

# 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 $V_R$ , $T_C = 120^\circ\text{C}$ ) Per Leg Per Package	$I_O$	20 40	A
Peak Repetitive Forward Current, (At Rated $V_R$ , Square Wave, 20 kHz, $T_C = 95^\circ\text{C}$ ) 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 $V_R$ , $T_J = 25^\circ\text{C}$ )	$dv/dt$	10,000	V/ $\mu\text{s}$

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.

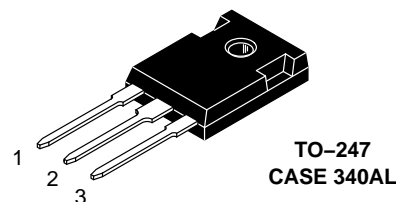
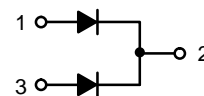
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



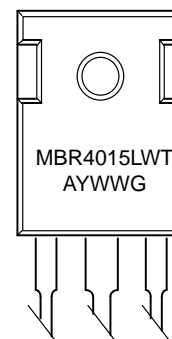
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## SCHOTTKY BARRIER RECTIFIER 40 AMPERES, 15 VOLTS



### 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

# MBR4015LWTG

## THERMAL CHARACTERISTICS

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

## ELECTRICAL CHARACTERISTICS

Rating	Symbol	Value		Unit
Maximum Instantaneous Forward Voltage (Note 2), See Figure 2 Per Leg  (I <sub>F</sub> = 20 A) (I <sub>F</sub> = 40 A)	V <sub>F</sub>	T <sub>J</sub> = 25°C	T <sub>J</sub> = 100°C	V
		0.42	0.36	
		0.50	0.48	
Maximum Instantaneous Reverse Current (Note 2), See Figure 4 Per Leg  (V <sub>R</sub> = 15 V) (V <sub>R</sub> = 7.5 V)	I <sub>R</sub>	T <sub>J</sub> = 25°C	T <sub>J</sub> = 100°C	mA
		5.0	530	
		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.

