

800 V tandem hyperfast diode

Datasheet – production data

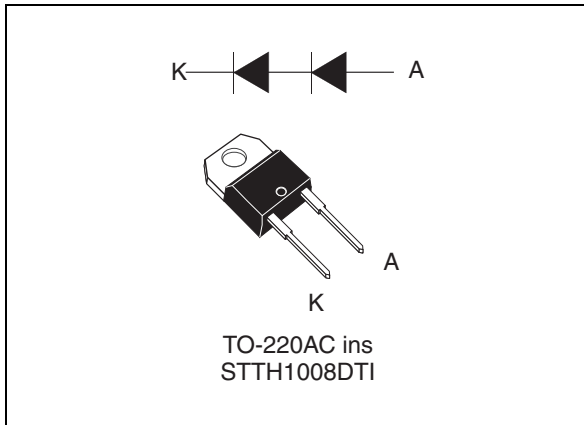


Table 1. Device summary

$I_{F(AV)}$	10 A
I_{FRM}	20 A
V_{RRM}	800 V
t_{rr}	40 ns
I_{RM}	8.5 A
V_F	1.7 V
T_j	150 °C

Features

- High voltage rectifier
- Tandem diodes in series
- Very low switching losses
- Insulated device with internal ceramic
- Equal thermal conditions for both 400 V diodes
- Static and dynamic equilibrium of internal diodes are warranted by design

Description

The STTH1008DTI is an ultrahigh performance diode composed of two 400 V dice in series.

1 Characteristics

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

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	800	V
$I_{F(RMS)}$	Forward rms current	16	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$	$T_c = 85\text{ °C}$	A
I_{FRM}	Repetitive peak forward current	$T_c = 135\text{ °C}, \delta = 0.3$	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10\text{ ms sinusoidal}$	A
T_{stg}	Storage temperature range	-65 to +175	°C
T_j	Maximum junction temperature	150	°C

Table 3. Thermal resistance

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case	2.5	°C/W

Table 4. Static electrical characteristics

Symbol	Parameters	Test conditions	Min.	Typ	Max.	Unit	
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$		20	μA	
		$T_j = 150\text{ °C}$		20	200		
$V_F^{(2)}$	Forward voltage drop	$T_c = 25\text{ °C}$	$I_F = 10\text{ A}$		2.15	2.5	V
		$T_c = 150\text{ °C}$		1.7	2.05		
		$T_c = 25\text{ °C}$	$I_F = 20\text{ A}$		2.45	2.85	
		$T_c = 150\text{ °C}$		2.05	2.45		

1. Pulse test: $t_p = 5\text{ ms}, \delta < 2\%$
2. Pulse test: $t_p = 380\text{ }\mu\text{s}, \delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 1.65 \times I_{F(AV)} + 0.04 \times I_{F(RMS)}^2$$

Table 5. Dynamic electrical characteristics

Symbol	Parameters	Test conditions		Min.	Typ	Max.	Unit
I_{RM}	Reverse recovery current	$T_j = 125\text{ }^\circ\text{C}$	$I_F = 10\text{ A}, V_R = 400\text{ V},$ $di_F/dt = -200\text{ A}/\mu\text{s}$		8.5	11.5	A
S_{factor}	Softness factor				0.8		
t_{rr}	Reverse recovery time	$T_j = 25\text{ }^\circ\text{C}$	$I_F = 1\text{ A}, V_R = 30\text{ V},$ $di_F/dt = -50\text{ A}/\mu\text{s}$		40	55	ns
		$T_j = 125\text{ }^\circ\text{C}$	$I_F = 10\text{ A}, V_R = 400\text{ V},$ $di_F/dt = -200\text{ A}/\mu\text{s}$		80		
t_{fr}	Forward recovery time	$T_j = 25\text{ }^\circ\text{C}$	$I_F = 10\text{ A}, V_{FR} = 3\text{ V},$ $di_F/dt = 100\text{ A}/\mu\text{s}$			180	ns
V_{FP}	Forward recovery voltage	$T_j = 25\text{ }^\circ\text{C}$			4.5	7	V

