

Automotive power Schottky rectifier

Features

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low thermal resistance
- Avalanche capability specified
- AEC-Q101 qualified

Description

Dual center tab Schottky rectifier suited for high frequency DC to DC converters.

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

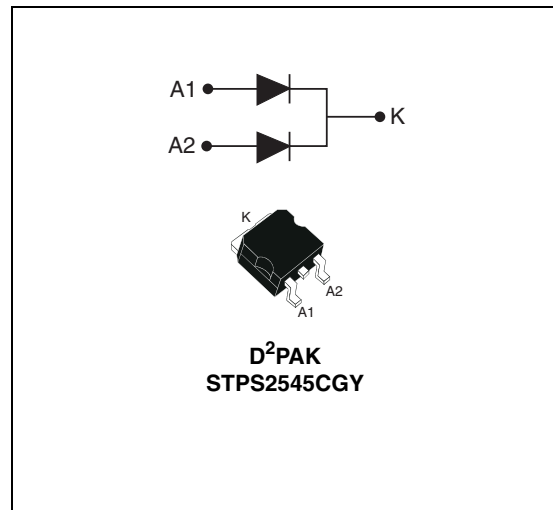


Table 1. Device summary

$I_{F(AV)}$	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 $\delta = 0.5$	T _c = 160 °C Per diode	12.5	A
I _{FSM}	Surge non repetitive forward current	t _p = 10 ms sinusoidal	200	A
I _{R(RM)}	Repetitive peak reverse current	t _p = 2 μ s square F=1 kHz	1	A
I _{R(SM)}	Non repetitive peak reverse current	t _p = 100 μ s square	2	A
P _{ARM}	Repetitive peak avalanche power	t _p = 1 μ s T _j = 25 °C	4800	W
T _{stg}	Storage temperature range		-65 to +175	°C
T _j	Maximum operating junction temperature ⁽¹⁾		-40 to +175	°C
dV/dt	Critical rate of rise reverse voltage		10000	V/ μ s

1. $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$ 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	Per diode	1.6	°C/W
		Total	1.1	°C/W
R _{th(c)}	Coupling		0.6	°C/W

When the diodes 1 and 2 are used simultaneously:

$$\Delta T_j(\text{diode 1}) = P(\text{diode 1}) \times R_{th(j-c)}(\text{Per diode}) + P(\text{diode 2}) \times R_{th(c)}$$

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	μ A
		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 μ s, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 0.42 \times I_{F(AV)} + 0.012 \times I_{F(RMS)}^2$$

Figure 1. Conduction losses versus average current

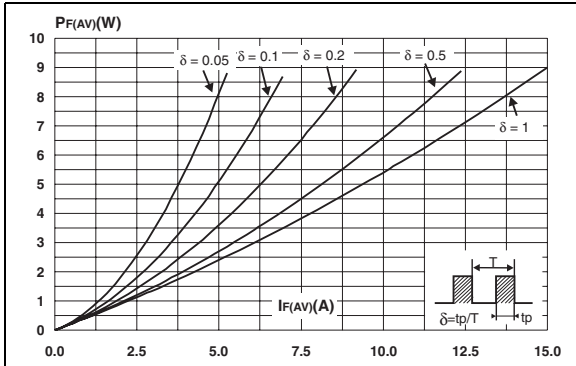


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$)

