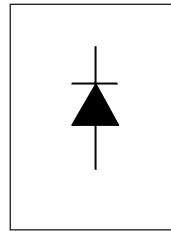


**FAST SOFT RECOVERY  
 RECTIFIER DIODE**



$$V_F < 1.31V @ 20A$$

$$I_{FSM} = 355A$$

$$V_{RRM} 800 \text{ to } 1200V$$

**Description/Features**

The 20ETF..S fast soft recovery **QUIETIR** rectifier series has been optimized for combined short reverse recovery time and low forward voltage drop. The glass passivation ensures stable reliable operation in the most severe temperature and power cycling conditions.

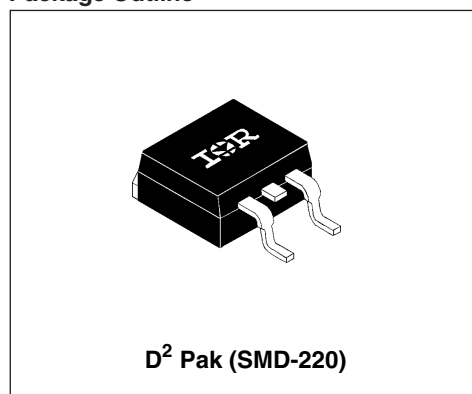
Typical applications are both:

- output rectification and freewheeling in inverters, choppers and converters
- and input rectifications where severe restrictions on conducted EMI should be met.

**Major Ratings and Characteristics**

Characteristics	20ETF..S	Units
$I_{F(AV)}$ Sinusoidal waveform	20	A
$V_{RRM}$ range	800 to 1200	V
$I_{FSM}$	355	A
$V_F$ @ 20A, $T_J = 25^\circ C$	1.31	V
$t_{rr}$ @ 1A, 100A/ $\mu s$	95	ns
$T_J$ range	-40 to 150	$^\circ C$

**Package Outline**



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
20ETF08S	800	900	6
20ETF10S	1000	1100	
20ETF12S	1200	1300	

Absolute Maximum Ratings

Parameters	20ETF..S	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current	20	A	@ $T_C = 97^\circ\text{C}$ , 180° conduction half sine wave
$I_{FSM}$ Max. Peak One Cycle Non-Repetitive Surge Current	300	A	10ms Sine pulse, rated $V_{RRM}$ applied
	355		10ms Sine pulse, no voltage reapplied
$I^2t$ Max. $I^2t$ for fusing	450	$A^2s$	10ms Sine pulse, rated $V_{RRM}$ applied
	635		10ms Sine pulse, no voltage reapplied
$I^2\sqrt{t}$ Max. $I^2\sqrt{t}$ for fusing	6350	$A^2\sqrt{s}$	$t = 0.1$ to 10ms, no voltage reapplied

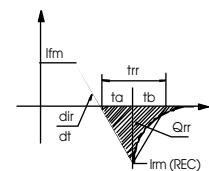
Electrical Specifications

Parameters	20ETF..S	Units	Conditions
$V_{FM}$ Max. Forward Voltage Drop	1.31	V	@ 20A, $T_J = 25^\circ\text{C}$
$r_t$ Forward slope resistance	11.88	$m\Omega$	$T_J = 150^\circ\text{C}$
$V_{F(TO)}$ Threshold voltage	0.93	V	
$I_{RM}$ Max. Reverse Leakage Current	0.1	mA	$T_J = 25^\circ\text{C}$
	6		$T_J = 150^\circ\text{C}$

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

Recovery Characteristics

Parameters	20ETF..S	Units	Conditions
$t_{rr}$ Reverse Recovery Time	400	ns	$I_F @ 20\text{Apk}$ @ 25A/ $\mu\text{s}$ @ 25°C
$I_{rr}$ Reverse Recovery Current	6.1	A	
$Q_{rr}$ Reverse Recovery Charge	1.7	$\mu\text{C}$	@ 25°C
S Snap Factor $t_b/t_a$	0.6	typical	



Thermal-Mechanical Specifications

Parameters	20ETF..S	Units	Conditions
T <sub>J</sub> Max. Junction Temperature Range	-40 to 150	°C	
T <sub>stg</sub> Max. Storage Temperature Range	-40 to 150	°C	
R <sub>thJC</sub> Max. Thermal Resistance Junction to Case	0.9	°C/W	DC operation
R <sub>thJA</sub> Max. Thermal Resistance Junction to Ambient (PCB Mount)**	62	°C/W	
T <sub>s</sub> Soldering Temperature	240	°C	
wt Approximate Weight	2(0.07)	g(oz.)	
Case Style	D <sup>2</sup> Pak (SMD-220)		

