MBR40250, MBR40250T, MBRF40250T

250 V, 40 A SWITCHMODE™ Schottky Power Rectifier

ON Semiconductor®

http://onsemi.com

SCHOTTKY RECTIFIER
40 AMPERES, 250 VOLTS

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 μA
- 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

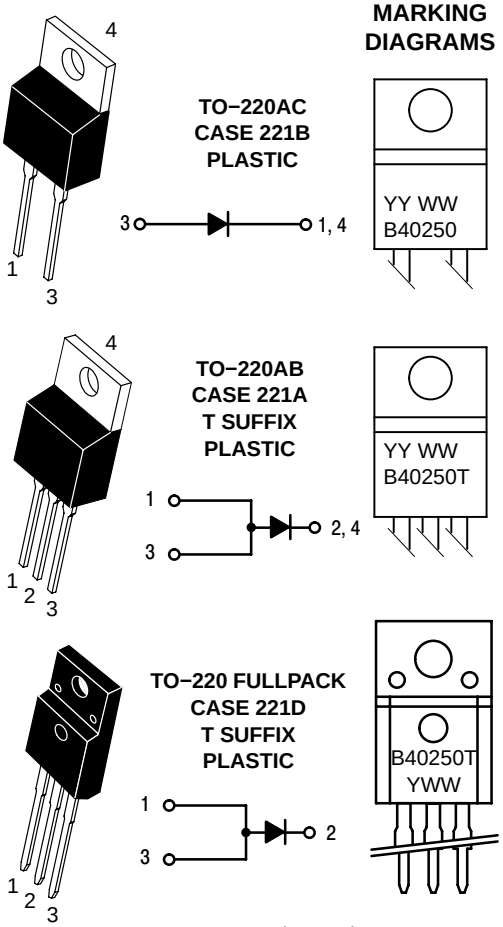
Applications

- 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

MARKING DIAGRAMS



B40250x = Device Code
x = T for 3 pins
YY = Year
WW = Work Week

ORDERING INFORMATION

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

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°C MBR40250, MBR40250T (Rated V_R) T_C = 46°C MBRF40250T	$I_{F(AV)}$	40	A
Peak Repetitive Forward Current (Rated V_R, Square Wave, 20 kHz) T_C = 82°C MBR40250, MBR40250T (Rated V_R, Square Wave, 20 kHz) T_C = 46°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	°C
Operating Junction Temperature	T_J	− 65 to +150	°C
Voltage Rate of Change (Rated V_R)	dv/dt	10,000	V/μs

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	Junction−to−Case	$R_{\theta JC}$		°C/W
	MBR40250(T)		2.0	
	MBRF40250		3.0	
	Junction−to−Ambient	$R_{\theta JA}$		
	MBR40250(T)		60	
	MBRF40250		50	

