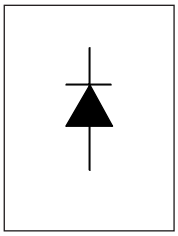
I2128 rev. A 01/2000

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.

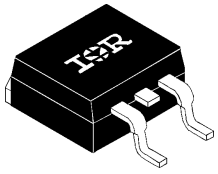
Typical applications are both:

- 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

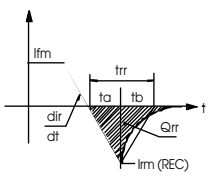
| | Parameters | 20ETF..S | Units | Conditions |
|---|---|---|---|---|
| $I_{F(AV)}$ | Max. Average Forward Current | 20 | A | @ $T_C$ = 97°C, 180° conduction half sine wave |
| $I_{FSM}$ | Max. Peak One Cycle Non-Repetitive | 300 | A | 10ms Sine pulse, rated $V_{RRM}$ applied |
| | Surge Current | 355 | | 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 | $D^2$Pak (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

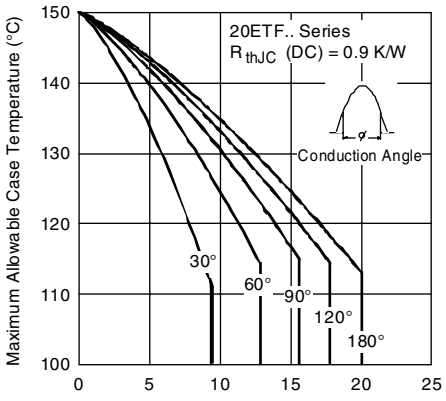



