

POWER SCHOTTKY RECTIFIER

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	10 A
V_{RRM}	45 V
V_F	0.57 V

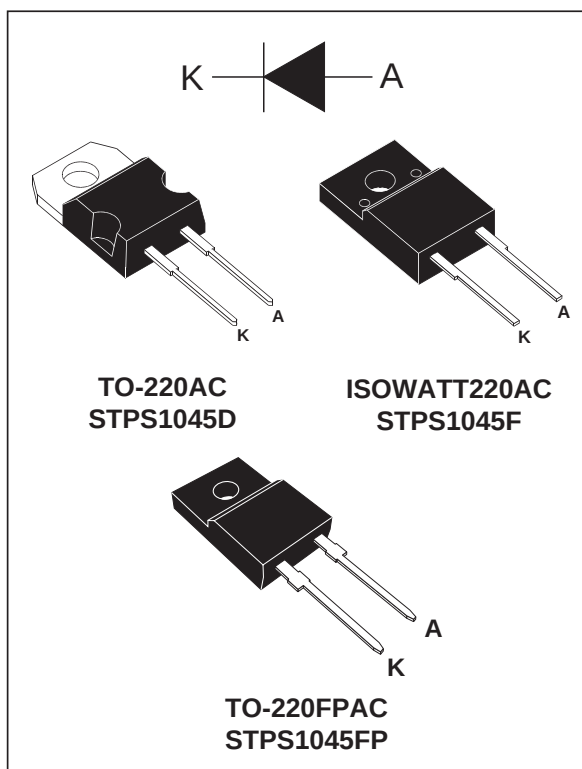
FEATURES AND BENEFITS

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- EXTREMELY FAST SWITCHING
- LOW FORWARD VOLTAGE DROP
- INSULATED PACKAGE: ISOWATT220AC, TO-220FPAC
Insulating voltage = 2000V DC
Capacitance = 12pF
- AVALANCHE CAPABILITY SPECIFIED

DESCRIPTION

Single chip Schottky rectifier suited for Switch Mode Power Supply and high frequency DC to DC converters.

This device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.



ABSOLUTE RATINGS (limiting values)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			45	V
$I_{F(RMS)}$	RMS forward current			30	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	TO-220AC	$T_c = 150^\circ\text{C}$	10	A
		ISOWATT220AC TO-220FPAC	$T_c = 145^\circ\text{C}$		
I_{FSM}	Surge non repetitive forward current		$t_p = 10 \text{ ms}$ Sinusoidal	180	A
I_{RRM}	Repetitive peak reverse current		$t_p = 2 \mu\text{s}$ $F = 1 \text{ KHz}$	1	A
P_{ARM}	Repetitive peak avalanche power		$t_p = 1 \mu\text{s}$ $T_j = 25^\circ\text{C}$	4000	W
T_{stg}	Storage temperature range			- 65 to + 175	$^\circ\text{C}$
T_j	Maximum junction temperature			175	$^\circ\text{C}$
dV/dt	Critical rate of rise of reverse voltage			10000	V/ μs

STPS1045D/F/FP

THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AC	2.2	$^{\circ}\text{C/W}$
		ISOWATT220AC TO-220FPAC	4.5	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Tests Conditions		Min.	Typ.	Max.	Unit
I_R^*	Reverse leakage current	$T_j = 25^{\circ}\text{C}$	$V_R = V_{RRM}$			100	μA
		$T_j = 125^{\circ}\text{C}$				15	mA
V_F^{**}	Forward voltage drop	$T_j = 25^{\circ}\text{C}$	$I_F = 20\text{ A}$			0.84	V
		$T_j = 125^{\circ}\text{C}$	$I_F = 20\text{ A}$			0.72	
		$T_j = 125^{\circ}\text{C}$	$I_F = 10\text{ A}$			0.60	

Pulse test : * $t_p = 5\text{ ms}$, $\delta < 2\%$

** $t_p = 380\text{ }\mu\text{s}$, $\delta < 2\%$

To evaluate the conduction losses use the following equation :

$$P = 0.42 \times I_{F(AV)} + 0.015 I_{F(RMS)}^2$$

Fig. 1: Average forward power dissipation versus average forward current.

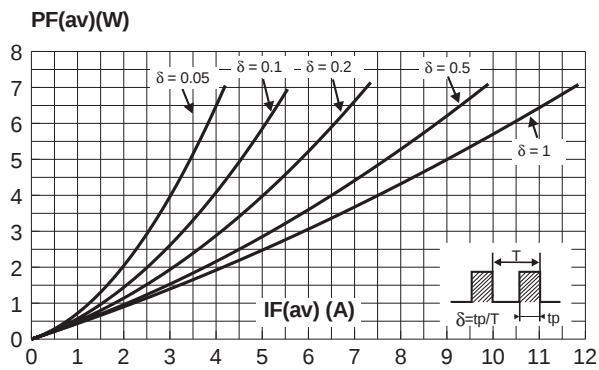


Fig. 2: Average current versus ambient temperature ($\delta : 0.5$).

