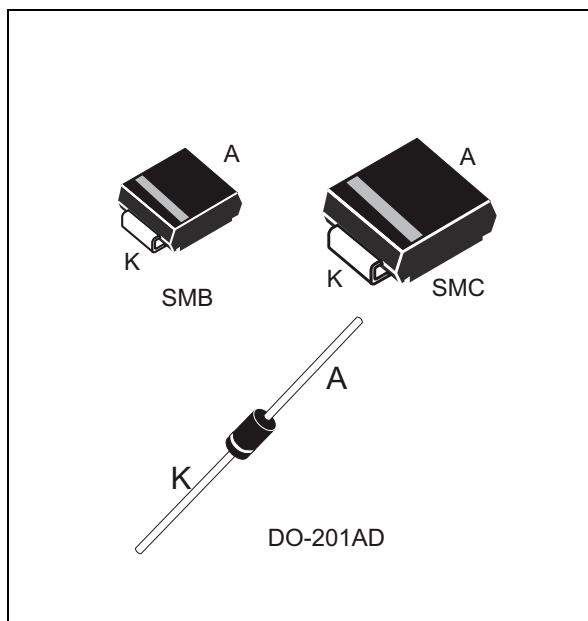


Power Schottky rectifier

Datasheet - production data



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.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	5 A
V_{RRM}	60 V
T_j (max.)	150 °C
V_f (max.)	0.48 V

Features

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

1 Characteristics

Table 2. 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			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		
		SMB	T _L = 80°C, δ = 0.5		
I _{FSM}	Surge non repetitive forward current, half sine wave, t _p = 10 ms		DO-201AD, SMC	150	A
			SMB	90	
P _{ARM}	Repetitive peak avalanche power		t _p = 10 μs T _j = 125 °C	280	W
T _{stg}	Storage temperature range			-65 to +175	°C
T _j	Maximum operating junction temperature ⁽¹⁾			150	°C

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		Parameter		Value	Unit
$R_{th(j-a)}$	Junction to ambient	DO-201AD		75	$^\circ\text{C/W}$
$R_{th(j-l)}$	Junction to lead	DO-201AD	Lead length = 10 mm	15	
		SMC		15	
		SMB		20	

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_J = 25^\circ\text{C}$	$V_R = V_{RRM}$	-		0.22	mA
		$T_J = 100^\circ\text{C}$		-	10	25	
		$T_J = 110^\circ\text{C}$		-	25	55	
		$T_J = 125^\circ\text{C}$		-	40	100	
$V_F^{(1)}$	Forward voltage drop	$T_J = 25^\circ\text{C}$	$I_F = 5\text{ A}$	-	0.47	0.52	V
		$T_J = 100^\circ\text{C}$		-	0.43	0.49	
		$T_J = 125^\circ\text{C}$		-	0.42	0.48	

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

To evaluate the conduction losses use the following equation:

