STPS15L45C-Y

Automotive low drop power Schottky rectifier

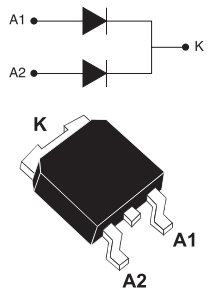
Features

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low forward voltage drop
- Avalanche capability specified
- AEC-Q101 qualified

Description

Dual center tab Schottky rectifier suited for Switch Mode Power Supply and high frequency DC to DC converters.

Package in DPAK, this device is intended for use in low voltage, high frequency inverters, free-wheeling and polarity protection for automotive application.



DPAK

STPS15L45CBY-TR

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	2 x 7.5 A
V_{RRM}	45 V
$T_{j\ (max)}$	150 °C
$V_{F\ (max)}$	0.46 V

1 Characteristics

Table 2. Absolute Ratings (limiting values)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			45	V
$I_{F(RMS)}$	Forward rms voltage			10	A
$I_{F(AV)}$	Average forward current	T_c = 140 °C δ = 0.5	Per diode Per device	7.5 15	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal		75	A
I_{RRM}	Peak repetitive reverse current	t_p = 2 µs square F= 1 kHz		1	
P_{ARM}	Repetitive peak avalanche power	t_p = 1 µs T_j = 25 °C		3700	W
T_{stg}	Storage temperature range			- 65 to + 175	°C
T_j	Maximum operating junction temperature range(1)			- 40 to +150	°C
dV/dt	Critical rate of rise of reverse voltage			10000	V/µs

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		Value	Unit
$R_{th(j-c)}$	Junction to case	Per diode Total	4 2.4	°C/W
$R_{th(c)}$	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 4. Static electrical characteristics

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$			1	mA
		T_j = 125 °C			23	45	mA
V_F(1)	Forward voltage drop	T_j = 25 °C	I_F = 7.5 A			0.52	V
		T_j = 125 °C	I_F = 7.5 A		0.40	0.46	
		T_j = 25 °C	I_F = 12 A			0.60	
		T_j = 125 °C	I_F = 12 A		0.49	0.57	
		T_j = 25 °C	I_F = 15 A			0.64	
		T_j = 125 °C	I_F = 15 A		0.53	0.63	

1. Pulse test: t_p = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:
$P = 0.29 \times I_{F(AV)} + 0.023\ I_F{}^2{}_{(RMS)}$

