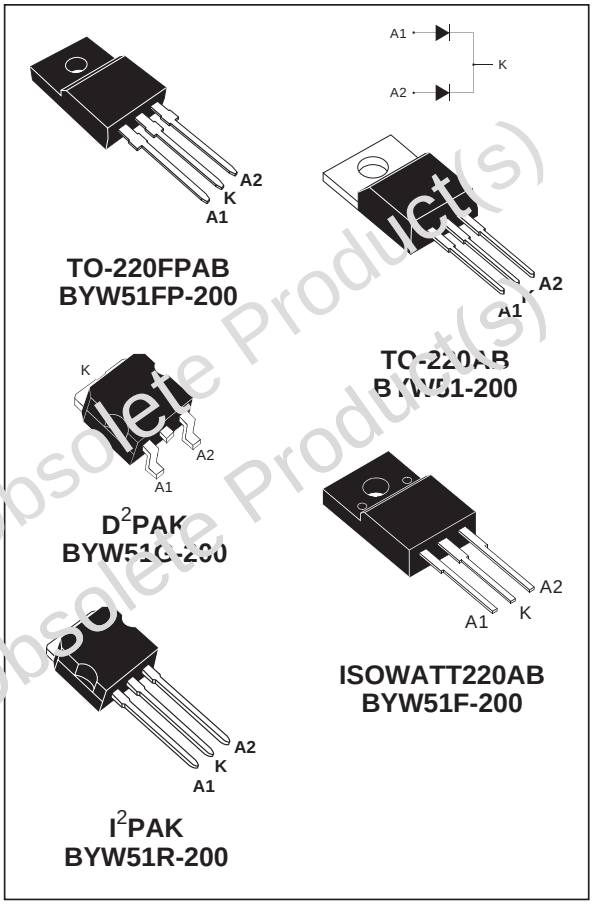
BYW51/F/G/FP/R-200

HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

MAIN PRODUCT CHARACTERISTICS

$I_{F(AV)}$	2 x 10 A
V_{RRM}	200 V
Tj (max)	150 °C
V_F (max)	0.85 V
trr (max)	25 ns



FEATURES AND BENEFITS

- SUITED FOR SMPS
- VERY LOW FORWARD LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH SURGE CURRENT CAPABILITY
- INSULATED PACKAGES (ISOWATT220AB / TO-220FP) :
  Insulation voltage = 2000 V DC
  Capacitance = 12 pF

DESCRIPTION

Dual center tap rectifier suited for Switched Mode Power Supplies and high frequency DC to DC converters.
Packaged in TO-220AB, ISOWATT220AB, TO-220FP, D^2PAK or I^2PAK, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE RATINGS (limiting values, per diode)

Symbol	Parameter				Value	Unit
V_{RRM}	Repetitive peak reverse voltage				200	V
$I_{F(RMS)}$	RMS forward current				20	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	TO-220AB / D^2PAK / I^2PAK	Tc=120°C	Per diode	10	A
				Per device	20	
		ISOWATT220AB	Tc=95°C	Per diode	10	
				Per device	20	
		TO-220FPAB	Tc=85°C	Per diode	10	
				Per device	20	
I_{FSM}	Surge non repetitive forward current		tp=10ms sinusoidal		100	A
Tstg	Storage temperature range				- 65 to + 150	°C
Tj	Maximum operating junction temperature				150	°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	1.4	
		ISOWATT220AB	Per diode	5.1	
			Total	4.05	
		TO-220FPAB	Per diode	5.7	
			Total	4.6	
$R_{th\ (c)}$	Coupling	TO-220AB / D^2PAK / I^2PAK		0.25	°C/W
		ISOWATT220AB		3.0	
		TO-220FPAB		3.5	

When diodes 1 and 2 are used simultaneously :
ΔTc (diode 1) = P(diode 1) x $R_{th(j-c)}$ (Per diode) + P(diode 2) x $R_{th(c)}$

STATIC ELECTRICAL CHARACTERISTICS (Per diode)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	Reverse leakage current	T_j = 25°C	$V_R = V_{RRM}$			15	µA
		T_j = 100°C				1	mA
V_F **	Forward voltage drop	T_j = 125°C	I_F = 8 A			0.85	V
		T_j = 125°C	I_F = 16 A			1.05	
		T_j = 25°C	I_F = 16 A			1.15	

Pulse test :* tp = 5 ms, δ < 2 %
** tp = 380 µs, δ < 2 %

To evaluate the conduction losses use the following equation :
$P = 0.65 \times I_{F(AV)} + 0.025 \times I_F{}^2{}_{(RMS)}$

RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Typ.	Max.	Unit
trr	T_j = 25°C	I_F = 0.5A I_R = 1A	Irr = 0.25A		25	ns
		I_F = 1A V_R = 30V	dI_F/dt = -50A/µs		35	
tfr	T_j = 25°C	I_F = 1A $V_{FR} = 1.1 \times V_F$ max	dI_F/dt = -50A/µs	15		ns
V_{FP}	T_j = 25°C	I_F = 1A	dI_F/dt = -50A/µs	2		V

Fig. 1: Average forward power dissipation versus average forward current (per diode).

