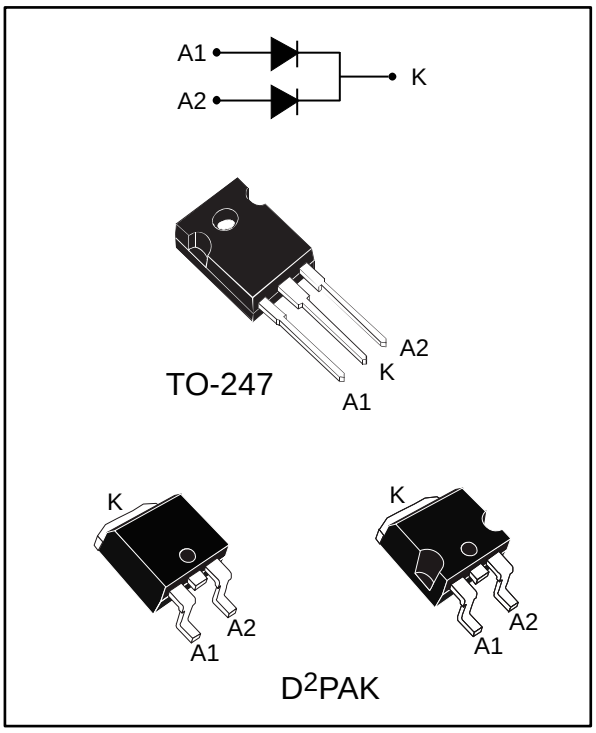
STPS30170C

High voltage power Schottky rectifier

Datasheet - production data



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 D²PAK on demand

Description

Dual center tap Schottky rectifier designed for high frequency switch mode power supply.

Table 1: Device summary

Symbol	Value
$I_{F(AV)}$	2 x 15 A
V_{RRM}	170 V
T_j (max)	175 °C
V_F (typ)	0.69 V

1 Characteristics

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

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			170	V
$I_{F(RMS)}$	Forward rms current			30	A
$I_{F(AV)}$	Average forward current δ = 0.5, square wave	T_C = 150 °C	Per diode	15	A
			Per device	30	
I_{FSM}	Surge non repetitive forward current	tp = 10 ms sinusoidal		220	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs, T_j = 125 °C		750	W
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Maximum operating junction temperature (1)			+175	°C

Notes:

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

Table 3: Thermal parameter

Symbol	Parameter			Max. value	Unit
$R_{th(j-c)}$	Junction to case	D^2PAK	Per diode	1.6	°C/W
		TO-247		1.5	
		D^2PAK	Total	0.95	
		TO-247		0.9	
$R_{th(c)}$	Coupling	D^2PAK	Coupling	0.3	°C/W
		TO-247			

When the diodes 1 and 2 are used simultaneously:

$\Delta T_{j\ (diode1)} = P_{(diode1)} \times R_{th(j-c)}$ (per diode) + $P_{(diode2)} \times R_{th(c)}$

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	$V_R = V_{RRM}$	-		20	µA
		T_j = 125 °C		-	5	20	mA
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 15 A	-		0.92	V
		T_j = 125 °C		-	0.69	0.75	
		T_j = 25 °C	I_F = 30 A	-		1	
		T_j = 125 °C		-	0.8	0.86	

Notes:

(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:

$P = 0.64 \times I_{F(AV)} + 0.0073\ I_F{}^2{}_{(RMS)}$

1.1 Characteristics (curves)

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

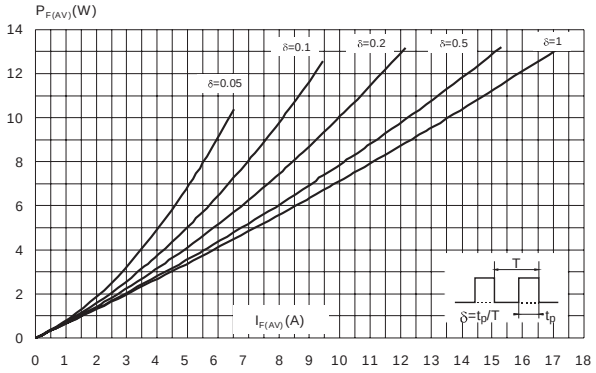


Figure 2: Average forward current versus ambient temperature (δ = 0.5, per diode)

