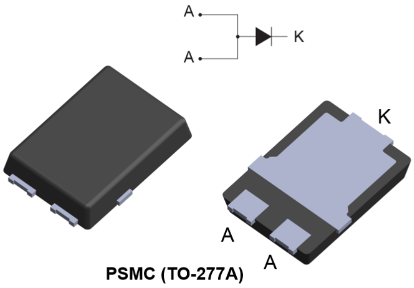
STTH802SFY

Datasheet

Automotive 200 V ultrafast recovery diode



Features

- AEC-Q101 qualified
- Very low conduction losses
- Negligible switching losses
- 175 °C maximum junction temperature
- V_{RRM} guaranteed from -40 °C to 175 °C
- Wettable flanks for automatic visual inspection
- PPAP capable
- ECOPACK®2 compliant component

Application

- DC/DC converters
- Reverse polarity protection
- Snubber
- Boost function
- Freewheeling diode

Description

The STTH802SFY ultrafast recovery diode has been designed for automotive applications.

Packaged in PSMC (TO-277A), this device provides a high level of performance in a compact and flat package which can withstand high operating junction temperature.

Product status link	
STTH802SFY	
Product summary	
Symbol	**Value**
$I_{F(AV)}$	8 A
V_{RRM}	200 V
T_j (max.)	175 °C
V_F (typ.)	0.79 V
t_{rr} (typ.)	17 ns

1 Characteristics

Table 1. **Absolute ratings (limiting values at 25 °C, unless otherwise specified with 2 anode terminals short-circuited)**

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	T_c = 145 °C , δ = 0.5 square pulse	8	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	150	A
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Operating junction temperature range(1)		-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 parameters**

Symbol	Parameter	Typ.	Unit
$R_{th(j-c)}$	Junction to case	2.4	°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 (anode terminals short-circuited)**

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		6	µA
		T_j = 125 °C		-	6	60	
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 8 A	-	0.94	1.08	V
		T_j = 125 °C		-	0.79	0.91	
		T_j = 150 °C		-	0.75	0.87	

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:

$P = 0.77 \times I_{F(AV)} + 0.018 \times I_F{}^2{}_{(RMS)}$

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 electrical characteristics (T_j = 25°C, unless otherwise specified)**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	I_F = 1.0 A, dI_F/dt = -50 A/µs, V_R = 30 V	-		35	ns
		I_F = 1.0 A, dI_F/dt = -100 A/µs, V_R = 30 V	-	17	22	

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{RM}	Reverse recovery current	I_F = 8 A, dI_F/dt = -200 A/µs, V_R = 160 V, T_j = 125 °C	-	5.8	7.5	A
Q_{rr}	Reverse recovery charge		-	100		nC

1.1 Characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current

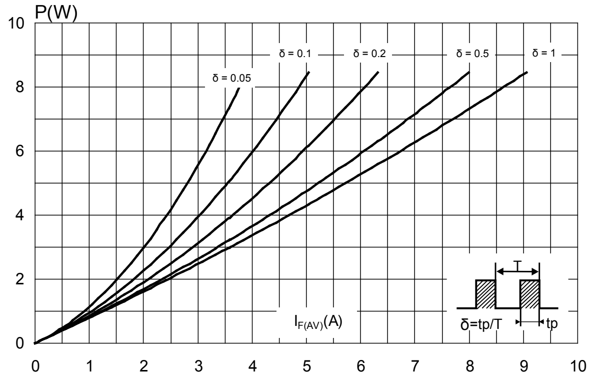


Figure 2. Forward voltage drop versus forward current (typical values)

