

International
IR Rectifier


SAFEIR Series
20ETS12, 20ETS12S

INPUT RECTIFIER DIODE

Description/Features

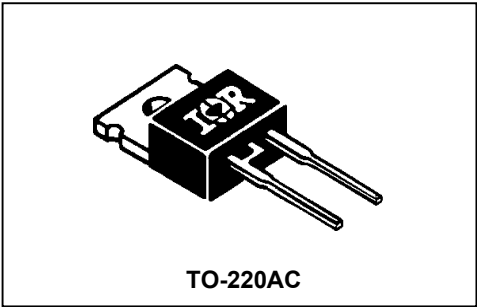
The 20ETS.. rectifier **SAFEIR** series has been optimized for very low forward voltage drop, with moderate leakage. The glass passivation technology used has reliable operation up to 150°C junction temperature.

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.



$V_F < 1V @ 10A$
 $I_{FSM} = 300A$
 $V_{RRM} 800 \text{ to } 1200V$

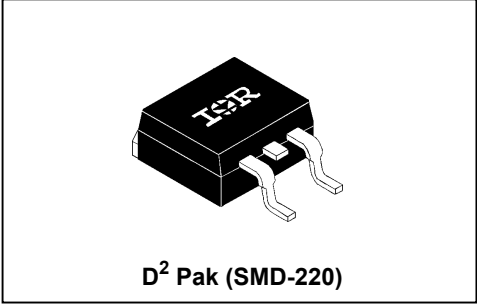
Package Outline



Major Ratings and Characteristics

Characteristics	20ETS..	Units
$I_{F(AV)}$ Sinusoidal waveform	20	A
V_{RRM} Range (*)	800 to 1200	V
I_{FSM}	300	A
$V_F @ 10A, T_J = 25^{\circ}C$	1.0	V
T_J	-40 to 150	$^{\circ}C$

Package Outline



Output Current in Typical Applications

	Single-phase Bridge	Three-phase Bridge	Units
Capacitive input filter $T_A = 55^{\circ}C, T_J = 125^{\circ}C$, common heatsink of $1^{\circ}C/W$	16.3	21	A

20ETS.., 20ETS..S *SAFEIR* Series

Bulletin I2101 rev. D 12/01

International
IOR Rectifier

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
20ETS08, 20ETS08S	800	900	1
20ETS12, 20ETS12S	1200	1300	

Absolute Maximum Ratings

Parameters	20ETS..	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current	20	A	@ $T_C = 105^\circ\text{C}$, 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, $T_J = 25^\circ\text{C}$
r_t Forward slope resistance	10.4	mΩ	$T_J = 150^\circ\text{C}$
$V_{F(TO)}$ Threshold voltage	0.85	V	
I_{RM} Max. Reverse Leakage Current	0.1	mA	$T_J = 25^\circ\text{C}$
	1.0		$T_J = 150^\circ\text{C}$

$V_R = \text{rated } V_{RRM}$

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 ² Pak 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, D ² Pak (SMD-220)		

* When mounted on 1" square (650mm²) 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

