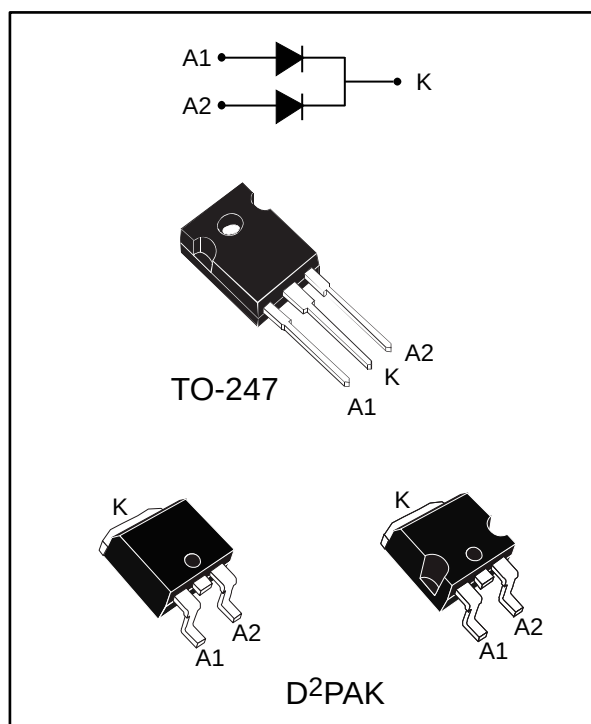


High voltage power Schottky rectifier

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	tp = 10 μs, Tj = 125 °C		750	W
T _{stg}	Storage temperature range			-65 to +175	°C
Tj	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 ² PAK	Per diode	1.6	°C/W
		TO-247		1.5	
		D ² PAK	Total	0.95	
		TO-247		0.9	
R _{th(c)}	Coupling	D ² PAK	Coupling	0.3	°C/W
		TO-247			

When the diodes 1 and 2 are used simultaneously:

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

Table 4: Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_J = 25\text{ }^{\circ}\text{C}$	$V_R = V_{RRM}$	-		20	μA
		$T_J = 125\text{ }^{\circ}\text{C}$		-	5	20	mA
$V_F^{(2)}$	Forward voltage drop	$T_J = 25\text{ }^{\circ}\text{C}$	$I_F = 15\text{ A}$	-		0.92	V
		$T_J = 125\text{ }^{\circ}\text{C}$		-	0.69	0.75	
		$T_J = 25\text{ }^{\circ}\text{C}$	$I_F = 30\text{ A}$	-		1	
		$T_J = 125\text{ }^{\circ}\text{C}$		-	0.8	0.86	

Notes:

⁽¹⁾Pulse test: $t_p = 5\text{ ms}$, $\delta < 2\%$

⁽²⁾Pulse test: $t_p = 380\text{ }\mu\text{s}$, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

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

1.1 Characteristics (curves)

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

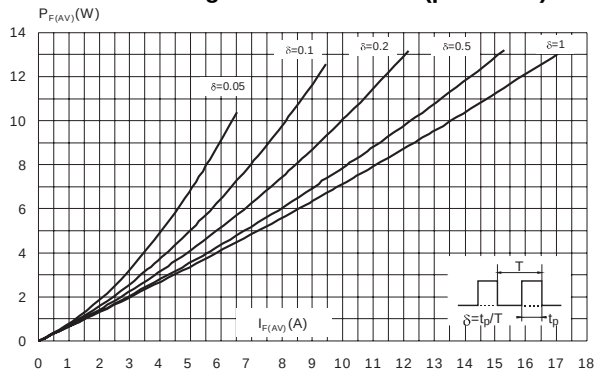


Figure 2: Average forward current versus ambient temperature ($\delta = 0.5$, per diode)

