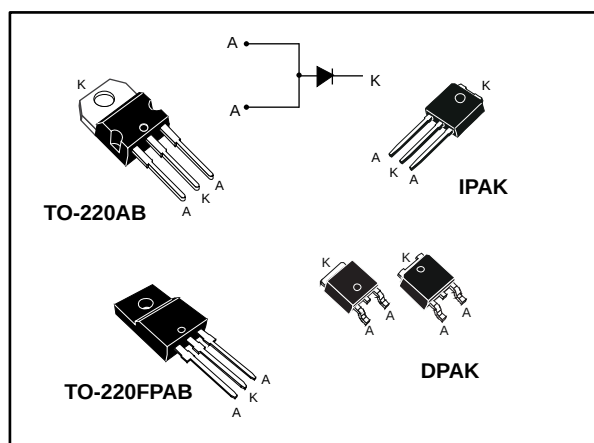


100 V field-effect rectifier diode

Datasheet - production data



Description

The device is based on a proprietary technology that achieves the best in class V_F/I_R trade-off for a given silicon surface. This 100 V rectifier has been optimized for use in confined casing applications where both efficiency and thermal performance matter. With a lower dependency of leakage current (I_R) and forward voltage (V_F) in function of temperature, the thermal runaway risk is reduced. Therefore, it can advantageously replace 100 V Schottky diodes.

Table 1: Device summary

Symbol	Value
$I_{F(AV)}$	20 A
V_{RRM}	100 V
V_F (max.)	0.415 V
I_R (max.)	140 μ A
T_j (max.)	175 °C

Features

- ST advanced rectifier process
- Stable leakage current over reverse voltage
- Reduced leakage current
- Low forward voltage drop
- High frequency operation
- Insulated package TO-220FPAB:
 - Insulated voltage: 2000 V_{RMS} sine
- ECOPACK®2 compliant component

1 Characteristics

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

Symbol	Parameter			Value	Unit
V _{RRM}	Repetitive peak reverse voltage			100	V
I _{F(RMS)}	Forward rms current			40	A
I _{F(AV)}	Average forward current δ = 0.5, square wave	TO-220AB, DPAK, IPAK	T _C = 155 °C	20	A
		TO-220FPAB	T _C = 110 °C		A
I _{FSM}	Surge non repetitive forward current	TO-220AB, TO-220FPAB	t _p = 10 ms sinusoidal	250	A
		DPAK, IPAK		150	A
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 resistance parameters

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AB, DPAK, IPAK	1	°C/W
		TO-220FPAB	3.8	

Table 4: Static electrical characteristics, anode terminals short circuited

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$	-		140	μA
		$T_j = 125\text{ °C}$		-	8	16	mA
		$T_j = 125\text{ °C}$	$V_R = 70\text{ V}$	-	4	7	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 2\text{ A}$	-	0.370	0.415	V
		$T_j = 125\text{ °C}$		-	0.315	0.365	
		$T_j = 25\text{ °C}$	$I_F = 5\text{ A}$	-	0.455	0.515	
		$T_j = 125\text{ °C}$		-	0.450	0.510	
		$T_j = 25\text{ °C}$	$I_F = 10\text{ A}$	-	0.580	0.655	
		$T_j = 125\text{ °C}$		-	0.550	0.605	
		$T_j = 125\text{ °C}$	$I_F = 20\text{ A}$	-	0.640	0.705	

Notes:

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

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

To evaluate the conduction losses use the following equation:

$$P = 0.415 \times I_{F(AV)} + 0.019 I_{F(RMS)}^2$$

1.1 Characteristics (curves)

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

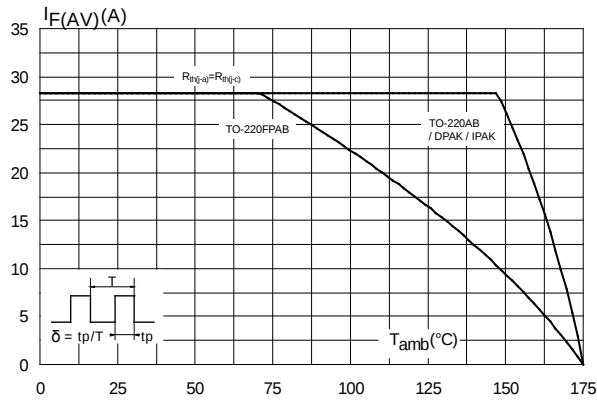


Figure 2: Relative variation of thermal impedance junction to case versus pulse duration

