STTH10002



Ultrafast recovery diode

Datasheet - production data

Features

- Very low forward losses
- Low recovery time
- High surge current capability
- Insulated package
 - Insulating voltage = 2500 V rms
 - Capacitance = 45 pF
- Complies with UL standards (File ref: E81734)

Description

The STTH10002 is a dual rectifier suited for welding equipment, and high power industrial applications.

Packaged in ISOTOP, this device is intended for use in the secondary rectification of power converters.

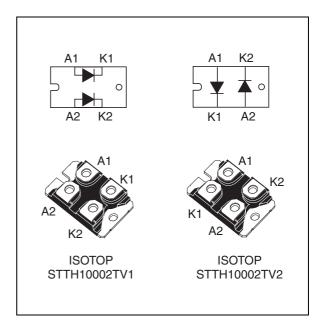


Table 1. Device summary

I _{F(AV)}	2 x 50 A
V_{RRM}	200 V
T _j (max)	150 °C
V _F (typ)	0.72 V
t _{rr} (typ)	30 ns

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1 Characteristics

Table 2. Absolute ratings (limiting values at $T_i = 25$ °C, unless otherwise specified)

Symbol	Parameter			Unit
V_{RRM}	Repetitive peak reverse voltage			V
I _{F(RMS)}	Forward rms current Per diode		150	Α
$I_{F(AV)}$ Average forward current, $\delta = 0$	Average forward current S = 0.5	Per diode T _c = 100 °C	50	Α
	Average lorward current, $\delta = 0.5$	Per device T _c = 95 °C	50	^
I _{FSM}	Surge non repetitive forward current $t_p = 10 \text{ ms sinusoidal}$		750	Α
T _{stg}	Storage temperature range			°C
T _j	Maximum operating junction temperature			°C

Table 3. Thermal parameters

Symbol	Parameter Value			Unit
В	R _{th(j-c)} Junction to case	Per diode	1	
□th(j-c)		Total	0.55	°C/W
R _{th(c)}	Coupling		0.1	

When the two diodes 1 and 2 are used simultaneously:

 $\Delta Tj(diode 1) = P (diode 1) X R_{th(j-c)} (Per diode) + P (diode 2) x R_{th(c)}$

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Тур.	Max.	Unit
ı (1)	I _R ⁽¹⁾ Reverse leakage current	T _j = 25 °C	$V_R = V_{RRM}$	-	-	50	μA
'R`		T _j = 125 °C		-	50	500	
		T _j = 25 °C	I _F = 50 A	-	-	1	
			I _F = 100 A	-	-	1.15	
V _F ⁽²⁾	Forward voltage drop	T _j = 125 °C	I _F = 100 A	-	0.90	1.0	V
		T 450.00	I _F = 50 A	-	0.72	0.80	
	T _j = 150 °C	I _F = 100 A	-	0.86	0.97		

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

To evaluate the conduction losses use the following equation:

$$P = 0.63 \times I_{F(AV)} + 0.0034 I_{F^{2}(RMS)}$$

^{2.} Pulse test: t_p = 380 μ s, δ < 2%

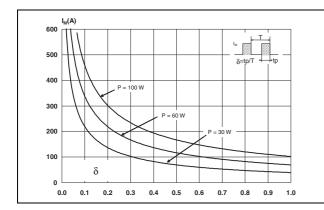
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Table 5. Dynamic characteristics

Symbol	Parameter	Test conditions	Min.	Тур.	Max.	Unit
		$I_F = 1 \text{ A, } dI_F/dt = -50 \text{ A/}\mu\text{s,}$ $V_R = 30 \text{ V, } T_j = 25 \text{ °C}$	1	53	65	ns
t _{rr}	Reverse recovery time	$I_F = 1 \text{ A, } dI_F/dt = -200 \text{ A/}\mu\text{s,}$ $V_R = 30 \text{ V, } T_j = 25 \text{ °C}$	ı	30	37	
I _{RM}	Reverse recovery current	$I_F = 50$ A, $dI_F/dt = 200$ A/ μ s, $V_R = 160$ V, $T_j = 125$ °C	1	10	13	Α
t _{fr}	Forward recovery time	$I_F = 50 \text{ A}, dI_F/dt = 200 \text{ A/}\mu\text{s}$ $V_{FR} = 1.1 \text{ x } V_{Fmax}, T_j = 25 \text{ °C}$	-	180	1	ns
V _{FP}	Forward recovery voltage	$I_F = 50 \text{ A, } dI_F/dt = 200 \text{ A/}\mu\text{s,}$ $T_j = 25 ^{\circ}\text{C}$	-	1.6	,	٧

Figure 1. Peak current versus duty cycle

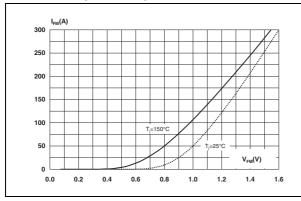
Figure 2. Forward voltage drop versus forward current (typical values, per diode)

