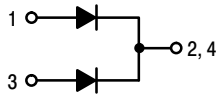
Switch-mode Power Rectifier

60 V, 20 A

MBR20L60CTG
MBRF20L60CTG

SCHOTTKY BARRIER RECTIFIER 20 AMPERES 60 VOLTS



Features and Benefits

- Low Power Loss/High Efficiency
- High Surge Capacity
- 20 A Total (10 A Per Diode Leg)
- Guard−Ring for Stress Protection
- These Devices are Pb−Free and are RoHS Compliant*

Applications

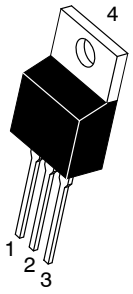
- Power Supply − Output Rectification
- Power Management
- Instrumentation

Mechanical Characteristics:

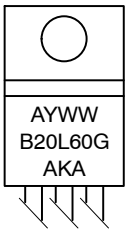
- Case: Epoxy, Molded
- Epoxy Meets UL 94 V−0 @ 0.125 in
- Weight: 1.9 Grams (Approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes: 260°C Max. for 10 Seconds
- Shipped 50 Units Per Plastic Tube

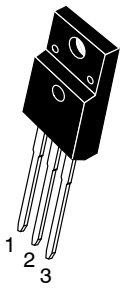
*For additional information on our Pb−Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

MARKING DIAGRAM

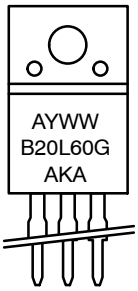


TO−220
CASE 221A
STYLE 6





TO−220 FULLPAK™
CASE 221D



A	= Assembly Location
Y	= Year
WW	= Work Week
B20L60	= Device Code
G	= Pb−Free Package
AKA	= Polarity Designator

ORDERING INFORMATION

Device	Package	Shipping
MBR20L60CTG	TO−220 (Pb−Free)	50 Units / Rail
MBRF20L60CTG	TO−220FP (Pb−Free)	50 Units / Rail

MAXIMUM RATINGS (Per Diode Leg)

Rating		Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage		V_{RRM} V_{RWM} V_R	60	V
Average Rectified Forward Current MBR20L60CT (Rated V_R) T_C = 138°C MBRF20L60CT (Rated V_R) T_C = 123°C	 Per Diode Per Device	$I_{F(AV)}$	 10 20	A
Nonrepetitive Peak Surge Current (Surge applied at rated load conditions halfwave, single phase, 60 Hz)		I_{FSM}	240	A
Operating Junction Temperature (Note 1)		T_J	−55 to +150	°C
Storage Temperature		T_{stg}	− 65 to +175	°C
ESD Ratings:	Machine Model = C Human Body Model = 3B		> 400 > 8000	V
Maximum Repetitive Peak Avalanche Voltage (t_p < 1 μs, T_J < 150°C, I_{AR} < 51 A)		V_{ARM}	85	V
Maximum Single−Pulse Peak Avalanche Voltage (t_p < 1 μs, T_J < 150°C, I_{AR} < 51 A)		V_{ASM}	85	V

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.

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

THERMAL CHARACTERISTICS

Characteristic		Symbol	Value	Unit
Maximum Thermal Resistance				°C/W
MBR20L60CTG	− Junction−to−Case	$R_{\theta JC}$	2.3	
	− Junction−to−Ambient	$R_{\theta JA}$	70	
MBRF20L60CTG	− Junction−to−Case	$R_{\theta JC}$	5.2	
	− Junction−to−Ambient	$R_{\theta JA}$	75	

ELECTRICAL CHARACTERISTICS (Per Diode Leg)

Characteristic	Symbol	Typ	Max	Unit
Maximum Instantaneous Forward Voltage (Note 2)	v_F			V
(I_F = 10 A, T_C = 25°C)		0.53	0.57	
(I_F = 10 A, T_C = 125°C)		0.49	0.54	
(I_F = 20 A, T_C = 25°C)		0.68	0.73	
(I_F = 20 A, T_C = 125°C)		0.64	0.69	
Maximum Instantaneous Reverse Current (Note 2)	i_R			
(Rated DC Voltage, T_C = 25°C)		118	380	μA
(Rated DC Voltage, T_C = 125°C)		52	96	mA

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.

