

## High efficiency ultrafast diode

### Main product characteristics

$I_{F(AV)}$	2 x 10 A
$V_{RRM}$	200 V
$T_j$ (max)	175° C
$V_F$ (typ)	0.76 V
$t_{rr}$ (typ)	20 ns

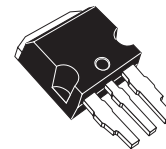
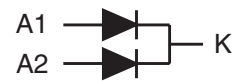
### Features and benefits

- Suited for SMPS
- Low losses
- Low forward and reverse recovery times
- High surge current capability
- High junction temperature

### Description

Dual center tab rectifier suited for switch mode power supplies and high frequency DC to DC converters.

Packaged in I<sup>2</sup>PAK double track, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection



I<sup>2</sup>PAK double track  
STTH2002CRC

### Order codes

Part Number	Marking
STTH2002CRC	STTH2002C
STTH2002CRC-TR	STTH2002C

# 1 Characteristics

**Table 1. Absolute ratings (limiting values at  $T_j = 25^\circ\text{C}$ , unless otherwise specified)**

Symbol	Parameter		Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage		200	V
$I_{F(RMS)}$	RMS forward current	Per diode	32	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$	Per diode $T_c = 150^\circ\text{C}$	10	A
		Per device $T_c = 145^\circ\text{C}$	20	
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10\text{ ms}$ Sinusoidal	100	A
$T_{stg}$	Storage temperature range		-65 to + 175	$^\circ\text{C}$
$T_j$	Maximum operating junction temperature		175	$^\circ\text{C}$

**Table 2. Thermal parameters**

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	Per diode	2.5	$^\circ\text{C/W}$
		Total	1.4	
$R_{th(c)}$	Coupling		0.25	

When the two 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 3. Static electrical characteristics**

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25^\circ\text{C}$	$V_R = V_{RRM}$			10	$\mu\text{A}$
		$T_j = 125^\circ\text{C}$			10	100	
$V_F^{(2)}$	Forward voltage drop	$T_j = 150^\circ\text{C}$	$I_F = 10\text{ A}$		0.76	0.85	
		$T_j = 25^\circ\text{C}$	$I_F = 20\text{ A}$			1.2	V
		$T_j = 150^\circ\text{C}$			0.90	1.02	

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:

$$P = 0.68 \times I_{F(AV)} + 0.017 I_{F(RMS)}^2$$

Table 4. Dynamic characteristics

Symbol	Parameter	Test conditions	Min.	Typ	Max.	Unit
$t_{rr}$	Reverse recovery time	$I_F = 1\text{ A}$ , $di_F/dt = -100\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$ , $T_j = 25\text{ }^\circ\text{C}$		20	25	ns
		$I_F = 1\text{ A}$ , $di_F/dt = -50\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$ , $T_j = 25\text{ }^\circ\text{C}$		28	35	
$I_{RM}$	Reverse recovery current	$I_F = 10\text{ A}$ , $di_F/dt = 200\text{ A}/\mu\text{s}$ , $V_R = 160\text{ V}$ , $T_j = 125\text{ }^\circ\text{C}$		5.8	7.5	A
$t_{fr}$	Forward recovery time	$I_F = 10\text{ A}$ , $di_F/dt = 50\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$ , $T_j = 25\text{ }^\circ\text{C}$		180		ns
$V_{FP}$	Forward recovery voltage	$I_F = 10\text{ A}$ , $di_F/dt = 50\text{ A}/\mu\text{s}$ , $V_{FR} = 1.1 \times V_{Fmax}$ , $T_j = 25\text{ }^\circ\text{C}$		1.6		V

Figure 1. Peak current versus duty cycle

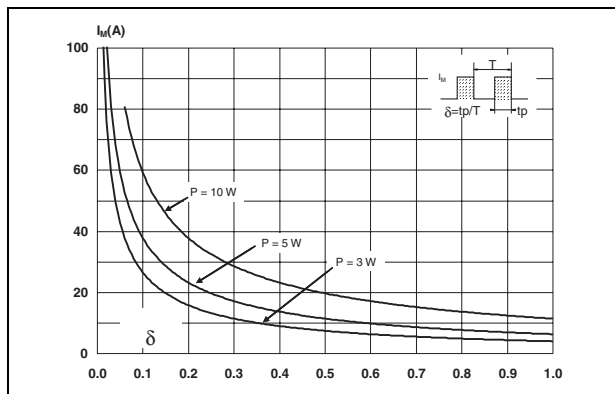


Figure 2. Forward voltage drop versus forward current (typical values)

