

## TURBO 2 ULTRAFAST HIGH VOLTAGE RECTIFIER

**Table 1: Main Product Characteristics**

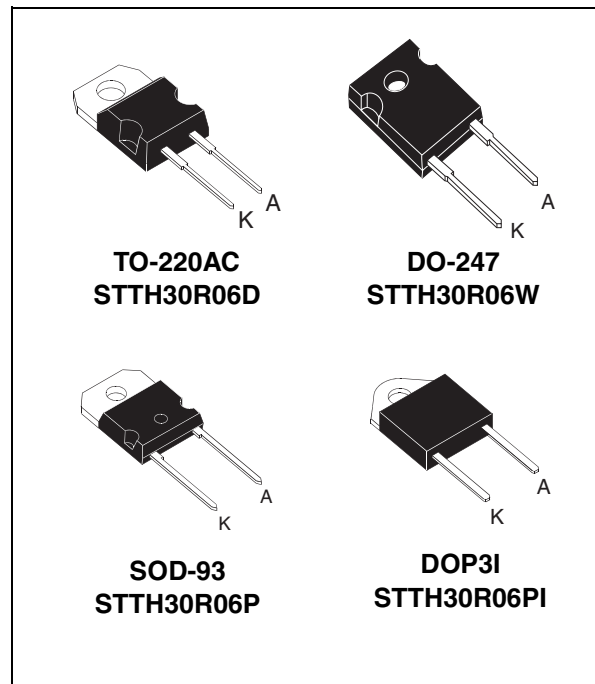
$I_{F(AV)}$	30 A
$V_{RRM}$	600 V
$T_j$	175°C
$V_F$ (typ)	1.10 V
$t_{rr}$ (max)	50 ns

### FEATURES AND BENEFITS

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

### DESCRIPTION

The STTH30R06, which is using ST Turbo 2 600V technology, is specially suited for use in switching power supplies, and industrial applications, as rectification and discontinuous mode PFC boost diode.



**Table 2: Order Codes**

Part Number	Marking
STTH30R06D	STTH30R06D
STTH30R06W	STTH30R06W
STTH30R06P	STTH30R06P
STTH30R06PI	STTH30R06PI

**Table 3: Absolute Ratings** (limiting values)

Symbol	Parameter		Value	Unit	
$V_{RRM}$	Repetitive peak reverse voltage		600	V	
$I_{F(RMS)}$	RMS forward voltage		50	A	
$I_{F(AV)}$	Average forward current	TO-220AC / DO-247 / SOD-93	$T_c = 115^\circ\text{C} \quad \delta = 0.5$	30	A
		DOP3I	$T_c = 85^\circ\text{C} \quad \delta = 0.5$		
$I_{FSM}$	Surge non repetitive forward current		$t_p = 10\text{ms sinusoidal}$	160	A
$T_{stg}$	Storage temperature range		-65 to + 175	°C	
$T_j$	Maximum operating junction temperature		175	°C	

**Table 4: Thermal Resistance**

Symbol	Parameter	Value (max.)	Unit
$R_{th(j-c)}$	Junction to case	TO-220AC / DO-247/ SOD-93	1.1
		DOP3I	1.7

**Table 5: Static Electrical Characteristics**

Symbol	Parameter	Test conditions	Min.	Typ	Max.	Unit
$I_R^*$	Reverse leakage current	$T_j = 25^\circ\text{C}$			25	$\mu\text{A}$
		$T_j = 150^\circ\text{C}$			80	
$V_F^{**}$	Forward voltage drop	$T_j = 25^\circ\text{C}$	$I_F = 30\text{A}$		1.85	V
		$T_j = 150^\circ\text{C}$			1.10	

