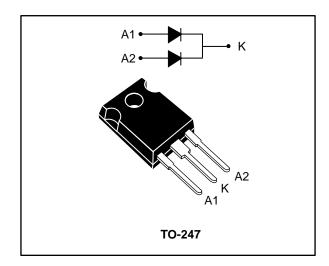
STTH6003



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

Characteristics STTH6003

1 Characteristics

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

Symbol	Parameter		Value	Unit		
V _{RRM}	Repetitive peak reverse voltage			300	V	
I _{F(RMS)}	Forward rms current			60	Α	
	Average forward current	T _c = 135 °C	Per diode	30		
I _{F(AV)}	δ = 0.5, square wave		Per device	60	Α	
I _{FSM}	Surge non repetitive forward current	t _P = 10 ms sir	nusoidal	300	Α	
Irsm	Non repetitive peak reverse current	4	Α			
T _{stg}	Storage temperature range			-65 to +175	°C	
Tj	Maximum operating junction temperature			+175	°C	

Table 3: Thermal parameters

Symbol	Parameter		Maximum	Unit
D	lunction to coop	Per diode	1	
R _{th(j-c)}	Junction to case	Total	0.55	°C/W
R _{th(c)}	Coupling		0.1	

When the diodes 1 and 2 are used simultaneously:

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

Table 4: Static electrical characteristics

	Symbol	Parameter	Test conditions		Min.	Тур.	Max.	Unit
	1_ (1)	Doverse leakage aurrent	T _j = 25 °C	V _R = 300 V	-		60	μA
	I _R ⁽¹⁾ F	Reverse leakage current	T _j = 125 °C		-	60	600	
	V _F ⁽²⁾	Converd voltage drep	T _j = 25 °C	I- 20 A	-		1.25	\ \/
		Forward voltage drop	T _j = 125 °C	I _F = 30 A	-	0.85	1	V

Notes:

 $^{(1)}\text{Pulse}$ test: t_p = 5 ms, δ < 2 %

 $^{(2)}$ Pulse test: tp = 380 µs, δ < 2 %

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

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

STTH6003 Characteristics

Table 5: Dynamic characteristics

Symbol	Parameters	Test conditions		Min.	Тур.	Max.	Unit
	Daviero responsario di ma	T 25.00	$I_F = 0.5 A;$ $I_{rr} = 0.25 A,$ $I_R = 1 A$	-		40	,
Trr	t_{rr} Reverse recovery time $T_j = 25$ °	1j = 25 °C	$I_F = 1 A,$ $dI_F/dt = -50 A/\mu s,$ $V_R = 30 V$	-		55	ns
t _{fr}	Forward recovery time		I _F = 30 A;	-		350	ns
V _{FP}	Forward recovery voltage	T _j = 25 °C	$dI_F/dt = 200 \text{ A/}\mu\text{s},$ $V_{FR} = 1.1 \text{ x V}_F$ $_{max.}$	-		5	V
Sfactor	Softness factor		V _{CC} = 200 V,	-	0.3		-
I _{RM}	Reverse recovery current	T _j = 125 °C	IF = 30 A, dIF/dt = 200 A/µs	-		11	Α

Characteristics STTH6003

1.1 Characteristics (curves)

Figure 1: Conduction losses versus average current (per diode) 40 $\delta = 0.1$ $\delta = 0.2$ $\delta = 0.05$ 35 4 30 25 20 15 10 $I_{F(AV)}(A)$ 15 25 35

junction to case versus pulse duration (TO-247)

2th(j-c)/Rth(j-c)

0.8

0.6

0.4

0.2

5=0.2

5=0.5

0.0

1E-3

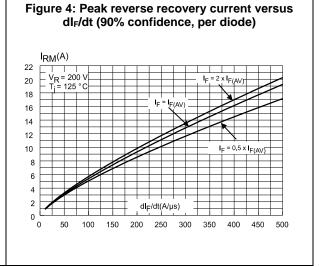
1E-2

1E-1

1E+0

1E+1

Figure 3: Relative variation of thermal impedance



STTH6003 Characteristics

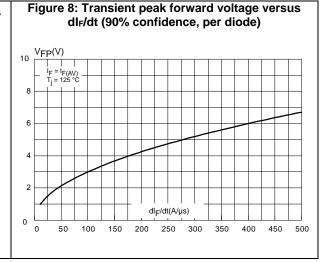
Figure 5: Reverse recovery time versus dlr/dt (90% confidence, per diode) 180 160 140 120 $I_F = 2 \times I_{F(AV)}$ 100 80 60 40 20 $dI_F/dt(A/\mu s)$ 250 100 150 200 300 350 400 450

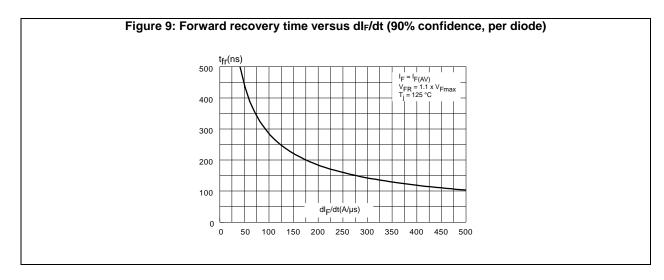
Figure 6: Softness factor (tb/ta) versus dl_F/dt

Figure 7: Relative variation of dynamic parameters versus junction temperature $(T_j = 125 °C)$ 2.4 2.2 2.0 Sfactor 1.8 1.6 1.4 1.2 1.0 0.8 0.6 0.4 0.2 T_j (°C) 0.0

75

100





125

25

50

Package information STTH6003

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**. 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

HEAT-SINK PLANE

D
L2
L1
L1
L1
L2
BACK VIEW 0075325, 8

Table 6: TO-247 package mechanical data

			ensions				
Ref.	Ref. Millimeters			Inche		s	
	Min.	Тур.	Max.	Min.	Тур.	Max.	
А	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	
С	0.40		0.80	0.015		0.031	
D ⁽¹⁾	19.85		20.15	0.781		0.793	
E	15.45		15.75	0.608		0.620	
е	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 ⁽²⁾	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:

 $^{^{(1)}}$ Dimension D plus gate protusion does not exceed 20.5 mm

 $[\]ensuremath{^{(2)}}\mbox{Resin}$ thickness around the mounting hole is not less than 0.9 mm.

Ordering information STTH6003

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 Section 2: Package information.
21-Nov-2016	7	Updated <i>Table 7: "Ordering information"</i> . Minor text changes.

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