STTH10002

Ultrafast recovery diode

Datasheet – production data

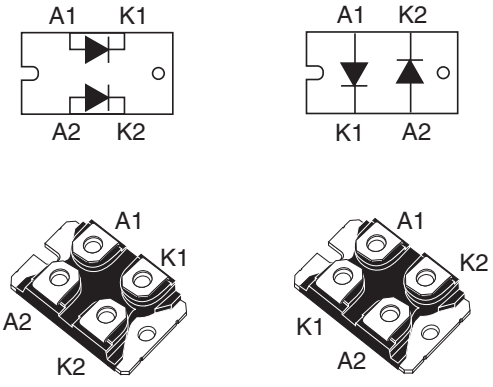
Features

- 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.



ISOTOP
STTH10002TV1

ISOTOP
STTH10002TV2

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

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:

ΔTj(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.	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	
		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:
$P = 0.63 \times I_{F(AV)} + 0.0034\ I_F{}^2{}_{(RMS)}$

Table 5. Dynamic characteristics

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

Figure 1. Peak current versus duty cycle

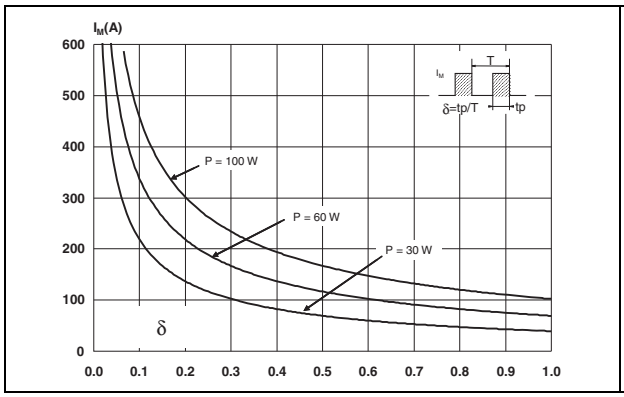


Figure 2. Forward voltage drop versus forward current (typical values, per diode)

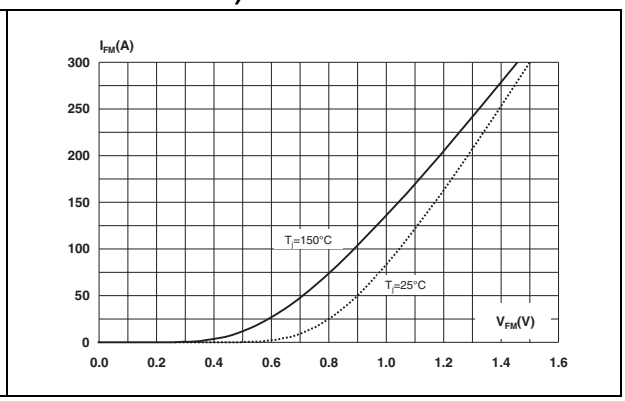


Figure 3. Forward voltage drop versus forward current (maximum values, per diode)

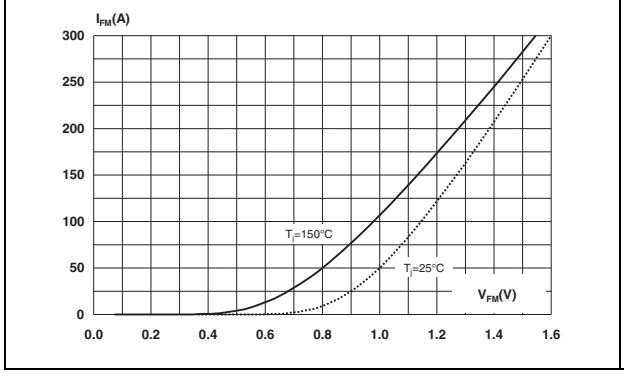


Figure 4. Relative variation of thermal impedance, junction to case, versus pulse duration

