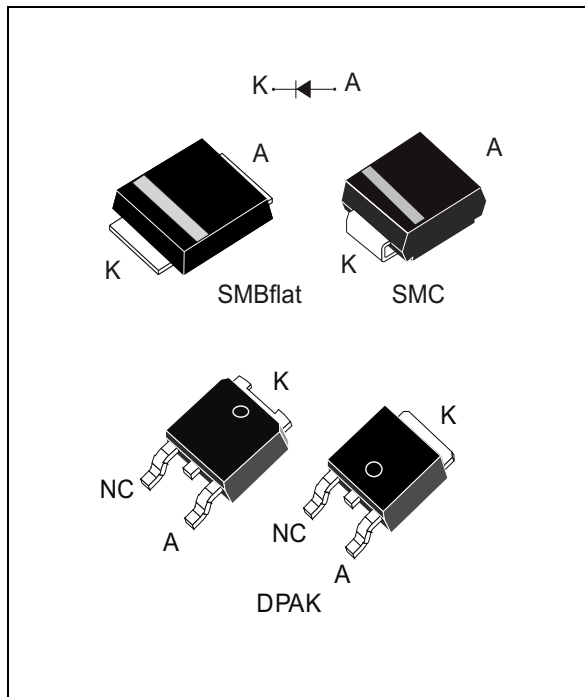


Power Schottky rectifier

Datasheet – production data



Description

This device is a 200 V Schottky rectifier suited for switch mode power supplies and high frequency DC to DC converters.

Packaged in DPAK, SMC and SMBflat, this device is especially intended for use in low voltage, high frequency inverters, freewheeling and polarity protection. Also ideal for all LED lighting applications.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	4 A
V_{RRM}	200 V
V_F (typ)	0.64 V
T_j (max)	175 °C

Features

- Negligible switching losses
- High junction temperature capability
- Very small conduction losses
- Low leakage current
- ECOPACK[®] compliant component (SMC and SMBflat)
- $T_j = -40$ °C minimum operating
- ECOPACK[®]2 compliant component for DPAK on demand

1 Characteristics

Table 2. Absolute ratings (limiting values at 25 °C, unless otherwise specified)

Symbol	Parameter	Value	Unit	
V _{RRM}	Repetitive peak reverse voltage	200	V	
I _{F(RMS)}	Forward rms current	10	A	
I _{F(AV)}	Average forward current, δ = 0.5, square wave	DPAK, T _c = 160 °C	4	A
		SMC and SMBflat T _L = 125 °C		
I _{F(SM)}	Surge non repetitive forward current	t _p = 10 ms sinusoidal	130	A
T _{stg}	Storage temperature range	-65 to +175	°C	
T _j	Operating junction temperature range ⁽¹⁾	-40 to +175	°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 parameters

Symbol	Parameter	Max. value	Unit
R _{th(j-c)}	Junction to case, DPAK	3.2	°C/W
R _{th(j-l)}	Junction to lead, SMBflat and SMC	15	

Table 4. 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}		5	μA
		T _j = 125 °C		0.70	2.50	mA
V _F ⁽²⁾	Forward voltage drop	T _j = 25 °C	I _F = 4 A		0.87	V
		T _j = 125 °C		0.64	0.71	

1. Pulse test: t_p = 5 ms, δ < 2%
2. Pulse test: t_p = 380 μs, δ < 2%

To evaluate the conduction losses use the following equation:

$$P = 0.63 \times I_{F(AV)} + 0.020 \times I_{F(RMS)}^2$$

Figure 1. Average forward power dissipation versus average forward current

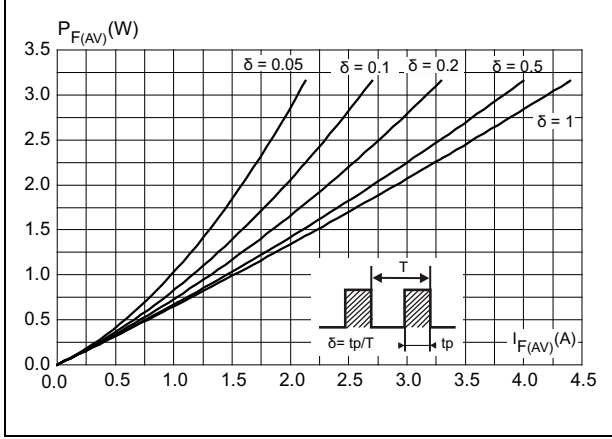


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$)