Figure 1. Conduction losses versus average current

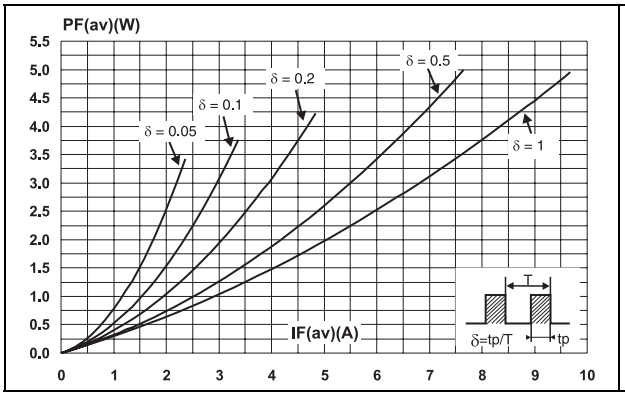


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

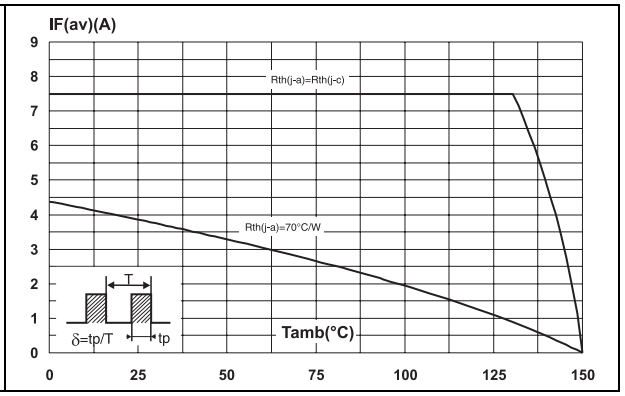


Figure 3. Normalized avalanche power derating versus pulse duration

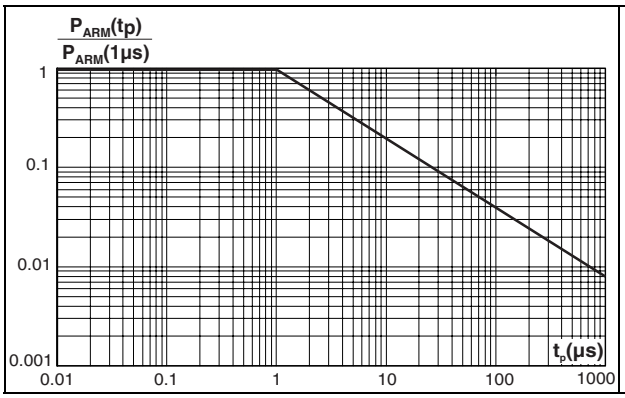


Figure 4. Normalized avalanche power derating versus junction temperature

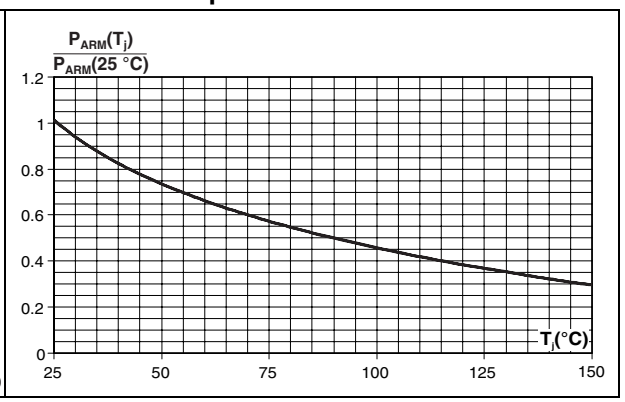


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values)

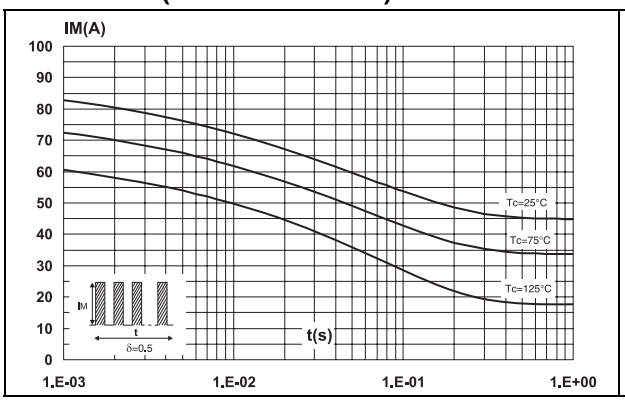


Figure 6. Relative variation of thermal impedance junction to ambient versus pulse duration

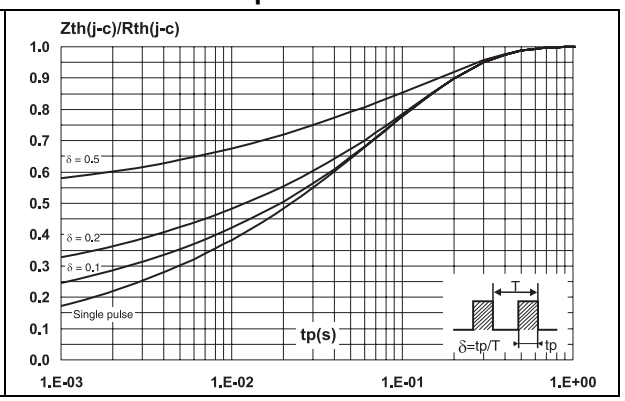


Figure 7. Reverse leakage current versus reverse voltage applied (typical values)

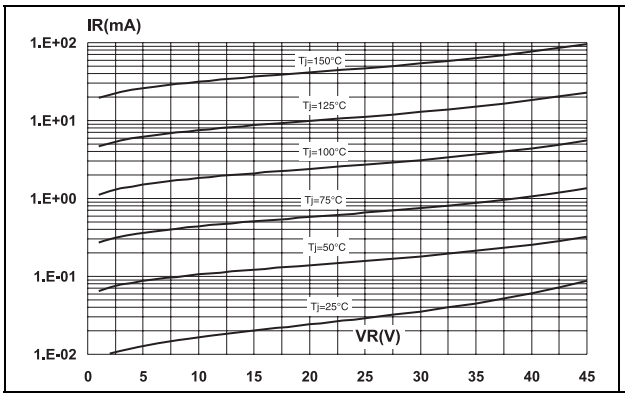


Figure 8. Junction capacitance versus reverse voltage applied (typical values)