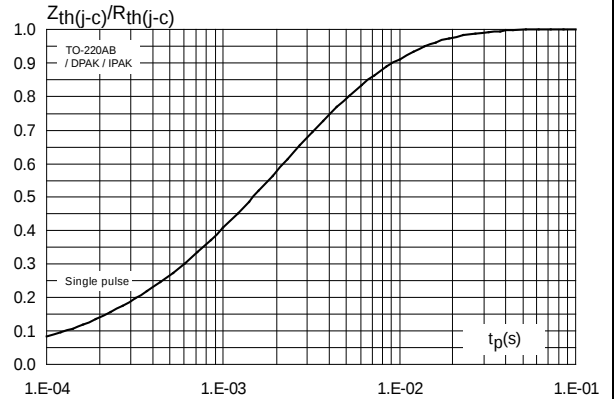


Figure 3: Relative variation of thermal impedance junction to case versus pulse duration

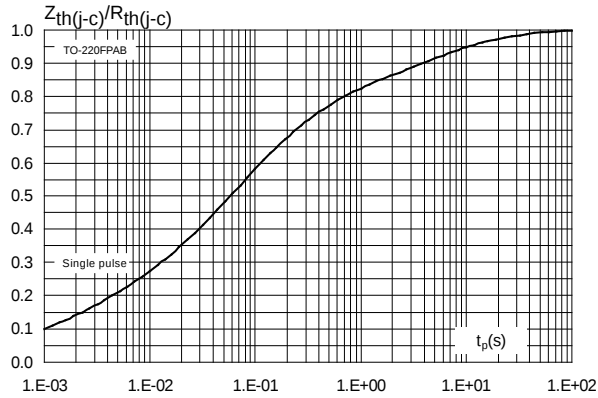


Figure 4: Reverse leakage current versus reverse voltage applied (typical values)

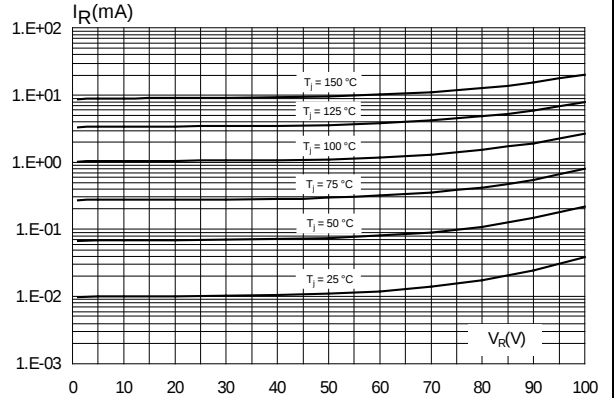


Figure 5: Junction capacitance versus reverse voltage applied (typical values)

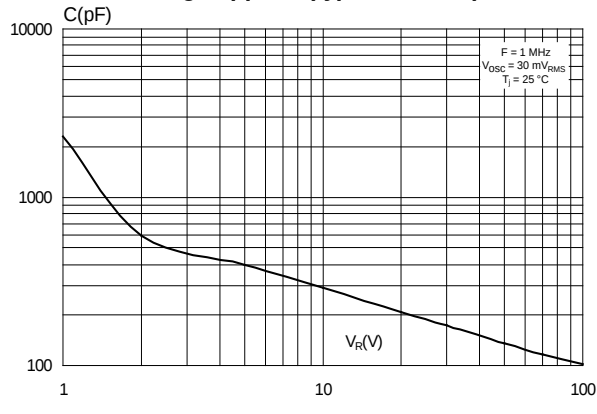


Figure 6: Forward voltage drop versus forward current (typical values)

