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STTH200L04TV1

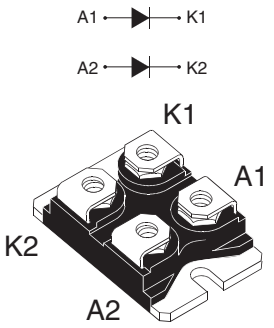
Ultrafast high voltage rectifier

Features

- Ultrafast switching
- Low reverse current
- Low thermal resistance
- Reduces switching and conduction losses
- Package insulation voltage: 2500 V_{RMS}

Description

The STTH200L04TV1 uses ST 400 V technology and is specially suited for use in switching power supplies, welding equipment, and industrial applications, as an output rectification diode.



ISOTOP
STTH200L04TV1

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	up to 2 x 120 A
V_{RRM}	400 V
T_j (max)	150 °C
V_F (typ)	0.83 V
t_{rr} (max)	50 ns

1 Characteristics

Table 2. Absolute ratings (limiting values, per diode)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			400	V
$I_{F(RMS)}$	Forward rms current			200	A
$I_{F(AV)}$	Average forward current	T_c = 90 °C δ = 0.5	Per diode	100	A
		T_c = 73 °C δ = 0.5	Per diode	120	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal		900	A
T_{stg}	Storage temperature range			-55 to + 150	°C
T_j	Maximum operating junction temperature			150	°C

Table 3. Thermal resistance

Symbol	Parameter		Value (max).	Unit
$R_{th(j-c)}$	Junction to case	Per diode	0.50	°C/W
		Total	0.30	
$R_{th(c)}$	Coupling		0.10	

When diodes 1 and 2 are used simultaneously:
Δ 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 (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$			100	µA
		T_j = 125 °C			100	1000	
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 100 A			1.2	V
		T_j = 150 °C			0.83	1.0	

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:
$P = 0.8 \times I_{F(AV)} + 0.002\ I_F{}^2{}_{(RMS)}$

Table 5. Dynamic characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	T_j = 25 °C	I_F = 1 A dI_F/dt = 50 A/µs V_R = 30 V		75	100	ns
			I_F = 1 A dI_F/dt = 200 A/µs V_R = 30 V		45	60	
I_{RM}	Reverse recovery current	T_j = 125 °C	I_F = 100 A V_R = 200 V dI_F/dt = 100 A/µs			18	A
S_{factor}	Softness factor	T_j = 125 °C	I_F = 100 A V_R = 200 V dI_F/dt = 100 A/µs		0.4		
t_{fr}	Forward recovery time	T_j = 25 °C	I_F = 100 A dI_F/dt = 200 A/µs V_{FR} = 1.1 x V_{Fmax}			800	ns
V_{FP}	Forward recovery voltage	T_j = 25 °C	I_F = 100 A dI_F/dt = 200 A/µs V_{FR} = 1.1 x V_{Fmax}		2.6		V

Figure 1. Conduction losses versus average forward current (per diode)

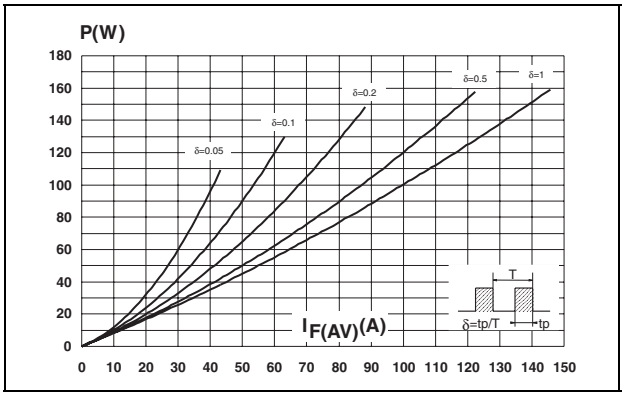


Figure 2. Forward voltage drop versus forward current (per diode)