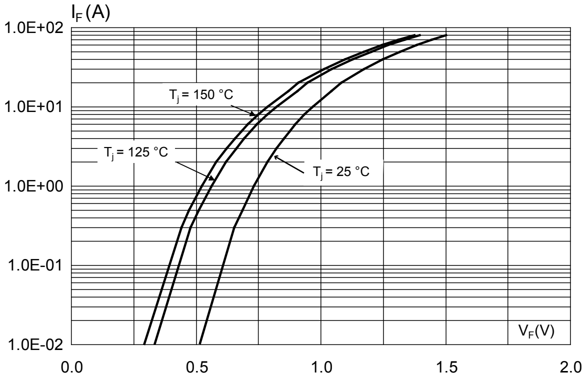


Figure 3. Forward voltage drop versus forward current (maximum values)

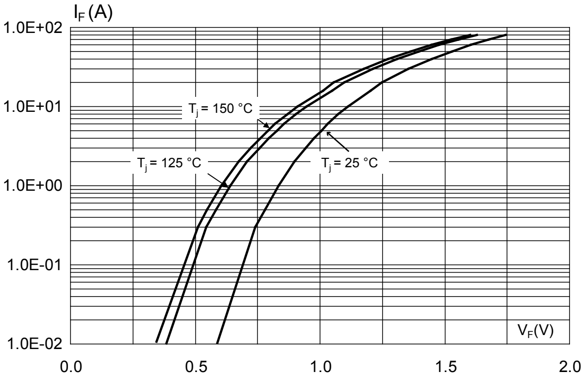


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

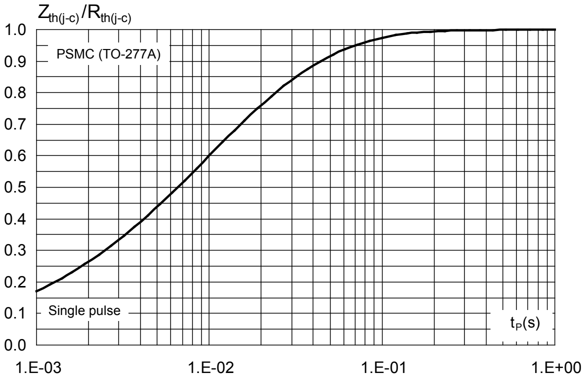


Figure 5. Peak reverse recovery current versus dI_F/dt (typical values)

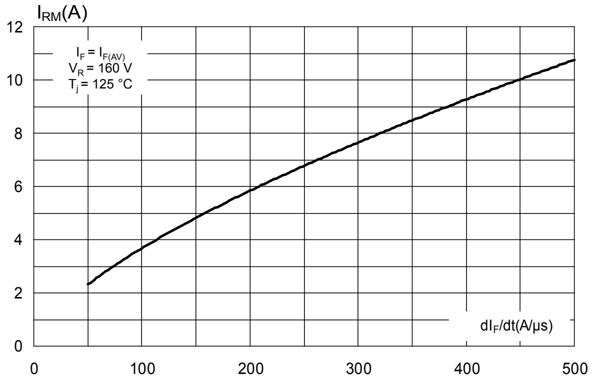


Figure 6. Reverse recovery time versus dI_F/dt (typical values)

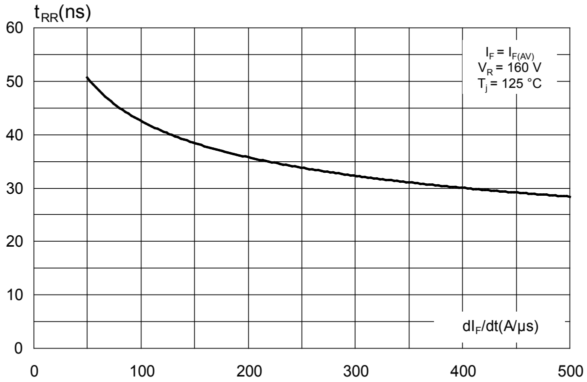


Figure 7. Reverse recovery charges versus dI_F/dt (typical values)

