

MBRB1045, MBRD1045

Preferred Device

SWITCHMODE™ Schottky Power Rectifier Surface Mount Power Package

This series of Power Rectifiers employs the Schottky Barrier principle in a large metal-to-silicon power diode. State-of-the-art geometry features epitaxial construction with oxide passivation and metal overlay contact. Ideally suited for use in low voltage, high frequency switching power supplies, free wheeling diodes, and polarity protection diodes.

Features

- Guardring for Stress Protection
- Low Forward Voltage
- 175°C Operating Junction Temperature
- Epoxy Meets UL 94 V-0 @ 0.125 in
- Short Heat Sink Tab Manufactured – Not Sheared!
- Pb-Free Packages are Available

Mechanical Characteristics:

- Case: Epoxy, Molded, Epoxy Meets UL 94 V-0
- Weight: 1.7 grams for D²PAK (approximately)
0.4 grams for DPAK (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
- Device Meets MSL1 Requirements
- ESD Ratings: Machine Model, C (>400 V)
Human Body Model, 3B (>8000 V)

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_R	45	V
Average Rectified Forward Current (Rated V_R) $T_C = 135^\circ\text{C}$	$I_{F(AV)}$	10	A
Peak Repetitive Forward Current (Rated V_R , Square Wave, 20 kHz) $T_C = 135^\circ\text{C}$	I_{FRM}	20	A
Nonrepetitive Peak Surge Current (Surge applied at rated load conditions halfwave, single phase, 60 Hz)	I_{FSM}	150 (MBRB) 70 (MBRD)	A
Operating Junction and Storage Temperature Range (Note 1)	T_J, T_{stg}	-65 to +175	°C
Voltage Rate of Change (Rated V_R)	dv/dt	10000	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.

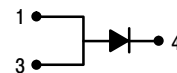
1. The heat generated must be less than the thermal conductivity from Junction-to-Ambient: $dP_D/dT_J < 1/R_{\theta JA}$.



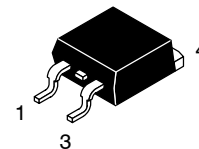
ON Semiconductor®

<http://onsemi.com>

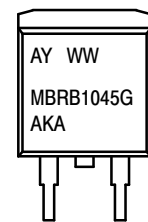
SCHOTTKY BARRIER RECTIFIER 10 AMPERES, 45 VOLTS



MARKING DIAGRAM

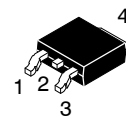


D²PAK
CASE 418B
PLASTIC

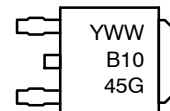


A = Assembly Location
Y = Year
WW = Work Week
MBRB1045 = Device Code
G = Pb-Free Package
AKA = Diode Polarity

MARKING DIAGRAM



DPAK
CASE 369C



Y = Year
WW = Work Week
B1045 = Device Code
G = Pb-Free Package

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

Preferred devices are recommended choices for future use and best overall value.

MBRB1045, MBRD1045

THERMAL CHARACTERISTICS

Characteristic	Symbol	Value	Unit
Thermal Resistance, (MBRB1045) – Junction-to-Case (Note 2)	$R_{\theta JC}$	1.0	°C/W
– Junction-to-Ambient (Note 2)	$R_{\theta JA}$	50	
(MBRD1045) – Junction-to-Case (Note 2)	$R_{\theta JC}$	2.43	
– Junction-to-Ambient (Note 2)	$R_{\theta JA}$	68	

2. When mounted using minimum recommended pad size on FR-4 board.

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Value	Unit
Maximum Instantaneous Forward Voltage (Note 3) ($I_F = 10$ Amps, $T_J = 125^\circ\text{C}$)	V_F	0.57	V
($I_F = 20$ Amps, $T_J = 125^\circ\text{C}$)		0.72	
($I_F = 20$ Amps, $T_J = 25^\circ\text{C}$)		0.84	
Maximum Instantaneous Reverse Current (Note 3) (Rated dc Voltage, $T_J = 125^\circ\text{C}$)	I_R	15	mA
(Rated dc Voltage, $T_J = 25^\circ\text{C}$)		0.1	

3. Pulse Test: Pulse Width = 300 μs , Duty Cycle $\leq 2.0\%$

ORDERING INFORMATION

Device	Package	Shipping [†]
MBRB1045	D ² PAK	50 Units / Rail
MBRB1045G	D ² PAK (Pb-Free)	50 Units / Rail
MBRB1045T4	D ² PAK	800 Units / Tape & Reel
MBRB1045T4G	D ² PAK (Pb-Free)	800 Units / Tape & Reel
MBRD1045T4G	DPAK (Pb-Free)	2500 Units / 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.