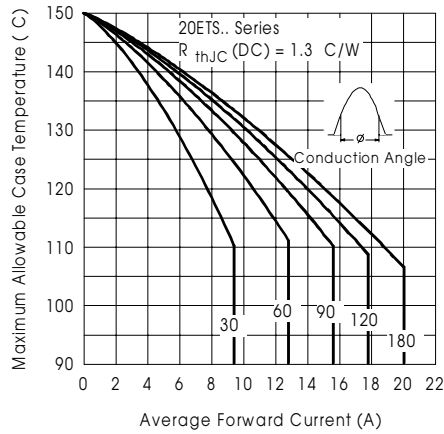


Fig. 1 - Current Rating Characteristics

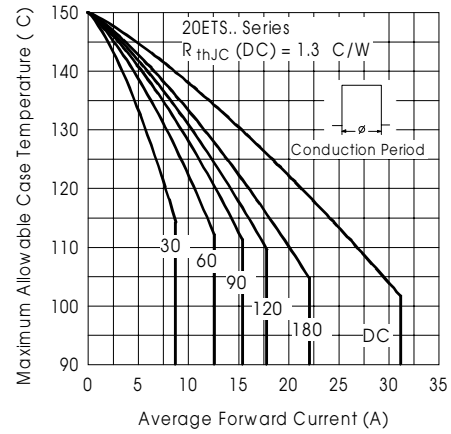


Fig. 2 - Current Rating Characteristics

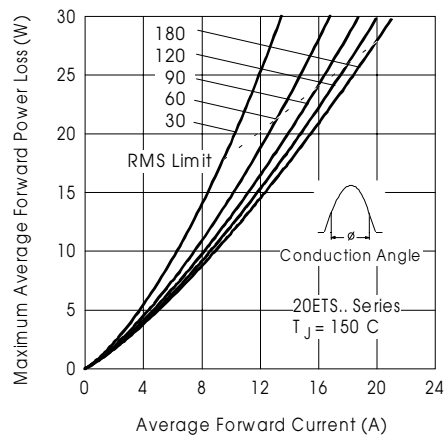


Fig. 3 - Forward Power Loss Characteristics

