

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

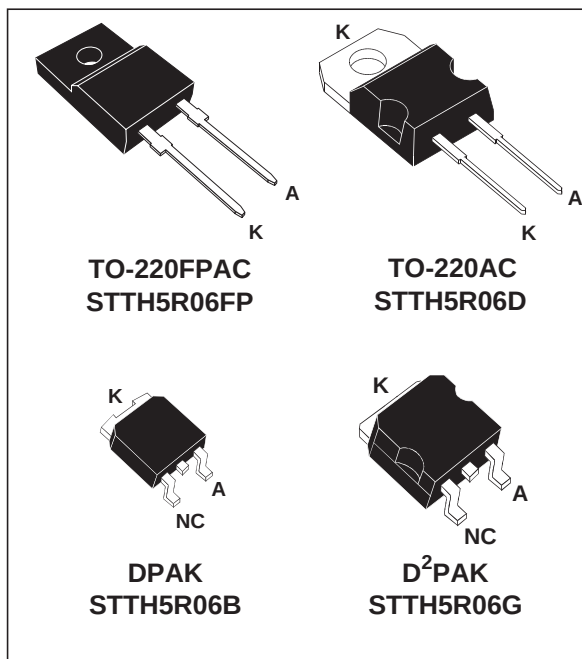
FEATURES AND BENEFITS

- 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.

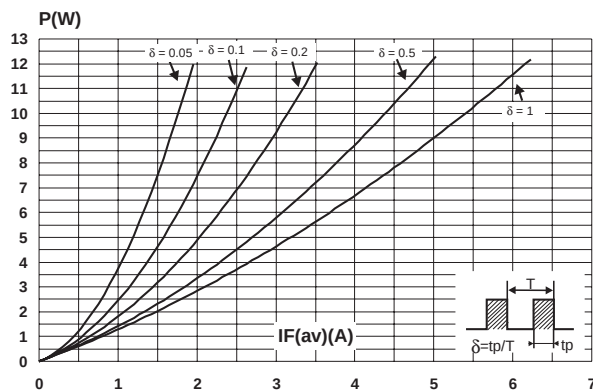


Fig. 2: Forward voltage drop versus forward current.

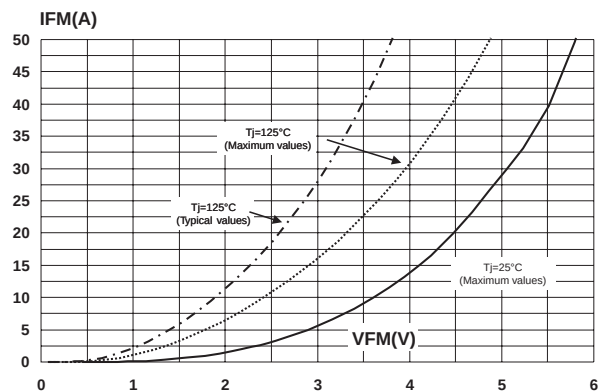


Fig. 3-1: Relative variation of thermal impedance junction to case versus pulse duration (TO-220AC, DPAK, D²PAK).

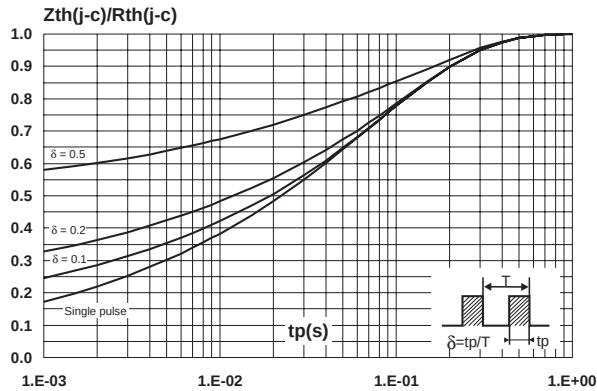


Fig. 3-2: Relative variation of thermal impedance junction to case versus pulse duration (TO-220FPAC).

