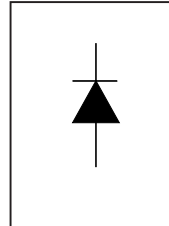


International
IR Rectifier

QUIETIR Series
20ETF12SPbF

**FAST SOFT RECOVERY
RECTIFIER DIODE**
Lead-Free ("PbF" suffix)



$$V_F < 1.31V @ 20A$$

$$I_{FSM} = 355A$$

$$V_{RRM} = 1200V$$

Description/ Features

The 20ETF12SPbF fast soft recovery **QUIETIR** rectifier series has been optimized for combined short reverse recovery time and low forward voltage drop.

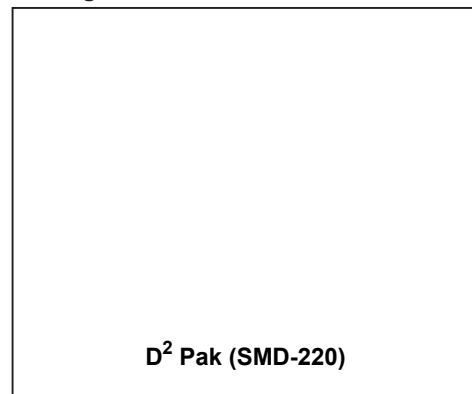
The glass passivation ensures stable reliable operation in the most severe temperature and power cycling conditions.

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

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
20ETF12SPbF	1200	1300	6

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

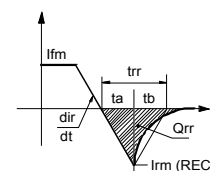
Electrical Specifications

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/ μs @ 25°C
I_{rr} Reverse Recovery Current	6.1	A	
Q_{rr} Reverse Recovery Charge	1.7	μC	@ 25°C
S Snap Factor t_b/t_a	0.6	typical	



Thermal-Mechanical Specifications

Parameters	20ETF..S	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	0.9	°C/W	DC operation
R _{thJA} Max. Thermal Resistance Junction to Ambient (PCB Mount)**	62	°C/W	
T _s Soldering Temperature	240	°C	
wt Approximate Weight	2 (0.07)	g (oz.)	
Case Style	D ² Pak (SMD-220)		
Device marking	20ETF12S		

