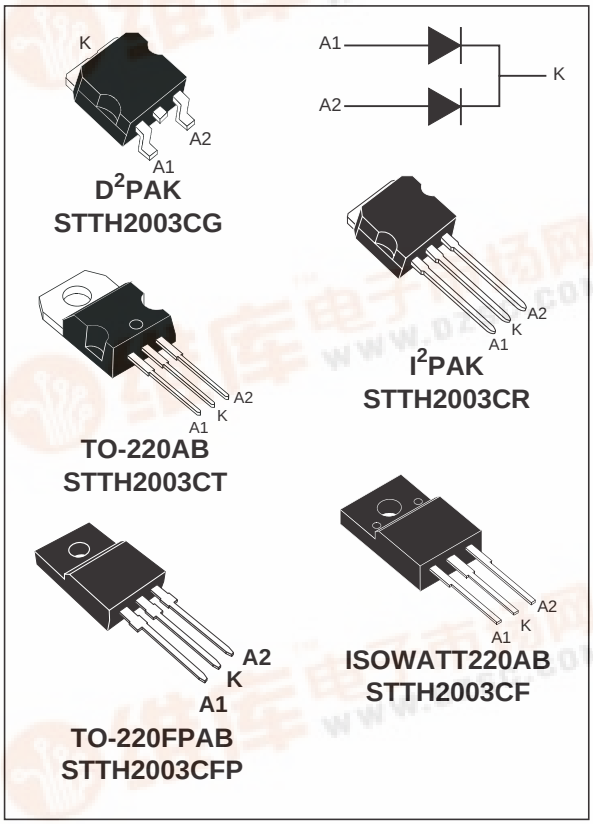
STTH2003CT/CG/CF/CR/CFP

HIGH FREQUENCY SECONDARY RECTIFIER

MAJOR PRODUCT CHARACTERISTICS

$I_{F(AV)}$	2 x 10 A
V_{RRM}	300 V
Tj (max)	175 °C
V_F (max)	1 V
trr (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, I^2PAK or D^2PAK, 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^2PAK / I^2PAK	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
Tj	Maximum operating junction temperature				175	°C

THERMAL RESISTANCES

Symbol	Parameter			Value	Unit
$R_{th\ (j-c)}$	Junction to case	TO-220AB / D^2PAK / I^2PAK	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^2PAK / I^2PAK	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 V	Tj = 25°C			20	µA
			Tj = 125°C		30	300	
V_F**	Forward voltage drop	I_F = 10 A	Tj = 25°C			1.25	V
			Tj = 125°C		0.85	1	

Pulse test : * tp = 5 ms, δ < 2 %

** tp = 380 µs, δ < 2%

To evaluate the maximum conduction losses use the following equation :
$P = 0.75 \times I_{F(AV)} + 0.025\ I_F{}^2{}_{(RMS)}$

RECOVERY CHARACTERISTICS

Symbol	Tests conditions		Min.	Typ.	Max.	Unit
trr	I_F = 0.5 A Irr = 0.25 A I_R = 1 A	Tj = 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	Tj = 25°C			230	ns
V_{FP}	V_{FR} = 1.1 x V_F max.				3.5	V
S_{factor}	Vcc = 200V I_F = 10 A	Tj = 125°C		0.3		-
I_{RM}	dI_F/dt = 200 A/µs				8	A

Fig. 1: Conduction losses versus average current (per diode).

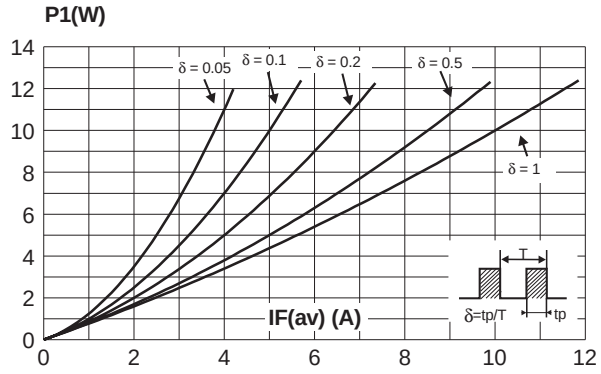


Fig. 2: Forward voltage drop versus forward current (maximum values, per diode).

