STPS2545C

Power Schottky rectifier

Features

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low thermal resistance
- Avalanche capability specified
- ECOPACK®2 compliant component (STPS2545CT)

Description

Dual center tab Schottky rectifier suited for switch mode power supplies and high frequency DC to DC converters.

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

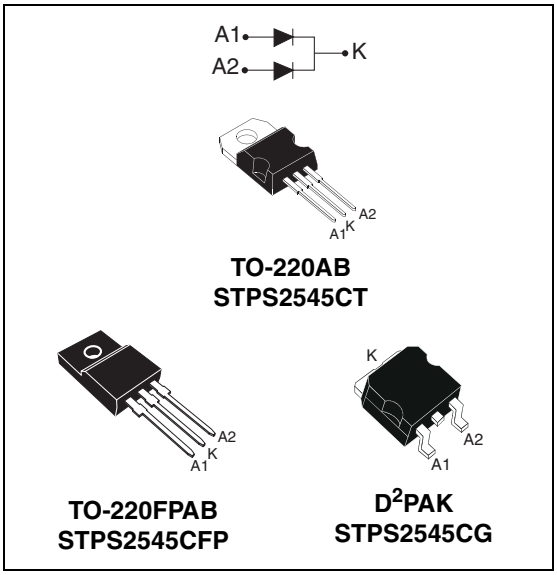


Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	2 x 12.5 A
V_{RRM}	45 V
$T_{j\ (max)}$	175 °C
$V_{F(max)}$	0.57 V

1 Characteristics

Table 2. Absolute ratings (limiting values, per diode)

Symbol	Parameter				Value	Unit
V_{RRM}	Repetitive peak reverse voltage				45	V
$I_{F(RMS)}$	Forward rms current				30	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	TO-220AB D^2PAK	T_c =160 °C	Per diode	12.5	A
		TO-220FPAB	T_c =140 °C	Per device	25	
I_{FSM}	Surge non repetitive forward current		t_p = 10 ms sinusoidal		200	A
I_{RRM}	Repetitive peak reverse current		t_p = 2 µs square F=1 kHz		1	A
I_{RSM}	Non repetitive peak reverse current		t_p = 100 µs square		2	A
P_{ARM}	Repetitive peak avalanche power		t_p = 1 µs T_j = 25 °C		4800	W
T_{stg}	Storage temperature range				-65 to + 175	°C
T_j	Maximum operating junction temperature(1)				175	°C
dV/dt	Critical rate of rise reverse voltage				10000	V/µs

1. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal resistances

Symbol	Parameter			Value	Unit
$R_{th\ (j-c)}$	Junction to ambient	TO-220AB / D^2PAK	Per diode	1.6	° C/W
		TO-220FPAB		4	
		TO-220AB / D^2PAK	Total	1.1	° C/W
		TO-220FPAB		3.5	
$R_{th\ (c)}$	Coupling	TO-220AB / D^2PAK		0.6	° C/W
		TO-220FPAB		3	

When the diodes 1 and 2 are used simultaneously :
ΔTj(diode 1) = P(diode1) x $R_{th(j-c)}$(Per diode) + P(diode 2) x $R_{th(c)}$

Table 4. Static electrical characteristics (per diode)

Symbol	Parameter	Tests Conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$			125	µA
		T_j = 125 °C			9	25	mA
V_F (1)	Forward voltage drop	T_j = 125 °C	I_F = 12.5 A		0.50	0.57	V
		T_j = 25 °C	I_F = 25 A			0.84	
		T_j = 125 °C	I_F = 25 A		0.65	0.72	

1. Pulse test : t_p = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation :
$P = 0.42 \times I_{F(AV)} + 0.012 \times I_F{}^2{}_{(RMS)}$

Figure 1. Conduction losses versus average current)

