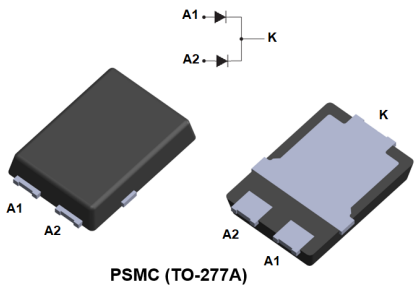
STTH602CSFY

Datasheet

Automotive 200 V, dual 3 A ultrafast rectifier



PSMC (TO-277A)

Features

- AEC-Q101 qualified
- PPAP capable
- 175 °C maximum operation junction temperature
- V_{RRM} guaranteed from -40 °C to 175 °C
- High surge current capability
- ECOPACK2 compliant component

Application

- Reverse polarity protection in E.C.U
- DC/DC converters
- Freewheeling diodes
- LED Lighting

Description

The STTH602CSFY has been developed for applications requiring an optimized VF and reverse recovery characteristics.

These characteristics make it ideal for use in secondary rectification functions, such as DC/DC converters or lighting applications.

Product status link
STTH602CSFY

Product summary	
Symbol	**Value**
$I_{F(AV)}$	2 X 3 A
V_{RRM}	200 V
t_{rr}(max)	24 ns
T_j (max.)	175 °C
V_F (typ.)	0.80 V

1 Characteristics

Table 1. Absolute ratings (limiting values per diode at 25 °C, unless otherwise specified)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage (T_j = -40 °C to +175 °C)			200	V
$I_{F(AV)}$	Average forward current, δ = 0.5	Per diode	T_c = 155 °C	3	A
		Per device	T_c = 155 °C	6	
I_{FSM}	Surge non repetitive forward current		t_p = 10 ms sinusoidal	55	A
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Operating junction temperature range			-40 to +175	°C

Table 2. Thermal resistance parameters

Symbol	Parameter		Typ.	Unit
$R_{th(j-c)}$	Junction to case	Total	2.14	°C/W

For more information, please refer to the following application note:

- AN5088: Rectifiers thermal management, handling and mounting recommendations

Table 3. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		4	µA
		T_j = 125 °C		-	3	30	
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 3 A	-	0.92	1.06	V
		T_j = 125 °C		-	0.80	0.92	
		T_j = 25 °C	I_F = 6 A	-	1.02	1.17	
		T_j = 125 °C		-	0.90	1.04	

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

To evaluate the conduction losses, use the following equation:

$P = 0.80 \times I_{F(AV)} + 0.040 \times I_F{}^2{}_{(RMS)}$

For more information, please refer to the following application notes related to the power losses:

- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses in a power diode

Table 4. Dynamic characteristics per diode at T_j = 25°C, unless otherwise specified

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	T_j = 25 °C	I_F = 1 A, dI_F/dt = -50 A/µs, V_R = 30 V	-	24	31	ns
			I_F = 1 A, dI_F/dt = -100 A/µs, V_R = 30 V	-	19	24	
I_{RM}	Reverse recovery current	T_j = 125 °C	I_F = 3 A, dI_F/dt = -200 A/µs, V_R = 160 V	-	4.8		A

1.1 Characteristics (curves)

Figure 1. Conduction losses versus average forward current (per diode)

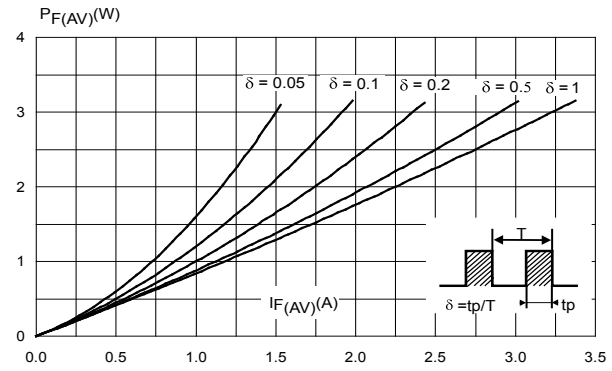


Figure 2. Forward voltage drop versus forward current (typical values, per diode)

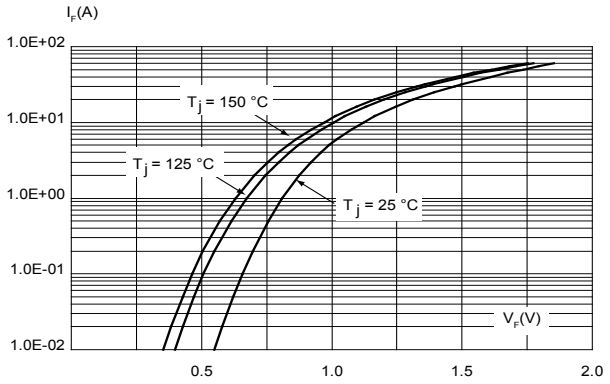


Figure 3. Forward voltage drop versus forward current (maximum values, per diode)

