

## HIGH EFFICIENCY ULTRAFAST DIODE

### MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	<b>2 x 15A</b>
$V_{RRM}$	<b>200 V</b>
$T_j$ (max)	<b>175 °C</b>
$V_F$ (typ)	<b>0.75 V</b>
$t_{rr}$ (typ)	<b>17 ns</b>

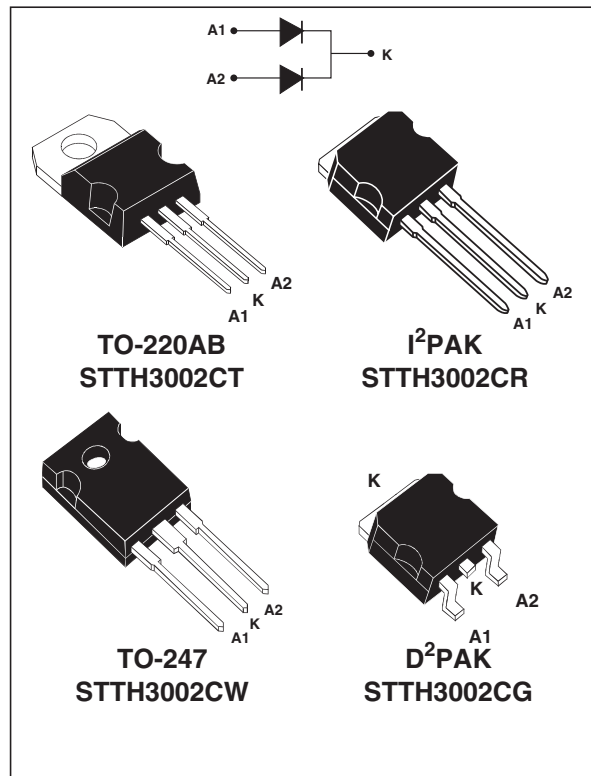
### FEATURES AND BENEFITS

- Suited for SMPS
- Low losses
- Low forward and reverse recovery times
- High surge current capability
- 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 TO-220AB, D<sup>2</sup>PAK, TO-247 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)

Symbol	Parameter		Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage		200	V
$I_{F(RMS)}$	RMS forward current		50	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	$T_c = 155^\circ\text{C}$ Per diode	15	A
		$T_c = 145^\circ\text{C}$ Per device	30	
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10$ ms Sinusoidal	180	A
$T_{stg}$	Storage temperature range		- 65 + 175	°C
$T_j$	Maximum operating junction temperature		175	°C

## STTH3002C

### THERMAL PARAMETERS

Symbol	Parameter	Maximum	Unit	
R <sub>th(j-c)</sub>	Junction to case	Per diode	1.5	°C/W
		Per device	1.0	
R <sub>th(j-c)</sub>	Coupling	0.5	°C/W	

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

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>			20	μA
		T <sub>j</sub> = 125°C			10	125	
V <sub>F</sub> **	Forward voltage drop	T <sub>j</sub> = 25°C	I <sub>F</sub> = 15 A			1.05	V
		T <sub>j</sub> = 25°C	I <sub>F</sub> = 30 A			1.18	
		T <sub>j</sub> = 150°C	I <sub>F</sub> = 15 A		0.75	0.84	
		T <sub>j</sub> = 150°C	I <sub>F</sub> = 30 A			0.99	

Pulse test: \* tp = 5ms, δ < 2%

\*\* tp = 380μs, δ < 2%

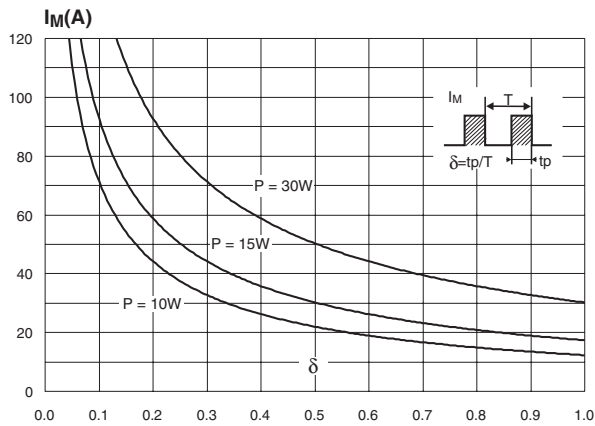
To evaluate the maximum conduction losses use the following equation :