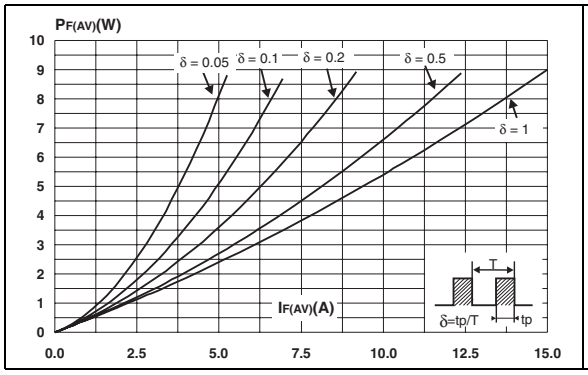


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

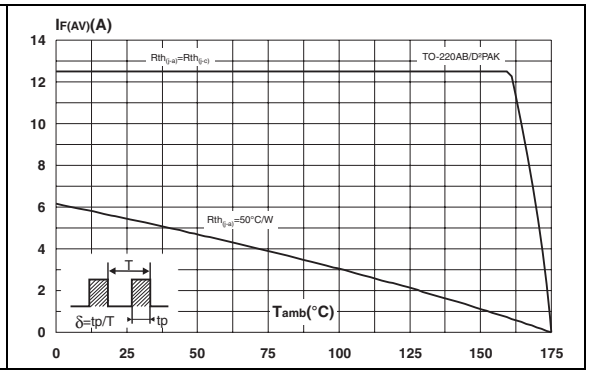


Figure 3. Normalized avalanche power derating versus pulse duration

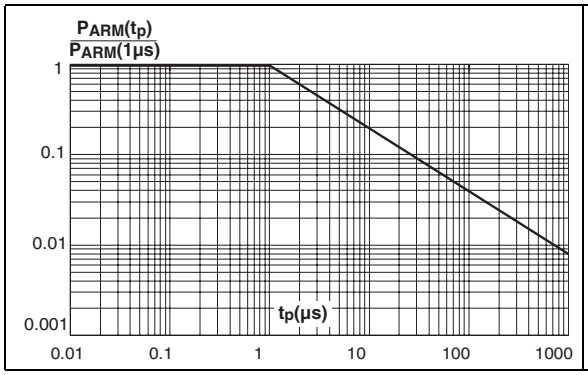


Figure 4. Normalized avalanche power derating versus junction temperature

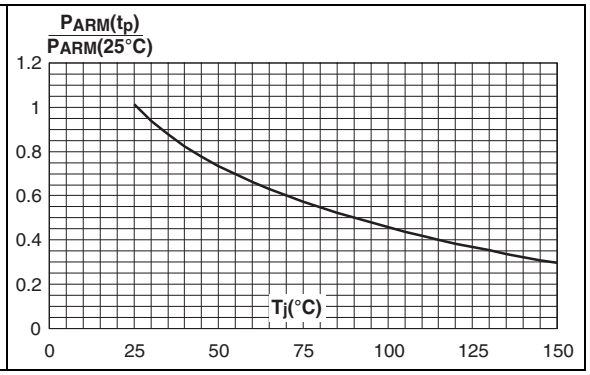


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values)

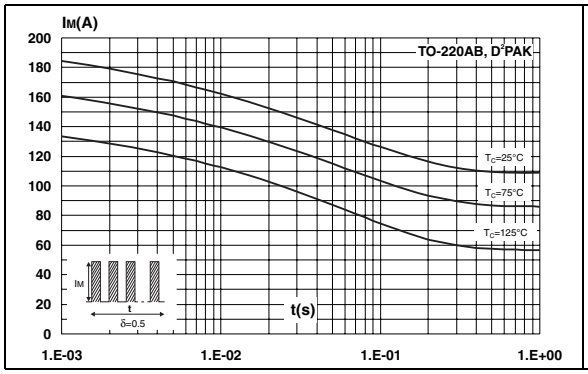


Figure 6. Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAB)

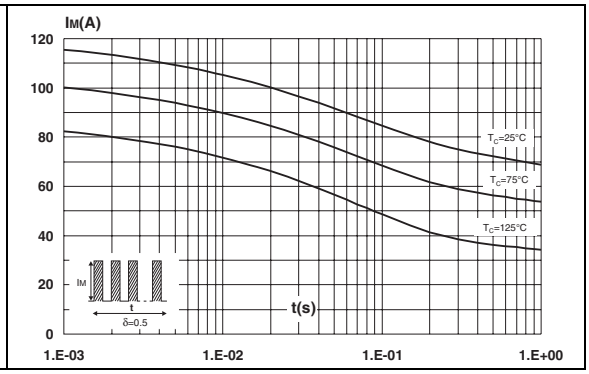


Figure 7. Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB, D²PAK)

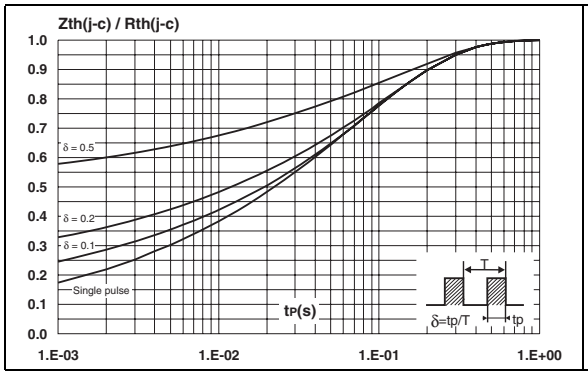


Figure 8. Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAB)