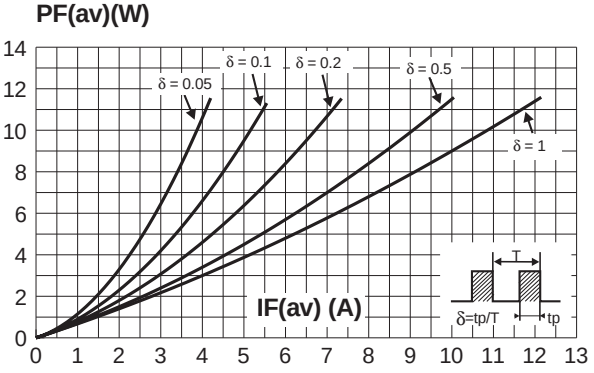


Fig. 2: Peak current versus form factor (per diode).

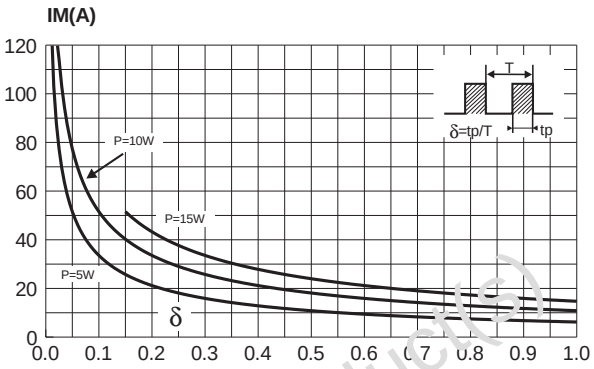


Fig. 3-1: Average forward current versus ambient temperature (δ = 0.5, D²PAK, TO-220AB).

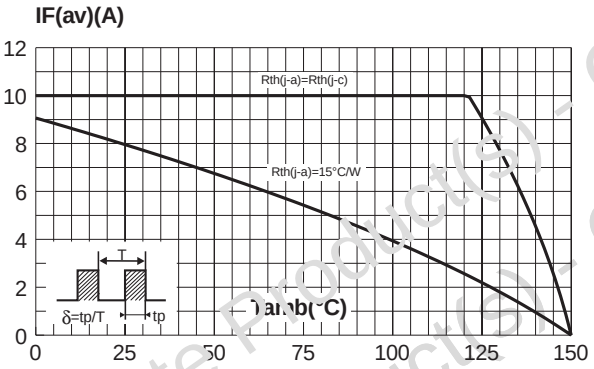


Fig. 3-2: Average forward current versus ambient temperature (δ = 0.5, ISOWATT220AB, TO-220FPAB).

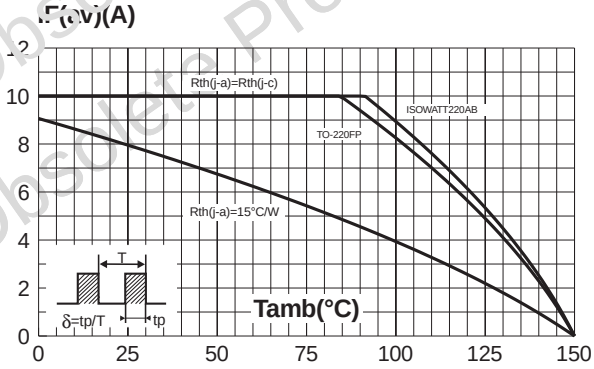


Fig. 4-1: Non repetitive surge peak forward current versus overload duration (D²PAK, TO-220AB)

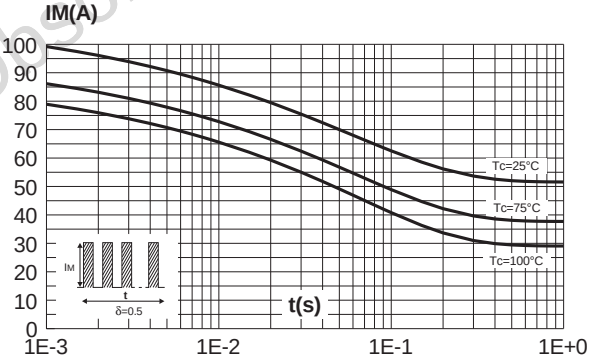


Fig. 4-2: Non repetitive surge peak forward current versus overload duration (ISOWATT220AB).