MBRB1045, MBRD1045

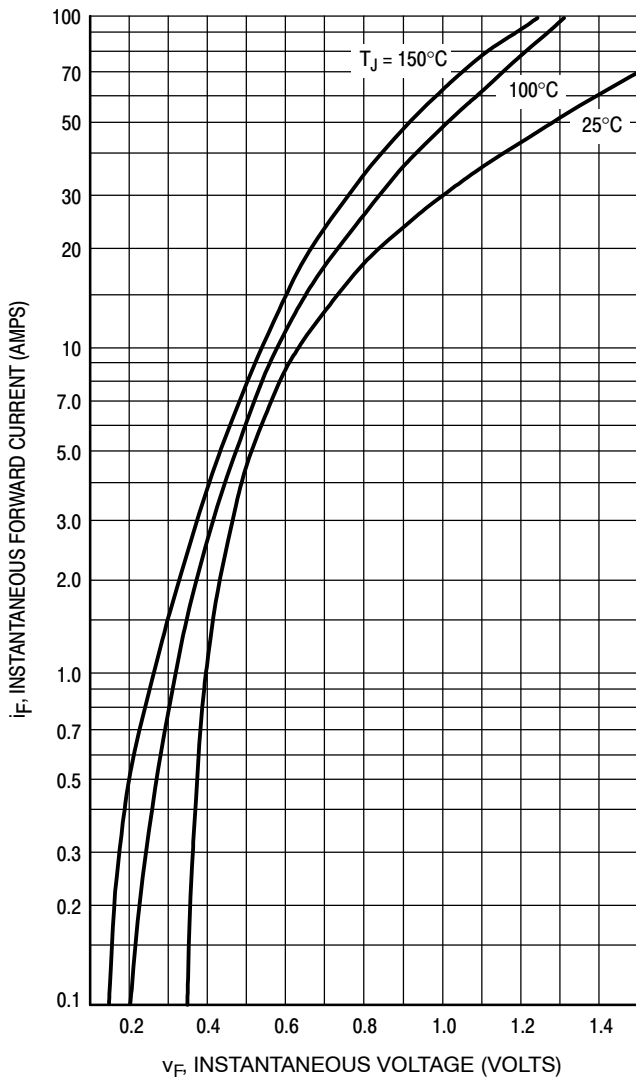


Figure 1. Maximum Forward Voltage

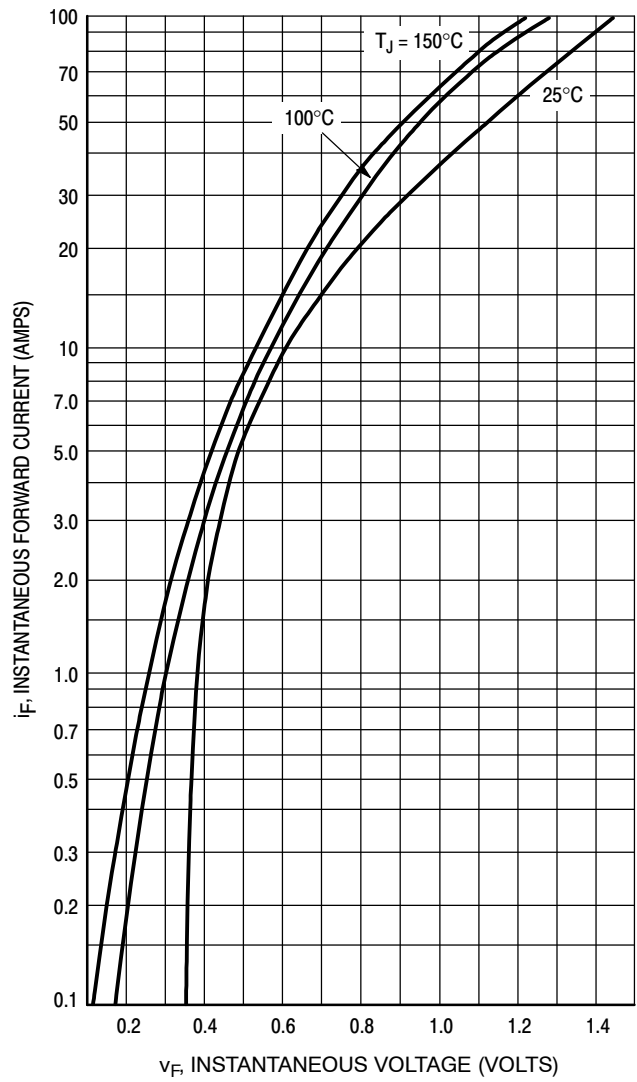


Figure 2. Typical Forward Voltage

MBRB1045, MBRD1045

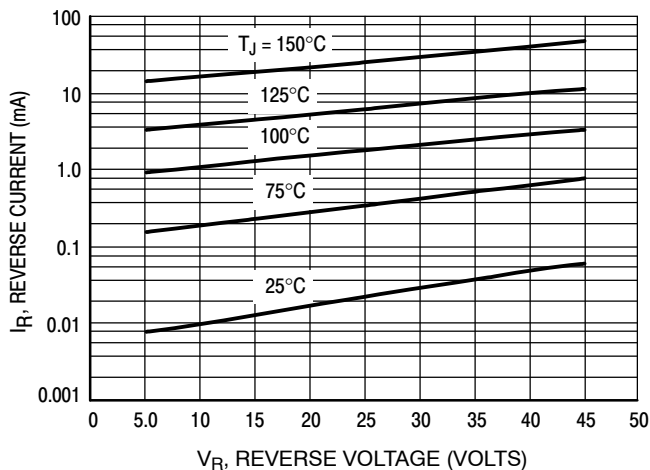


