



# STTH1602C

## 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

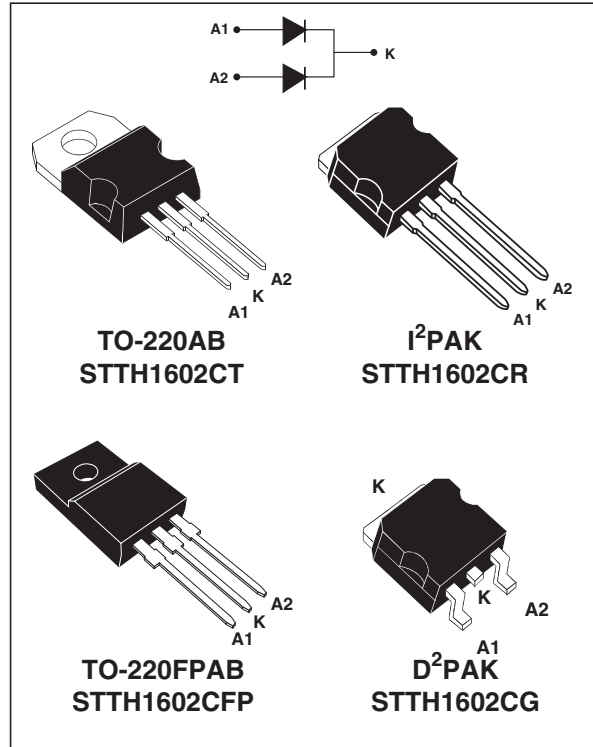
### FEATURES AND BENEFITS

- 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, D<sup>2</sup>PAK, TO-220FPAB and I<sup>2</sup>PAK, 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 <sup>2</sup> PAK / D <sup>2</sup> PAK	T <sub>c</sub> = 150°C Per diode	8	A
			T <sub>c</sub> = 140°C Per device	16	
			T <sub>c</sub> = 140°C Per diode	10	
			T <sub>c</sub> = 130°C Per device	20	
		TO-220FPAB	T <sub>c</sub> = 130°C Per diode	8	
			T <sub>c</sub> = 100°C Per device	16	
			T <sub>c</sub> = 110°C Per diode	10	
			T <sub>c</sub> = 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 <sub>th(j-c)</sub>	Junction to case	TO-220AB / I <sup>2</sup> PAK / D <sup>2</sup> PAK	Per diode	3.0	°C/W
			Per device	1.9	
		TO-220FPAB	Per diode	5.5	
			Per device	4.5	
R <sub>th(j-c)</sub>	Coupling	TO-220AB / I <sup>2</sup> PAK / D <sup>2</sup> 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 <sub>R</sub> *	Reverse leakage current	T <sub>j</sub> = 25°C	V <sub>R</sub> = V <sub>RRM</sub>			6	μA
		T <sub>j</sub> = 125°C			4	60	
V <sub>F</sub> **	Forward voltage drop	T <sub>j</sub> = 25°C	I <sub>F</sub> = 8 A			1.1	V
		T <sub>j</sub> = 25°C	I <sub>F</sub> = 16 A			1.25	
		T <sub>j</sub> = 150°C	I <sub>F</sub> = 8 A		0.78	0.89	
		T <sub>j</sub> = 150°C	I <sub>F</sub> = 16 A			1.05	

Pulse test: \* t<sub>p</sub> = 5ms, δ < 2%

\*\* t<sub>p</sub> = 380μs, δ < 2%

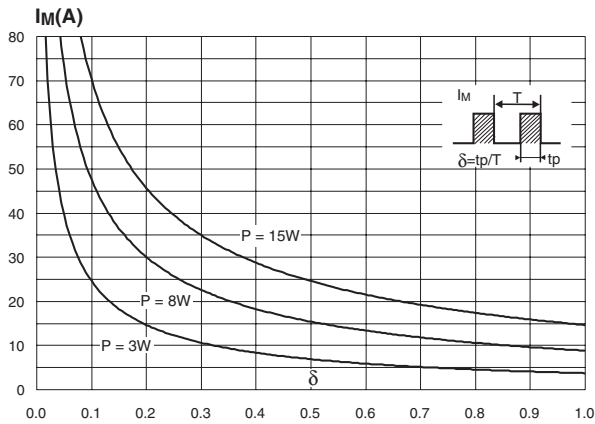
To evaluate the maximum conduction losses use the following equation :

