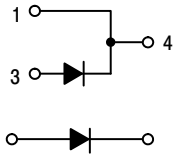
Switch-mode Power Rectifiers

MUR810G, MUR815G, MUR820G, MUR840G, MUR860G, MURF860G,

ULTRAFAST RECTIFIERS
8.0 AMPERES, 50–600 VOLTS



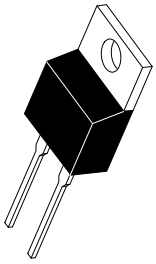
This series is designed for use in switching power supplies, inverters and as free wheeling diodes.

Features

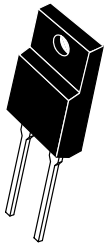
- Ultrafast 25 and 50 Nanosecond Recovery Time
- 175°C Operating Junction Temperature
- Epoxy Meets UL 94 V–0 @ 0.125 in
- Low Forward Voltage
- Low Leakage Current
- Reverse Voltage to 600 V
- ESD Ratings:
  - ♦ Machine Model = C (> 400 V)
  - ♦ Human Body Model = 3B (> 16,000 V)
- SUR8 Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC–Q101 Qualified and PPAP Capable
- These Devices are Pb–Free and are RoHS Compliant*

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

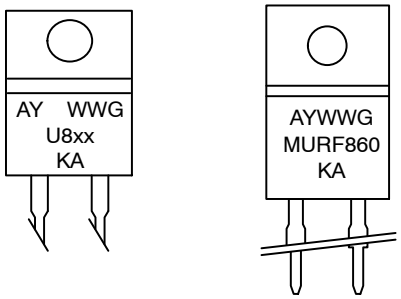


TO–220AC
CASE 221B
STYLE 1



TO–220 FULLPAK
CASE 221AG
STYLE 1

MARKING DIAGRAM



A	=	Assembly Location
Y	=	Year
WW	=	Work Week
U8XX	=	Device Code
		xx = 05, 10, 15, 20, 40, or 60
G	=	Pb–Free Package
KA	=	Diode Polarity

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 7 of this data sheet.

NOTE: Some of the device on this data sheet have been **DISCONTINUED**. Please refer to the table on page 7

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

January, 2025 – Rev. 14
Publication Order Number:
MUR820/D

MAXIMUM RATINGS

Rating	Symbol	MUR/SUR8						Unit
		805	810	815	820	840	860	
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	V_{RRM} V_{RWM} V_R	50	100	150	200	400	600	V
Average Rectified Forward Current Total Device, (Rated V_R), T_C = 150°C	$I_{F(AV)}$	8.0						A
Peak Repetitive Forward Current (Rated V_R, Square Wave, 20 kHz), T_C = 150°C	I_{FM}	16						A
Nonrepetitive Peak Surge Current (Surge applied at rated load conditions halfwave, single phase, 60 Hz)	I_{FSM}	100						A
Operating Junction Temperature and Storage Temperature Range	T_J, T_{stg}	−65 to +175						°C

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	MUR/SUR8						Unit
		805	810	815	820	840	860	
Maximum Thermal Resistance, Junction−to−Case	$R_{\theta JC}$	3.0				2.0		°C/W
Thermal Resistance, Junction−to−Case MURF860	$R_{\theta JC}$	4.75						°C/W
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	73						°C/W
Thermal Resistance, Junction−to−Ambiente MURF860	$R_{\theta JA}$	75						°C/W

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	MUR/SUR8						Unit
		805	810	815	820	840	860	
Maximum Instantaneous Forward Voltage (Note 1) (i_F = 8.0 A, T_C = 150°C) (i_F = 8.0 A, T_C = 25°C)	v_F	0.895 0.975				1.00 1.30	1.20 1.50	V
Maximum Instantaneous Reverse Current (Note 1) (Rated DC Voltage, T_J = 150°C) (Rated DC Voltage, T_J = 25°C)	i_R	250 5.0				500 10		μA
Maximum Reverse Recovery Time (I_F = 1.0 A, di/dt = 50 A/μs) (I_F = 0.5 A, i_R = 1.0 A, I_{REC} = 0.25 A)	t_{rr}	35 25				60 50		ns

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 μs, Duty Cycle ≤ 2.0%.

