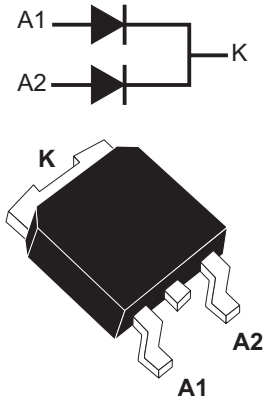
STPS640C-Y

Automotive power Schottky rectifier

Datasheet – production data



DPAK
STPS640CBY-TR

Features

- Low forward voltage drop
- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low thermal resistance
- AEC-Q101 qualified.

Description

This dual Schottky rectifier is designed for switch mode power supplies and other power converters.

This device is intended for use in low and medium voltage operation, and in particular high frequency circuits where low switching losses are required (free wheeling and polarity protection) in automotive applications.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	2 x 3 A
V_{RRM}	40 V
T_j	150 °C
$V_{F\ (Typ)}$	0.50 V

1 Characteristics

Table 2. Absolute ratings (limiting values, per diode)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			40	V
$I_{F(RMS)}$	Forward rms current			6	A
$I_{F(AV)}$	Average forward current, δ = 0.5, T_c = 135 °C		per diode	3	A
			per device	6	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal, T_c = 25 °C		75	A
I_{RRM}	Peak repetitive reverse current	t_p = 2 µs, F = 1kHz		1	A
P_{ARM}	Repetitive peak avalanche power	t_p = 1 µs, T_c = 25 °C		1300	W
T_{stg}	Storage temperature range			-65 to +150	°C
T_j	Operating junction temperature			-40 to +150	°C

Table 3. Thermal parameters

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	per diode	5.5	°C/W
		per device	3	
$R_{th(c)}$	coupling		0.5	

When the diodes 1 and 2 are used simultaneously :
ΔTj(diode 1) = P(diode1) x $R_{th(j-c)}$(Per diode) + P(diode 2) x $R_{th(c)}$

Table 4. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-	-	100	µA
		T_j = 125 °C		-	2	10	mA
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 3 A	-	-	0.63	V
		T_j = 125 °C		-	0.50	0.57	
		T_j = 25 °C	I_F = 6 A	-	-	0.84	
		T_j = 125 °C		-	0.67	0.72	

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:
$P = 0.42 \times I_{F(AV)} + 0.050 \times I_{F}^{2}{}_{(RMS)}$