Pulse test: \*  $t_p = 5\text{ ms}$ ,  $\delta < 2\%$

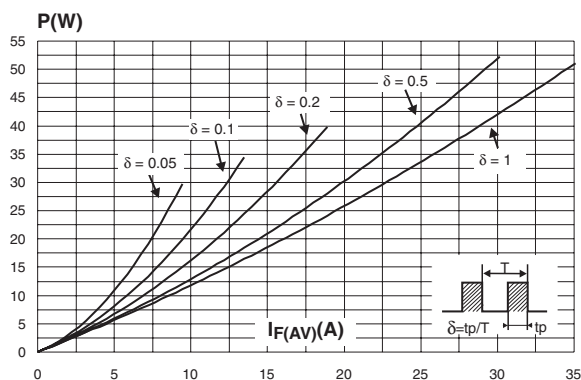
\*\*  $t_p = 380\ \mu\text{s}$ ,  $\delta < 2\%$

To evaluate the conduction losses use the following equation:  $P = 1.07 \times I_{F(AV)} + 0.011 I_F^2(\text{RMS})$

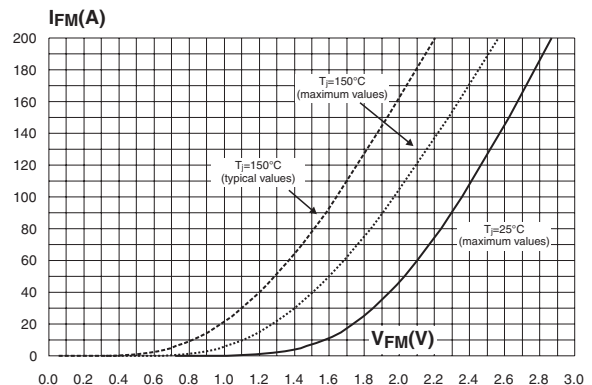
**Table 6: Dynamic Characteristics**

Symbol	Parameter	Test conditions	Min.	Typ	Max.	Unit	
$t_{rr}$	Reverse recovery time	$T_j = 25^\circ\text{C}$	$I_F = 0.5\text{A}$ $I_{rr} = 0.25\text{A}$ $I_R = 1\text{A}$			50	
						$I_F = 1\text{A}$ $di_F/dt = 50\text{ A}/\mu\text{s}$ $V_R = 30\text{V}$	50
$I_{RM}$	Reverse recovery current	$T_j = 125^\circ\text{C}$	$I_F = 30\text{A}$ $V_R = 400\text{V}$		8	11	A
$t_{fr}$	Forward recovery time	$T_j = 25^\circ\text{C}$	$I_F = 30\text{A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$			500	ns
$V_{FP}$	Forward recovery voltage	$T_j = 25^\circ\text{C}$	$I_F = 30\text{A}$ $di_F/dt = 100\text{ A}/\mu\text{s}$		2.5		V

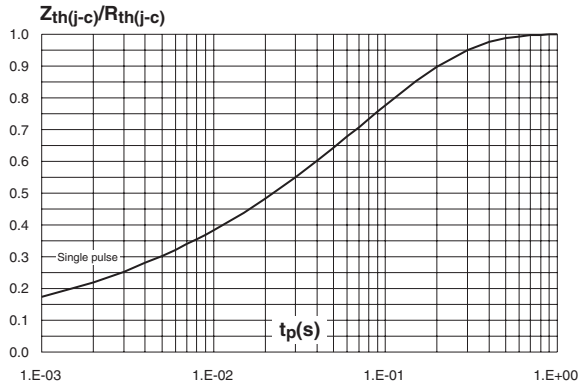
**Figure 1: Conduction losses versus average forward current**