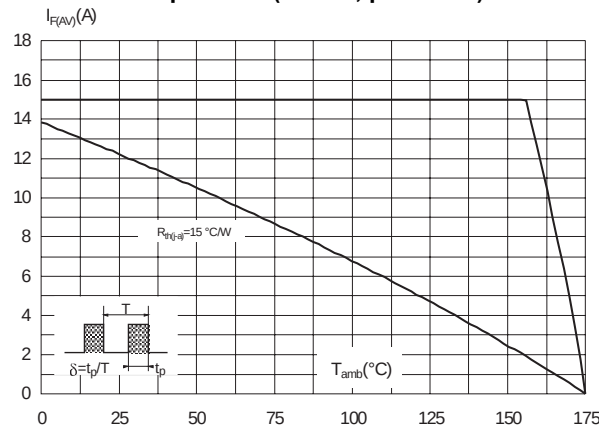


Figure 3: Normalized avalanche power derating versus pulse duration ($T_J = 125^\circ\text{C}$)

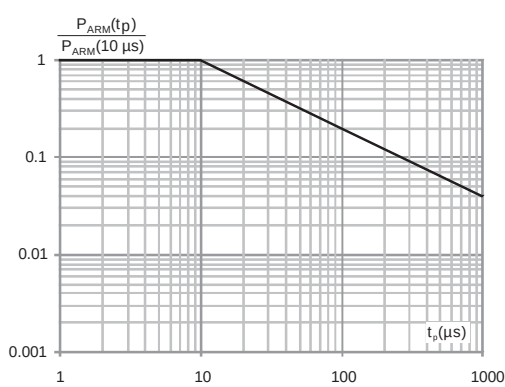


Figure 4: Relative variation of thermal impedance junction to case versus pulse duration (D²PAK and TO-247)

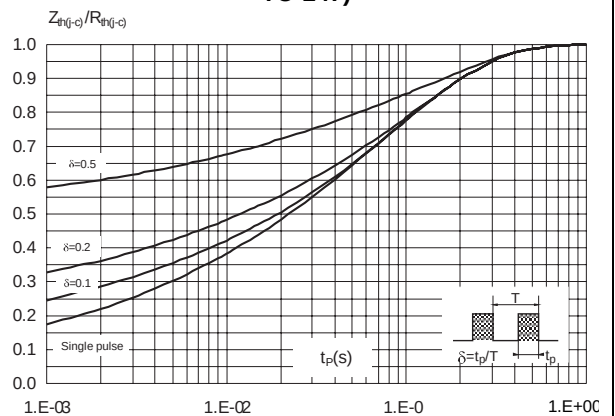


Figure 5: Reverse leakage current versus reverse voltage applied (typical values, per diode)

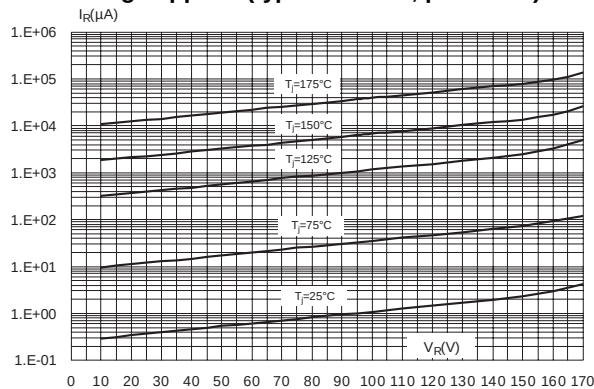


Figure 6: Junction capacitance versus reverse voltage applied (typical values, per diode)

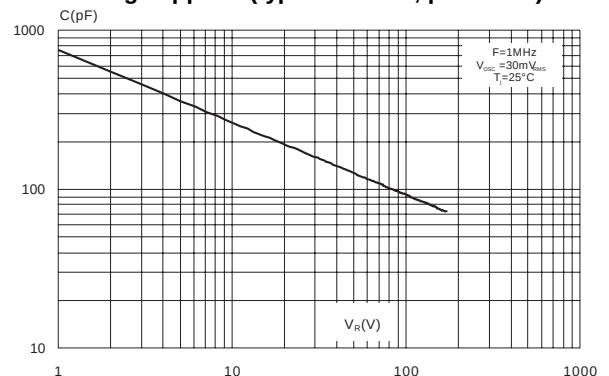


Figure 7: Forward voltage drop versus forward current (per diode, low level)

