



# STTH5L06D/B/FP

## TURBO 2 ULTRAFast HIGH VOLTAGE RECTIFIER

### MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	5 A
$V_{RRM}$	600 V
$I_R$ (max)	125 $\mu$ A
$T_j$ (max)	175 °C
$V_F$ (max)	1.05 V
$t_{rr}$ (max)	95 ns

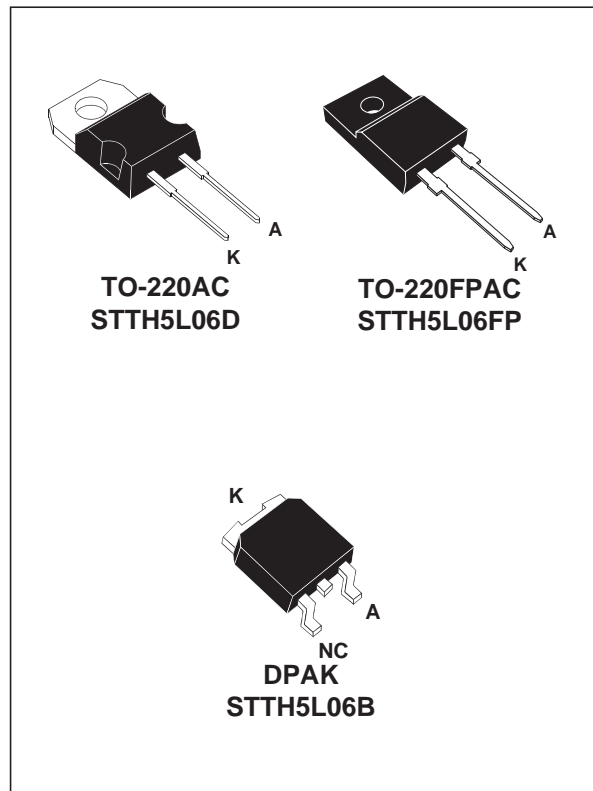
### FEATURES AND BENEFITS

- Ultrafast switching
- Low reverse recovery current
- Reduces switching & conduction losses
- Low thermal resistance

### DESCRIPTION

The STTH5L06D/B/FP, which is using ST Turbo 2 600V technology, is specially suited as boost diode in discontinuous or critical mode power factor corrections.

The device, available in TO-220AC, TO-220FPAC and DPAK, is also intended for use as a free wheeling diode in power supplies and other power switching applications.



### ABSOLUTE RATINGS (limiting values)

Symbol	Parameter		Value	Unit	
$V_{RRM}$	Repetitive peak reverse voltage		600	V	
$I_{F(RMS)}$	RMS forward current		TO-220AC/TO-220FPAC DPAK	20 10 A	
$I_{F(AV)}$	Average forward current	TO-220AC / DPAK	$T_c = 150^\circ\text{C}$ $\delta = 0.5$	5	A
		TO-220FPAC	$T_c = 135^\circ\text{C}$ $\delta = 0.5$		
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10$ ms Sinusoidal	TO-220AC/TO-220FPAC DPAK	90 60	A
		$t_p = 10$ ms Sinusoidal			
$T_{stg}$	Storage temperature range		- 65 + 175	°C	
$T_j$	Maximum operating junction temperature		+ 175	°C	

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## THERMAL PARAMETERS

Symbol	Parameter		Maximum	Unit
R <sub>th(j-c)</sub>	Junction to case	TO-220AC / DPAK	3.5	°C/W
		TO-220FPAC	6.0	

## STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
I <sub>R</sub>	Reverse leakage current	V <sub>R</sub> = 600V	T <sub>j</sub> = 25°C			5	μA
			T <sub>j</sub> = 150°C		10	125	
V <sub>F</sub>	Forward voltage drop	I <sub>F</sub> = 5 A	T <sub>j</sub> = 25°C			1.3	V
			T <sub>j</sub> = 150°C		0.85	1.05	

