

High voltage power Schottky rectifier

Datasheet – production data

Features

- High junction temperature capability
- Low leakage current
- Good trade off between leakage current and forward voltage drop
- Low thermal resistance
- High frequency operation

Description

Dual center tap Schottky rectifier suited for high frequency switch mode power supply.

Packaged in TO-247, this device is intended for use to enhance the reliability of the application.

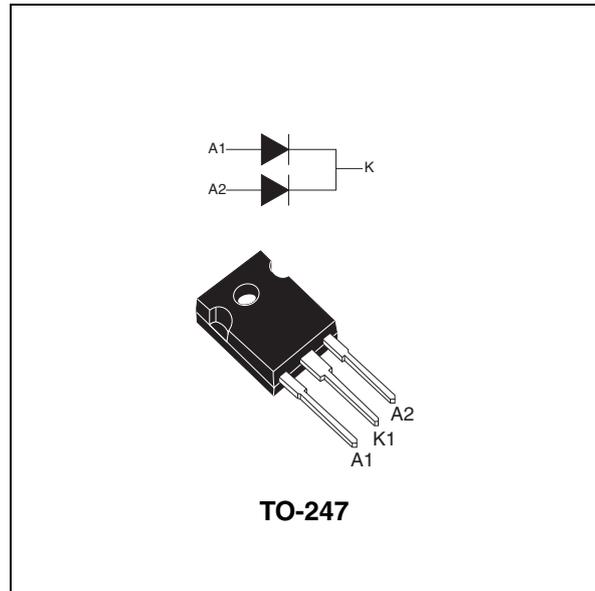


Table 1. Device summary

$I_{F(AV)}$	2 x 30 A
V_{RRM}	100 V
$T_j(\text{max})$	175 °C
$V_F(\text{max})$	0.67 V

1 Characteristics

Table 2. Absolute ratings (limiting values, per diode)

Symbol	Parameter		Value	Unit	
V _{RRM}	Repetitive peak reverse voltage		100	V	
I _{F(RMS)}	Forward rms current		80	A	
I _{F(AV)}	Average forward current	T _c = 150 °C δ = 0.5	Per diode Per device	30 60	A
I _{FSM}	Surge non repetitive forward current	t _p = 10 ms sinusoidal	450	A	
P _{ARM}	Repetitive peak avalanche power	t _p = 1 μs T _j = 25 °C	26400	W	
T _{stg}	Storage temperature range		-65 to + 175	°C	
T _j	Maximum operating junction temperature ⁽¹⁾		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	Per diode	0.9	°C/W
		Total	0.6	
R _{th(c)}	Junction to case	Coupling	0.3	°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	Test conditions		Min.	Typ.	Max.	Unit
I _R ⁽¹⁾	Reverse leakage current	T _j = 25 °C	V _R = V _{RRM}		3	16	μA
		T _j = 125 °C			4	16	mA
V _F ⁽¹⁾	Forward voltage drop	T _j = 25 °C	I _F = 30 A			0.79	V
		T _j = 125 °C	I _F = 30 A		0.63	0.67	
		T _j = 25 °C	I _F = 60 A			0.93	
		T _j = 125 °C	I _F = 60 A		0.72	0.78	

1. Pulse test: t_p = 380 μs, δ < 2%

To evaluate the conduction losses use the following equation:

$$P = 0.56 \times I_{F(AV)} + 0.0036 I_{F(RMS)}^2$$

Figure 1. Conduction losses versus average current (per diode)