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

## TYPICAL CHARACTERISTICS

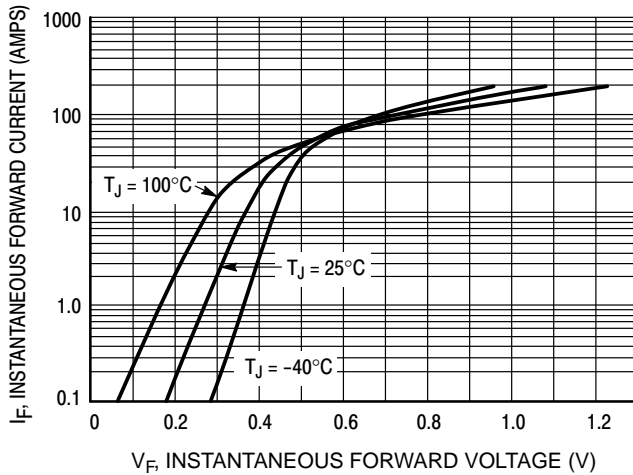


Figure 1. Typical Forward Voltage Per Leg

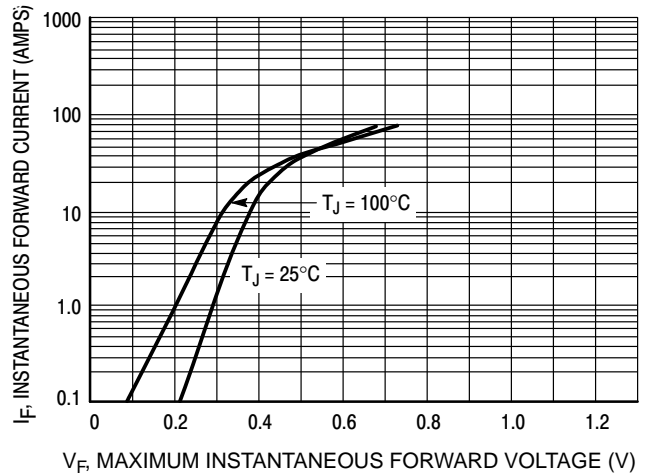


Figure 2. Maximum Forward Voltage Per Leg

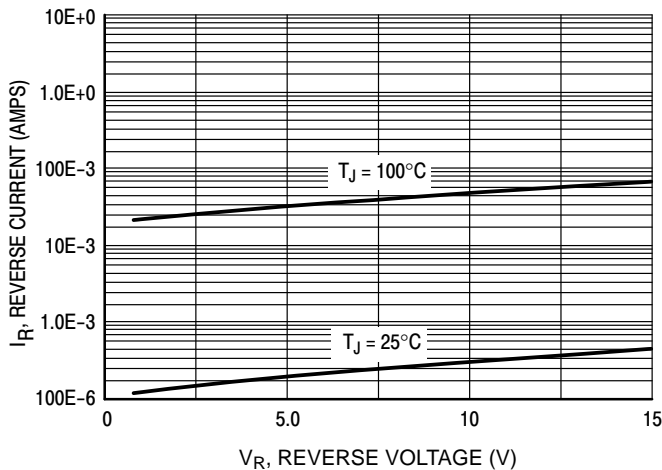


Figure 3. Typical Reverse Current Per Leg

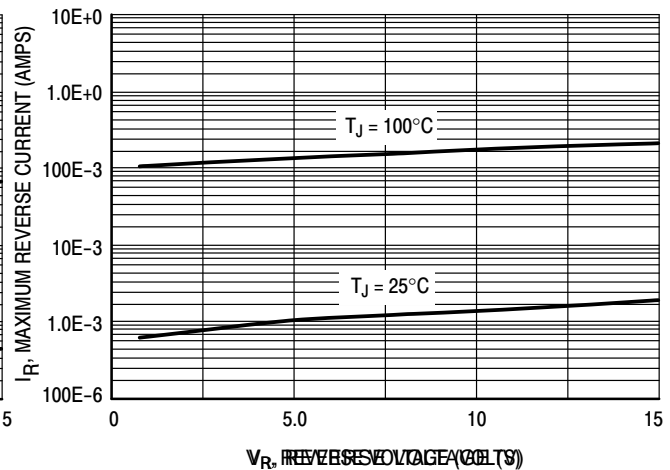


Figure 4. Maximum Reverse Current Per Leg

TYPICAL CHARACTERISTICS

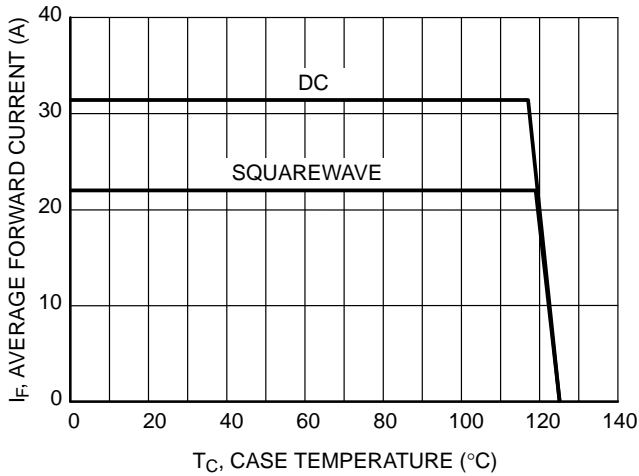


Figure 5. Current Derating Per Leg

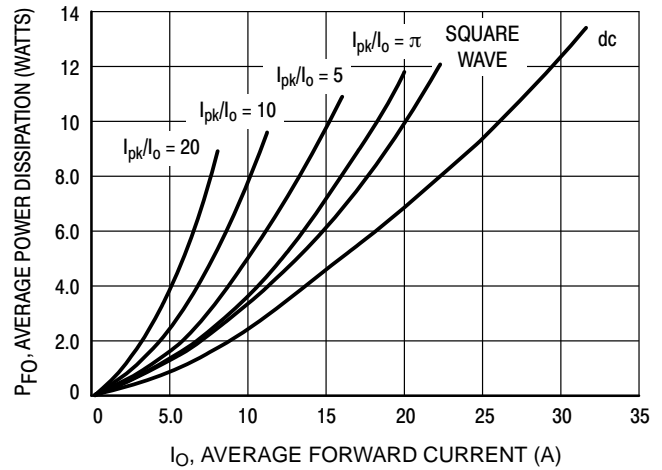


Figure 6. Forward Power Dissipation Per Leg

