

# MBR40250G, MBR40250TG, MBRF40250TG, MBRB40250TG



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## Switch-mode Schottky Power Rectifier 250 V, 40 A

### Features

- 250 V Blocking Voltage
- Low Forward Voltage Drop,  $V_F = 0.86$  V
- Soft Recovery Characteristic,  $T_{RR} < 35$  ns
- Stable Switching Performance Over Temperature
- These Devices are Pb-Free and are RoHS Compliant

### Benefits

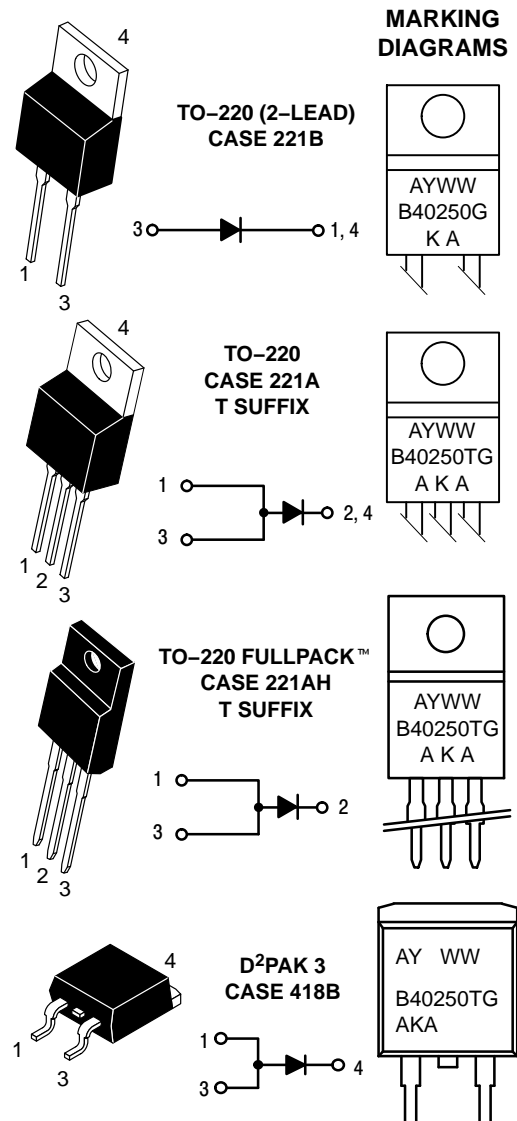
- Reduces or Eliminates Reverse Recovery Oscillations
- Minimizes Need for EMI Filtering
- Reduces Switching Losses
- Improved Efficiency

### Applications

- Power Supply
- Power Management
- Automotive
- Instrumentation

### Mechanical Characteristics

- Case: Epoxy, Molded
- Weight: 1.9 grams (approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes:  
260°C Max. for 10 Seconds
- Epoxy Meets UL 94 V-0 at 0.125 in



B40250 = Device Code  
T = 3 pins  
A = Assembly Location  
Y = Year  
WW = Work Week  
G = Pb-Free Package  
KA, AKA = Polarity Designator

### ORDERING INFORMATION

See detailed ordering and shipping information on page 4 of this data sheet.

# MBR40250G, MBR40250TG, MBRF40250TG, MBRB40250TG

## MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	$V_{RRM}$ $V_{RWM}$ $V_R$	250	V
Average Rectified Forward Current (Rated $V_R$ ) $T_C = 82^\circ\text{C}$ MBR40250, MBR40250T, MBRB40250T (Rated $V_R$ ) $T_C = 46^\circ\text{C}$ MBRF40250T	$I_{F(AV)}$	40	A
Peak Repetitive Forward Current (Rated $V_R$ , Square Wave, 20 kHz) $T_C = 82^\circ\text{C}$ MBR40250, MBR40250T, MBRB40250T (Rated $V_R$ , Square Wave, 20 kHz) $T_C = 46^\circ\text{C}$ MBRF40250T	$I_{FRM}$	80	A
Nonrepetitive Peak Surge Current (Surge applied at rated load conditions halfwave, single phase, 60 Hz)	$I_{FSM}$	150	A
Storage Temperature	$T_{stg}$	-65 to +175	$^\circ\text{C}$
Operating Junction Temperature	$T_J$	-65 to +150	$^\circ\text{C}$
Voltage Rate of Change (Rated $V_R$ )	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.