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

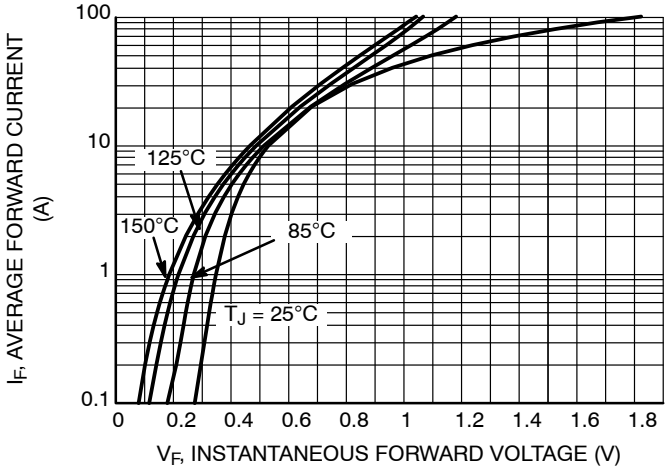


Figure 1. Typical Forward Voltage

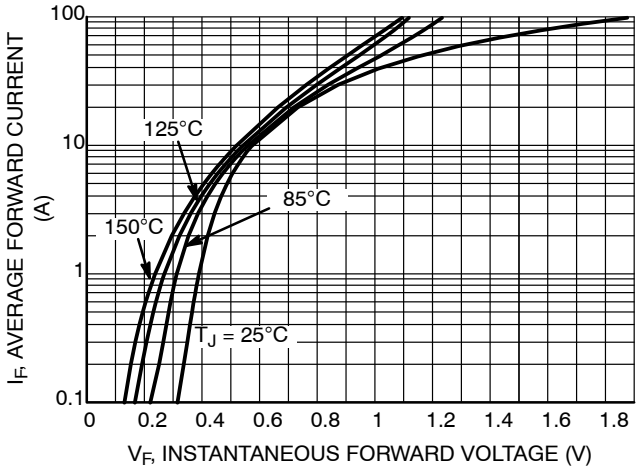


Figure 2. Maximum Forward Voltage

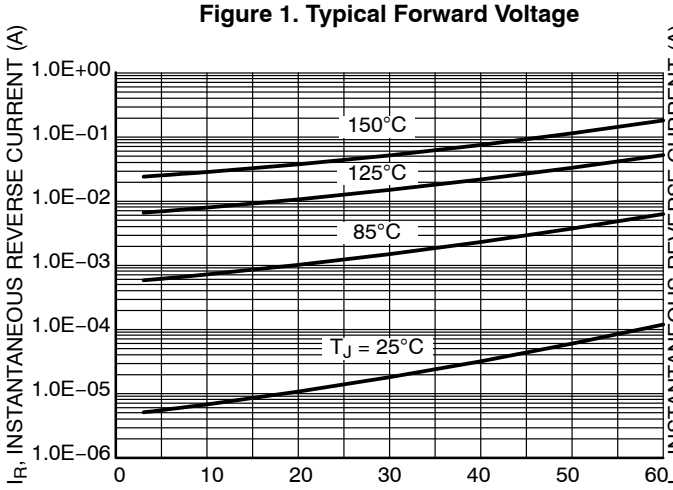


Figure 3. Typical Reverse Current

