STPS5L60

Power Schottky rectifier

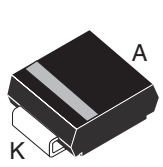
Features

- Negligible switching losses
- Low forward voltage drop for higher efficiency
- Low thermal resistance
- Avalanche capability specified

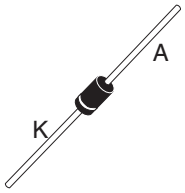
Description

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 consumer SMPS such as DVD and set-top-box.



SMC
STPS5L60S



DO-201AD
STPS5L60

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
$I_{F(RMS)}$	RMS forward current			15	A
$I_{F(AV)}$	Average forward current	DO-201AD	T_l = 100 °C δ = 0.5	5	A
		SMC	T_l = 100 °C δ = 0.5		
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	Maximum operating junction temperature(1)			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
$R_{th\ (j-a)}$	Junction to ambient	DO-201AD		75	°C/W
$R_{th\ (j-l)}$	Junction to leads		Lead length = 10mm	15	
$R_{th\ (j-l)}$	Junction to leads	SMC		15	

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

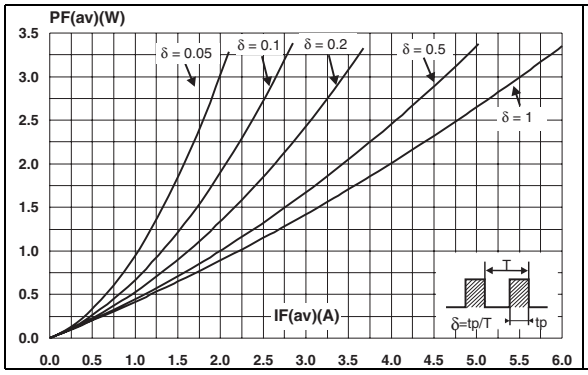


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

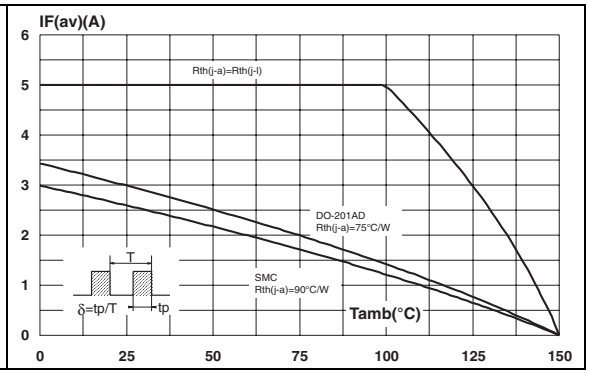


Figure 3. Normalized avalanche power derating versus pulse duration

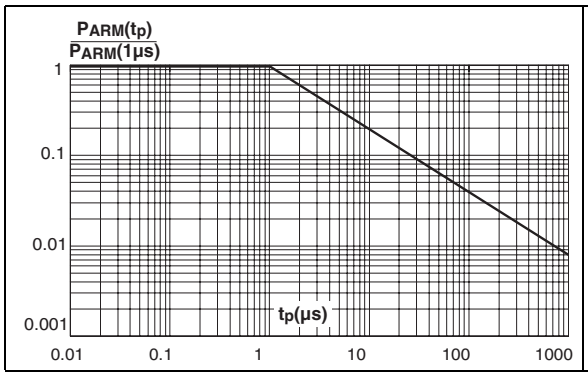


Figure 4. Normalized avalanche power derating versus junction temperature

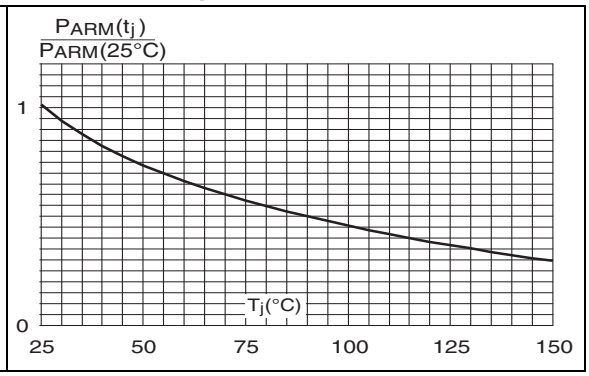


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values) DO-201AD

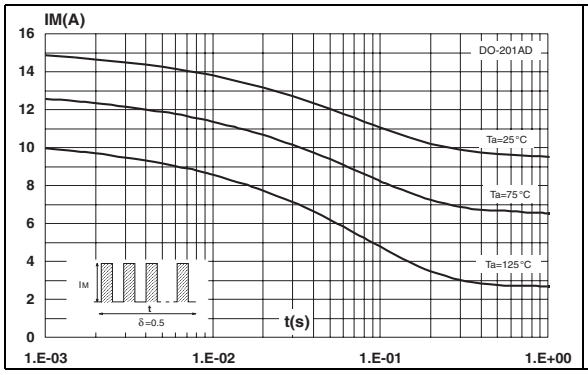


Figure 6. Non repetitive surge peak forward current versus overload duration (maximum values) SMC

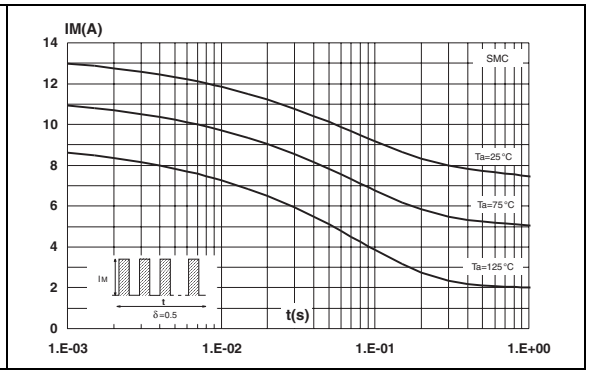


Figure 7. Relative variation of thermal impedance junction to ambient versus pulse duration, DO-201AD

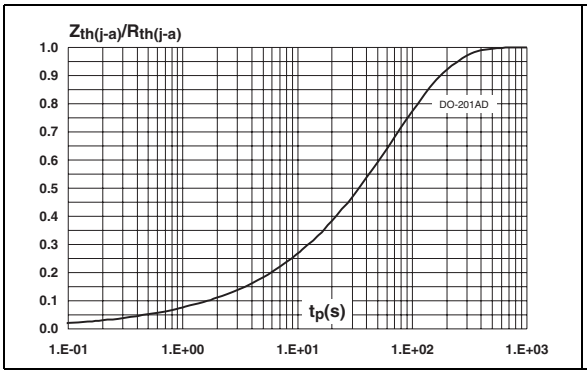


Figure 8. Relative variation of thermal impedance junction to ambient versus pulse duration, SMC

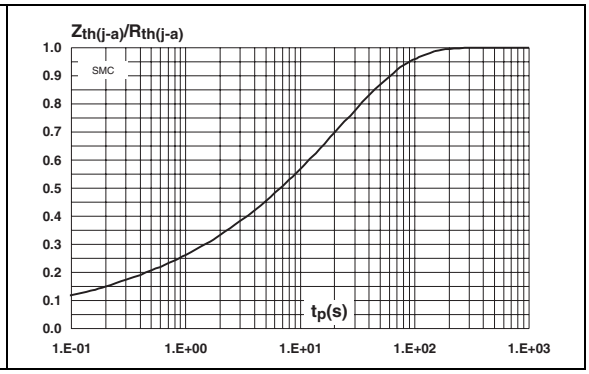


Figure 9. Reverse leakage current versus reverse voltage applied (typical values)

