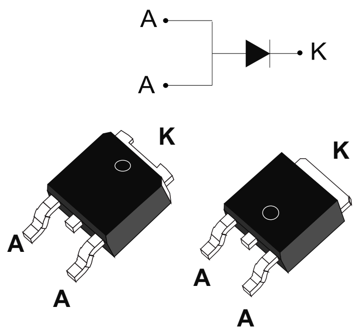
STPS1045B

Power Schottky rectifier

Datasheet — production data



DPAK

Features

- Very small conduction losses
- Extremely fast switching
- Low thermal resistance
- Negligible switching losses
- Low forward voltage drop
- Low capacitance
- Avalanche specification
- ECOPACK®2 compliant component for DPAK on demand

Description

High voltage Schottky rectifier suited for switch mode power supply and other power converters.

Packaged in DPAK, this device is intended for use in high frequency circuitries where low switching losses is required.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	10 A
V_{RRM}	45 V
T_j	175 °C
$V_{F(typ)}$	0.50 V

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
$I_{F(RMS)}$ / pin	Forward rms current		7	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$, square wave	T_c = 150 °C	10	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	75	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs, T_j = 125 °C	285	W
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Maximum operating junction temperature(1)		175	°C

1. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal resistance

Symbol	Parameter	Max. value	Unit
$R_{th(j-c)}$	Junction to case	3	°C/W

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 = 25 °C	I_F = 10 A	-		0.63	V
		T_j = 125 °C		-	0.50	0.57	
		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, $\delta < 2\%$
2. Pulse test: t_p = 380 µs, $\delta < 2\%$

To evaluate the conduction losses, use the following equation:

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

Figure 1. Average forward power dissipation versus average forward current

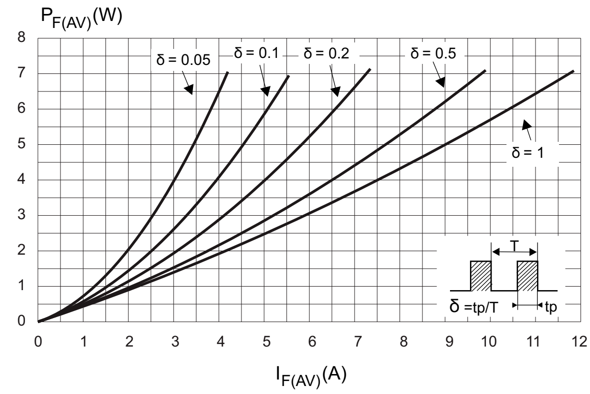


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

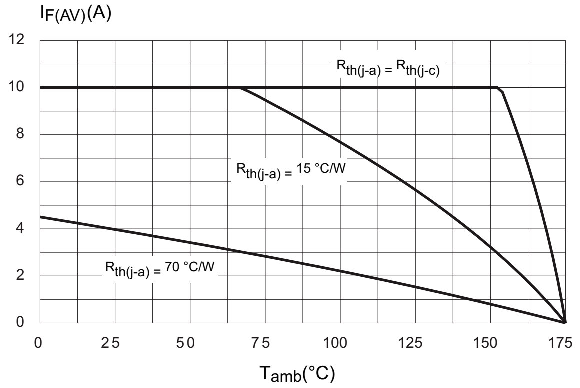


Figure 3. Normalized avalanche power derating versus pulse duration at T_j = 125 °C

