STTH5R06-Y

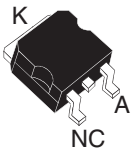
Automotive Turbo 2 ultrafast high voltage rectifier

Features

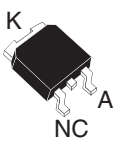
- Ultrafast switching
- Low reverse recovery current
- Reduces switching losses
- Low thermal resistance
- AEC-Q101 qualified

Description

The STTH5R06, 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.



D^2PAK
STTH5R06G-Y



DPAK
STTH5R06B-Y

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	5 A
V_{RRM}	600 V
T_j	175 °C
V_F (typ)	1.5 V
t_{rr} (max)	35 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	D^2PAK			25	A
		DPAK			10	
$I_{F(AV)}$	Average forward current $\delta = 0.5$	D^2PAK / DPAK	T_c = 145 °C		5	A
I_{FSM}	Surge non repetitive forward current	T_p = 10 ms sinusoidal		D^2PAK	70	A
				DPAK	50	A
T_{stg}	Storage temperature range				-65 to + 175	°C
T_j	Operating junction temperature range				-40 to + 175	°C

Table 3. Thermal parameter

Symbol	Parameter	Maximum	Unit
$R_{th(j-c)}$	Junction to case	2.2	°C/W

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$			30	µA
		T_j = 125 °C			30	300	
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 5 A			3.2	V
		T_j = 125 °C			1.5	1.95	

1. Pulse test: t_p = 5 ms, δ < 2 %
2. Pulse test: t_p = 380 µs, δ < 2 %

To evaluate the maximum conduction losses use the following equation:
$P = 1.35 \times I_{F(AV)} + 0.12\ I_{F}^{2}{}_{(RMS)}$

Table 5. Dynamic electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	T_j = 25 °C	I_F = 0.5 A, I_{rr} = 0.25 A, I_R = 1 A			20	ns
			I_F = 1 A, dI_F/dt = - 50 A/µs, V_R = 30 V			35	
I_{RM}	Reverse recovery current	T_j = 125 °C	I_F = 5 A, dI_F/dt = - 200 A/µs, V_R = 400 V		4.5	6	A
S_{factor}	Softness factor				0.5		-
Q_{rr}	Reverse recovery charges				110		nC
t_{fr}	Forward recovery time	T_j = 25 °C	I_F = 5 A dI_F/dt = 40 A/µs V_{FR} = 2.5 V			220	ns
V_{FP}	Forward recovery voltage					4.5	V