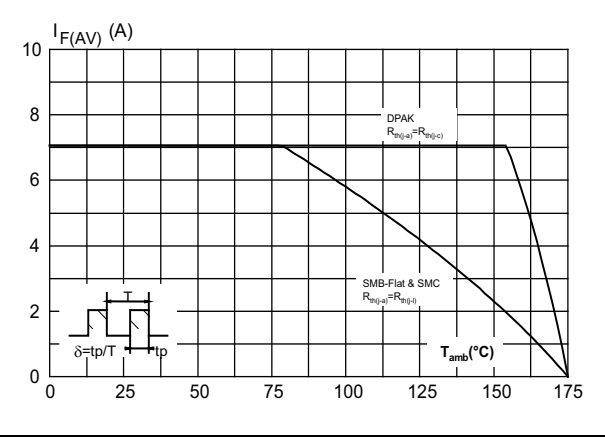


Figure 3. Relative variation of thermal impedance, junction to case, versus pulse duration (DPAK)

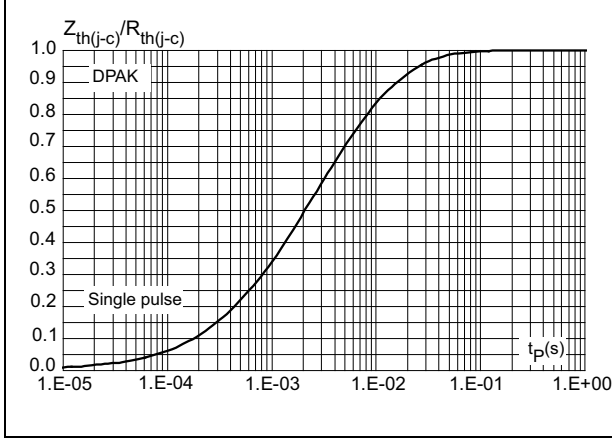


Figure 4. Relative variation of thermal impedance, junction to lead versus pulse duration (SMBflat)

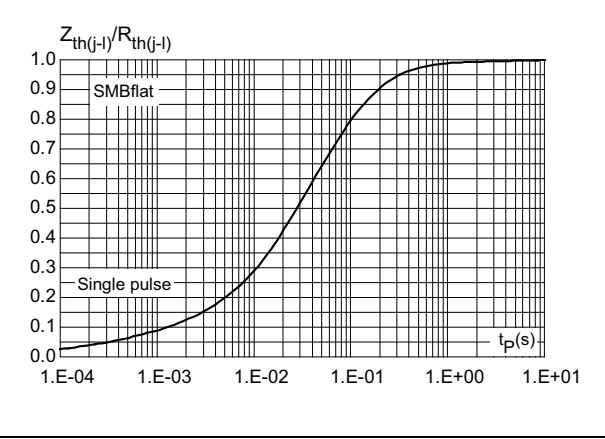


Figure 5. Relative variation of thermal impedance, junction to lead, versus pulse duration (SMC)

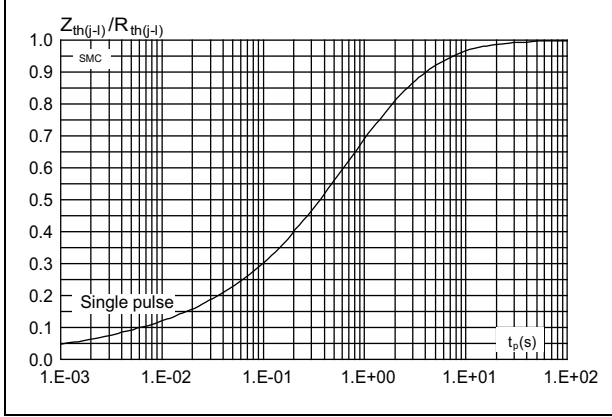


Figure 6. Reverse leakage current versus reverse voltage applied (typical values)

