

# 1 Characteristics

**Table 2: Absolute ratings (limiting values at 25 °C, unless otherwise specified, anode terminals short-circuited)**

Symbol	Parameter			Value	Unit
V <sub>RRM</sub>	Repetitive peak reverse voltage			100	V
I <sub>F(RMS)</sub>	Forward rms current			40	A
I <sub>F(AV)</sub>	Average forward current δ = 0.5, square wave		T <sub>C</sub> = 150 °C	20	A
I <sub>FSM</sub>	Surge non repetitive forward current	t <sub>p</sub> = 10 ms sinusoidal	TO-220AB	220	A
			DPAK, IPAK	150	A
T <sub>stg</sub>	Storage temperature range			-65 to +175	°C
T <sub>j</sub>	Maximum operating junction temperature <sup>(1)</sup>			175	°C

**Notes:**

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

**Table 3: Thermal resistance parameters**

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case	1.3	°C/W

**Table 4: Static electrical characteristics (anode terminals short circuited)**

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$	-		110	μA
		$T_j = 125\text{ °C}$		-	6	12	mA
		$T_j = 125\text{ °C}$	$V_R = 70\text{ V}$	-	3	6	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 2\text{ A}$	-	0.395	0.445	V
		$T_j = 125\text{ °C}$		-	0.36	0.415	
		$T_j = 25\text{ °C}$	$I_F = 5\text{ A}$	-	0.520	0.585	
		$T_j = 125\text{ °C}$		-	0.500	0.555	
		$T_j = 25\text{ °C}$	$I_F = 10\text{ A}$	-	0.680	0.780	
		$T_j = 125\text{ °C}$		-	0.600	0.660	
		$T_j = 125\text{ °C}$	$I_F = 20\text{ A}$	-	0.690	0.760	

**Notes:**

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

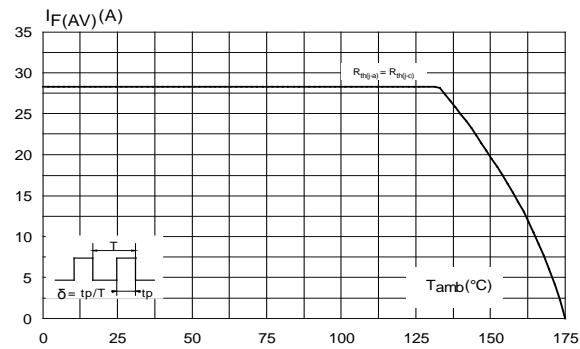
<sup>(2)</sup>Pulse test:  $t_p = 380\text{ μs}$ ,  $\delta < 2\%$

To evaluate the conduction losses use the following equation:

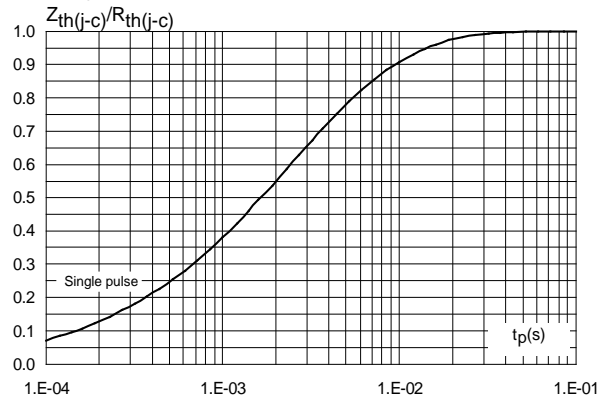
$$P = 0.45 \times I_{F(AV)} + 0.021 \times I_{F(RMS)}^2$$