Figure 1. Average forward power dissipation versus average forward current

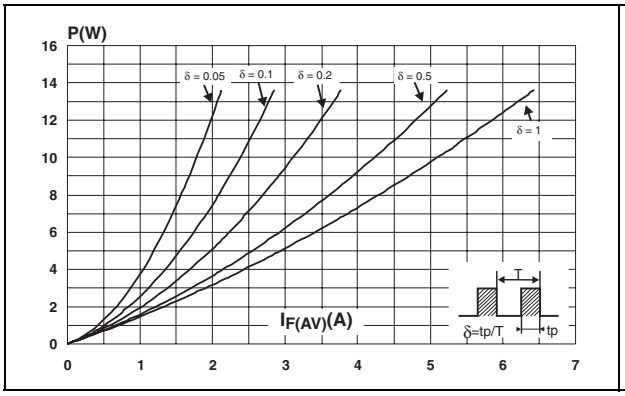


Figure 2. Forward voltage drop versus forward current

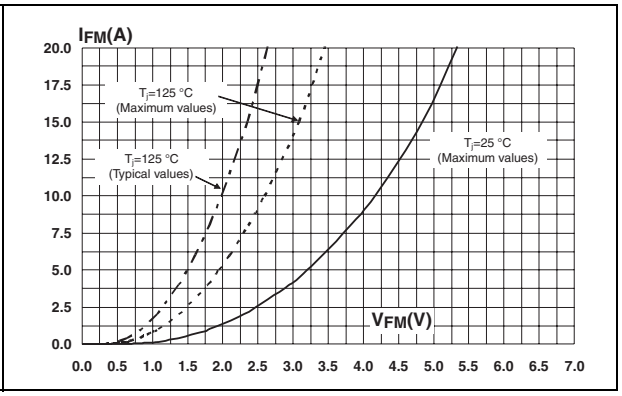


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

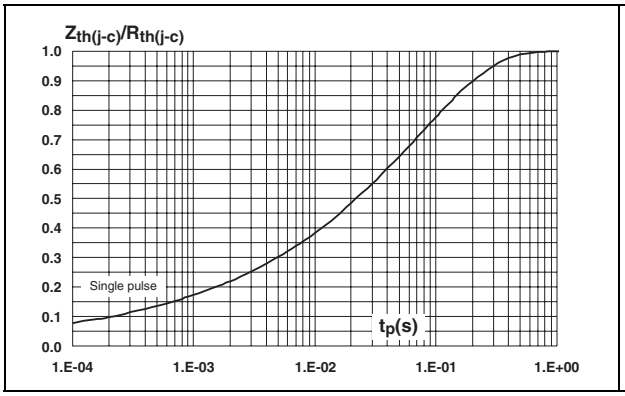


Figure 4. Peak reverse recovery current versus dI_F/dt (typical values)

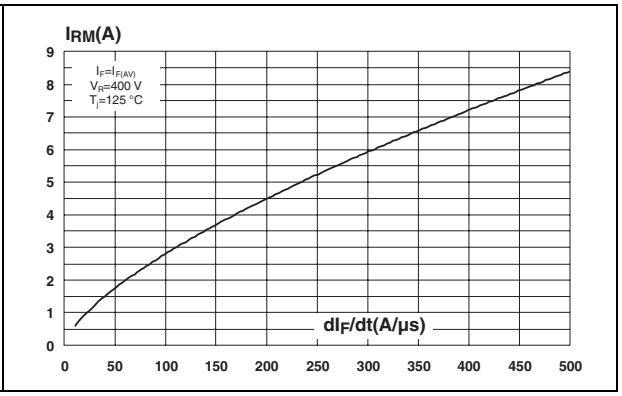


Figure 5. Reverse recovery time versus dI_F/dt (typical values)

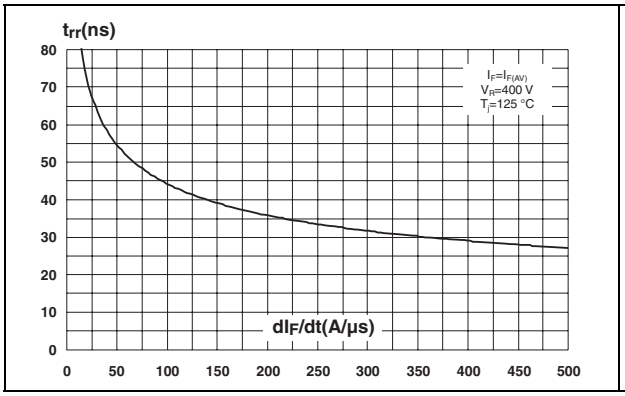


Figure 6. Reverse recovery charges versus dI_F/dt (typical values)

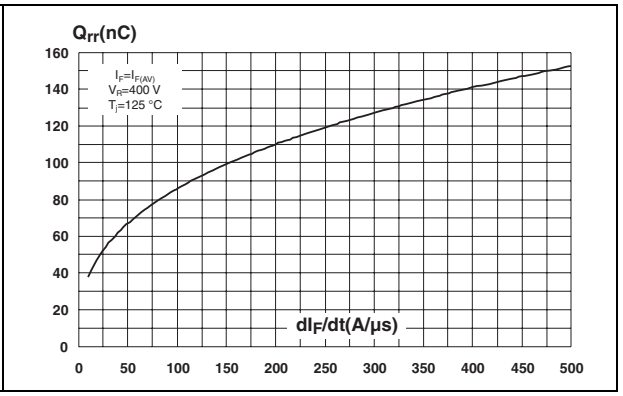


Figure 7. Softness factor versus dI_F/dt (typical values)

