

STTH6110TV

Ultrafast recovery - high voltage diode

Main product characteristics

I _{F(AV)}	2 x 30 A
V _{RRM}	1000 V
Тj	150° C
V _F (typ)	1.3 V
t _{rr} (typ)	42 ns

Features and benefits

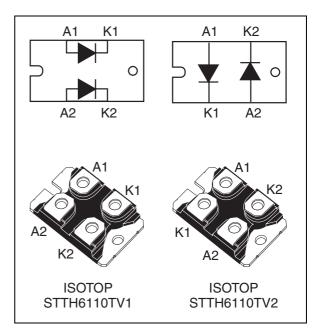
- Ultrafast, soft recovery
- Very low conduction and switching losses
- High frequency and/or high pulsed current operation
- High reverse voltage capability
- High junction temperature
- Insulated package
 - Electrical insulation = 2500 V_{RMS} Capacitance = 45 pF

Description

The compromise-free, 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.

These demanding applications include industrial power supplies, motor control, and similar industrial 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 advantage for reducing maintenance of the equipment



Order codes

Part Number	Marking
STTH6110TV1	STTH6110TV1
STTH6110TV2	STTH6110TV2

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			1000	V
I _{F(RMS)}	RMS forward current	RMS forward current			
I _{F(AV)}	Average forward current, $\delta = 0.5$ Per diode $T_c = 60^{\circ} C$		30	А	
I _{FRM}	Repetitive peak forward current	$t_p = 5 \ \mu s$, F = 5 kHz square		350	А
I _{FSM}	Surge non repetitive forward current	240	А		
T _{stg}	Storage temperature range			-65 to + 150	°C
Т _ј	Maximum operating junction temperature			150	°C

Table 2.Thermal parameters

Symbol	Parameter		Value	Unit
P	Junction to case	Per diode	1.4	
∩th(j-c)	R _{th(j-c)} Junction to case	Total	0.75	° C/W
R _{th(c)}	Coupling thermal resistance		0.1	

When the diodes are used simultaneously:

 $\Delta T_{j(diode1)} = P_{(diode1)} x R_{th(j-c)} (per \ diode) + P_{(diode2)} x R_{th(c)}$

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Тур	Max.	Unit
I _R ⁽¹⁾	Reverse leakage current	$T_j = 25^\circ C$	V - V			15	μA
'R` ´	neverse leakage current	akage current $T_j = 125^{\circ} C$ $V_R = V_{RRM}$	VR - VRRM		10	100	μΑ
		T _j = 25° C				2.0	
V _F ⁽²⁾ Forward voltage drop	T _j = 100° C	I _F = 30 A		1.4	1.8	V	
		T _j = 150° C			1.3	1.7	

1. Pulse test: t_p = 5 ms, δ < 2 %

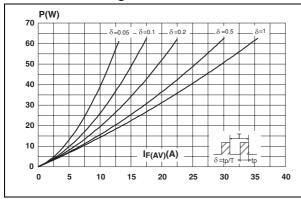
2. Pulse test: $t_p = 380 \ \mu s$, $\delta < 2 \ \%$

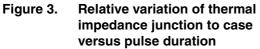
To evaluate the conduction losses use the following equation: P = 1.3 x $I_{F(AV)}$ + 0.013 ${I_F}^2_{(RMS)}$

Table 4.	Dynamic	characteristics
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Symbol	Parameter	Test conditions	Min.	Тур	Max.	Unit
		$I_F = 1 \text{ A}, dI_F/dt = -50 \text{ A}/\mu\text{s},$ $V_R = 30 \text{ V}, T_j = 25^{\circ} \text{ C}$ $I_F = 1 \text{ A}, dI_F/dt = -100 \text{ A}/\mu\text{s},$ $V_R = 30 \text{ V}, T_j = 25^{\circ} \text{ C}$			100	
τ _{rr} Reverse recovery time	53			70	ns	
	$\label{eq:IF} \begin{array}{l} I_{F} = 1 \ A, \ dI_{F}/dt = \text{-200 } A/\mus, \\ V_{R} = 30 \ V, \ T_{j} = 25^{\circ} \ C \end{array}$		42	55		
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} $		24	32	А
S	Softness factor	$ I_F = 30 \text{ A}, \text{ dI}_F/\text{dt} = -200 \text{ A}/\mu\text{s}, \\ V_R = 600 \text{ V}, \text{ T}_j = 125^\circ \text{ C} $		1		
t _{fr}	Forward recovery time	$I_F = 30 \text{ A} \qquad dI_F/dt = 100 \text{ A}/\mu\text{s}$ $V_{FR} = 1.5 \text{ x} \text{ V}_{Fmax}, \text{T}_\text{j} = 25^\circ \text{ C}$			450	ns
V _{FP}	Forward recovery voltage	$I_F = 30 \text{ A, } dI_F/dt = 100 \text{ A/}\mu\text{s},$ $T_j = 25^\circ \text{ C}$		5		V