Figure 1. Conduction losses versus average current

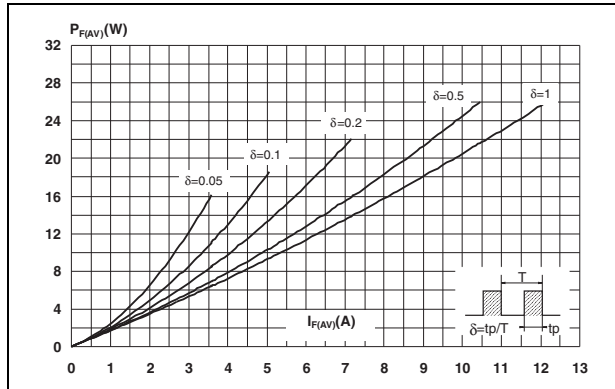


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

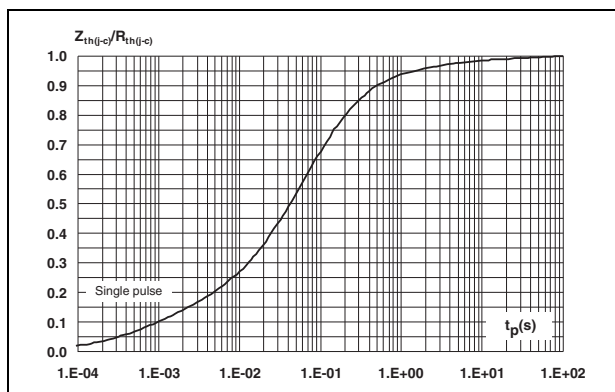


Figure 2. Forward voltage drop versus forward current (typical values)

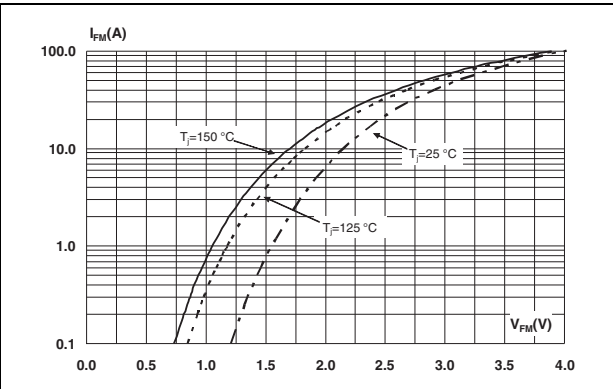


Figure 4. Peak reverse recovery current versus di_F/dt (typical values)

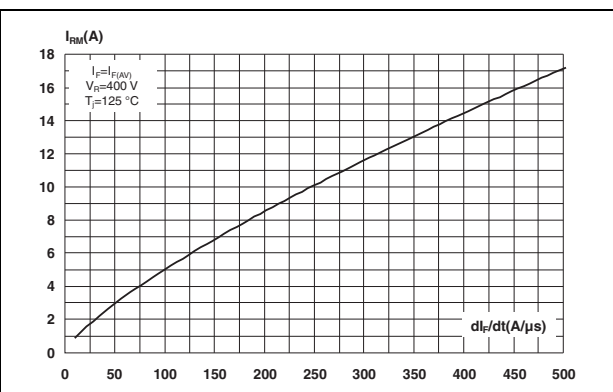


Figure 5. Reverse recovery time versus dl_F/dt (typical values)

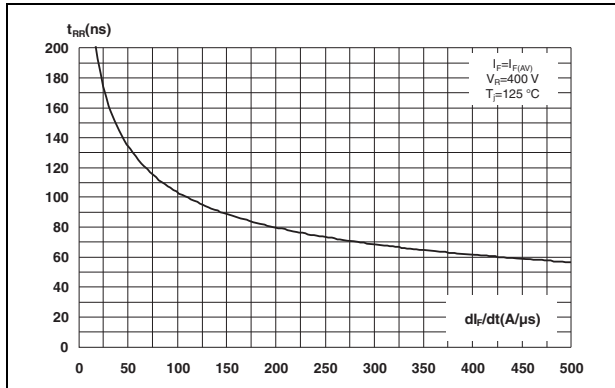


Figure 6. Reverse recovery charges versus dl_F/dt (typical values)

