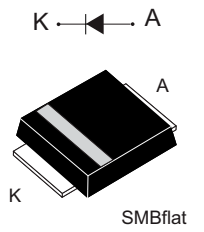
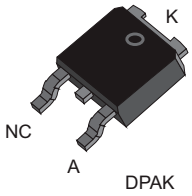
STPS4S200

Power Schottky rectifier

Datasheet – production data





Features

- Negligible switching losses
- High junction temperature capability
- Very small conduction losses
- Low leakage current
- Avalanche rated
- ECOPACK® compliant component (SMBflat)
- T_j = -40 °C minimum operating

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 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

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
		SMBflat, T_L = 125 °C		
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	250	A
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Operating junction temperature(1)		-40 to +175	°C

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
$R_{th(j-c)}$	Junction to case, DPAK	3.2	°C/W
$R_{th(j-l)}$	Junction to lead, SMBflat	15	

When the two diodes 1 and 2 are used simultaneously:

ΔT_j(diode1) = P(diode1) x $R_{th(j-c)}$(per diode) + P(diode2) x $R_{th(c)}$

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			0.7	2.5	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:

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

Figure 1. Average forward power dissipation versus average forward current

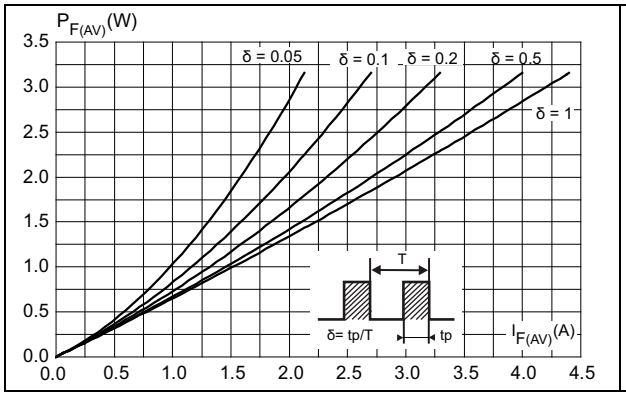


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

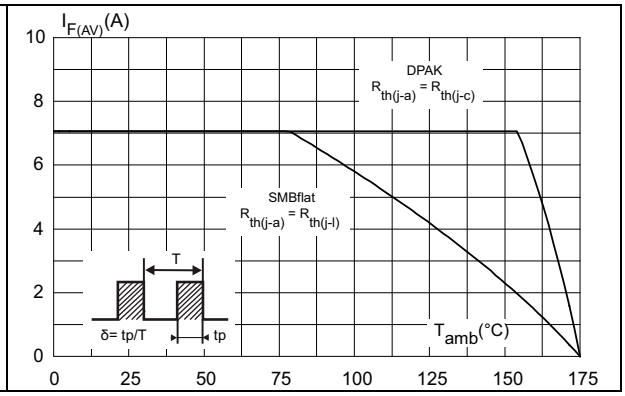


Figure 3. Relative variation of thermal impedance, junction to case, versus pulse duration (DPAK)

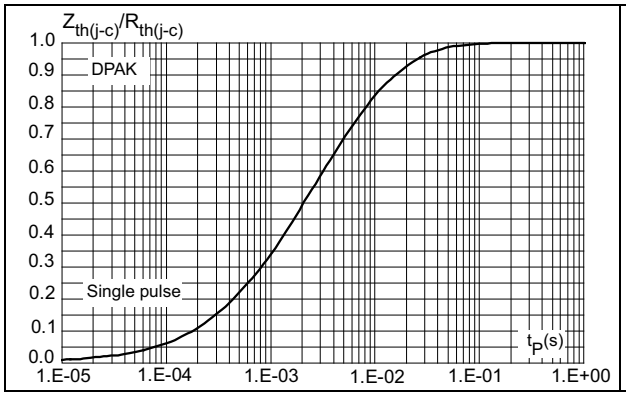


Figure 4. Relative variation of thermal impedance, junction to lead versus pulse duration (SMBflat)