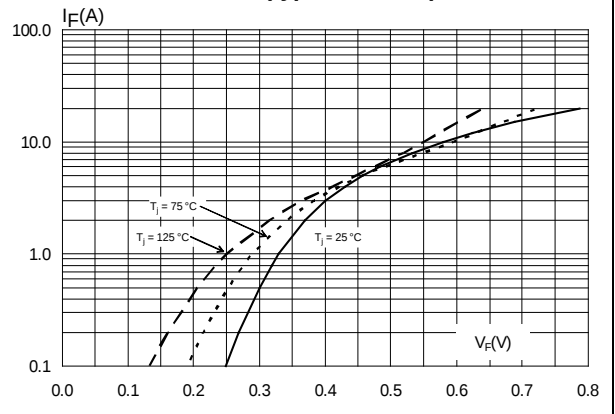
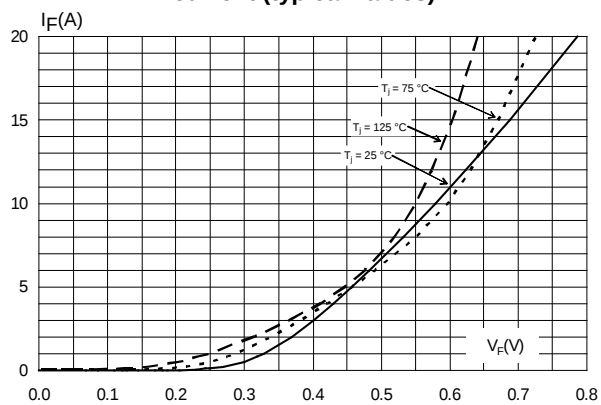
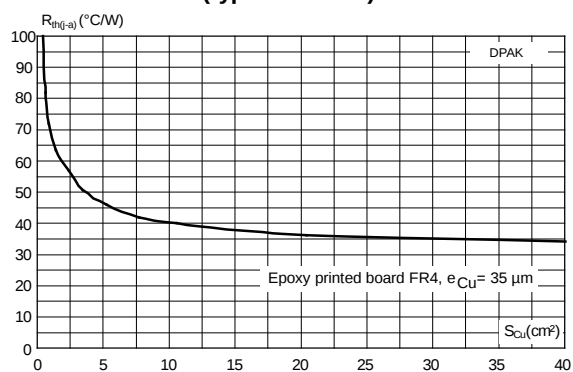


Figure 7: Forward voltage drop versus forward current (typical values)**Figure 8: Thermal resistance junction to ambient versus copper surface under tab for DPAK (typical values)**

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. 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 and TO-220FPAB)
- Maximum torque value: 0.6 N·m (for TO-220AB and TO-220FPAB)

