

International **IR** Rectifier


SAFEIR Series 10ETS12, 10ETS12S

INPUT RECTIFIER DIODE

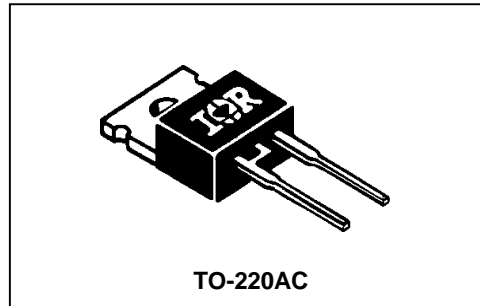
Description/Features

The 10ETS.. 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.

| | |
|---|---------------------------------|
|  | $V_F < 1V @ 10A$ |
| | $I_{FSM} = 200A$ |
| | $V_{RRM} 800 \text{ to } 1200V$ |

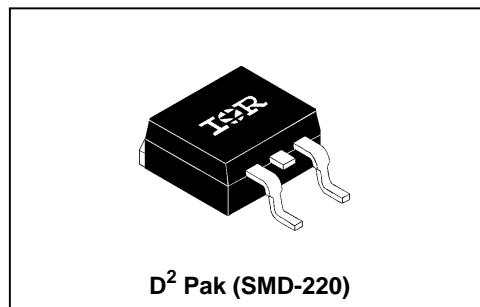
Package Outline



Major Ratings and Characteristics

| Characteristics | 10ETS.. | Units |
|---------------------------------|-------------|------------|
| $I_{F(AV)}$ Sinusoidal waveform | 10 | A |
| V_{RRM} Range | 800 to 1200 | V |
| I_{FSM} | 200 | A |
| $V_F @ 10A, T_J = 25^\circ C$ | 1.1 | V |
| T_J | -40 to 150 | $^\circ C$ |

Package Outline



Output Current in Typical Applications

| Applications | Single-phase Bridge | Three-phase Bridge | Units |
|---|---------------------|--------------------|-------|
| Capacitive input filter $T_A = 55^\circ C, T_J = 125^\circ C$ common heatsink of $1^\circ C/W$ | 12.0 | 16.0 | A |

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 |
|-------------------|---|--|--------------------------|
| 10ETS08, 10ETS08S | 800 | 900 | 0.5 |
| 10ETS12, 10ETS12S | 1200 | 1300 | |

Absolute Maximum Ratings

| Parameters | 10ETS.. | Units | Conditions |
|--|---------|---------------|--|
| $I_{F(AV)}$ Max. Average Forward Current | 10 | A | @ $T_C = 105^\circ\text{C}$, 180° conduction half sine wave |
| I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current | 170 | A | 10ms Sine pulse, rated V_{RRM} applied |
| | 200 | | 10ms Sine pulse, no voltage reapplied |
| I^2t Max. I^2t for fusing | 130 | A^2s | 10ms Sine pulse, rated V_{RRM} applied |
| | 145 | | 10ms Sine pulse, no voltage reapplied |
| $I^2\sqrt{t}$ Max. $I^2\sqrt{t}$ for fusing | 1450 | $A^2\sqrt{s}$ | t = 0.1 to 10ms, no voltage reapplied |

Electrical Specifications

| Parameters | 10ETS.. | Units | Conditions |
|---------------------------------------|---------|-------|---------------------------------|
| V_{FM} Max. Forward Voltage Drop | 1.1 | V | @ 10A, $T_J = 25^\circ\text{C}$ |
| r_t Forward slope resistance | 20 | mΩ | $T_J = 150^\circ\text{C}$ |
| $V_{F(TO)}$ Threshold voltage | 0.82 | V | |
| I_{RM} Max. Reverse Leakage Current | 0.05 | mA | $T_J = 25^\circ\text{C}$ |
| | 0.50 | | $T_J = 150^\circ\text{C}$ |

