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HIGH EFFICIENCY ULTRAFAST DIODE

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	Up to 2 x 10A
V_{RRM}	200 V
T_j (max)	175 °C
V_F (typ)	0.78 V
t_{rr} (typ)	21 ns

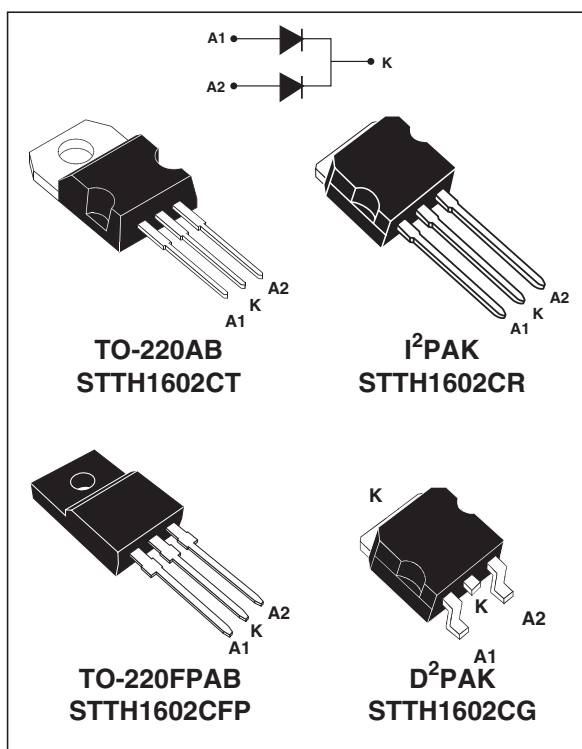
FEATURES AND BENEFITS

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

DESCRIPTION

Dual center tap rectifier suited for Switch Mode Power Supplies and High frequency DC to DC converters.

Packaged in TO-220AB, D²PAK, TO-220FPAB and I²PAK, 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		30	A	
$I_{F(AV)}$	Average forward current $\delta = 0.5$	TO-220AB / I ² PAK / D ² PAK	T _c = 150°C Per diode	8	A
			T _c = 140°C Per device	16	
			T _c = 140°C Per diode	10	
			T _c = 130°C Per device	20	
		TO-220FPAB	T _c = 130°C Per diode	8	
			T _c = 100°C Per device	16	
			T _c = 110°C Per diode	10	
			T _c = 75°C Per device	20	
I_{FSM}	Surge non repetitive forward current	tp = 10 ms Sinusoidal	80	A	
T_{stg}	Storage temperature range		- 65 + 175	°C	
T_j	Maximum operating junction temperature		175	°C	

STTH1602C

THERMAL PARAMETERS

Symbol	Parameter		Maximum	Unit	
$R_{th(j-c)}$	Junction to case	TO-220AB / I ² PAK / D ² PAK	Per diode	3.0	°C/W
			Per device	1.9	
		TO-220FPAB	Per diode	5.5	
			Per device	4.5	
$R_{th(j-c)}$	Coupling	TO-220AB / I ² PAK / D ² PAK	0.8	°C/W	
		TO-220FPAB	3.5		

When the diodes 1 and 2 are used simultaneously:

$$\Delta T_j (\text{diode1}) = P(\text{diode1}) \times R_{th(j-c)} (\text{per diode}) + P(\text{diode2}) \times R_{th(c)}$$

STATIC ELECTRICAL CHARACTERISTICS (per diode)

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
I_R^*	Reverse leakage current	T _j = 25°C	$V_R = V_{RRM}$			6	μA
		T _j = 125°C			4	60	
V_F^{**}	Forward voltage drop	T _j = 25°C	I _F = 8 A			1.1	V
		T _j = 25°C	I _F = 16 A			1.25	
		T _j = 150°C	I _F = 8 A		0.78	0.89	
		T _j = 150°C	I _F = 16 A			1.05	

