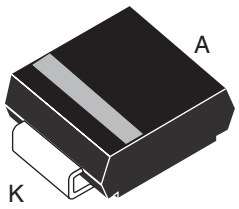
STPS5L60-Y

Automotive power Schottky rectifier

Datasheet – production data

Features

- Negligible switching losses
- Low forward voltage drop for higher efficiency
- Low thermal resistance
- Avalanche capability specified
- AEC-Q101 qualified
- ECOPACK®2 compliant component



SMC
STPS5L60SY

Description

Power Schottky rectifier suited for switch mode power supplies and high frequency inverters.

This device is intended for use in low voltage output for small battery chargers and battery protection in automotive applications.

Table 1. Device summary

$I_{F(AV)}$	5 A
V_{RRM}	60 V
$T_{j\ (max)}$	150 °C
$V_{F\ (max)}$	0.53 V

1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		60	V
$I_{F(RMS)}$	Forward rms current		15	A
$I_{F(AV)}$	Average forward current	T_l = 100 °C δ = 0.5	5	A
I_{FSM}	Surge non repetitive forward current	Half wave, single phase t_p = 10 ms	150	A
P_{ARM}	Repetitive peak avalanche power	t_p = 1 µs T_j = 25 °C	4000	W
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Operating junction temperature(1)		-40 to +150	°C
dV/dt	Critical rate of rise of reverse voltage (rated V_R, T_j = 25 °C)		10000	V/µs

1. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal parameters

Symbol	Parameter	Value	Unit
$R_{th\ (j-l)}$	Junction to leads	15	°C/W

Table 4. Static electrical characteristics

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$			0.22	mA
		T_j = 100 °C			10	25	
		T_j = 125 °C			40	100	
V_F (1)	Forward voltage drop	T_j = 25 °C	I_F = 5 A		0.47	0.52	V
		T_j = 100 °C			0.43	0.49	
		T_j = 125 °C			0.42	0.48	

1. Pulse test: tp = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:
$P = 0.39 \times I_{F(AV)} + 0.028 \times I_{F^2(RMS)}$

Figure 1. Conduction losses versus average current

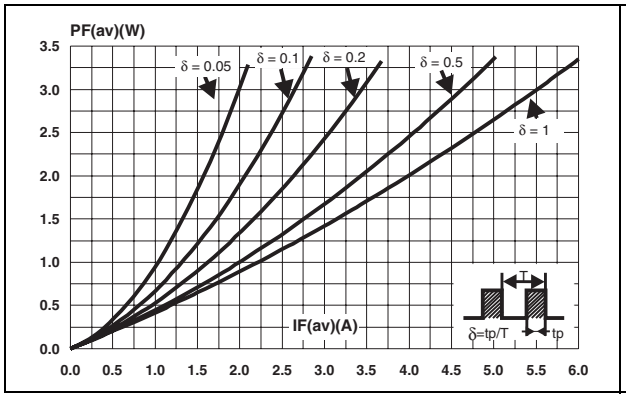


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

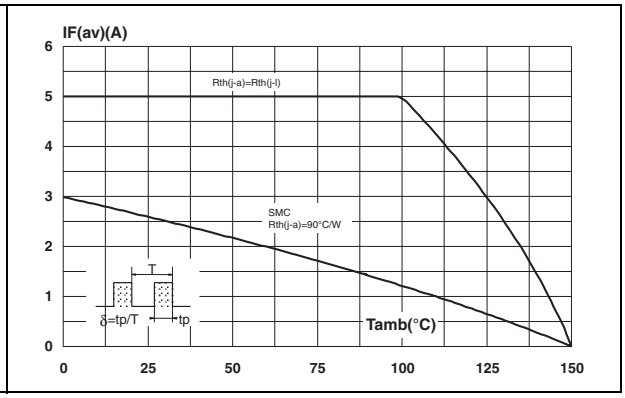


Figure 3. Normalized avalanche power derating versus pulse duration

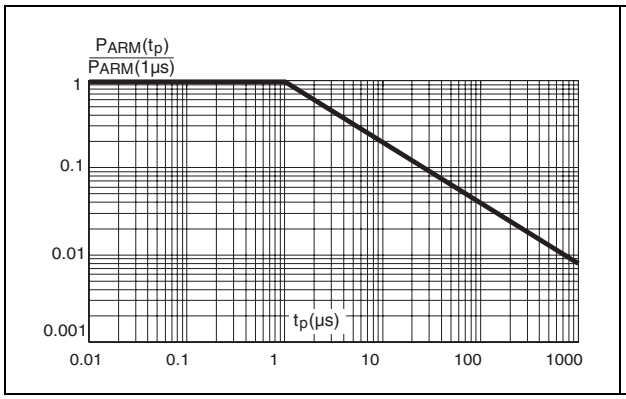


Figure 4. Normalized avalanche power derating versus junction temperature

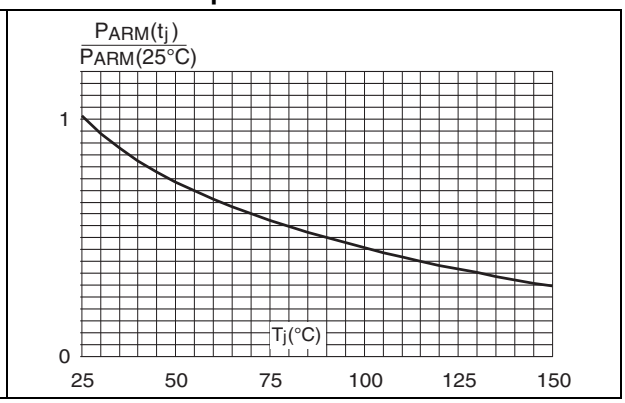


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values)

