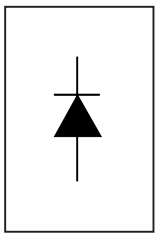
Bulletin I2192 12/04

International
IOR Rectifier

SAFEIR Series
20ETS12PbF

INPUT RECTIFIER DIODE
Lead-Free ("PbF" suffix)



V_F < 1V @ 10A
I_{FSM} = 300A
V_{RRM} = 1200V

Description/ Features

The 20ETS12PbF rectifier *SAFEIR* series has been optimized for very low forward voltage drop, with moderate leakage. The glass passivation technology used has reliable operation up to 150°C junction temperature.

Typical applications are in input rectification and these products are designed to be used with International Rectifier Switches and Output Rectifiers which are available in identical package outlines.

Output Current in Typical Applications

Applications	Single-phase Bridge	Three-phase Bridge	Units
Capacitive input filter T_A = 55°C, T_J = 125°C, common heatsink of 1°C/W	16.3	21	A

Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Sinusoidal waveform	20	A
V_{RRM}	1200	V
I_{FSM}	300	A
V_F @10 A, T_J = 25°C	1.0	V
T_J	-40 to 150	°C

Package Outline

TO-220AC

Voltage Ratings

Part Number	V_{RRM}, maximum peak reverse voltage V	V_{RSM}, maximum non repetitive peak reverse voltage V	I_{RRM} 150°C mA
20ETS12PbF	1200	1300	1

Absolute Maximum Ratings

	Parameters	20ETS..	Units	Conditions
$I_{F(AV)}$	Max. Average Forward Current	20	A	@ T_C = 105° C, 180° conduction half sine wave
I_{FSM}	Max. Peak One Cycle Non-Repetitive Surge Current	250	A	10ms Sine pulse, rated V_{RRM} applied
		300		10ms Sine pulse, no voltage reapplied
I^2t	Max. I^2t for fusing	316	A^2s	10ms Sine pulse, rated V_{RRM} applied
		442		10ms Sine pulse, no voltage reapplied
$I^2\sqrt{t}$	Max. $I^2\sqrt{t}$ for fusing	4420	$A^2\sqrt{s}$	t = 0.1 to 10ms, no voltage reapplied

Electrical Specifications

	Parameters	20ETS..	Units	Conditions	
V_{FM}	Max. Forward Voltage Drop	1.1	V	@ 20A, T_J = 25°C	
r_t	Forward slope resistance	10.4	mΩ	T_J = 150°C	
$V_{F(TO)}$	Threshold voltage	0.85	V		
I_{RM}	Max. Reverse Leakage Current	0.1	mA	T_J = 25 °C	V_R = rated V_{RRM}
		1.0		T_J = 150 °C	

Thermal-Mechanical Specifications

	Parameters		20ETS..	Units	Conditions
T_J	Max. Junction Temperature Range		-40 to 150	°C	
T_{stg}	Max. Storage Temperature Range		-40 to 150	°C	
R_{thJC}	Max. Thermal Resistance Junction to Case		1.3	°C/W	DC operation
R_{thJA}	Max. Thermal Resistance Junction to Ambient		62	°C/W	(*) For D^2Pak version
R_{thCS}	Typ. Thermal Resistance Case to Heatsink		0.5	°C/W	Mounting surface, smooth and greased
wt	Approximate Weight		2 (0.07)	g (oz.)	
T	Mounting Torque	Min.	6 (5)	Kg-cm (lbf-in)	
		Max.	12 (10)		
	Case Style		TO-220AC		
	Device Marking		10ETS12		

* When mounted on 1" square (650mm^2) PCB of FR-4 or G-10 material 4 oz (140µm) copper 40°C/W
For recommended footprint and soldering techniques refer to application note # AN-994

