

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

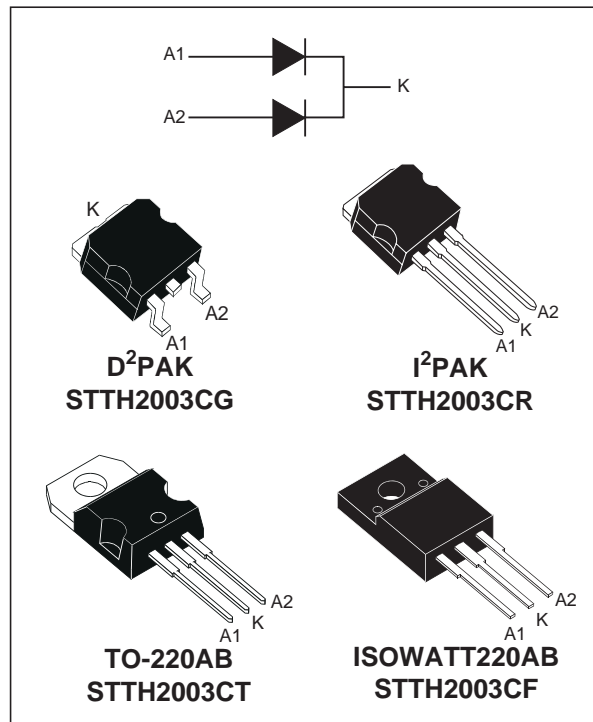
FEATURES AND BENEFITS

- COMBINES HIGHEST RECOVERY AND REVERSE VOLTAGE PERFORMANCE
- ULTRA-FAST, SOFT AND NOISE-FREE RECOVERY

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, 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 $\delta = 0.5$	TO-220AB / D ² PAK / I ² PAK	$T_c = 140^\circ\text{C}$	Per diode Per device	10 20	A
		ISOWATT220AB	$T_c = 125^\circ\text{C}$			
I_{FSM}	Surge non repetitive forward current		$t_p = 10 \text{ ms}$ sinusoidal	110	A	
I_{RSM}	Non repetitive avalanche current		$t_p = 20 \mu\text{s}$ 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	
R _{th(c)}		TO-220AB / D ² PAK / I ² PAK	Coupling	0.1	
		ISOWATT220AB	Coupling	2.5	

STATIC ELECTRICAL CHARACTERISTICS (per diode)

Symbol	Parameter	Tests conditions		Min.	Typ.	Max.	Unit
I _R [*]	Reverse leakage current	V _R = 300 V	T _j = 25°C			20	μA
			T _j = 125°C		30	300	
V _F ^{**}	Forward voltage drop	I _F = 10 A	T _j = 25°C			1.25	V
			T _j = 125°C		0.85	1	

Pulse test : * t_p = 5 ms, δ < 2 %

** t_p = 380 μs, δ < 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
t _{rr}	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	
t _{fr}	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	
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).

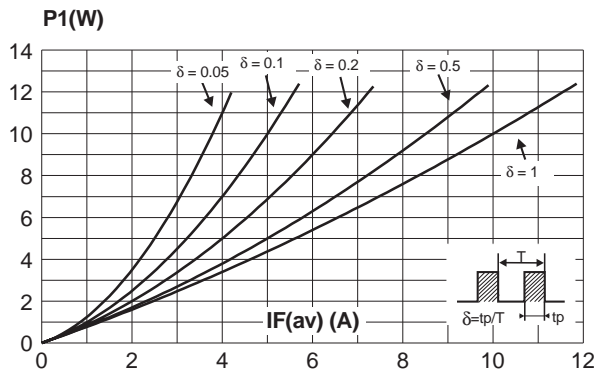


Fig. 2: Forward voltage drop versus forward current (maximum values, per diode).

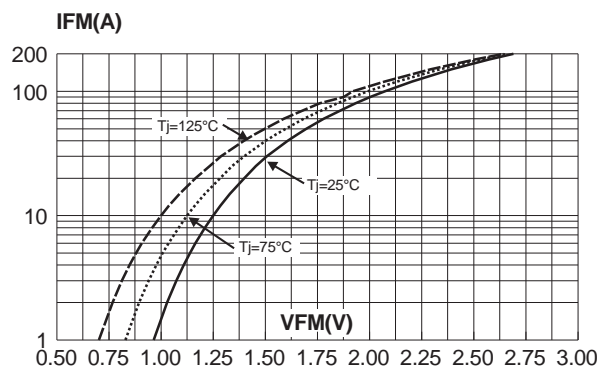


Fig. 3-1: Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB / D²PAK / I²PAK).

