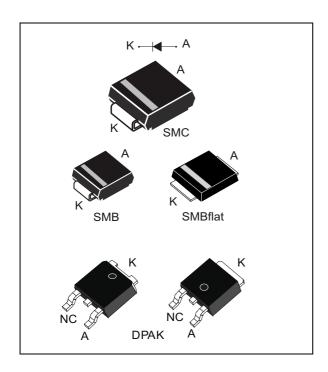


Power Schottky rectifier

Datasheet - production data



Description

Single chip Schottky rectifier suited for switch mode power supplies and high frequency DC to DC converters.

Packaged in DPAK, SMC, SMB, and SMBflat, this device is intended for use in low and medium voltage operation, high frequency inverters, free wheeling and polarity protection applications where low switching losses are required.

Table 1. Device summary

Symbol	Value
I _{F(AV)}	3 A
V_{RRM}	40 V
T _{j(max)}	150 °C
V _{F (Typ)}	0.52 V

Features

- Very small conduction losses
- · Negligible switching losses
- Low forward voltage drop
- Low thermal resistance
- Extremely fast switching
- Surface mounted device
- Avalanche capability specified
- ECOPACK[®]2 compliant component for DPAK on demand

Characteristics STPS340

Characteristics 1

Table 2. Absolute ratings (limiting values at T_{amb} = 25 °C unless otherwise specified)

Symbol	Parameter		Value	Unit	
V_{RRM}	Repetitive peak reverse voltage				V
I _{F(RMS)}	Forward rms current		DPAK	6	Α
		T _c = 135 °C	DPAK		
		T _I = 105 °C	SMC	3	А
IF(AV)		T _I = 95 °C	SMB		
		T _I = 115 °C	SMBflat		
I _{FSM}	Surge non repetitive forward current $t_p = 10 \text{ ms sinusoidal}$		75	Α	
P _{ARM} ⁽¹⁾	Repetitive peak avalanche power $t_p = 10 \mu s$, $T_j = 125 °C$			90	W
T _{stg}	Storage temperature range			-65 to +150	°C
Tj	Maximum operating junction temperature ⁽²⁾			150	°C

For pulse time duration derating, please refer to Figure 4. More details regarding the avalanche energy measurements and diode validation in the avalanche are provided in the application notes AN1768 and AN2025.

Table 3. Thermal parameters

Symbol	Parameter	Max. value	Unit	
		SMC	20	
$R_{th(j-l)}$	Junction to lead	SMB	25	°C/W
		SMBflat	15	C/VV
R _{th(j-c)}	Junction to case	DPAK	5.5	

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Тур	Max.	Unit
I _R ⁽¹⁾	Poverse leekage gurrent	T _j = 25 °C	V - V	-		20	μA
'R` ′	Reverse leakage current	T _j = 125 °C	$V_R = V_{RRM}$	-	2	10	mA
		T _j = 25 °C	-		0.63		
V _E ⁽¹⁾	Forward voltage drop	T _j = 125 °C	I _F = 3 A	-	0.52	0.57	V
vF. ,	Forward voitage drop	$T_j = 25 ^{\circ}\text{C}$ $T_i = 125 ^{\circ}\text{C}$	I - 6 A	-		0.84	V
			I _F = 6 A	-	0.63	0.72	

^{1.} Pulse test: t_p = 380 μ s, δ < 2%

To evaluate the conduction losses, use the following equation: P = 0.42 x I_{F(AV)} + 0.050 x I_F^2_{(RMS)}

$$P = 0.42 \text{ x } I_{E(AV)} + 0.050 \text{ x } I_{E(RMS)}^{2}$$

 $^{2. \}quad \frac{dPtot}{dTj} < \frac{1}{Rth(j-a)} \ condition \ to \ avoid \ thermal \ runaway \ for \ a \ diode \ on \ its \ own \ heatsink$

STPS340 Characteristics

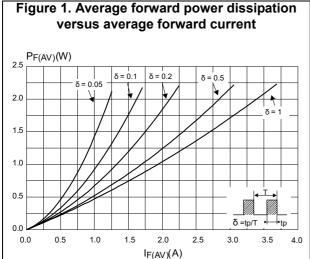
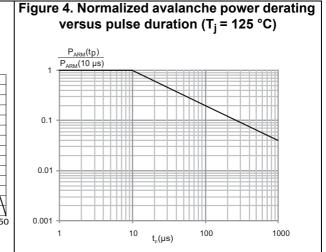


Figure 2. Average forward current versus ambient temperature (δ = 0.5)(DPAK, SMB, SMC) $I_{F(AV)}(A)$ 3.5 DPAK 3.0 $R_{th(i-a)} = R_{th(i-l)}$ 2.5 SMC 2.0 1.5 1.0 0.5 0.0 T_{amb}(°C)

Figure 3. Average forward current versus ambient temperature (δ = 0.5) (SMBflat) $I_{F(AV)}(A)$ 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 100 150 50 75 T_{amb}(°C)