2.1 IPAK package information

Figure 9: IPAK package outline

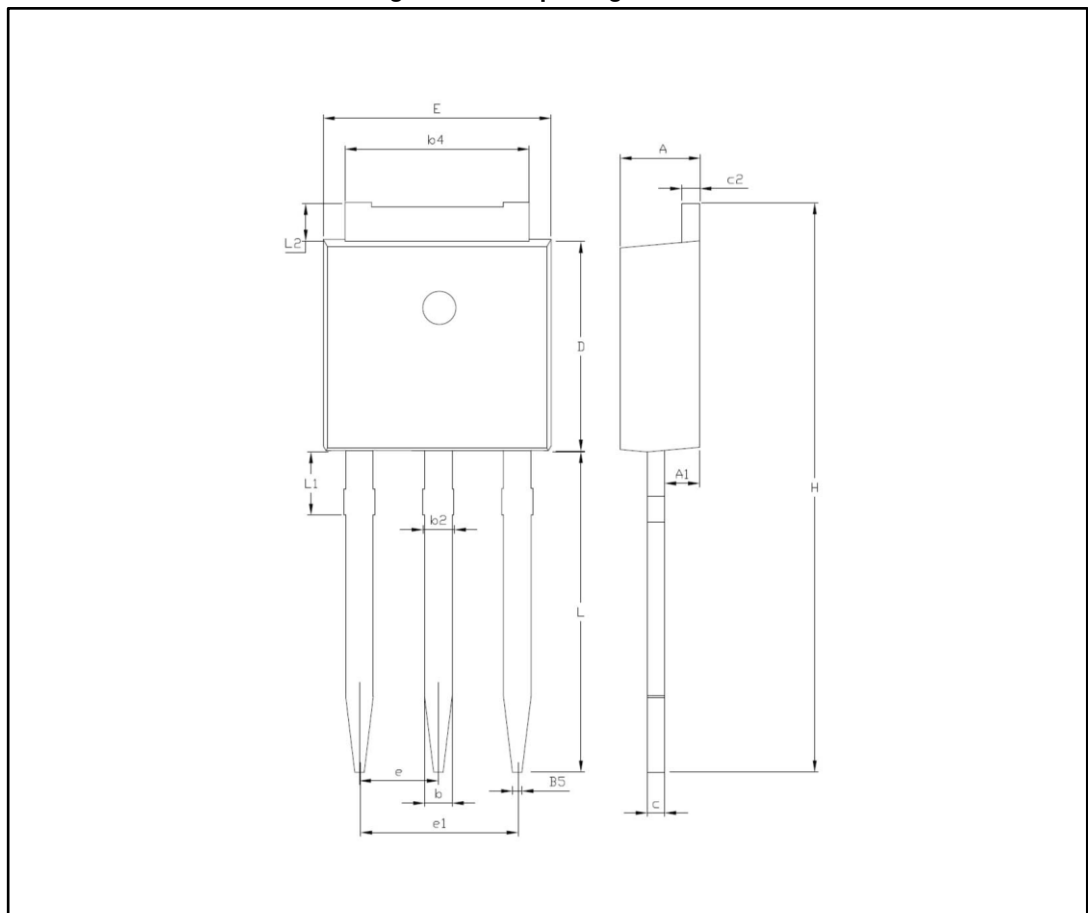
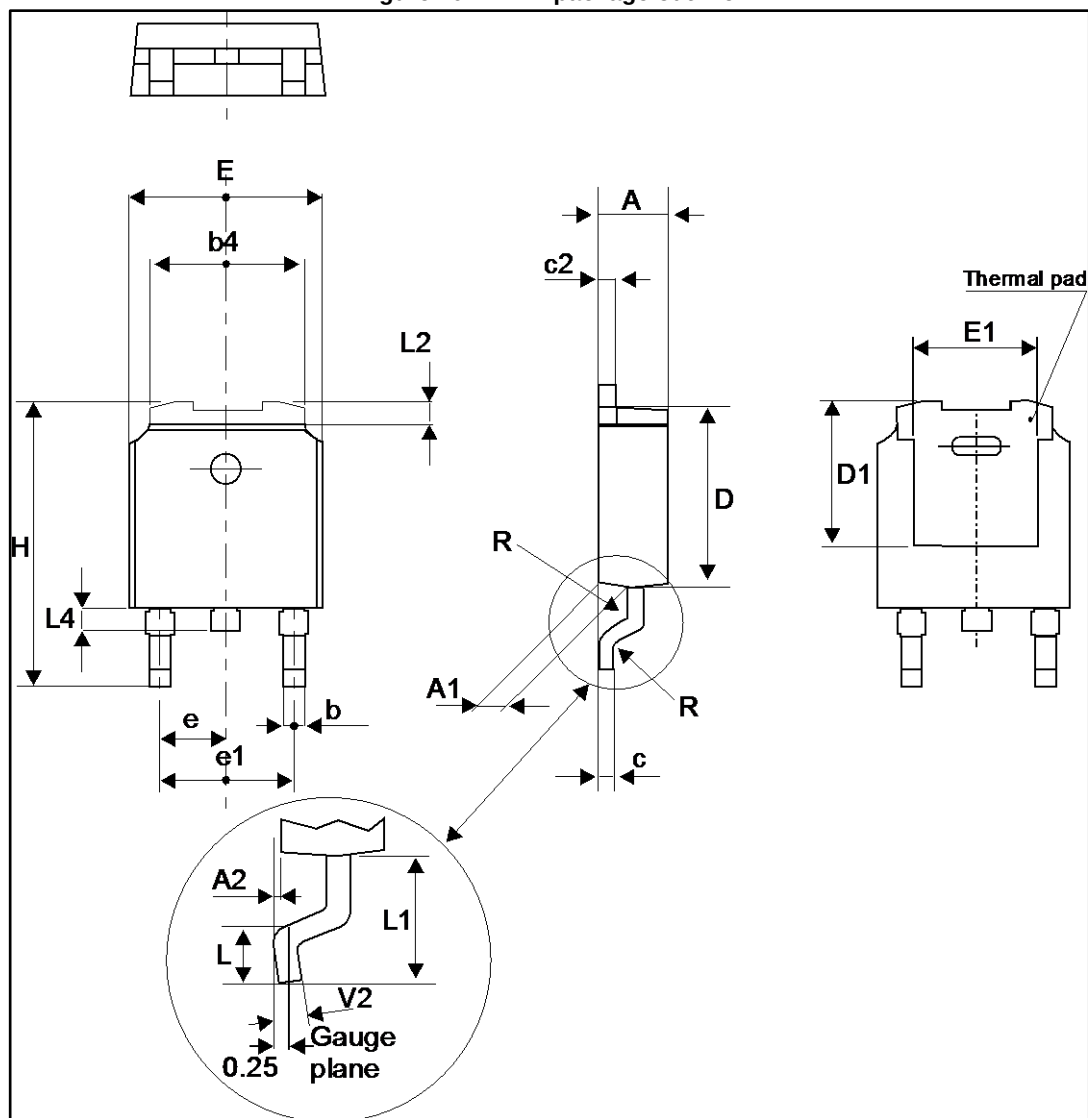


