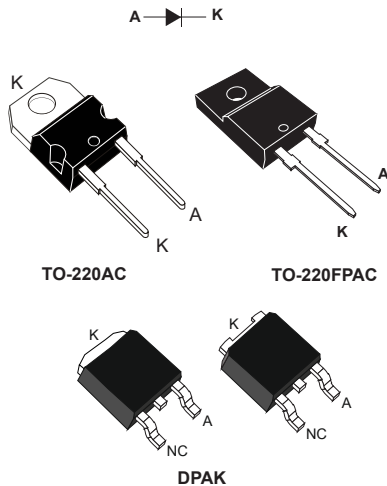


600 V, 8 A ultrafast high voltage rectifier



Features

- Ultrafast recovery
- Low reverse recovery current
- Low thermal resistance
- Higher frequency operation
- Reduces switching and conduction losses
- ECOPACK2 compliant
- Insulated TO-220FPAC:
 - Insulating voltage = 2000 V_{RMS}
 - Package capacitance = 12 pF

Applications

- SMPS in telecom power
- On-board DC/DC converter
- Telecom / Server power equipment

Description

This device is an ultrafast diode based on 600 V Pt doping planar technology. It can be used in hard switching conditions for power factor corrections. Its extremely low reverse recovery current reduces the switching power losses of the MOSFET and thus increases the overall application efficiency.

This diode is also intended for applications in power supplies and power conversions systems, and all sorts of power switching.

Product status link

[STTH8S06](#)

Product summary

Symbol	Value
$I_{F(AV)}$	8 A
V_{RRM}	600 V
$V_{F(typ.)}$	1.5 V
$t_{rr(max.)}$	12 ns
T_j	+175 °C

1 Characteristics

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

Symbol	Parameter	Value	Unit
V_{RRM}	Repetitive peak reverse voltage	600	V
$I_{F(AV)}$	Average forward current $\delta = 0.5$ square wave	8	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10$ ms 60	A
T_{stg}	Storage temperature range	-65 to +175	°C
T_j	Maximum operating junction temperature	+175	

Table 2. Thermal parameters

Symbol	Parameter	Max. value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AC, DPAK 3.0	°C/W
		TO-220FPAC 5.5	

For more information, you can refer to the following application note related to the thermal management:

- [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	-		20	μ A
		$T_j = 125$ °C	-	25	200	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25$ °C	-		3.4	V
		$T_j = 150$ °C	-	1.5	1.9	

1. Pulse test: $t_p = 5$ ms, $\delta < 2\%$

2. Pulse test: $t_p = 380$ μ s, $\delta < 2\%$

To evaluate the maximum conduction losses, use the following equation:

$$P = 1.20 \times I_{F(AV)} + 0.087 \times I_F^2 (RMS)$$

For more information, you can 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

Table 4. Dynamic electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	$T_J = 25\text{ }^{\circ}\text{C}$	$I_F = 1\text{ A}$, $dI_F/dt = -200\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$	-	12	18	ns
I_{RM}	Reverse recovery current		$I_F = 8\text{ A}$, $dI_F/dt = -200\text{ A}/\mu\text{s}$, $V_R = 200\text{ V}$	-	1.6	2.2	A
S_{factor}	Softness factor			-	1		-
Q_{rr}	Reverse recovery charges			-	17		nC
I_{RM}	Reverse recovery current	$T_J = 125\text{ }^{\circ}\text{C}$	$I_F = 8\text{ A}$, $dI_F/dt = -200\text{ A}/\mu\text{s}$, $V_R = 200\text{ V}$	-	4.4	6.0	A
S_{factor}	Softness factor			-	0.3		-
Q_{rr}	Reverse recovery charges			-	90		nC

1.1 Characteristics (curves)

Figure 1. Forward voltage drop versus forward current

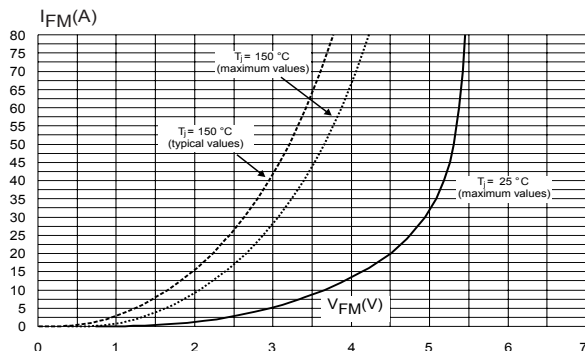


Figure 2. Relative variation of thermal impedance junction to case versus pulse duration (TO-220AC)

