



STTH5R06D/FP/B/G

TURBO 2 ULTRAFAST HIGH VOLTAGE RECTIFIER

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	5 A
V_{RRM}	600 V
$I_{RM} (typ.)$	5 A
$T_j (max)$	175 °C
$V_F (max)$	1.8 V
$t_{rr} (max)$	40 ns

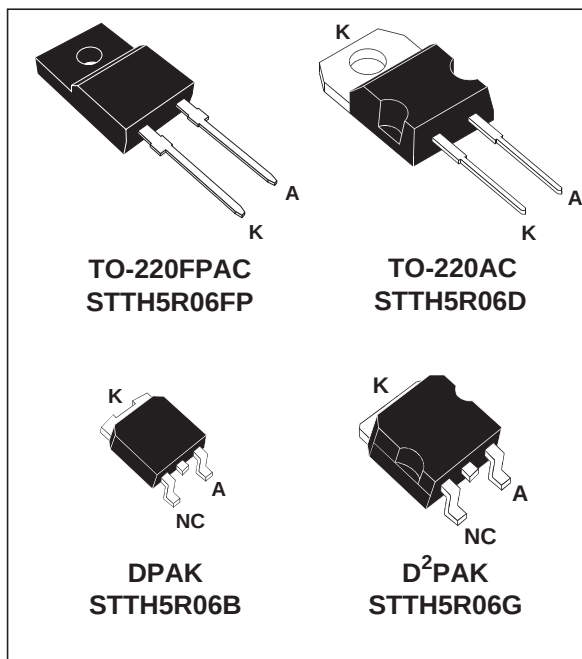
FEATURES AND BENEFITS

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

DESCRIPTION

The STTH5R06D/FP/B/G, which is using ST Turbo 2 600V technology, is specially suited as boost diode in continuous mode power factor corrections and hard switching conditions.

The device (available in TO-220AC, TO-220FPAC, D²PAK 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 / D ² PAK	20	A
		DPAK	10	A
$I_{F(AV)}$	Average forward current	TO-220AC TO-220FPAC DPAK / D ² PAK	$T_c = 105^{\circ}\text{C} \quad \delta = 0.5$ 5	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10 \text{ ms Sinusoidal}$	50	A
T_{stg}	Storage temperature range		- 65 + 175	°C
T_j	Maximum operating junction temperature		175	°C

THERMAL RESISTANCES

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	TO-220AC / DPAK / D ² PAK	3.0	°C/W
		TO-220FPAC	5.5	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
I_R	Reverse leakage current	$V_R = 600V$	$T_j = 25^\circ C$			20	μA
			$T_j = 125^\circ C$		25	250	
V_F	Forward voltage drop	$I_F = 5 A$	$T_j = 25^\circ C$			2.9	V
			$T_j = 125^\circ C$		1.4	1.8	

To evaluate the maximum conduction losses use the following equation :

$$P = 1.16 \times I_{F(AV)} + 0.128 I_{F(RMS)}^2$$

DYNAMIC ELECTRICAL CHARACTERISTICS

Symbol	Tests conditions		Min.	Typ.	Max.	Unit
t_{rr}	$I_F = 0.5 A$ $I_{rr} = 0.25 A$ $I_R = 1A$	$T_j = 25^\circ C$			25	ns
	$I_F = 1 A$ $dI_F/dt = - 50 A/\mu s$ $V_R = 30V$				40	
I_{RM}	$V_R = 400 V$ $I_F = 5A$ $dI_F/dt = - 200A/\mu s$	$T_j = 125^\circ C$		5.0	6.0	A
S factor				0.35		
Q_{rr}				110		nC
t_{fr}	$I_F = 5 A$ $dI_F/dt = 40 A/\mu s$ $V_{FR} = 1.1 \times V_{Fmax}$	$T_j = 25^\circ C$			150	ns
V_{FP}					4.5	V

Fig. 1: Conduction losses versus average current.