ELECTRICAL CHARACTERISTICS

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

DYNAMIC CHARACTERISTICS

Capacitance	V_R = −5.0 V, T_C = 25°C, Frequency = 1.0 MHz	C_T	500	pF

1. Pulse Test: Pulse Width = 300 μs, Duty Cycle ≤ 2.0%.

TYPICAL CHARACTERISTICS

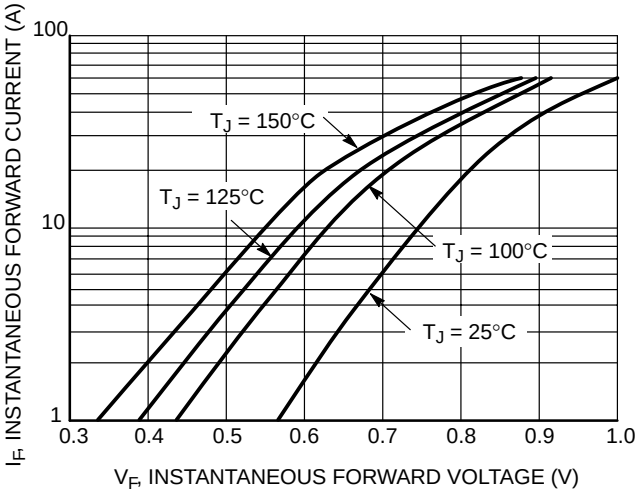


Figure 1. Typical Forward Voltage

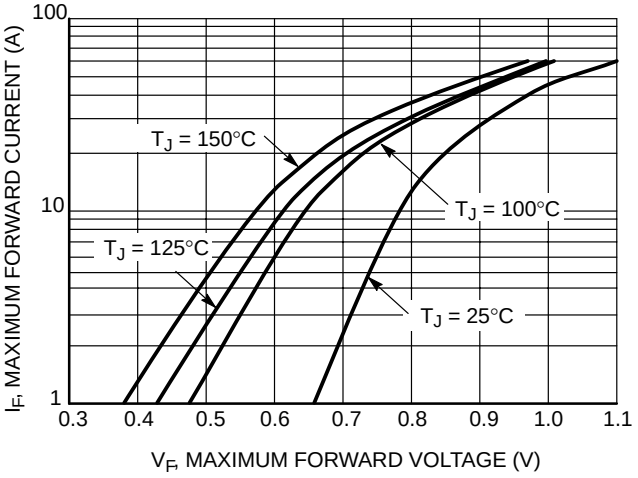


Figure 2. Maximum Forward Voltage

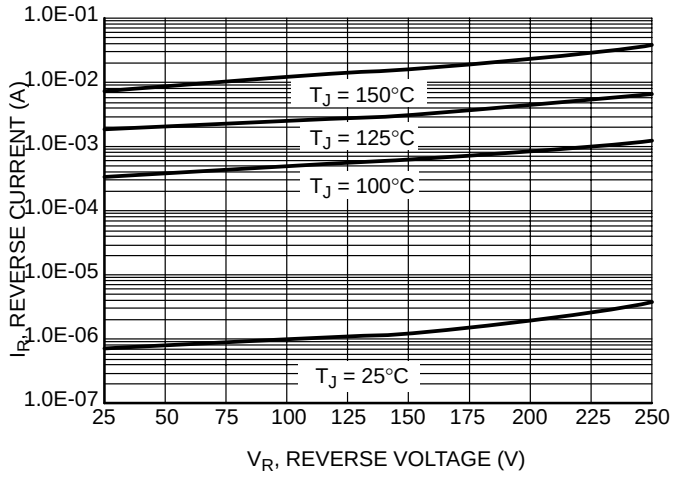


Figure 3. Typical Reverse Current

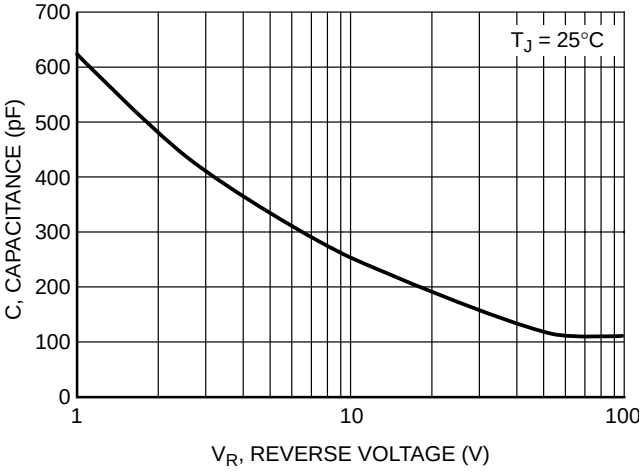


Figure 4. Typical Capacitance

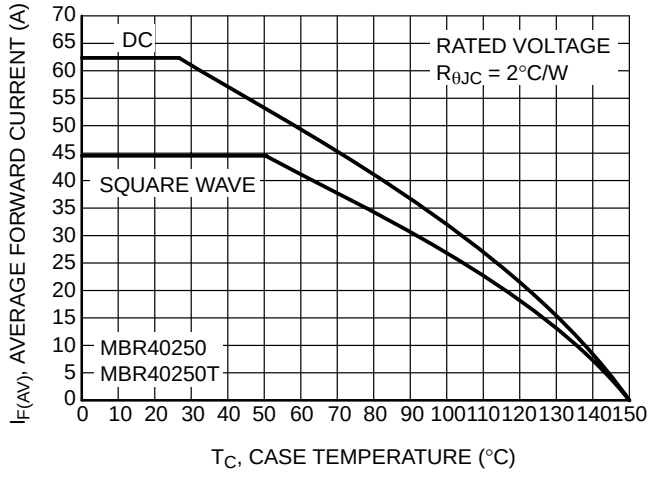


Figure 5. Current Derating (Case) for MBR40250 and MBR40250T

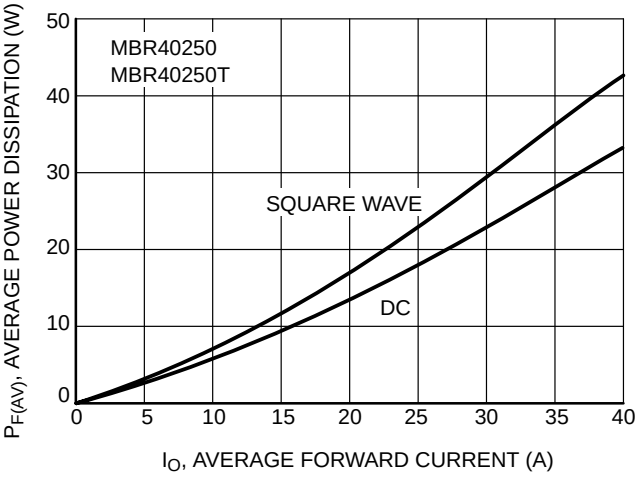


Figure 6. Forward Power Dissipation for MBR40250 and MBR40250T

TYPICAL CHARACTERISTICS

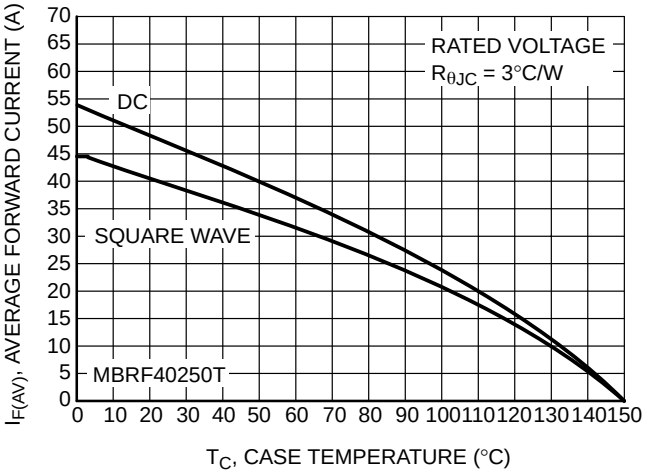


Figure 7. Current Derating (Case) for MBRF40250T