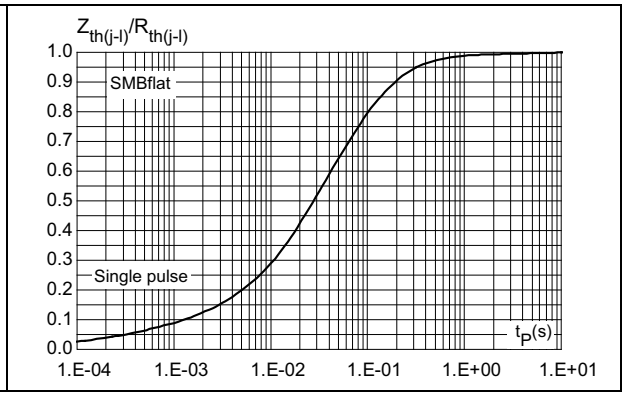


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

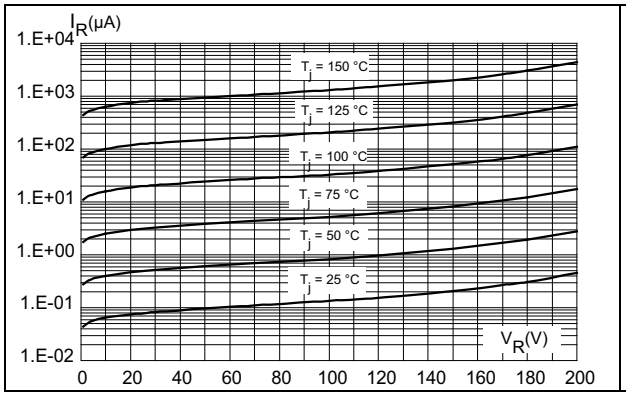


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

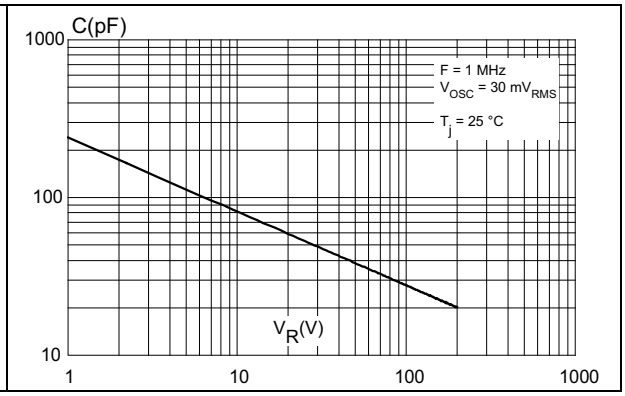


Figure 7. Forward voltage drop versus forward current (typical values)

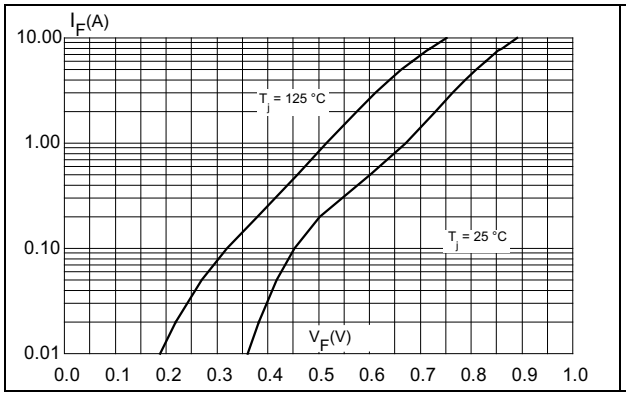


Figure 8. Forward voltage drop versus forward current (maximum values)

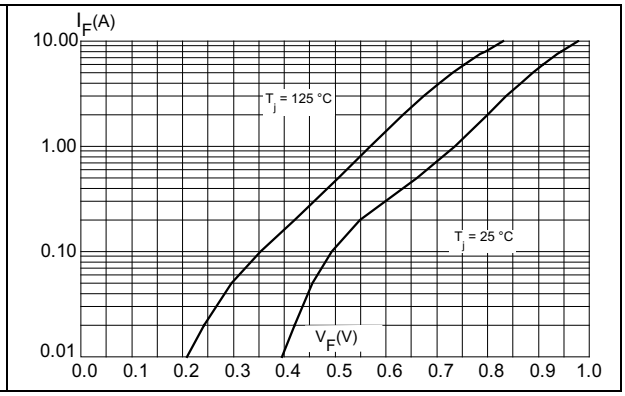


Figure 9. Thermal resistance junction to ambient versus copper surface under tab (typical values)