## 1.1 Characteristics (curves)

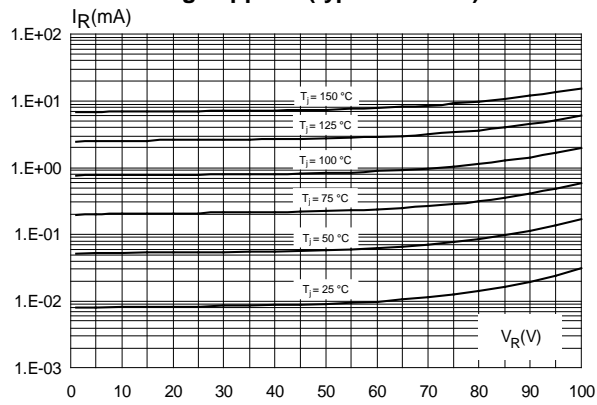
**Figure 1: Average forward current versus ambient temperature ( $\delta = 0.5$ )**



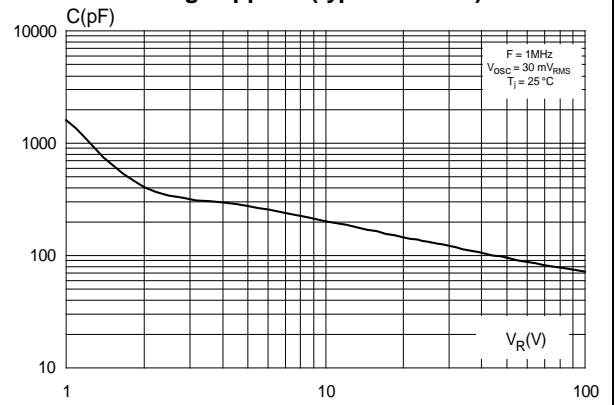
**Figure 2: Relative variation of thermal impedance junction to case versus pulse duration**



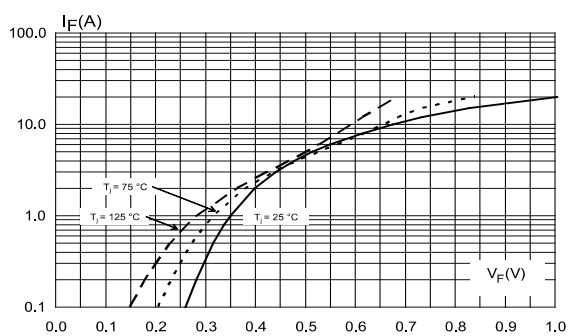
**Figure 3: Reverse leakage current versus reverse voltage applied (typical values)**



**Figure 4: Junction capacitance versus reverse voltage applied (typical values)**



**Figure 5: Forward voltage drop versus forward current (typical values, log scale)**



**Figure 6: Forward voltage drop versus forward current (typical values, linear scale)**

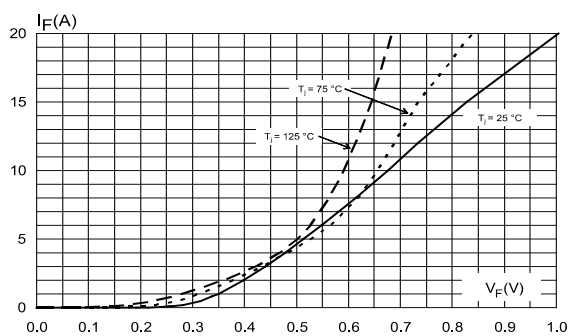
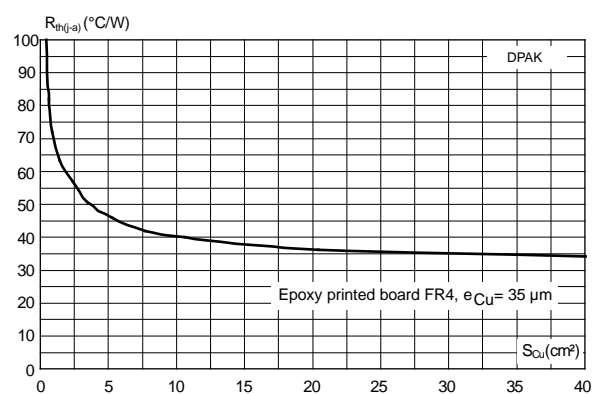


Figure 7: Thermal resistance junction to ambient versus copper surface under tab for DPAK (typical values)



