1 Characteristics

Table 2. Absolute ratings (limiting values at 25° C, unless otherwise specified)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			600	V
$I_{F(RMS)}$	RMS forward current		TO-220AC	20	A
			DPAK	10	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$, square wave.	T_c = 145° C	TO-220AC DPAK	5	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms Sinusoidal	TO-220AC	70	A
			DPAK	55	A
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Maximum operating junction temperature			175	°C

Table 3. Thermal parameters

Symbol	Parameter	Max. value	Unit
$R_{th(j-c)}$	Junction to case	3.5	° C/W

Table 4. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
I_R(1)	Reverse leakage current	T_j = 25° C	$V_R = V_{RRM}$	-		5	µA
		T_j = 150° C		-	13	130	
V_F(2)	Forward voltage drop	T_j = 25° C	I_F = 5 A	-		1.85	V
		T_j = 150° C		-	1.10	1.40	

1. Pulse test: t_p = 5 ms, $\delta < 2\%$
2. Pulse test: t_p = 380 µs, $\delta < 2\%$

To evaluate the conduction losses, use the following equation:
$P = 1.07 \times I_{F(AV)} + 0.066 \times I_F{}^2{}_{(RMS)}$

Table 5. Dynamic characteristics

Symbol	Parameter	Test conditions		Min.	Typ	Max.	Unit
t_{rr}	Reverse recovery time	T_j = 25° C	I_F = 0.5 A I_{rr} = 0.25 A I_R = 1 A	-		30	ns
			I_F = 1 A V_R = 30 V dI_F/dt = -50 A/µs	-	35	50	
I_{RM}	Reverse recovery current	T_j = 125° C	I_F = 5 A V_R = 400 V dI_F/dt = -100 A/µs	-	3.5	5	A
Q_{rr}	Reverse recovery charges			-	175		nC
t_{fr}	Forward recovery time	T_j = 25° C	I_F = 5 A V_{FR} = 1.1 x V_{Fmax} dI_F/dt = 100 A/µs	-		180	ns
V_{FP}	Forward recovery voltage			-	4		V

Figure 1. Conduction losses versus average current

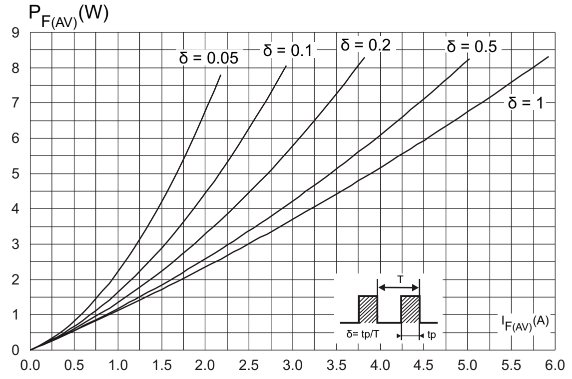


Figure 2. Forward voltage drop versus forward current

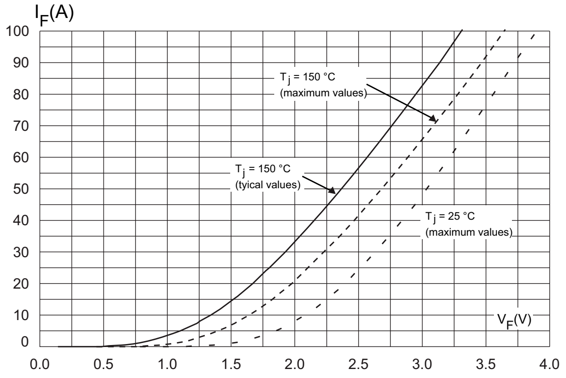


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

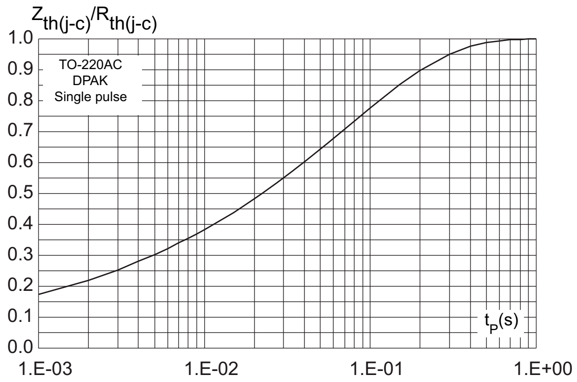


Figure 4. Peak reverse recovery current versus dI_F/dt (typical values)