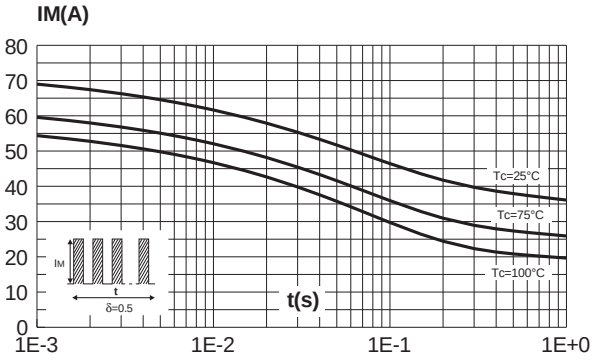


Fig. 4-3: Non repetitive surge peak forward current versus overload duration (TO-220FPAB).

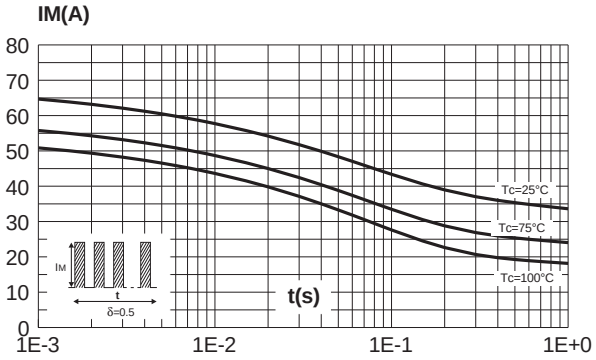


Fig. 5-1: Relative variation of thermal impedance junction to case versus pulse duration (D^2PAK, TO-220AB).

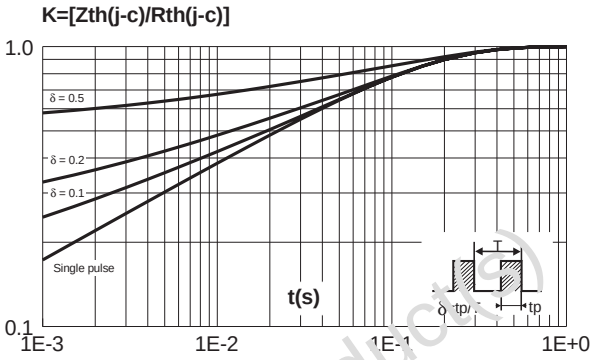


Fig. 5-2: Relative variation of thermal impedance junction to case versus pulse duration (ISOWATT220AB, TO-220FPAB).

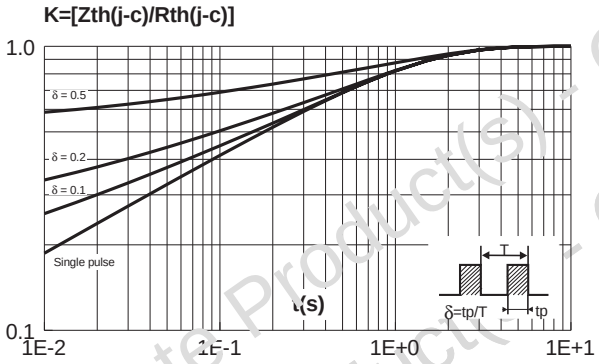


Fig. 6: Forward voltage drop versus forward current (maximum values, per diode).

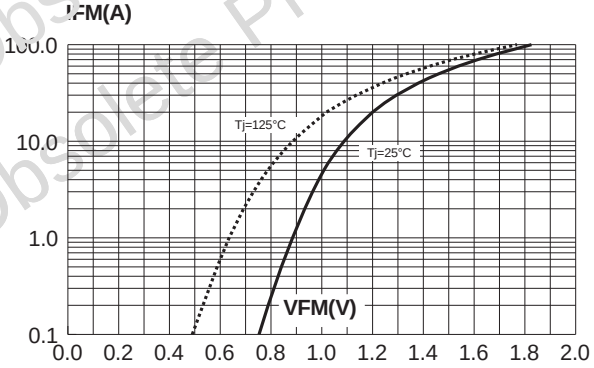


Fig. 7: Junction capacitance versus reverse voltage applied (typical values, per diode).