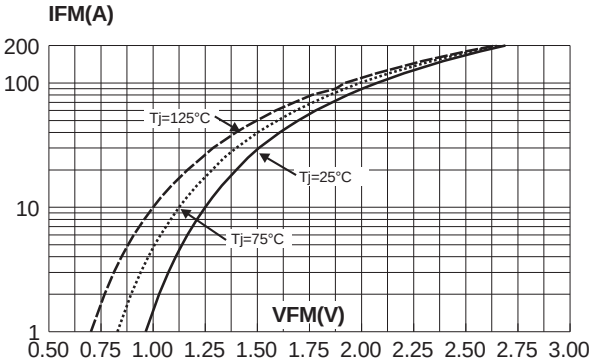


Fig. 3-1: Relative variation of thermal impedance junction to case versus pulse duration (TO-220AB / D^2PAK / I^2PAK).

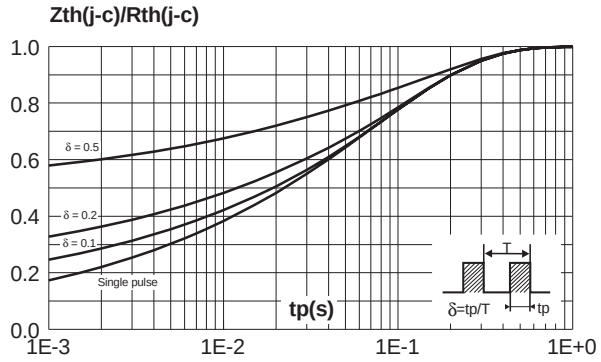


Fig. 3-2: Relative variation of thermal impedance junction to case versus pulse duration (ISOWATT220AB).

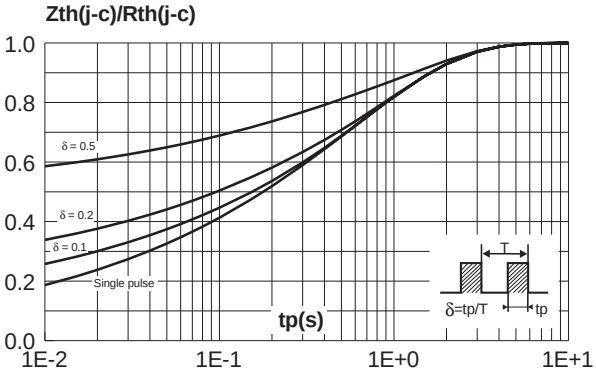


Fig. 4: Peak reverse recovery current versus dI_F/dt (90% confidence, per diode).

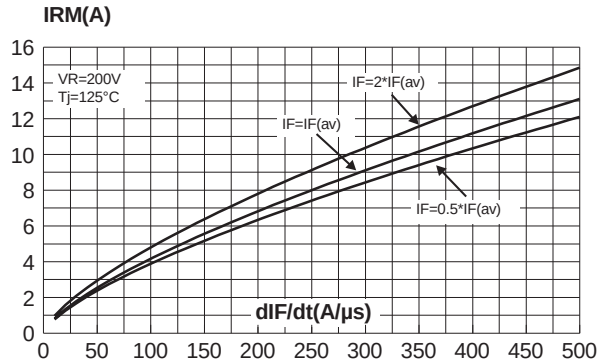


Fig. 5: Reverse recovery time versus dI_F/dt (90% confidence, per diode).

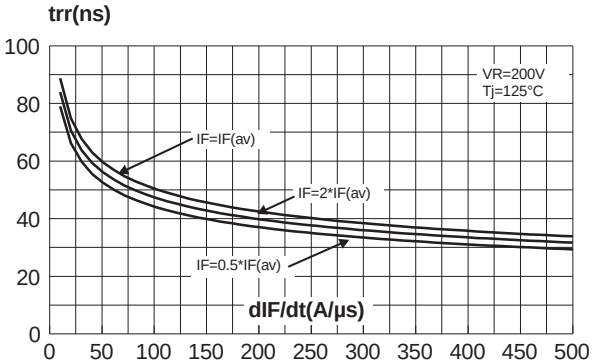


Fig. 6: Softness factor (tb/ta) versus dI_F/dt (typical values, per diode).

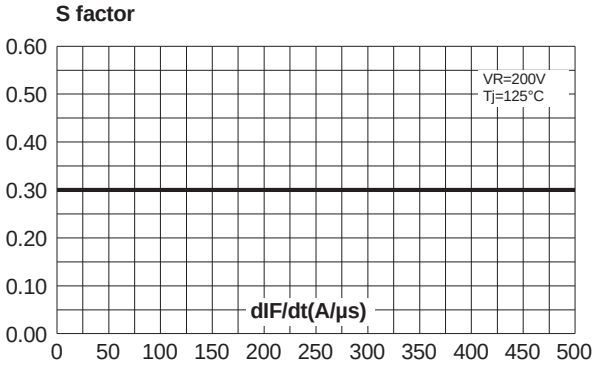


Fig. 7: Relative variation of dynamic parameters versus junction temperature (reference: Tj = 125°C).