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

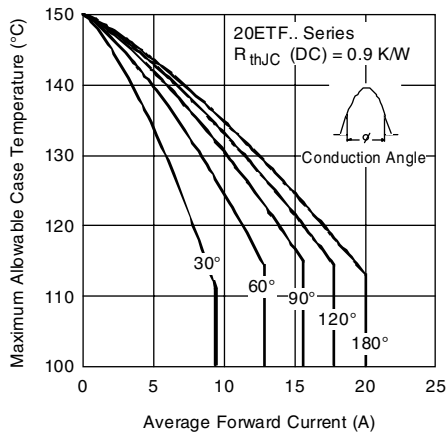


Fig. 1 - Current Rating Characteristics

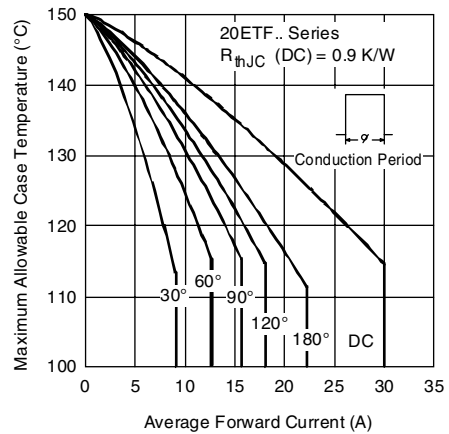


Fig. 2 - Current Rating Characteristics

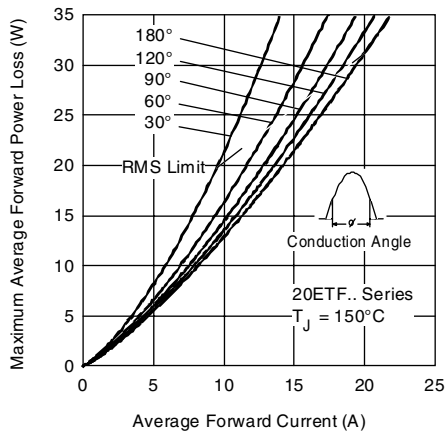


Fig. 3 - Forward Power Loss Characteristics

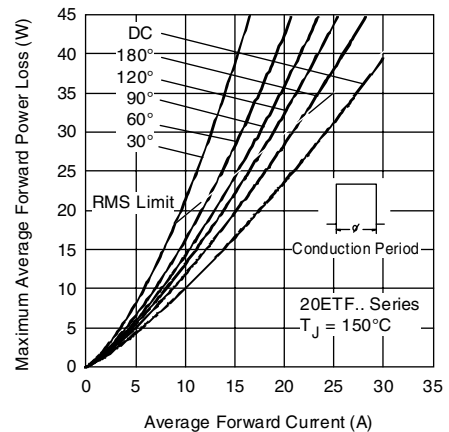


Fig. 4 - Forward Power Loss Characteristics

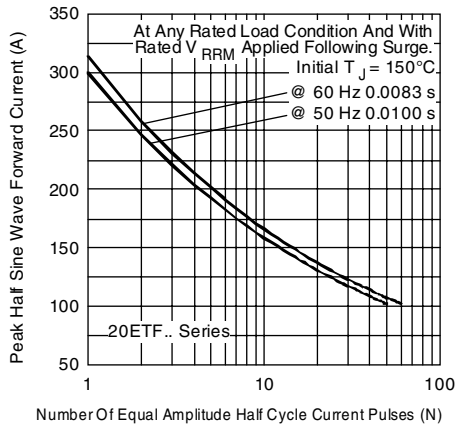


Fig. 5 - Maximum Non-Repetitive Surge Current

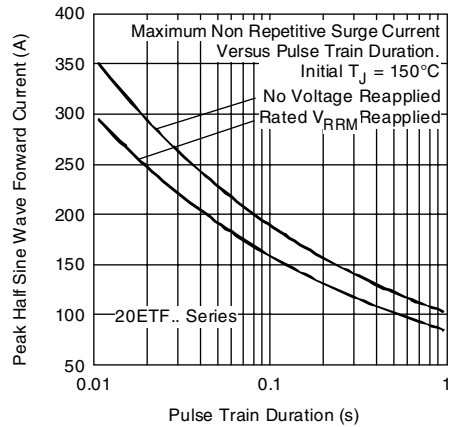


Fig. 6 - Maximum Non-Repetitive Surge Current

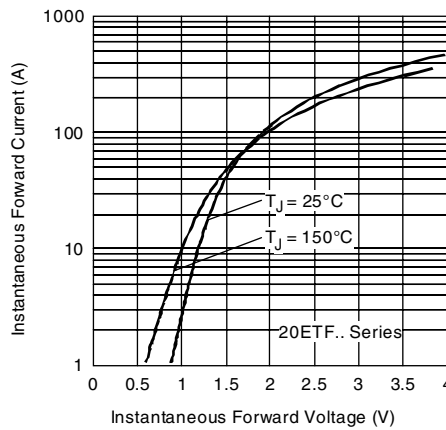


Fig. 7 - Forward Voltage Drop Characteristics

