

## Automotive power Schottky rectifier

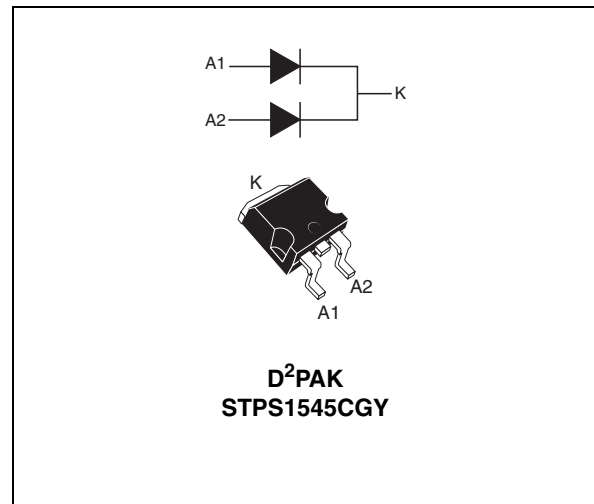
### Features

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

### Description

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

Packaged in D<sup>2</sup>PAK, 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 7.5 A
$V_{RRM}$	45 V
$T_j(max)$	175 °C
$V_{F(max)}$	0.57 V

# 1 Characteristics

**Table 2. Absolute Ratings (limiting values)**

Symbol	Parameter		Value	Unit
V <sub>RRM</sub>	Repetitive peak reverse voltage		45	V
I <sub>F(RMS)</sub>	RMS forward voltage		20	A
I <sub>F(AV)</sub>	Average forward current $\delta = 0.5$	T <sub>c</sub> = 157 °C Per diode	7.5	A
I <sub>FSM</sub>	Surge non repetitive forward current	t <sub>p</sub> = 10 ms Sinusoidal	150	A
I <sub>RRM</sub>	Peak repetitive reverse current	t <sub>p</sub> = 2 $\mu$ s square F = 1 kHz	1	A
I <sub>RSM</sub>	Non repetitive peak reverse current	t <sub>p</sub> = 100 $\mu$ s square	2	A
P <sub>ARM</sub>	Repetitive peak avalanche power	t <sub>p</sub> = 1 $\mu$ s T <sub>j</sub> = 25 °C	2700	W
T <sub>stg</sub>	Storage temperature range		-65 to +175	°C
T <sub>j</sub>	Maximum operating junction temperature <sup>(1)</sup>		-40 to +175	°C
dV/dt	Critical rate of rise of reverse voltage		10000	V/ $\mu$ 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 <sub>th(j-c)</sub>	Junction to case	Per diode	3.0	°C/W
		Total	1.7	
R <sub>th(c)</sub>	Coupling		0.35	

When the diodes 1 and 2 are used simultaneously :

$$\Delta T_j(\text{diode 1}) = P(\text{diode1}) \times R_{th(j-c)}(\text{Per diode}) + P(\text{diode 2}) \times R_{th(c)}$$

**Table 4. Static electrical characteristics (per diode)**

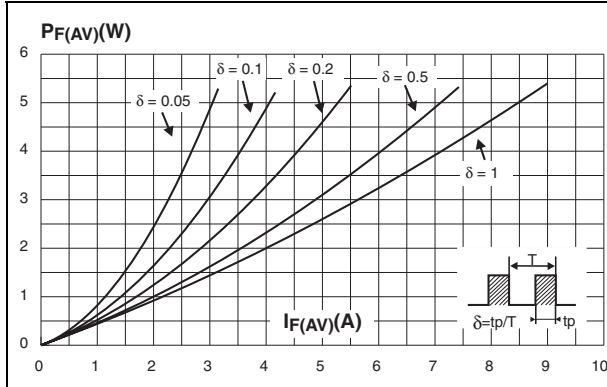
Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I <sub>R</sub> <sup>(1)</sup>	Reverse leakage current	T <sub>j</sub> = 25 °C	V <sub>R</sub> = V <sub>RRM</sub>	-	-	100	$\mu$ A
		T <sub>j</sub> = 125 °C		-	5	15	mA
V <sub>F</sub> <sup>(1)</sup>	Forward voltage drop	T <sub>j</sub> = 125 °C	I <sub>F</sub> = 7.5A	-	0.5	0.57	V
		T <sub>j</sub> = 25 °C	I <sub>F</sub> = 15 A	-	-	0.84	
		T <sub>j</sub> = 125 °C	I <sub>F</sub> = 15 A	-	0.65	0.72	