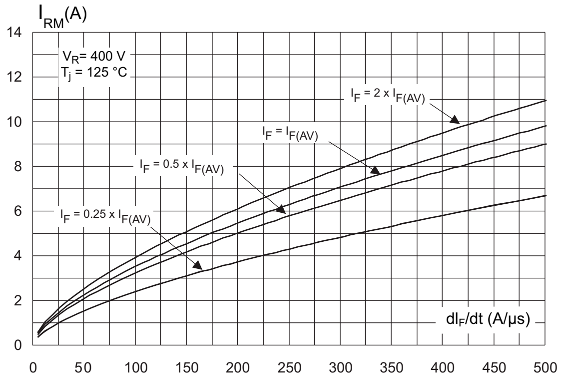


Figure 5. Reverse recovery time versus dI_F/dt (typical values)

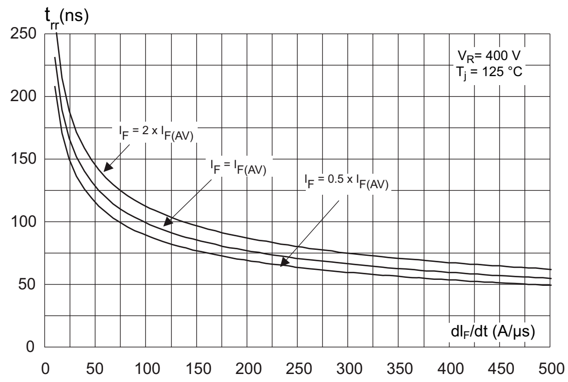


Figure 6. Reverse recovery charges versus dI_F/dt (typical values)

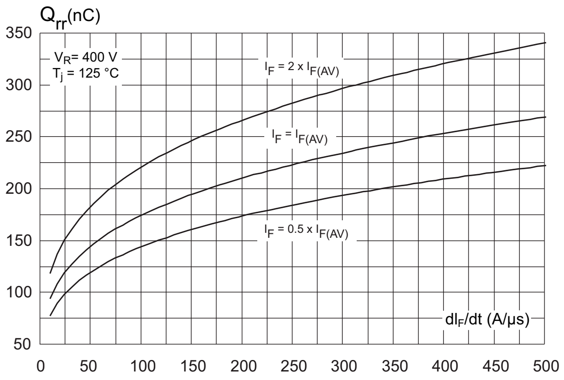


Figure 7. Softness factor versus dI_F/dt (typical values)

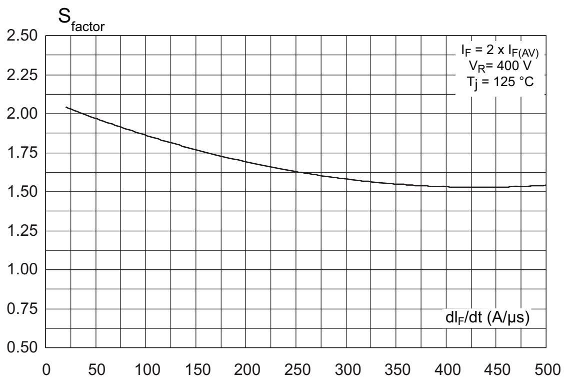


Figure 8. Relative variations of dynamic parameters versus junction temperature

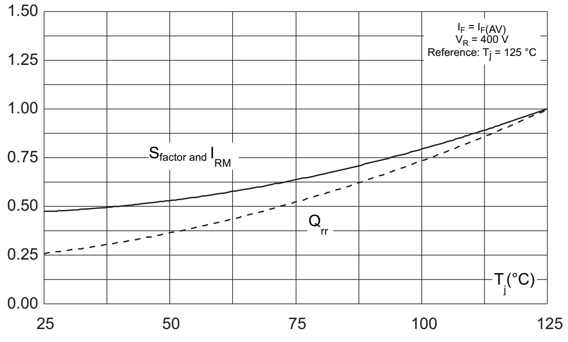


Figure 9. Transient peak forward voltage versus dI_F/dt (typical values)

