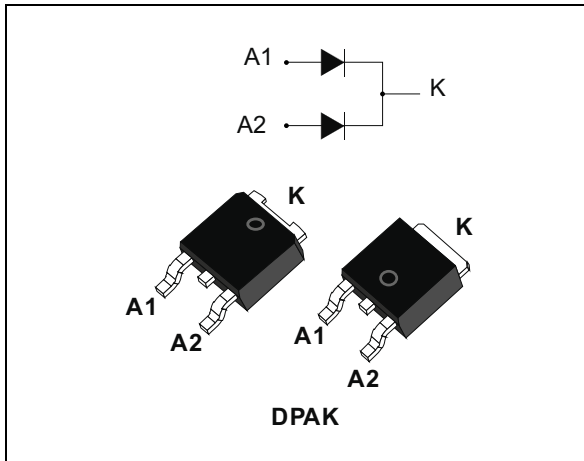


## High efficiency ultrafast diode

Datasheet - production data



### Description

Dual center tap rectifier suited for switched mode power supply and high frequency DC to DC converters.

Packaged in DPAK, this device is intended for use in low voltage, high frequency inverters, freewheeling and polarity protection applications.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	2 X 4 A
$V_{RRM}$	200 V
$T_j$ (max)	175 °C
$V_F$ (typ.)	0.81 V
$t_{rr}$ (typ.)	13 ns

### Features

- Suited for SMPS
- Low losses
- Low forward and reverse recovery time
- High surge current capability
- High junction temperature
- ECOPACK<sup>®</sup>2 compliant component for DPAK on demand

# 1 Characteristics

**Table 2. Absolute ratings (limiting values at  $T_j = 25\text{ °C}$  per diode, unless otherwise specified)**

Symbol	Parameter		Value	Unit	
$V_{RRM}$	Repetitive peak reverse voltage		200	V	
$I_{F(RMS)}$	Forward rms current		10	A	
$I_{F(AV)}$	Average forward current, $\delta = 0.5$ , square wave	$T_c = 155\text{ °C}$	Per diode	4	A
		$T_c = 150\text{ °C}$	Per device	8	
$I_{FSM}$	Surge non repetitive forward current		$t_p = 10\text{ ms}$ sinusoidal	50	A
$T_{stg}$	Storage temperature range		-65 to +175	°C	
$T_j$	Maximum operating junction temperature		175	°C	

**Table 3. Thermal resistances**

Symbol	Parameter		Max. value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	4	°C/W
		Total	2.5	
$R_{th(c)}$	Coupling		1.0	

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 4. Static electrical characteristics (per diode)**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit	
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	-		4	$\mu\text{A}$	
		$T_j = 125\text{ °C}$	-	2	40		
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 4\text{ A}$	-		1.10	V
		$T_j = 125\text{ °C}$		-	0.81	0.95	
		$T_j = 25\text{ °C}$	$I_F = 8\text{ A}$	-		1.25	
		$T_j = 125\text{ °C}$		-	0.95	1.10	

1. Pulse test:  $t_p = 5\text{ ms}$ ,  $\delta < 2\%$

2. Pulse test:  $t_p = 380\text{ }\mu\text{s}$ ,  $\delta < 2\%$

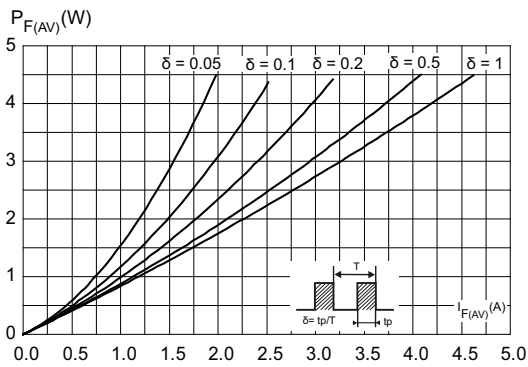
To evaluate the conduction losses, use the following equation:

$$P = 0.80 \times I_{F(AV)} + 0.037 \times I_{F(RMS)}^2$$

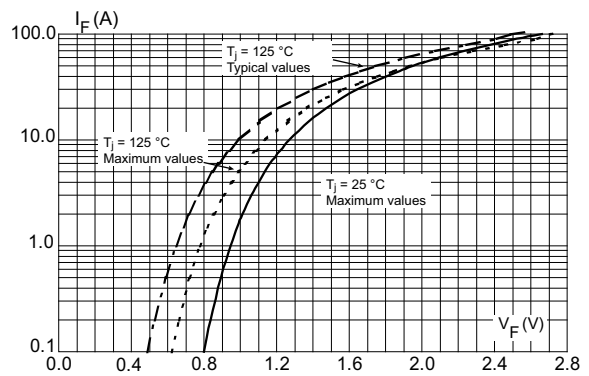
Table 5. Dynamic characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$t_{rr}$	Reverse recovery time	$T_j = 25\text{ °C}$	$I_F = 0.5\text{ A}$ $I_{RR} = 0.25\text{ A}$ $I_R = 1\text{ A}$	-	13	20	ns
$t_{fr}$	Forward recovery time		$I_F = 4\text{ A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$	-	50		ns
$V_{FP}$	Forward recovery voltage		$I_F = 4\text{ A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$	-	2.4		V

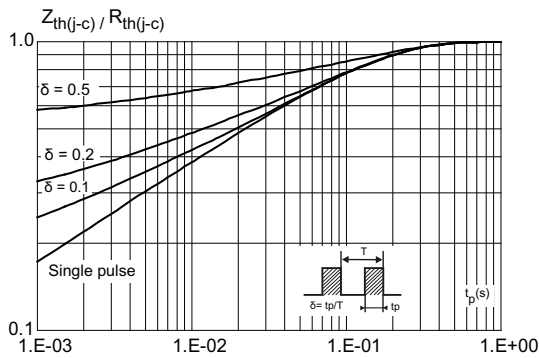
**Figure 1. Average forward power dissipation versus average forward current (per diode)**



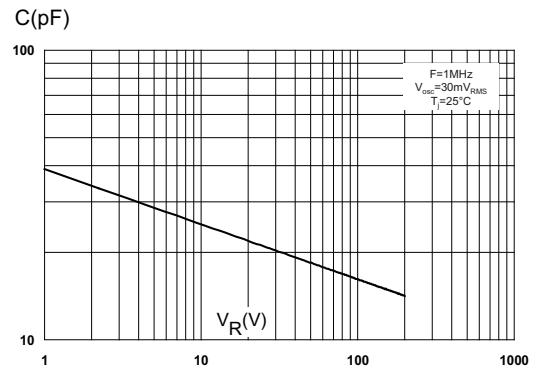
**Figure 2. Forward voltage drop versus forward current (per diode)**



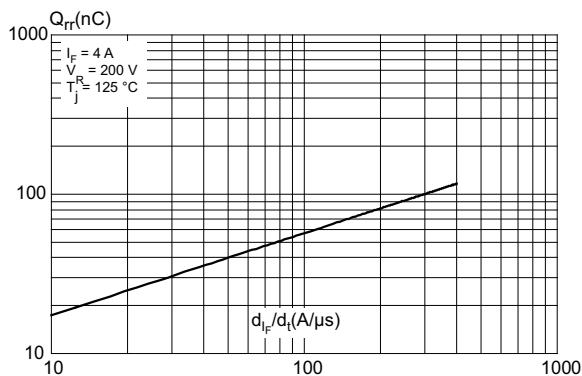
**Figure 3. Relative variation of thermal impedance, junction to case, versus pulse duration**



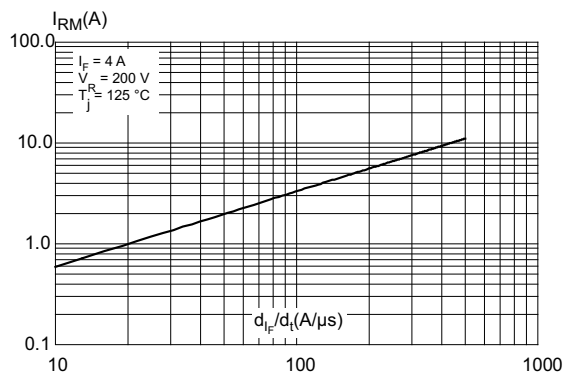
**Figure 4. Junction capacitance versus reverse applied voltage (typical values, per diode)**