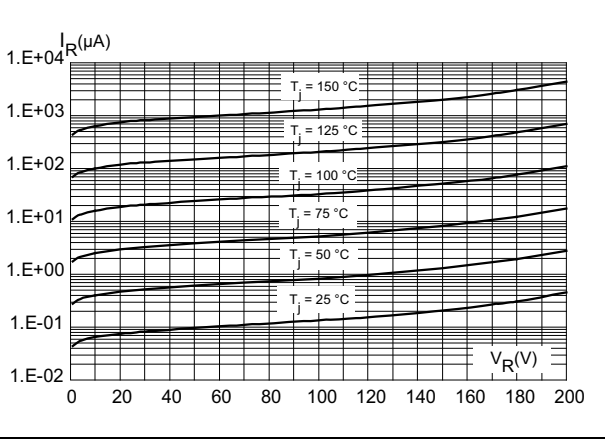


Figure 7. Junction capacitance versus reverse voltage applied (typical values)

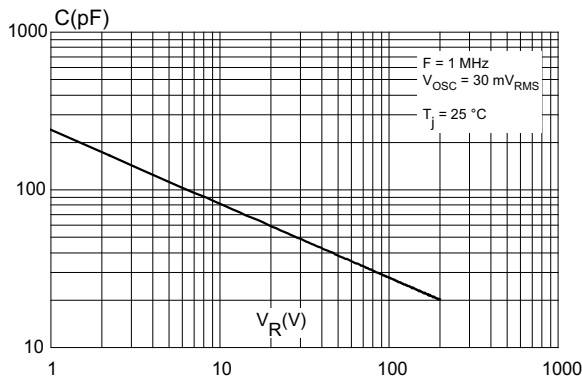


Figure 8. Forward voltage drop versus forward current (typical values)

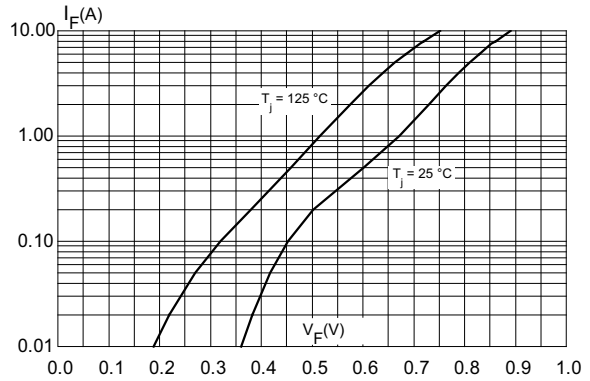


Figure 9. Forward voltage drop versus forward current (maximum values)

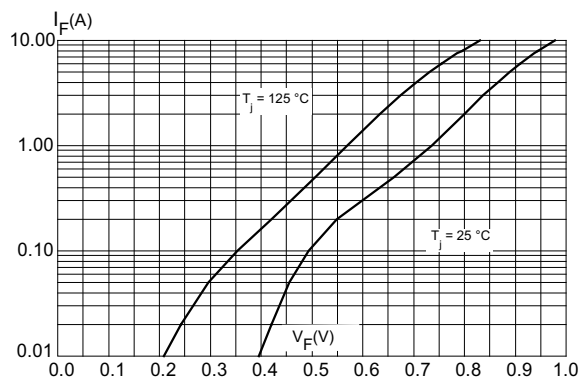


Figure 10. Thermal resistance junction to ambient versus copper surface under tab (typical values)