$$P = 0.39 \times I_{F(AV)} + 0.028 I_F^2(\text{RMS})$$

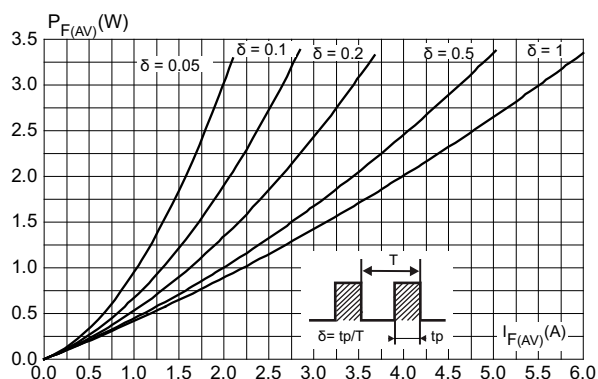
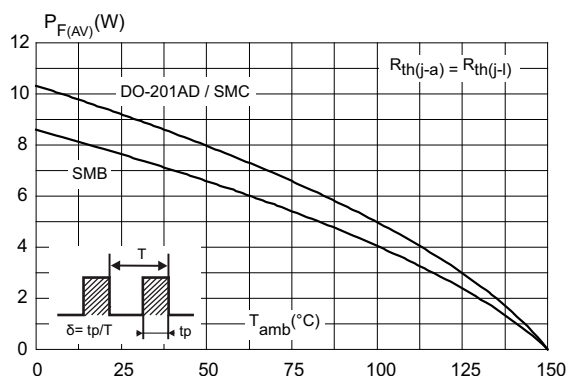
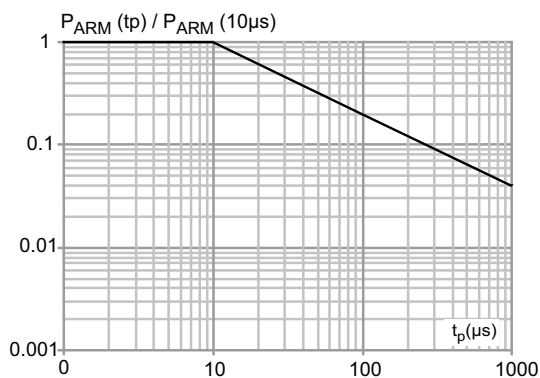
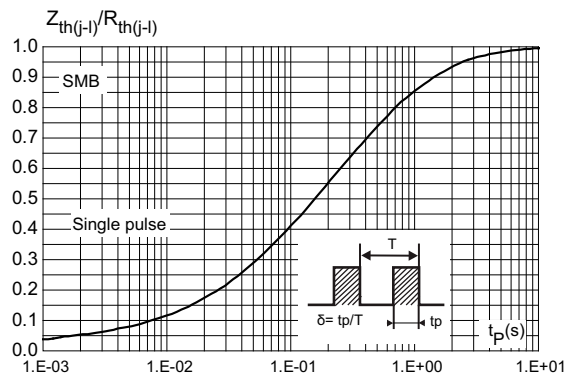
Figure 1. Average forward power dissipation versus average current**Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$)****Figure 3. Normalized avalanche power derating versus pulse duration****Figure 4. Relative variation of thermal impedance junction to lead versus pulse duration, SMB**

Figure 5. Relative variation of thermal impedance junction to ambient versus pulse duration, DO-201AD

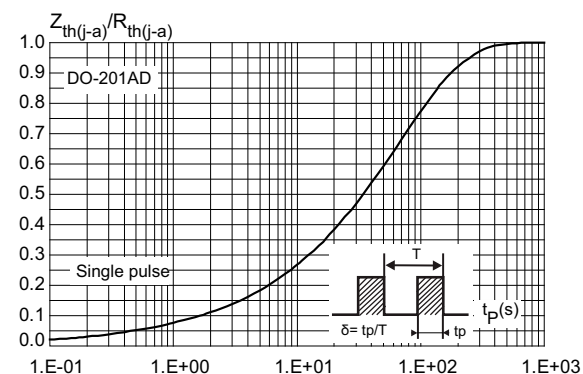


Figure 6. Relative variation of thermal impedance junction to ambient versus pulse duration, SMC

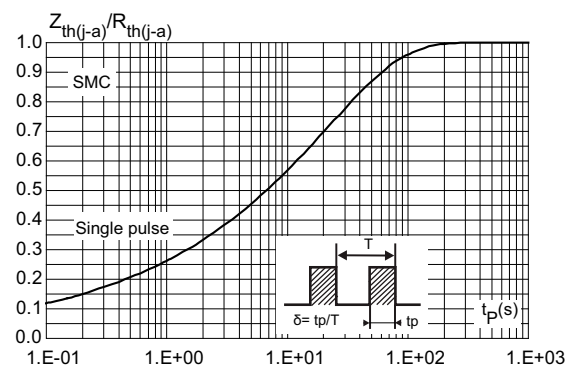


Figure 7. Reverse leakage current versus reverse voltage applied (typical values)

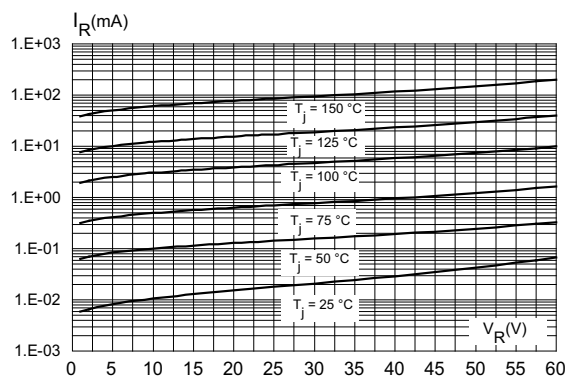


Figure 8. Junction capacitance versus reverse voltage applied (typical values)