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

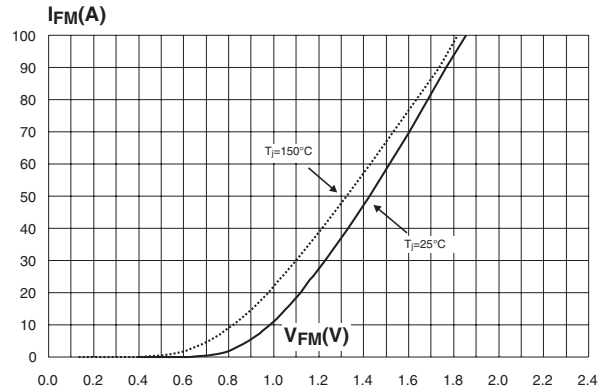
### DYNAMIC ELECTRICAL CHARACTERISTICS

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

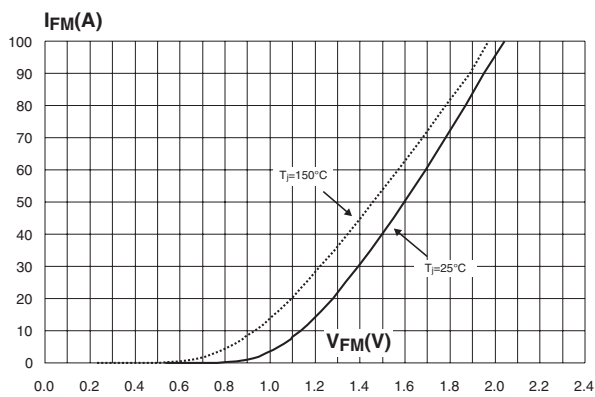
**Fig. 1:** Peak current versus duty cycle (per diode).



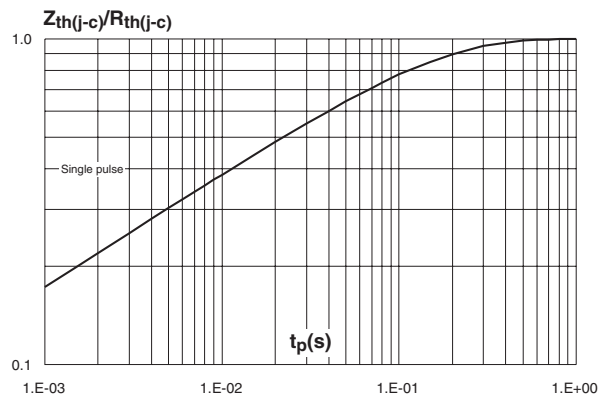
**Fig. 2-1:** Forward voltage drop versus forward current (typical values, per diode).



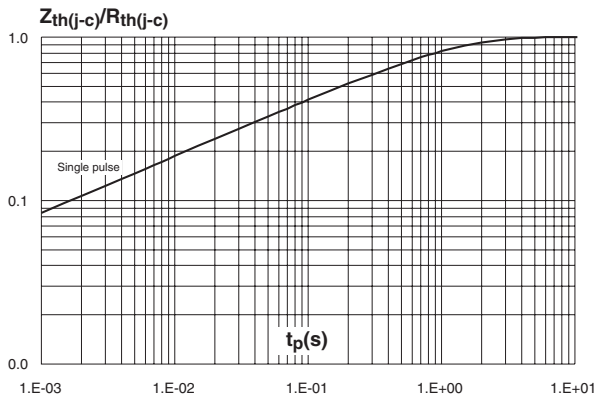
**Fig. 2-2:** Forward voltage drop versus forward current (maximum values, per diode).



