

STTH6112TV

Ultrafast recovery - 1200 V diode

Main product characteristics

I _{F(AV)}	2 x 30 A
V _{RRM}	1200 V
Tj	150° C
V _F (typ)	1.30 V
t _{rr} (typ)	45 ns

Features and benefits

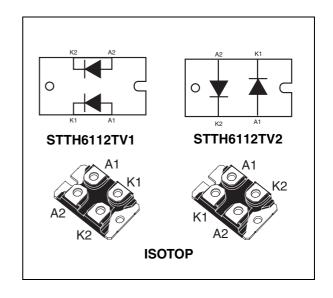
- Ultrafast, soft recovery
- Very low conduction and switching losses
- High frequency and/or high pulsed current operation
- High reverse voltage capability
- High junction temperature
- Insulated package: Electrical insulation = 2500 V_{RMS} Capacitance < 45 pF

Description

The high quality design of this diode has produced a device with low leakage current, regularly reproducible characteristics and intrinsic ruggedness. These characteristics make it ideal for heavy duty applications that demand long term reliability.

Such demanding applications include industrial power supplies, motor control, and similar mission-critical systems that require rectification and freewheeling. These diodes also fit into auxiliary functions such as snubber, bootstrap, and demagnetization applications.

The improved performance in low leakage current, and therefore thermal runaway guard band, is an immediate competitive advantage for this device.



Order codes

Part Number	Marking
STTH6112TV1	STTH6112TV1
STTH6112TV2	STTH6112TV2

Characteristics STTH6112TV

1 Characteristics

Table 1. Absolute ratings (limiting values per diode at 25° C, unless otherwise specified)

Symbol	Parameter			Value	Unit
V _{RRM}	Repetitive peak reverse voltage			1200	V
I _{F(RMS)}	RMS forward current			100	Α
I _{F(AV)}	Average forward current, $\delta = 0.5$		T _c = 70° C per diode	30	Α
I _{FRM}	Repetitive peak forward current	$t_p = 5 \mu s$, $F = 5 kHz sq$	300	Α	
I _{FSM}	Surge non repetitive forward current	t _p = 10 ms Sinusoidal	250	Α	
T _{stg}	Storage temperature range			-65 to + 150	°C
T _j	Maximum operating junction temperature			150	°C

Table 2. Thermal parameters

Symbol	Parameter		Value	Unit
D	Junction to case	Per diode	1.16	
' 'th(j-c)	R _{th(j-c)} Junction to case		0.63	°C/W
R _{th(c)}	Coupling thermal resistance		0.1	

When the diodes are used simultaneously: $\Delta T_{j(diode1)} = P_{(diode1)} \ x \ R_{th(j\text{-}c)} \ (\text{per diode}) + P_{(diode2)} \ x \ R_{th(c)}$

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Тур	Max.	Unit
I _B ⁽¹⁾	Reverse leakage current	T _j = 25° C	V - V			20	
'R`	neverse leakage current	T _j = 125° C	$V_R = V_{RRM}$		15	150	μA
	$V_F^{(2)}$ Forward voltage drop $ T_j = 150^{\circ} C $ $ T_j = 25^{\circ} C $				2.10		
		T _j = 125° C	I _F = 25 A		1.25	1.90	
V (2)		T _j = 150° C			1.20	1.80	V
V _F ` ′		T _j = 25° C				2.25	V
		T _j = 125° C	I _F = 30 A		1.35	2.05	
		T _j = 150° C			1.30	1.95	

^{1.} Pulse test: t_p = 5 ms, δ < 2 %

To evaluate the conduction losses use the following equation:

$$P = 1.60 \text{ x } I_{F(AV)} + 0.012 I_{F}^{2}_{(RMS)}$$

^{2.} Pulse test: t_p = 380 μ s, δ < 2 %

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Table 4. Dynamic characteristics

