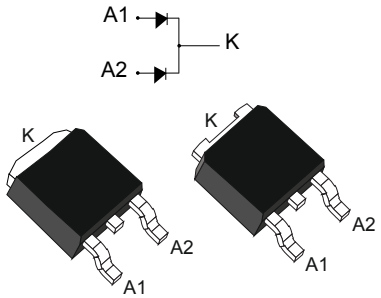
STPS15L45C

Datasheet

2 x 7.5 A - 45 V low drop power Schottky rectifier



DPAK

Features

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low forward voltage drop
- Low capacitance
- Avalanche capability specified
- ECOPACK2 compliant component

Applications

- SMPS
- Freewheeling diodes
- Switching diodes

Description

Dual center tab Schottky rectifier suited for SMPS and high frequency DC to DC converters.

Packaged in DPAK, the STPS15L45C is intended for use in low voltage, high frequency inverters, freewheeling and polarity protection applications.

Product status link
STPS15L45C

Product summary	
Symbol	**Value**
$I_{F(AV)}$	2 x 7.5 A
V_{RRM}	45 V
$T_{j(max.)}$	150 °C
$V_{F(typ.)}$	0.40 V

1 Characteristics

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

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			45	V
$I_{F(RMS)}$	Forward rms current			10	A
$I_{F(AV)}$	Average forward current	T_c = 140 °C, δ = 0.5 square wave	Per diode	7.5	A
			Per device	15	
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	265	W
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Maximum operating junction temperature(1)			150	°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		Max. value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	4	°C/W
		Total	2.4	
$R_{th(c)}$	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 $R_{th(c)}$

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

- AN5088 : Rectifiers thermal management, handling and mounting recommendations

Table 3. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		500	µA
		T_j = 125 °C		-	60	120	mA
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 7.5 A	-		0.52	V
		T_j = 125 °C		-	0.40	0.46	
		T_j = 25 °C	I_F = 12 A	-		0.60	
		T_j = 125 °C		-	0.49	0.57	
		T_j = 25 °C	I_F = 15 A	-		0.64	
		T_j = 125 °C		-	0.53	0.63	

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:

$P = 0.29 \times I_{F(AV)} + 0.023 \times I_F{}^2{}_{(RMS)}$

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)