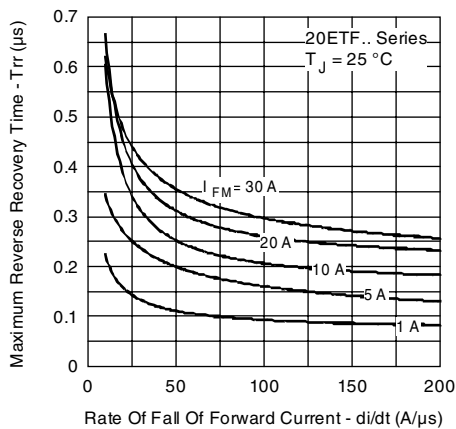


Fig. 8 - Recovery Time Characteristics,  $T_J = 25^\circ\text{C}$

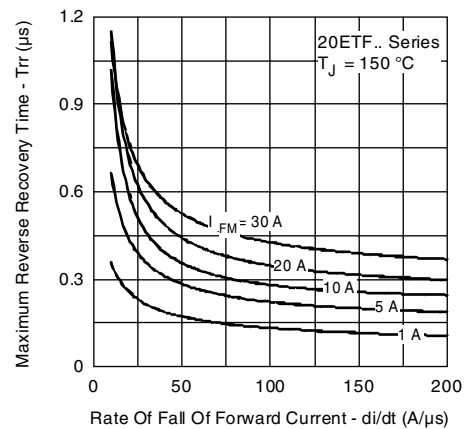


Fig. 9 - Recovery Time Characteristics,  $T_J = 150^\circ\text{C}$

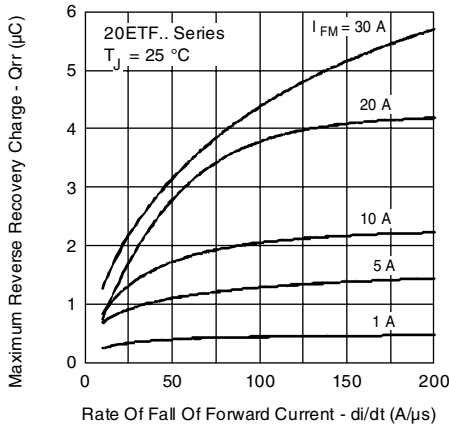


Fig. 10 - Recovery Charge Characteristics,  $T_J = 25^\circ\text{C}$

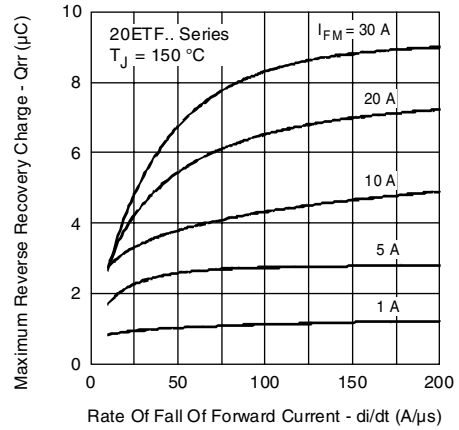


Fig. 11 - Recovery Charge Characteristics,  $T_J = 150^\circ\text{C}$

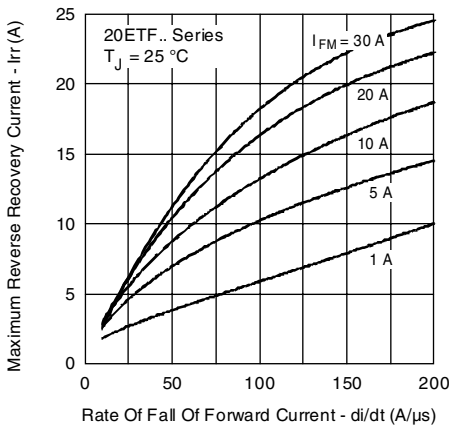


Fig. 12 - Recovery Current Characteristics,  $T_J = 25^\circ\text{C}$

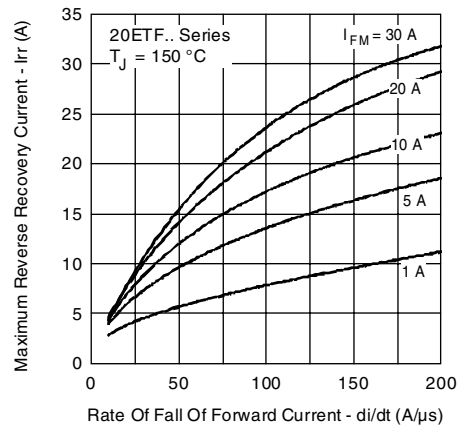


Fig. 13 - Recovery Current Characteristics,  $T_J = 150^\circ\text{C}$

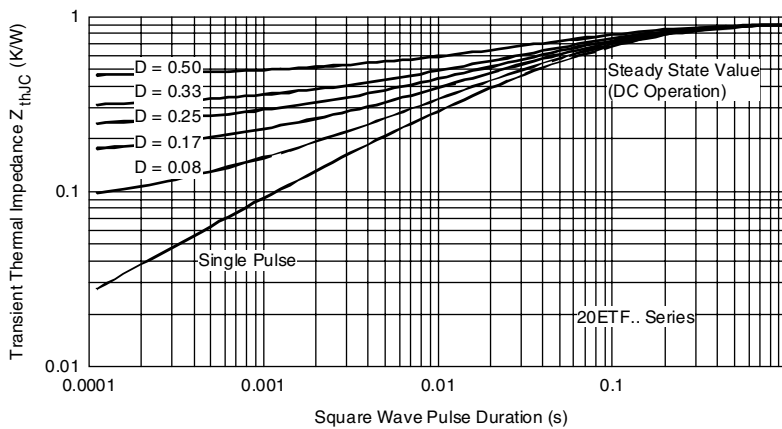