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Value	Unit
Maximum Thermal Resistance Junction-to-Case MBR40250(T) and MBRB40250T MBRF40250	$R_{\theta JC}$	2.0 3.0	$^\circ\text{C/W}$
Junction-to-Ambient MBR40250(T) MBRF40250 MBRB40250T	$R_{\theta JA}$	60 50 50	

## ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Value	Unit
Maximum Instantaneous Forward Voltage (Note 1) $I_F = 20\text{ A}$ , $T_C = 25^\circ\text{C}$ $I_F = 20\text{ A}$ , $T_C = 125^\circ\text{C}$ $I_F = 40\text{ A}$ , $T_C = 25^\circ\text{C}$ $I_F = 40\text{ A}$ , $T_C = 125^\circ\text{C}$	$V_F$	0.86 0.71 0.97 0.86	V
Maximum Instantaneous Reverse Current (Note 1) Rated DC Voltage, $T_C = 25^\circ\text{C}$ Rated DC Voltage, $T_C = 125^\circ\text{C}$	$I_R$	0.25 30	mA
Maximum Reverse Recovery Time $I_F = 1.0\text{ A}$ , $di/dt = 50\text{ A}/\mu\text{s}$ , $T_C = 25^\circ\text{C}$	$t_{rr}$	35	ns

## DYNAMIC CHARACTERISTICS

Characteristic	Symbol	Value	Unit
Capacitance $V_R = -5.0\text{ V}$ , $T_C = 25^\circ\text{C}$ , Frequency = 1.0 MHz	$C_T$	500	pF

