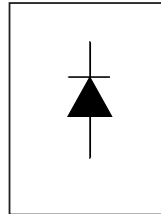


International
IOR Rectifier

QUIETIR Series 20ETF06SPbF

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



$$\begin{aligned} V_F &< 1.2V @ 10A \\ I_{FSM} &= 300A \\ V_{RRM} &= 600V \end{aligned}$$

Description/Features

The 20ETF06SPbF soft recovery rectifier **QUIETIR** 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.

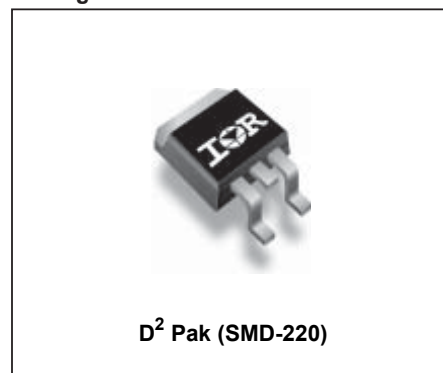
Typical applications are both:

- 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}	600	V
I_{FSM}	300	A
V_F @ 10 A, $T_J = 25^\circ\text{C}$	1.2	V
t_{rr} @ 1A, 100A/ μs	60	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
20ETF06SPbF	600	700	5

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	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	$\text{A}^2\sqrt{\text{s}}$	$t = 0.1$ to 10ms, no voltage reapplied

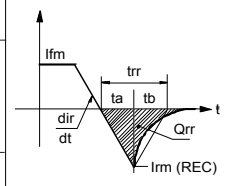
Electrical Specifications

Parameters	20ETF..S	Units	Conditions
V_{FM} Max. Forward Voltage Drop	1.30	V	@ 20A, $T_J = 25^\circ\text{C}$
	1.67	V	@ 60A, $T_J = 25^\circ\text{C}$
r_t Forward slope resistance	12.5	$\text{m}\Omega$	
$V_{F(TO)}$ Threshold voltage	0.9	V	$T_J = 150^\circ\text{C}$
I_{RM} Max. Reverse Leakage Current	0.1	mA	$T_J = 25^\circ\text{C}$
	5.0	mA	$T_J = 150^\circ\text{C}$

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

Recovery Characteristics

Parameters	20ETF..S	Units	Conditions
t_{rr} Reverse Recovery Time	160	ns	$I_F @ 20\text{Apk}$
I_{rr} Reverse Recovery Current	10	A	@ 100A/ μs
Q_{rr} Reverse Recovery Charge	1.25	μC	@ 25°C
S Snap Factor t_b/t_a	0.6	typical	



Thermal-Mechanical Specifications

Parameters	20ETF..	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)**	40	°C/W	
T _s Soldering Temperature	240	°C	
wt Approximate Weight	2 (0.07)	g (oz.)	
Case Style	D ² Pak		
Marking Device	20ETF06S		

