

## **STTH200L04TV1**

## Ultrafast high voltage rectifier

#### Mian product characteristics

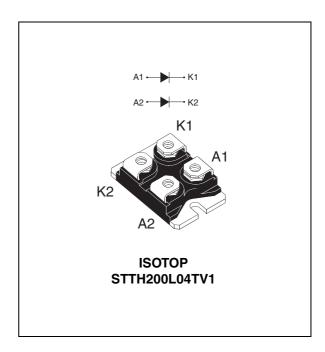
I <sub>F(AV)</sub>	up to 2 x 120 A
V <sub>RRM</sub>	400 V
T <sub>j</sub> (max)	150° C
V <sub>F</sub> (typ)	0.83 V
t <sub>rr</sub> (max)	50 ns

#### Features and benefits

- Ultrafast switching
- Low reverse current
- Low thermal resistance
- Reduces switching and conduction losses
- Package insulation voltage: 2500 V<sub>RMS</sub>

#### **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.



#### **Order codes**

Part number	Marking
STTH200L04TV1	STTH200L04TV1

Table 1. Absolute ratings (limiting values, per diode)

Symbol	Parai	Value	Unit			
V <sub>RRM</sub>	Repetitive peak reverse voltage			400	V	
I <sub>F(RMS)</sub>	RMS forward current	200	Α			
	Average femore gurrent	$T_c = 90^{\circ} \text{ C } \delta = 0.5$	Per diode	100	Α	
<sup>I</sup> F(AV)	Average forward current	$T_c = 73^{\circ} \text{ C } \delta = 0.5$	Per diode	120	^	
I <sub>FSM</sub>	Surge non repetitive forward current	t <sub>p</sub> = 10 ms sinusoidal		900	Α	
T <sub>stg</sub>	Storage temperature range			-55 to + 150	° C	
T <sub>j</sub>	Maximum operating junction temperature			150	° C	

Characteristics STTH200L04TV1

### 1 Characteristics

Table 2. Thermal resistance

Symbol	Parameter		Value (max).	Unit
В	lunation to coop	Per diode	0.50	
R <sub>th(j-c)</sub>	Junction to case Total		0.30	°C/W
R <sub>th(c)</sub>	Coupling		0.10	

When diodes 1 and 2 are used simultaneously:

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

Table 3. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Тур	Max.	Unit	
I <sub>R</sub> <sup>(1)</sup>	Reverse leakage		T <sub>j</sub> = 25° C			100	μА	
'R`	current	T <sub>j</sub> = 125° C	$V_{R} = V_{RRM}$	VR = VRRM		100	1000	μΑ
V_(2)	$V_F^{(2)}$ Forward voltage drop $T_j = 25^{\circ} \text{ C}$ $T_j = 150^{\circ} \text{ C}$	T <sub>j</sub> = 25° C	—— I⊏ = 100 A			1.2	V	
VF` ′		T <sub>j</sub> = 150° C			0.83	1.0	V	

<sup>1.</sup> Pulse test:  $t_p = 5$  ms,  $\delta < 2\%$ 

To evaluate the conduction losses use the following equation:

 $P = 0.8 \times I_{F(AV)} + 0.0033 I_{F^2(RMS)}$ 

Table 4. Dynamic characteristics (per diode)

Symbol	Parameter	Test conditions			Тур	Max	Unit
+	Reverse recovery $T_i = 25^{\circ} \text{ C}$		$I_F = 1 \text{ A}  dI_F/dt = 50 \text{ A/}\mu\text{s}$ $V_R = 30 \text{ V}$		75	100	ns
t <sub>rr</sub>	une	,	$I_F = 1 \text{ A}  dI_F/dt = 200 \text{ A/}\mu\text{s}$ $V_R = 30 \text{ V}$		45	60	120
I <sub>RM</sub>	Current	-	$I_F = 100 \text{ A}$ $V_R = 200 \text{ V}$ $dI_F/dt = 100 \text{ A}/\mu\text{s}$			18	Α
S <sub>factor</sub>	Softness factor	T <sub>j</sub> = 125° C	$I_F = 100 \text{ A}$ $V_R = 200 \text{ V}$ $dI_F/dt = 100 \text{ A}/\mu\text{s}$		0.4		
t <sub>fr</sub>	Forward recovery time	T <sub>j</sub> = 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 <sub>FP</sub>	Forward recovery voltage	T <sub>j</sub> = 25° C	$I_F = 100 \text{ A}$ $V_{Fmax}$ $V_{Fmax}$		2.6		V