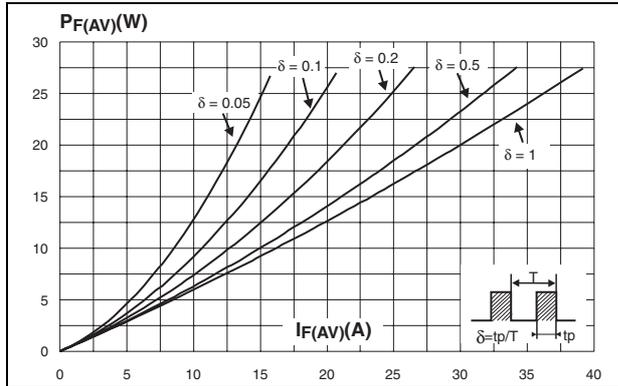


Figure 2. Normalized avalanche power derating versus pulse duration

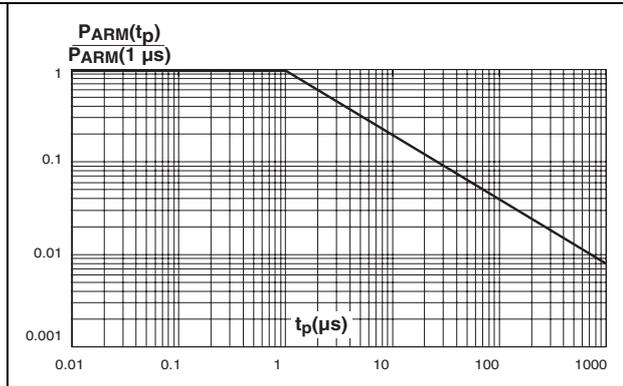


Figure 3. Normalized avalanche power derating versus junction temperature

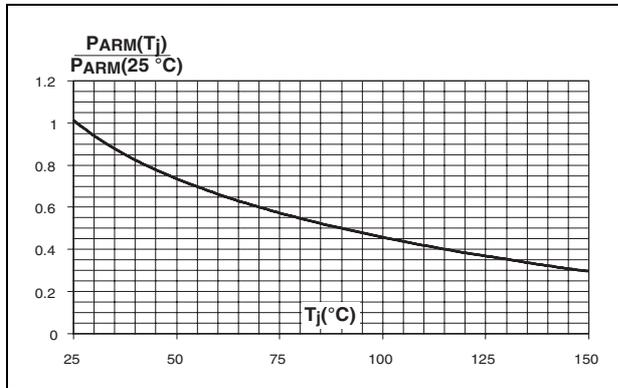


Figure 4. Average forward current versus ambient temperature (delta = 0.5, per diode)

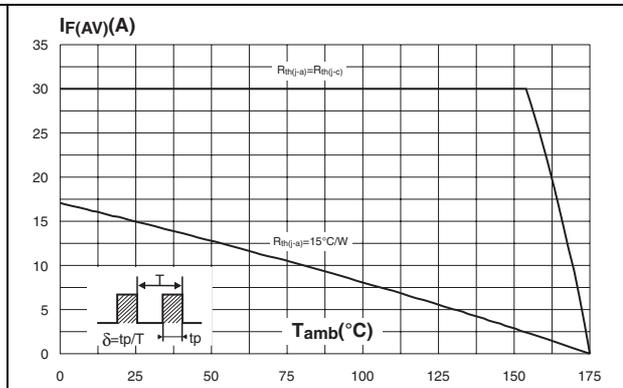


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values, per diode)

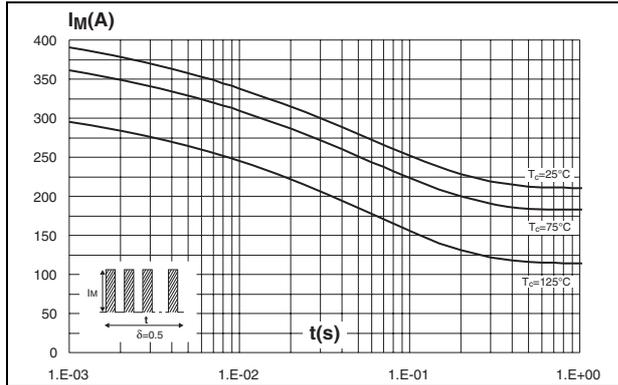


Figure 6. Relative variation of thermal impedance junction to case versus pulse duration

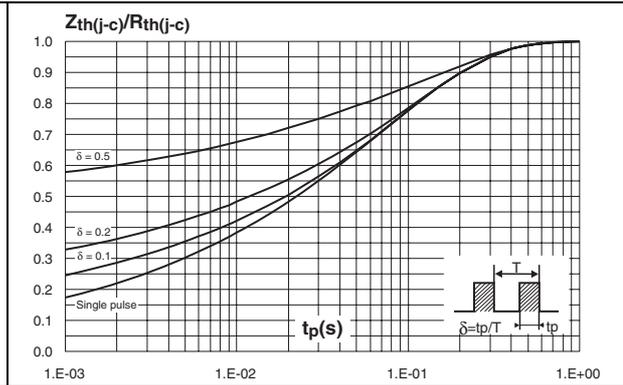


Figure 7. Reverse leakage current versus reverse voltage applied (typical values, per diode)

