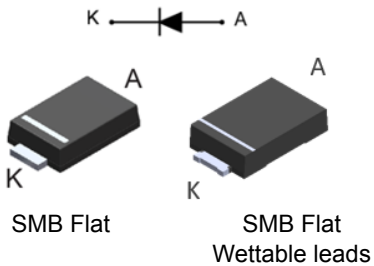


Automotive 2 A - 600 V turbo 2 ultrafast rectifier



Features

- AEC-Q101 qualified
- Ultrafast recovery
- Low switching losses
- High surge capability
- Low leakage current
- High junction temperature
- **ECOPACK2** or **ECOPACK3** compliant component on demand
- V_{RRM} guaranteed from -40 to +175 °C



Description

The **STTH2R06-Y** is an ultrafast recovery power rectifier dedicated to energy recovery in automotive application housed in SMB Flat to improve space saving.

It is especially designed for clamping function in energy recovery block.

The compromise between forward voltage drop and recovery time offers optimized performances.



Product status link

[STTH2R06-Y](#)

Product summary

$I_{F(AV)}$	2 A
V_{RRM}	600 V
T_j (max.)	175 °C
V_F (typ.)	1.1 V
T_{rr} (typ.)	35 ns

1 Characteristics

Table 1. Absolute ratings (limiting values at $T_j = 25\text{ °C}$, unless otherwise specified)

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage, $T_j = -40\text{ to }+175\text{ °C}$	600	V
$I_{F(AV)}$	Average forward current $T_L = 110\text{ °C } \delta = 0.5$	2	A
I_{FSM}	Forward surge current $t_p = 10\text{ ms}$	28	A
T_{stg}	Storage temperature range	-65 to + 175	°C
$T_j^{(1)}$	Operating temperature range	-40 to + 175	°C

1. $(dP_{tot}/dT_j) < (1/R_{th(j-a)})$ condition to avoid thermal runaway for a diode on its own heatsink.

Table 2. Thermal resistance

Symbol	Parameter	Value	Unit
$R_{th(j-l)}$	Junction to lead	18	°C/W

Table 3. Static electrical characteristic

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	-		2	μA
		$T_j = 125\text{ °C}$	-	12	85	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	-		1.9	V
		$T_j = 150\text{ °C}$	-	1.1	1.4	

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

2. Pulsetest: $t_p = 380\text{ }\mu\text{s}$, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 1.10 \times I_{F(AV)} + 0.15 I_F^2(RMS)$$

Table 4. Dynamic electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	$T_j = 25\text{ °C}$ $I_F = 1\text{ A}$; $dI_F/dt = -50\text{ A}/\mu\text{s}$; $V_R = 30\text{ V}$	-	35	50	ns
t_{fr}	Forward recovery time	$T_j = 25\text{ °C}$ $I_F = 2\text{ A}$; $dI_F/dt = 100\text{ A}/\mu\text{s}$; $V_{FR} = 2.5\text{ V}$	-		80	
V_{FP}	Forward recovery voltage		-		7	V

1.1 Electrical characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current

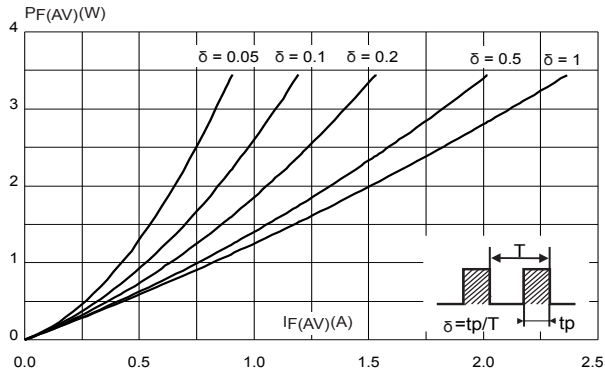


Figure 2. Forward voltage drop versus forward current (typical values)