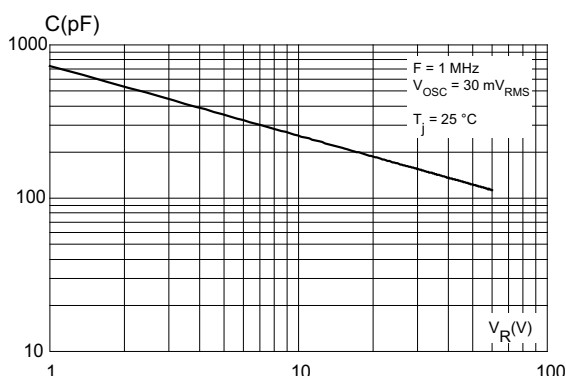


Figure 9. Forward voltage drop versus forward current (low level)

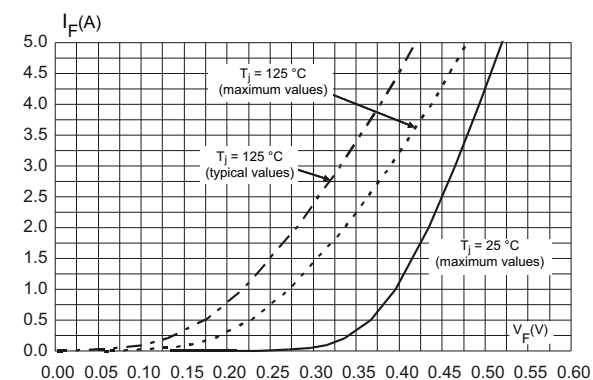


Figure 10. Forward voltage drop versus forward current (High level)

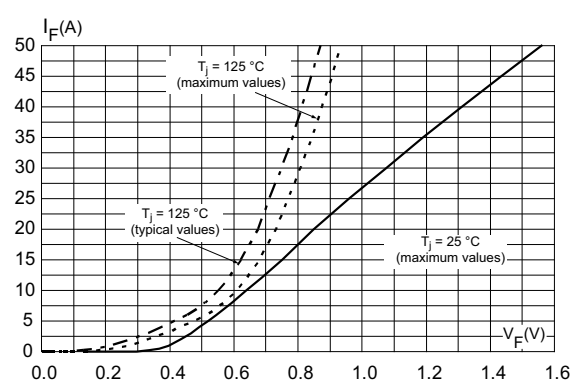


Figure 11. Thermal resistance junction to ambient versus copper surface under each lead SMB (typical values)

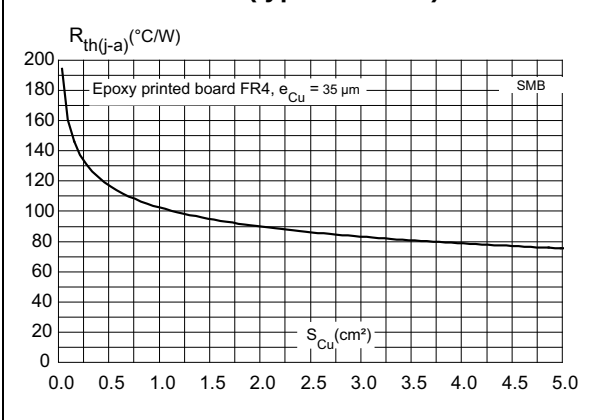


Figure 12. Thermal resistance junction to ambient versus copper surface under each lead DO-201AD (typical values)