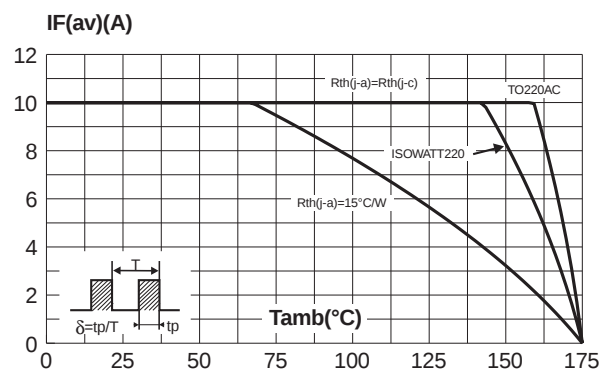


Fig. 3: Normalized avalanche power derating versus pulse duration.

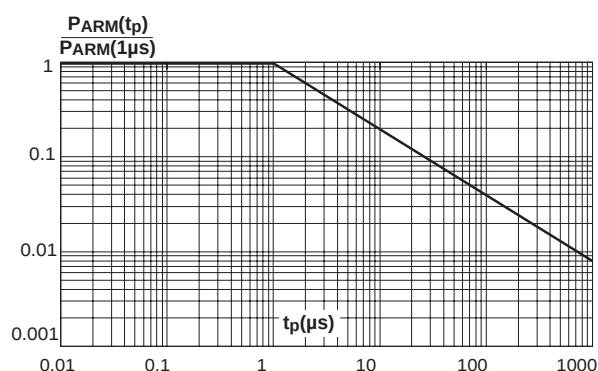


Fig. 4: Normalized avalanche power derating versus junction temperature.

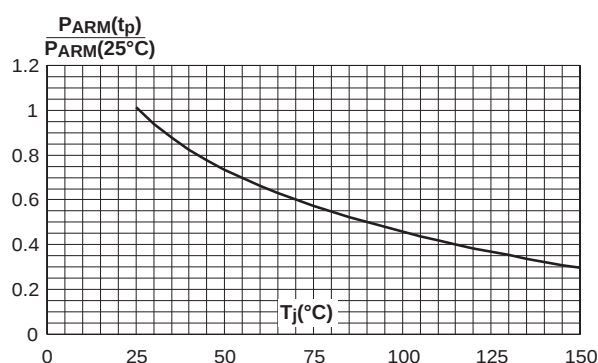


Fig. 5-1: Non repetitive surge peak forward current versus overload duration (maximum values) (TO-220AC).

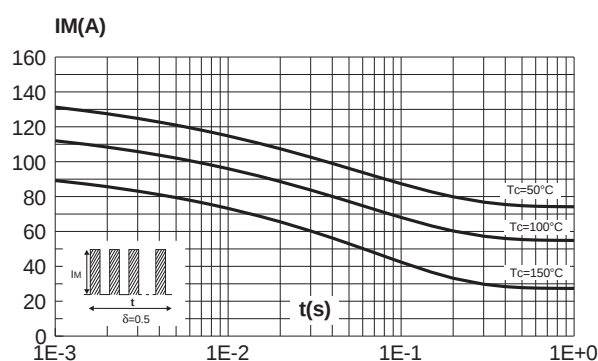


Fig. 5-2: Non repetitive surge peak forward current versus overload duration (maximum values) (ISOWATT220AC, TO-220FPAC).

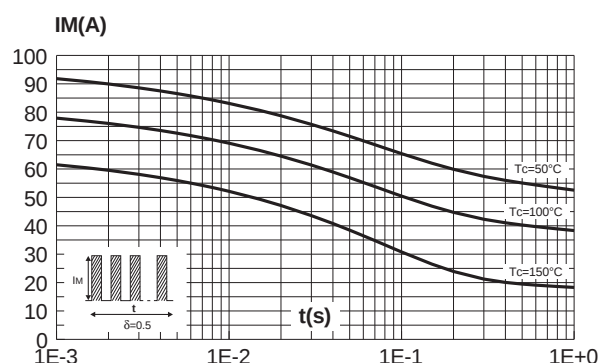


Fig. 6-1: Relative variation of thermal transient impedance junction to case versus pulse duration (TO-220AC).