$$P = 0.69 \times I_{F(AV)} + 0.01 I_{F(RMS)}^2$$

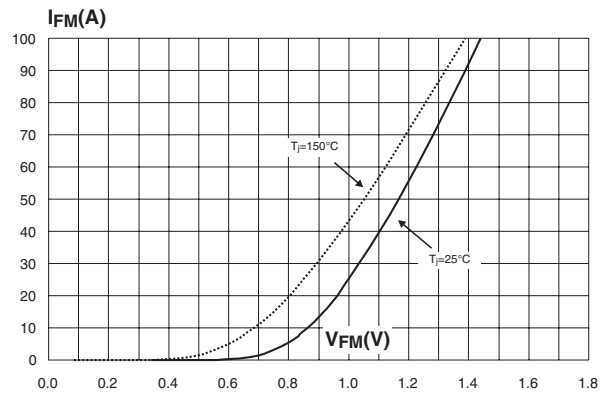
### DYNAMIC ELECTRICAL CHARACTERISTICS

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 = 200 A/μs		17	22	ns
I <sub>RM</sub>	Reverse recovery current	T <sub>j</sub> = 125°C	I <sub>F</sub> = 15 A V <sub>R</sub> = 160V dI <sub>F</sub> /dt = 200 A/μs		6.0	7.8	A
t <sub>fr</sub>	Forward recovery time	T <sub>j</sub> = 25°C	I <sub>F</sub> = 15 A dI <sub>F</sub> /dt = 200 A/μs V <sub>FR</sub> = 1.1 x V <sub>Fmax</sub>			110	ns
V <sub>FP</sub>	Forward recovery voltage	T <sub>j</sub> = 25°C	I <sub>F</sub> = 15 A dI <sub>F</sub> /dt = 200 A/μs		2.5		V

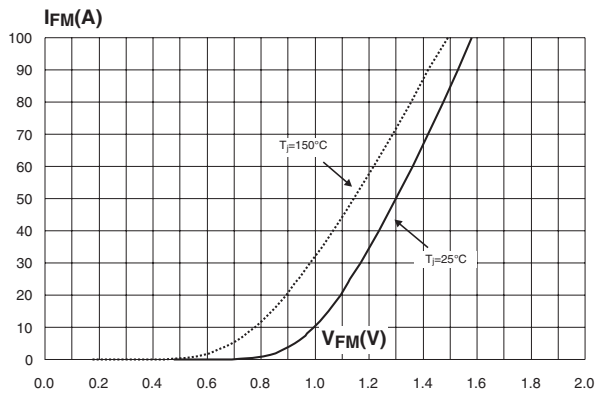
**Fig. 1:** Peak current versus duty cycle (per diode).



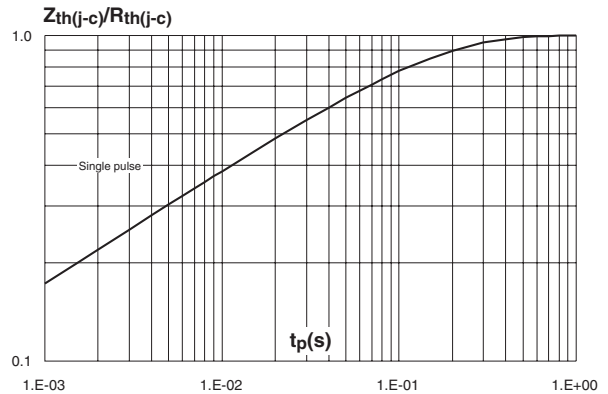
**Fig. 2-1:** Forward voltage drop versus forward current (typical values, per diode).



