

## HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

### MAIN PRODUCT CHARACTERISTICS

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

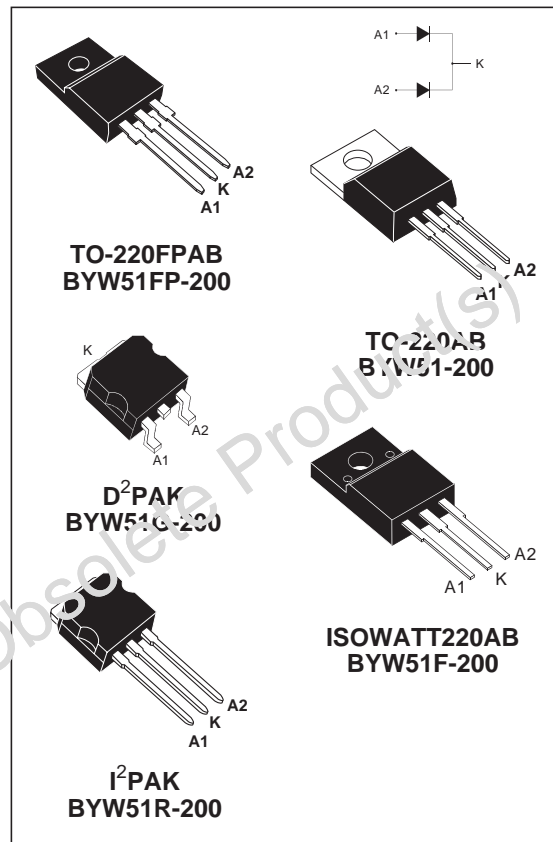
### FEATURES AND BENEFITS

- 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<sup>2</sup>PAK or I<sup>2</sup>PAK, 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 <sup>2</sup> PAK I <sup>2</sup> PAK	$T_c=120^\circ\text{C}$	Per diode	10	A
				Per device	20	
		ISOWATT220AB	$T_c=95^\circ\text{C}$	Per diode	10	
				Per device	20	
		TO-220FPAB	$T_c=85^\circ\text{C}$	Per diode	10	
				Per device	20	
$I_{FSM}$	Surge non repetitive forward current		$t_p=10\text{ms}$ sinusoidal	100	A	
$T_{stg}$	Storage temperature range		- 65 to + 150	°C		
$T_j$	Maximum operating junction temperature		150	°C		

## BYW51/F/G/FP/R-200

### THERMAL RESISTANCES

Symbol	Parameter		Value	Unit	
$R_{th(j-c)}$	Junction to case	TO-220AB / D <sup>2</sup> PAK / I <sup>2</sup> PAK	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 <sup>2</sup> PAK / I <sup>2</sup> PAK	0.25	°C/W	
		ISOWATT220AB	3.0		
		TO-220FPAB	3.5		

When diodes 1 and 2 are used simultaneously :

$$\Delta T_c (\text{diode 1}) = P(\text{diode 1}) \times R_{th(j-c)} (\text{Per diode}) + P(\text{diode 2}) \times R_{th(c)}$$

### STATIC ELECTRICAL CHARACTERISTICS (Per diode)

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

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

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

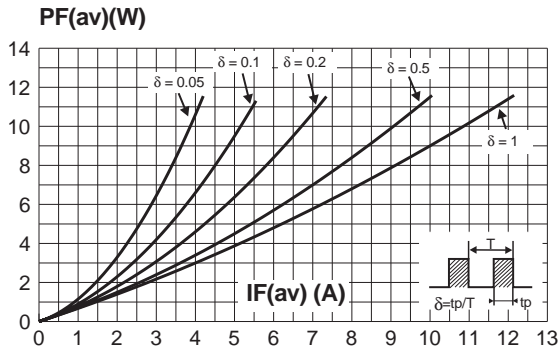
To evaluate the conduction losses use the following equation :

