

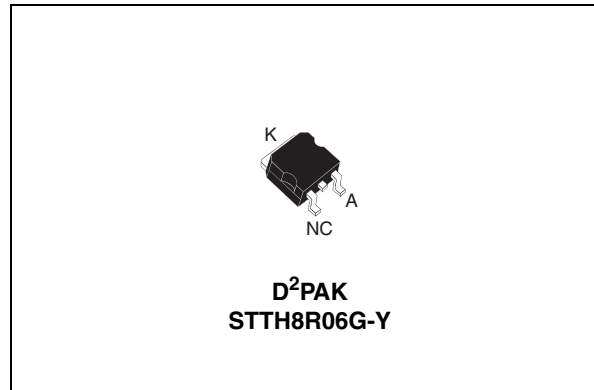
## Automotive Turbo 2 ultrafast high voltage rectifier

### Features

- Ultrafast switching
- Low reverse recovery current
- Low thermal resistance
- Reduces switching losses
- AEC-Q101 qualified

### Description

The STTH8R06, which uses ST Turbo 2 600 V technology, is specially suited as a boost diode in continuous mode power factor correction and hard switching conditions. This device is also intended for use as a free wheeling diode in power supplies and other power switching applications.



**Table 1. Device summary**

Symbol	Value
$I_{F(AV)}$	8 A
$V_{RRM}$	600 V
$T_j$	175 °C
$V_F$ (typ)	1.5 V
$t_{rr}$ (max)	45 ns

# 1 Characteristics

**Table 2. Absolute ratings (limiting values)**

Symbol	Parameter		Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage		600	V
$I_{F(RMS)}$	Forward rms current		40	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	$T_c = 135\text{ °C}$	8	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10\text{ ms sinusoidal}$	90	A
$T_{stg}$	Storage temperature range		-65 to + 175	°C
$T_j$	Operating junction temperature range		-40 to + 175	°C

**Table 3. Thermal resistance**

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

**Table 4. Static electrical characteristics**

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$I_R$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$			30	$\mu\text{A}$
		$T_j = 125\text{ °C}$			35	400	
$V_F$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 8\text{ A}$			3.2	V
		$T_j = 125\text{ °C}$			1.5	1.95	

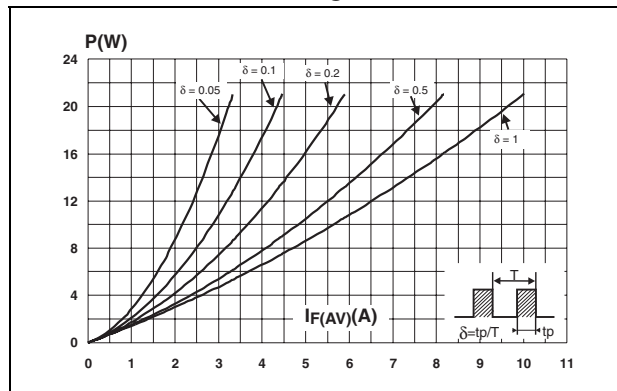
To evaluate the conduction losses use the following equation:

$$P = 1.35 \times I_{F(AV)} + 0.075 I_{F(RMS)}^2$$

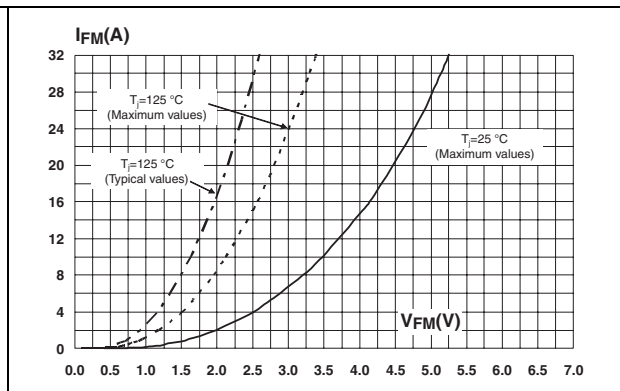
**Table 5. Dynamic characteristics**

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$t_{rr}$	Reverse recovery time	$T_j = 25\text{ }^\circ\text{C}$	$I_F = 0.5\text{ A}$ , $I_{rr} = 0.25\text{ A}$ , $I_R = 1\text{ A}$			25	ns
			$I_F = 1\text{ A}$ , $di_F/dt = -50\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$			45	
$I_{RM}$	Reverse recovery current	$T_j = 125\text{ }^\circ\text{C}$	$I_F = 8\text{ A}$ , $V_R = 400\text{ V}$ , $di_F/dt = -200\text{ A}/\mu\text{s}$		5.5	7.2	A
S factor	Softness factor				0.4		
Qrr	Reverse recovery charges				150		nC
$t_{fr}$	Forward recovery time	$T_j = 25\text{ }^\circ\text{C}$	$I_F = 8\text{ A}$ , $di_F/dt = 64\text{ A}/\mu\text{s}$ $V_{FR} = 2.5\text{ V}$			200	ns
$V_{FP}$	Forward recovery voltage					5	V

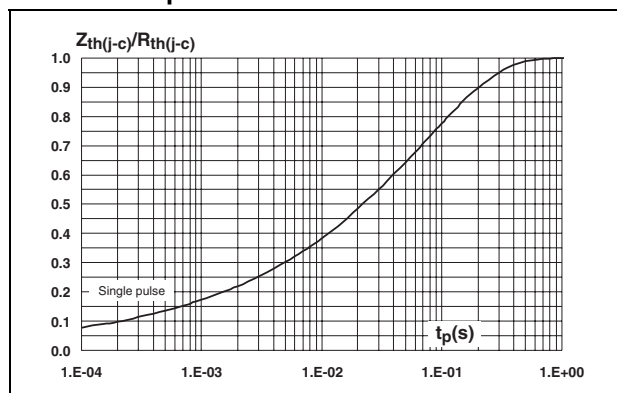
**Figure 1. Average forward power dissipation versus average forward current**



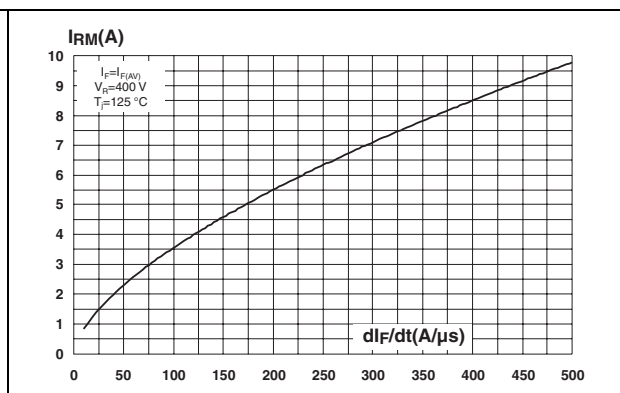
**Figure 2. Forward voltage drop versus forward current**



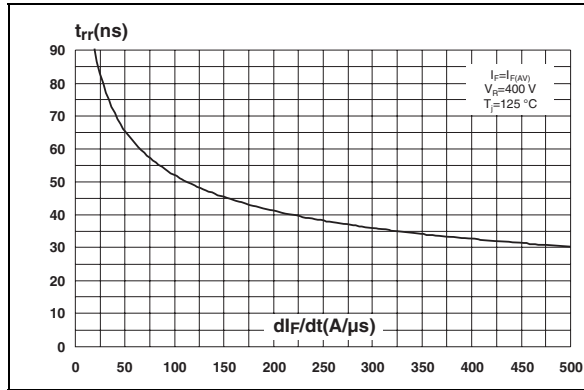
**Figure 3. Relative variation of thermal impedance junction to case versus pulse duration**