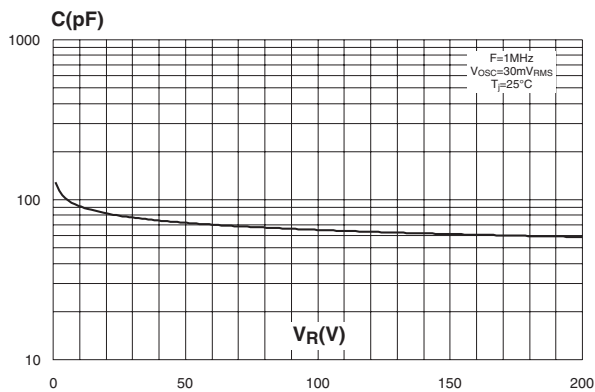
**Fig. 2-2:** Forward voltage drop versus forward current (maximum values, per diode).



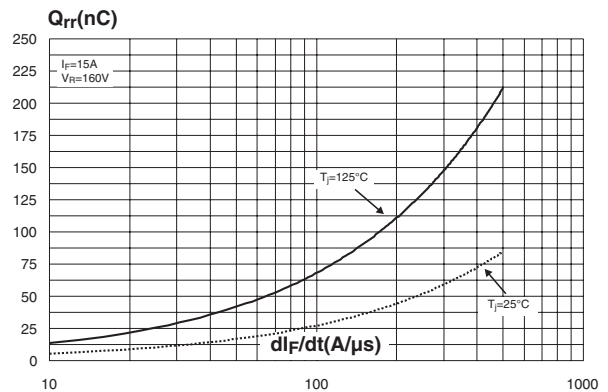
**Fig. 3:** Relative variation of thermal impedance junction to case versus pulse duration.



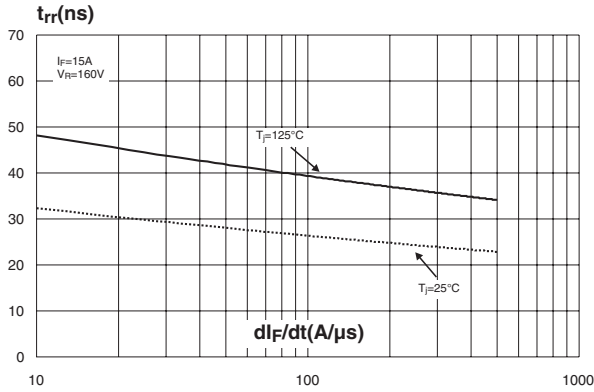
**Fig. 4:** Junction capacitance versus reverse voltage applied (typical values, per diode).



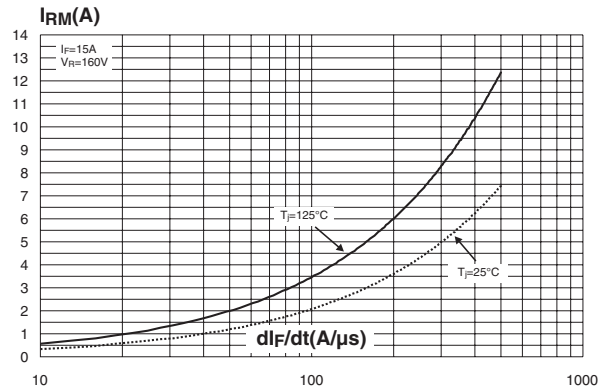
**Fig. 5:** Reverse recovery charges versus  $di_F/dt$  (typical values, per diode).



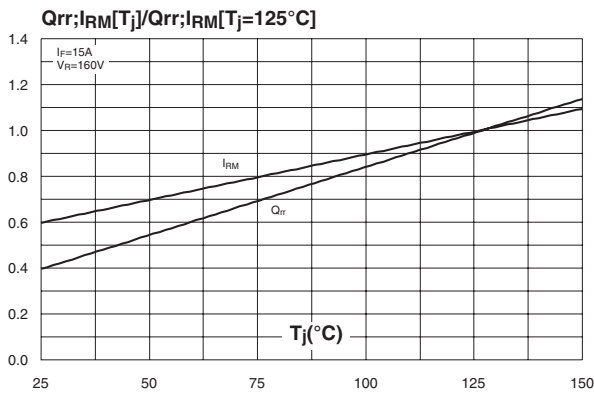
**Fig. 6:** Reverse recovery time versus  $di_F/dt$  (typical values, per diode).



