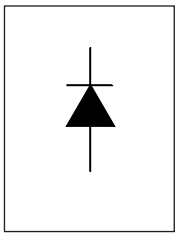
Bulletin I2101 rev. B 07/97

International
IOR Rectifier

# *SAFEIR* Series
# 20ETS..

## INPUT RECTIFIER DIODE



$V_F$ < 1V @ 10A
$I_{FSM}$ = 300A
$V_{RRM}$ 800 to 1600V

### Description/Features

The 20ETS.. rectifier *SAFEIR* series has been optimized for very low forward voltage drop, with moderate leakage. The glass passivation technology used has reliable operation up to 150°C junction temperature.

Typical applications are in input rectification and these products are designed to be used with International Rectifier Switches and Output Rectifiers which are available in identical package outlines.

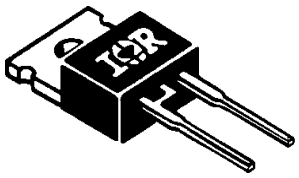
### Output Current in Typical Applications

| | Single-phase Bridge | Three-phase Bridge | Units |
|---|---|---|---|
| Capacitive input filter $T_A$ = 55°C, $T_J$ = 125°C, common heatsink of 1°C/W | 16.3 | 21 | A |

### Major Ratings and Characteristics

| Characteristics | 20ETS.. | Units |
|---|---|---|
| $I_{F(AV)}$ Sinusoidal waveform | 20 | A |
| $V_{RRM}$ | 800 to 1600 | V |
| $I_{FSM}$ | 300 | A |
| $V_F$ @10 A, $T_J$ = 25°C | 1.0 | V |
| $T_J$ | -40 to 150 | °C |

### Package Outline



**TO-220AC**

Also available in SMD-220 package (series 20ETS..S)

## 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 |
|---|---|---|---|
| 20ETS08 | 800 | 900 | 1 |
| 20ETS12 | 1200 | 1300 | |
| 20ETS16 | 1600 | 1700 | |

Provide terminal coating for voltages above 1200V

## Absolute Maximum Ratings

| | Parameters | 20ETS.. | Units | Conditions |
|---|---|---|---|---|
| $I_{F(AV)}$ | Max. Average Forward Current | 20 | A | @ $T_C$ = 105° 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 | $A^2\sqrt{s}$ | t = 0.1 to 10ms, no voltage reapplied |

## Electrical Specifications

| | Parameters | 20ETS.. | Units | Conditions | |
|---|---|---|---|---|---|
| $V_{FM}$ | Max. Forward Voltage Drop | 1.1 | V | @ 20A, $T_J$ = 25°C | |
| $r_t$ | Forward slope resistance | 10.4 | mΩ | $T_J$ = 150°C | |
| $V_{F(TO)}$ | Threshold voltage | 0.85 | V | | |
| $I_{RM}$ | Max. Reverse Leakage Current | 0.1 | mA | $T_J$ = 25 °C | $V_R$ = rated $V_{RRM}$ |
| | | 1.0 | | $T_J$ = 150 °C | |

## Thermal-Mechanical Specifications

| | Parameters | | 20ETS.. | 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 | | 1.3 | °C/W | DC operation |
| $R_{thJA}$ | Max. Thermal Resistance Junction to Ambient | | 62 | °C/W | |
| $R_{thCS}$ | Typ. Thermal Resistance Case to Heatsink | | 0.5 | °C/W | Mounting surface, smooth and greased |
| wt | Approximate Weight | | 2 (0.07) | g (oz.) | |
| T | Mounting Torque | Min. | 6 (5) | Kg-cm (lbf-in) | |
| | | Max. | 12 (10) | | |
| | Case Style | | TO-220AC | | |

