MBR40250, MBR40250T, MBRF40250T, MBRB40250T

250 V, 40 A SWITCHMODE™ Schottky Power Rectifier

ON Semiconductor®

http://onsemi.com

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 are Pb−Free Devices*

Benefits

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

Applications

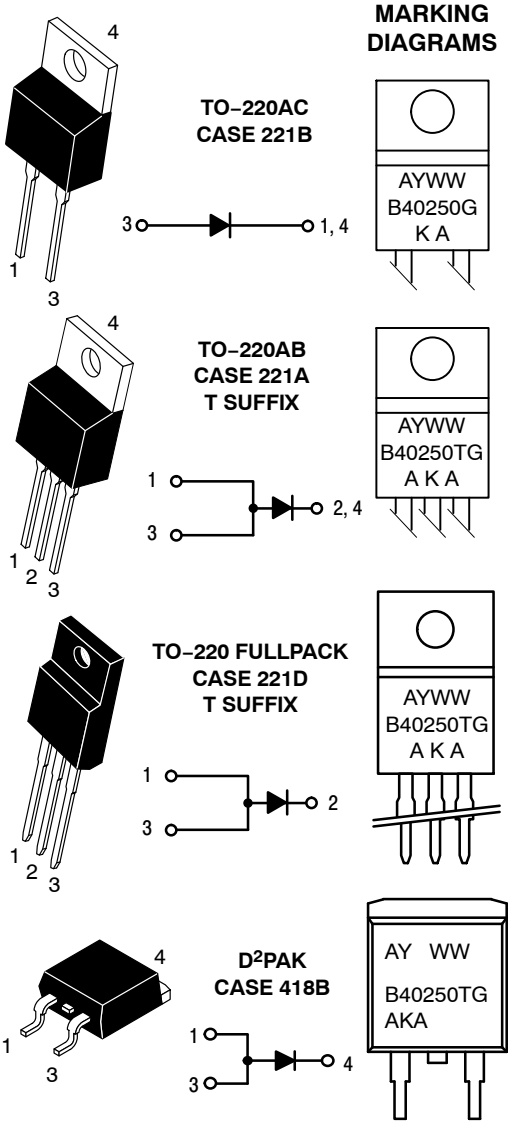
- Power Supply
- Power Management
- Automotive
- Instrumentation

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

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

MARKING DIAGRAMS



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 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, MBRB40250T (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, MBRB40250T (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, 60 Hz)	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

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.

THERMAL CHARACTERISTICS

Rating		Symbol	Value	Unit
Maximum Thermal Resistance	Junction−to−Case	$R_{\theta JC}$		°C/W
	MBR40250(T) and MBRB40250T		2.0	
	MBRF40250		3.0	
	Junction−to−Ambient	$R_{\theta JA}$		
	MBR40250(T)		60	
	MBRF40250		50	
	MBRB40250T		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		0.25	
	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

