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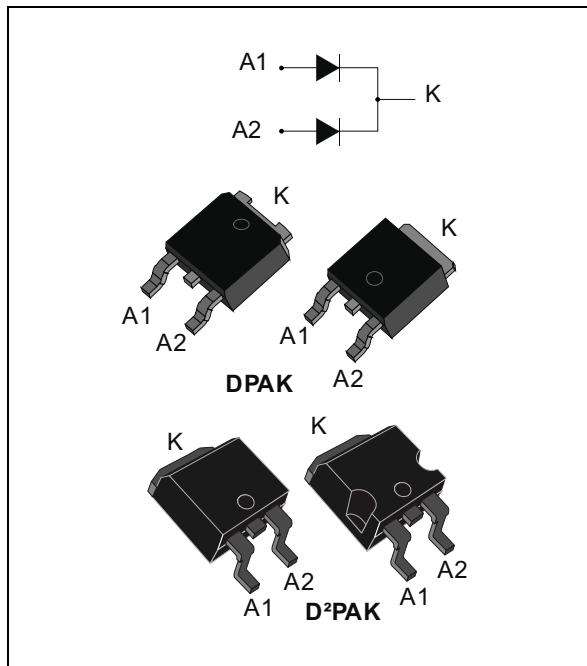
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# STPS10170C

## 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<sup>®</sup>2 compliant component for DPAK and D<sup>2</sup>PAK on demand

Characteristics

STPS10170C

# 1 Characteristics

**Table 2. Absolute ratings (limiting values per diode at T<sub>amb</sub> = 25 °C unless otherwise stated)**

Symbol	Parameter		Value	Unit	
V <sub>RRM</sub>	Repetitive peak reverse voltage		170	V	
I <sub>F(RMS)</sub>	Forward rms current		10	A	
I <sub>F(AV)</sub>	Average forward current, δ = 0.5, square wave	T <sub>C</sub> = 155 °C	Per diode	5	A
			Total	10	
I <sub>FSM</sub>	Surge non repetitive forward current	t <sub>p</sub> = 10 ms sinusoidal	75	A	
P <sub>ARM</sub> <sup>(1)</sup>	Repetitive peak avalanche power	t <sub>p</sub> = 10 μs, T <sub>j</sub> = 125 °C	220	W	
T <sub>stg</sub>	Storage temperature range		-65 to + 175	°C	
T <sub>j</sub>	Maximum operating junction temperature <sup>(2)</sup>		175	°C	

- 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.
- $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$  condition to avoid thermal runaway for a diode on its own heatsink

**Table 3. Thermal parameters**

Symbol	Parameter		Value	Unit
R <sub>th(j-c)</sub>	Junction to case	Per diode	4	°C/W
		Total	2.4	
R <sub>th(c)</sub>	Coupling		0.7	

When the diodes 1 and 2 are used simultaneously:

$$\Delta T_j(\text{diode 1}) = P(\text{diode1}) \times R_{th(j-c)}(\text{Per diode}) + P(\text{diode 2}) \times R_{th(c)}$$

**Table 4. Static electrical characteristics (per diode)**

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I <sub>R</sub> <sup>(1)</sup>	Reverse leakage current	T <sub>j</sub> = 25 °C	V <sub>R</sub> = V <sub>RRM</sub>	-	-	10	μA
		T <sub>j</sub> = 125 °C		-	-	10	mA
V <sub>F</sub> <sup>(2)</sup>	Forward voltage drop	T <sub>j</sub> = 25 °C	I <sub>F</sub> = 5 A	-	-	0.92	V
		T <sub>j</sub> = 125 °C		-	0.69	0.75	
		T <sub>j</sub> = 25 °C	I <sub>F</sub> = 10 A	-	-	1.0	
		T <sub>j</sub> = 125 °C		-	0.79	0.85	

- Pulse test: t<sub>p</sub> = 5 ms, δ < 2%
- Pulse test: t<sub>p</sub> = 380 μs, δ < 2%

