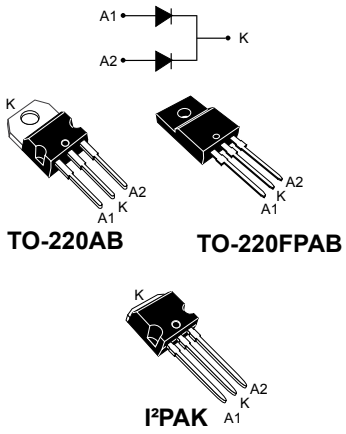
STPS30L120C

Datasheet

120 V power Schottky rectifier



Features

- High junction temperature capability
- Avalanche capability specified
- Low forward voltage drop current
- High frequency operation
- Insulated package: TO-220FPAB
  - Insulating voltage = 1500 V_{RMS}
- ECOPACK®2 compliant

Applications

- Switching diode
- SMPS
- DC/DC converter
- LED lighting
- Notebook adapter

Description

This dual center tap Schottky rectifier is optimized for high frequency switch mode power supplies.

Packaged in TO-220AB, I2PAK and TO-220FPAB, the STPS30L120C provides adaptor designers with an optimized price-performance ratio.

Product status link	
STPS30L120C	
Product summary	
Symbol	**Value**
$I_{F(AV)}$	2 x 15A
V_{RRM}	120 V
T_j (max.)	150 °C
V_F (typ.)	0.65 V

1 Characteristics

Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified, per diode)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		120	V
$I_{F(RMS)}$	Forward rms current		30	A
$I_{F(AV)}$	Average forward current, δ = 0.5 square wave	Per diode	15	A
		Per device	30	
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	220	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs, T_j = 125 °C	828	W
T_{stg}	Storage temperature range		-65 to +175	°C
T_j	Maximum operating junction temperature(1)		150	°C

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

Table 2. Thermal resistance parameters

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB, I²PAK	Per diode	1.3	°C/W
			Total	0.7	
		TO-220FPAB	Per diode	4.5	
			Total	3.8	
$R_{th(c)}$	Coupling	TO-220AB, I²PAK		0.1	
		TO-220FPAB		3	

When the diodes 1 and 2 are used simultaneously:

T_j(diode 1) = P(diode 1) x $R_{th(j-c)}$(per diode) + P(diode 2) x $R_{th(c)}$

For more information, please refer to the following application note:

- AN5088 : Rectifiers thermal management, handling and mounting recommendations

Table 3. Static electrical characteristics (per diode)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		200	µA
		T_j = 125 °C		-	12	35	mA
V_F(2)	Forward voltage drop	T_j = 25 °C	I_F = 5 A	-		0.675	V
		T_j = 125 °C		-	0.51	0.57	
		T_j = 25 °C	I_F = 15 A	-		0.88	
		T_j = 125 °C		-	0.65	0.71	
		T_j = 25 °C	I_F = 30 A	-		1.08	
		T_j = 125 °C		-	0.755	0.84	

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:

$P = 0.58 \times I_{F(AV)} + 0.0087 \times I_F{}^2{}_{(RMS)}$

For more information, please refer to the following application notes related to the power losses :

- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

1.1 Characteristics (curves)

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

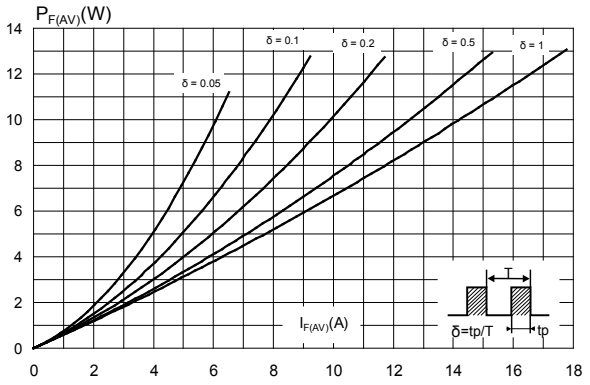


Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)