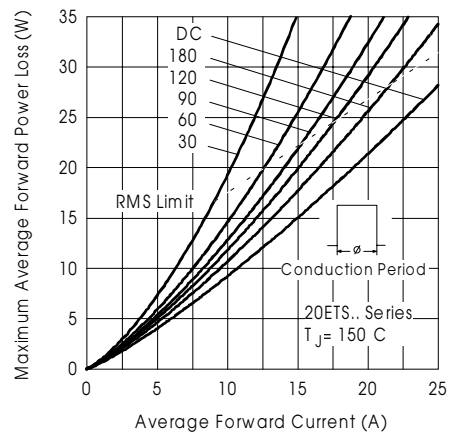


Fig. 4 - Forward Power Loss Characteristics

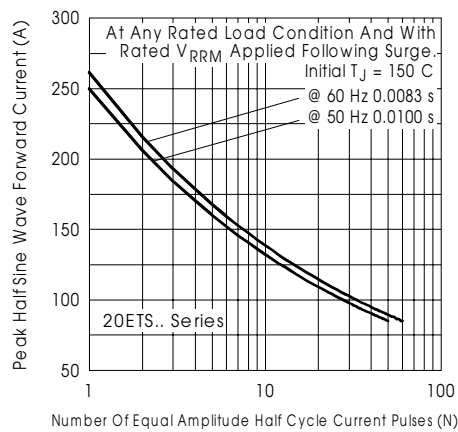


Fig. 5 - Maximum Non-Repetitive Surge Current

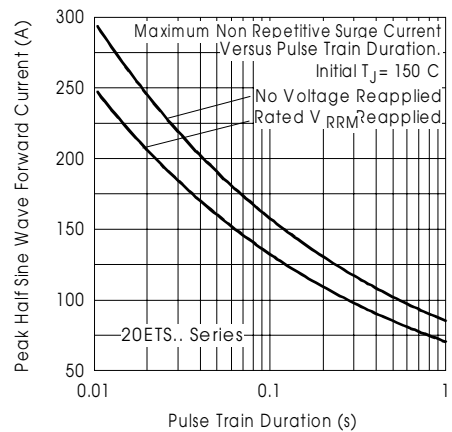


Fig. 6 - Maximum Non-Repetitive Surge Current

