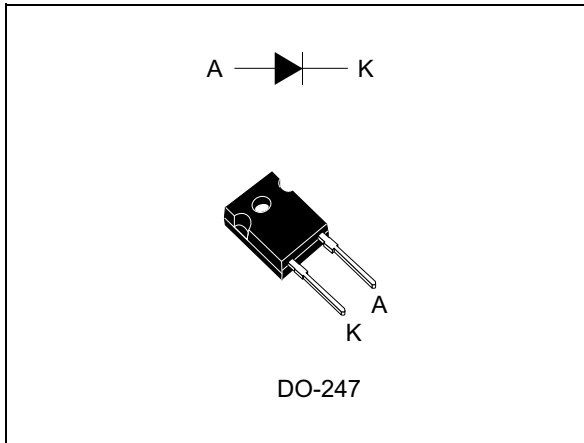


Turbo 2 ultrafast high voltage rectifier

Datasheet - production data


Description

The STTH80S06, which is using ST Turbo 2 600 V technology, is specially suited for use in switching power supplies, and solar inverters. Thanks to its low V_F characteristics, as well as fast recovery, this device exhibits high performance in free-wheeling applications or boost converters working at switching frequency up to 100 kHz.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	80 A
V_{RRM}	600 V
T_j (max)	175 °C
V_F (typ)	1.65 V
t_{rr} (typ)	32 ns

Features

- Ultrafast switching
- Low reverse current
- Low thermal resistance
- Reduces switching and conduction losses
- Repetitive peak reverse voltage specified from -40 °C to +175 °C

1 Characteristics

Table 2. Absolute ratings (limiting values at $T_j = 25\text{ °C}$, unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage	$T_j = -40\text{ °C to }+175\text{ °C}$	600	V
$I_{F(RMS)}$	RMS forward current		113	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$ square wave	$T_c = 105\text{ °C}$	80	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10\text{ ms sinusoidal}$	400	A
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Operating junction temperature range		-40 to +175	°C

Table 3. Thermal parameters

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case	0.3	°C/W

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit	
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$	-	0.2	50	μA
		$T_j = 150\text{ °C}$		-	0.2	2	mA
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 20\text{ A}$	-	1.7	2.2	V
		$T_j = 150\text{ °C}$		-	1.0	1.3	
		$T_j = 150\text{ °C}$	$I_F = 80\text{ A}$	-	1.65	2.15	

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:

$$P = 1.43 \times I_{F(AV)} + 0.009 \times I_{F(RMS)}^2$$

Table 5. Dynamic electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit	
t_{rr}	Reverse recovery time	$T_j = 25\text{ °C}$	$I_F = 0.5\text{ A}, I_{rr} = 0.25\text{ A}, I_R = 1\text{ A}$	-	32	45	ns
			$I_F = 1\text{ A}, V_R = 30\text{ V}, dI_F/dt = -50\text{ A}/\mu\text{s}$	-	55	75	ns
I_{RM}	Reverse recovery current	$T_j = 125\text{ °C}$	$I_F = 80\text{ A}, dI_F/dt = -200\text{ A}/\mu\text{s}, V_R = 400\text{ V}$	-	14	-	A
S_{factor}	Softness factor			-	0.4	-	-
Q_{rr}	Reverse recovery charges			-	900	-	nC
t_{fr}	Forward recovery time	$T_j = 25\text{ °C}$	$I_F = 80\text{ A}, dI_F/dt = 200\text{ A}/\mu\text{s}, V_{FR} = 1.1 \times V_{Fmax}$	-	-	800	ns
V_{FP}	Forward recovery voltage			-	3.6	-	V

Figure 1. Average forward power dissipation versus average forward current

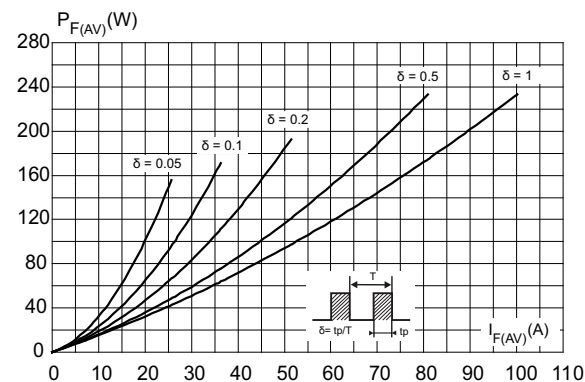


Figure 2. Forward voltage drop versus forward current (typical values)

