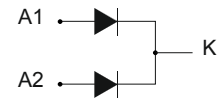
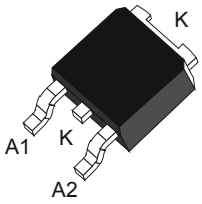
STPS15L45C-Y

Datasheet

Automotive 45 V low drop power Schottky rectifier





DPAK

Features

- AEC-Q101 qualified
- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low forward voltage drop
- Avalanche capability specified
- PPAP capable
- ECOPACK®2 compliant component

Applications

- DC/DC converters
- Reverse polarity protection
- 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-Y is intended for use in low voltage, high frequency inverters, freewheeling and polarity protection for automotive application.

Product status link
STPS15L45C-Y

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	266	W
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Operating junction temperature range(1)			-40 to +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 $R_{th(c)}$

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(1)	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. *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)

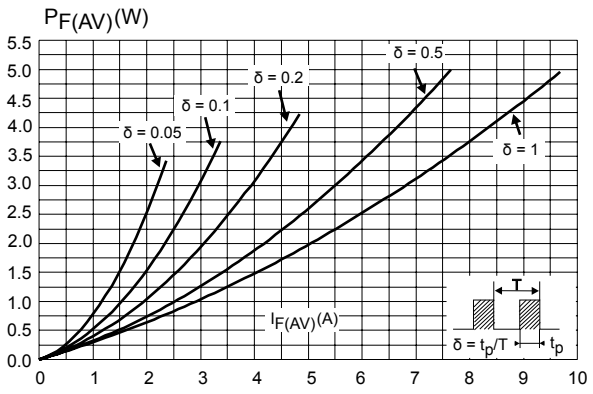


Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

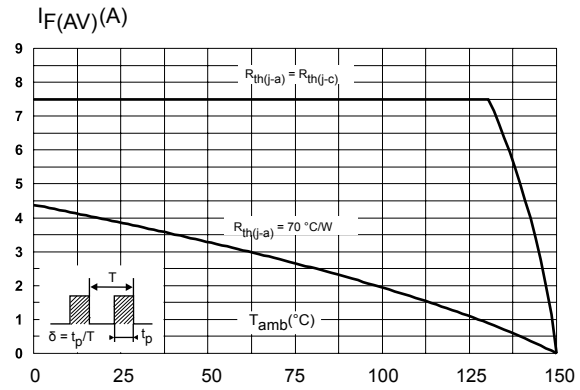


Figure 3. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

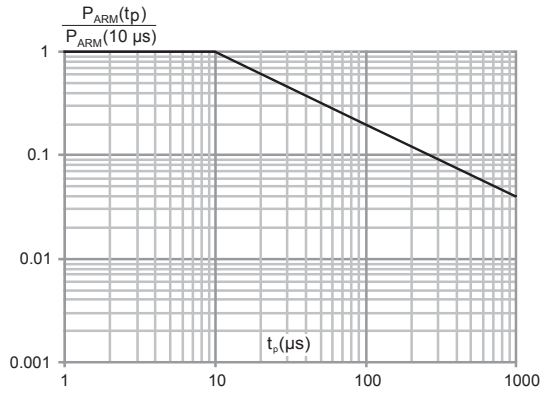


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

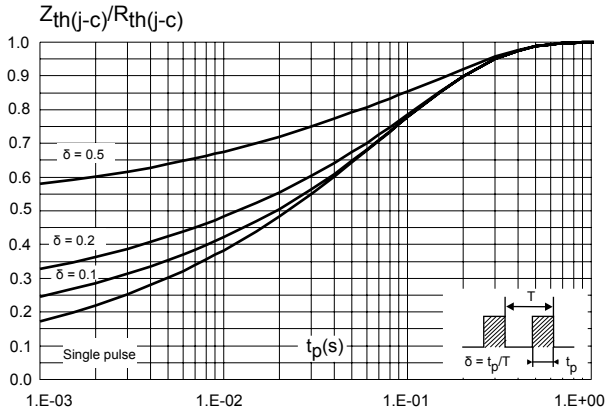


Figure 5. Reverse leakage current versus reverse voltage applied (typical values, per diode)