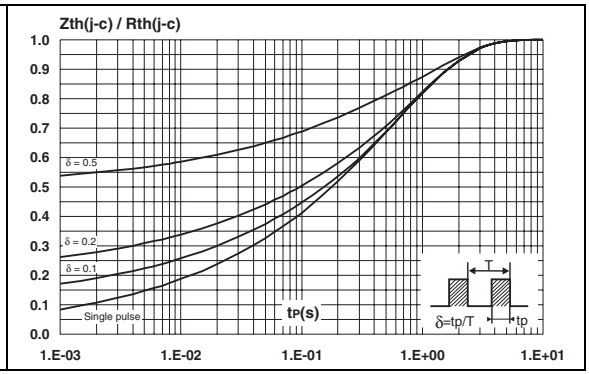


Figure 9. Reverse leakage current versus reverse voltage applied (typical values)

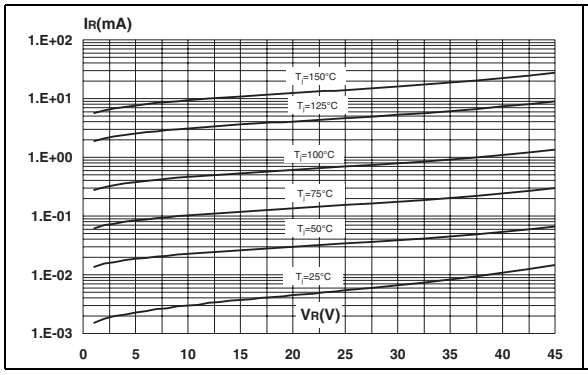


Figure 10. Junction capacitance versus reverse voltage applied (typical values)

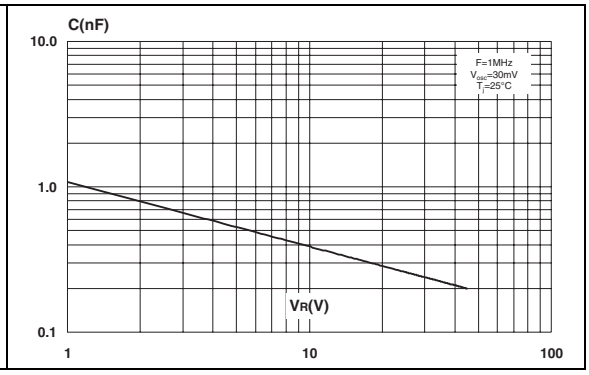


Figure 11. Forward voltage drop versus forward current

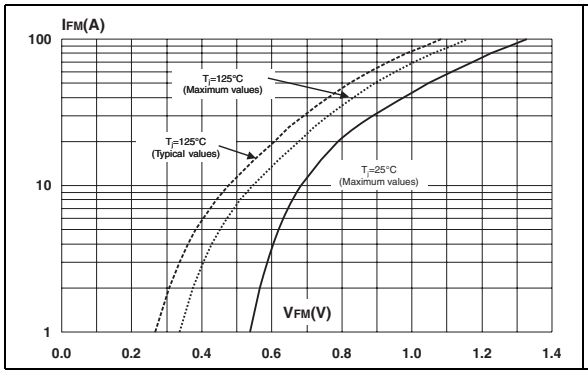
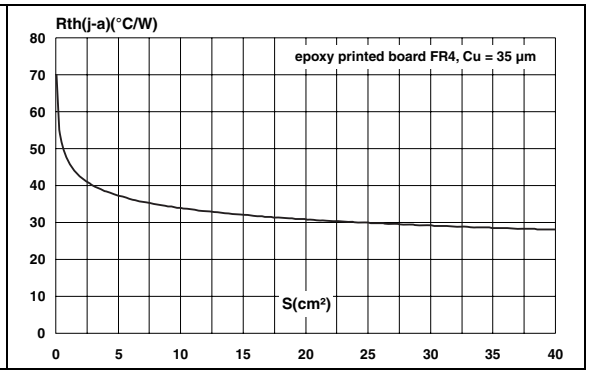


Figure 12. Thermal resistance junction to ambient versus copper surface under tab

