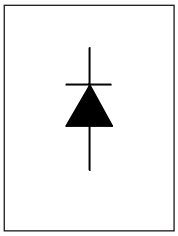
I2128 rev. A 01/2000

International
IOR Rectifier

QUIETIR Series
20ETF..S HV

FAST SOFT RECOVERY RECTIFIER DIODE



V_F < 1.31V @ 20A
I_{FSM} = 355A
V_{RRM} 800 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.

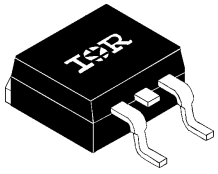
Typical applications are both:

- 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
$I_{F(AV)}$	Sinusoidalwaveform	20	A
V_{RRM}	range	800to1200	V
I_{FSM}		355	A
V_F	@20A, T_J=25°C	1.31	V
trr	@1A, 100A/µs	95	ns
T_J	range	-40to150	°C

Package Outline



D^2 Pak (SMD-220)

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

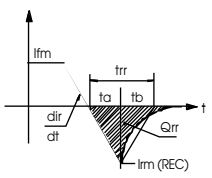
	Parameters	20ETF..S	Units	Conditions
$I_{F(AV)}$	Max. Average Forward Current	20	A	@ T_C = 97°C, 180° conduction half sine wave
I_{FSM}	Max. Peak One Cycle Non-Repetitive	300	A	10ms Sine pulse, rated V_{RRM} applied
	Surge Current	355		10ms Sine pulse, no voltage reapplied
I^2t	Max. I^2t for fusing	450	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°C	
r_t	Forward slope resistance	11.88	mΩ	T_J = 150°C	
$V_{F(TO)}$	Threshold voltage	0.93	V		
I_{RM}	Max. Reverse Leakage Current	0.1	mA	T_J = 25 °C	V_R = rated V_{RRM}
		6		T_J = 150 °C	

Recovery Characteristics

	Parameters	20ETF..S	Units	Conditions
t_{rr}	Reverse Recovery Time	400	ns	I_F @ 20Apk
I_{rr}	Reverse Recovery Current	6.1	A	@ 25A/ µs
Q_{rr}	Reverse Recovery Charge	1.7	µC	@ 25°C
S	Snap Factor tb/ta	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^2Pak (SMD-220)		