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

Thermal-Mechanical Specifications

| Parameters | 10ETS.. | 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 | 2.5 | °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 | TO-220AC, D ² Pak (SMD-220) | | |

* 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

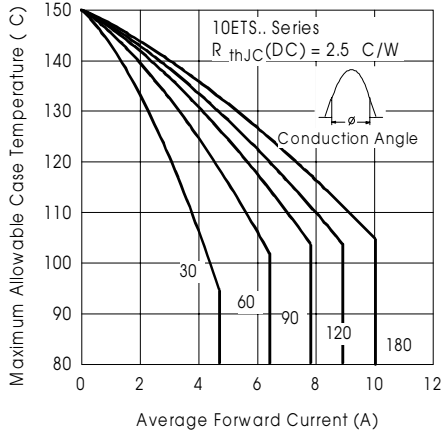


Fig. 1 - Current Rating Characteristics

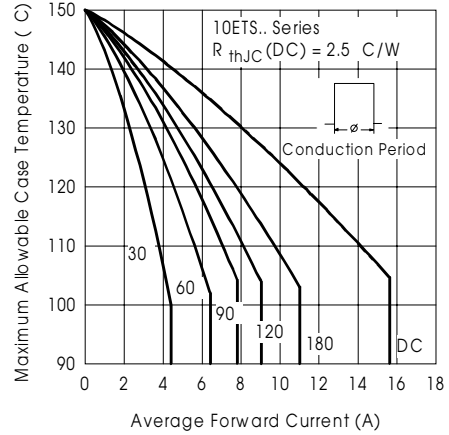


Fig. 2 - Current Rating Characteristics