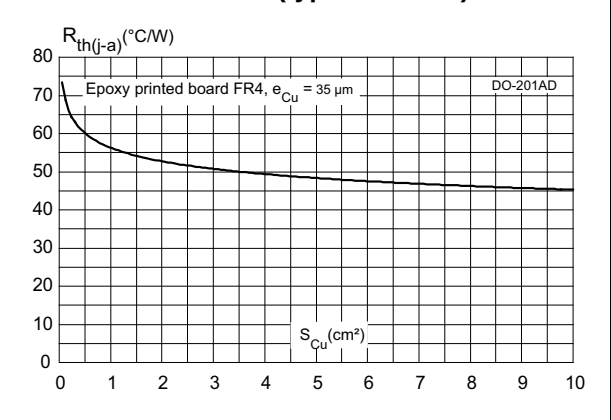


Figure 13. Thermal resistance junction to ambient versus copper surface under each lead SMC (typical values)

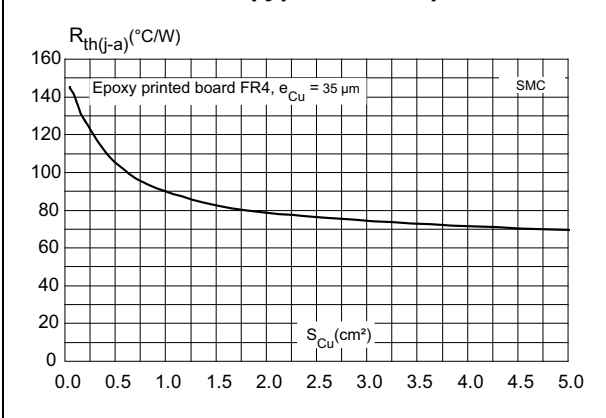
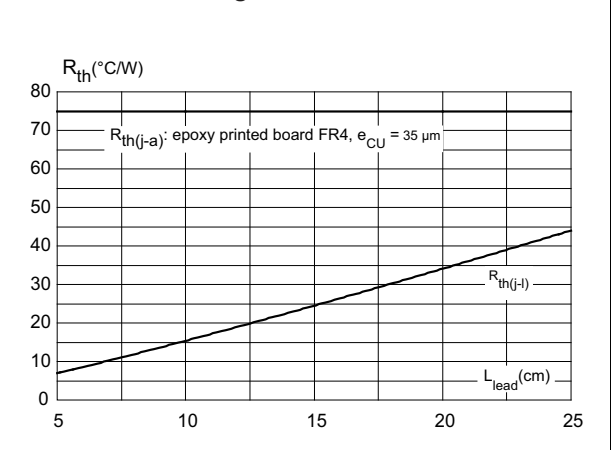


