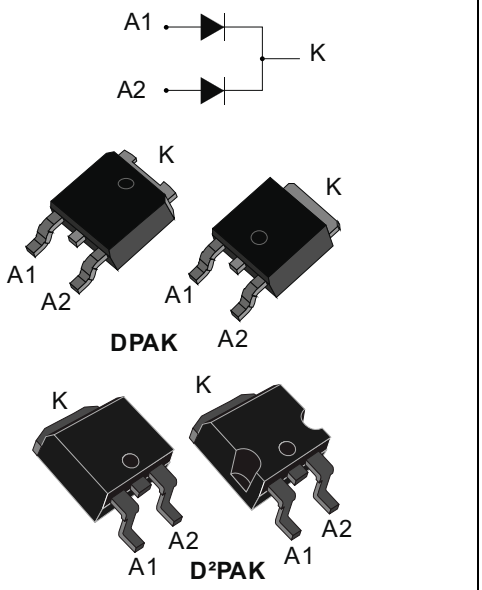
STPS10170C

High voltage power Schottky rectifier

Datasheet – production data



Description

This dual center tab Schottky rectifier is suited for high frequency switched mode power supplies.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	2 x 5 A
V_{RRM}	170 V
$T_{j(max)}$	175 °C
$V_{F\ (Typ)}$	0.69 V

Features

- High junction temperature capability
- Good trade off between leakage current and forward voltage drop
- Low leakage current
- Avalanche capability specified
- ECOPACK®2 compliant component for DPAK and D²PAK on demand

This is information on a product in full production. www.st.com

1 Characteristics

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

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			170	V
$I_{F(RMS)}$	Forward rms current			10	A
$I_{F(AV)}$	Average forward current, δ = 0.5, square wave	T_c = 155 °C	Per diode	5	A
			Total	10	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal		75	A
P_{ARM}(1)	Repetitive peak avalanche power	t_p = 10 µs, T_j = 125 °C		220	W
T_{stg}	Storage temperature range			-65 to + 175	°C
T_j	Maximum operating junction temperature(2)			175	°C

1. For pulse time duration derating, please refer to *Figure 3*. More details regarding the avalanche energy measurements and diode validation in the avalanche are provided in the application notes AN1768 and AN2025.
2. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ 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	Per diode	4	°C/W
		Total	2.4	
$R_{th(c)}$	Coupling		0.7	

When the diodes 1 and 2 are used simultaneously:
ΔTj(diode 1) = P(diode1) x $R_{th(j-c)}$(Per diode) + P(diode 2) x $R_{th(c)}$

Table 4. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-	-	10	µA
		T_j = 125 °C		-	-	10	mA
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 5 A	-	-	0.92	V
		T_j = 125 °C		-	0.69	0.75	
		T_j = 25 °C	I_F = 10 A	-	-	1.0	
		T_j = 125 °C		-	0.79	0.85	

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:
$P = 0.65x\ I_{F(AV)} + 0.02\ x\ I_F{}^2{}_{(RMS)}$

Figure 1. Average forward power dissipation versus average forward current (per diode)

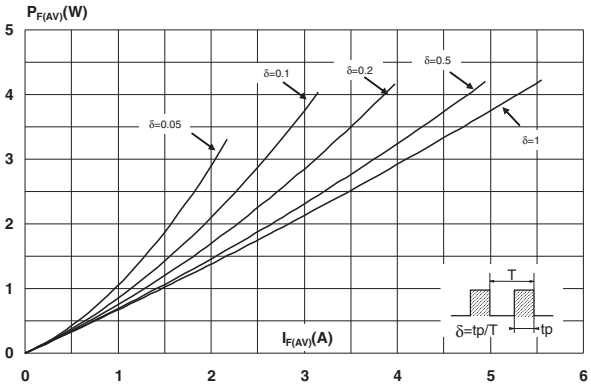


Figure 2. Average forward current per diode versus ambient temperature (δ = 0.5)