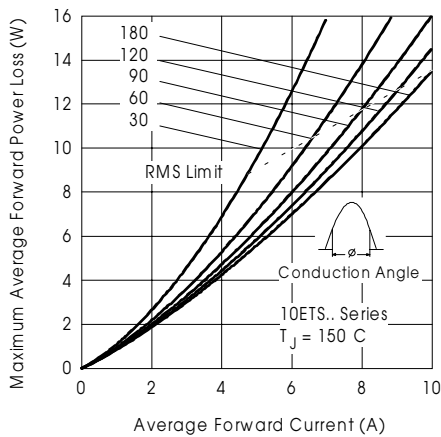


Fig. 3 - Forward Power Loss Characteristics

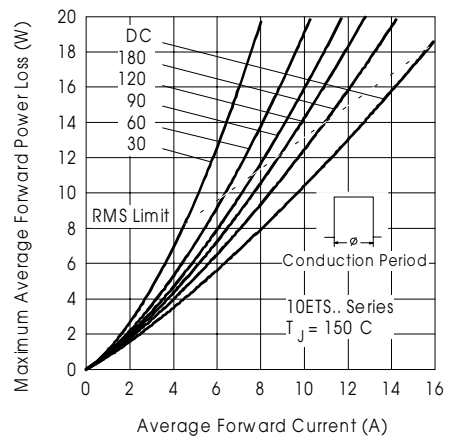


Fig. 4 - Forward Power Loss Characteristics

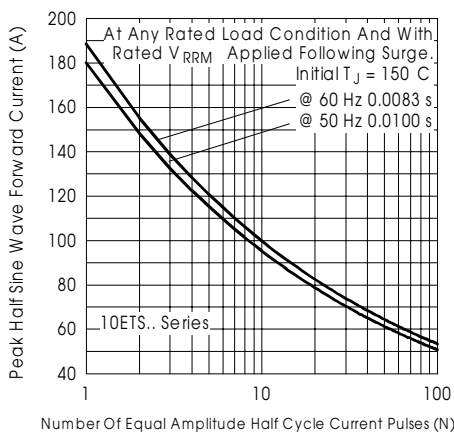


Fig. 5 - Maximum Non-Repetitive Surge Current

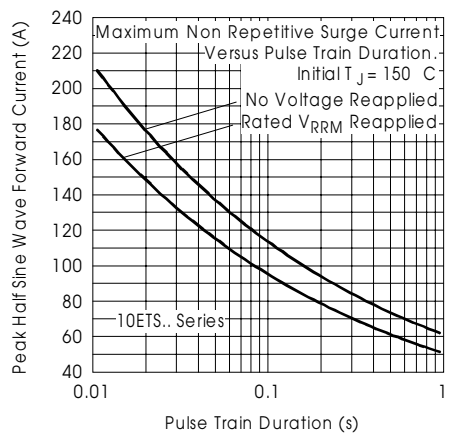


Fig. 6 - Maximum Non-Repetitive Surge Current

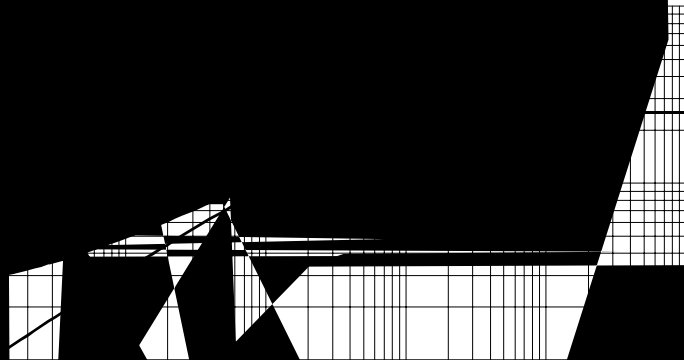
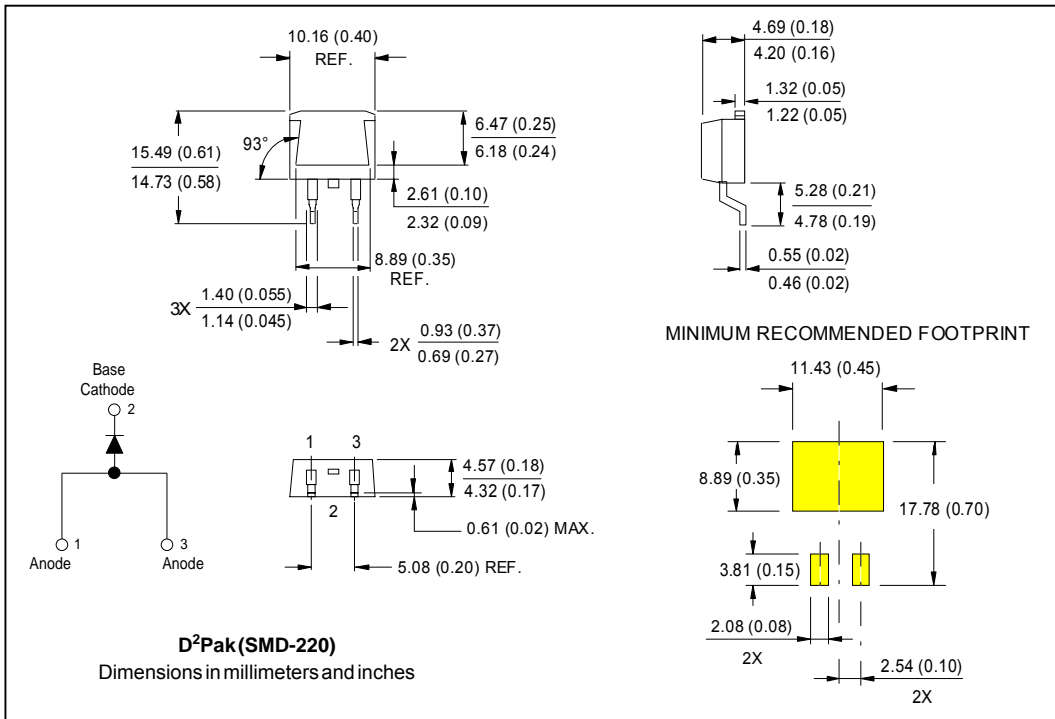
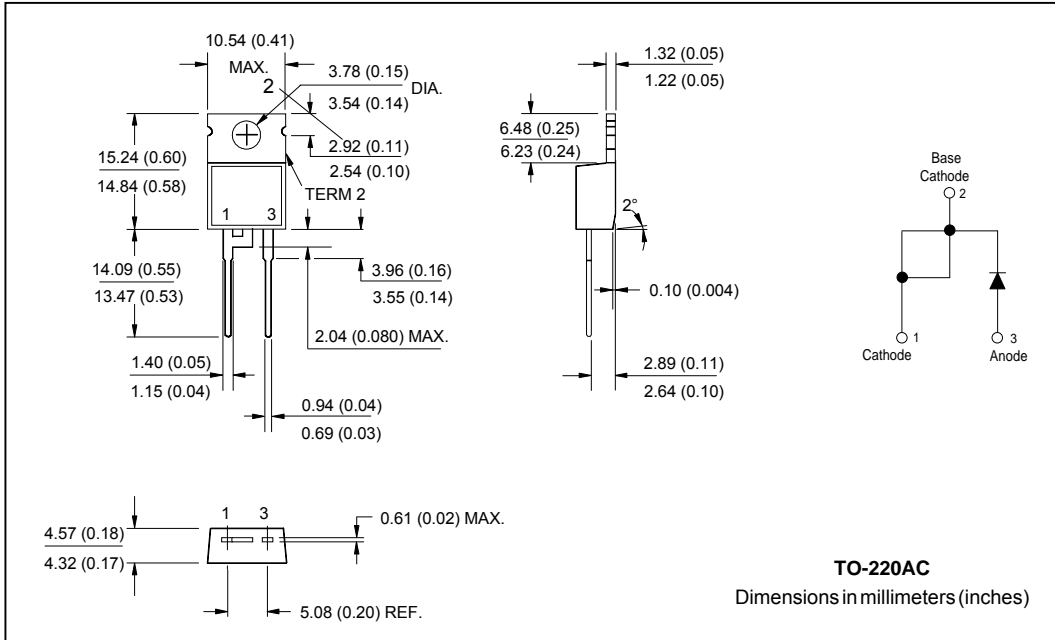