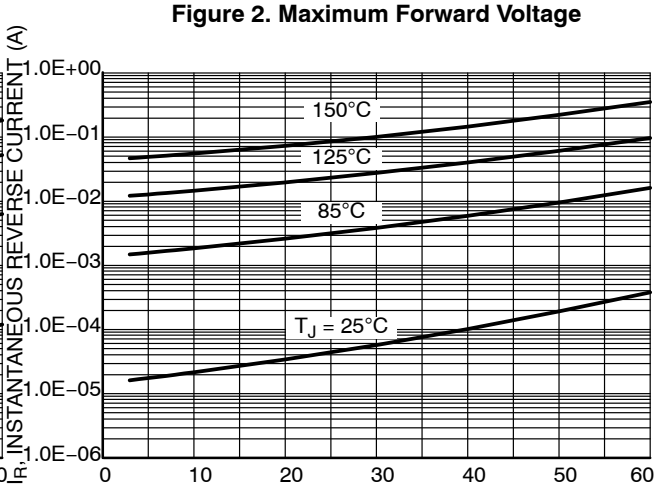


Figure 4. Maximum Reverse Current

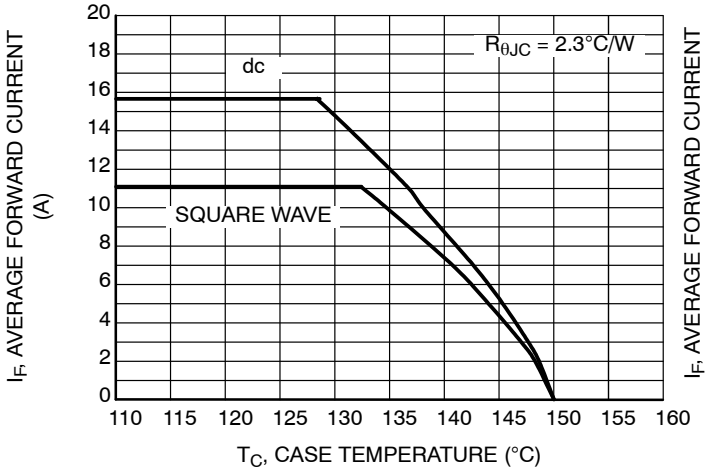


Figure 5. Current Derating, Case per Leg
MBR20L60CT

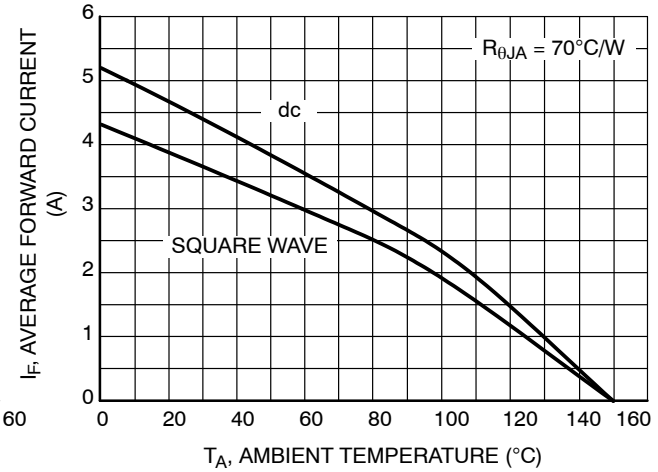


Figure 6. Current Derating, Ambient per Leg
MBR20L60CT

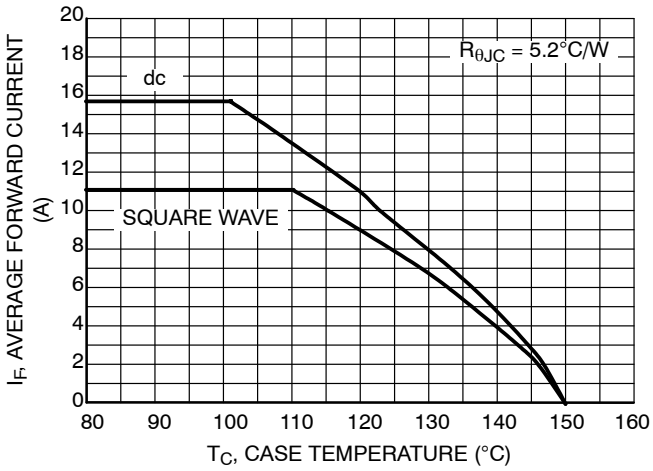


