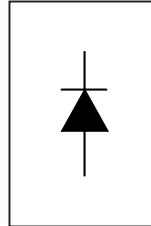


International  
**IR** Rectifier

## SAFEIR Series 10ETS12SPbF

### INPUT RECTIFIER DIODE Lead-Free ("PbF" suffix)



$$V_F < 1V @ 10A$$

$$I_{FSM} = 200A$$

$$V_{RRM} = 1200V$$

#### Description/ Features

The 10ETS12SPbF 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

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

#### Major Ratings and Characteristics

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

#### Package Outline



## 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
10ETS12SPbF	1200	1300	0.5

## Absolute Maximum Ratings

Parameters	Values	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	Values	Units	Conditions
$V_{FM}$ Max. Forward Voltage Drop	1.1	V	@ 10A, $T_J = 25^\circ\text{C}$
$r_t$ Forward slope resistance	20	$m\Omega$	$T_J = 150^\circ\text{C}$
$V_{F(TO)}$ 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	Values	Units	Conditions
$T_J$ Max. Junction Temperature Range	-40 to 150	$^\circ\text{C}$	
$T_{stg}$ Max. Storage Temperature Range	-40 to 150	$^\circ\text{C}$	
$R_{thJC}$ Max. Thermal Resistance Junction to Case	2.5	$^\circ\text{C}/\text{W}$	DC operation
$R_{thJA}$ Max. Thermal Resistance Junction to Ambient (PCB Mount)*	62	$^\circ\text{C}/\text{W}$	
$T_s$ Soldering Temperature	240	$^\circ\text{C}$	
wt Approximate Weight	2 (0.07)	g (oz.)	
Case Style	D <sup>2</sup> Pak (SMD-220)		
Device Marking	10ETS12S		

\* When mounted on 1" square (650mm<sup>2</sup>) PCB of FR-4 or G-10 material 4 oz (140 $\mu\text{m}$ ) copper 40 $^\circ\text{C}/\text{W}$   
For recommended footprint and soldering techniques refer to application note #AN-994