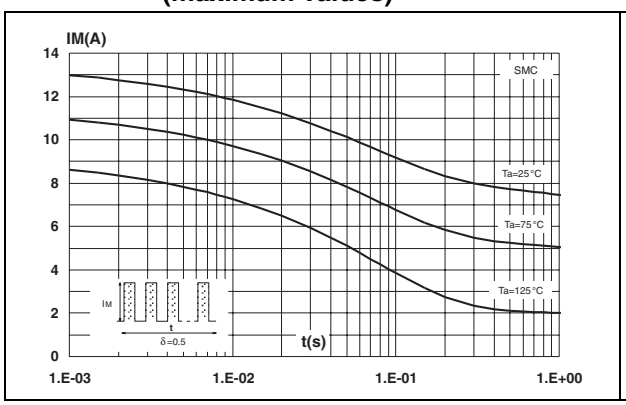


Figure 6. Relative variation of thermal impedance junction to ambient versus pulse duration

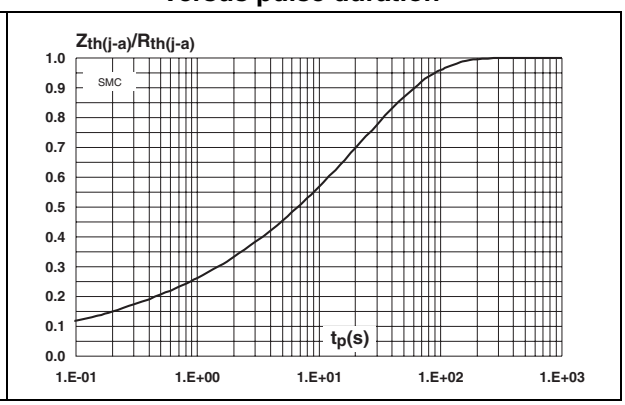


Figure 7. Reverse leakage current versus reverse voltage applied (typical values)

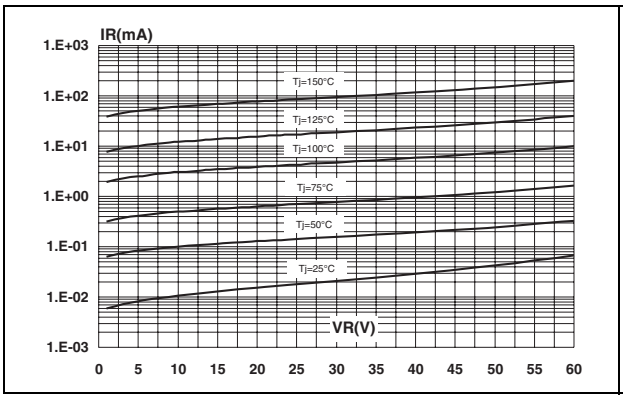


Figure 8. Junction capacitance versus reverse voltage applied (typical values)

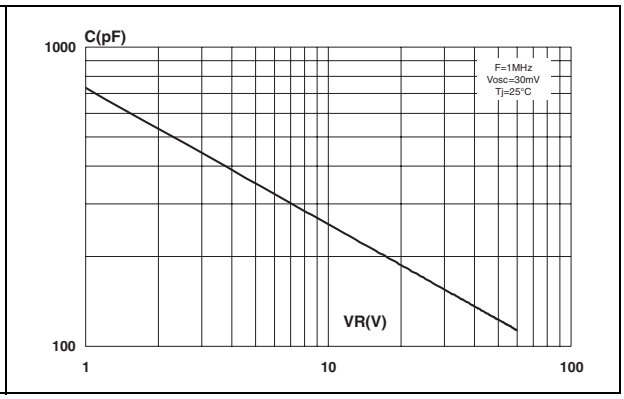


Figure 9. Forward voltage drop versus forward current (low level)

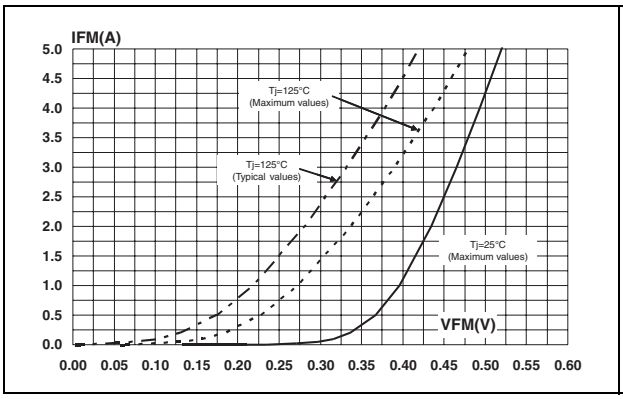


Figure 10. Forward voltage drop versus forward current (high level)

