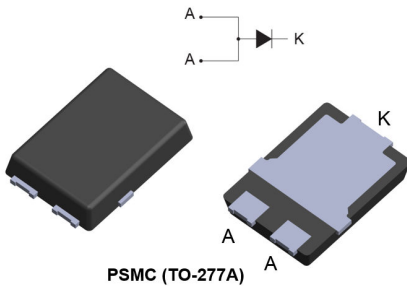



## Automotive 100 V - 8 A power Schottky trench rectifier



## Features

- AEC-Q101 qualified 
- PPAP capable
- Low forward voltage drop
- Low recovery charges
- Reduces conduction, reverse and switching losses
- 100% Avalanche tested in production
- Operating  $T_j$  from  $-40\text{ }^\circ\text{C}$  to  $+175\text{ }^\circ\text{C}$
- Flat packages
- ECOPACK2 compliant



## Product label



## Product status link

[STPST8H100-Y](#)

## Product summary

$I_{F(AV)}$	8 A
$V_{RRM}$	100 V
$T_j$ (max.)	$175\text{ }^\circ\text{C}$
$V_F$ (typ.)	0.560 V

## Applications

- Automotive LED lighting
- Flyback topology
- On-board DC/DC converter
- ECU power supply

## Description

This 8 A, 100 V rectifier is based on ST trench technology that achieves the best-in-class  $V_F/I_R$  trade-off for a given silicon surface.

Integrated in flat and space-saving packages, this STPST8H100-Y trench, and automotive-graded device is intended to be used in high frequency miniature switched mode power supplies such as in automotive, DC/DC converters or ECU power supply. It is also adapted to freewheeling applications, OR-ring, or reverse polarity protection.

# 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 ( $T_j = -40\text{ °C}$ to $+175\text{ °C}$ )		100	V
$I_{F(AV)}$	Average forward current, $\delta = 0.5$ , square wave	$T_c = 155\text{ °C}$	8	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10\text{ ms}$ sinusoidal	200	A
$I_{AS}$	Single pulse avalanche current <sup>(1)</sup>	$T_j = 25\text{ °C}$ , $L = 300\text{ }\mu\text{H}$ , $V_{DD} = 15\text{ V}$	12	A
$T_{stg}$	Storage temperature range		-65 to +175	°C
$T_j$	Maximum operating junction temperature range <sup>(2)</sup>		-40 to +175	°C

1. Please refer to [Figure 1](#) and [Figure 2](#) for the unclamped inductive switching test circuit, and waveform.

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

**Table 2. Thermal resistance parameter**

Symbol	Parameter	Typ. value	Unit
$R_{th(j-c)}$	Junction to case	1.4	°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**

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 125\text{ °C}$	$V_R = 70\text{ V}$	-	1.5	4.6	mA
		$T_j = 25\text{ °C}$	$V_R = 100\text{ V}$	-		17	$\mu\text{A}$
		$T_j = 125\text{ °C}$		-	3	10	mA
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 4\text{ A}$	-	0.530	0.590	V
		$T_j = 125\text{ °C}$		-	0.460	0.515	
		$T_j = 25\text{ °C}$	$I_F = 8\text{ A}$	-	0.625	0.695	
		$T_j = 125\text{ °C}$		-	0.560	0.615	

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:

$$P = 0.415 \times I_{F(AV)} + 0.025 \times I_F^2(\text{RMS})$$

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 on a power diode

Figure 1. Current and voltage waveforms for avalanche energy test across D.U.T (device under test)

