

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.

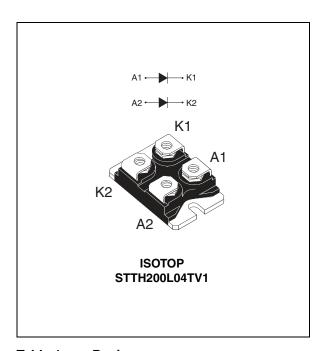


Table 1. Device summary

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

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

Symbol	Param	Value	Unit		
V _{RRM}	Repetitive peak reverse voltage	400	V		
I _{F(RMS)}	Forward rms current			200	Α
	Average forward current	$T_c = 90 ^{\circ}\text{C} \delta = 0.5$	Per diode	100	Α
'F(AV)	I _{F(AV)} Average forward current	$T_c = 73$ °C $\delta = 0.5$	Per diode	120	A
I _{FSM}	Surge non repetitive forward current	repetitive forward $t_p = 10 \text{ ms sinusoidal}$			Α
T _{stg}	Storage temperature range	-55 to + 150	°C		
Tj	Maximum operating junction temperature			150	°C

Table 3. Thermal resistance

Symbol	Parameter	Parameter Value (max).				
R _{th(j-c)} Junction to case		er diode	0.50			
	Total	tal	0.30	°C/W		
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.	Тур.	Max.	Unit
I _R ⁽¹⁾	Reverse leakage	T _j = 25 °C	$V_R = V_{RRM}$			100	μA
'R'	'R`´ current	T _j = 125 °C	VR - VRRM		100	1000	μΛ
V _E (2)	V _E ⁽²⁾ Forward voltage drop	T _j = 25 °C I _F = 100 A			1.2	V	
VF` ′	Polward voitage drop	T _j = 150 °C	IF = 100 A		0.83	1.0	V

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

To evaluate the conduction losses use the following equation:

$$P = 0.8 \text{ x } I_{F(AV)} + 0.002 I_{F^2(RMS)}$$

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^{2.} Pulse test: $t_p = 380 \mu s$, $\delta < 2\%$

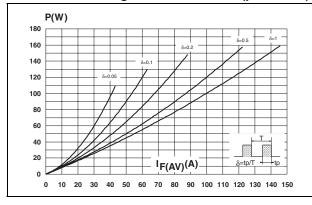
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Table 5. Dynamic characteristics (per diode)

Symbol	Parameter		Min.	Тур.	Max.	Unit	
	Reverse recovery		$I_F = 1 \text{ A} dI_F/dt = 50 \text{ A/}\mu\text{s}$ $V_R = 30 \text{ V}$		75	100	ns
t _{rr}	time	1, - 23 0	$I_F = 1 \text{ A} dI_F/dt = 200 \text{ A/}\mu\text{s}$ $V_R = 30 \text{ V}$		45	60	113
I _{RM}	Reverse recovery current	T _j = 125 °C	$I_F = 100 \text{ A}$ $V_R = 200 \text{ V}$ $dI_F/dt = 100 \text{ A}/\mu\text{s}$			18	Α
S _{factor}	Softness factor	T _j = 125 °C	$I_F = 100 \text{ A}$ $V_R = 200 \text{ V}$ $dI_F/dt = 100 \text{ A}/\mu\text{s}$		0.4		
t _{fr}	Forward recovery time	T _j = 25 °C	$I_F = 100 \text{ A}$ $dI_F/dt = 200 \text{ A}/\mu\text{s}$ $V_{FR} = 1.1 \text{ x } V_{Fmax}$			800	ns
V _{FP}	Forward recovery voltage	T _j = 25 °C	$I_F = 100 \text{ A}$ V_{Fmax} V_{Fmax}		2.6		V

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

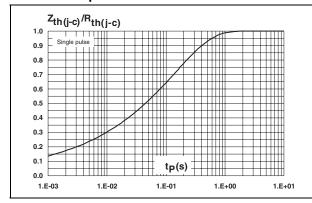
Figure 2. Forward voltage drop versus forward current (per diode)

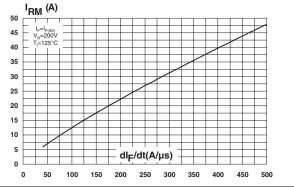


I_{FM}(A) 180 160 T_j=150°C (Maximum values) 140 120 100 40 20 $V_{FM}(V)$ 0.0 0.2 0.4 0.6 0.8 1.0 1.2

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

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





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

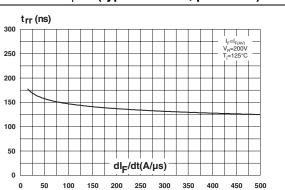


Figure 6. Reverse recovery charges versus dl_F/dt (typical values, per diode)

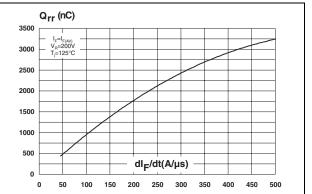
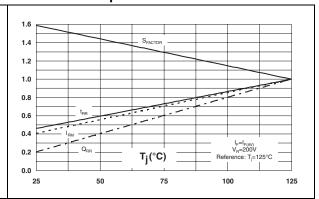


Figure 7. Reverse recovery softness factor versus dl_F/dt (typical values, per diode)

SFACTOR 0.8 I_F < 2 x I_{F(AV)} V_R=200V T_j=125°C 0.7 0.6 0.5 0.4 0.3 0.2 0.1 dl_F/dt(A/μs) 0.0 0 50 250 350 500 100 150 200 300 400 450

Figure 8. Relative variations of dynamic parameters versus junction temperature

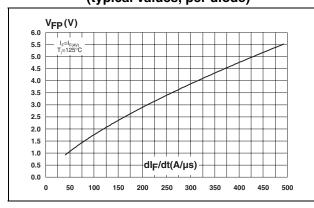


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Figure 9. Transient peak forward voltage versus dl_F/dt (typical values, per diode)

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



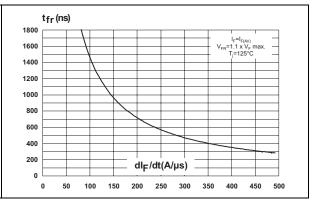
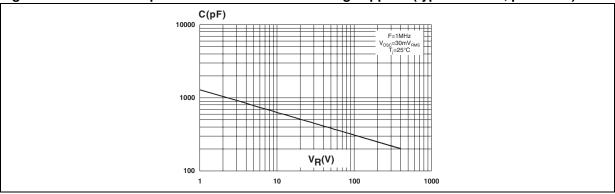


Figure 11. Junction capacitance versus reverse voltage applied (typical values, per diode)

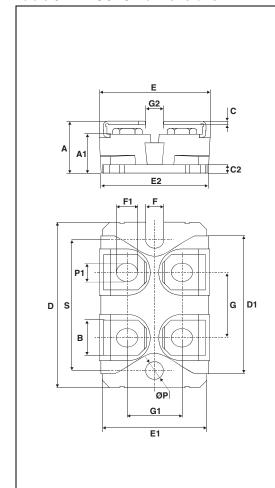


2 Package information

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

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.	Millimeters Min. Max.		Inc	hes	
			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.		0.97	6 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	

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 $R_{\rm d}$ to 0.002 in the conduction losses equation above <i>Table 4</i> . Reformatted to current standards.

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