STPS3L60S

Datasheet

60 V power Schottky rectifier



SMC

Features

- Negligible switching losses
- Low thermal resistance
- Avalanche capability
- Low forward voltage drop
- ECOPACK®2 compliant

Applications

- Set-top box
- Battery charger
- DC/DC converter
- Telecom power
- Switching diode

Description

Schottky rectifier suited for SMPS and high frequency DC to DC converters.

Packaged in SMC, the STPS3L60S is intended for use in DC/DC battery chargers, lighting applications, telecom converters.

Product status link
STPS3L60S

Product summary	
$I_{F(AV)}$	3 A
V_{RRM}	60 V
T_j (max.)	150 °C
V_F (typ.)	0.56 V

1 Characteristics

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

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		60	V
$I_{F(RMS)}$	Forward rms current		10	A
$I_{F(AV)}$	Average forward current , δ = 0.5 square wave	T_l = 100 °C	3	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	75	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs, T_j = 125 °C	115	W
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Maximum operating junction temperature(1)		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 parameter

Symbol	Parameter	Max. value	Unit
$R_{th(j-l)}$	Junction to lead	20	°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 = 25 °C	$V_R = V_{RRM}$	-		55	µA
		T_j = 125 °C		-	10	15	mA
V_F(1)	Forward voltage drop	T_j = 25 °C	I_F = 3 A	-		0.7	V
		T_j = 125 °C		-	0.56	0.65	
		T_j = 25 °C	I_F = 6 A	-		0.94	
		T_j = 125 °C		-	0.67	0.76	

1. *Pulse test: t_p = 380 µs, δ < 2%*

To evaluate the conduction losses, use the following equation:

$P = 0.54 \times I_{F(AV)} + 0.037 \times I_F{}^2{}_{(RMS)}$

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 power dissipation versus average forward current

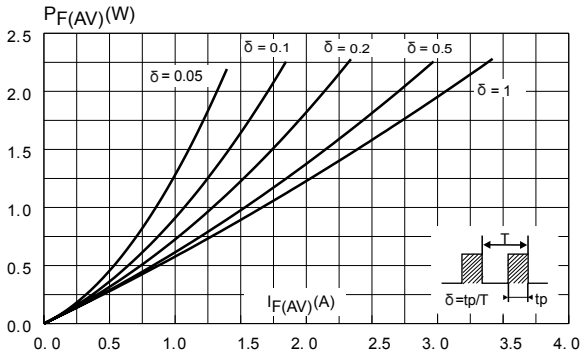


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

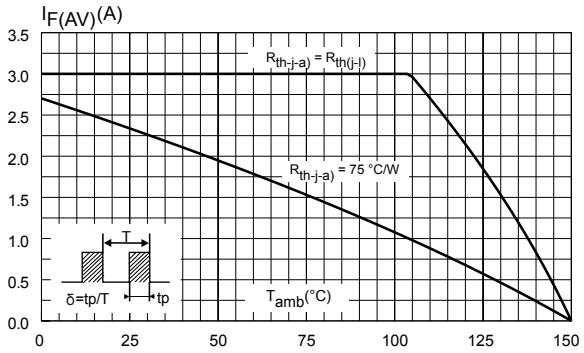


Figure 3. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

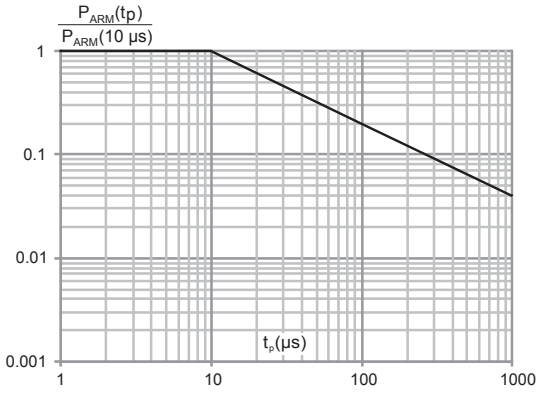


Figure 4. Relative variation of thermal impedance junction to lead versus pulse duration