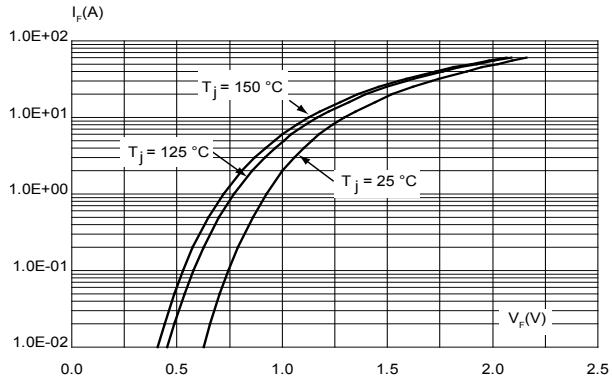


Figure 4. Relative variation of thermal impedance junction to case total versus pulse duration

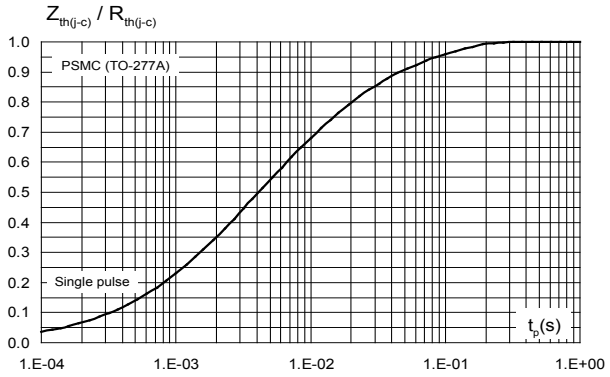


Figure 5. Peak reverse recovery current versus dIF/dt (typical values, per diode)

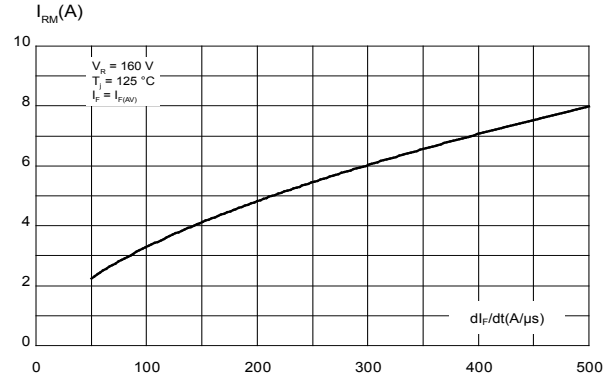


Figure 6. Reverse recovery time versus dIF/dt (typical values, per diode)

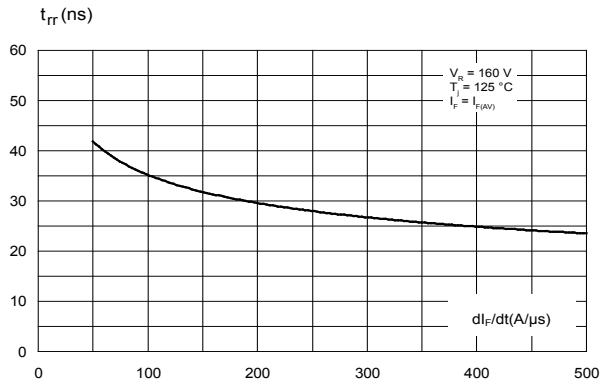


Figure 7. Reverse recovery charges versus dIF/dt (typical values, per diode)

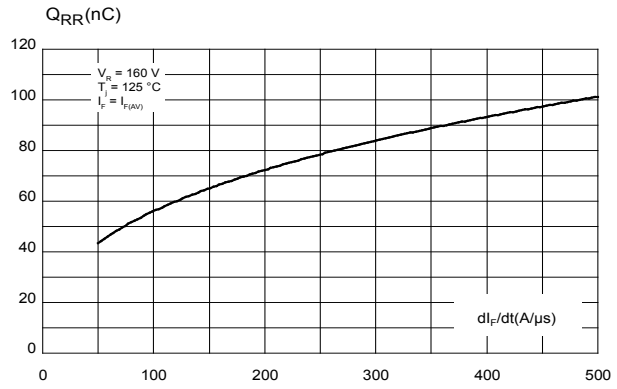


Figure 8. Reverse recovery softness versus dIF/dt (typical values, per diode)

