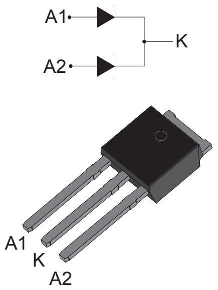
STPS2045CH

Datasheet

45 V power Schottky rectifier



IPAK

Features

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

Applications

- DC/DC converter
- Battery charger
- SMPS
- Desktop power
- Auxiliary power

Description

This dual-diode common cathode Schottky rectifier is ideal for high frequency switch mode power supply.

Packaged in IPAK, the STPS2045CH is optimized for notebook, game station and desktop adapters, providing in these applications a good efficiency at both low and high load.

Product status link
STPS2045CH

Product summary	
$I_{F(AV)}$	2 x 10 A
V_{RRM}	45 V
V_F (typ.)	0.50 V
T_j (max.)	175 °C

1 Characteristics

Table 1. Absolute ratings (limiting values, at 25 °C unless otherwise specified)

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 δ = 0.5, square wave	T_C = 155 °C	Per diode	10	A
		T_C = 150 °C	Per device	20	
I_{FSM}	Surge non repetitive forward current		t_p = 10 ms sine-wave	150	A
P_{ARM}	Repetitive peak avalanche power		t_p = 10 µs, T_j = 125 °C	280	W
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Maximum operating junction temperature (1)			+175	°C

1. *$(dP_{tot}/dT_j) < (1/R_{th(j-a)})$ condition to avoid thermal runaway for a diode on its own heatsink.*

Table 2. Thermal resistance parameters

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	

For more information, please refer to the following application note :

- AN5088 : Rectifiers thermal management, handling and mounting recommendations

Table 3. 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	-	0.50	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:

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

For more information, please refer to the following application notes related to the power losses :

- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

1.1 Characteristics (curves)

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

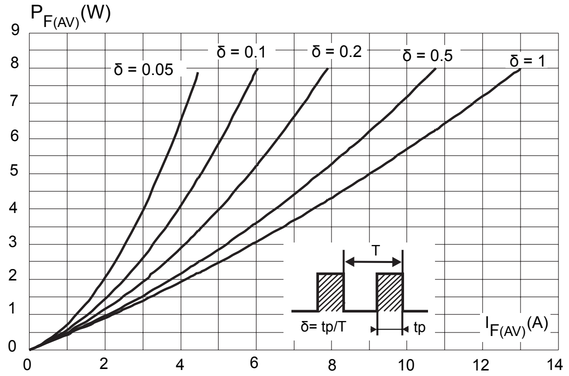


Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

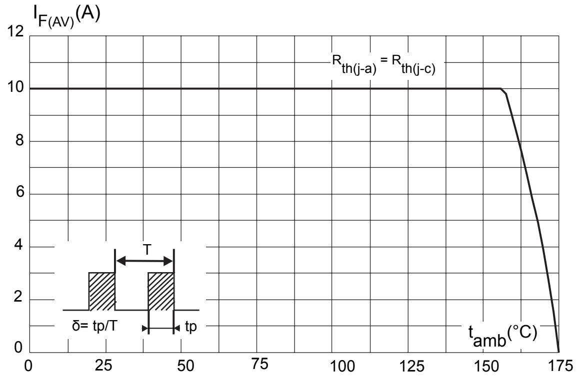


Figure 3. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

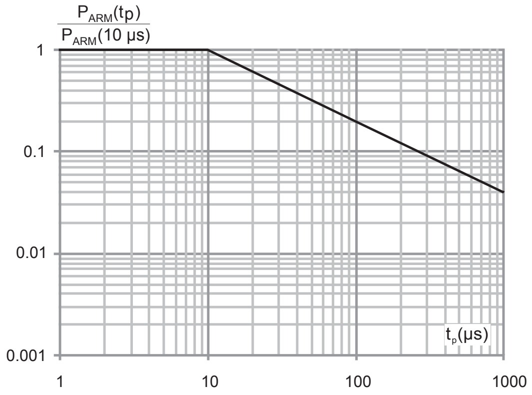


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

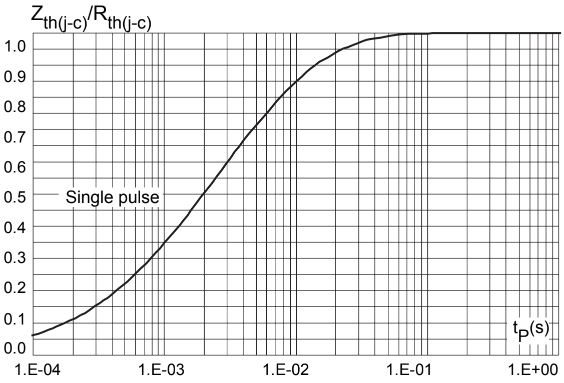


Figure 5. Reverse leakage current versus reverse voltage applied (typical values, per diode)

