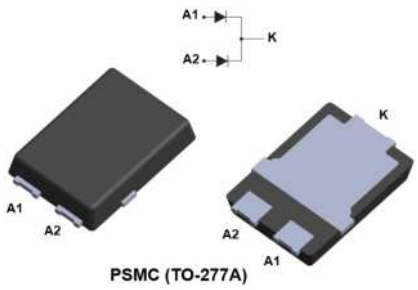
STPS10L40CSF

Datasheet

40 V, 2 x 5 A low forward voltage power Schottky rectifier



PSMC (TO-277A)

Features

- Low profile design – 1.1mm package typical height
- Wettable flanks for automatic visual inspection
- Very low conduction losses
- High forward surge current capability
- ECOPACK2 compliant

Applications

- DC/DC converter
- Stand by power
- Oring
- Polarity protection

Description

This 2 x 5 A, 40 V Schottky diode is suitable for power supply, especially for lighting power, as well as auxiliary power in server or telecom SMPS.

Packaged in PSMC (TO-277A), this STPS10L40CSF, dual diode device provides a high level of efficiency in a compact and flat package is ideal for oring function in server for instance.

Product status link
STPS10L40CSF

Product summary	
$I_{F(AV)}$	2 x 5 A
V_{RRM}	40 V
T_j (max.)	150 °C
V_F (typ.)	0.370 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			40	V
$I_{F(AV)}$	Average forward current, δ = 0.5 square wave	T_c = 135 °C(1)	Per diode	5	A
			Per device	10	
P_{ARM}	Repetitive avalanche power	t_p = 10 µs	T_j = 125 °C	165	W
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal		120	A
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Maximum operating junction temperature(2)			+150	°C

1. *Value based on $R_{th(j-c)}$(max.).*
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, per device	PSMC (TO-277)	1.0	°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	$V_R = V_{RRM}$	-		125	µA
		T_j = 125 °C		-	30	50	mA
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 5 A	-		0.495	V
		T_j = 125 °C		-	0.370	0.430	
		T_j = 25 °C	I_F = 10 A	-		0.600	
		T_j = 125 °C		-	0.505	0.590	

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:

$P = 0.25 \times I_{F(AV)} + 0.036 \times I_F{}^2{}_{(RMS)}$

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 on a power diode

1.1 Characteristics (curves)

Figure 1. Average forward current versus case temperature (δ = 0.5, per diode)

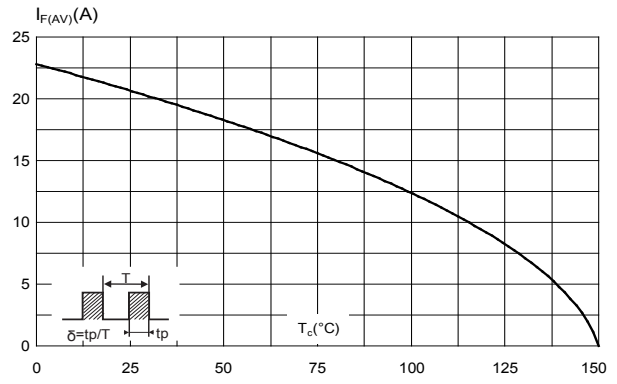


Figure 2. Relative variation of thermal impedance junction to case versus pulse duration

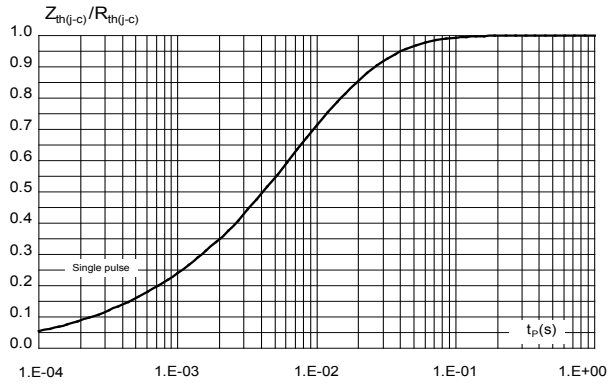


Figure 3. Reverse leakage current versus reverse voltage applied (typical values, per diode)