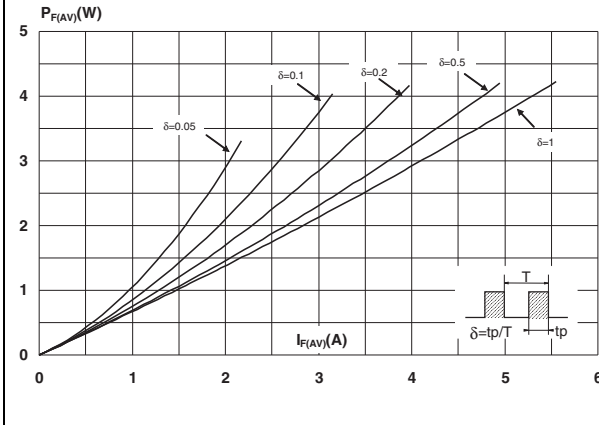
To evaluate the conduction losses use the following equation:

$$P = 0.65 \times I_{F(AV)} + 0.02 \times I_{F(RMS)}^2$$

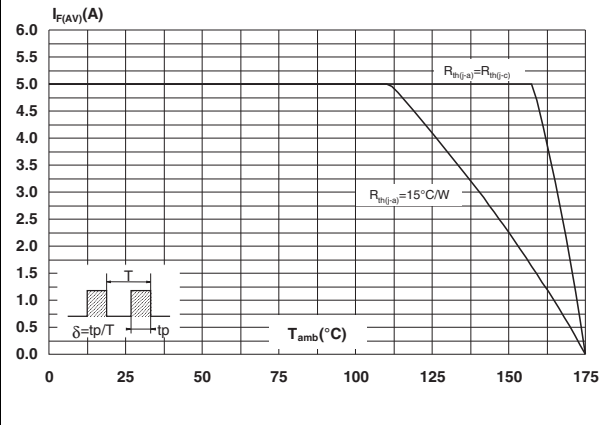
**STPS10170C**

**Characteristics**

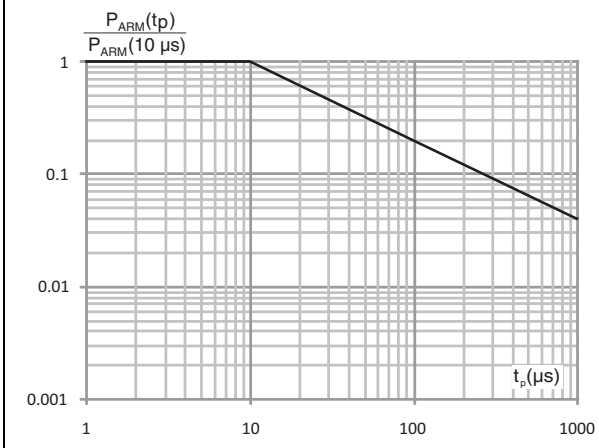
**Figure 1. Average forward power dissipation versus average forward current (per diode)**



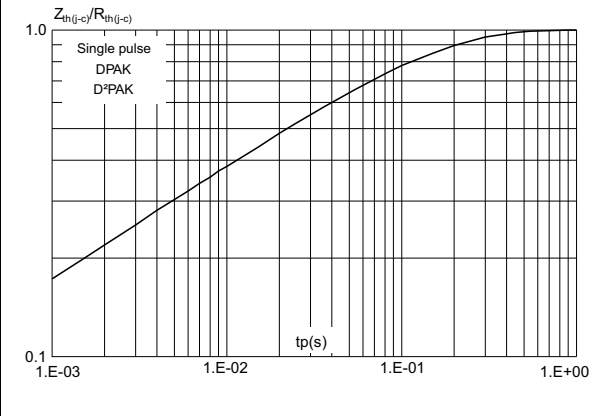
**Figure 2. Average forward current per diode versus ambient temperature ( $\delta = 0.5$ )**