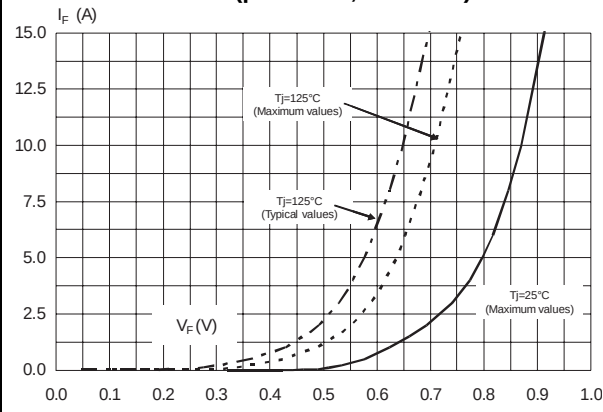


Figure 8: Forward voltage drop versus forward current (per diode, high level)

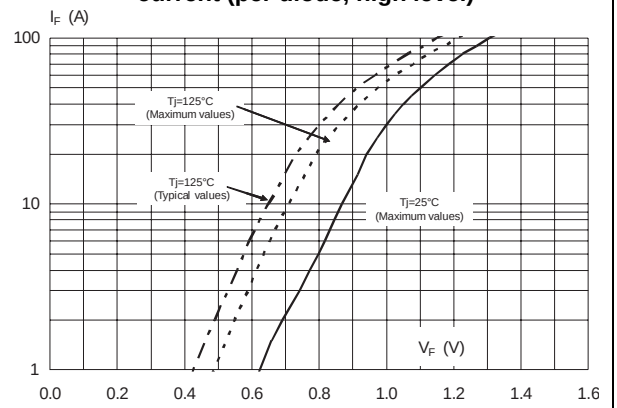
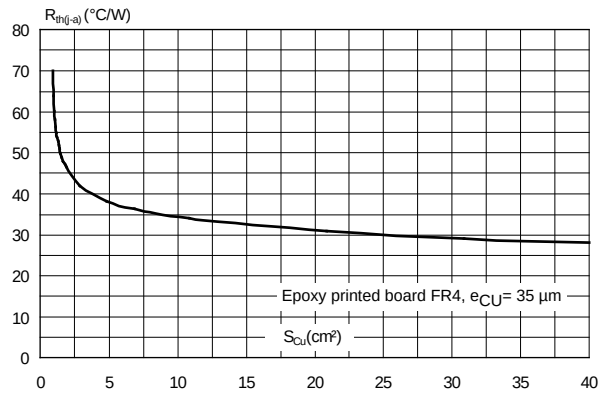


Figure 9: Thermal resistance junction to ambient versus copper surface under tab for D²PAK (typical values)

