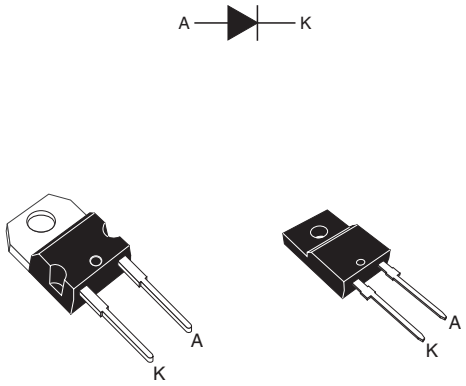
STPS1045

Power Schottky rectifier

Main product characteristics

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



TO-220AC
STPS1045D

TO-220FPAC
STPS1045FP

Features and Benefits

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low forward voltage drop
- Insulated package: TO-220FPAC
  Insulating voltage = 2000V DC
  Capacitance = 12 pF
- 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.

1 Characteristics

Table 1. Absolute Ratings (limiting values)

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

Table 2. Thermal resistances

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

Table 3. Static electrical characteristics

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	$T_j = 25°$ C	$V_R = V_{RRM}$			100	µA
		$T_j = 125°$ C				15	mA
V_F(2)	Forward voltage drop	$T_j = 25°$ C	$I_F = 20$ A			0.84	V
		$T_j = 125°$ C	$I_F = 20$ A			0.72	
		$T_j = 125°$ C	$I_F = 10$ A			0.60	

1. Pulse test: tp = 5 ms, $\delta < 2\%$
2. Pulse test: tp = 380 µs, $\delta < 2\%$

To evaluate the conduction losses use the following equation:
$P = 0.42 \times I_{F(AV)} + 0.015\ I_F{}^2{}_{(RMS)}$

