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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.

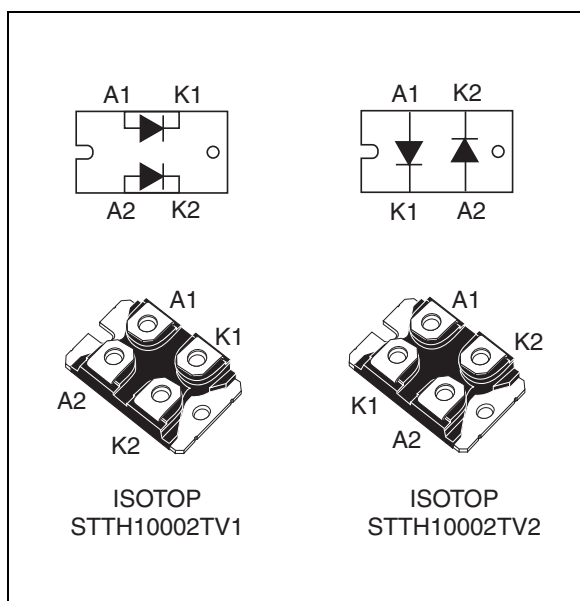


Table 1. Device summary

$I_{F(AV)}$	2 x 50 A
V_{RRM}	200 V
T_j (max)	150 °C
V_F (typ)	0.72 V
t_{rr} (typ)	30 ns

Characteristics

STTH10002

1 Characteristics

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

Symbol	Parameter		Value	Unit
V _{RRM}	Repetitive peak reverse voltage		200	V
I _{F(RMS)}	Forward rms current	Per diode	150	A
I _{F(AV)}	Average forward current, δ = 0.5	Per diode T _c = 100 °C	50	A
		Per device T _c = 95 °C		
I _{FSM}	Surge non repetitive forward current	t _p = 10 ms sinusoidal	750	A
T _{stg}	Storage temperature range		-55 to + 150	°C
T _j	Maximum operating junction temperature		150	°C

Table 3. Thermal parameters

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

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 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I _R ⁽¹⁾	Reverse leakage current	T _j = 25 °C	V _R = V _{RRM}	-	-	50	μA
		T _j = 125 °C		-	50	500	
V _F ⁽²⁾	Forward voltage drop	T _j = 25 °C	I _F = 50 A	-	-	1	V
			I _F = 100 A	-	-	1.15	
		T _j = 125 °C	I _F = 100 A	-	0.90	1.0	
			I _F = 50 A	-	0.72	0.80	
T _j = 150 °C	I _F = 50 A	-	0.72	0.80			
	I _F = 100 A	-	0.86	0.97			

1. Pulse test: t_p = 5 ms, δ < 2%

2. Pulse test: t_p = 380 μs, δ < 2%

To evaluate the conduction losses use the following equation:

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

STTH10002

Characteristics

Table 5. Dynamic characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	$I_F = 1\text{ A}$, $di_F/dt = -50\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$, $T_j = 25\text{ }^\circ\text{C}$	-	53	65	ns
		$I_F = 1\text{ A}$, $di_F/dt = -200\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$, $T_j = 25\text{ }^\circ\text{C}$	-	30	37	
I_{RM}	Reverse recovery current	$I_F = 50\text{ A}$, $di_F/dt = 200\text{ A}/\mu\text{s}$, $V_R = 160\text{ V}$, $T_j = 125\text{ }^\circ\text{C}$	-	10	13	A
t_{fr}	Forward recovery time	$I_F = 50\text{ A}$, $di_F/dt = 200\text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \times V_{Fmax}$, $T_j = 25\text{ }^\circ\text{C}$	-	180	-	ns
V_{FP}	Forward recovery voltage	$I_F = 50\text{ A}$, $di_F/dt = 200\text{ A}/\mu\text{s}$, $T_j = 25\text{ }^\circ\text{C}$	-	1.6	-	V

Figure 1. Peak current versus duty cycle

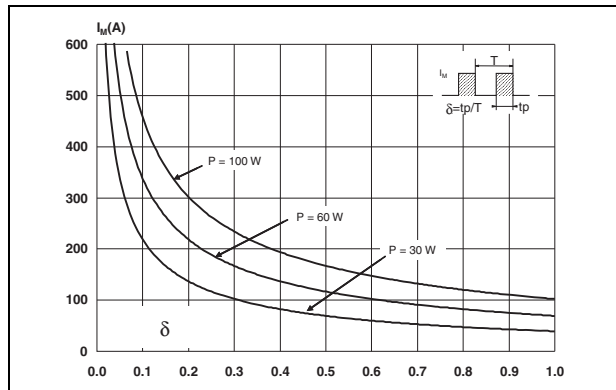


Figure 2. Forward voltage drop versus forward current (typical values, per diode)