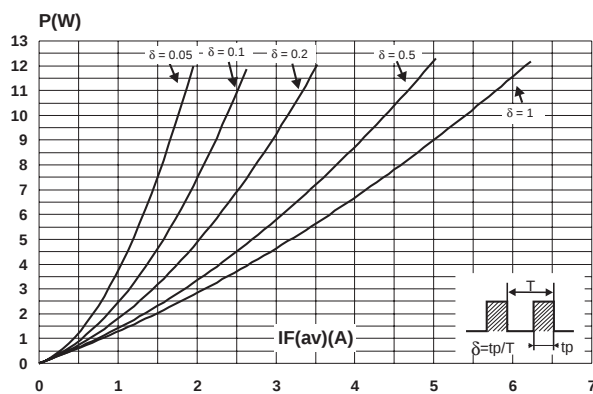


Fig. 2: Forward voltage drop versus forward current.

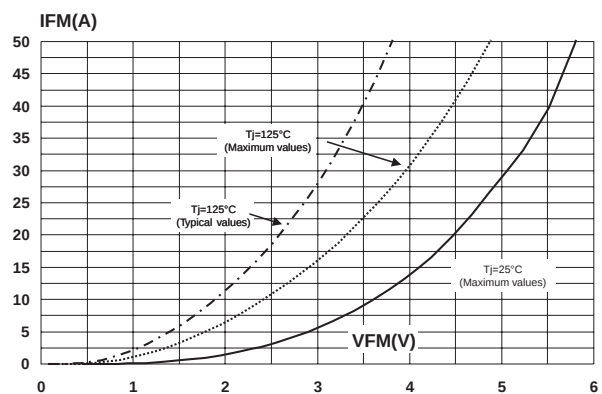


Fig. 3-1: Relative variation of thermal impedance junction to case versus pulse duration (TO-220AC, DPAK, D²PAK).

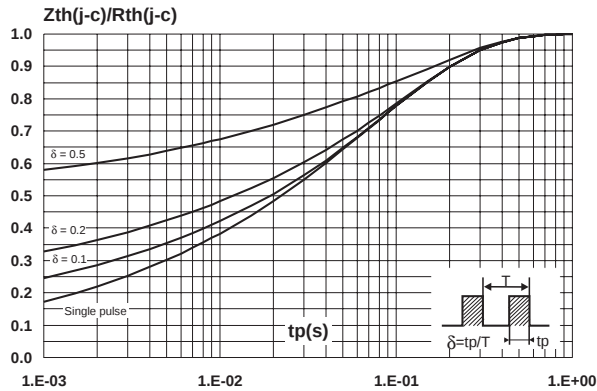


Fig. 3-2: Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAC).

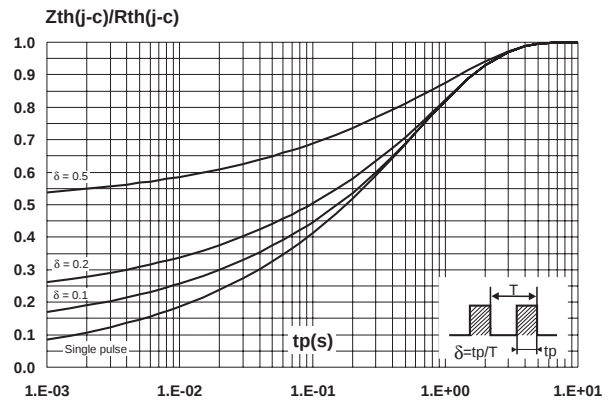


Fig. 4: Peak reverse recovery current versus dI_F/dt (90% confidence).

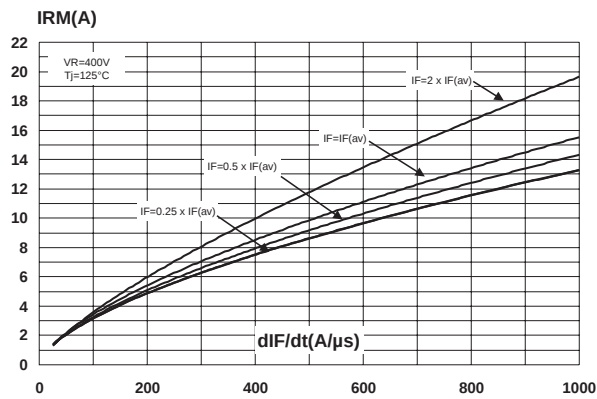


Fig. 5: Reverse recovery time versus dI_F/dt (90% confidence).