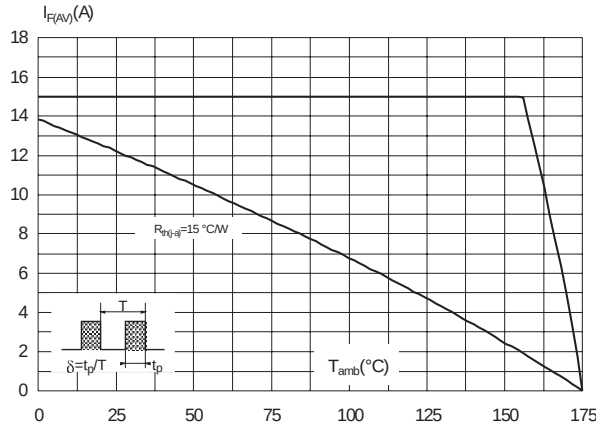


Figure 3: Normalized avalanche power derating versus pulse duration (Tj = 125 °C)

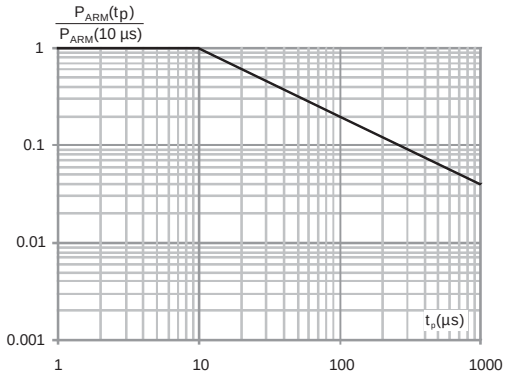


Figure 4: Relative variation of thermal impedance junction to case versus pulse duration (D²PAK and TO-247)

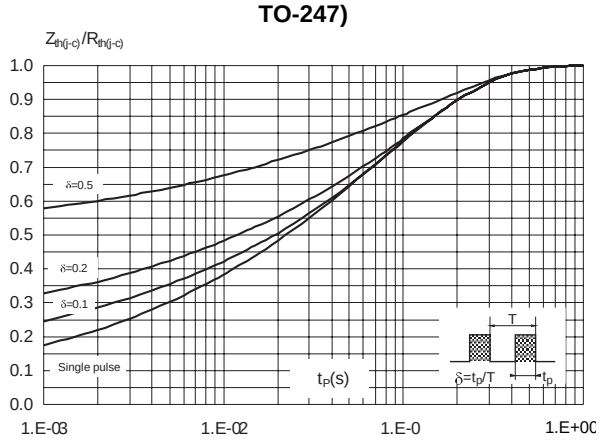


Figure 5: Reverse leakage current versus reverse voltage applied (typical values, per diode)

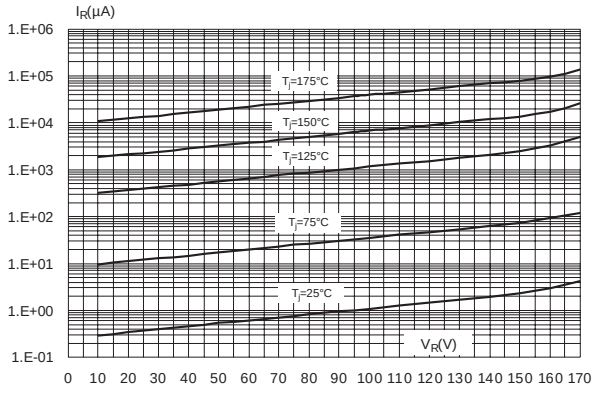


Figure 6: Junction capacitance versus reverse voltage applied (typical values, per diode)