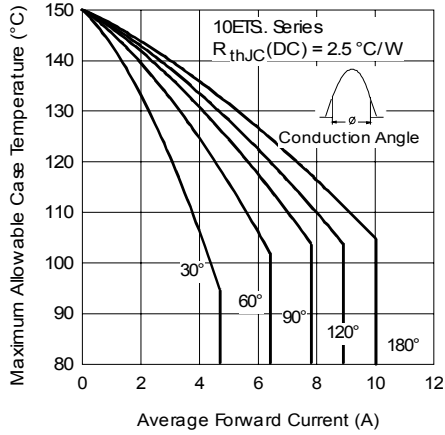


Fig. 1 - Current Rating Characteristics

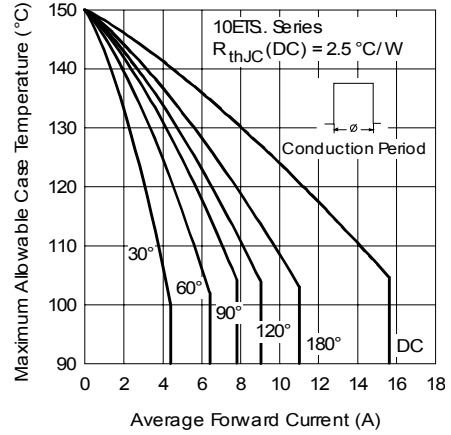


Fig. 2 - Current Rating Characteristics

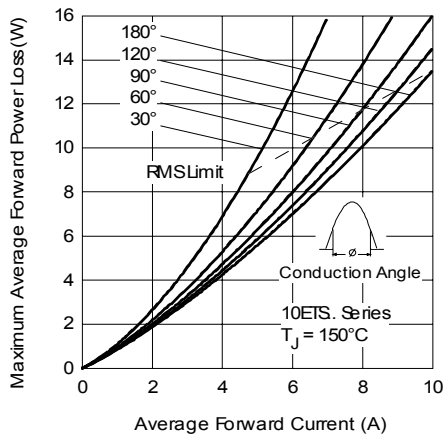


Fig. 3 - Forward Power Loss Characteristics

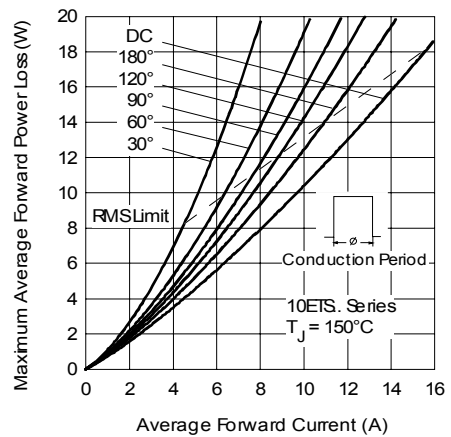


Fig. 4 - Forward Power Loss Characteristics

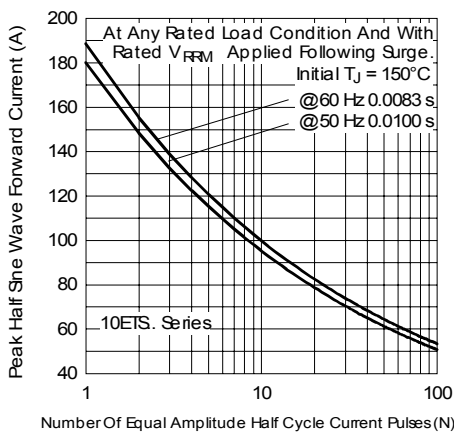


