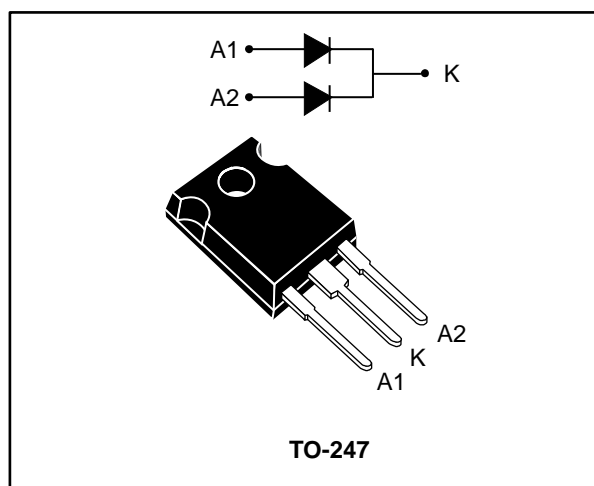


## High frequency secondary rectifier

Datasheet - production data



### Description

Dual rectifier suited for switch mode power supply and high frequency DC to DC converters. Packaged in TO-247, this device is intended for use in low voltage, high frequency inverters, free wheeling operation, welding equipment and telecom power supplies.

**Table 1: Device summary**

Symbol	Value
$I_{F(AV)}$	2 x 30 A
$V_{RRM}$	300 V
$V_F$ (max.)	1 V
$t_{rr}$ (max.)	55 ns

### Features

- Combines highest recovery and voltage performance
- Ultrafast, soft and noise-free recovery
- Low inductance and low capacitance allow simplified layout

# 1 Characteristics

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

Symbol	Parameter		Value	Unit	
V <sub>RRM</sub>	Repetitive peak reverse voltage		300	V	
I <sub>F(RMS)</sub>	Forward rms current		60	A	
I <sub>F(AV)</sub>	Average forward current δ = 0.5, square wave	T <sub>c</sub> = 135 °C	Per diode	30	A
			Per device	60	
I <sub>FSM</sub>	Surge non repetitive forward current	t <sub>p</sub> = 10 ms sinusoidal	300	A	
I <sub>RSM</sub>	Non repetitive peak reverse current	t <sub>p</sub> = 100 μs square	4	A	
T <sub>stg</sub>	Storage temperature range		-65 to +175	°C	
T <sub>j</sub>	Maximum operating junction temperature		+175	°C	

**Table 3: Thermal parameters**

Symbol	Parameter		Maximum	Unit
R <sub>th(j-c)</sub>	Junction to case	Per diode	1	°C/W
		Total	0.55	
R <sub>th(c)</sub>	Coupling		0.1	

When the diodes 1 and 2 are used simultaneously:

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

**Table 4: Static electrical characteristics**

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I <sub>R</sub> <sup>(1)</sup>	Reverse leakage current	T <sub>j</sub> = 25 °C	V <sub>R</sub> = 300 V	-		60	μA
		T <sub>j</sub> = 125 °C		-	60	600	
V <sub>F</sub> <sup>(2)</sup>	Forward voltage drop	T <sub>j</sub> = 25 °C	I <sub>F</sub> = 30 A	-		1.25	V
		T <sub>j</sub> = 125 °C		-	0.85	1	