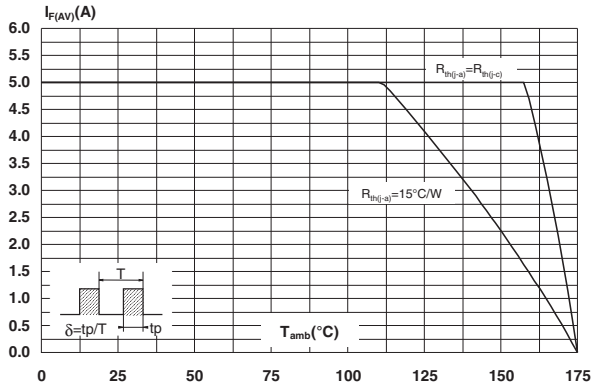


Figure 3. Normalized avalanche power derating versus pulse duration at T_j = 125 °C

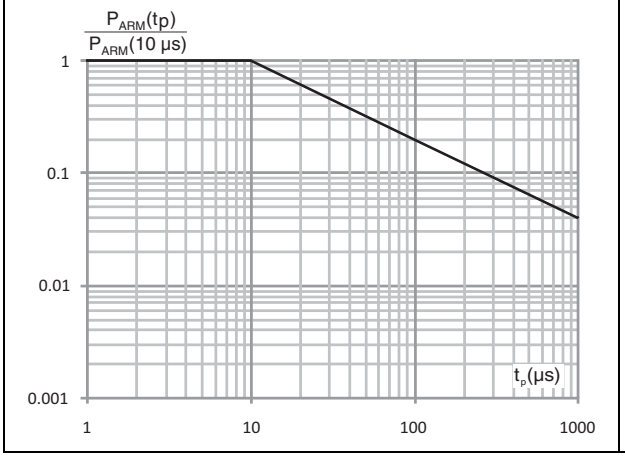


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

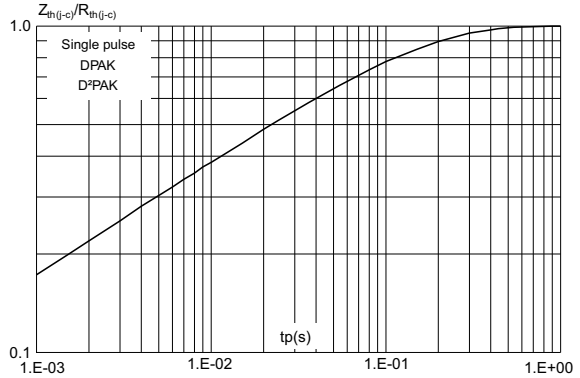


Figure 5. Reverse leakage current versus reverse voltage applied (typical values, per diode)

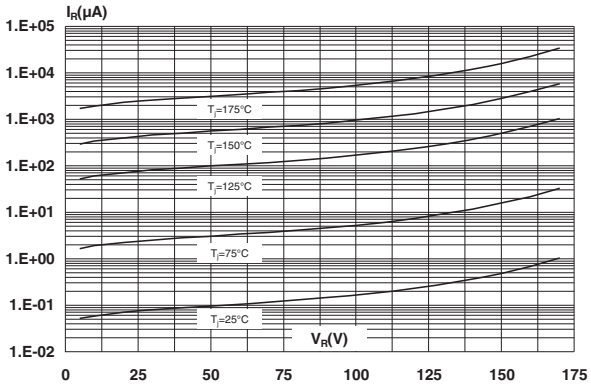


Figure 6. Junction capacitance versus reverse voltage applied (typical values, per diode)

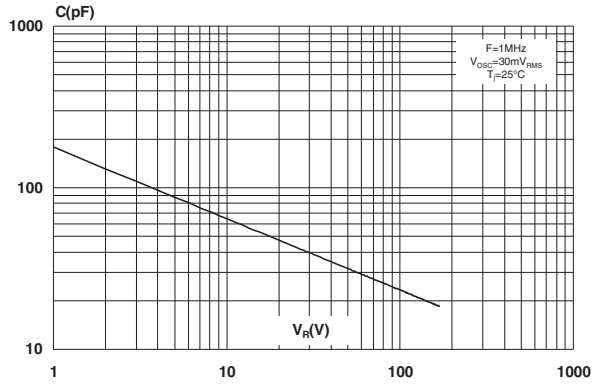


Figure 7. Forward voltage drop vs. forward current (per diode)