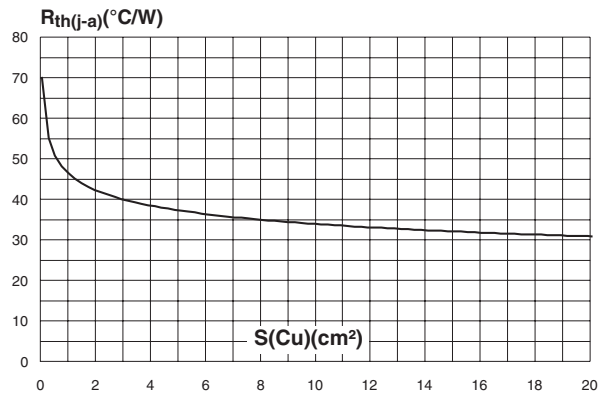
**Fig. 7:** Peak reverse recovery current versus  $di_F/dt$  (typical values, per diode).



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

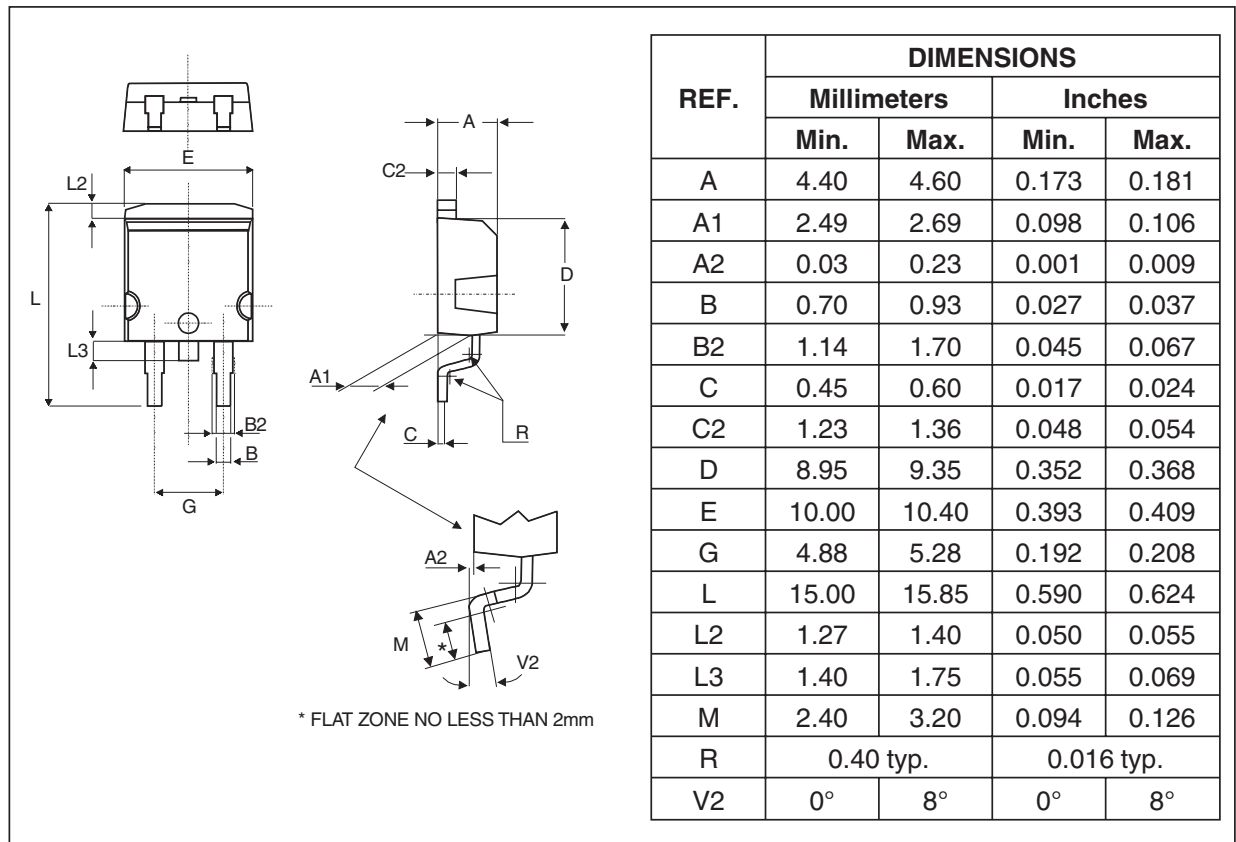


**Fig. 9:** Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4,  $e_{Cu}$ : 35 $\mu$ m) for D<sup>2</sup>PAK.

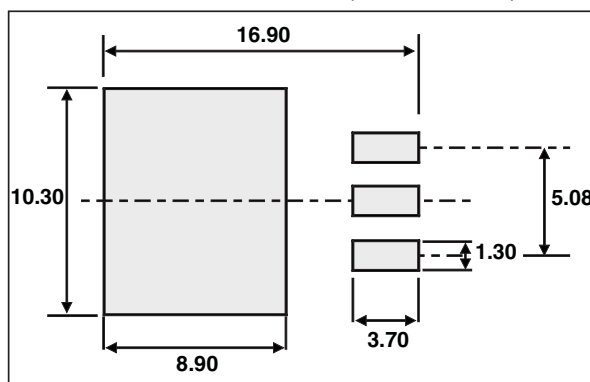


Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH3002CT	STTH3002CT	TO-220AB	2.23 g	50	Tube
STTH3002CG	STTH3002CG	D <sup>2</sup> PAK	1.48 g	50	Tube
STTH3002CG-TR	STTH3002CG	D <sup>2</sup> PAK	1.48 g	1000	Tape & reel
STTH3002CR	STTH3002CR	I <sup>2</sup> PAK	1.49 g	50	Tube
STTH3002CW	STTH3002CW	TO-247	4.46 g	50	Tube