$$P = 0.65 \times I_{F(AV)} + 0.025 \times I_{F(RMS)}^2$$

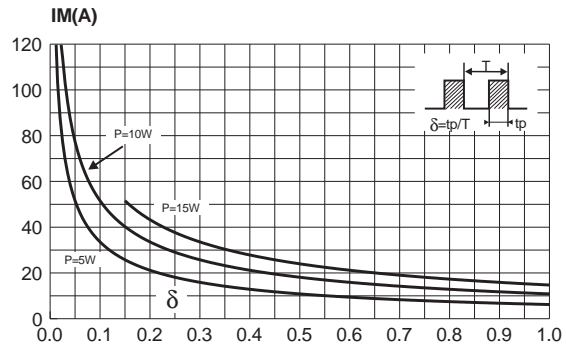
### RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Typ.	Max.	Unit
trr	$T_j = 25^\circ\text{C}$	$I_F = 0.5 \text{ A}$ $I_R = 1 \text{ A}$	$I_{rr} = 0.25 \text{ A}$		25	ns
		$I_F = 1 \text{ A}$ $V_R = 30 \text{ V}$	$di_F/dt = -50 \text{ A}/\mu\text{s}$		35	
tfr	$T_j = 25^\circ\text{C}$	$I_F = 1 \text{ A}$ $V_{FR} = 1.1 \times V_F \text{ max}$	$di_F/dt = -50 \text{ A}/\mu\text{s}$	15		ns
$V_{FP}$	$T_j = 25^\circ\text{C}$	$I_F = 1 \text{ A}$	$di_F/dt = -50 \text{ A}/\mu\text{s}$	2		V

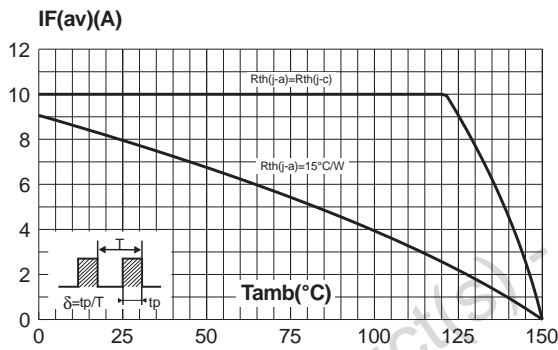
**Fig. 1:** Average forward power dissipation versus average forward current (per diode).



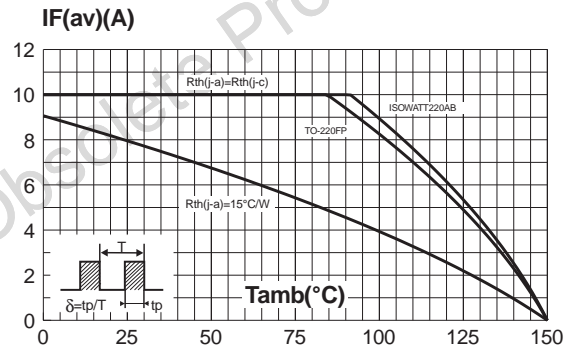
**Fig. 2:** Peak current versus form factor (per diode).



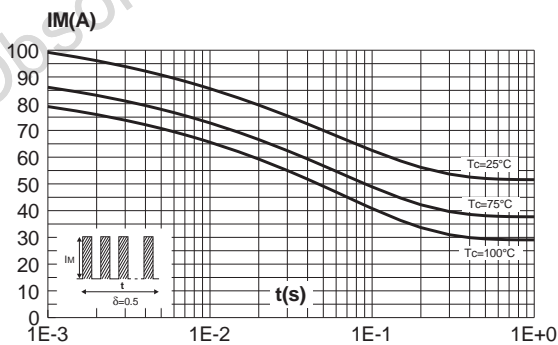
**Fig. 3-1:** Average forward current versus ambient temperature ( $\delta = 0.5$ , D<sup>2</sup>PAK, TO-220AB).