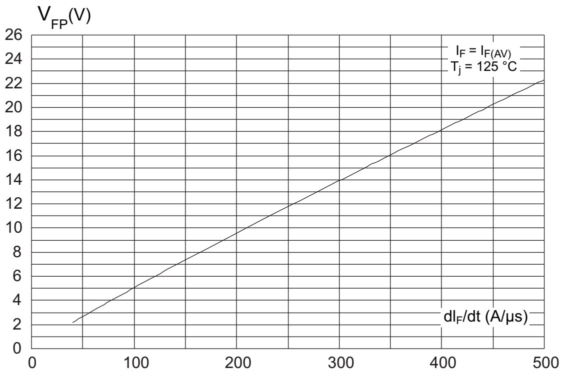


Figure 10. Forward recovery time versus dI_F/dt (typical values)

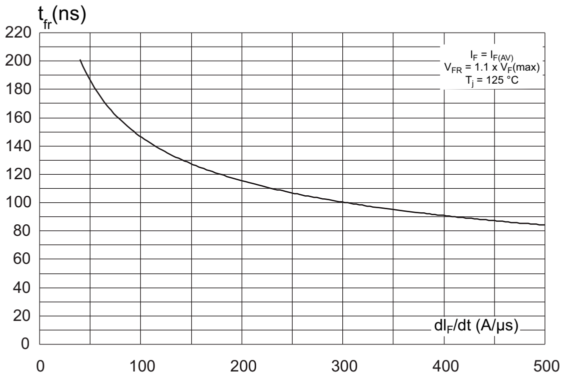


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

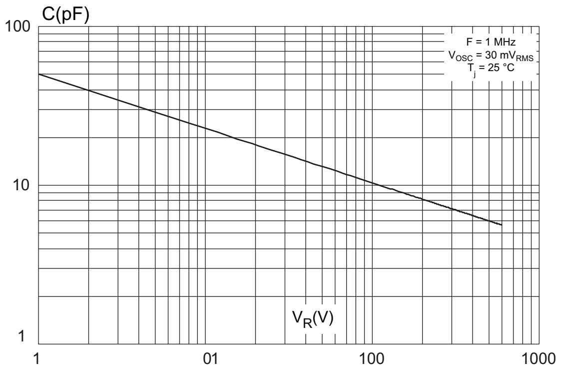
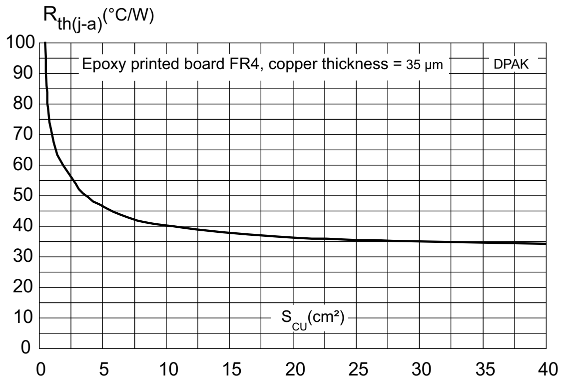


Figure 12. Thermal resistance junction to ambient versus copper surface under tab