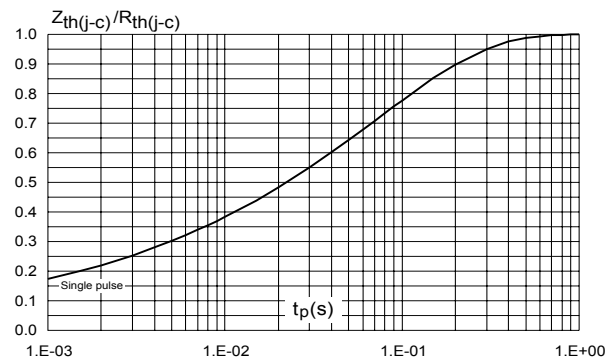


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAC)

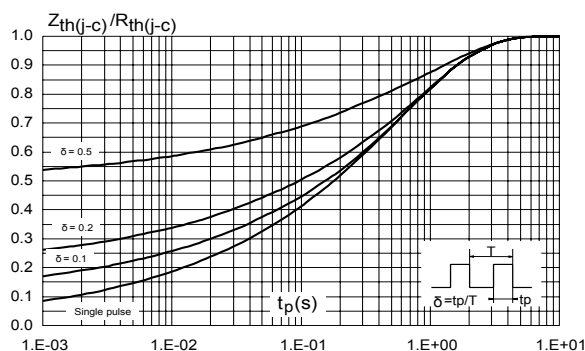


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration (DPAK)

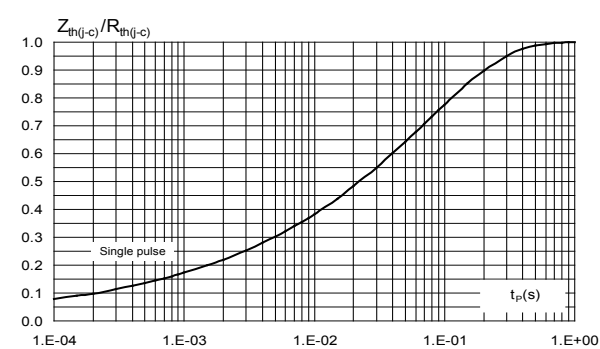


Figure 5. Peak reverse recovery current versus di_F/dt (typical values)

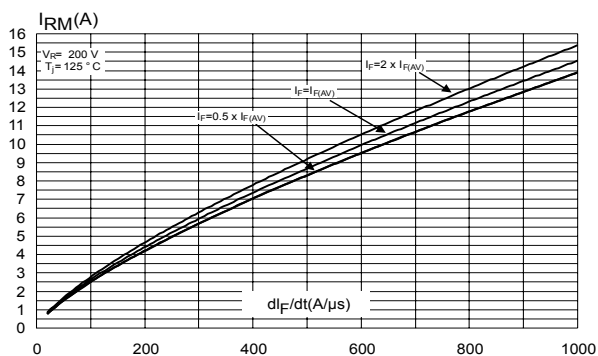


Figure 6. Reverse recovery time versus di_F/dt (typical values)