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

# MBR40250G, MBR40250TG, MBRF40250TG, MBRB40250TG

## TYPICAL CHARACTERISTICS

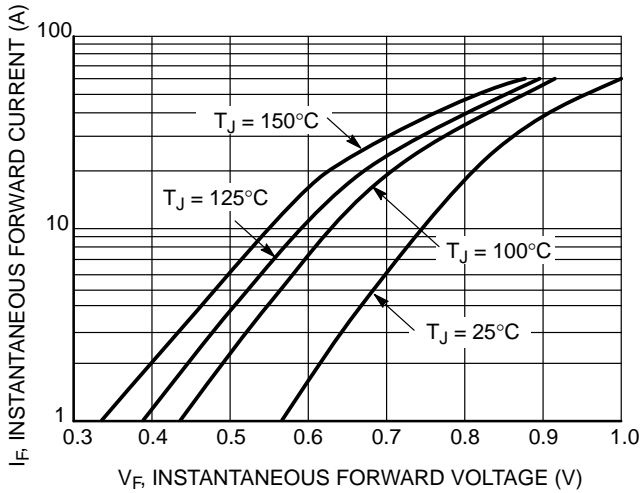


Figure 1. Typical Forward Voltage

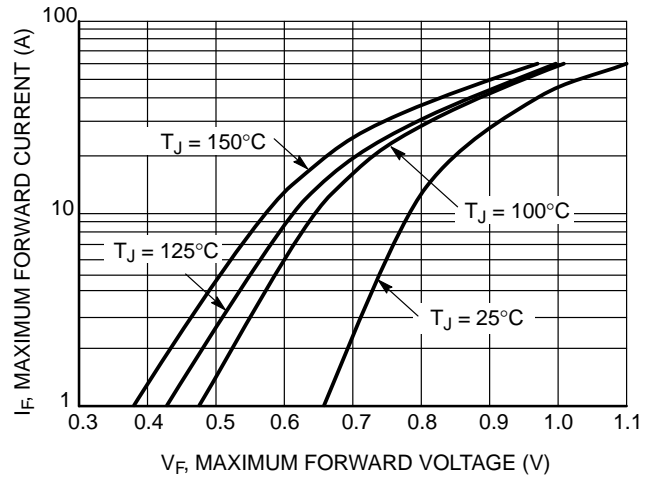


Figure 2. Maximum Forward Voltage

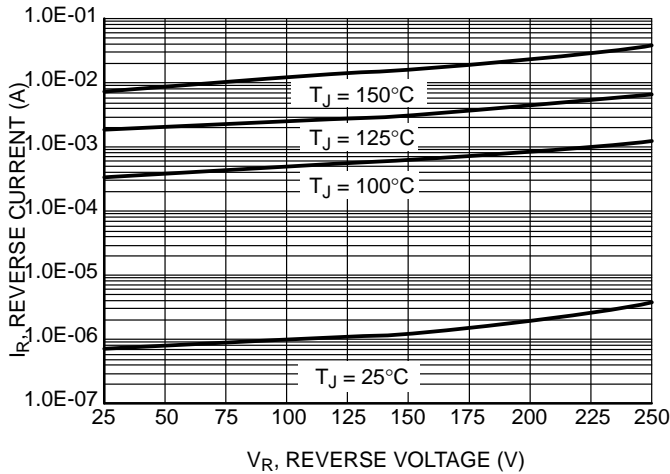


Figure 3. Typical Reverse Current

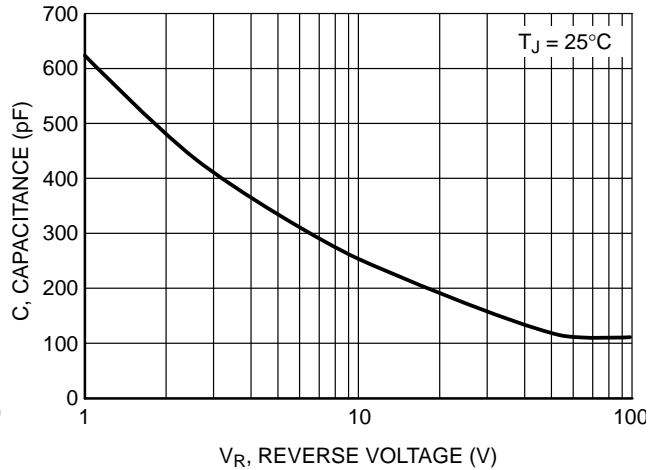


Figure 4. Typical Capacitance

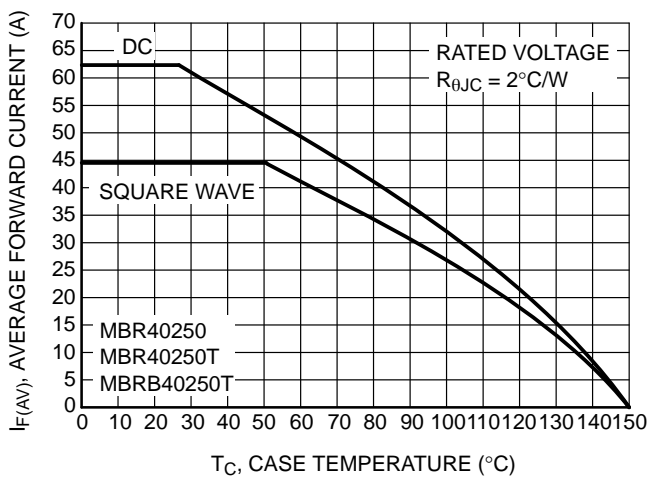


Figure 5. Current Derating (Case) for MBR40250, MBR40250T and MBRB40250T

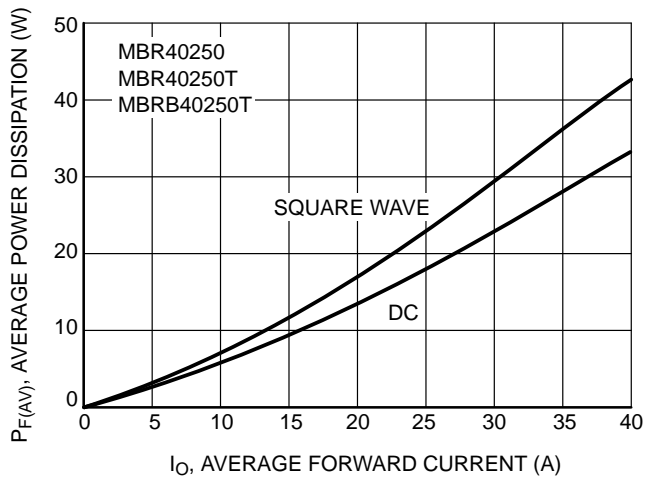


Figure 6. Forward Power Dissipation for MBR40250, MBR40250T and MBRB40250T

