

## Automotive power Schottky rectifier

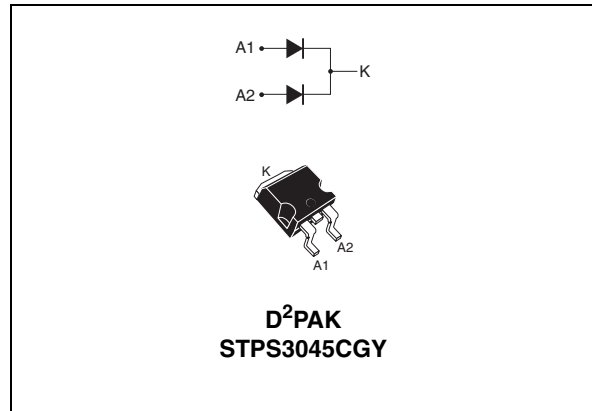
### Features

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

### Description

This device is a dual center tap Schottky rectifier suited for switch mode power supply and 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 15 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 <sub>RRM</sub>	Repetitive peak reverse voltage		45	V
I <sub>F(RMS)</sub>	Forward rms voltage		30	A
I <sub>F(AV)</sub>	Average forward current $\delta = 0.5$	T <sub>C</sub> = 155 °C Per diode Per device	10 30	A
I <sub>FSM</sub>	Surge non repetitive forward current	t <sub>p</sub> = 10 ms sinusoidal	220	A
P <sub>ARM</sub>	Repetitive peak avalanche power	t <sub>p</sub> = 1 $\mu$ s T <sub>j</sub> = 25 °C	6000	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 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 resistance parameters**

Symbol	Parameter		Value	Unit
R <sub>th(j-c)</sub>	Junction to case	Per diode Total	1.60 0.85	° C/W
R <sub>th(c)</sub>	Coupling		0.10	° C/W

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)**

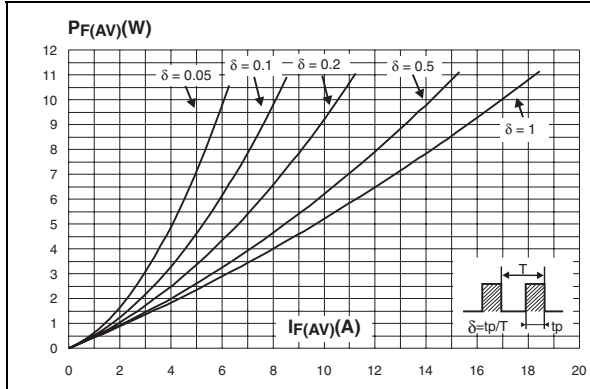
Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
I <sub>R</sub> <sup>(1)</sup>	Reverse leakage current	T <sub>j</sub> = 25 °C	V <sub>R</sub> = V <sub>RRM</sub>	-	-	200	$\mu$ A
		T <sub>j</sub> = 125 °C		-	11	40	mA
V <sub>F</sub> <sup>(1)</sup>	Forward voltage drop	T <sub>j</sub> = 125 °C	I <sub>F</sub> = 15 A	-	0.5	0.57	V
		T <sub>j</sub> = 25 °C	I <sub>F</sub> = 30 A	-	-	0.84	
		T <sub>j</sub> = 125 °C		-	0.65	0.72	

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

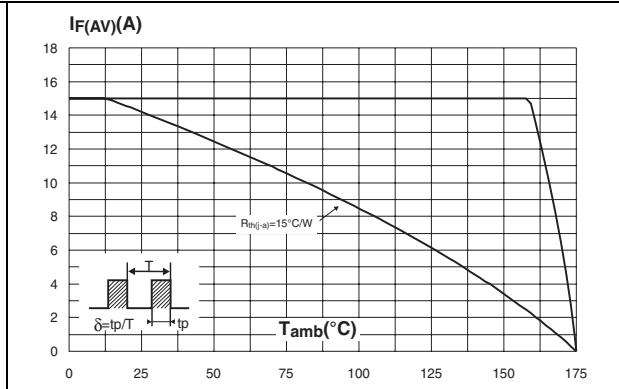
To evaluate the conduction losses use the following equation:

$$P = 0.42 \times I_{F(AV)} + 0.01 I_{F(RMS)}^2$$

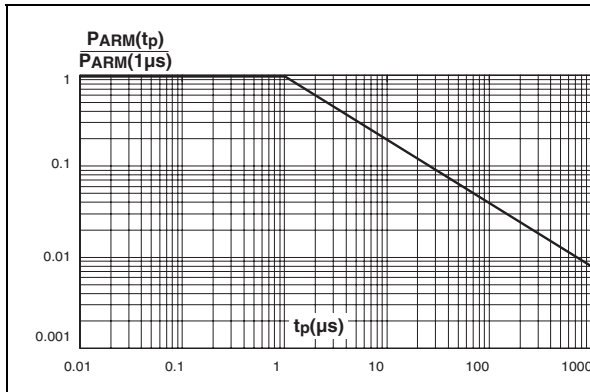
**Figure 1. Average forward power dissipation versus average forward current (per diode)**



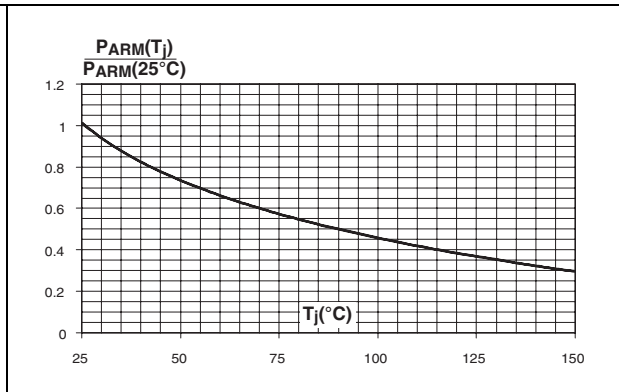
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ , per diode)**



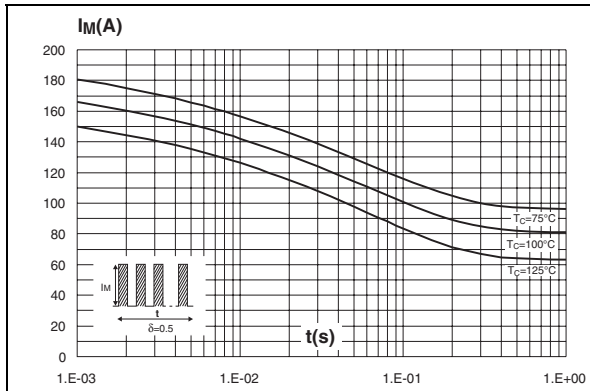
**Figure 3. Normalized avalanche power derating versus pulse duration**



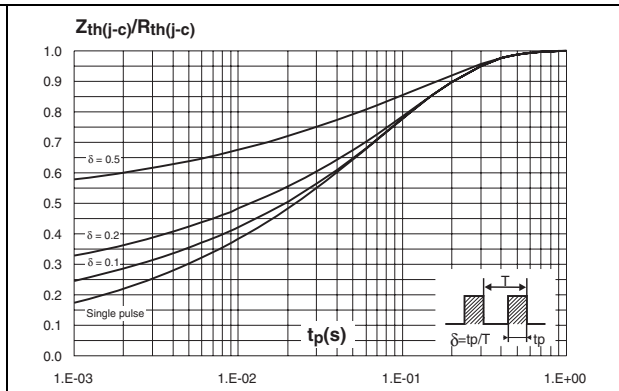
**Figure 4. Normalized avalanche power derating versus junction temperature**



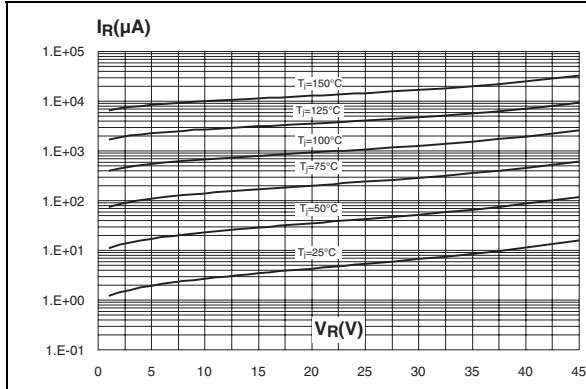
**Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values, per diode)**