** 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

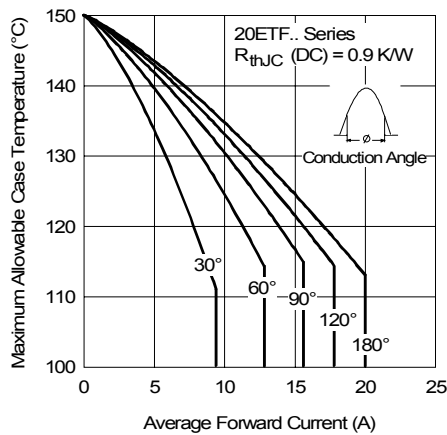


Fig. 1 - Current Rating Characteristics

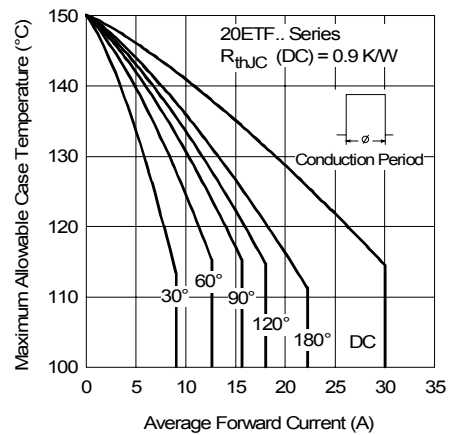


Fig. 2 - Current Rating Characteristics

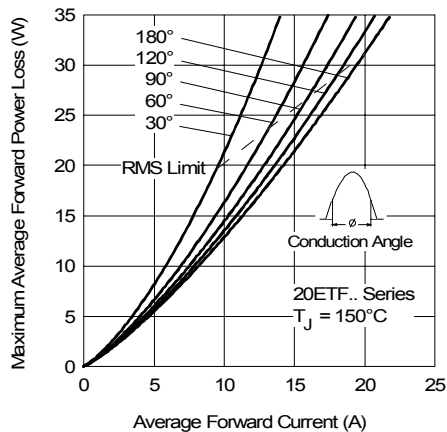


Fig. 3 - Forward Power Loss Characteristics

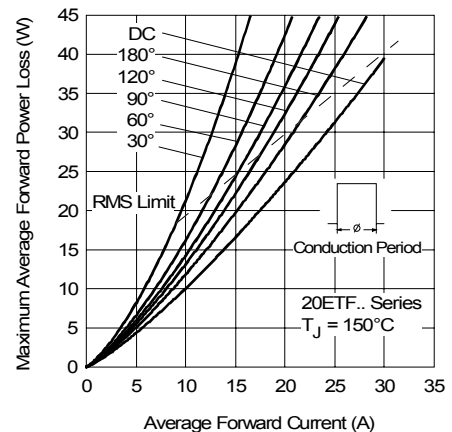


Fig. 4 - Forward Power Loss Characteristics

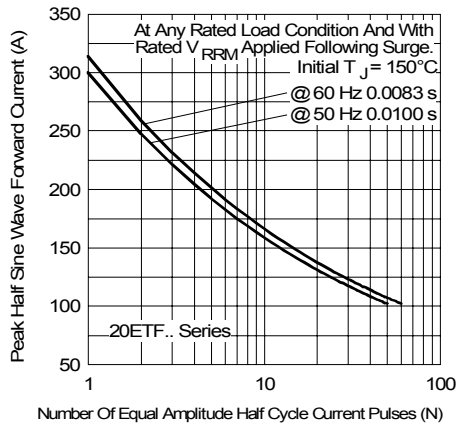


Fig. 5 - Maximum Non-Repetitive Surge Current