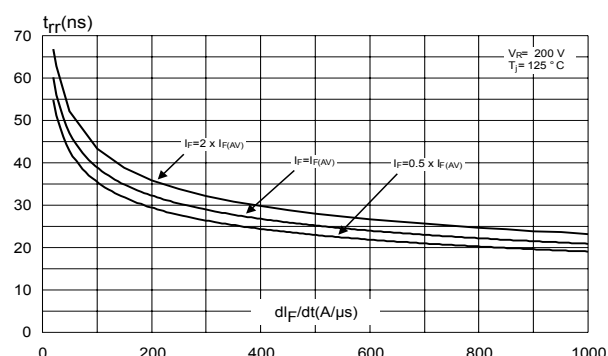
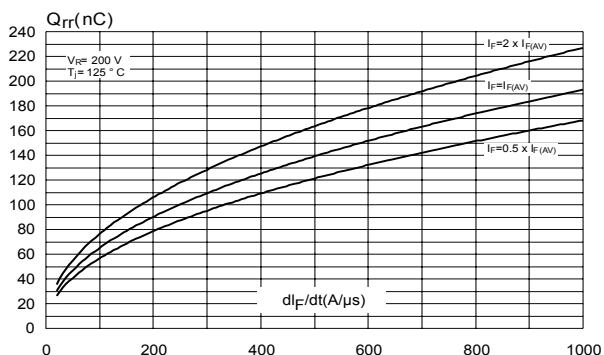
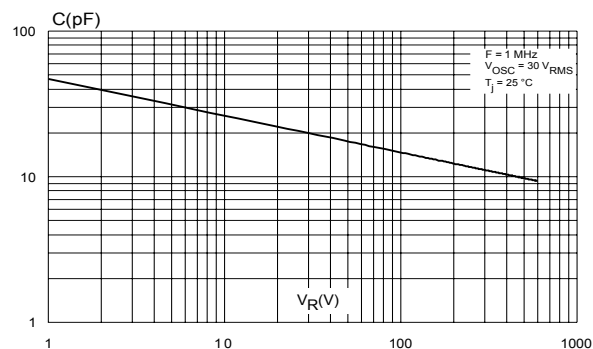
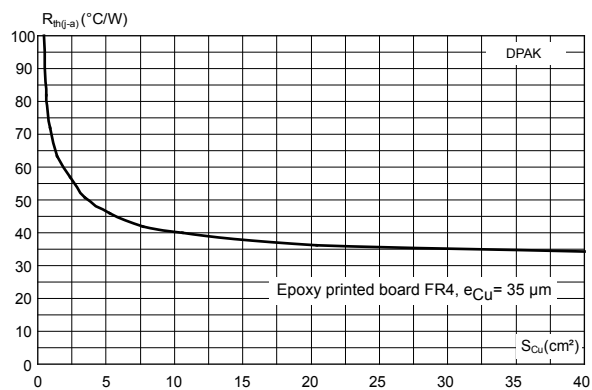


Figure 7. Reverse recovery charges versus di_F/dt (typical values)

Figure 8. Junction capacitance versus reverse voltage applied (typical values)

Figure 9. Thermal resistance junction to ambient versus copper surface under tab (DPAK, typical values)