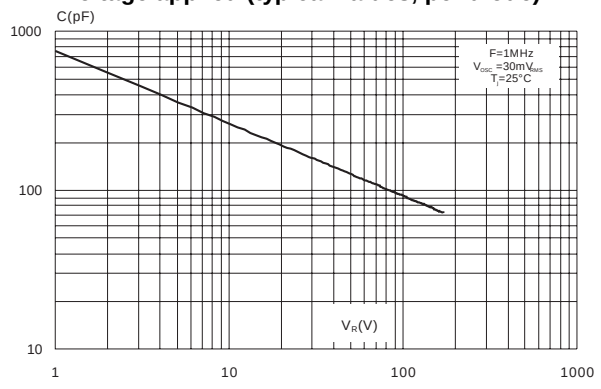


Figure 7: Forward voltage drop versus forward current (per diode, low level)

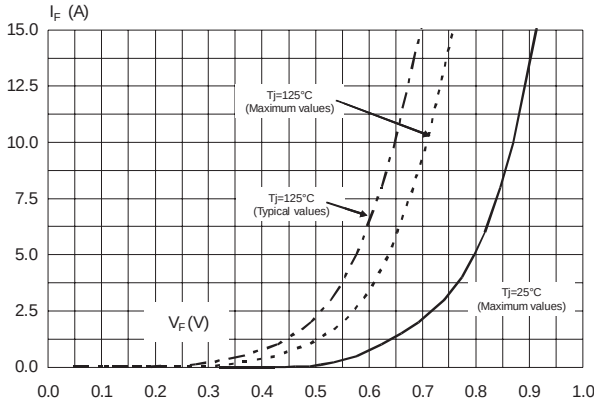


Figure 8: Forward voltage drop versus forward current (per diode, high level)

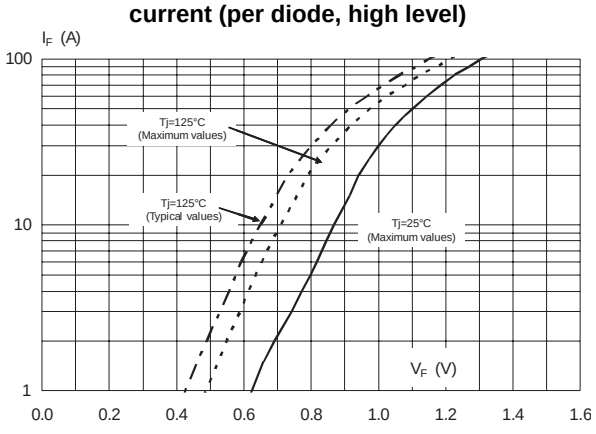
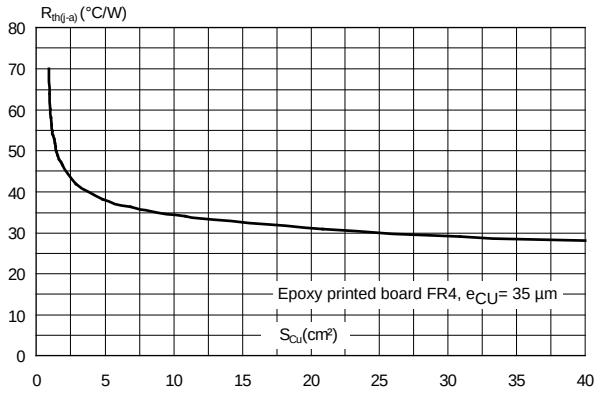


Figure 9: Thermal resistance junction to ambient versus copper surface under tab for D²PAK (typical values)