Figure 1. Average forward power dissipation versus average forward current

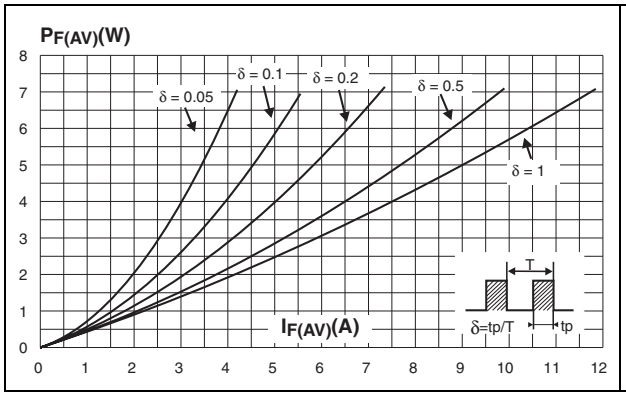


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

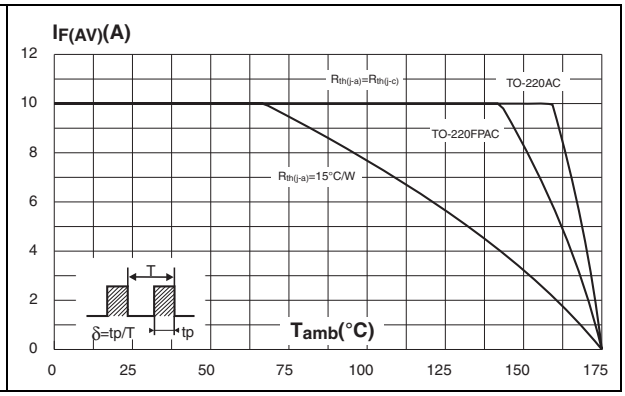


Figure 3. Normalized avalanche power derating versus pulse duration

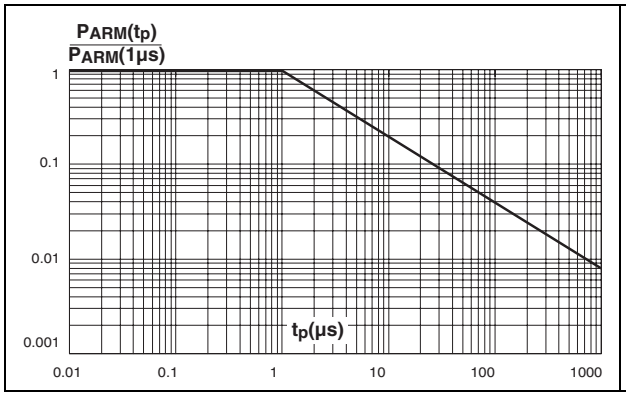


Figure 4. Normalized avalanche power derating versus junction temperature

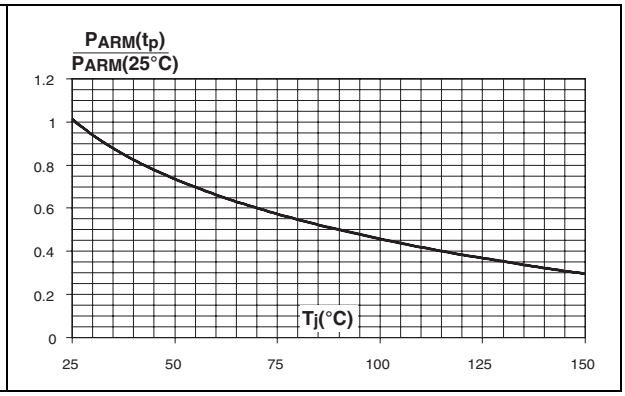


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values) (TO-220AC)

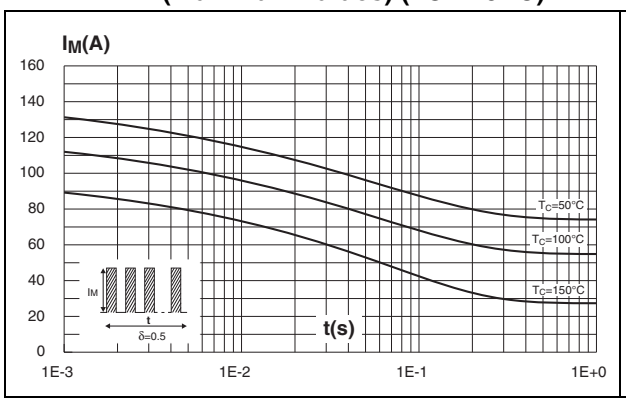


Figure 6. Non repetitive surge peak forward current versus overload duration (maximum values) (TO-220FPAC)

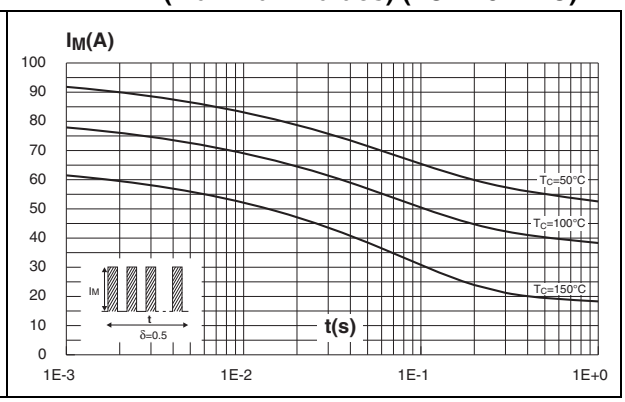


Figure 7. Relative variation of thermal transient impedance junction to case versus pulse duration (TO-220AC)