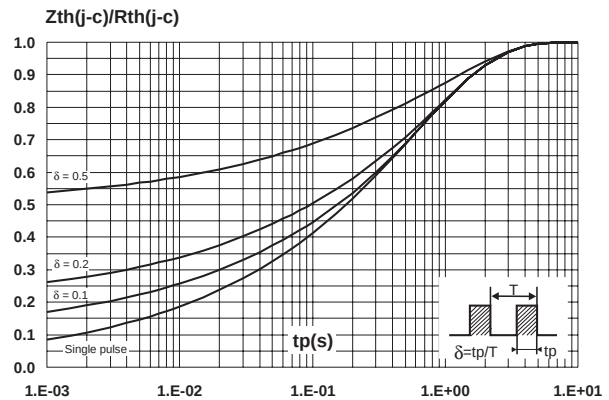


Fig. 4: Peak reverse recovery current versus dI_F/dt (90% confidence).

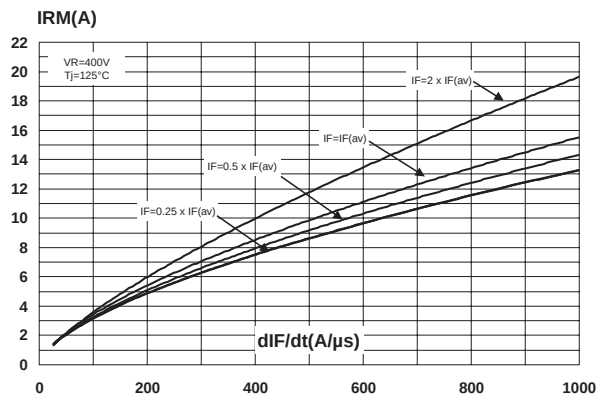


Fig. 5: Reverse recovery time versus dI_F/dt (90% confidence).

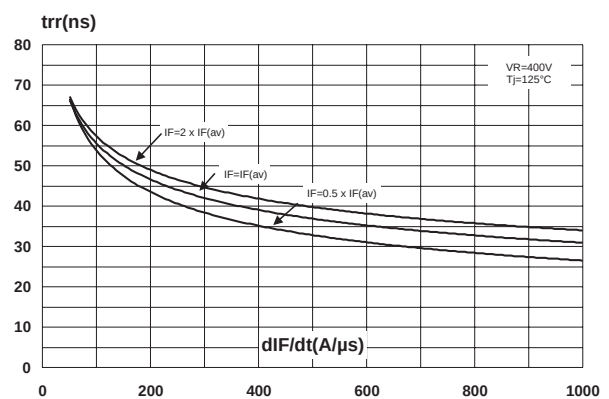


Fig. 6: Reverse recovery charges versus dI_F/dt (90% confidence).

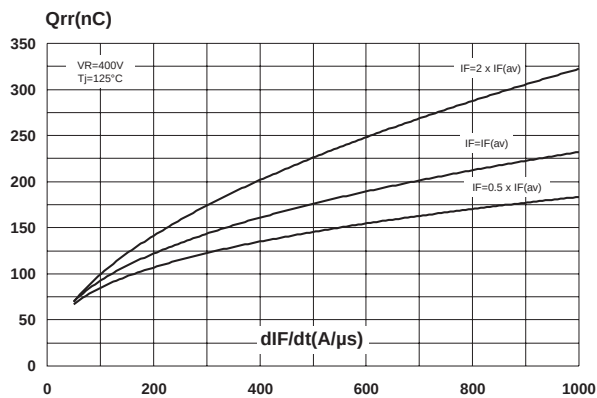


Fig. 7: Softness factor versus dI_F/dt (typical values).

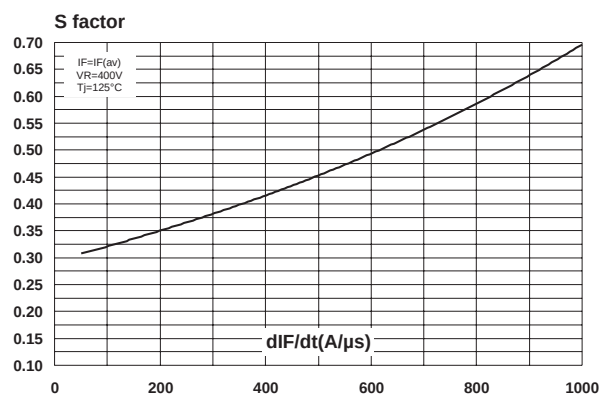


Fig. 8: Relative variation of dynamic parameters versus junction temperature.