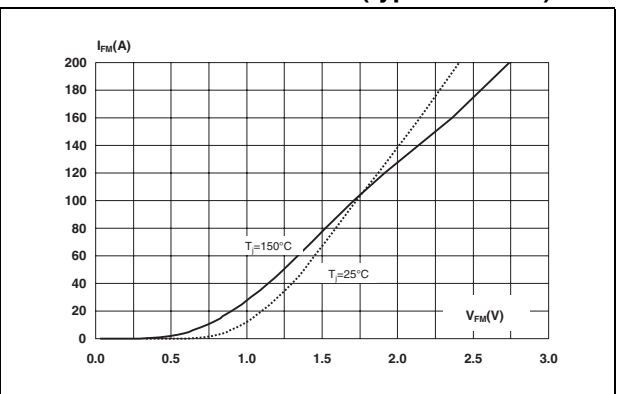


Figure 3. Forward voltage drop versus forward current (maximum values)

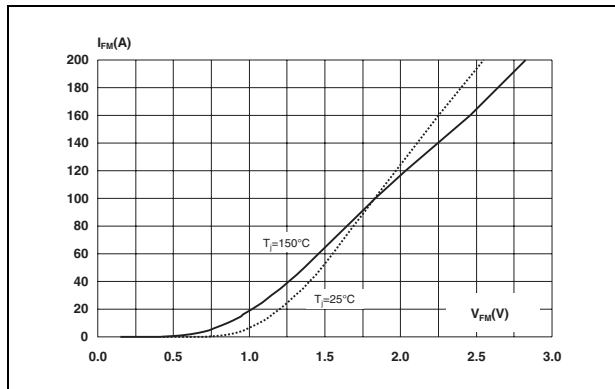
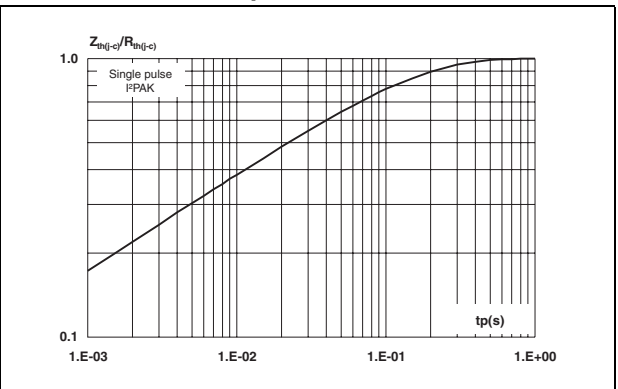
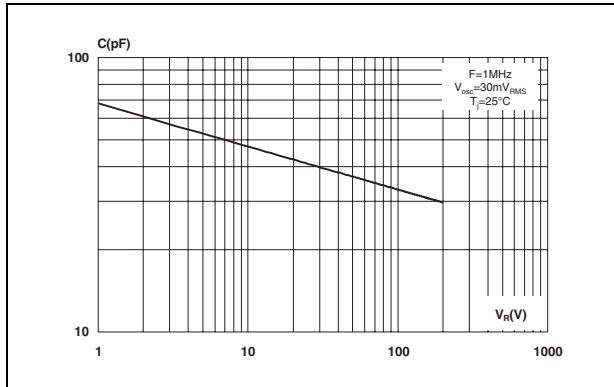


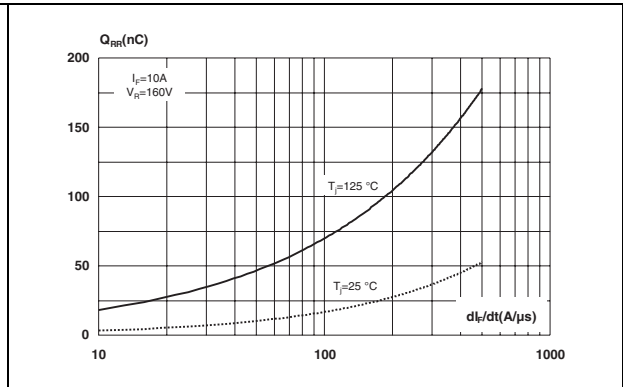
Figure 4. Relative variation of thermal impedance, junction to case, versus pulse duration



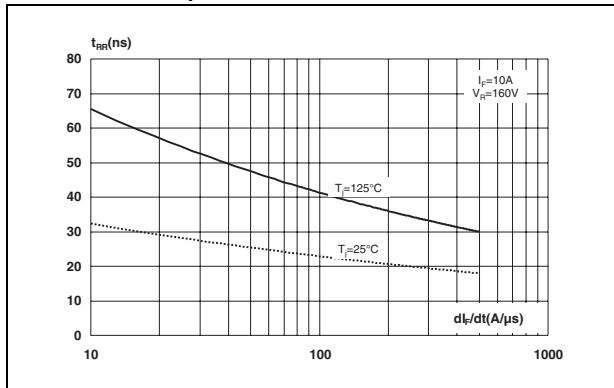
**Figure 5. Junction capacitance versus reverse applied voltage (typical values)**



