

Automotive high voltage power Schottky rectifier

Features

- Negligible switching losses
- High junction temperature capability
- Low leakage current
- Good trade off between leakage current and forward voltage drop
- Avalanche specification
- AEC-Q101 qualified

Description

This high voltage Schottky barrier rectifier is packaged in DPAK, and designed for high frequency miniature switched mode power supplies such as adaptators and on board DC to DC converters for automotive applications.

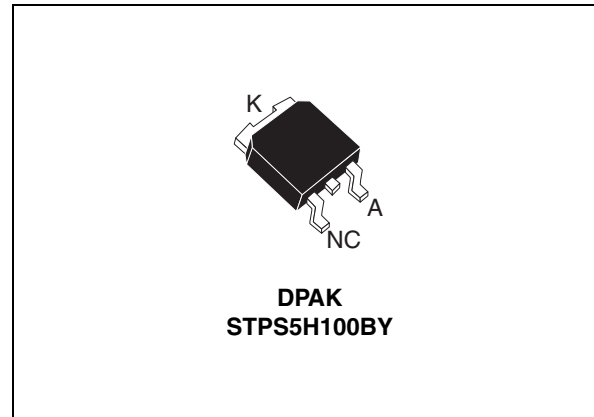


Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	5 A
V_{RRM}	100 V
T_j (max)	175 °C
V_F (max)	0.61 V

1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter	Value	Unit	
V _{RRM}	Repetitive peak reverse voltage	100	V	
I _{F(RMS)}	Forward rms current	10	A	
I _{F(AV)}	Average forward current	T _c = 165 °C, δ = 0.5	5	A
I _{FSM}	Surge non repetitive forward current	t _p = 10 ms sinusoidal	75	A
I _{RRM}	Repetitive peak reverse current	t _p = 2 μs, 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	7200	W
T _{stg}	Storage temperature range	-65 to + 175	°C	
T _j	Operating junction temperature ⁽¹⁾	-40 to +175	°C	
dV/dt	Critical rate of rise of reverse voltage	10000	V/μs	

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

Symbol	Parameter	Value	Unit
R _{th(j-c)}	Junction to case	2.5	°C/W

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I _R ⁽¹⁾	Reverse leakage current	T _j = 25 °C	V _R = V _{RRM}		3.5	μA
		T _j = 125 °C		1.3	4.5	mA
V _F ⁽²⁾	Forward voltage drop	T _j = 25 °C	I _F = 5 A		0.73	V
		T _j = 125 °C		0.57	0.61	
		T _j = 25 °C	I _F = 10 A		0.85	
		T _j = 125 °C		0.66	0.71	

1. Pulse test: t_p = 5 ms, δ < 2%

2. Pulse test: t_p = 380 μs, δ < 2%

To evaluate the conduction losses use the following equation:

$$P = 0.51 \times I_{F(AV)} + 0.02 I_{F(RMS)}^2$$

Figure 1. Average forward power dissipation versus average forward current

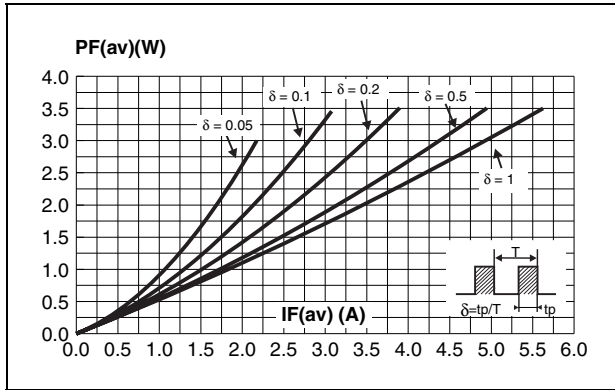


Figure 2. Average forward current versus ambient temperature (delta = 0.5)