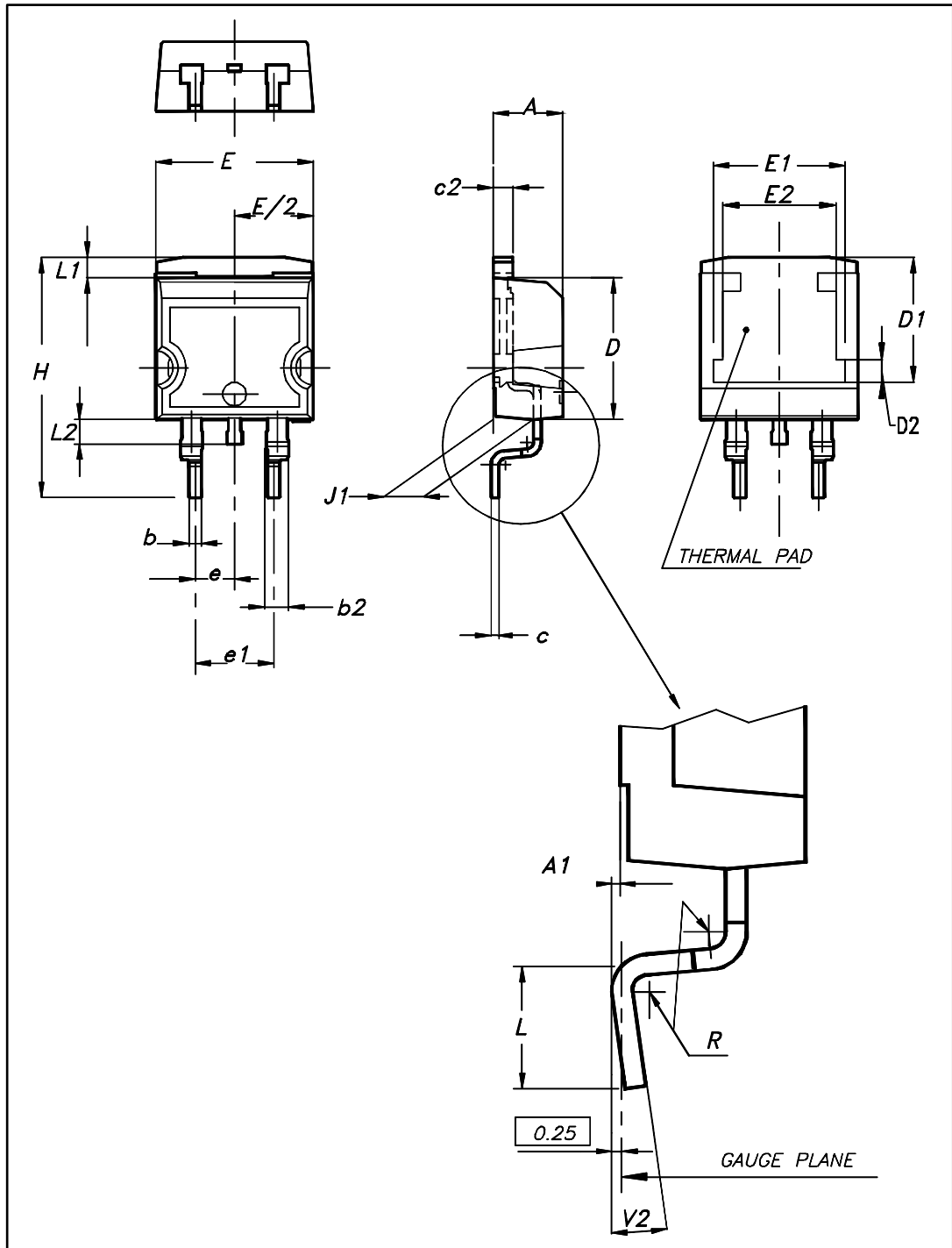


2 Package information

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)