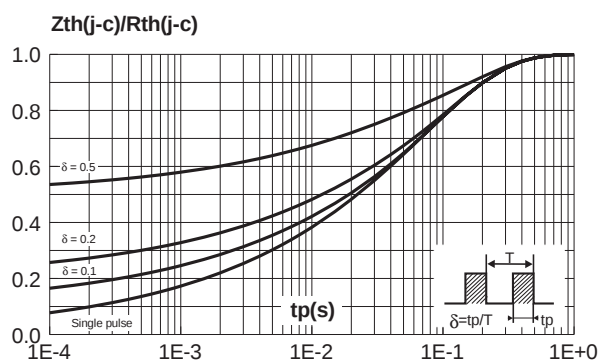


Fig. 6-2: Relative variation of thermal transient impedance junction to case versus pulse duration (ISOWATT220AC, TO-220FPAC).

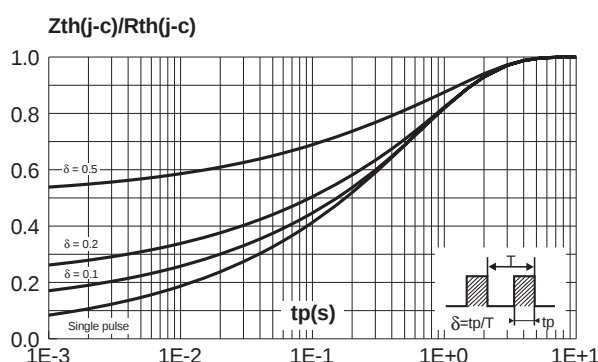


Fig. 7: Reverse leakage current versus reverse voltage applied (typical values).

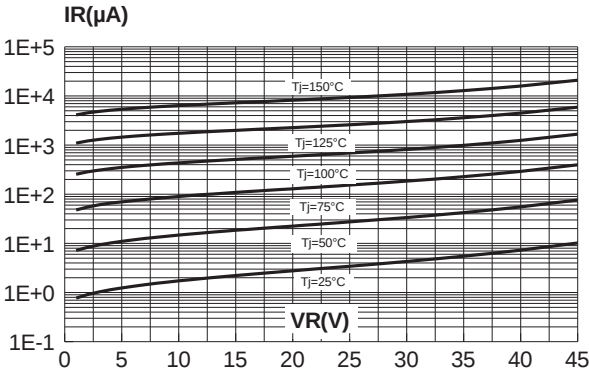


Fig. 8: Junction capacitance versus reverse voltage applied (typical values).

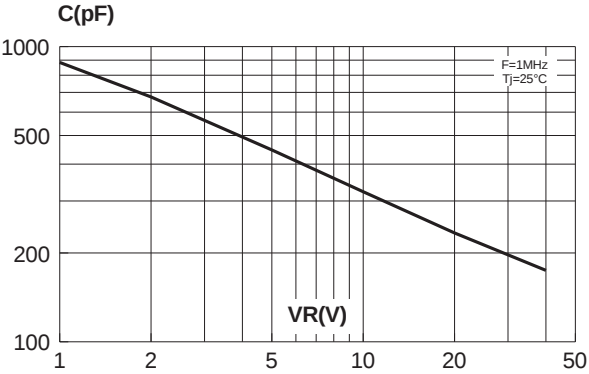
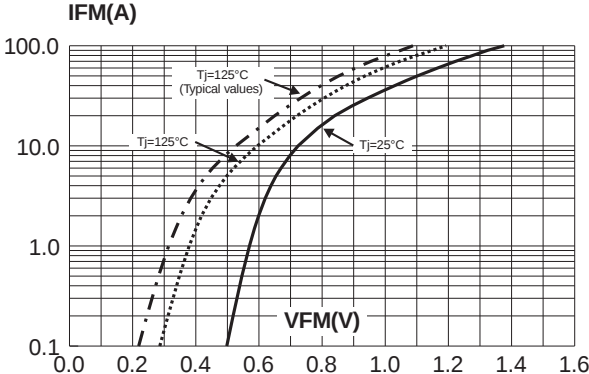


Fig. 9: Forward voltage drop versus forward current (maximum values).