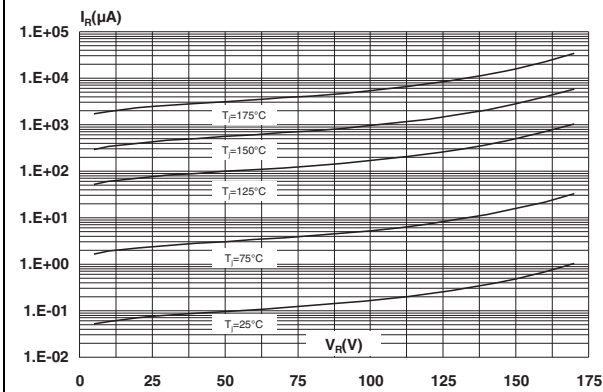
**Figure 3. Normalized avalanche power derating versus pulse duration at  $T_j = 125^\circ\text{C}$**



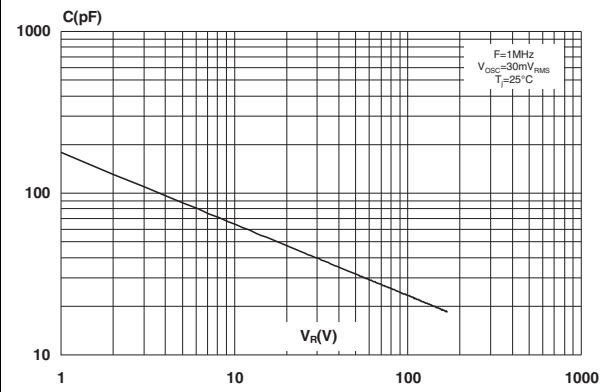
**Figure 4. Relative variation of thermal impedance junction to case versus pulse duration**



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



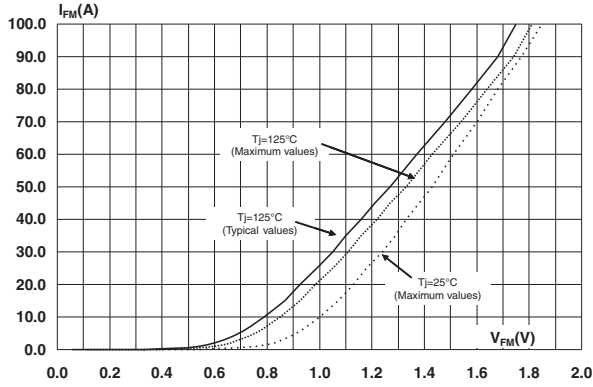
**Figure 6. Junction capacitance versus reverse voltage applied (typical values, per diode)**



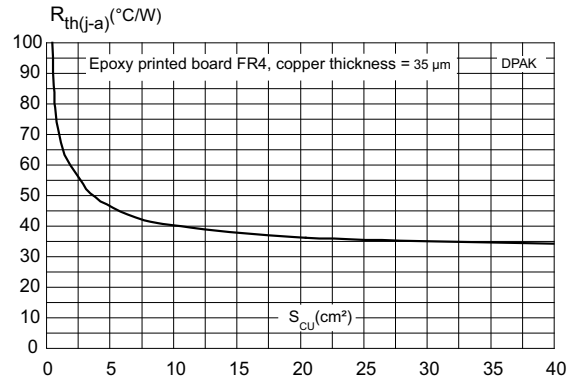
**Characteristics**

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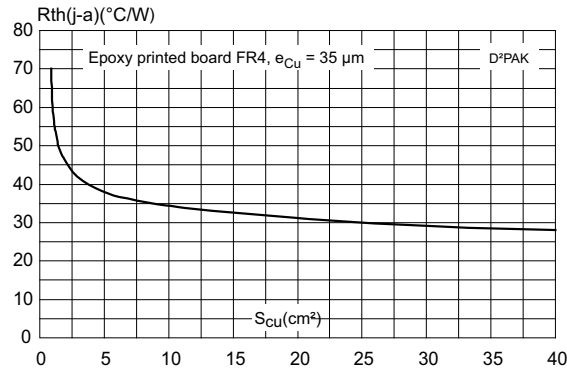
**Figure 7. Forward voltage drop vs. forward current (per diode)**