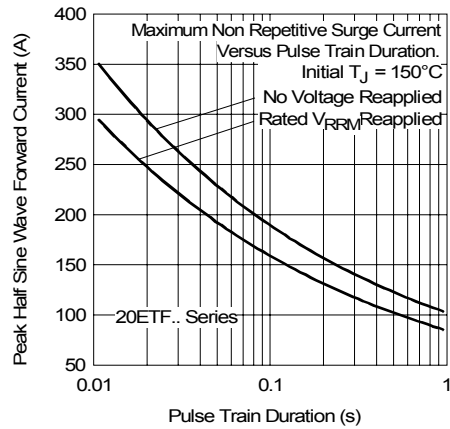


Fig. 6 - Maximum Non-Repetitive Surge Current

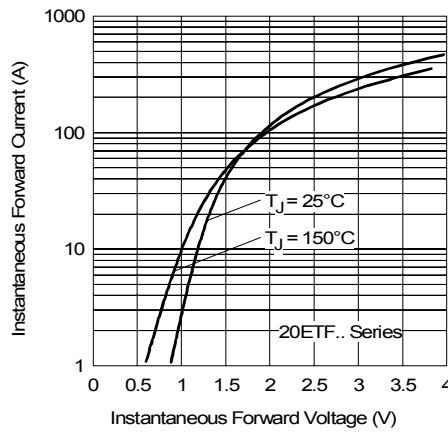


Fig. 7 - Forward Voltage Drop Characteristics

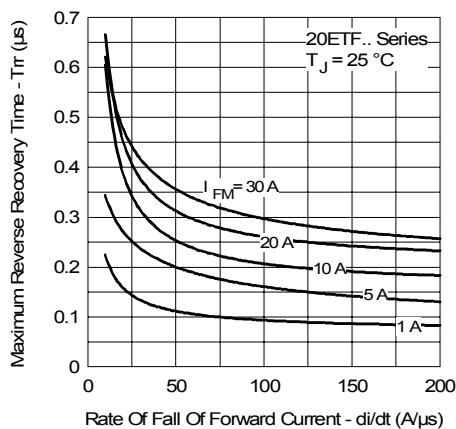


Fig. 8 - Recovery Time Characteristics, $T_J = 25^\circ\text{C}$

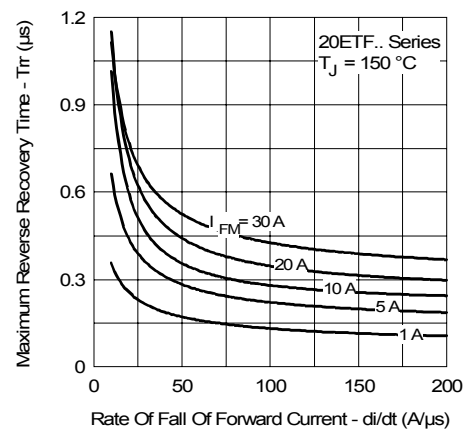


Fig. 9 - Recovery Time Characteristics, $T_J = 150^\circ\text{C}$

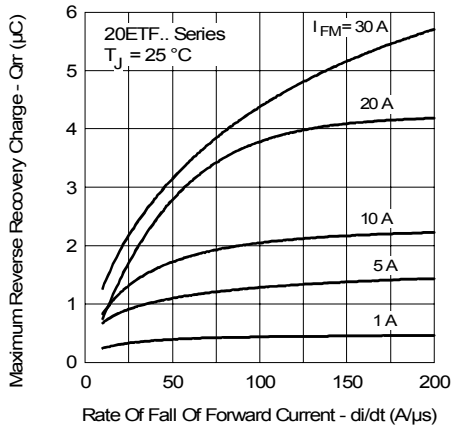


Fig. 10 - Recovery Charge Characteristics, $T_J = 25^\circ\text{C}$