Pulse test: * tp = 5ms, δ < 2%

** tp = 380μs, δ < 2%

To evaluate the maximum conduction losses use the following equation :

$$P = 0.73 \times I_{F(AV)} + 0.020 I_{F(RMS)}^2$$

DYNAMIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
t _{rr}	Reverse recovery time	T _j = 25°C	I _F = 1 A V _R = 30V dI _F /dt = 100 A/μs		21	26	ns
I _{RM}	Reverse recovery current	T _j = 125°C	I _F = 8 A V _R = 160V dI _F /dt = 200 A/μs		6.8	8.8	A
t _{fr}	Forward recovery time	T _j = 25°C	I _F = 8 A dI _F /dt = 100 A/μs V _{FR} = 1.1 × V _{Fmax}			160	ns
V _{FP}	Forward recovery voltage	T _j = 25°C	I _F = 8 A dI _F /dt = 100 A/μs		2.4		V

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

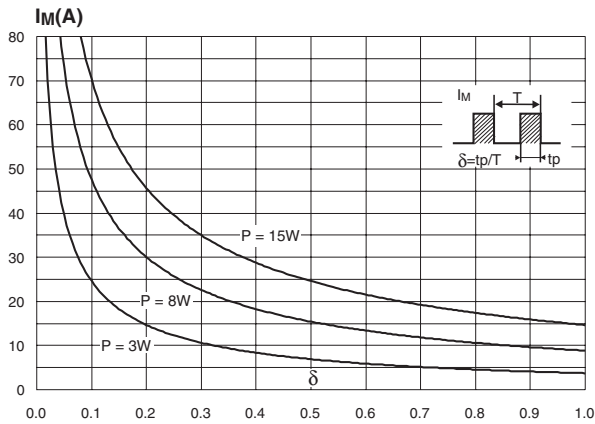


Fig. 2-1: Forward voltage drop versus forward current (typical values, per diode).

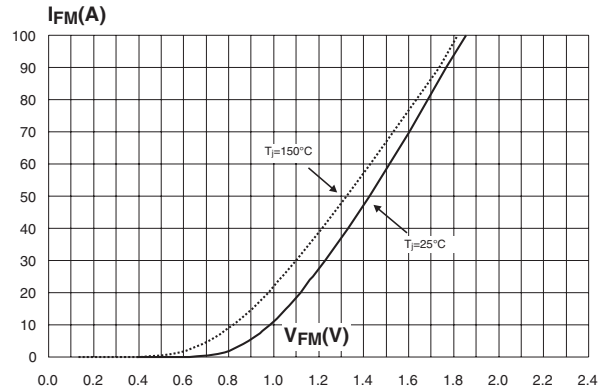


Fig. 2-2: Forward voltage drop versus forward current (maximum values, per diode).

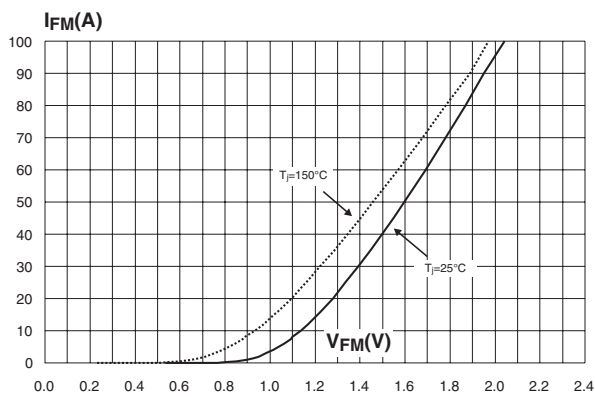


Fig. 3-1: Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB, D²PAK, I²PAK).

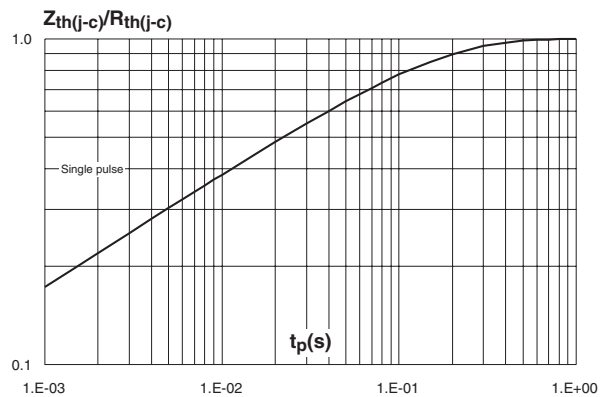


Fig. 3-2: Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAB).