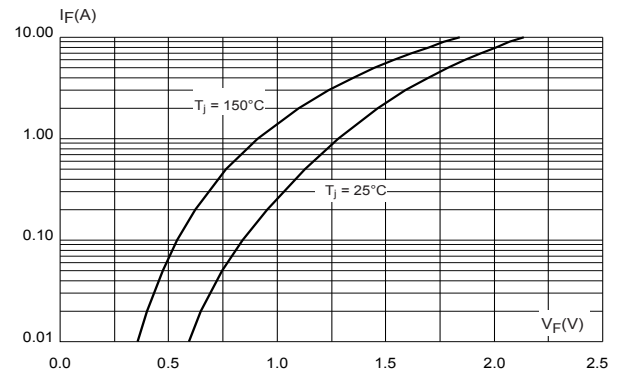


Figure 3. Forward voltage drop versus forward current (maximum values)

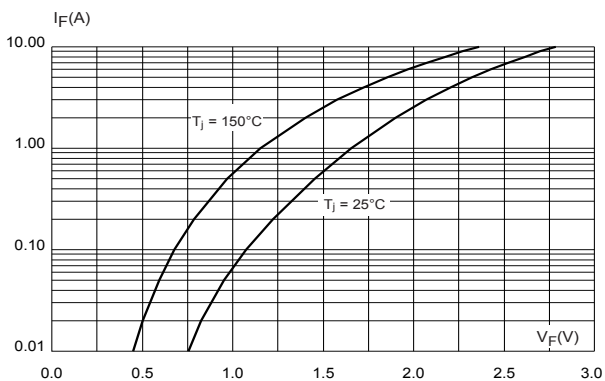


Figure 4. Relative variation of thermal impedance junction to lead versus pulse duration

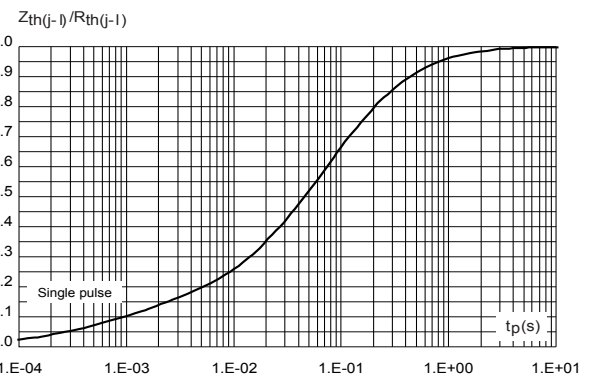


Figure 5. Peak reverse recovery current versus di_F/dt (typical values)

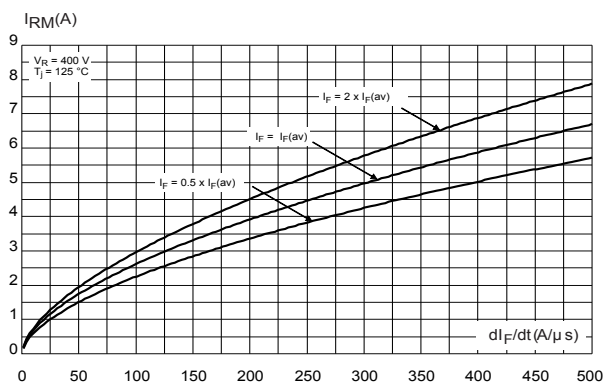


Figure 6. Reverse recovery time versus di_F/dt (typical values)

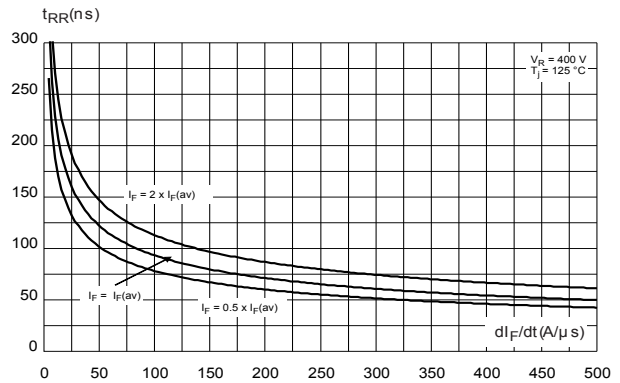


Figure 7. Reverse recovery charges versus dl_F/dt (typical values)

