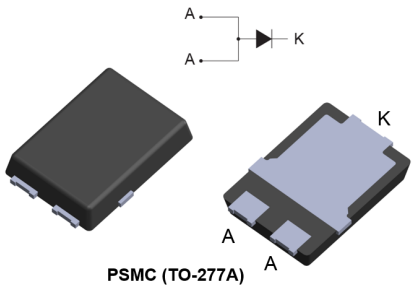
STPS10200SF

Datasheet

200 V, 10 A power Schottky rectifier



PSMC (TO-277A)

Features

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

Applications

- AC/DC converter, as for LED lighting applications
- DC/DC converter, especially for server stand by power supply or telecom
- Secondary rectification
- DC / DC converter
- Auxiliary Power supply
- Freewheeling function
- Reverse battery protection

Description

This 10 A, 200 V Schottky diode is suitable for power supply, especially for lighting power, server or telecom.

Packaged in PSMC (TO-277A), STPS10200SF provides a high level of performance in a compact and flat package which can withstand high operating junction temperature.

Product status link
STPS10200SF

Product summary	
Symbol	**Value**
$I_{F(AV)}$	10 A
V_{RRM}	200 V
T_j (max.)	175 °C
V_F (typ.)	0.660 V

1 Characteristics

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

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		200	V
$I_{F(AV)}$	Average forward current, δ = 0.5 square wave	T_c = 160 °C	10	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	210	A
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Maximum operating junction temperature(1)		+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. value	Unit
$R_{th(j-c)}$	Junction to case	0.84	°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		-	1.5	4	mA
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 5 A	-		0.830	V
		T_j = 125 °C		-	0.600	0.665	
		T_j = 25 °C	I_F = 10 A	-		0.895	
		T_j = 125 °C		-	0.660	0.730	

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:

$P = 0.60 \times I_{F(AV)} + 0.013 \times I_F{}^2{}_{(RMS)}$

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

1.1 Characteristics (curves)

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

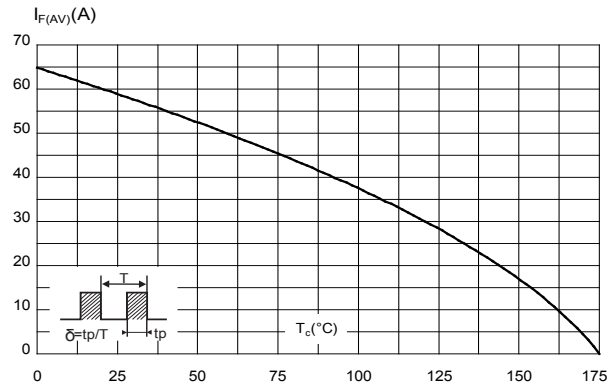


Figure 2. Relative variation of thermal impedance junction to case versus pulse duration

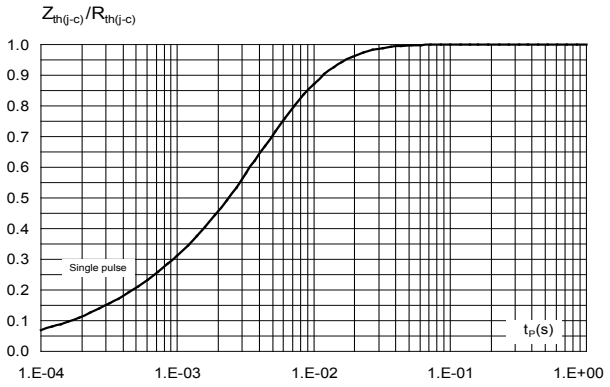


Figure 3. Reverse leakage current versus reverse voltage applied (typical values)

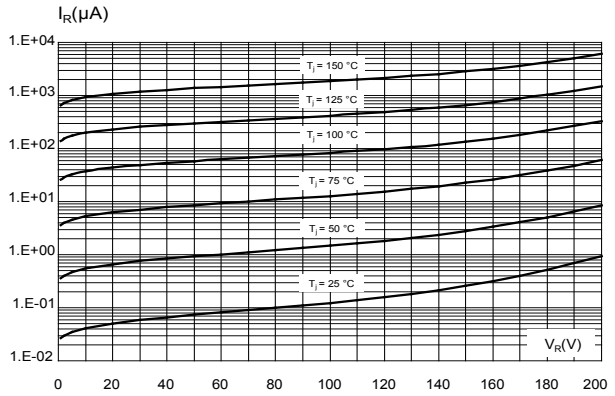


Figure 4. Junction capacitance versus reverse voltage applied (typical values)

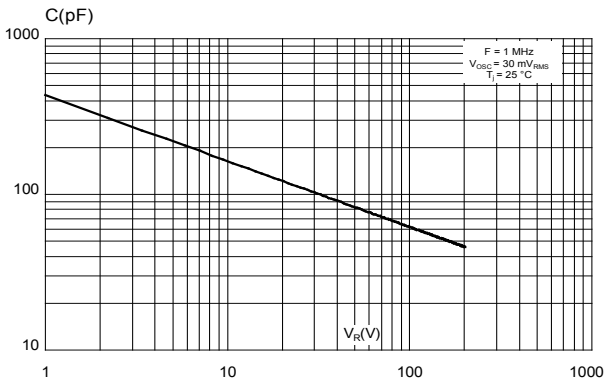


Figure 5. Forward voltage drop versus forward current (typical values)