Figure 1. **Conduction losses versus** average current





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

e pulse

1.E-02

1.0

0.9

0.8 0.7

0.6

0.5

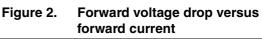
0.4

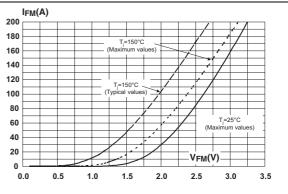
0.3 0.2

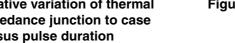
0.1

0.0

1.E-03







tp(s) T

1.E+00

1.E+01

1.E-01



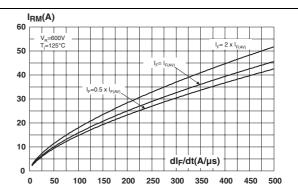


Figure 5. Reverse recovery time versus dl_F/dt (typical values)

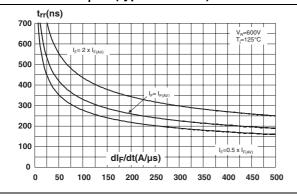


Figure 7. Softness factor versus dl_F/dt (typical values)

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

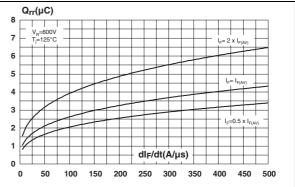
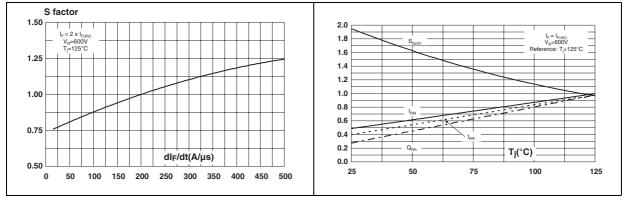


Figure 8. Relative variations of dynamic parameters versus junction temperature





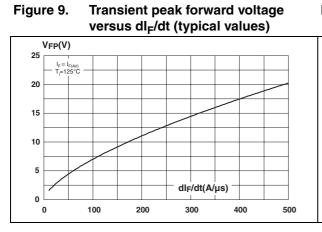


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

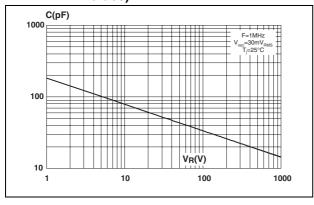
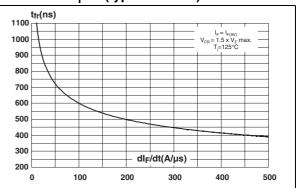


Figure 10. Forward recovery time versus dl_F/dt (typical values)



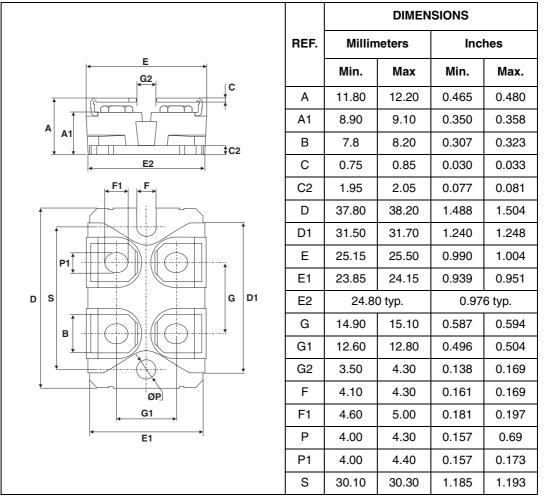
Characteristics

2 Package information

Epoxy meets UL94, V0

Cooling method: by conduction (C)

Table 5. ISOTOP dimensions



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
STTH6110TV1	STTH6110TV1	ISOTOP	27 g	10	Tube
STTH6110TV2	STTH6110TV2	ISOTOP	27 g	10	Tube

4 Revision history

Date	Revision	Description of Changes
22-Feb-2006	1	First issue.



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