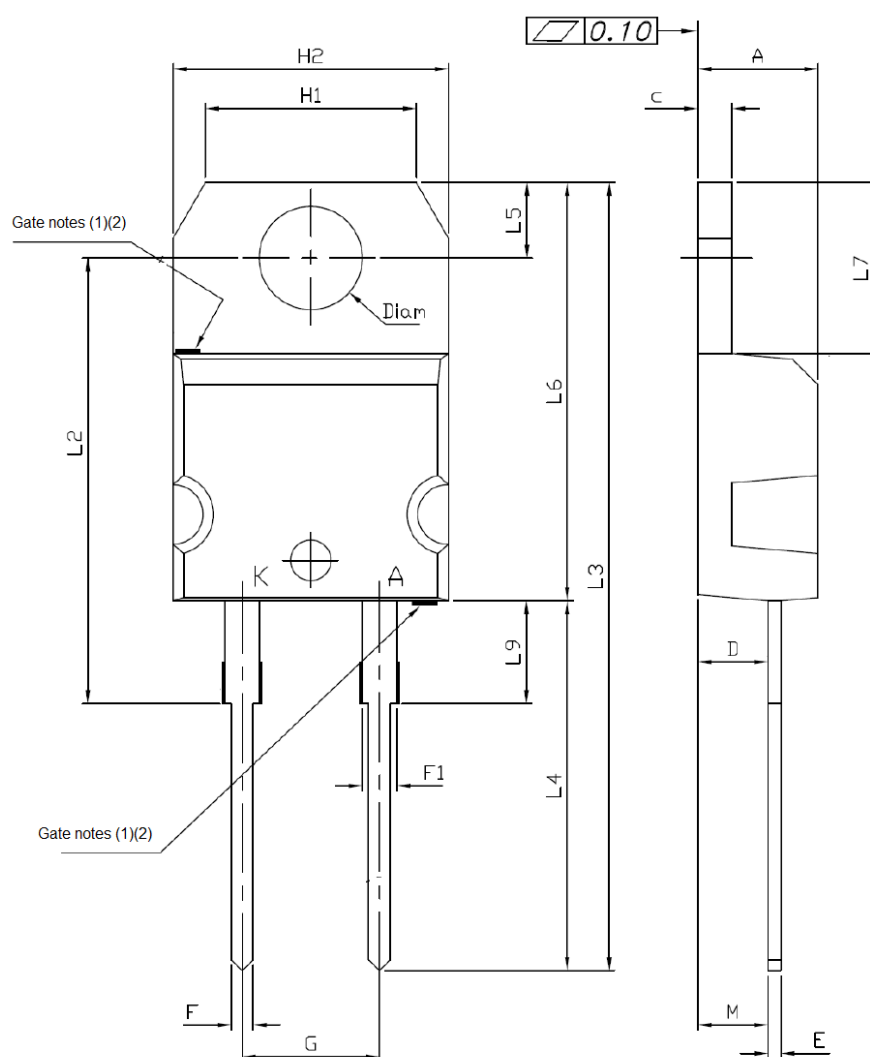
2 Package information

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-220AC 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-220AC package outline



- (1) : Max resin gate protusion 0.5 mm
- (2) : Resin gate position is accepted in each of the two positions shown on the drawings or their symmetrical

0015990

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

Table 5. TO-220AC package mechanical data

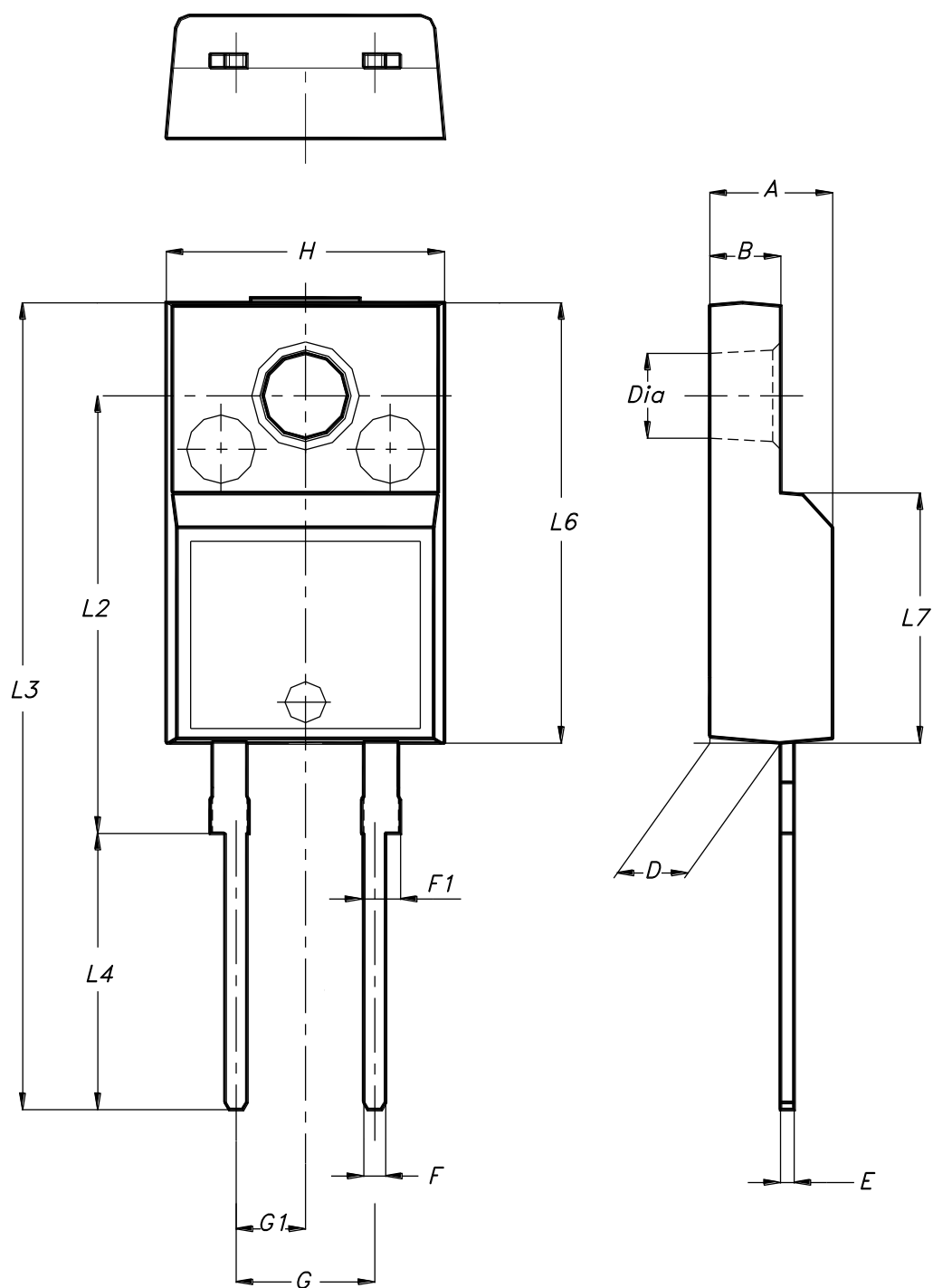
Ref.	Dimensions					
	Millimeters			Inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.066
G	4.95		5.15	0.194		0.202
H2	10.00		10.40	0.393		0.409
L2		16.40			0.645	
L4	13.00		14.00	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.20		6.60	0.244		0.259
L9	3.50		3.93	0.137		0.154
M		2.60			0.102	
Diam	3.75		3.85	0.147		0.151
Slug flatness		0.03	0.10		0.001	0.004