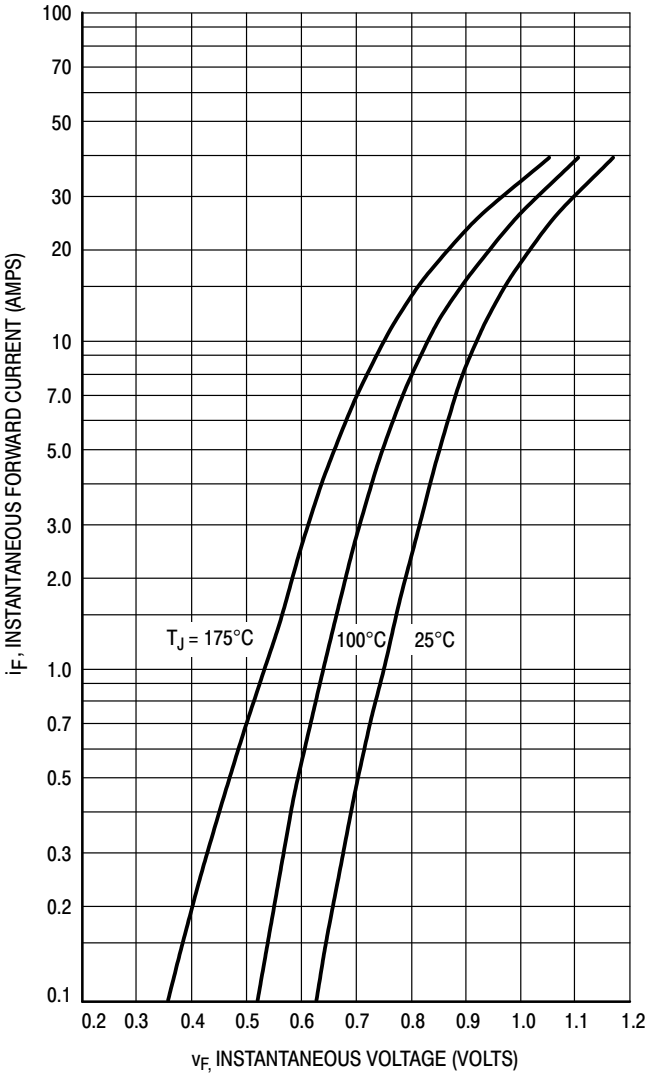


Figure 1. Typical Forward Voltage

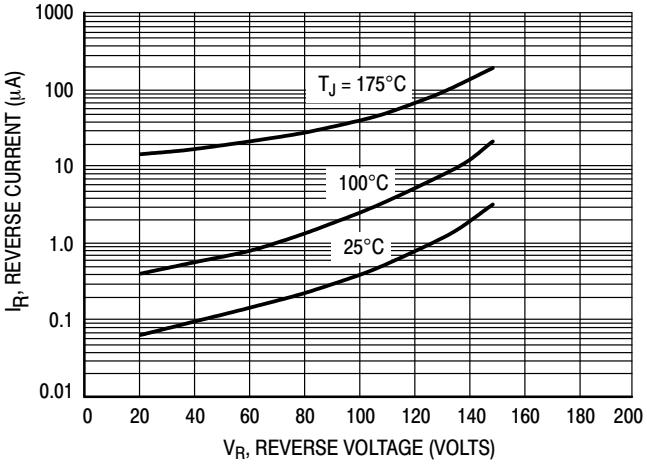


Figure 2. Typical Reverse Current*

* The curves shown are typical for the highest voltage device in the grouping. Typical reverse current for lower voltage selections can be estimated from these same curves if V_R is sufficiently below rated V_R.