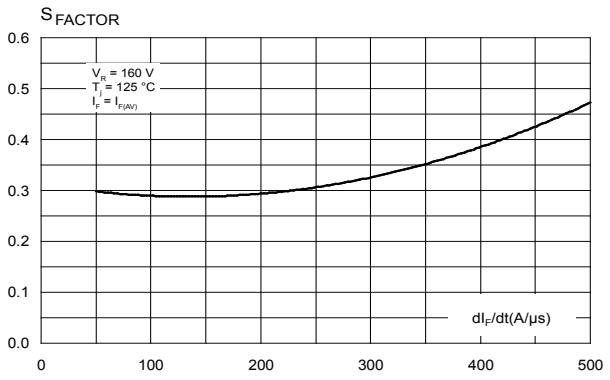


Figure 9. Relative variations of dynamic parameters versus junction temperature

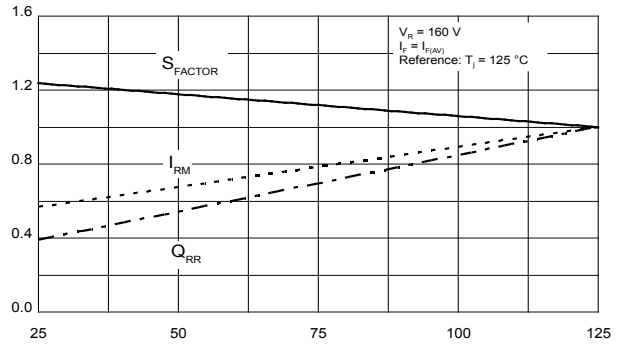


Figure 10. Junction capacitance versus reverse voltage applied (typical values, per diode)

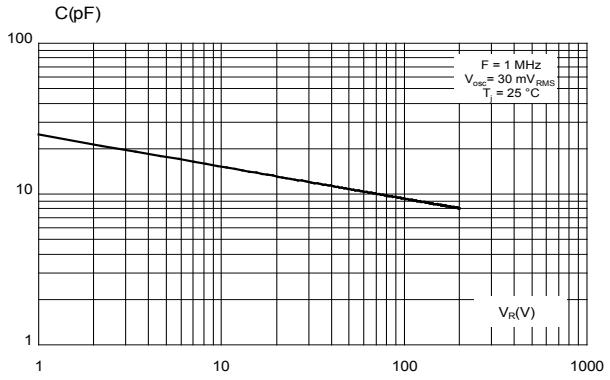
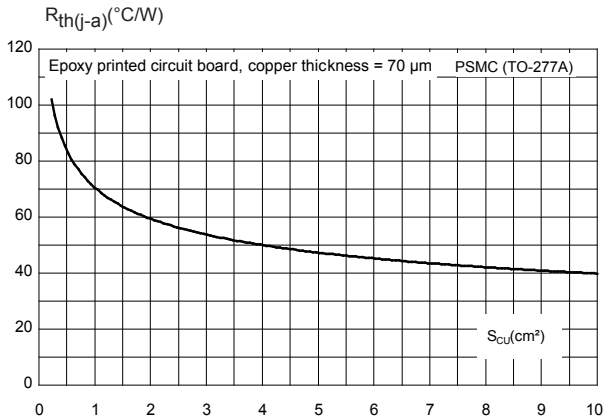


Figure 11. Thermal resistance junction to ambient versus copper surface under tab (typical values, epoxy printed board FR4, e_{Cu} = 70 µm) (PSMC (TO-277A))



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 PSMC (TO-277A) package information

- Epoxy meets UL94,V0
- Cooling method : by conduction (C)