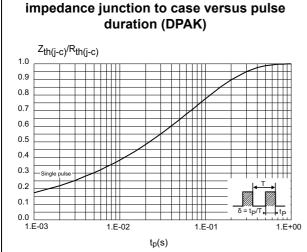


Figure 5. Relative variation of thermal

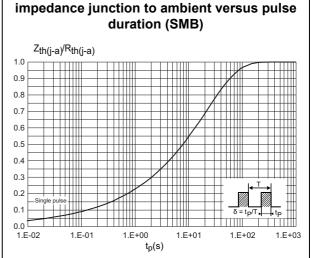


Figure 6. Relative variation of thermal

Characteristics STPS340

Figure 7. Relative variation of thermal impedance junction to ambient versus pulse duration (SMC) $Z_{th(j-a)}/R_{th(j-a)}$ 1.0 0.9 0.7 0.6 0.5 0.4 0.3 0.2 0.1 LILIII 0.0 1.E-02 1.E-01 1.E+00 1.E+01 1.E+02 1.E+03 t_p(s)

Figure 8. Relative variation of thermal impedance junction to lead versus pulse duration (SMBflat) $Z_{th(j-l)}$ / $R_{th(j-l)}$ 1.0 0.9 0.8 0.7 0.6 0.4 0.3 0.2 0.1 0.0 1.E-04 1.E-03 1.E-02 1.E-01 1.E+00 1.E+01

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

IR(mA)

1.E+01

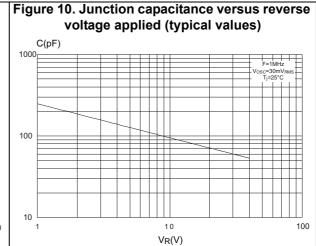
1.E+01

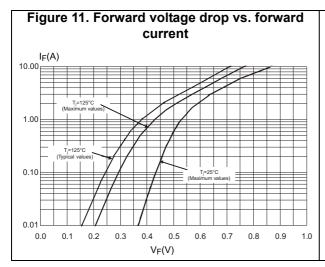
1.E-02

1.E-03

1.E-04

0 5 10 15 20 25 30 35 40 VR(V)





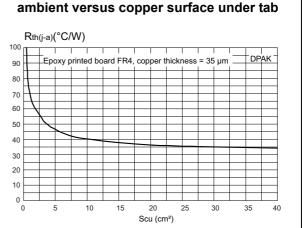


Figure 12. Thermal resistance junction to

STPS340 Characteristics

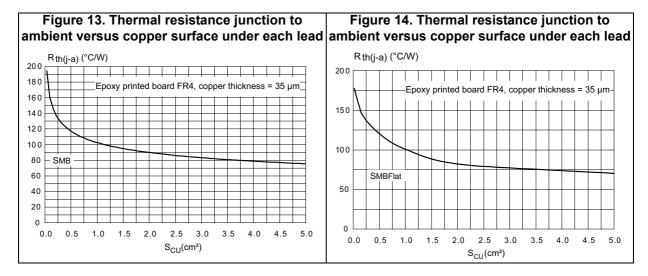
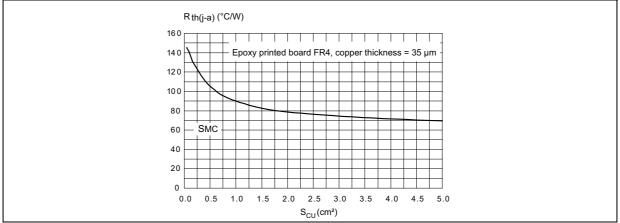


Figure 15. Thermal resistance junction to ambient versus copper surface under each lead



STPS340 Package Information

2 **Package Information**

- Epoxy meets UL94,V0
- Cooling method: by conduction (C)
- Band indicates cathode (SMB, SMBflat, SMC)

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

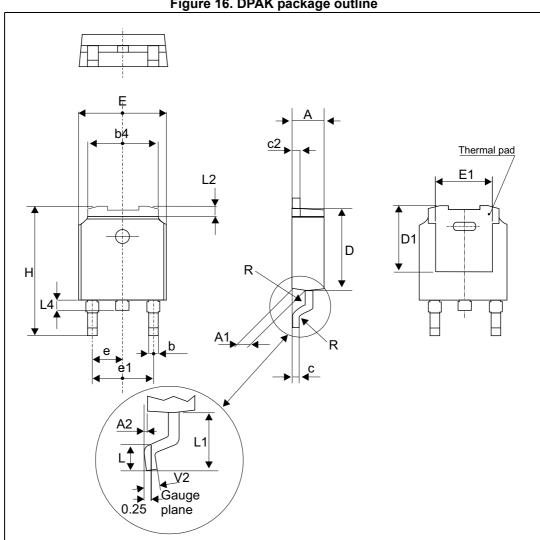


Figure 16. DPAK package outline

Note:

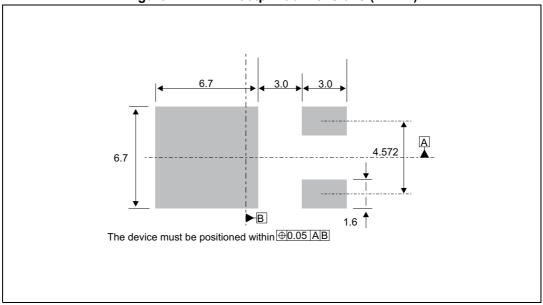
This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