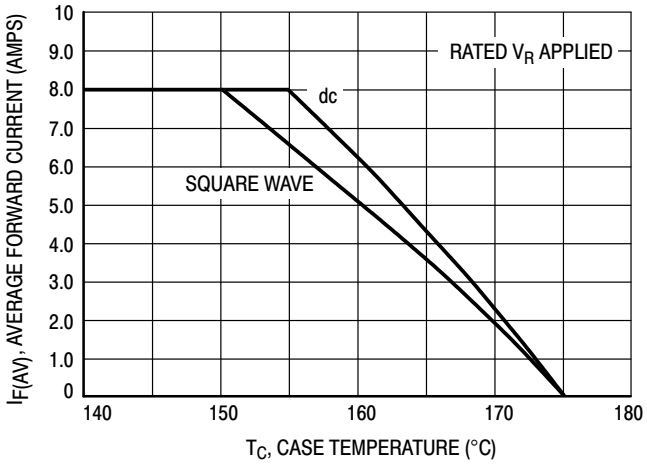


Figure 3. Current Derating, Case

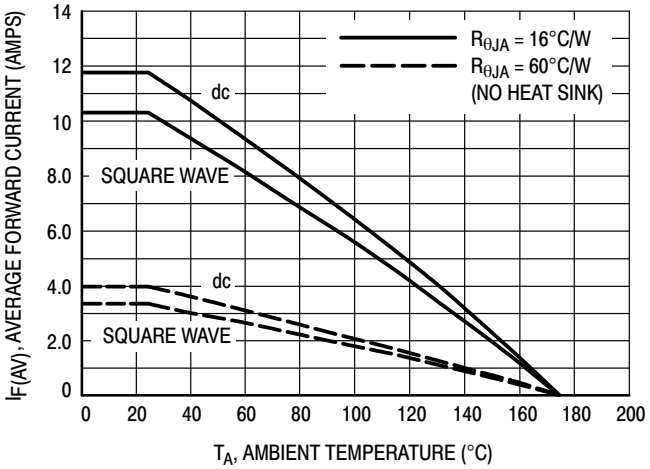


Figure 4. Current Derating, Ambient

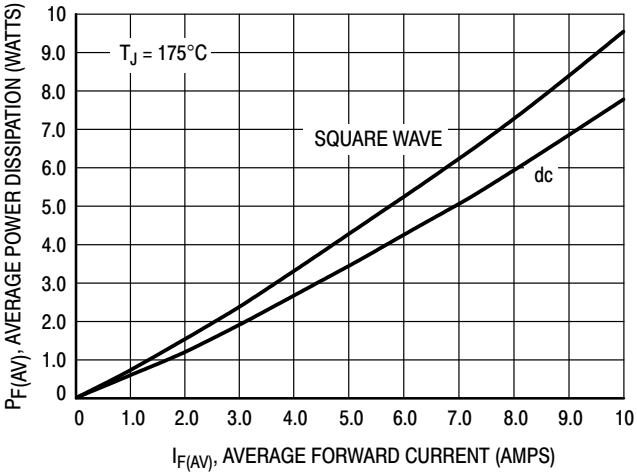


Figure 5. Power Dissipation

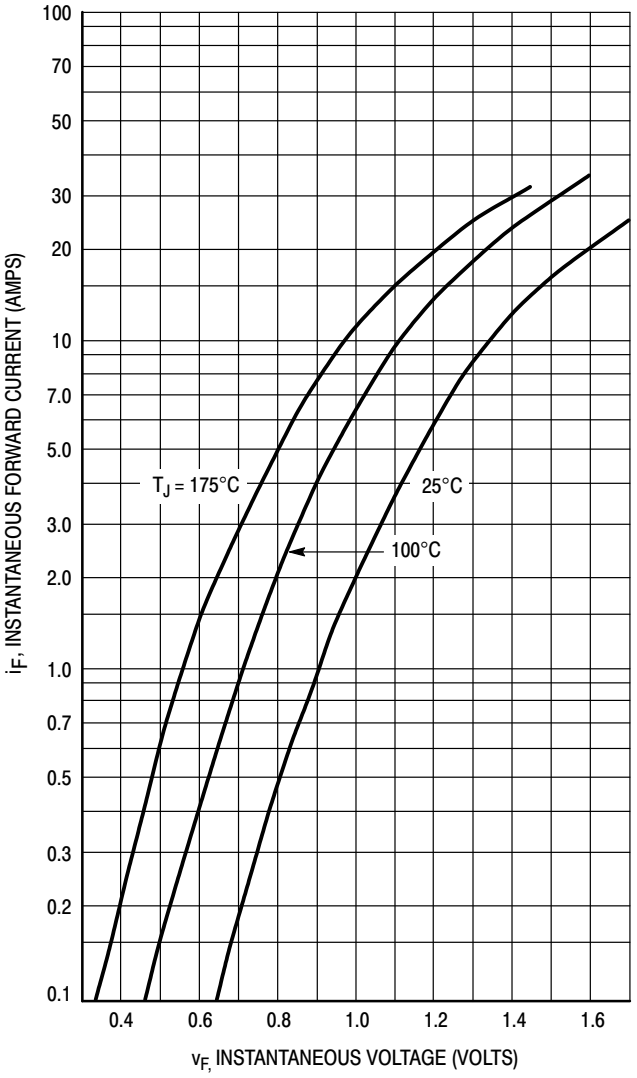


Figure 6. Typical Forward Voltage

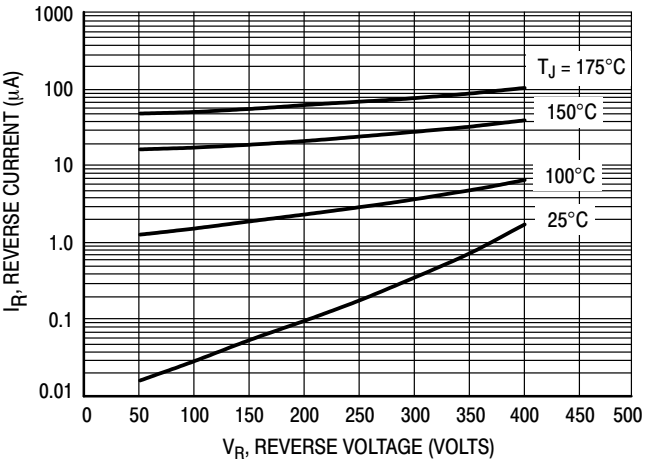


Figure 7. Typical Reverse Current*

* The curves shown are typical for the highest voltage device in the grouping. Typical reverse current for lower voltage selections can be estimated from these same curves if V_R is sufficiently below rated V_R.