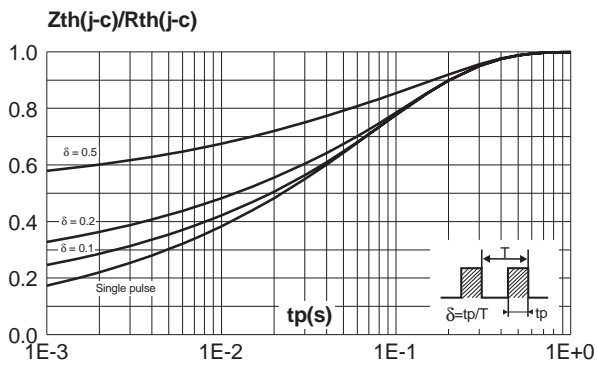


Fig. 3-2: Relative variation of thermal impedance junction to case versus pulse duration (ISOWATT220AB).

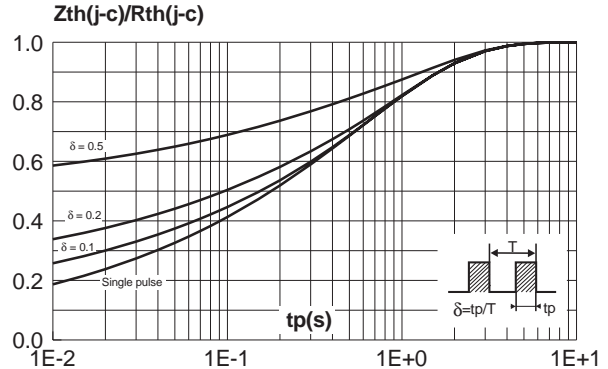


Fig. 4: Peak reverse recovery current versus di_F/dt (90% confidence, per diode).

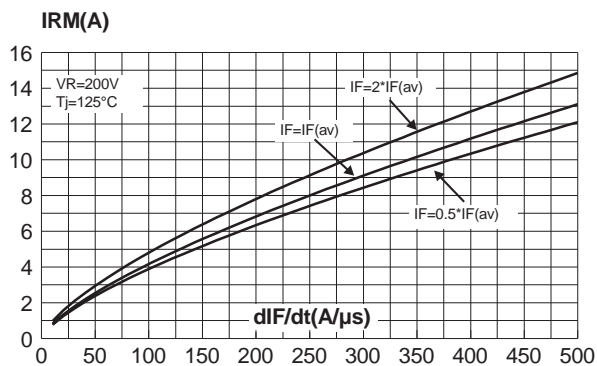


Fig. 5: Reverse recovery time versus di_F/dt (90% confidence, per diode).

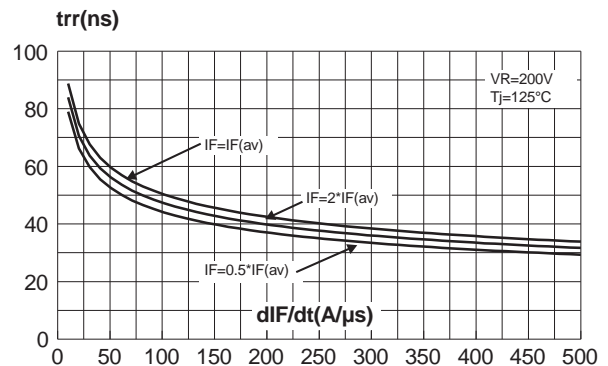


Fig. 6: Softness factor (tb/ta) versus dI_F/dt (typical values, per diode).