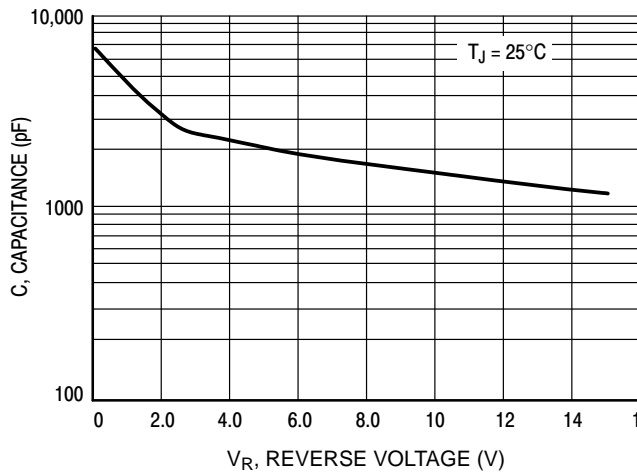


Figure 7. Capacitance Per Leg

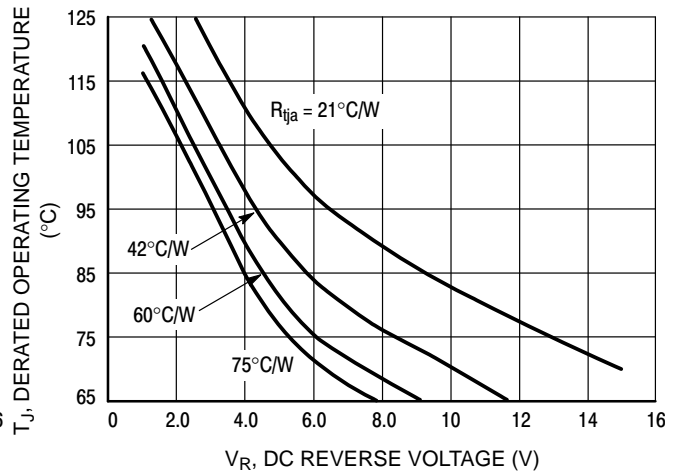


Figure 8. Typical Operating Temperature Derating Per Leg\*

\*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:  $T_J = T_{Jmax} - r(t)(P_f + P_r)$  where

$r(t)$  = thermal impedance under given conditions,

$P_f$  = forward power dissipation, and

$P_r$  = reverse power dissipation

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

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## TYPICAL CHARACTERISTICS

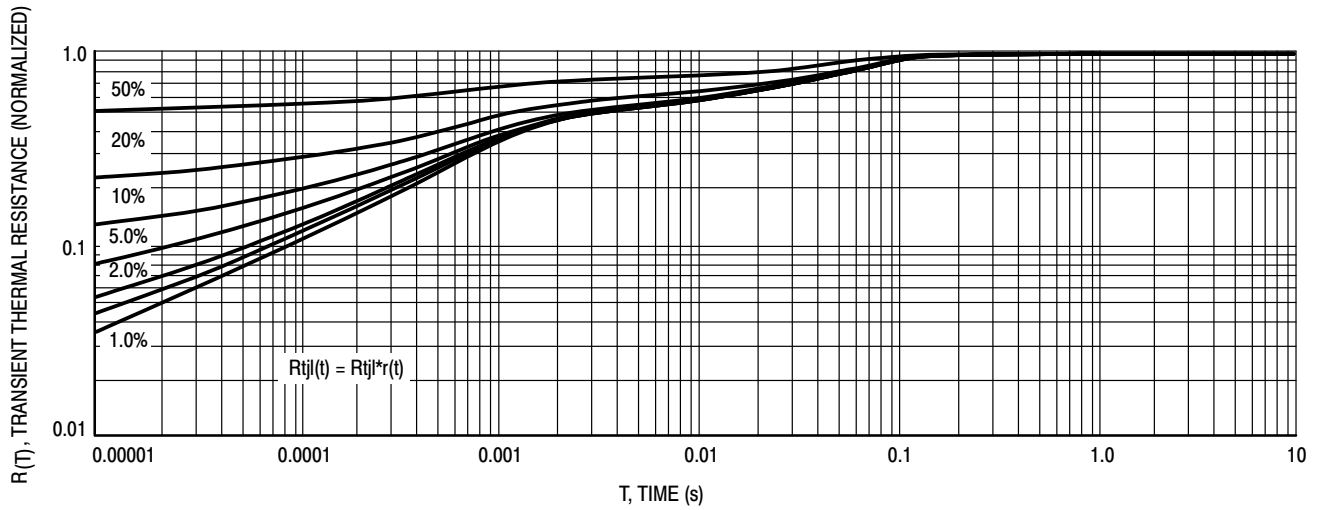


Figure 9. Thermal Response Junction to Lead (Per Leg)