Table 5: IPAK package mechanical data

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 10: DPAK package outline

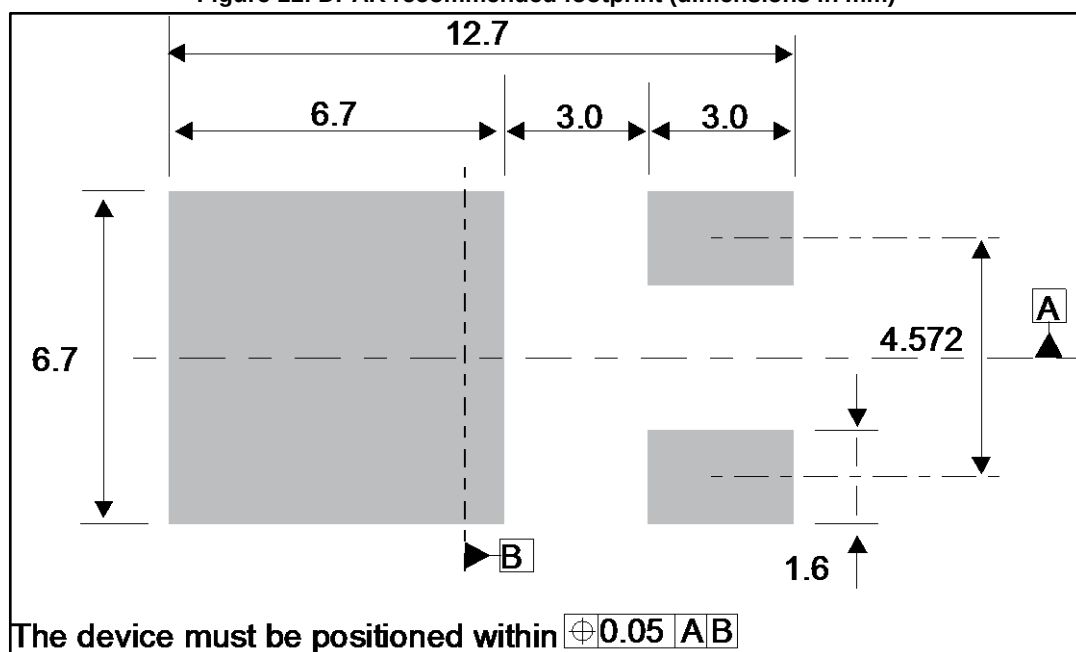


This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

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 11: DPAK recommended footprint (dimensions in mm)