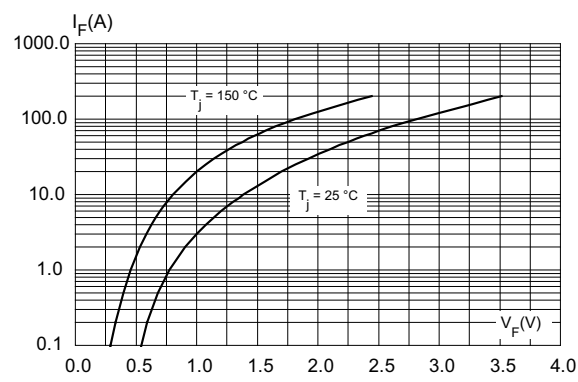


Figure 3. Forward voltage drop versus forward current (maximum values)

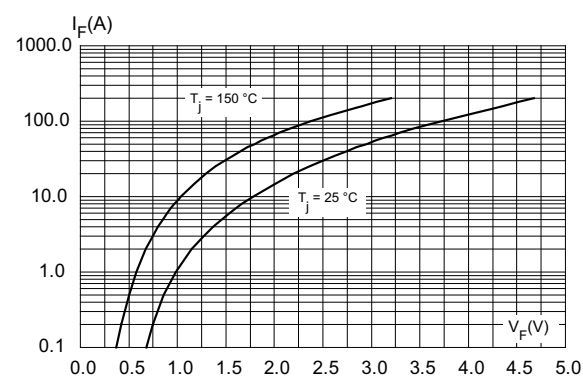


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

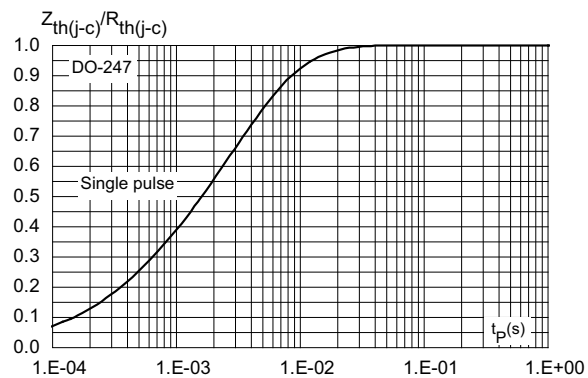


Figure 5. Peak reverse recovery current versus di_F/dt (typical values)

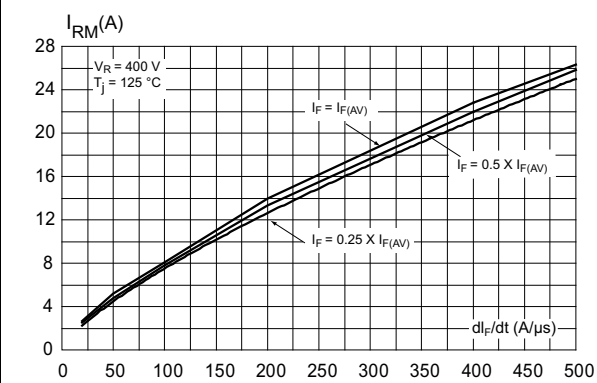


Figure 6. Reverse recovery time versus di_F/dt (typical values)

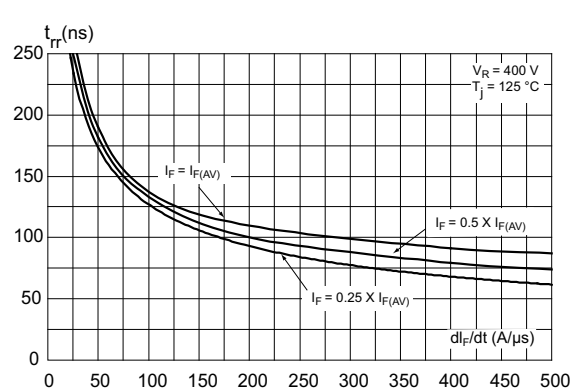


Figure 7. Reverse recovery charges versus di_F/dt (typical values)

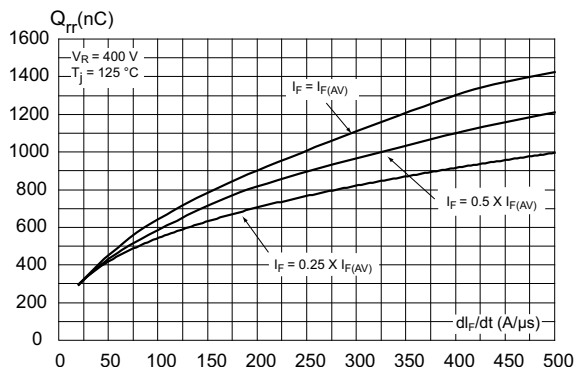


Figure 8. Softness factor versus di_F/dt (typical values)