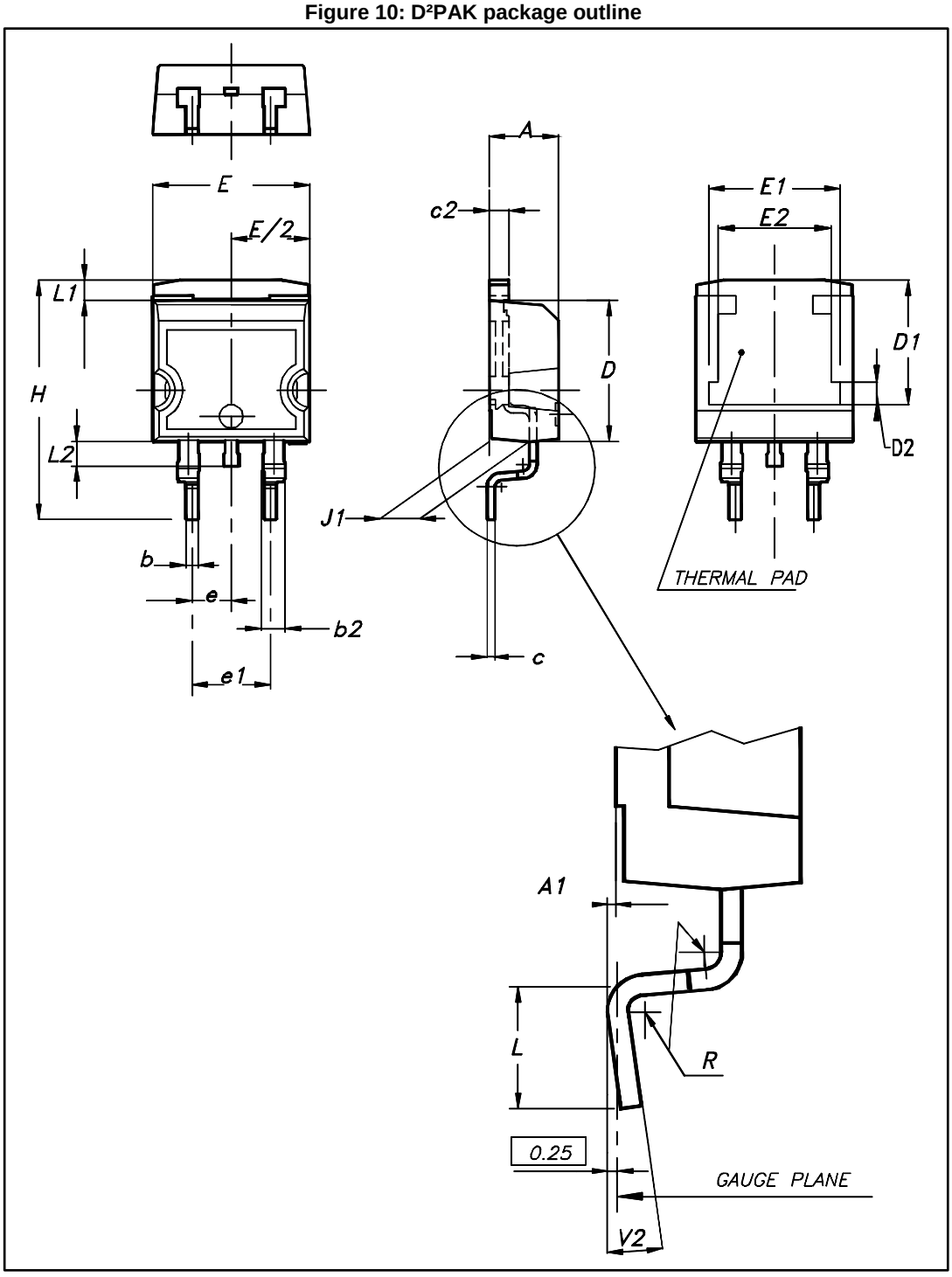
2 Package information

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.

- Cooling method: by conduction (C)
- Epoxy meets UL 94,V0
- Recommended torque values: 0.55 N·m (for TO-247)
- Maximum torque values: 1.0 N·m maximum (for TO-247)