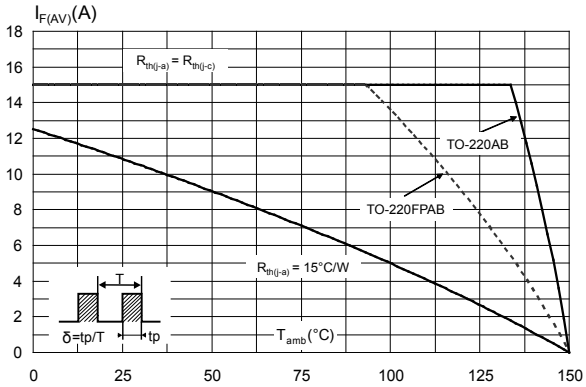


Figure 3. Normalized avalanche power derating versus pulse duration (T_j = 125 °C)

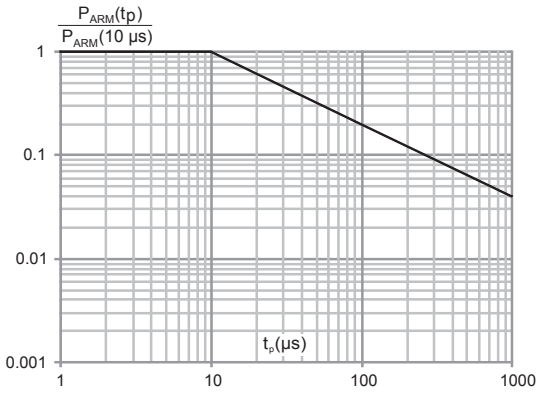


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB, I²PAK)

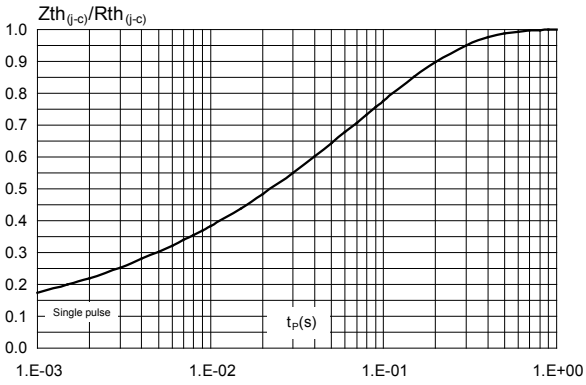


Figure 5. Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAB)

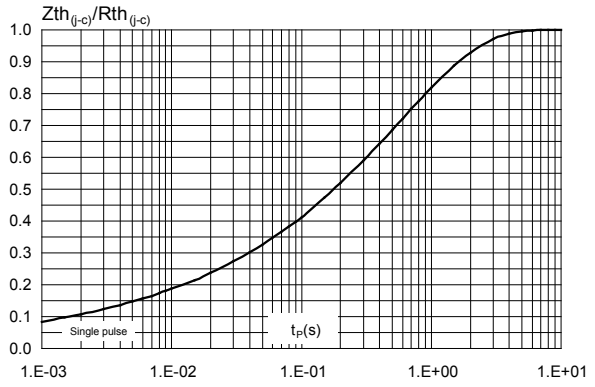


Figure 6. Reverse leakage current versus reverse voltage applied (typical values, per diode)

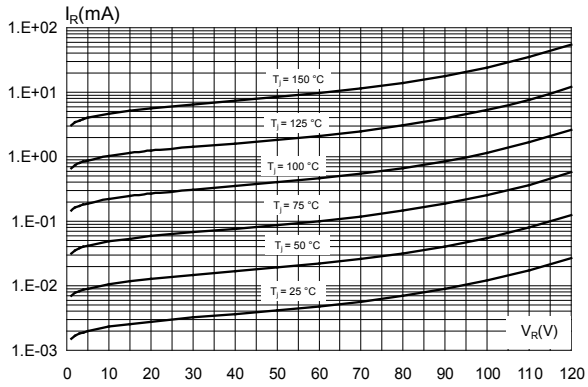


Figure 7. Junction capacitance versus reverse voltage applied (typical values, per diode)