To evaluate the maximum conduction losses use the following equation :  
 $P = 0.89 \times I_{F(AV)} + 0.033 I_{F(RMS)}^2$

## DYNAMIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
t <sub>rr</sub>	Reverse recovery time	I <sub>F</sub> = 1 A dI <sub>F</sub> /dt = - 50 A/μs V <sub>R</sub> = 30V	T <sub>j</sub> = 25°C		65	95	ns
t <sub>fr</sub>	Forward recovery time	I <sub>F</sub> = 5 A dI <sub>F</sub> /dt = 100 A/μs V <sub>FR</sub> = 1.1 x V <sub>Fmax</sub>	T <sub>j</sub> = 25°C			150	ns
V <sub>FP</sub>	Forward recovery time	I <sub>F</sub> = 5 A dI <sub>F</sub> /dt = 100 A/μs	T <sub>j</sub> = 25°C			7	V

Fig. 1: Conduction losses versus average current.

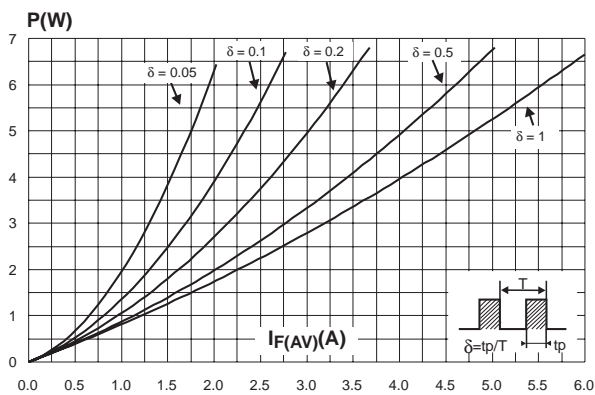
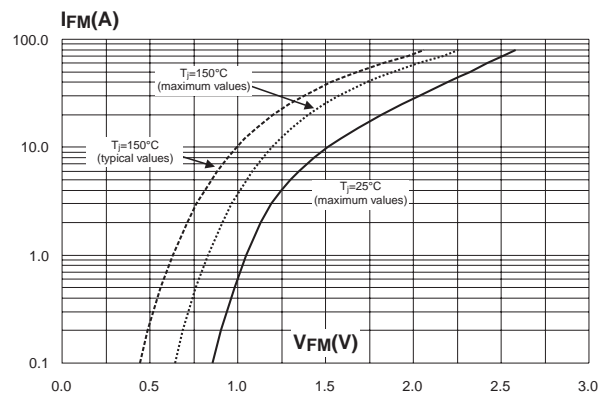
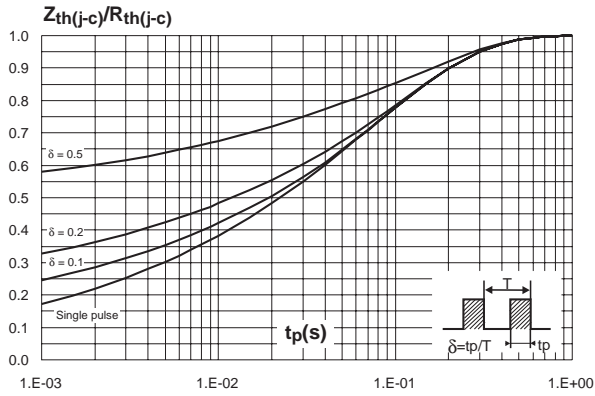


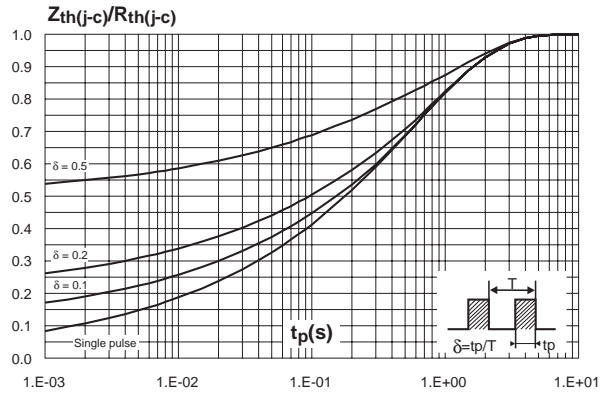
Fig. 2: Forward voltage drop versus forward current.