2.3 TO-220FPAB package information

Figure 12: TO-220FPAB package outline

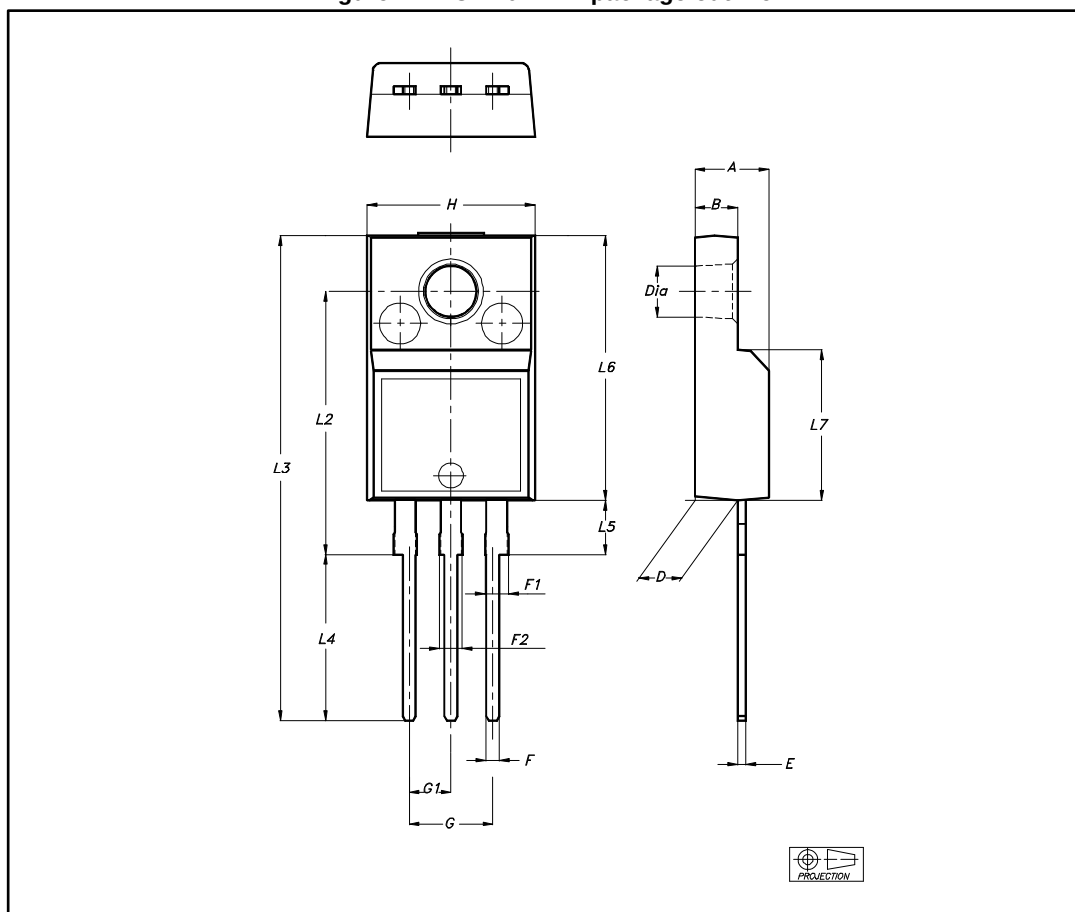


Table 7: TO-220FPAB package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
B	2.5	2.7	0.098	0.106
D	2.5	2.75	0.098	0.108
E	0.45	0.70	0.018	0.028
F	0.75	1	0.030	0.039
F1	1.15	1.70	0.045	0.067
F2	1.15	1.70	0.045	0.067
G	4.95	5.2	0.195	0.205
G1	2.4	2.7	0.094	0.106
H	10	10.4	0.394	0.409
L2	16 typ.		0.63 typ.	
L3	28.60	30.6	1.126	1.205
L4	9.8	10.6	0.386	0.417
L5	2.9	3.6	0.114	0.142
L6	15.9	16.4	0.626	0.646
L7	9	9.3	0.354	0.366
Dia	3	3.2	0.118	0.126