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

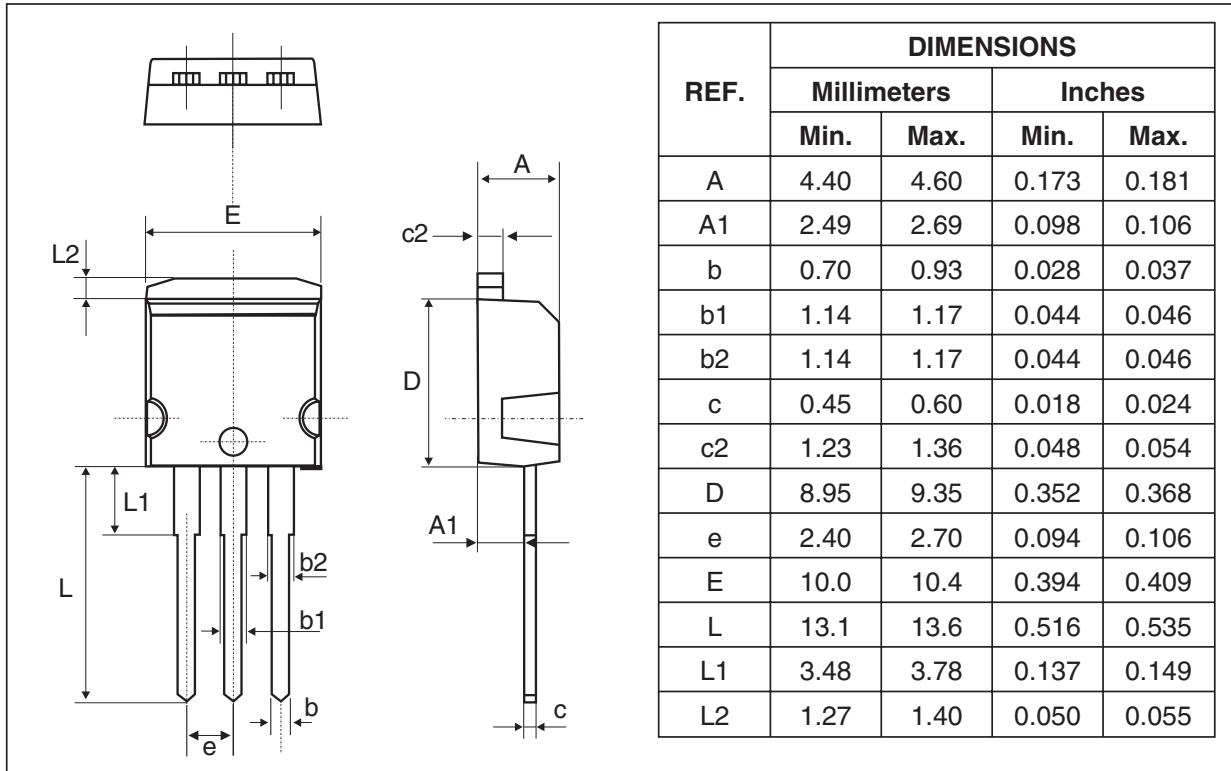


**FOOTPRINT DIMENSIONS** (in millimeters)

