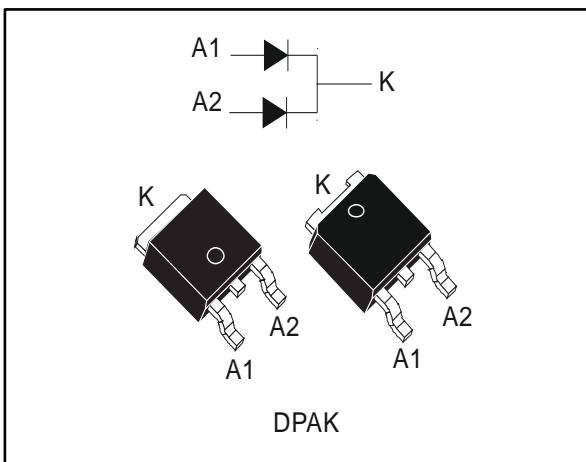


## Power Schottky rectifier

Datasheet - production data



### 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

### 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

# 1 Characteristics

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

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 $\delta = 0.5$ , square wave	$T_c = 135 \text{ } ^\circ\text{C}$	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10 \text{ ms sinusoidal}$	A
$P_{ARM}$	Repetitive peak avalanche power	$t_p = 10 \mu\text{s}$ $T_j = 125 \text{ } ^\circ\text{C}$	W
$T_{stg}$	Storage temperature range	-65 to +150	$^\circ\text{C}$
$T_j$	Maximum operating junction temperature <sup>(1)</sup>	150	$^\circ\text{C}$

**Notes:**

<sup>(1)</sup> $(dP_{tot}/dT_j) < (1/R_{th(j-a)})$  condition to avoid thermal runaway for a diode on its own heatsink.

Table 3: Thermal parameters

Symbol	Parameter	Max. value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	5.5
		Per device	3
$R_{th(c)}$	Coupling	0.5	$^\circ\text{C/W}$

When the diodes 1 and 2 are used simultaneously:

$$\Delta T_j \text{ (diode1)} = P_{(diode1)} \times R_{th(j-c)} \text{ (per diode)} + P_{(diode2)} \times R_{th(c)}$$

Table 4: Static electrical characteristics (per diode)

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

**Notes:**

<sup>(1)</sup>Pulse test:  $t_p = 5 \text{ ms}$ ,  $\delta < 2\%$

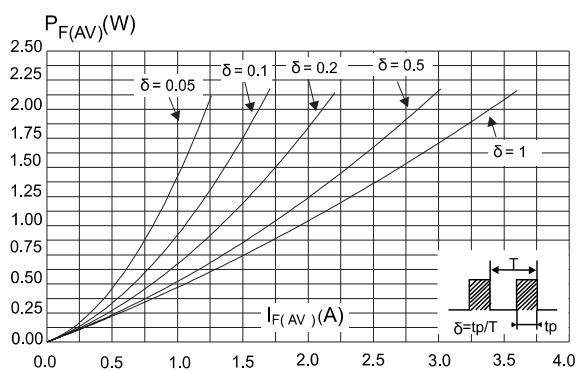
<sup>(2)</sup>Pulse test:  $t_p = 380 \mu\text{s}$ ,  $\delta < 2\%$

To evaluate the conduction losses, use the following equation:

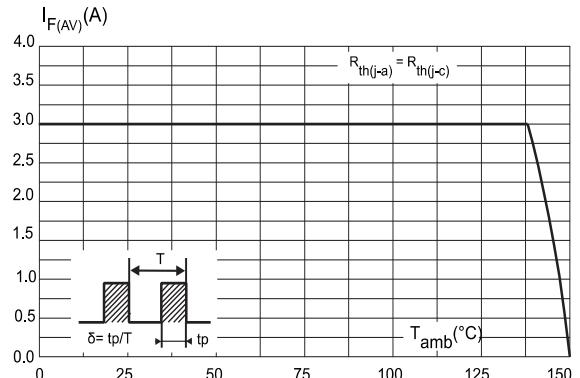
$$P = 0.42 \times I_{F(AV)} + 0.050 \times I_F^2 \text{ (RMS)}$$