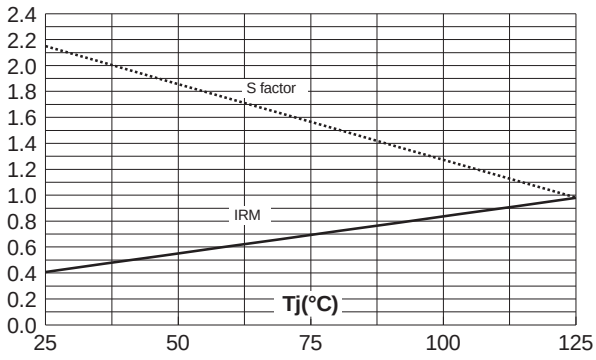


Fig. 8: Transient peak forward voltage versus dI_F/dt (90% confidence, per diode) (TO-220AB).

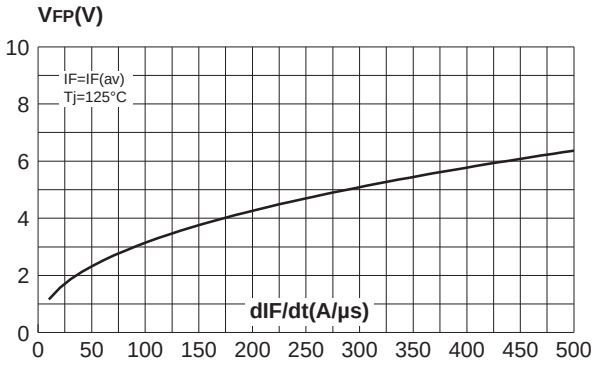


Fig. 9: Forward recovery time versus dI_F/dt (90% confidence, per diode).

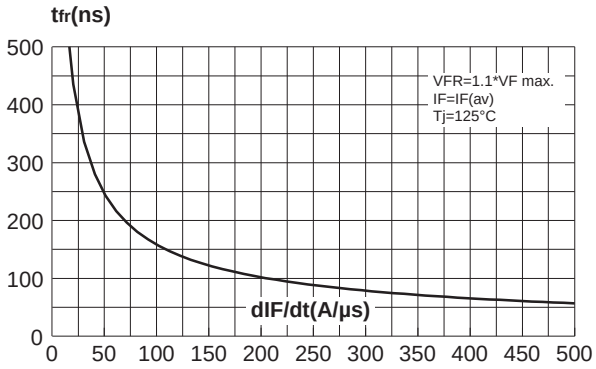
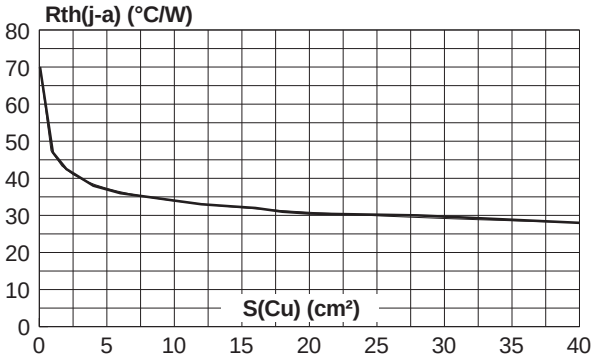
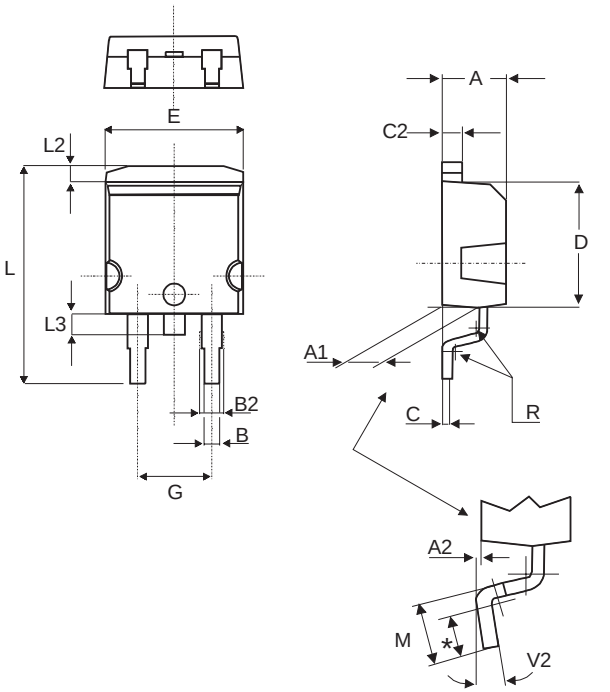


Fig. 10: Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, copper thickness: 35µm) (D^2PAK).