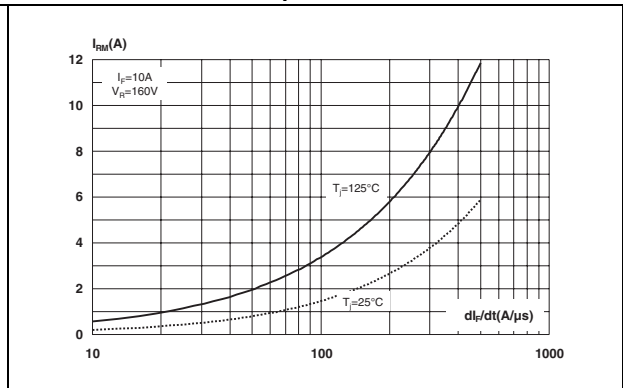
**Figure 6. Reverse recovery charges versus  $di_F/dt$  (typical values)**



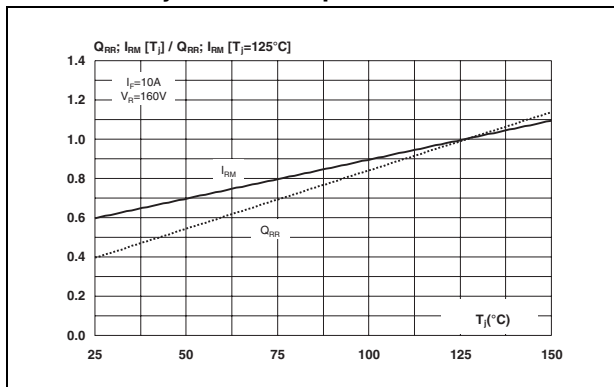
**Figure 7. Reverse recovery time versus  $di_F/dt$  (typical values)**



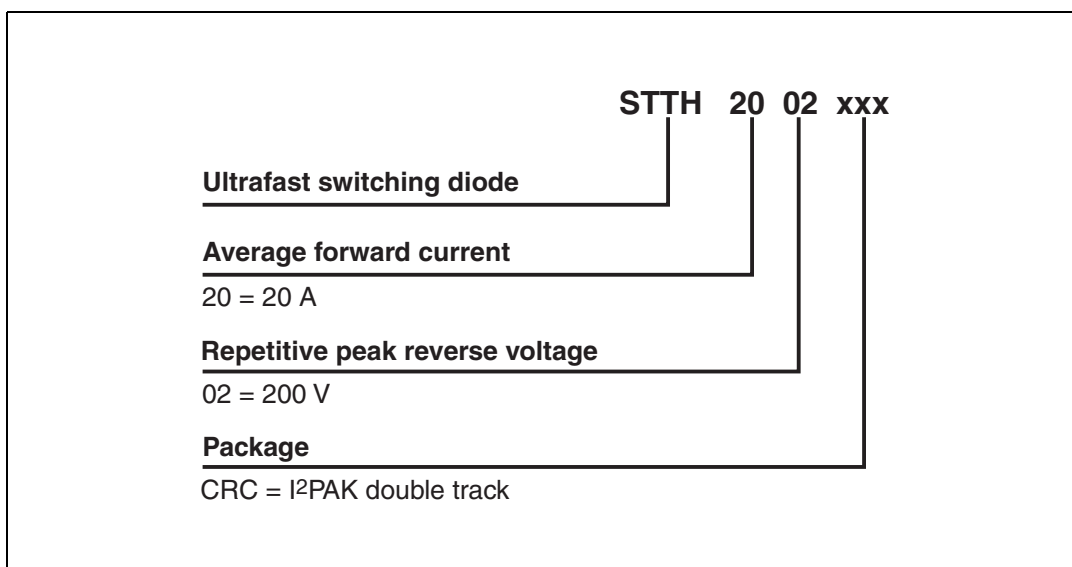
**Figure 8. Peak reverse recovery current versus  $di_F/dt$  (typical values)**



**Figure 9. Dynamic parameters versus junction temperature**



## 2 Ordering information scheme



### 3 Package information

Epoxy meets UL94, V0

Cooling method: by conduction (C)

**Table 5. I<sup>2</sup>PAK double track dimensions**

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.49	2.69	0.098	0.106
B	0.70	0.93	0.027	0.037
B2	1.14	1.70	0.045	0.067
C	0.45	0.60	0.018	0.024
C2	1.23	1.36	0.048	0.053
D	8.95	9.35	0.352	0.368
E	10	10.40	0.394	0.409
G	4.88	5.28	0.192	0.208
L	16.70	17.5	0.657	0.689
L2	1.27	1.40	0.050	0.055
L3	13.82	14.42	0.544	0.568

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## 4 Ordering information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
STTH2002CRC	STTH2002C	I <sup>2</sup> PAK DT	1.48 g	50	Tube
STTH2002CRC-TR	STTH2002C	I <sup>2</sup> PAK DT	1.48 g	1000	Tape and reel

## 5 Revision history

Date	Revision	Description of Changes
05-Apr-2006	1	First issue

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