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Automotive power Schottky rectifier

Features

- AEC-Q101 qualified
- Negligible switching losses
- Low forward voltage drop
- Surface mount miniature package
- Avalanche capability specified
- ECOPACK[®]2 compliant component

Description

This power Schottky rectifier is suited to switched mode power supplies and high frequency DC to DC converters for automotive applications.

Packaged in SMA, this device is especially intended for use in low voltage, high frequency inverters and small battery chargers.

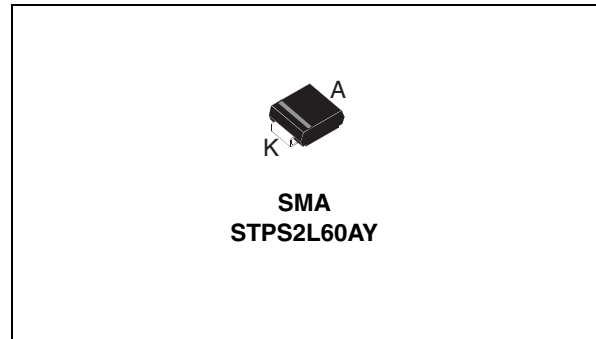


Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	2 A
V_{RRM}	60 V
$T_j(max)$	150 °C
$V_F(max)$	0.55 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 voltage	10	A
$I_{F(AV)}$	Average forward current	$T_L = 115\text{ °C } \delta = 0.5$	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10\text{ ms sinusoidal}$	A
P_{ARM}	Repetitive peak avalanche power	$t_p = 1\text{ }\mu\text{s } T_j = 25\text{ °C}$	W
T_{stg}	Storage temperature range	-65 to +150	°C
T_j	Operating junction temperature range ⁽¹⁾	-40 to +150	°C
dV/dt	Critical rate of rise of reverse voltage	10000	V/ μs

1. $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal resistance

Symbol	Test conditions	Value	Unit
$R_{th(j-l)}$	Junction-lead	25	°C/W

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$		100	μA
		$T_j = 100\text{ °C}$		2	10	mA
$V_F^{(1)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 2\text{ A}$		0.60	V
		$T_j = 125\text{ °C}$		0.51	0.55	
		$T_j = 25\text{ °C}$	$I_F = 4\text{ A}$		0.77	
		$T_j = 125\text{ °C}$		0.62	0.67	

1. Pulse test: $t_p = 380\text{ }\mu\text{s}$, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 0.43 \times I_{F(AV)} + 0.06 I_{F(RMS)}^2$$

Figure 1. Average forward power dissipation versus average forward current

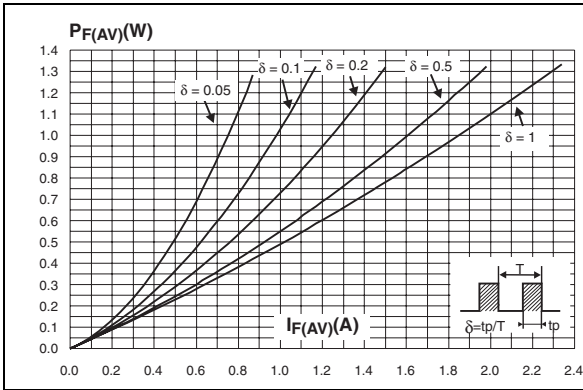


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$)