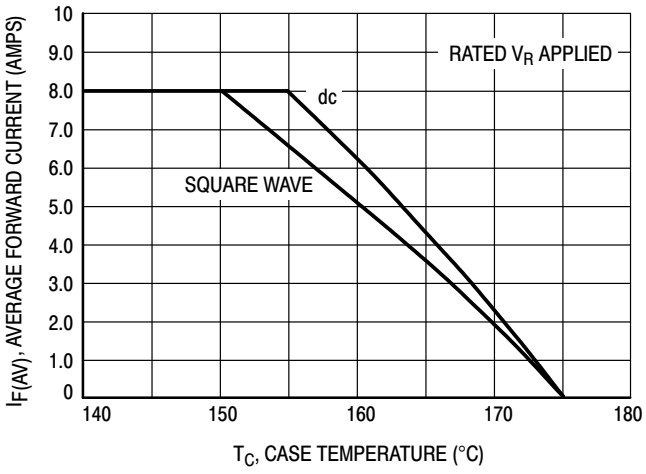


Figure 8. Current Derating, Case

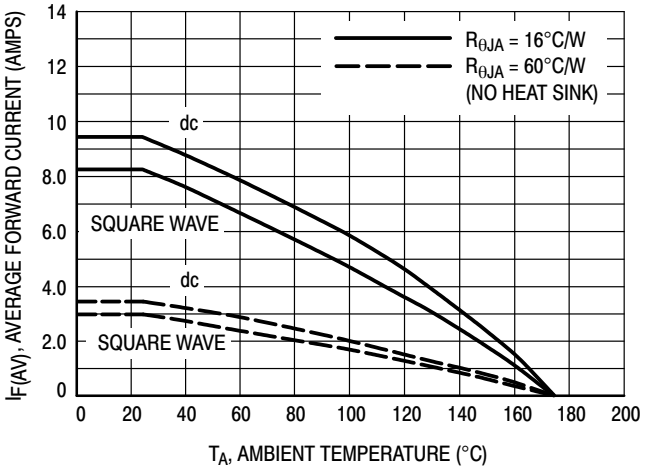


Figure 9. Current Derating, Ambient

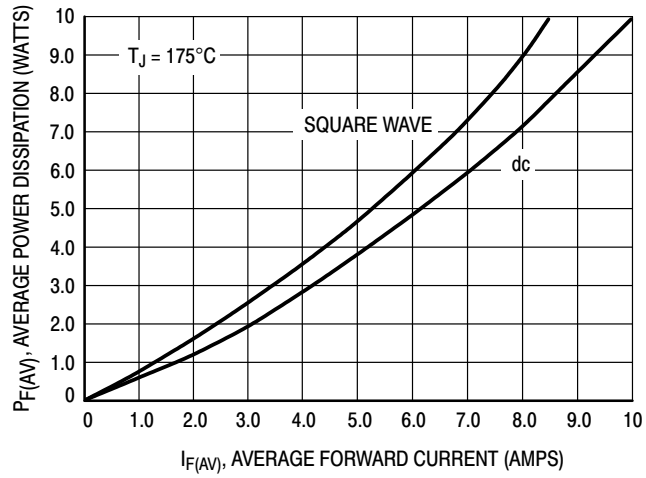


Figure 10. Power Dissipation

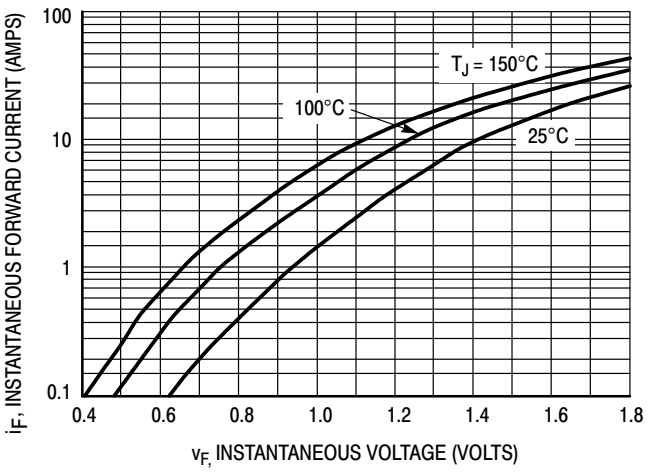


Figure 11. Typical Forward Voltage

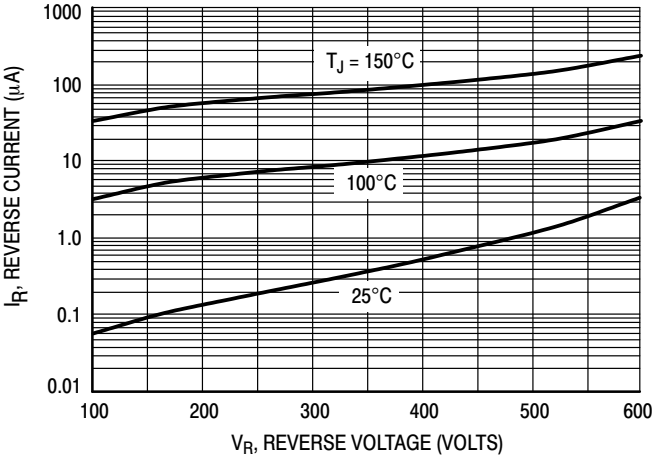


Figure 12. Typical Reverse Current*

* The curves shown are typical for the highest voltage device in the grouping. Typical reverse current for lower voltage selections can be estimated from these same curves if V_R is sufficiently below rated V_R.