Note: For packing information, inner box dimensions and tube dimensions, refer to [TN1173](#).

2.2 TO-220FPAC 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 11. TO-220FPAC package outline



7147406

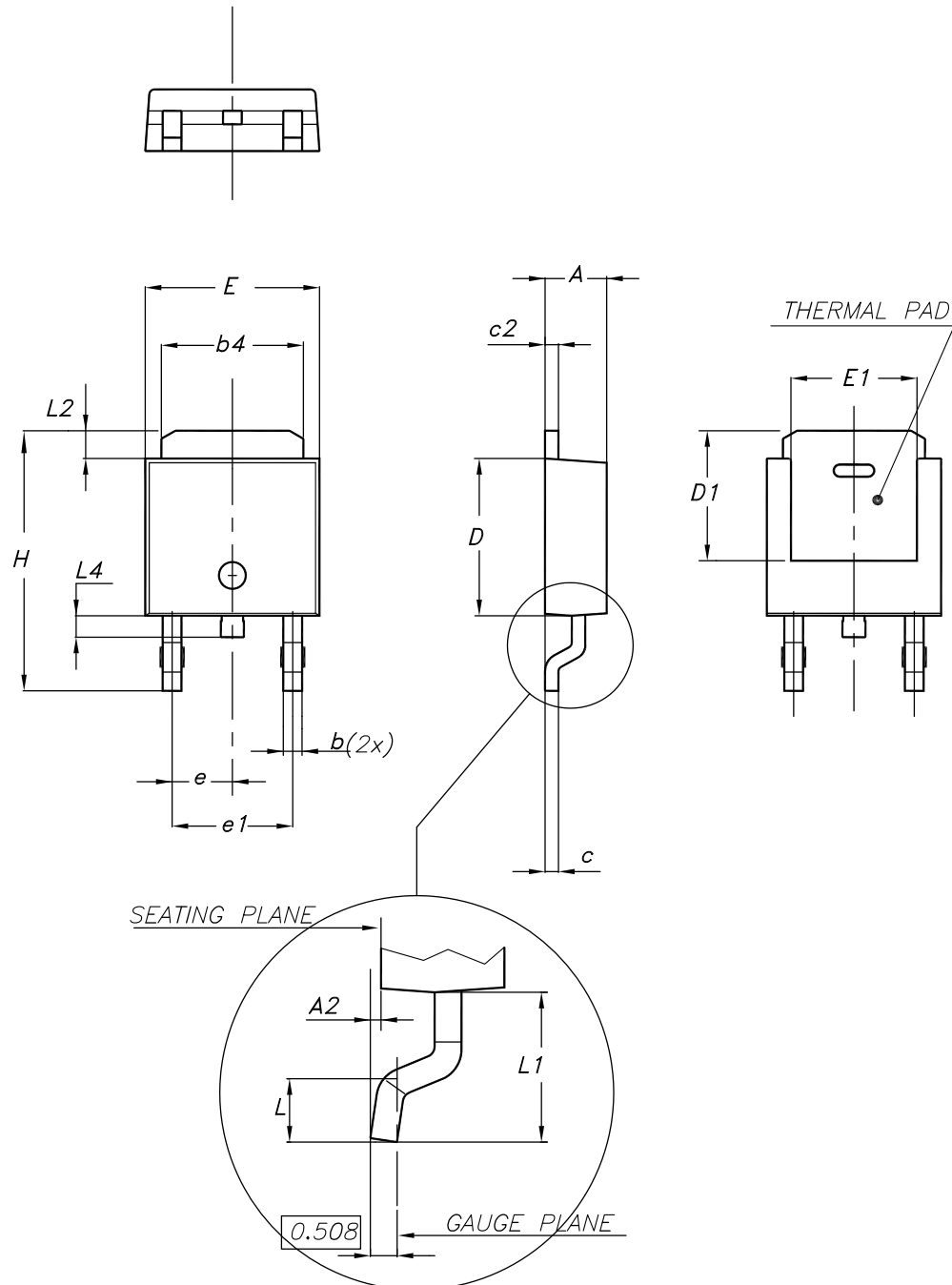
Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 6. TO-220FPAC package mechanical data