Figure 7. Current Derating, Case per Leg MBRF20L60CT

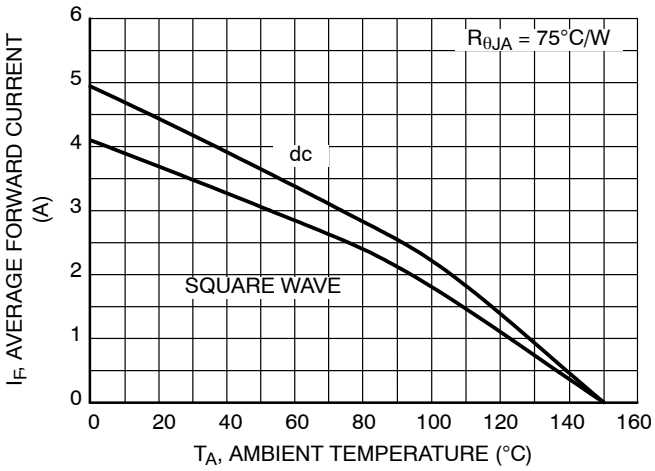


Figure 8. Current Derating, Ambient per Leg MBRF20L60CT

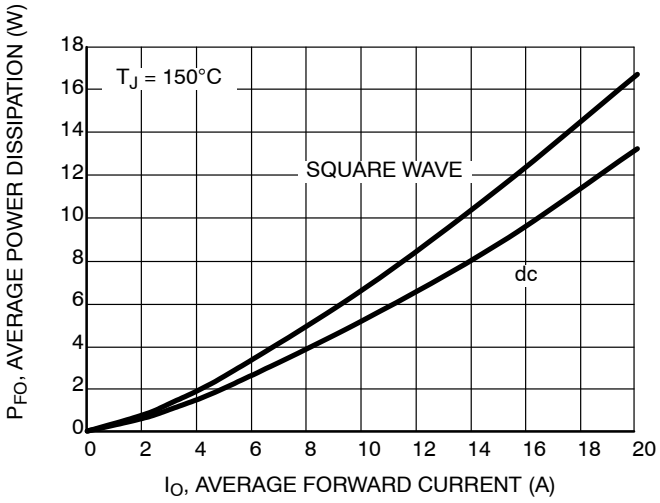


Figure 9. Forward Power Dissipation

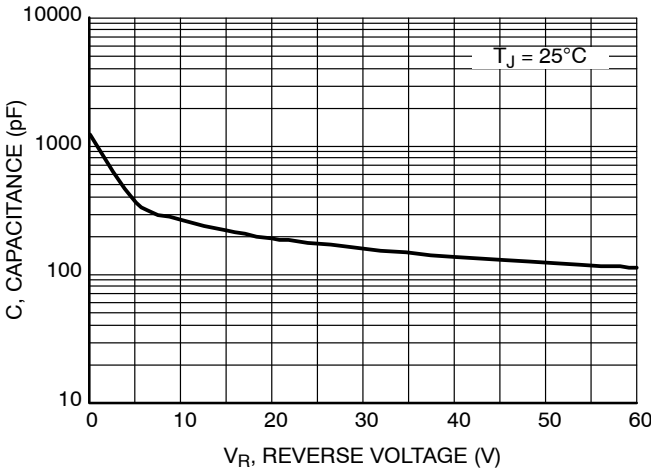


Figure 10. Capacitance