# MBR40250G, MBR40250TG, MBRF40250TG, MBRB40250TG

## TYPICAL CHARACTERISTICS

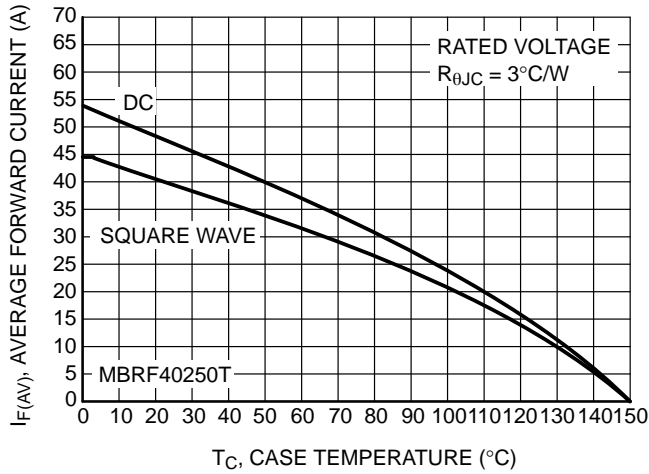


Figure 7. Current Derating (Case) for MBRF40250T

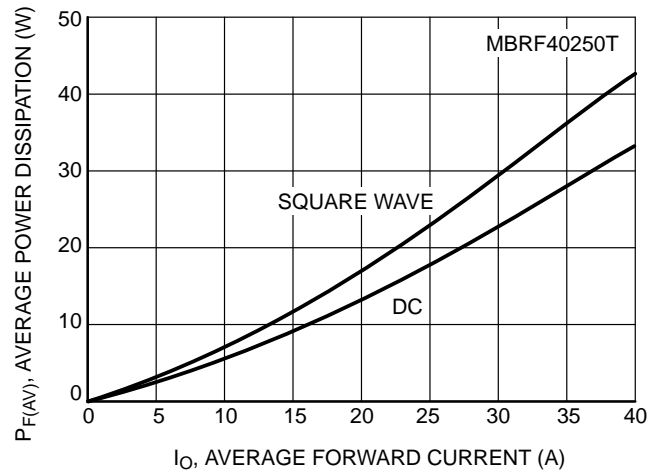


Figure 8. Forward Power Dissipation for MBRF40250T

### ORDERING INFORMATION

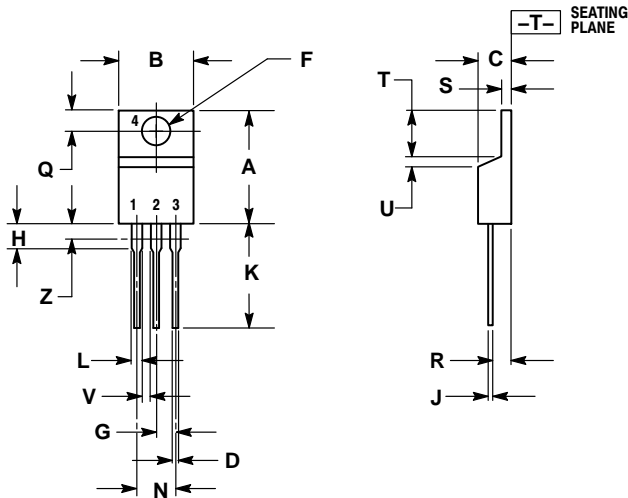
Device	Package	Shipping†
MBR40250G	TO-220 (2-LEAD) (Pb-Free)	50 Units / Rail
MBR40250TG	TO-220 (Pb-Free)	50 Units / Rail
MBRF40250TG	TO-220 FULLPACK (Pb-Free)	50 Units / Rail
MBRB40250TG	D <sup>2</sup> PAK 3 (Pb-Free)	50 Units / Rail
MBRB40250TT4G	D <sup>2</sup> PAK 3 (Pb-Free)	800 Units / Tape & Reel

†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.

