

STTH1210-Y

Datasheet - production data

Automotive ultrafast recovery - high voltage diode

Features

- AEC-Q101 qualified
- Ultrafast, soft recovery
- Very low conduction and switching losses
- High frequency and high pulsed current operation
- High reverse voltage capability
- High junction temperature

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, like automotive applications.

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.

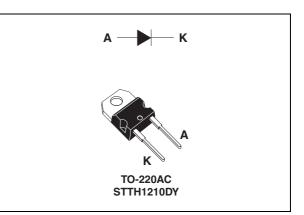


Table 1. Device summary

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I _{F(AV)}	12 A
V _{RRM}	1000 V
Тj	175 °C
V _F (typ)	1.30 V
t _{rr} (typ)	48 ns

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This is information on a product in full production.

1 Characteristics

Table 2. Absolute ratings (limiting values at 25 °C, unless otherwise specified)

Symbol	Paran	Value	Unit		
V _{RRM}	Repetitive peak reverse voltage	Repetitive peak reverse voltage			
I _{F(RMS)}	Forward rms current			30	А
I _{F(AV)}	Average forward current, $\delta = 0.5$	Average forward current, $\delta = 0.5$ T _c = 125 °C		12	А
I _{FRM}	Repetitive peak forward current $t_p = 5 \ \mu s$, F = 5 kHz square		120	А	
I _{FSM}	Surge non repetitive forward current	80	А		
T _{stg}	Storage temperature range			-65 to +175	°C
Тj	Operating junction temperature range			-40 to +175	°C

Table 3.Thermal parameters

Symbol	Parameter	Value	Unit
R _{th(j-c)}	Junction to case	1.9	°C/W

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Тур.	Max.	Unit
I _B ⁽¹⁾	Poverce leakage ourrent	T _j = 25 °C	V - V			10	
IR ⁽¹⁾ Reverse leakage current	neverse leakage current	T _j = 125 °C	$V_{R} = V_{RRM}$		3	30	μA
		T _j = 25 °C				2.0	
V _F ⁽²⁾ Forwar	Forward voltage drop	T _j = 100 °C	I _F = 12 A		1.40	1.8	V
		T _j = 150 °C			1.30	1.7	

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

2. Pulse test: t_p = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:

 $P = 1.3 \text{ x } I_{F(AV)} + 0.033 I_{F}^{2}_{(RMS)}$



Table 5.	Dynamic characteristi	cs
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Symbol	Parameter	Test conditions	Min.	Тур	Max.	Unit
t _{rr} Reverse recovery time		$\label{eq:IF} \begin{array}{l} I_F = 1 \ A, \ dI_F/dt = \text{-50 } A/\mus, \\ V_R = 30 \ V, \ T_j = 25 \ ^\circC \end{array}$		67	90	nc
	$\label{eq:IF} \begin{array}{l} I_F = 1 \mbox{ A, } dI_F/dt = -100 \mbox{ A/}\mu s, \\ V_R = 30 \mbox{ V, } T_j = 25 \mbox{ °C} \end{array}$		48	65	ns	
I _{RM}	Reverse recovery current	$ I_F = 12 \text{ A, } dI_F/dt = -200 \text{ A}/\mu\text{s}, \\ V_R = 600 \text{ V, } T_j = 125 ^\circ\text{C} $		15	20	А
S	Softness factor	$ I_F = 12 \text{ A, } dI_F/dt = -200 \text{ A}/\mu\text{s}, \\ V_R = 600 \text{ V, } T_j = 125 ^\circ\text{C} $		2		
t _{fr}	Forward recovery time	$I_F = 12 \text{ A} \qquad dI_F/dt = 50 \text{ A}/\mu\text{s}$ $V_{FR} = 1.5 \text{ x} \text{ V}_{Fmax}, \text{ T}_j = 25 \text{ °C}$			400	ns
V _{FP}	Forward recovery voltage	$I_F = 12 \text{ A}, \text{ d}I_F/\text{d}t = 50 \text{ A}/\mu\text{s},$ $T_j = 25 ^\circ\text{C}$		5		V