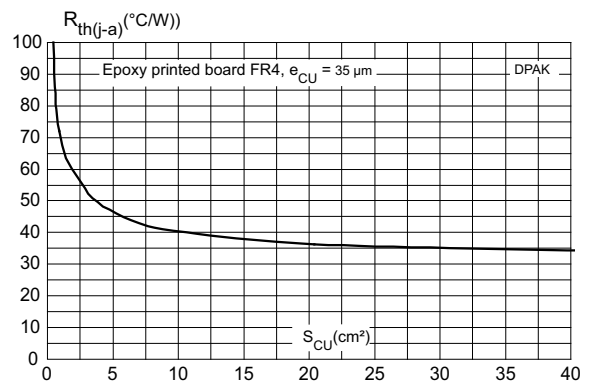


Figure 11. Thermal resistance junction to ambient versus copper surface under each lead (typical values) (SMBflat)

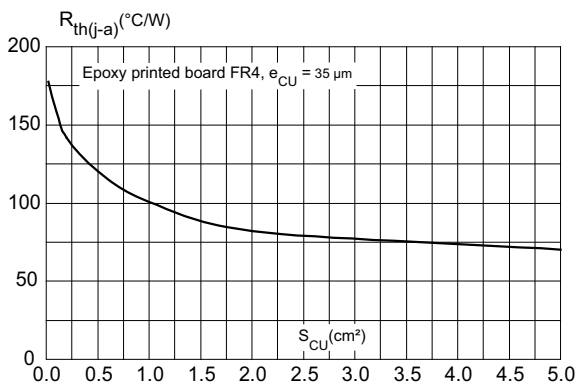
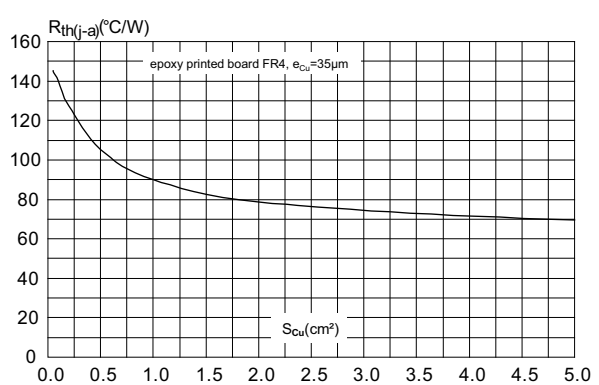


Figure 12. Thermal resistance junction to ambient versus copper surface under each lead (typical values) (SMC)