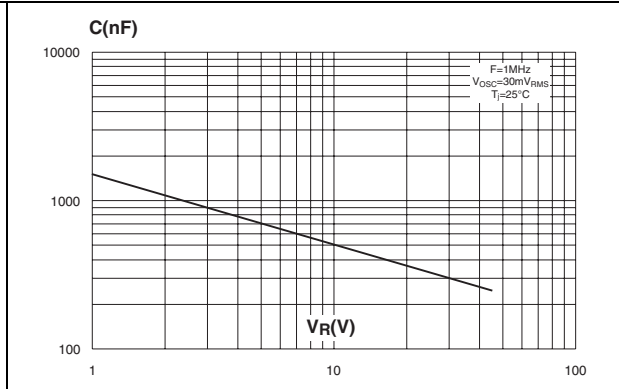
**Figure 6. Relative variation of thermal impedance junction to ambient versus pulse duration**



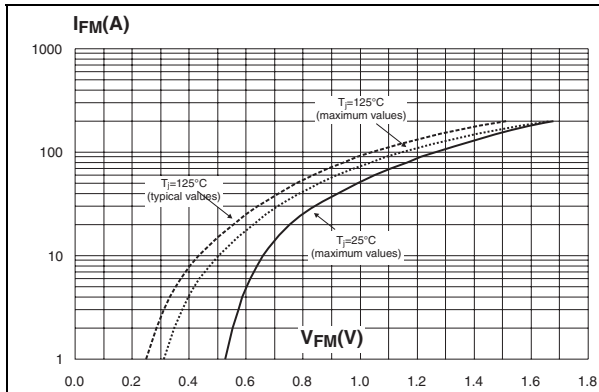
**Figure 7. Reverse leakage current versus reverse voltage applied (typical values, per diode)**



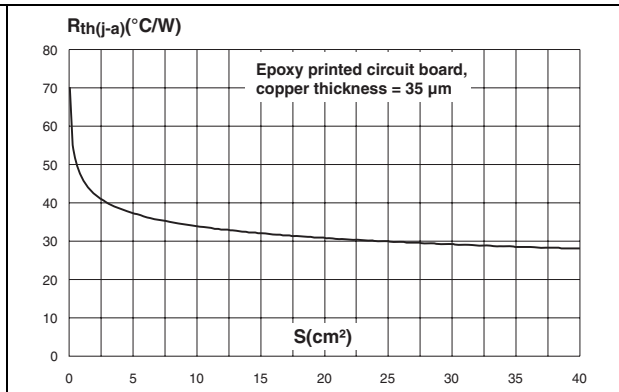
**Figure 8. Junction capacitance versus reverse voltage applied (typical values, per diode)**



**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

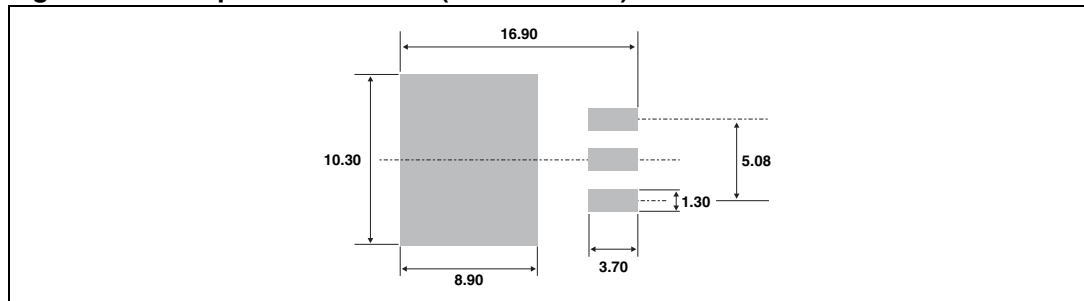
- Epoxy meets UL94,V0
- Lead-free package

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](http://www.st.com). ECOPACK® is an ST trademark.

**Table 5. Package dimensions D<sup>2</sup>PAK**

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 millimeters)**



### 3 Ordering information

**Table 6. Ordering information**

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS3045CGY-TR	STPS3045CGY	D <sup>2</sup> PAK	1.48 g	1000	Tape and reel

### 4 Revision history

**Table 7. Document revision history**

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

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