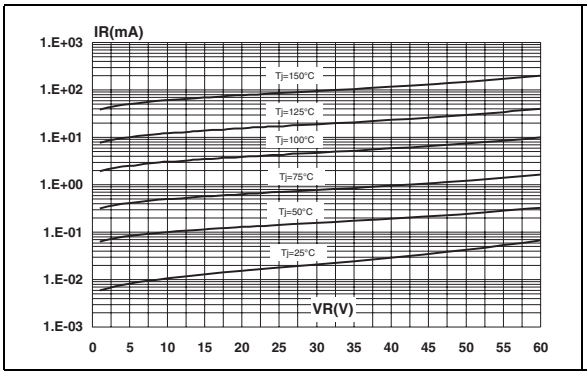


Figure 10. Junction capacitance versus reverse voltage applied (typical values)

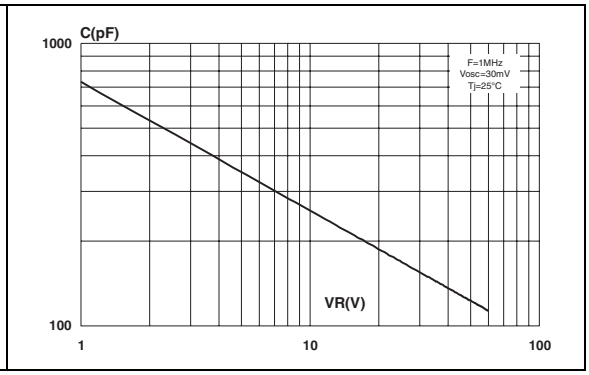


Figure 11. Forward voltage drop versus forward current (low level)

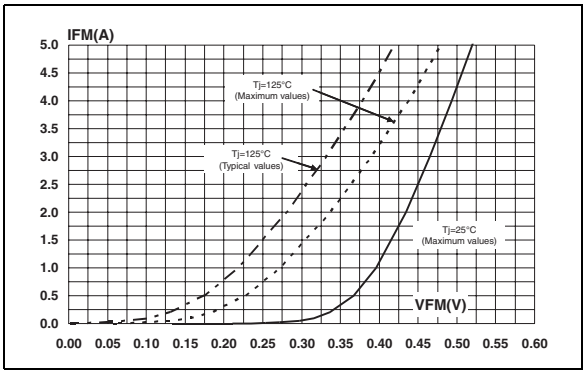


Figure 12. Forward voltage drop versus forward current (high level)

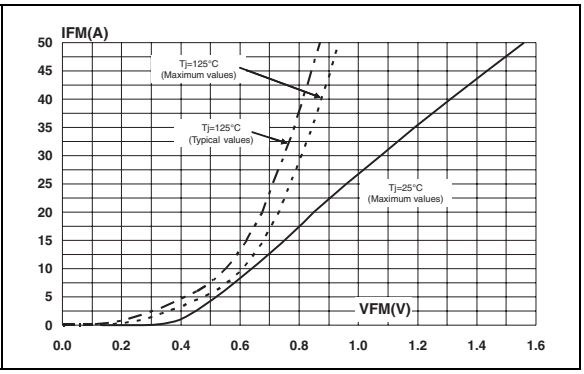


Figure 13. Thermal resistance junction to ambient versus copper surface under each lead (epoxy printed board FR4, Cu = 35 µm) SMC

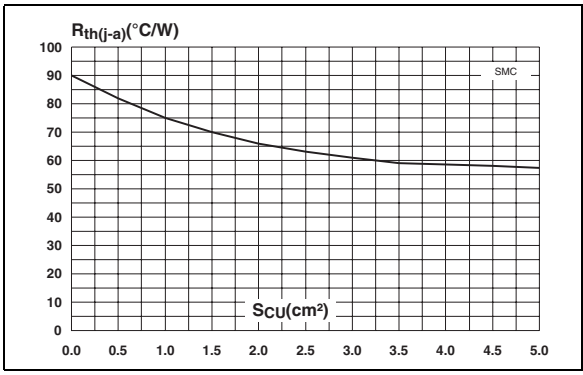


Figure 14. Thermal resistance junction to ambient versus copper surface under each lead (epoxy printed board FR4, Cu = 35 µm), DO-201AD