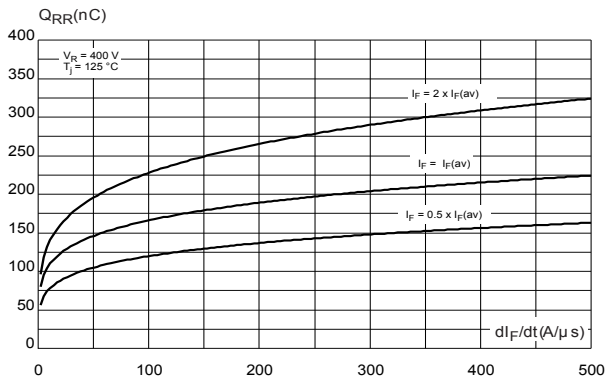


Figure 8. Relative variation of dynamic parameters versus junction temperature

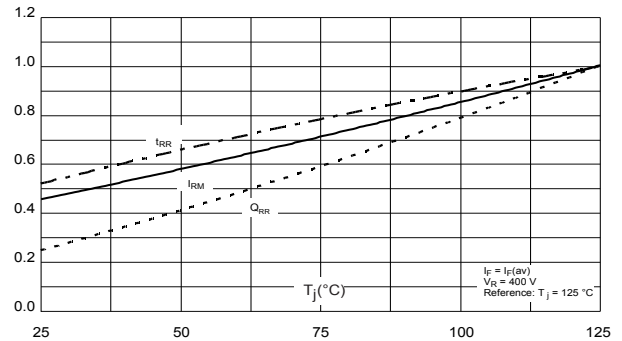


Figure 9. Transient peak forward voltage versus dl_F/dt (typical values)

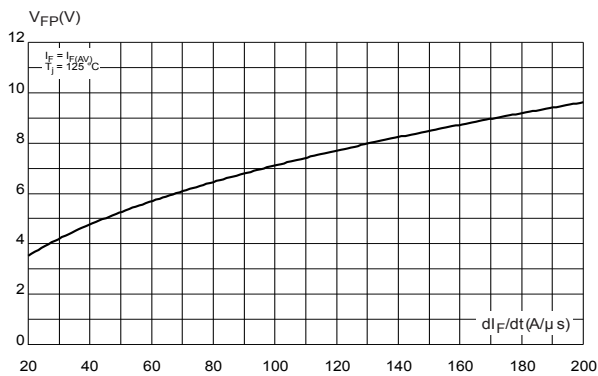


Figure 10. Forward recovery time versus dl_F/dt (typical values)

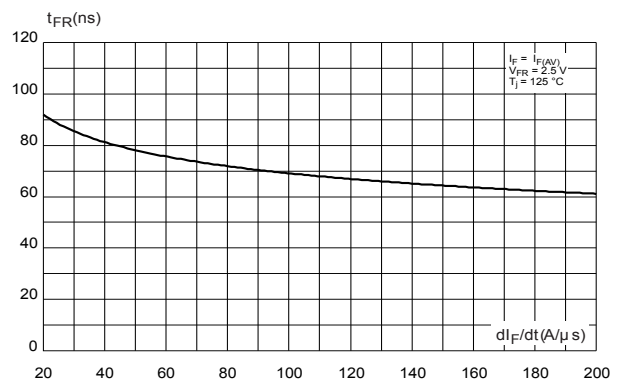


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

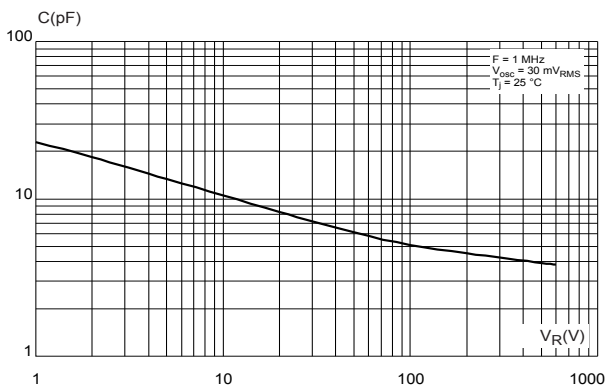
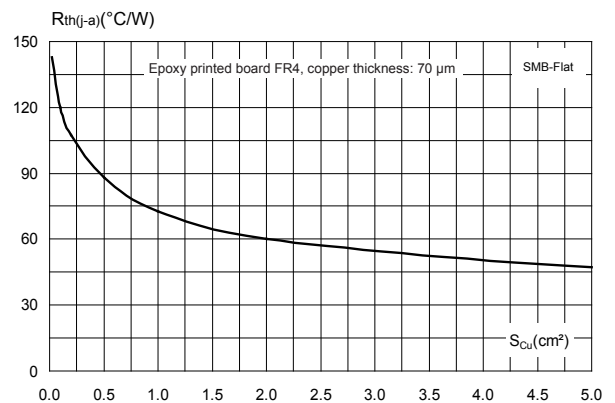