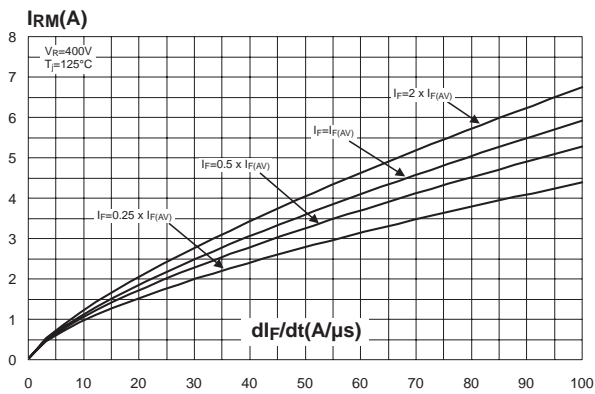
**Fig. 3-1:** Relative variation of thermal impedance junction to case versus pulse duration (TO-220AC, DPAK).



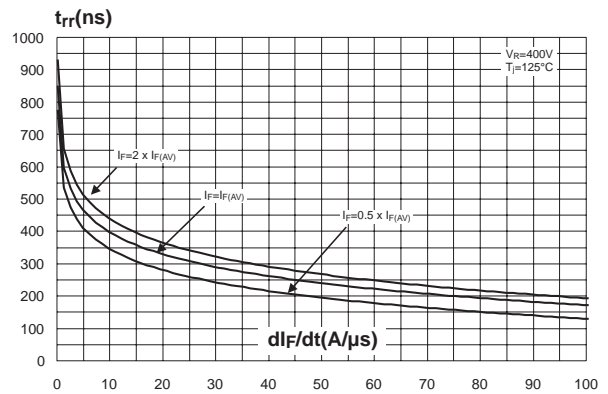
**Fig. 3-2:** Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAC).



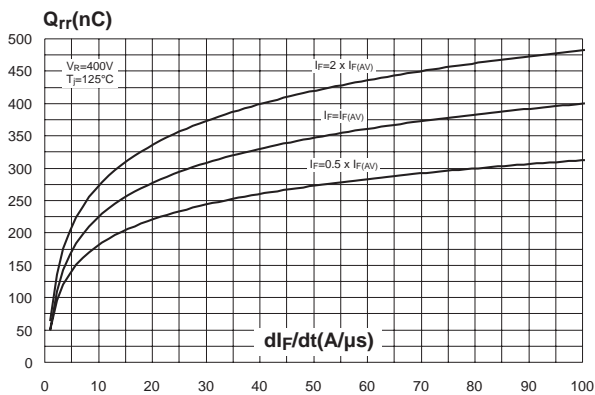
**Fig. 4:** Peak reverse recovery current versus  $di_F/dt$  (90% confidence).



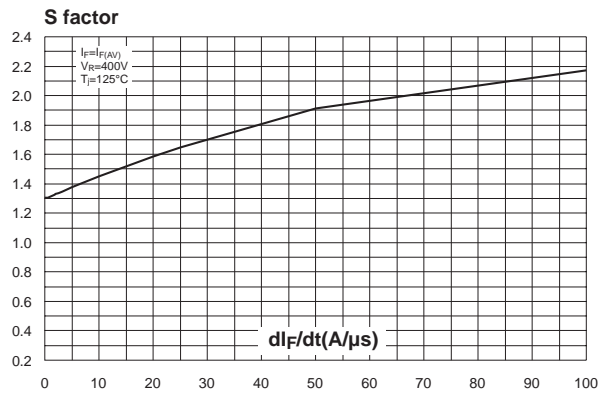
**Fig. 5:** Reverse recovery time versus  $di_F/dt$  (90% confidence).