**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 (D<sup>2</sup>PAK)**



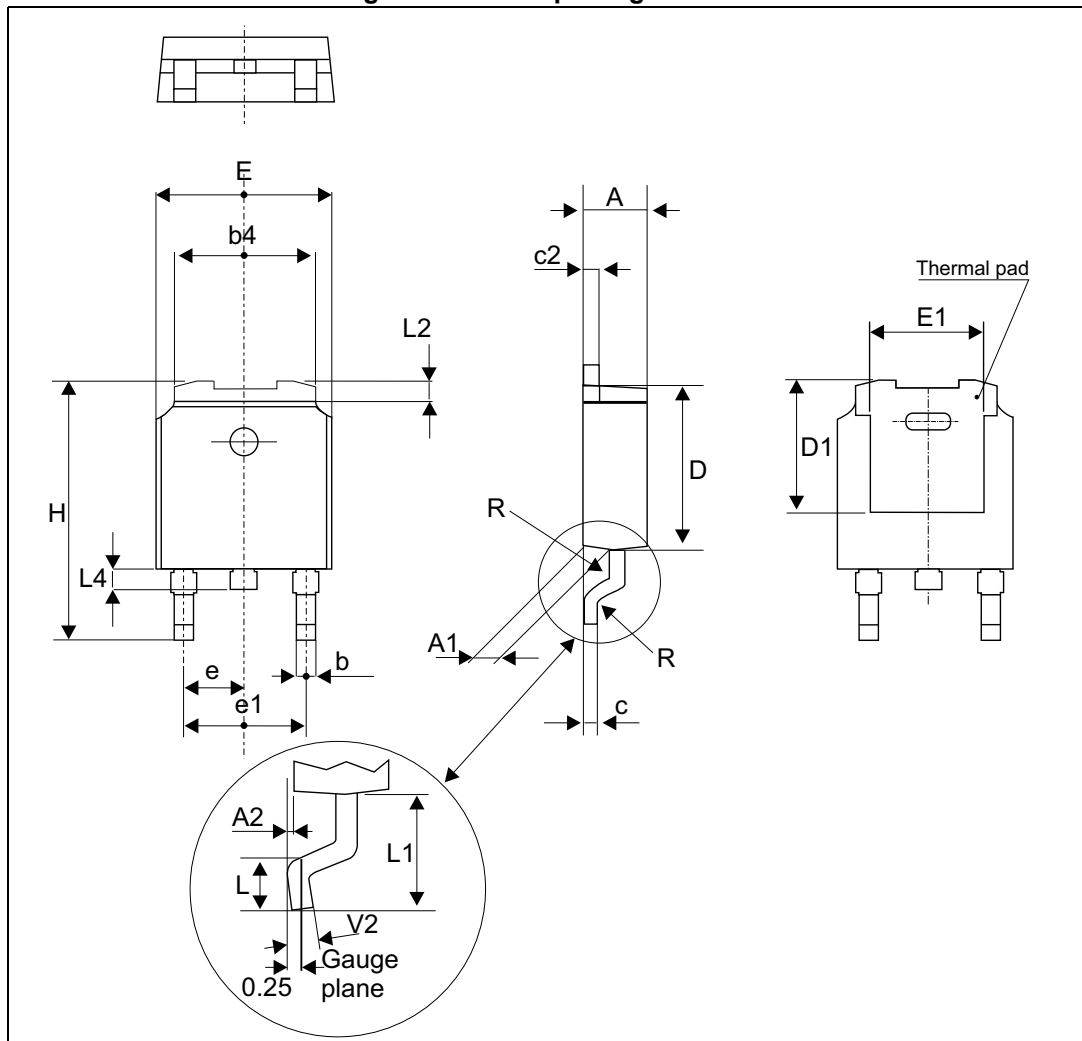
## 2 Package Information

- 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](http://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.