**Notes:**

(1)Pulse test: t<sub>p</sub> = 5 ms, δ < 2 %

(2)Pulse test: t<sub>p</sub> = 380 μs, δ < 2 %

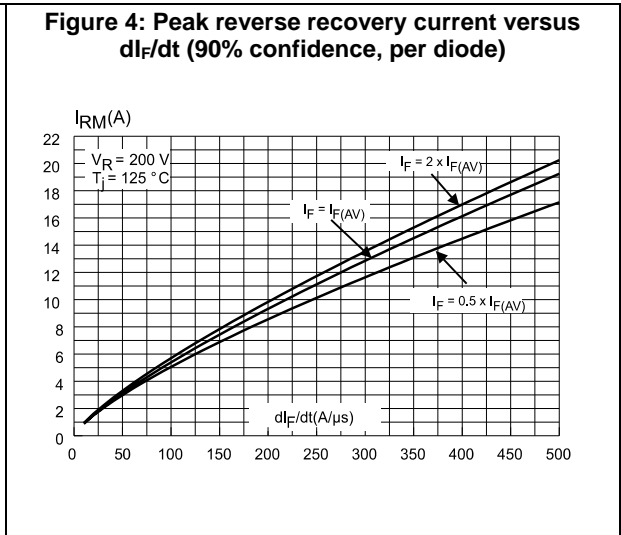
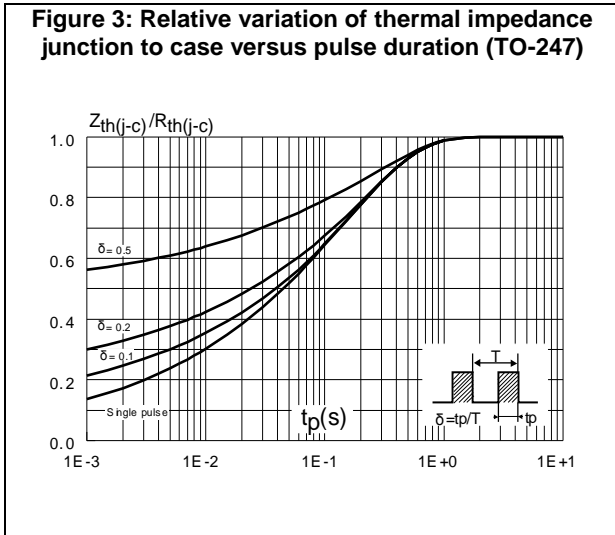
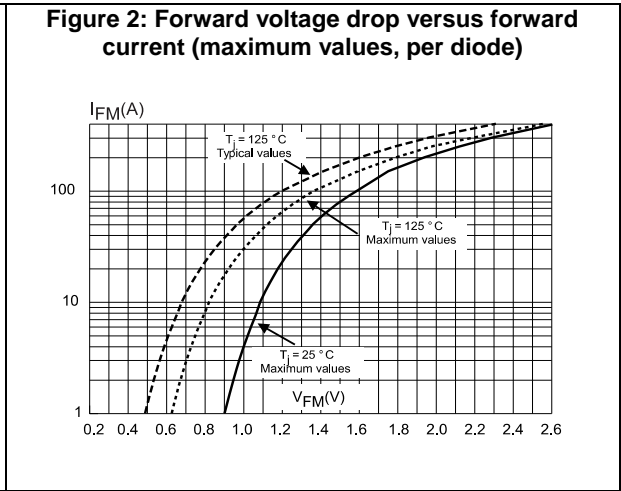
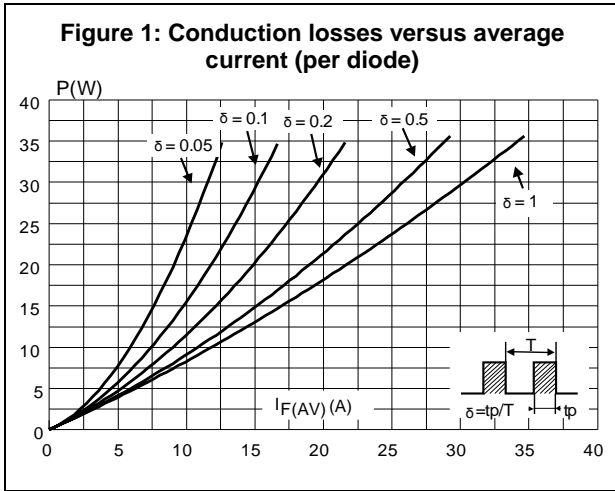
To evaluate the maximum conduction losses, use the following equation:

$$P = 0.75 \times I_{F(AV)} + 0.008 \times I_{F(RMS)}^2$$

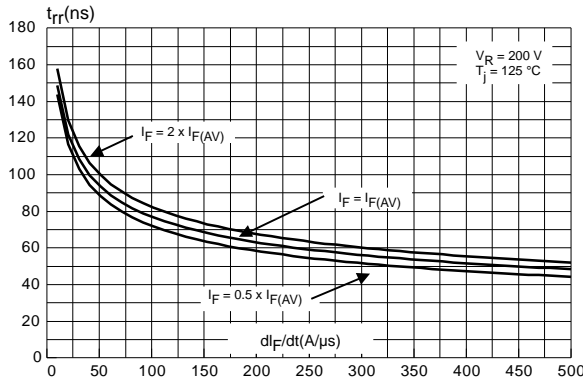
Table 5: Dynamic characteristics

Symbol	Parameters	Test conditions		Min.	Typ.	Max.	Unit
$t_{rr}$	Reverse recovery time	$T_j = 25\text{ °C}$	$I_F = 0.5\text{ A};$ $I_{rr} = 0.25\text{ A},$ $I_R = 1\text{ A}$	-		40	ns
			$I_F = 1\text{ A},$ $di_F/dt = -50\text{ A}/\mu\text{s},$ $V_R = 30\text{ V}$	-		55	
$t_{fr}$	Forward recovery time	$T_j = 25\text{ °C}$	$I_F = 30\text{ A};$ $di_F/dt = 200\text{ A}/\mu\text{s},$ $V_{FR} = 1.1 \times V_{F\text{ max.}}$	-		350	ns
$V_{FP}$	Forward recovery voltage			-		5	V
$S_{\text{factor}}$	Softness factor	$T_j = 125\text{ °C}$	$V_{CC} = 200\text{ V},$ $I_F = 30\text{ A},$ $di_F/dt = 200\text{ A}/\mu\text{s}$	-	0.3		-
$I_{RM}$	Reverse recovery current			-		11	A

