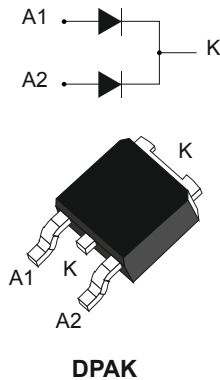



## Automotive 45 V low drop power Schottky rectifier



### Features

- AEC-Q101 qualified 
- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low forward voltage drop
- Avalanche capability specified
- PPAP capable
- **ECOPACK<sup>®2</sup>** 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	
<a href="#">STPS15L45C-Y</a>	
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 <sub>RRM</sub>	Repetitive peak reverse voltage		45	V	
I <sub>F(RMS)</sub>	Forward rms current		10	A	
I <sub>F(AV)</sub>	Average forward current	T <sub>c</sub> = 140 °C, δ = 0.5 square wave	Per diode	7.5	A
			Per device	15	
I <sub>FSM</sub>	Surge non repetitive forward current		t <sub>p</sub> = 10 ms sinusoidal	75	A
P <sub>ARM</sub>	Repetitive peak avalanche power		t <sub>p</sub> = 10 μs, T <sub>j</sub> = 125 °C	266	W
T <sub>stg</sub>	Storage temperature range		-65 to +175	°C	
T <sub>j</sub>	Operating junction temperature range <sup>(1)</sup>		-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 <sub>th(j-c)</sub>	Junction to case	Per diode	4	°C/W
		Total	2.4	
R <sub>th(c)</sub>	Coupling		0.7	

When the diodes 1 and 2 are used simultaneously :

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

**Table 3. Static electrical characteristics (per diode)**

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I <sub>R</sub> <sup>(1)</sup>	Reverse leakage current	T <sub>j</sub> = 25 °C	V <sub>R</sub> = V <sub>RRM</sub>	-		500	μA
		T <sub>j</sub> = 125 °C		-	60	120	mA
V <sub>F</sub> <sup>(1)</sup>	Forward voltage drop	T <sub>j</sub> = 25 °C	I <sub>F</sub> = 7.5 A	-		0.52	V
		T <sub>j</sub> = 125 °C		-	0.40	0.46	
		T <sub>j</sub> = 25 °C	I <sub>F</sub> = 12 A	-		0.60	
		T <sub>j</sub> = 125 °C		-	0.49	0.57	
		T <sub>j</sub> = 25 °C	I <sub>F</sub> = 15 A	-		0.64	
		T <sub>j</sub> = 125 °C		-	0.53	0.63	

1. t<sub>p</sub> = 380 μs, δ < 2%

To evaluate the conduction losses, use the following equation:

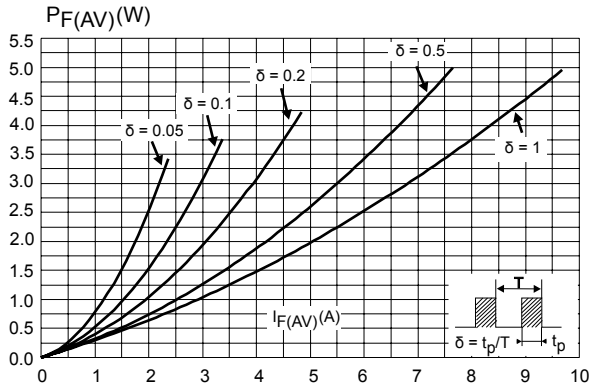
$$P = 0.29 \times I_{F(AV)} + 0.023 \times I_{F(RMS)}^2$$

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

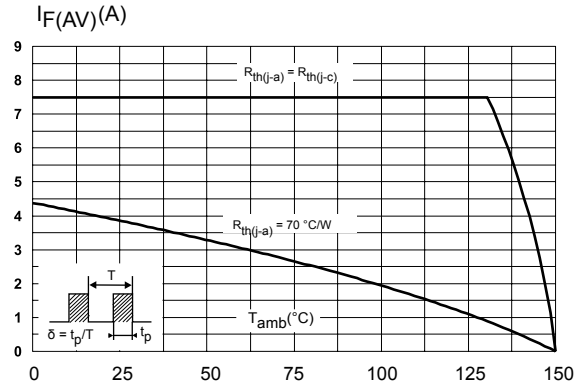
- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