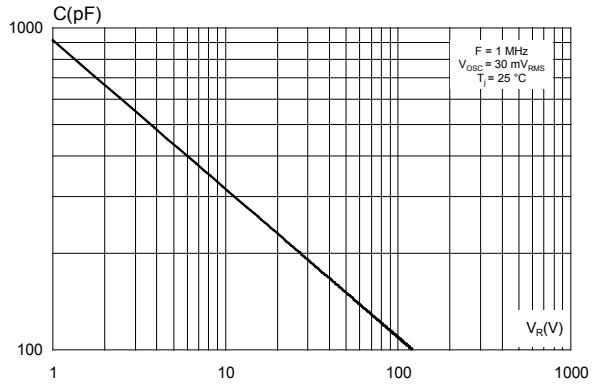
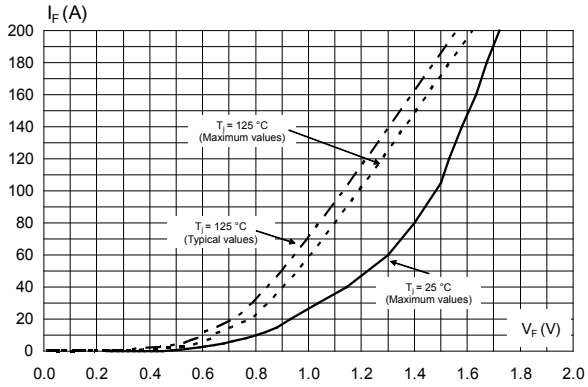


Figure 8. Forward voltage drop versus forward current (per diode)



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.

2.1 TO-220AB package information

- Epoxy meets UL 94,V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.55 N·m
- Maximum torque value: 0.70 N·m