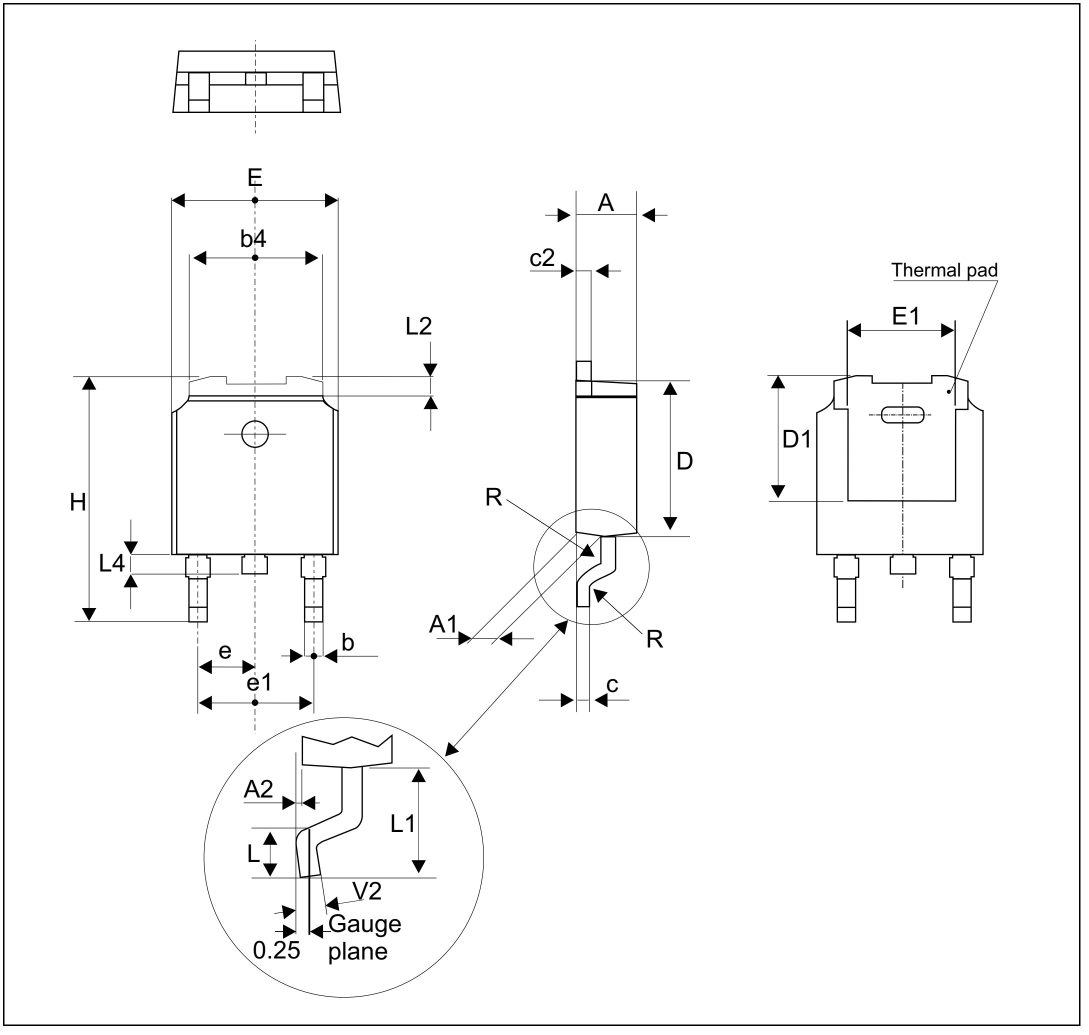
2 Package Information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.55 Nm for TO-220AC
- Maximum torque value: 0.7 Nm for TO-220AC

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 DPAK package information

Figure 13. DPAK package outline

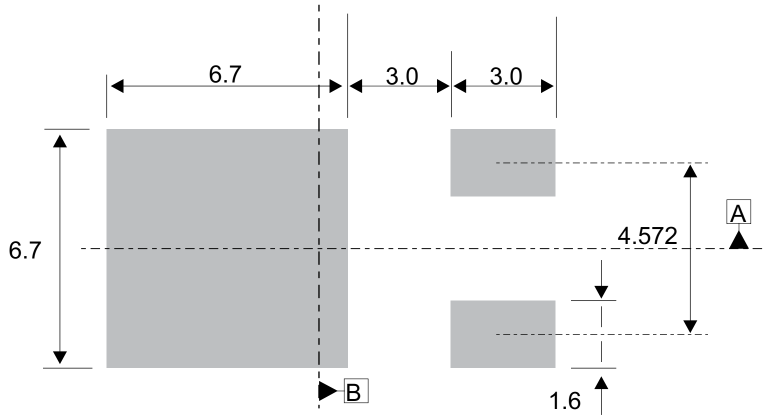


Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 6. DPAK package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	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		0.214
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		0.264
E1	4.32		5.50	0.170		0.216
e		2.28			0.090	
e1	4.40		4.70	0.173		0.185
H	9.35		10.40	0.368		0.409
L	1.00		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 14. Footprint (dimensions in mm)