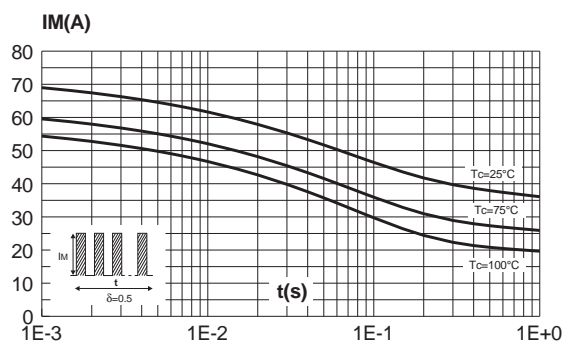
**Fig. 3-2:** Average forward current versus ambient temperature ( $\delta = 0.5$ , ISOWATT220AB, TO-220FPAB).



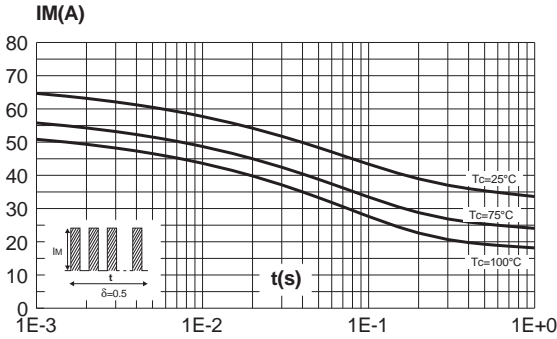
**Fig. 4-1:** Non repetitive surge peak forward current versus overload duration (D<sup>2</sup>PAK, TO-220AB).



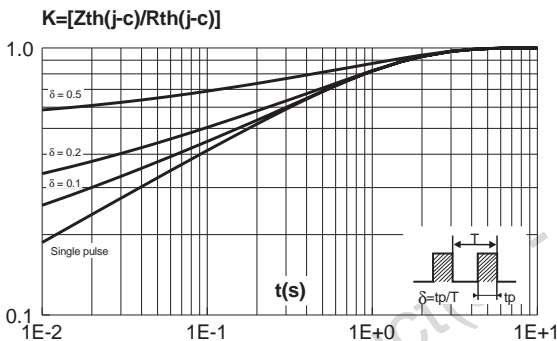
**Fig. 4-2:** Non repetitive surge peak forward current versus overload duration (ISOWATT220AB).



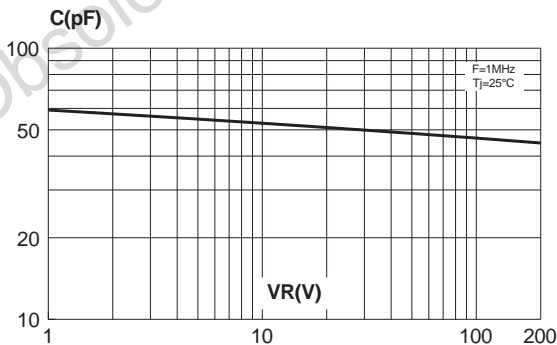
**Fig. 4-3:** Non repetitive surge peak forward current versus overload duration (TO-220FPAB).



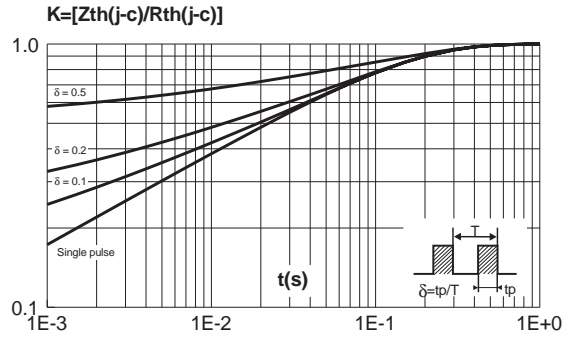
**Fig. 5-2:** Relative variation of thermal impedance junction to case versus pulse duration (ISOWATT220AB, TO-220FPAB).