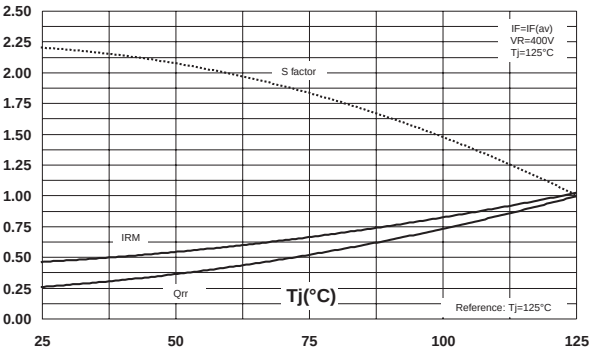


Fig. 9: Transient peak forward voltage versus dI_F/dt (90% confidence).

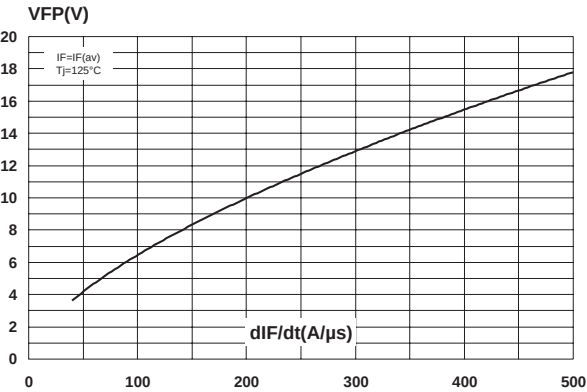


Fig. 10: Forward recovery time versus dI_F/dt (90% confidence).

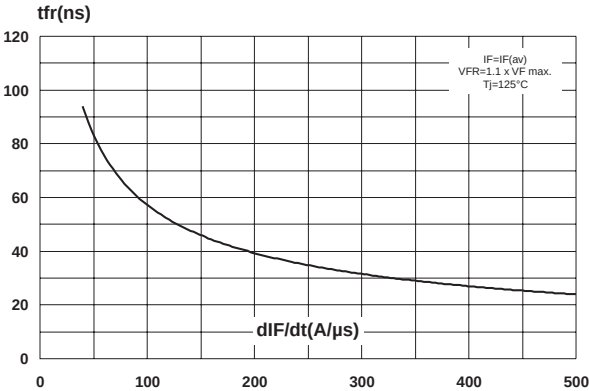


Fig. 11: Junction capacitance versus reverse voltage applied (typical values).