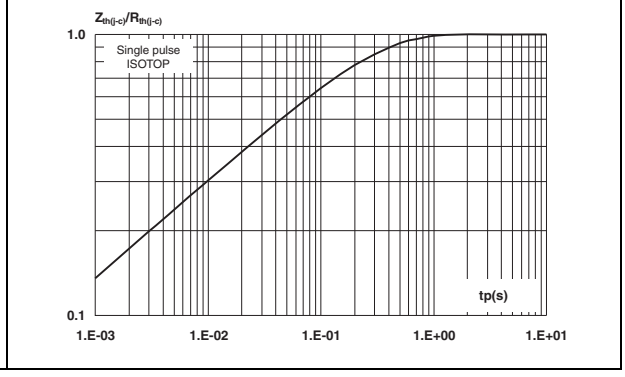


Figure 5. Junction capacitance versus reverse applied voltage (typical values)

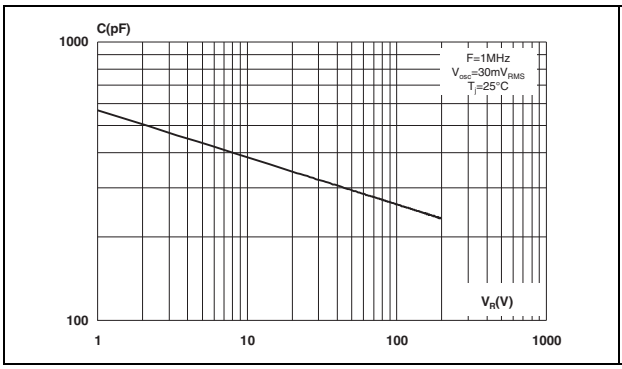


Figure 6. Reverse recovery charges versus dI_F/dt (typical values)

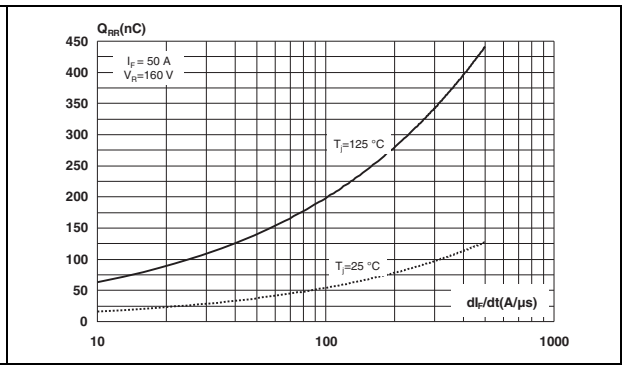


Figure 7. Reverse recovery time versus dI_F/dt (typical values)

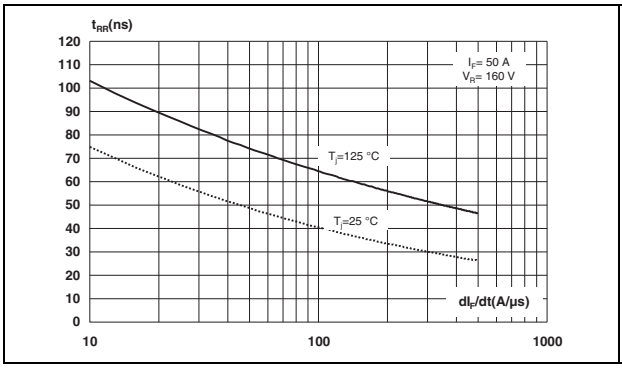


Figure 8. Peak reverse recovery current versus dI_F/dt (typical values)