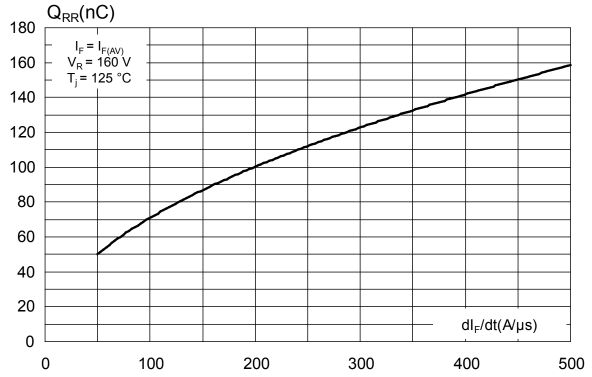


Figure 8. Reverse recovery softness factor versus dI_F/dt (typical values)

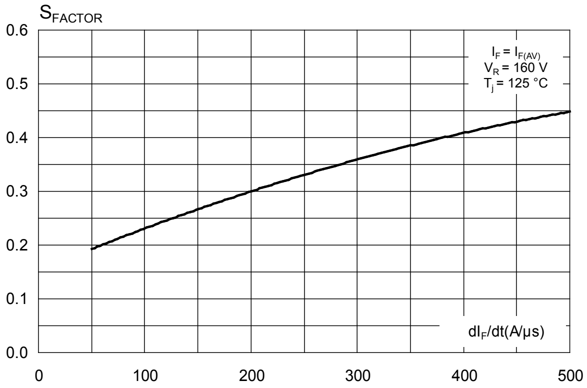


Figure 9. Relative variations of dynamic parameters versus junction temperature

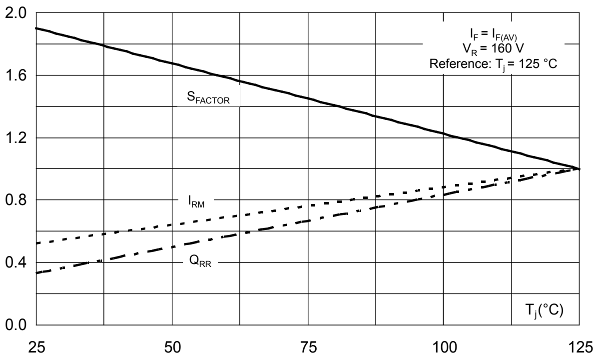


Figure 10. Junction capacitance versus reverse voltage applied (typical values)

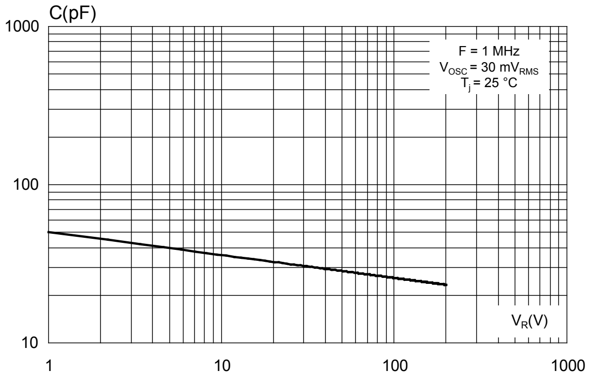
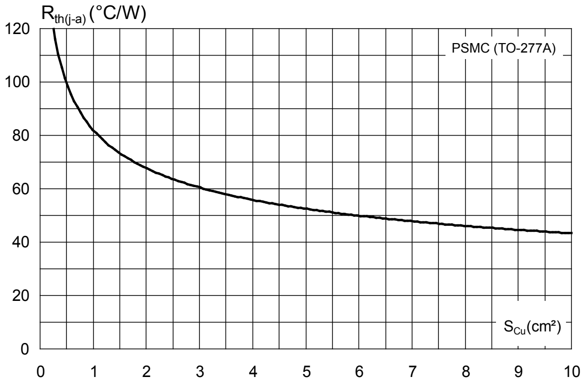


Figure 11. **Thermal resistance junction to ambient versus copper surface under tab (typical values, epoxy printed board FR4, e_{Cu} = 35 µm) (PSMC (TO-277A))**