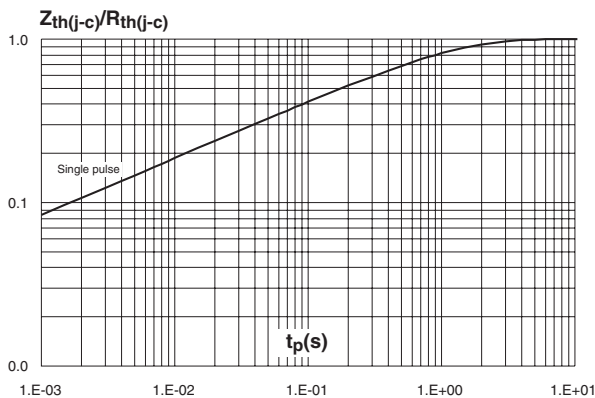


Fig. 4: Junction capacitance versus reverse voltage applied (typical values, per diode).

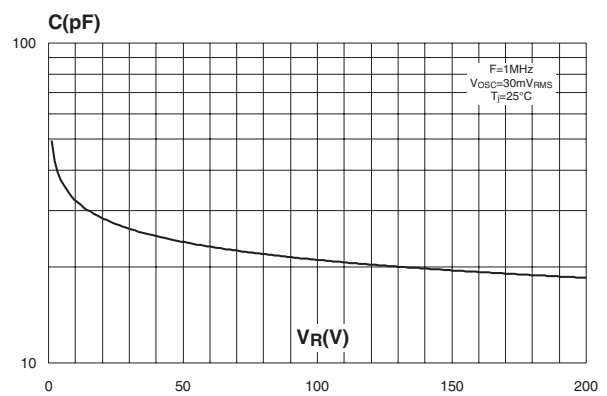


Fig. 5: Reverse recovery charges versus di_F/dt (typical values, per diode).

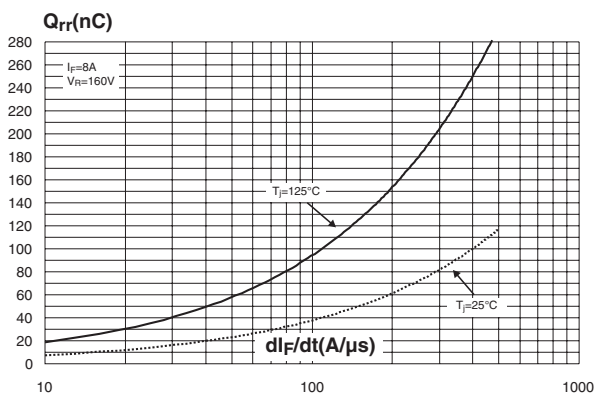


Fig. 6: Reverse recovery time versus di_F/dt (typical values, per diode).

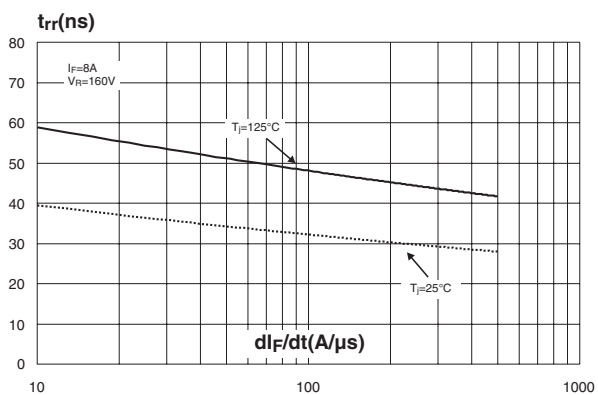


Fig. 7: Peak reverse recovery current versus di_F/dt (typical values, per diode).

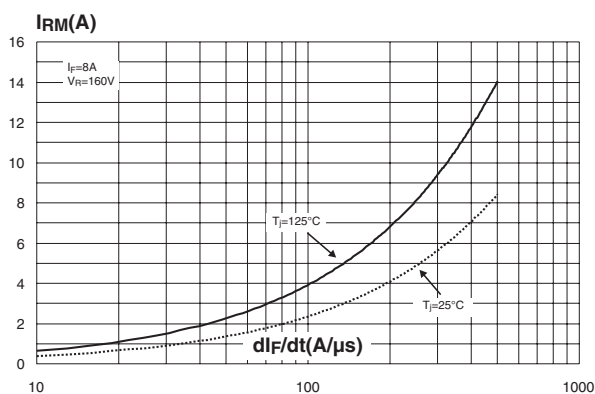


Fig. 8: Dynamic parameters versus junction temperature.