1. Pulse test: t<sub>p</sub> = 380  $\mu$ s,  $\delta < 2\%$

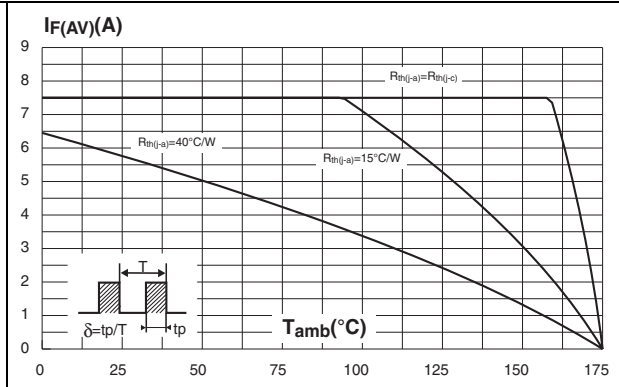
To evaluate the conduction losses use the following equation:

$$P = 0.42 \times I_{F(AV)} + 0.020 I_{F(RMS)}^2$$

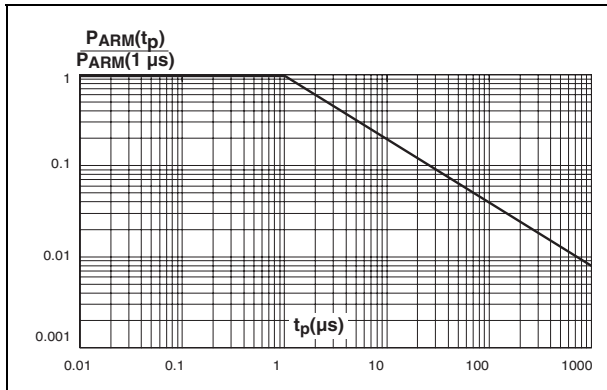
**Figure 1. Average forward power dissipation versus average forward current (per diode)**



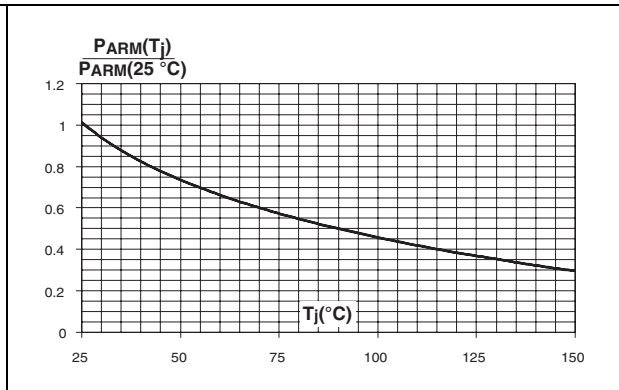
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ , per diode)**



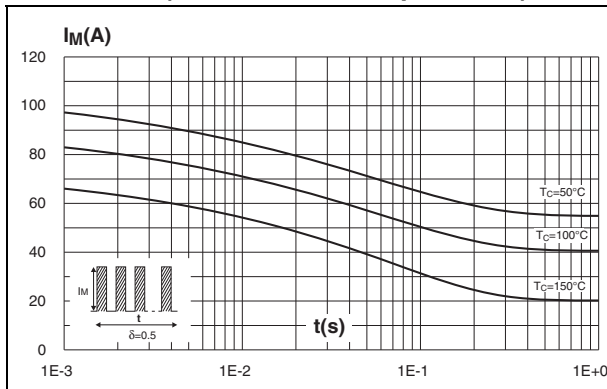
**Figure 3. Normalized avalanche power derating versus pulse duration**



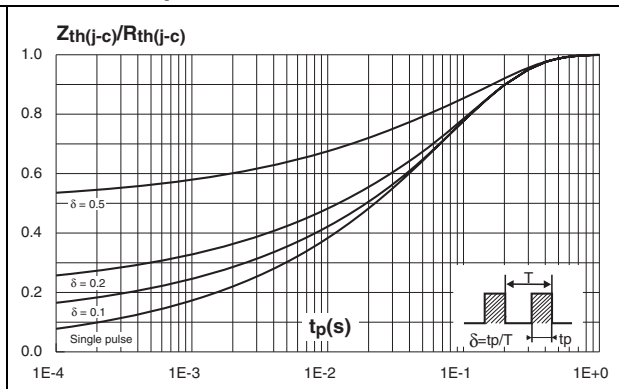
**Figure 4. Normalized avalanche power derating versus junction temperature**



