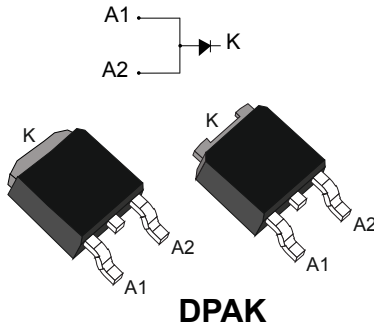


2 x 7.5 A - 45 V low drop power Schottky rectifier



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 :

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

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	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$	-		500	μA
		$T_j = 125\text{ °C}$		-	60	120	mA
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 7.5\text{ A}$	-		0.52	V
		$T_j = 125\text{ °C}$		-	0.40	0.46	
		$T_j = 25\text{ °C}$	$I_F = 12\text{ A}$	-		0.60	
		$T_j = 125\text{ °C}$		-	0.49	0.57	
		$T_j = 25\text{ °C}$	$I_F = 15\text{ A}$	-		0.64	
		$T_j = 125\text{ °C}$		-	0.53	0.63	

1. Pulse test: $t_p = 5\text{ ms}$, $\delta < 2\%$

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

To evaluate the conduction losses, use the following equation:

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

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)

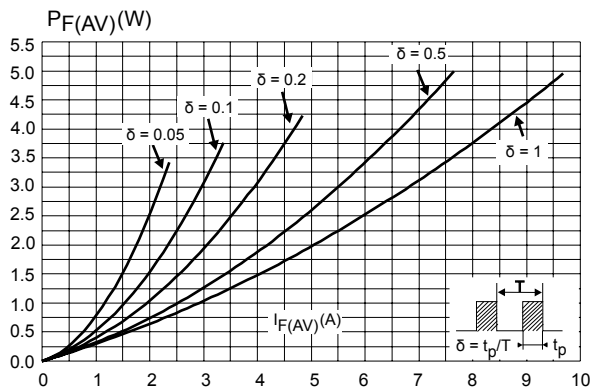


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$, per diode)

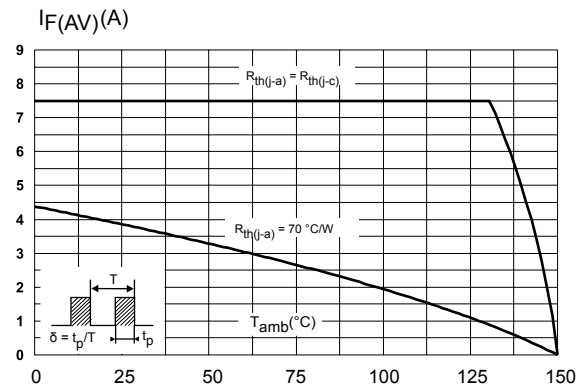


Figure 3. Normalized avalanche power derating versus pulse duration ($T_j = 125^\circ\text{C}$)

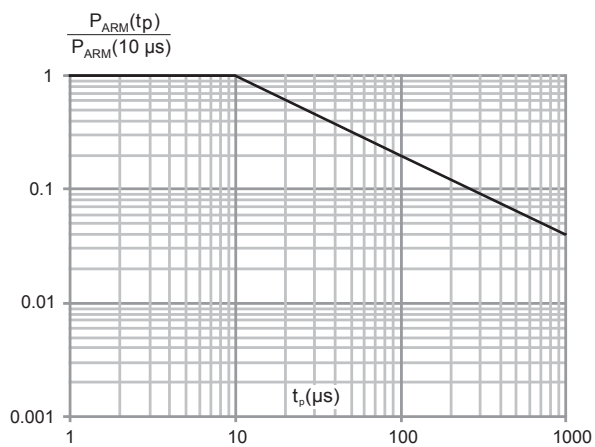


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

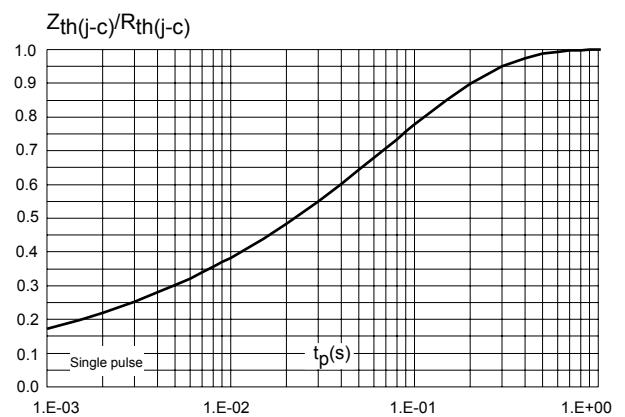


Figure 5. Reverse leakage current versus reverse voltage applied (typical values, per diode)