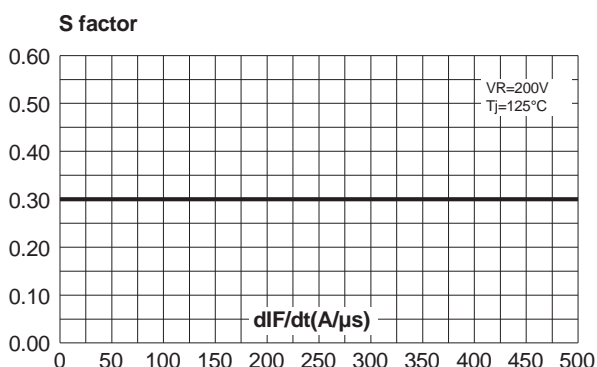


Fig. 7: Relative variation of dynamic parameters versus junction temperature (reference: $T_j = 125^\circ\text{C}$).

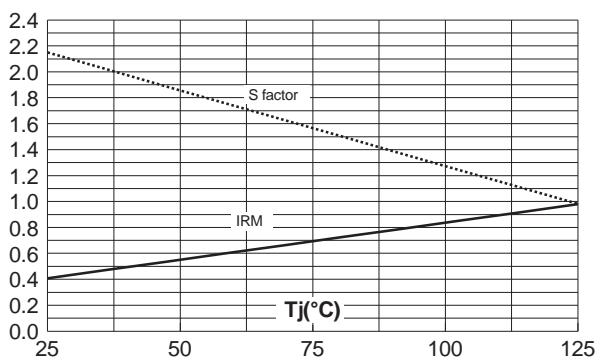


Fig. 8: Transient peak forward voltage versus dI_F/dt (90% confidence, per diode) (TO-220AB).

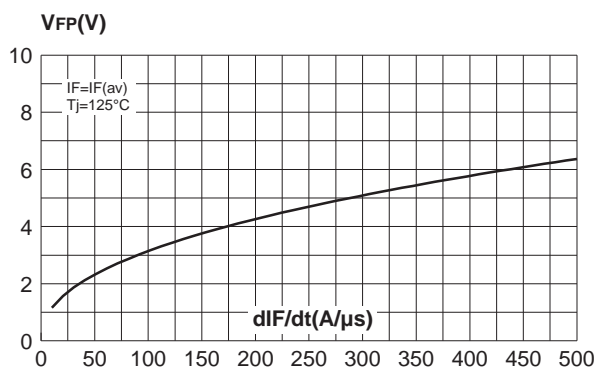


Fig. 9: Forward recovery time versus dI_F/dt (90% confidence, per diode).