Figure 3. Maximum Reverse Current

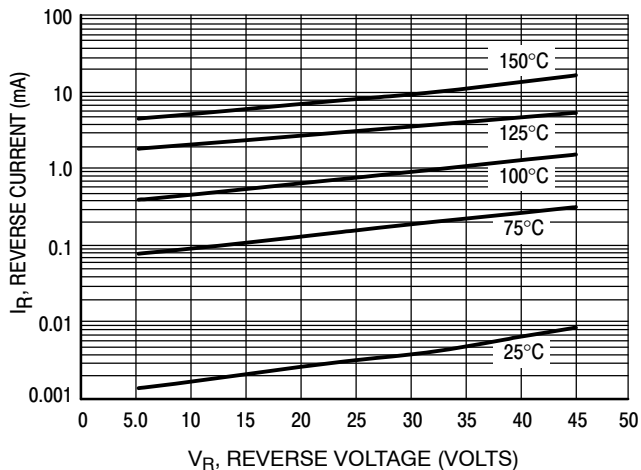


Figure 4. Typical Reverse Current

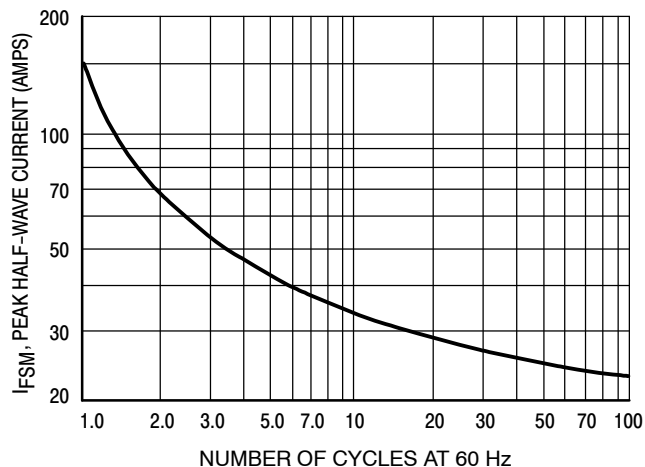


Figure 8. Maximum Surge Capability

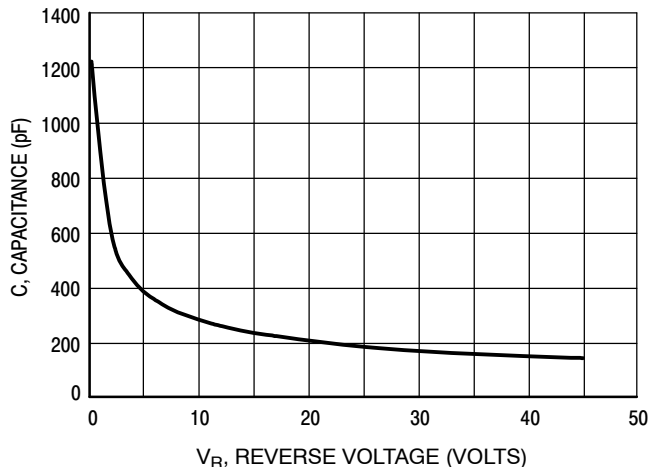