Symbol	Parameter	Test conditions	Min.	Тур	Max.	Unit
		$I_F = 1 \text{ A, } dI_F/dt = -50 \text{ A/}\mu\text{s,}$ $V_R = 30 \text{ V, } T_j = 25^{\circ} \text{ C}$			115	
t _{rr}	Reverse recovery time	$I_F = 1 \text{ A, } dI_F/dt = -100 \text{ A/}\mu\text{s,}$ $V_R = 30 \text{ V, } T_j = 25^{\circ} \text{ C}$		57	80	ns
		$I_F = 1 \text{ A, } dI_F/dt = -200 \text{ A/}\mu\text{s,}$ $V_R = 30 \text{ V, } T_j = 25^{\circ} \text{ C}$		45	65	
I _{RM}	Reverse recovery current	$I_F = 30 \text{ A}, dI_F/dt = -200 \text{ A/}\mu\text{s},$ $V_R = 600 \text{ V}, T_j = 125^{\circ} \text{ C}$		25	35	Α
S	Softness factor	$I_F = 30 \text{ A}, dI_F/dt = -200 \text{ A/}\mu\text{s},$ $V_R = 600 \text{ V}, T_j = 125^{\circ} \text{ C}$		1.5		
t _{fr}	Forward recovery time	$I_F = 30 \text{ A}$ $dI_F/dt = 100 \text{ A/}\mu\text{s}$ $V_{FR} = 1.5 \text{ x } V_{Fmax}, T_j = 25^{\circ} \text{ C}$			550	ns
V _{FP}	Forward recovery voltage	$I_F = 30 \text{ A}, dI_F/dt = 100 \text{ A/}\mu\text{s},$ $T_j = 25^{\circ} \text{ C}$		6		V

Figure 1. Conduction losses versus average current

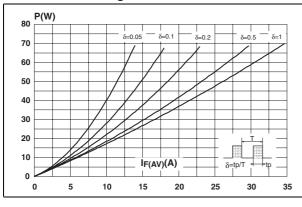
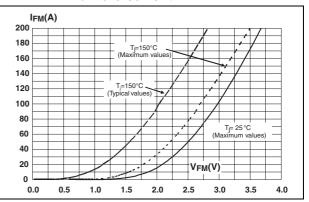


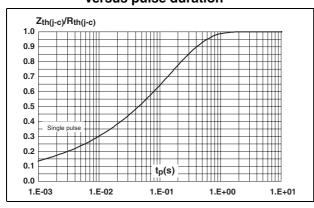
Figure 2. Forward voltage drop versus forward current



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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)



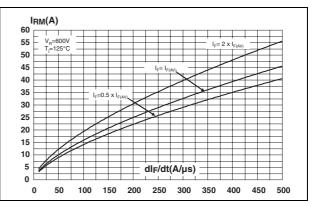
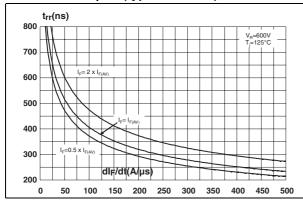


Figure 5. Reverse recovery time versus dl_F/dt (typical values)

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



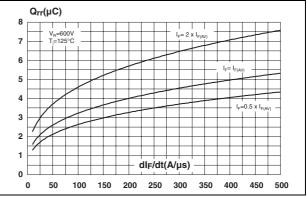
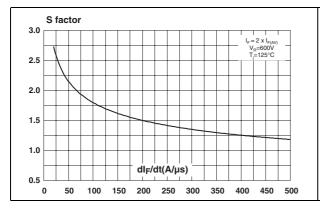
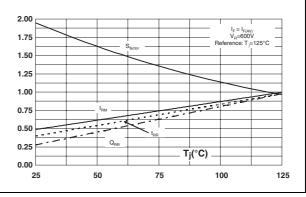


Figure 7. Softness factor versus dI_F/dt (typical values)

