

High voltage power Schottky rectifier

Datasheet – production data

Features

- Negligible switching losses
- Low leakage current
- Good trade off between leakage current and forward voltage drop
- Low thermal resistance
- Avalanche capability specified

Description

Dual center tap Schottky rectifier suited for switch mode power supplies and high frequency DC to DC converters.

Packaged in TO-247, this device is intended for use in high frequency inverters.

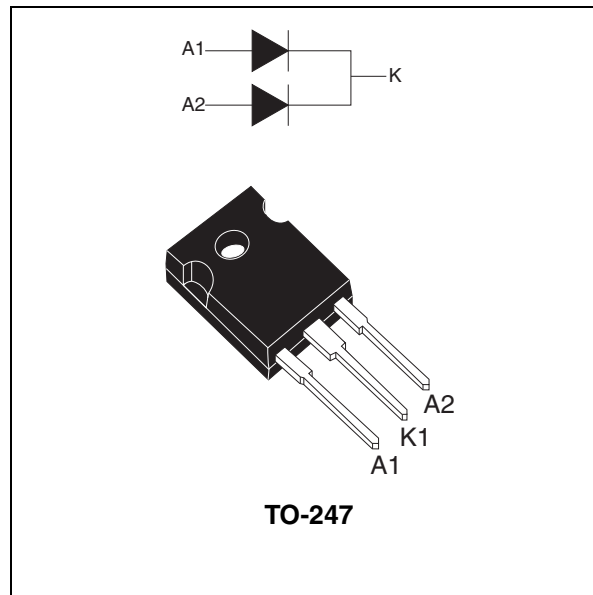


Table 1. Device summary

$I_{F(AV)}$	2 x 20 A
V_{RRM}	100 V
$T_j(\text{max})$	175 °C
$V_F(\text{max})$	0.61 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		30	A
$I_{F(AV)}$	Average forward current	$T_c = 160\text{ }^\circ\text{C}$ $\delta = 0.5$	Per diode 40 Per device	20 A
I_{FSM}	Surge non repetitive forward current	$t_p = 10\text{ ms}$ sinusoidal	300	A
I_{RRM}	Repetitive peak reverse current	$t_p = 2\text{ }\mu\text{s}$ $F = 1\text{ kHz}$ square	1	A
I_{RSM}	Non repetitive peak reverse current	$t_p = 100\text{ }\mu\text{s}$ square	4	A
E_{AS}	Non repetitive avalanche energy	$T_j = 25\text{ }^\circ\text{C}$, $L = 60\text{ mH}$ $I_{as} = 3\text{ A}$	36	mJ
P_{ARM}	Repetitive peak avalanche power	$t_p = 1\text{ }\mu\text{s}$, $T_j = 25\text{ }^\circ\text{C}$	26400	W
T_{stg}	Storage temperature range		-65 to + 175	$^\circ\text{C}$
T_j	Maximum operating junction temperature		175	$^\circ\text{C}$
dV/dt	Critical rate of rise of reverse voltage		10000	V/ μs

Table 3. Thermal resistance

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	Per diode Total	0.9 0.55	$^\circ\text{C/W}$
$R_{th(c)}$		Coupling	0.1	

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

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ }^\circ\text{C}$	$V_R = V_{RRM}$			10	μA
		$T_j = 125\text{ }^\circ\text{C}$			5	15	mA
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ }^\circ\text{C}$	$I_F = 20\text{ A}$			0.73	V
		$T_j = 125\text{ }^\circ\text{C}$	$I_F = 20\text{ A}$		0.58	0.61	
		$T_j = 25\text{ }^\circ\text{C}$	$I_F = 40\text{ A}$			0.85	
		$T_j = 125\text{ }^\circ\text{C}$	$I_F = 40\text{ A}$		0.67	0.72	

1. Pulse test: $t_p = 5\text{ ms}$, $\delta < 2\%$

2. Pulse test: $t_p = 380\text{ }\mu\text{s}$, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 0.5 \times I_{F(AV)} + 0.0055 I_{F(RMS)}^2$$