## 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](http://www.st.com). ECOPACK® is an ST trademark.

- Cooling method: by conduction (C)
- Epoxy meets UL 94,V0
- Recommended torque value: 0.55 N·m (for TO-220AB)
- Maximum torque value: 0.6 N·m (for TO-220AB)

### 2.1 IPAK package information

Figure 8: IPAK package outline

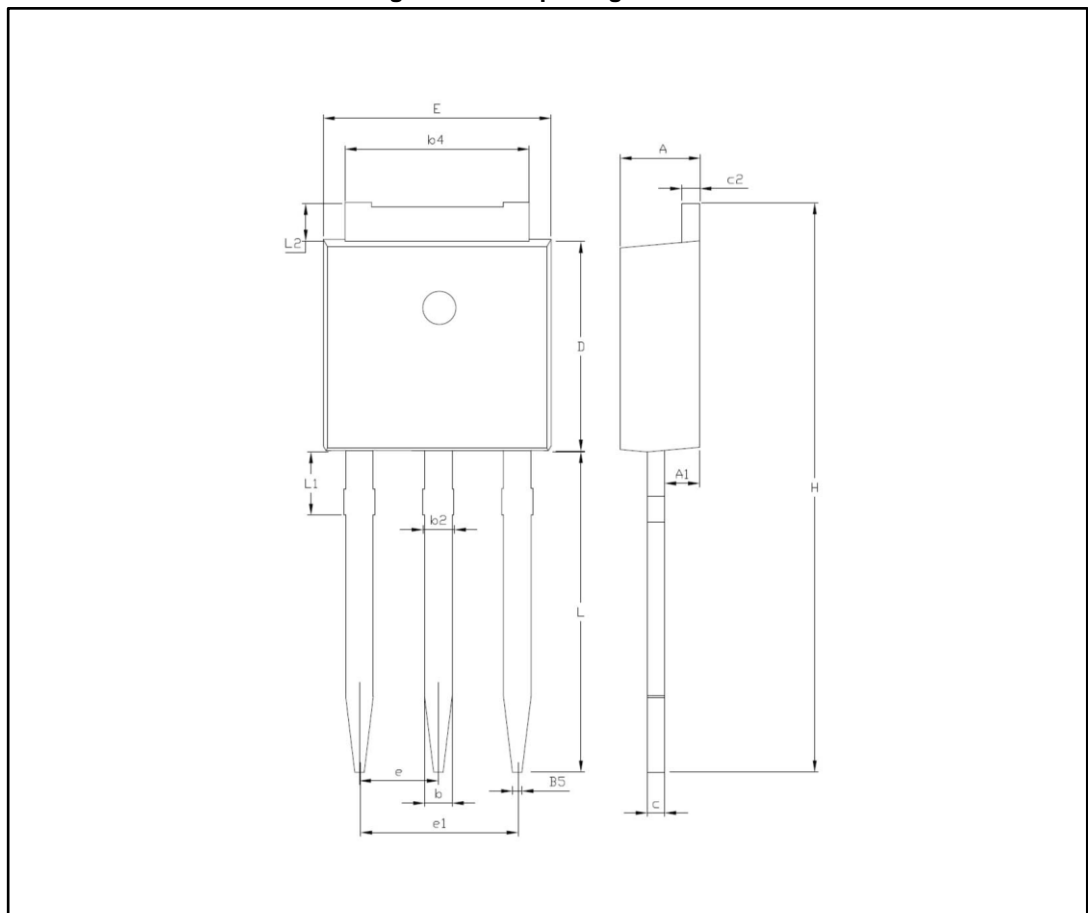
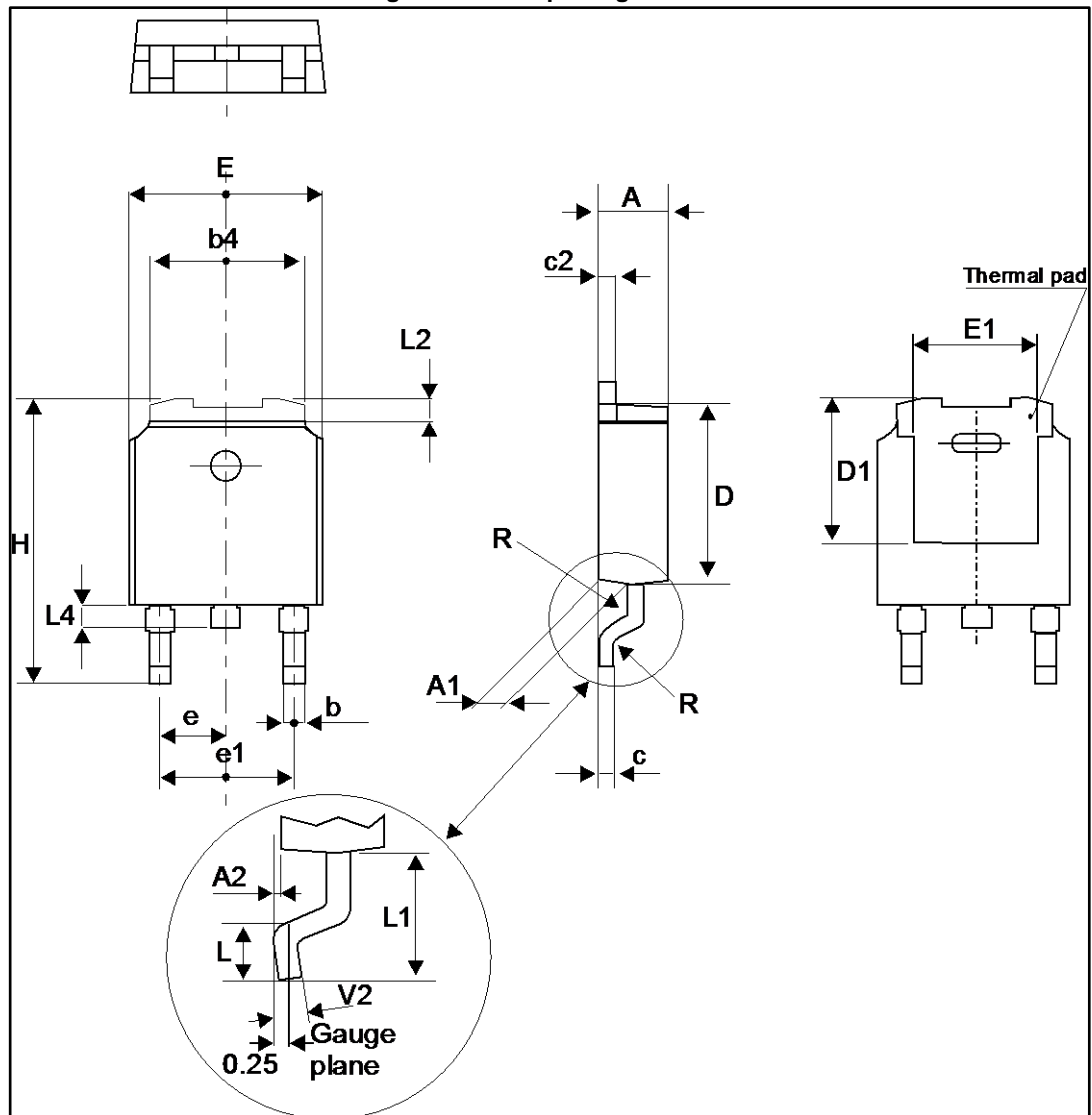