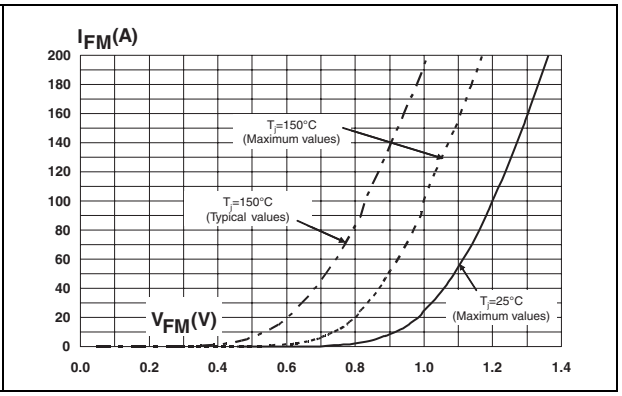


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

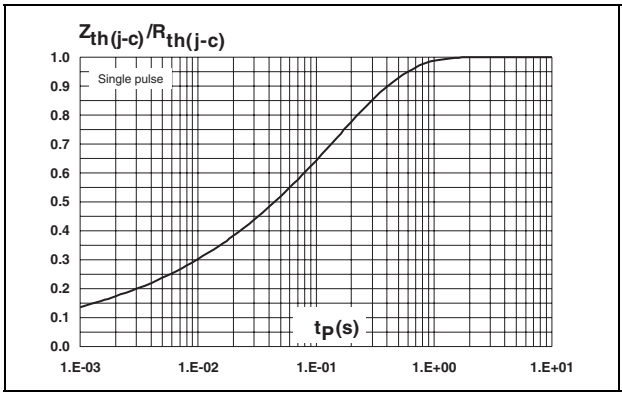


Figure 4. Peak reverse recovery current versus dI_F/dt (typical values, per diode)

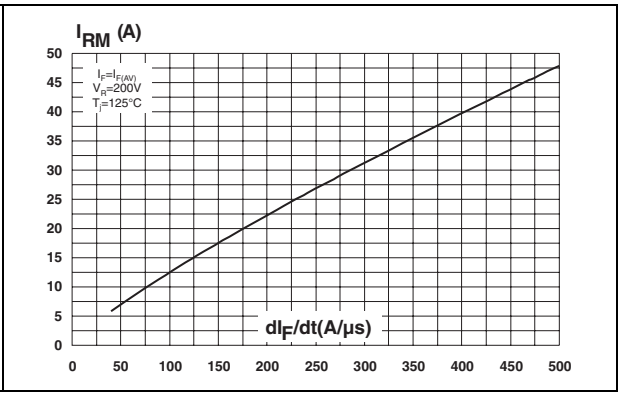


Figure 5. Reverse recovery time versus dI_F/dt (typical values, per diode)

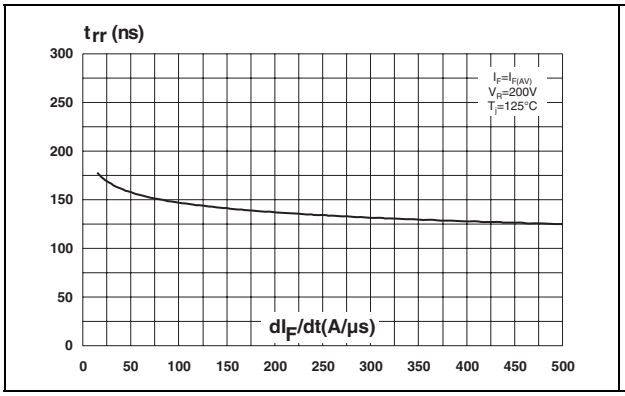


Figure 6. Reverse recovery charges versus dI_F/dt (typical values, per diode)

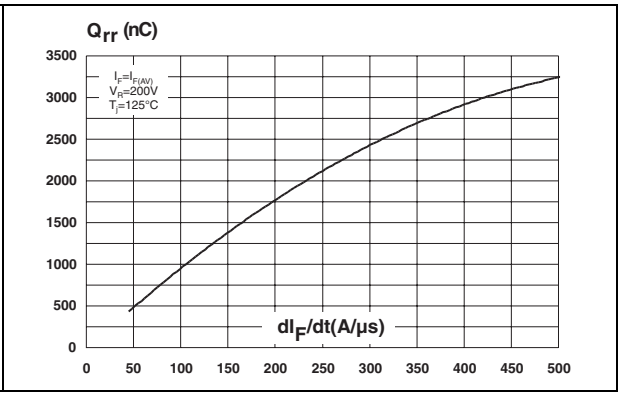


Figure 7. Reverse recovery softness factor versus dI_F/dt (typical values, per diode)