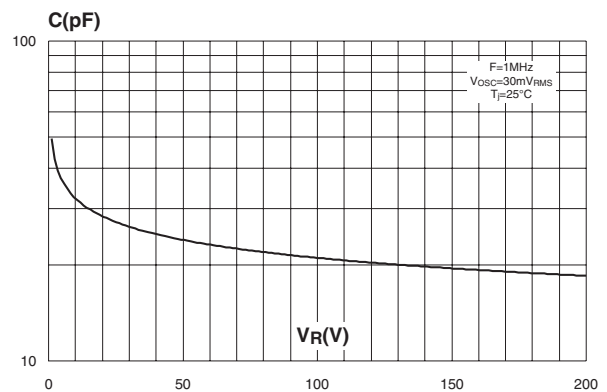
**Fig. 3-1:** Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB, D<sup>2</sup>PAK, I<sup>2</sup>PAK).



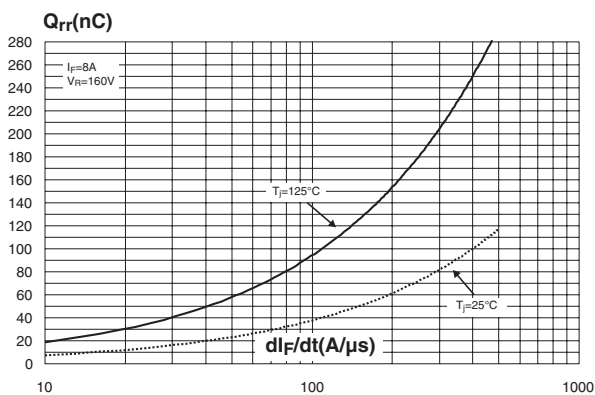
**Fig. 3-2:** Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAB).



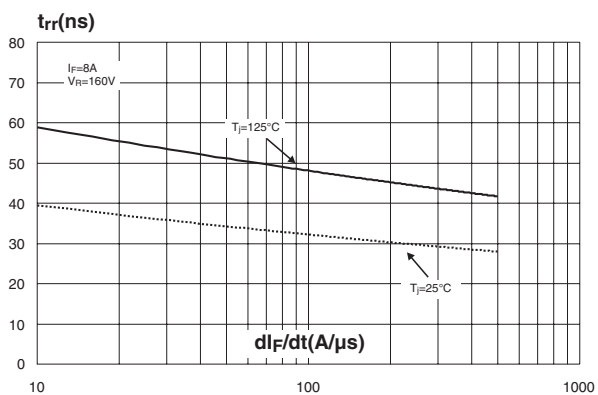
**Fig. 4:** Junction capacitance versus reverse voltage applied (typical values, per diode).



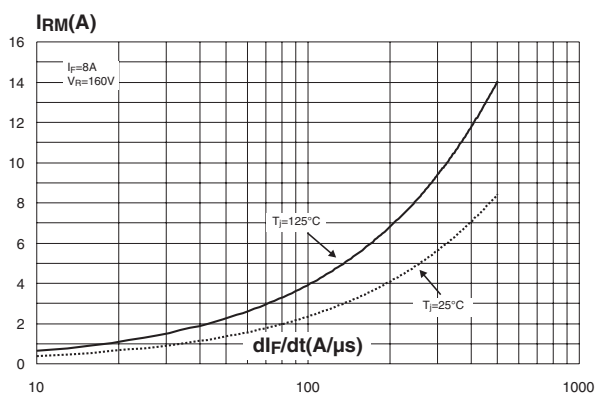
**Fig. 5:** Reverse recovery charges versus  $di_F/dt$  (typical values, per diode).



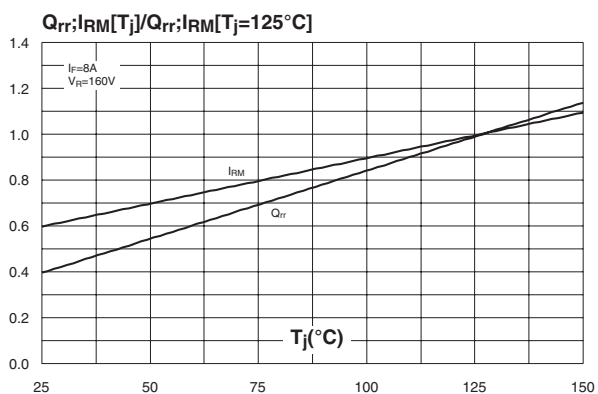
**Fig. 6:** Reverse recovery time versus  $di_F/dt$  (typical values, per diode).