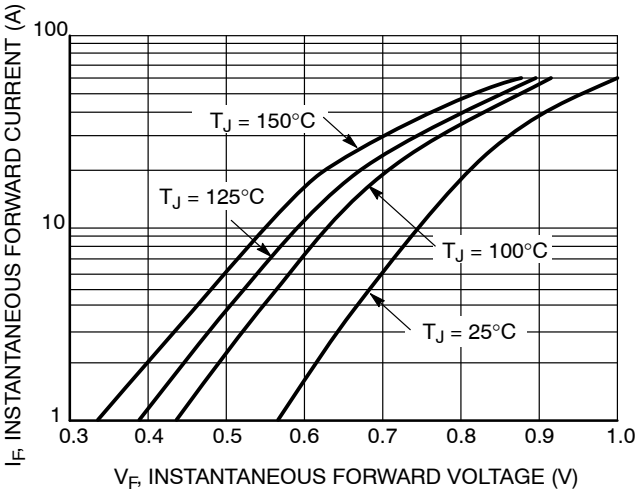


Figure 1. Typical Forward Voltage

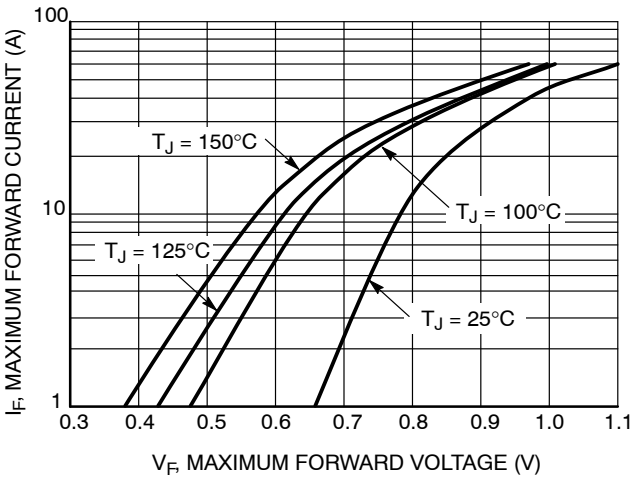


Figure 2. Maximum Forward Voltage

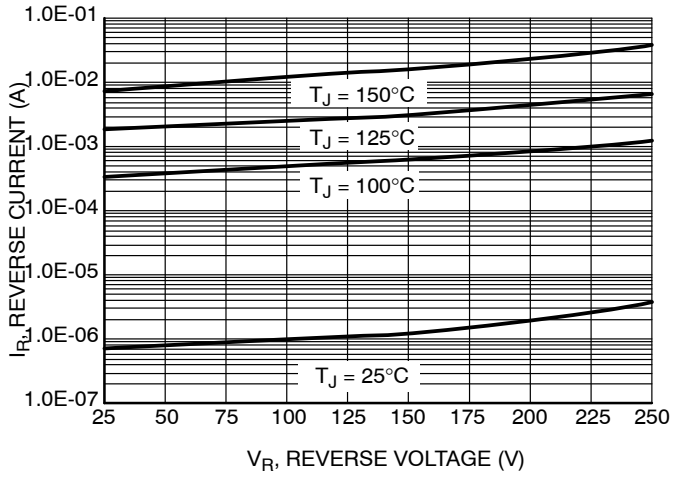


Figure 3. Typical Reverse Current

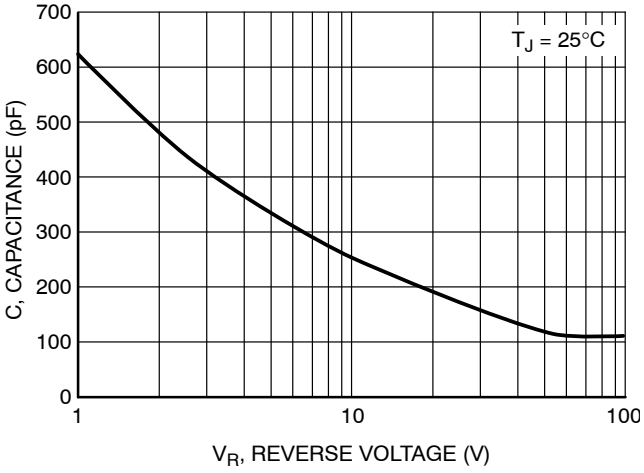


Figure 4. Typical Capacitance

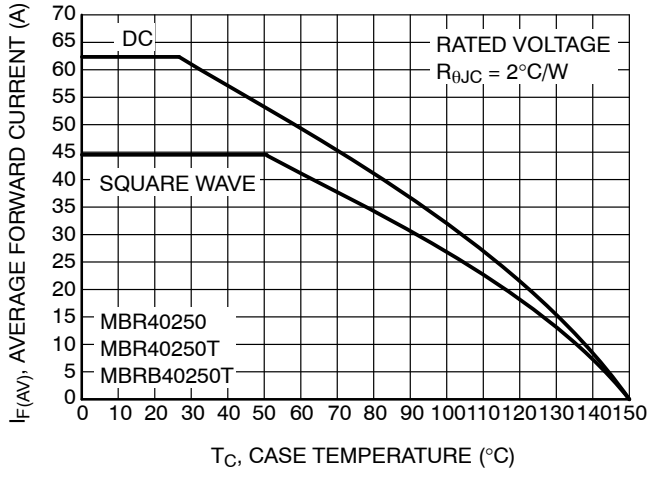


Figure 5. Current Derating (Case) for MBR40250, MBR40250T and MBRB40250T

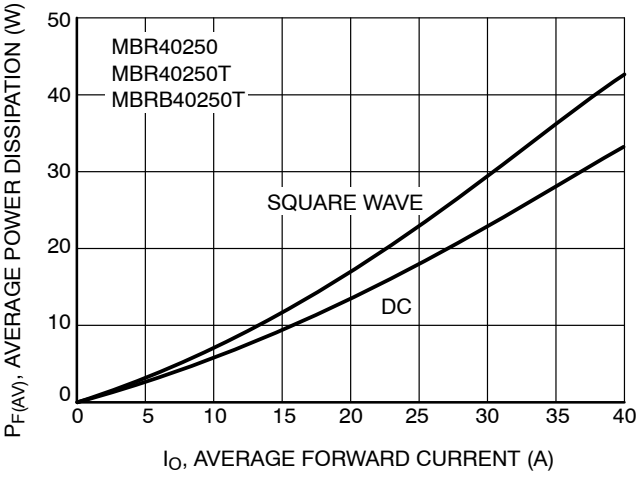


Figure 6. Forward Power Dissipation for MBR40250, MBR40250T and MBRB40250T

TYPICAL CHARACTERISTICS

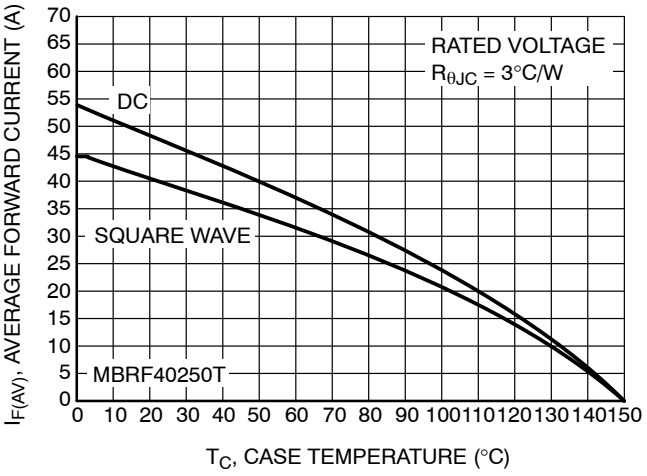


Figure 7. Current Derating (Case) for MBRF40250T

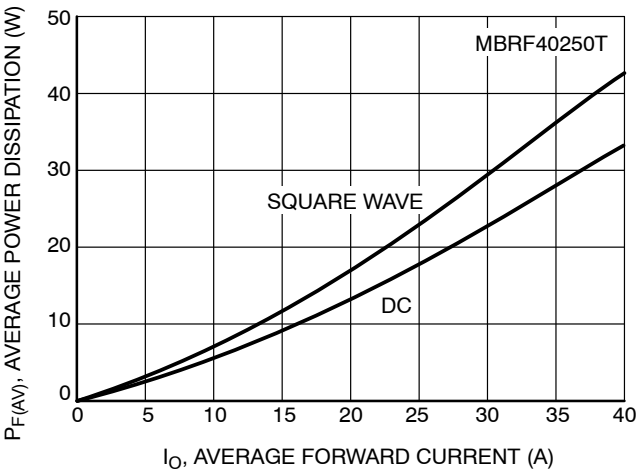