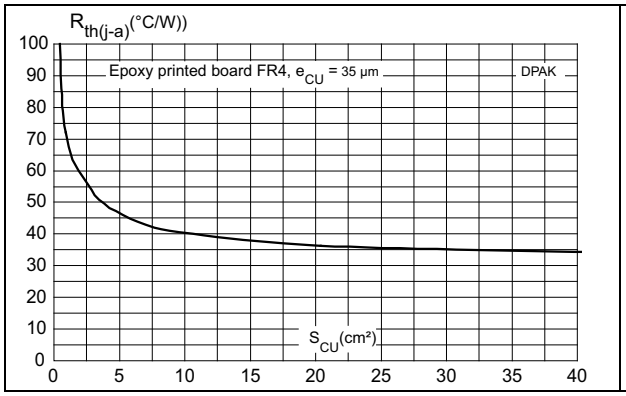
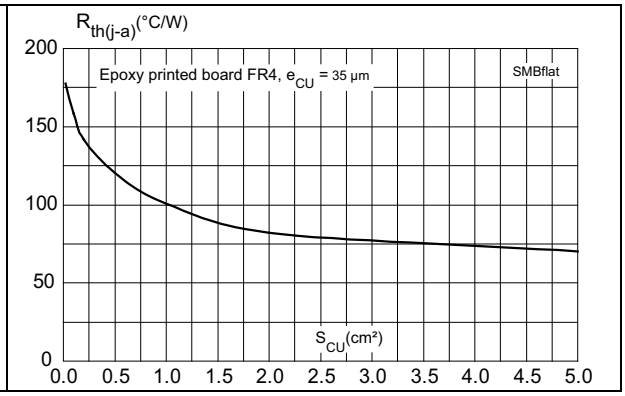


Figure 10. Thermal resistance junction to ambient versus copper surface under each lead (typical values)



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.