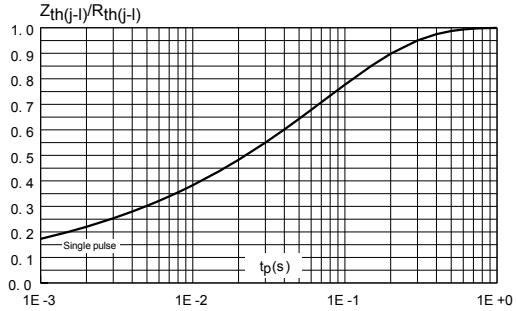


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

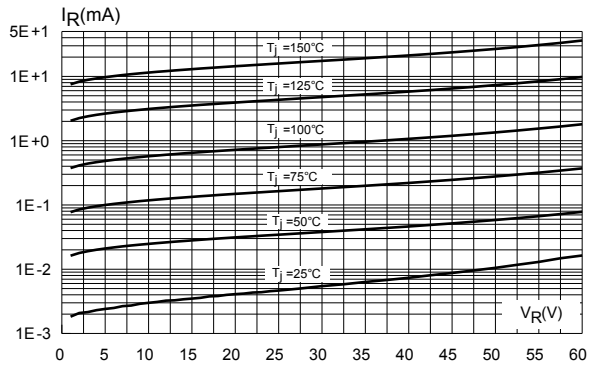


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

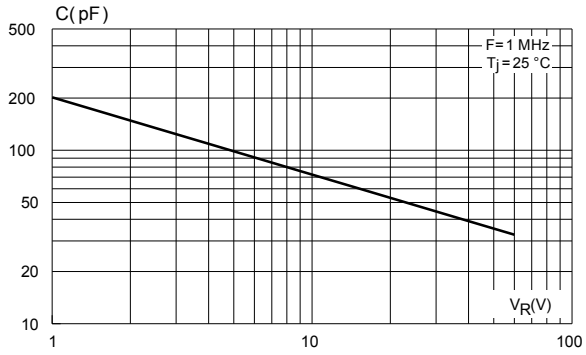


Figure 7. Forward voltage drop versus forward current (low level)

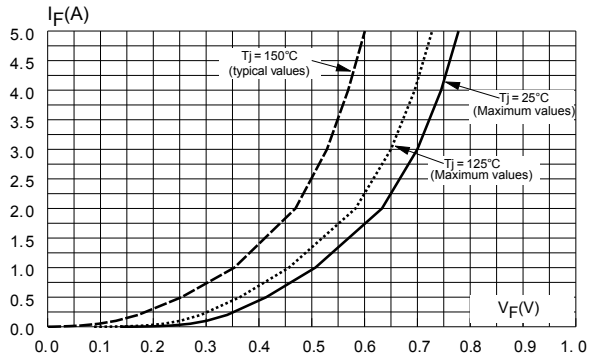


Figure 8. Forward voltage drop versus forward current (high level)

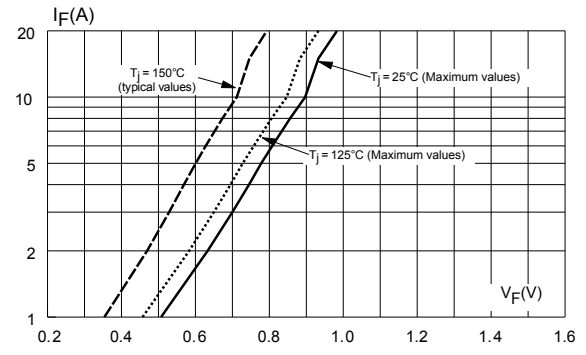
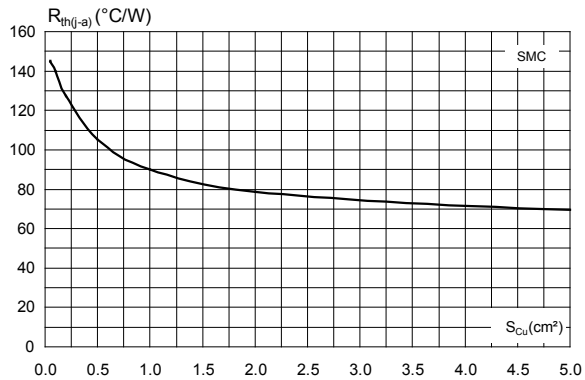