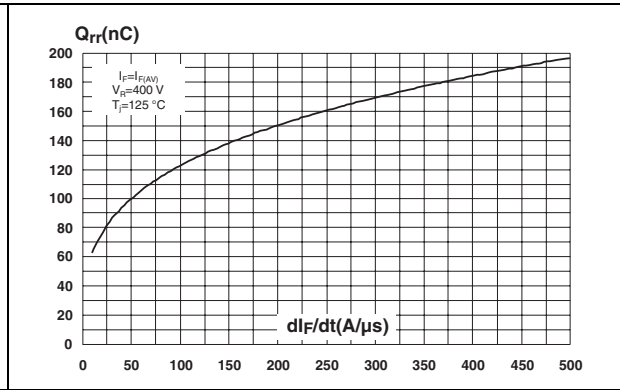
**Figure 4. Peak reverse recovery current versus diF/dt (typical values)**



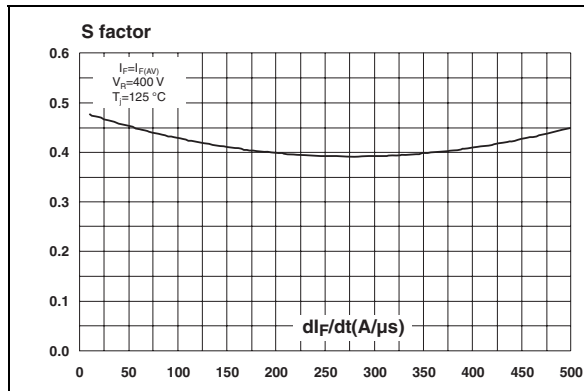
**Figure 5. Reverse recovery time versus  $di_F/dt$  (typical values)**



**Figure 6. Reverse recovery charges versus  $di_F/dt$  (typical values)**



**Figure 7. Reverse recovery softness factor versus  $di_F/dt$  (typical values)**



**Figure 8. Relative variations of dynamic parameters versus junction temperature**

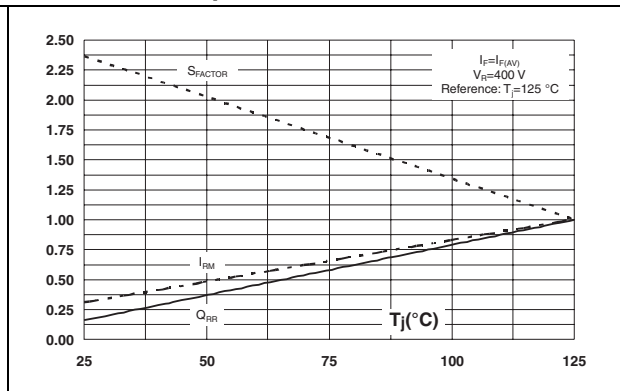


Figure 9. Transient peak forward voltage versus  $di_F/dt$  (typical values)

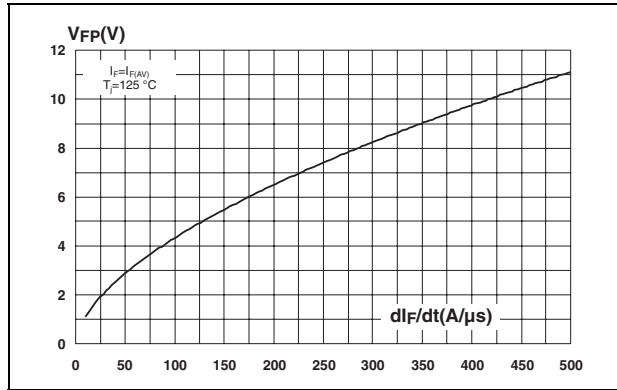


Figure 10. Forward recovery time versus  $di_F/dt$  (typical values)