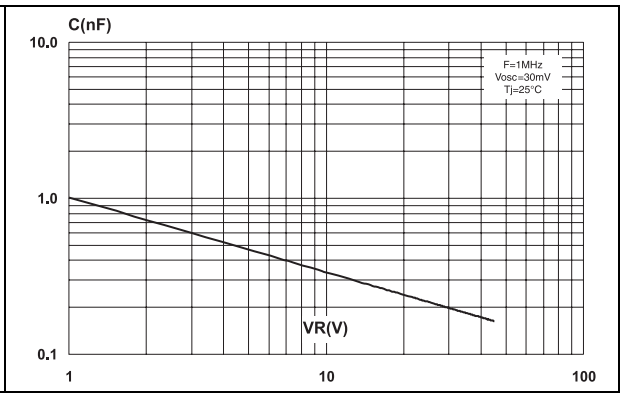


Figure 9. Forward voltage drop versus forward current

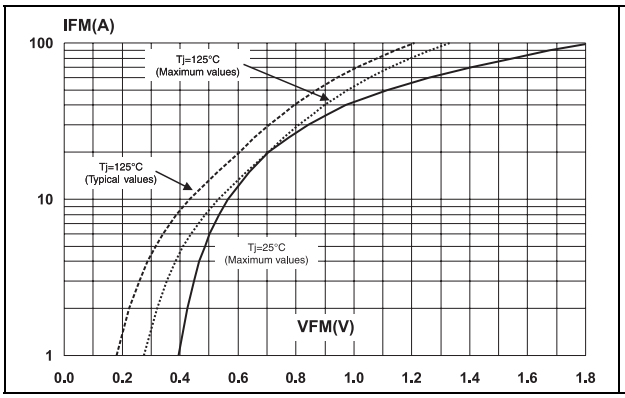
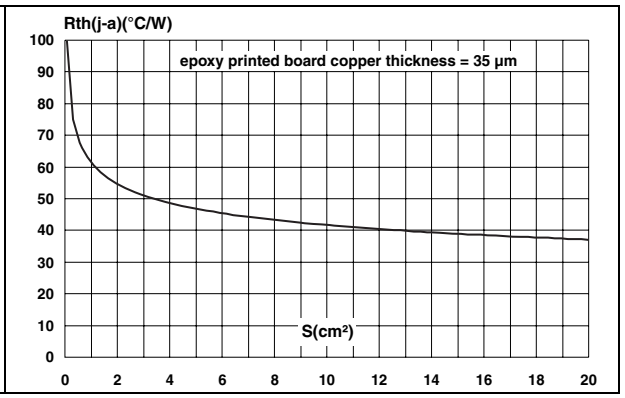


Figure 10. Thermal resistance junction to ambient versus copper surface under tab

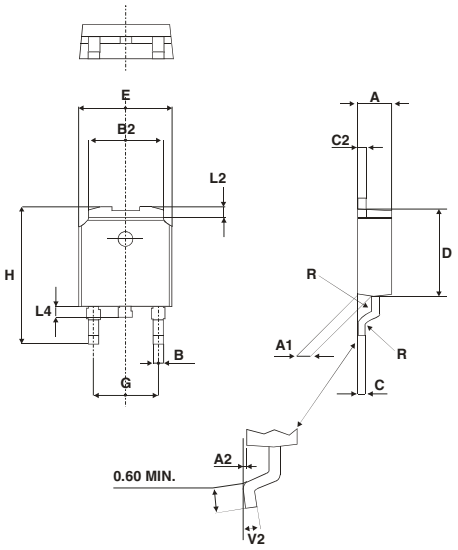


2 Package information

- Epoxy meets UL94,V0
- Lead-free packages

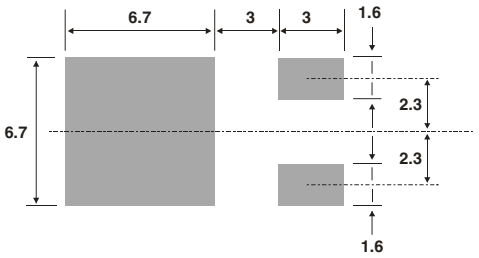
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

Table 5. DPAK dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.20	2.40	0.086	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
B2	5.20	5.40	0.204	0.212
C	0.45	0.60	0.017	0.023
C2	0.48	0.60	0.018	0.023
D	6.00	6.20	0.236	0.244
E	6.40	6.60	0.251	0.259
G	4.40	4.60	0.173	0.181
H	9.35	10.10	0.368	0.397
L2	0.80 typ.		0.031 typ.	
L4	0.60	1.00	0.023	0.039
V2	0°	8°	0°	8°

Figure 11. Footprint (dimensions in mm)



3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS15L45CBY-TR	S15L45CY	DPAK	0.30 g	2500	Tape and reel

4 Revision history

Table 7. Document revision history

Date	Revision	Changes
10-Mar-2011	1	First issue.

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