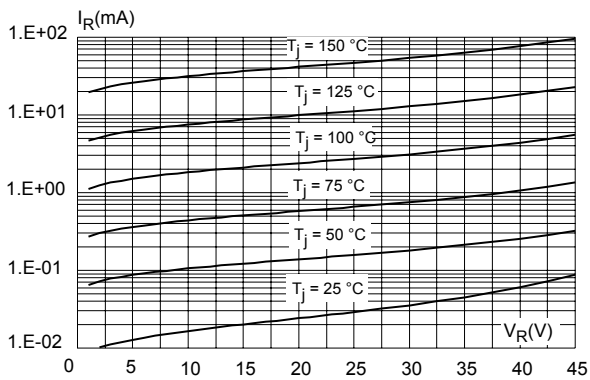


Figure 6. Junction capacitance versus reverse voltage applied (typical values, per diode)

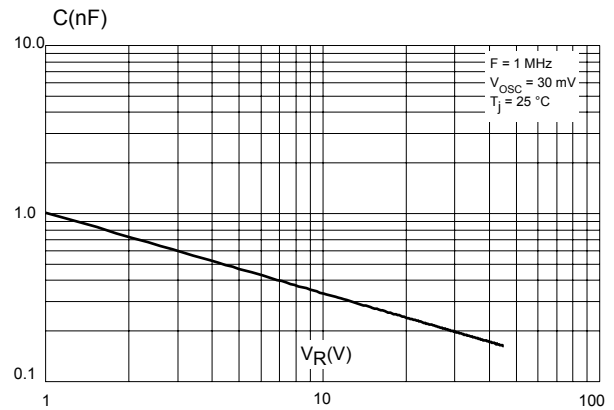


Figure 7. Forward voltage drop versus forward current (per diode)

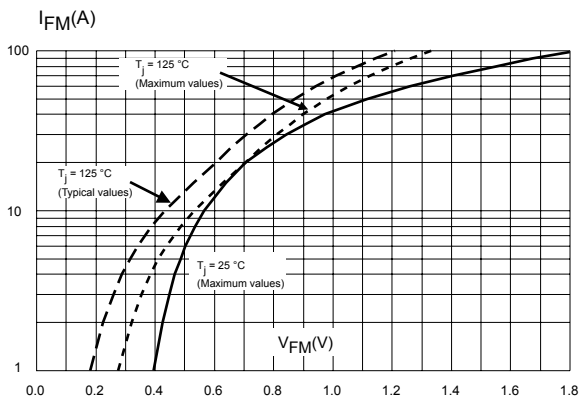
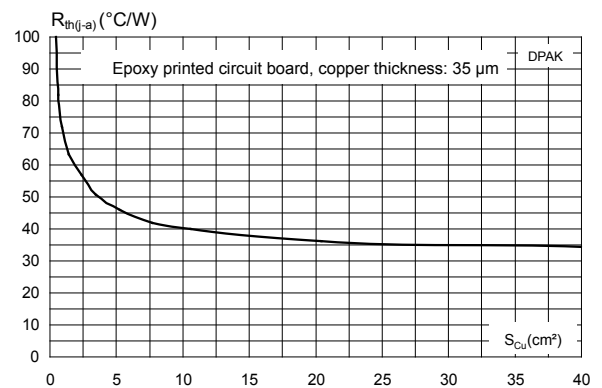