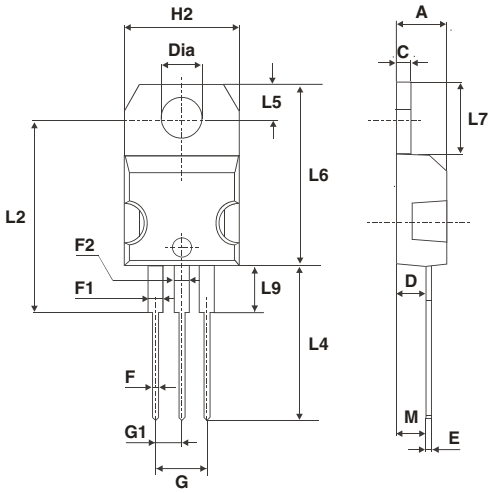


2 Package information

- Epoxy meets UL94, V0
- Lead-free packages

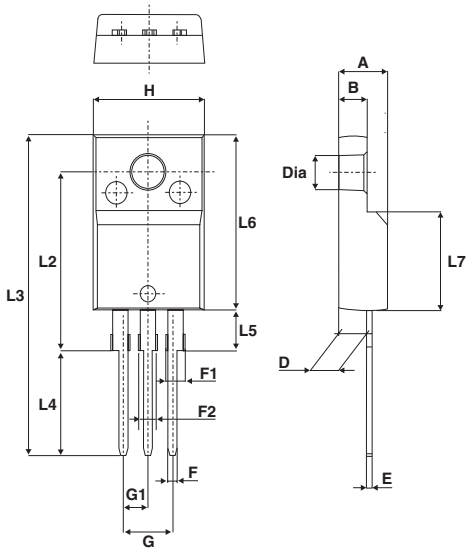
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

Table 5. TO-220AB dimensions



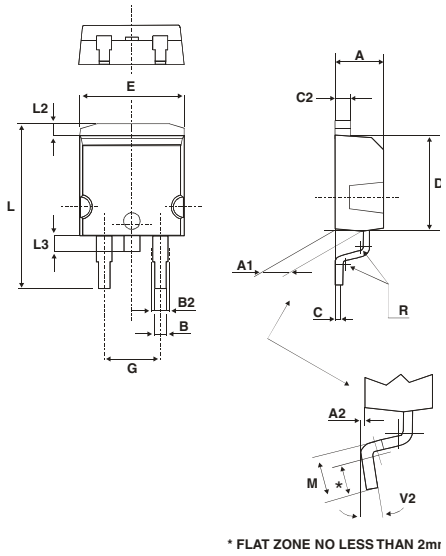
Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
C	1.23	1.32	0.048	0.051
D	2.40	2.72	0.094	0.107
E	0.49	0.70	0.019	0.027
F	0.61	0.88	0.024	0.034
F1	1.14	1.70	0.044	0.066
F2	1.14	1.70	0.044	0.066
G	4.95	5.15	0.194	0.202
G1	2.40	2.70	0.094	0.106
H2	10	10.40	0.393	0.409
L2	16.4 typ.		0.645 typ.	
L4	13	14	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.	3.75	3.85	0.147	0.151

Table 6. TO-220FPAB dimensions



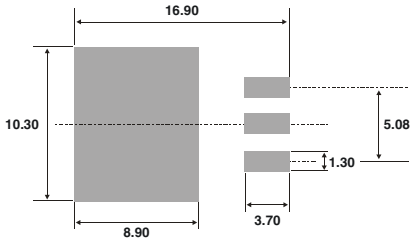
Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	0.173	0.181
B	2.5	2.7	0.098	0.106
D	2.5	2.75	0.098	0.108
E	0.45	0.70	0.018	0.027
F	0.75	1	0.030	0.039
F1	1.15	1.70	0.045	0.067
F2	1.15	1.70	0.045	0.067
G	4.95	5.20	0.195	0.205
G1	2.4	2.7	0.094	0.106
H	10	10.4	0.393	0.409
L2	16 Typ.		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

Table 7. D²PAK dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.49	2.69	0.098	0.106
A2	0.03	0.23	0.001	0.009
B	0.70	0.93	0.027	0.037
B2	1.14	1.70	0.045	0.067
C	0.45	0.60	0.017	0.024
C2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
E	10.00	10.40	0.393	0.409
G	4.88	5.28	0.192	0.208
L	15.00	15.85	0.590	0.624
L2	1.27	1.40	0.050	0.055
L3	1.40	1.75	0.055	0.069
M	2.40	3.20	0.094	0.126
R	0.40 typ.		0.016 typ.	
V2	0°	8°	0°	8°

Figure 13. Footprint (dimensions in mm)



3 Ordering information

Table 8. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS2545CT	STPS2545CT	TO-220AB	2.20 g	50	Tube
STPS2545CFP	STPS2545CFP	TO-220FPAB	2.0 g	50	Tube
STPS2545CG	STPS2545CG	D^2PAK	1.48 g	50	Tube
STPS2545CG-TR	STPS2545CG	D^2PAK	1.48 g	1000	Tape and reel

4 Revision history

Table 9. Document revision history

Date	Revision	Changes
July-2003	2A	Last release.
21-Jun-2010	3	Updated ECOPACK statement.

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