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

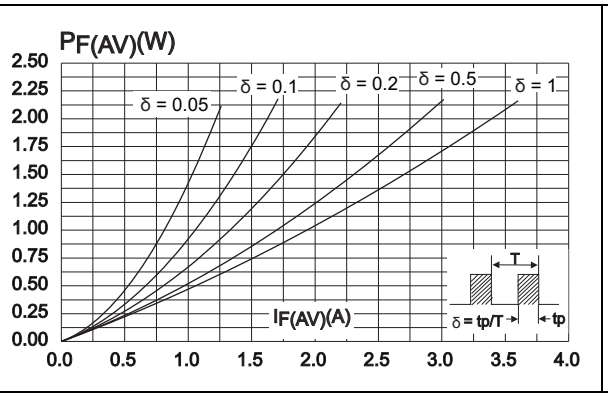


Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

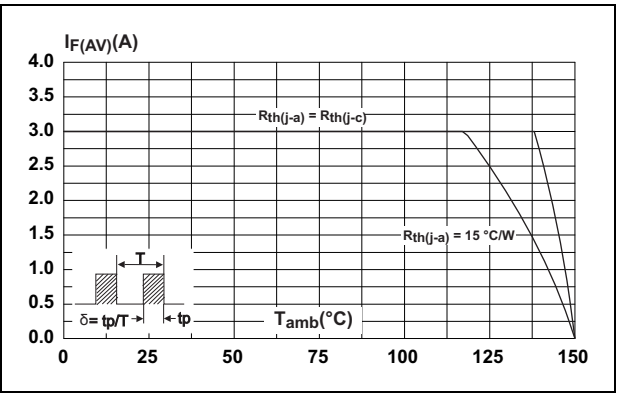


Figure 3. Normalized avalanche power derating versus pulse duration

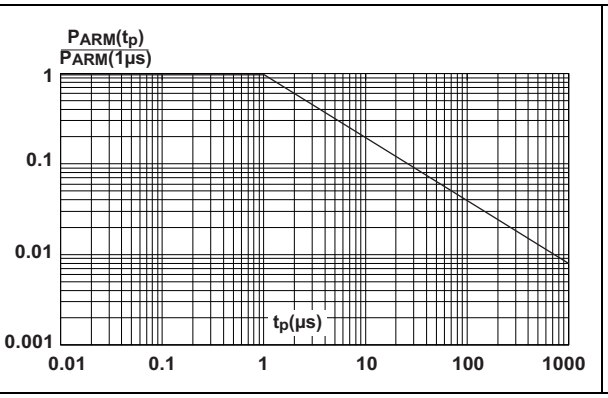


Figure 4. Normalized avalanche power derating versus junction temperature

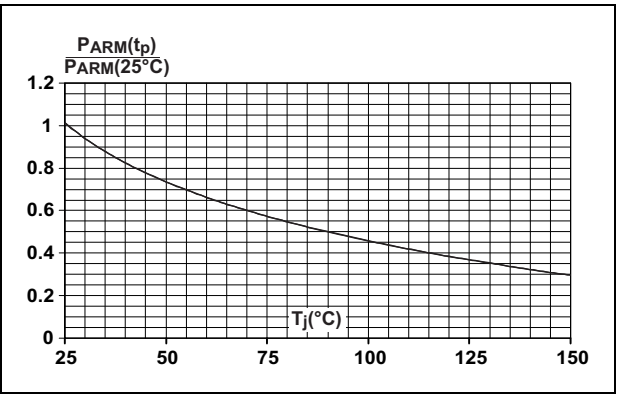


Figure 5. Relative variation of thermal impedance junction to case versus pulse duration

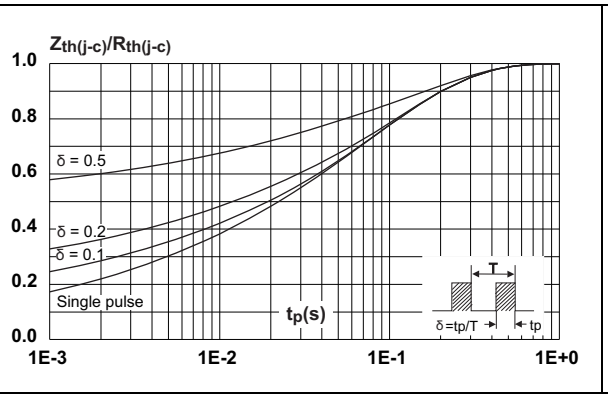


Figure 6. Reverse leakage current vs. reverse voltage applied (typical values, per diode)

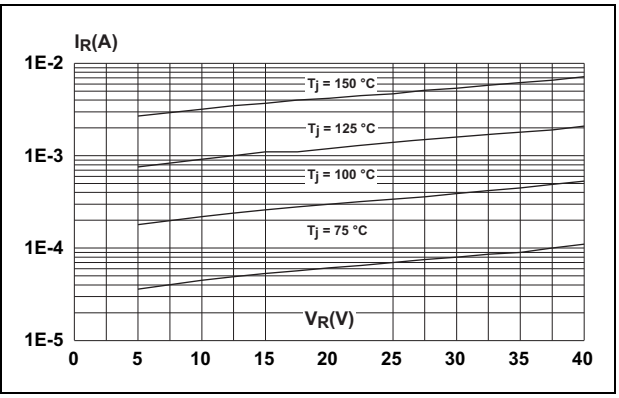


Figure 7. Junction capacitance vs. reverse voltage applied (typical values, per diode)