Figure 12. Thermal resistance junction to ambient versus copper surface under each lead



2 Package information

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 SMB Flat package information

- Epoxy meets UL94, V0
- Lead-free package

Figure 13. SMB Flat package outline

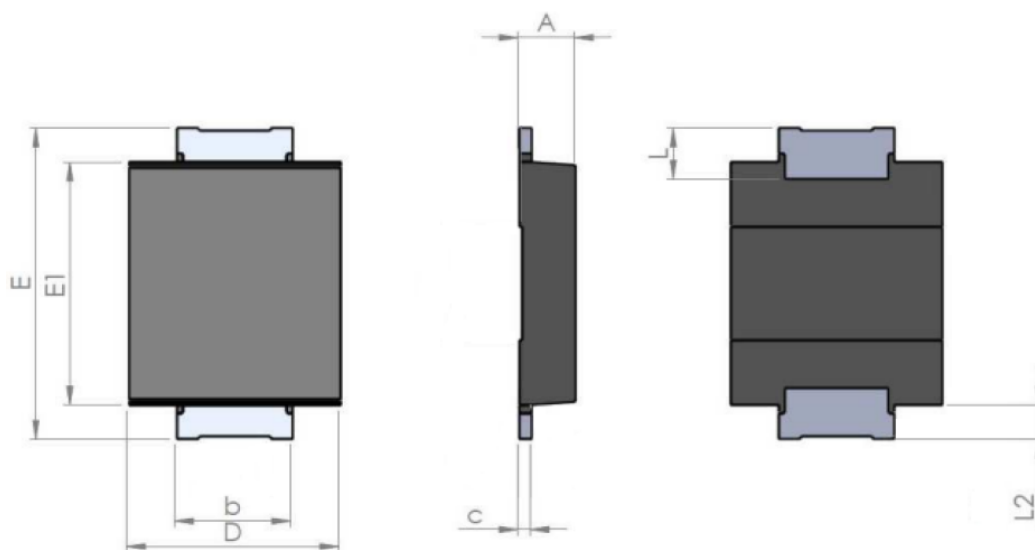
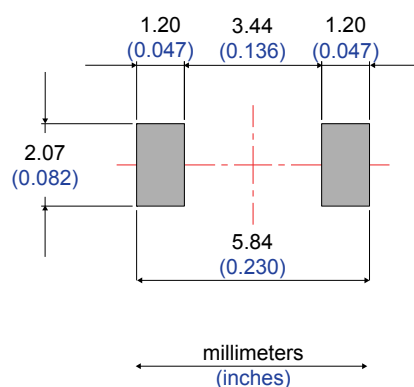


Table 5. SMB Flat mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.10	0.035		0.043
b	1.95		2.20	0.077		0.087
c	0.15		0.40	0.006		0.016
D	3.30		3.95	0.130		0.156
E	5.10		5.60	0.200		0.220
E1	4.05		4.60	0.159		0.181
L	0.75		1.50	0.030		0.060
L2		0.60			0.024	

Figure 14. Footprint recommendations, dimensions in mm (inches)



3 Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH2R06UFY	F2R6Y	SMBflat	50 mg	5000	Tape and reel

Revision history

Table 6. Document revision history

Date	Version	Changes
04-Aug-2014	1	Initial release.
02-May-2022	2	Updated Section 2.1 SMB Flat package information.

IMPORTANT NOTICE – 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 acknowledgment.

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. For additional information about ST trademarks, refer to www.st.com/trademarks. 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.

© 2022 STMicroelectronics – All rights reserved