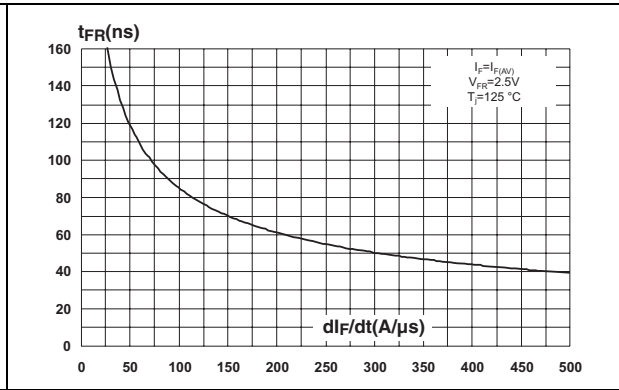


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

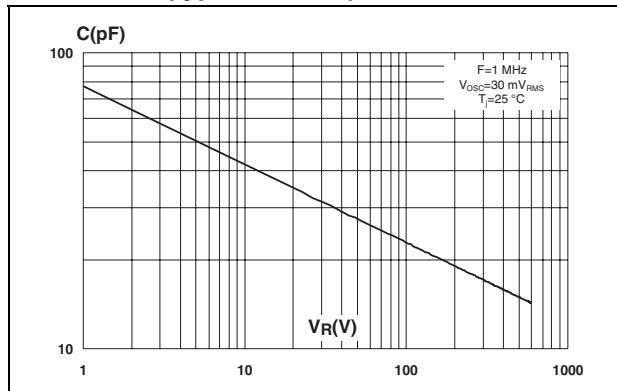
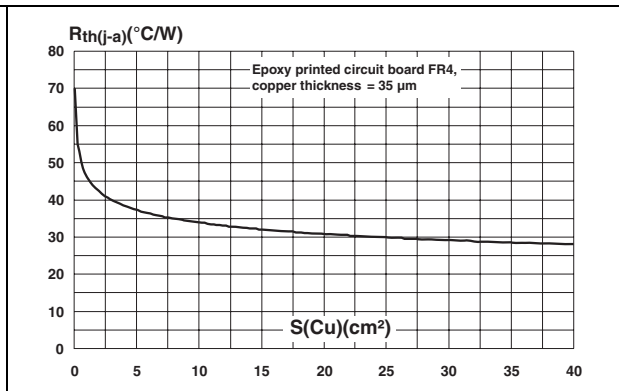


Figure 12. Thermal resistance junction to ambient versus copper surface under tab



## 2 Package information

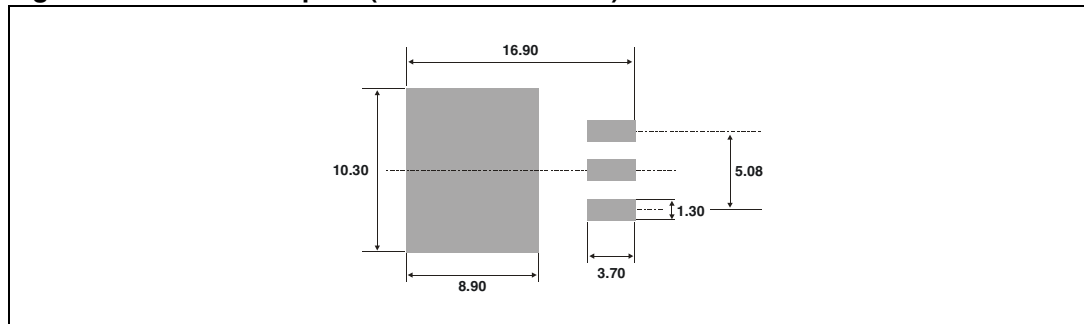
- Epoxy meets UL94, V0
- Lead-free package

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK® is an ST trademark.

**Table 6. D<sup>2</sup>PAK dimensions**

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.49	2.69	0.098	0.106
A2	0.03	0.23	0.001	0.009
B	0.70	0.93	0.027	0.037
B2	1.14	1.70	0.045	0.067
C	0.45	0.60	0.017	0.024
C2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
E	10.00	10.40	0.393	0.409
G	4.88	5.28	0.192	0.208
L	15.00	15.85	0.590	0.624
L2	1.27	1.40	0.050	0.055
L3	1.40	1.75	0.055	0.069
M	2.40	3.20	0.094	0.126
R	0.40 typ.		0.016 typ.	
V2	0°	8°	0°	8°

**Figure 13. D<sup>2</sup>PAK footprint (dimensions in mm)**



### 3 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH8R06GY-TR	STTH8R06GY	D <sup>2</sup> PAK	1.48 g	1000	Tape and reel

### 4 Revision history

Table 8. Document revision history

Date	Revision	Changes
03-Nov-2011	1	Initial release.

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