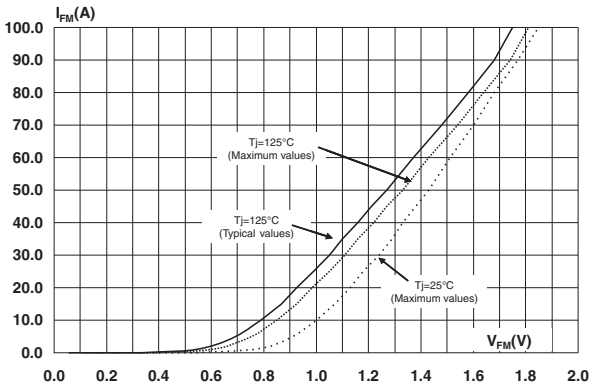


Figure 8. Thermal resistance junction to ambient versus copper surface under tab (DPAK)

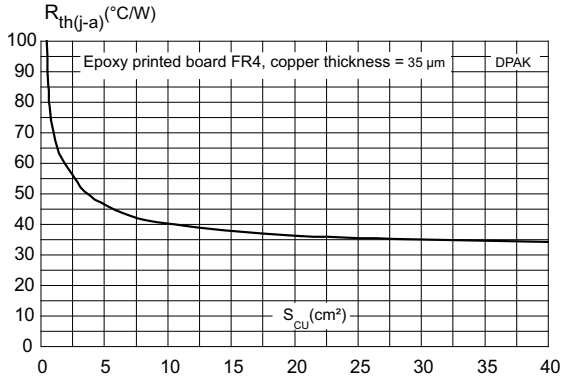
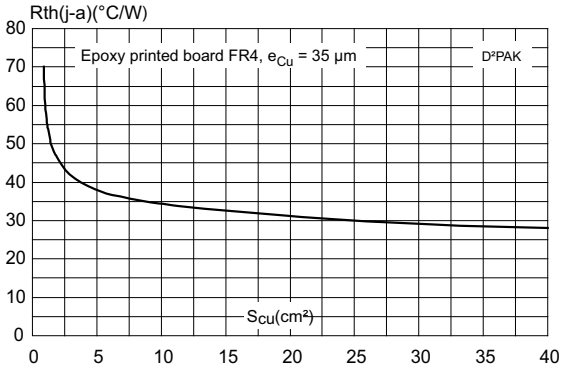


Figure 9. Thermal resistance junction to ambient versus copper surface under tab (D²PAK)