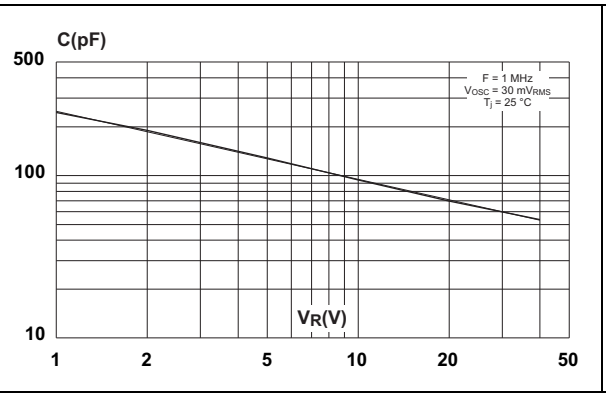


Figure 8. Forward voltage drop vs. forward current (per diode)

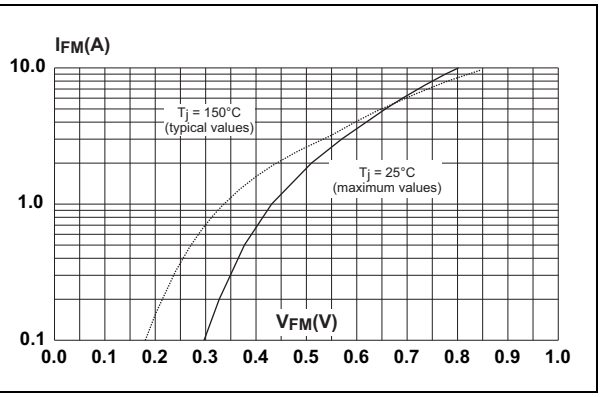
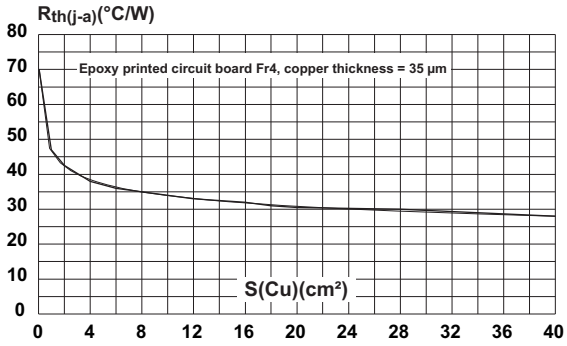


Figure 9. Thermal resistance junction to ambient versus copper surface under tab



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.