Table 5: IPAK package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.20	2.40	0.087	0.094
A1	0.90	1.10	0.035	0.043
b	0.64	0.90	0.025	0.035
b2		0.95		0.037
b4	5.20	5.43	0.205	0.214
B5	0.30 typ.		0.012 typ.	
c	0.45	0.60	0.018	0.024
c2	0.46	0.60	0.018	0.024
D	6.00	6.20	0.236	0.244
E	6.40	6.65	0.252	0.261
e	2.28 typ.		typ.0.090	
e1	4.40	4.60	0.173	0.181
H	16.10 typ.		0.634 typ.	
L	9.0	9.60	0.354	0.378
L1	0.80	1.20	0.031	0.047
L2	0.80 typ.	1.25	0.031 typ.	0.049
V1	+10°		+10	

## 2.2 DPAK package information

Figure 9: DPAK package outline

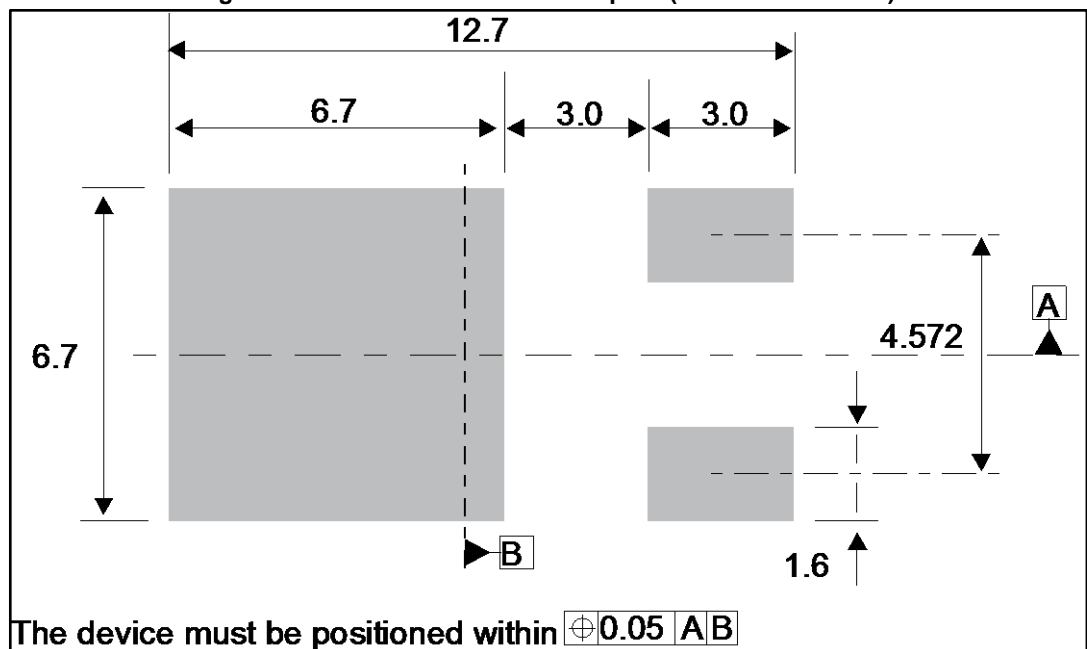


This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 6: DPAK package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	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	0.215
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	0.265
E1	4.32	5.50	0.170	0.216
e	2.286 typ.		0.090 typ.	
e1	4.40	4.70	0.173	0.185
H	9.35	10.40	0.368	0.409
L	1.0	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 10: DPAK recommended footprint (dimensions in mm)