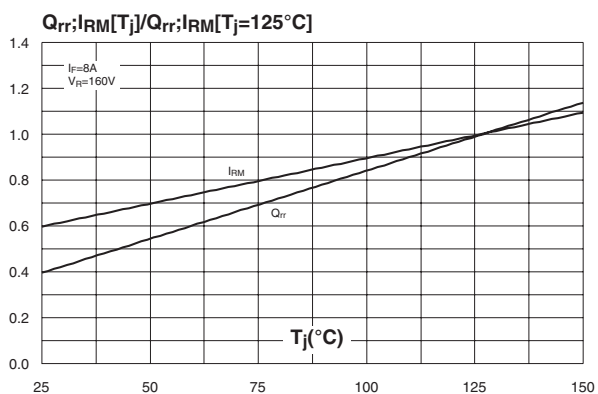
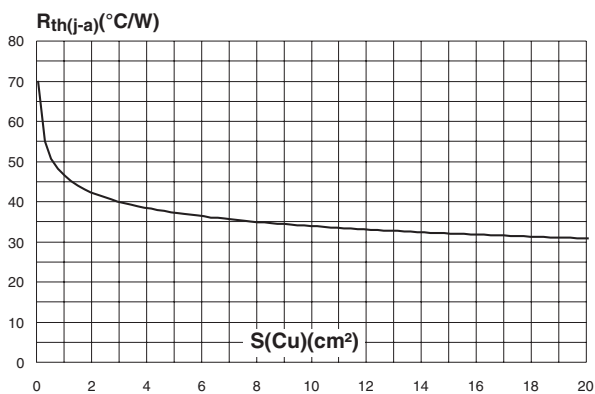


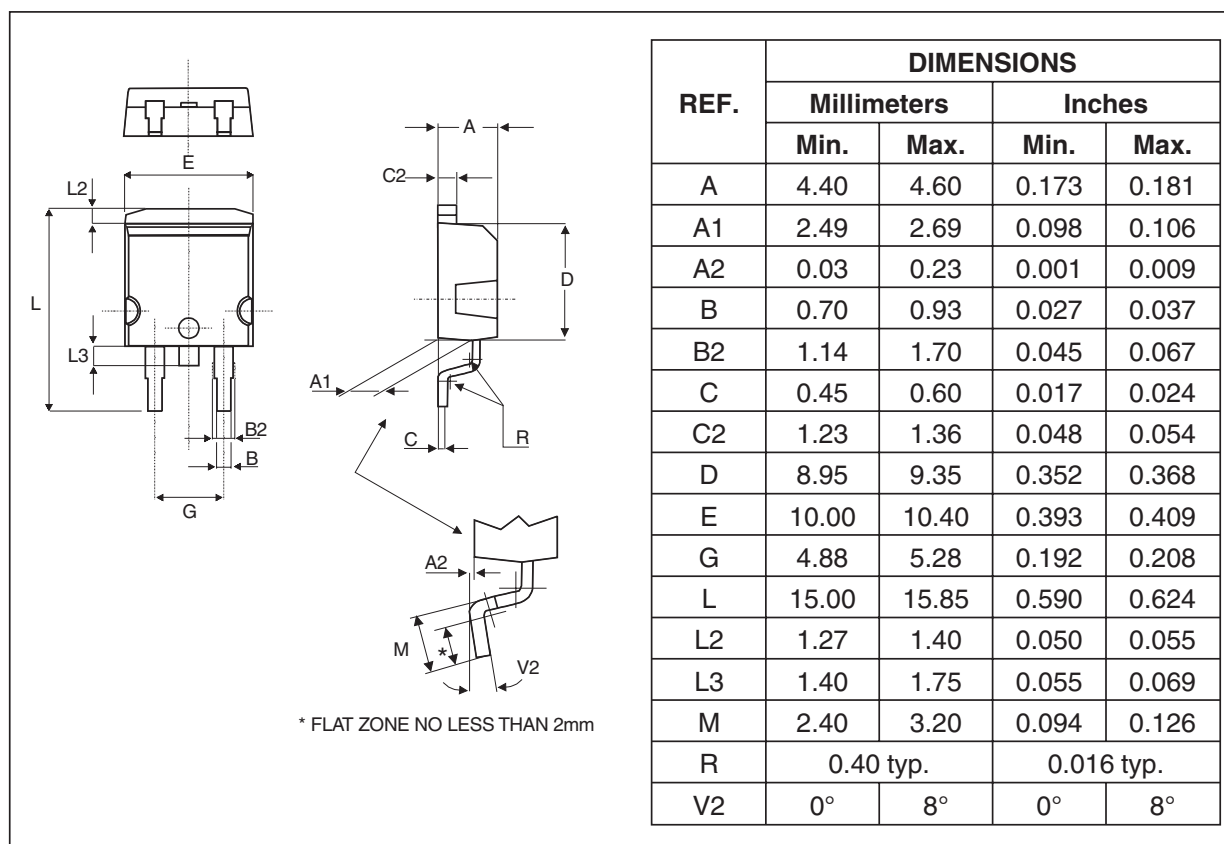
Fig. 9: Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, ϵ_{cu} : 35 μ m) for D²PAK.