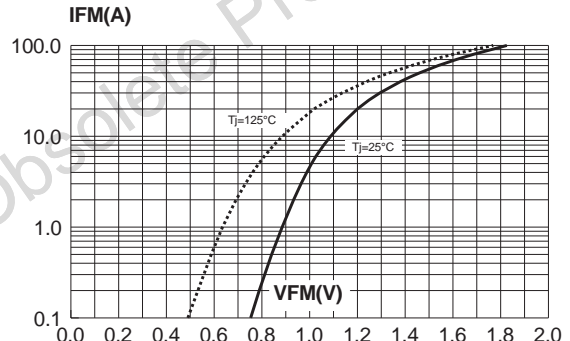
**Fig. 7:** Junction capacitance versus reverse voltage applied (typical values, per diode).



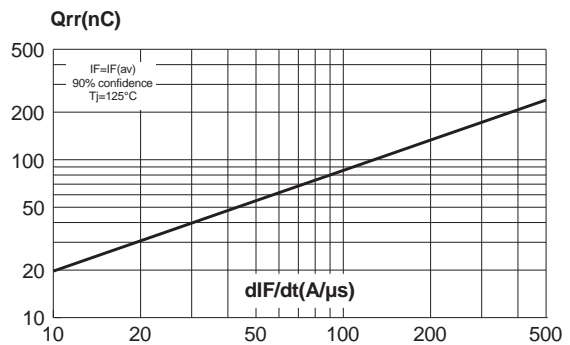
**Fig. 5-1:** Relative variation of thermal impedance junction to case versus pulse duration (D<sup>2</sup>PAK, TO-220AB).



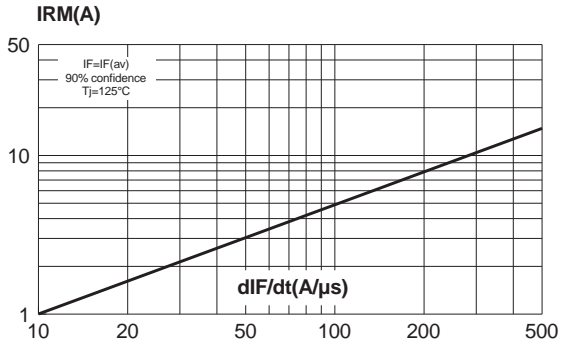
**Fig. 6:** Forward voltage drop versus forward current (maximum values, per diode).



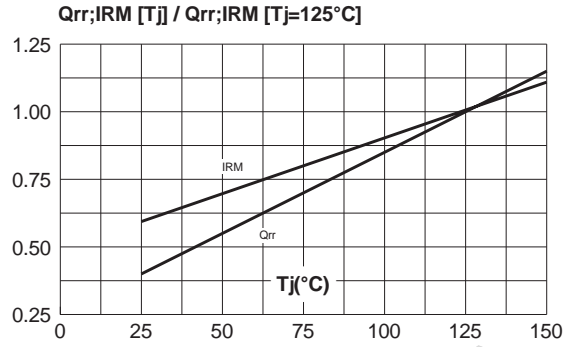
**Fig. 8:** Reverse recovery charges versus  $dI_F/dt$  (per diode).



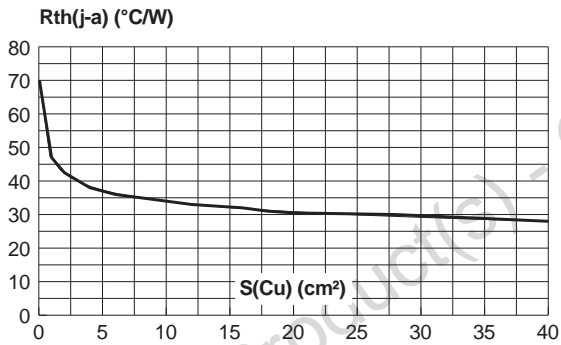
**Fig. 9:** Peak reverse recovery current versus  $dI_F/dt$  (per diode).