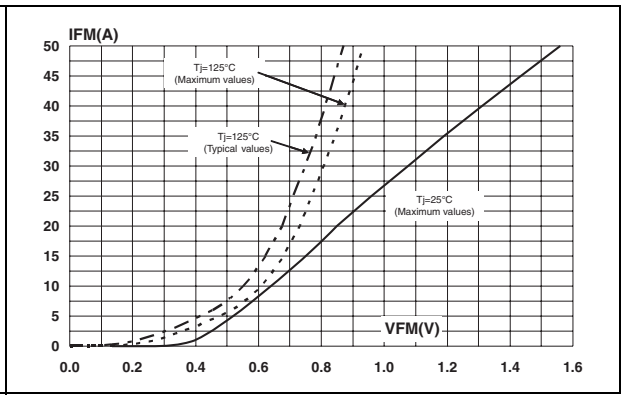
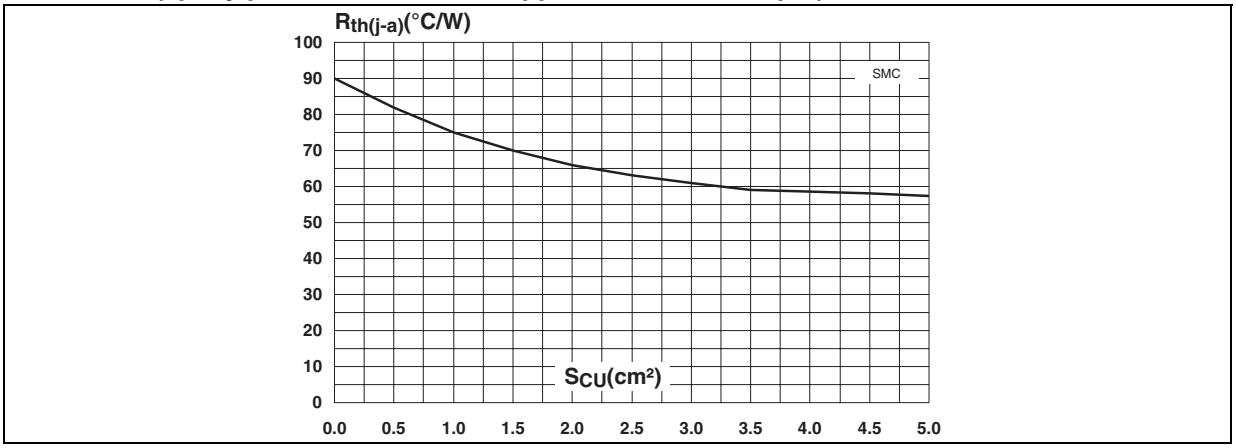


Figure 11. Thermal resistance junction to ambient versus copper surface under each lead (epoxy printed board FR4, copper thickness = 35 µm)

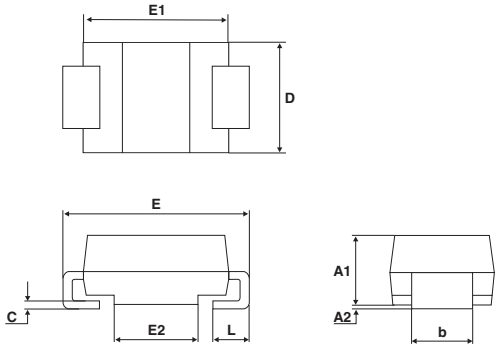


2 Package information

- Epoxy meets UL94, V0
- Lead-free package

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.

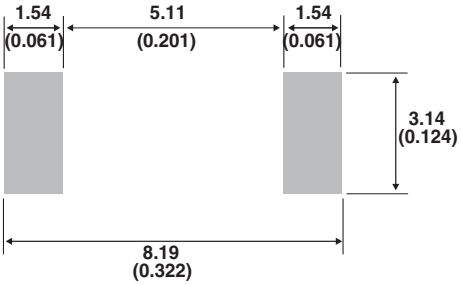
Table 5. SMC dimensions



Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.096
A2	0.05	0.20	0.002	0.008
b(1)	2.90	3.20	0.114	0.126
c(1)	0.15	0.40	0.006	0.016
D	5.55	6.25	0.218	0.246
E	7.75	8.15	0.305	0.321
E1	6.60	7.15	0.260	0.281
E2	4.40	4.70	0.173	0.185
L	0.75	1.50	0.030	0.059

1. Dimensions b and c apply to plated leads

Figure 12. Footprint, dimensions in mm (inches)



3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS5L60SY	S56Y	SMC	0.245 g	2500	Tape and reel

4 Revision history

Table 7. Document revision history

Date	Revision	Description of Changes
29-Mar-2012	1	Initial issue

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