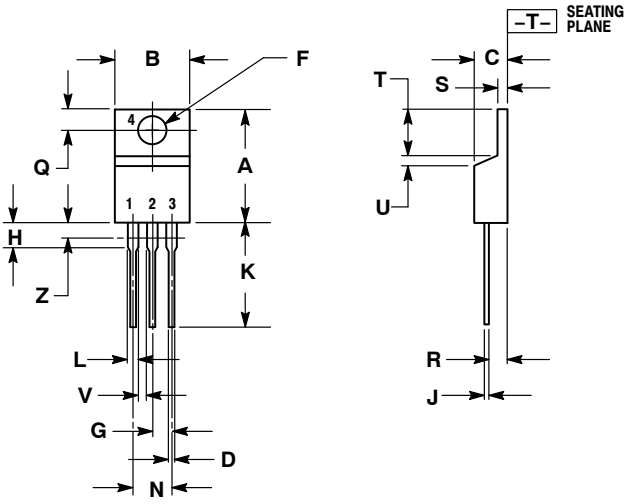
Figure 8. Forward Power Dissipation for MBRF40250T

ORDERING INFORMATION

Device	Package	Shipping†
MBR40250G	TO−220AC (Pb−Free)	50 Units / Rail
MBR40250TG	TO−220AB (Pb−Free)	50 Units / Rail
MBRF40250TG	TO−220 FULLPACK (Pb−Free)	50 Units / Rail
MBRB40250TG	D^2PAK (Pb−Free)	50 Units / Rail
MBRB40250TT4G	D^2PAK (Pb−Free)	800 Units / Tape & Reel

PACKAGE DIMENSIONS

TO−220
CASE 221A−09
ISSUE AF

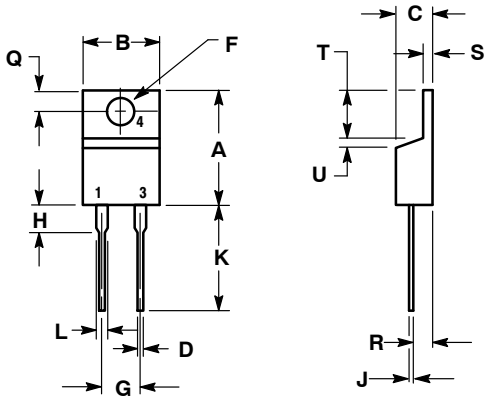


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

	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	0.161	3.61	4.09
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.014	0.025	0.36	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