Figure 11. DPAK dimension definitions

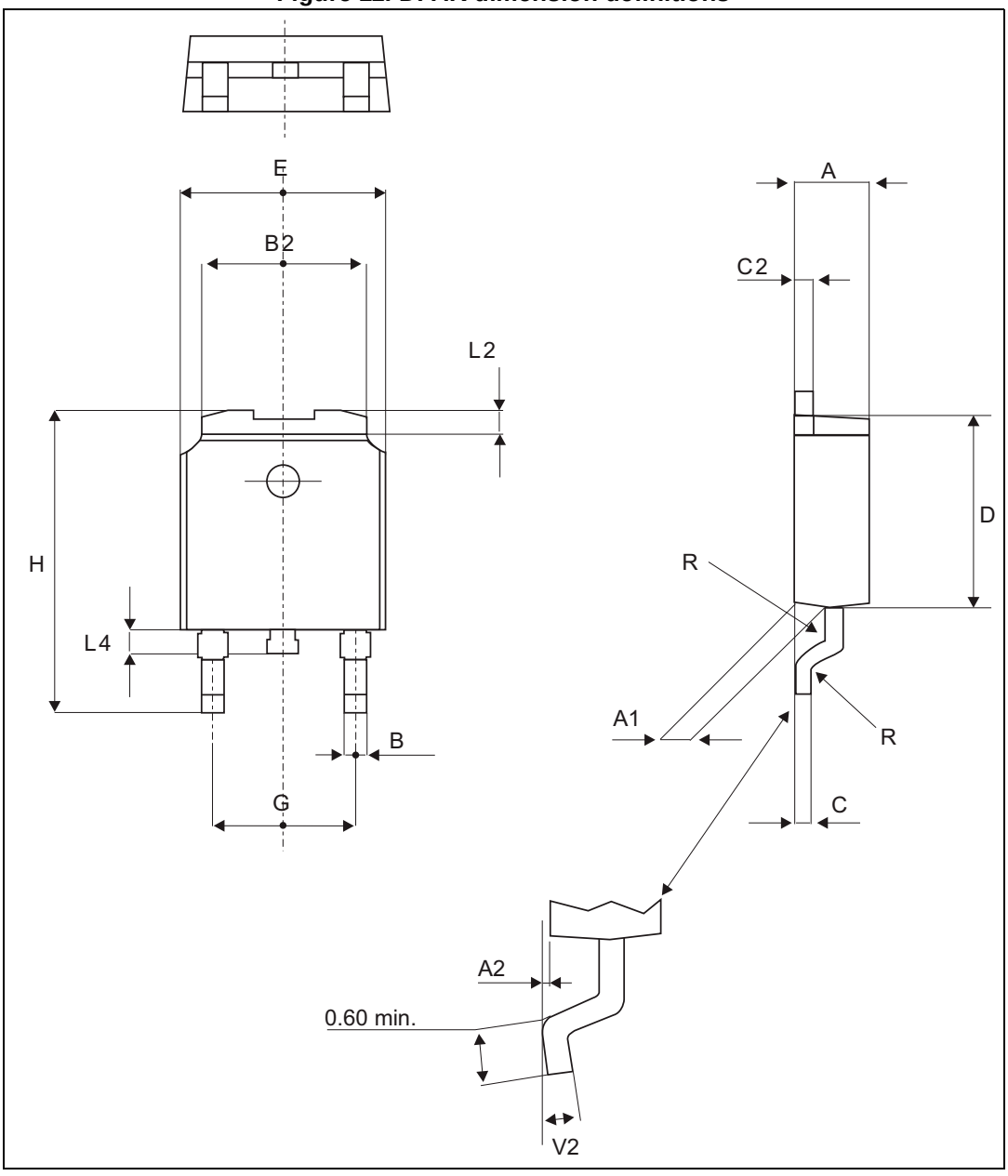


Table 5. DPAK dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.20		2.40	0.086		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
B2	5.20		5.40	0.204		0.212
C	0.45		0.60	0.017		0.023
C2	0.48		0.60	0.018		0.023
D	6.00		6.20	0.236		0.244
E	6.40		6.60	0.251		0.259
G	4.40		4.60	0.173		0.181
H	9.35		10.10	0.368		0.397
L2		0.80 typ.			0.031 typ.	
L4	0.60		1.00	0.023		0.039
V2	0°		8°	0°		8°

Figure 12. Footprint (dimensions in mm)