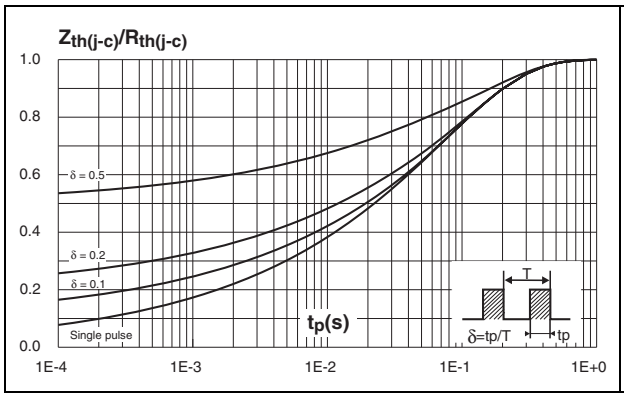


Figure 8. Relative variation of thermal transient impedance junction to case versus pulse duration (TO-220FPAC)

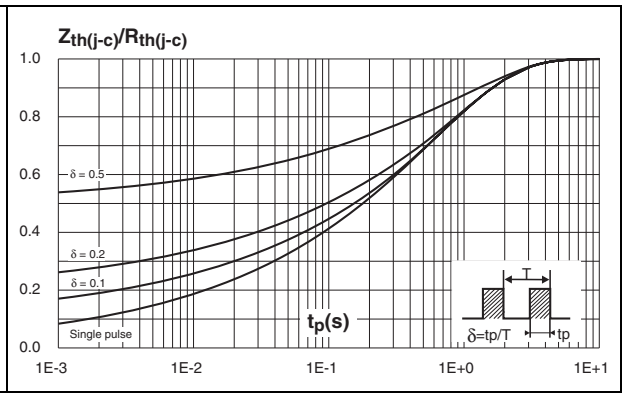


Figure 9. Reverse leakage current versus reverse voltage applied (typical values)

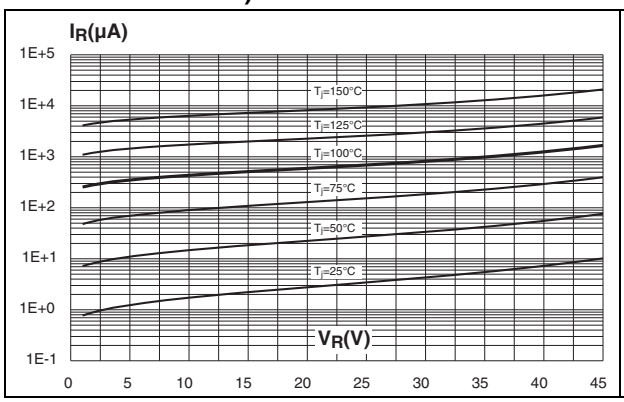


Figure 10. Reverse leakage current versus reverse voltage applied (typical values)

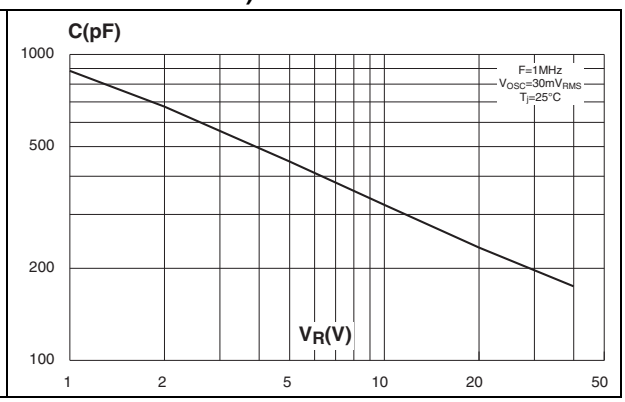
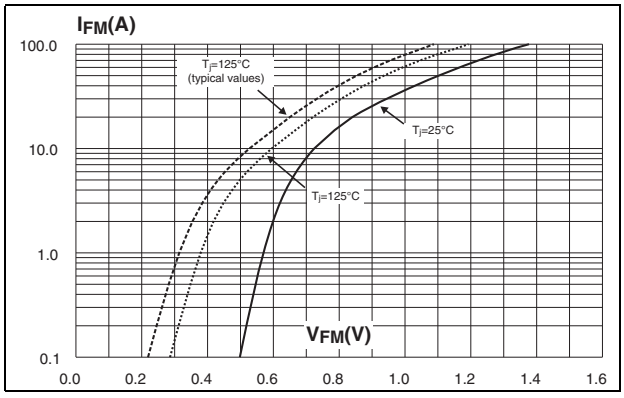