Fig. 5 - Maximum Non-Repetitive Surge Current

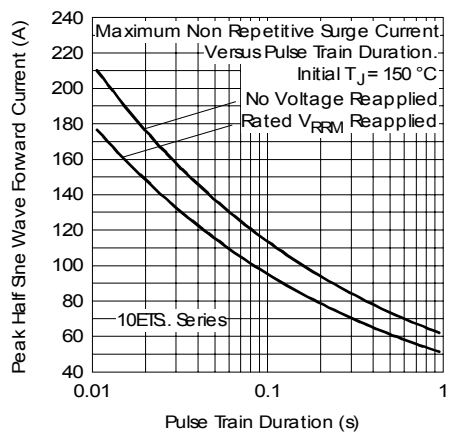


Fig. 6 - Maximum Non-Repetitive Surge Current

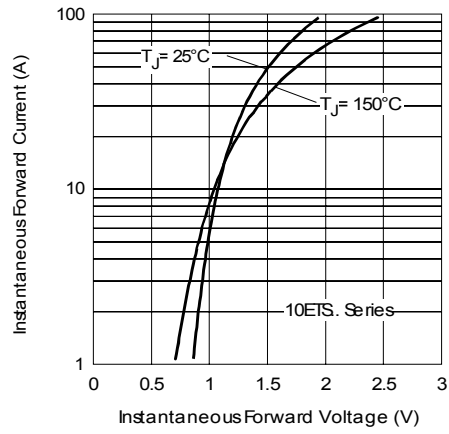


Fig. 8 - Forward Voltage Drop Characteristics

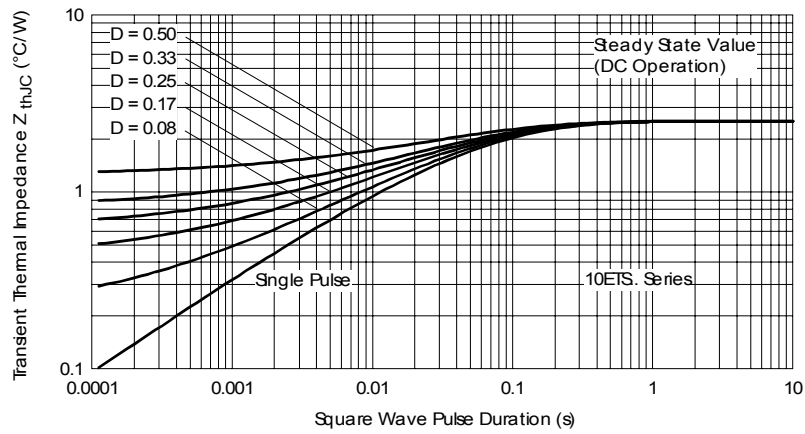
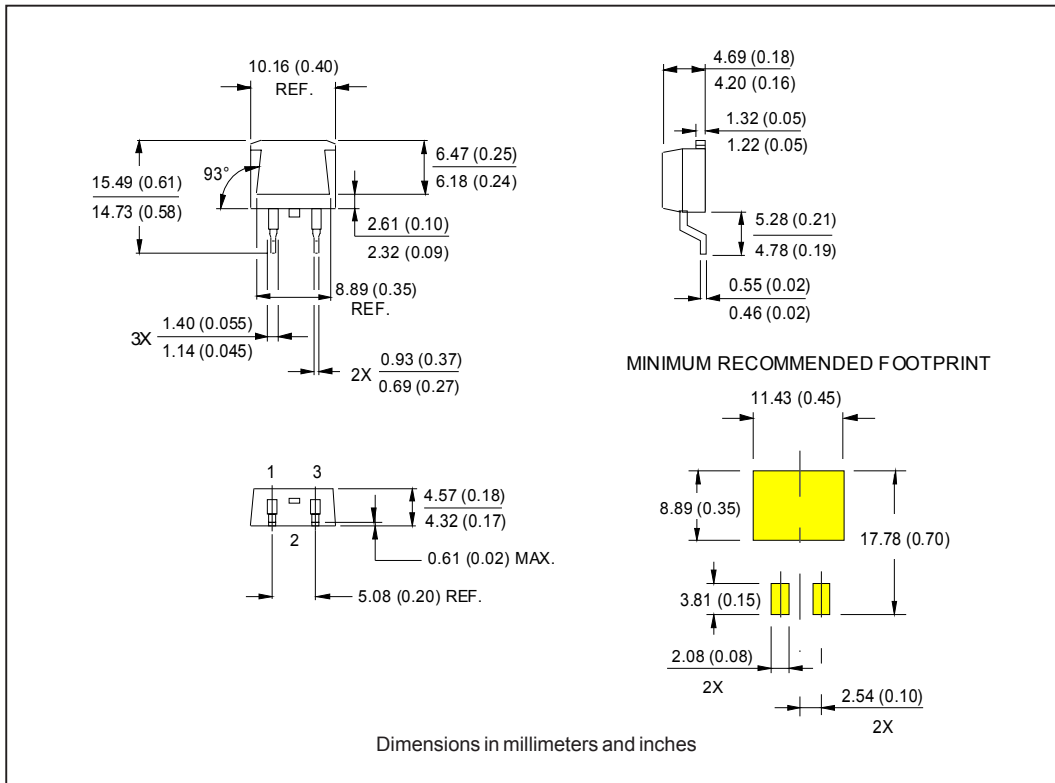
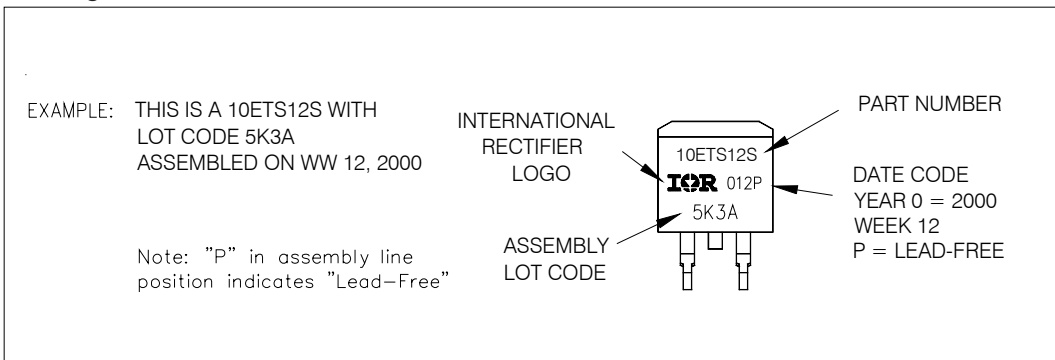