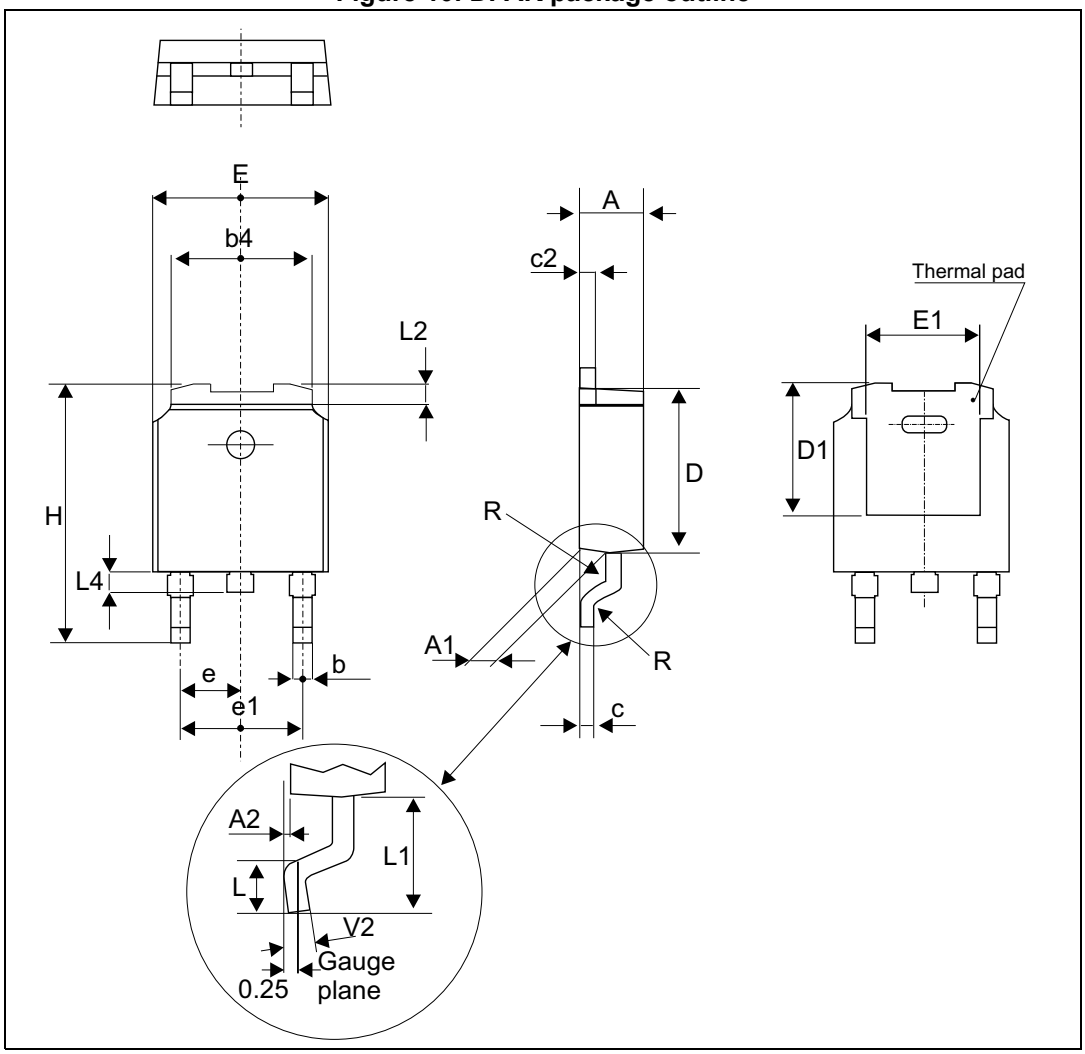
2 Package Information

- 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 DPAK package information

Figure 10. DPAK package outline

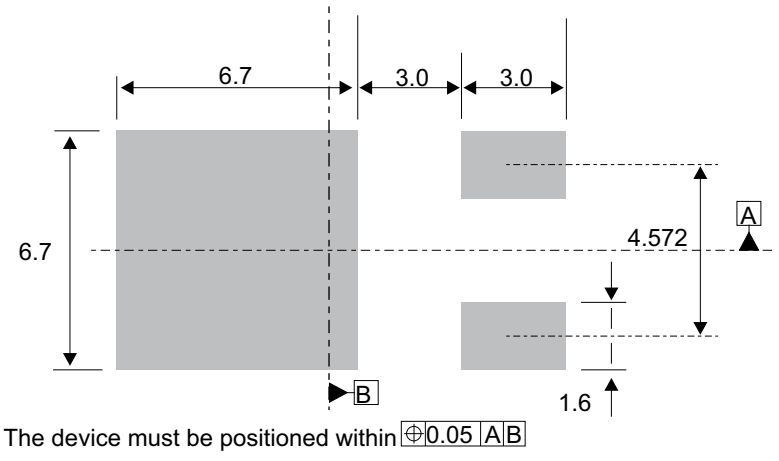


Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 5. DPAK package mechanical data