**When mounted on 1" square (650mm^2) 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

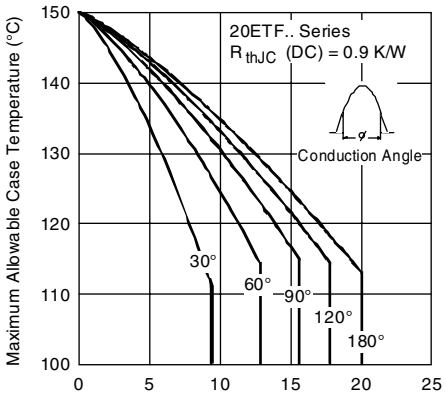


Fig. 1 - Current Rating Characteristics

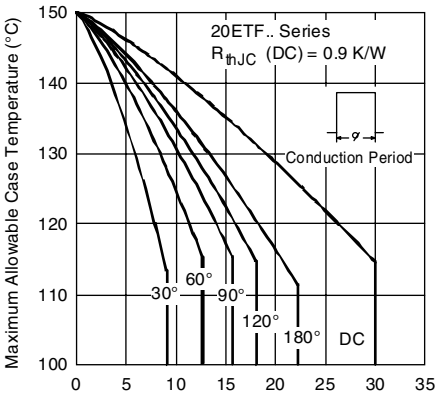


Fig. 2 - Current Rating Characteristics

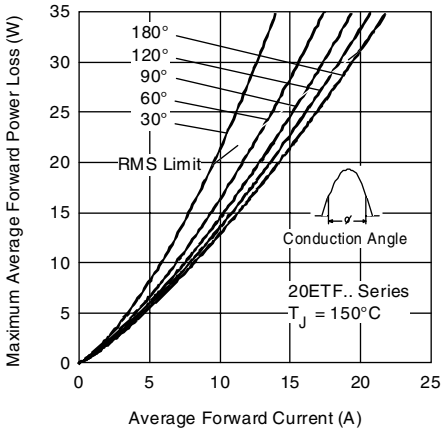


Fig. 3 - Forward Power Loss Characteristics

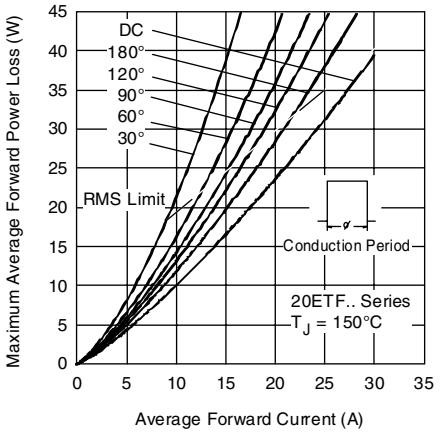


Fig. 4 - Forward Power Loss Characteristics

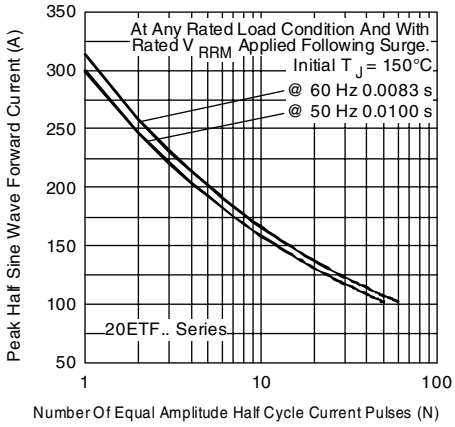


Fig. 5 - Maximum Non-Repetitive Surge Current

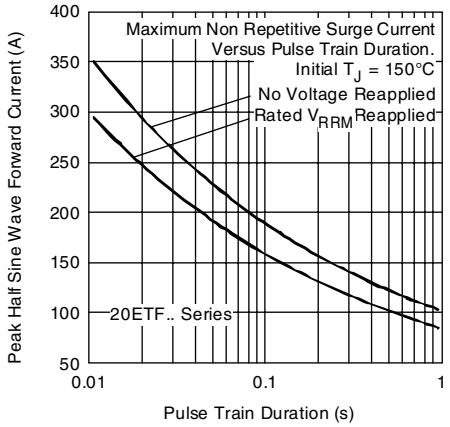


Fig. 6 - Maximum Non-Repetitive Surge Current

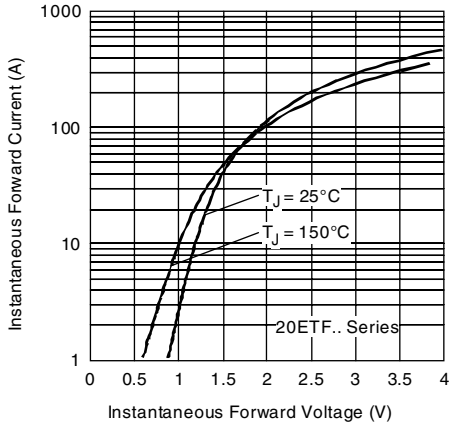


Fig. 7 - Forward Voltage Drop Characteristics

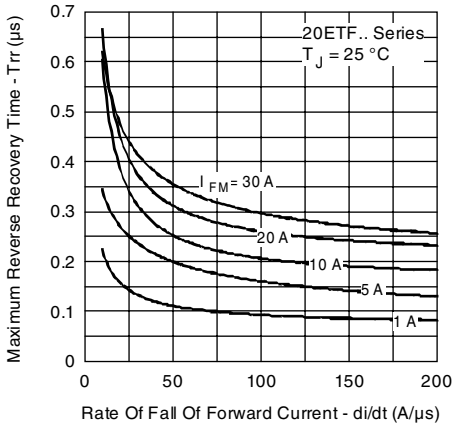