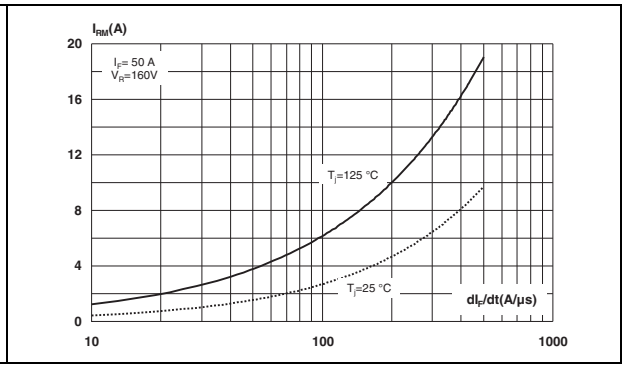
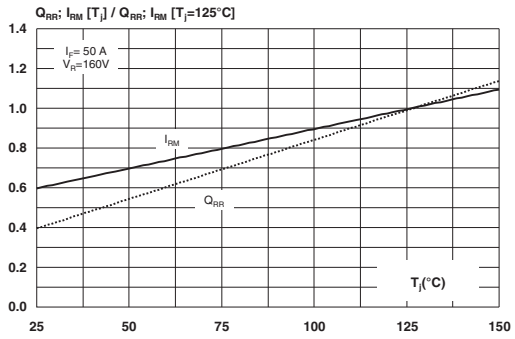
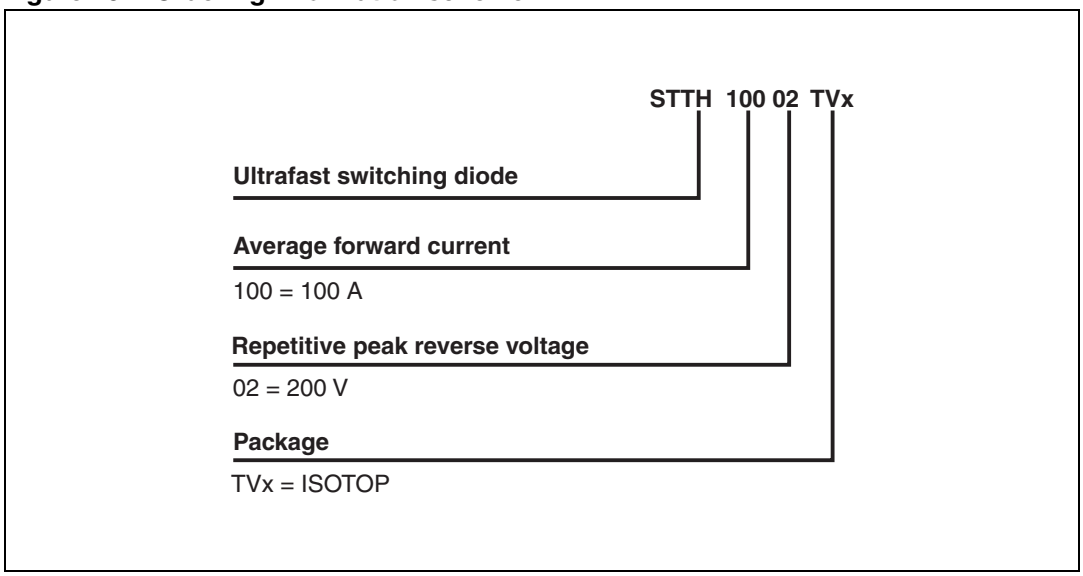


Figure 9. Dynamic parameters versus junction temperature



2 Ordering information scheme

Figure 10. Ordering information scheme

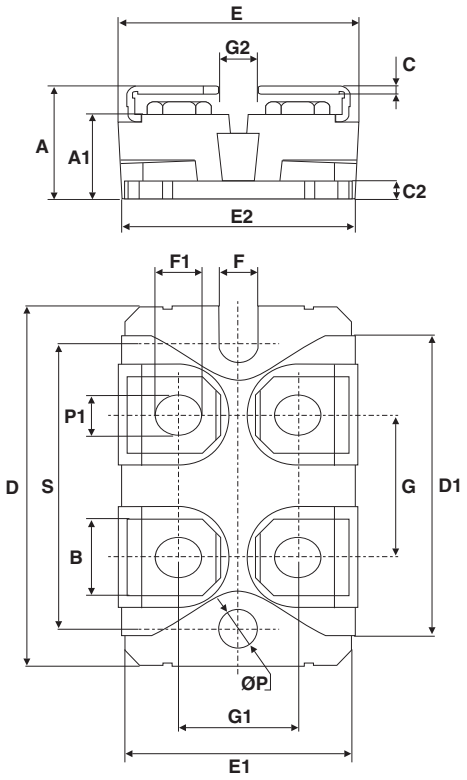


3 Package information

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

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



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

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*.