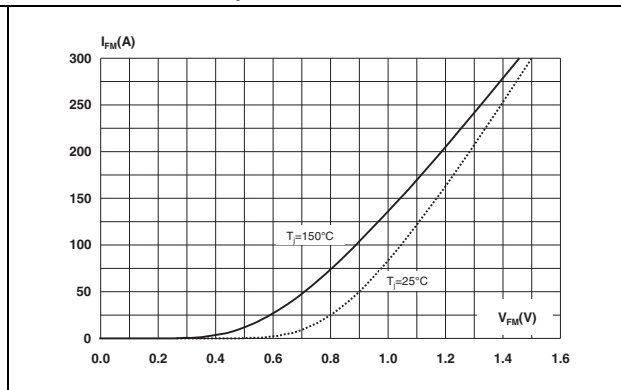


Figure 3. Forward voltage drop versus forward current (maximum values, per diode)

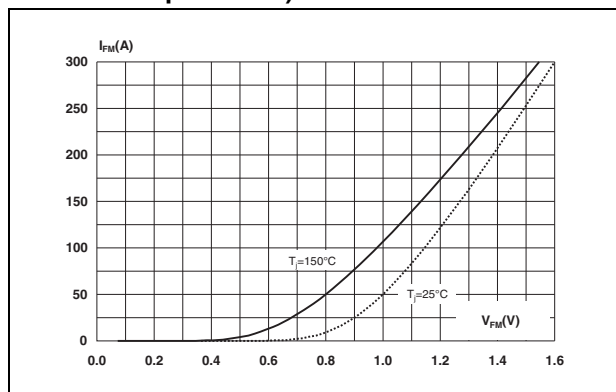
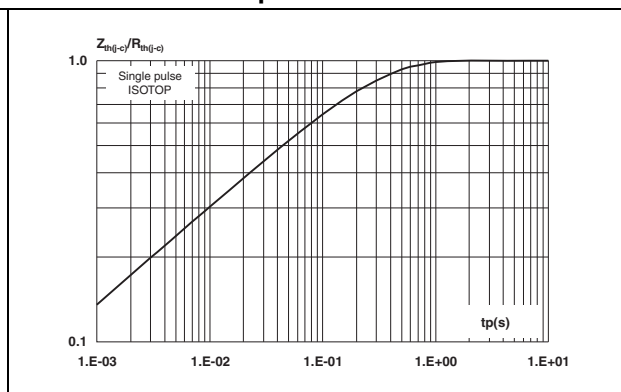


Figure 4. Relative variation of thermal impedance, junction to case, versus pulse duration



Characteristics

STTH10002

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

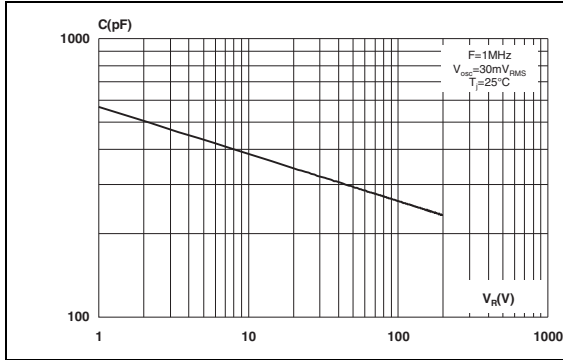


Figure 6. Reverse recovery charges versus di_F/dt (typical values)

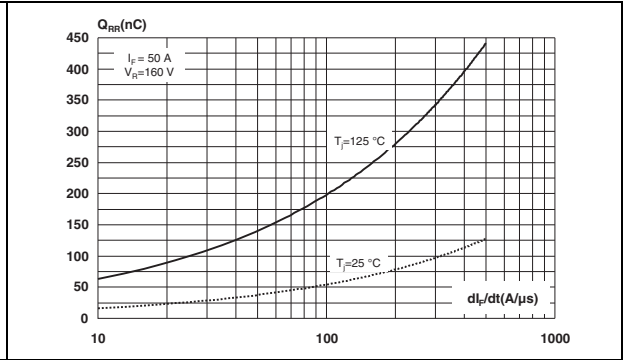


Figure 7. Reverse recovery time versus di_F/dt (typical values)

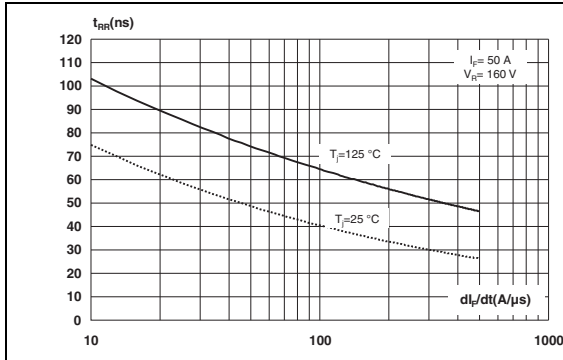


Figure 8. Peak reverse recovery current versus di_F/dt (typical values)