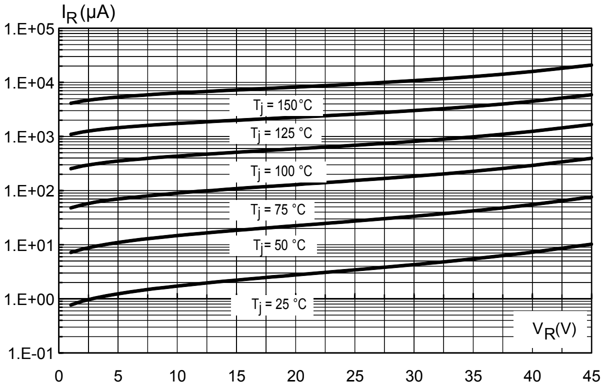


Figure 6. Junction capacitance versus reverse voltage applied (typical values, per diode)

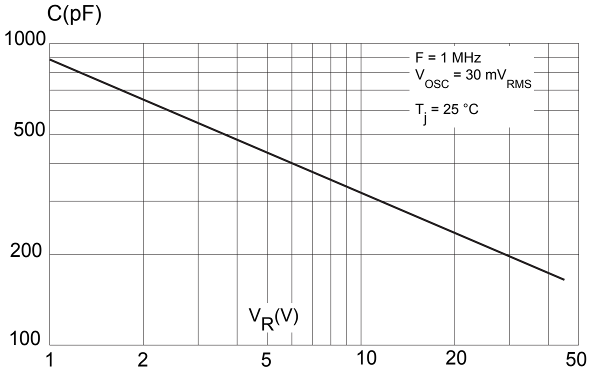
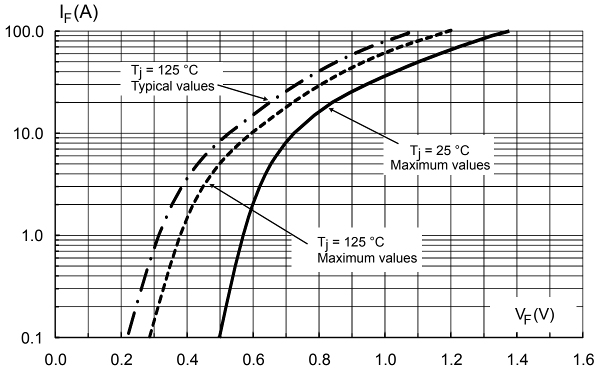


Figure 7. Forward voltage drop versus forward current (per diode)



2 Package information

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.

2.1 IPAK package information

- Cooling method: by conduction (C)
- Epoxy meets UL 94,V0

Figure 8. IPAK package outline

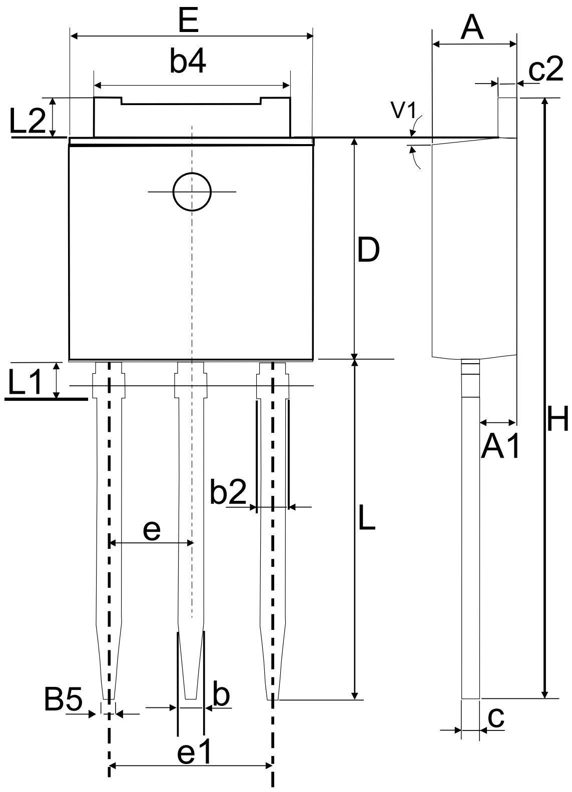


Table 4. **IPAK package mechanical data**

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.20	2.40	0.087	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	0.205	0.214
B5	0.30 typ.		0.012 typ.	
c	0.45	0.60	0.018	0.024
c2	0.46	0.60	0.018	0.024
D	6.00	6.20	0.236	0.244
E	6.40	6.65	0.252	0.261
e	2.28 typ.		typ.0.090	
e1	4.40	4.60	0.173	0.181
H	16.10 typ.		0.634 typ.	
L	9.0	9.60	0.354	0.378
L1	0.80	1.20	0.031	0.047
L2	0.80 typ.	1.25	0.031 typ.	0.049
V1	+10°		+10	

3 Ordering information

Table 5. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS2045CH	S20 45CH	IPAK	0.31 g	75	Tube

Revision history

Table 6. **Document revision history**

Date	Version	Changes
21-Jun-2012	1	First issue.
09-Oct-2014	2	Updated Table 2 and IPAK package informations.
27-Nov-2018	3	Removed figure 1 and figure 9. Updated Table 1. Absolute ratings (limiting values, at 25 °C unless otherwise specified), Figure 5. Reverse leakage current versus reverse voltage applied (typical values, per diode), Figure 7. Forward voltage drop versus forward current (per diode) and Table 5. Ordering information.