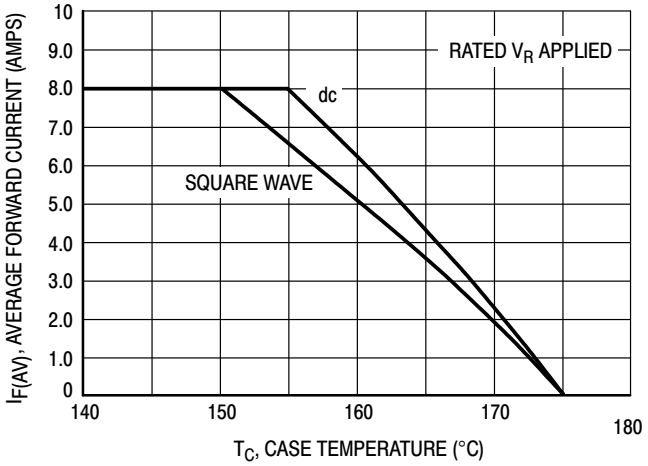


Figure 13. Current Derating, Case

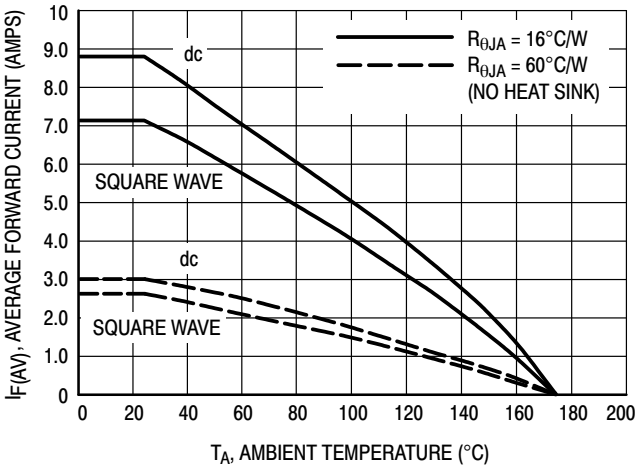


Figure 14. Current Derating, Ambient

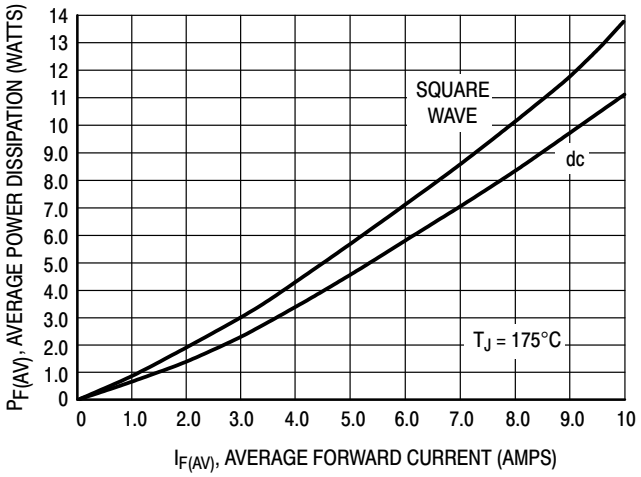


Figure 15. Power Dissipation

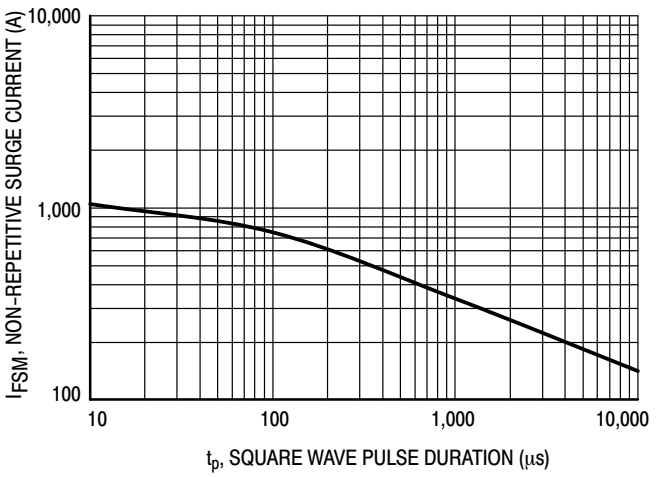


Figure 16. Typical Non−Repetitive Surge Current

* Typical performance based on a limited sample size. ON Semiconductor does not guarantee ratings not listed in the Maximum Ratings table.