Fig. 14 - Thermal Impedance  $Z_{thJC}$  Characteristics

Ordering Information Table

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

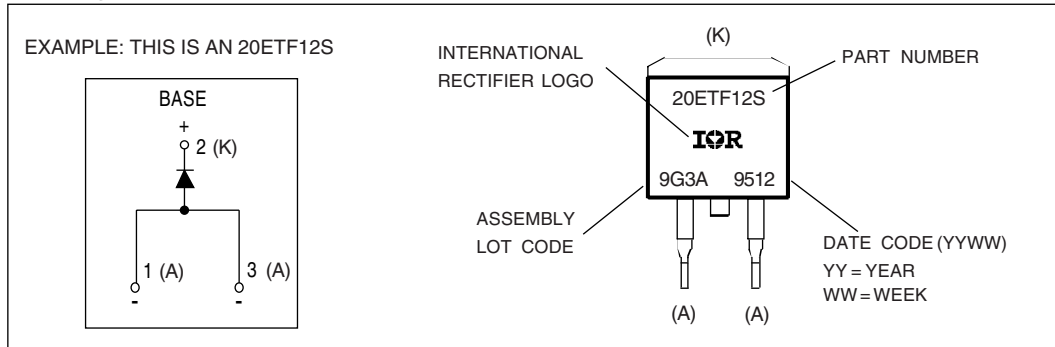
08 = 800V
10 = 1000V
12 = 1200V

Outline Table

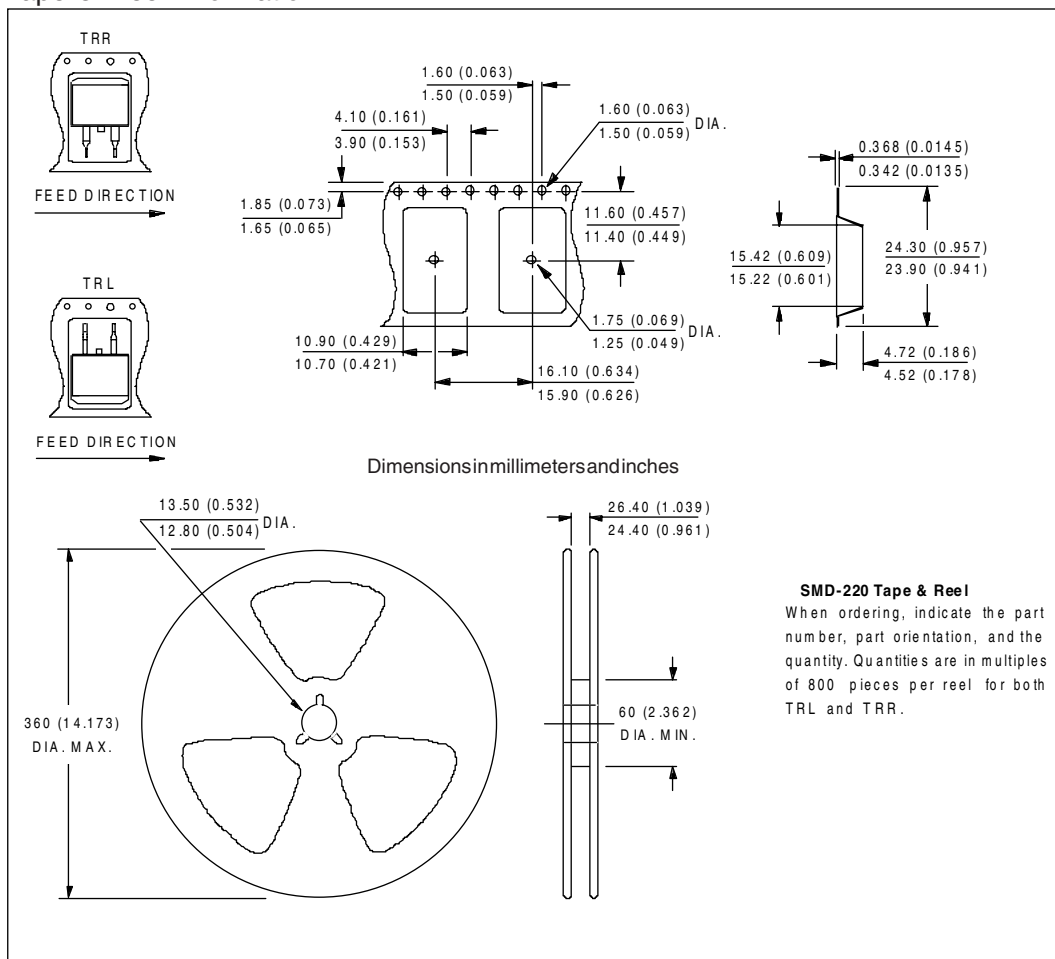
Dimensions in millimeters and inches

MINIMUM RECOMMENDED FOOTPRINT

Marking Information



Tape & Reel Information



**WORLD HEADQUARTERS:** 233 Kansas St., El Segundo, California 90245 U.S.A Tel: (310) 322-3331 Fax: (310) 322-3332  
**EUROPEAN HEADQUARTERS:** Hurst Green, Oxted, Surrey RH8 9BB, U.K. Tel: ++ 44 1883 732020 Fax: ++ 44 1883 733408  
**IR CANADA:** 7231 Victoria Park Ave., Suite #201, Markham, Ontario L3R 2Z8 Tel: (905) 475 1897. Fax: (905) 475 8801  
**IR GERMANY:** Saalburgstrasse 157, 61350 Bad Homburg Tel: ++ 49 6172 96590 Fax: ++ 49 6172 965933  
**IR ITALY:** Via Liguria 49, 10071 Borgaro, Torino Tel: ++ 39 11 4510111 Fax: ++ 39 11 4510220  
**IR FAR EAST:** K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo, Japan 171 Tel: 81 3 3983 0086 Fax: 81 3 3983 0642  
**IR SOUTHEAST ASIA:** 315 Outram Road, # 10-02 Tan Boon Liat Building, SINGAPORE 0316. Tel: 65 221 8371. Fax: 65 221 8372.

<http://www.irf.com> Fax-On-Demand: +44 1883 733420 Data and specifications subject to change without notice 11/97



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