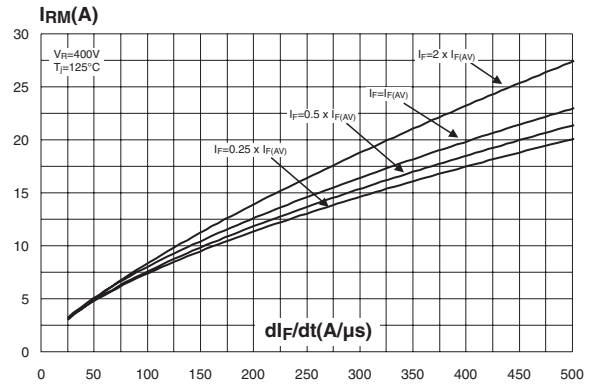
**Figure 2: Forward voltage drop versus forward current**



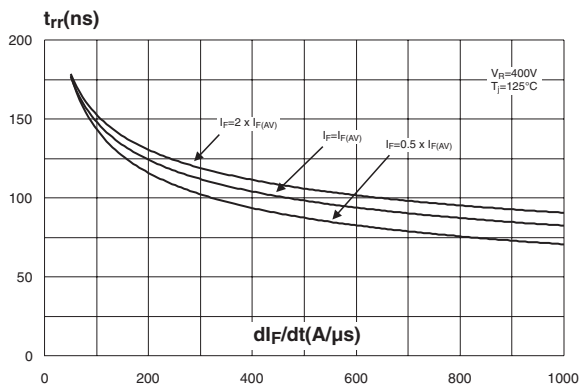
**Figure 3: Relative variation of thermal impedance junction to case versus pulse duration**



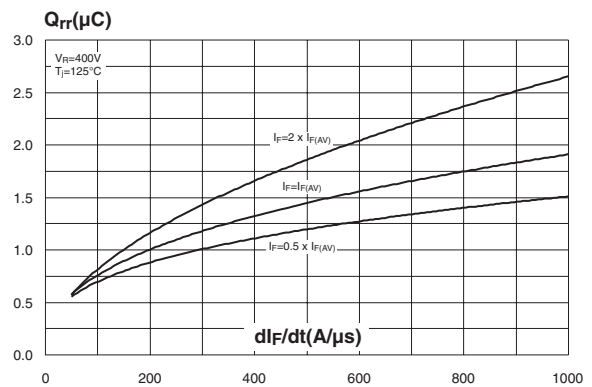
**Figure 4: Peak reverse recovery current versus  $di_F/dt$  (typical values)**



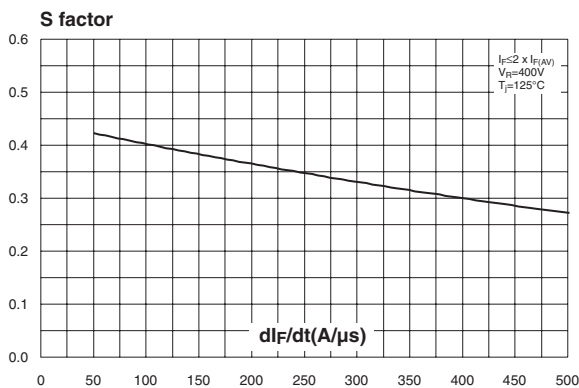
**Figure 5: Reverse recovery time versus  $di_F/dt$  (typical values)**



**Figure 6: Reverse recovery charges versus  $di_F/dt$  (typical values)**



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



**Figure 8: Relative variations of dynamic parameters versus junction temperature**

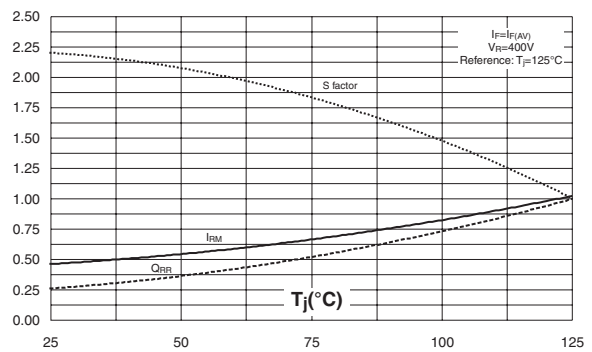


Figure 9: Transient peak forward voltage versus  $di_F/dt$  (typical values)