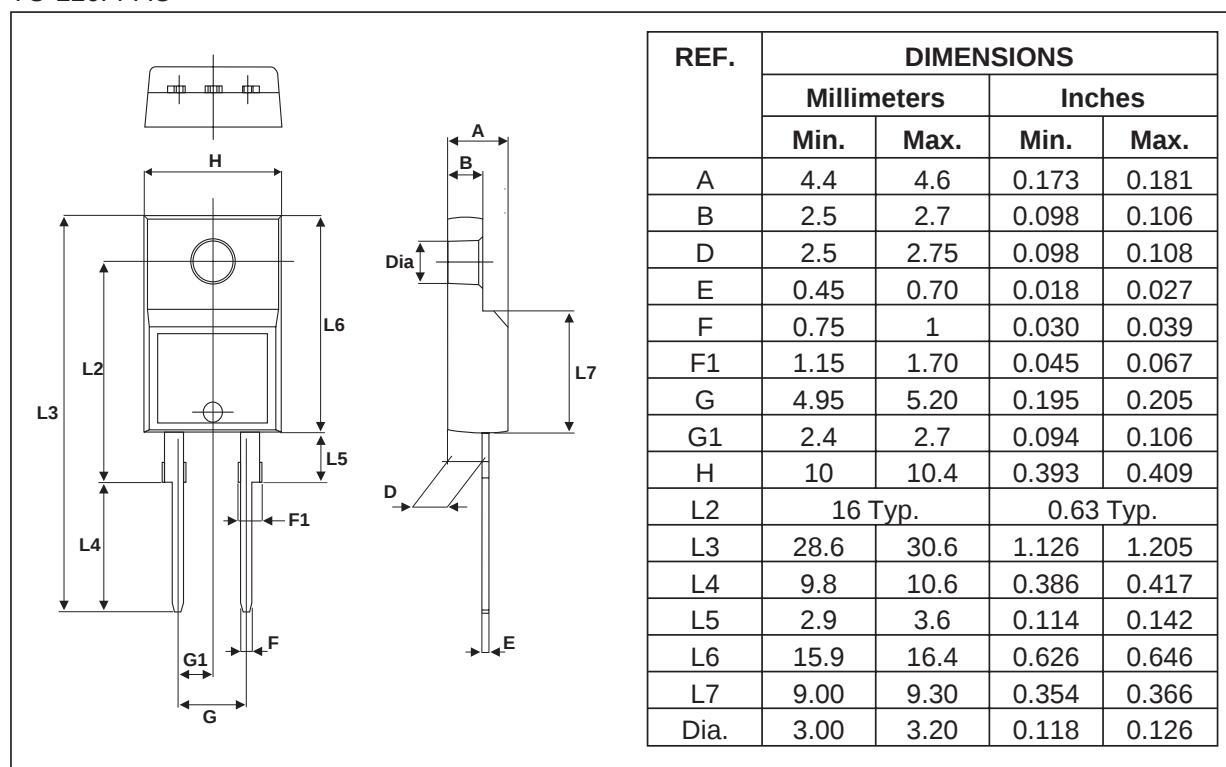


PACKAGE MECHANICAL DATA
 TO-220AC

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
C	1.23	1.32	0.048	0.051
D	2.40	2.72	0.094	0.107
E	0.49	0.70	0.019	0.027
F	0.61	0.88	0.024	0.034
F1	1.14	1.70	0.044	0.066
G	4.95	5.15	0.194	0.202
H2	10.00	10.40	0.393	0.409
L2	16.40 typ.		0.645 typ.	
L4	13.00	14.00	0.511	0.551
L5	2.65	2.95	0.104	0.116
L6	15.25	15.75	0.600	0.620
L7	6.20	6.60	0.244	0.259
L9	3.50	3.93	0.137	0.154
M	2.6 typ.		0.102 typ.	
Diam. I	3.75	3.85	0.147	0.151

PACKAGE MECHANICAL DATA
 ISOWATT220AC

REF.	DIMENSIONS					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
B	2.50		2.70	0.098		0.106
D	2.40		2.75	0.094		0.108
E	0.40		0.70	0.016		0.028
F	0.75		1.00	0.030		0.039
F1	1.15		1.70	0.045		0.067
G	4.95		5.20	0.195		0.205
H	10.00		10.40	0.394		0.409
L2		16.00			0.630	
L3	28.60		30.60	1.125		1.205
L6	15.90		16.40	0.626		0.646
L7	9.00		9.30	0.354		0.366
Diam	3.00		3.20	0.118		0.0126

PACKAGE MECHANICAL DATA
 TO-220FPAC


Type	Marking	Package	Weight	Base Qty	Delivery Mode
STPS1045D	STPS1045D	TO-220AC	1.86 g	50	Tube
STPS1045F	STPS1045F	ISOWATT220AC	2 g	50	Tube
STPS1045FP	STPS1045FP	TO-220FPAC	1.9 g	50	Tube

- Epoxy meets UL94, V0

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics

© 2003 STMicroelectronics - Printed in Italy - All rights reserved.

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - Finland - France - Germany
 Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore
 Spain - Sweden - Switzerland - United Kingdom - United States.

<http://www.st.com>