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 (TO277-A) package information

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

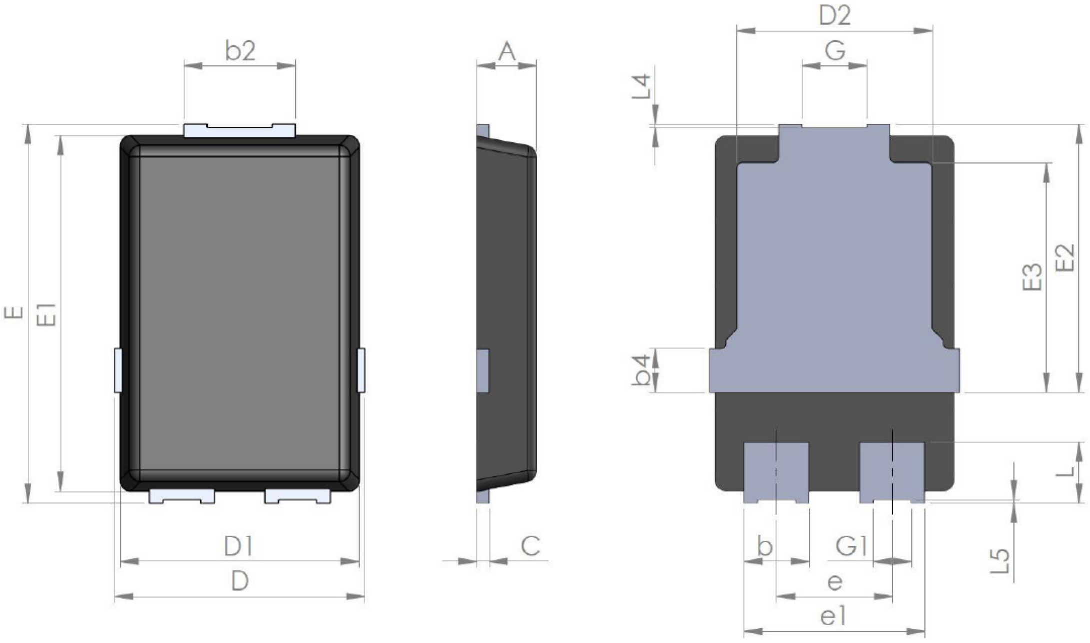
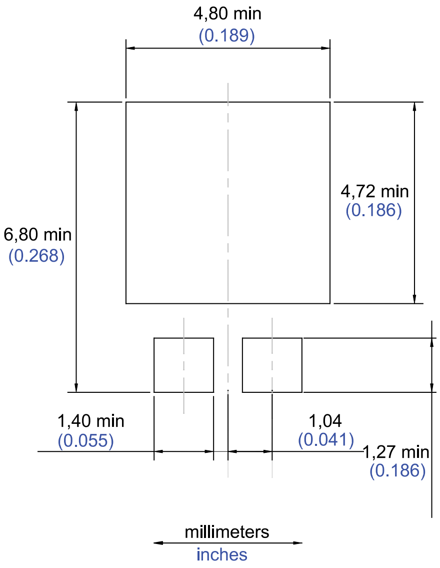


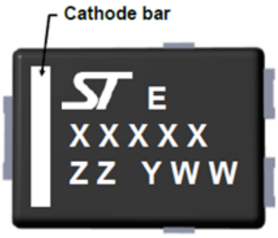
Table 5. PSMC (TO-277A) package mechanical data

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

Ref.	Dimensions					
	Millimeters			Inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
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**

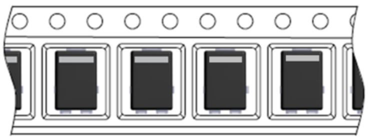




E : ECOPACK grade
XXXX : Marking
ZZ : Manufacturing location
Y : Year
WW : week

Figure 14. PSMC (TO-277A) marking

Figure 15. Package orientation in reel



Taped according to EIA-481
Note: Pocket dimensions are not on scale
Pocket shape may vary depending on package
Cathode band only on unidirectional devices