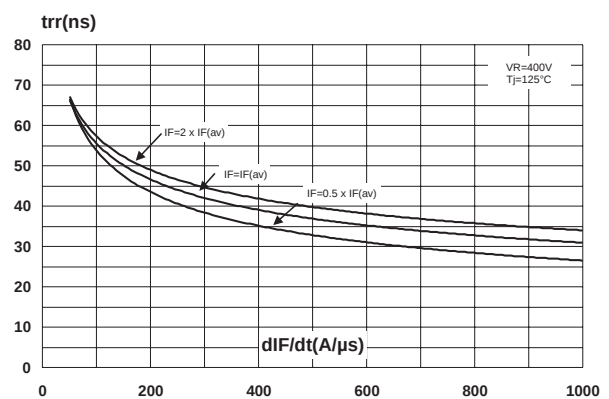


Fig. 6: Reverse recovery charges versus dI_F/dt (90% confidence).

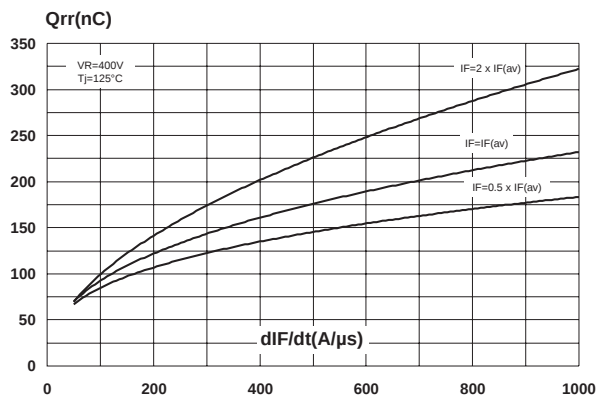


Fig. 7: Softness factor versus dI_F/dt (typical values).

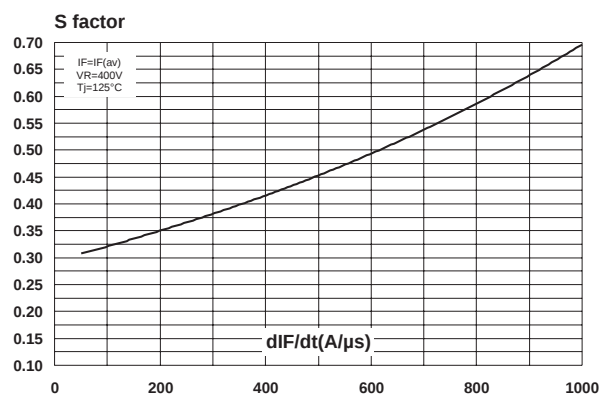


Fig. 8: Relative variation of dynamic parameters versus junction temperature.

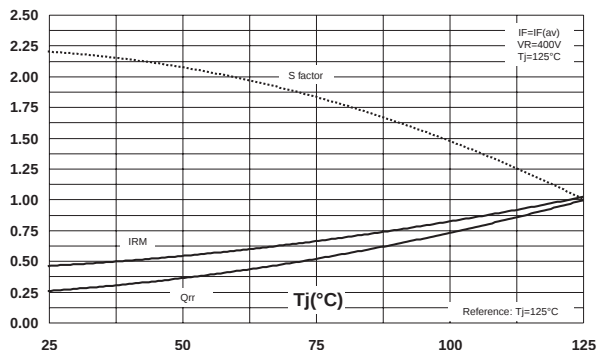


Fig. 9: Transient peak forward voltage versus dI_F/dt (90% confidence).

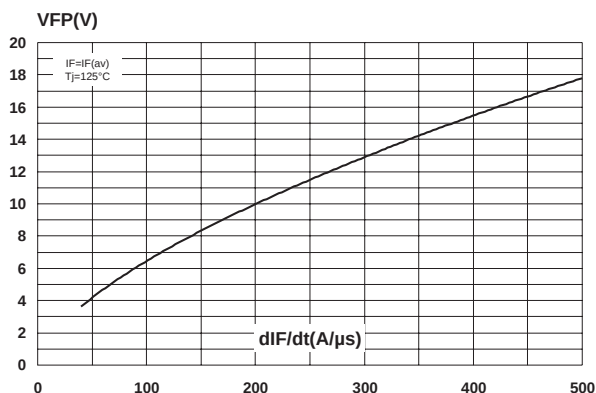


Fig. 10: Forward recovery time versus dI_F/dt (90% confidence).