# MBR40250G, MBR40250TG, MBRF40250TG, MBRB40250TG

## PACKAGE DIMENSIONS

### TO-220 CASE 221A-09 ISSUE AH

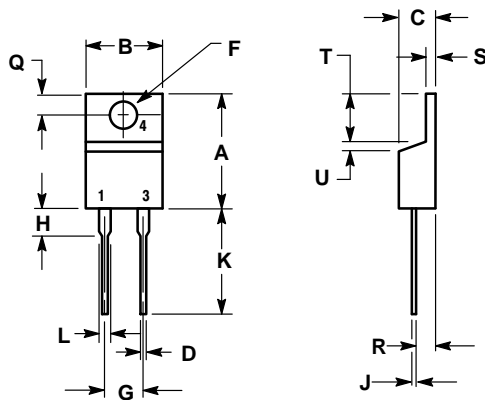


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.415	9.66	10.53
C	0.160	0.190	4.07	4.83
D	0.025	0.038	0.64	0.96
F	0.142	0.161	3.61	4.09
G	0.095	0.105	2.42	2.66
H	0.110	0.161	2.80	4.10
J	0.014	0.024	0.36	0.61
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	---	1.15	---
Z	---	0.080	---	2.04

- STYLE 6:
- PIN 1. ANODE
  - CATHODE
  - ANODE
  - CATHODE

### TO-220, 2-LEAD CASE 221B-04 ISSUE F



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.

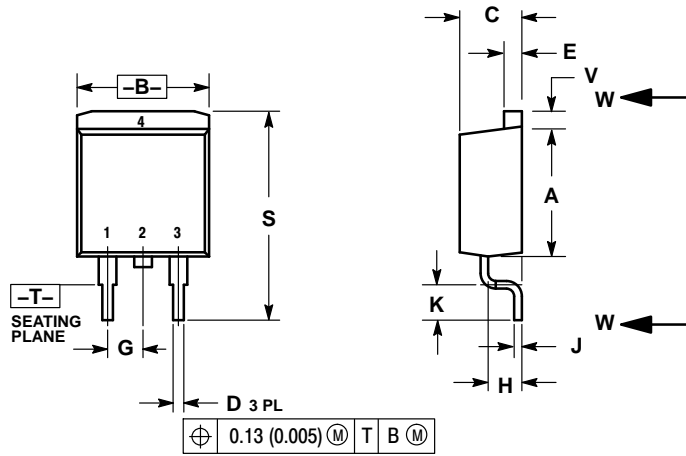
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.595	0.620	15.11	15.75
B	0.380	0.405	9.65	10.29
C	0.160	0.190	4.06	4.82
D	0.025	0.039	0.64	1.00
F	0.142	0.161	3.61	4.09
G	0.190	0.210	4.83	5.33
H	0.110	0.130	2.79	3.30
J	0.014	0.025	0.36	0.64
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.14	1.52
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.14	1.39
T	0.235	0.255	5.97	6.48
U	0.000	0.050	0.000	1.27