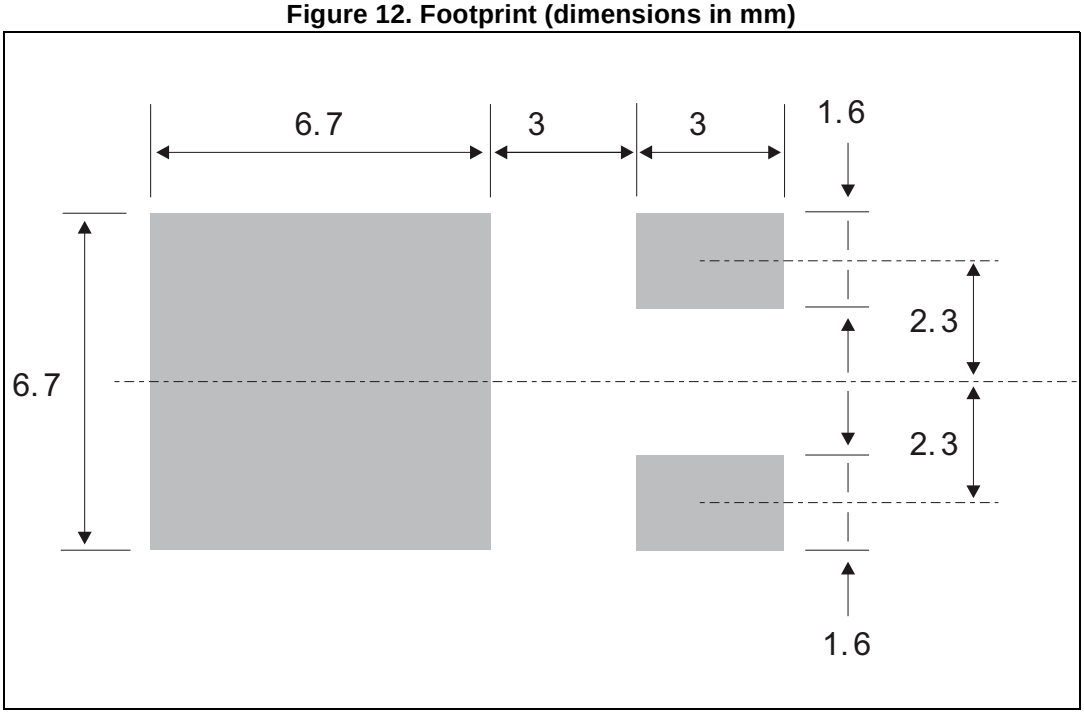


Figure 13. SMBflat dimensions definitions

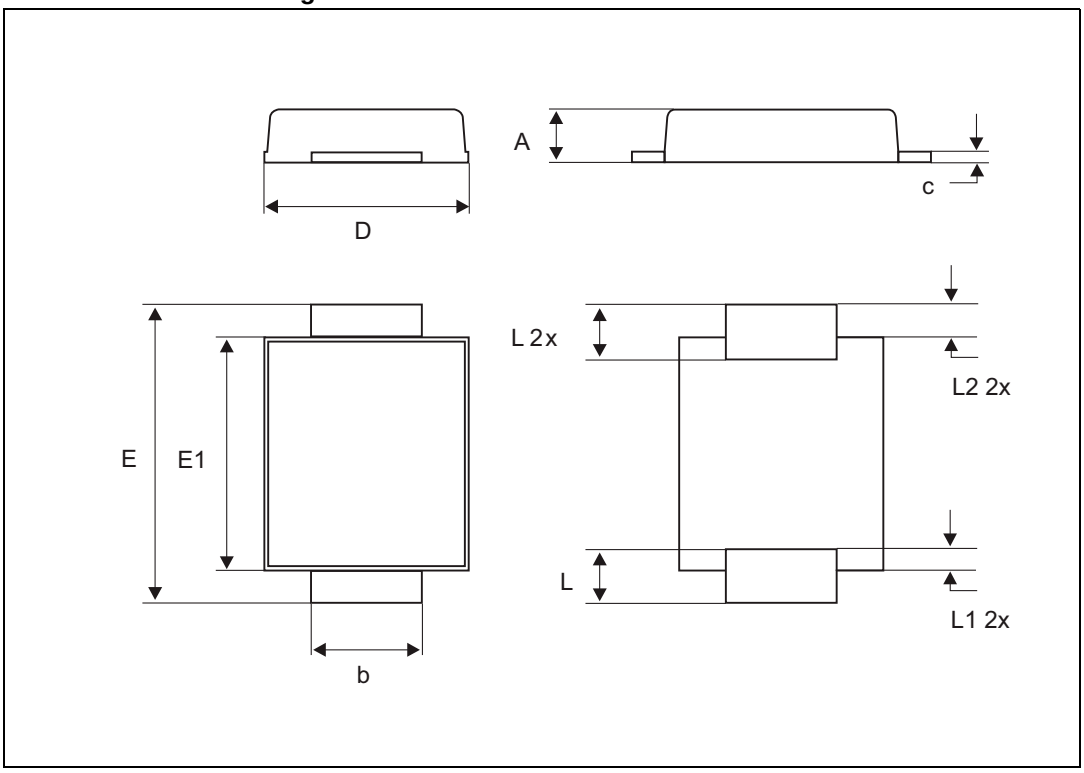
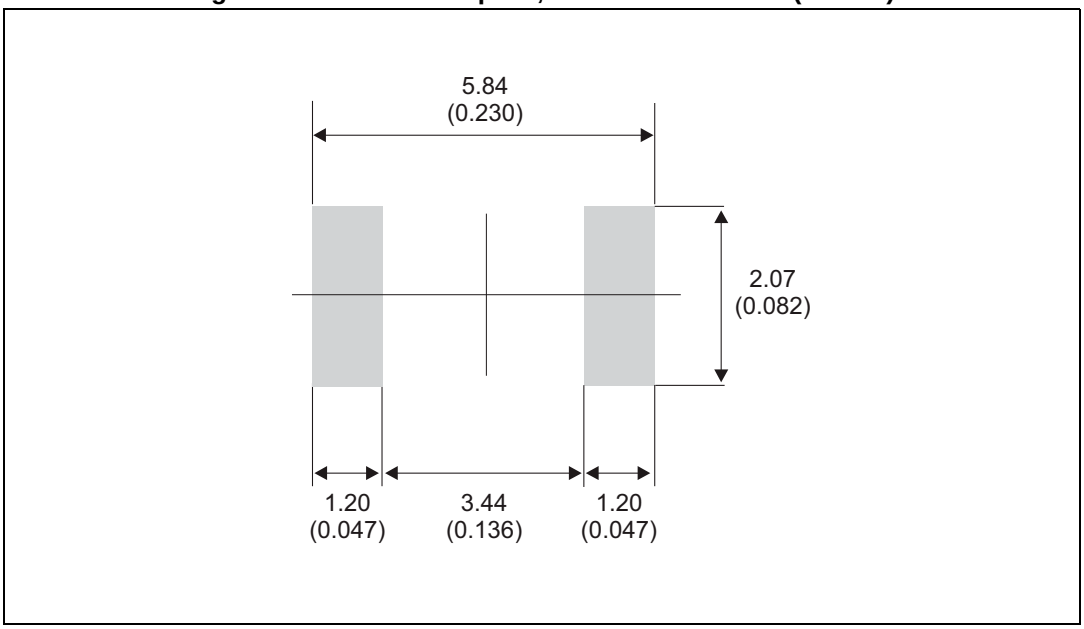


Table 6. SMBflat dimension values

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 14. SMBflat footprint, dimensions in mm (inches)



3 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS4S200B-TR	S4 200B	DPAK	0.3 g	2500	Tape and reel
STPS4S200UF	FG42	SMBflat	0.050 g	5000	Tape and reel

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
17-Oct-2014	1	First release.