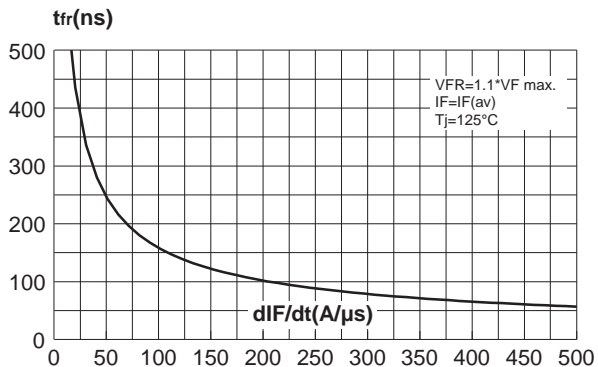
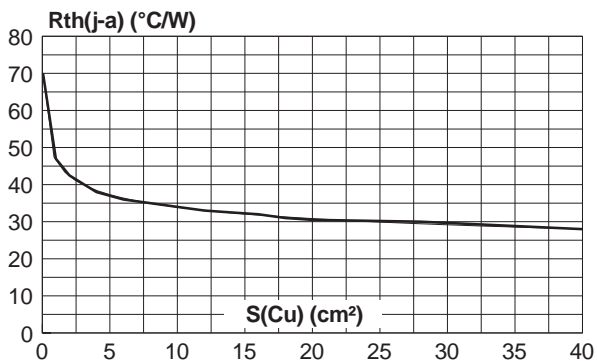
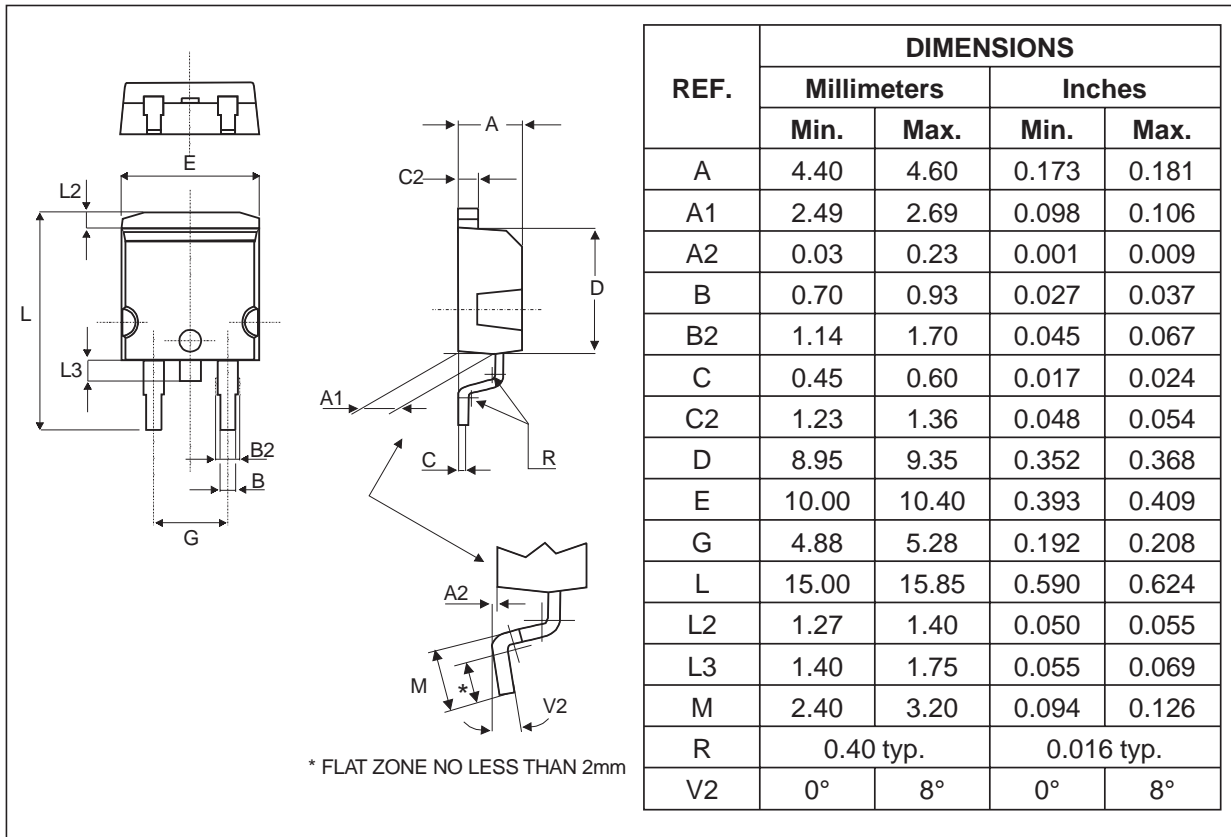


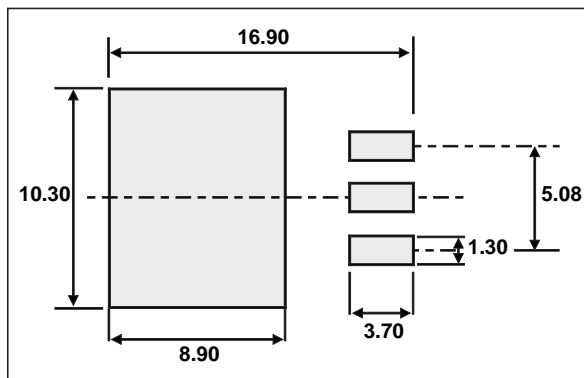
Fig. 10: Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, copper thickness: $35\mu\text{m}$) ($D^2\text{PAK}$).