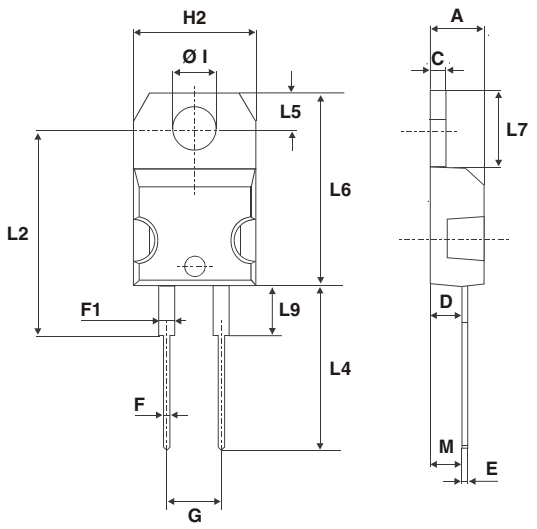
Figure 11. Forward voltage drop versus forward current (maximum values)



2 Package Information

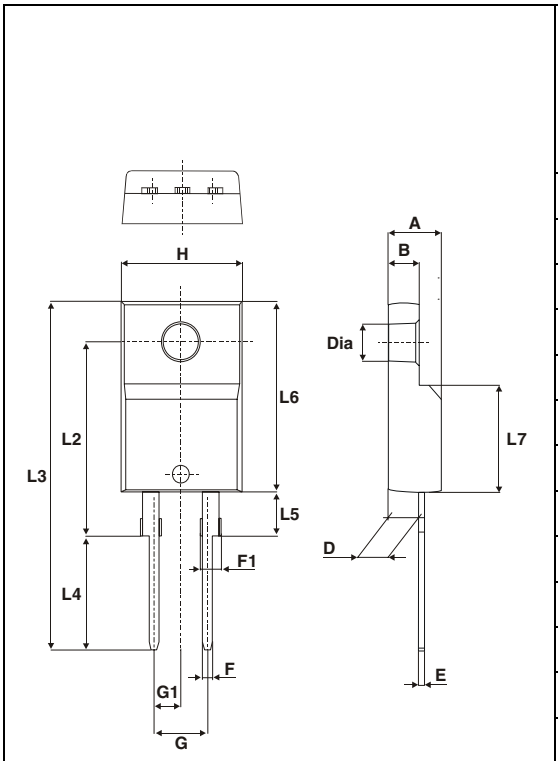
- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.55 Nm
- Maximum torque value: 0.70 Nm

Figure 12. TO-220AC dimensions



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

Figure 13. TO-220FPAC dimensions



Ref	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	0.173	0.181
B	2.5	2.7	0.098	0.106
D	2.5	2.75	0.098	0.108
E	0.45	0.70	0.018	0.027
F	0.75	1	0.030	0.039
F1	1.15	1.70	0.045	0.067
G	4.95	5.20	0.195	0.205
G1	2.4	2.7	0.094	0.106
H	10	10.4	0.393	0.409
L2	16 Typ.		0.63 Typ.	
L3	28.6	30.6	1.126	1.205
L4	9.8	10.6	0.386	0.417
L5	2.9	3.6	0.114	0.142
L6	15.9	16.4	0.626	0.646
L7	9.00	9.30	0.354	0.366
Dia.	3.00	3.20	0.118	0.126

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

3 Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPS1045D	STPS1045D	TO-220AC	1.86 g	50	Tube
STPS1045FP	STPS1045FP	TO-220FPAC	1.9 g	50	Tube

4 Revision history

Date	Revision	Description of Changes
Jul-2003	5D	Last release.
22-Mar-2007	6	Removed ISOWATT package.

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