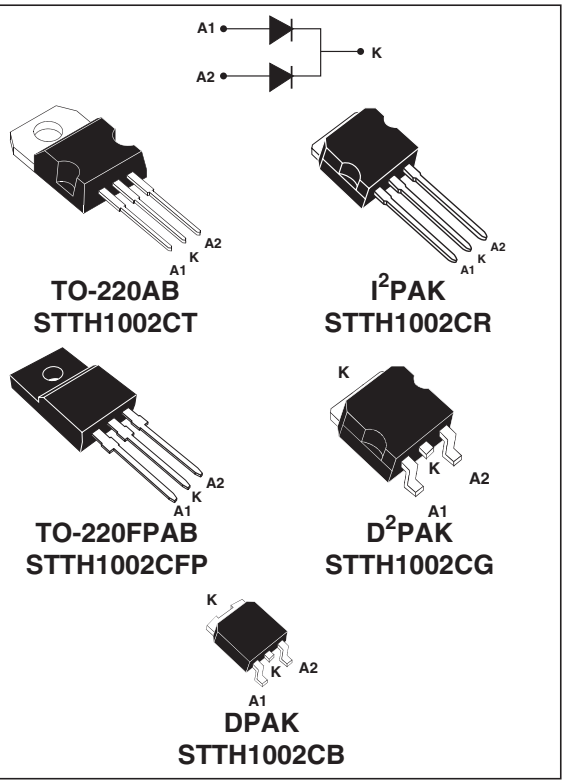
STTH1002C

HIGH EFFICIENCY ULTRAFAST DIODE

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	Up to 2 x 8A
V_{RRM}	200 V
Tj (max)	175 °C
V_F (typ)	0.78 V
t_{rr} (typ)	20 ns



FEATURES AND BENEFITS

- Suited for SMPS
- Low losses
- Low forward and reverse recovery times
- Insulated package: TO-220FPAB
- High junction temperature
- Low leakage current

DESCRIPTION

Dual center tap rectifier suited for Switch Mode Power Supplies and High frequency DC to DC converters.
Packaged in DPAK, D^2PAK, TO-220AB, TO220-FPAB and I^2PAK, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values, per diode)

Symbol	Parameter				Value	Unit
V_{RRM}	Repetitive peak reverse voltage				200	V
$I_{F(RMS)}$	RMS forward current	TO-220AB / TO-220FPAB / I^2PAK / D^2PAK /			20	A
		DPAK			10	
$I_{F(AV)}$	Average forward current δ =0.5	TO-220AB / I^2PAK / D^2PAK / DPAK	Tc = 155°C	Per diode	5	A
			Tc = 150°C	Per device	10	
			Tc = 135°C	Per diode	8	
			Tc = 125°C	Per device	16	
		TO-220FPAB	Tc = 140°C	Per diode	5	
			Tc = 120°C	Per device	10	
			Tc = 110°C	Per diode	8	
			Tc = 75°C	Per device	16	
I_{FSM}	Surge non repetitive forward current		tp = 10 ms Sinusoidal		50	A
T_{stg}	Storage temperature range				- 65 + 175	°C
Tj	Maximum operating junction temperature				175	°C

THERMAL PARAMETERS

Symbol	Parameter			Maximum	Unit
$R_{th\ (j-c)}$	Junction to case	TO-220AB / I^2PAK / D^2PAK / DPAK	Per diode	4.0	°C/W
			Per device	2.5	
		TO-220FPAB	Per diode	6.5	
			Per device	5	
$R_{th\ (j-c)}$	Coupling	TO-220AB / I^2PAK / D^2PAK / DPAK		1.0	°C/W
		TO-220FPAB		3.5	

When the diodes 1 and 2 are used simultaneously:
Δ Tj (diode1) = P(diode1) x $R_{th(j-c)}$ (per diode) + P(diode2) x $R_{th(c)}$

STATIC ELECTRICAL CHARACTERISTICS (per diode)