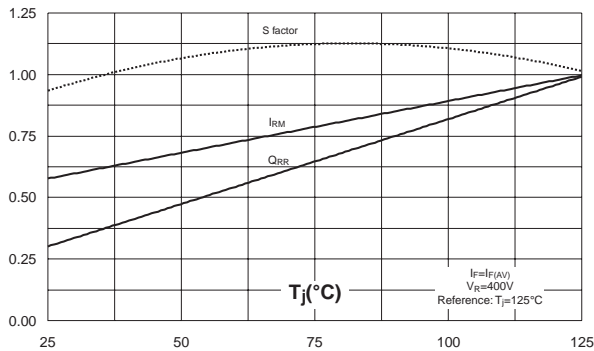
**Fig. 6:** Reverse recovery charges versus  $di_F/dt$  (90% confidence).



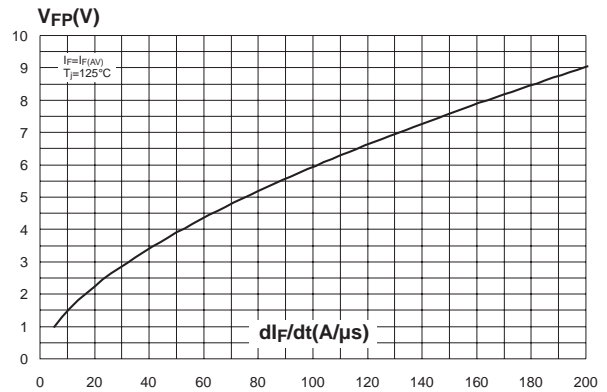
**Fig. 7:** Softness factor versus  $di_F/dt$  (typical values).



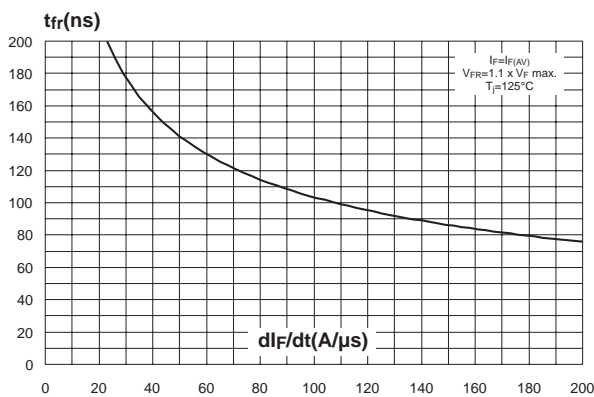
**Fig. 8:** Relative variations of dynamic parameters versus junction temperature.



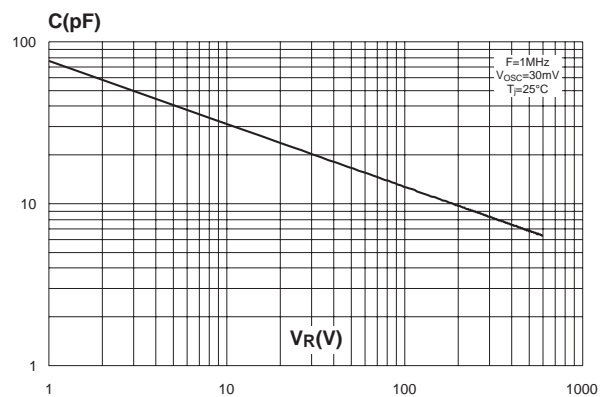
**Fig. 9:** Transient peak forward voltage versus  $di_F/dt$  (90% confidence).



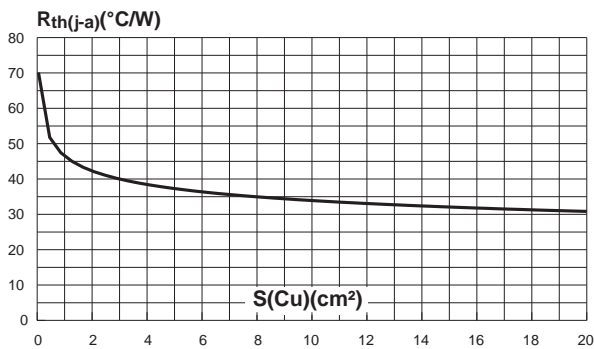
**Fig. 10:** Forward recovery time versus  $di_F/dt$  (90% confidence).