## 1.1 Characteristics (curves)

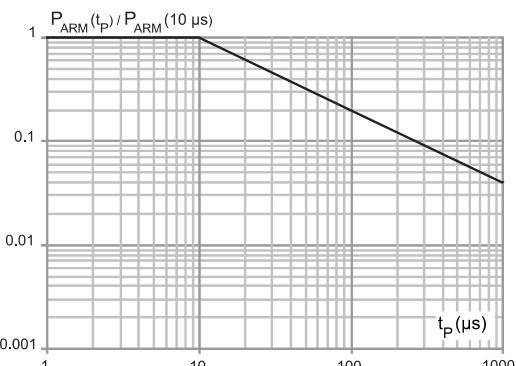
**Figure 1: Average forward power dissipation versus average forward current (per diode)**



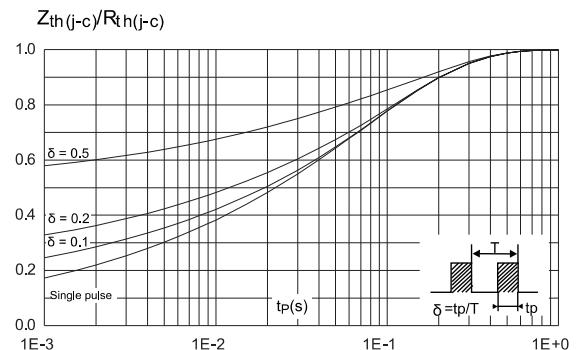
**Figure 2: Average forward current versus ambient temperature (per diode,  $\delta = 0.5$ )**



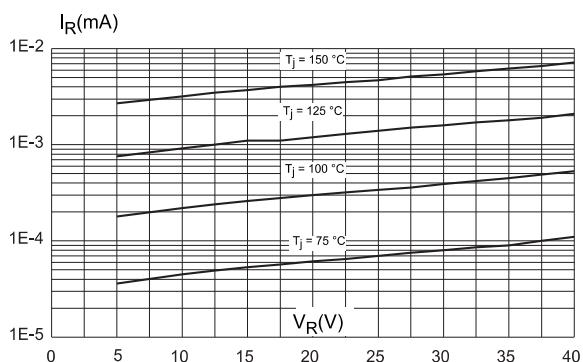
**Figure 3: Normalized avalanche power derating versus pulse duration ( $T_j = 125^\circ\text{C}$ )**



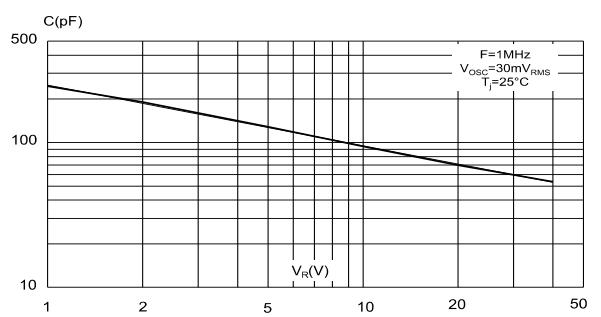
**Figure 4: Relative variation of thermal impedance junction to case versus pulse duration**



**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)**



## Characteristics

STPS640C

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

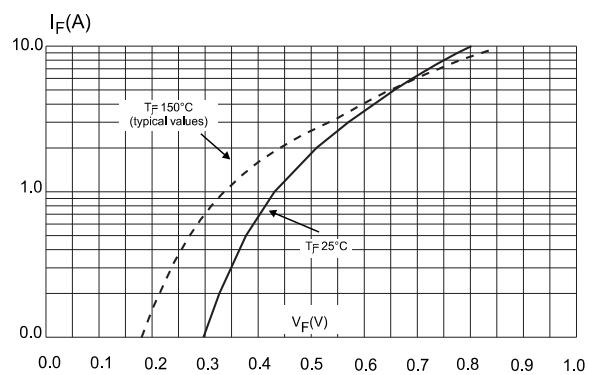
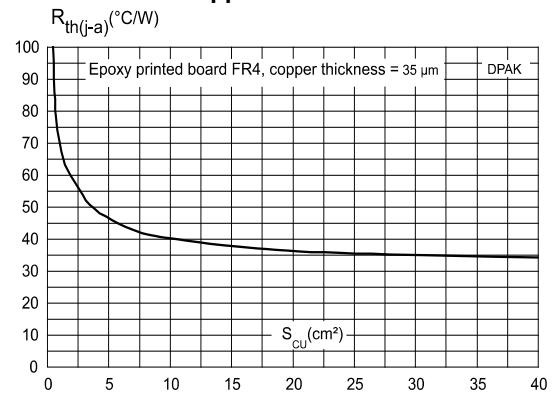