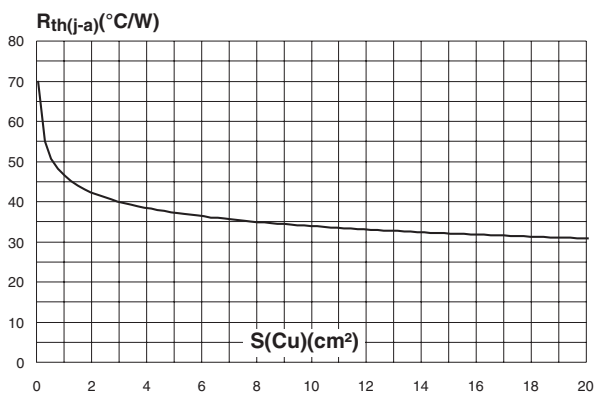
**Fig. 7:** Peak reverse recovery current versus  $di_F/dt$  (typical values, per diode).



**Fig. 8:** Dynamic parameters versus junction temperature.

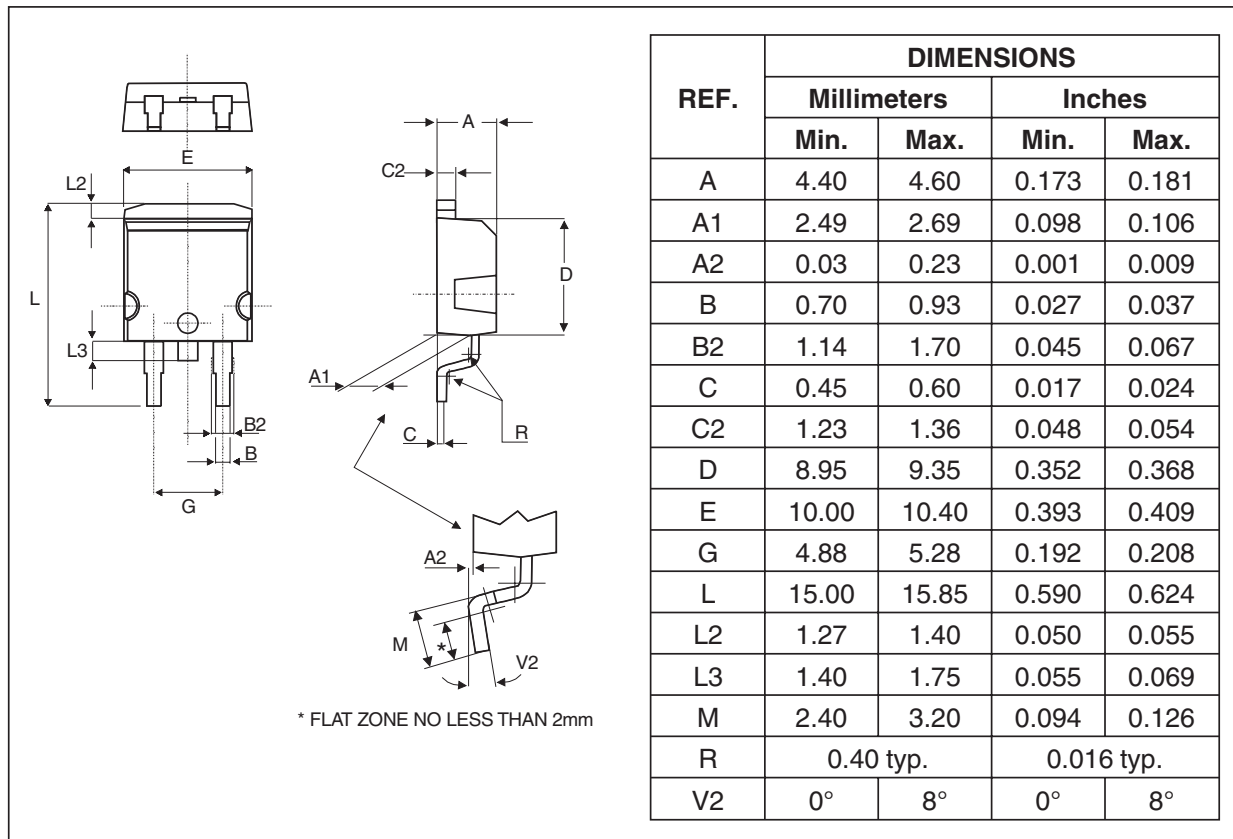


**Fig. 9:** Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4,  $\epsilon_{cu}$ : 35 $\mu$ m) for D<sup>2</sup>PAK.

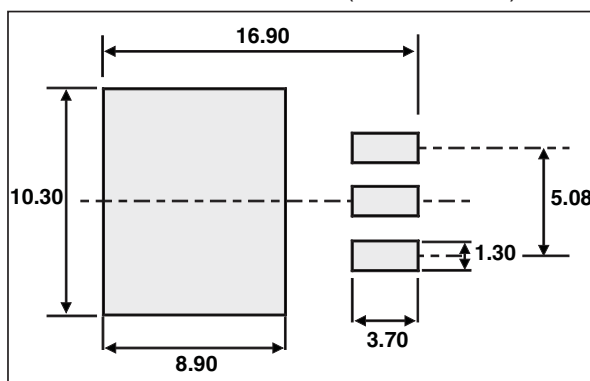


Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH1602CT	STTH1602CT	TO-220AB	2.23 g	50	Tube
STTH1602CG	STTH1602CG	D <sup>2</sup> PAK	1.48 g	50	Tube
STTH1602CG-TR	STTH1602CG	D <sup>2</sup> PAK	1.48 g	1000	Tape & reel
STTH1602CR	STTH1602CR	I <sup>2</sup> PAK	1.49 g	50	Tube
STTH1602CFP	STTH1602CFP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