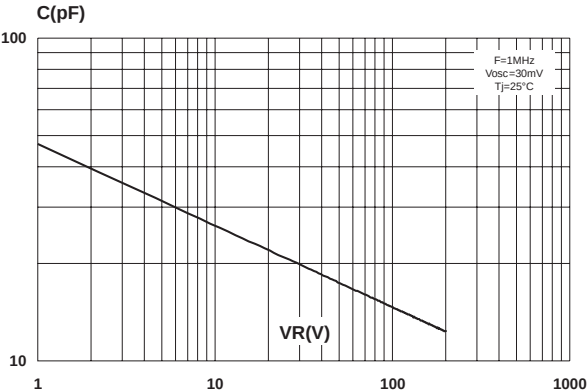
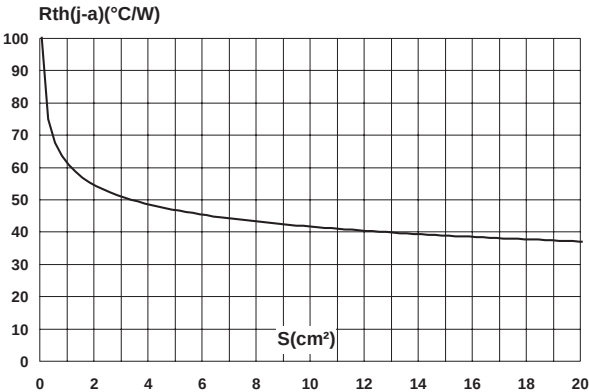
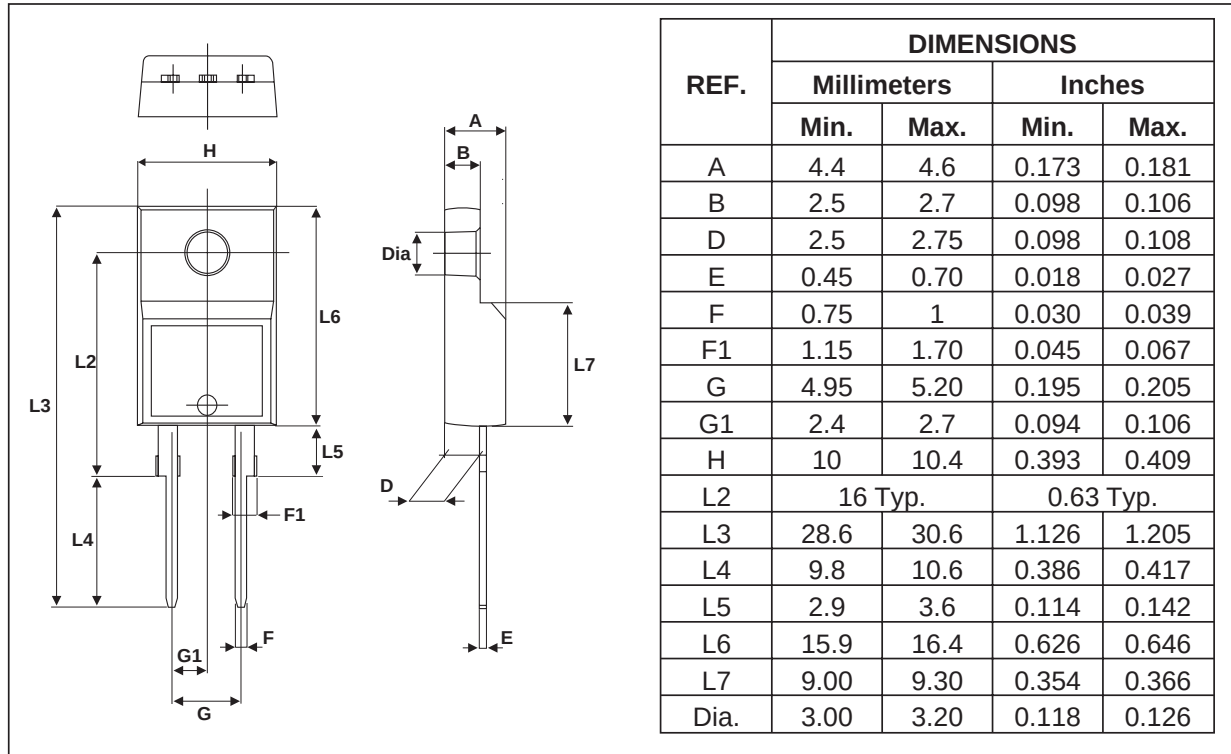