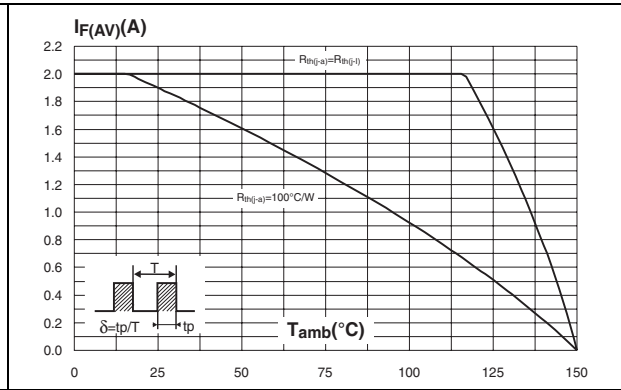


Figure 3. Normalized avalanche power derating versus pulse duration

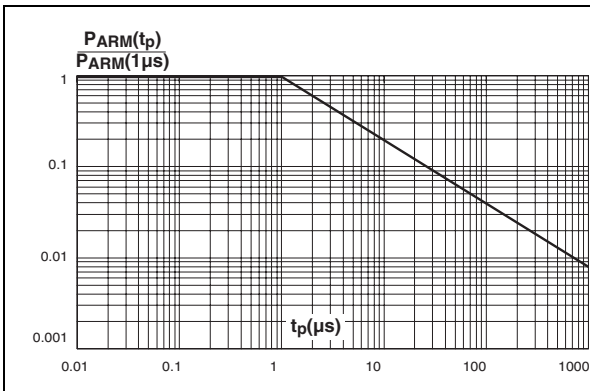


Figure 4. Normalized avalanche power derating versus junction temperature

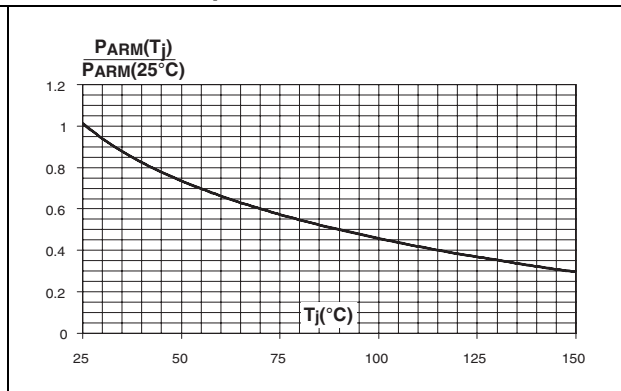


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values)

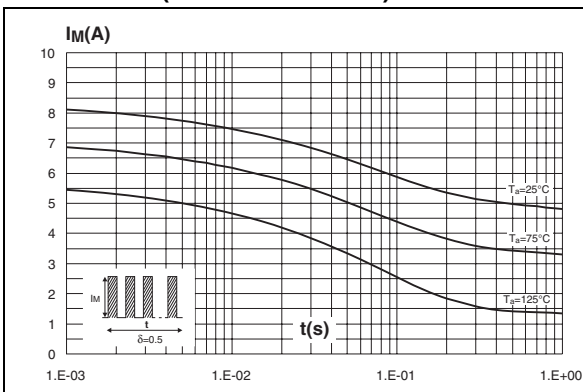


Figure 6. Relative variation of thermal impedance junction to ambient versus pulse duration

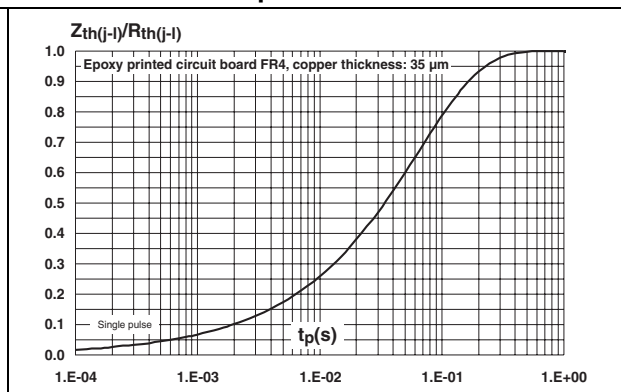


Figure 7. Reverse leakage current versus reverse voltage applied (typical values)

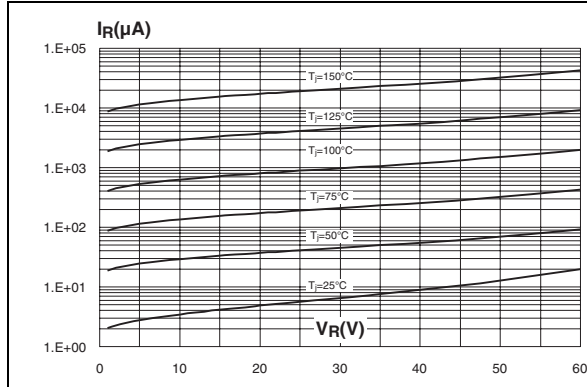


Figure 8. Junction capacitance versus reverse voltage applied (typical values)

