

# MBR40250, MBR40250T, MBRF40250T

## 250 V, 40 A SWITCHMODE™ Schottky Power Rectifier

### Features

- 250 V Blocking Voltage
- Low Forward Voltage Drop,  $V_F = 0.86$  V
- Soft Recovery Characteristic,  $T_{RR} < 35$  ns
- Low Reverse Current,  $I_R = 30$   $\mu$ A
- Stable Switching Performance Over Temperature
- Pb-Free Packages are Available

### 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

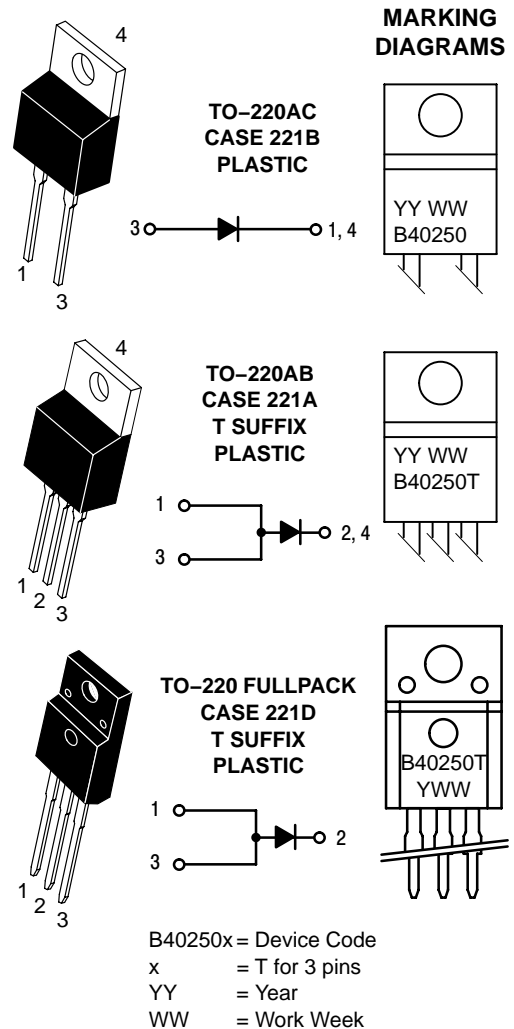
- Case: Epoxy, Molded
- Weight: 1.9 grams (approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes:  
260°C Max. for 10 Seconds
- Epoxy Meets UL 94 V-0 at 0.125 in



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## SCHOTTKY RECTIFIER 40 AMPERES, 250 VOLTS



### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

# MBR40250, MBR40250T, MBRF40250T

## 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 (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 (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, 20 kHz)	$I_{FSM}$	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/ $\mu\text{s}$

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

## THERMAL CHARACTERISTICS

Rating	Symbol	Value	Unit
Maximum Thermal Resistance	$R_{\theta JC}$	Junction-to-Case MBR40250(T)	2.0
		MBRF40250	3.0
	$R_{\theta JA}$	Junction-to-Ambient MBR40250(T)	60
		MBRF40250	50

## ELECTRICAL CHARACTERISTICS

Rating	Symbol	Value	Unit
Maximum Instantaneous Forward Voltage (Note 1)	$V_F$	$I_F = 20\text{ A}$ , $T_C = 25^\circ\text{C}$	0.86
		$I_F = 20\text{ A}$ , $T_C = 125^\circ\text{C}$	0.71
		$I_F = 40\text{ A}$ , $T_C = 25^\circ\text{C}$	0.97
		$I_F = 40\text{ A}$ , $T_C = 125^\circ\text{C}$	0.86
Maximum Instantaneous Reverse Current (Note 1)	$I_R$	Rated DC Voltage, $T_C = 25^\circ\text{C}$	0.03
		Rated DC Voltage, $T_C = 125^\circ\text{C}$	30
Maximum Reverse Recovery Time	$t_{rr}$	35	ns
		$I_F = 1.0\text{ A}$ , $di/dt = 50\text{ A}/\mu\text{s}$ , $T_C = 25^\circ\text{C}$	

## DYNAMIC CHARACTERISTICS

Capacitance	$V_R = -5.0\text{ V}$ , $T_C = 25^\circ\text{C}$ , Frequency = 1.0 MHz	$C_T$	500	pF
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1. Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