PACKAGE MECHANICAL DATA

D^2PAK

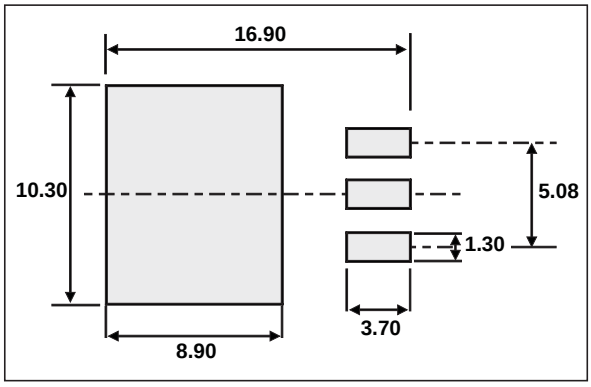


* FLAT ZONE NO LESS THAN 2mm

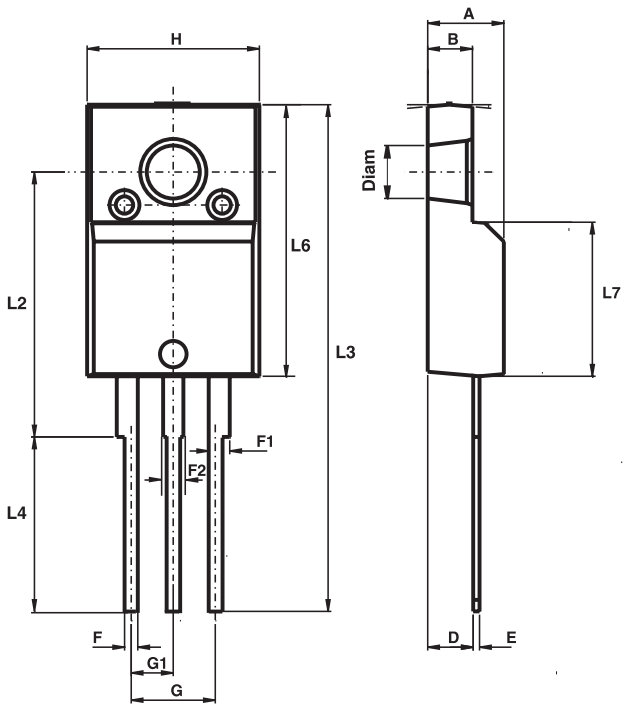
REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
A1	2.49	2.69	0.098	0.106
A2	0.03	0.23	0.001	0.009
B	0.70	0.93	0.027	0.037
B2	1.14	1.70	0.045	0.067
C	0.45	0.60	0.017	0.024
C2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
E	10.00	10.40	0.393	0.409
G	4.88	5.28	0.192	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)