Figure 8. Relative variations of dynamic parameters versus junction temperature

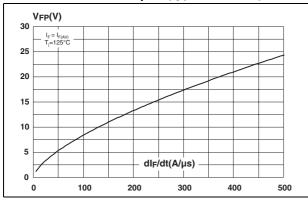




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Figure 9. Transient peak forward voltage versus dl_F/dt (typical values)

Figure 10. Forward recovery time versus dl_F/dt (typical values)



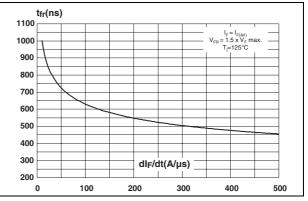
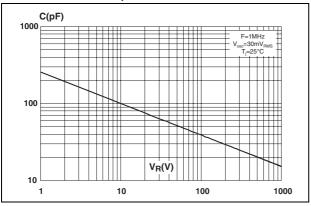


Table 5. Junction capacitance versus reverse voltage applied (typical values)



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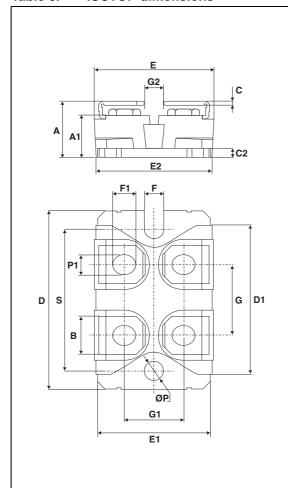
Package information STTH6112TV

2 Package information

Epoxy meets UL94, V0

Cooling method: by conduction (C)

Table 6. ISOTOP dimensions



DIMENSIONS				
Millim	neters	Inc	hes	
Min.	Max	Min.	Max.	
11.80	12.20	0.465	0.480	
8.90	9.10	0.350	0.358	
7.8	8.20	0.307	0.323	
0.75	0.85	0.030	0.033	
1.95	2.05	0.077	0.081	
37.80	38.20	1.488	1.504	
31.50	31.70	1.240	1.248	
25.15	25.50	0.990	1.004	
23.85	24.15	0.939	0.951	
24.80) typ.	0.97	6 typ.	
14.90	15.10	0.587	0.594	
12.60	12.80	0.496	0.504	
3.50	4.30	0.138	0.169	
4.10	4.30	0.161	0.169	
4.60	5.00	0.181	0.197	
4.00	4.30	0.157	0.69	
4.00	4.40	0.157	0.173	
30.10	30.30	1.185	1.193	
	Min. 11.80 8.90 7.8 0.75 1.95 37.80 31.50 25.15 23.85 24.80 14.90 12.60 3.50 4.10 4.60 4.00 4.00	Millimeters Min. Max 11.80 12.20 8.90 9.10 7.8 8.20 0.75 0.85 1.95 2.05 37.80 38.20 31.50 31.70 25.15 25.50 23.85 24.15 24.80 typ. 15.10 12.60 12.80 3.50 4.30 4.10 4.30 4.00 4.30 4.00 4.40	Min. Max Min. 11.80 12.20 0.465 8.90 9.10 0.350 7.8 8.20 0.307 0.75 0.85 0.030 1.95 2.05 0.077 37.80 38.20 1.488 31.50 31.70 1.240 25.15 25.50 0.990 23.85 24.15 0.939 24.80 typ. 0.97 14.90 15.10 0.587 12.60 12.80 0.496 3.50 4.30 0.138 4.10 4.30 0.161 4.60 5.00 0.181 4.00 4.30 0.157 4.00 4.40 0.157	

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.

3 Ordering information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
STTH6112TV1	STTH6112TV1	ISOTOP	27 g	10	Tube
STTH6112TV2	STTH6112TV2	ISOTOP	27 g	10	Tube

4 Revision history

Date	Revision	Description of Changes
02-Mar-2006	1	First issue.

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