Figure 9. TO-220AB package outline

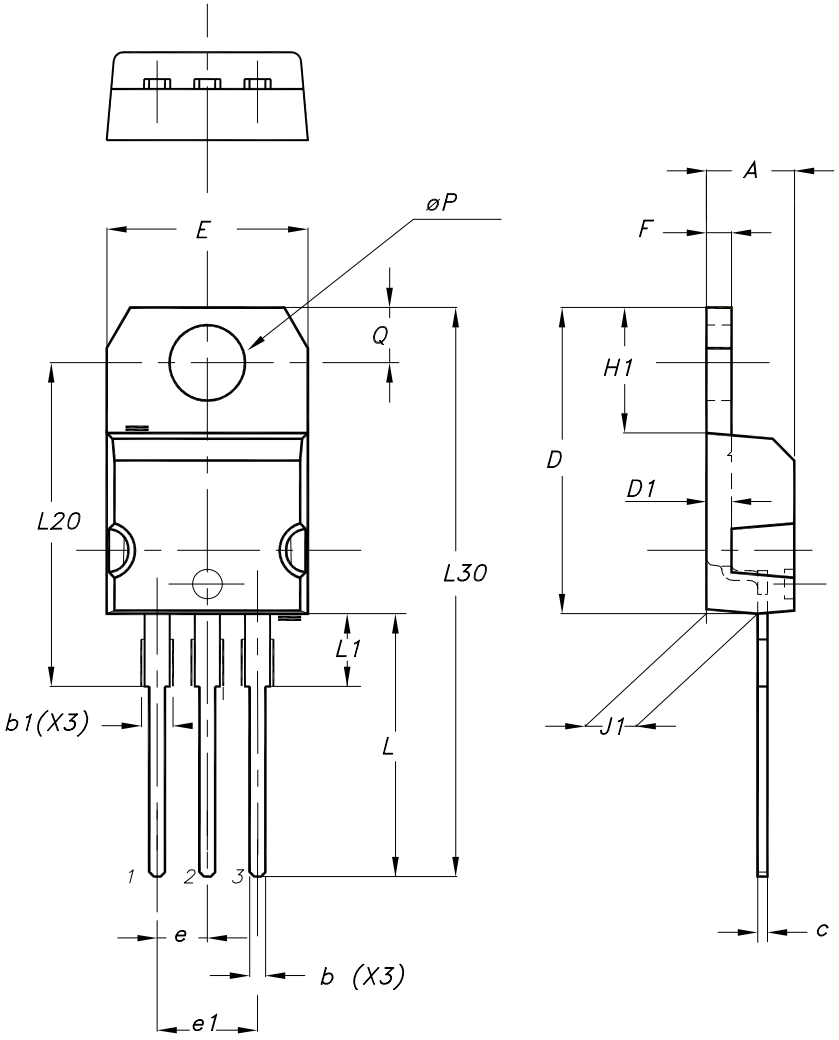


Table 4. TO-220AB package mechanical data

Ref.	Dimensions			
	Millimeters		Inches (for reference only)	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
b	0.61	0.88	0.240	0.035
b1	1.14	1.55	0.045	0.061
c	0.48	0.70	0.019	0.028
D	15.25	15.75	0.600	0.620
D1	1.27 typ.		0.050 typ.	
E	10.00	10.40	0.394	0.409
e	2.40	2.70	0.094	0.106
e1	4.95	5.15	0.195	0.203
F	1.23	1.32	0.048	0.052
H1	6.20	6.60	0.244	0.260
J1	2.40	2.72	0.094	0.107
L	13.00	14.00	0.512	0.551
L1	3.50	3.93	0.138	0.155
L20	16.40 typ.		0.646 typ.	
L30	28.90 typ.		1.138 typ.	
θP	3.75	3.85	0.148	0.152
Q	2.65	2.95	0.104	0.116

2.2 TO-220FPAB package information

- Epoxy meets UL 94,V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.55 N·m
- Maximum torque value: 0.70 N·m