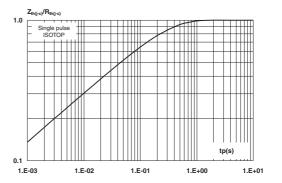


1_{FM}(A)
250
200
150
100
0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6

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

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

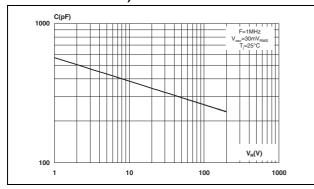




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Figure 5. Junction capacitance versus reverse applied voltage (typical values)

Figure 6. Reverse recovery charges versus dl_F/dt (typical values)



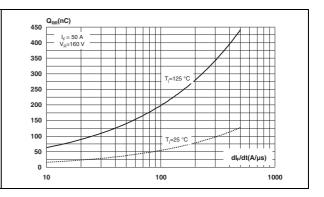
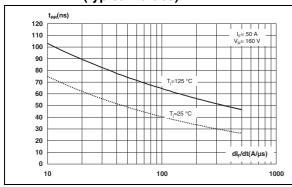


Figure 7. Reverse recovery time versus dI_F/dt Figure 8. Peak reverse recovery current (typical values)



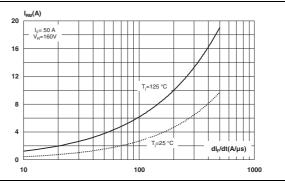
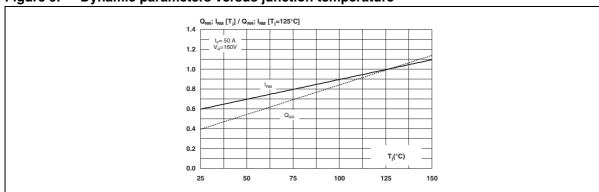
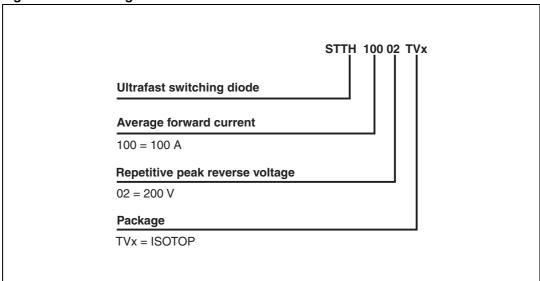


Figure 9. Dynamic parameters versus junction temperature



2 Ordering information scheme

Figure 10. Ordering information scheme

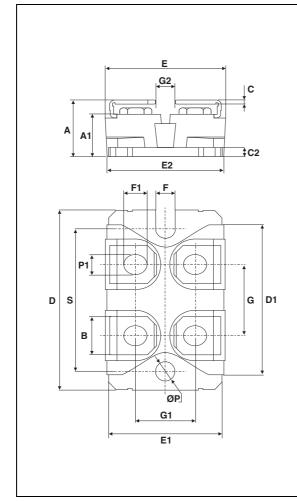


3 Package information

- 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. ECOPACK[®] is an ST trademark.

Table 6. ISOTOP dimensions



	Dimensions			
Ref.	Ref. Millimeters Min. Max.		Inches	
			Min.	Max.
Α	11.80	12.20	0.465	0.480
A1	8.90	9.10	0.350	0.358
В	7.8	8.20	0.307	0.323
С	0.75	0.85	0.030	0.033
C2	1.95	2.05	0.077	0.081
D	37.80	38.20	1.488	1.504
D1	31.50	31.70	1.240	1.248
Е	25.15	25.50	0.990	1.004
E1	23.85	24.15	0.939	0.951
E2	24.80 typ.		0.976 typ.	
G	14.90	15.10	0.587	0.594
G1	12.60	12.80	0.496	0.504
G2	3.50	4.30	0.138	0.169
F	4.10	4.30	0.161	0.169
F1	4.60	5.00	0.181	0.197
Р	4.00	4.30	0.157	0.69
P1	4.00	4.40	0.157	0.173
S	30.10	30.30	1.185	1.193

4 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty ⁽¹⁾	Delivery mode
STTH10002TV1	STTH10002TV1	ISOTOP	27 g	10	Tube
STTH10002TV2	STTH10002TV2	130101	21 g	with screws	Tube

^{1.} This product is supplied with 40 terminal screws and washers for each tube. The screws and washers are supplied in a separate pack with the order.

5 Revision history

Table 8. Document revision history

Date	Revision	Changes
05-Apr-2006	1	First issue
23-Oct-2012	2	Added UL file reference. Updated storage temperature range in <i>Table 2</i> . Added footnote to <i>Table 7</i> .

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