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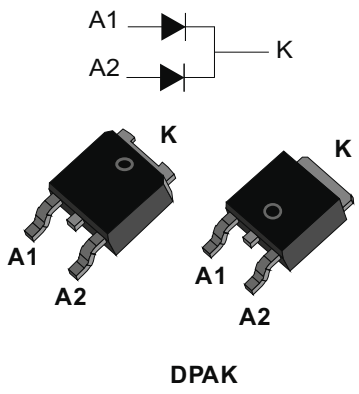
STPS640C

Power Schottky rectifier

Datasheet – production data



DPAK

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).

Table 1. Device summary

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

Features

- Very small conduction losses
- Extremely fast switching
- Low thermal resistance
- Negligible switching losses
- Low forward voltage drop
- Low capacitance
- Avalanche specification
- ECOPACK®2 compliant component for DPAK on demand

1 Characteristics

Table 2. Absolute ratings (limiting values, per diode, at 25 °C unless otherwise stated)

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, square wave	T_c = 120 °C, δ = 0.5	3	A
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	90	W
T_{stg}	Storage temperature range		-65 to + 150	°C
T_j	Maximum operating junction temperature(1)		150	°C

1. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

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:

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

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

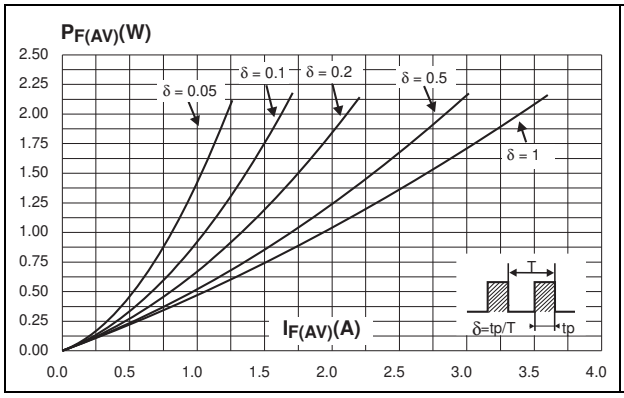


Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

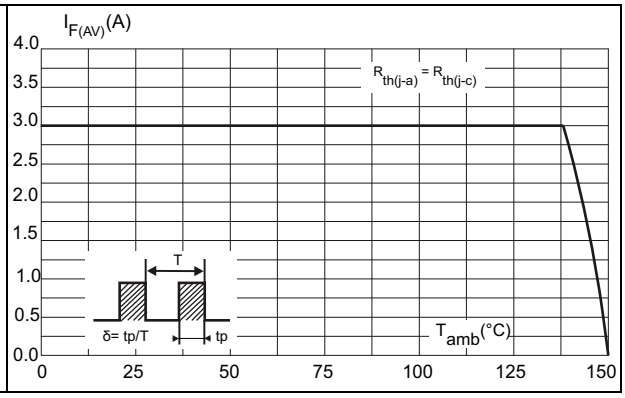


Figure 3. Normalized avalanche power derating versus pulse duration at T_j = 125 °C