<sup>2.</sup> Pulse test:  $t_p = 380 \mu s$ ,  $\delta < 2\%$ 

STTH200L04TV1 Characteristics

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

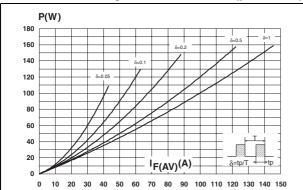


Figure 2. Forward voltage drop versus forward current (per diode)

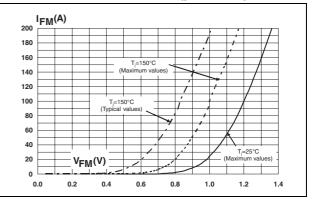


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

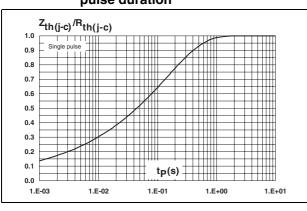


Figure 4. Peak reverse recovery current versus dl<sub>F</sub>/dt (typical values, per diode)

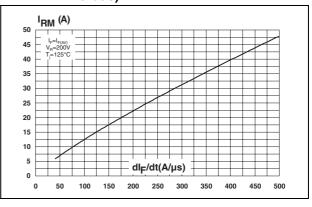


Figure 5. Reverse recovery time versus dl<sub>-</sub>/dt (typical values, per diode)

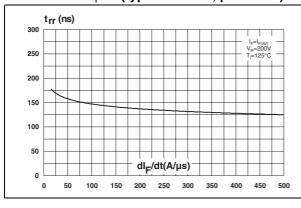
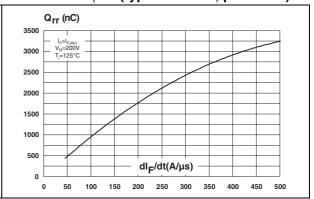


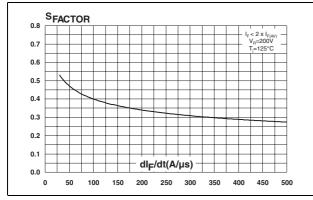
Figure 6. Reverse recovery charges versus dl<sub>F</sub>/dt (typical values, per diode)



Characteristics STTH200L04TV1

Figure 7. Reverse recovery softness factor versus dl<sub>F</sub>/dt (typical values, per diode)

Figure 8. Relative variations of dynamic parameters versus junction temperature



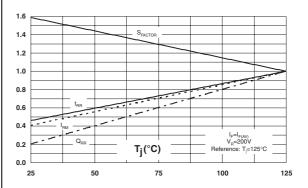
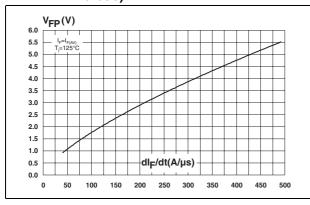


Figure 9. Transient peak forward voltage versus dl<sub>F</sub>/dt (typical values, per diode)

Figure 10. Forward recovery time versus dI<sub>F</sub>/dt (typical values, per diode)



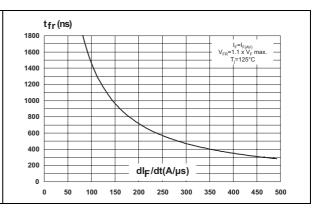
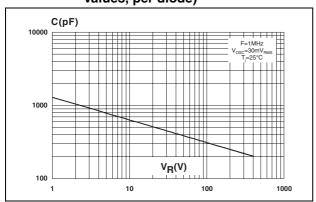


Figure 11. Junction capacitance versus reverse voltage applied (typical values, per diode)



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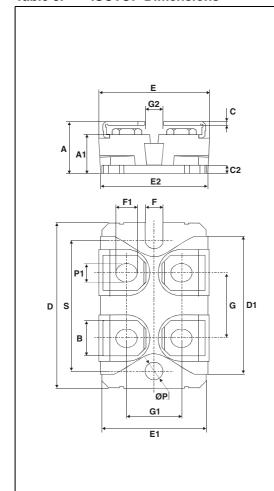
STTH200L04TV1 Package information

## 2 Package information

Epoxy meets UL94, V0

Cooling method: by conduction (C)

Table 5. ISOTOP Dimensions



Ref.	Millimeters		Inc	hes	
	Min.	Max.	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	0 typ.	0.976 typ.		
G	14.90	15.10	0.587	0.594	
G1	12.60	12.80	0.496	0.504	
G2	G2 3.50 F 4.10 F1 4.60 P 4.00		0.138	0.169	
F			0.161	0.169	
F1			0.181	0.197	
Р			0.157	0.69	
P1	4.00	4.40	0.157	0.173	
S	30.10	30.30	1.185	1.193	

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Ordering information STTH200L04TV1

# 3 Ordering information

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

# 4 Revision history

Date	Revision	Description of Changes
11-Aug-2006	1	First issue

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