Fig. 8 - Recovery Time Characteristics, T_J = 25°C

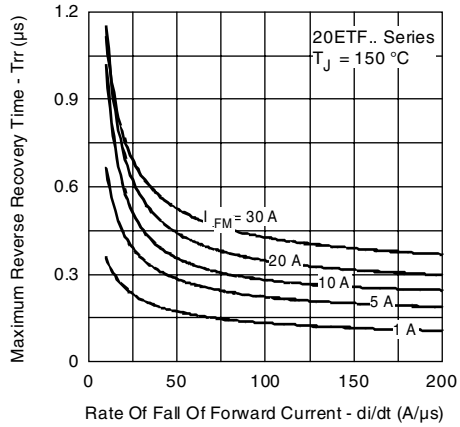


Fig. 9 - Recovery Time Characteristics, T_J = 150°C

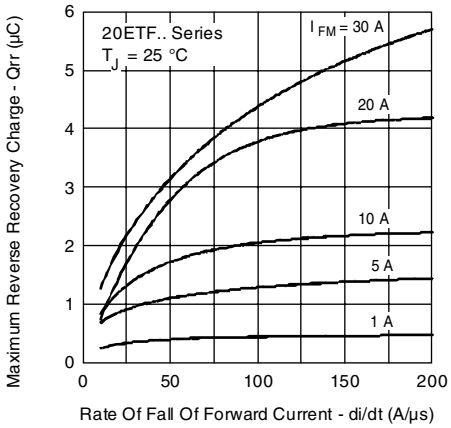


Fig. 10 - Recovery Charge Characteristics, T_J = 25°C

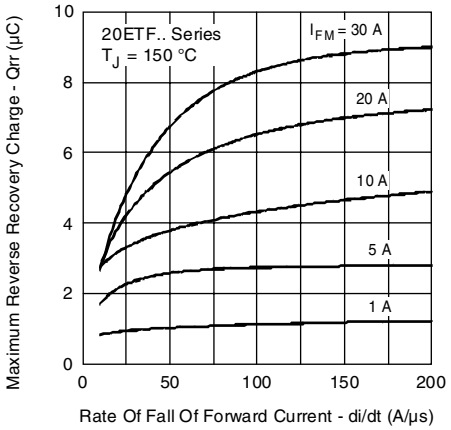


Fig. 11 - Recovery Charge Characteristics, T_J = 150°C

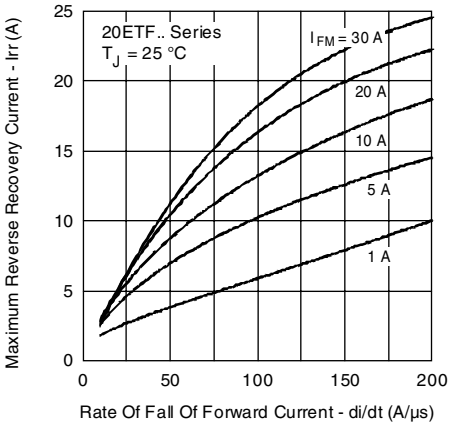


Fig. 12 - Recovery Current Characteristics, T_J = 25°C

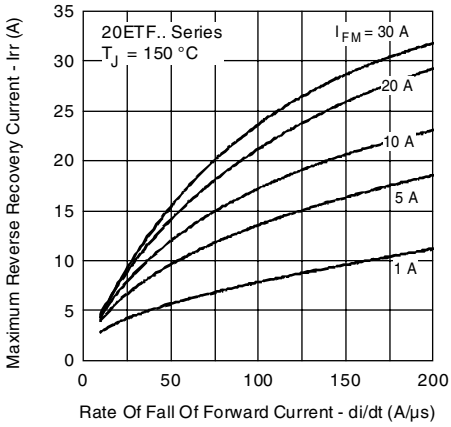


Fig. 13 - Recovery Current Characteristics, T_J = 150°C

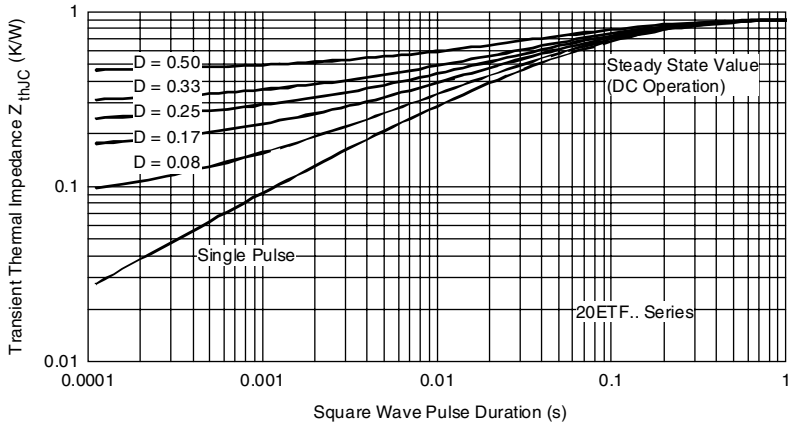


Fig. 14 - Thermal Impedance Z_{thJC} Characteristics

Ordering Information Table

Device Code

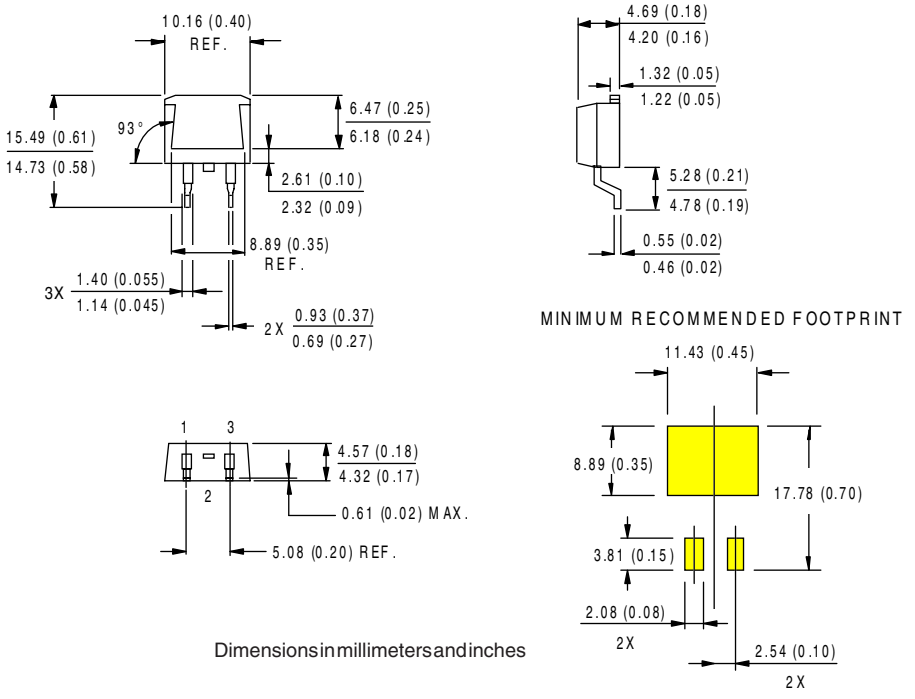
20	E	T	F	12	S	TRL
(1)	(2)	(3)	(4)	(5)	(6)	(7)