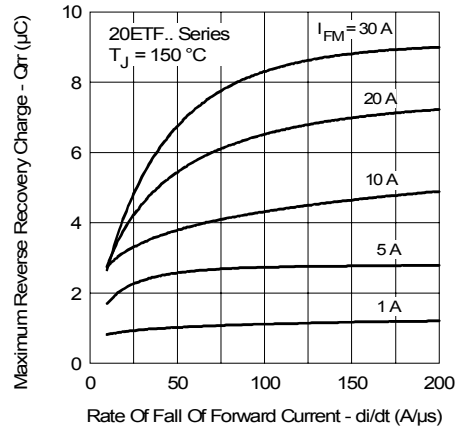


Fig. 11 - Recovery Charge Characteristics, $T_J = 150^\circ\text{C}$

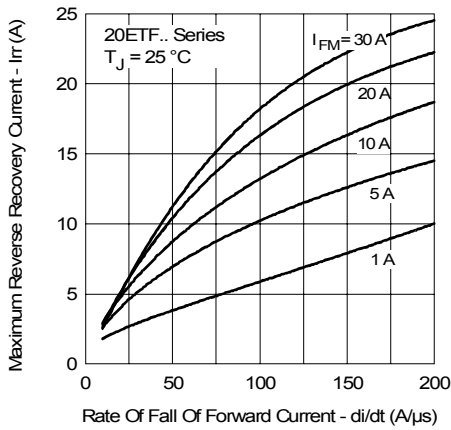


Fig. 12 - Recovery Current Characteristics, $T_J = 25^\circ\text{C}$

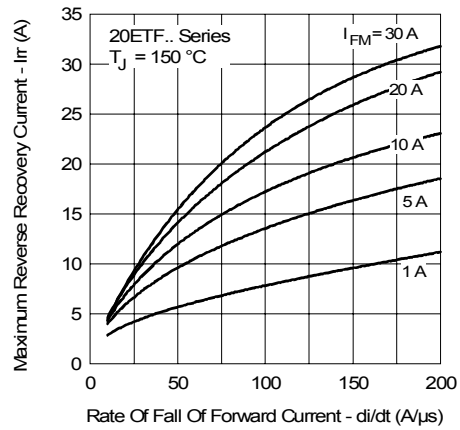


Fig. 13 - Recovery Current Characteristics, $T_J = 150^\circ\text{C}$

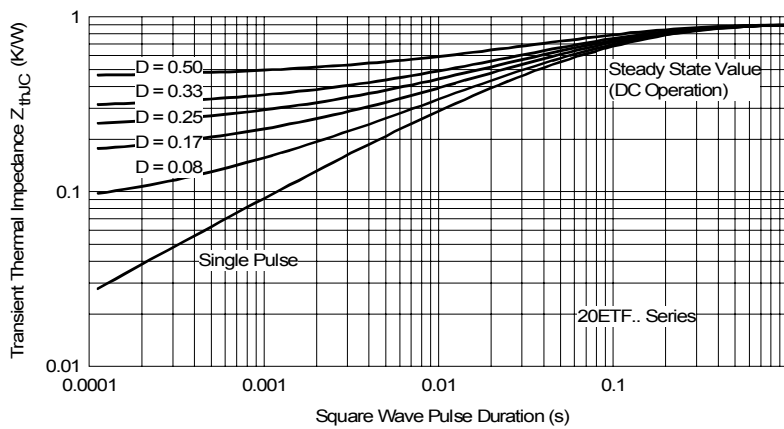
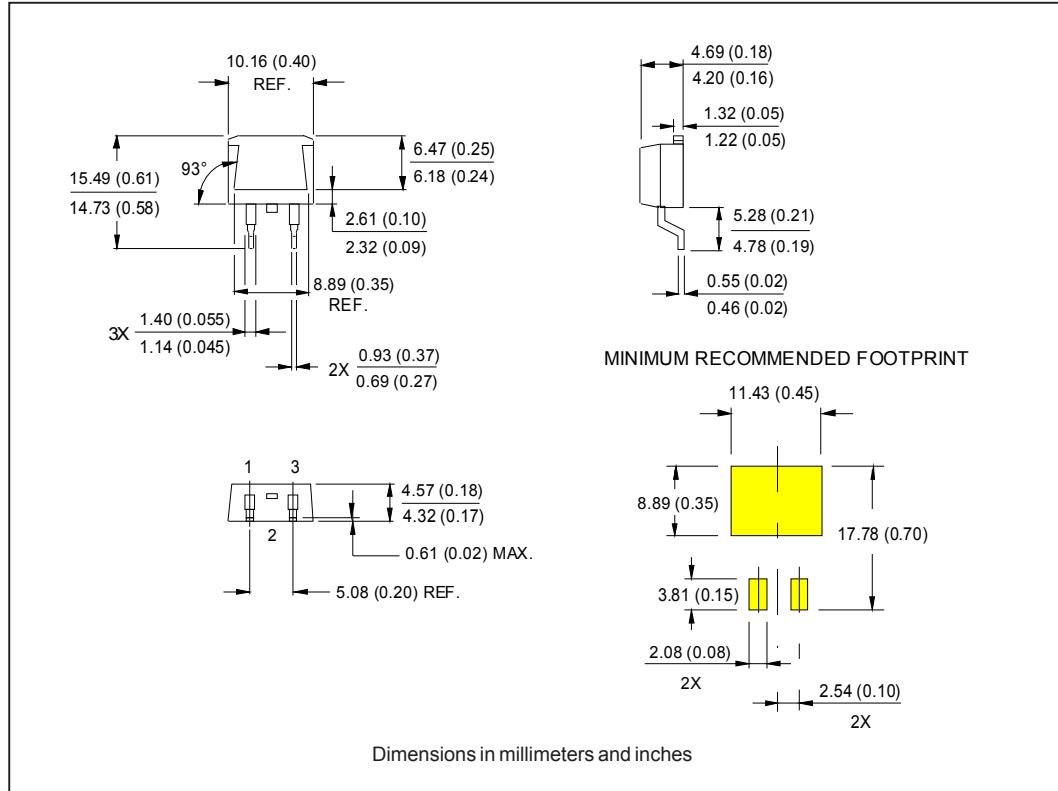
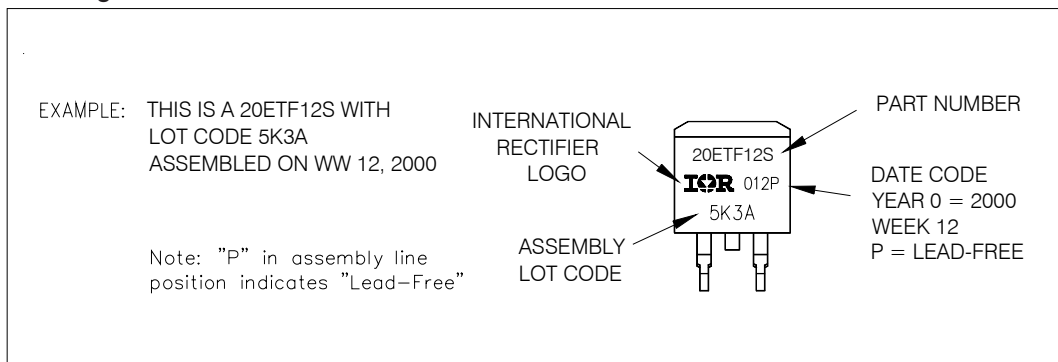