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

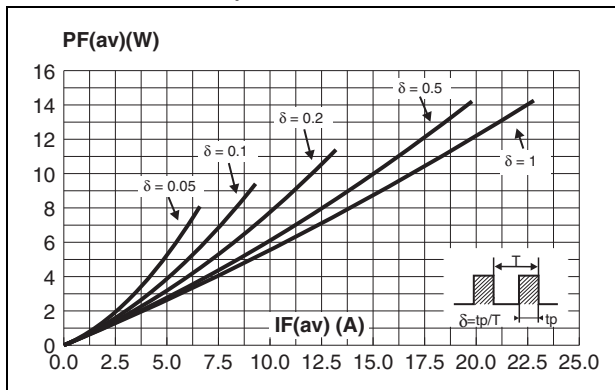


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$, per diode)

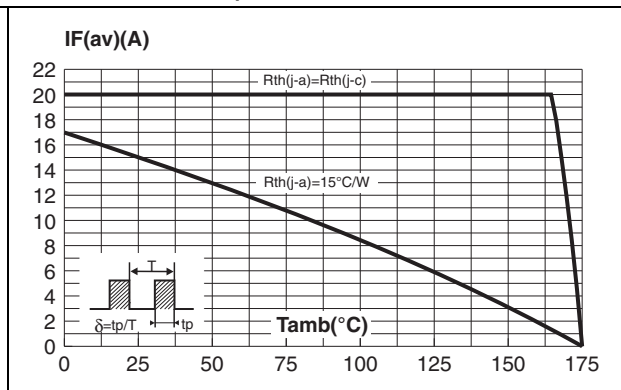


Figure 3. Normalized avalanche power derating versus pulse duration

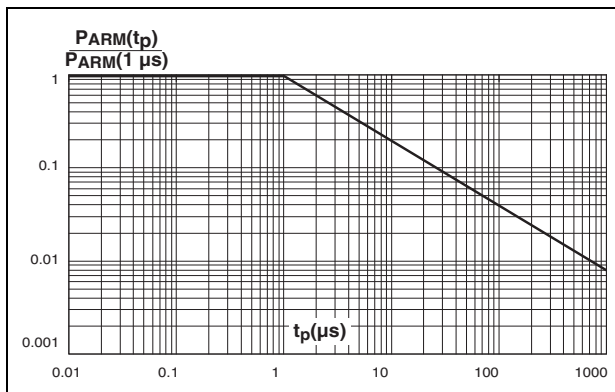


Figure 4. Normalized avalanche power derating versus junction temperature

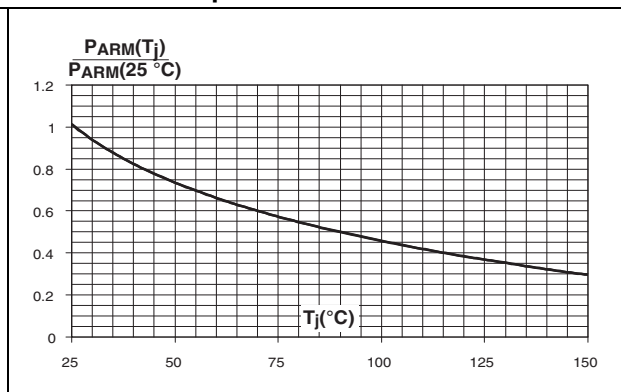


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values, per diode)

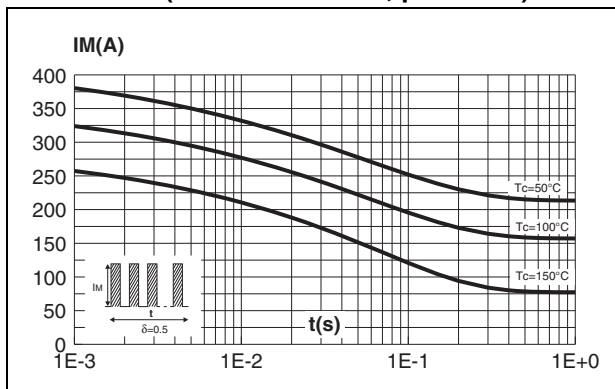


Figure 6. Relative variation of thermal impedance junction to case versus pulse duration