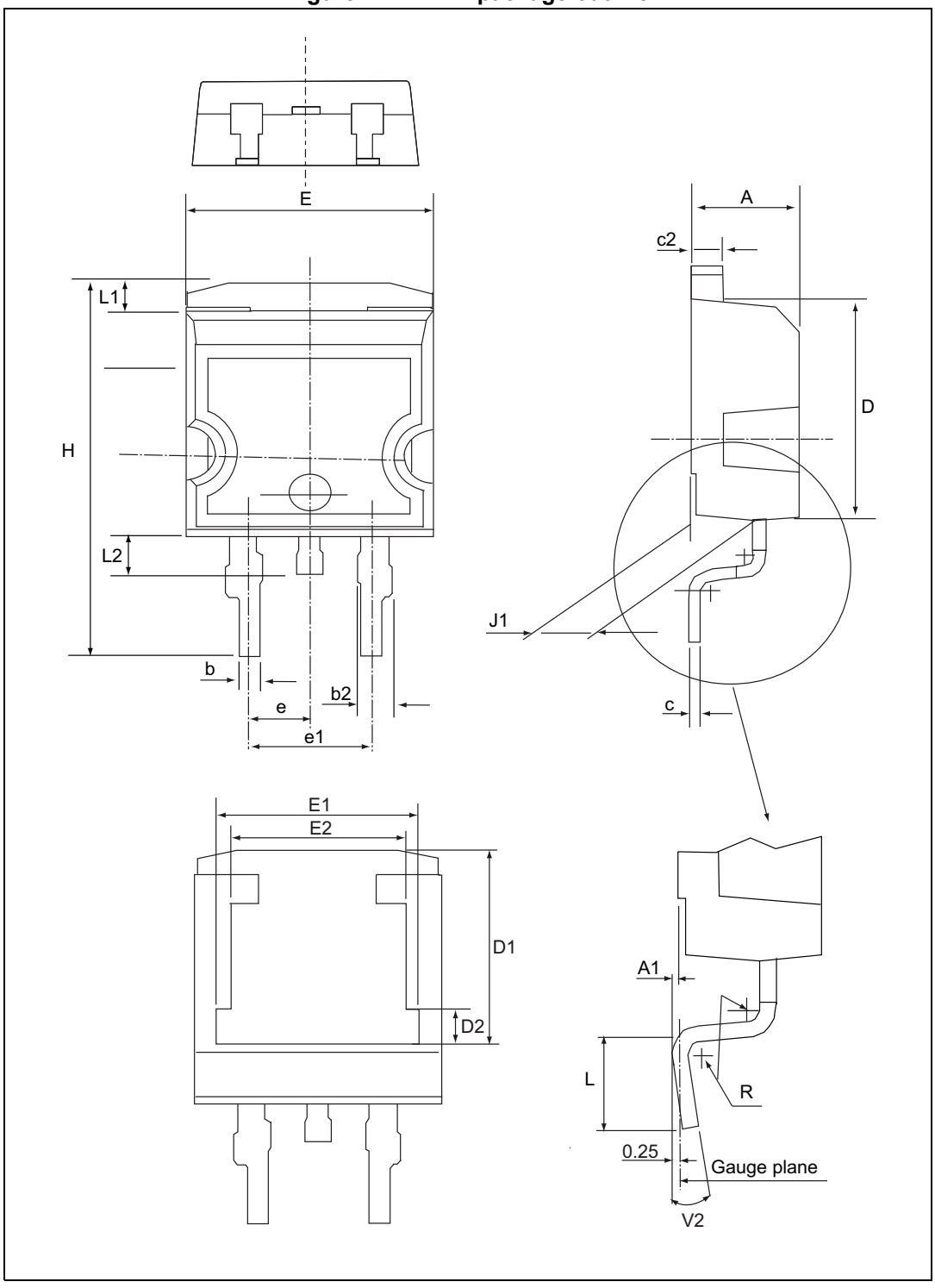
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.18		2.40	0.085		0.094
A1	0.90		1.10	0.035		0.043
A2	0.03		0.23	0.001		0.009
b	0.64		0.90	0.025		0.035
b4	4.95		5.46	0.194		0.214
c	0.46		0.61	0.018		0.024
c2	0.46		0.60	0.018		0.023
D	5.97		6.22	0.235		0.244
D1	4.95		5.60	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 11. DPAK footprint dimensions (in mm)