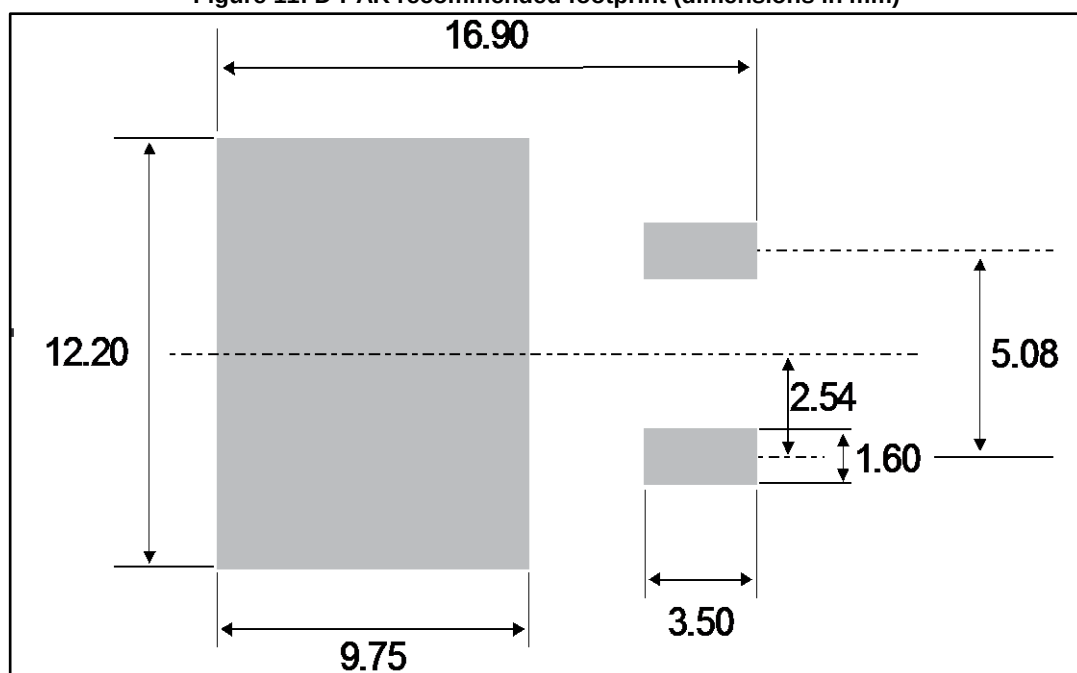
2.1 D²PAK package information

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

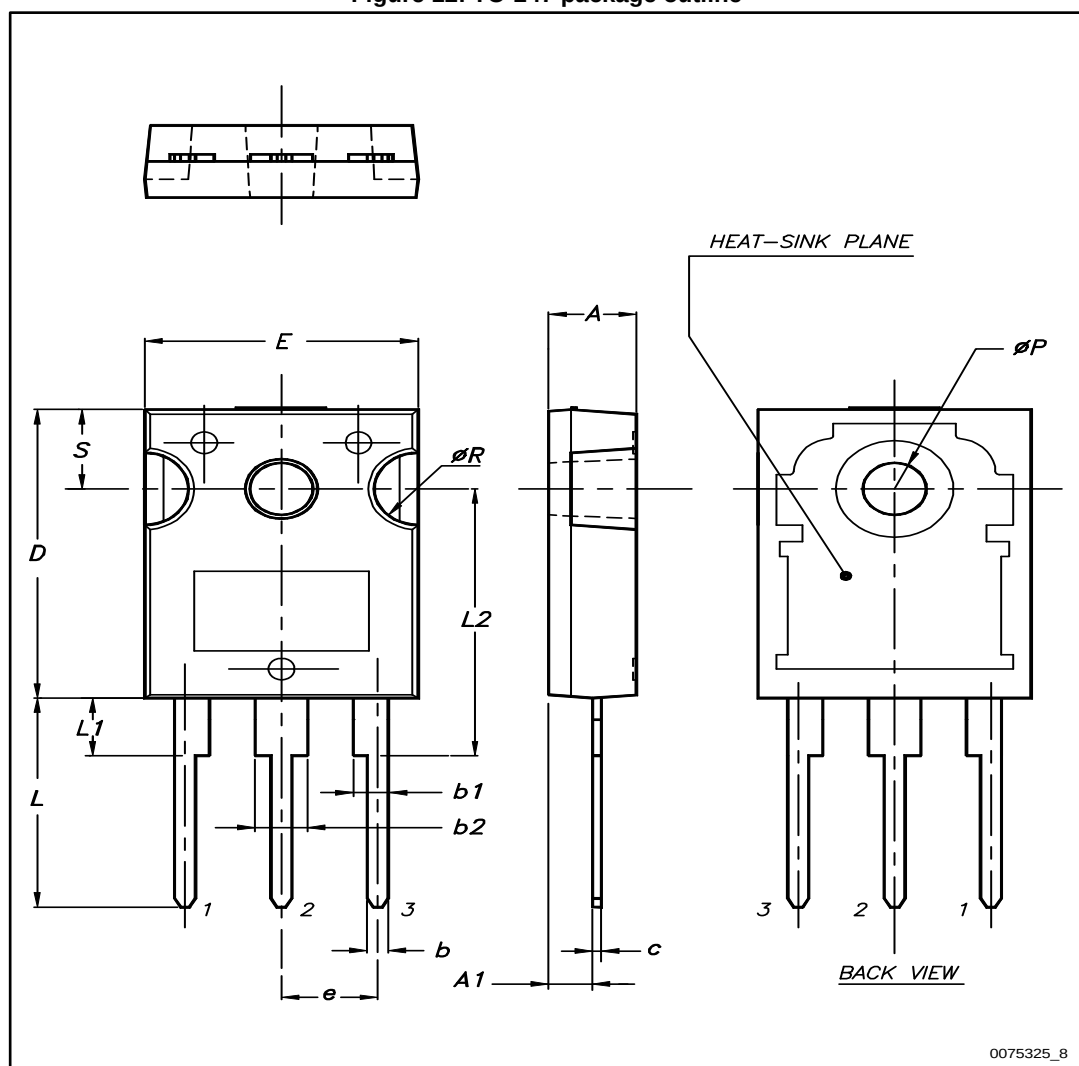


Table 6: TO-247 package mechanical data

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 ² PAK	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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