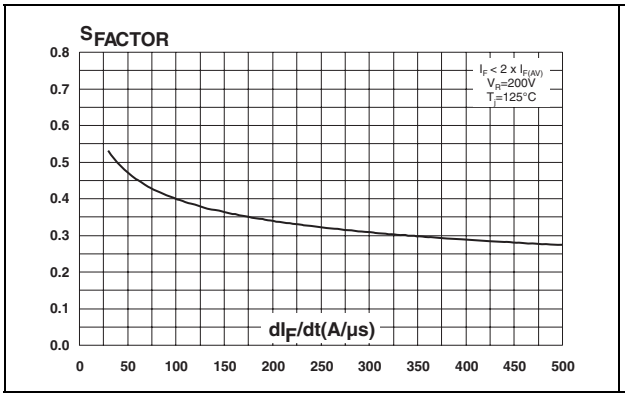


Figure 8. Relative variations of dynamic parameters versus junction temperature

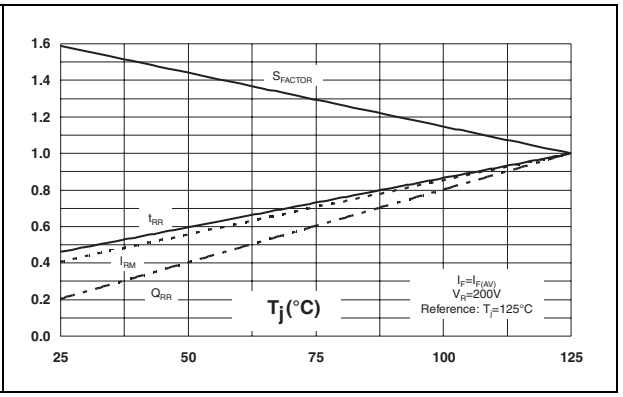


Figure 9. Transient peak forward voltage versus dI_F/dt (typical values, per diode)

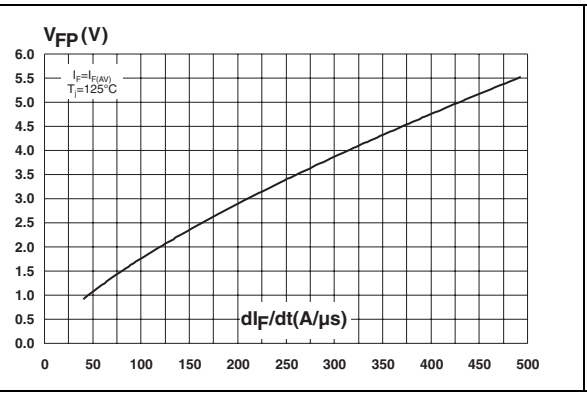


Figure 10. Forward recovery time versus dI_F/dt (typical values, per diode)

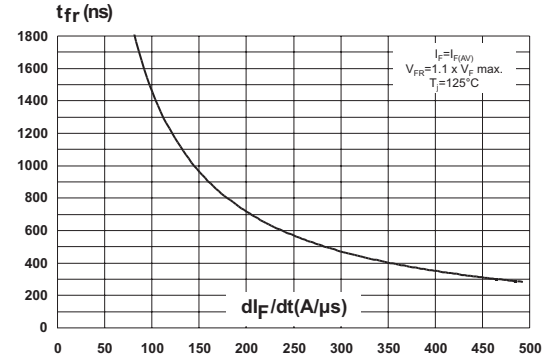
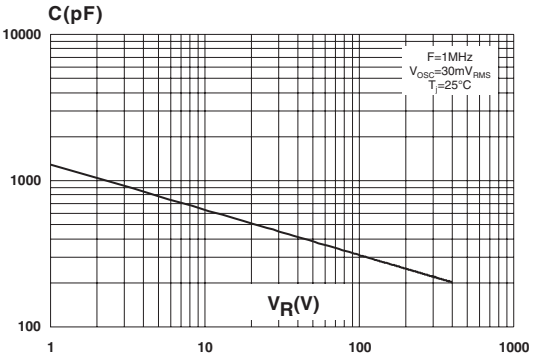


Figure 11. Junction capacitance versus reverse voltage applied (typical values, per diode)



2 Package information

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

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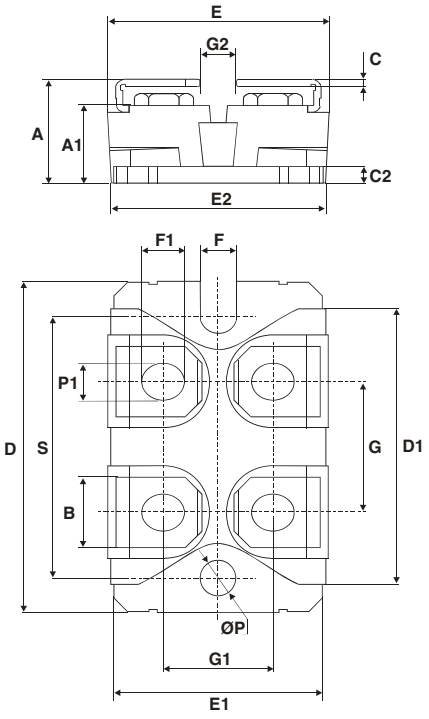
Table 6. ISOTOP dimensions



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

3 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH200L04TV1	STTH200L04TV1	ISOTOP	27 g (without screws)	10 (with screws)	Tube

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
11-Aug-2006	1	First issue.
05-Sep-2011	2	Changed value of R_d to 0.002 in the conduction losses equation above *Table 4*. Reformatted to current standards.

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