Fig. 14 - Thermal Impedance Z_{thJC} Characteristics

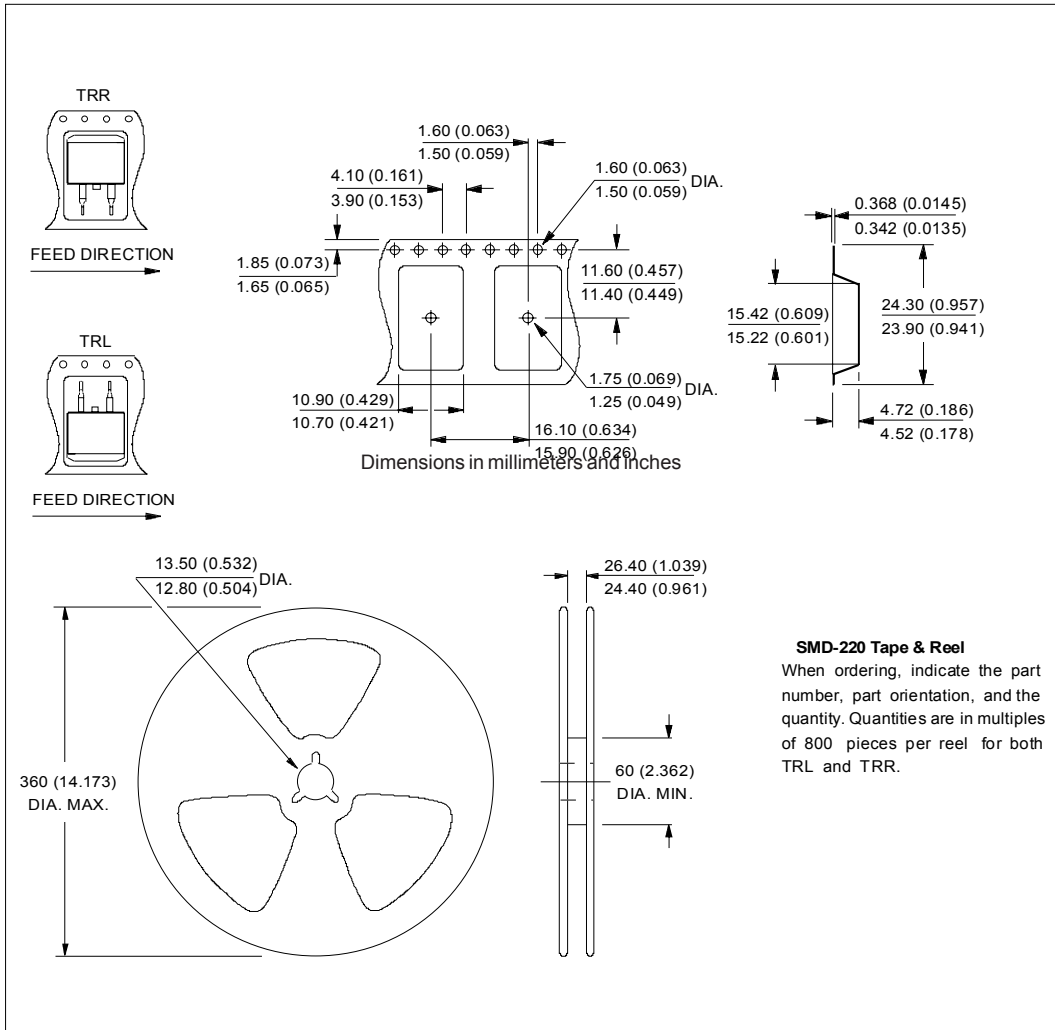
Outline Table



Marking Information



Tape & Reel Information



SMD-220 Tape & Reel

When ordering, indicate the part number, part orientation, and the quantity. Quantities are in multiples of 800 pieces per reel for both TRL and TRR.

Ordering Information Table

Device Code	20	E	T	F	12	S	TRL	PbF
	1	2	3	4	5	6	7	8
1	-	Current Rating (20 = 20A)						
2	-	Circuit Configuration:						
		E = Single Diode						
3	-	Package:						
		T = D ² Pak (TO-220AC)						
4	-	Type of Silicon:						
		F = Fast Soft Recovery Rectifier						
5	-	Voltage Rating (12 = 1200V)						
6	-	S = Surface Mountable						
7	-	• none = Tape						
		• TRR = Tape & Reel (Right Oriented)						
		• TRL = Tape & Reel (Left Oriented)						
8	-	• 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.