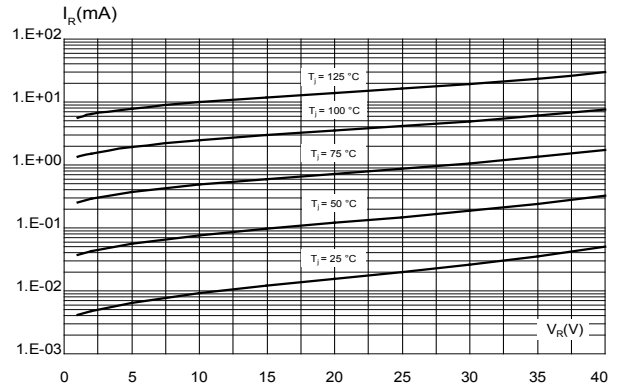


Figure 4. Junction capacitance versus reverse voltage applied (typical values, per diode)

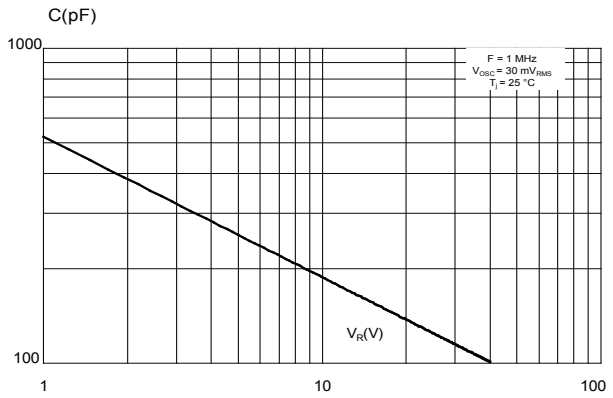


Figure 5. Forward voltage drop versus forward current (typical values, per diode)

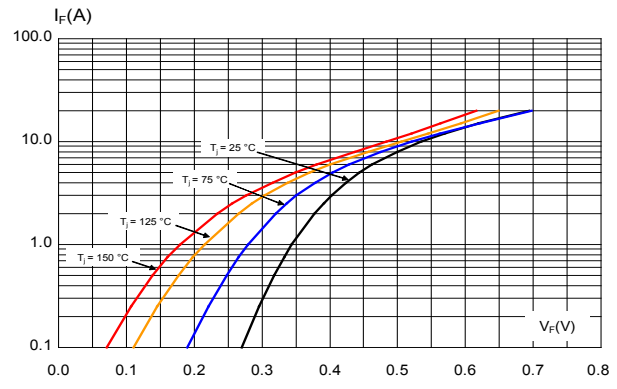


Figure 6. Thermal resistance junction to ambient versus copper surface under tab (typical values, epoxy printed board FR4, e_{Cu}= 70 µm)

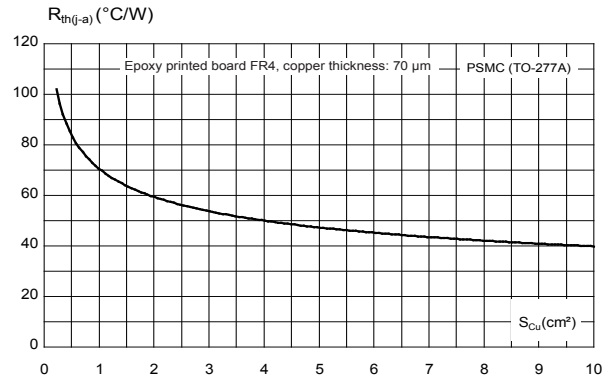
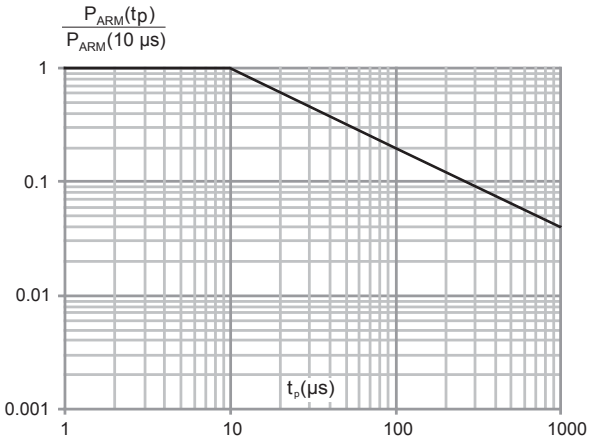