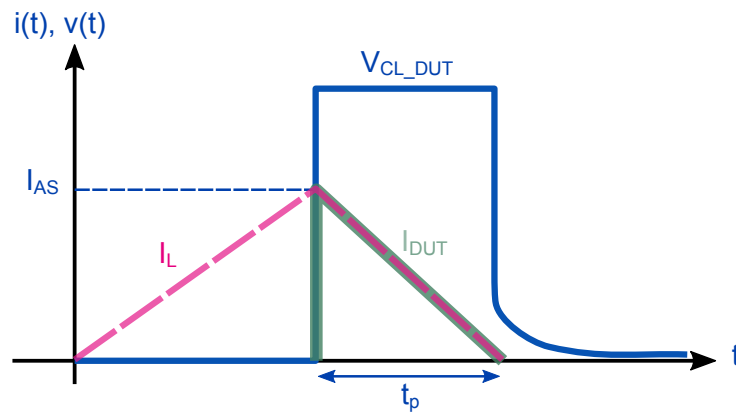
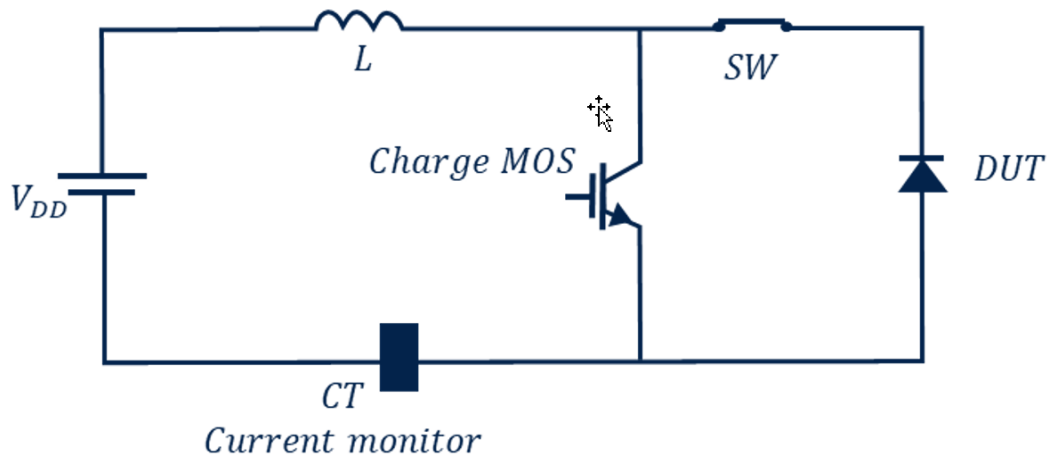


Figure 2. Unclamped Inductive Switching Test circuit

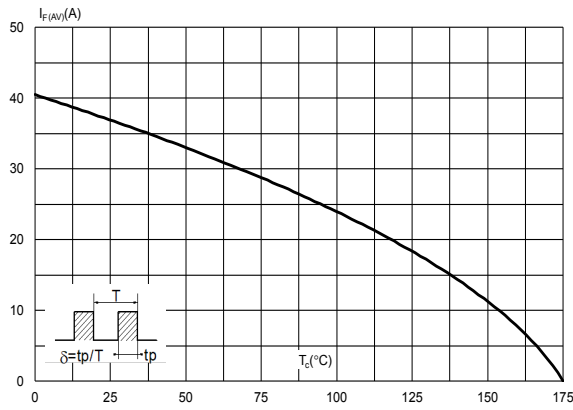


$$E_{AS} = \frac{1}{2} \times L \times I_{AS}^2 \times \left( \frac{V_{CLDUT}}{V_{CLDUT} - V_{DD}} \right) \cong \frac{1}{2} \times L \times I_{AS}^2$$

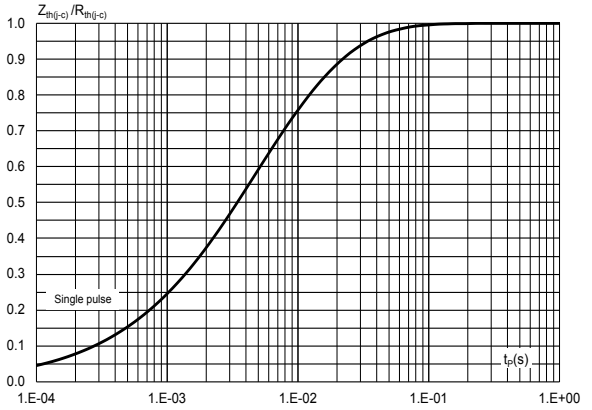
$$t_p = \left( \frac{L \times I_{AS}}{V_{CLDUT} - V_{DD}} \right)$$