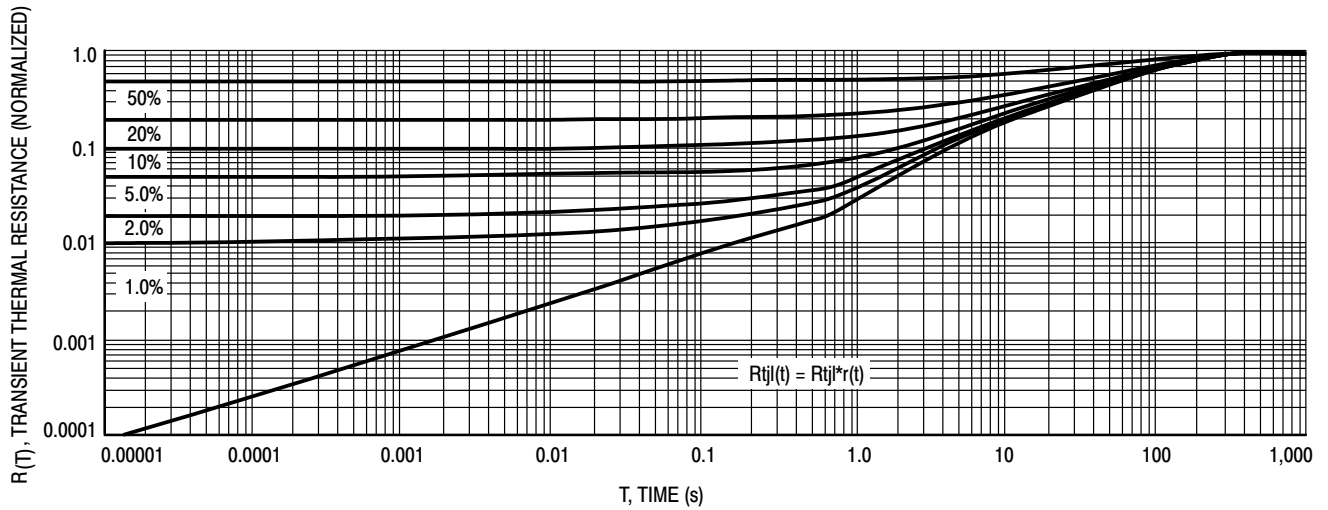
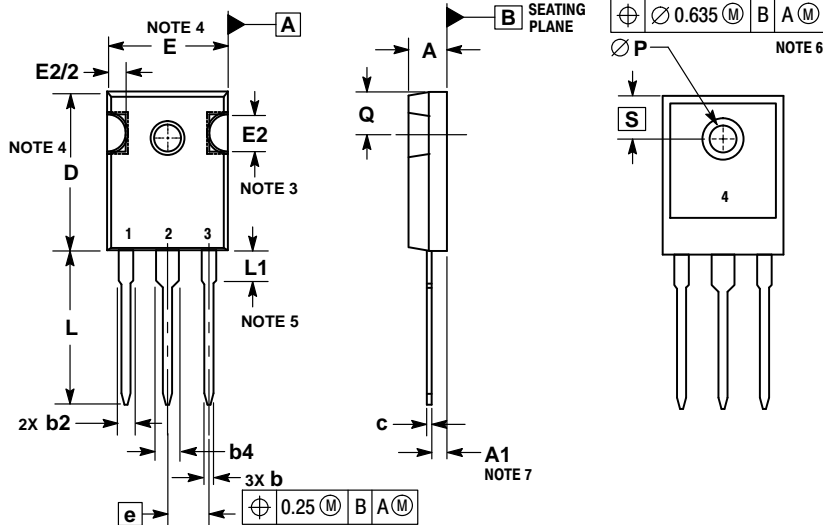


Figure 10. Thermal Response Junction to Ambient (Per Leg)

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## PACKAGE DIMENSIONS


### TO-247 CASE 340AL ISSUE A



#### 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. ØP 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.

DIM	MILLIMETERS	
	MIN	MAX
A	4.70	5.30
A1	2.20	2.60
b	1.00	1.40
b2	1.65	2.35
b4	2.60	3.40
c	0.40	0.80
D	20.30	21.40
E	15.50	16.25
E2	4.32	5.49
e	5.45 BSC	
L	19.80	20.80
L1	3.50	4.50
P	3.55	3.65
Q	5.40	6.20
S	6.15 BSC	

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