Fig. 1 - Current Rating Characteristics

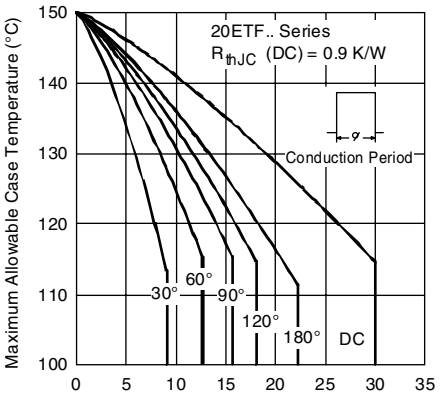



Fig. 2 - Current Rating Characteristics

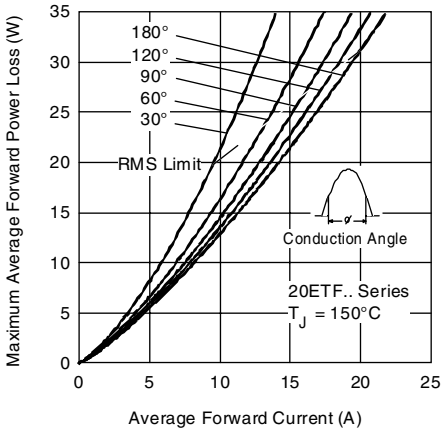



Fig. 3 - Forward Power Loss Characteristics

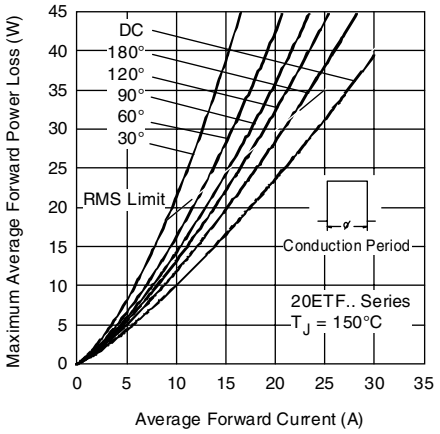



Fig. 4 - Forward Power Loss Characteristics

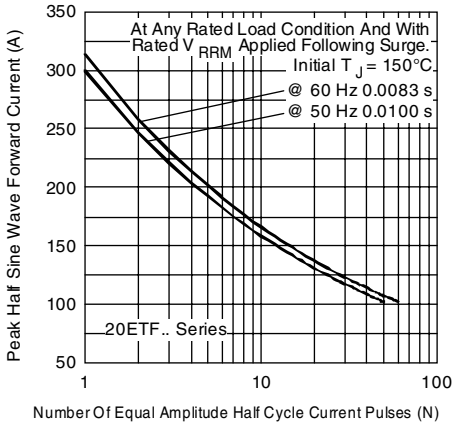



Fig. 5 - Maximum Non-Repetitive Surge Current

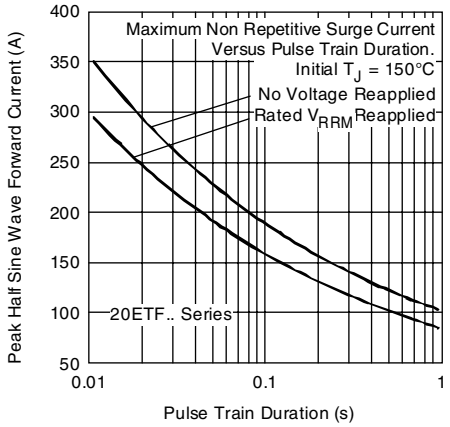



Fig. 6 - Maximum Non-Repetitive Surge Current

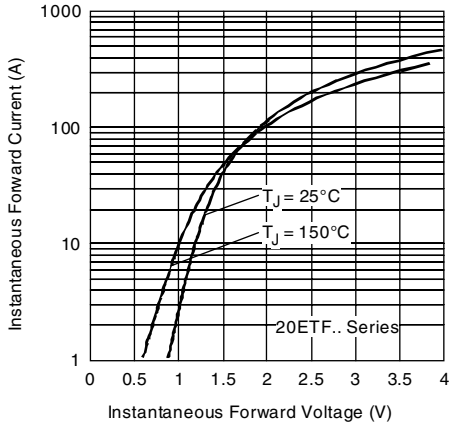



Fig. 7 - Forward Voltage Drop Characteristics

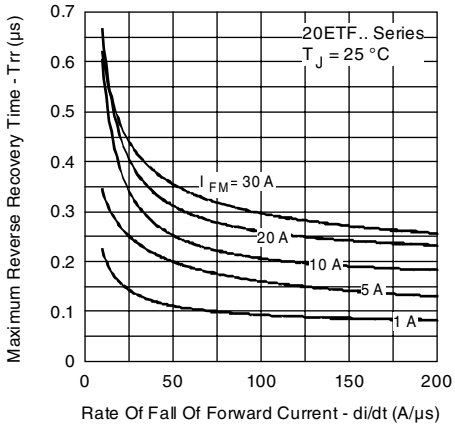



Fig. 8 - Recovery Time Characteristics, $T_J$ = 25°C

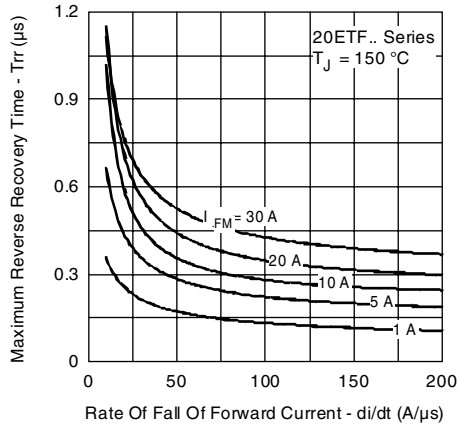



