

STTH200L04TV1

Ultrafast high voltage rectifier

Mian product characteristics

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

Features and benefits

- 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.



Order codes

Part number	Marking
STTH200L04TV1	STTH200L04TV1

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

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

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Table 2. Thermal resistance

Symbol	Parameter		Value (max).	Unit
В	lunation to coop	Per diode	0.50	
R _{th(j-c)}	Junction to case Total		0.30	°C/W
R _{th(c)}	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 _R ⁽¹⁾	Reverse leakage		T _j = 25° C			100	μА	
'R`	current	T _j = 125° C	$V_{R} = V_{RRM}$	VR = VRRM		100	1000	μΑ
V _E (2)	V (2) Farward valtage drap	T _j = 25° C	I⊏ = 100 A			1.2	V	
VF` ′	Forward voltage drop	T _j = 150° C			0.83	1.0	V	

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

To evaluate the conduction losses use the following equation:

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

Table 4. Dynamic characteristics (per diode)

Symbol	Parameter	Test conditions			Тур	Max	Unit
+	Beverse 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}	une	,	$I_F = 1 \text{ A} dI_F/dt = 200 \text{ A/}\mu\text{s}$ $V_R = 30 \text{ V}$		45	60	120
I _{RM}	Current	-	$I_F = 100 \text{ A}$ $V_R = 200 \text{ V}$ $dI_F/dt = 100 \text{ A}/\mu\text{s}$			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

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

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

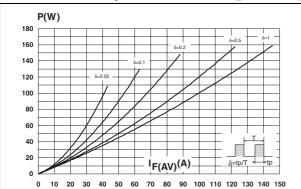


Figure 2. Forward voltage drop versus forward current (per diode)

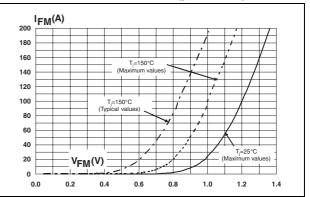


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

Zth(j-c) /Rth(j-c)

1.0

0.9

0.8

0.7

0.6

0.5

0.4

0.3

0.2

0.1

0.0

1.E-03

1.E-02

1.E-01

1.E+00

1.E+01

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

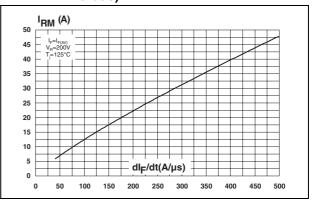


Figure 5. Reverse recovery time versus dl₋/dt (typical values, per diode)

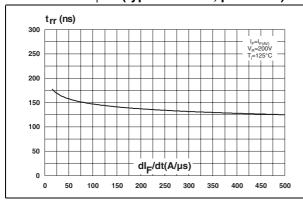
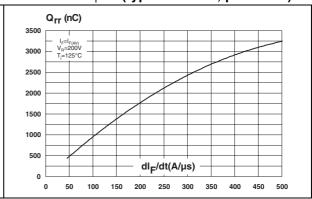


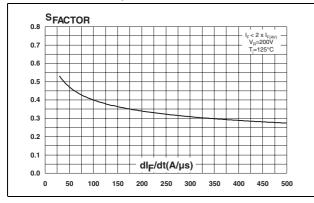
Figure 6. Reverse recovery charges versus dl_F/dt (typical values, per diode)



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

Figure 8. Relative variations of dynamic parameters versus junction temperature



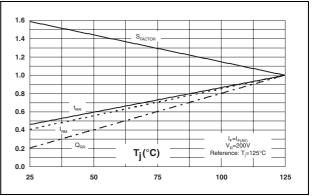
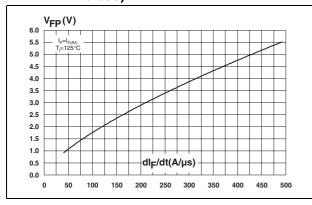


Figure 9. Transient peak forward voltage versus dl_F/dt (typical values, per diode)

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



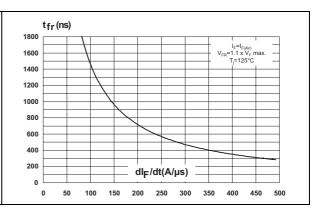
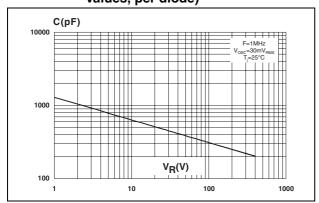


Figure 11. Junction capacitance versus reverse voltage applied (typical values, per diode)



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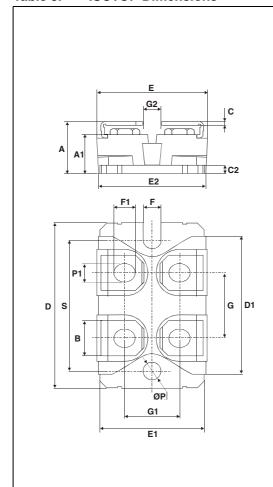
STTH200L04TV1 Package information

2 Package information

Epoxy meets UL94, V0

Cooling method: by conduction (C)

Table 5. ISOTOP Dimensions



	Dimensions						
Ref.	Millimeters		Inc	nes			
	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	O 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 4.30 F 4.10 4.30 F1 4.60 5.00 P 4.00 4.30 P1 4.00 4.40		0.138	0.169			
F			0.161	0.169			
F1			0.181	0.197			
Р			0.157	0.69			
P1			0.157	0.173			
S	30.10	30.30	1.185	1.193			

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

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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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