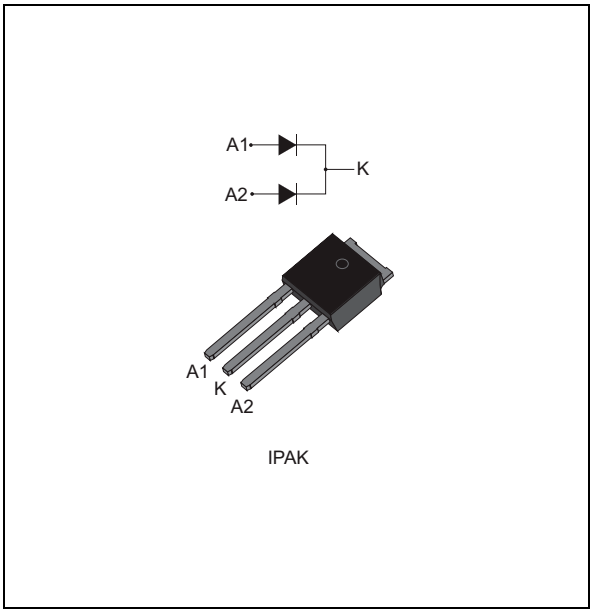
STPS2045CH

Power Schottky rectifier

Datasheet – production data



Features

- Very small conduction losses
- Avalanche specification
- Low forward voltage drop
- High frequency operation
- ECOPACK®2 compliant on demand

Description

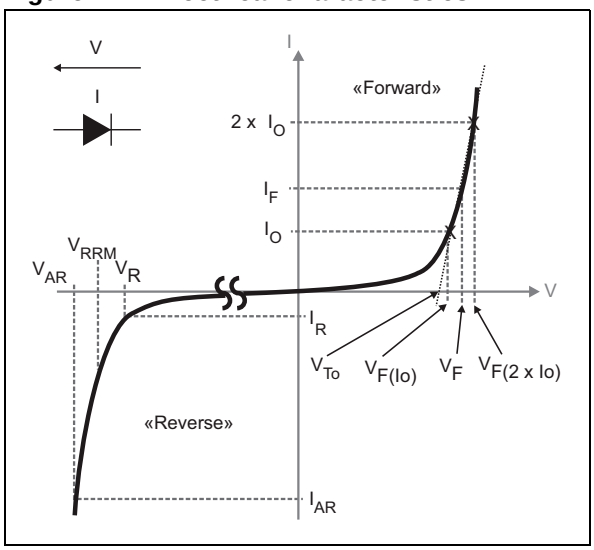
This device is a dual diode Schottky rectifier, suited to high frequency switch mode power supply.

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.

Table 1. Device summary

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

Figure 1. Electrical characteristics(a)



a. V_{ARM} and I_{ARM} must respect the reverse safe operating area defined in *Figure 9*. V_{AR} and I_{AR} are pulse measurements (t_p < 10 µs). V_R, I_R, V_{RRM} and V_F, are static characteristics

1 Characteristics

Table 2. Absolute ratings (limiting values, at 25 °C unless otherwise stated)

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

1. For pulse time duration derating, 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.
2. See *Figure 9*
3. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ 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	2.5	°C/W
		Total	1.6	
$R_{th(c)}$	Coupling		0.7	

When the diodes 1 and 2 are used simultaneously:
ΔT_j(diode 1) = P(diode1) x $R_{th(j-c)}$(Per diode) + P(diode 2) x $R_{th(c)}$

Table 4. Static electrical characteristics

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

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:

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

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

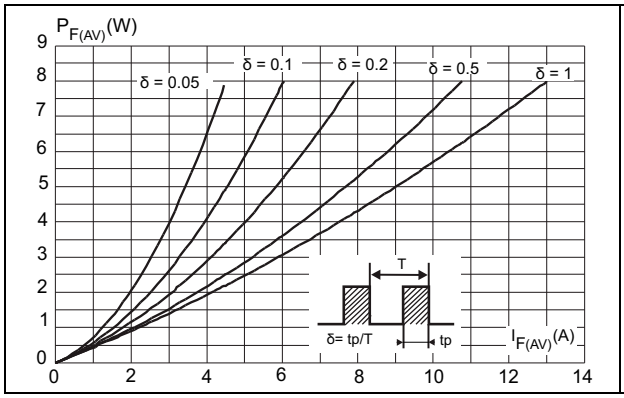


Figure 3. Average forward current versus ambient temperature (δ = 0.5, per diode)

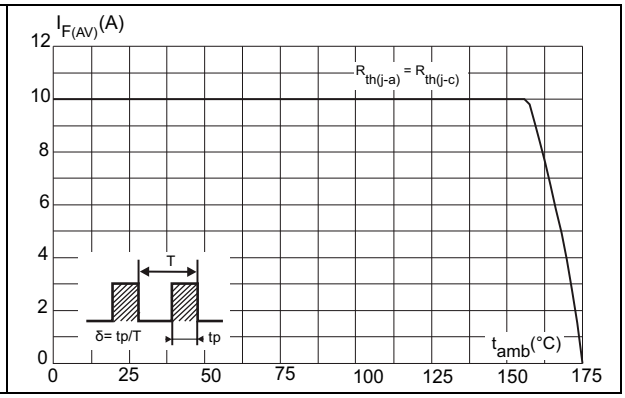


Figure 4. Normalized avalanche power derating versus pulse duration at T_j = 125 °C