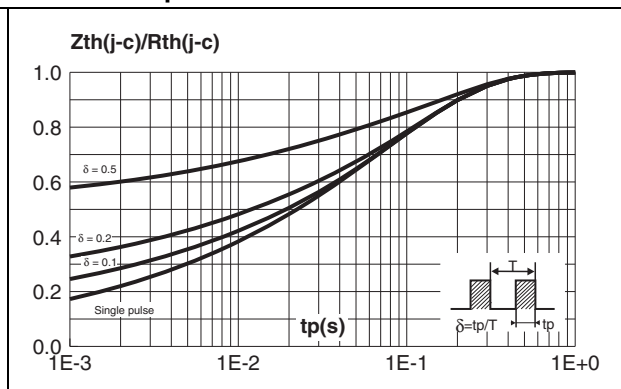


Figure 7. Reverse leakage current versus reverse voltage applied (maximum values, per diode)

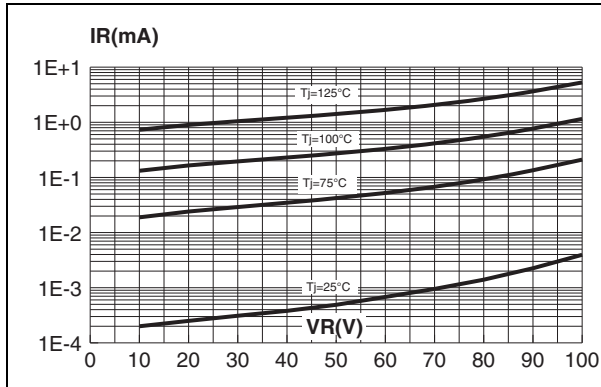


Figure 8. Junction capacitance versus reverse voltage applied (typical values, per diode)

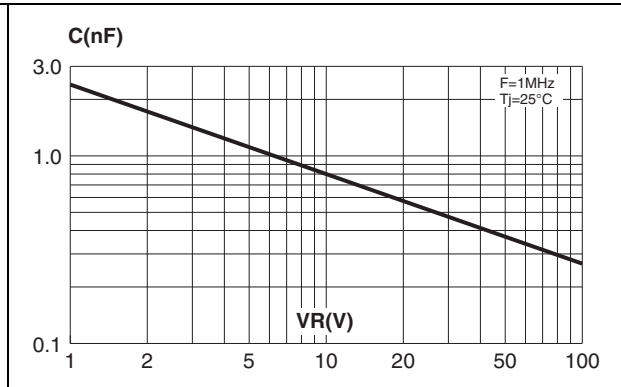
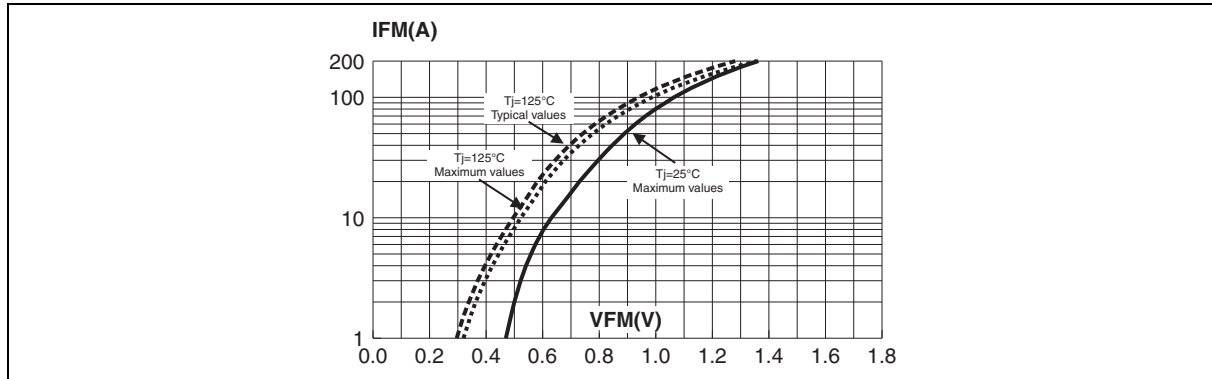


Figure 9. Forward voltage drop versus forward current (per diode)



2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque values: 0.55 N·m (1.0 N·m maximum)

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

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPS40H100CW	STPS40H100CW	TO-247	4.36 g	30	Tube

4 Revision history

Table 7. Document revision history

Date	Revision	Changes
Jul-2003	4D	Previous release.
16-Jan-2013	5	Updated package graphic to clarify lead length.

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