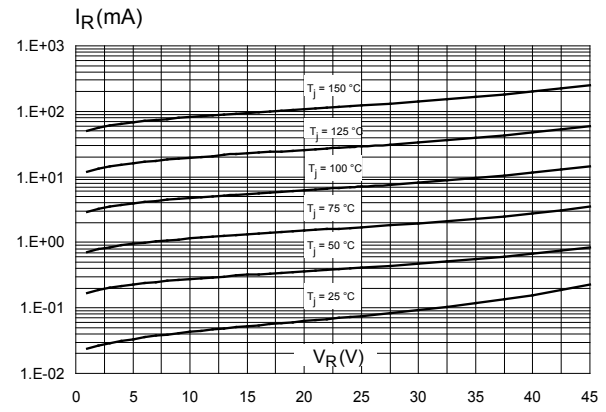


Figure 6. Junction capacitance versus reverse voltage applied (typical values, per diode)

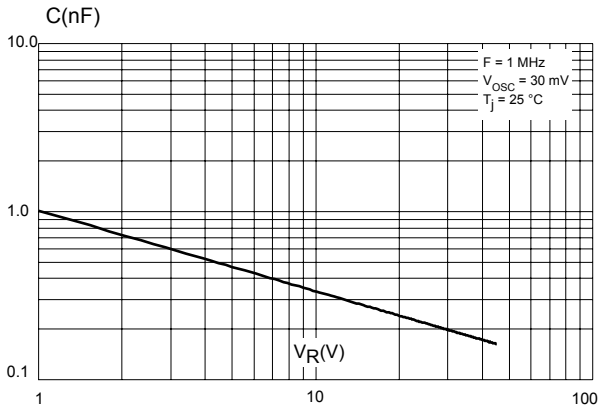


Figure 7. Forward voltage drop versus forward current (per diode)

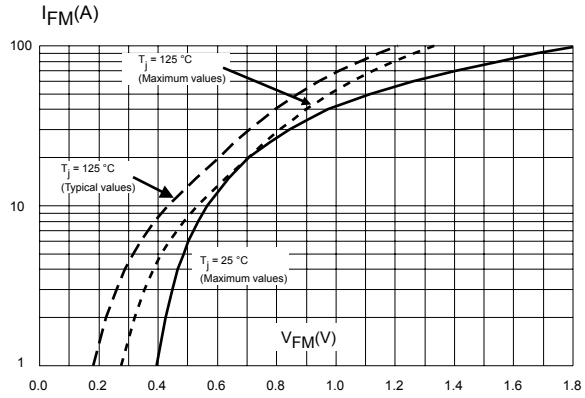
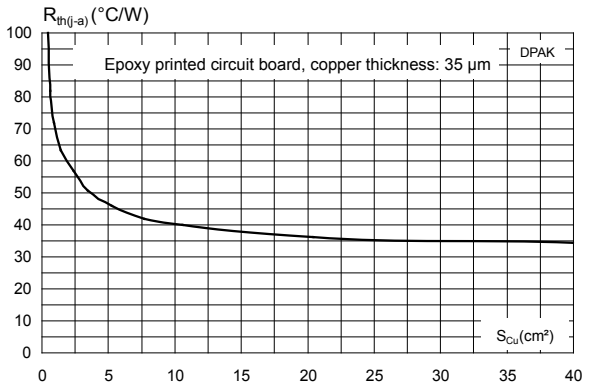


Figure 8. Thermal resistance junction to ambient versus copper surface under tab



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 UL94, V0
- Lead-free packages