Figure 10. TO-220FPAB package outline

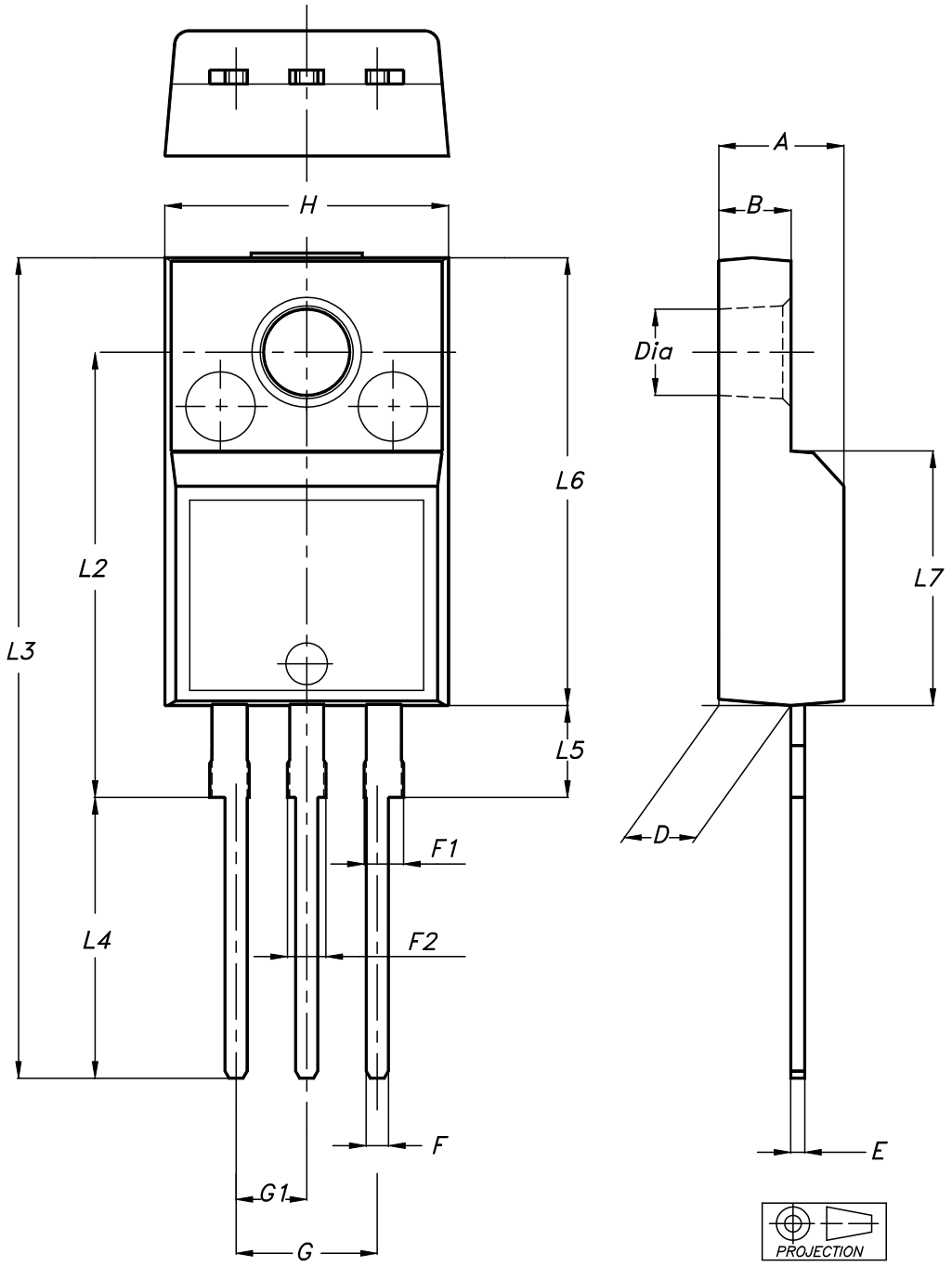


Table 5. **TO-220FPAB package mechanical data**

Ref.	Dimensions			
	Millimeters		Inches (for reference only)	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.1739	0.1818
B	2.50	2.70	0.0988	0.1067
D	2.50	2.75	0.0988	0.1087
E	0.45	0.70	0.0178	0.0277
F	0.75	1.00	0.0296	0.0395
F1	1.15	1.70	0.0455	0.0672
F2	1.15	1.70	0.0455	0.0672
G	4.95	5.20	0.1957	0.2055
G1	2.40	2.70	0.0949	0.1067
H	10.00	10.40	0.3953	0.4111
L2	16.00 typ.		0.6324 typ.	
L3	28.60	30.60	1.1304	1.2095
L4	9.80	10.60	0.3874	0.4190
L5	2.90	3.60	0.1146	0.1423
L6	15.90	16.40	0.6285	0.6482
L7	9.00	9.30	0.3557	0.3676
Dia	3.00	3.20	0.1186	0.1265

2.3 I²PAK package information

- Epoxy meets UL 94,V0
- Cooling method: by conduction (C)