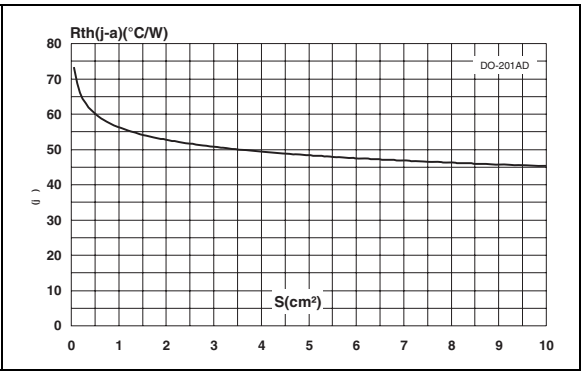
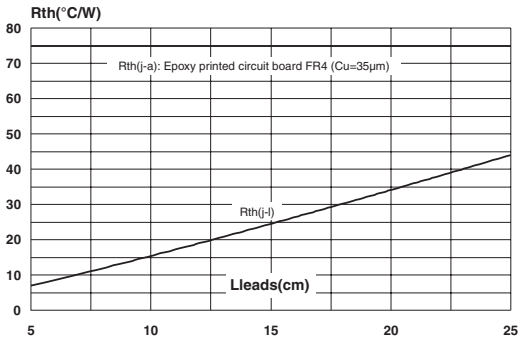


Figure 15. Thermal resistances versus leads length DO-201AD

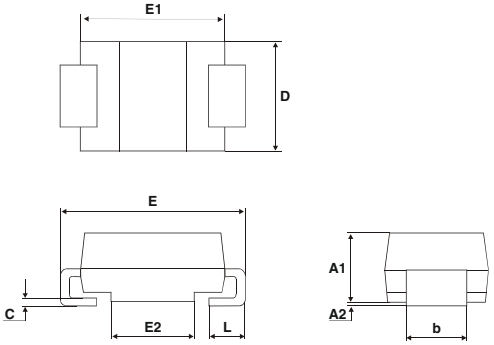


2 Package information

- Epoxy meets UL94, V0

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at *www.st.com*.

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 16. Footprint, dimensions in mm (inches)

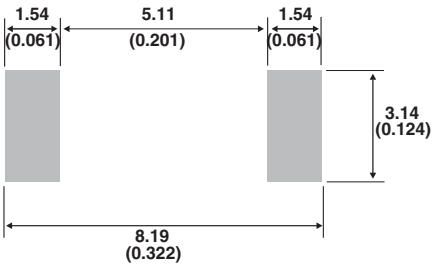
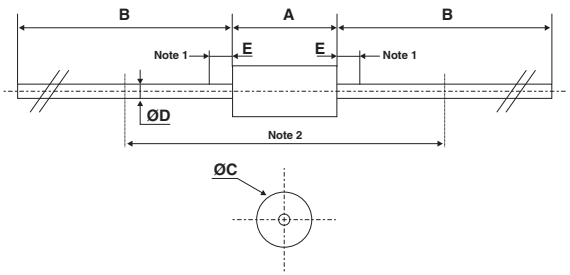


Figure 17. Package mechanical data DO-201AD plastic



REF.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A		9.50		0.374
B	25.40		1.000	
∅C		5.30		0.209
∅D		1.30		0.051
E		1.25		0.049

Notes

1-The lead diameter ∅D is not controlled over zone E

2 - The minimum axial length within which the device may be placed with its leads bent at right angles is 0.59" (15 mm)

3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS5L60	STPS5L60	D0-201AD	1.12 g	600	Ammopack
STPS5L60RL	STPS5L60	D0-201AD	1.12 g	1900	Tape and reel
STPS5L60S	S56	SMC	0.245 g	2500	Tape and reel

4 Revision history

Table 7. Document revision history

Date	Revision	Description of changes
July-2003	2	Previous issue.
16-May-2008	3	Added ECOPACK statement. Added SMC package. Updated characteristic curves.

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