



STTH2003CT/CG/CF/CR/CFP

HIGH FREQUENCY SECONDARY RECTIFIER

MAJOR PRODUCT CHARACTERISTICS

$I_{F(AV)}$	2 x 10 A
V_{RRM}	300 V
T_j (max)	175 °C
V_F (max)	1 V
t_{rr} (max)	35 ns

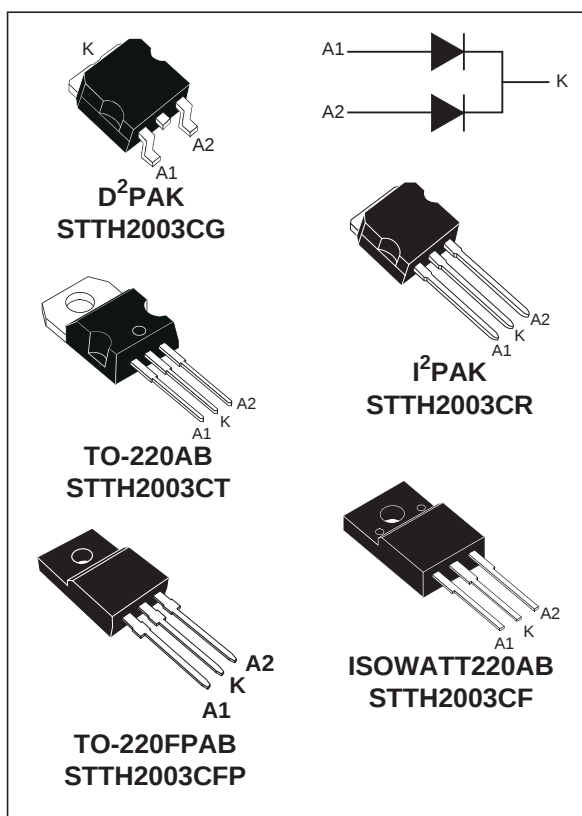
FEATURES AND BENEFITS

- COMBINES HIGHEST RECOVERY AND REVERSE VOLTAGE PERFORMANCE
- ULTRA-FAST, SOFT AND NOISE-FREE RECOVERY
- INSULATED PACKAGES: ISOWATT220AB, TO-220FPAB
Electric insulation: 2000VDC
Capacitance: 12pF

DESCRIPTION

Dual center tap Fast Recovery Epitaxial Diodes suited for Switch Mode Power Supply and high frequency DC/DC converters.

Packaged in TO-220AB, ISOWATT220AB, TO-220FPAB, I²PAK or D²PAK, this device is especially intended for secondary rectification.



ABSOLUTE RATINGS (limiting values, per diode)

Symbol	Parameter				Value	Unit
V _{RRM}	Repetitive peak reverse voltage				300	V
I _{F(RMS)}	RMS forward current				30	A
I _{F(AV)}	Average forward current δ = 0.5	TO-220AB / D ² PAK / I ² PAK	Tc=140°C	Per diode Per device	10 20	A
		ISOWATT220AB	Tc=125°C			
		TO-220FPAB	Tc=115°C			
I _{FSM}	Surge non repetitive forward current		tp = 10 ms sinusoidal		110	A
I _{RSM}	Non repetitive avalanche current		tp = 20 μs square		5	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-220AB / D ² PAK / I ² PAK	Per diode	2.5	°C/W
			Total	1.3	
		ISOWATT220AB	Per diode	3.9	
			Total	3.2	
		TO-220FPAB	Per diode	4.6	
			Total	4	
$R_{th(c)}$		TO-220AB / D ² PAK / I ² PAK	Coupling	0.1	
		ISOWATT220AB	Coupling	2.5	
		TO-220FPAB	Coupling	3.5	

STATIC ELECTRICAL CHARACTERISTICS (per diode)

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
I_R^*	Reverse leakage current	$V_R = 300\text{ V}$	$T_j = 25^\circ\text{C}$			20	μA
			$T_j = 125^\circ\text{C}$		30	300	
V_F^{**}	Forward voltage drop	$I_F = 10\text{ A}$	$T_j = 25^\circ\text{C}$			1.25	V
			$T_j = 125^\circ\text{C}$		0.85	1	