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
I_R*	Reverse leakage current	Tj = 25°C	$V_R = V_{RRM}$			5	µA
		Tj = 125°C			3	40	
V_F**	Forward voltage drop	Tj = 25°C	I_F = 5 A			1.1	V
		Tj = 25°C	I_F = 10 A			1.25	
		Tj = 150°C	I_F = 5 A		0.78	0.89	
		Tj = 150°C	I_F = 10 A			1.05	

Pulse test: * tp = 5ms, δ < 2%

** tp = 380µs, δ < 2%

To evaluate the maximum conduction losses use the following equation :
$P = 0.73 \times I_{F(AV)} + 0.032\ I_F{}^2{}_{(RMS)}$

DYNAMIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
t_{rr}	Reverse recovery time	Tj = 25°C	I_F = 1 A V_R = 30V dI_F/dt = 100 A/µs		20	25	ns
I_{RM}	Reverse recovery current	Tj = 125°C	I_F = 5 A V_R = 160V dI_F/dt = 200 A/µs		5.9	7.6	A
t_{fr}	Forward recovery time	Tj = 25°C	I_F = 5 A dI_F/dt = 100 A/µs V_{FR} = 1.1 x $V_F$max			110	ns
V_{FP}	Forward recovery voltage	Tj = 25°C	I_F = 5 A dI_F/dt = 100 A/µs		2.4		V

Fig. 1: Peak current versus duty cycle (per diode).

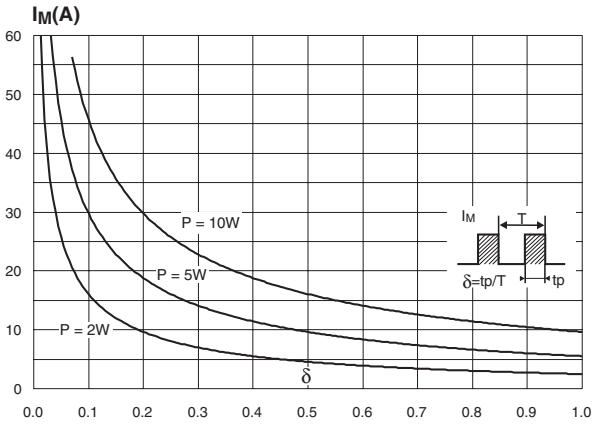


Fig. 2-1: Forward voltage drop versus forward current (typical values, per diode).

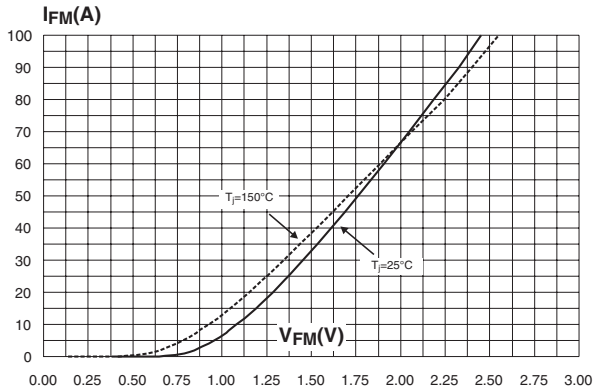


Fig. 2-2: Forward voltage drop versus forward current (maximum values, per diode).

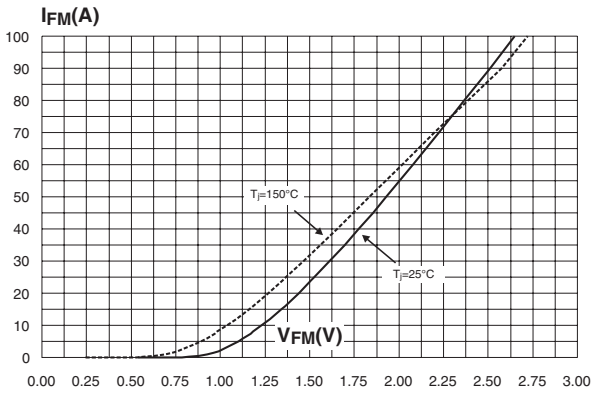


Fig. 3-1: Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB, I^2PAK, D^2PAK, DPAK).