**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

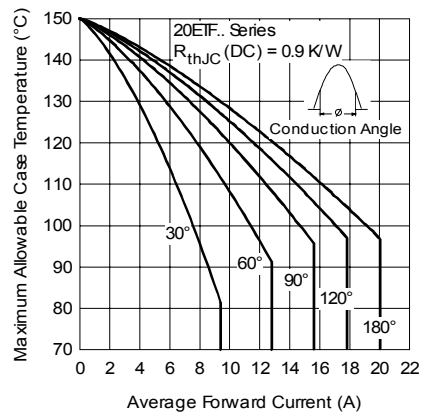


Fig. 1 - Current Rating Characteristics

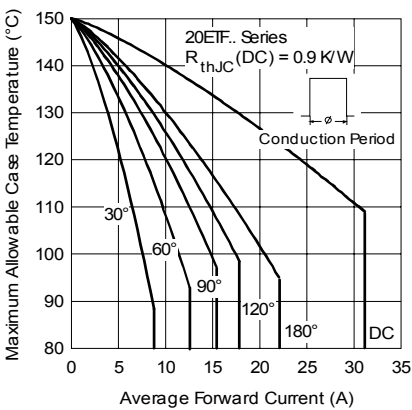


Fig. 2 - Current Rating Characteristics

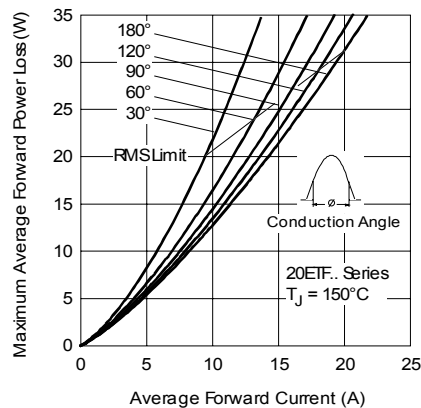


Fig. 3 - Forward Power Loss Characteristics

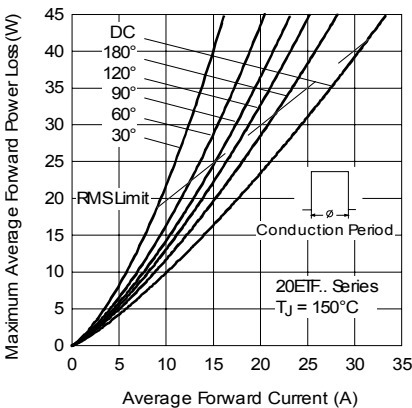


Fig. 4 - Forward Power Loss Characteristics

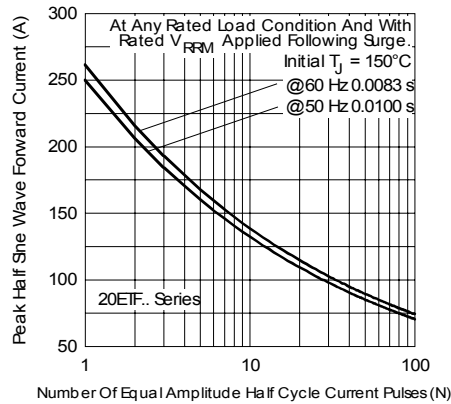


Fig. 5 - Maximum Non-Repetitive Surge Current