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

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

To evaluate the maximum conduction losses use the following equation :

$$P = 0.75 \times I_{F(AV)} + 0.025 I_{F(RMS)}^2$$

RECOVERY CHARACTERISTICS

Symbol	Tests conditions			Min.	Typ.	Max.	Unit
trr	I _F = 0.5 A	I _{rr} = 0.25 A	I _R = 1 A	T _j = 25°C		25	ns
	I _F = 1 A	dI _F /dt = - 50 A/μs V _R = 30 V				35	
tfr	I _F = 10 A dI _F /dt = 100 A/μs			T _j = 25°C		230	ns
V _{FP}	V _{FR} = 1.1 x V _F max.					3.5	V
S _{factor}	V _{CC} = 200V I _F = 10 A			T _j = 125°C	0.3		-
I _{RM}	dI _F /dt = 200 A/μs					8	A

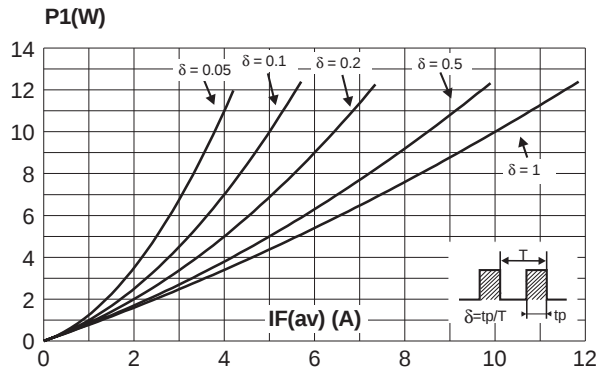
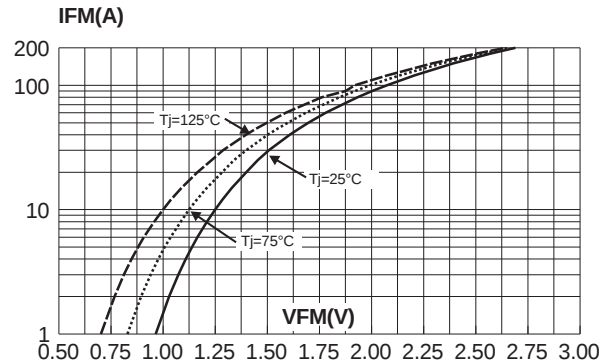
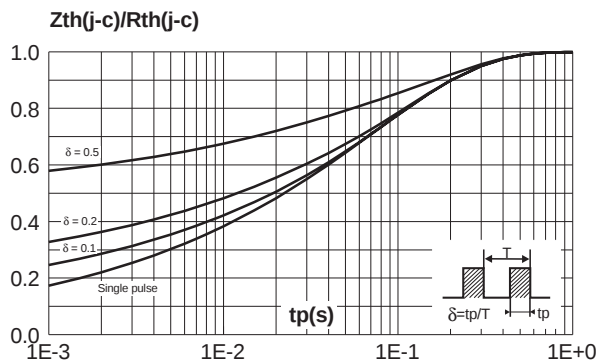
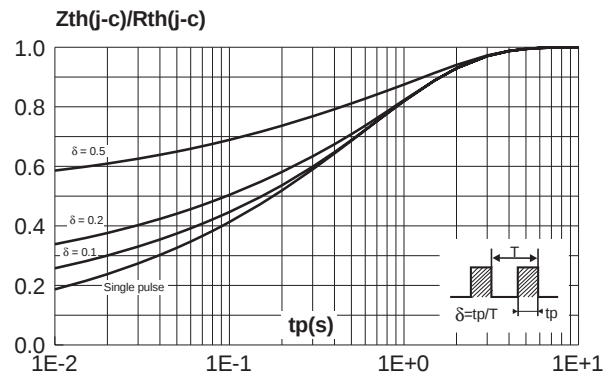
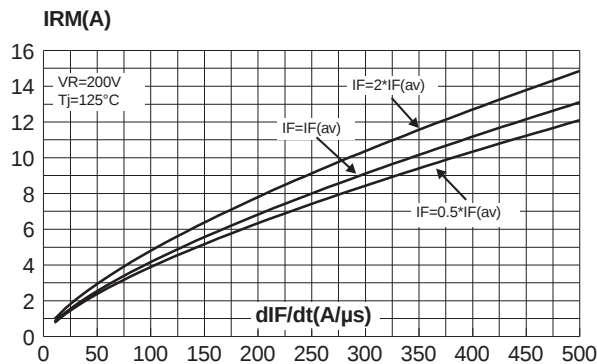
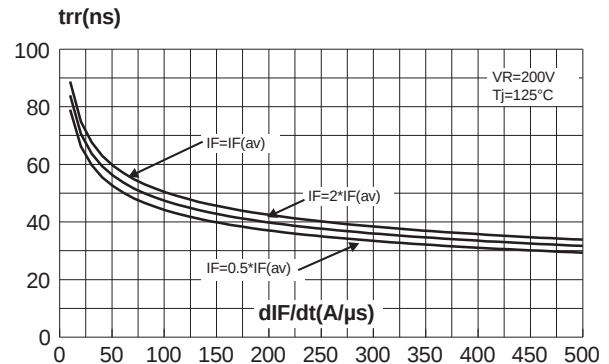
Fig. 1: Conduction losses versus average current (per diode).**Fig. 2:** Forward voltage drop versus forward current (maximum values, per diode).**Fig. 3-1:** Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB / D²PAK / I²PAK).**Fig. 3-2:** Relative variation of thermal impedance junction to case versus pulse duration (ISOWATT220AB).**Fig. 4:** Peak reverse recovery current versus dI_F/dt (90% confidence, per diode).**Fig. 5:** Reverse recovery time versus dI_F/dt (90% confidence, per diode).