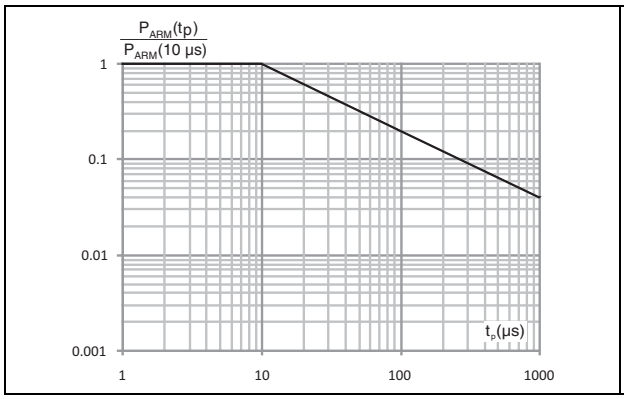


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

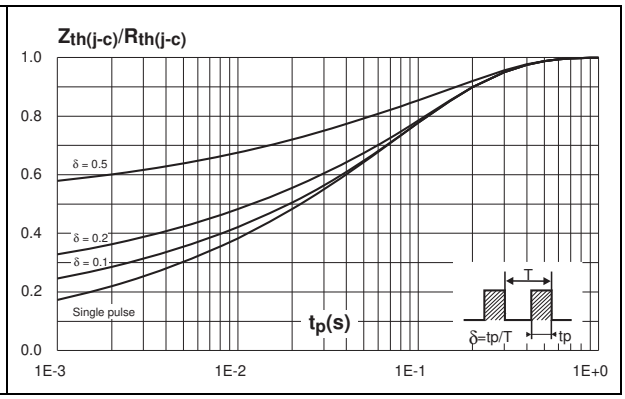


Figure 5. Reverse leakage current versus reverse voltage applied (typical values, per diode)

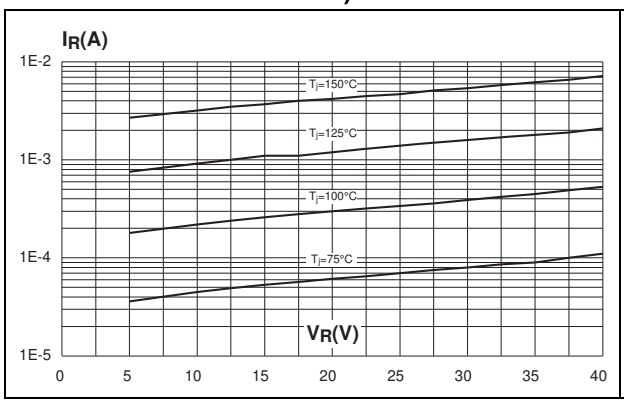


Figure 6. Junction capacitance versus reverse voltage applied (typical values, per diode)

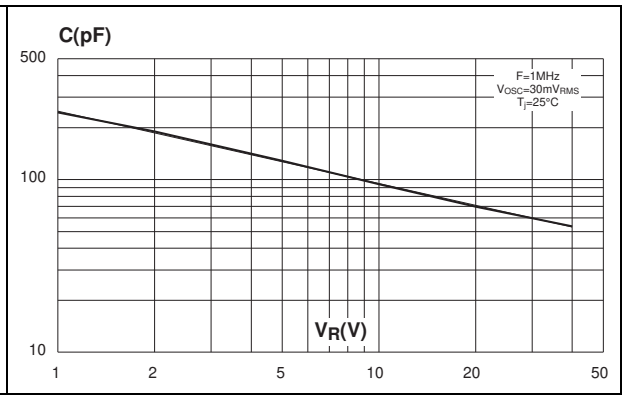


Figure 7. Forward voltage drop versus forward current (maximum values, per diode)

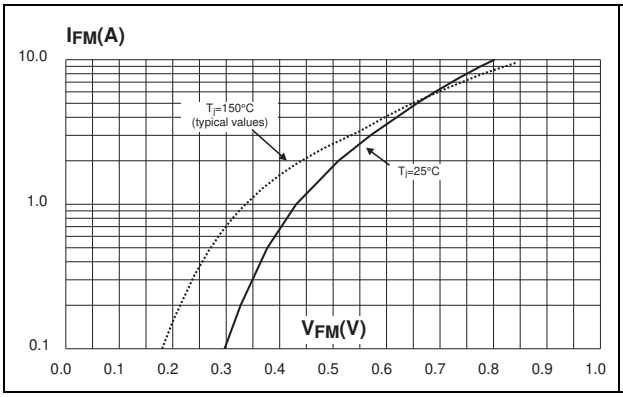
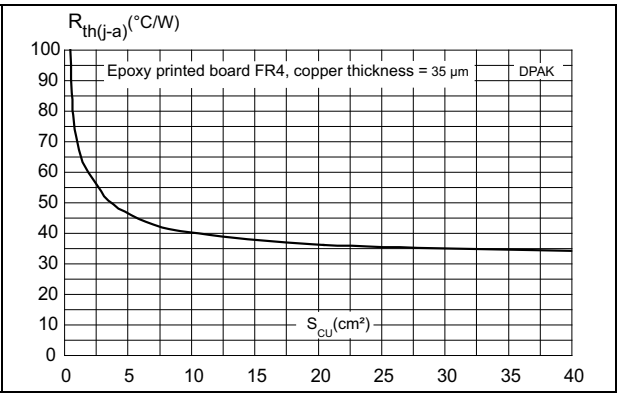