2.4 TO-220AB package information

Figure 13: TO-220AB package outline

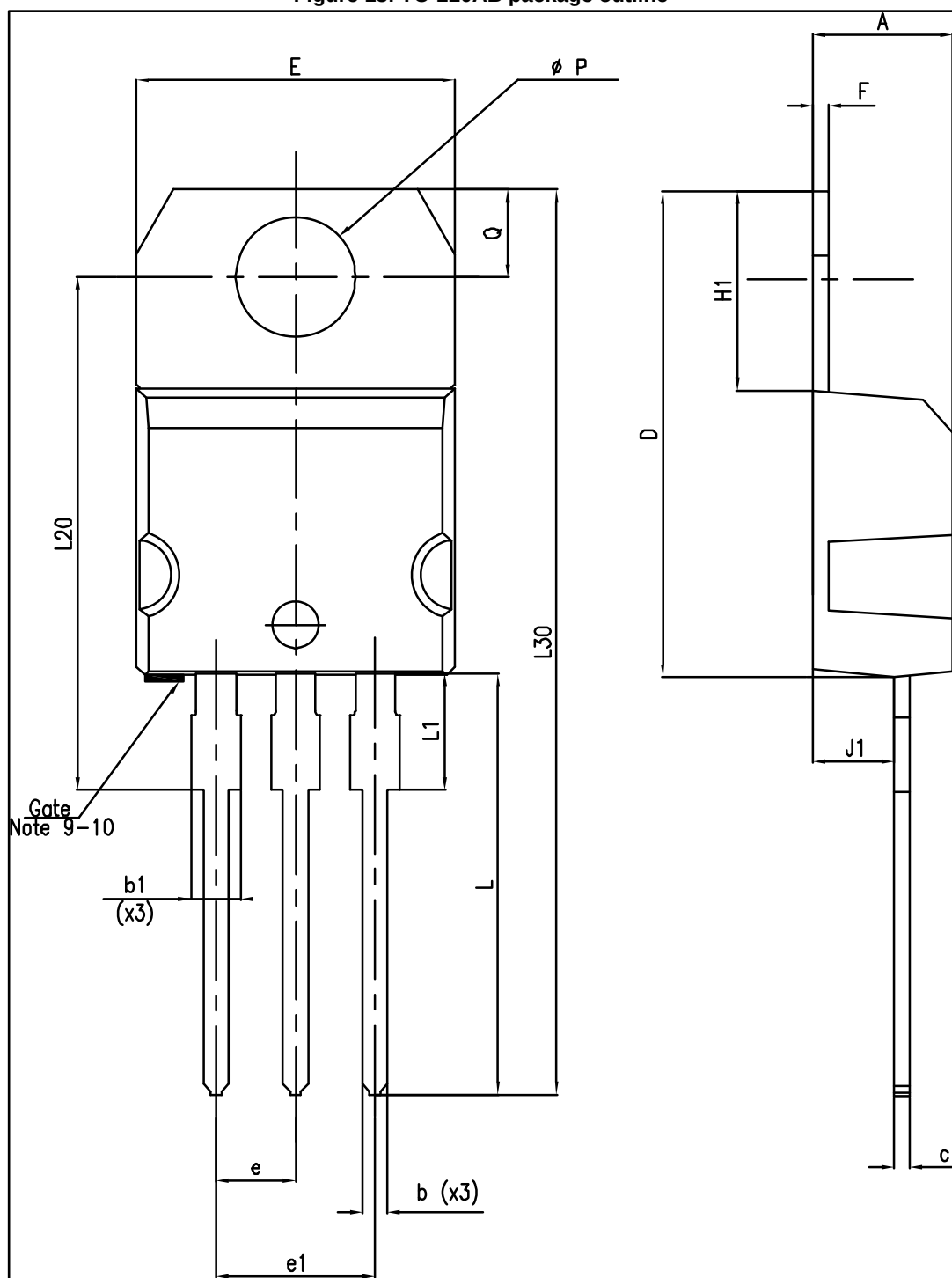


Table 8: TO-220AB package mechanical data

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 9: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
FERD20H100STS	FD20H100STS	TO-220AB	1.38 g	50	Tube
FERD20H100SFP	FD20H100SFP	TO-220FPAB	1.7 g	50	Tube
FERD20H100SB-TR	FD20 H100S	DPAK	0.35 g	2500	Tape and reel
FERD20H100SH	FD20 H100S	IPAK	0.32 g	75	Tube

4 Revision history

Table 10: Document revision history

Date	Revision	Changes
08-Mar-2016	1	Initial release.
09-May-2016	2	Update of document title.
13-Nov-2017	3	Updated cover page and Table 9: "Ordering information" .

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