Fig. 6: Softness factor (t_b/t_a) versus dI_F/dt (typical values, per diode).

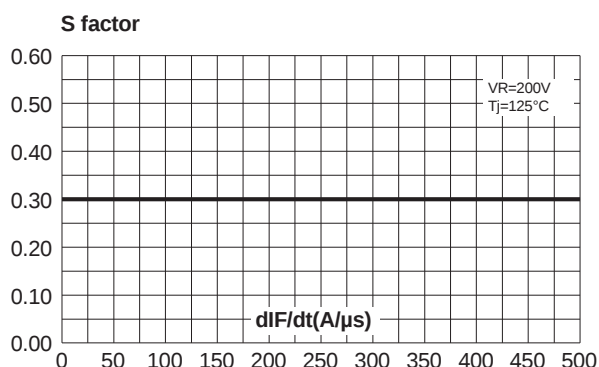


Fig. 8: Transient peak forward voltage versus dI_F/dt (90% confidence, per diode) (TO-220AB).

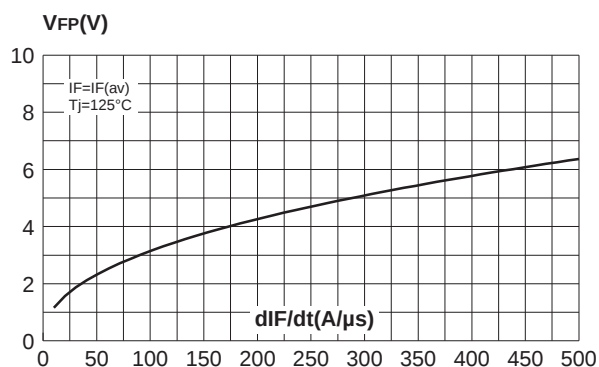


Fig. 10: Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, copper thickness: 35μm) (D²PAK).

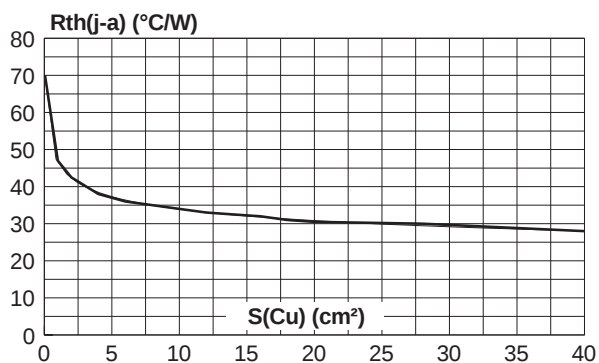


Fig. 7: Relative variation of dynamic parameters versus junction temperature (reference: $T_j = 125^\circ C$).