### 1.1 Characteristics (curves)

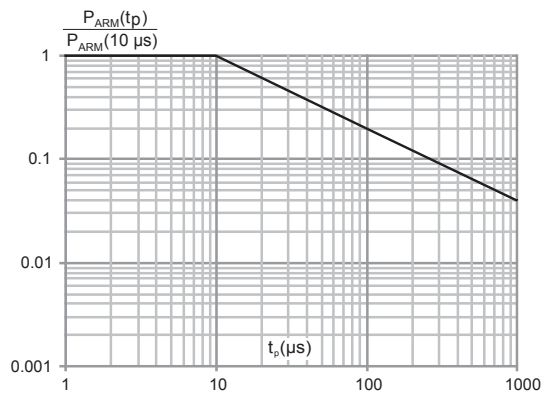
**Figure 1. Average forward power dissipation versus average forward current (per diode)**



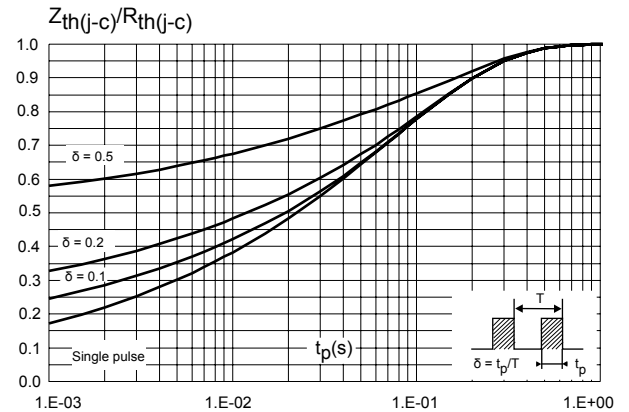
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ , per diode)**



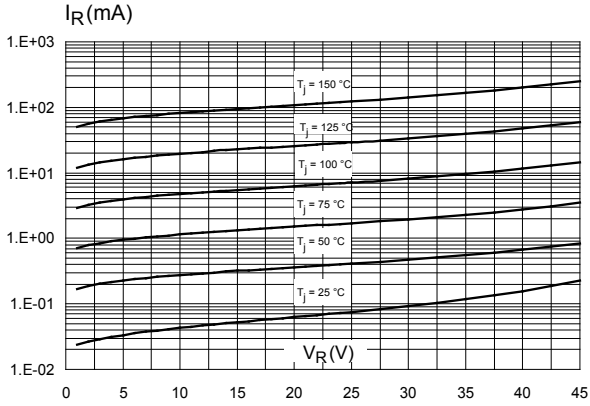
**Figure 3. Normalized avalanche power derating versus pulse duration ( $T_j = 125$  °C)**



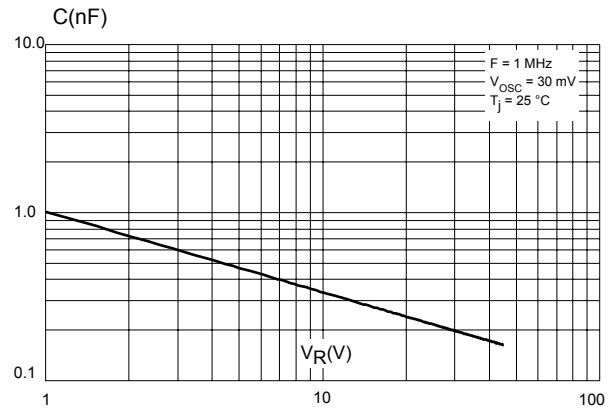
**Figure 4. Relative variation of thermal impedance junction to case versus pulse duration**



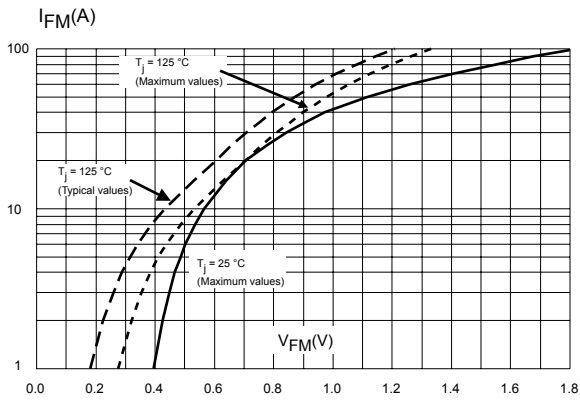
**Figure 5. Reverse leakage current versus reverse voltage applied (typical values, per diode)**