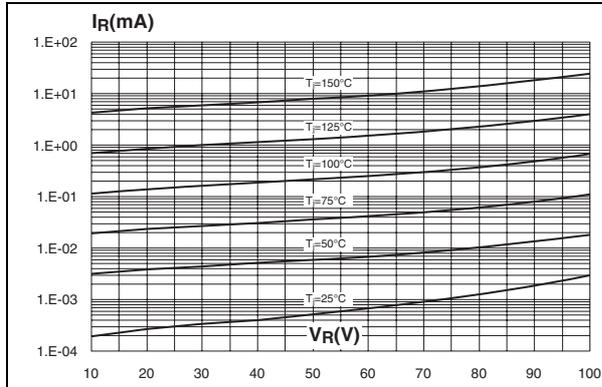


Figure 8. Junction capacitance versus reverse voltage applied (typical values, per diode)

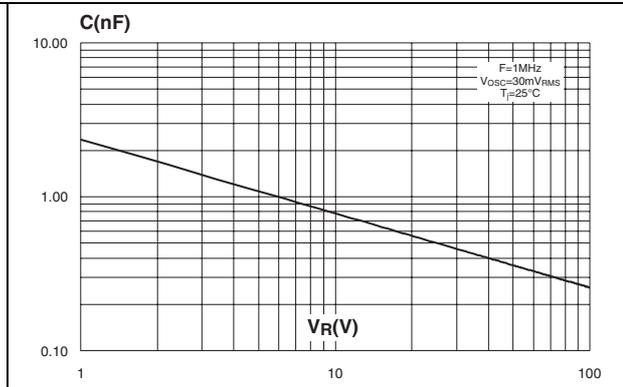
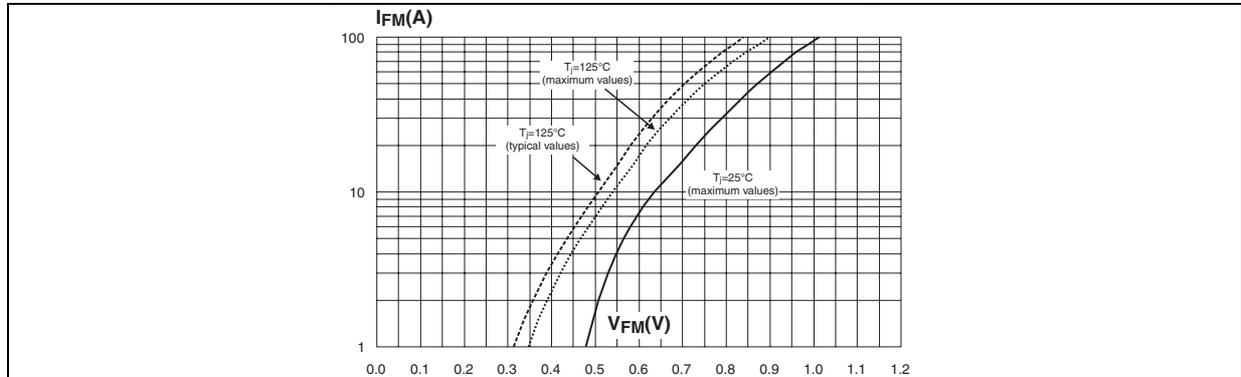


Figure 9. Forward voltage drop versus forward current (per diode)



2 Package information

- Epoxy meets UL94, V0
- Lead-free package
- Cooling method: Conduction
- Recommended torque value: 0.9 to 1.2 N·m

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Table 5. TO-247 dimensions

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.85		5.15	0.191		0.203
A1	2.20		2.60	0.086		0.102
b	1.00		1.40	0.039		0.055
b1	2.00		2.40	0.078		0.094
b2	3.00		3.40	0.118		0.133
c	0.40		0.80	0.015		0.031
D ⁽¹⁾	19.85		20.15	0.781		0.793
E	15.45		15.75	0.608		0.620
e	5.30	5.45	5.60	0.209	0.215	0.220
L	14.20		14.80	0.559		0.582
L1	3.70		4.30	0.145		0.169
L2	18.50 typ.			0.728 typ.		
∅P ⁽²⁾	3.55		3.65	0.139		0.143
∅R	4.50		5.50	0.177		0.217
S	5.30	5.50	5.70	0.209	0.216	0.224

1. Dimension D plus gate protrusion does not exceed 20.5 mm
2. Resin thickness around the mounting hole is not less than 0.9 mm

3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS61H100CW	STPS61H100CW	TO-247	4.4 g	30	Tube

4 Revision history

Table 7. Document revision history

Date	Revision	Changes
Oct-2003	1A	Previous version
Sep-2006	2	Reformatted for internal distribution.
12-Mar-2012	3	Updated package dimension nomenclature and illustration in Table 5 . Dimensions of actual package remain unchanged.

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