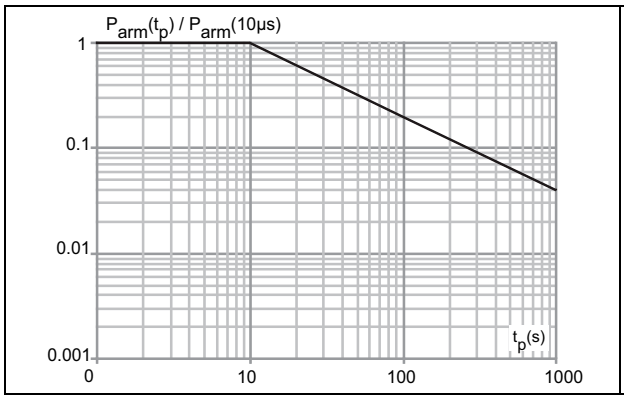


Figure 5. Relative variation of thermal impedance junction to case versus pulse duration

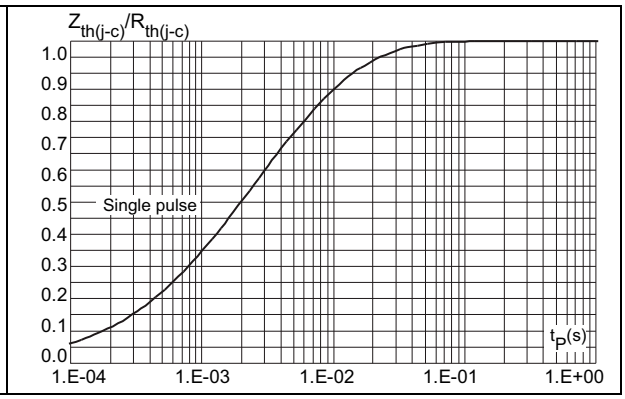


Figure 6. Reverse leakage current versus reverse voltage applied (typical values, per diode)

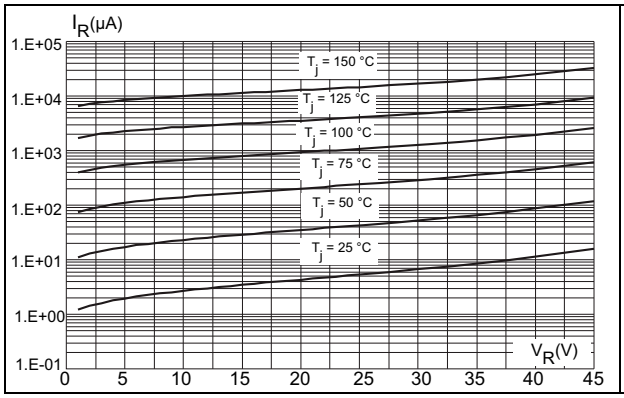


Figure 7. Junction capacitance versus reverse voltage applied (typical values, per diode)

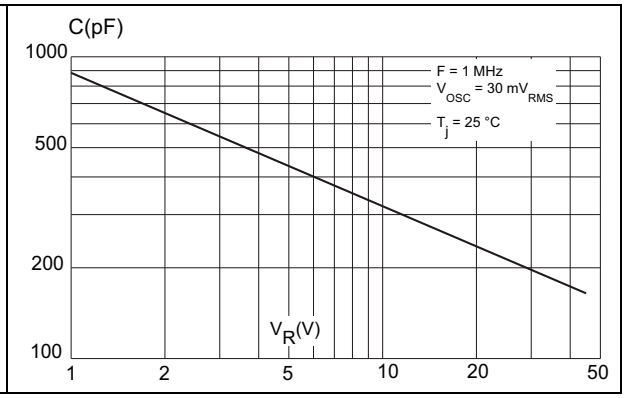


Figure 8. Forward voltage drop versus forward current (per diode)

