

Bulletin I2111 rev. C 03/99

International
IR Rectifier

QUIETIR Series
20ETF..S

SURFACE MOUNTABLE
FAST SOFT RECOVERY
RECTIFIER DIODE



$V_F < 1.2V @ 10A$
 $I_{FSM} = 300A$
 $V_{RRM} 200 \text{ to } 600V$

Description/Features

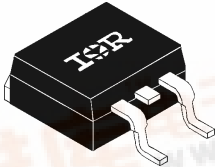
The 20ETF..S soft recovery rectifier **QUIETIR** series has been optimized for combined short reverse recovery time and low forward voltage drop.
The glass passivation ensures stable reliable operation in the most severe temperature and power cycling conditions.

- 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	20ETF..S	Units
$I_{F(AV)}$ Sinusoidal waveform	20	A
V_{RRM} range	200 to 600	V
I_{FSM}	300	A
$V_F @ 10A, T_J = 25^{\circ}C$	1.2	V
$t_{rr} @ 1A, 100A/\mu s$	60	ns
T_J range	-40 to 150	$^{\circ}C$

Package Outline



D² Pak (SMD-220)



20ETF..S QUIETIR Series

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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
20ETF02S	200	300	5
20ETF04S	400	500	
20ETF06S	600	700	

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 reappplied
I^2t Max. I^2t for fusing	316	A^2s	10ms Sine pulse, rated V_{RRM} applied
	442		10ms Sine pulse, no voltage reappplied
$I^2\sqrt{t}$ Max. $I^2\sqrt{t}$ for fusing	4420	$A^2\sqrt{s}$	t=0.1 to 10ms, no voltage reappplied

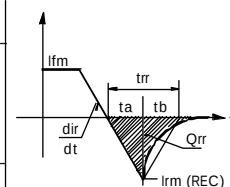
Electrical Specifications

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	mΩ	
$V_{F(TO)}$ 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	$I_F @ 20\text{Apk}$ @ 100A/μs @ 25°C
I_{rr} Reverse Recovery Current	10	A	
Q_{rr} Reverse Recovery Charge	1.25	μC	
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		