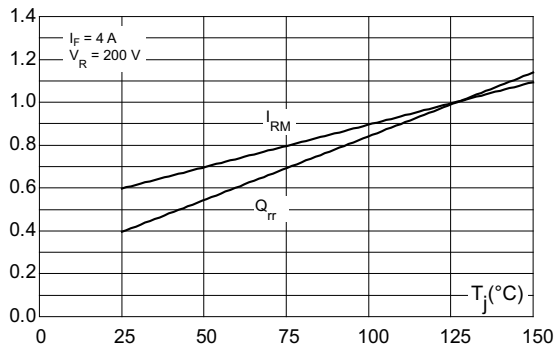
**Figure 5. Reverse recovery charges versus  $dI_F/dt$  (typical values, per diode)**



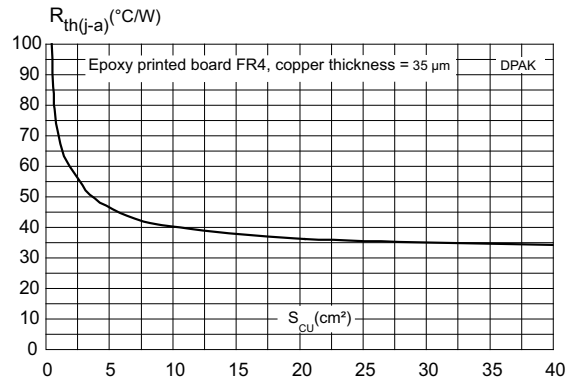
**Figure 6. Peak reverse recovery current versus  $dI_F/dt$  (typical values, per diode)**