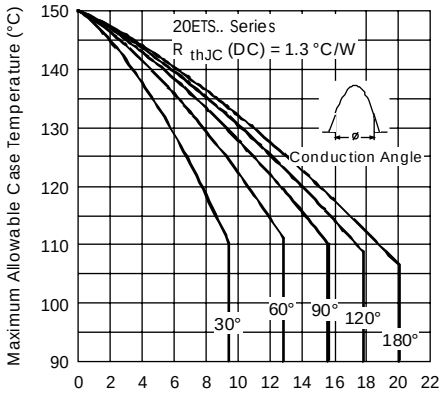



Fig.1-CurrentRatingCharacteristics

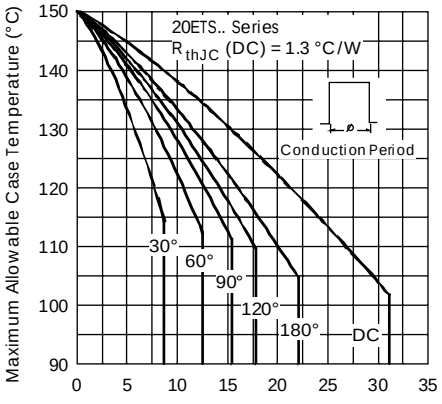



Fig.2-CurrentRatingCharacteristics

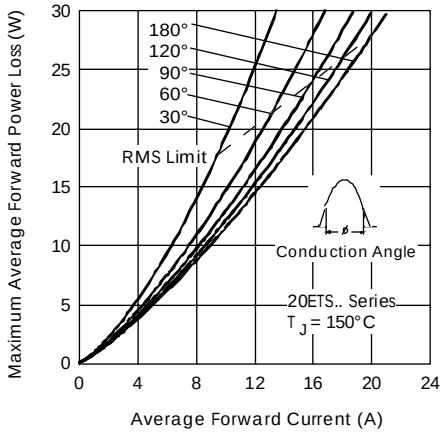



Fig.3-ForwardPowerLossCharacteristics

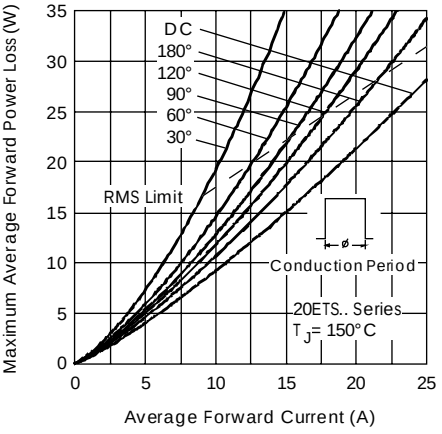



Fig.4-ForwardPowerLossCharacteristics

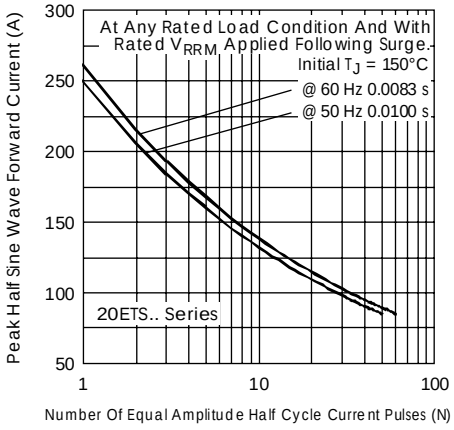



Fig. 5 - Maximum Non-Repetitive Surge Current

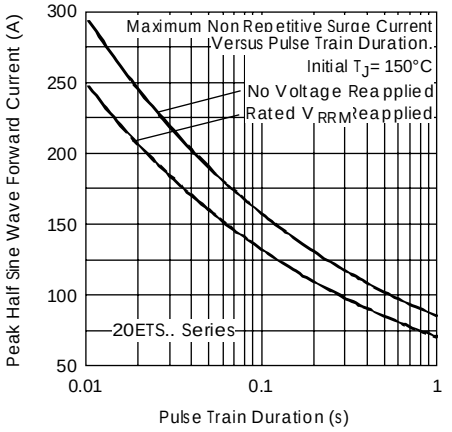



Fig. 6 - Maximum Non-Repetitive Surge Current

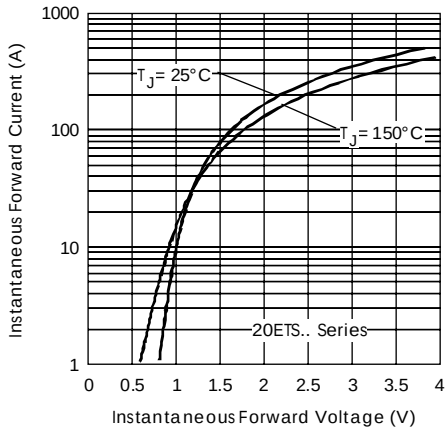