**When mounted on 1" square (650mm²) 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

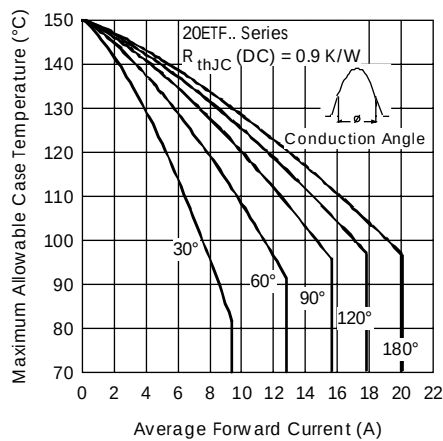


Fig. 1 - Current Rating Characteristics

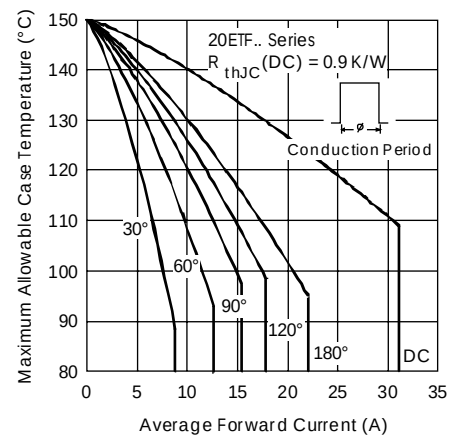


Fig. 2 - Current Rating Characteristics

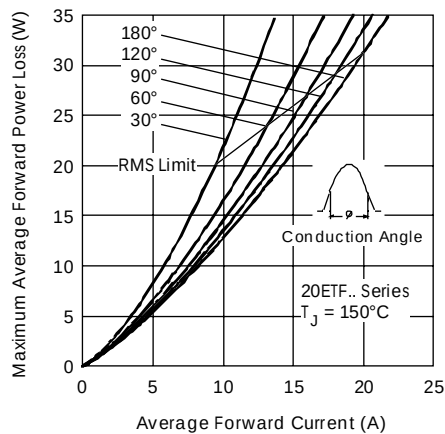


Fig. 3 - Forward Power Loss Characteristics

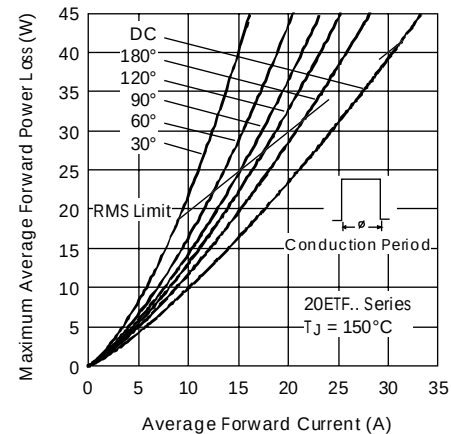


Fig. 4 - Forward Power Loss Characteristics

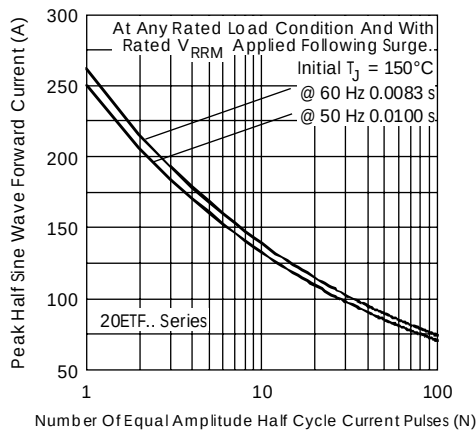


Fig. 5 - Maximum Non-Repetitive Surge Current

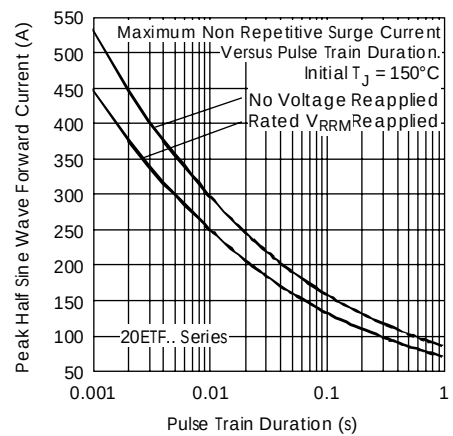


Fig. 6 - Maximum Non-Repetitive Surge Current