**PACKAGE MECHANICAL DATA**  
D<sup>2</sup>PAK

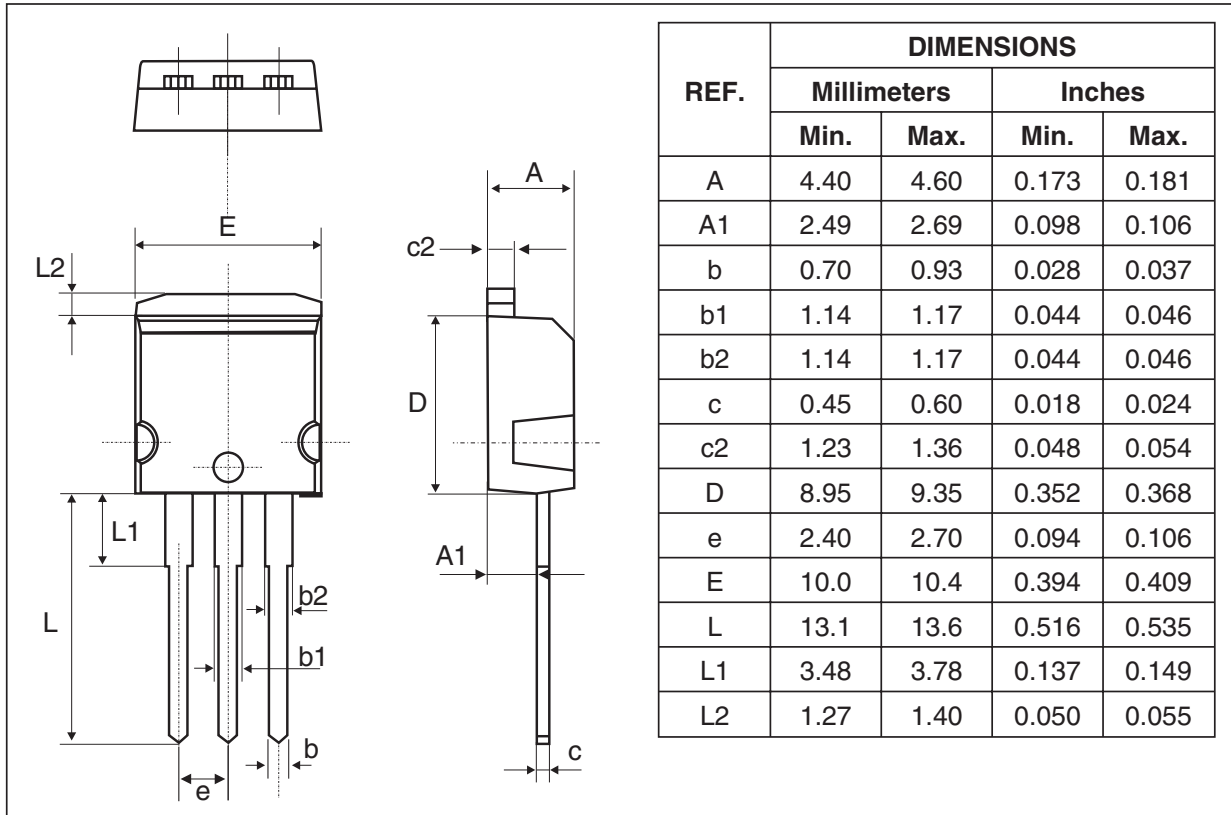


**FOOTPRINT DIMENSIONS** (in millimeters)