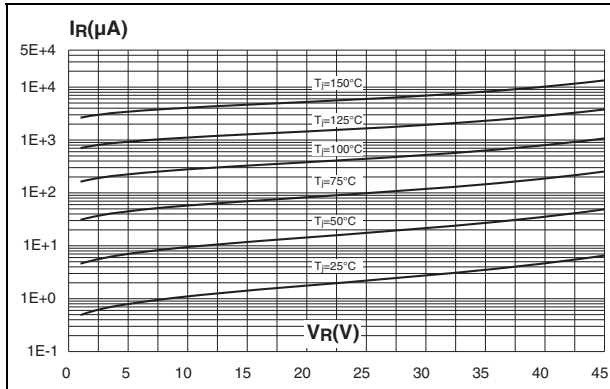
**Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values, per diode)**



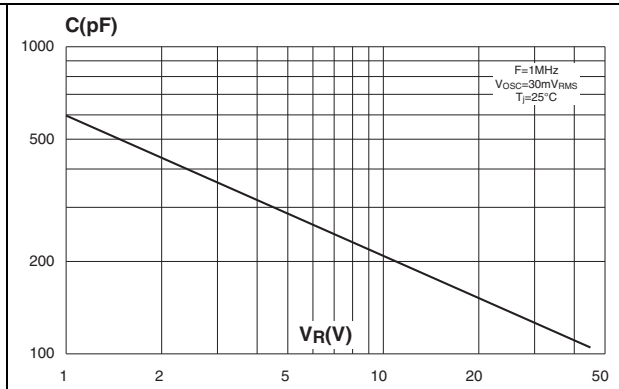
**Figure 6. Relative variation of thermal impedance junction to case versus pulse duration**



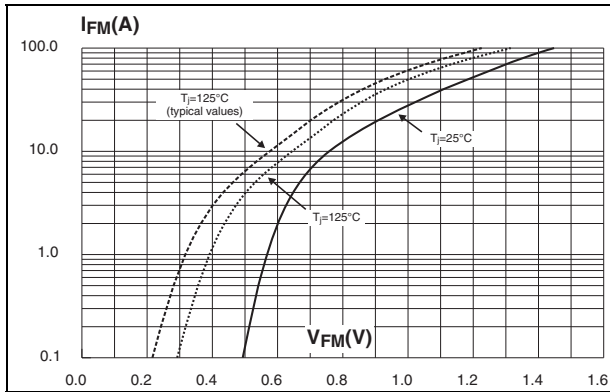
**Figure 7. Reverse leakage current versus reverse voltage applied (typical values, per diode)**



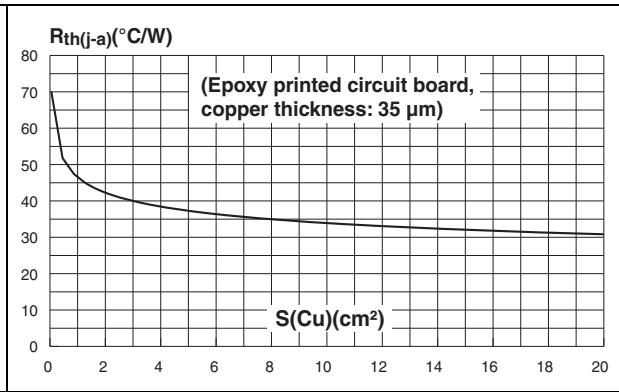
**Figure 8. Junction capacitance versus reverse voltage applied (typical values, per diode)**



**Figure 9. Forward voltage drop versus forward current (maximum values, per diode)**



**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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Figure 11. D<sup>2</sup>PAK dimensions