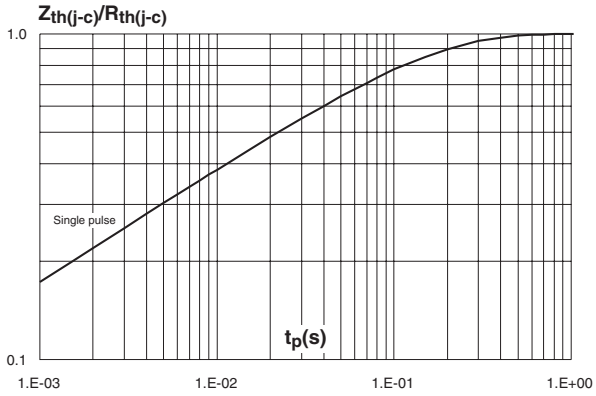


Fig. 3-2: Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAB).

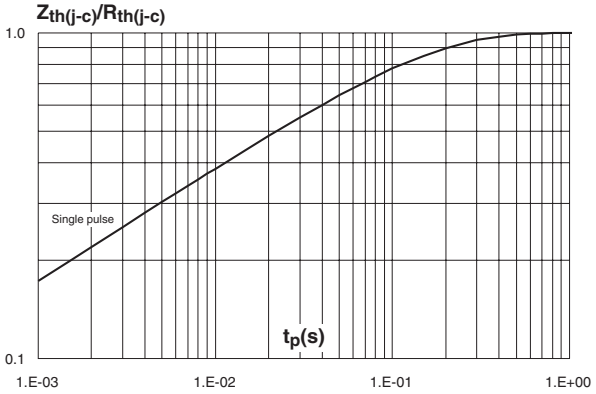


Fig. 4: Junction capacitance versus reverse voltage applied (typical values, per diode).

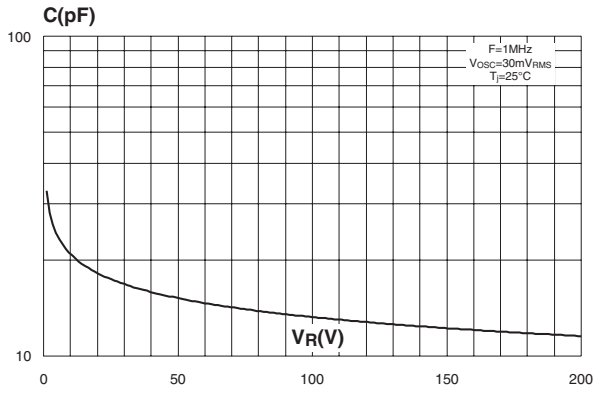


Fig. 5: Reverse recovery charges versus dI_F/dt (typical values, per diode).

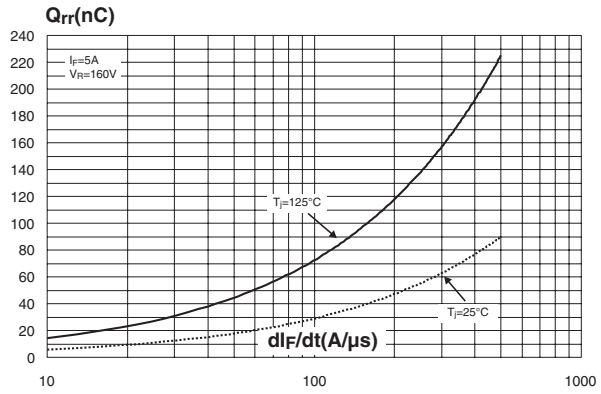


Fig. 6: Reverse recovery time versus dI_F/dt (typical values, per diode).