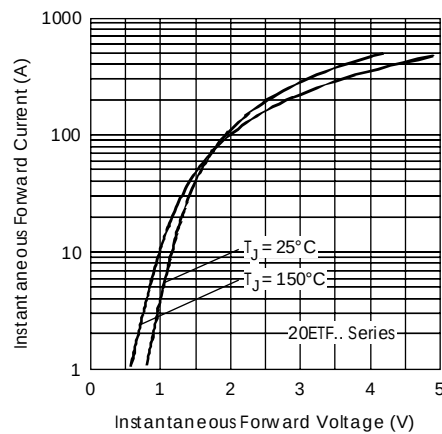


Fig. 7 - Forward Voltage Drop Characteristics

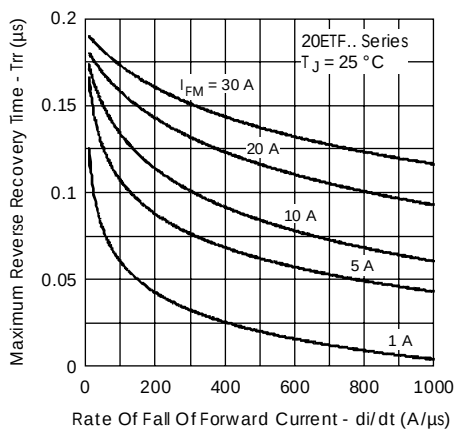


Fig. 8 - Recovery Time Characteristics, $T_j = 25^\circ\text{C}$

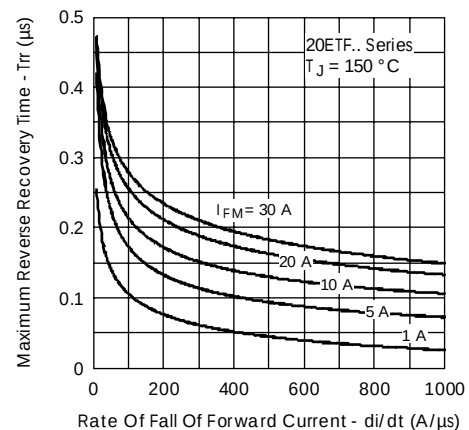


Fig. 9 - Recovery Time Characteristics, $T_j = 150^\circ\text{C}$

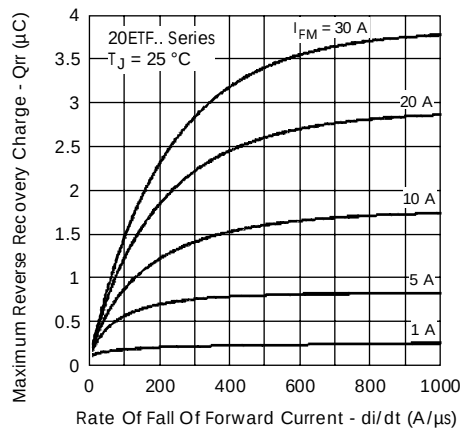


Fig. 10 - Recovery Charge Characteristics, $T_J = 25^\circ\text{C}$

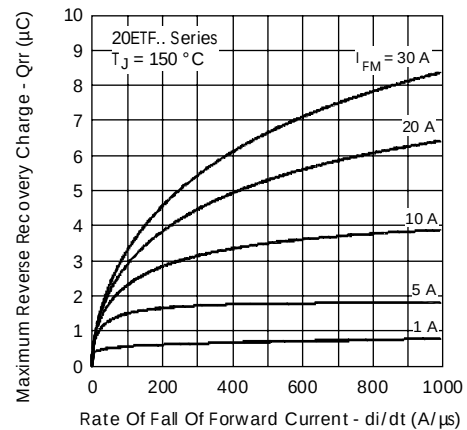


Fig. 11 - Recovery Charge Characteristics, $T_J = 150^\circ\text{C}$

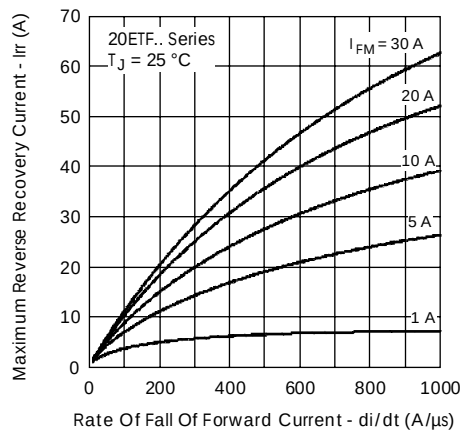