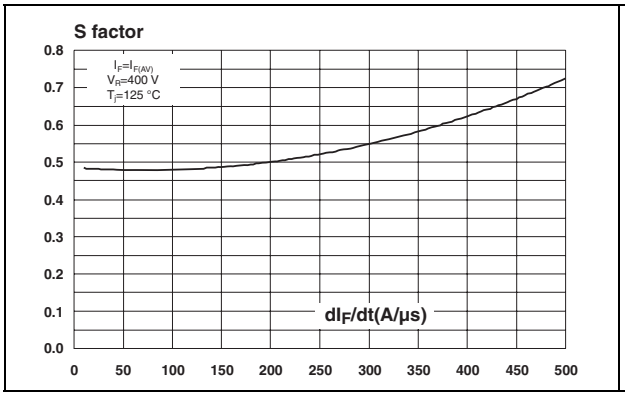


Figure 8. Relative variations of dynamic parameters versus junction temperature

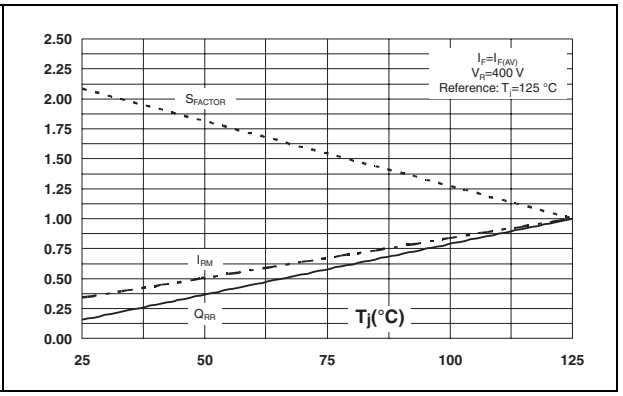


Figure 9. Transient peak forward voltage versus dI_F/dt (typical values)

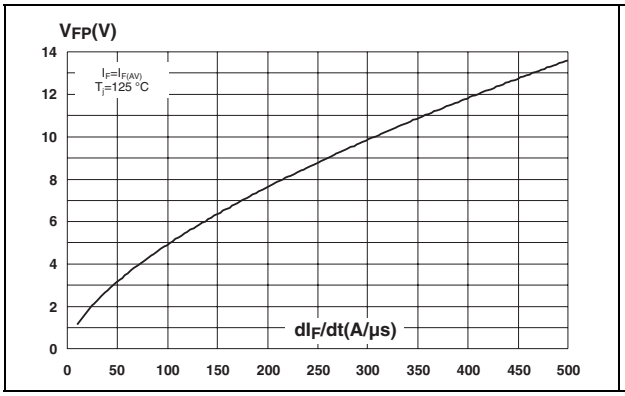


Figure 10. Forward recovery time versus dI_F/dt (typical values)

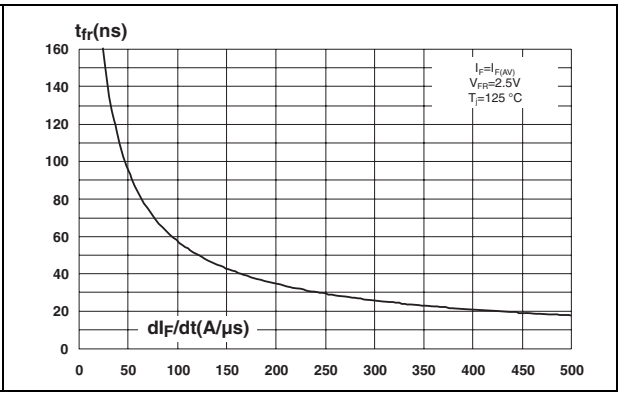


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

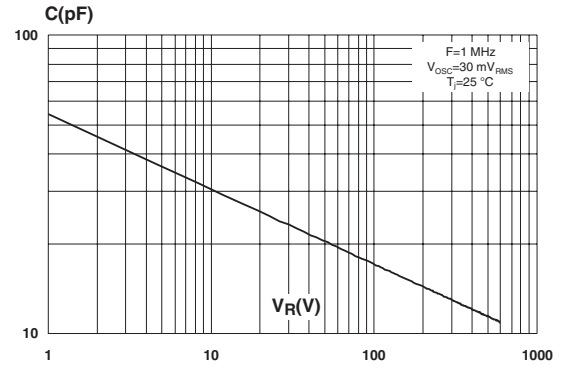


Figure 12. Thermal resistance junction to ambient versus copper surface under tab (D^2PAK)

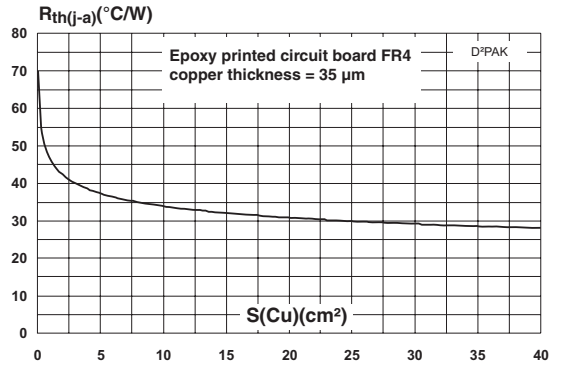
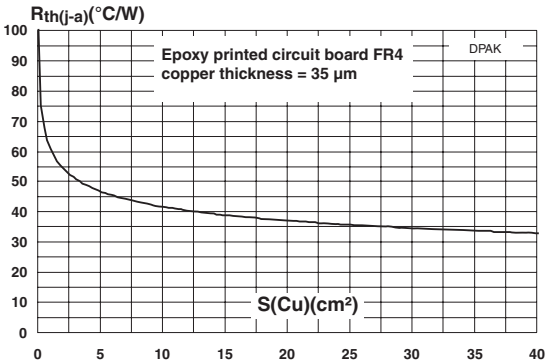


