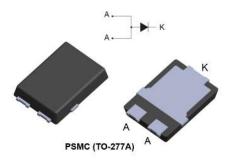


# STPS5L60SF

Datasheet

# 60 V power Schottky rectifier



## **Features**

- Low profile design package height of 1.1 mm typ.
- Wettable flanks for automatic visual inspection
- Low forward voltage drop
- Avalanche capability
- ECOPACK<sup>®</sup>2 compliant

## **Applications**

- Set-top box
- Battery charger
- DC/DC converter
- Notebook adapter
- Switching diode

### **Description**

This 60 V Schottky barrier rectifier has been optimized for use in high frequency miniature DC/DC converters, reverse battery protection, battery chargers and adaptors.

Packaged in PSMC (TO-277A), the STPS5L60SF provides a high level of performance in a compact and flat package which can withstand high operating junction temperature.

Product status link					
STPS5	STPS5L60SF				
Product summary					
Symbol	Symbol Value				
I <sub>F(AV)</sub>	5 A				
<b>V</b> <sub>RRM</sub> 60 ∨					
<b>T<sub>j</sub> (max.)</b> 150 °C					
<b>V<sub>F</sub> (typ.)</b> 0.40 ∨					

## 1 Characteristics

### Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified, anode terminals shortcircuited)

Symbol	Parameter	Value	Unit		
V <sub>RRM</sub>	Repetitive peak reverse voltage	epetitive peak reverse voltage			
I <sub>F(AV)</sub>	Average forward current , $\delta$ = 0.5 square pulse	T <sub>c</sub> = 135 °C	5	Α	
I <sub>FSM</sub>	Surge non repetitive forward current $t_p$ = 10 ms sinusoidal		220	Α	
P <sub>ARM</sub>	Repetitive peak avalanche power	280	W		
T <sub>stg</sub>	Storage temperature range	-65 to +175	°C		
Тj	Maximum operating junction temperature <sup>(1)</sup>	+150	°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	Parameter Typ. value	
R <sub>th(j-c)</sub>	Junction to case	1.9	°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.	Тур.	Max.	Unit
L (1)	IR <sup>(1)</sup> Reverse leakage current	T <sub>j</sub> = 25 °C		-		470	μA
'R` '		T <sub>j</sub> = 125 °C	V <sub>R</sub> = V <sub>RRM</sub>	-	50	150	mA
		T <sub>j</sub> = 25 °C	I <sub>F</sub> = 2.5 A	-		0.44	V
$\mathcal{M}_{-}(2)$	Forward voltage drap	T <sub>j</sub> = 125 °C		-	0.30	0.35	
V <sub>F</sub> <sup>(2)</sup> Forw	-	T <sub>j</sub> = 25 °C	I <sub>F</sub> = 5 A	-		0.51	V
		T <sub>j</sub> = 125 °C		-	0.40	0.46	

1. Pulse test:  $t_p = 5 ms$ ,  $\delta < 2\%$ 

2. Pulse test:  $t_p = 380 \ \mu s, \ \delta < 2\%$ 

To evaluate the maximum conduction losses, use the following equation:

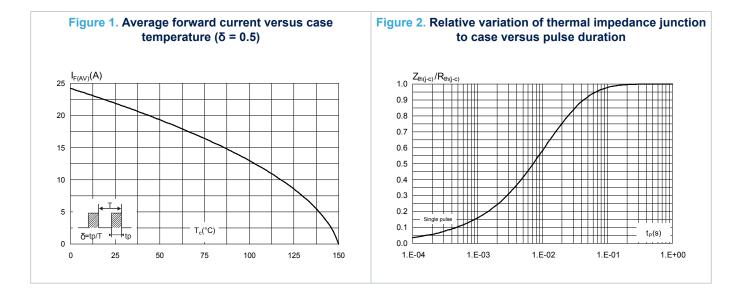
 $P = 0.24 \text{ x } I_{F(AV)} + 0.044 \text{ x } I_{F}^{2}(RMS)$ 

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



## 1.1 Characteristics (curves)



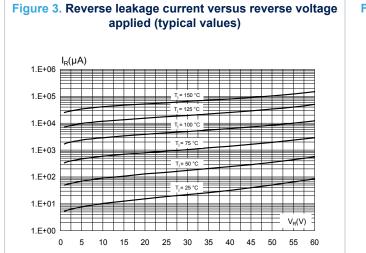
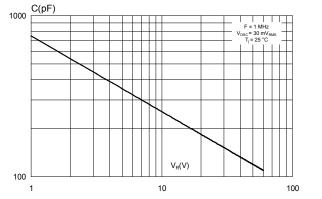


Figure 4. Junction capacitance versus reverse voltage applied (typical values)





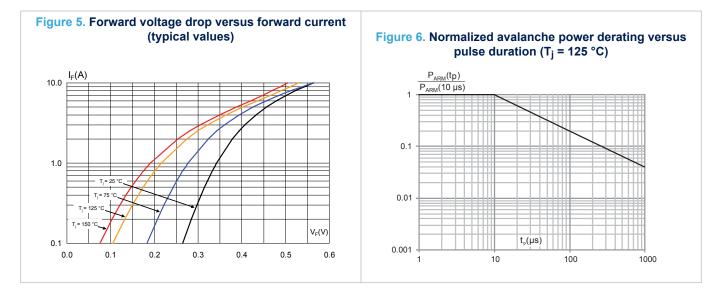
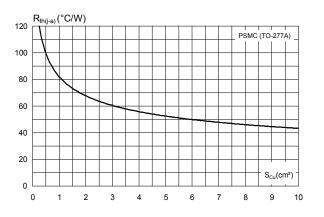


Figure 7. Thermal resistance junction to ambient versus copper surface under tab (typical values, epoxy printed board FR4,  $e_{Cu}$  = 35 µm) (PSMC (TO-277A))



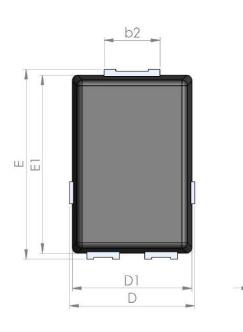
# 2 Package information

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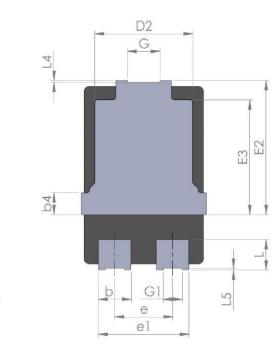
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: www.st.com. ECOPACK<sup>®</sup> is an ST trademark.

## 2.1 PSMC (TO-277A) package information

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



### Figure 8. PSMC (TO-277A) package outline



#### Table 4. PSMC (TO-277A) package mechanical data

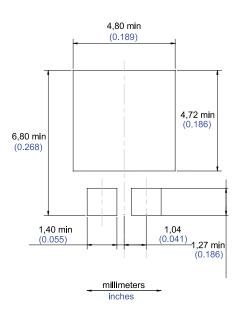
C

	Dimensions						
Ref.	Millimeters			Inches (for reference only)			
	Min.	Тур.	Max.	Min.	Тур.	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		
С	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	



	Dimensions							
Ref.		Millimeters			Inches (for reference only)			
	Min.	Тур.	Max.	Min.	Тур.	Max.		
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			
е		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				







# **3** Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS5L60SF	PS5L60	PSMC (TO-277A)	90 mg	6000	Tape and Reel

Table 5. Ordering information

# **Revision history**

### Table 6. Document revision history

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



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