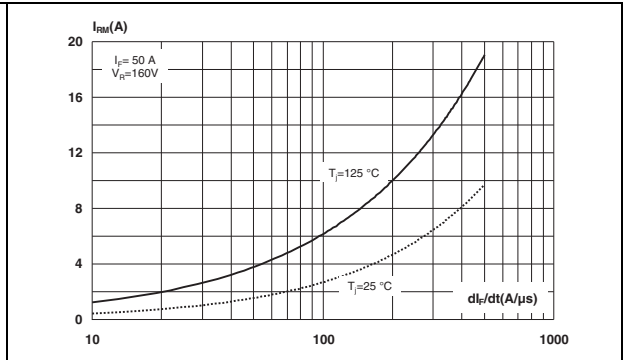
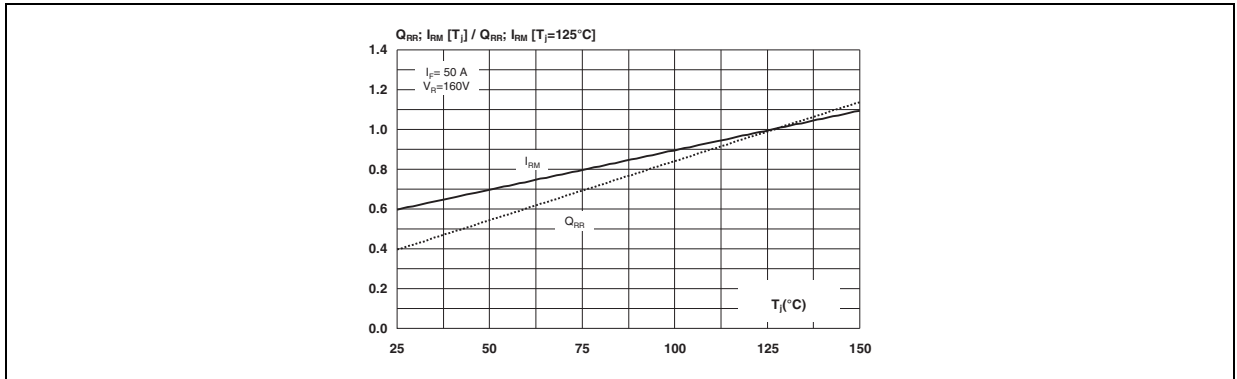
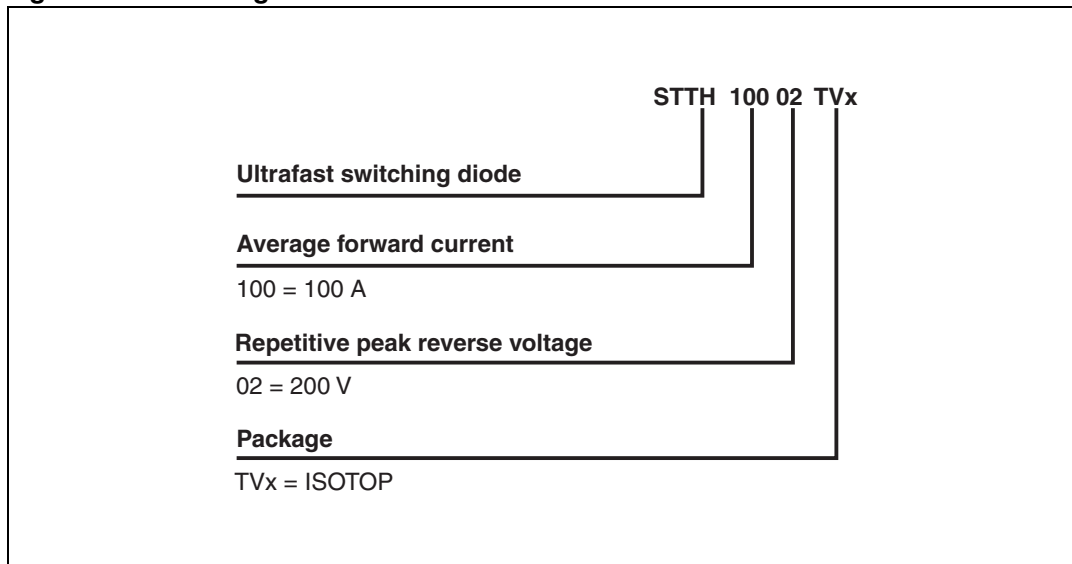


Figure 9. Dynamic parameters versus junction temperature



2 Ordering information scheme

Figure 10. Ordering information scheme



3 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)

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Table 6. ISOTOP dimensions

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	11.80	12.20	0.465	0.480
A1	8.90	9.10	0.350	0.358
B	7.8	8.20	0.307	0.323
C	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
E	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
P	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

STTH10002

Ordering information

4 Ordering information

Table 7. Ordering information

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

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 Table 2 . Added footnote to Table 7 .

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