF 1.5° TO THE TOP OF THE PART WITH A MAXIMUM DIAMETER OF 3.91.
7. DIMENSION A1 TO BE MEASURED IN THE REGION DEFINED BY L1.

	MILLIMETERS	
DIM	MIN	MAX
A	4.70	5.30
A1	2.20	2.60
b	1.07	1.33
b2	1.65	2.35
b4	2.60	3.40
c	0.45	0.68
D	20.80	21.34
E	15.50	16.25
E2	4.32	5.49
e	5.45 BSC	
F	2.655	---
L	19.80	20.80
L1	3.81	4.32
P	3.55	3.65
Q	5.40	6.20
S	6.15 BSC	

GENERIC MARKING DIAGRAM*



XXXXX = Specific Device Code
A = Assembly Location
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.

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