Figure 10. DPAK dimension definitions

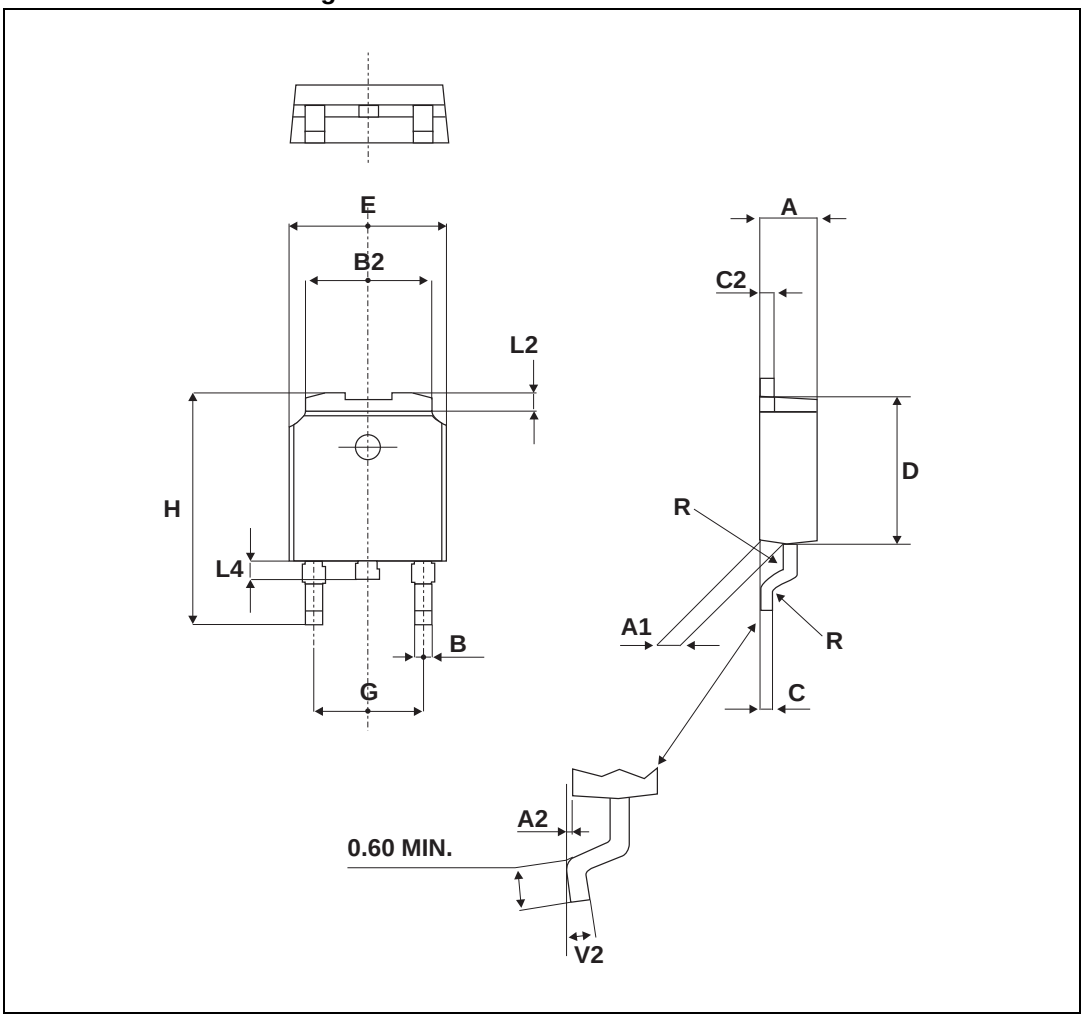
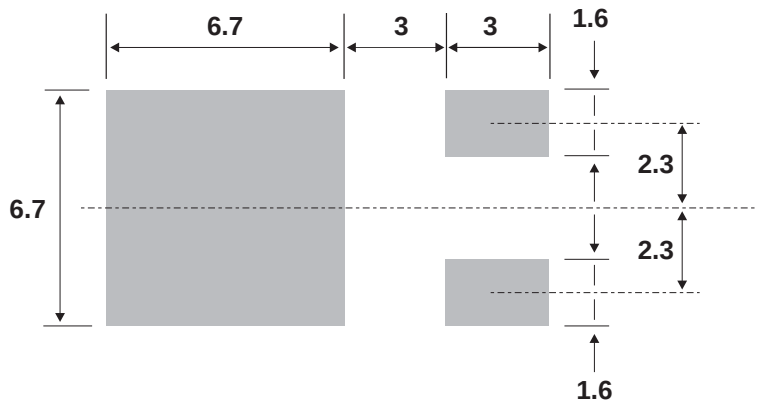


Table 5. DPAK dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	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 (inches)



3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS640CBY-TR	STPS640CY	DPAK	0.3 g	2500	Tape and reel

4 Revision history

Table 7. Revision history

Date	Revision	Changes
6-Nov-2013	1	First issue
04-Dec-2013	2	Properties changed from preliminary data to production data.

Mouser Electronics

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STPS640CBY-TR