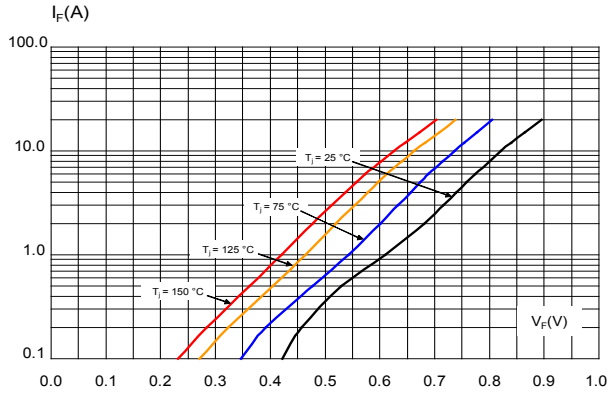
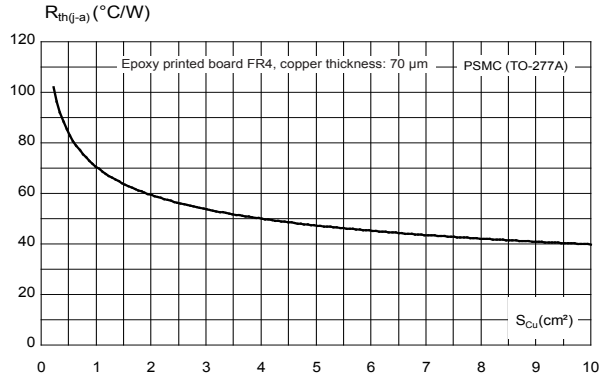


Figure 6. Thermal resistance junction to ambient versus copper surface under tab (typical values, epoxy printed board FR4, e_{Cu} = 70 μm) (PSMC (TO-277A))



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 (TO-277A) package information

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

Figure 7. PSMC (TO-277A) package outline

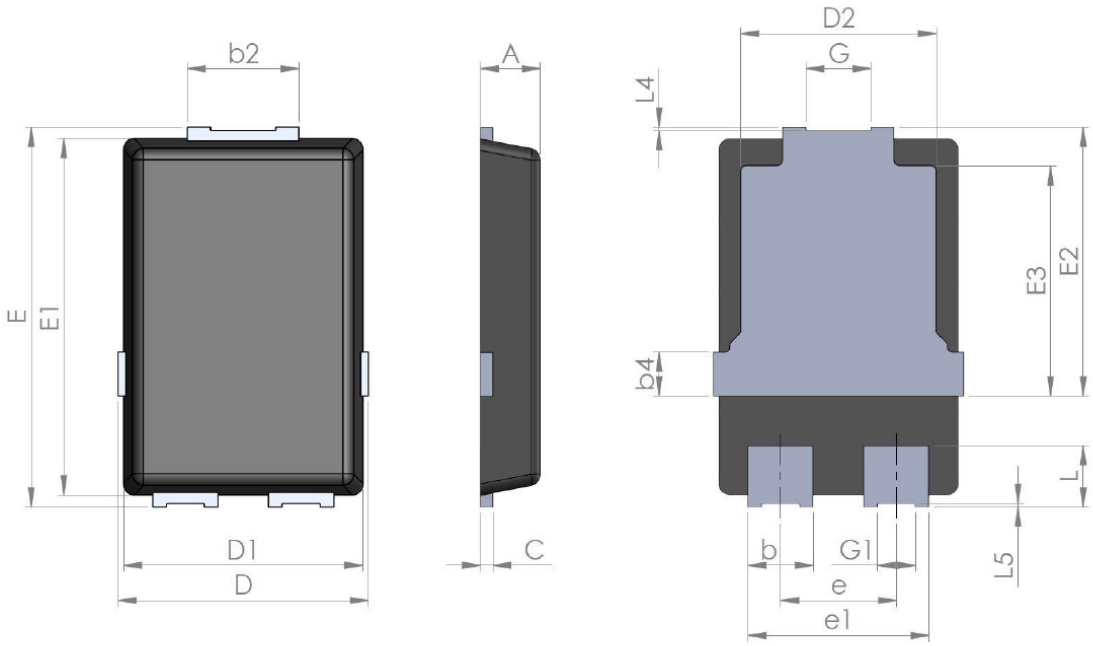
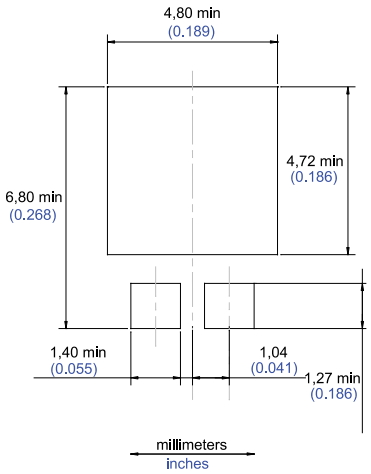


Table 4. PSMC (TO-277A) package mechanical data

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 8. 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
STPS10200SF	PS10200	PSMC (TO-277A)	90 mg	6000	Tape and Reel

Revision history

Table 6. **Document revision history**

Date	Version	Changes
01-Dec-2020	1	Initial release.