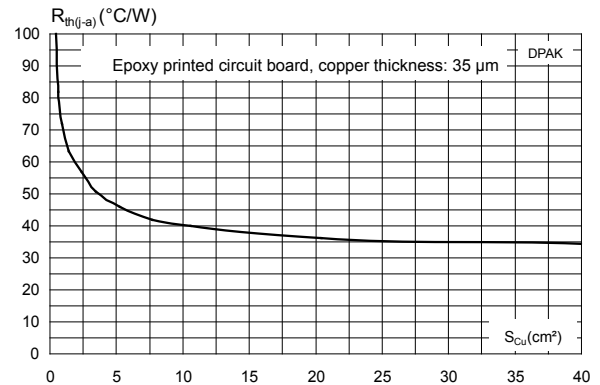
**Figure 6. Junction capacitance versus reverse voltage applied (typical values, per diode)**



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



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



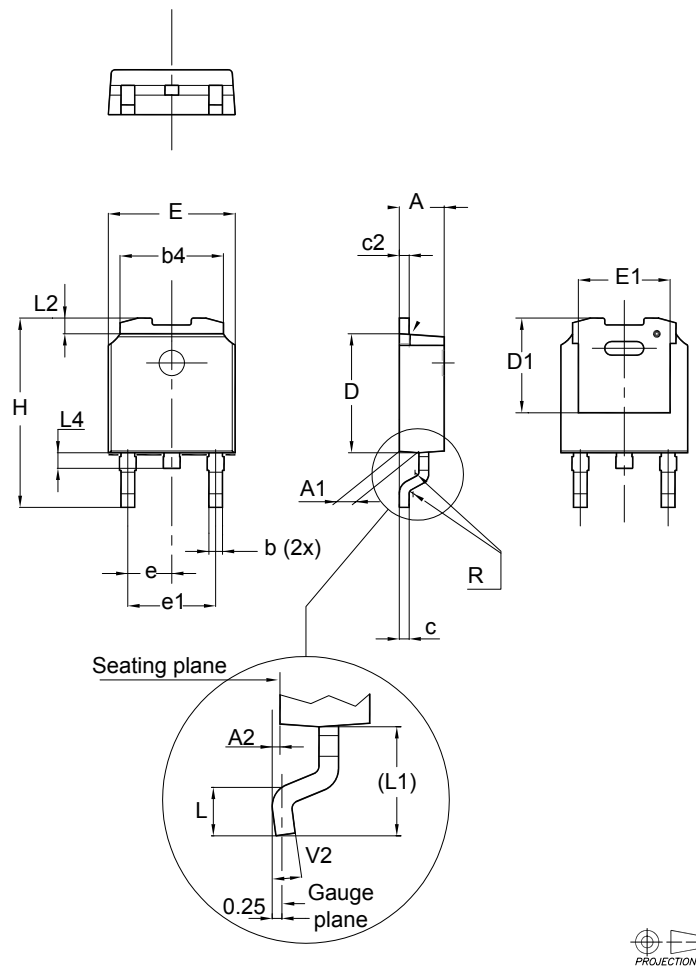
## 2 Package information

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](http://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

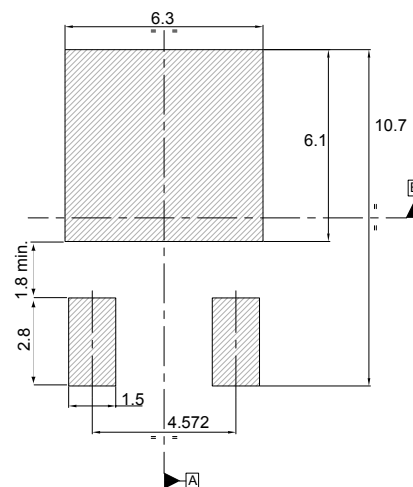


**Table 4. DPAK mechanical data**

Dim.	Dimensions					
	Millimeters			Inches <sup>(1)</sup>		
	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  $\Phi 0.05 \text{ A B}$

### 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](http://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 <a href="#">Section Applications</a> on cover page. Updated <a href="#">Figure 5. Reverse leakage current versus reverse voltage applied (typical values, per diode)</a> and <a href="#">Table 3. Static electrical characteristics (per diode)</a> .

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