2.1 D²PAK package information

Figure 10: D²PAK package outline

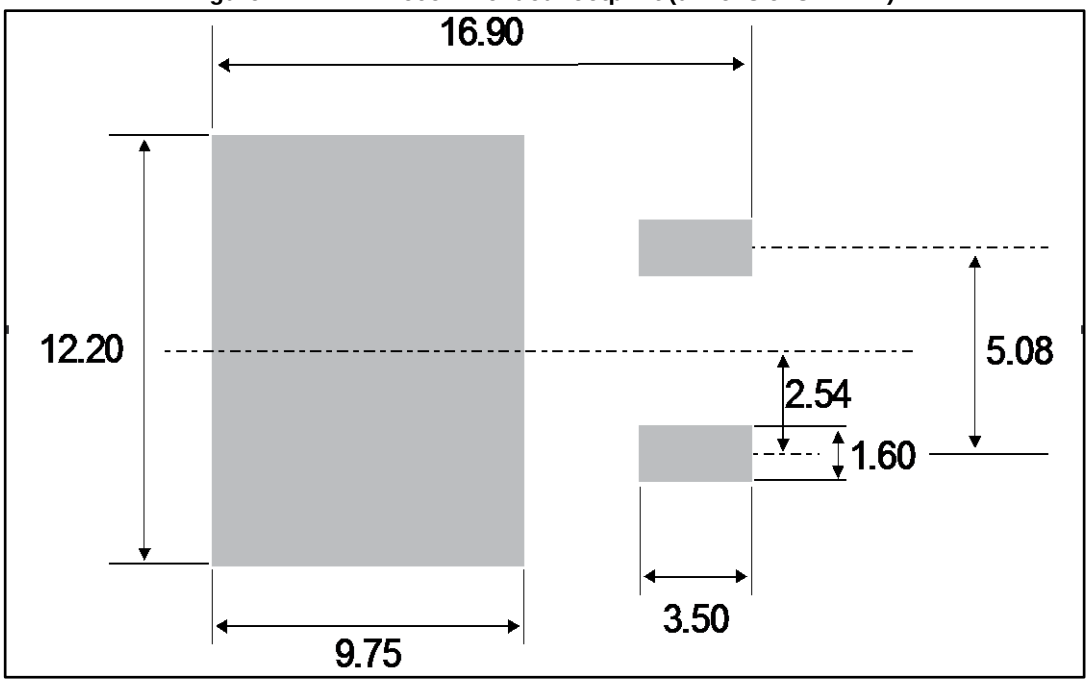


This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 5: D²PAK package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.36	4.60	0.172	0.181
A1	0.00	0.25	0.000	0.010
b	0.70	0.93	0.028	0.037
b2	1.14	1.70	0.045	0.067
c	0.38	0.69	0.015	0.027
c2	1.19	1.36	0.047	0.053
D	8.60	9.35	0.339	0.368
D1	6.90	8.00	0.272	0.311
D2	1.10	1.50	0.043	0.060
E	10.00	10.55	0.394	0.415
E1	8.10	8.90	0.319	0.346
E2	6.85	7.25	0.266	0.282
e	2.54 typ.		0.100	
e1	4.88	5.28	0.190	0.205
H	15.00	15.85	0.591	0.624
J1	2.49	2.90	0.097	0.112
L	1.90	2.79	0.075	0.110
L1	1.27	1.65	0.049	0.065
L2	1.30	1.78	0.050	0.070
R	0.4 typ.		0.015	
V2	0°	8°	0°	8°

Figure 11: D²PAK recommended footprint (dimensions in mm)



