

Features

- Very small conduction losses
- Avalanche rated
- Low forward voltage drop
- High frequency operation

Description

This device is a dual diode Schottky rectifier, suited to high frequency switch mode power supply.

Packaged in IPAK, this device is intended to be used in notebook, game station and desktop adapters, providing in these applications a good efficiency at both low and high load.

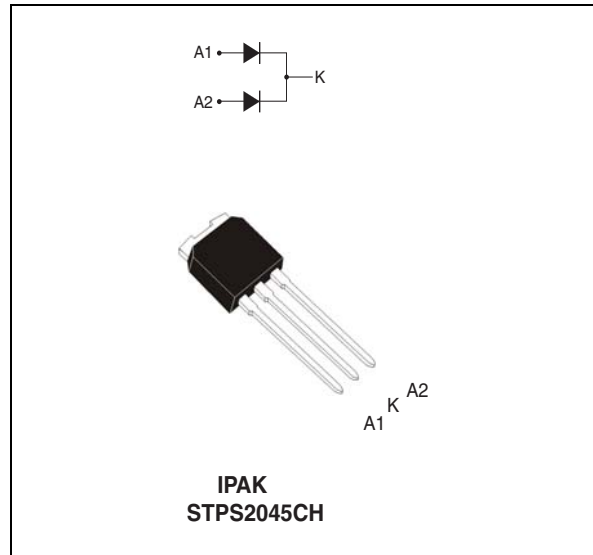


Figure 1. Electrical characteristics^(a)

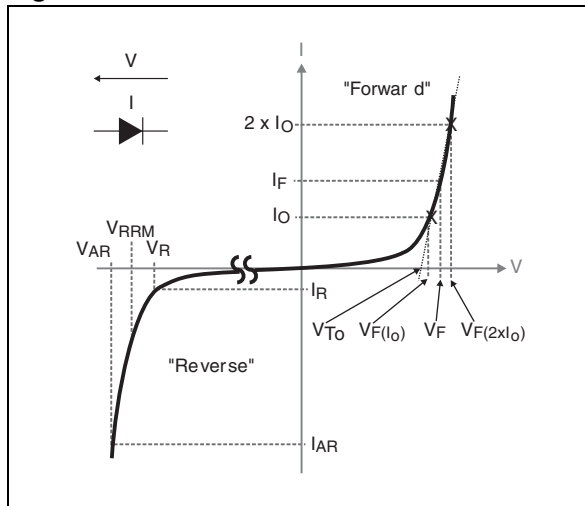


Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	2 x 10 A
V_{RRM}	45 V
$T_j(max)$	175 °C
$V_F(max)$	0.57 V

- a. V_{ARM} and I_{ARM} must respect the reverse safe operating area defined in [Figure 8](#). V_{AR} and I_{AR} are pulse measurements ($t_p < 10 \mu s$). V_R , I_R , V_{RRM} and V_F are static characteristics

1 Characteristics

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

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			45	V
$I_{F(RMS)}$	Forward rms voltage			20	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	$T_c = 155\text{ }^{\circ}\text{C}$	Per diode	10	A
		$T_c = 150\text{ }^{\circ}\text{C}$	Per package	20	
I_{FSM}	Surge non repetitive forward current		$t_p = 10\text{ ms}$ sine-wave	150	A
$P_{ARM}^{(1)}$	Repetitive peak avalanche power		$t_p = 10\text{ }\mu\text{s}$, $T_j = 125\text{ }^{\circ}\text{C}$	280	W
$V_{ARM}^{(2)}$	Maximum repetitive peak avalanche voltage		$t_p < 10\text{ }\mu\text{s}$, $T_j < 125\text{ }^{\circ}\text{C}$, $I_{AR} < 4.7\text{ A}$	60	V
$V_{ASM}^{(2)}$	Maximum single-pulse peak avalanche voltage		$t_p < 10\text{ }\mu\text{s}$, $T_j < 125\text{ }^{\circ}\text{C}$, $I_{AR} < 4.7\text{ A}$	60	V
T_{stg}	Storage temperature range			-65 to + 175	$^{\circ}\text{C}$
T_j	Maximum operating junction temperature ⁽³⁾			+ 175	$^{\circ}\text{C}$

- For pulse time duration deratings, please refer to [Figure 4](#). More details regarding the avalanche energy measurements and diode validation in the avalanche are provided in the application notes AN1768 and AN2025.
- See [Figure 8](#)
- $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal resistance parameters