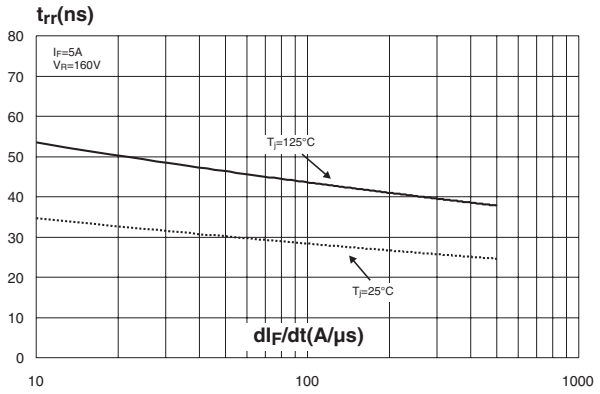


Fig. 7: Peak reverse recovery current versus dI_F/dt (typical values, per diode).

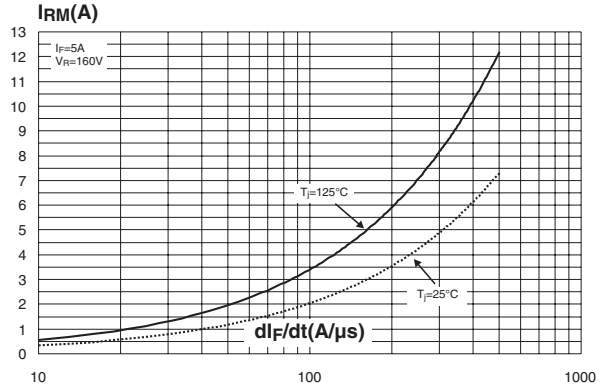


Fig. 8: Dynamic parameters versus junction temperature.

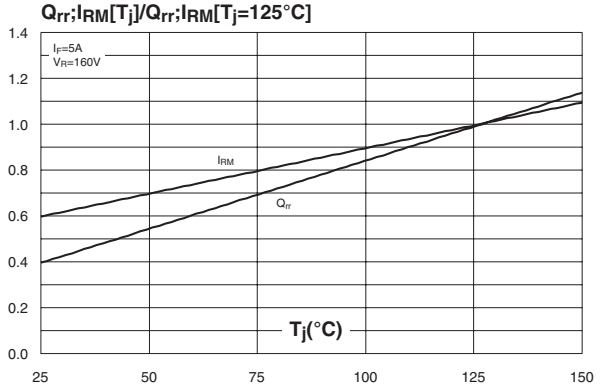


Fig. 9-1: Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, e_{CU}: 35µm) for D^2PAK.

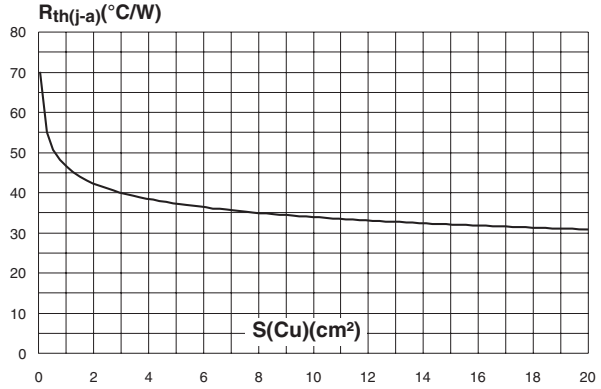
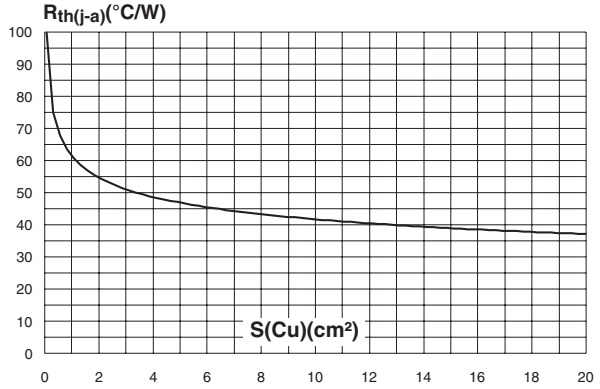