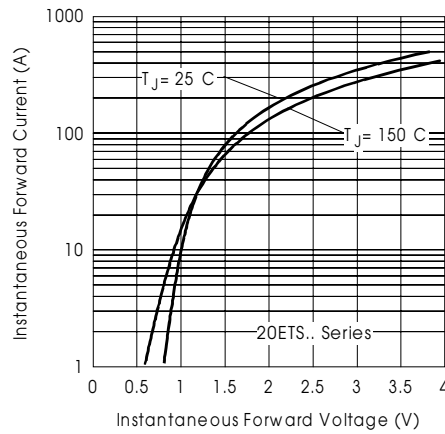


Fig. 7 - Forward Voltage Drop Characteristics

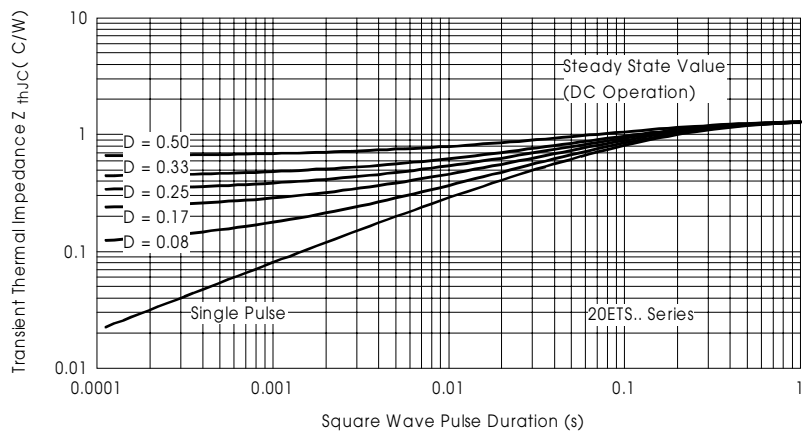
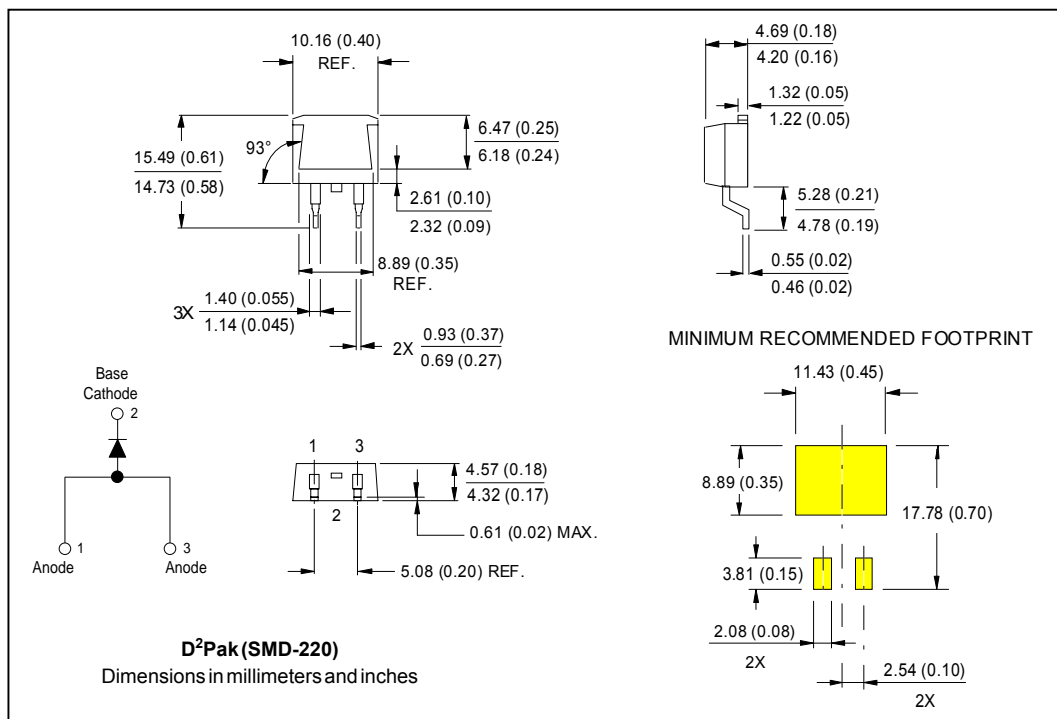
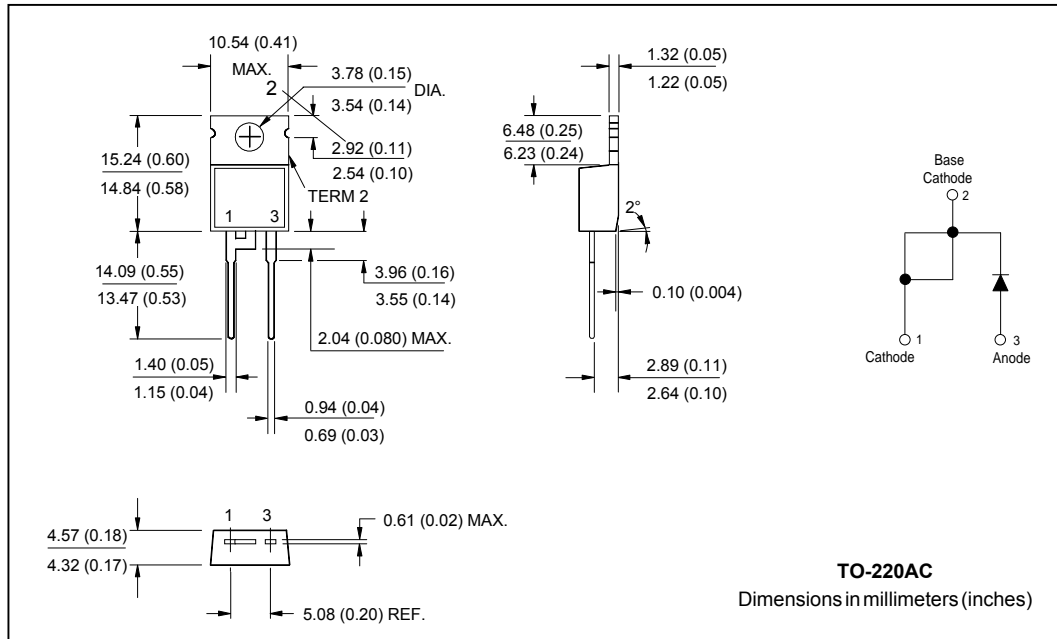
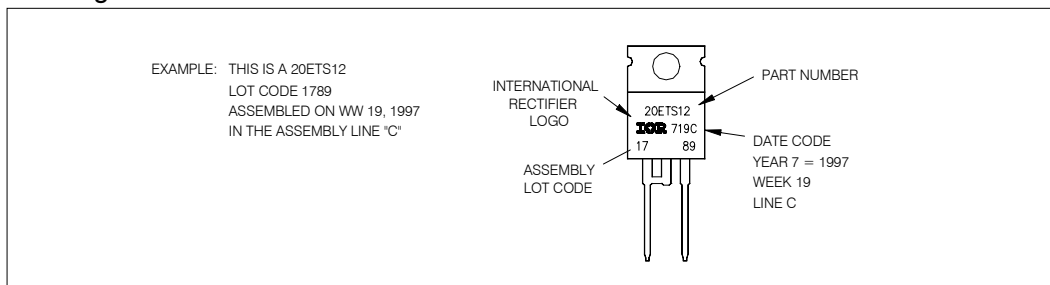