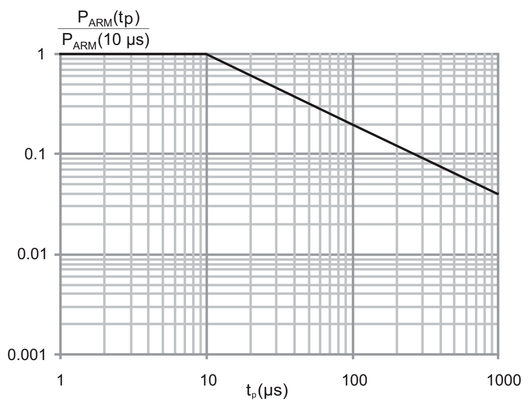


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

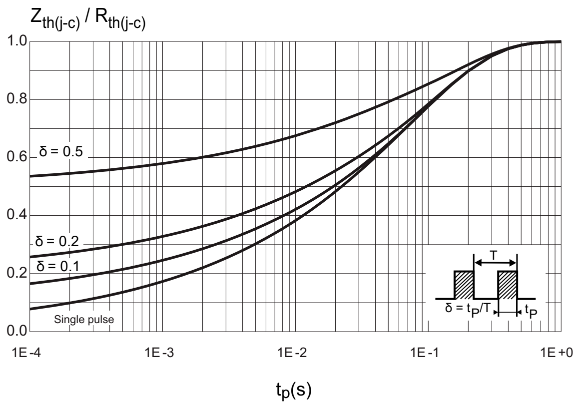


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

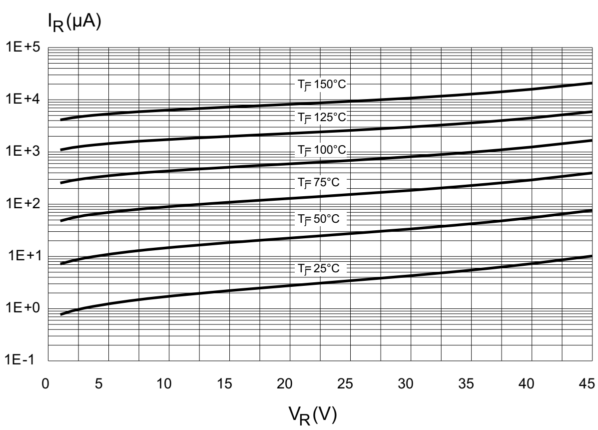


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

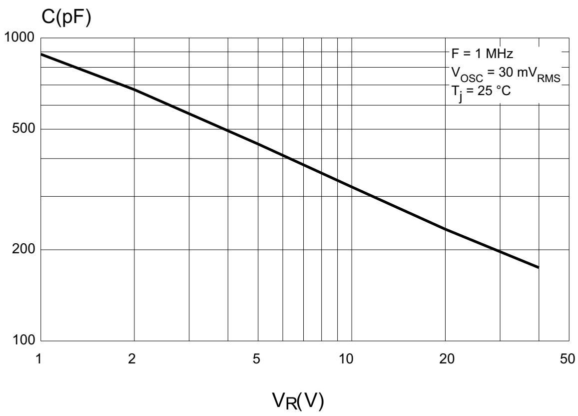


Figure 7. Forward voltage drop versus forward current

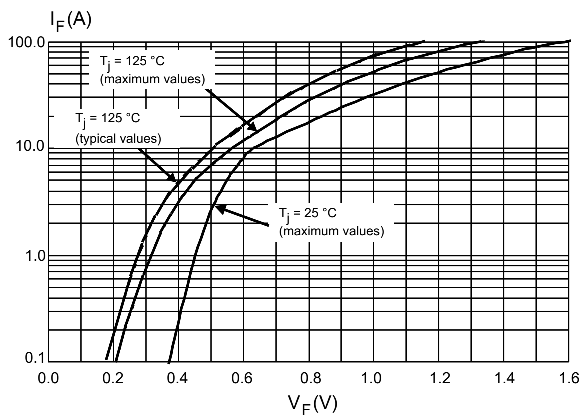
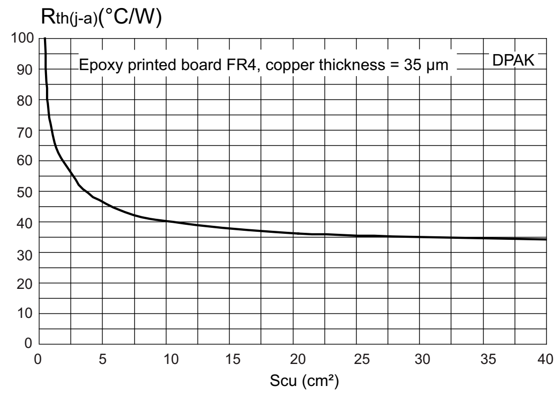


