

# STPS3045C-Y

# 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.

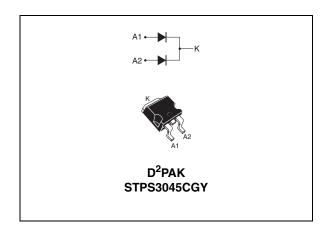


Table 1. Device summary

I <sub>F(AV)</sub>	2 x 15 A
V <sub>RRM</sub>	45 V
T <sub>j (max)</sub>	175 °C
V <sub>F (max)</sub>	0.57 V

Characteristics STPS3045C-Y

#### 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	Α
I <sub>F(AV)</sub>	Average forward current $\delta = 0.5$	ge forward current $\delta = 0.5$ $T_C = 155$ °C Per diode Per device		10 30	Α
I <sub>FSM</sub>	Surge non repetitive forward current	t <sub>p</sub> = 10 ms s	inusoidal	220	Α
P <sub>ARM</sub>	Repetitive peak avalanche power $t_p = 1 \mu s T_j = 25  ^{\circ}C$			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/µs

<sup>1.</sup>  $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$  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:

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

Table 4. Static electrical characteristics (per diode)

Symbol	Parameter	Tests conditions		Min.	Тур.	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	μΑ
'R	neverse leakage current	T <sub>j</sub> = 125 °C		-	11	40	mA
		T <sub>j</sub> = 125 °C	I <sub>F</sub> = 15 A	-	0.5	0.57	
V <sub>F</sub> <sup>(1)</sup>	Forward voltage drop	T <sub>j</sub> = 25 °C	I <sub>F</sub> = 30 A	-	-	0.84	V
		T <sub>j</sub> = 125 °C		-	0.65	0.72	

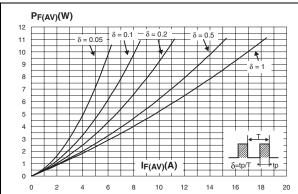
<sup>1.</sup> Pulse test:  $t_p = 380 \mu s$ ,  $\delta < 2\%$ 

To evaluate the conduction losses use the following equation:

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

STPS3045C-Y Characteristics

Figure 1. Average forward power dissipation Figure 2. Average forward current versus awerage forward current (per diode) Figure 2. Average forward current ambient temperature ( $\delta = 0.5$ , per diode)



IF(AV)(A)

18

16

14

12

10

8

6

4

2

0

0

25

50

75

100

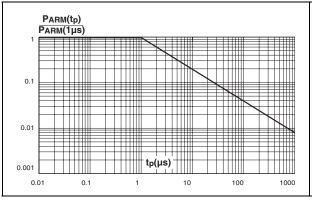
125

150

175

Figure 3. Normalized avalanche power derating versus pulse duration

Figure 4. Normalized avalanche power derating versus junction temperature



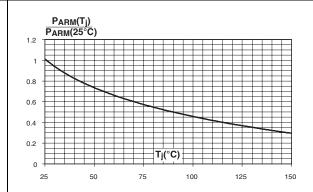
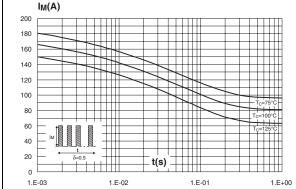


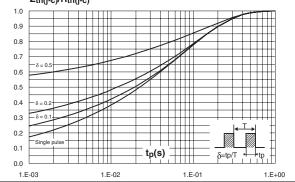
Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values, per diode)

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

Zth(j-c)/Rth(j-c)

1.0
0.9

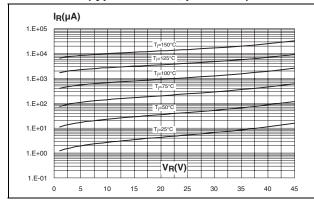




Characteristics STPS3045C-Y

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)



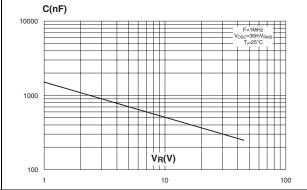
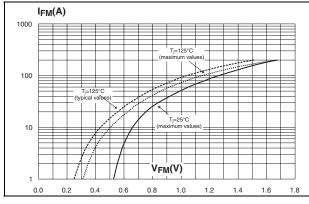
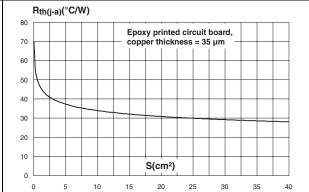


Figure 9. Forward voltage drop versus forward current (maximum values, per diode)

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





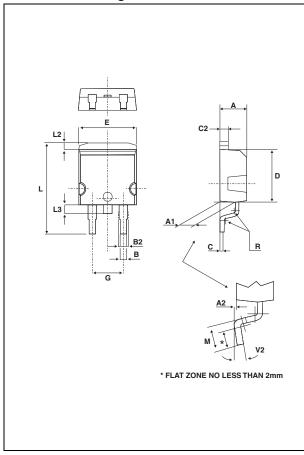
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# 2 Package information

- Epoxy meets UL94,V0
- Lead-free package

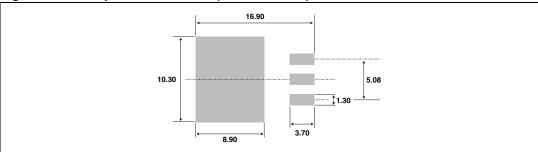
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Table 5. Package dimensions D<sup>2</sup>PAK



	Dimensions			
Ref.	Millim	neters	Incl	nes
	Min.	Max.	Min.	Max.
Α	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
В	0.70	0.93	0.027	0.037
B2	1.14	1.70	0.045	0.067
С	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
Е	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
М	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)



Ordering information STPS3045C-Y

# 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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