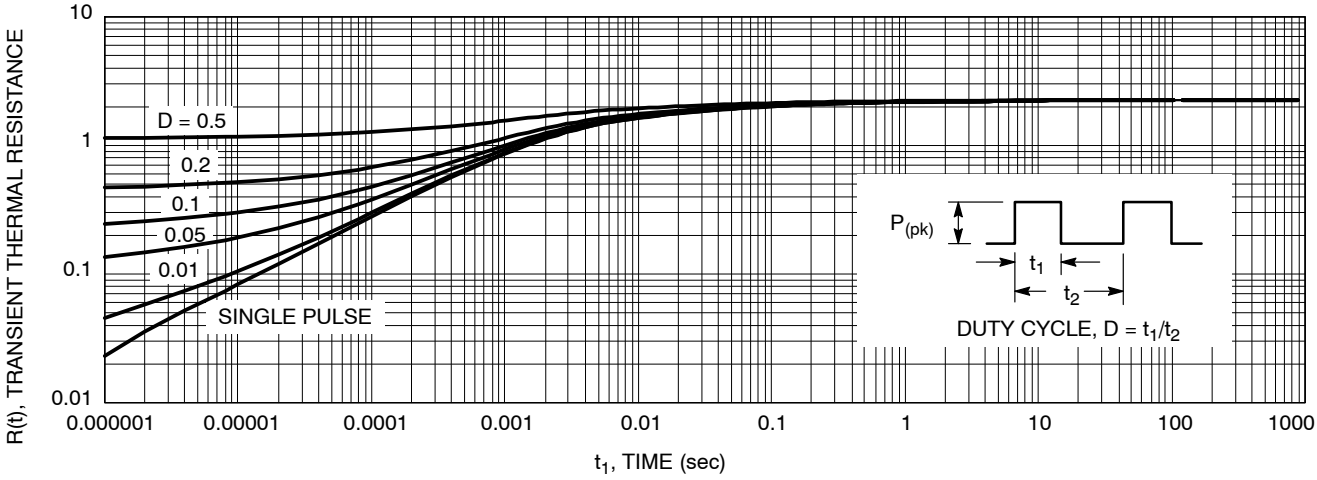


Figure 11. Thermal Response Junction−to−Case, per Leg for MBR20L60CT

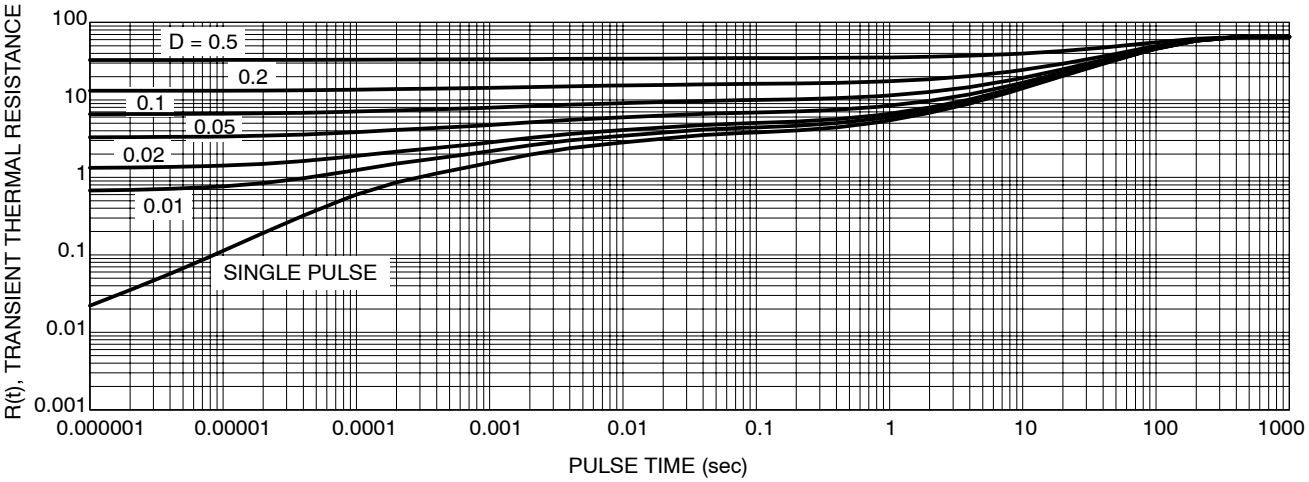


Figure 12. Thermal Response Junction−to−Ambient, per Leg for MBR20L60CT

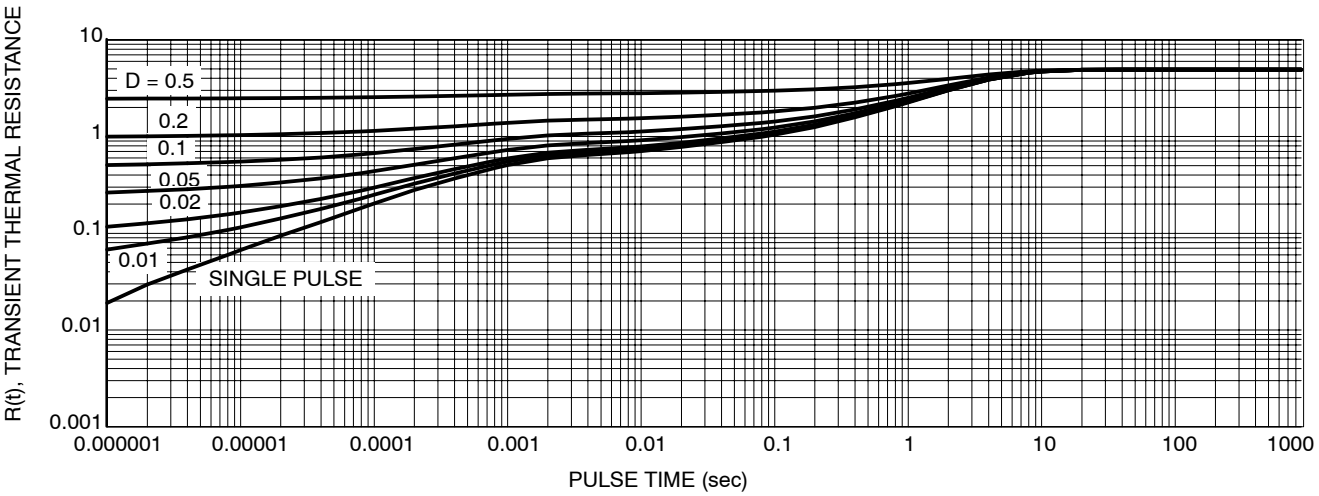