Ref.	Dimensions			
	Millimeters		Inches (for reference only)	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
B	2.50	2.70	0.098	0.106
D	2.50	2.75	0.098	0.108
E	0.45	0.70	0.018	0.027
F	0.75	1	0.030	0.039
F1	1.15	1.70	0.045	0.067
G	4.95	5.20	0.195	0.205
G1	2.4	2.70	0.094	0.106
H	10	10.40	0.393	0.409
L2	16 typ.		0.63 typ.	
L3	28.6	30.60	1.126	1.205
L4	9.8	10.60	0.386	0.417
L6	15.9	16.40	0.626	0.646
L7	9.00	9.30	0.354	0.366
Diam	3.00	3.20	0.118	0.126

2.3 DPAK (TO-252) type E package information

Figure 12. DPAK (TO-252) type E package outline

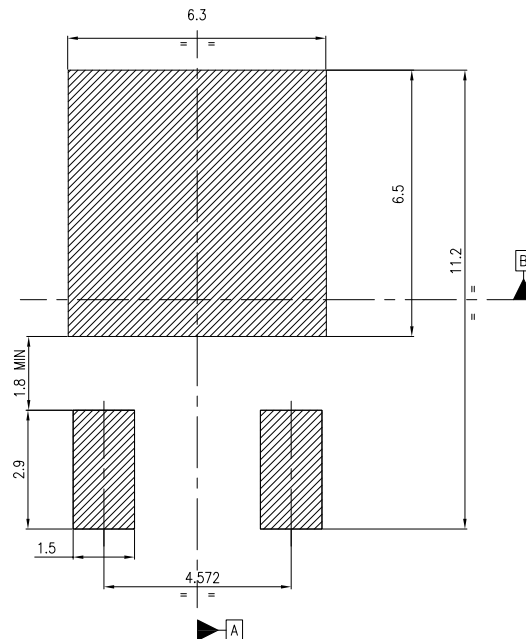


0068772_E

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

Table 7. DPAK (TO-252) type E mechanical data

Ref.	Dimensions					
	mm			Inches (for reference only)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.18		2.39	0.085		0.095
A2			0.13			0.006
b	0.65		0.884	0.025		0.035
b4	4.95		5.46	0.194		0.215
c	0.46		0.61	0.018		0.025
c2	0.46		0.60	0.018		0.024
D	5.97		6.22	0.235		0.245
D1	5.21			0.205		
E	6.35		6.73	0.250		0.265
E1	4.32			0.170		
e		2.286			0.090	
e1		4.572			0.180	
H	9.94		10.34	0.391		0.408
L	1.50		1.78	0.059		0.071
L1		2.74			0.108	
L2	0.89		1.27	0.035		0.050
L4			1.02			0.041

Figure 13. DPAK (TO-252) recommended footprint (dimensions are in mm)


Notes:

- 1) This footprint is able to ensure insulation up to 630 Vrms (according to CEI IEC 664-1)
- 2) The device must be positioned within $\Phi 0.05$ A B

FP_0068772_E

3 Ordering information

Table 8. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STTH8S06D	STTH8S06D	TO-220AC	1.9 g	50	Tube
STTH8S06FP	STTH8S06FP	TO-220FPAC	1.64 g	50	Tube
STTH8S06B-TR	STTH8 S06B	DPAK	0.35 g	2500	Tape and reel

Revision history

Table 9. Document revision history

Date	Revision	Changes
18-Dec-2007	1	first issue
10-Feb-2017	2	Added DPAK package. Updated Section "Features".
18-Jun-2025	3	Inserted Applications. Updated Section 2: Package information . Minor text changes.

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