Figure 5. Typical Capacitance

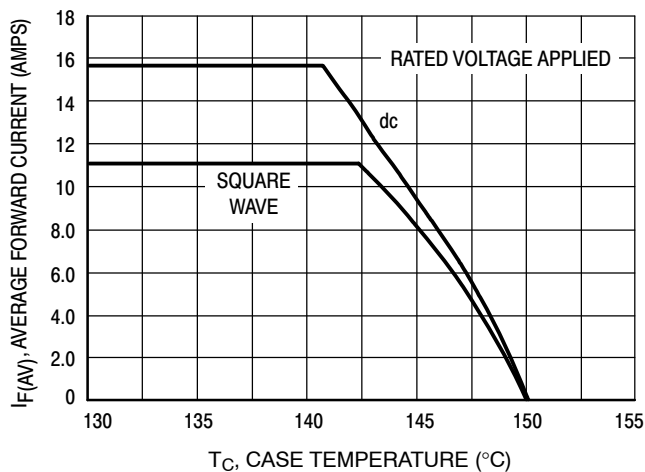


Figure 6. Current Derating, Case, $R_{\theta JC} = 1.0 \text{ } ^\circ\text{C/W}$

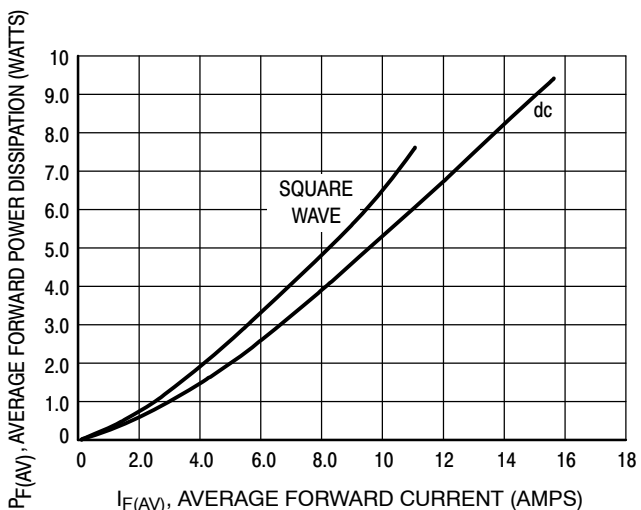
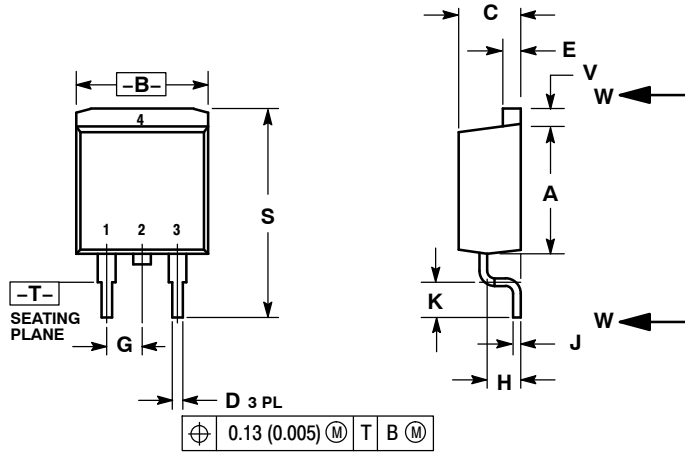