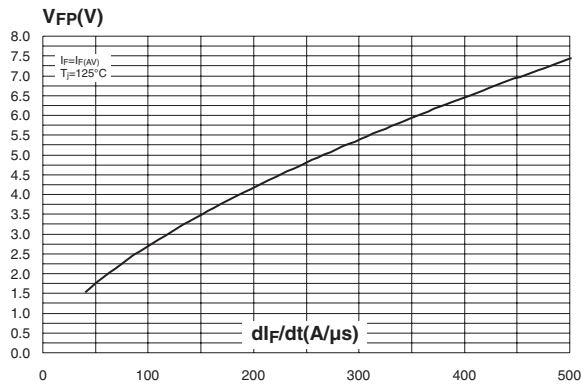


Figure 10: Forward recovery time versus  $di_F/dt$  (typical values)

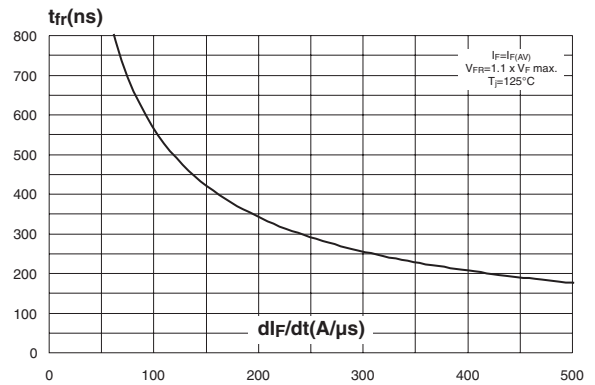


Figure 11: Junction capacitance versus reverse voltage applied (typical values)