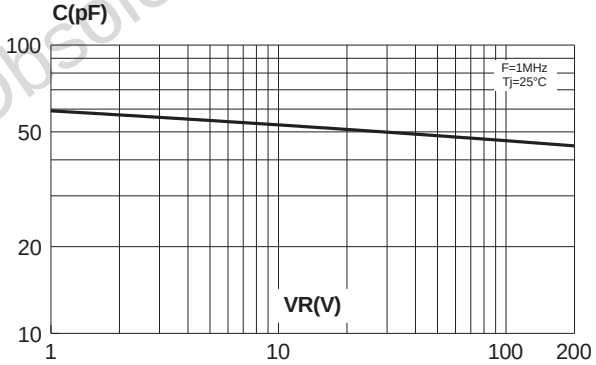


Fig. 8: Reverse recovery charges versus dI_F/dt (per diode).

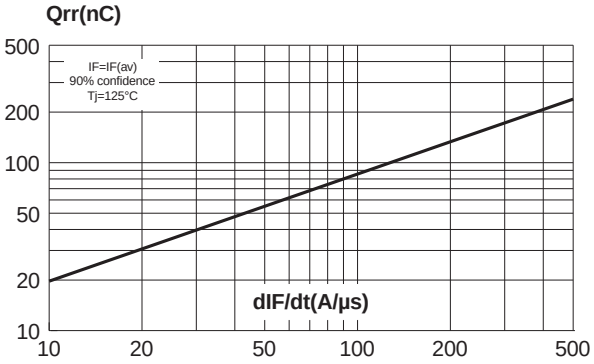


Fig. 9: Peak reverse recovery current versus dI_F/dt (per diode).

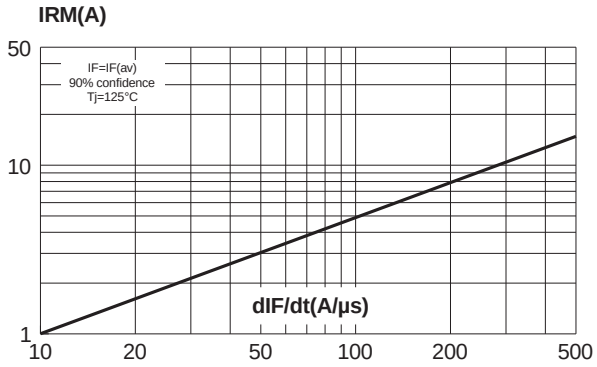


Fig. 10: Dynamic parameters versus junction temperature.

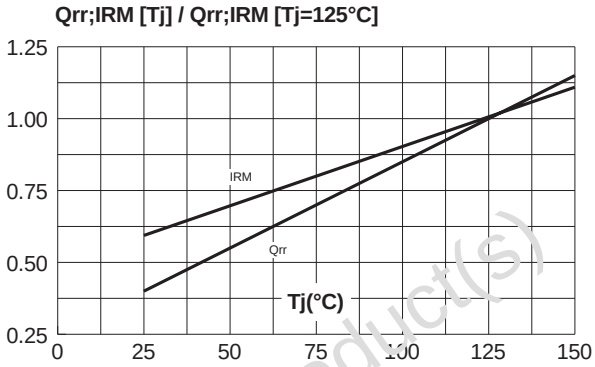
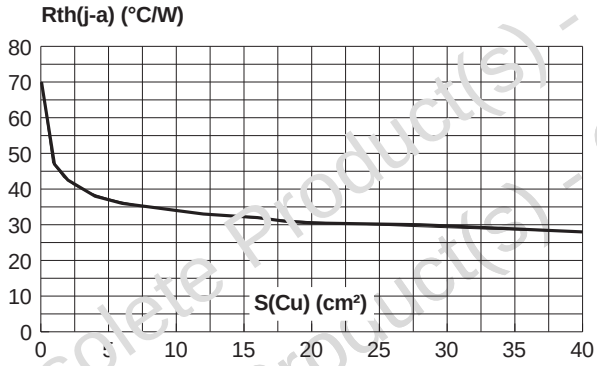
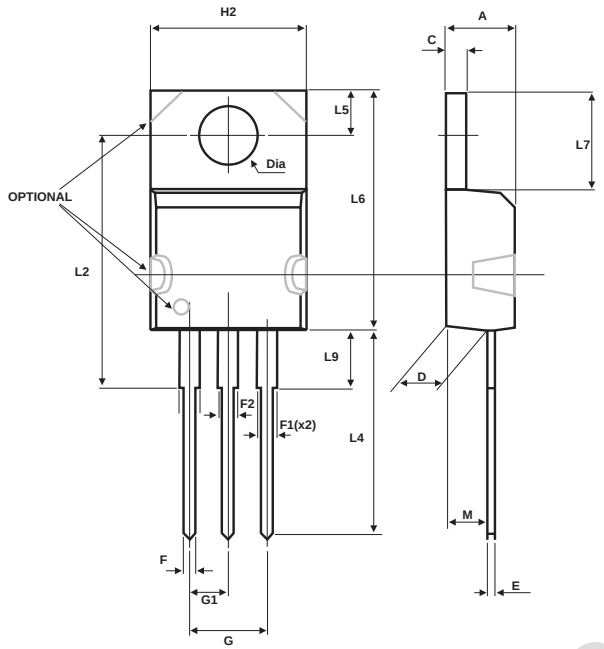