The device must be positioned within ⊕ 0.05 | A | B

2.2 TO-220AC package information

Figure 15. TO-220AC package outline

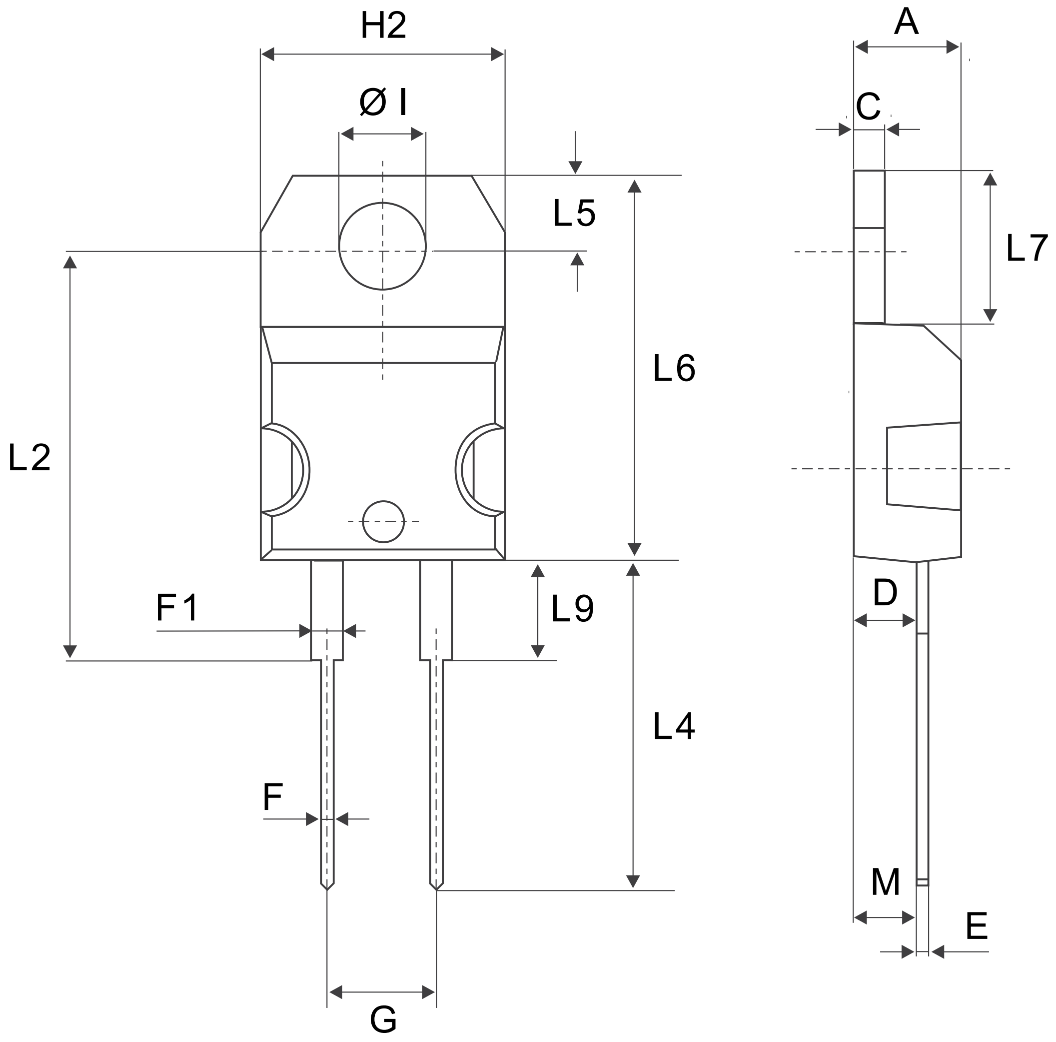


Table 7. TO-220AC package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	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 typ.			0.645 typ.	
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		2.6 typ.			0.102 typ.	
Diam. I	3.75		3.85	0.147		0.151

3 Ordering Information

Table 8. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STTH506B-TR	STTH 506B	DPAK	0.30 g	2500	Tape and reel
STTH506B	STTH 506B	DPAK	0.30 g	75	Tube
STTH506D	STTH506D	TO-220AC	1.86 g	50	Tube

4 Revision history

Table 9. Document revision history

Date	Revision	Description of Changes
14-Oct-2008	1	First issue.
08-Aug-2014	2	Updated DPAK package information and removed TO-220AB package.
26-Nov-2014	3	Updated Figure 13 and Figure 14.
03-Nov-2016	4	Updated DPAK package information and reformatted to current standard.