**Figure 7. Dynamic parameters versus junction temperature (reference:  $T_j = 125\text{ }^\circ\text{C}$ )**



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



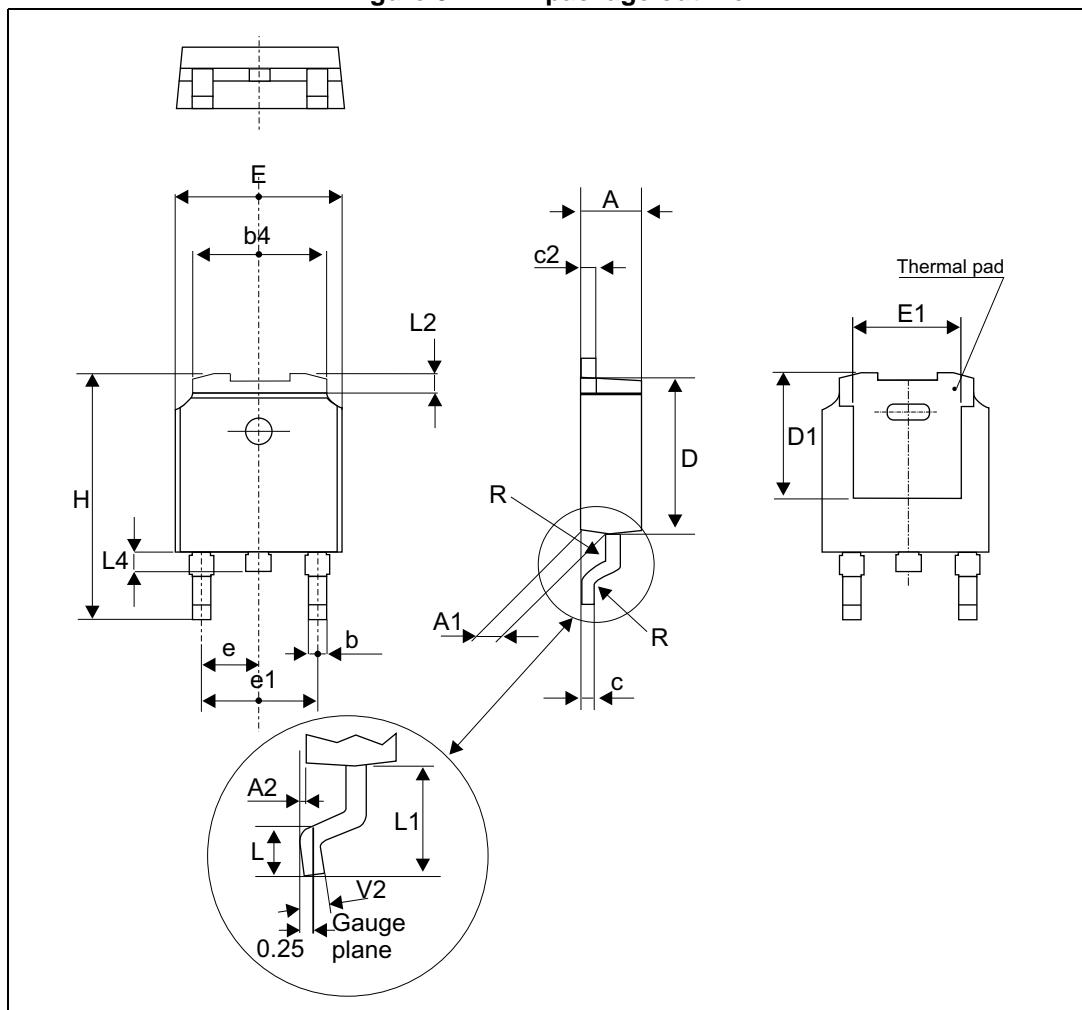
## 2 Package Information

- 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](http://www.st.com). ECOPACK® is an ST trademark.

### 2.1 DPAK package information

Figure 9. DPAK package outline

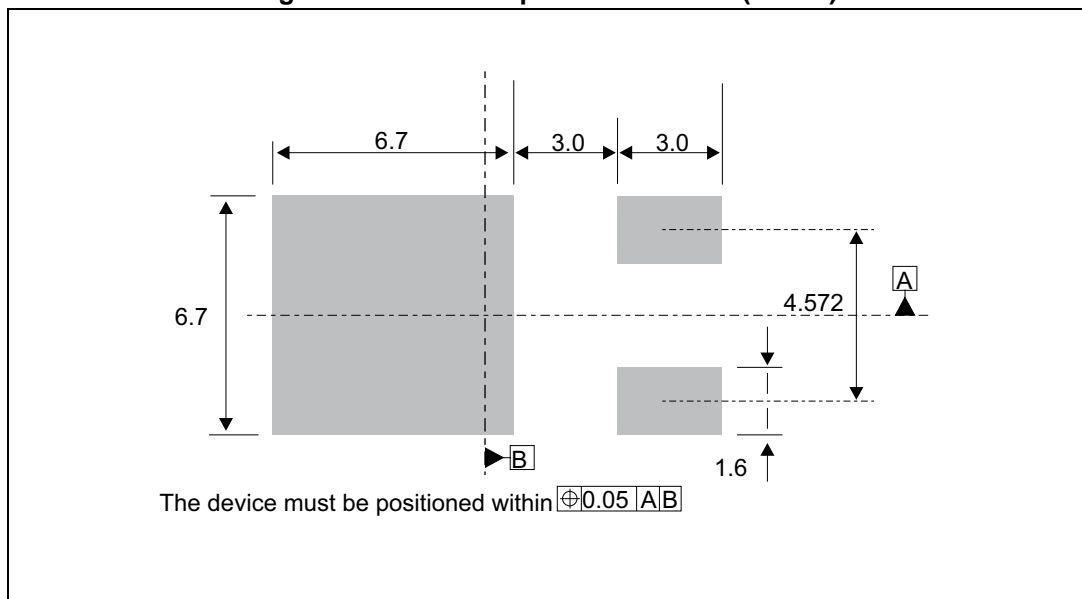


*Note:* This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 6. DPAK package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	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		0.214
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		0.264
E1	4.32		5.50	0.170		0.216
e		2.28			0.090	
e1	4.40		4.70	0.173		0.185
H	9.35		10.40	0.368		0.409
L	1.00		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 footprint dimensions (in mm)



### 3 Ordering Information

**Table 7. Ordering information**

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH802CB-TR	STTH8 02CB	DPAK	0.3 g	2500	Tape and reel

### 4 Revision history

**Table 8. Document revision history**

Date	Revision	Description of Changes
26-Jun-2012	1	First release.
04-Nov-2014	2	Removed TO-220AB and TO-220FPAB package information. Reformatted to current standard.
02-Nov-2016	3	Updated DPAK package information and reformatted to current standard.



**IMPORTANT NOTICE – PLEASE READ CAREFULLY**

STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2016 STMicroelectronics – All rights reserved