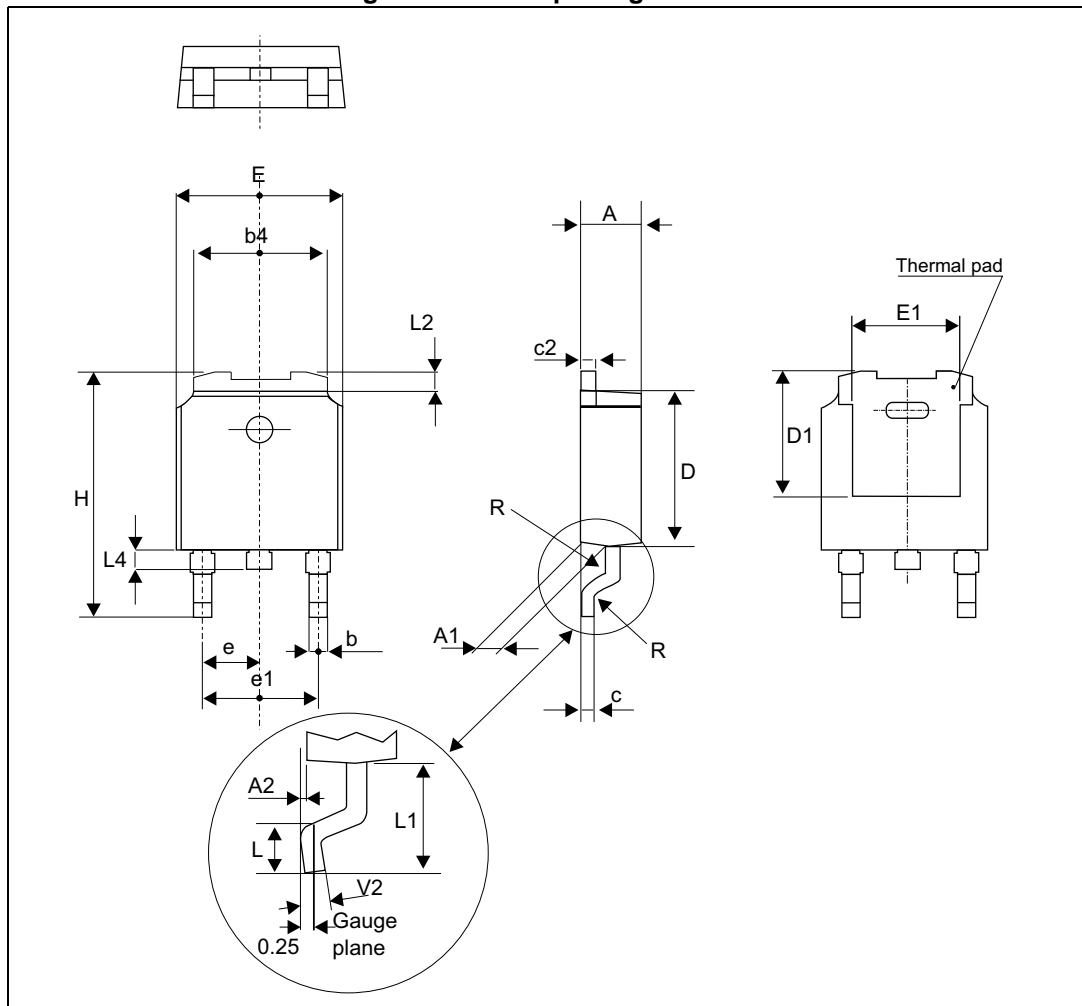
2 Package information

- Epoxy meets UL94,V0
- Lead-free package
- Band indicates cathode

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 DPAK package information

Figure 13. DPAK package outline

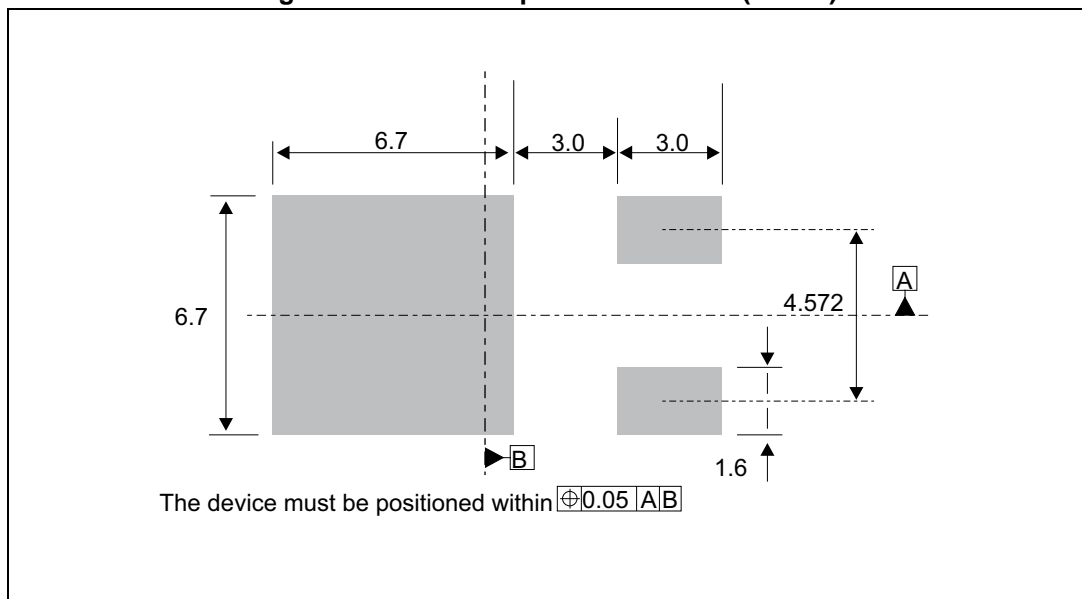


Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 5. DPAK