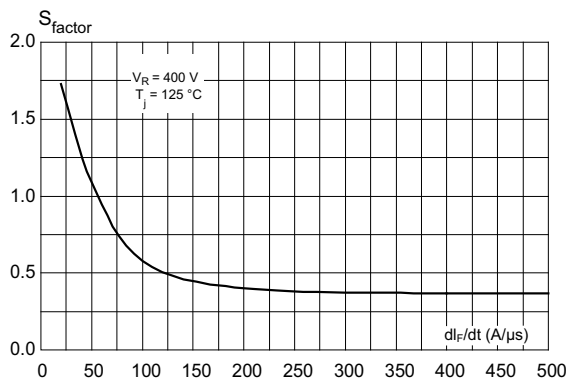


Figure 9. Relative variations of dynamic parameters versus junction temperature

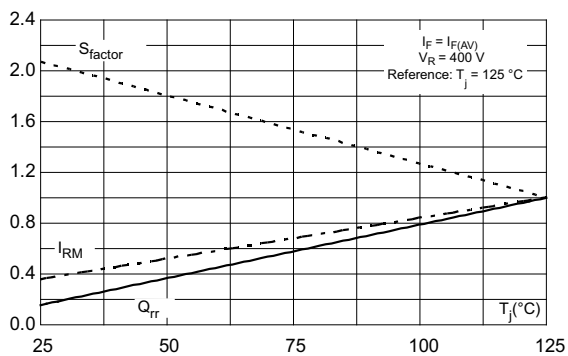


Figure 10. Transient peak forward voltage versus di_F/dt (typical values)

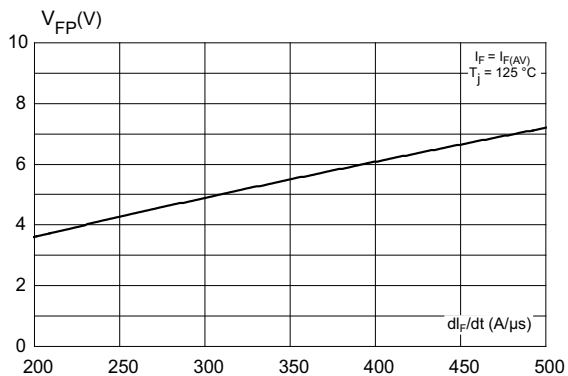


Figure 11. Forward recovery time versus di_F/dt (typical values)

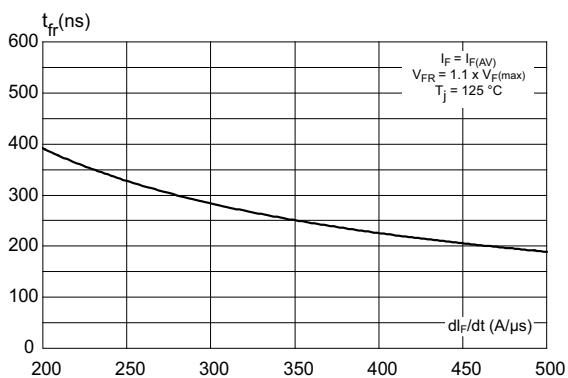
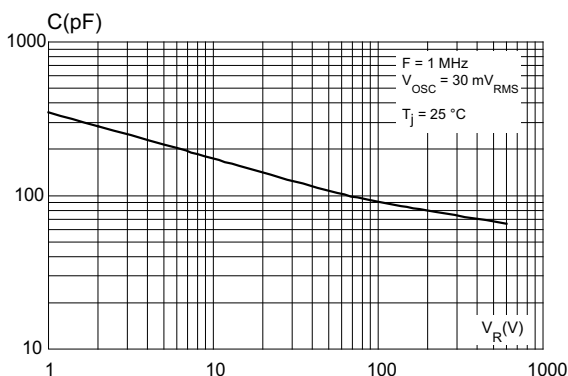


Figure 12. Junction capacitance versus reverse voltage applied (typical values)



2 Package information

- Epoxy meets UL94, V0
- Recommended torque value: 0.55 N·m
- Maximum torque value: 1.0 N·m

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.