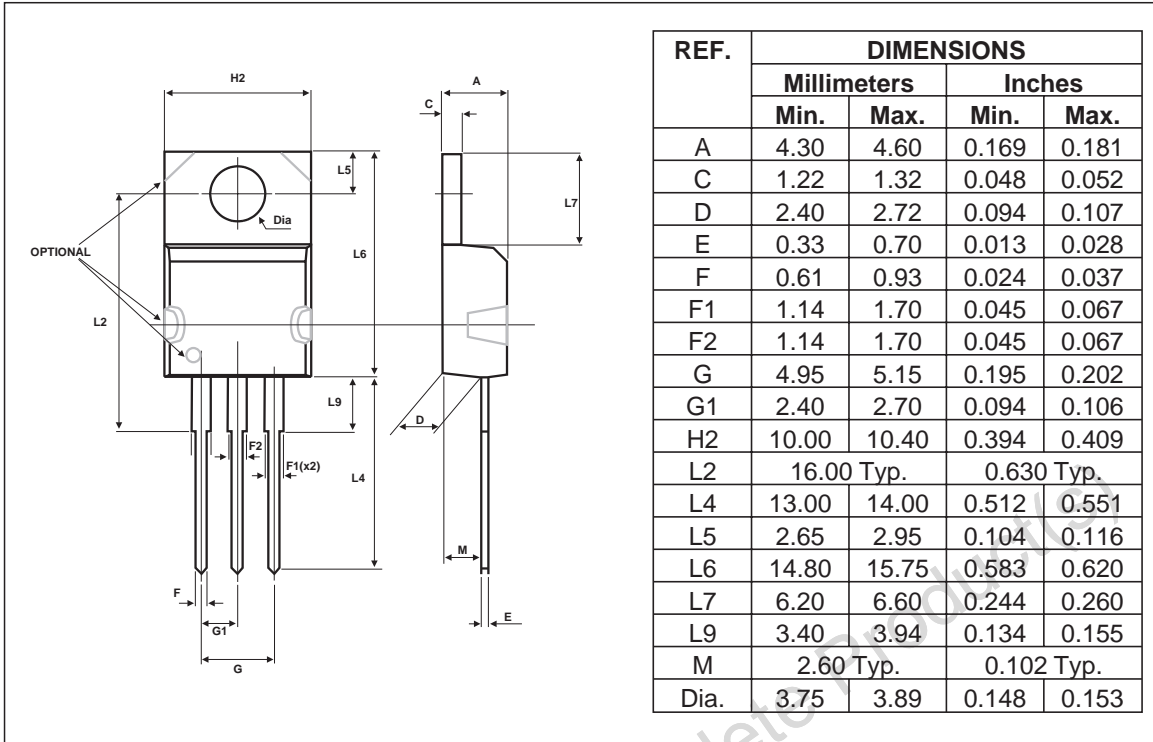
**Fig. 10:** Dynamic parameters versus junction temperature.



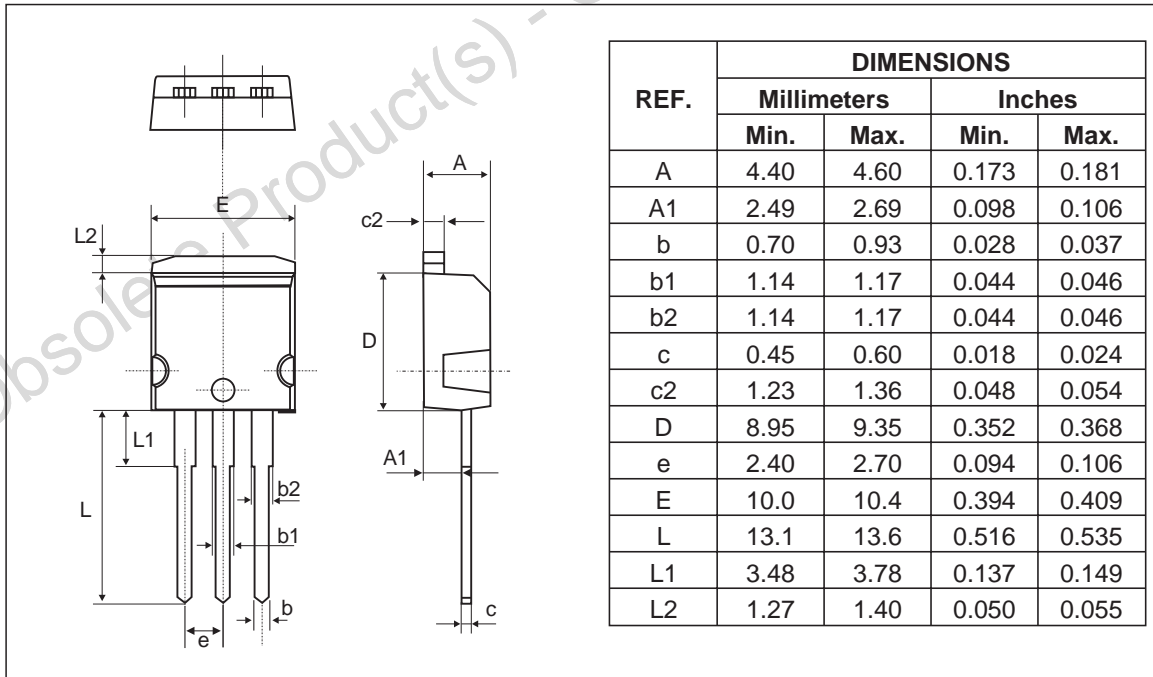
**Fig. 11:** Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, copper thickness: 35μm) (D<sup>2</sup>PAK).