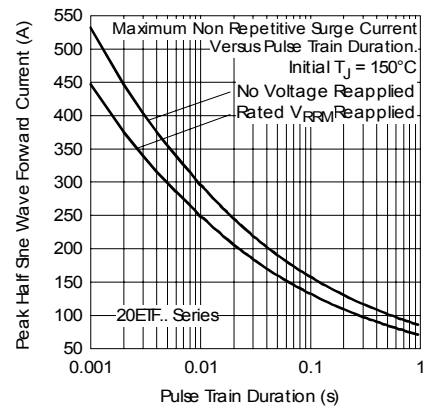


Fig. 6 - Maximum Non-Repetitive Surge Current

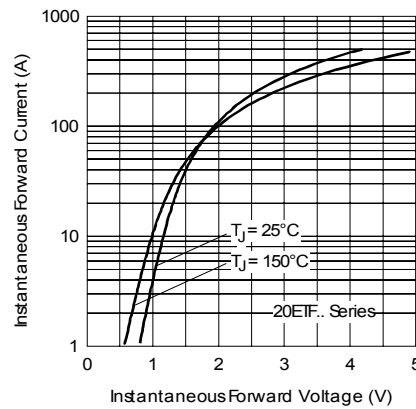


Fig. 7 - Forward Voltage Drop Characteristics

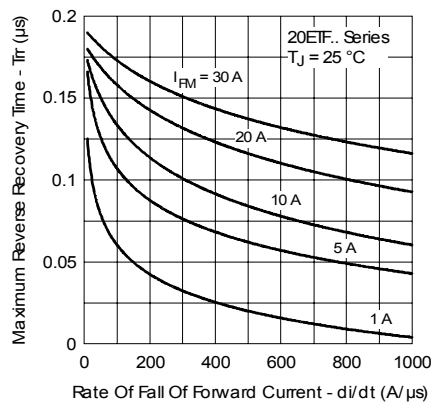


Fig. 8 - Recovery Time Characteristics, $T_J = 25^\circ\text{C}$

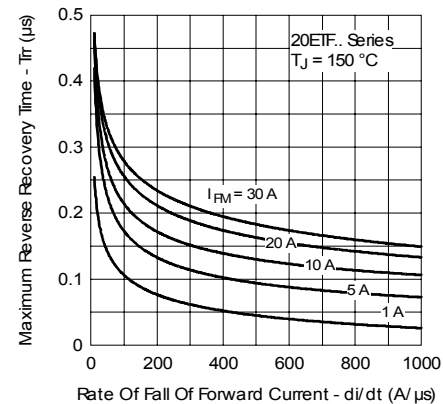


Fig. 9 - Recovery Time Characteristics, $T_J = 150^\circ\text{C}$

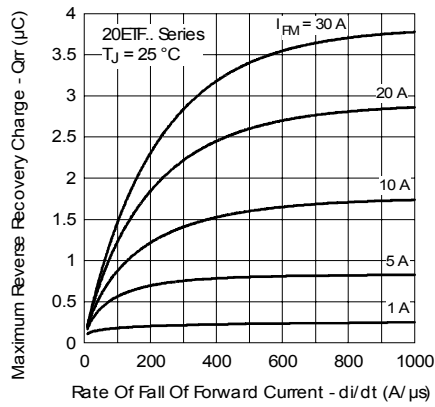


Fig. 10 - Recovery Charge Characteristics, $T_J = 25^\circ\text{C}$