Figure 7. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)



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 8. PSMC (TO-277A) package outline

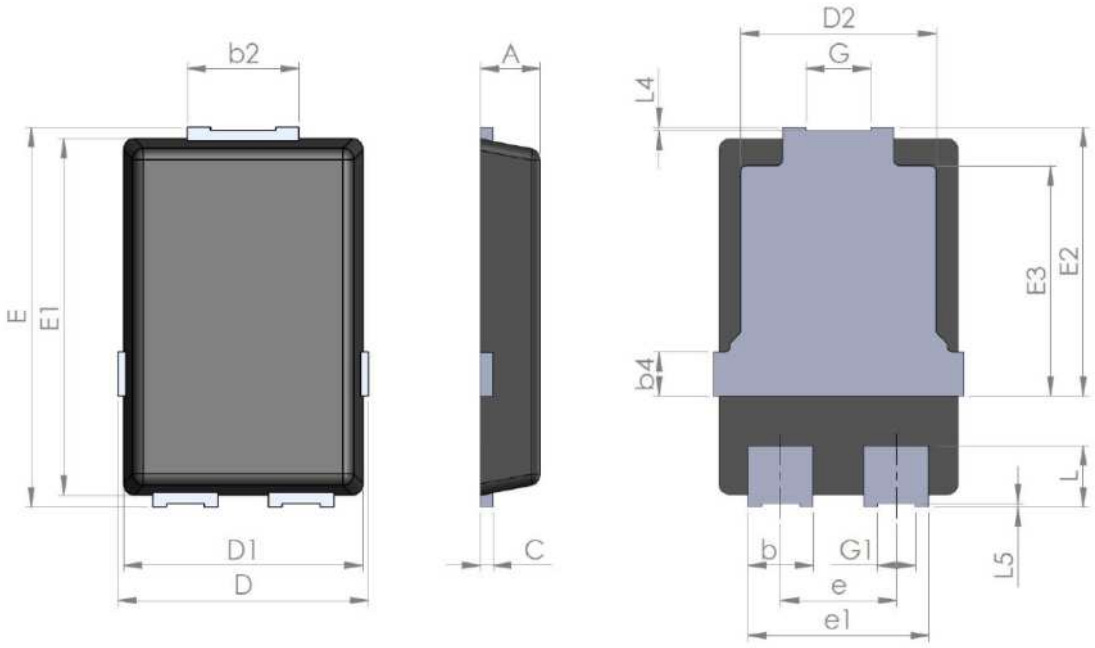
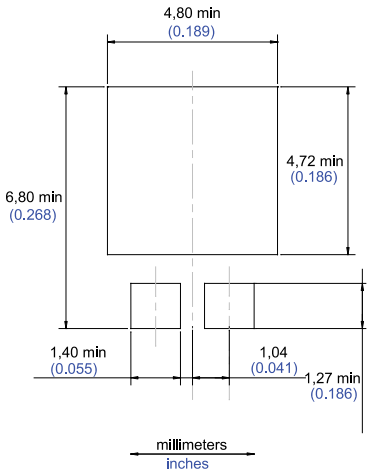


Table 4. PSMC (TO-277A) package mechanical data

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 9. 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
STPS10L40CSF	10L40C	PSMC (TO-277A)	90 mg	6000	Tape and reel

Revision history

Table 6. **Document revision history**

Date	Version	Changes
20-May-2021	1	Initial release.

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