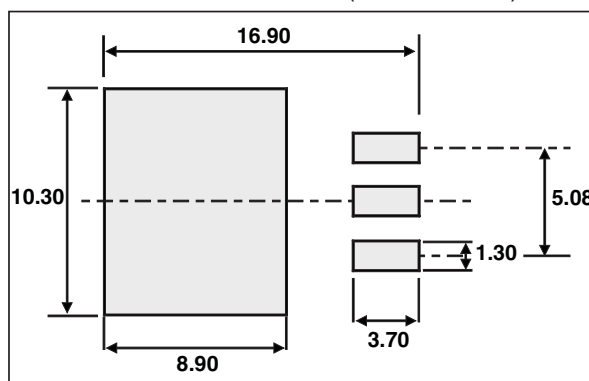
Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH1602CT	STTH1602CT	TO-220AB	2.23 g	50	Tube
STTH1602CG	STTH1602CG	D ² PAK	1.48 g	50	Tube
STTH1602CG-TR	STTH1602CG	D ² PAK	1.48 g	1000	Tape & reel
STTH1602CR	STTH1602CR	I ² PAK	1.49 g	50	Tube
STTH1602CFP	STTH1602CFP	TO-220FPAB	1.70g	50	Tube

PACKAGE MECHANICAL DATA

D²PAK

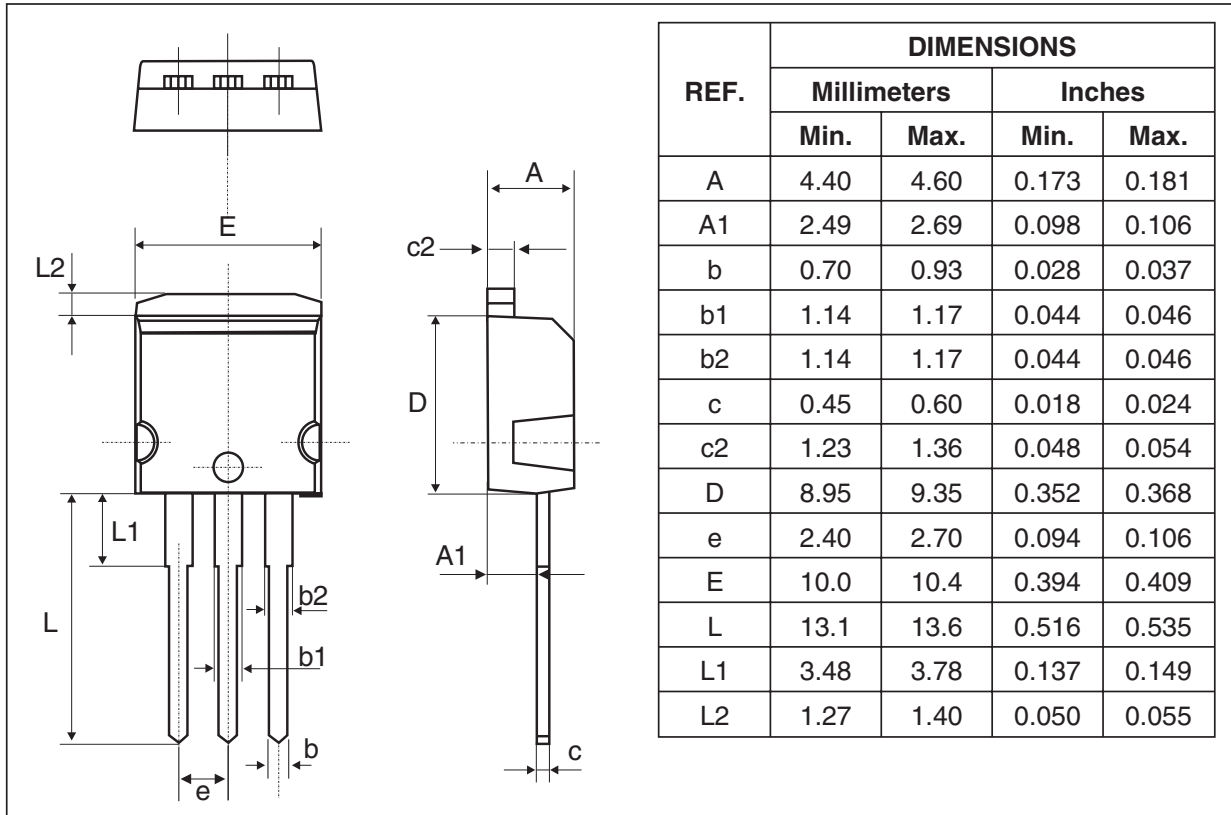


FOOTPRINT DIMENSIONS (in millimeters)