Figure 14. Thermal resistances versus leads length DO-201AD



2 Package information

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

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 SMB package information

Figure 15. SMB package outline

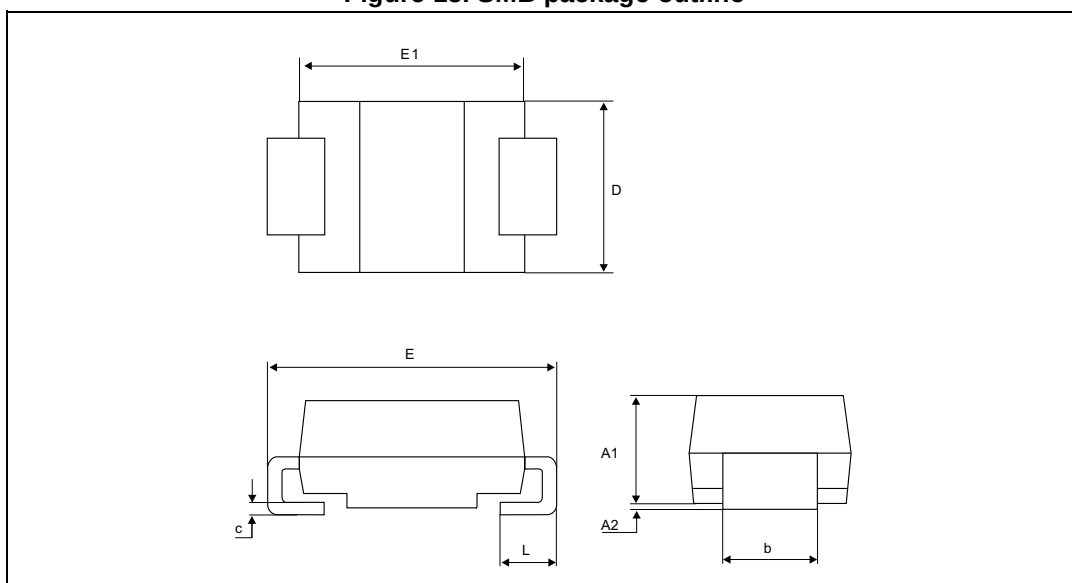
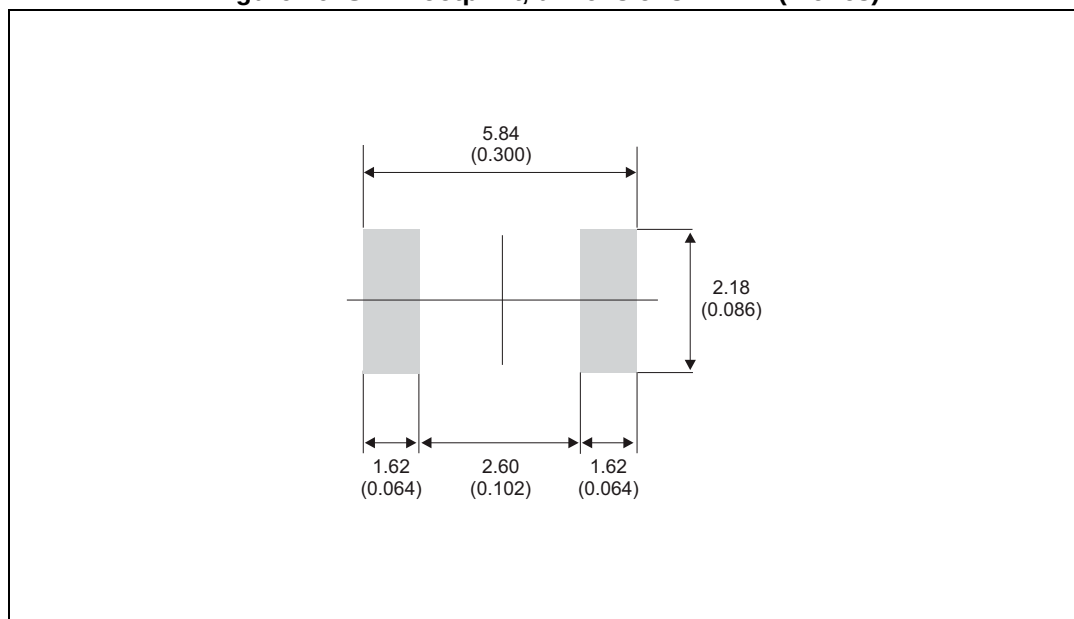