Figure 11. I²PAK package outline

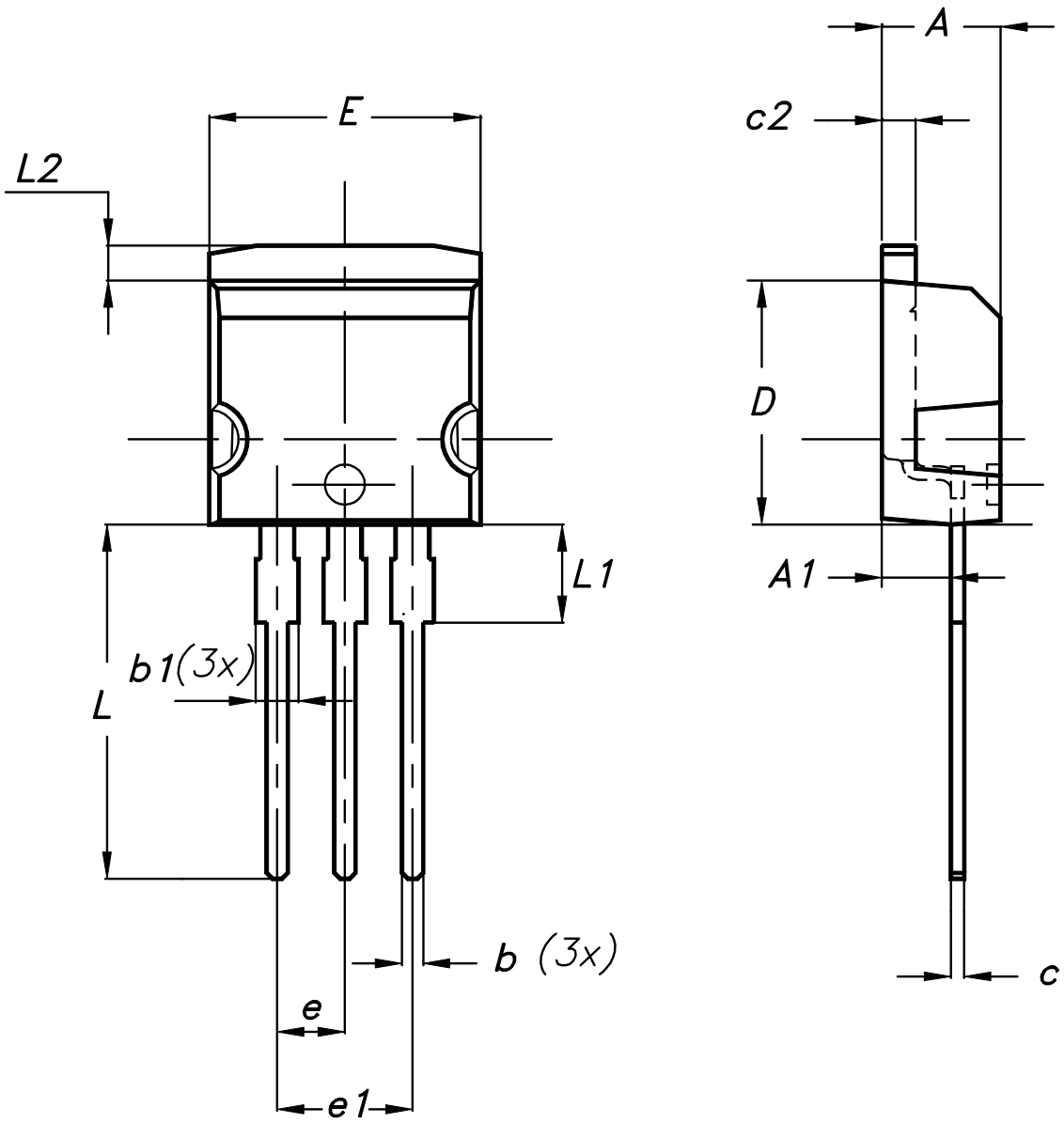


Table 6. I²PAK package mechanical data

Ref.	Dimensions			
	Millimeters		Inches (for reference only)	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.40	2.72	0.094	0.107
b	0.61	0.88	0.024	0.035
b1	1.14	1.70	0.044	0.067
c	0.49	0.70	0.019	0.028
c2	1.23	1.32	0.048	0.052
D	8.95	9.35	0.352	0.368
e	2.40	2.70	0.094	0.106
e1	4.95	5.15	0.195	0.203
E	10.00	10.40	0.394	0.409
L	13.00	14.00	0.512	0.551
L1	3.50	3.93	0.138	0.155
L2	1.27	1.40	0.050	0.055

3 Ordering Information

Table 7. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS30L120CT	STPS30L120CT	TO-220AB	1.95 g	50	Tube
STPS30L120CFP	STPS30L120CFP	TO-220FPAB	1.90 g	50	
STPS30L120CR	STPS30L120CR	I²PAK	1.50 g	50	

Revision history

Table 8. **Document revision history**

Date	Version	Changes
28-Sep-2009	1	First issue.
17-Feb-2010	2	Updated Table 2. Added Figure 1 and Figure 13.
26-May-2011	3	Added I2PAK package.
03-Jul-2018	4	Removed figure 5, figure 6, figure 7, figure 13. Updated Figure 3. Normalized avalanche power derating versus pulse duration (T_j = 125 °C) and Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified, per diode). Minor text changes to improve readability.

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