Figure 1. Conduction losses versus average current

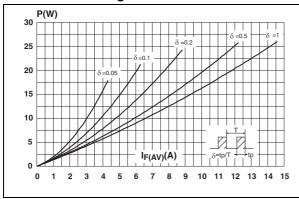
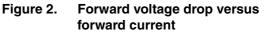


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration



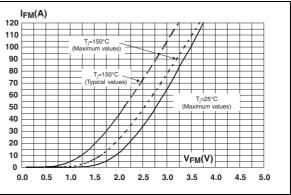
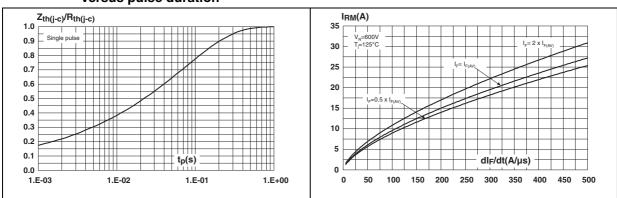


Figure 4. Peak reverse recovery current versus dl_F/dt (typical values)





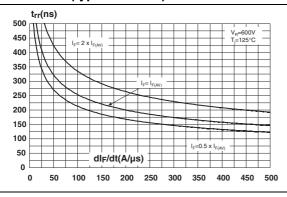
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=0.5 ×

Figure 5. Reverse recovery time versus dl_F/dt Figure 6. (typical values)

Reverse recovery charges versus dl_⊧/dt (typical values)

dlF/dt(A/µs)



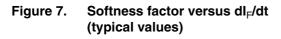
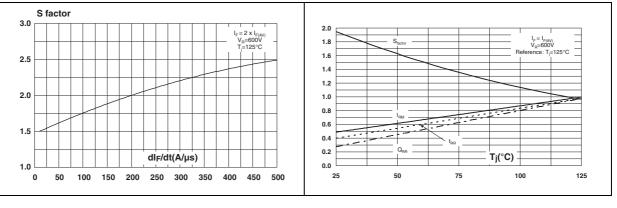


Figure 8. Relative variations of dynamic parameters versus junction temperature



Qrr(µC)

=600V =125°C

3.5

3.0

2.5

2.0

1.5

1.0

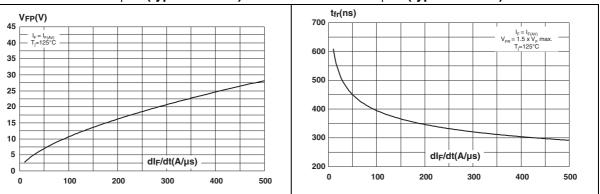
0.5

0.0

0 50 100 150 200 250 300 350 400 450 500

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

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





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100		F=1MH	z
		V _{osc} =30mV T _j =25°	
_			
10			
_			++++
		/ _R (V)	
1 - 1	10	100	1000

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

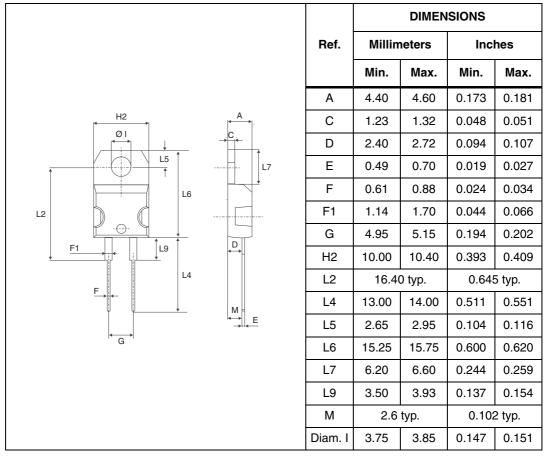


2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.4 to 0.6 N·m

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Table 6. T0-220AC dimensions





3 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH1210DY	STTH1210DY	TO-220AC	1.86 g	50	Tube

4 Revision history

Table 8.Document revision history

Date	Revision	Changes
24-Oct-2012	1	First issue.



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