Fig. 12 - Recovery Current Characteristics, $T_J = 25^\circ\text{C}$

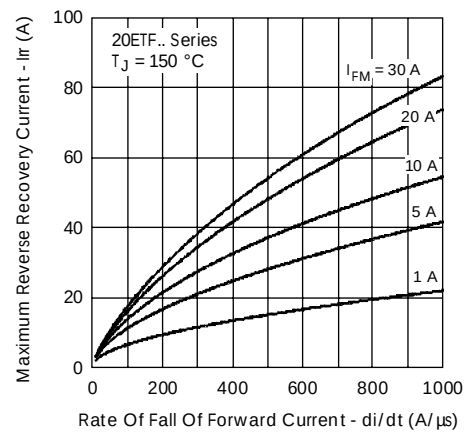


Fig. 13 - Recovery Current Characteristics, $T_J = 150^\circ\text{C}$

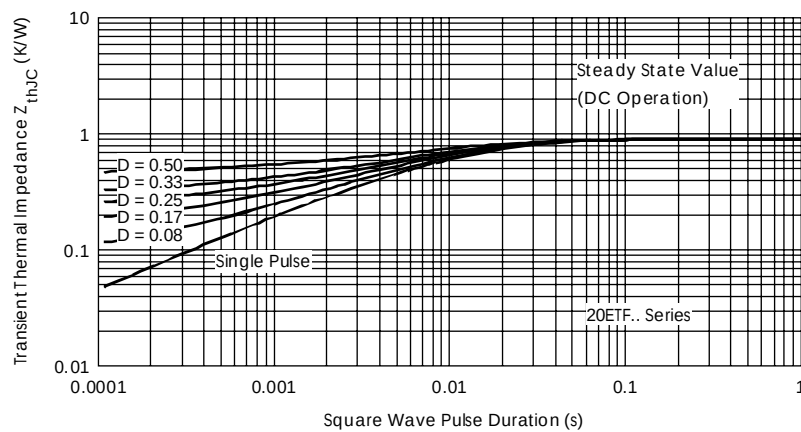


Fig. 14 - Thermal Impedance Z_{thJC} Characteristics

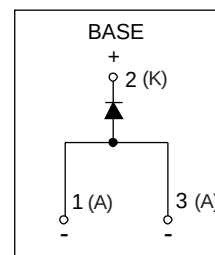
Ordering Information Table

Device Code						
20	E	T	F	06	S	TRL
①	②	③	④	⑤	⑥	⑦

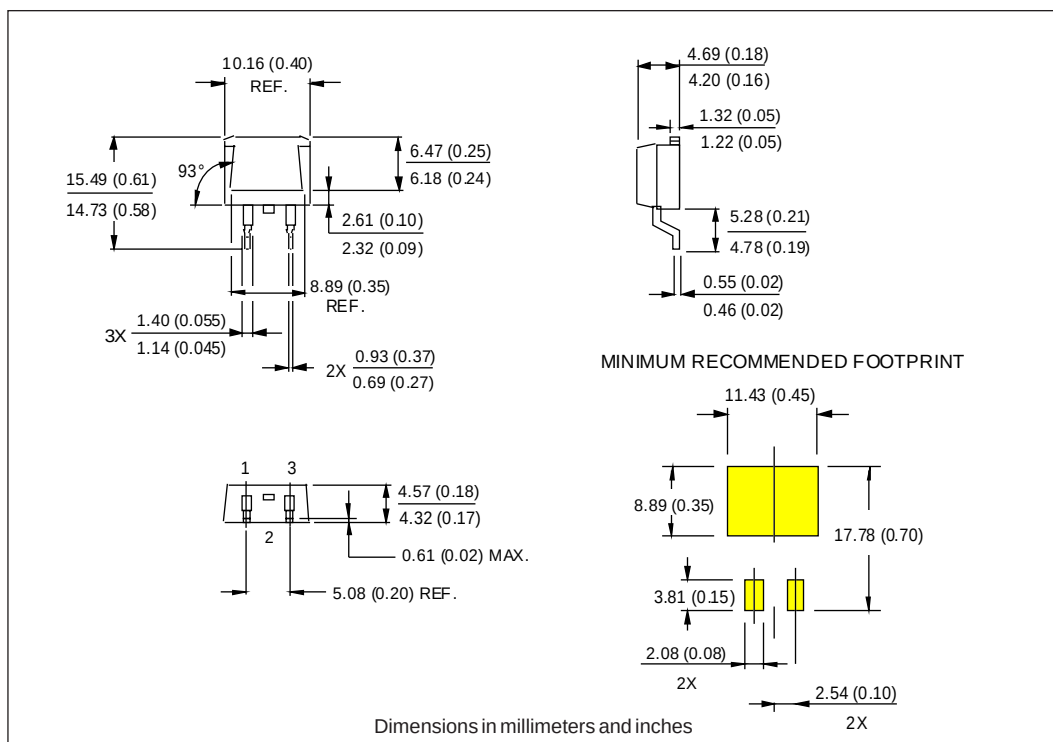
1	-	Current Rating
2	-	Circuit Configuration: E = Single Diode
3	-	T = TO-220AC
4	-	F = Fast Recovery
5	-	Voltage code: Code x 100 = V_{RRM}
6	-	S = D ² Pak (SMD-220) Version
7	-	Tape and Reel Option:

02	=	200V
04	=	400V
06	=	600V

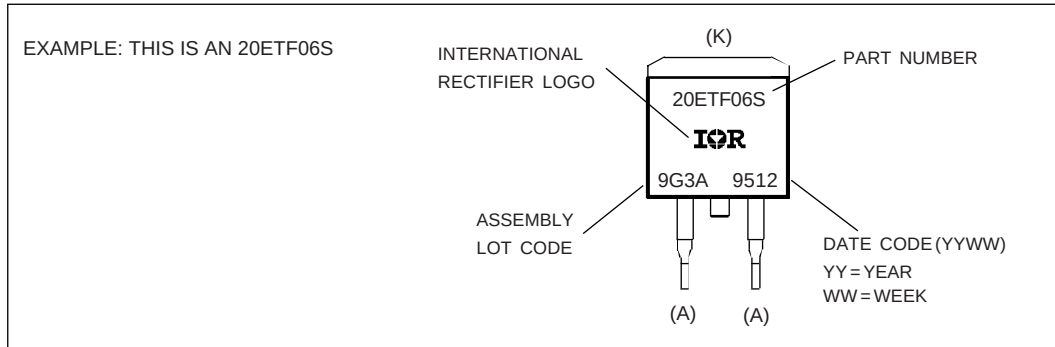
TRL = Left Reel
TRR = Right Orientation Reel



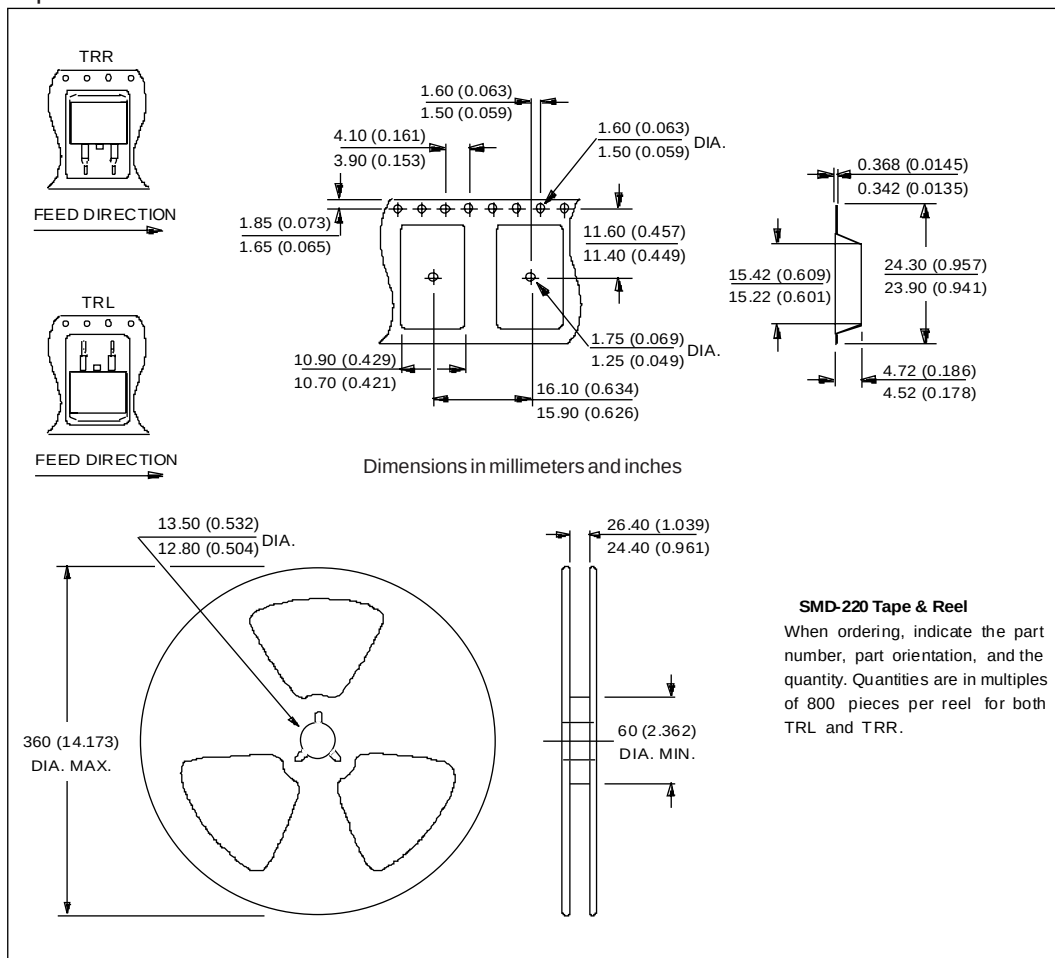
Outline Table



Marking Information



Tape & Reel Information



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Data and specifications subject to change without notice.