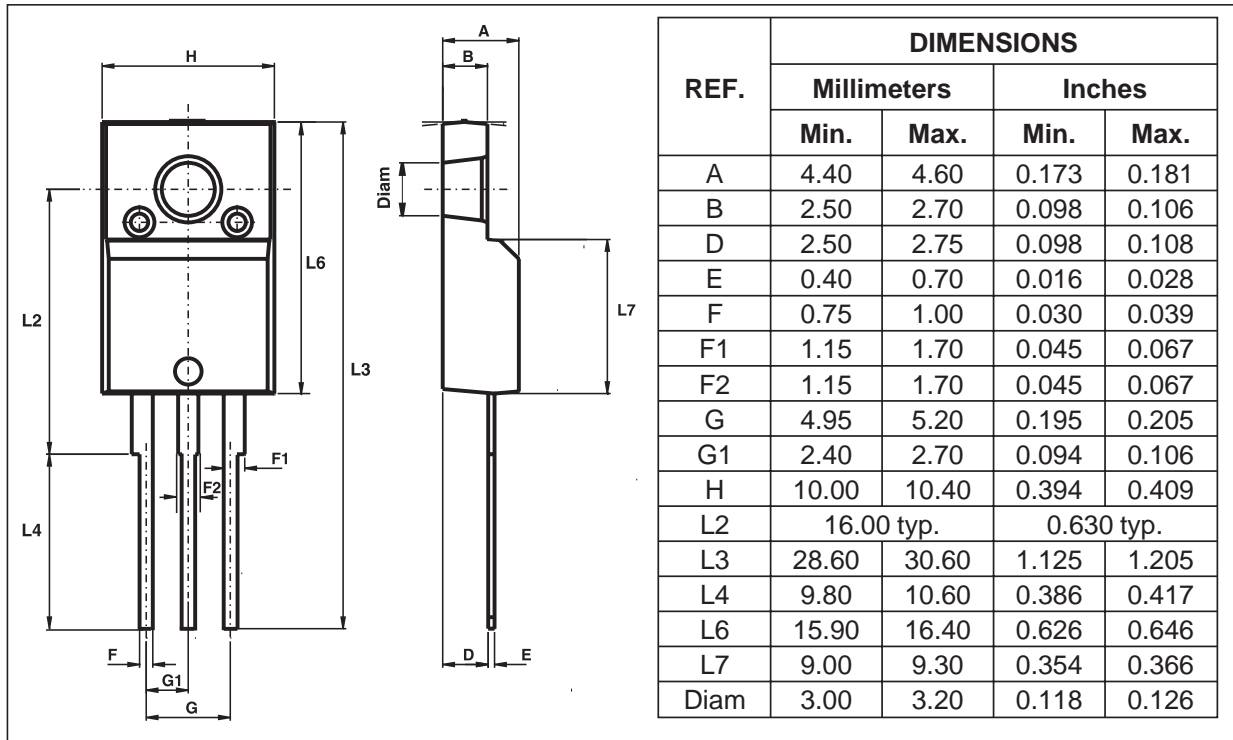
PACKAGE MECHANICAL DATA
D²PAK



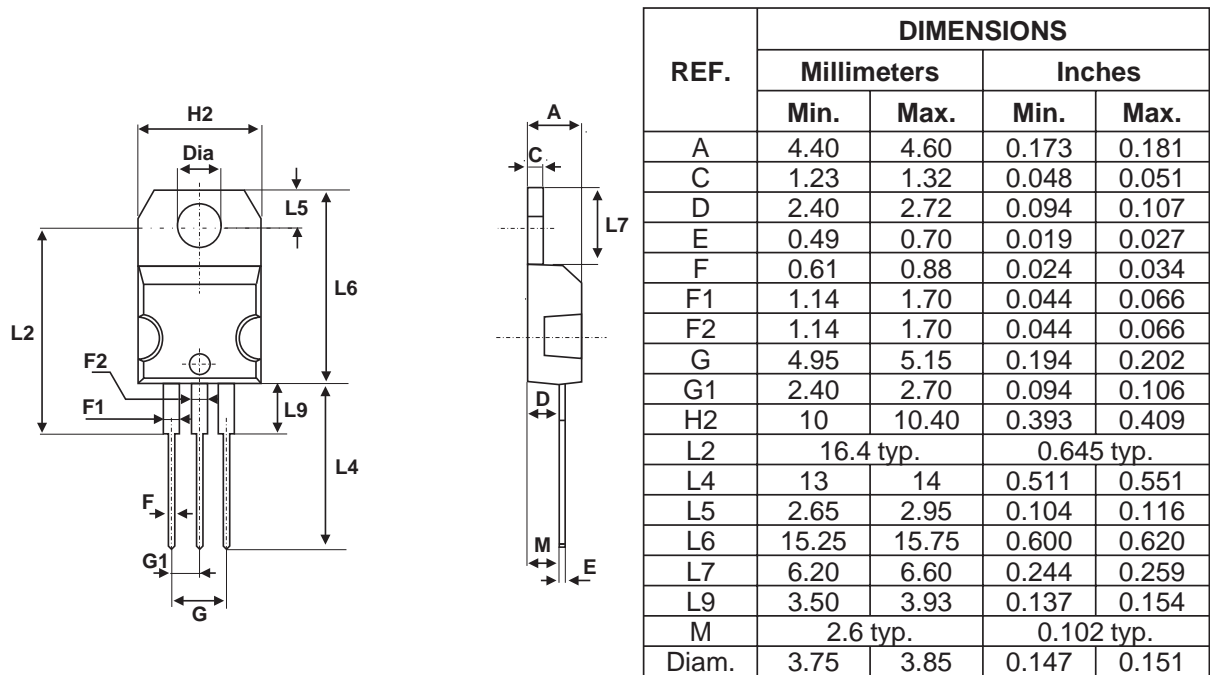
FOOT PRINT DIMENSIONS (in millimeters)
D²PAK