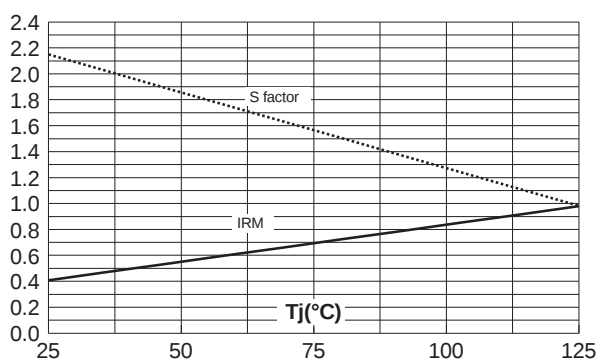
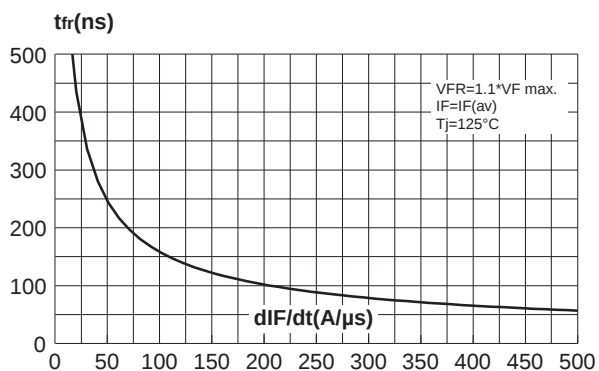
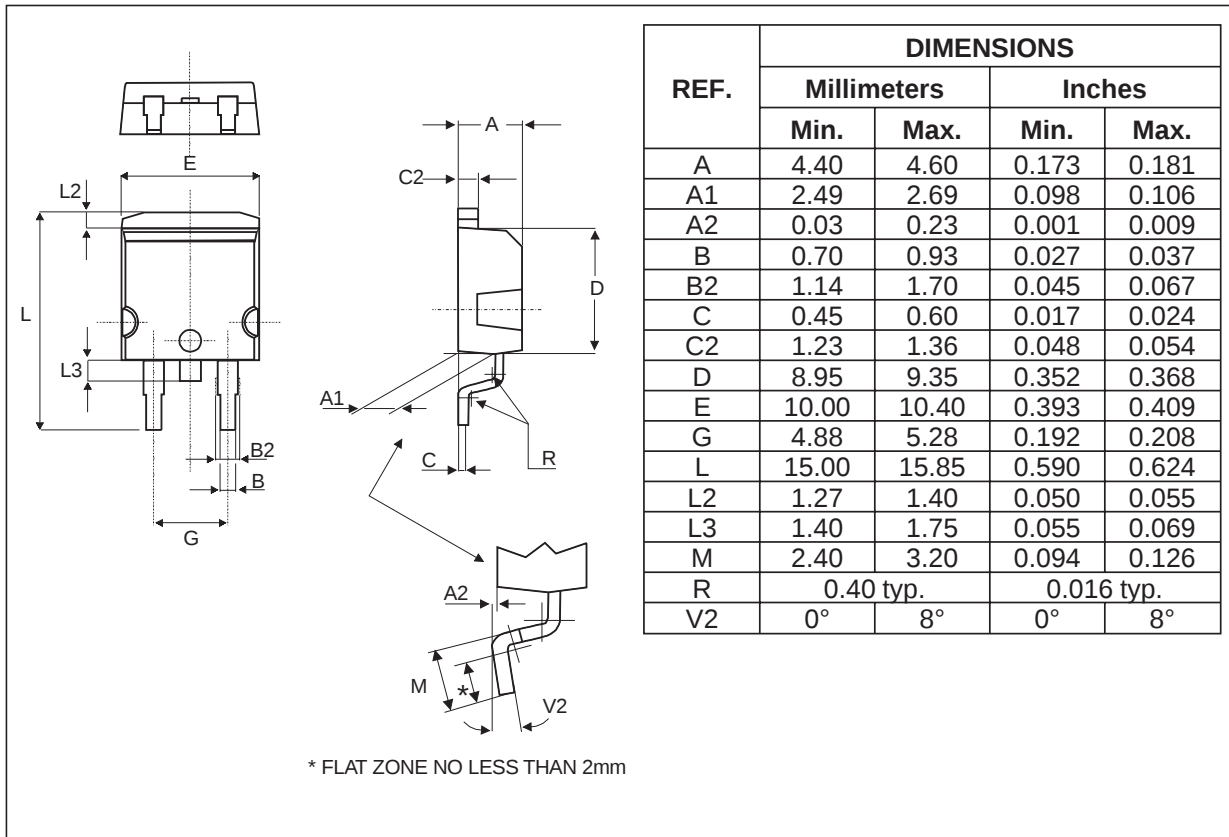