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Table 5. DPAK package mechanical data

			/ puonu;	Dimensions		
Ref.		Millimeters			Inches	
	Min.	Тур.	Max.	Min.	Тур.	Max.
А	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
С	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
Е	6.35		6.73	0.250		0.264
E1	4.32		5.50	0.170		0.216
е		2.28			0.090	
e1	4.40		4.70	0.173		0.185
Н	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 17. DPAK footprint dimensions (in mm)



Package Information STPS340

2.2 SMBflat package information

Figure 18. SMBflat package outline

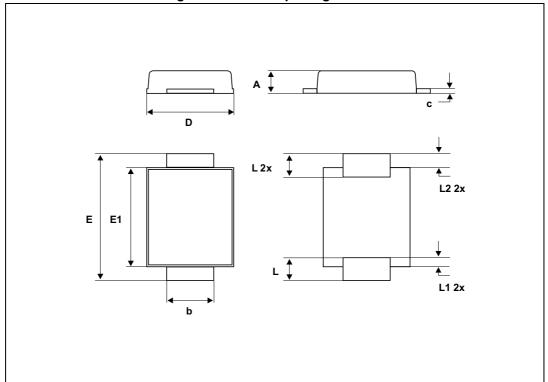
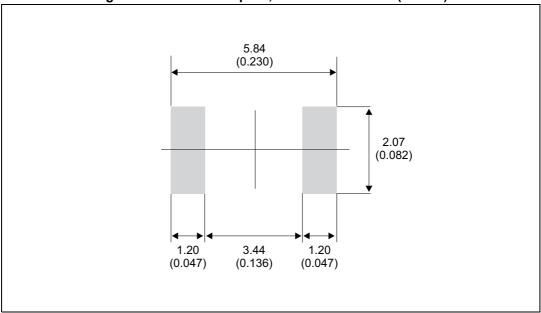


Table 6. SMBflat package mechanical data

	Dimensions					
Ref.		Millimeters			Inches	
	Min.	Тур.	Max.	Min.	Тур.	Max.
А	0.90		1.10	0.035		0.043
b	1.95		2.20	0.077		0.087
С	0.15		0.40	0.006		0.016
D	3.30		3.95	0.130		0.155
Е	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 19. SMBflat footprint, dimensions in mm (inches)



Package Information STPS340

2.3 SMB package information

E1

E1

A1

A2

A2

Figure 20. SMB package outline

Table 7. SMB package mechanical data

	Dimensions				
Ref.	Millim	Millimeters		hes	
	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	
С	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	

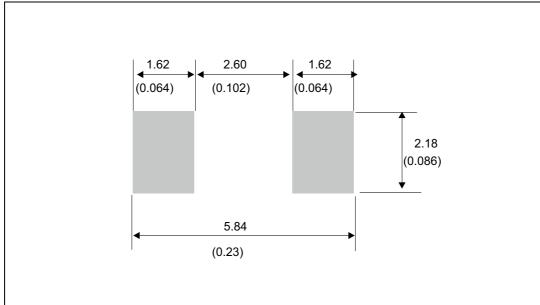


Figure 21. SMB footprint, dimensions in mm (inches)



Package Information STPS340

2.4 SMC package information

E1

E1

A1

A2

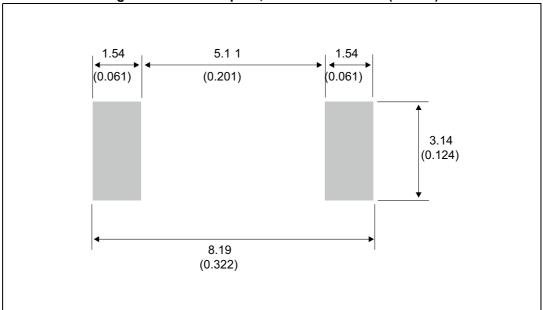
Figure 22. SMC package outline

Table 8. SMC package mechanical data

		nsions		
Ref.	Millim	eters	Inc	hes
	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 23. SMC footprint, dimensions in mm (inches)



Ordering information STPS340

3 Ordering information

Table 9. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS340U	U34	SMB	107 mg		
STPS340S	S34	SMC	243 mg	2500	Tape and reel
STPS340B-TR	S3 40	DPAK	320 mg		Tape and reel
STPS340UF	FU34	SMBflat	50 mg	5000	

4 Revision history

Table 10. Revision history

Date	Revision Changes		
Jul-2003	7	Last update.	
Feb-2005	8	Layout update. No content change.	
08-Feb-2007	9	Reformatted to current standard. Added ECOPACK statement. Added SMBflat package.	
10-Feb-2009	10	Updated ECOPACK statement. Corrected Y axis in Figure 10.	
23-Apr-2015	11	Updated DPAK and reformatted to current standard.	
22-Sep-2016	12	Updated DPAK package information and reformatted to current standard.	

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