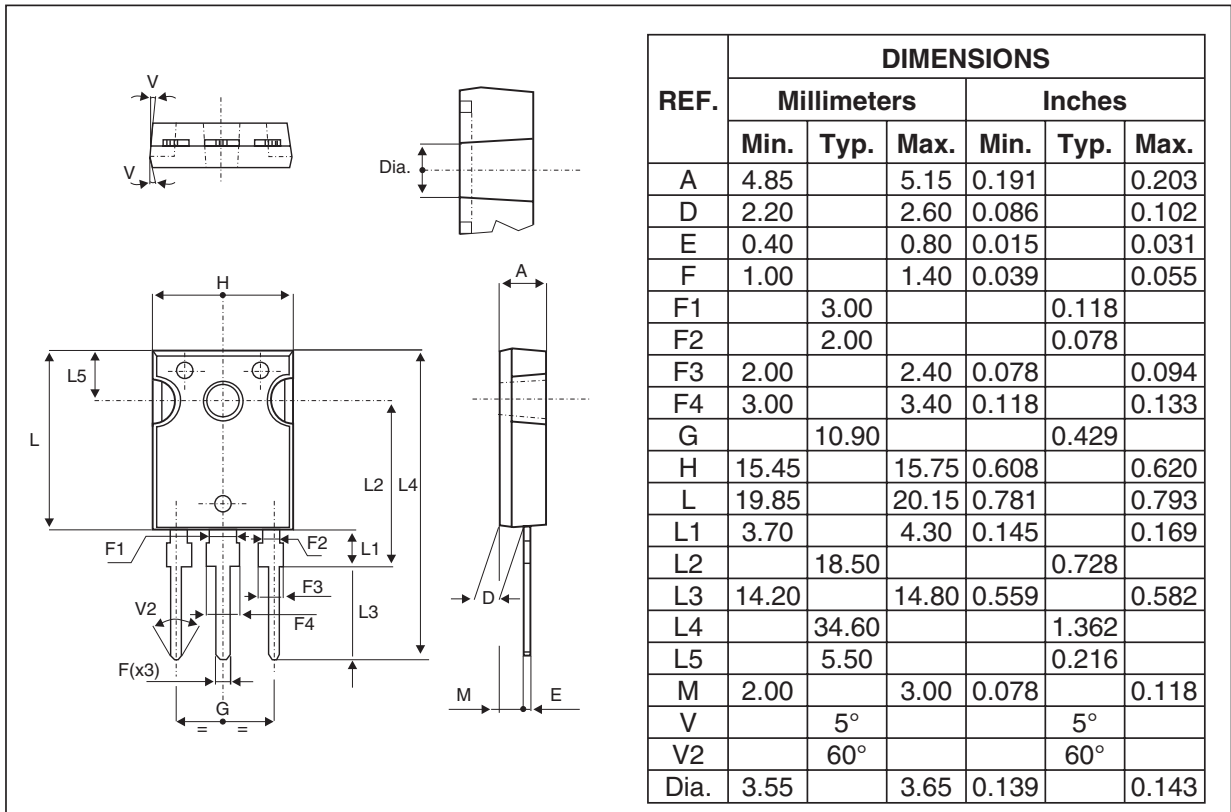


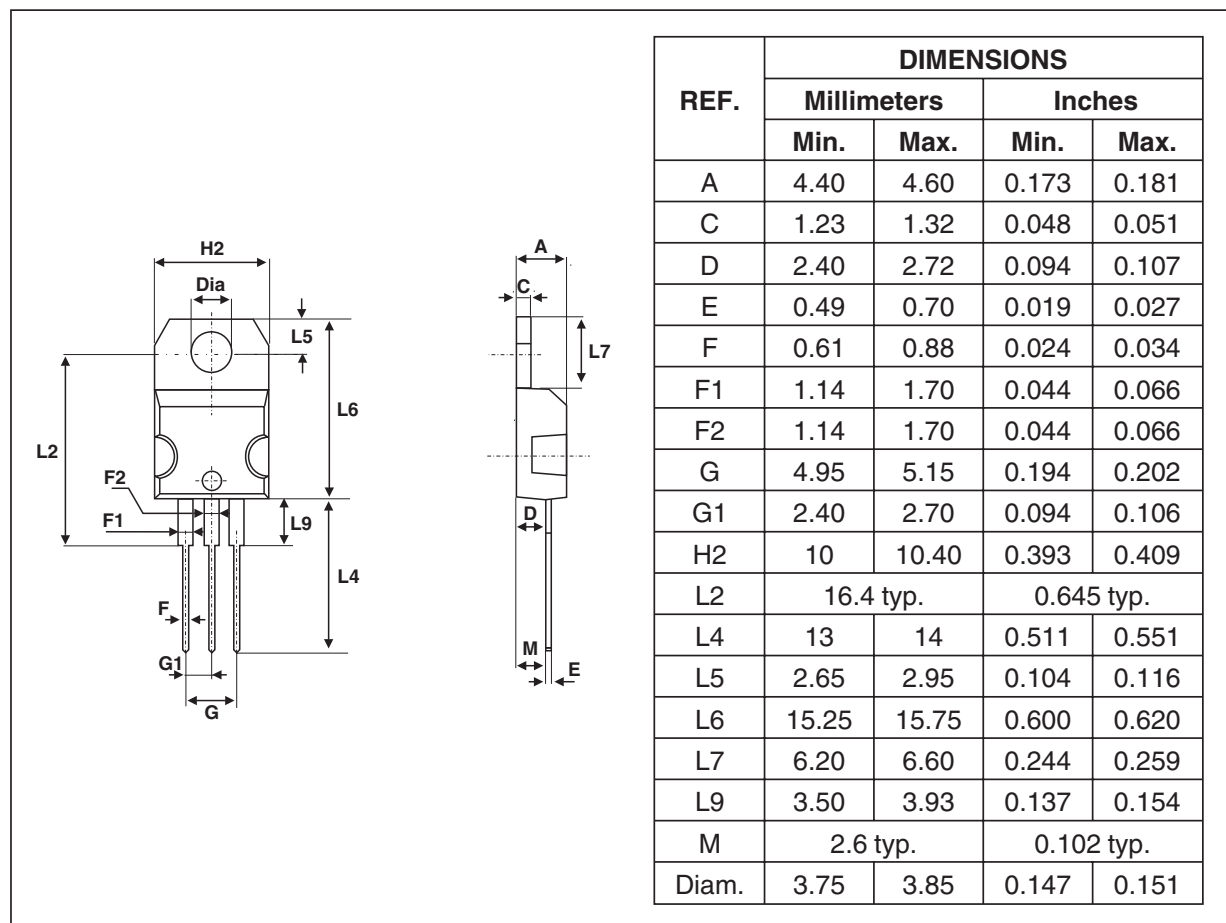
**STTH3002C**

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



**PACKAGE MECHANICAL DATA**  
TO-247



**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.

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