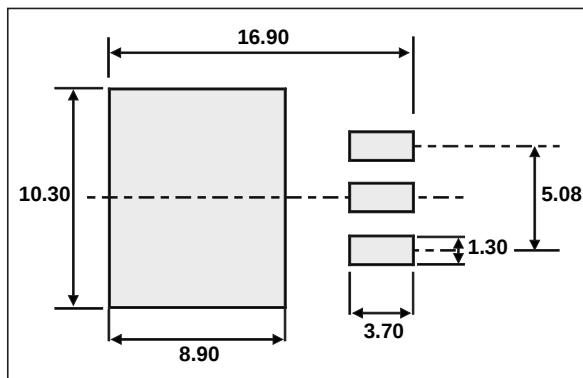
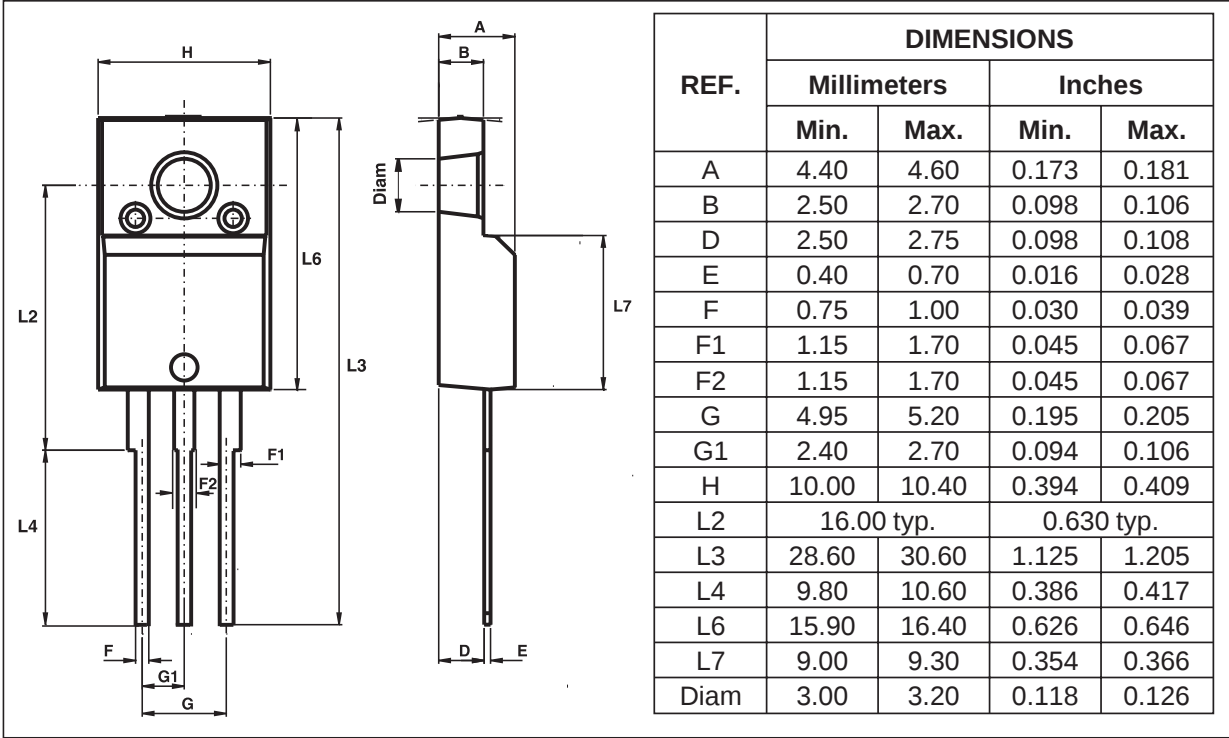