package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.18		2.40	0.085		0.094
A1	0.90		1.10	0.035		0.043
A2	0.03		0.23	0.001		0.009
b	0.64		0.90	0.025		0.035
b4	4.95		5.46	0.194		0.214
c	0.46		0.61	0.018		0.024
c2	0.46		0.60	0.018		0.023
D	5.97		6.22	0.235		0.244
D1	4.95		5.60	0.194		0.220
E	6.35		6.73	0.250		0.264
E1	4.32		5.50	0.170		0.216
e		2.28			0.090	
e1	4.40		4.70	0.173		0.185
H	9.35		10.40	0.368		0.409
L	1.00		1.78	0.039		0.070
L2			1.27			0.050
L4	0.60		1.02	0.023		0.040
V2	-8°		+8°	-8°		8°

Figure 14. DPAK footprint dimensions (in mm)



2.2 SMBflat package information

Figure 15. SMBflat package outline

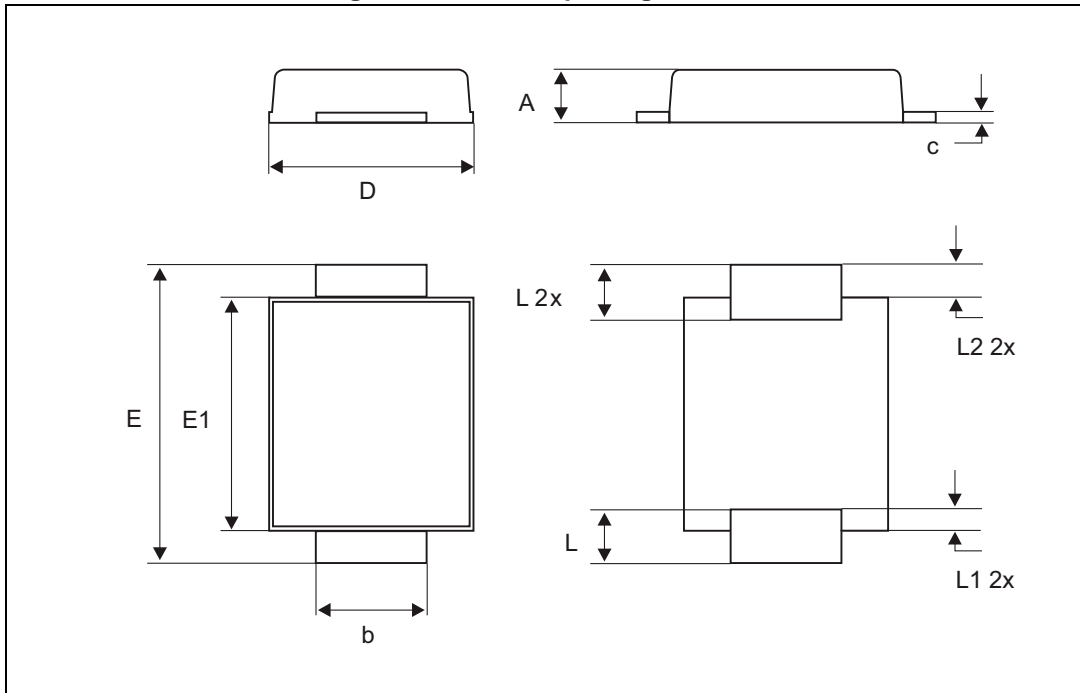
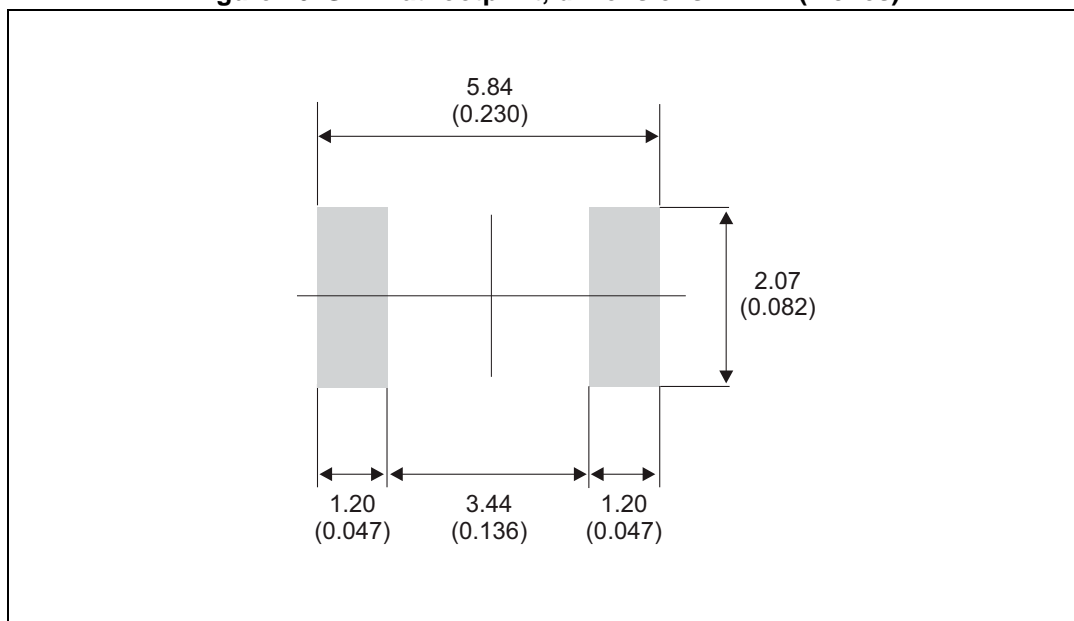