2.2 TO-247 package information

Figure 12: TO-247 package outline

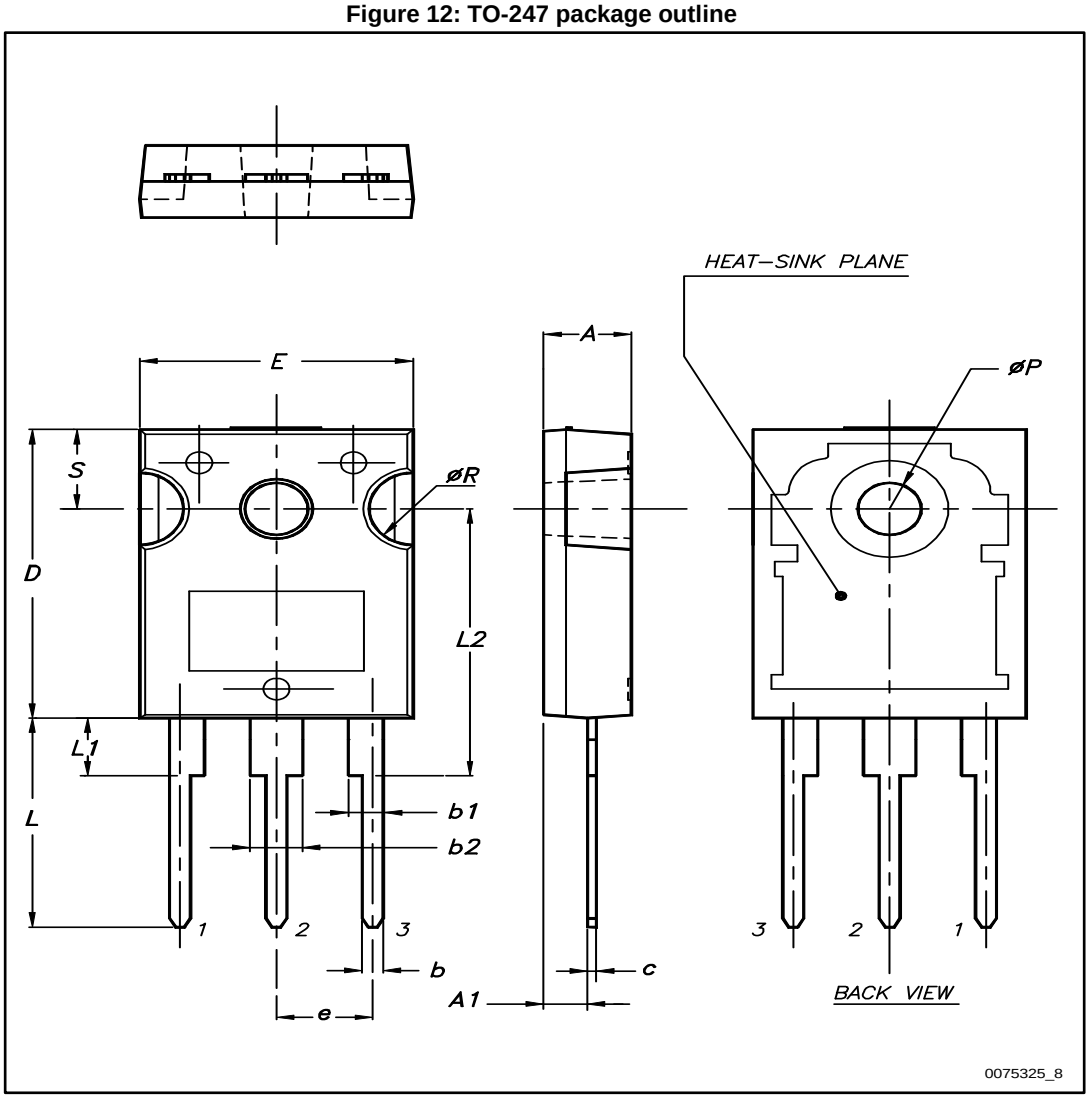


Table 6: TO-247 package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.85		5.15	0.191		0.203
A1	2.20		2.60	0.086		0.102
b	1.00		1.40	0.039		0.055
b1	2.00		2.40	0.078		0.094
b2	3.00		3.40	0.118		0.133
c	0.40		0.80	0.015		0.031
D(1)	19.85		20.15	0.781		0.793
E	15.45		15.75	0.608		0.620
e	5.30	5.45	5.60	0.209	0.215	0.220
L	14.20		14.80	0.559		0.582
L1	3.70		4.30	0.145		0.169
L2		18.50			0.728	
ØP(2)	3.55		3.65	0.139		0.143
ØR	4.50		5.50	0.177		0.217
S	5.30	5.50	5.70	0.209	0.216	0.224

Notes:

(1)Dimension D plus gate protusion does not exceed 20.5 mm

(2)Resin thickness around the mounting hole is not less than 0.9 mm.

3 Ordering information

Table 7: Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS30170CW	STPS30170CW	TO-247	4.40g	30	Tube
STPS30170CG-TR	STPS30170CG	D^2PAK	1.48g	1000	Tape and reel

4 Revision history

Table 8: Document revision history

Date	Revision	Changes
16-Sep-2005	1	First issue.
16-May-2017	2	Updated features, package silhouette and *Table 1: "Device summary"*. Updated *Section 1: "Characteristics"*, *Section 1.1: "Characteristics (curves)"*, *Section 2: "Package information"* and *Table 7: "Ordering information"*.

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