- **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}

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

- **6** - S = TO-220 D^2Pak (SMD-220) Version
- **7** - Tape and Reel Option:
  TRL = Left Reel
  TRR = Right Orientation Reel

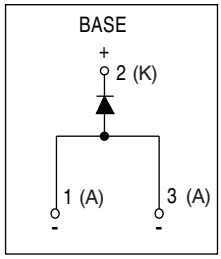
Outline Table

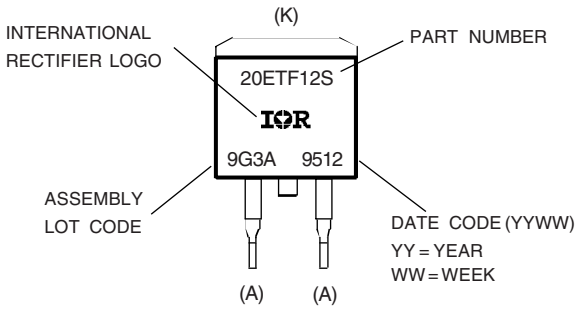


Dimensions in millimeters and inches

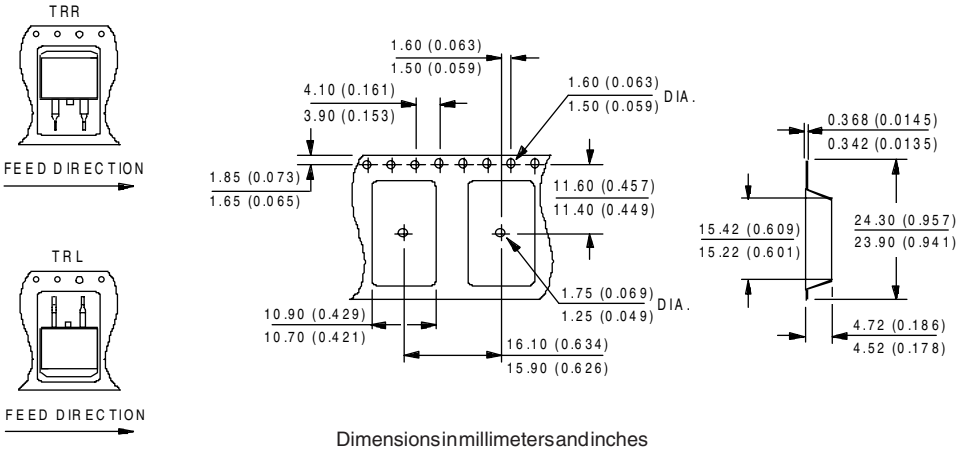
Marking Information

EXAMPLE: THIS IS AN 20ETF12S

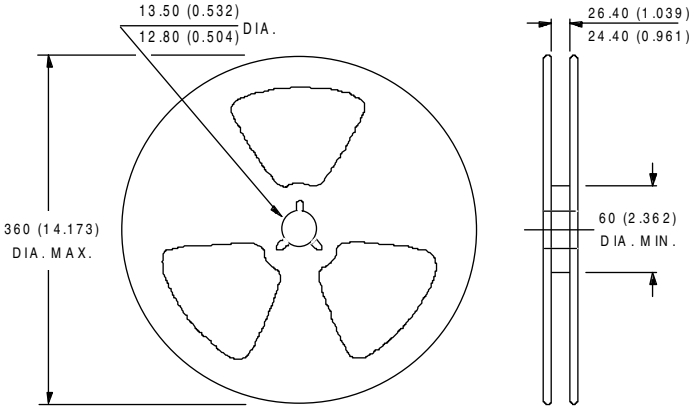




Tape & Reel Information



Dimensions in millimeters and inches



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.

International
IOR Rectifier

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.