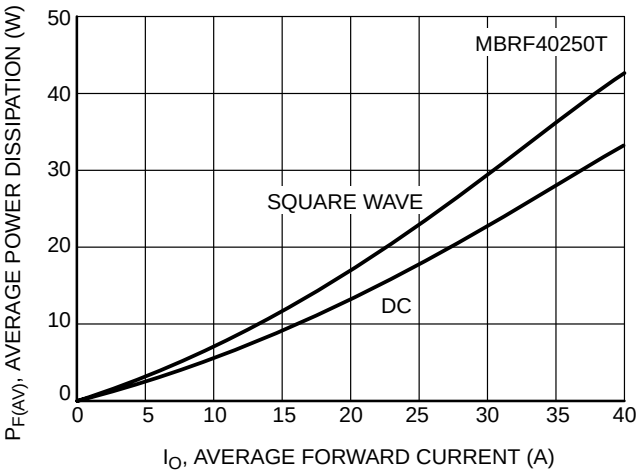


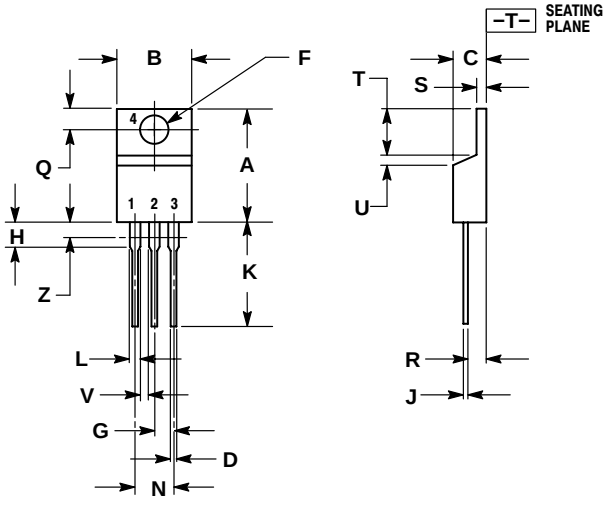
Figure 8. Forward Power Dissipation for MBRF40250T

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)	

PACKAGE DIMENSIONS

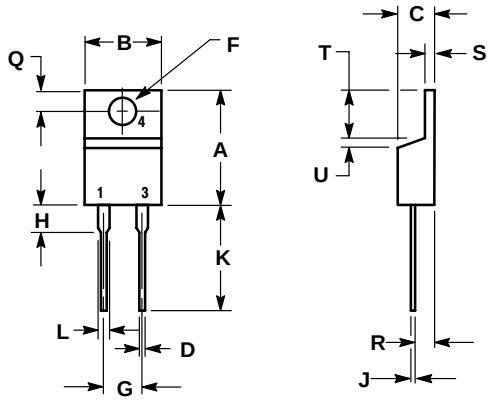
TO−220AB
CASE 221A−09
ISSUE AA



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.

	INCHES		MILLIMETERS	
DIM	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

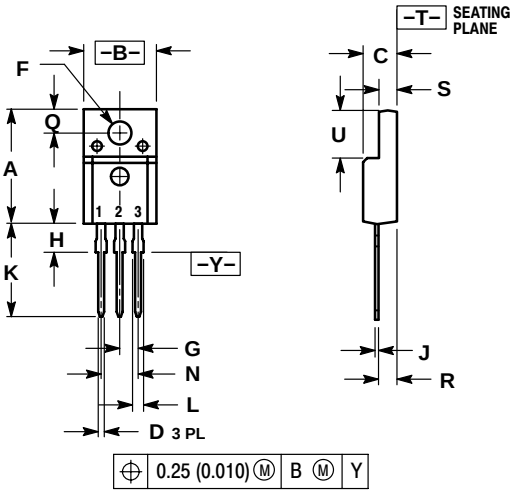


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

	INCHES		MILLIMETERS	
DIM	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

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.

	INCHES		MILLIMETERS	
DIM	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

SWITCHMODE is a trademark of Semiconductor Components Industries, LLC (SCILLC).

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
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