Fig. 9: Forward recovery time versus dI_F/dt (90% confidence, per diode).

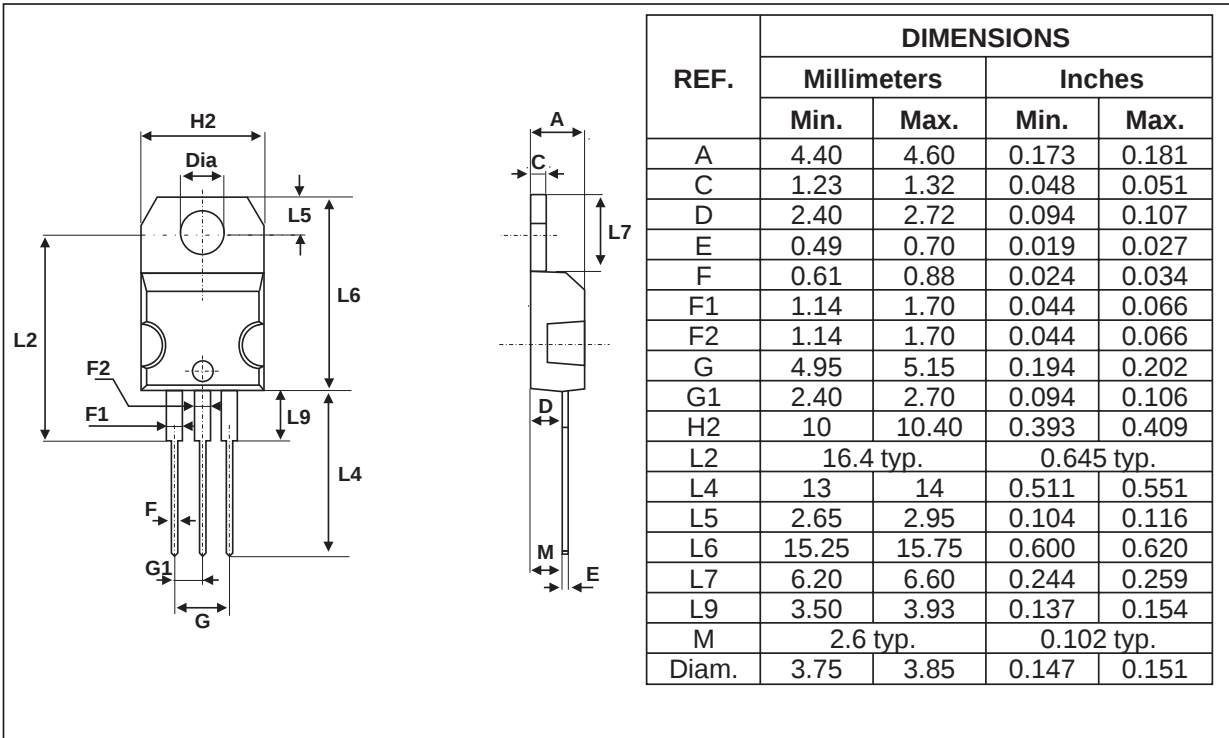


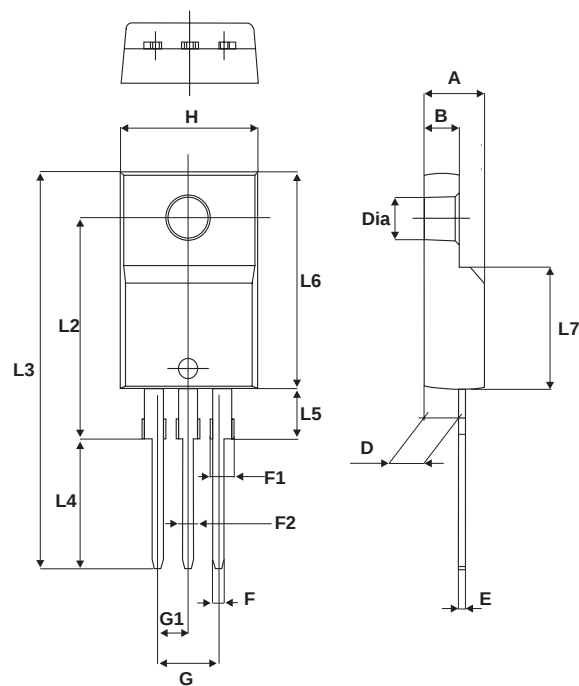
PACKAGE MECHANICAL DATA
D²PAK

FOOT PRINT DIMENSIONS (in millimeters)
D²PAK


PACKAGE MECHANICAL DATA
ISOWATT220AB

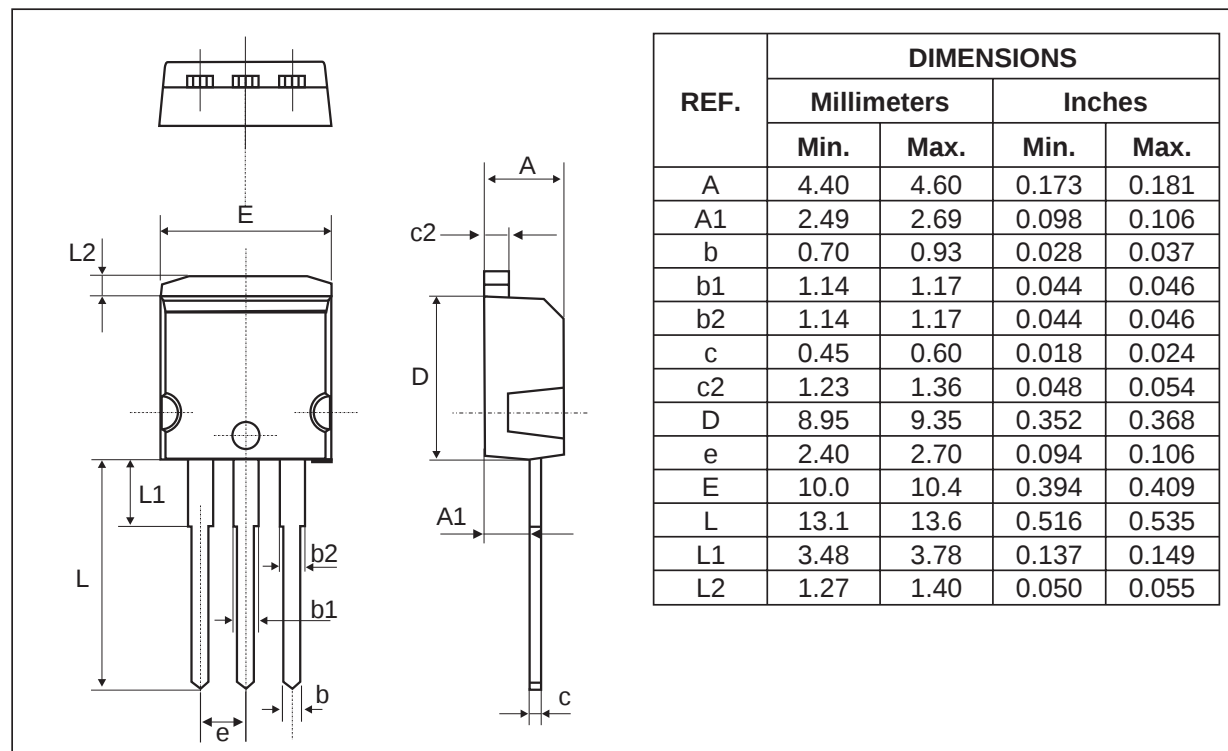


PACKAGE MECHANICAL DATA
TO-220AB



PACKAGE MECHANICAL DATA
 TO-220FPAB


REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	0.173	0.181
B	2.5	2.7	0.098	0.106
D	2.5	2.75	0.098	0.108
E	0.45	0.70	0.018	0.027
F	0.75	1	0.030	0.039
F1	1.15	1.70	0.045	0.067
F2	1.15	1.70	0.045	0.067
G	4.95	5.20	0.195	0.205
G1	2.4	2.7	0.094	0.106
H	10	10.4	0.393	0.409
L2	16 Typ.		0.63 Typ.	
L3	28.6	30.6	1.126	1.205
L4	9.8	10.6	0.386	0.417
L5	2.9	3.6	0.114	0.142
L6	15.9	16.4	0.626	0.646
L7	9.00	9.30	0.354	0.366
Dia.	3.00	3.20	0.118	0.126

PACKAGE MECHANICAL DATA
I²PAK


Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH2003CT	STTH2003CT	TO-220AB	2.2 g	50	Tube
STTH2003CG	STTH2003CG	D ² PAK	1.48 g	50	Tube
STTH2003CG-TR	STTH2003CG	D2PAK	1.48 g	500	Tape & reel
STTH2003CF	STTH2003CF	ISOWATT220AB	2.08 g	50	Tube
STTH2003CFP	STTH2003CFP	TO-220FPAB	2.08 g	50	Tube
STTH2003CR	STTH2003CR	I ² PAK	1.49 g	50	Tube

- Cooling method: by conduction (C)
- Recommended torque value: 0.55 N.m.
- Maximum torque value: 0.70 N.m.
- Epoxy meets UL 94,V0

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