Figure 8: Thermal resistance junction to ambient versus copper surface under tab



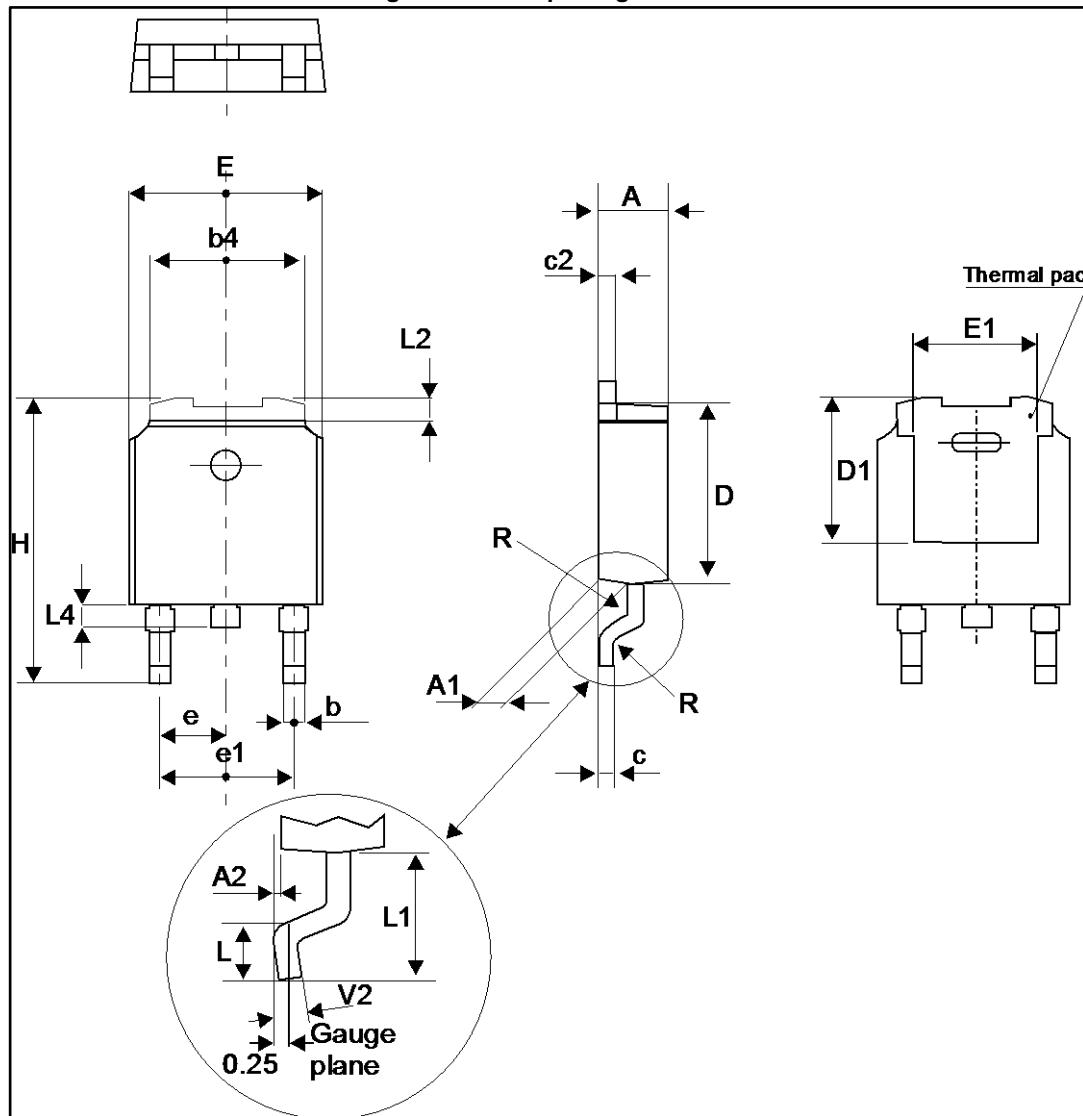
## 2 Package information

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.