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	2.50	$^{\circ}\text{C/W}$
		Total	1.6	
$R_{th(c)}$	Coupling		0.7	$^{\circ}\text{C/W}$

When the diodes 1 and 2 are used simultaneously:

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

Table 4. Static electrical characteristics (per diode)

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ }^{\circ}\text{C}$	$V_R = V_{RRM}$			100	μA
		$T_j = 125\text{ }^{\circ}\text{C}$			7	15	mA
$V_F^{(2)}$	Forward voltage drop	$T_j = 125\text{ }^{\circ}\text{C}$	$I_F = 10\text{ A}$		0.5	0.57	V
		$T_j = 25\text{ }^{\circ}\text{C}$	$I_F = 20\text{ A}$			0.84	
		$T_j = 125\text{ }^{\circ}\text{C}$			0.65	0.72	

- Pulse test: $t_p = 5\text{ ms}$, $\delta < 2\%$
- Pulse test: $t_p = 380\text{ }\mu\text{s}$, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 0.42 \times I_{F(AV)} + 0.015 I_{F(RMS)}^2$$

Figure 2. Average forward power dissipation versus average forward current (per diode)

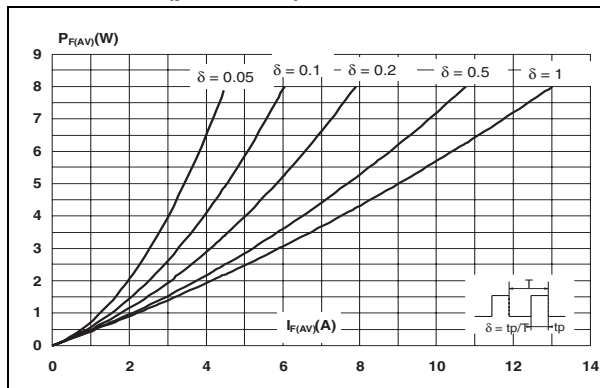


Figure 3. Junction capacitance versus reverse voltage applied (typical values, per diode)

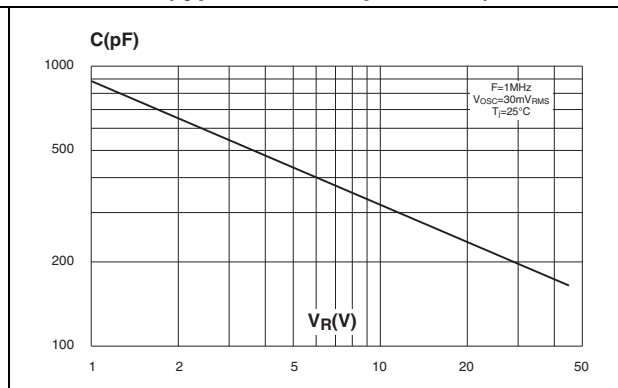


Figure 4. Normalized avalanche power derating versus pulse duration

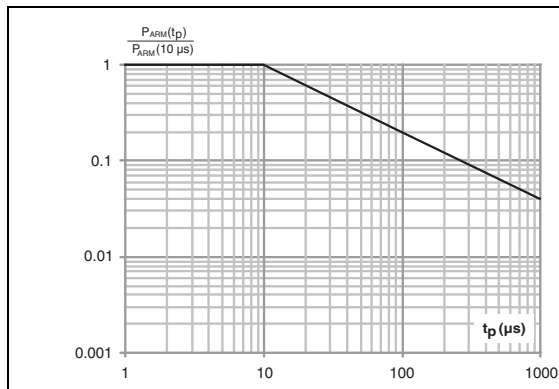


Figure 5. Relative variation of thermal impedance junction to case versus pulse duration

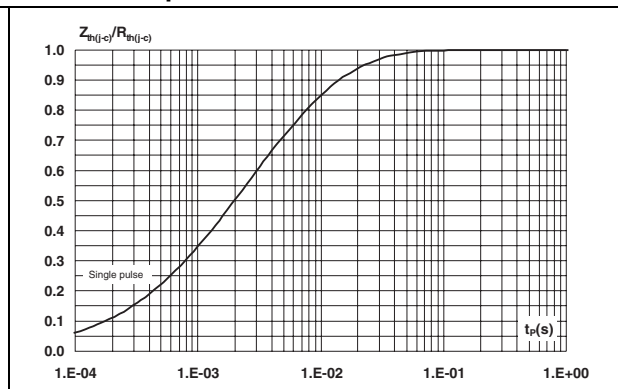


Figure 6. Reverse leakage current versus reverse voltage applied (typical values, per diode)