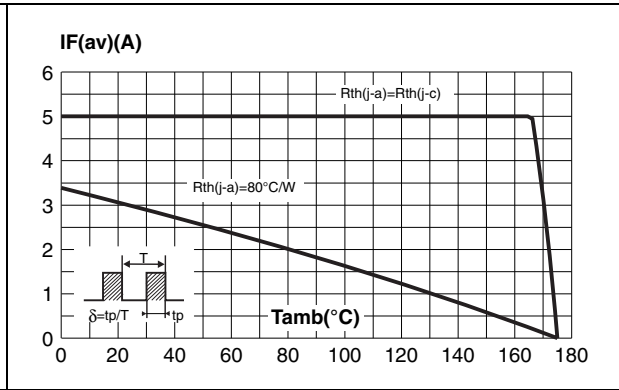


Figure 3. Normalized avalanche power derating versus pulse duration

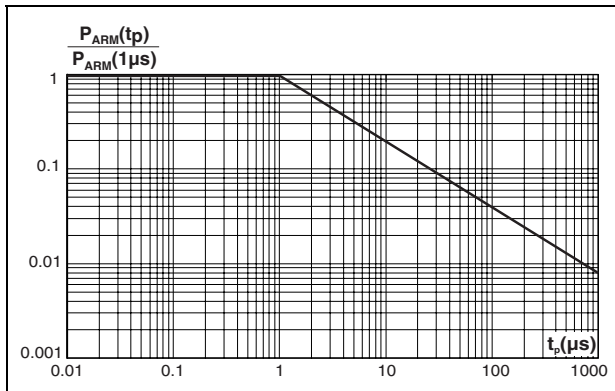


Figure 4. Normalized avalanche power derating versus junction temperature

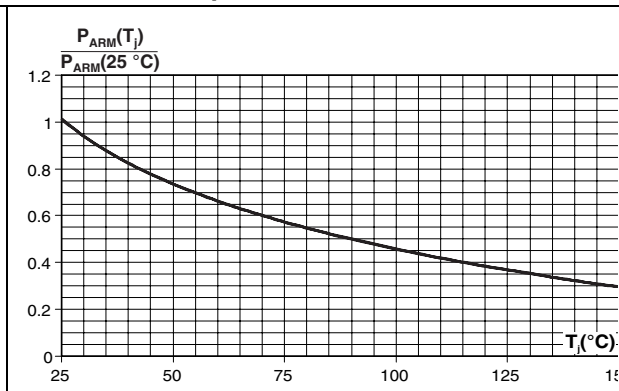


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values)

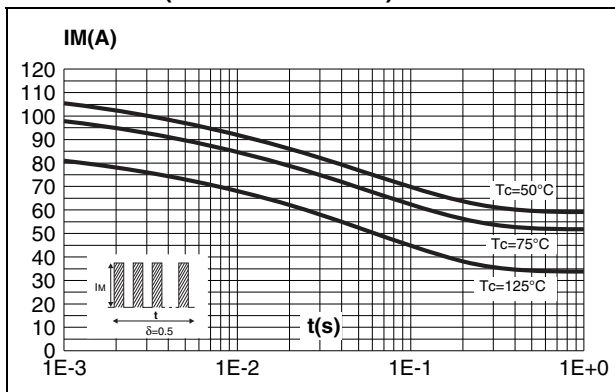


Figure 6. Relative variation of thermal impedance junction to case versus pulse duration