- Cooling method: by conduction (C)
- Epoxy meets UL 94,V0

### 2.1 DPAK package information

Figure 9: DPAK package outline

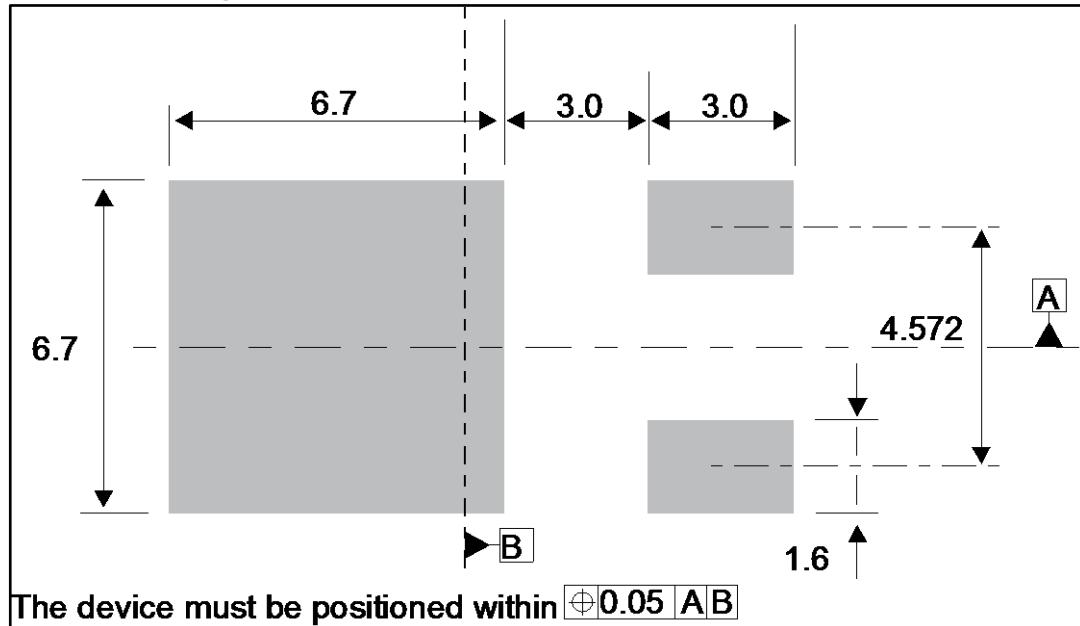


This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 5: DPAK package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.18	2.40	0.085	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	4.95	5.46	0.194	0.215
c	0.46	0.61	0.018	0.024
c2	0.46	0.60	0.018	0.023
D	5.97	6.22	0.235	0.244
D1	4.95	5.60	0.194	0.220
E	6.35	6.73	0.250	0.265
E1	4.32	5.50	0.170	0.216
e	2.286 typ.		0.090 typ.	
e1	4.40	4.70	0.173	0.185
H	9.35	10.40	0.368	0.409
L	1.0	1.78	0.039	0.070
L2		1.27		0.050
L4	0.60	1.02	0.023	0.040
V2	-8°	+8°	-8°	+8°

Figure 10: DPAK recommended footprint (dimensions in mm)



### 3 Ordering information

Table 6: Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS640CB	S6 40C	DPAK	0.32 g	75	Tube
STPS640CB-TR	S6 40C			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 <i>Figure 8</i> . Updated ECOPACK statement.
20-Nov-2014	8	<i>Figure 3</i> . Removed PARM ( $T_j = 25^\circ\text{C}$ ), TO-220AB and TO-220FPAB package information.
16-May-2017	9	Updated DPAK package information and reformatted to current standard.

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**Наши контакты:**

**Телефон:** +7 812 627 14 35

**Электронная почта:** [sales@st-electron.ru](mailto:sales@st-electron.ru)

**Адрес:** 198099, Санкт-Петербург,  
Промышленная ул, дом № 19, литер Н,  
помещение 100-Н Офис 331