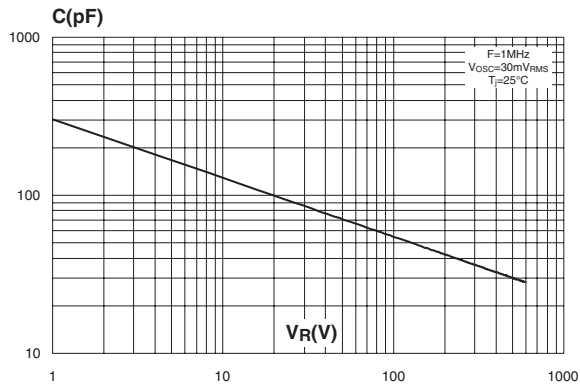


Figure 12: DO-247 Package Mechanical Data

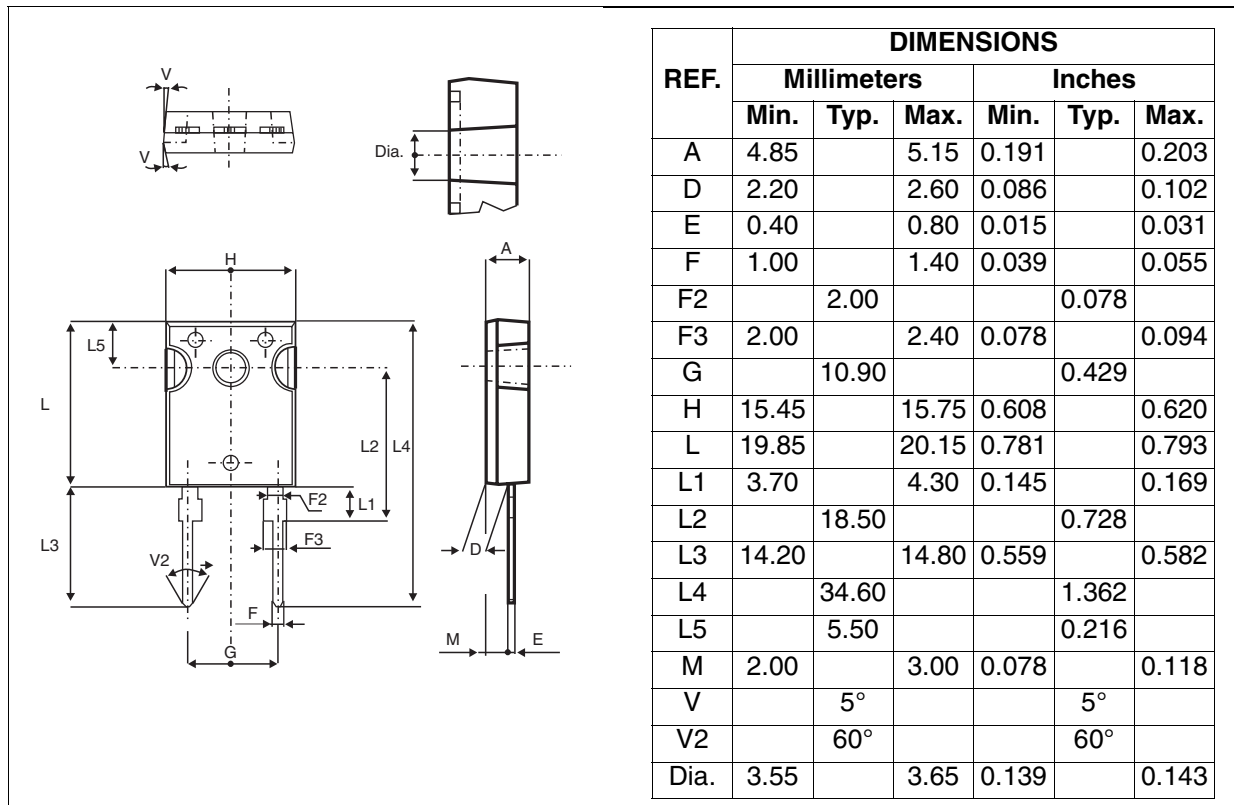


Figure 13: SOD-93 Package Mechanical Data

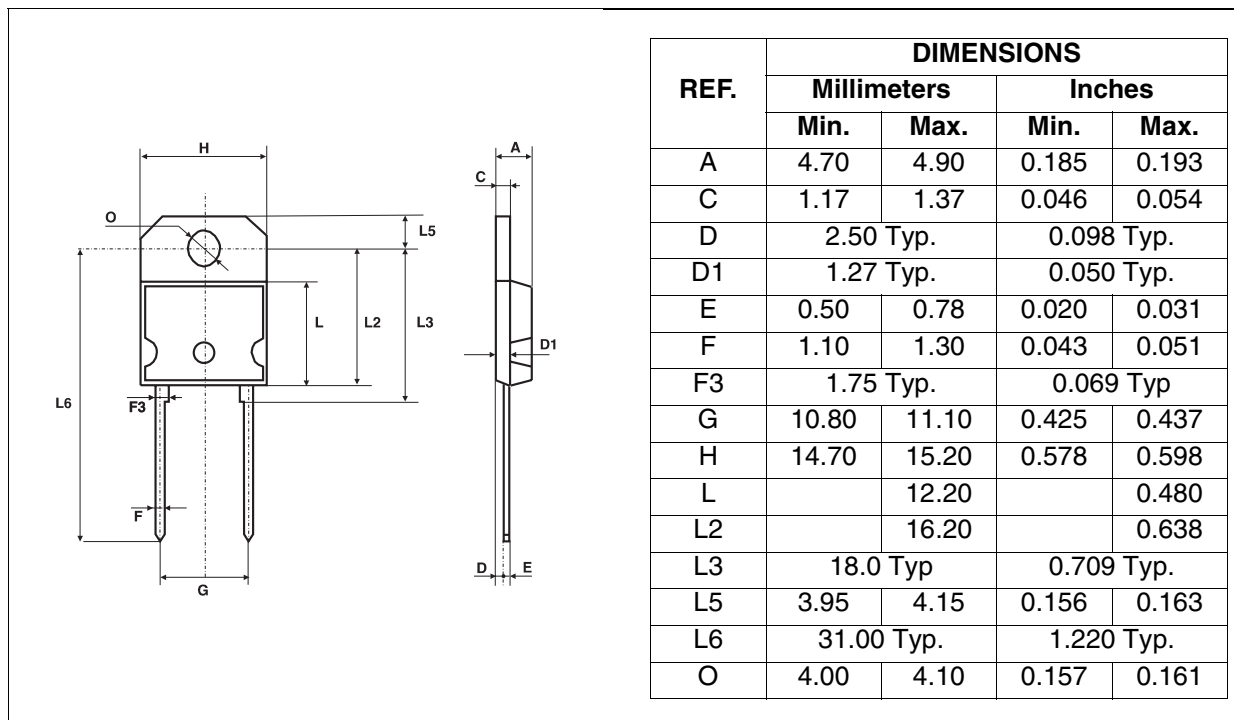


Figure 14: TO-220AC Package Mechanical Data

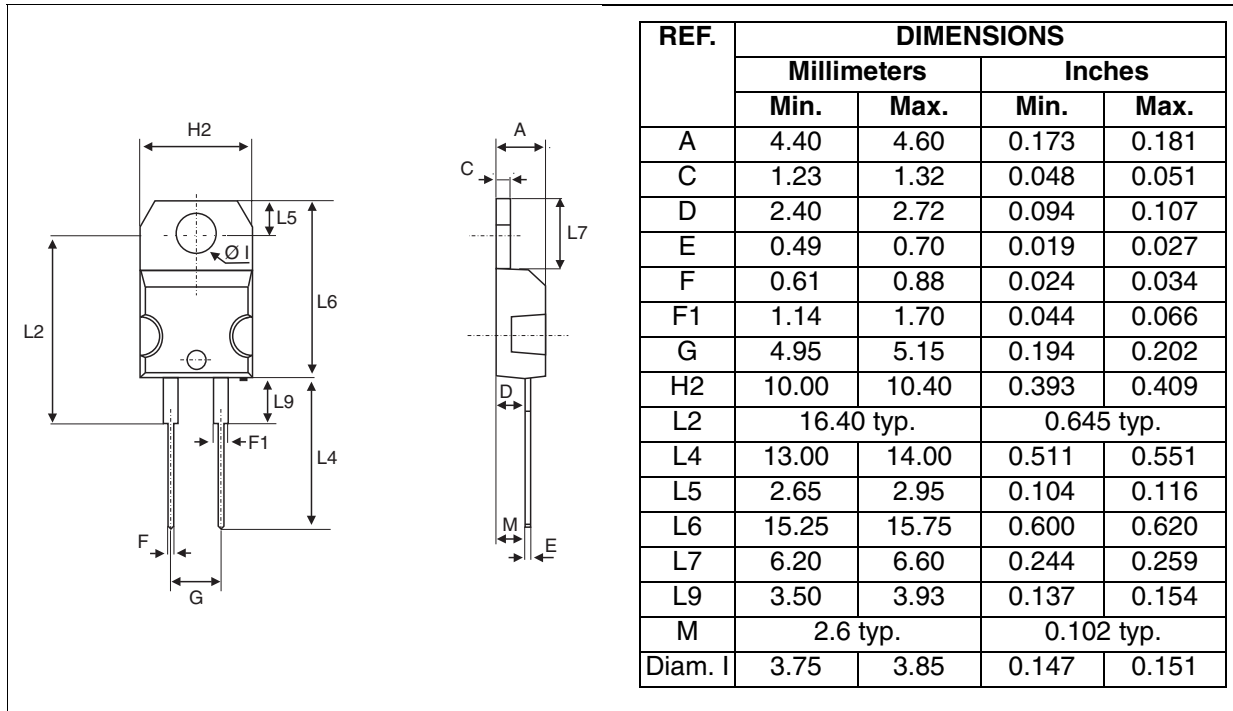