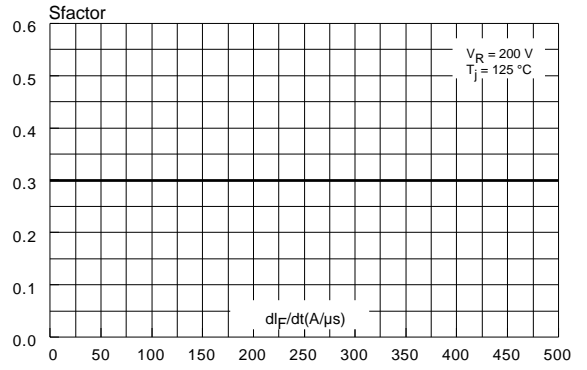
# 1.1 Characteristics (curves)



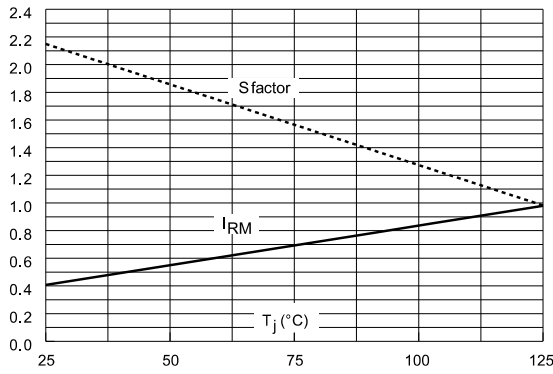
**Figure 5: Reverse recovery time versus  $di_F/dt$  (90% confidence, per diode)**



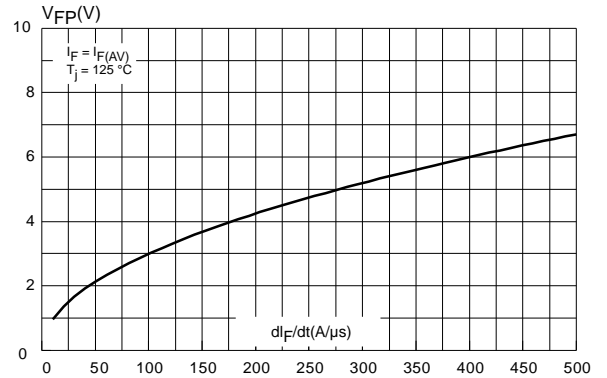
**Figure 6: Softness factor (tb/ta) versus  $di_F/dt$  (typical values, per diode)**



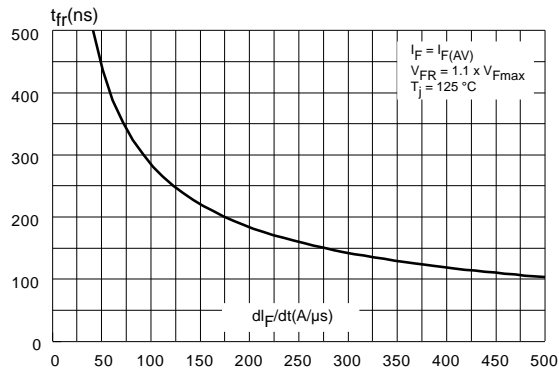
**Figure 7: Relative variation of dynamic parameters versus junction temperature ( $T_j = 125$  °C)**



**Figure 8: Transient peak forward voltage versus  $di_F/dt$  (90% confidence, per diode)**



**Figure 9: Forward recovery time versus  $di_F/dt$  (90% confidence, per diode)**



## 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.

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque values: 0.55 N·m
- Maximum torque value: 1.0 N·m