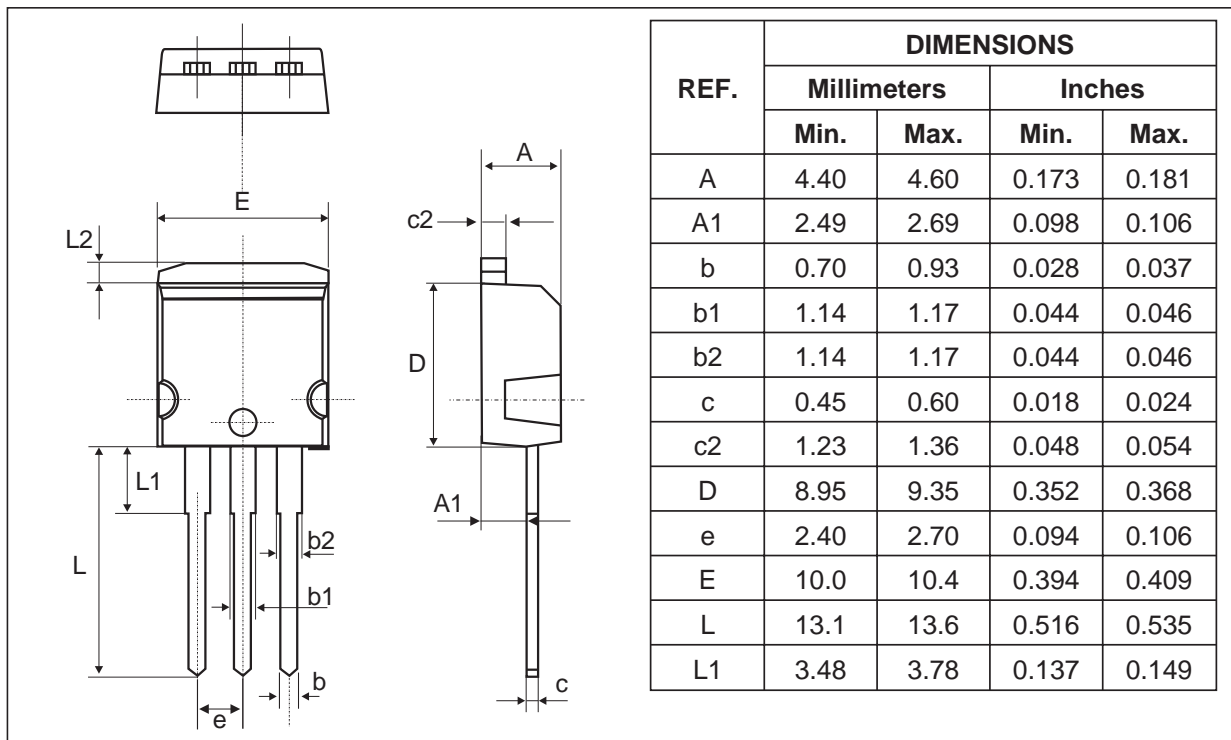


PACKAGE MECHANICAL DATA
ISOWATT220AB



PACKAGE MECHANICAL DATA
TO-220AB



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
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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