Figure 13. Thermal Response Junction−to−Case, per Leg for MBRF20L60CT

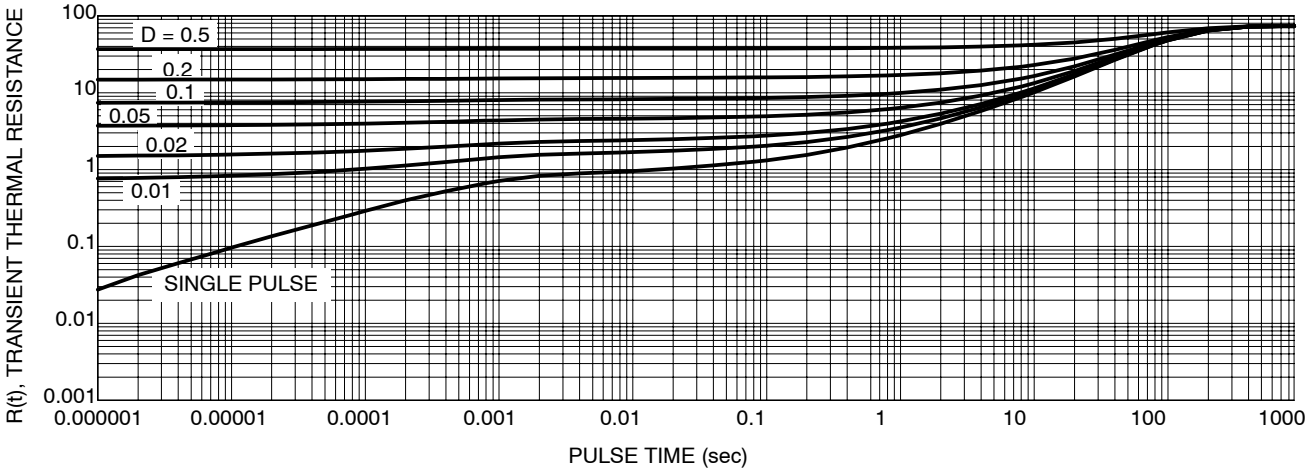
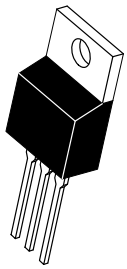


Figure 14. Thermal Response Junction−to−Ambient, per Leg for MBRF20L60CT

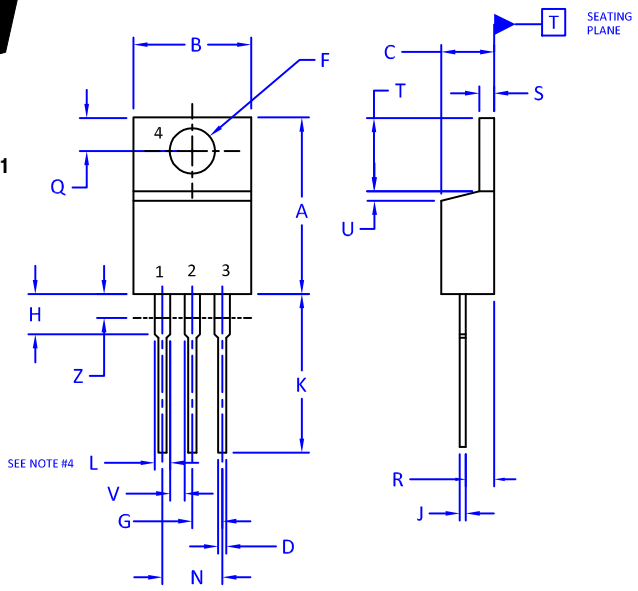
MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