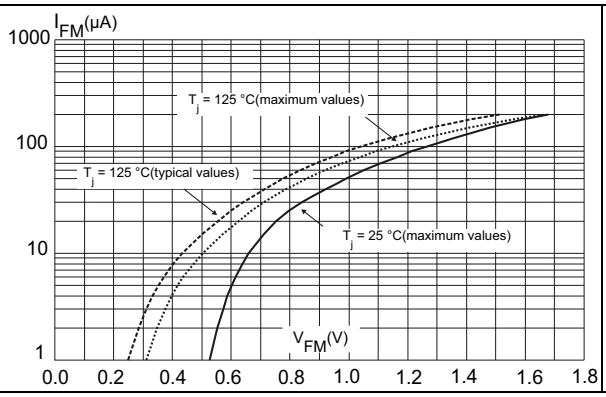
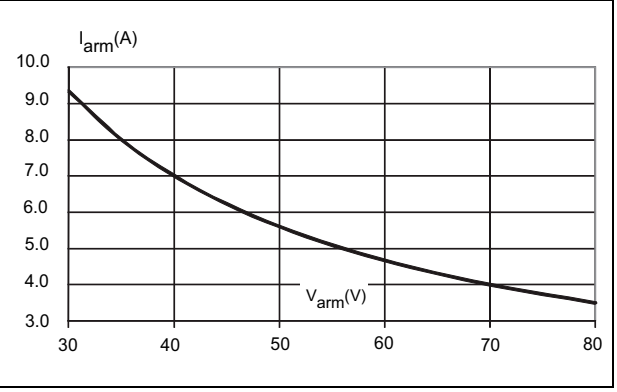


Figure 9. Reverse safe operating area (t_p < 10 µs and T_j < 125 °C)

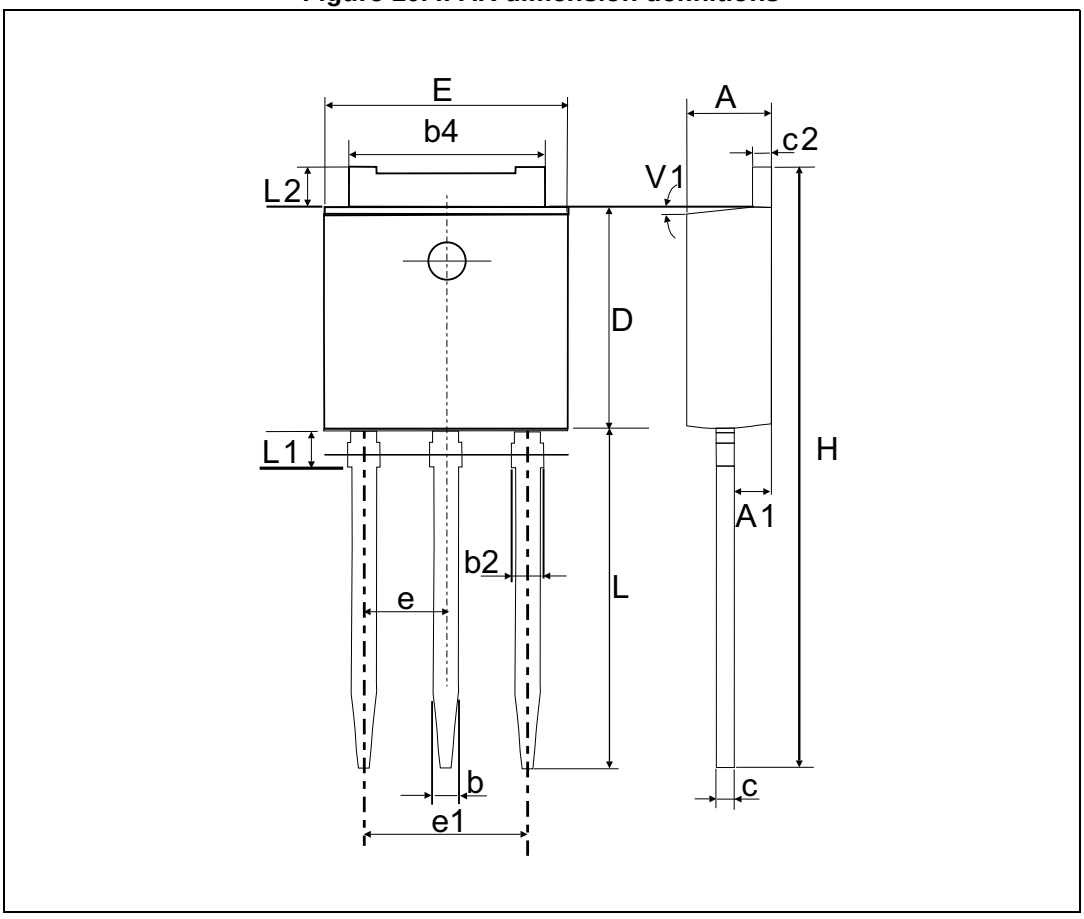


2 Package Information

- Epoxy meets UL94, V0
- Lead-free package
- ECOPACK®2 compliant component on demand

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.

Figure 10. IPAK dimension definitions



Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 5. IPAK dimension values

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
b	0.64		0.90	0.025		0.035
b2			0.95			0.037
b4	5.20		5.43	0.204		0.213
c	0.45		0.60	0.017		0.023
c2	0.46		0.60	0.018		0.023
D	6		6.20	0.236		0.244
E	6.40		6.65	0.252		0.262
e		2.28			0.090	
e1	4.40		4.60	0.173		0.181
H		16.10			0.634	
L	9		9.60	0.354		0.377
L1	0.8		1.20	0.031		0.047
L2		0.80	1.25		0.031	0.049
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.
09-Oct-2014	2	Updated *Table 2* and IPAK package informations.