# MBR40250, MBR40250T, MBRF40250T

## TYPICAL CHARACTERISTICS

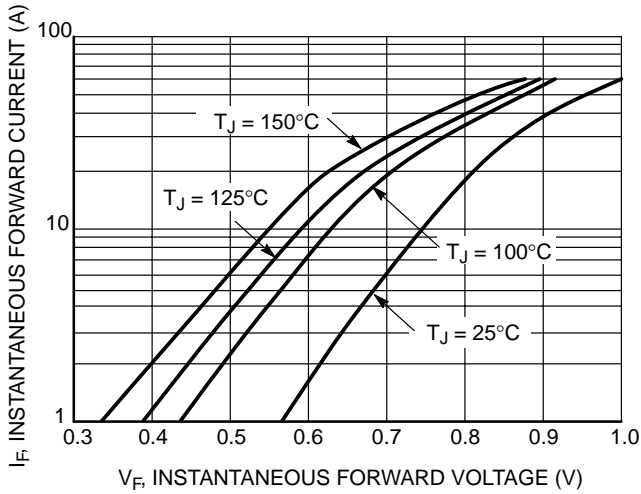


Figure 1. Typical Forward Voltage

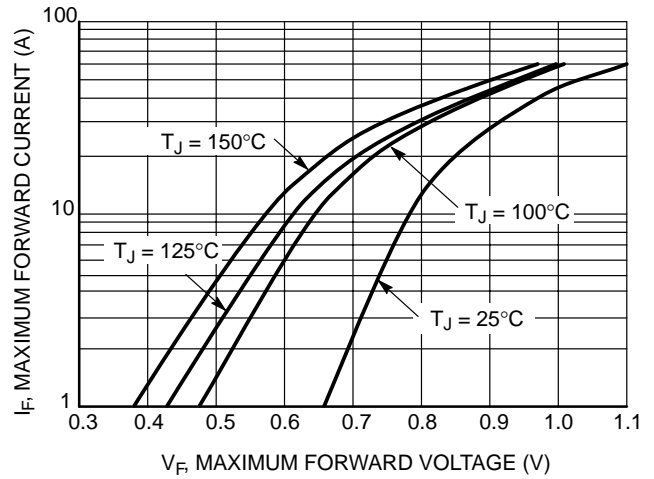


Figure 2. Maximum Forward Voltage

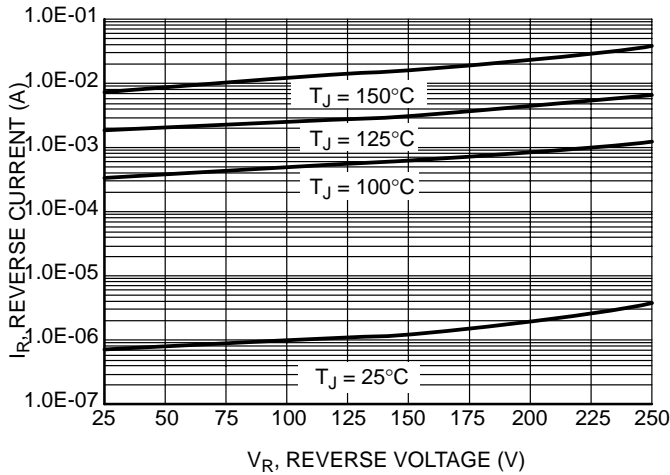


Figure 3. Typical Reverse Current

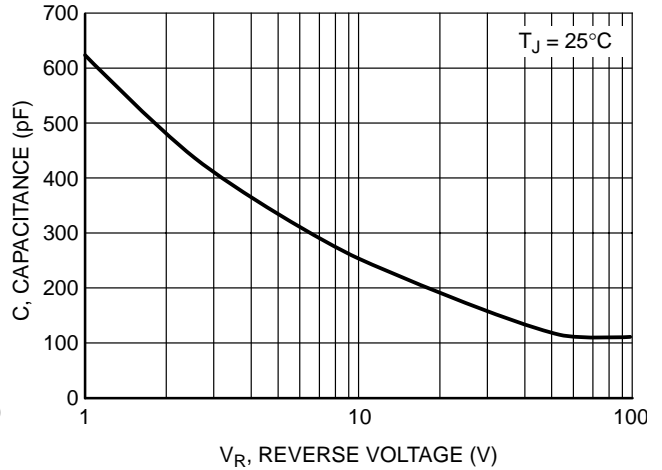


Figure 4. Typical Capacitance

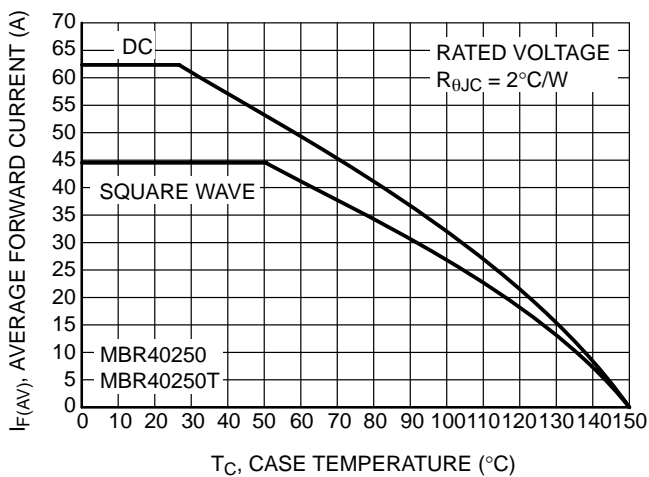


Figure 5. Current Derating (Case) for MBR40250 and MBR40250T

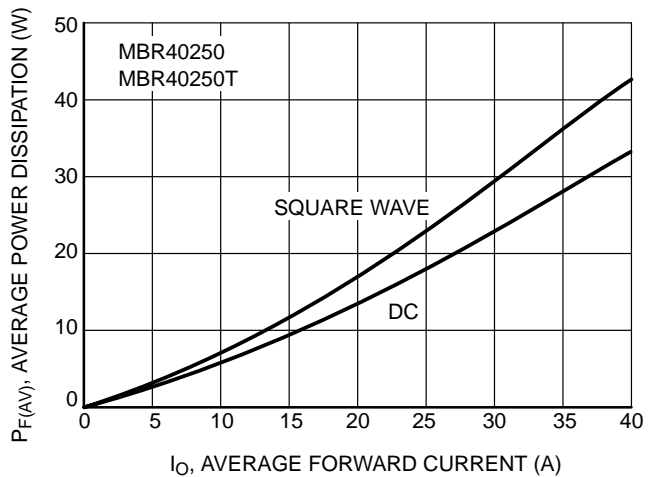


Figure 6. Forward Power Dissipation for MBR40250 and MBR40250T

# MBR40250, MBR40250T, MBRF40250T

## TYPICAL CHARACTERISTICS

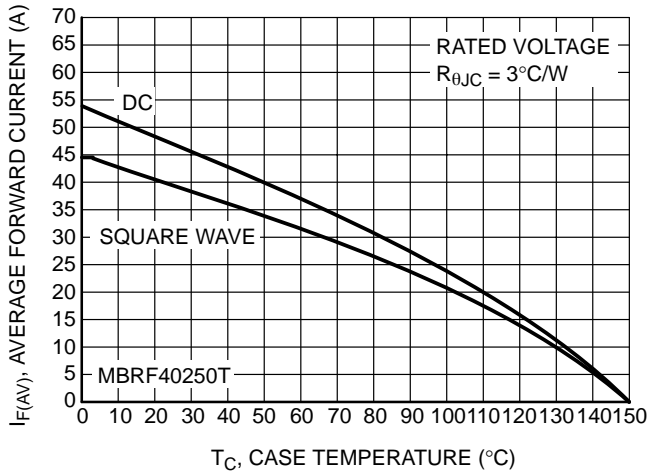


Figure 7. Current Derating (Case) for MBRF40250T

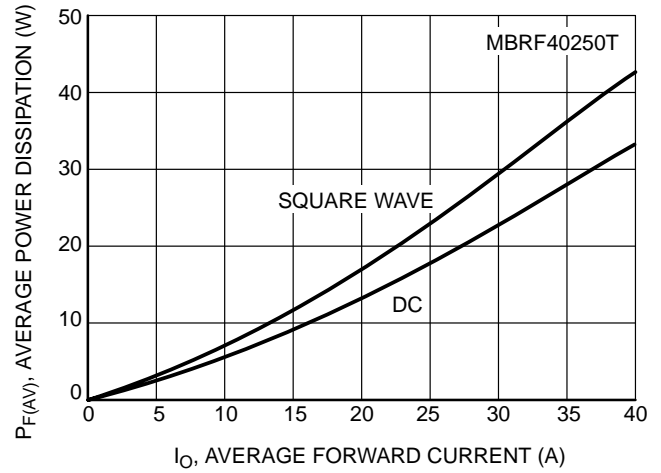


Figure 8. Forward Power Dissipation for MBRF40250T