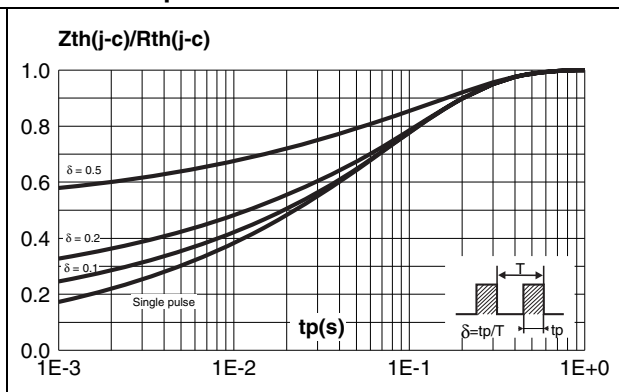


Figure 7. Reverse leakage current versus reverse voltage applied

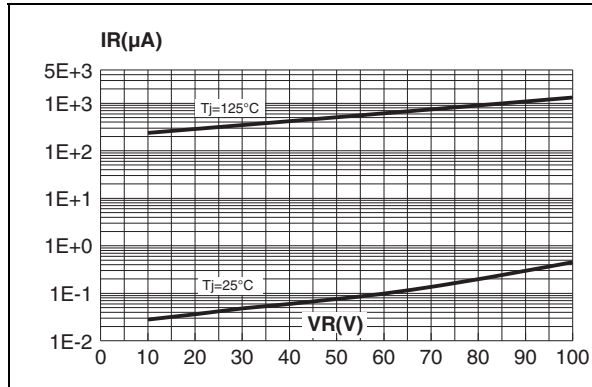


Figure 8. Junction capacitance versus reverse voltage applied (typical values)

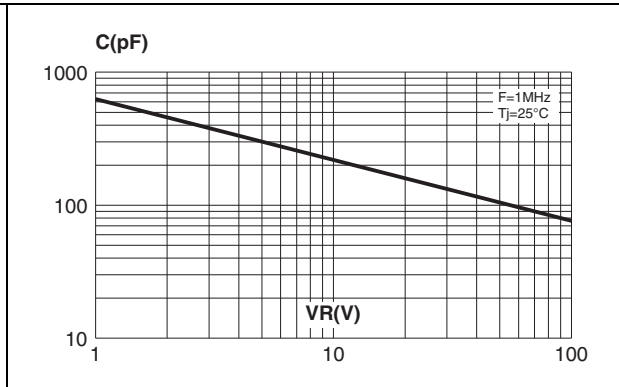


Figure 9. Forward voltage drop versus forward current (maximum values)

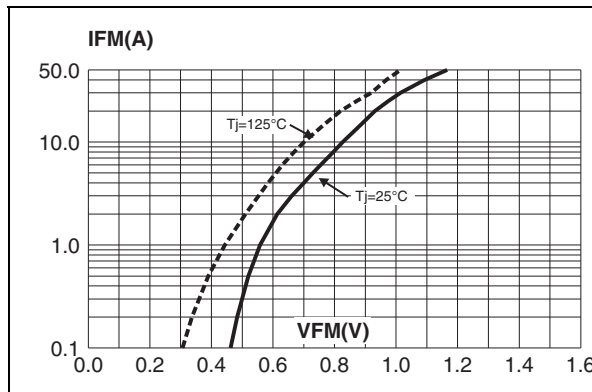
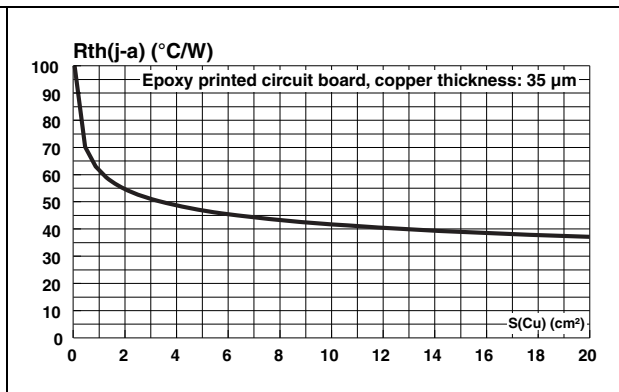


Figure 10. Thermal resistance junction to ambient versus copper surface under tab



2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)