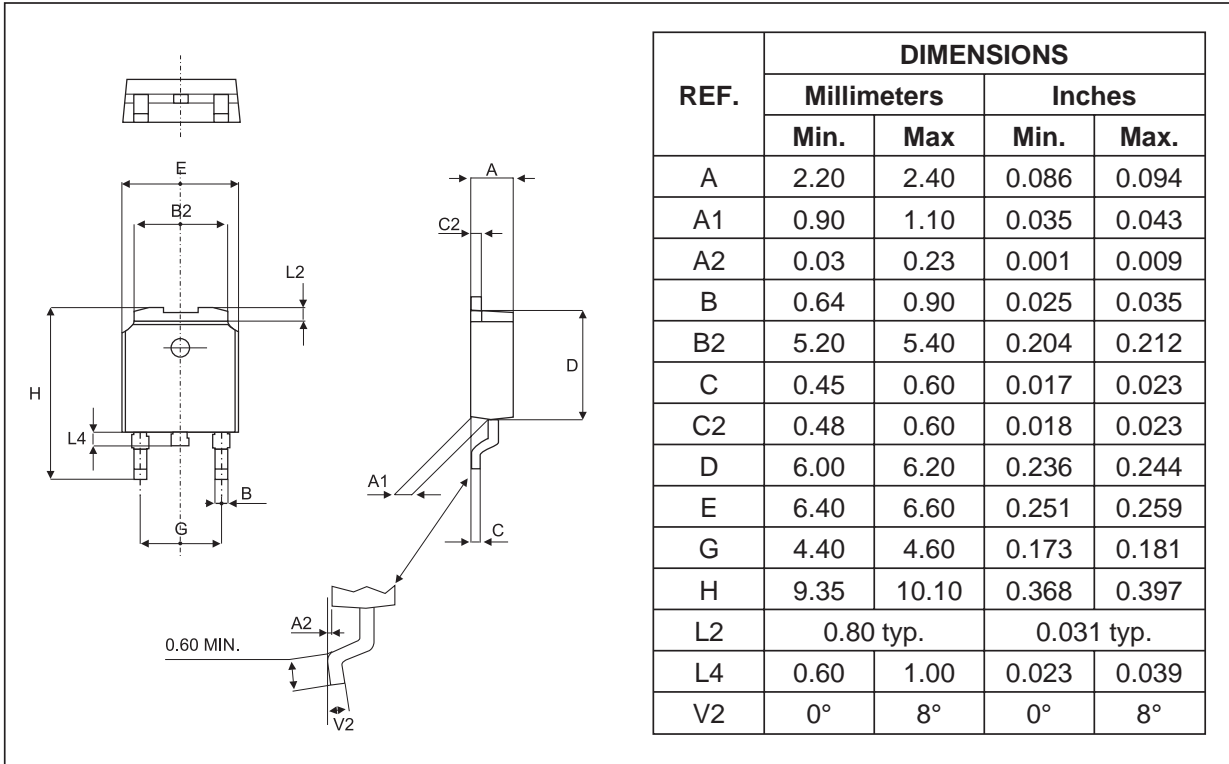
**Fig. 11:** Junction capacitance versus reverse voltage applied (typical values).