D^2PAK

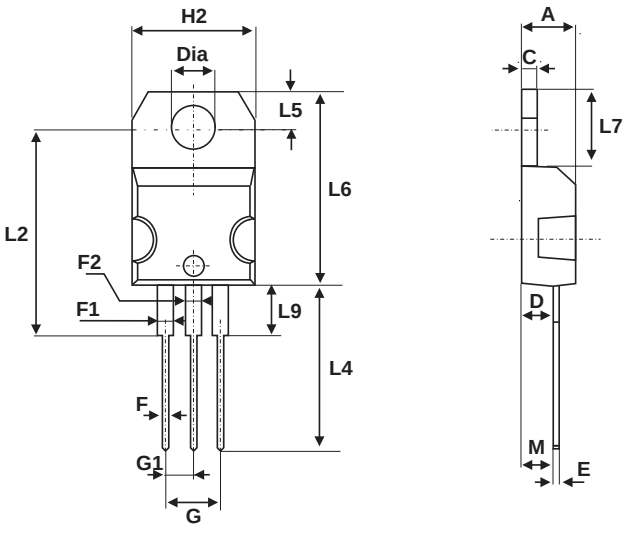


PACKAGE MECHANICAL DATA
ISOWATT220AB



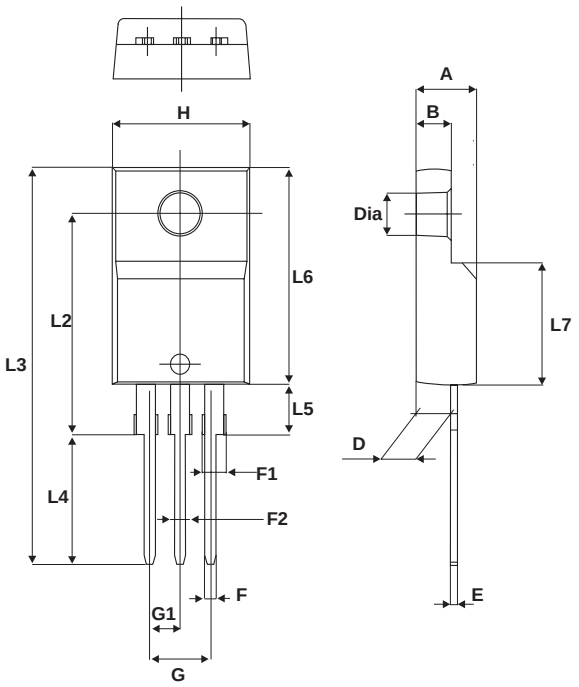
REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
B	2.50	2.70	0.098	0.106
D	2.50	2.75	0.098	0.108
E	0.40	0.70	0.016	0.028
F	0.75	1.00	0.030	0.039
F1	1.15	1.70	0.045	0.067
F2	1.15	1.70	0.045	0.067
G	4.95	5.20	0.195	0.205
G1	2.40	2.70	0.094	0.106
H	10.00	10.40	0.394	0.409
L2	16.00 typ.		0.630 typ.	
L3	28.60	30.60	1.125	1.205
L4	9.80	10.60	0.386	0.417
L6	15.90	16.40	0.626	0.646
L7	9.00	9.30	0.354	0.366
Diam	3.00	3.20	0.118	0.126

PACKAGE MECHANICAL DATA
TO-220AB



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
C	1.23	1.32	0.048	0.051
D	2.40	2.72	0.094	0.107
E	0.49	0.70	0.019	0.027
F	0.61	0.88	0.024	0.034
F1	1.14	1.70	0.044	0.066
F2	1.14	1.70	0.044	0.066
G	4.95	5.15	0.194	0.202
G1	2.40	2.70	0.094	0.106
H2	10	10.40	0.393	0.409
L2	16.4 typ.		0.645 typ.	
L4	13	14	0.511	0.551
L5	2.65	2.95	0.104	0.116
L6	15.25	15.75	0.600	0.620
L7	6.20	6.60	0.244	0.259
L9	3.50	3.93	0.137	0.154
M	2.6 typ.		0.102 typ.	
Diam.	3.75	3.85	0.147	0.151

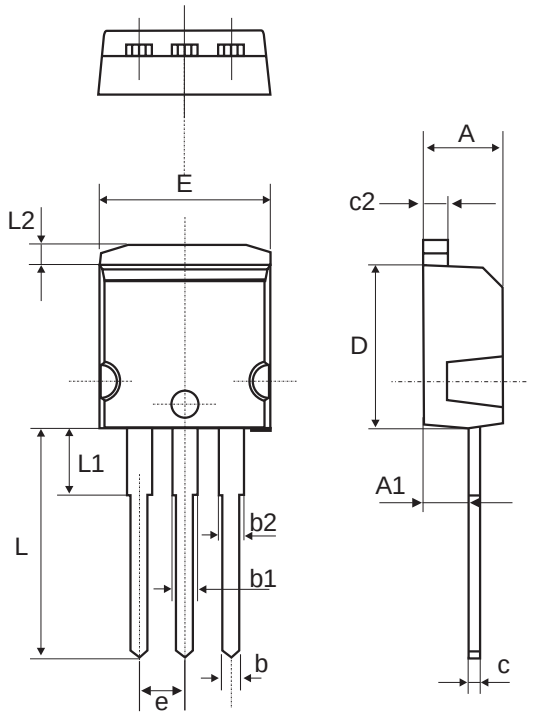
PACKAGE MECHANICAL DATA
TO-220FPAB



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

I^2PAK



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
b	0.70	0.93	0.028	0.037
b1	1.14	1.17	0.044	0.046
b2	1.14	1.17	0.044	0.046
c	0.45	0.60	0.018	0.024
c2	1.23	1.36	0.048	0.054
D	8.95	9.35	0.352	0.368
e	2.40	2.70	0.094	0.106
E	10.0	10.4	0.394	0.409
L	13.1	13.6	0.516	0.535
L1	3.48	3.78	0.137	0.149
L2	1.27	1.40	0.050	0.055

Ordering code	Marking	Package	Weight	Base qty	Delivery mode
STTH2003CT	STTH2003CT	TO-220AB	2.2 g	50	Tube
STTH2003CG	STTH2003CG	D^2PAK	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^2PAK	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