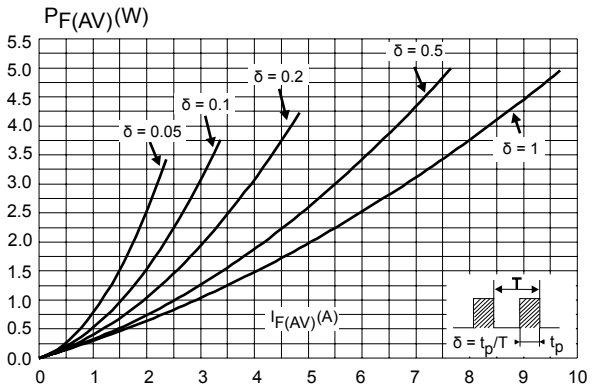


Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

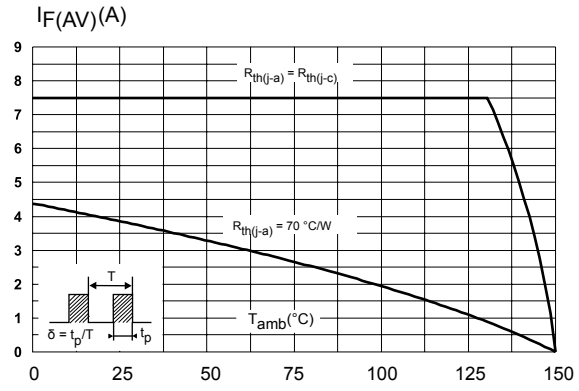


Figure 3. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

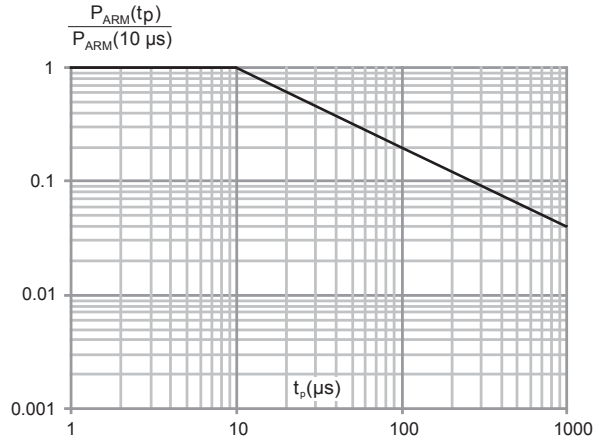


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

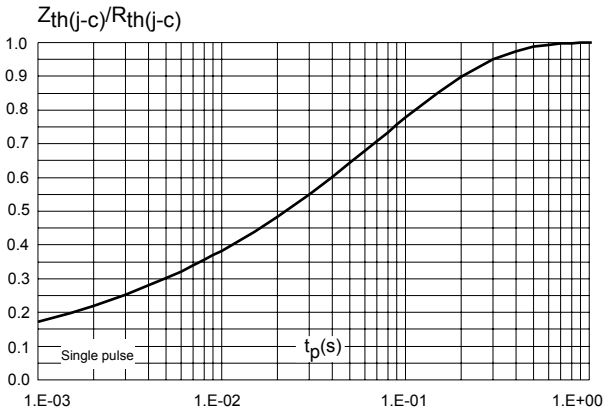


Figure 5. Reverse leakage current versus reverse voltage applied (typical values, per diode)

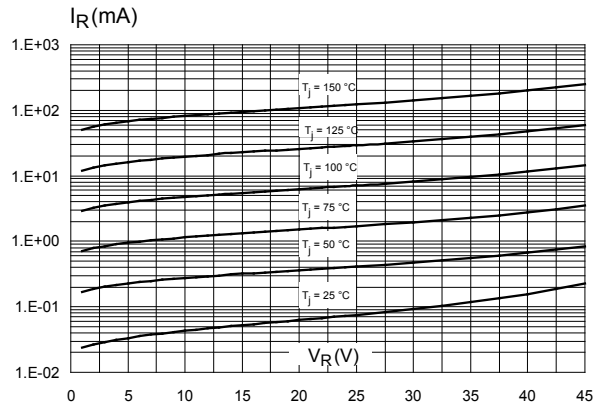


Figure 6. Junction capacitance versus reverse voltage applied (typical values, per diode)

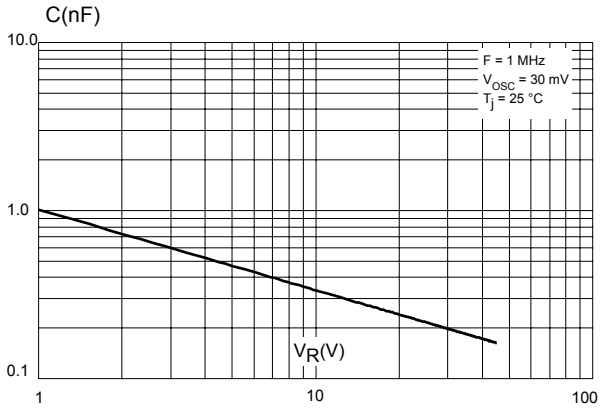


Figure 7. Forward voltage drop versus forward current (per diode)

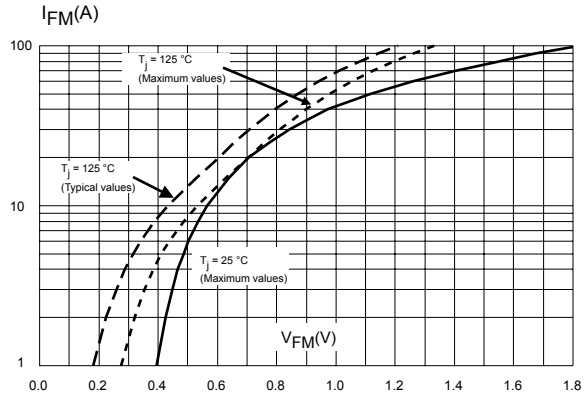
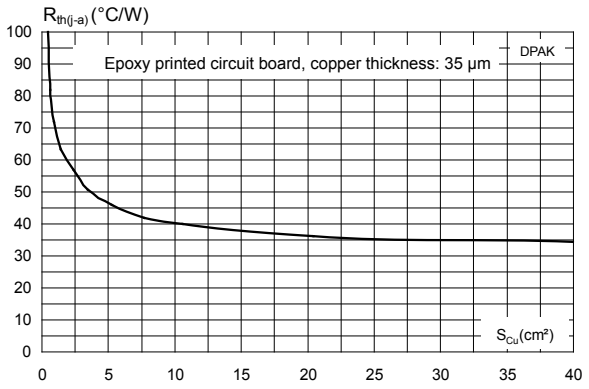