Figure 15: DOP3I Package Mechanical Data

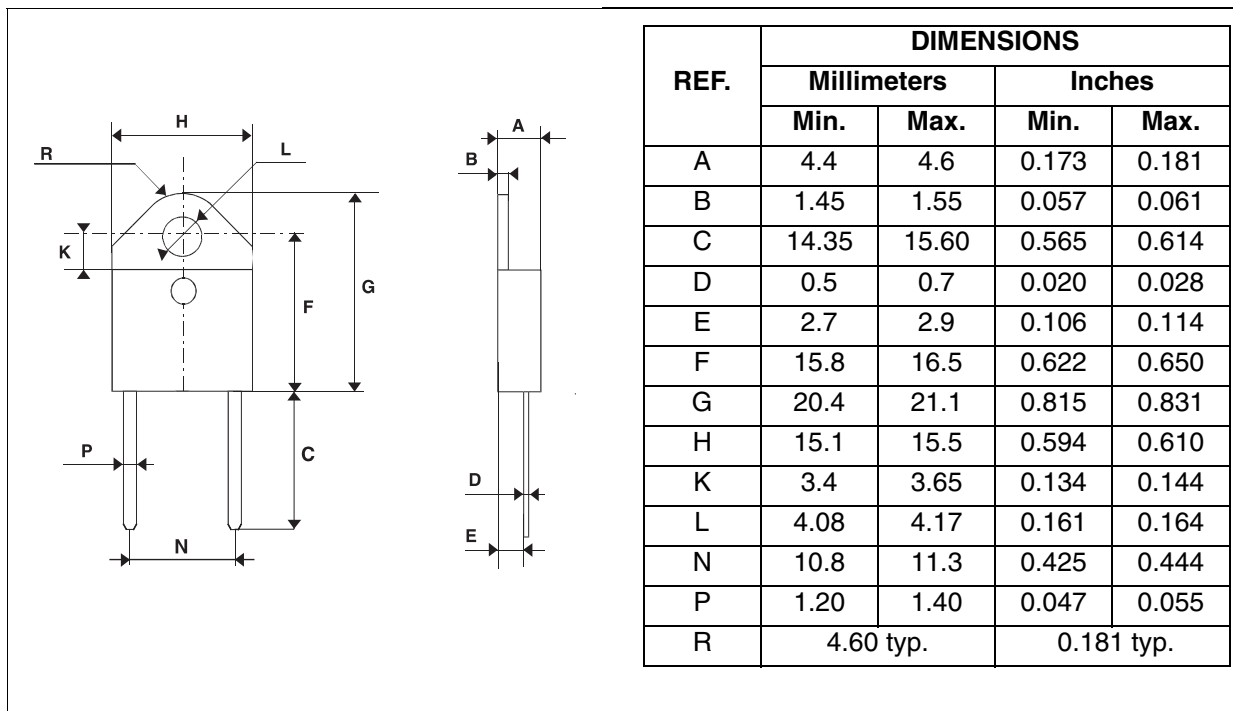


Table 7: Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STTH30R06D	STTH30R06D	TO-220AC	1.90 g	50	Tube
STTH30R06W	STTH30R06W	DO-247	4.40 g	30	Tube
STTH30R06P	STTH30R06P	SOD-93	3.79 g	30	Tube
STTH30R06PI	STTH30R06PI	DOP3I	4.46 g	30	Tube

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.55 m.N. (TO-220AC)
- Maximum torque value: 0.70 m.N. (TO-220AC)

Table 8: Revision History

Date	Revision	Description of Changes
18-Oct-2004	1	First issue

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