Table 5. SMB package mechanical data

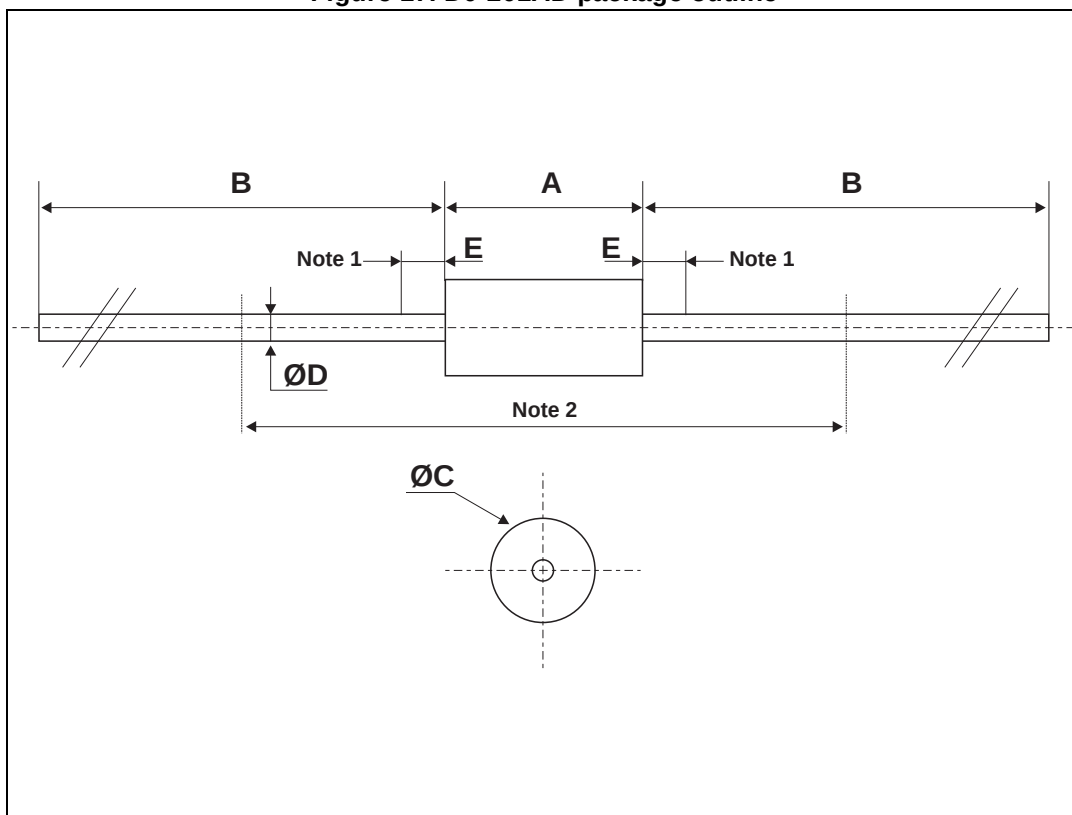
Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A1	1.90	2.45	0.075	0.096
A2	0.05	0.20	0.002	0.008
b	1.95	2.20	0.077	0.087
c	0.15	0.40	0.006	0.016
D	3.30	3.95	0.130	0.156
E	5.10	5.60	0.201	0.220
E1	4.05	4.60	0.159	0.181
L	0.75	1.50	0.030	0.059

Figure 16. SMB footprint, dimensions in mm (inches)



2.2 D0-201AD package information

Figure 17. D0-201AD package outline



1. Note1: The lead diameter $\varnothing D$ is not controlled over zone E.
2. Note2: The minimum axial length within which the device may be placed with its leads bent at right angles is 0.59" (15mm).

Table 6. D0-201AD package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A		9.50		0.374
B	25.40		1000	
$\varnothing C$		5.30		0.209
$\varnothing D$		1.30		0.051
E		1.25		0.049