Figure 13. Thermal resistance junction to ambient versus copper surface under tab (DPAK)

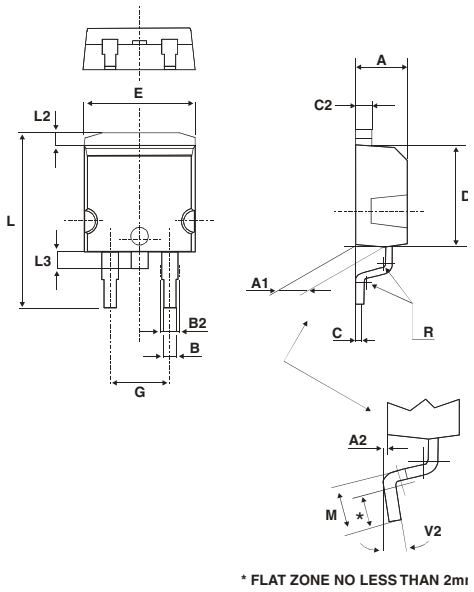


2 Package information

- Epoxy meets UL94, V0
- Lead-free packages

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. ECOPACK® is an ST trademark.

Table 6. D²PAK 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 14. Footprint (dimensions in mm)

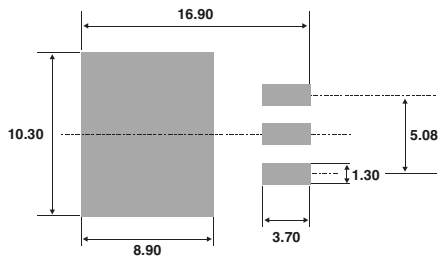
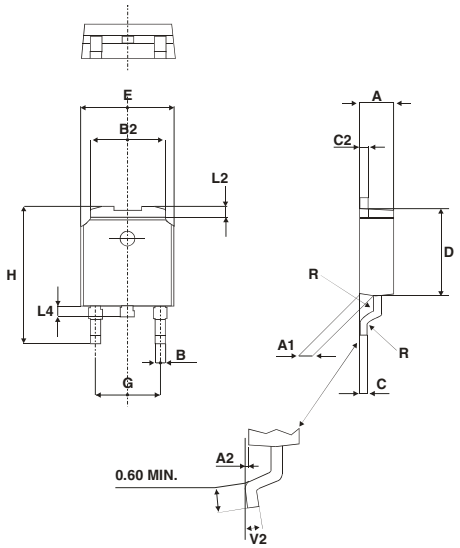
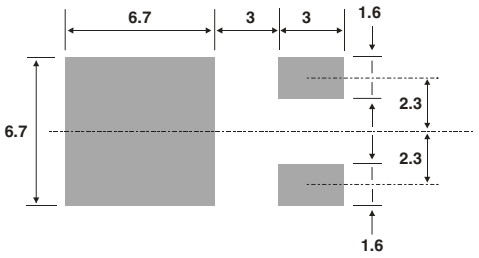


Table 7. DPAK dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.20	2.40	0.086	0.094
A1	0.90	1.10	0.035	0.043
A2	0.03	0.23	0.001	0.009
B	0.64	0.90	0.025	0.035
B2	5.20	5.40	0.204	0.212
C	0.45	0.60	0.017	0.023
C2	0.48	0.60	0.018	0.023
D	6.00	6.20	0.236	0.244
E	6.40	6.60	0.251	0.259
G	4.40	4.60	0.173	0.181
H	9.35	10.10	0.368	0.397
L2	0.80 typ.		0.031 typ.	
L4	0.60	1.00	0.023	0.039
V2	0°	8°	0°	8°

Figure 15. Footprint (dimensions in mm)



3 Ordering information

Table 8. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH5R06GY-TR	STTH5R06GY	D^2PAK	1.48 g	1000	Tape and reel
STTH5R06BY-TR	STTH5R06BY	DPAK	0.3 g	2500	Tape and reel

4 Revision history

Table 9. Document revision history

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