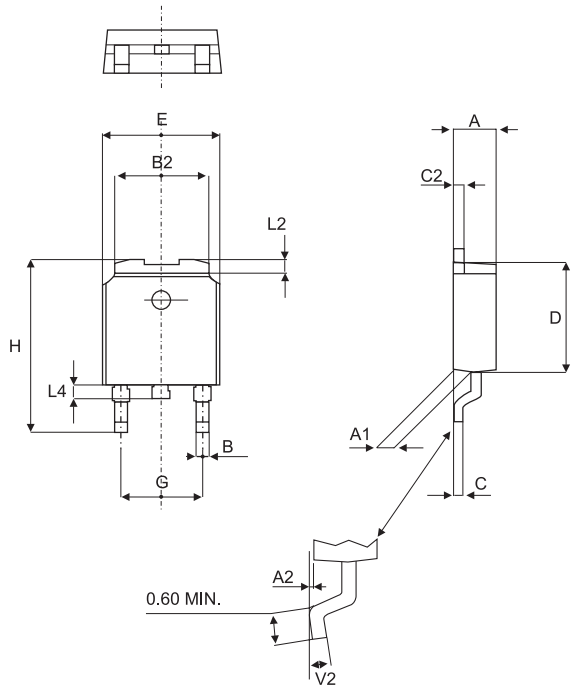
Fig. 9-2: Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, e_{CU}: 35µm) for DPAK.



Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH1002CB	STTH1002CB	DPAK	0.3 g	75	Tube
STTH1002CB-TR	STTH1002CB	DPAK	0.3 g	2500	Tape & reel
STTH1002CT	STTH1002CT	TO-220AB	2.23 g	50	Tube
STTH1002CG	STTH1002CG	D^2PAK	1.48 g	50	Tube
STTH1002CG-TR	STTH1002CG	D^2PAK	1.48g	1000	Tape & reel
STTH1002CR	STTH1002CR	I^2PAK	1.49 g	50	Tube
STTH1002CFP	STTH1002CFP	TO-220FPAB	1.70 g	50	Tube

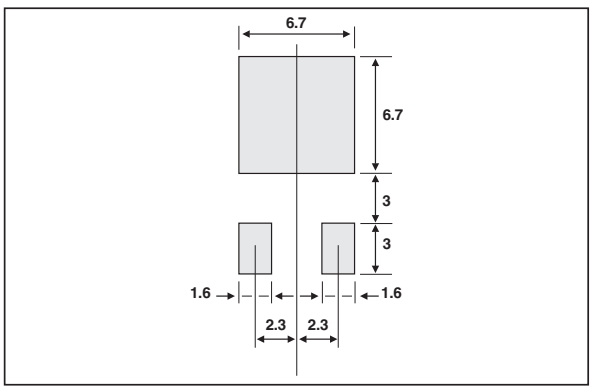
PACKAGE MECHANICAL DATA

DPAK



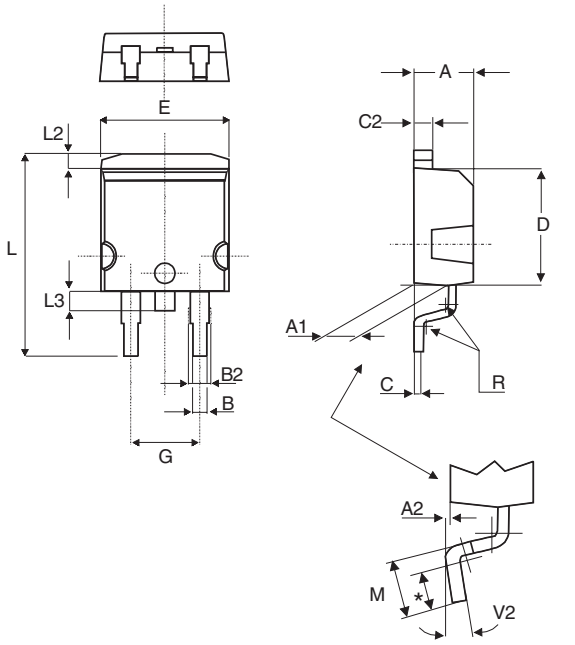
REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max	Min.	Max.
A	2.20	2.40	0.086	0.094
A1	0.90	1.10	0.035	0.043
A2	0.03	0.23	0.001	0.009
B	0.64	0.90	0.025	0.035
B2	5.20	5.40	0.204	0.212
C	0.45	0.60	0.017	0.023
C2	0.48	0.60	0.018	0.023
D	6.00	6.20	0.236	0.244
E	6.40	6.60	0.251	0.259
G	4.40	4.60	0.173	0.181
H	9.35	10.10	0.368	0.397
L2	0.80 typ.		0.031 typ.	
L4	0.60	1.00	0.023	0.039
V2	0°	8°	0°	8°