2.3 SMC package information

Figure 18. SMC package outline

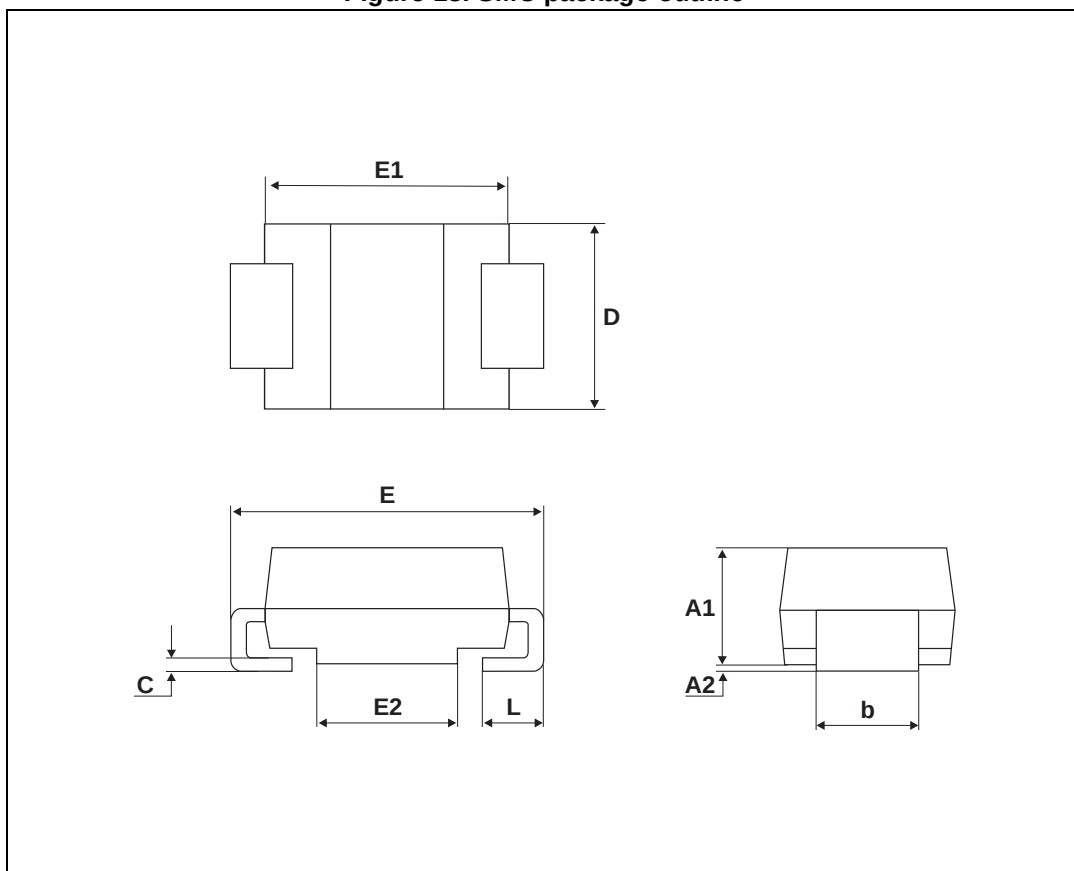
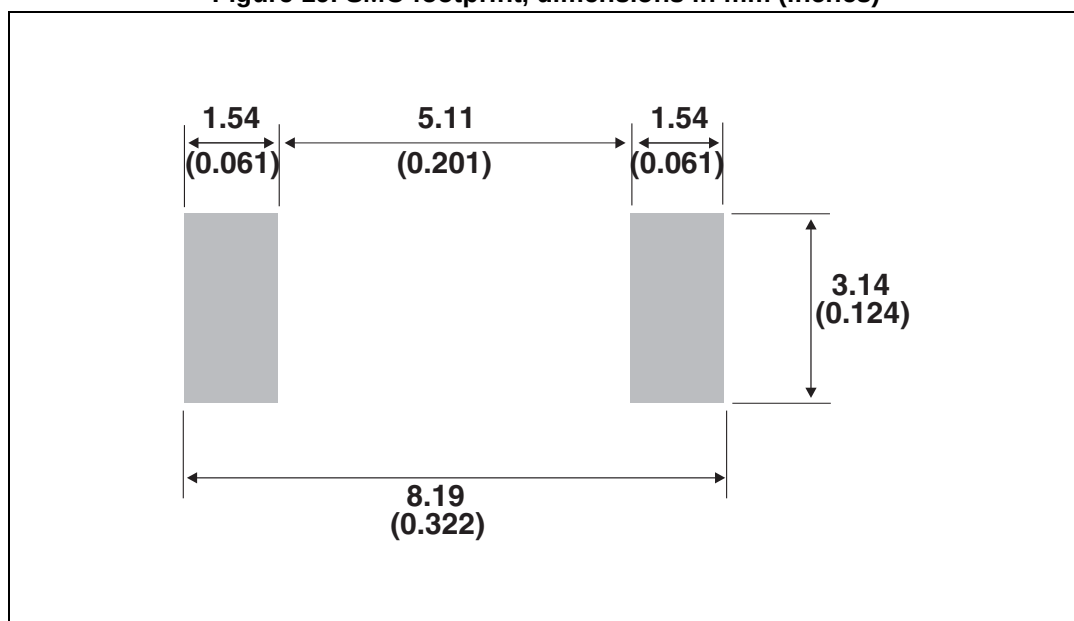


Table 7. SMC package mechanical data

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 19. SMC footprint, dimensions in mm (inches)



3 Ordering information

Table 8. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS5L60S	S56	SMC	0.245 g	2500	Tape and reel
STPS5L60RL	STPS5L60	D0-201AD	1.12 g	1900	Tape and reel
STPS5L60L	STPS5L60	D0-201AD	1.12 g	600	Ammopack
STPS5L60U	G56	SMB	0.107 g	2500	Tape and reel

4 Revision history

Table 9. Document revision history

Date	Revision	Changes
July-2003	2	Previous issue.
16-May-2008	3	Added ECOPACK statement. Added SMC package. Updated characteristic curves.
17-Jul-2015	4	Added SMB package information and reformatted to current standard.

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