Fig. 11: Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, copper thickness: 35µm) (D^2PAK) .



PACKAGE MECHANICAL DATA

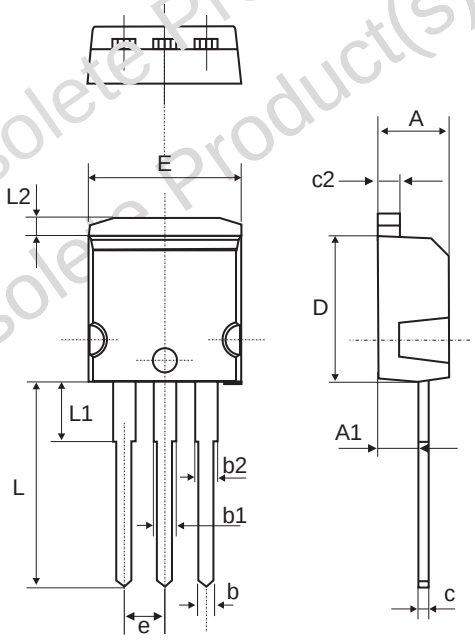
TO-220AB (JEDEC compatible)



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.30	4.60	0.169	0.181
C	1.22	1.32	0.048	0.052
D	2.40	2.72	0.094	0.107
E	0.33	0.70	0.013	0.028
F	0.61	0.93	0.024	0.037
F1	1.14	1.70	0.045	0.067
F2	1.14	1.70	0.045	0.067
G	4.95	5.15	0.195	0.202
G1	2.40	2.70	0.094	0.106
H2	10.00	10.40	0.394	0.409
L2	16.00 Typ.		0.630 Typ.	
L4	13.00	14.00	0.512	0.551
L5	2.65	2.95	0.104	0.116
L6	14.80	15.75	0.583	0.620
L7	6.20	6.60	0.244	0.260
L9	3.40	3.94	0.134	0.155
M	2.60 Typ.		0.102 Typ.	
Dia.	3.75	3.89	0.148	0.153