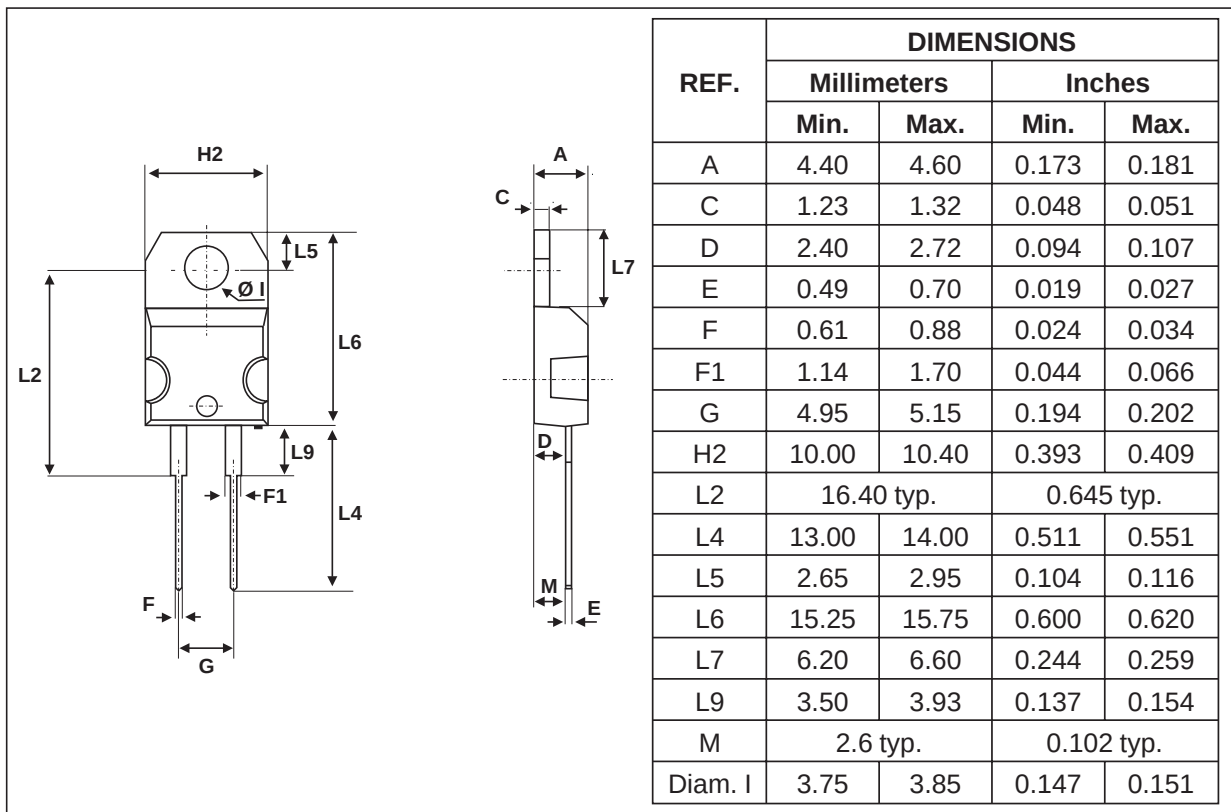
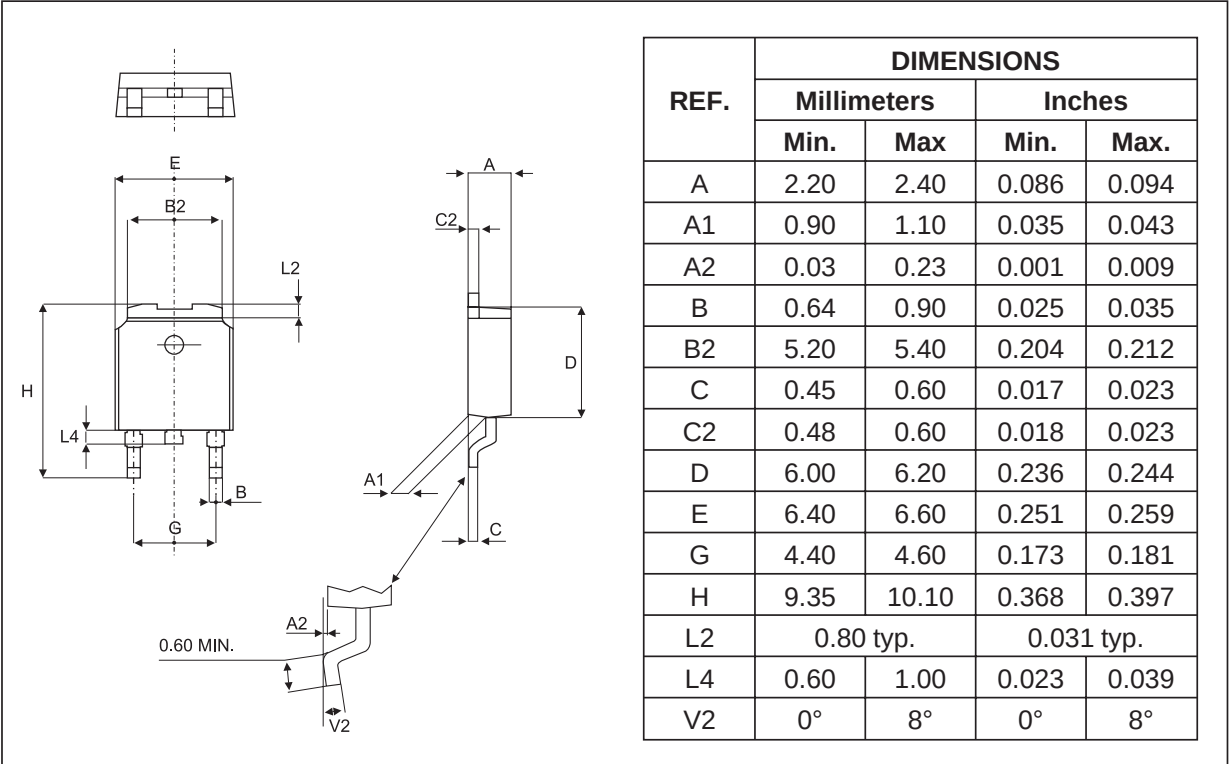