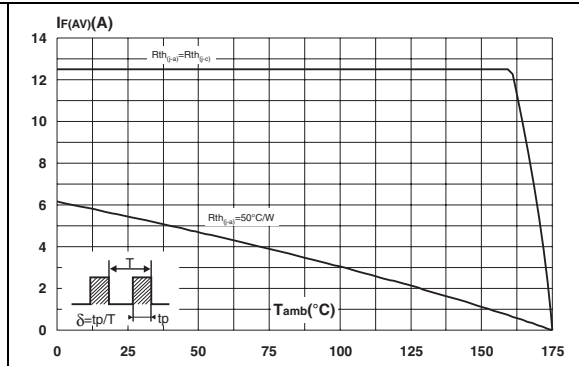


Figure 3. Normalized avalanche power derating versus pulse duration

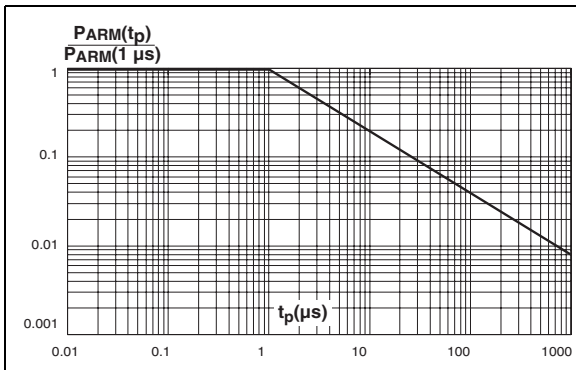


Figure 4. Normalized avalanche power derating versus junction temperature

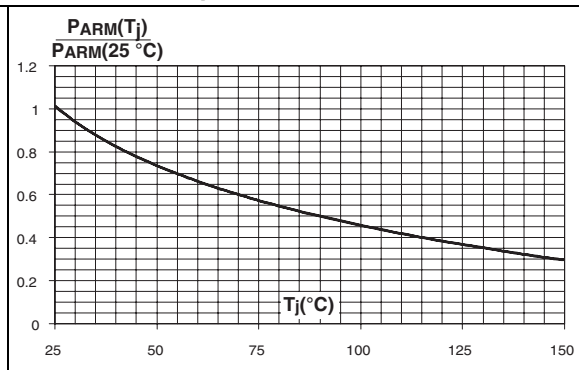


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values)

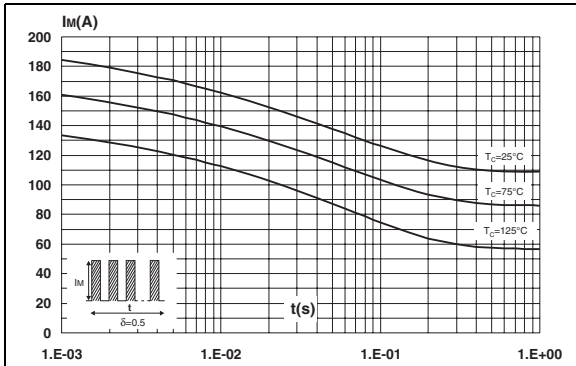


Figure 6. Relative variation of thermal impedance junction to case versus pulse duration

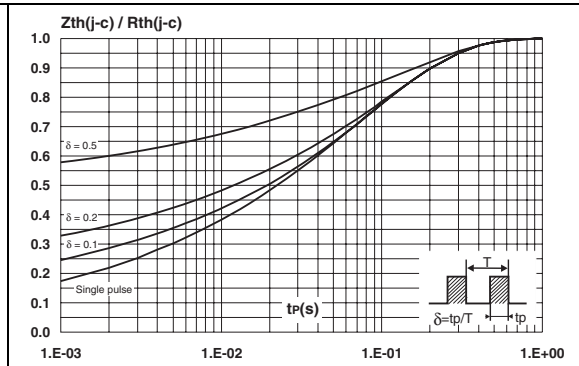


Figure 7. Reverse leakage current versus reverse voltage applied (typical values)

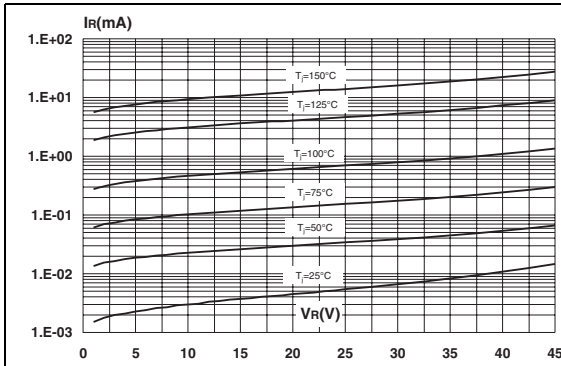


Figure 8. Junction capacitance versus reverse voltage applied (typical values)