Figure 8. Thermal resistance junction to ambient versus copper surface under tab

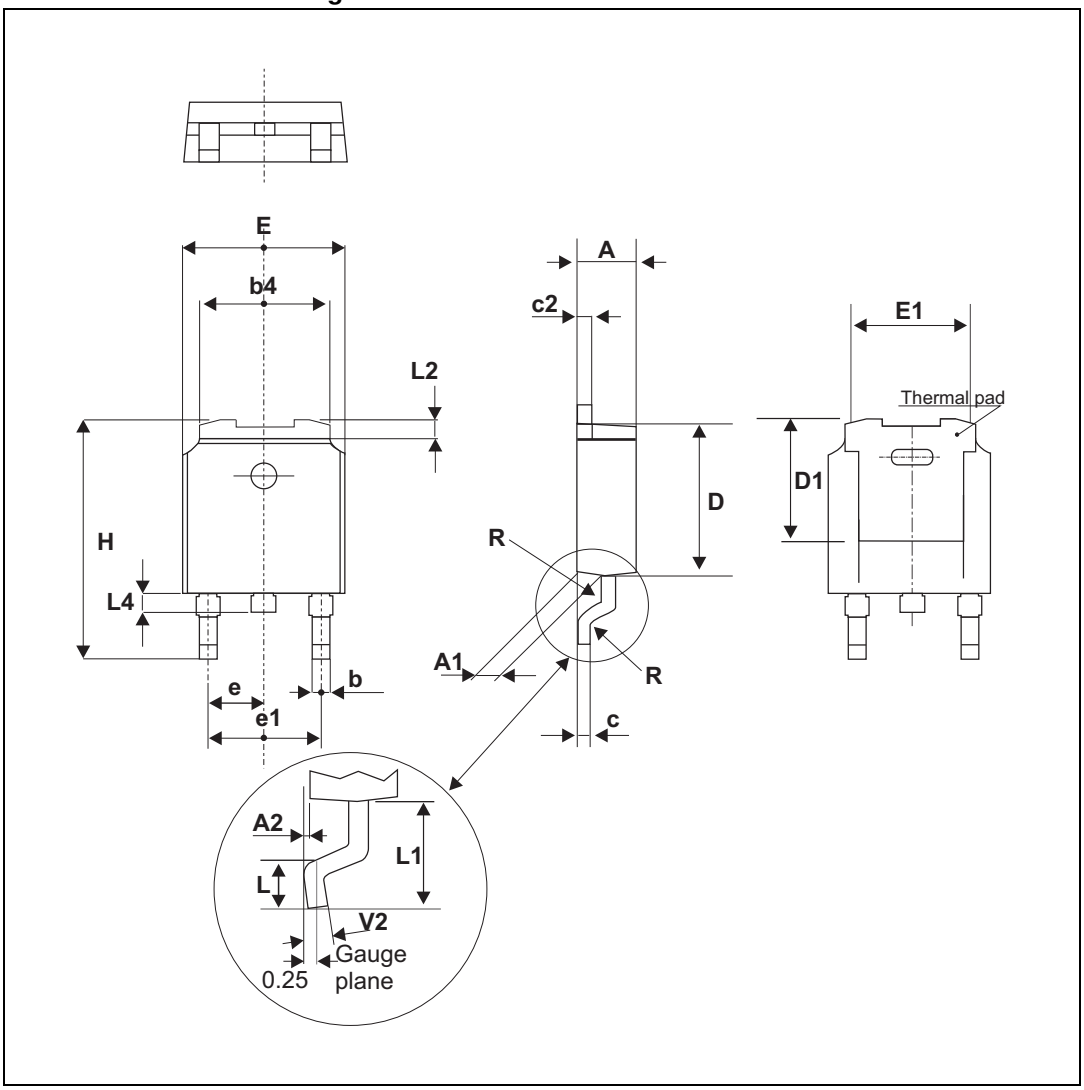


2 Package Information

- Epoxy meets UL94,V0
- Cooling method: by conduction (C)