Fig. 9 - Recovery Time Characteristics, $T_J$ = 150°C

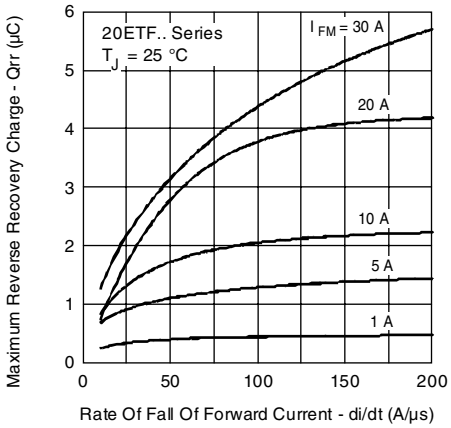



Fig. 10 - Recovery Charge Characteristics, $T_J$ = 25°C

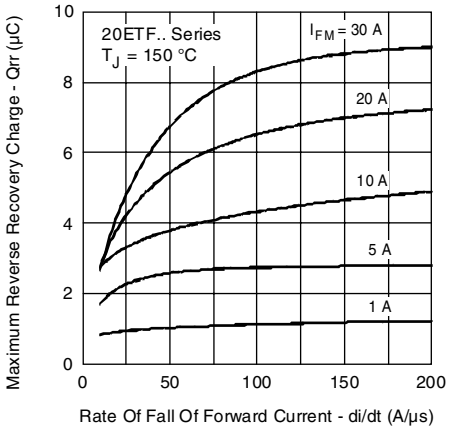



Fig. 11 - Recovery Charge Characteristics, $T_J$ = 150°C

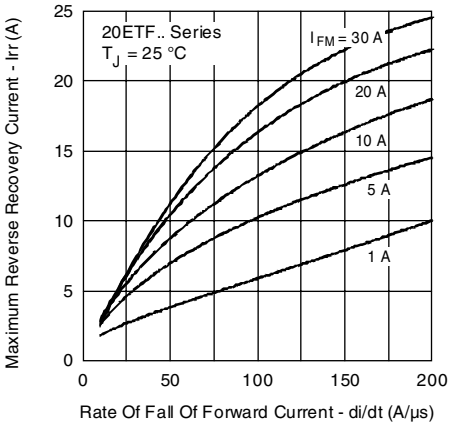



Fig. 12 - Recovery Current Characteristics, $T_J$ = 25°C

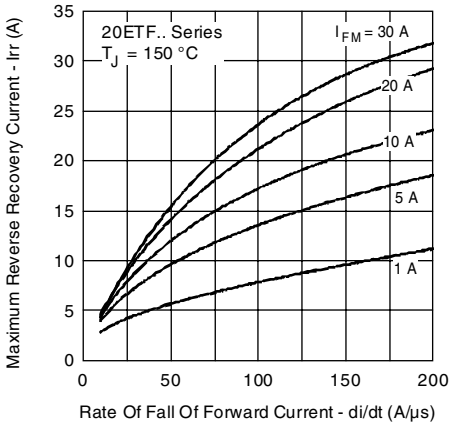



Fig. 13 - Recovery Current Characteristics, $T_J$ = 150°C

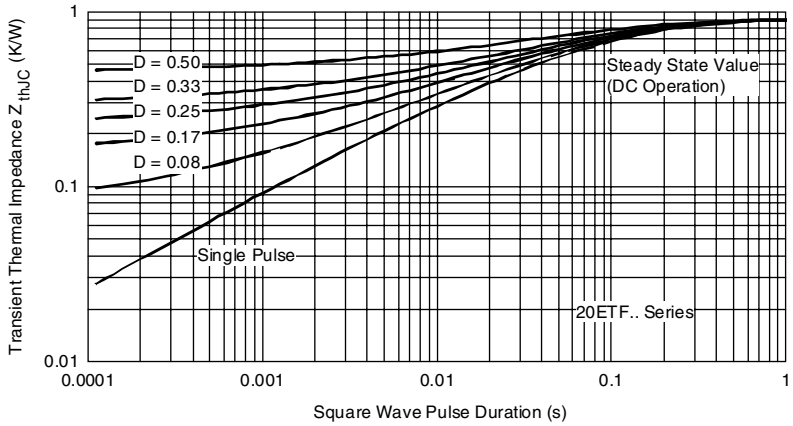



Fig. 14 - Thermal Impedance $Z_{thJC}$ Characteristics

## Ordering Information Table

**Device Code**

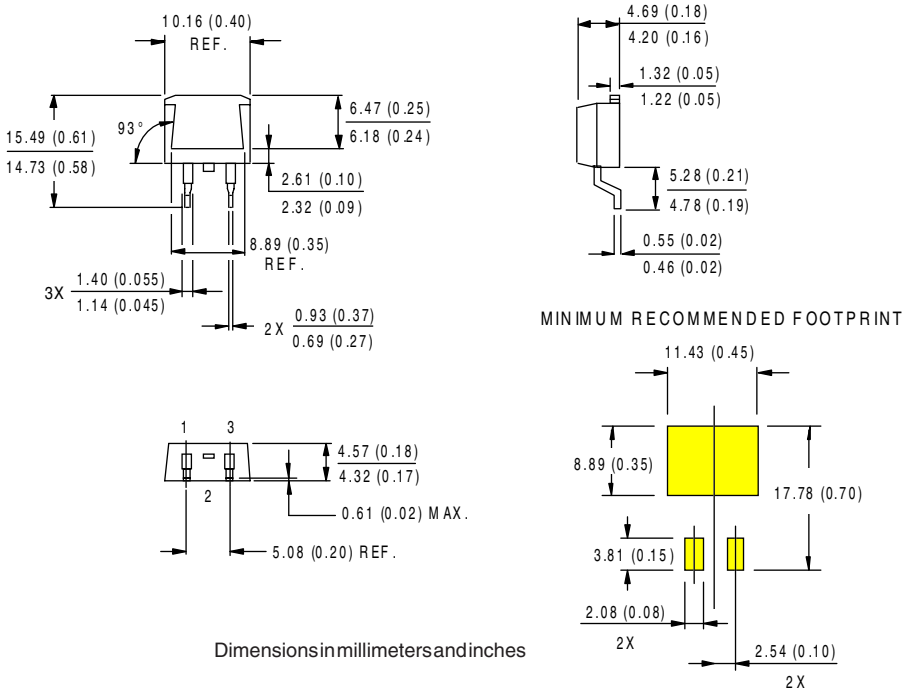
| 20 | E | T | F | 12 | S | TRL |
|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |

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

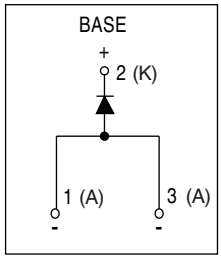
## Outline Table

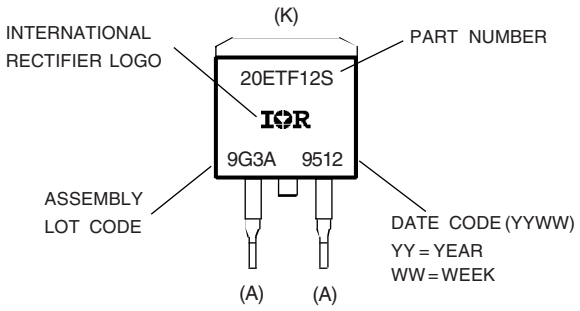



Dimensions in millimeters and inches

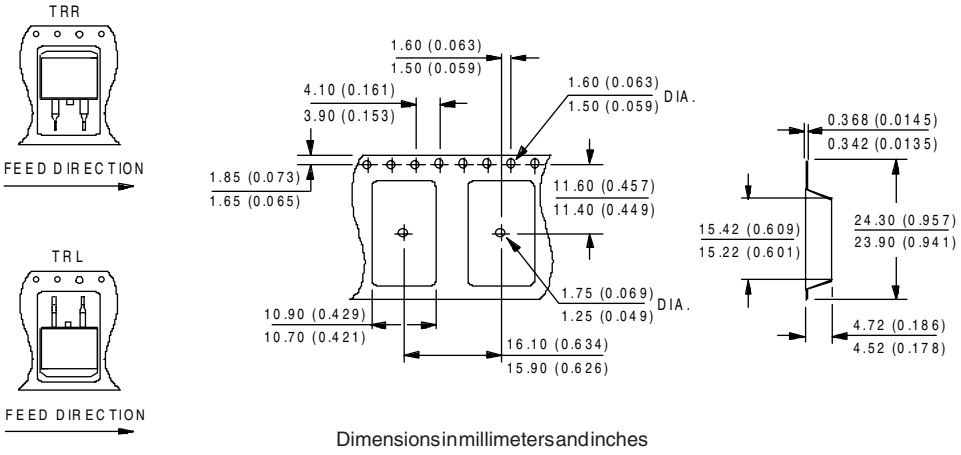
## Marking Information

EXAMPLE: THIS IS AN 20ETF12S

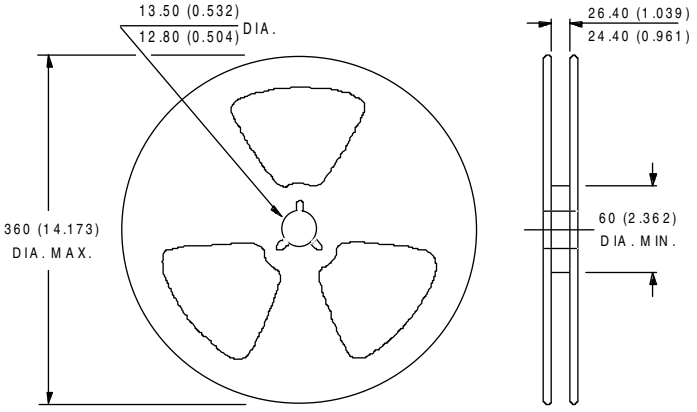



## Tape & Reel Information




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
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