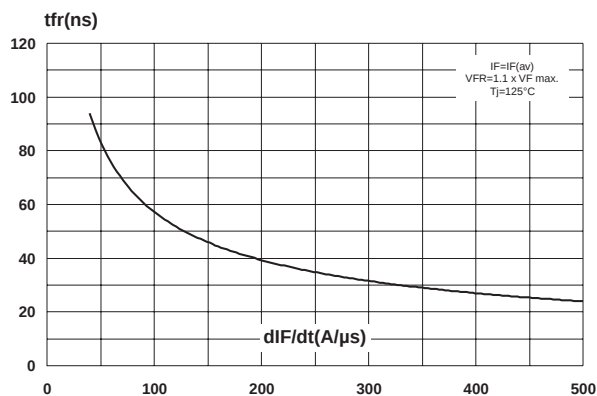


Fig. 11: Junction capacitance versus reverse voltage applied (typical values).

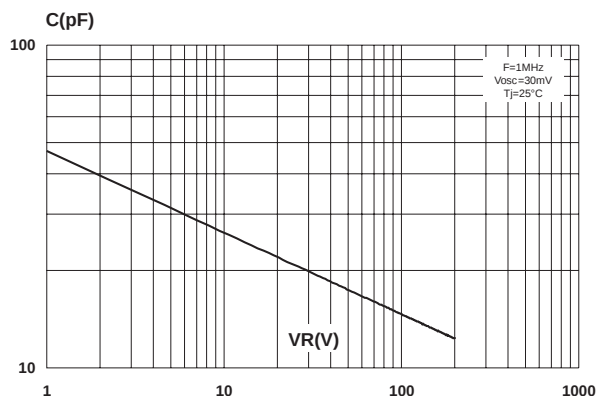
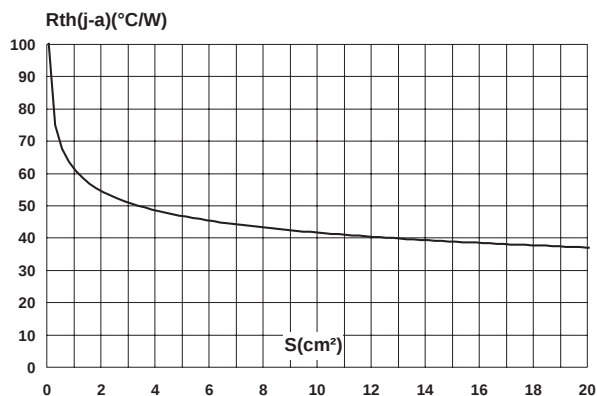