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Figure 11. DPAK dimensions

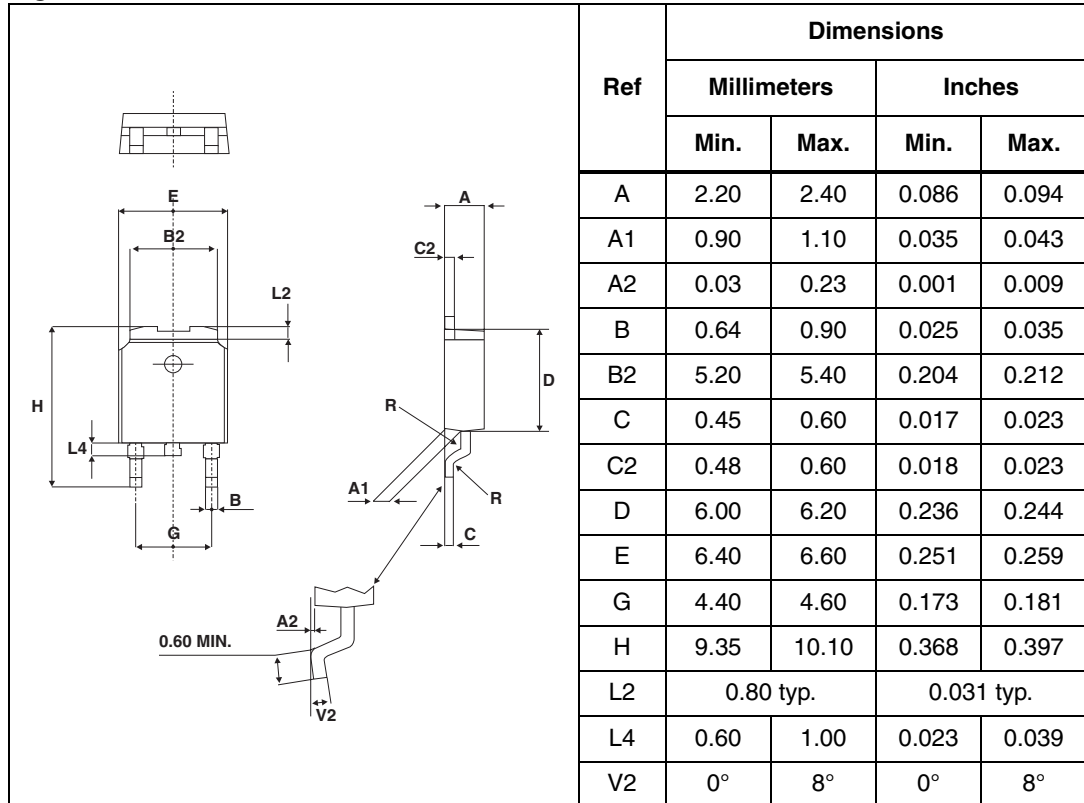
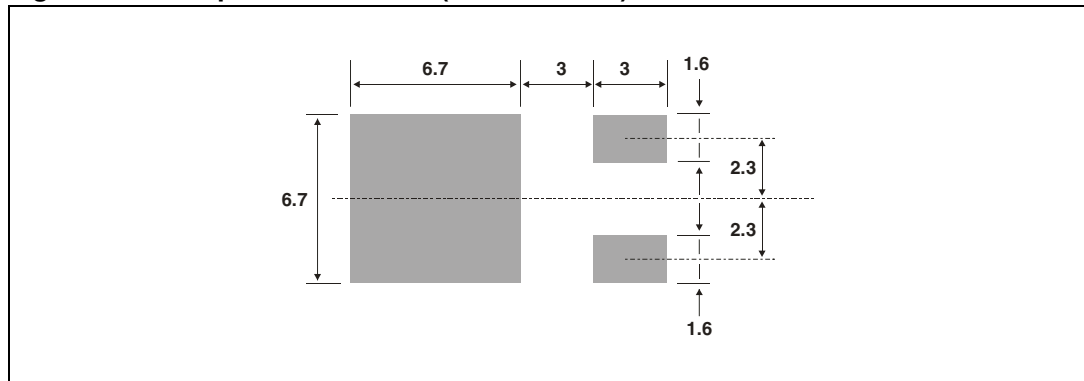


Figure 12. Footprint dimensions (in millimeters)



3 Ordering information

Table 5. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS5H100BY-TR	S5H100Y	DPAK	0.30 g	2500	Tape and reel

4 Revision history

Table 6. Document revision history

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

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