2.1 DO-247 package information

Figure 13. DO-247 package outline

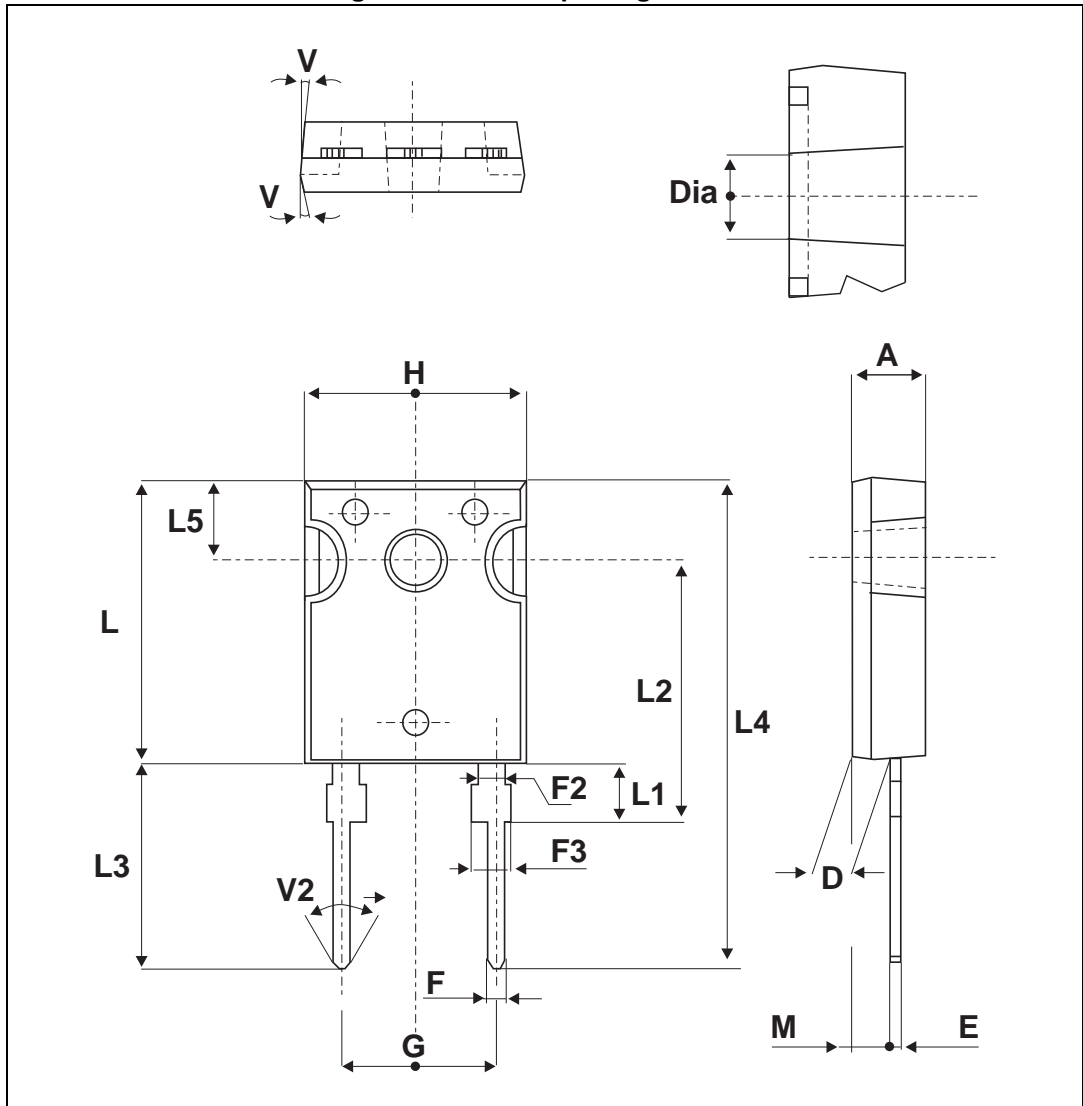


Table 6. DO-247 package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.85		5.15	0.191		0.203
D	2.20		2.60	0.086		0.102
E	0.40		0.80	0.015		0.031
F	1.00		1.40	0.039		0.055
F2		2.00			0.078	
F3	2.00		2.40	0.078		0.094
G		10.90			0.429	
H	15.45		15.75	0.608		0.620
L	19.85		20.15	0.781		0.793
L1	3.70		4.30	0.145		0.169
L2		18.50			0.728	
L3	14.20		14.80	0.559		0.582
L4		34.60			1.362	
L5		5.50			0.216	
M	2.00		3.00	0.078		0.118
V		5°			5°	
V2		60°			60°	
Dia.	3.55		3.65	0.139		0.143

3 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH80S06W	STTH80S06W	DO-247	4.40 g	30	Tube

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
22-Jul-2015	1	First issue.

IMPORTANT NOTICE – PLEASE READ CAREFULLY

STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2015 STMicroelectronics – All rights reserved