Table 6. SMBflat package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90		1.10	0.035		0.043
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		0.155
E	5.10		5.60	0.200		0.220
E1	4.05		4.60	0.159		0.181
L	0.75		1.50	0.029		0.059
L1		0.40			0.016	
L2		0.60			0.024	

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



2.3 SMC package information

Figure 17. SMC dimensions definitions

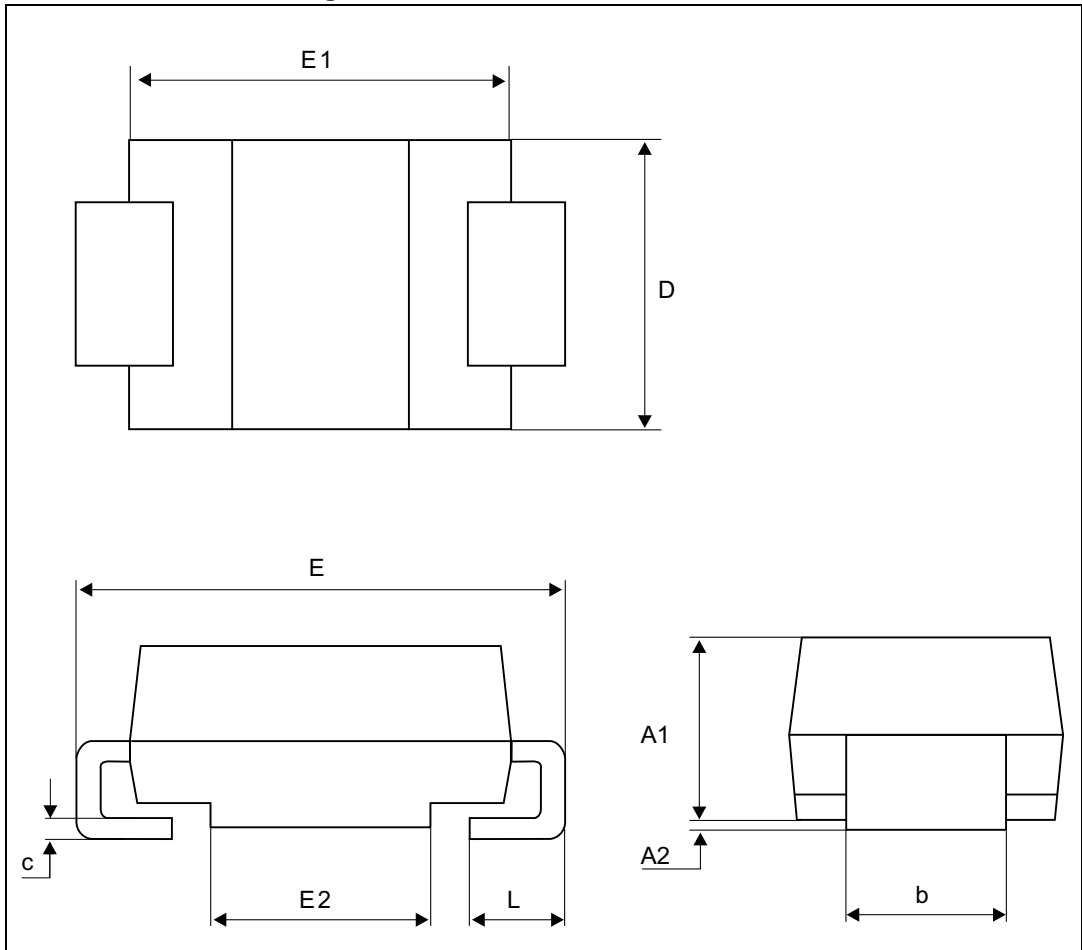
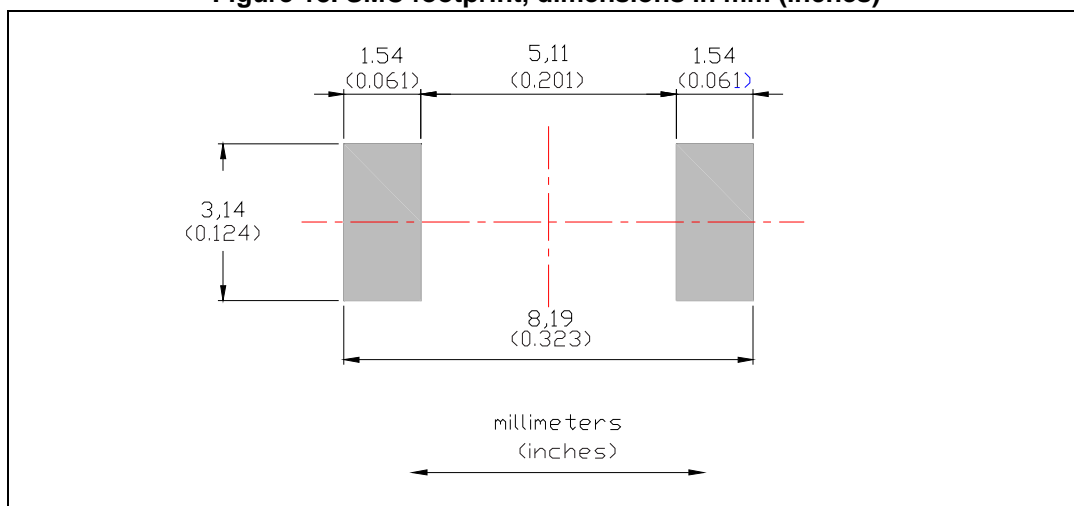


Table 7. SMC dimension values

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 18. SMC footprint, dimensions in mm (inches)



3 Ordering information

Table 8. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS4S200B-TR	S4 200B	DPAK	320 mg	2500	Tape and reel
STPS4S200UF	FG42	SMBflat	50 mg	5000	Tape and reel
STPS4S200S	S42	SMC	250 mg	2500	Tape and reel

4 Revision history

Table 9. Document revision history

Date	Revision	Changes
17-Oct-2014	1	First release.
26-Aug-2015	2	Added device in SMC package. Updated document accordingly.
15-May-2017	3	Updated DPAK package information and reformatted to current standard.

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