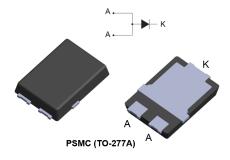




## 60 V power Schottky rectifier



#### **Features**

- Low profile design package height of 1.1 mm typ.
- · Wettable flanks for automatic visual inspection
- Low forward voltage drop
- Avalanche capability
- ECOPACK®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 STPS10M60SF provides a high level of performance in a compact and flat package which can withstand very high operating junction temperature.

Product status link				
STPS10M60SF				
Product summary				
Symbol	Symbol Value			
I <sub>F(AV)</sub>	10 A			
V <sub>RRM</sub>	60 V			
T <sub>j</sub> (max.)	175 °C			
V <sub>F</sub> (typ.)	0.53 V			



## 1 Characteristics

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

Symbol	Parameter	Value	Unit	
V <sub>RRM</sub>	Repetitive peak reverse voltage	60	V	
I <sub>F(AV)</sub>	Average forward current, δ = 0.5 square pulse	10	Α	
I <sub>FSM</sub>	Surge non repetitive forward current	230	Α	
P <sub>ARM</sub>	Repetitive peak avalanche power	258	W	
T <sub>stg</sub>	Storage temperature range	-65 to +175	°C	
T <sub>j</sub>	Maximum operating junction temperature <sup>(1)</sup> +175			

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

Table 2. Thermal resistance parameters

Symbol	Parameter	Typ. value	Unit
R <sub>th(j-c)</sub>	Junction to case	2	°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)	I <sub>R</sub> <sup>(1)</sup> Reverse leakage current	T <sub>j</sub> = 25 °C	\ \ -\\	-		50	μA
'R'		T <sub>j</sub> = 125 °C	$V_R = V_{RRM}$	-	8	25	mA
		T <sub>j</sub> = 25 °C	I <sub>F</sub> = 5 A	-		0.56	V
V <sub>F</sub> <sup>(2)</sup>	Converd valtage drep	T <sub>j</sub> = 125 °C		-	0.43	0.49	
v <sub>F</sub> · / Folward (	Forward voltage drop	T <sub>j</sub> = 25 °C	I <sub>F</sub> = 10 A	-		0.65	
		T <sub>j</sub> = 125 °C		-	0.53	0.60	

- 1. Pulse test:  $t_p$  = 5 ms,  $\delta$  < 2%
- 2. Pulse test:  $t_p = 380 \ \mu s, \ \delta < 2\%$

To evaluate the conduction losses, use the following equation:

 $P = 0.38 \times I_{F(AV)} + 0.022 \times I_{F}^{2}(RMS)$ 

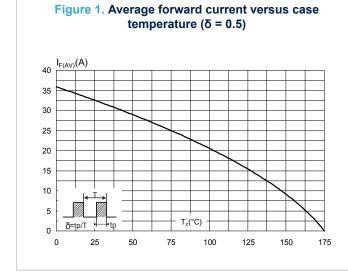
For more information, please refer to the following application notes related to the power losses:

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

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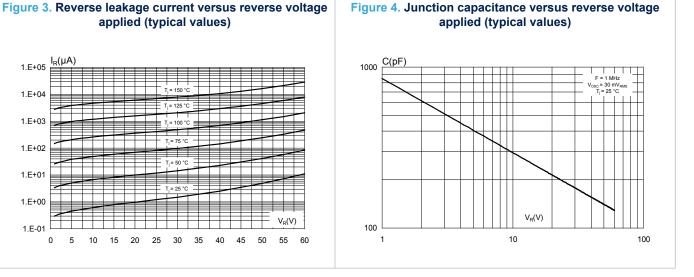
#### 1.1 **Characteristics (curves)**



to case versus pulse duration 1.0 0.9 0.8 0.7 0.6 0.5 0.3 0.2 0.1  $t_P(s)$ 0.0 1.E-04 1.E-03 1.E-02 1.E-01 1.E+00

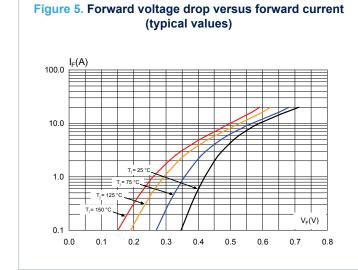
Figure 2. Relative variation of thermal impedance junction

applied (typical values) 1.E+05 1.E+04 1.E+03 T<sub>j</sub> = 75 °C 1.E+02 1.E+01 1.E-01



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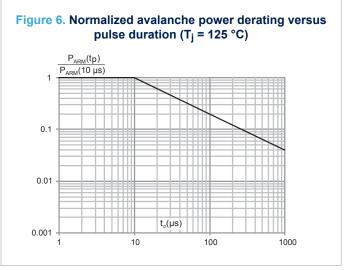
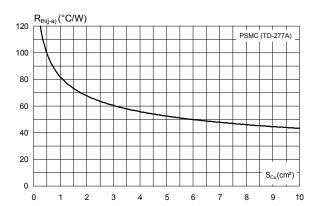


Figure 7. Thermal resistance junction to ambient versus copper surface under tab (typical values, epoxy printed board FR4,  $e_{Cu}$  = 35  $\mu$ m) (PSMC (TO-277A))



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## Package information

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)

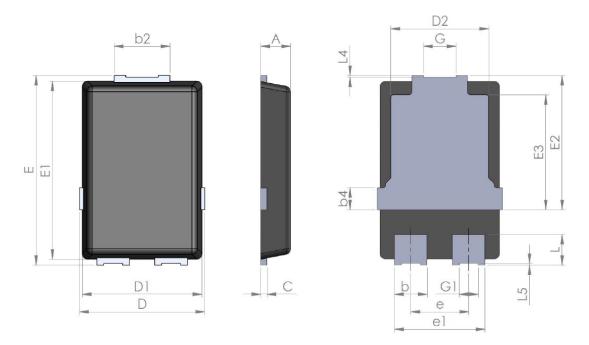


Figure 8. PSMC (TO-277A) package outline

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

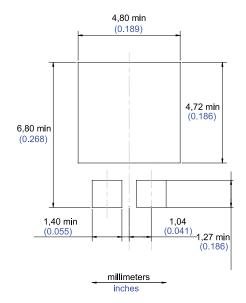
	Dimensions							
Ref.		Millimeters			Inches (for reference only)			
	Min.	Тур.	Max.	Min.	Тур.	Max.		
Α	1.00	1.10	1.20	0.039	0.043	0.047		
b	1.05	1.20	1.35	0.041	0.047	0.053		
b2	1.90	2.05	2.20	0.075	0.081	0.087		
b4		0.75			0.029			
С	0.15	0.23	0.40	0.006	0.009	0.016		
D	4.45	4.60	4.75	0.175	0.181	0.187		
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		

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	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			

Figure 9. PSMC (TO-277A) package footprint in mm (in inches)



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# 3 Ordering information

**Table 5. Ordering information** 

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS10M60SF	PS10M60	PSMC (TO-277A)	90 mg	6000	Tape and Reel

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## **Revision history**

**Table 6. Document revision history** 

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

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