## 1.1 Characteristics (curves)

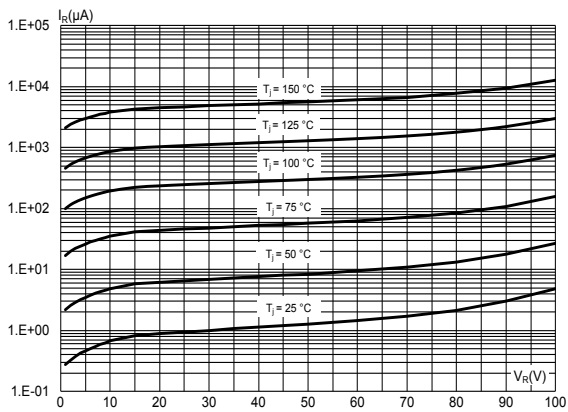
**Figure 3. Average forward current versus case temperature ( $\delta = 0.5$ )**



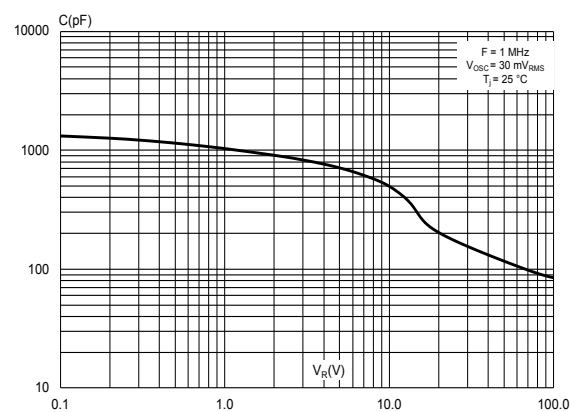
**Figure 4. Relative variation of thermal impedance junction to case versus pulse duration**



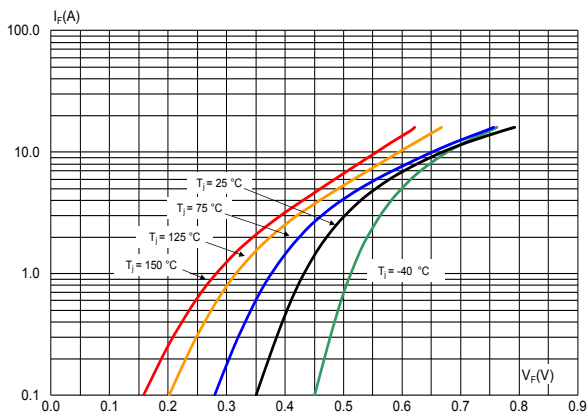
**Figure 5. Reverse leakage current versus reverse voltage applied (typical values)**



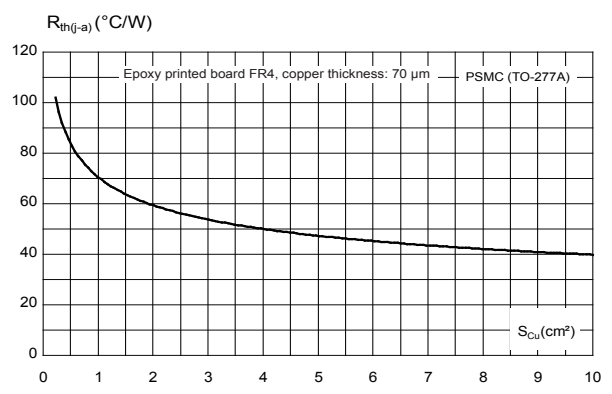
**Figure 6. Junction capacitance versus reverse voltage applied (typical values)**