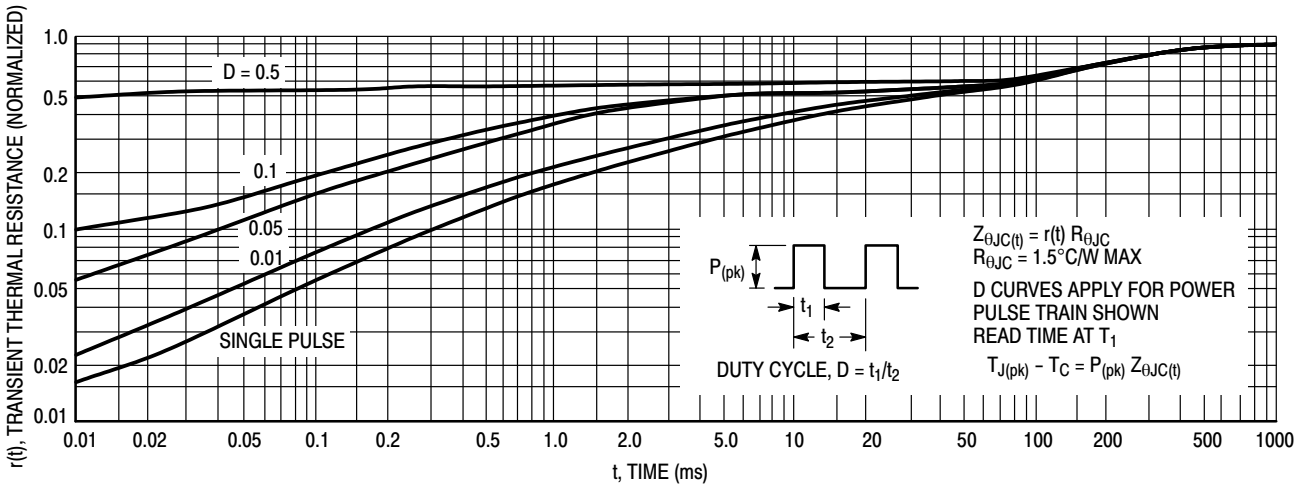


Figure 17. Thermal Response

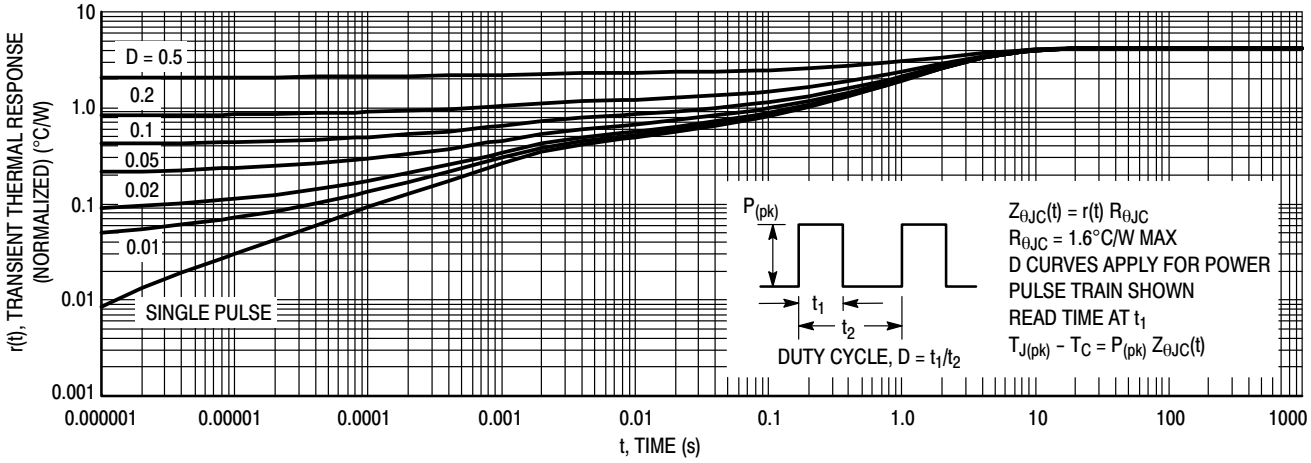


Figure 18. Thermal Response, (MURF860G) Junction−to−Case ($R_{\theta JC}$)

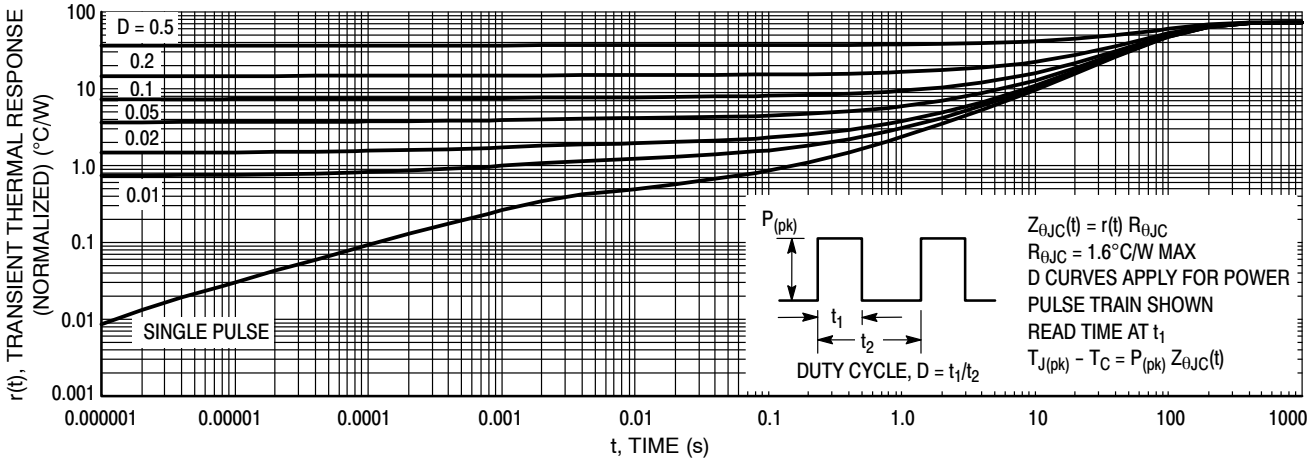


Figure 19. Thermal Response, (MURF860G) Junction−to−Ambient ($R_{\theta JA}$)

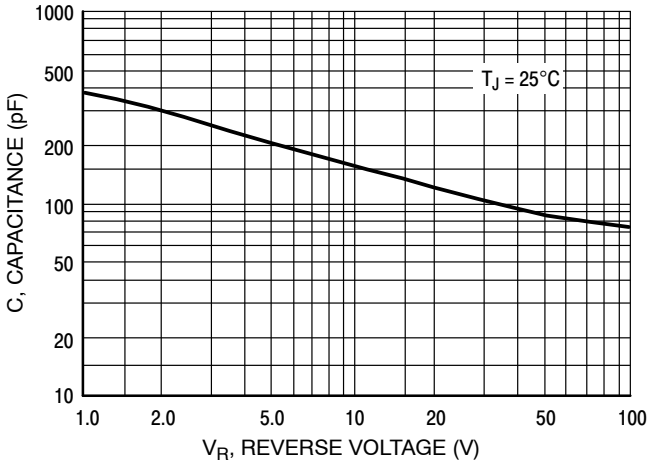


Figure 20. Typical Capacitance

ORDERING INFORMATION

Device	Package	Shipping
MUR810G	TO−220AC (Pb−Free)	50 Units / Rail
MUR815G	TO−220AC (Pb−Free)	50 Units / Rail
MUR820G	TO−220AC (Pb−Free)	50 Units / Rail
MUR840G	TO−220AC (Pb−Free)	50 Units / Rail
MUR860G	TO−220AC (Pb−Free)	50 Units / Rail
MURF860G	TO−220FP (Pb−Free)	50 Units / Rail