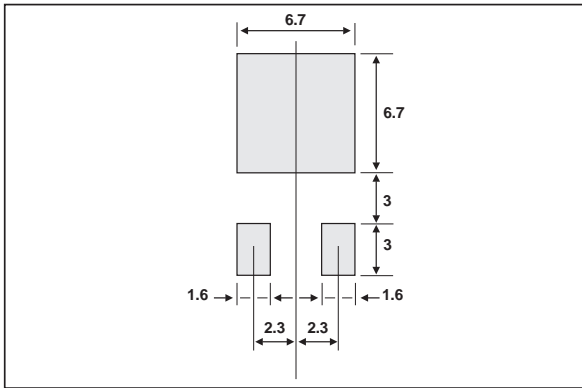
**Fig. 12:** Thermal resistance junction to ambient versus copper surface under tab (epoxy printed circuit board FR4, copper thickness: 35 $\mu m$ ) (DPAK).



**PACKAGE MECHANICAL DATA**  
DPAK

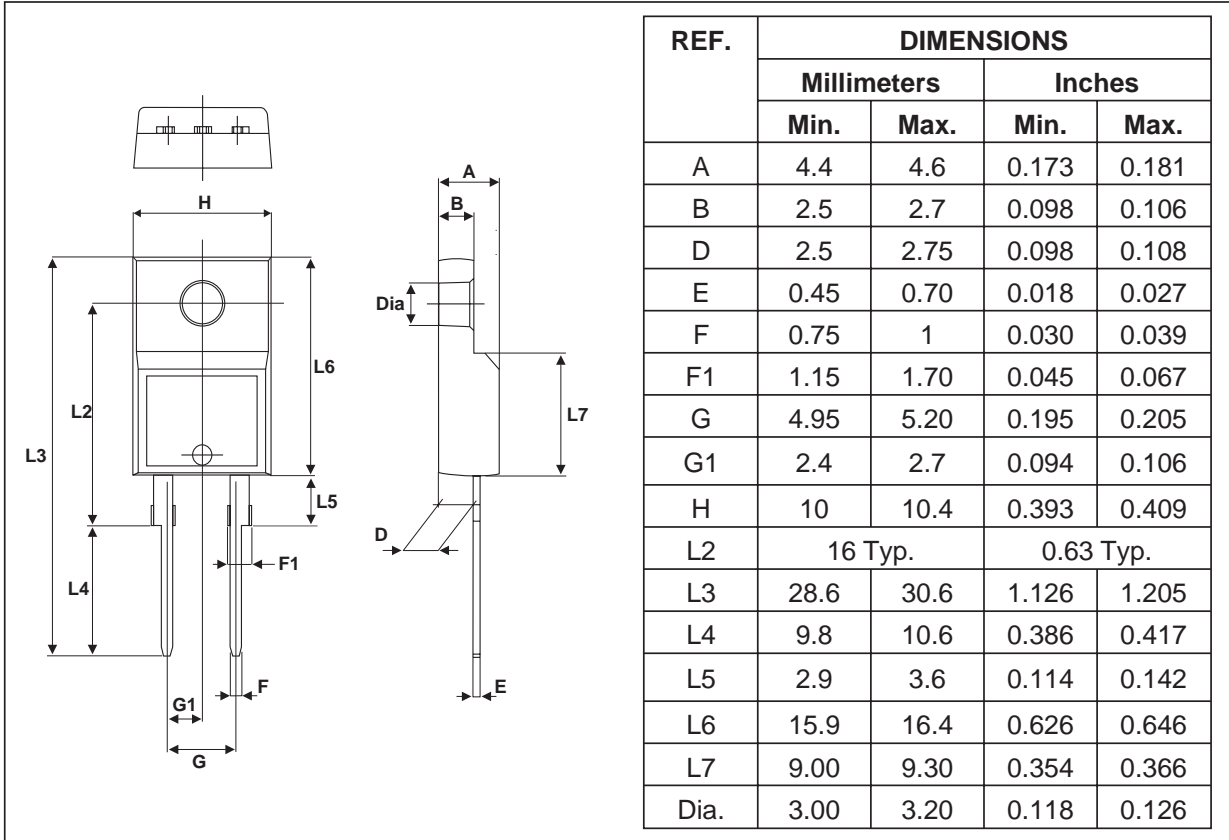


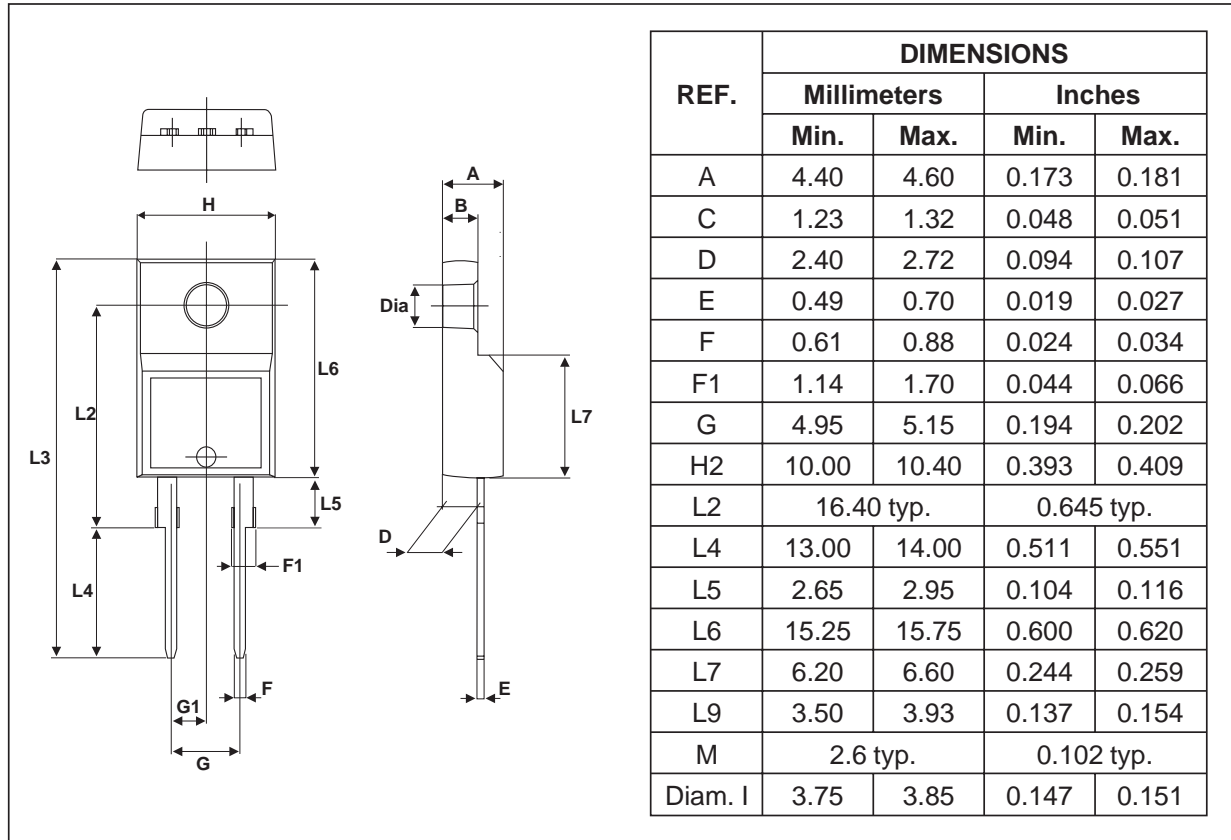
**FOOTPRINT**



**STTH5L06D/B/FP**

**PACKAGE MECHANICAL DATA**  
TO-220FPAC



**PACKAGE MECHANICAL DATA**  
 TO-220AC


Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH5L06D	STTH5L06D	TO-220AC	1.9 g	50	Tube
STTH5L06B	STTH5L06B	DPAK	0.3 g	75	Tube
STTH5L06B-TR	STTH5L06B	DPAK	0.3 g	2500	Tape & reel
STTH5L06FP	STTH5L06FP	TO-220PFAC	1.7 g	50	Tube

- Epoxy meets UL 94, V0
- Recommended torque value (TO-220AC): 0.55 Nm
- Maximum torque value (TO-220AC / TO-220FPAC): 0.7 Nm

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