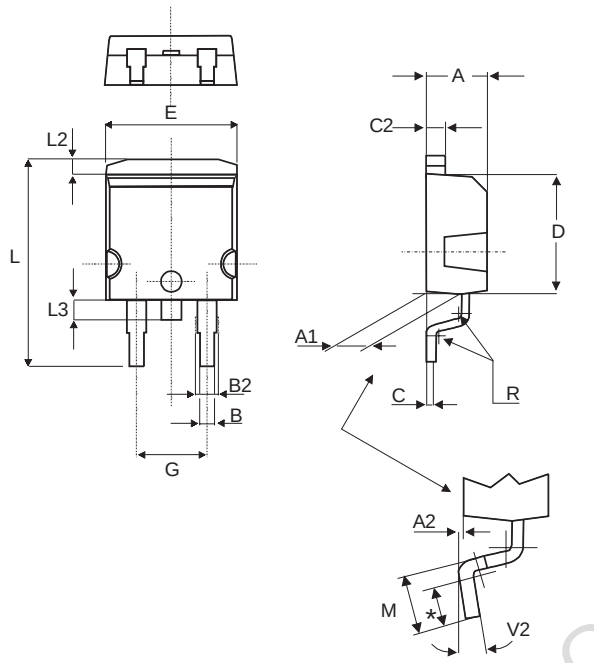
PACKAGE MECHANICAL DATA

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

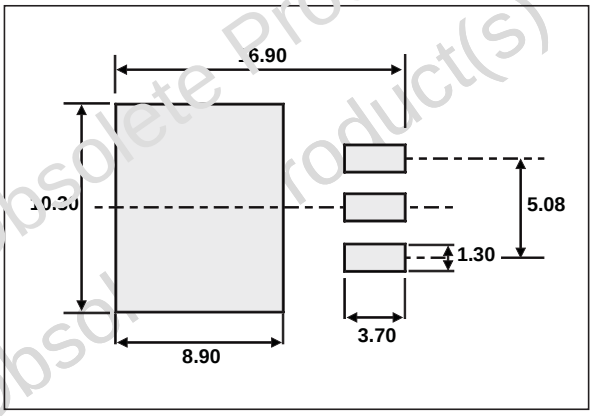
PACKAGE MECHANICAL DATA
D^2PAK



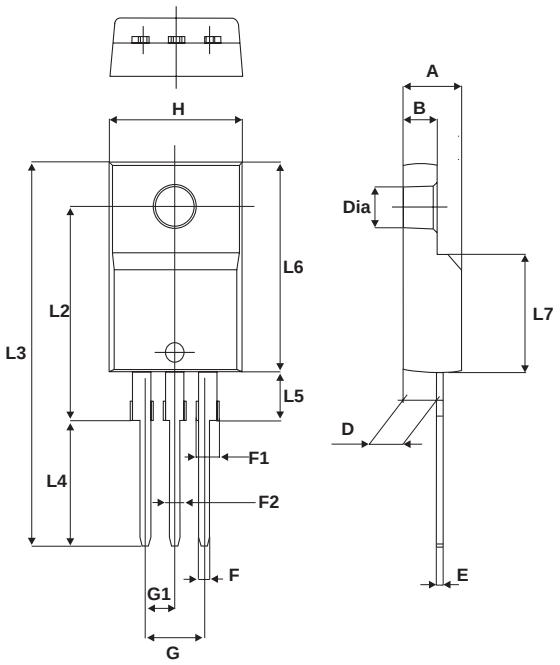
* FLAT ZONE NO LESS THAN 2mm

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 (in millimeters)
D^2PAK

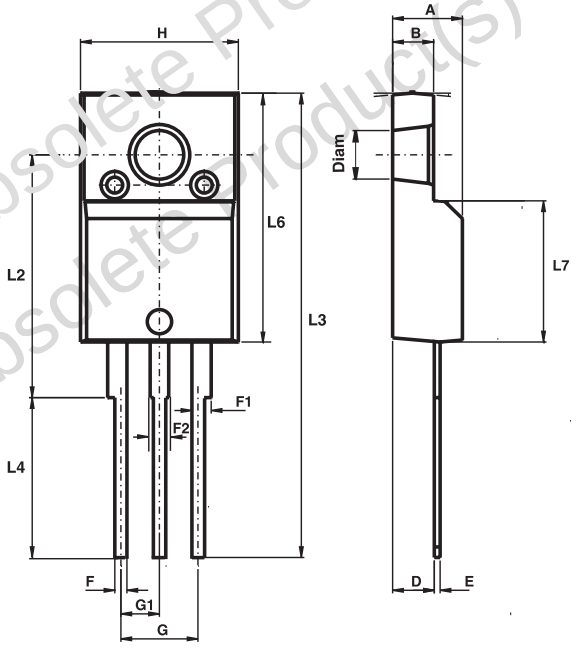


PACKAGE MECHANICAL DATA
TO-220FPAB



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
ISOWATT220AB (JEDEC compatible)



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

Ordering code	Marking	Package	Weight	Base qty	Delivery mode
BYW51-200	BYW51-200	TO220AB	2.2 g.	50	Tube
BYW51F-200	BYW51F-200	ISOWATT220AB	2.08 g.	50	Tube
BYW51G-200	BYW51G-200	D^2PAK	1.48 g.	50	Tube
BYW51FP-200	BYW51FP-200	TO-220FPAB	2g	50	Tube
BYW51R-200	BYW51R-200	I^2PAK	1.49 g	50	Tube

- Recommended torque value (TO-220AB): 0.8 N.m.
- Maximum torque value (TO-220AB): 1.0 N.m.
- Recommended torque value (ISOWATT220AB / TO-220FPAB): 0.55 N.m.
- Maximum torque value (ISOWATT220AB / TO-220FPAB): 0.70 N.m.
- Epoxy meets UL94,V0