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 9. DPAK dimension definitions

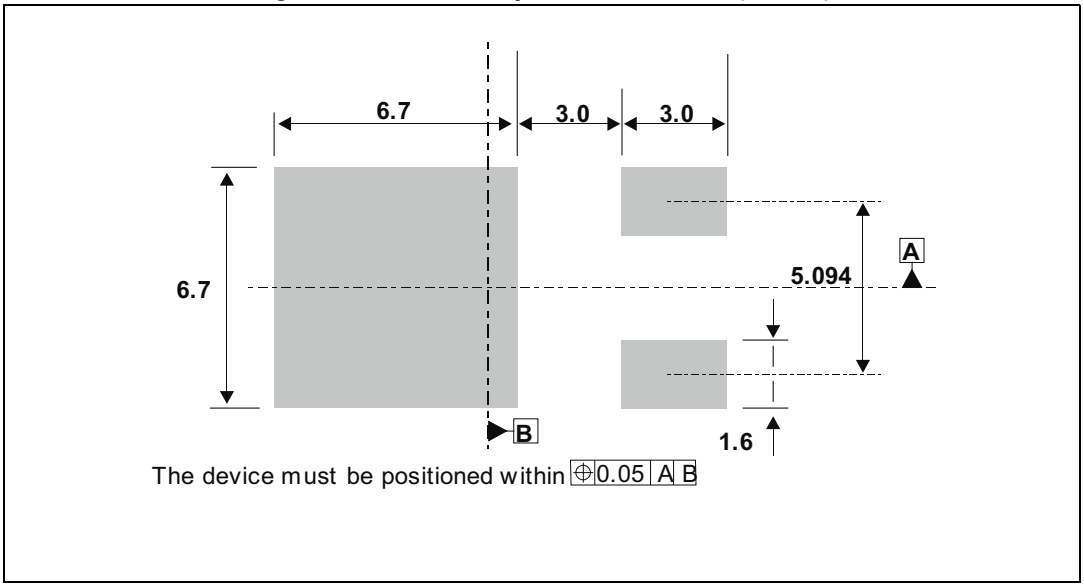


Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 5. DPAK dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.18		2.40	0.085		0.094
A1	0.90		1.1	0.035		0.043
A2	0.03		0.23	0.001		0.01
b	0.64		0.90	0.025		0.035
b4	4.95		5.46	0.195		0.215
c	0.46		0.61	0.018		0.024
c2	0.46		0.60	0.018		0.024
D	5.97		6.22	0.235		0.245
D1	5.10			0.201		
E	6.35		6.73	0.250		0.265
E1	4.32			0.170		
e1	4.4		4.7	0.173		0.185
H	9.35		10.40	0.368		0.407
L	1.0		1.78	0.039		0.070
L2			1.27			0.05
L4	0.6		1.02	0.024		0.040
V2	0°		8°	0°		8°

Figure 10. DPAK footprint dimensions (in mm)



3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS640CB	S640C	DPAK	0.32 g	75	Tube
STPS640CB-TR	S640C			2500	Tape and reel

4 Revision history

Table 7. Document revision history

Date	Revision	Changes
Aug-2003	6B	Last issue
22-Mar-2007	7	Updated *Figure 8* Updated ECOPACK statement.
20-Nov-2014	8	Updated DPAK package information, *Table 2* and *Figure 3*. Removed P_{ARM} (T_j = 25 °C), TO-220AB and TO-220FPAB package information.