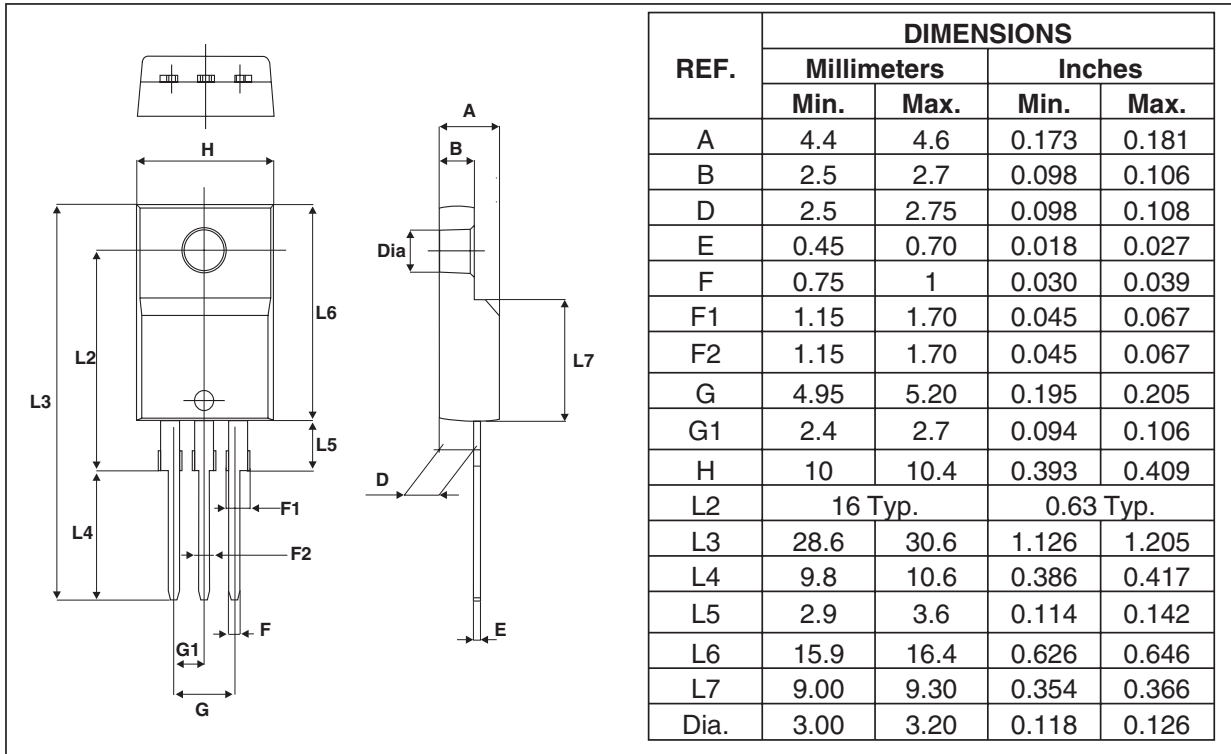


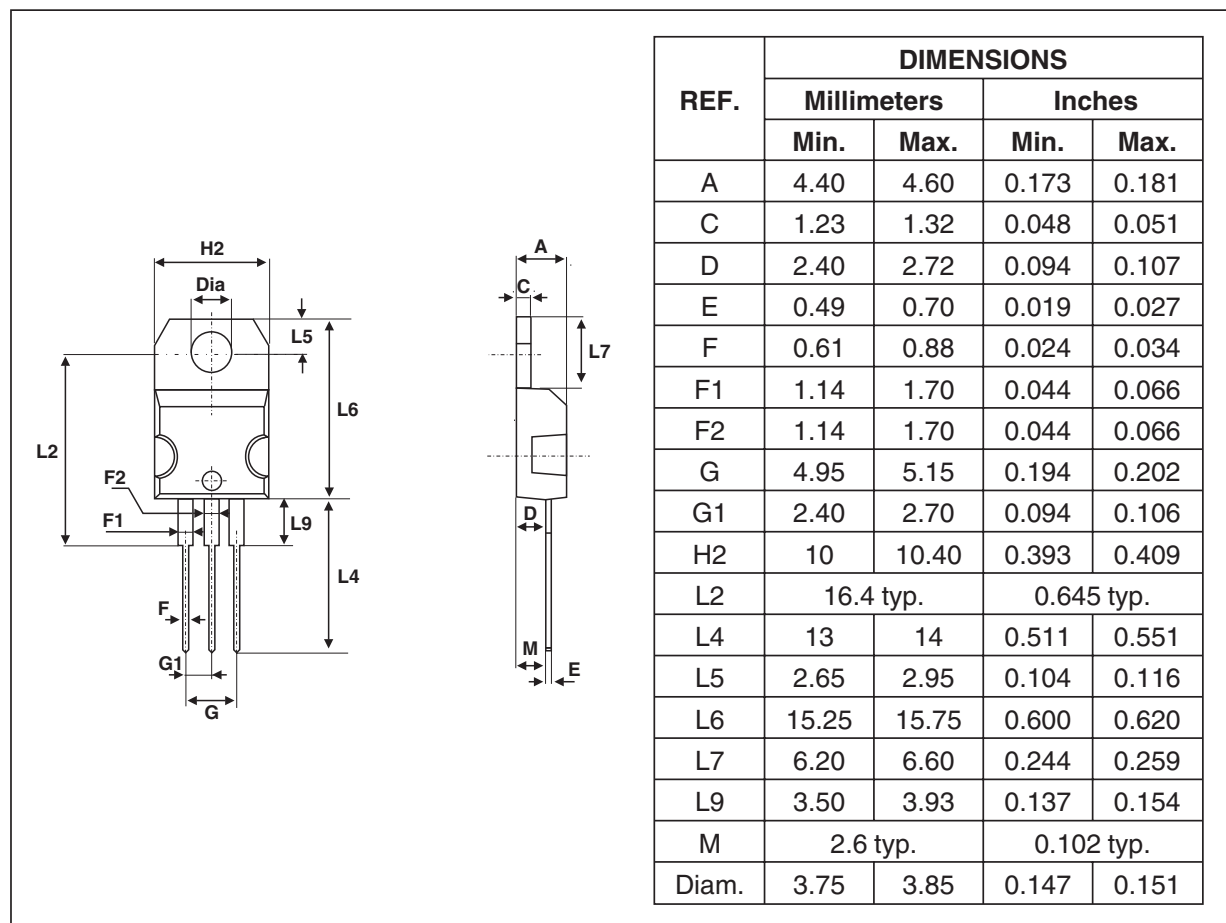
STTH1602C

PACKAGE MECHANICAL DATA
I²PAK



PACKAGE MECHANICAL DATA
TO-220FPAB



PACKAGE MECHANICAL DATA
TO-220AB


- 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.

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