FOOTPRINT



PACKAGE MECHANICAL DATA

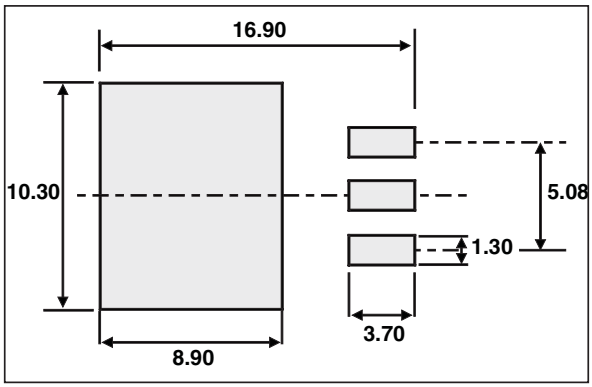
D^2PAK



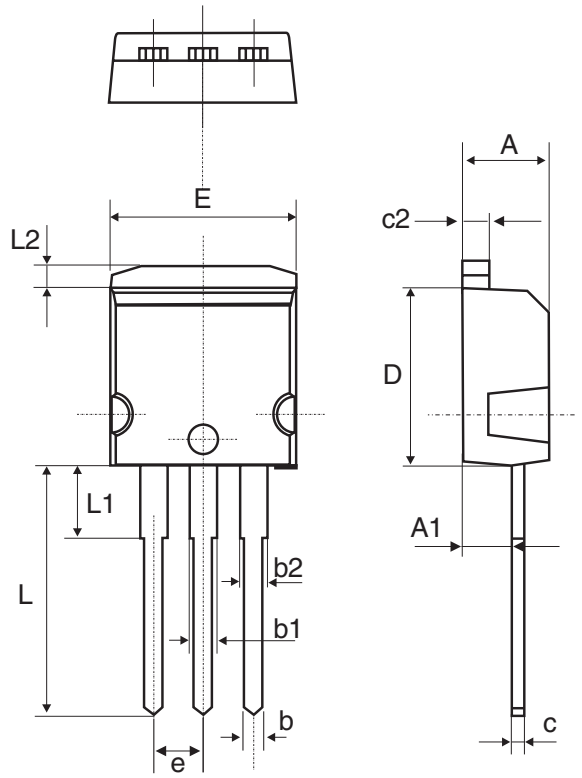
* FLAT ZONE NO LESS THAN 2mm

REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.49	2.69	0.098	0.106
A2	0.03	0.23	0.001	0.009
B	0.70	0.93	0.027	0.037
B2	1.14	1.70	0.045	0.067
C	0.45	0.60	0.017	0.024
C2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
E	10.00	10.40	0.393	0.409
G	4.88	5.28	0.192	0.208
L	15.00	15.85	0.590	0.624
L2	1.27	1.40	0.050	0.055
L3	1.40	1.75	0.055	0.069
M	2.40	3.20	0.094	0.126
R	0.40 typ.		0.016 typ.	
V2	0°	8°	0°	8°