**Figure 7. Forward voltage drop versus forward current (typical values)**



**Figure 8. Thermal resistance junction to ambient versus copper surface under tab (typical values, epoxy printed board FR4,  $e_{Cu} = 70 \mu\text{m}$ )**



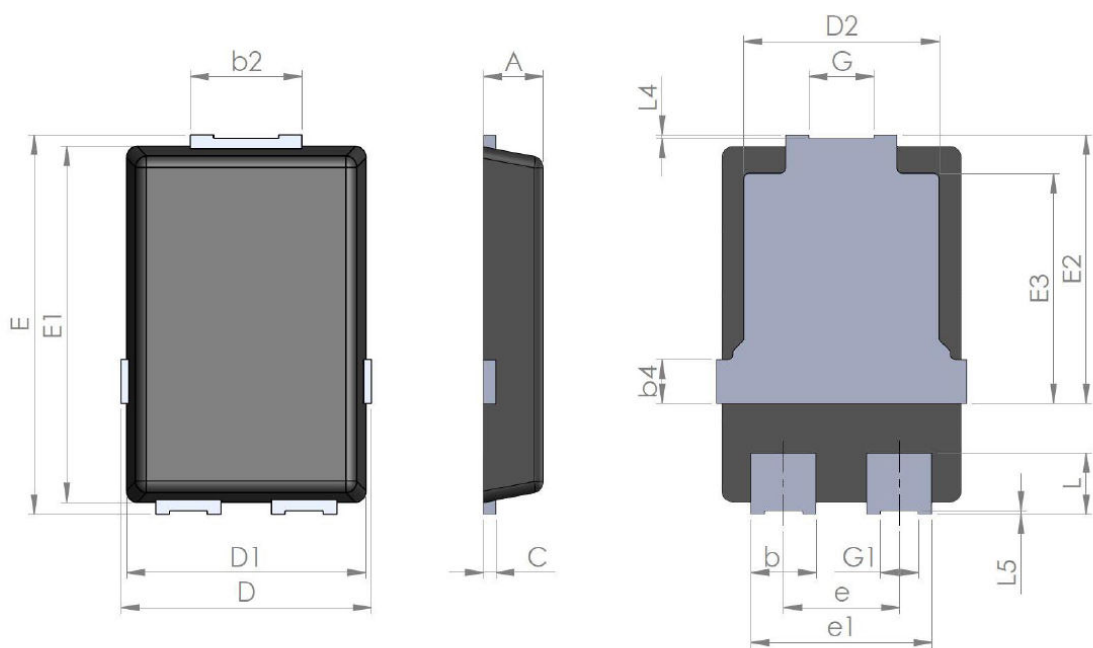
## 2 Package information

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](http://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 9. PSMC (TO-277A) package outline

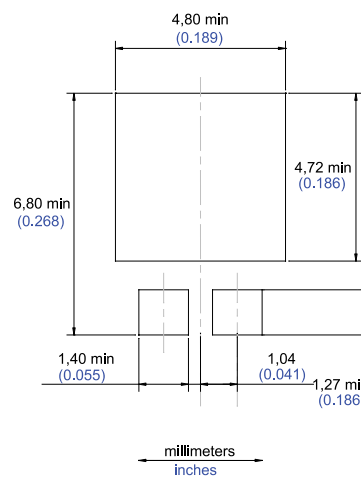


**Note:** This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 4. 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 10. 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 5. Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPST8H100SFY	T8H1Y	PSMC (TO-277A)	90.0 mg	6000	Tape and reel

## Revision history

**Table 6. Document revision history**

Date	Revision	Changes
02-Jan-2023	1	Initial release.
24-Jul-2023	2	Updated <i>Features</i> .



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