Figure 9. Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, e_{Cu}: 35 µm)



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 SMC package information

- Epoxy meets UL94, V0

Figure 10. SMC package outline

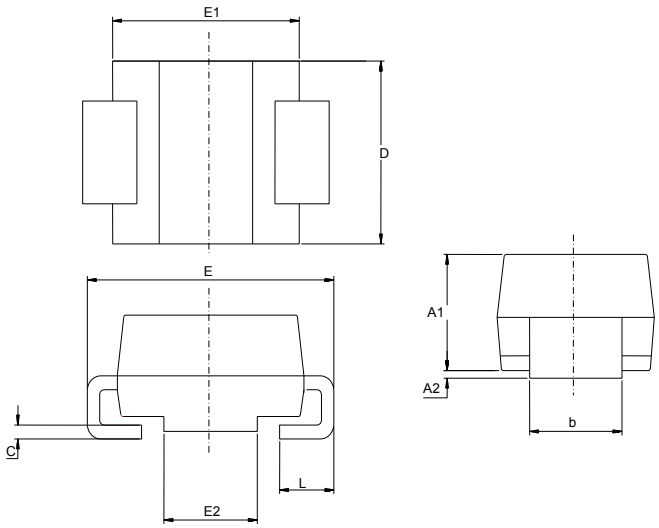
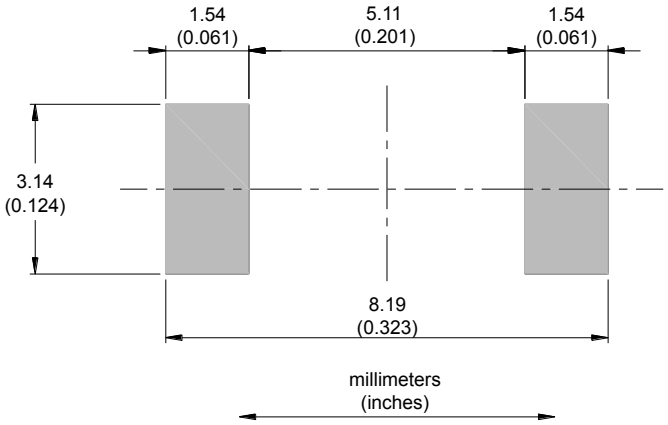


Table 4. SMC package mechanical data

Ref.	Dimensions			
	Millimeters		Inches (for reference only)	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.0748	0.0965
A2	0.05	0.20	0.0020	0.0079
b	2.90	3.20	0.1142	0.1260
c	0.15	0.40	0.0059	0.0157
D	5.55	6.25	0.2185	0.2461
E	7.75	8.15	0.3051	0.3209
E1	6.60	7.15	0.2598	0.2815
E2	4.40	4.70	0.1732	0.1850
L	0.75	1.50	0.0295	0.0591

Figure 11. SMC recommended footprint



3 Ordering information

Table 5. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS3L60S	S36	SMC	0.245 g	2500	Tape and reel

Revision history

Table 6. **Document revision history**

Date	Version	Changes
July-2003	2	Previous release.
13-Nov-2018	3	Updated cover page. Removed figure 3, figure 4 and figure 5. Updated Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified), Section 1.1 Characteristics (curves) and Table 5. Ordering information. Minor text changes to improve readability.

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