**PACKAGE MECHANICAL DATA**  
TO-220AB (JEDEC compatible)

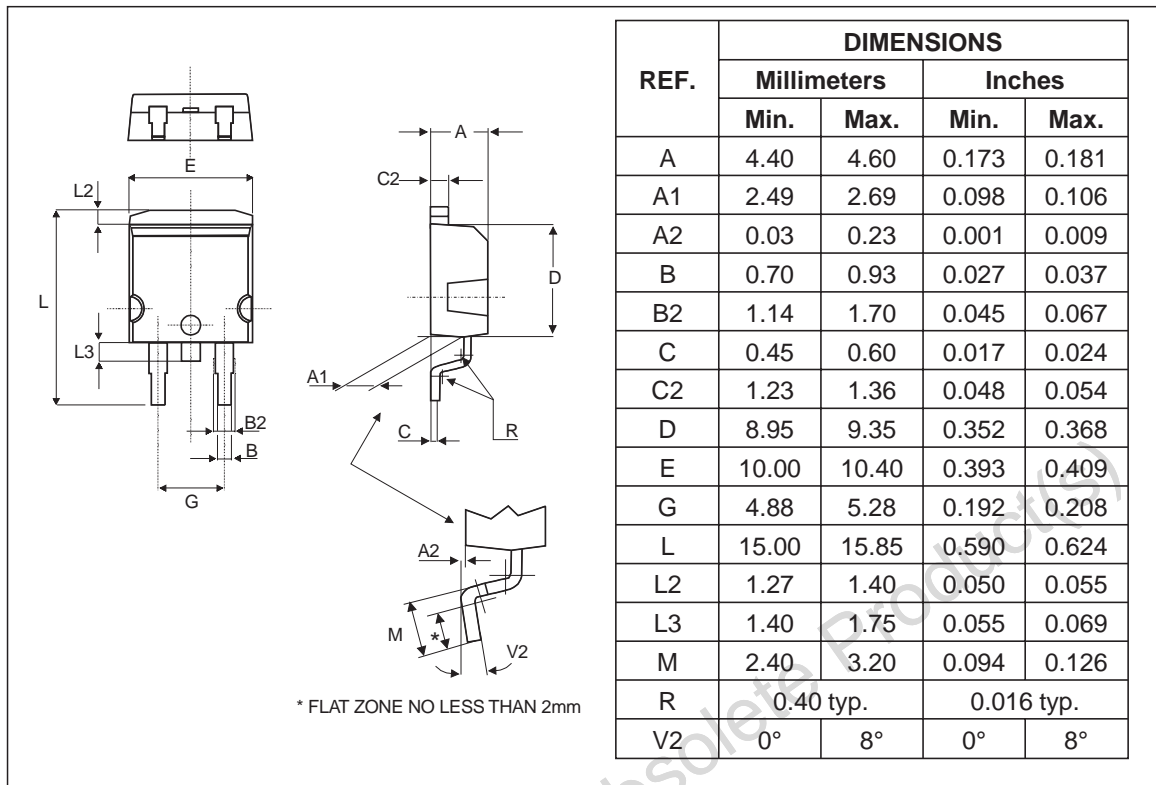


**PACKAGE MECHANICAL DATA**  
I<sup>2</sup>PAK