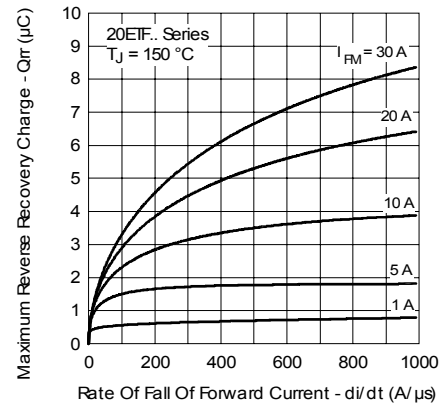


Fig. 11 - Recovery Charge Characteristics, $T_J = 150^\circ\text{C}$

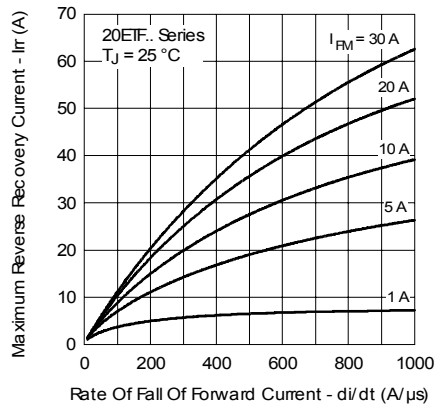


Fig. 12 - Recovery Current Characteristics, $T_J = 25^\circ\text{C}$

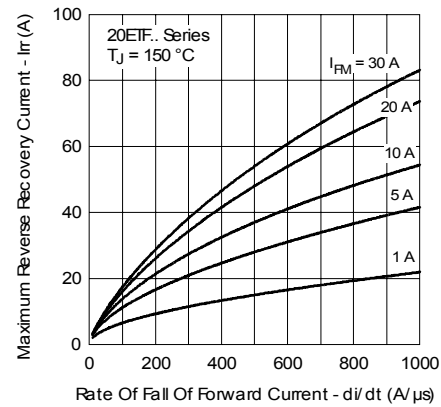


Fig. 13 - Recovery Current Characteristics, $T_J = 150^\circ\text{C}$

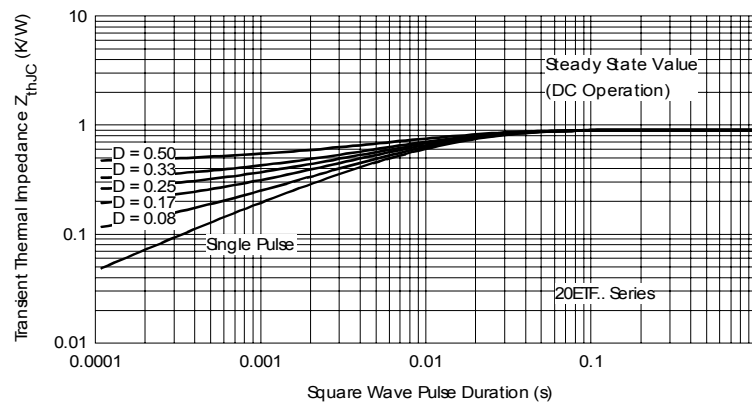
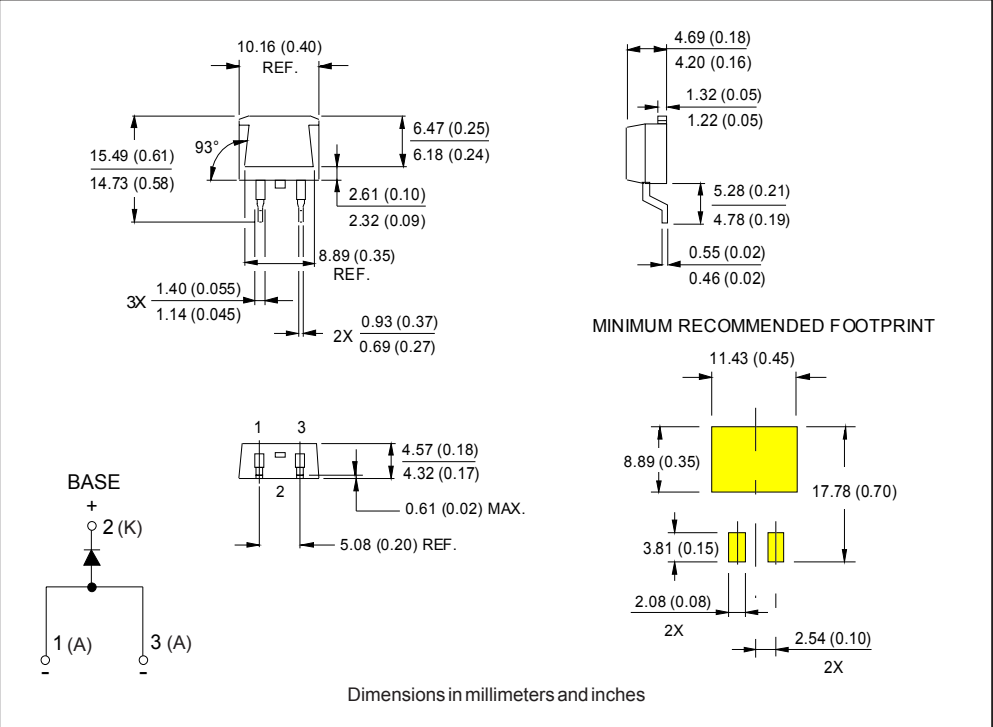
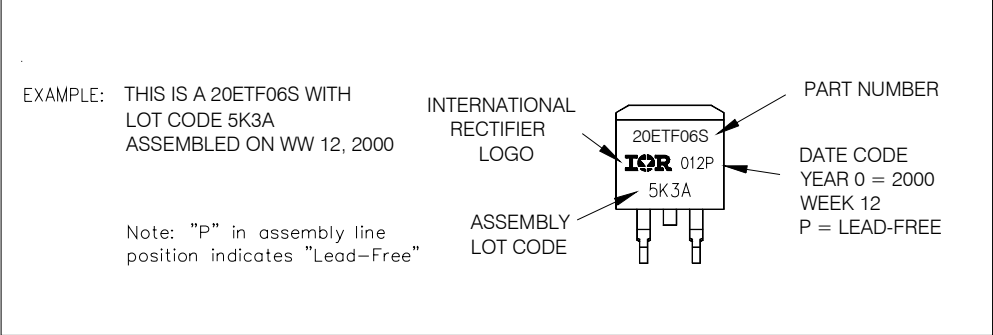