STYLE 6:
PIN 1. ANODE
2. CATHODE
3. ANODE
4. CATHODE

TO−220AC
CASE 221B−04
ISSUE E

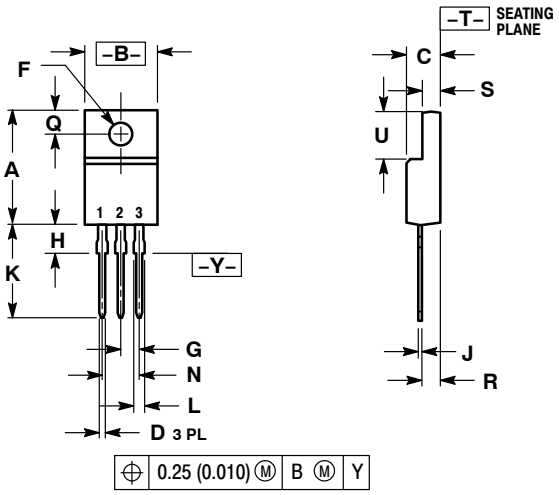


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

	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	0.161	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

PACKAGE DIMENSIONS

TO−220 FULLPAK
CASE 221D−03
ISSUE J

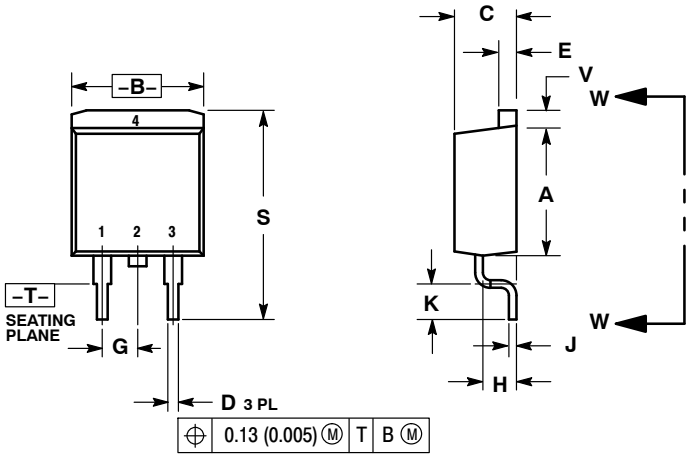


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH
3. 221D−01 THRU 221D−02 OBSOLETE, NEW STANDARD 221D−03.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.617	0.635	15.67	16.12
B	0.392	0.419	9.96	10.63
C	0.177	0.193	4.50	4.90
D	0.024	0.039	0.60	1.00
F	0.116	0.129	2.95	3.28
G	0.100 BSC		2.54 BSC	
H	0.118	0.135	3.00	3.43
J	0.018	0.025	0.45	0.63
K	0.503	0.541	12.78	13.73
L	0.048	0.058	1.23	1.47
N	0.200 BSC		5.08 BSC	
Q	0.122	0.138	3.10	3.50
R	0.099	0.117	2.51	2.96
S	0.092	0.113	2.34	2.87
U	0.239	0.271	6.06	6.88

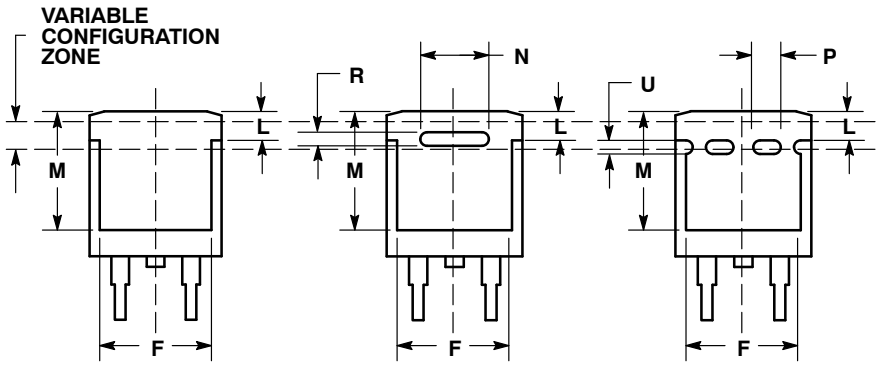
PACKAGE DIMENSIONS

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.

	INCHES		MILLIMETERS	
DIM	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



VIEW W–W 1 | VIEW W–W 2 | VIEW W–W 3

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AVIC JONHON

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