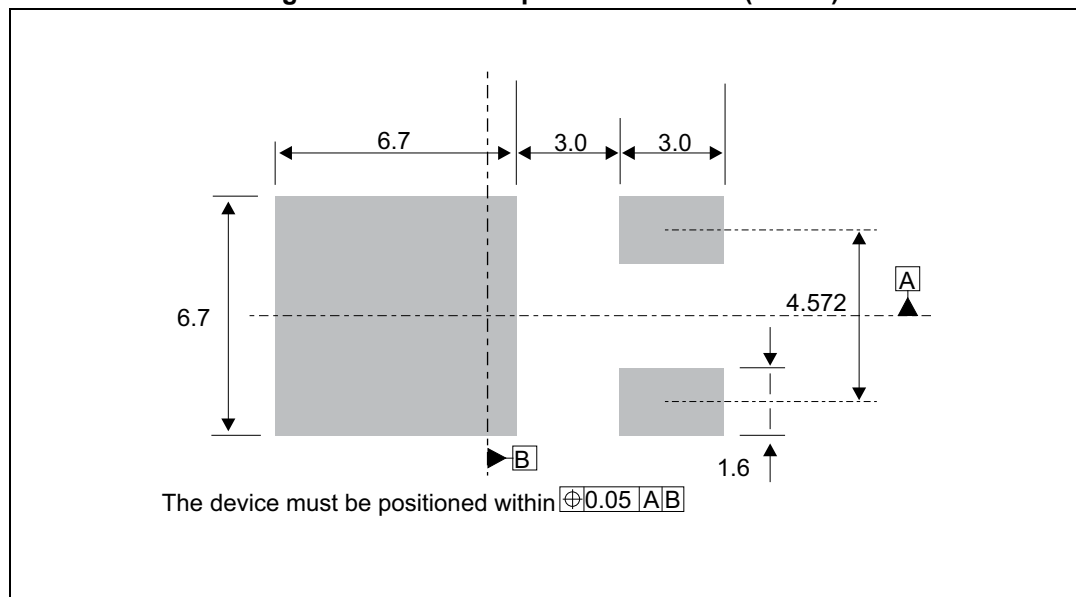
Package Information

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Table 5. DPAK package mechanical data

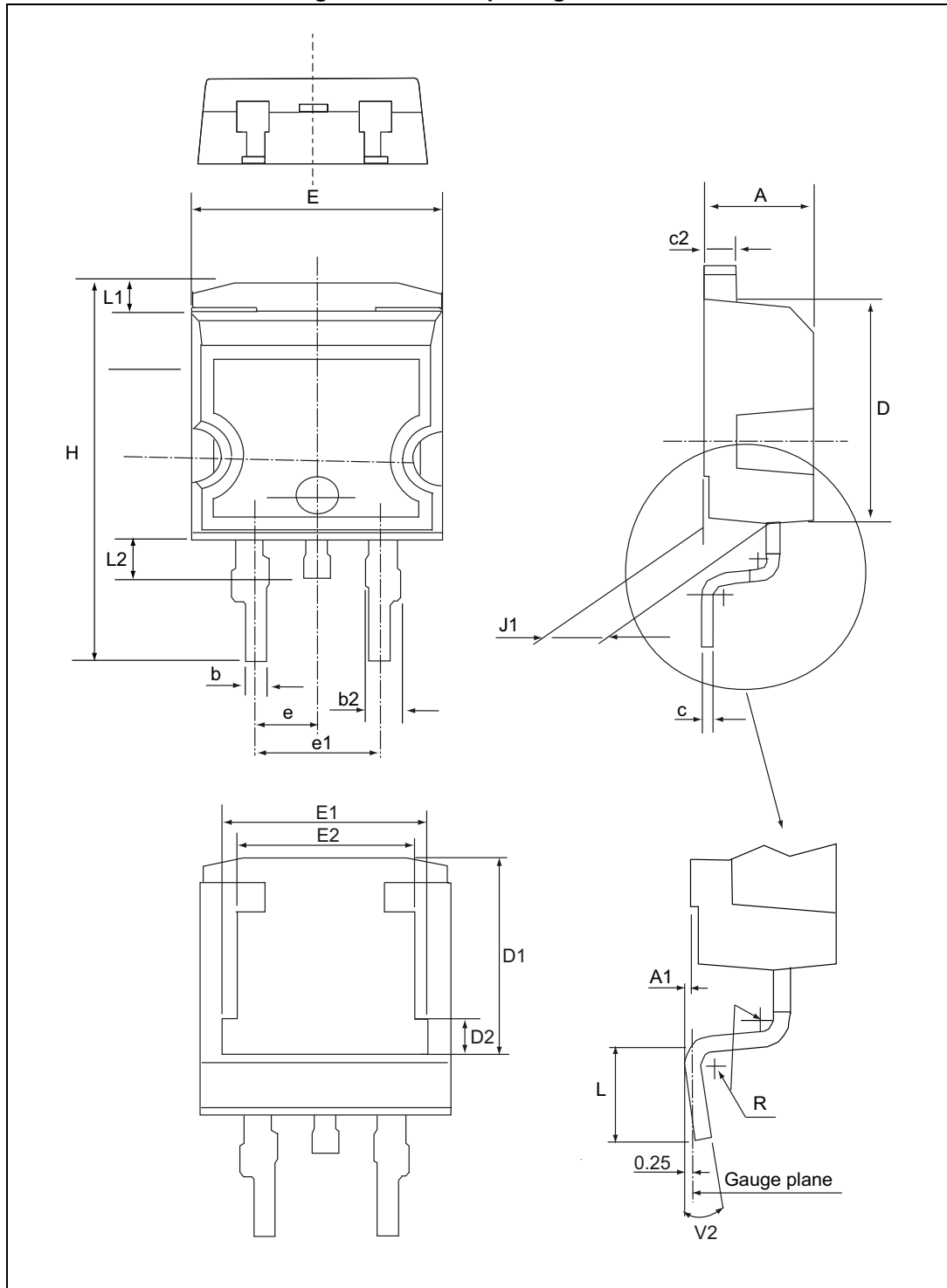
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.18		2.40	0.085		0.094
A1	0.90		1.10	0.035		0.043
A2	0.03		0.23	0.001		0.009
b	0.64		0.90	0.025		0.035
b4	4.95		5.46	0.194		0.214
c	0.46		0.61	0.018		0.024
c2	0.46		0.60	0.018		0.023
D	5.97		6.22	0.235		0.244
D1	4.95		5.60	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 D<sup>2</sup>PAK package information