Figure 16. Tape and reel orientation

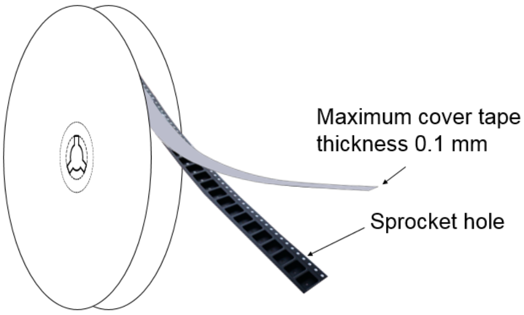


Figure 17. 13" reel dimension values

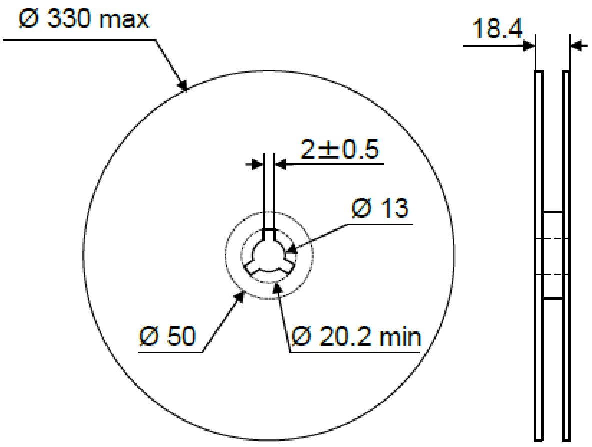


Figure 18. Inner box dimension values

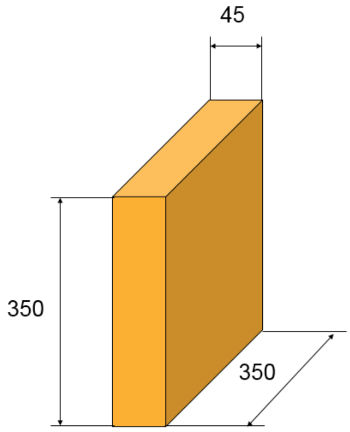
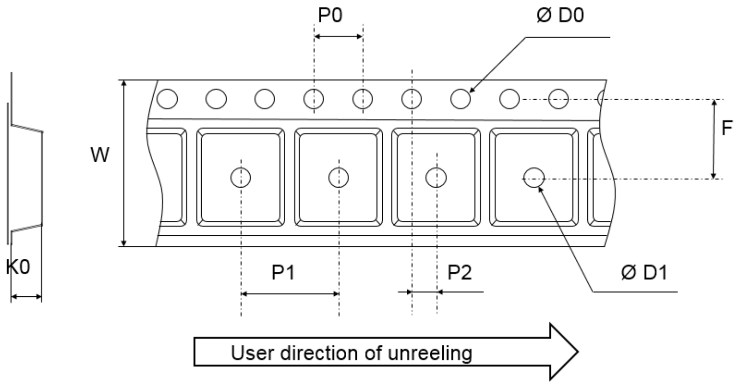


Figure 19. Tape outline



Note: Pocket dimensions are not on scale
Pocket shape may vary depending on package

Table 6. Tape dimension values

Ref.	Dimensions		
	Millimeters		
	Min.	Typ.	Max.
D0	1.5	1.55	1.6
D1	1.5		
F	5.45	5.5	5.55
K0	1.3	1.4	1.5
P0	3.9	4.0	4.1
P1	7.9	8.0	8.1
P2	1.95	2.0	2.05
W	11.7	12	12.3

3 Ordering information

Table 7. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH802SFY	TH802Y	PSMC (TO-277A)	90 mg	6000	Tape and Reel

Revision history

Table 8. **Document revision history**

Date	Version	Changes
07-Jul-2018	1	Initial release.

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
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http://moschip.ru/get-element

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