DISCONTINUED (Note 2)

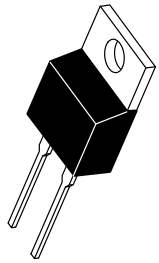
Device	Package	Shipping†
MUR805G	TO−220AC (Pb−Free)	50 Units / Rail
SUR8820G	TO−220AC (Pb−Free)	50 Units / Rail
SUR8840G	TO−220AC (Pb−Free)	50 Units / Rail

†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.

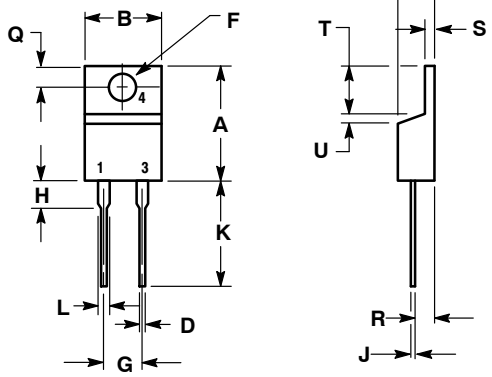
2. **DISCONTINUED:** This device is not recommended for new design. Please contact your **onsemi** representative for information. The most current information on this device may be available on www.onsemi.com.

TO−220, 2−LEAD
CASE 221B−04
ISSUE F

DATE 12 APR 2013



SCALE 1:1



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	0.039	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
2. N/A
3. ANODE
4. CATHODE

STYLE 2:
PIN 1. ANODE
2. N/A
3. CATHODE
4. ANODE

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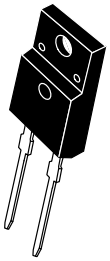
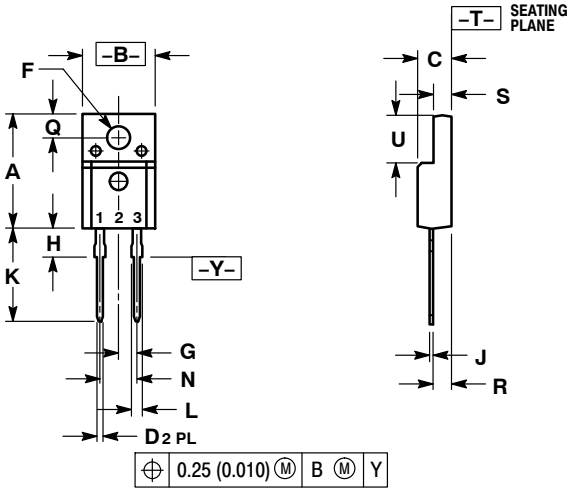
DESCRIPTION:	**TO−220, 2−LEAD**		**PAGE 1 OF 1**



SCALE 1:1

TO−220 FULLPAK, 2−LEAD
CASE 221E−01
ISSUE A

DATE 21 JAN 2008

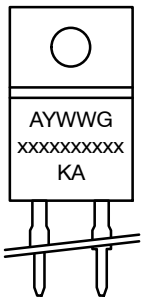


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.617	0.633	15.67	16.07
B	0.392	0.408	9.96	10.36
C	0.177	0.193	4.50	4.90
D	0.024	0.039	0.60	1.00
F	0.121	0.129	3.08	3.28
G	0.100 BSC		2.54 BSC	
H	0.117	0.133	2.98	3.38
J	0.018	0.025	0.45	0.64
K	0.499	0.562	12.68	14.27
L	0.045	0.060	1.14	1.52
N	0.200 BSC		5.08 BSC	
Q	0.122	0.138	3.10	3.50
R	0.101	0.117	2.56	2.96
S	0.092	0.108	2.34	2.74
U	0.255	0.271	6.48	6.88

STYLE 1:
PIN 1. CATHODE
2. N/A
3. ANODE

GENERIC MARKING DIAGRAM*



Rectifier

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

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “ ▪”, may or may not be present.

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DESCRIPTION:	**TO−220 FULLPAK, 2−LEAD**	**PAGE 1 OF 1**

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales

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