Figure 7. Forward Power Dissipation

MBRB1045, MBRD1045

PACKAGE DIMENSIONS

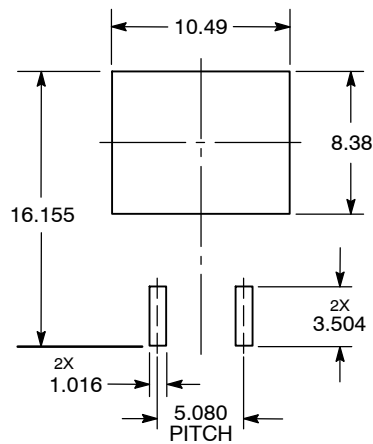
D²PAK 3
CASE 418B-04
ISSUE K



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. 418B-01 THRU 418B-03 OBSOLETE, NEW STANDARD 418B-04.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.340	0.380	8.64	9.65
B	0.380	0.405	9.65	10.29
C	0.160	0.190	4.06	4.83
D	0.020	0.035	0.51	0.89
E	0.045	0.055	1.14	1.40
F	0.310	0.350	7.87	8.89
G	0.100 BSC		2.54 BSC	
H	0.080	0.110	2.03	2.79
J	0.018	0.025	0.46	0.64
K	0.090	0.110	2.29	2.79
L	0.052	0.072	1.32	1.83
M	0.280	0.320	7.11	8.13
N	0.197 REF		5.00 REF	
P	0.079 REF		2.00 REF	
R	0.039 REF		0.99 REF	
S	0.575	0.625	14.60	15.88
V	0.045	0.055	1.14	1.40

SOLDERING FOOTPRINT*



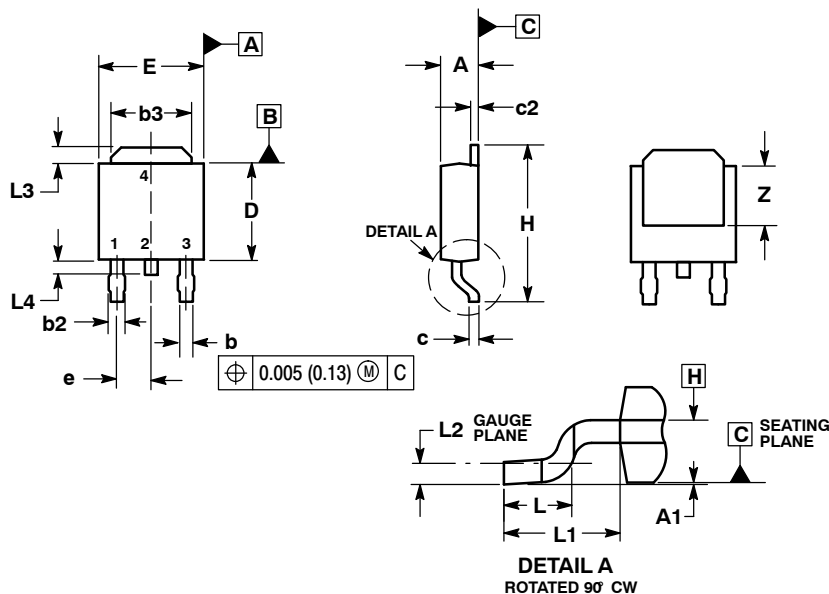
DIMENSIONS: MILLIMETERS

*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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PACKAGE DIMENSIONS

DPAK (SINGLE GAUGE) CASE 369C-01 ISSUE D

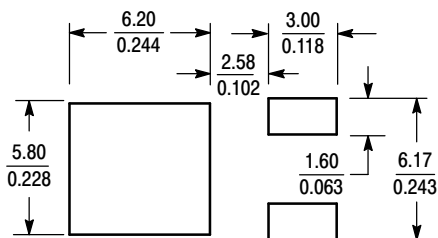


NOTES:

1. DIMENSIONING AND TOLERANCING PER 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.

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	0.030	0.045	0.76	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	0.108	REF	2.74	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	---

SOLDERING FOOTPRINT*



SCALE 3:1 $\left(\frac{\text{mm}}{\text{inches}}\right)$

*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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