Fig. 9- Thermal Impedance Z_{thJC} Characteristics

Outline Table



Ordering Information Table

| Device Code | | | | | | | | | | | | | | | |
|-------------|---|----|---|----|---|-----|---|-----|---|---|---|---|---|---|---|
| | <table border="1" style="margin: auto;"> <tr> <td style="padding: 5px;">10</td> <td style="padding: 5px;">E</td> <td style="padding: 5px;">T</td> <td style="padding: 5px;">S</td> <td style="padding: 5px;">12</td> <td style="padding: 5px;">S</td> <td style="padding: 5px;">TRL</td> </tr> <tr> <td style="text-align: center;">①</td> <td style="text-align: center;">②</td> <td style="text-align: center;">③</td> <td style="text-align: center;">④</td> <td style="text-align: center;">⑤</td> <td style="text-align: center;">⑥</td> <td style="text-align: center;">⑦</td> </tr> </table> | 10 | E | T | S | 12 | S | TRL | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| 10 | E | T | S | 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} | | | | | | | | | | | | | | |
| 6 | - S = TO-220 D ² Pak (SMD-220) Version | | | | | | | | | | | | | | |
| 7 | - Tape and Reel Option TRL = Left Reel TRR = Right Orientation Reel | | | | | | | | | | | | | | |

| |
|------------|
| 08 = 800V |
| 12 = 1200V |

Data and specifications subject to change without notice.
 This product has been designed and qualified for Industrial Level.
 Qualification Standards can be found on IR's Web site.