Fig. 12: Thermal resistance junction to ambient versus copper surface under tab (epoxy printed circuit board FR4, Cu=35μm) (DPAK and D²PAK).

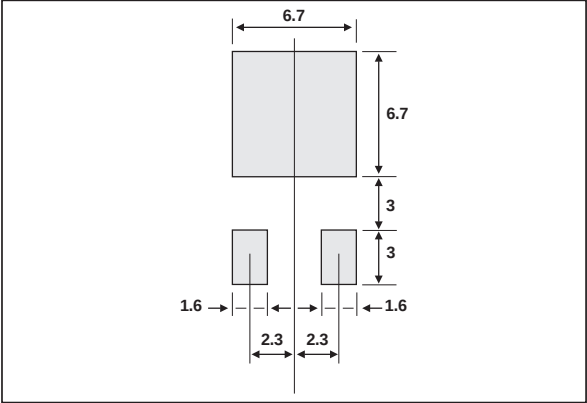


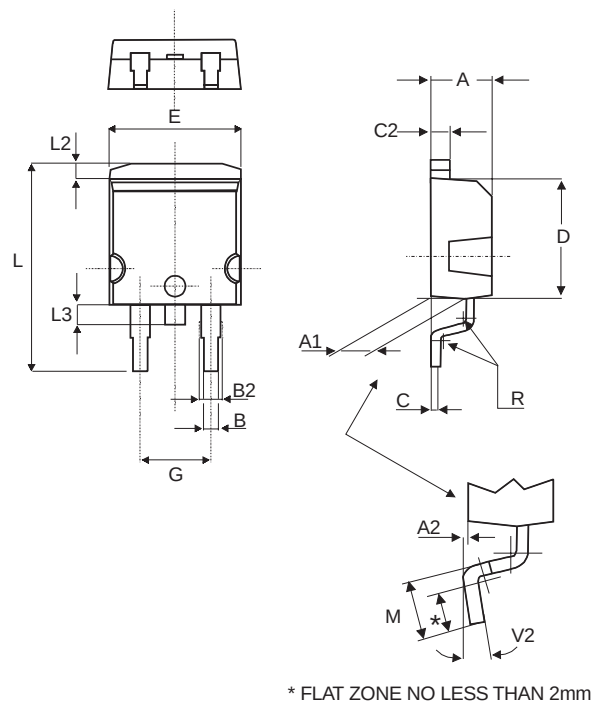
PACKAGE MECHANICAL DATA
TO-220FPAC

PACKAGE MECHANICAL DATA
TO-220AC


PACKAGE MECHANICAL DATA
DPAK

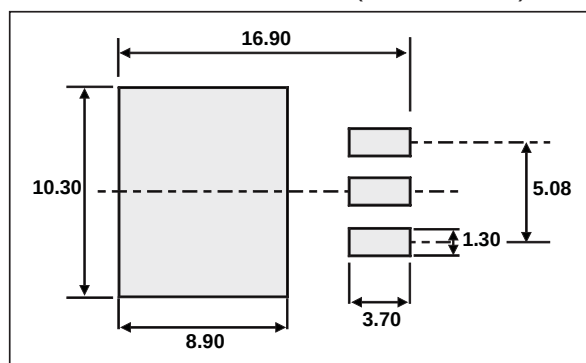


FOOT PRINT DIMENSIONS (in millimeters)
DPAK



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

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