Fig. 14 - Thermal Impedance Z_{thJC} Characteristics

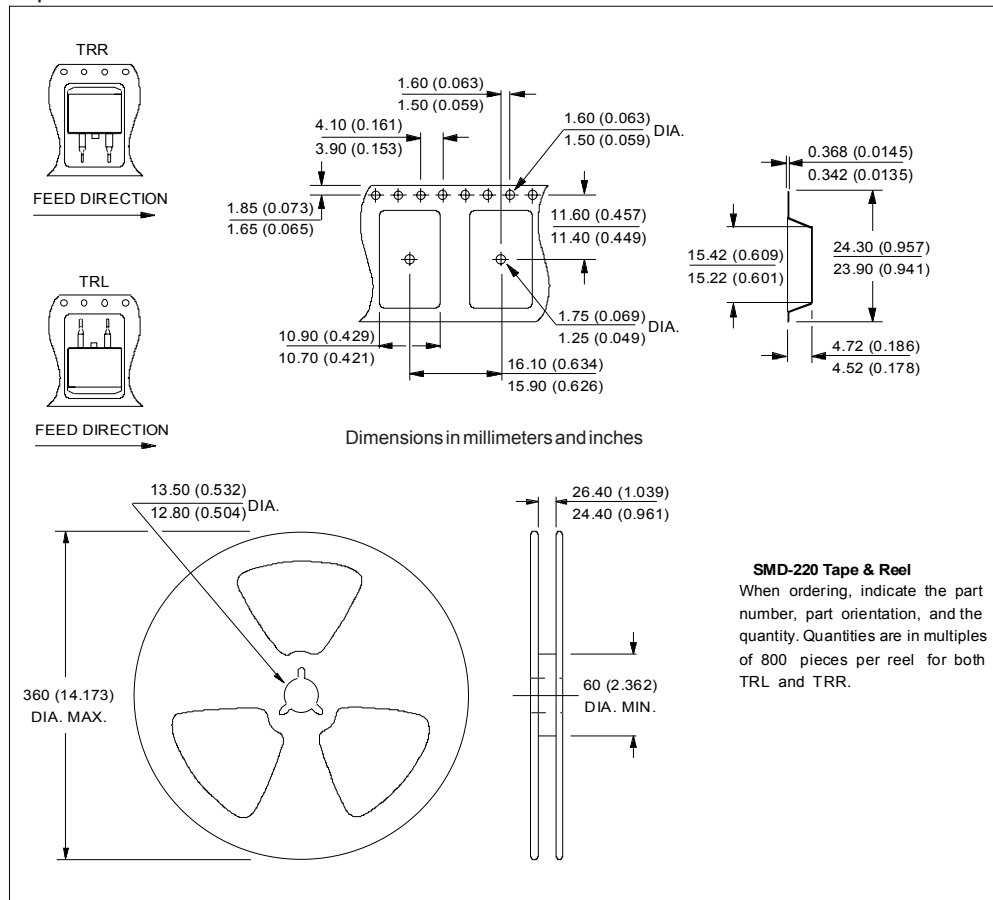
Outline Table



Marking Information



Tape & Reel Information



Ordering Information Table

Device Code							
20	E	T	F	06	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 (06 = 600V)					
6	-	S = Surface Mountable					
7	-	• none = Tube					
		• 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.

International
IR Rectifier

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7309
03/05



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