TO−220
CASE 221A
ISSUE AK

DATE 13 JAN 2022



SCALE 1:1



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 2009.
2. CONTROLLING DIMENSION: INCHES
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.
4. MAX WIDTH FOR F102 DEVICE = 1.35MM

	INCHES		MILLIMETERS	
DIM	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	3.60	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	1.41
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 1:
PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

STYLE 2:
PIN 1. BASE
2. EMITTER
3. COLLECTOR
4. EMITTER

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

STYLE 4:
PIN 1. MAIN TERMINAL 1
2. MAIN TERMINAL 2
3. GATE
4. MAIN TERMINAL 2

STYLE 5:
PIN 1. GATE
2. DRAIN
3. SOURCE
4. DRAIN

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

STYLE 7:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. ANODE

STYLE 8:
PIN 1. CATHODE
2. ANODE
3. EXTERNAL TRIP/DELAY
4. ANODE

STYLE 9:
PIN 1. GATE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

STYLE 10:
PIN 1. GATE
2. SOURCE
3. DRAIN
4. SOURCE

STYLE 11:
PIN 1. DRAIN
2. SOURCE
3. GATE
4. SOURCE

STYLE 12:
PIN 1. MAIN TERMINAL 1
2. MAIN TERMINAL 2
3. GATE
4. NOT CONNECTED

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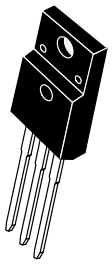
DESCRIPTION:	**TO−220**	**PAGE 1 OF 1**

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

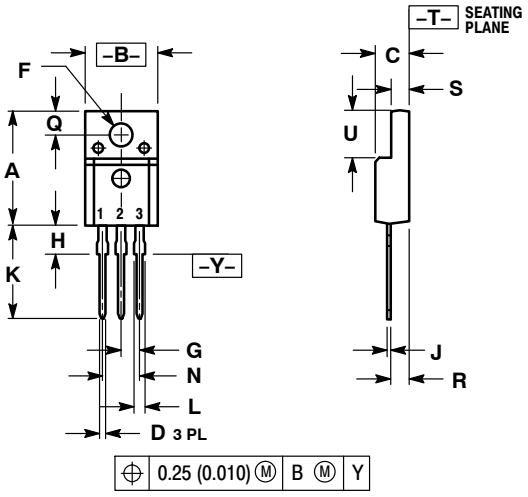
ON Semiconductor®

TO−220 FULLPAK
CASE 221D−03
ISSUE K

DATE 27 FEB 2009



SCALE 1:1



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

STYLE 1:
PIN 1. GATE
2. DRAIN
3. SOURCE

STYLE 2:
PIN 1. BASE
2. COLLECTOR
3. EMITTER

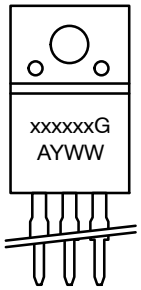
STYLE 3:
PIN 1. ANODE
2. CATHODE
3. ANODE

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

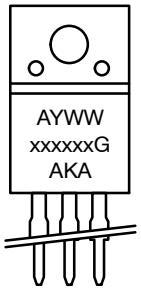
STYLE 5:
PIN 1. CATHODE
2. ANODE
3. GATE

STYLE 6:
PIN 1. MT 1
2. MT 2
3. GATE

MARKING DIAGRAMS



Bipolar



Rectifier

xxxxxx	= Specific Device Code
G	= Pb−Free Package
A	= Assembly Location
Y	= Year
WW	= Work Week

A	= Assembly Location
Y	= Year
WW	= Work Week
xxxxxx	= Device Code
G	= Pb−Free Package
AKA	= Polarity Designator

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