Fig. 9 - Thermal Impedance  $Z_{thJC}$  Characteristics

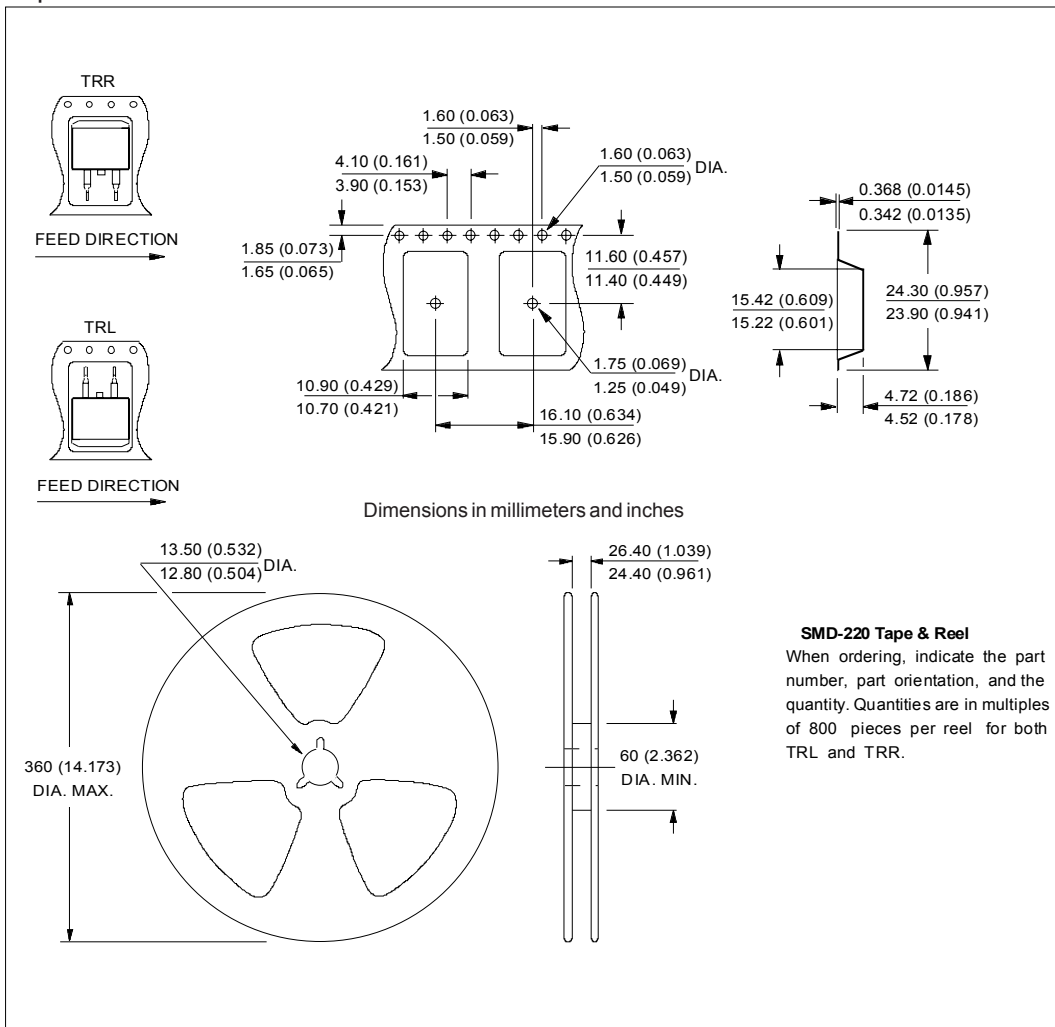
Outline Table



Marking Information



Tape & Reel Information



Ordering Information Table

Device Code																	
	<table border="1" style="display: inline-table; border-collapse: collapse;"> <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;">TR</td> <td style="padding: 5px;">PbF</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> <td style="text-align: center;">⑧</td> </tr> </table>	10	E	T	S	12	S	TR	PbF	①	②	③	④	⑤	⑥	⑦	⑧
10	E	T	S	12	S	TR	PbF										
①	②	③	④	⑤	⑥	⑦	⑧										
<b>1</b>	- Current Rating (10 = 10A)																
<b>2</b>	- Circuit Configuration E = Single Diode																
<b>3</b>	- Package T = TO-220AC																
<b>4</b>	- Type of Silicon S = Standard Recovery Rectifier																
<b>5</b>	- Voltage Rating (12 = 1200V)																
<b>6</b>	- S = TO-220 D <sup>2</sup> Pak (SMD-220) Version																
<b>7</b>	- <ul style="list-style-type: none"> <li>• none = Tube</li> <li>• TRL = Tape &amp; Reel (Left Oriented)</li> <li>• TRR = Tape &amp; Reel (Right Oriented)</li> </ul>																
<b>8</b>	- <ul style="list-style-type: none"> <li>• none = Standard Production</li> <li>• PbF = Lead-Free</li> </ul>																

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