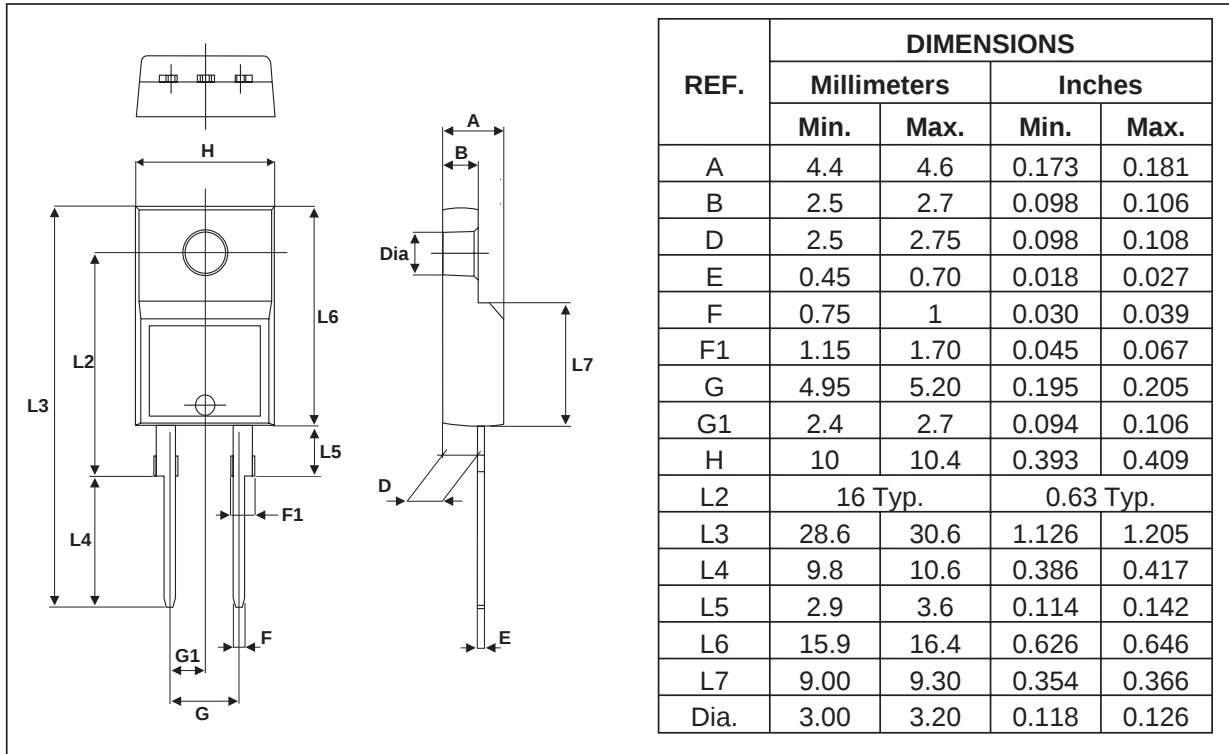
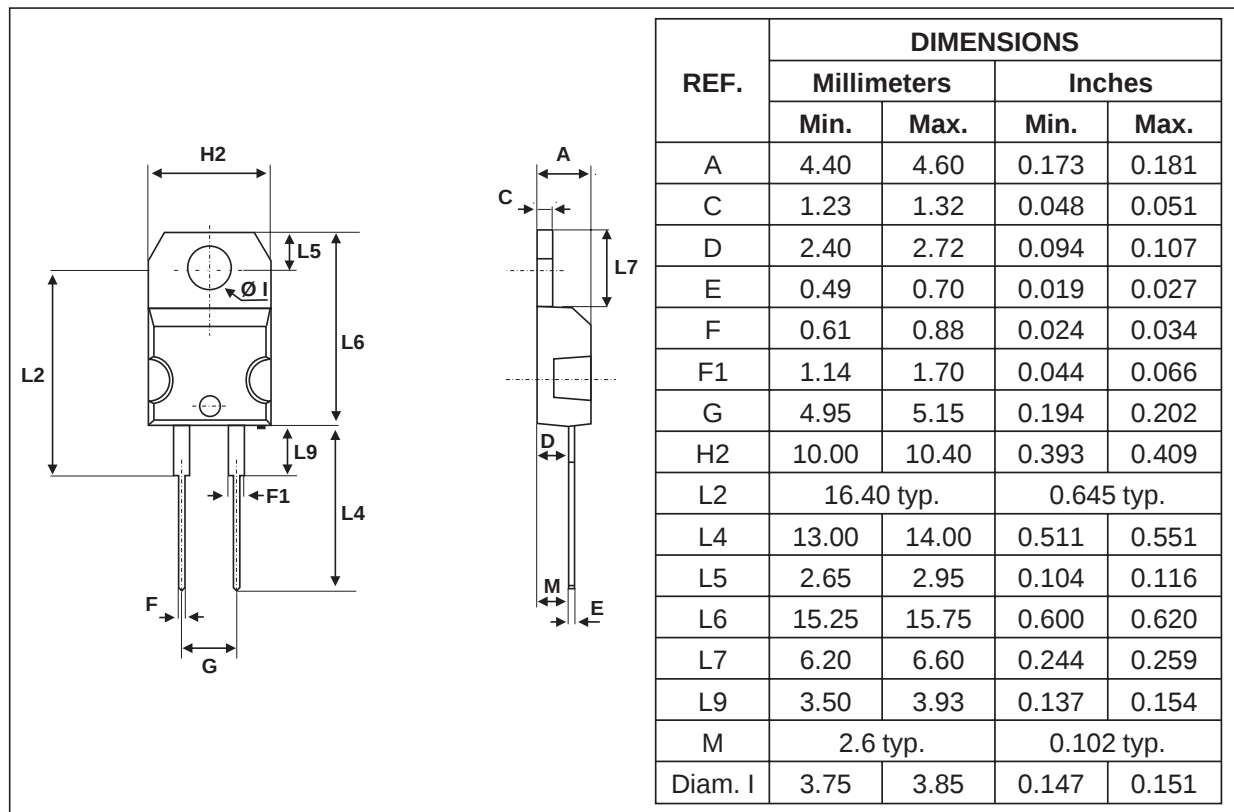
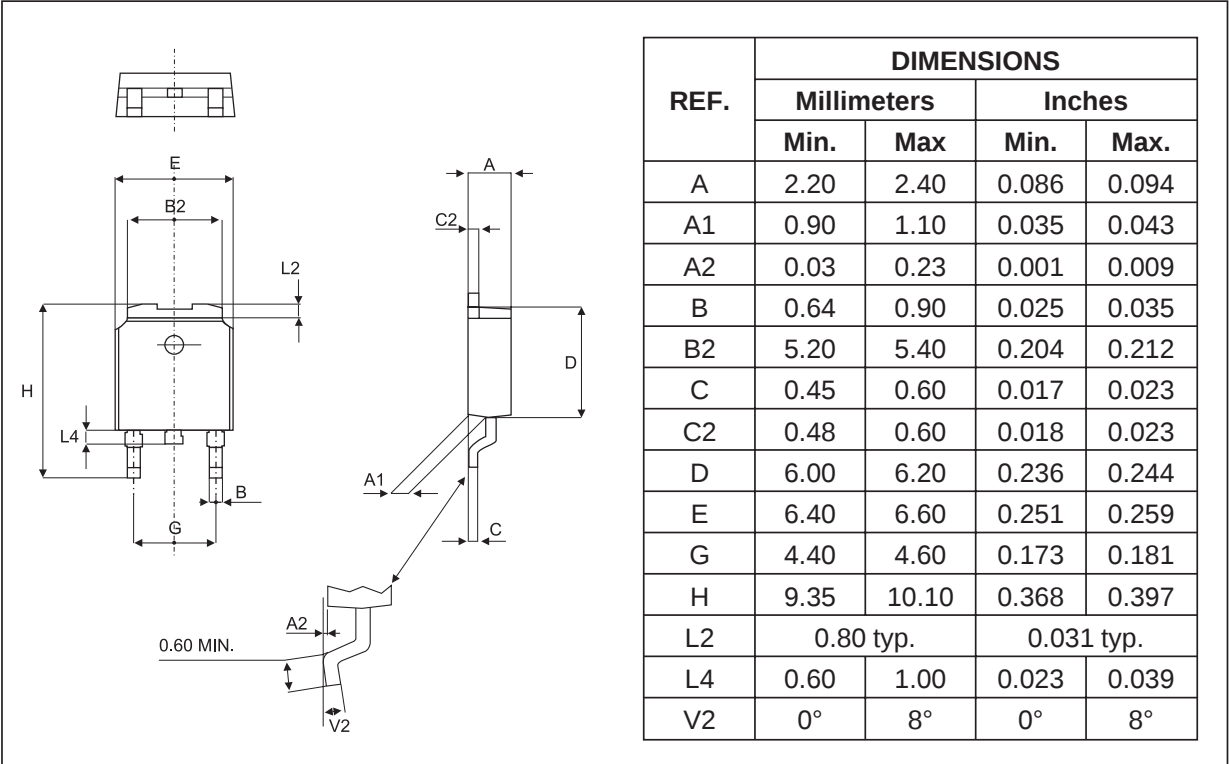