Figure 8. Thermal resistance junction to ambient versus copper surface under tab



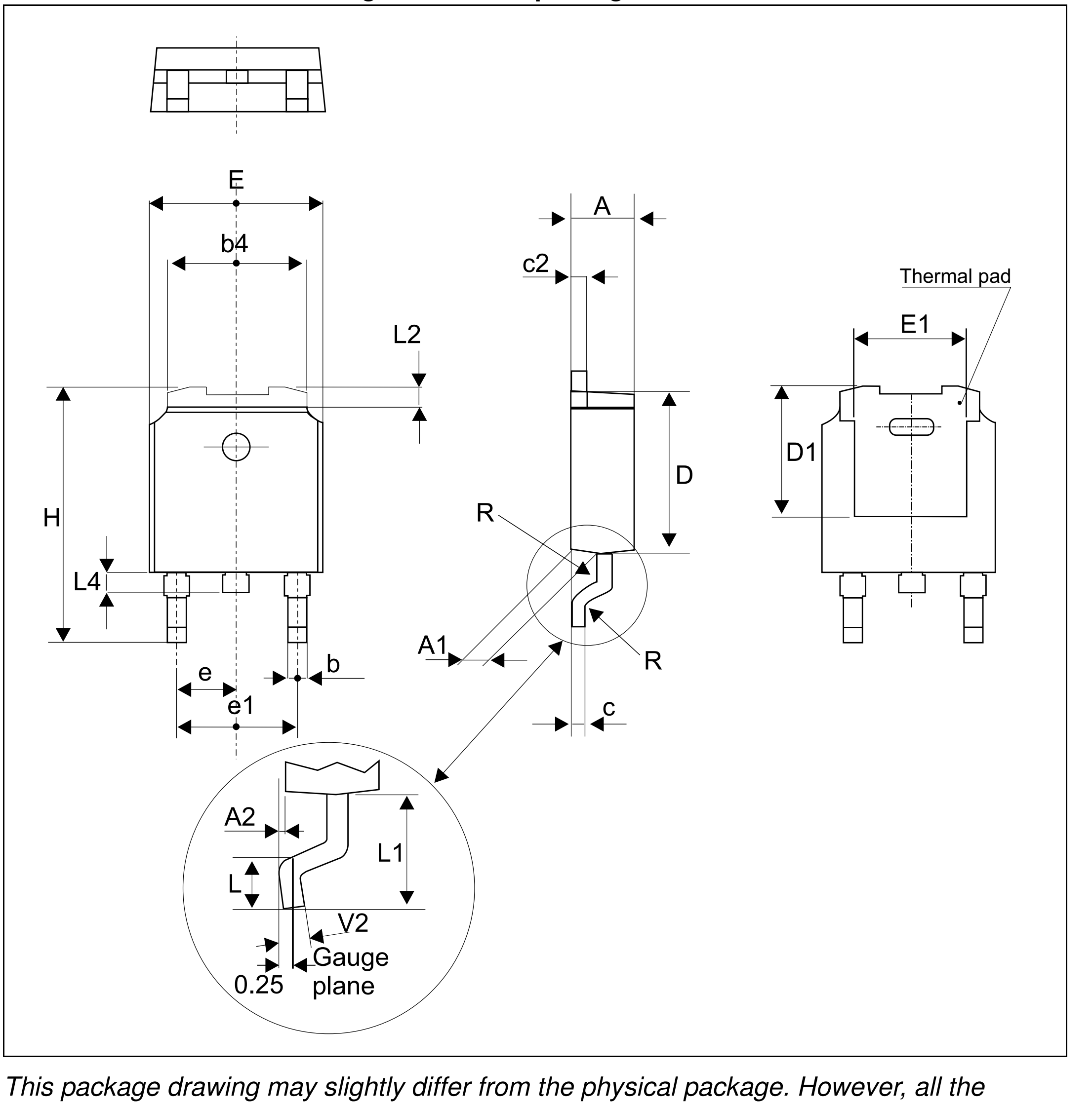
2 Package Information

- Epoxy meets UL94,V0
- Cooling method: by conduction (C)

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 DPAK package information

Figure 9. DPAK package outline

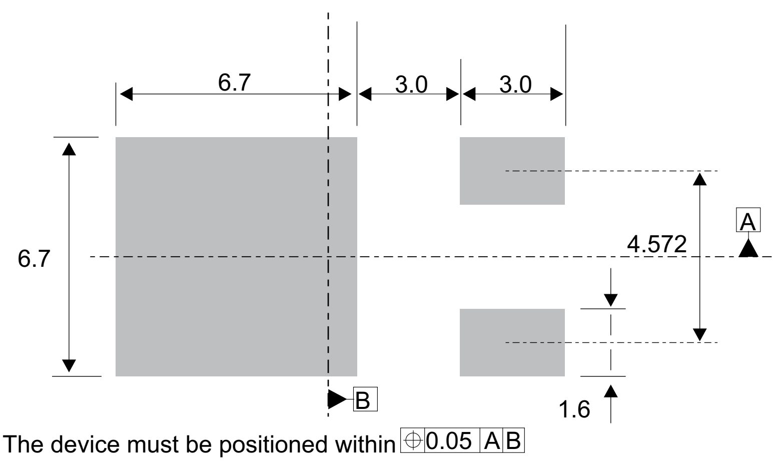


Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 5. DPAK package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.18		2.40	0.085		0.094
A1	0.90		1.10	0.035		0.043
A2	0.03		0.23	0.001		0.009
b	0.64		0.90	0.025		0.035
b4	4.95		5.46	0.194		0.214
c	0.46		0.61	0.018		0.024
c2	0.46		0.60	0.018		0.023
D	5.97		6.22	0.235		0.244
D1	4.95		5.60	0.194		0.220
E	6.35		6.73	0.250		0.264
E1	4.32		5.50	0.170		0.216
e		2.28			0.090	
e1	4.40		4.70	0.173		0.185
H	9.35		10.40	0.368		0.409
L	1.00		1.78	0.039		0.070
L2			1.27			0.050
L4	0.60		1.02	0.023		0.040
V2	-8°		+8°	-8°		8°

Figure 10. DPAK footprint dimensions (in mm)



3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS1045B	S10 45	DPAK	0.30 g	75	Tube
STPS1045B-TR	S10 45			2500	Tape and reel

4 Revision history

Table 7. Document revision history

Date	Revision	Changes
Jul-2003	3B	Last issue
21-Apr-2005	4	IPAK package removed
03-Nov-2005	5	DPAK foot print dimensions updated.
01-Jul-2010	6	Updated Figure 10 Updated ECOPACK statement.
04-Nov-2014	7	Updated DPAK package information, Table 2 and Figure 5. Removed P_{ARM} (T_j = 25 °C).
07-Apr-2015	8	Updated Table 2. Format update to current standard.
05-Oct-2016	9	Updated DPAK package information.