Figure 9. DPAK package outline

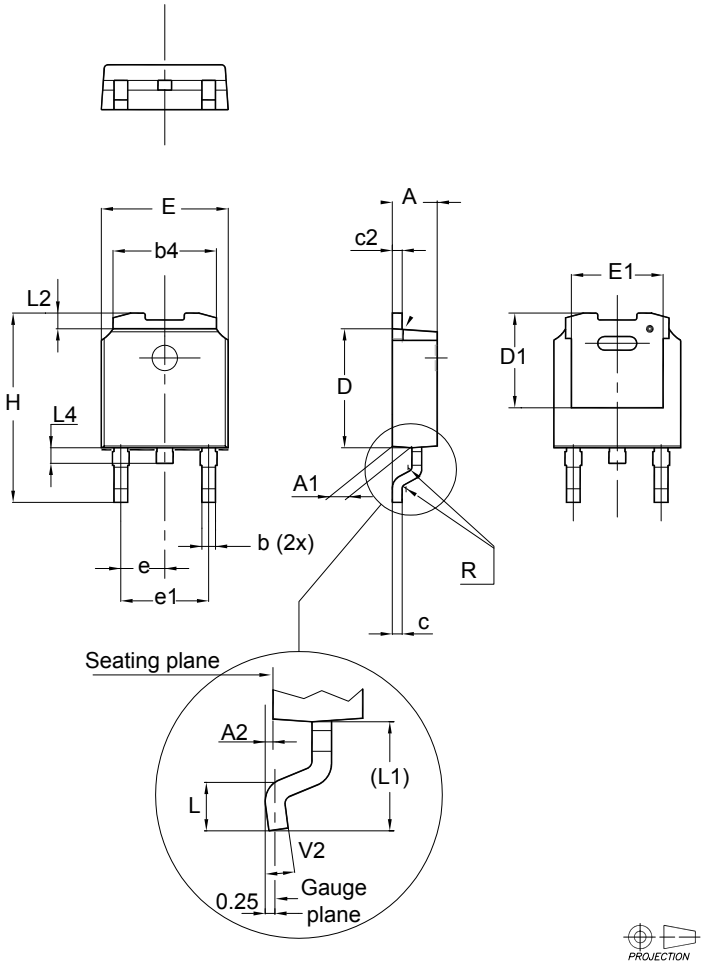
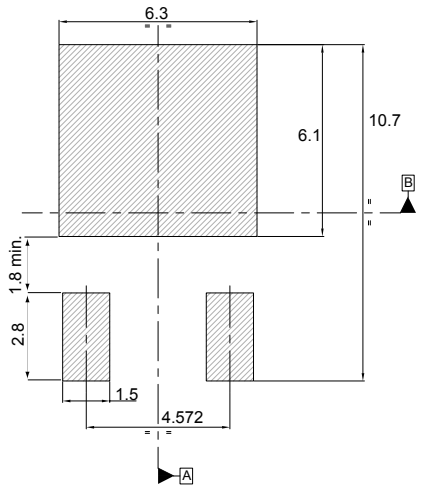


Table 4. DPAK mechanical data

Dim.	Dimensions					
	Millimeters			Inches[1]		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.20		2.40	0.087		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	5.20		5.40	0.205		0.213
c	0.45		0.60	0.018		0.024
c2	0.48		0.60	0.019		0.024
D	6.00		6.20	0.236		0.244
D1	4.95	5.10	5.25	0.195	0.201	0.207
E	6.40		6.60	0.252		0.260
E1	4.60	4.70	4.80	0.181	0.185	0.189
e	2.159	2.286	2.413	0.085	0.090	0.095
e1	4.445	4.572	4.699	0.175	0.180	0.185
H	9.35		10.10	0.368		0.398
L	1.00		1.50	0.039		0.059
(L1)	2.60	2.80	3.00	0.102	0.110	0.118
L2	0.65	0.80	0.95	0.026	0.031	0.037
L4	0.60		1.00	0.024		0.039
R		0.20			0.008	
V2	0°		8°	0°		8°

1. *Inches dimensions given for reference only*

Figure 10. DPAK recommended footprint (dimensions are 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
STPS15L45CBY-TR	S15L45CY	DPAK	0.32 g	2500	Tape and reel

For a list of available options (e.g. memory size, package) and orderable part numbers or for further information on any aspect of this device, please go to www.st.com or contact the ST Sales Office nearest to you.

Note: Qualified and characterized according to AEC Q101.

Revision history

Table 6. Document revision history

Date	Version	Changes
10-Mar-2011	1	First issue.
07-Jul-2015	2	Updated Table 2. Format updated to current standard.
29-Nov-2018	3	Added Section Applications on cover page. Updated Figure 5. Reverse leakage current versus reverse voltage applied (typical values, per diode) and Table 3. Static electrical characteristics (per diode).

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