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

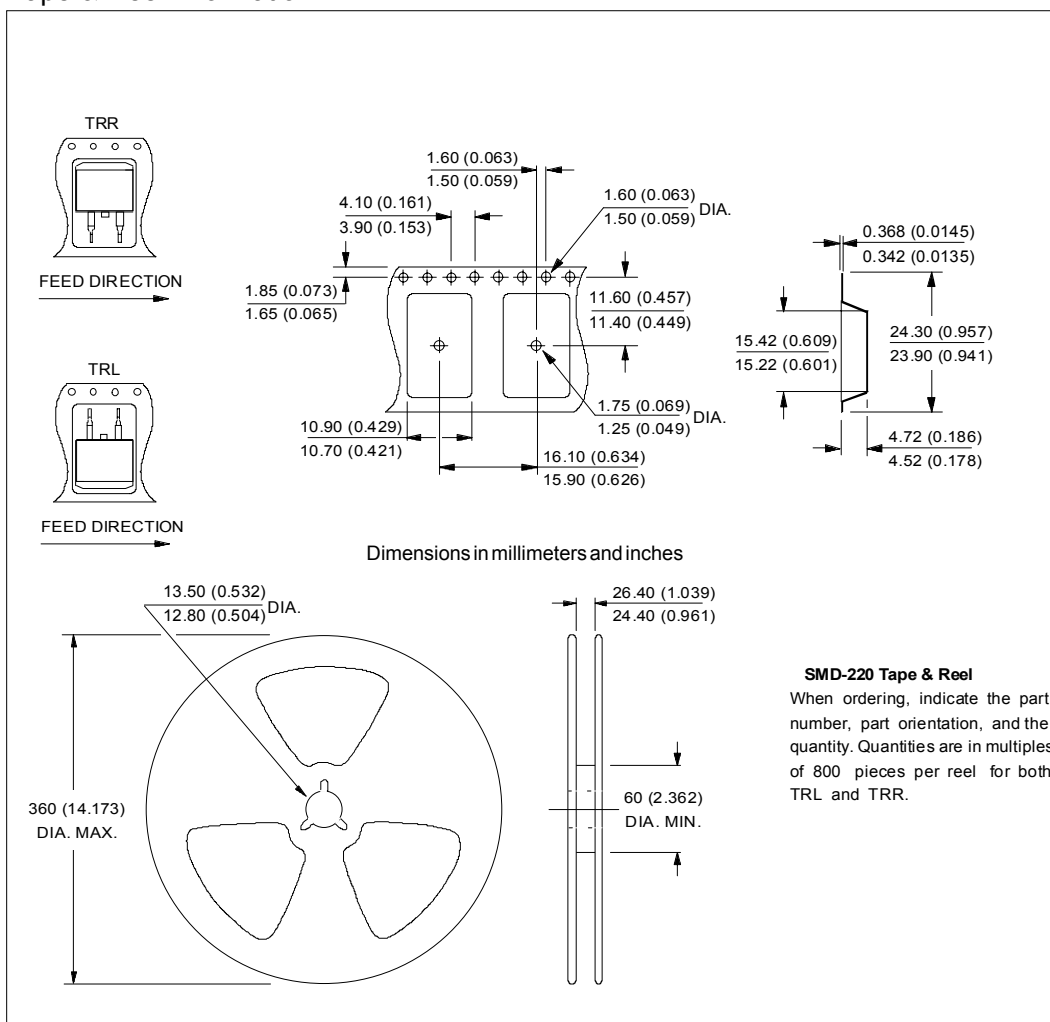
Outline Table



Marking Information



Tape & Reel Information



Ordering Information Table

Device Code						
20	E	T	S	12	S	TRL
1	2	3	4	5	6	7
1	-	Current Rating				
2	-	Circuit Configuration				
		E = Single Diode				
3	-	Package				
		T = TO-220AC				
4	-	Type of Silicon				
		S = Standard Recovery Rectifier				
5	-	Voltage code: Code x 100 = V_{RRM}				
6	-	S = TO-220 D ² Pak (SMD-220) Version				
7	-	Tape and Reel Option				
		TRL = Left Reel				
		TRR = Right Orientation Reel				

08 = 800V
12 = 1200V

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

International
IR Rectifier

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Visit us at www.irf.com for sales contact information. 12/01