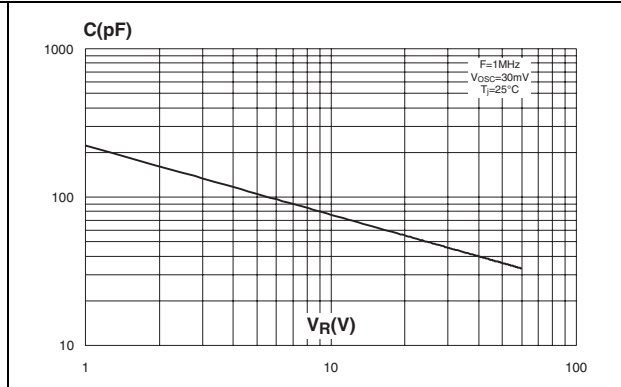


Figure 9. Forward voltage drop versus forward current (maximum values, low level)

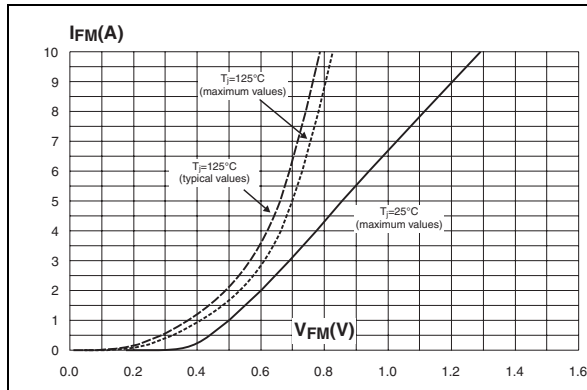
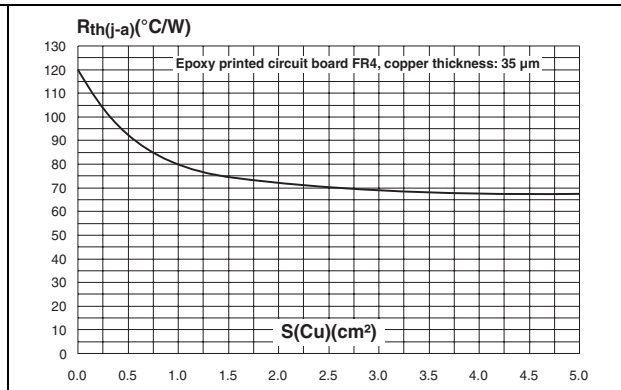


Figure 10. Thermal resistance junction to ambient versus copper surface under each lead



2 Package information

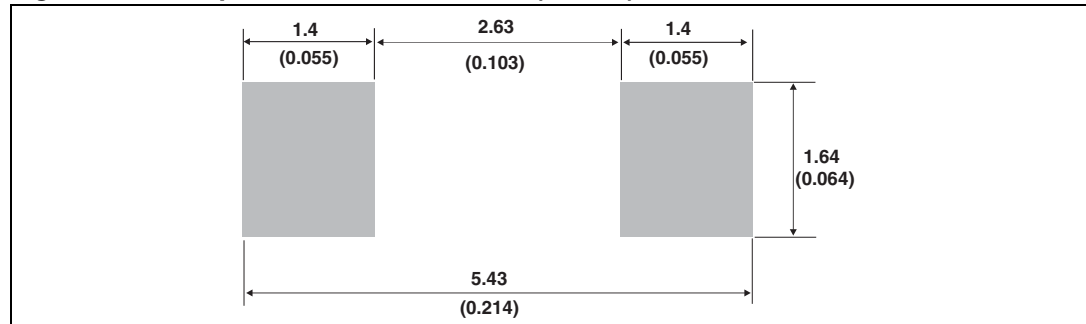
- Epoxy meets UL94, V0
- Lead-free package

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. SMA dimensions

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.094
A2	0.05	0.20	0.002	0.008
b	1.25	1.65	0.049	0.065
c	0.15	0.40	0.006	0.016
D	2.25	2.90	0.089	0.114
E	4.80	5.35	0.189	0.211
E1	3.95	4.60	0.156	0.181
L	0.75	1.50	0.030	0.059

Figure 11. Footprint, dimensions in mm (inches)



3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS2L60AY	S26Y	SMA	0.068 g	5000	Tape and reel

4 Revision history

Table 7. Document revision history

Date	Revision	Changes
02-Nov-2011	1	Initial release.

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