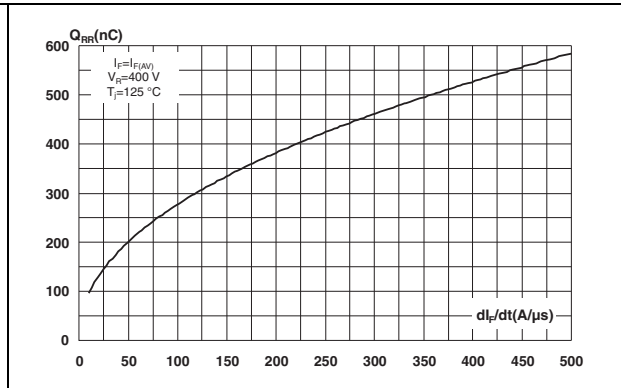


Figure 7. Reverse recovery softness factor versus dl_F/dt (typical values)

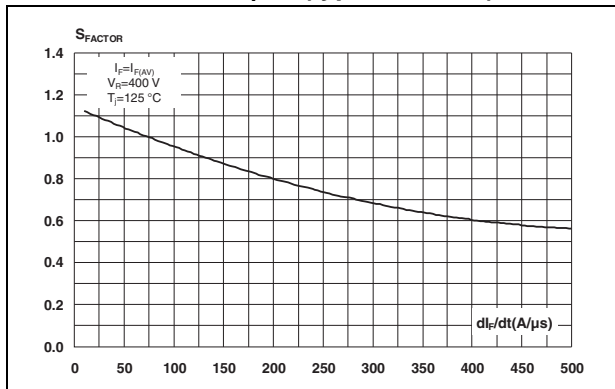


Figure 8. Relative variations of dynamic parameters versus junction temperature

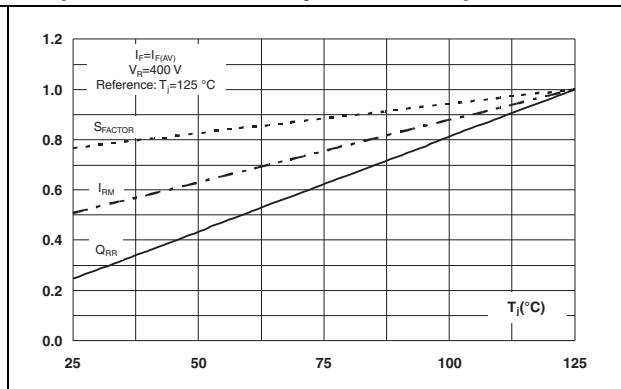


Figure 9. Transient peak forward voltage versus dl_F/dt (typical values)

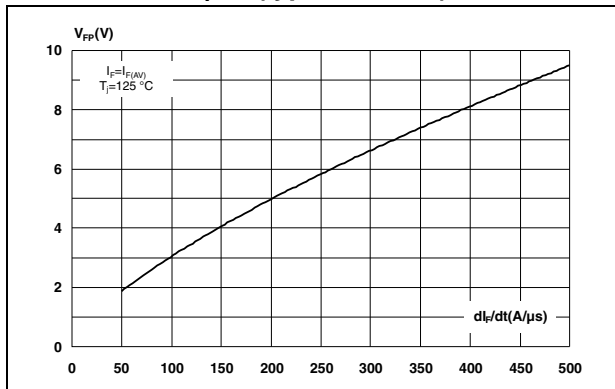


Figure 10. Forward recovery time versus dl_F/dt (typical values)