Figure 12. D<sup>2</sup>PAK package outline



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



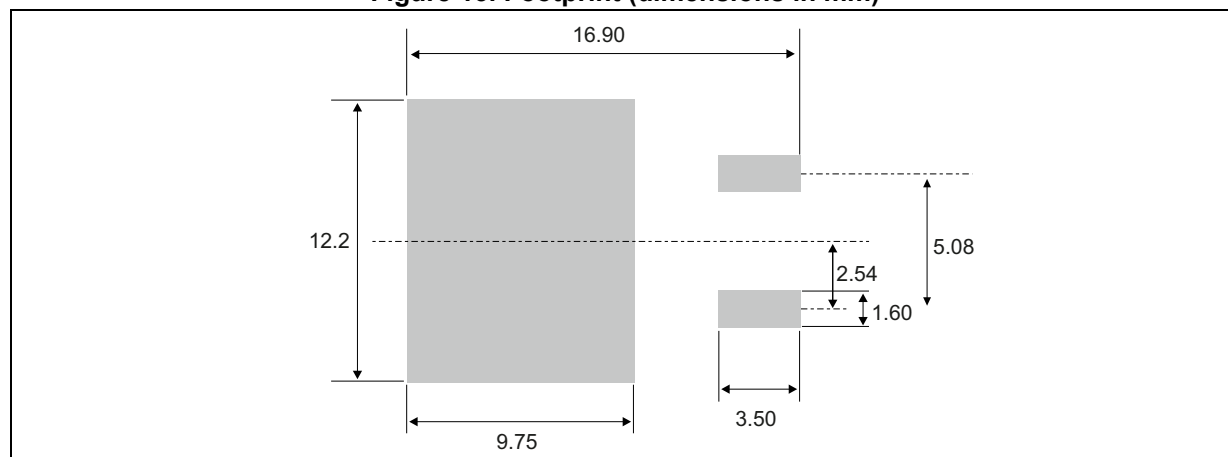
Package Information

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Table 6. D<sup>2</sup>PAK 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	D <sup>2</sup> PAK	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 D <sup>2</sup> PAK 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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