Figure 12. PSMC (TO-277A) package outline

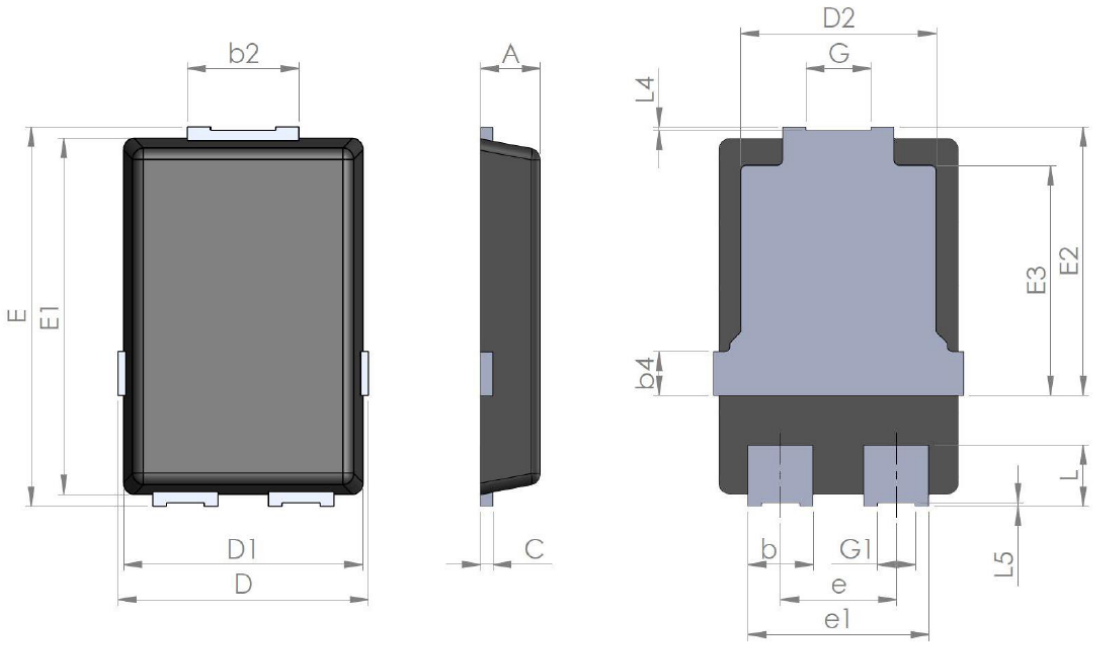
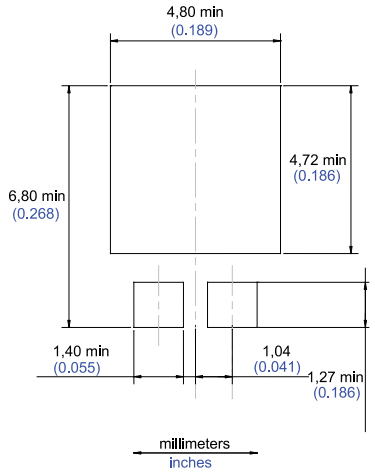


Table 5. PSMC (TO-277A) package mechanical data

Ref.	Dimensions					
	Millimeters			Inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	1.00	1.10	1.20	0.039	0.043	0.047
b	1.05	1.20	1.35	0.041	0.047	0.053
b2	1.90	2.05	2.20	0.075	0.081	0.087
b4		0.75			0.029	
C	0.15	0.23	0.40	0.006	0.009	0.016
D	4.45	4.60	4.75	0.175	0.181	0.187
D1	4.25	4.40	4.45	0.167	0.173	0.175
D2	3.40	3.60	3.70	0.134	0.142	0.146
E	6.35	6.50	6.65	0.250	0.256	0.262
E1	6.05	6.10	6.15	0.238	0.240	0.242
E2	4.50	4.60	4.70	0.177	0.181	0.185
E3		3.94			1.55	
e		2.13			0.084	
e1		3.33			0.131	
G		1.20			0.047	
G1		0.70			0.027	
L	0.90	1.05	1.24	0.035	0.041	0.049
L4	0.02			0.0008		
L5	0.02			0.0008		

Figure 13. PSMC (TO-277A) package footprint in mm (in inches)



Note: For package and tape orientation, reel and inner box dimensions and tape outline please check TN1173

3 Ordering information

Table 6. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH602CSFY	T602CY	PSMC (TO-277A)	90 mg	6000	Tape and Reel

Revision history

Table 7. **Document revision history**

Date	Version	Changes
06-Nov-2020	1	Initial release.

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. For additional information about ST trademarks, please 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.

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Rectifiers ***category:***

Click to view products by STMicroelectronics ***manufacturer:***

Other Similar products are found below :

70HFR40 RL252-TP 150KR30A 1N5397 NTE5841 NTE6038 SCF5000 1N4002G 1N4005-TR JANS1N6640US 481235F RRE02VS6SGTR 067907F MS306 70HF40 T85HFL60S02 US2JFL-TP A1N5404G-G CRS04(T5L,TEMQ) ACGRA4007-HF ACGRB207-HF CLH03(TE16L,Q) ACGRC307-HF ACEFC304-HF NTE6356 NTE6359 NTE6002 NTE6023 NTE6039 NTE6077 85HFR60 40HFR60 70HF120 85HFR80 D126A45C SCF7500 D251N08B SCHJ22.5K SM100 SCPA2 SCH10000 SDHD5K VS-12FL100S10 ACGRA4001-HF D1821SH45T PR D1251S45T NTE5990 NTE6358 NTE6162 NTE5850