Figure 8. Thermal resistance junction to ambient versus copper surface under tab



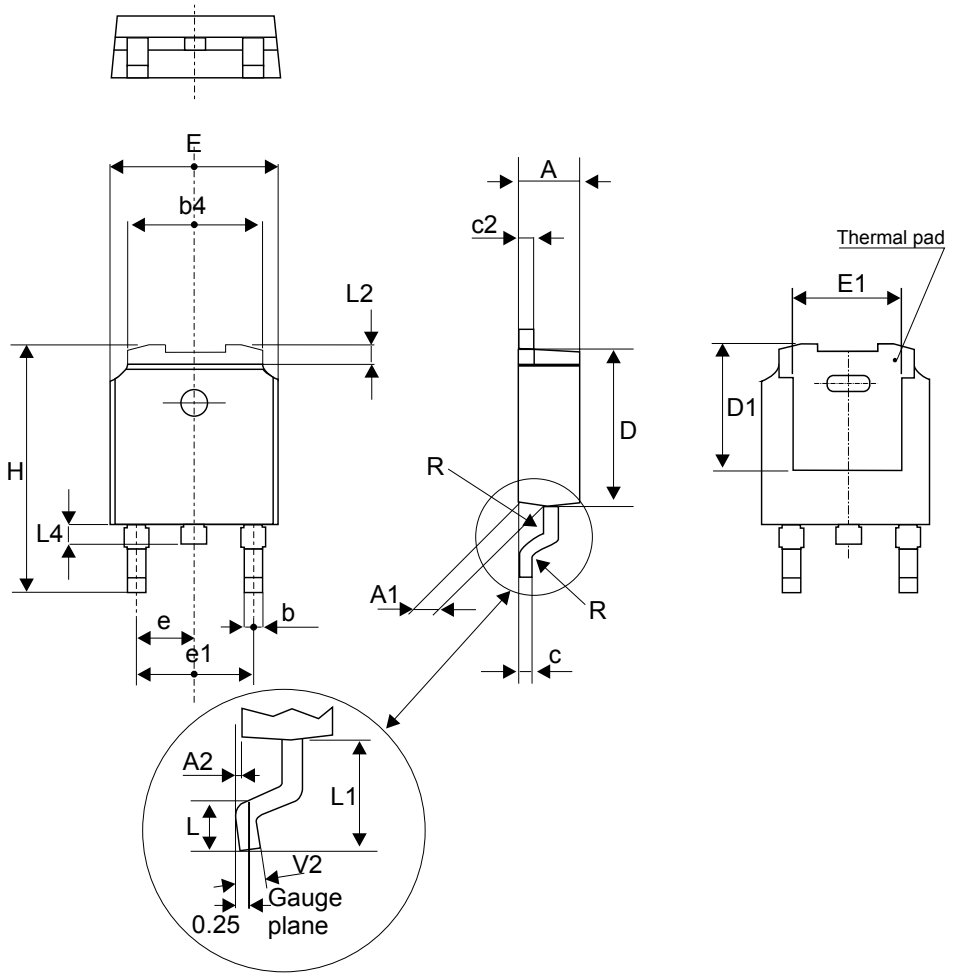
2 Package information

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 DPAK package information

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

Figure 9. DPAK package outline

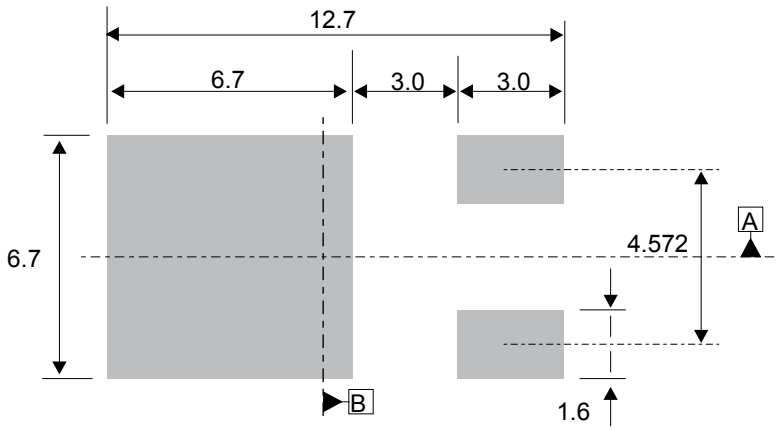


Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 4. **DPAK package mechanical data**

Ref.	Dimensions			
	Millimeters		Inches (for reference only)	
	Min.	Max.	Min.	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	0.215
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	0.265
E1	4.32	5.50	0.170	0.216
e	2.286 typ.		0.090 typ.	
e1	4.40	4.70	0.173	0.185
H	9.35	10.40	0.368	0.409
L	1.0	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 recommended footprint (dimensions in mm)**



The device must be positioned within ⌖ 0.05 A B

3 Ordering Information

Table 5. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS15L45CB	S15L45C	DPAK	0.35 g	75	Tube
STPS15L45CB-TR				2500	Tape and reel

Revision history

Table 6. **Document revision history**

Date	Version	Changes
10-Mar-2011	2	Automatic revalidation date workflow started.
07-Jul-2015	3	Updated DPAK package information and reformatted to current standard. Removed IPAK.
29-Nov-2018	4	Updated DPAK package information and reformatted to current standard.
09-Aug-2019	5	Added Section Applications. Updated Table 3, Figure 4 and Table 5.
02-Apr-2020	6	Updated Figure 5.