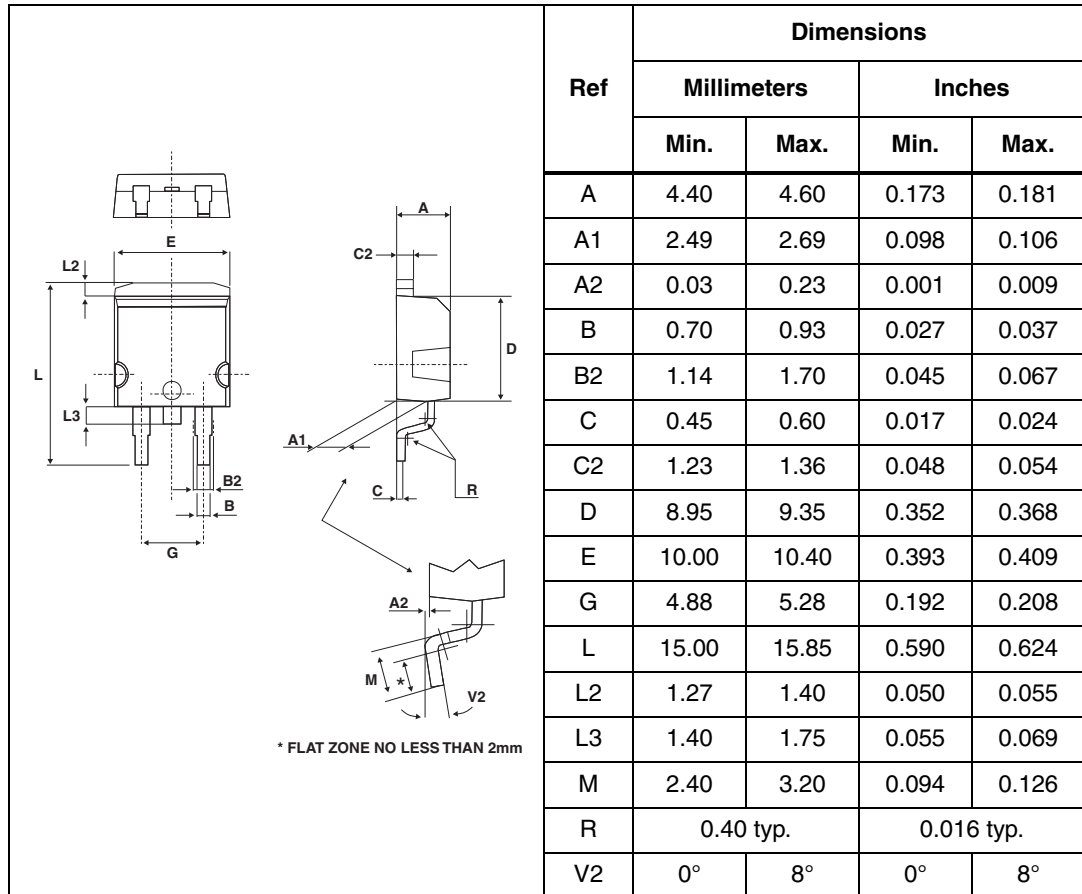
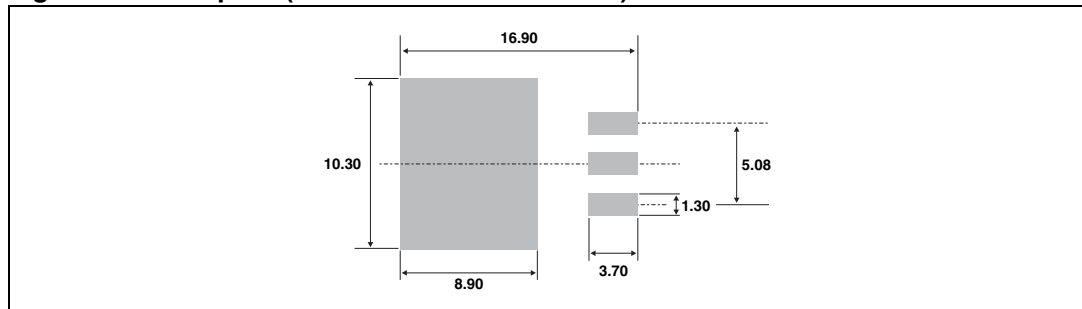


Figure 12. Footprint (dimensions in millimeters)



### 3 Ordering information

**Table 5. Ordering information**

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS1545CGY-TR	STPS1545CGY	D <sup>2</sup> PAK	1.48 g	1000	Tape and reel

### 4 Revision history

**Table 6. Document revision history**

Date	Revision	Changes
23-May-2011	1	Initial release.

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