- STYLE 1:
- PIN 1. CATHODE
  - N/A
  - ANODE
  - CATHODE

# MBR40250G, MBR40250TG, MBRF40250TG, MBRB40250TG

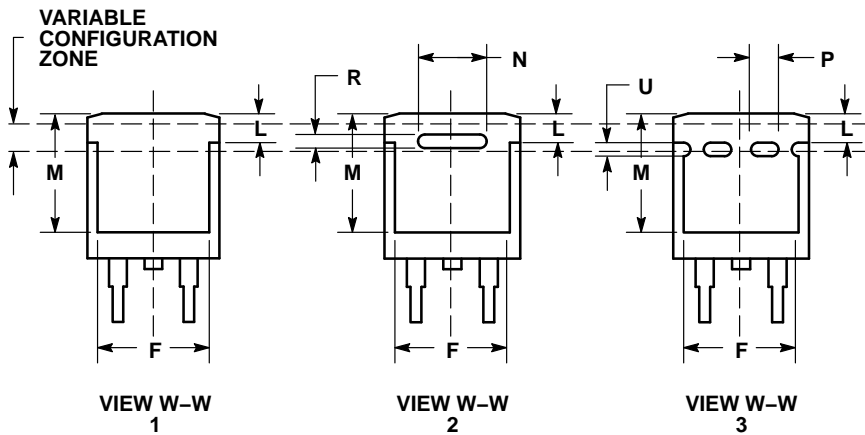
## PACKAGE DIMENSIONS

D<sup>2</sup>PAK 3  
CASE 418B-04  
ISSUE K



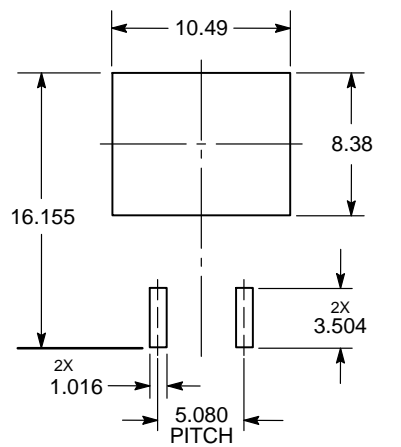
- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. 418B-01 THRU 418B-03 OBSOLETE, NEW STANDARD 418B-04.

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



- STYLE 3:
1. ANODE
  2. CATHODE
  3. ANODE
  4. CATHODE

### SOLDERING FOOTPRINT\*



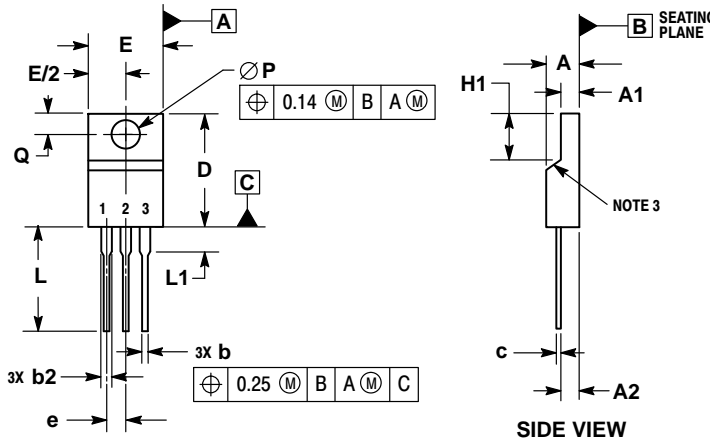
DIMENSIONS: MILLIMETERS

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

# MBR40250G, MBR40250TG, MBRF40250TG, MBRB40250TG

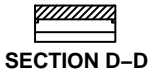
## PACKAGE DIMENSIONS

### TO-220 FULLPAK, 3-LEAD CASE 221AH ISSUE F



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
  2. CONTROLLING DIMENSION: MILLIMETERS.
  3. CONTOUR UNCONTROLLED IN THIS AREA.
  4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH AND GATE PROTRUSIONS. MOLD FLASH AND GATE PROTRUSIONS NOT TO EXCEED 0.13 PER SIDE. THESE DIMENSIONS ARE TO BE MEASURED AT OUTERMOST EXTREME OF THE PLASTIC BODY.
  5. DIMENSION b2 DOES NOT INCLUDE DAMBAR PROTRUSION. LEAD WIDTH INCLUDING PROTRUSION SHALL NOT EXCEED 2.00.
  6. CONTOURS AND FEATURES OF THE MOLDED PACKAGE BODY MAY VARY WITHIN THE ENVELOPE DEFINED BY DIMENSIONS A1 AND H1 FOR MANUFACTURING PURPOSES.

DIM	MILLIMETERS	
	MIN	MAX
A	4.30	4.70
A1	2.50	2.90
A2	2.50	2.90
b	0.54	0.84
b2	1.10	1.40
c	0.49	0.79
D	14.70	15.30
E	9.70	10.30
e	2.54 BSC	
H1	6.60	7.10
L	12.50	14.73
L1	---	2.80
P	3.00	3.40
Q	2.80	3.20

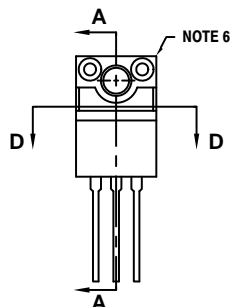


FRONT VIEW

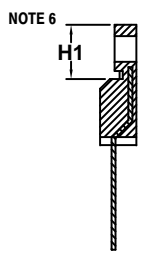
SIDE VIEW

SECTION D-D

- STYLE 3:
1. ANODE
  2. CATHODE
  3. ANODE



ALTERNATE CONSTRUCTION



SECTION A-A

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