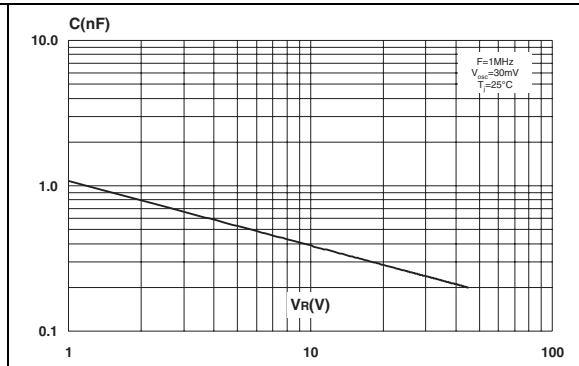


Figure 9. Forward voltage drop versus forward current

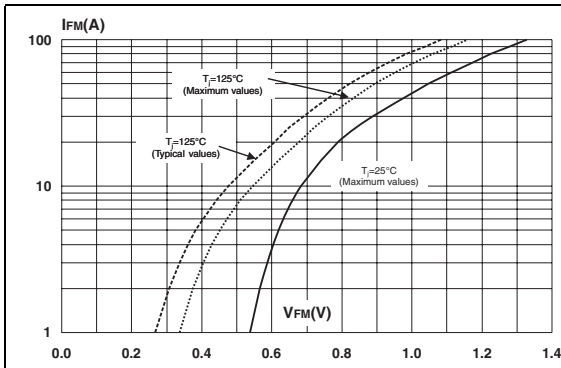
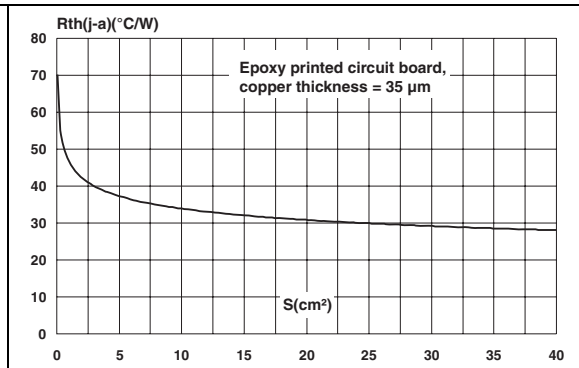


Figure 10. Thermal resistance junction to ambient versus copper surface under tab



2 Package information

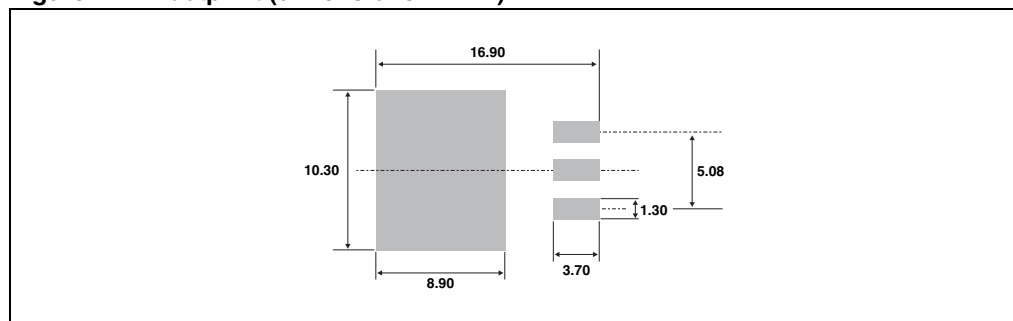
- Epoxy meets UL94, V0
- Lead-free package

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Table 5. 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 11. Footprint (dimensions in mm)



3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS2545CGY-TR	STPS2545CGY	D ² PAK	1.48 g	1000	Tape and reel

4 Revision history

Table 7. Document revision history

Date	Revision	Changes
03-Nov-2011	1	Initial release.

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