FOOTPRINT DIMENSIONS (in millimeters)

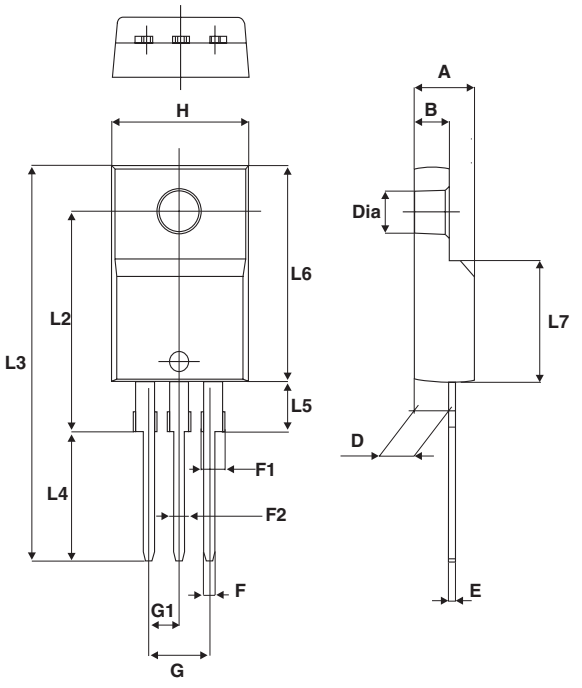


PACKAGE MECHANICAL DATA
I^2PAK



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.49	2.69	0.098	0.106
b	0.70	0.93	0.028	0.037
b1	1.14	1.17	0.044	0.046
b2	1.14	1.17	0.044	0.046
c	0.45	0.60	0.018	0.024
c2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
e	2.40	2.70	0.094	0.106
E	10.0	10.4	0.394	0.409
L	13.1	13.6	0.516	0.535
L1	3.48	3.78	0.137	0.149
L2	1.27	1.40	0.050	0.055

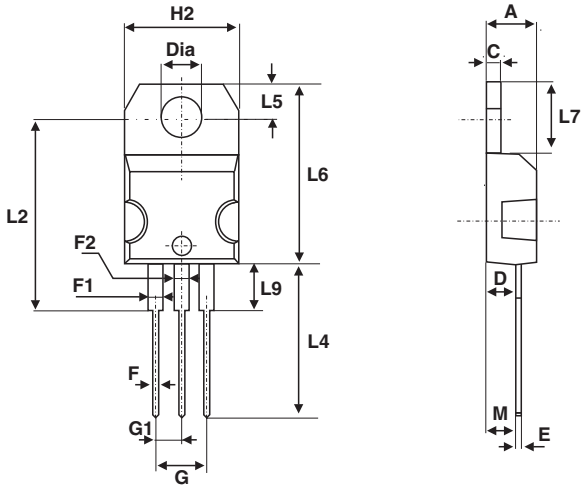
PACKAGE MECHANICAL DATA
TO-220FPAB



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	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	0.027
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	5.20	0.195	0.205
G1	2.4	2.7	0.094	0.106
H	10	10.4	0.393	0.409
L2	16 Typ.		0.63 Typ.	
L3	28.6	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	9.00	9.30	0.354	0.366
Dia.	3.00	3.20	0.118	0.126

PACKAGE MECHANICAL DATA

TO-220AB



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	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
F2	1.14	1.70	0.044	0.066
G	4.95	5.15	0.194	0.202
G1	2.40	2.70	0.094	0.106
H2	10	10.40	0.393	0.409
L2	16.4 typ.		0.645 typ.	
L4	13	14	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.	3.75	3.85	0.147	0.151

- Epoxy meets UL94,V0
- Cooling method: by conduction (method C)
- Recommended torque value (TO-220AB): 0.8 N.m.
- Maximum torque value (TO-220AB): 1.0 N.m.
- Recommended torque value (TO-220FPAB): 0.55 N.m.
- Maximum torque value (TO-220FPAB): 0.7 N.m.