Fig. 7 - Forward Voltage Drop Characteristics

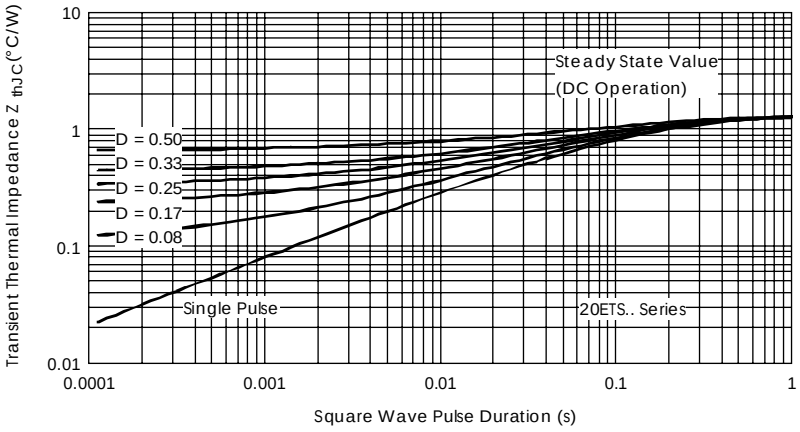
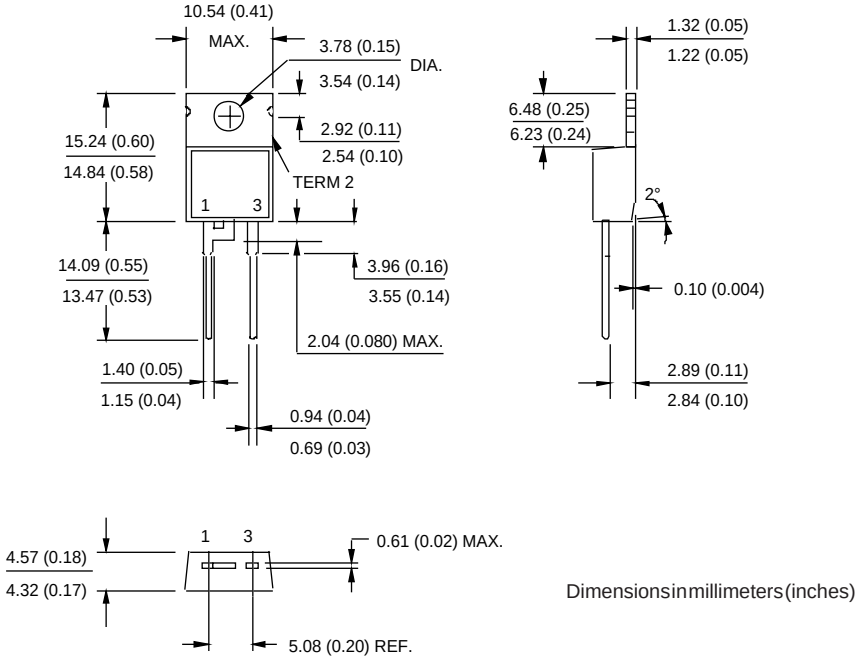



Fig. 8 - Thermal Impedance $Z_{thJC}$ Characteristics

## Outline Table

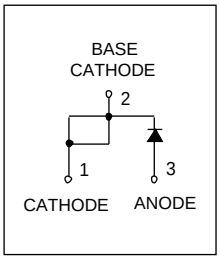



Dimensions in millimeters (inches)

## Ordering Information Table

**Device Code**

| 20 | E | T | S | 16 |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |




**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 |
| 12 | = | 1200V |
| 16 | = | 1600V |