Figure 8. Thermal resistance junction to ambient versus copper surface under tab



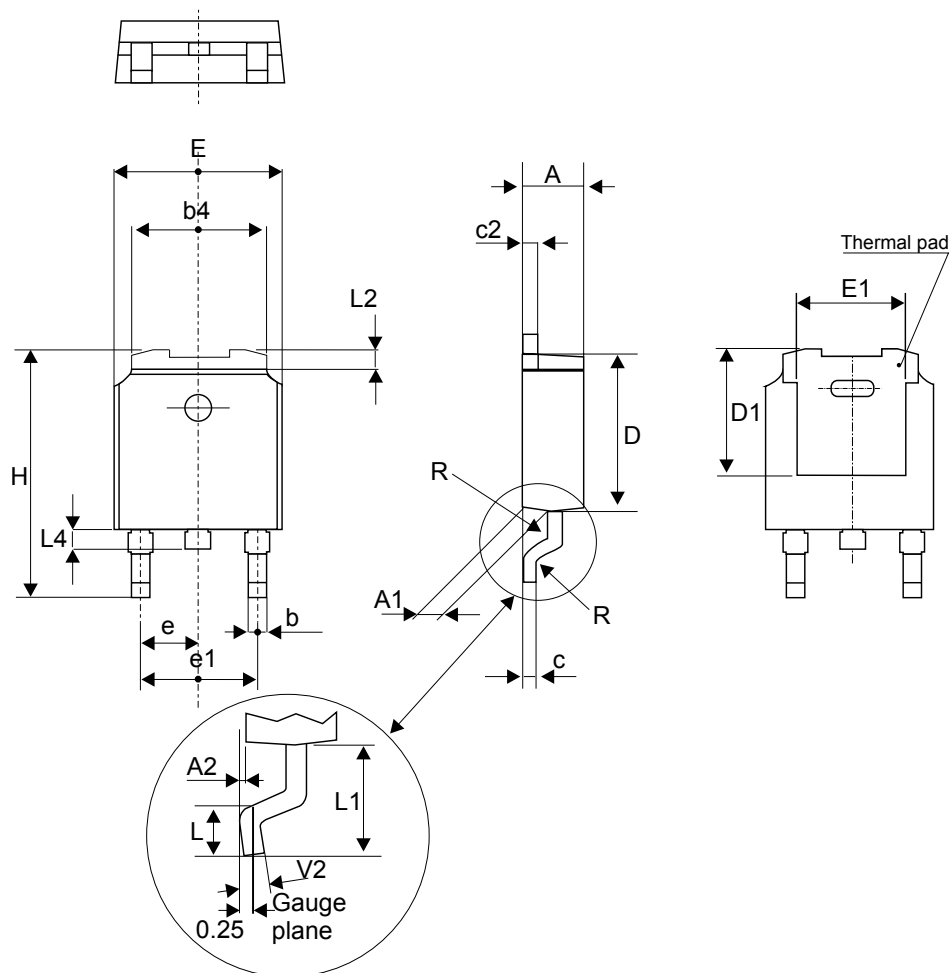
2 Package information

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)

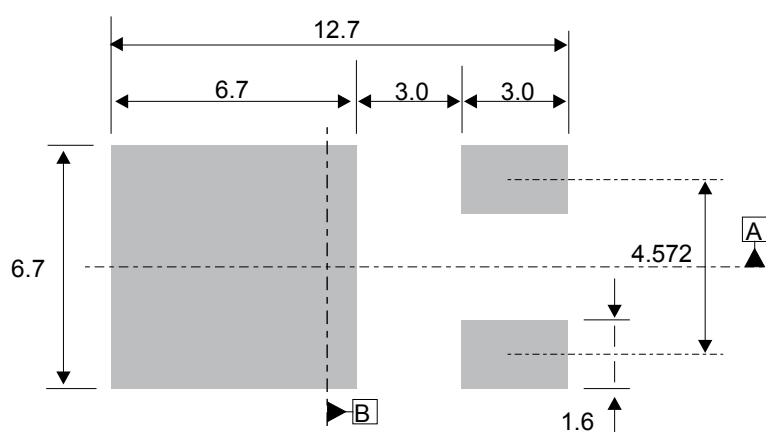
Figure 9. DPAK package outline



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 $\oplus 0.05$ AB

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 .

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