### 2.1 TO-247 package information

Figure 10: TO-247 package outline

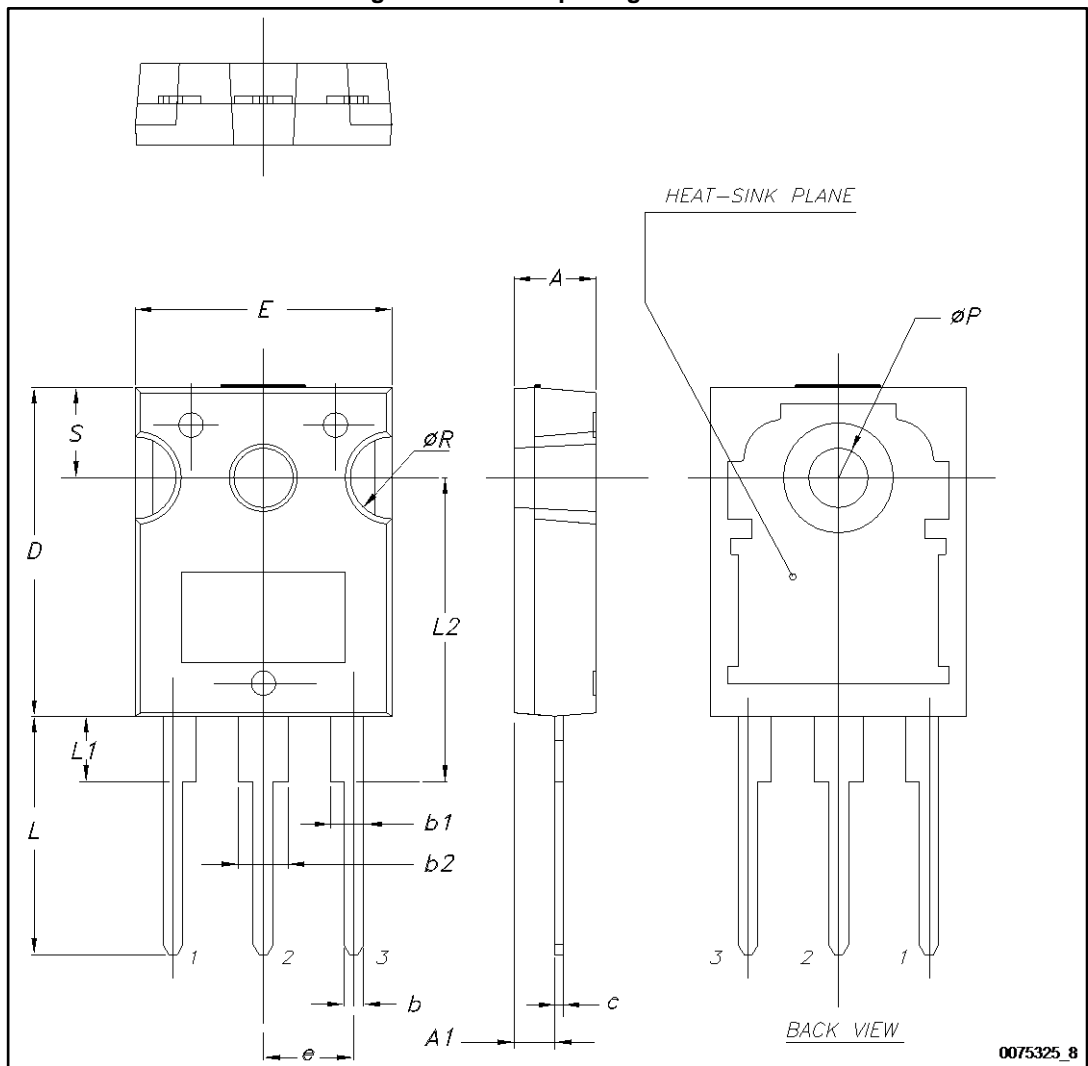


Table 6: TO-247 package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.85		5.15	0.191		0.203
A1	2.20		2.60	0.086		0.102
b	1.00		1.40	0.039		0.055
b1	2.00		2.40	0.078		0.094
b2	3.00		3.40	0.118		0.133
c	0.40		0.80	0.015		0.031
D <sup>(1)</sup>	19.85		20.15	0.781		0.793
E	15.45		15.75	0.608		0.620
e	5.30	5.45	5.60	0.209	0.215	0.220
L	14.20		14.80	0.559		0.582
L1	3.70		4.30	0.145		0.169
L2		18.50			0.728	
ØP <sup>(2)</sup>	3.55		3.65	0.139		0.143
ØR	4.50		5.50	0.177		0.217
S	5.30	5.50	5.70	0.209	0.216	0.224

**Notes:**

<sup>(1)</sup>Dimension D plus gate protusion does not exceed 20.5 mm

<sup>(2)</sup>Resin thickness around the mounting hole is not less than 0.9 mm.

### 3 Ordering information

Table 7: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH6003CW	STTH6003CW	TO-247	4.36 g	30	Tube

### 4 Revision history

Table 8: Document revision history

Date	Revision	Changes
Oct-1999	5C	Previous revision.
18-Jun-2014	6	Removed ISOTOP package. Updated <i>Section 2: Package information</i> .
21-Nov-2016	7	Updated <a href="#">Table 7: "Ordering information"</a> . Minor text changes.



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