2.2 D²PAK package information

Figure 12. D²PAK package outline

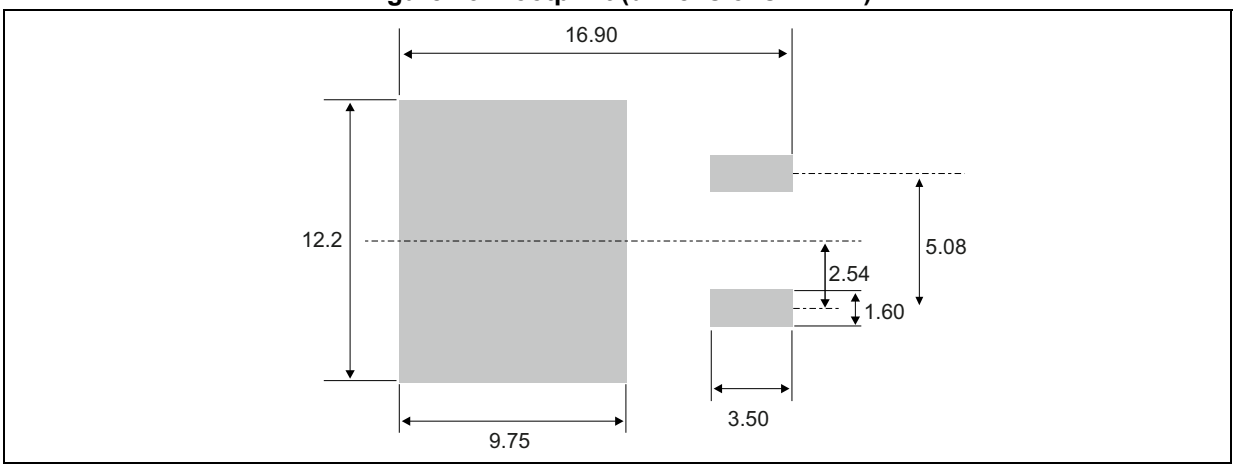


Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 6. D^2PAK package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.36		4.60	0.171		0.181
A1	0		0.25			0.010
b	0.70		0.93	0.027		0.037
b2	1.14		1.70	0.045		0.067
c	0.38		0.69	0.014		0.027
c2	1.19		1.36	0.046		0.053
D	8.60		9.35	0.338		0.368
D1	6.90		8.00	0.271		0.315
D2	1.10		1.50	0.043		0.060
E	10.00		10.55	0.393		0.415
E1	8.10		8.90	0.318		0.350
E2	6.85		7.25	0.269		0.285
e		2.54			0.1	
e1	4.88		5.28	0.192		0.208
H	15.00		15.85	0.590		0.624
J1	2.49		2.90	0.098		0.114
L	1.90		2.79	0.074		0.110
L1	1.27		1.65	0.050		0.065
L2	1.30		1.78	0.051		0.070
R		0.40 typ.		0.016 typ.		
V2	0°		8°	0°		8°

Figure 13. Footprint (dimensions in mm)



3 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS10170CG-TR	STPS10170CG	D²PAK	1.38 g	1000	Tape and reel
STPS10170CB-TR	PS10170CB	DPAK	0.32 g	2500	

4 Revision history

Table 8. Revision history

Date	Revision	Changes
13-Jul-2006	1	First issue.
09-Jan-2015	2	Updated DPAK and D²PAK and reformatted to current standard.
23-Apr-2015	3	Updated Figure 12 and reformatted to current standard.
18-Dec-2015	4	Updated DPAK package information and reformatted to current standard.

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