Fig. 12: Thermal resistance junction to ambient versus copper surface under tab (epoxy printed circuit board FR4, Cu=35μm) (DPAK and D²PAK).

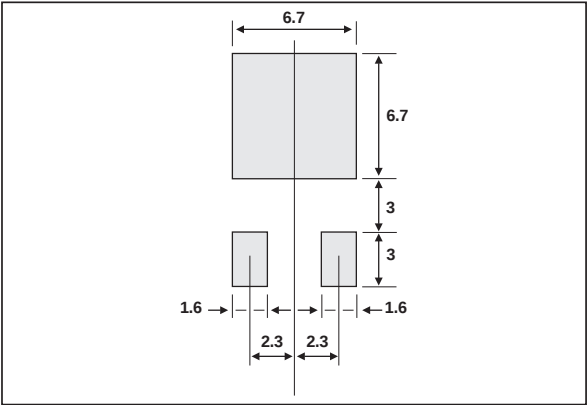


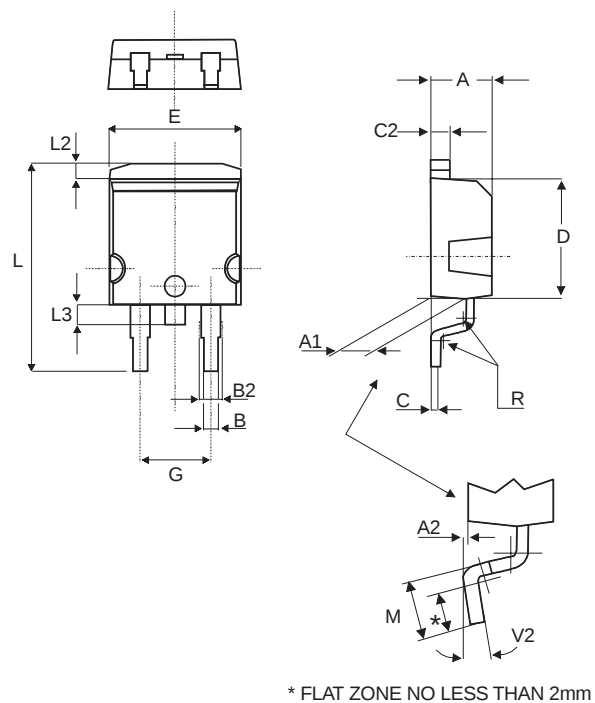
PACKAGE MECHANICAL DATA
TO-220FPAC

PACKAGE MECHANICAL DATA
TO-220AC


PACKAGE MECHANICAL DATA
DPAK

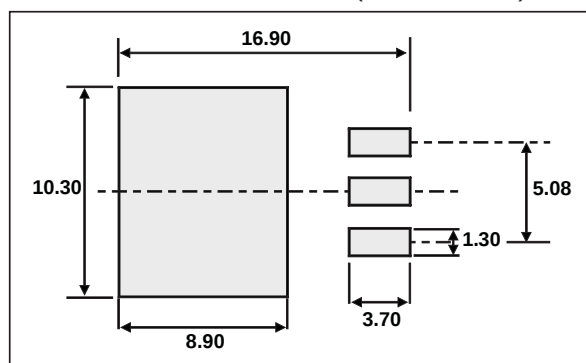


FOOT PRINT DIMENSIONS (in millimeters)
DPAK



PACKAGE MECHANICAL DATA
D²PAK


REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.49	2.69	0.098	0.106
A2	0.03	0.23	0.001	0.009
B	0.70	0.93	0.027	0.037
B2	1.14	1.70	0.045	0.067
C	0.45	0.60	0.017	0.024
C2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
E	10.00	10.40	0.393	0.409
G	4.88	5.28	0.192	0.208
L	15.00	15.85	0.590	0.624
L2	1.27	1.40	0.050	0.055
L3	1.40	1.75	0.055	0.069
M	2.40	3.20	0.094	0.126
R	0.40 typ.		0.016 typ.	
V2	0°	8°	0°	8°

FOOT PRINT DIMENSIONS (in millimeters)


Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH5R06D	STTH5R06D	TO-220AC	1.9 g	50	Tube
STTH5R06FP	STTH5R06FP	TO-220FPAC	1.7 g	50	Tube
STTH5R06B	STTH5R06B	DPAK	0.3 g	75	Tube
STTH5R06B-TR	STTH5R06B	DPAK	0.3 g	2500	Tape & reel
STTH5R06G	STTH5R06G	D ² PAK	1.48 g	50	Tube
STTH5R06G-TR	STTH5R06G	D ² PAK	1.48 g	1000	Tape & reel

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

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied.

STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics

© 2002 STMicroelectronics - Printed in Italy - All rights reserved.

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - Finland - France - Germany
Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore
Spain - Sweden - Switzerland - United Kingdom - United States.

<http://www.st.com>