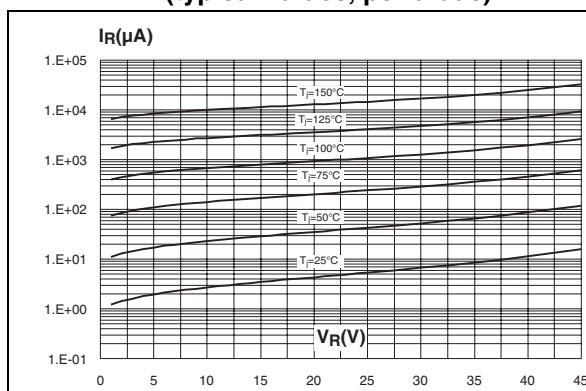


Figure 7. Forward voltage drop versus forward current (per diode)

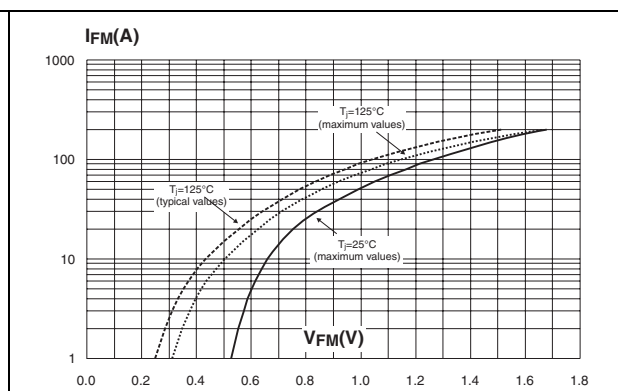


Figure 8. Reverse safe operating area
($t_p < 10 \mu s$ and $T_j < 125^\circ C$)

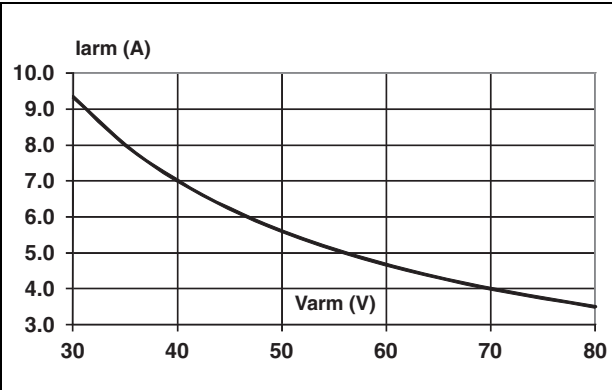
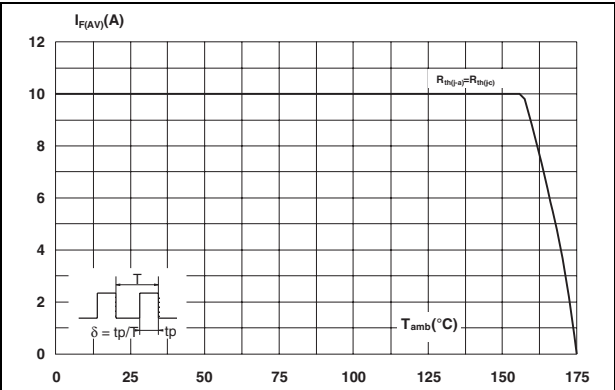


Figure 9. Average forward current versus
ambient temperature
($\delta = 0.5$, per diode)



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. ECOPACK® is an ST trademark.

Table 5. IPAK Dimensions

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.20		2.40	0.086		0.094
A1	0.90		1.10	0.035		0.043
A3	0.70		1.30	0.027		0.051
B	0.64		0.90	0.025		0.035
B2	5.20		5.40	0.204		0.212
B3			0.95			0.037
B5		0.30			0.035	
C	0.45		0.60	0.017		0.023
C2	0.48		0.60	0.019		0.023
D	6		6.20	0.236		0.244
E	6.40		6.60	0.252		0.260
e		2.28			0.090	
G	4.40		4.60	0.173		0.181
H		16.10			0.634	
L	9		9.40	0.354		0.370
L1	0.8		1.20	0.031		0.047
L2		0.80	1		0.031	0.039
V1		10°			10°	

3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS2045CH	S2045CH	IPAK	0.35 g	75	Tube

4 Revision history

Table 7. Document revision history

Date	Revision	Changes
21-Jun-2012	1	First issue

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