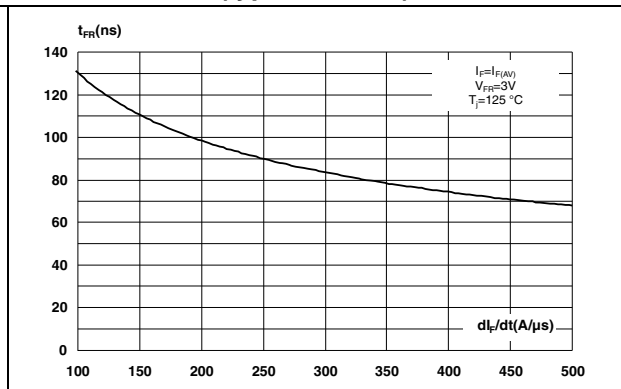
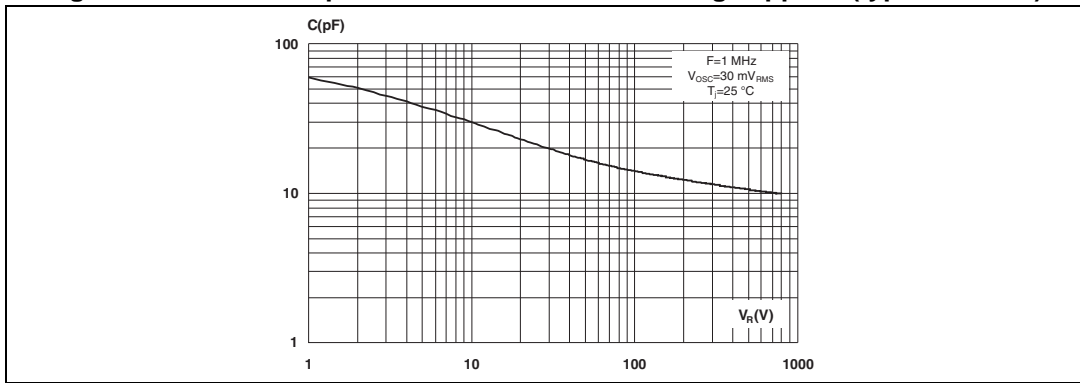


Figure 11. Junction capacitance versus reverse voltage applied (typical values)



2 Package information

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

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Figure 12. TO-220AC ins dimension definitions

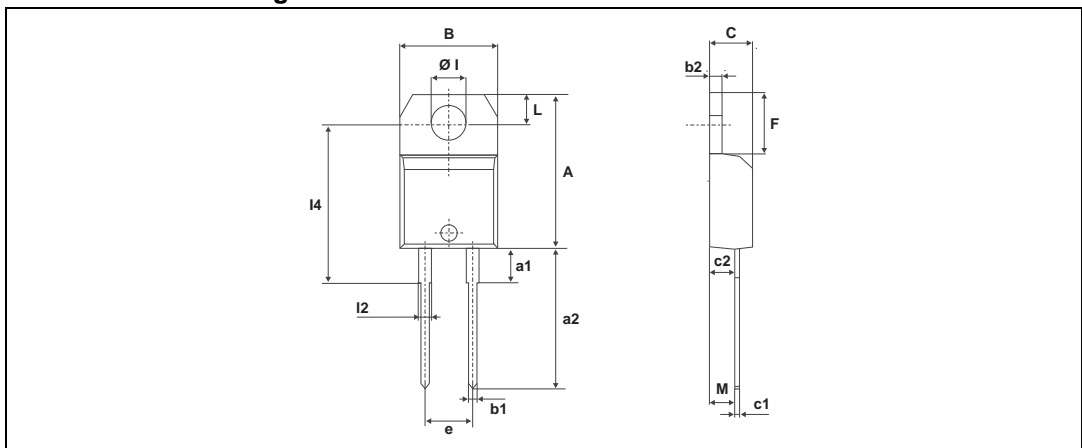


Table 6. TO-220AC ins dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.20		15.90	0.598		0.625
a1		3.75			0.147	
a2	13.00		14.00	0.511		0.551
B	10.00		10.40	0.393		0.409
b1	0.61		0.88	0.024		0.034
b2	1.23		1.32	0.048		0.051
C	4.40		4.60	0.173		0.181
c1	0.49		0.70	0.019		0.027
c2	2.40		2.72	0.094		0.107
e	4.80		5.40	0.189		0.212
F	6.20		6.60	0.244		0.259
ØI	3.75		3.85	0.147		0.151
I4	15.80	16.40	16.80	0.622	0.646	0.661
L	2.65		2.95	0.104		0.116
I2	1.14		1.70	0.044		0.066
M		2.60			0.102	

3 Ordering information

Table 7. Ordering information

Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH1008DTI	STTH1008DTI	TO-220AC insulated	2.3 g	50	Tube

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
05-Mar-2013	1	Initial release.

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