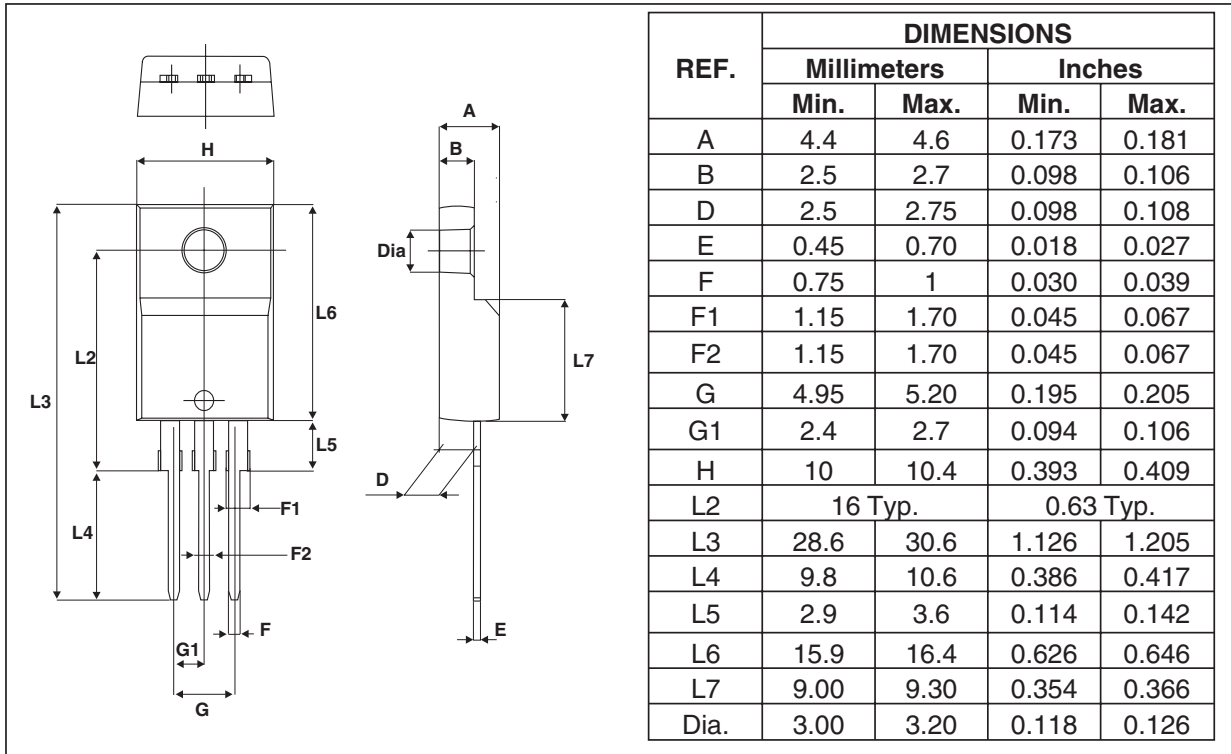


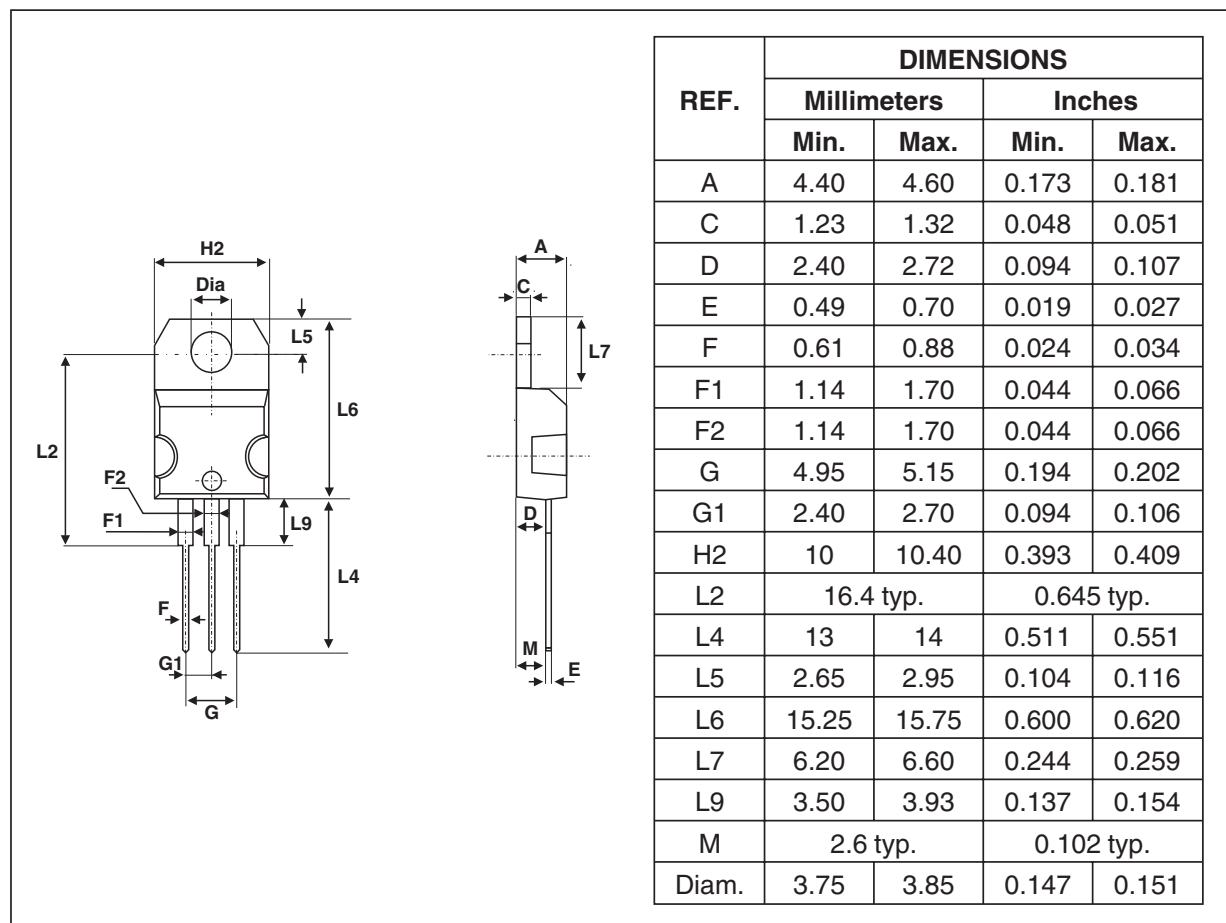
**STTH1602C**

**PACKAGE MECHANICAL DATA**  
I<sup>2</sup>PAK



**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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