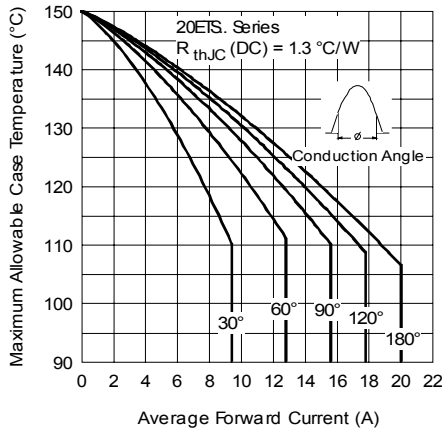


Fig. 1 - Current Rating Characteristics

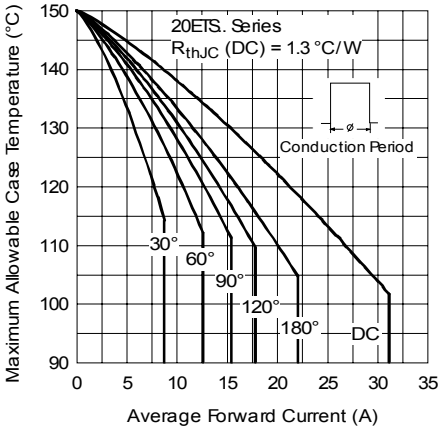


Fig. 2 - Current Rating Characteristics

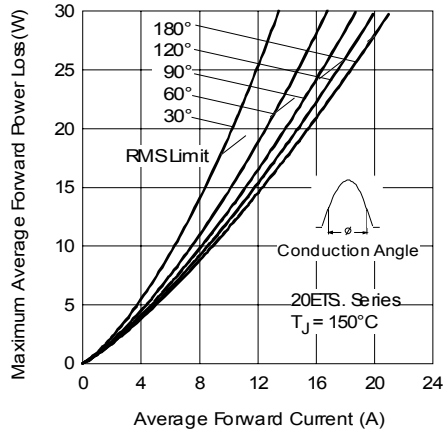


Fig. 3 - Forward Power Loss Characteristics

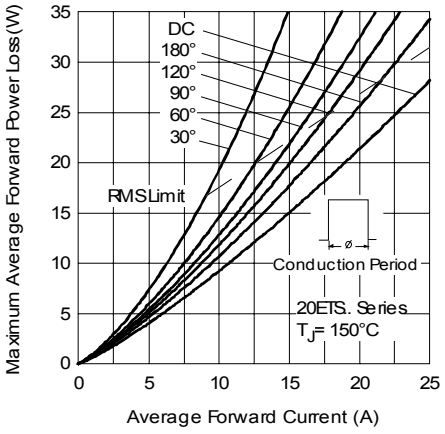


Fig. 4 - Forward Power Loss Characteristics

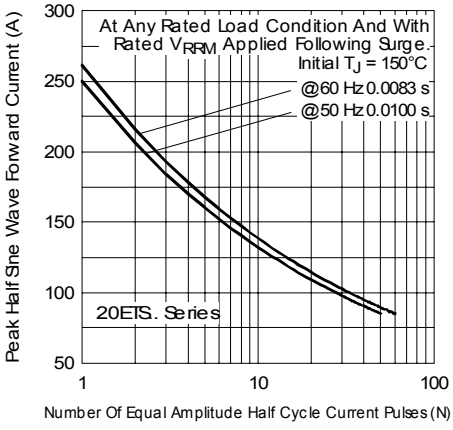


Fig. 5 - Maximum Non-Repetitive Surge Current

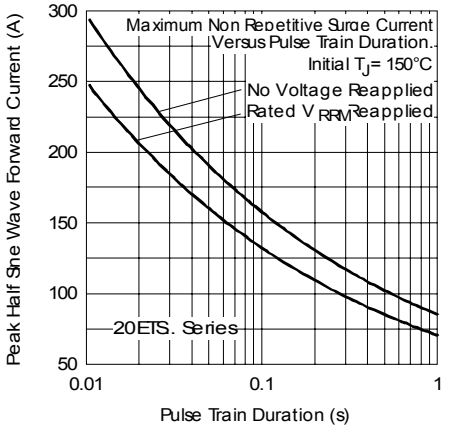


Fig. 6 - Maximum Non-Repetitive Surge Current

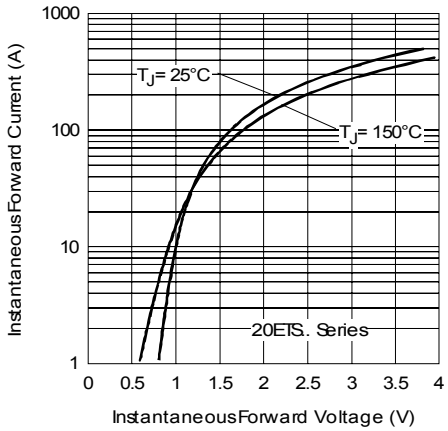


Fig. 7 - Forward Voltage Drop Characteristics

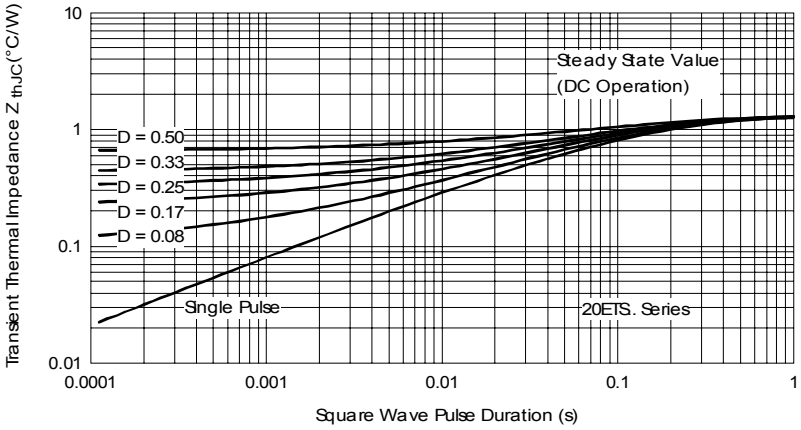
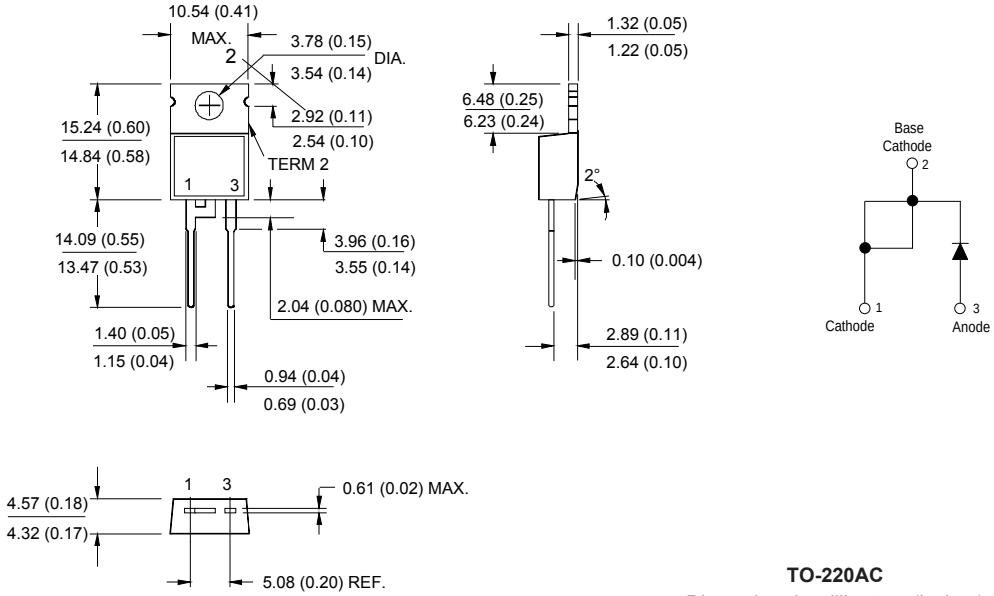


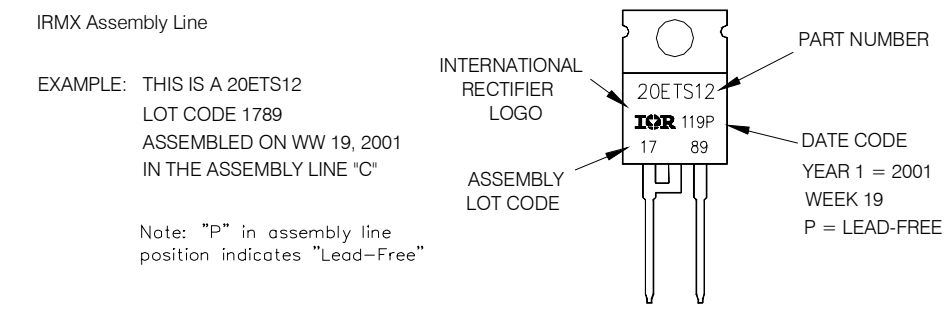
Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

Outline Table



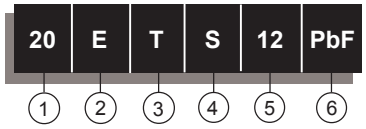
TO-220AC
Dimensions in millimeters (inches)

Part Marking Information



Ordering Information Table

Device Code



1	-	Current Rating (20 = 20A)
2	-	Circuit Configuration E = Single Diode
3	-	Package T = TO-220AC
4	-	Type of Silicon S = Standard Recovery Rectifier
5	-	Voltage Rating (12 = 1200V)
6	-	• none = Standard Production • PbF = Lead-Free

Data and specifications subject to change without notice.
This product has been designed and qualified for Industrial Level and Lead-Free.
Qualification Standards can be found on IR's Web site.

International IOR Rectifier

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Notice

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