## 2.3 TO-220AB package information

Figure 11: TO-220AB package outline

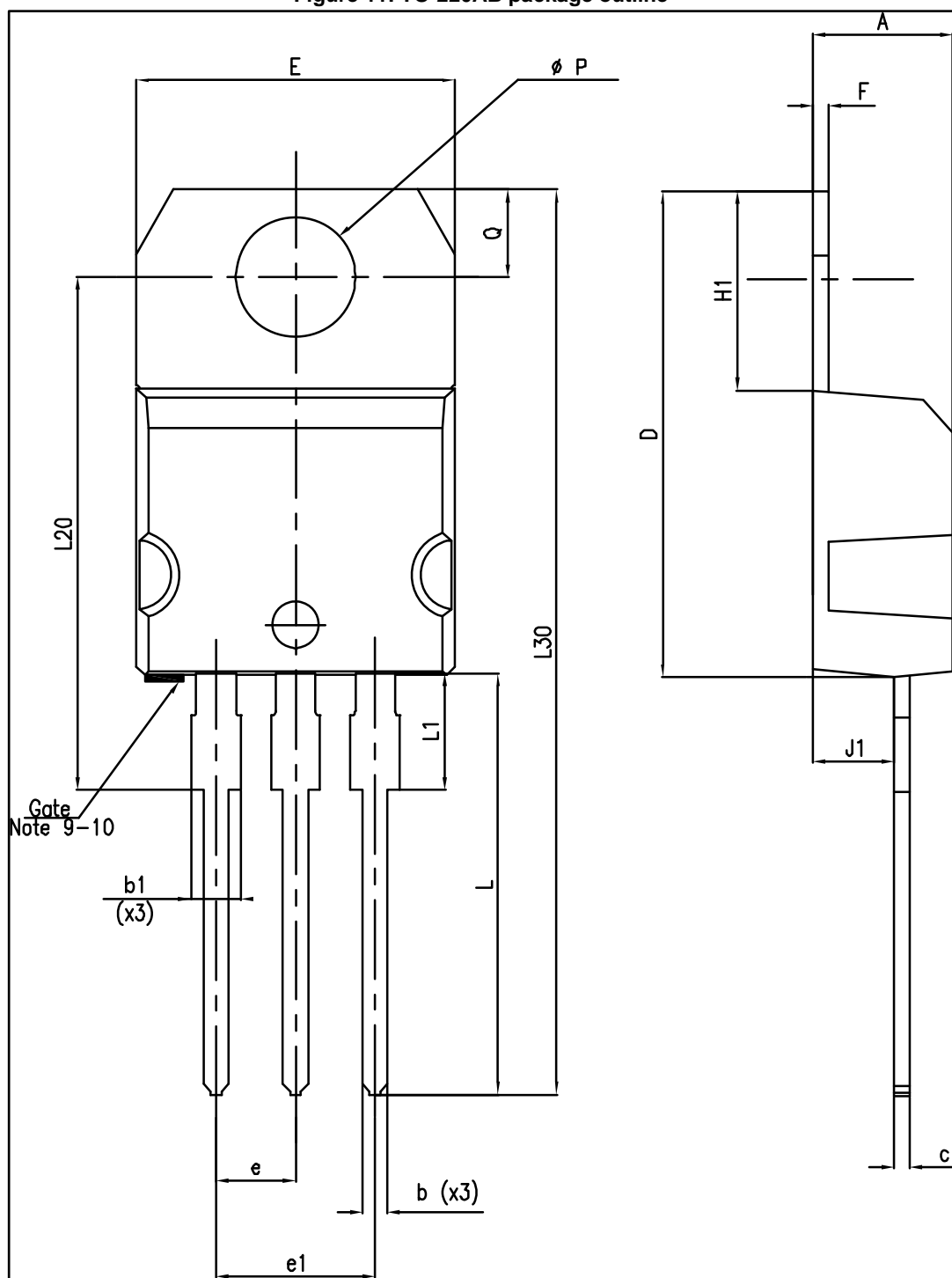




Table 7: TO-220AB package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
b	0.61	0.88	0.024	0.035
b1	1.14	1.70	0.045	0.067
c	0.48	0.70	0.019	0.028
D	15.25	15.75	0.600	0.620
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	0.51	0.60	0.020	0.024
J1	2.40	2.72	0.094	0.107
H1	6.20	6.60	0.244	0.256
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	
Ø P	3.75	3.85	0.148	0.156
Q	2.65	2.95	0.104	0.116

### 3 Ordering information

Table 8: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
FERD20S100STS	FD20S100STS	TO-220AB	1.38 g	50	Tube
FERD20S100SB-TR	FD20 S100S	DPAK	0.35 g	2500	Tape and reel
FERD20S100SH	FD20 S100S	IPAK	0.32 g	75	Tube

### 4 Revision history

Table 9: Document revision history

Date	Revision	Changes
03-Jun-2016	1	Initial release.
14-Nov-2017	2	Updated cover page.

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