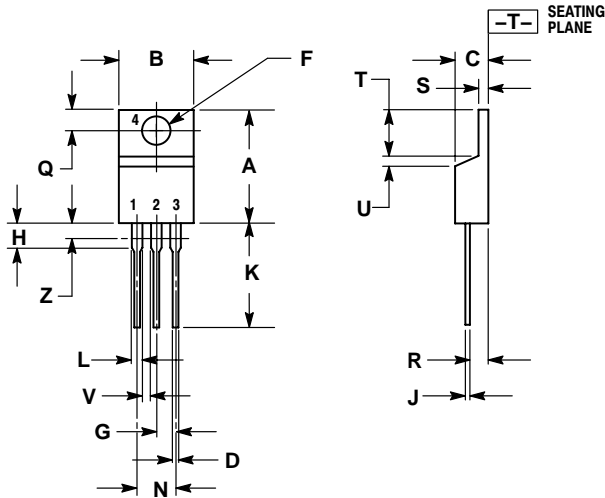
### ORDERING INFORMATION

Device	Package	Shipping†
MBR40250	TO-220AC	50 Units / Rail
MBR40250G	TO-220AC (Pb-Free)	
MBR40250T	TO-220AB	50 Units / Rail
MBR40250TG	TO-220AB (Pb-Free)	
MBRF40250T	TO-220 FULLPACK	50 Units / Rail
MBRF40250TG	TO-220 FULLPACK (Pb-Free)	

# MBR40250, MBR40250T, MBRF40250T

## PACKAGE DIMENSIONS

### TO-220AB CASE 221A-09 ISSUE AA

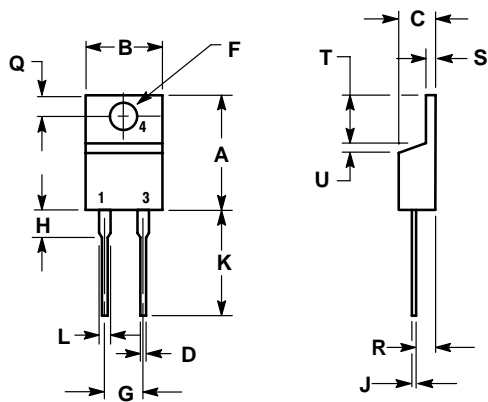


NOTES:

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	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.018	0.025	0.46	0.64
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

### TO-220AC CASE 221B-04 ISSUE D



NOTES:

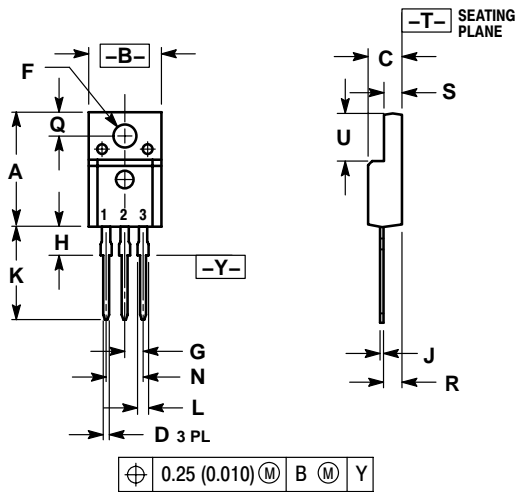
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

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	0.035	0.64	0.89
F	0.142	0.147	3.61	3.73
G	0.190	0.210	4.83	5.33
H	0.110	0.130	2.79	3.30
J	0.018	0.025	0.46	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

# MBR40250, MBR40250T, MBRF40250T

## PACKAGE DIMENSIONS

### TO-220 FULLPACK CASE 221D-03 ISSUE G



#### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH
3. 221D-01 THRU 221D-02 OBSOLETE, NEW STANDARD 221D-03.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.625	0.635	15.88	16.12
B	0.408	0.418	10.37	10.63
C	0.180	0.190	4.57	4.83
D	0.026	0.031	0.65	0.78
F	0.116	0.119	2.95	3.02
G	0.100 BSC		2.54 BSC	
H	0.125	0.135	3.18	3.43
J	0.018	0.025	0.45	0.63
K	0.530	0.540	13.47	13.73
L	0.048	0.053	1.23	1.36
N	0.200 BSC		5.08 BSC	
Q	0.124	0.128	3.15	3.25
R	0.099	0.103	2.51	2.62
S	0.101	0.113	2.57	2.87
U	0.238	0.258	6.06	6.56

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