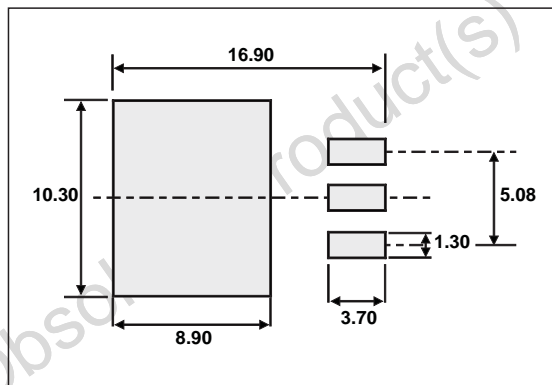


**BYW51/F/G/FP/R-200**

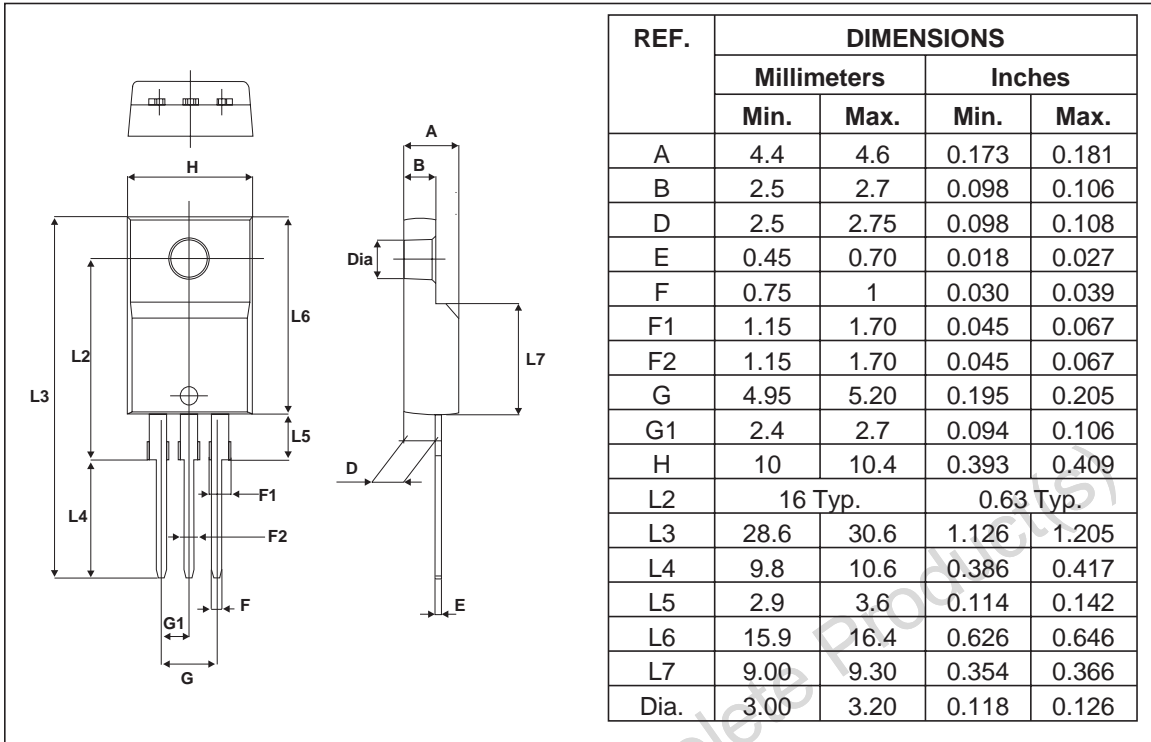
**PACKAGE MECHANICAL DATA**  
D<sup>2</sup>PAK



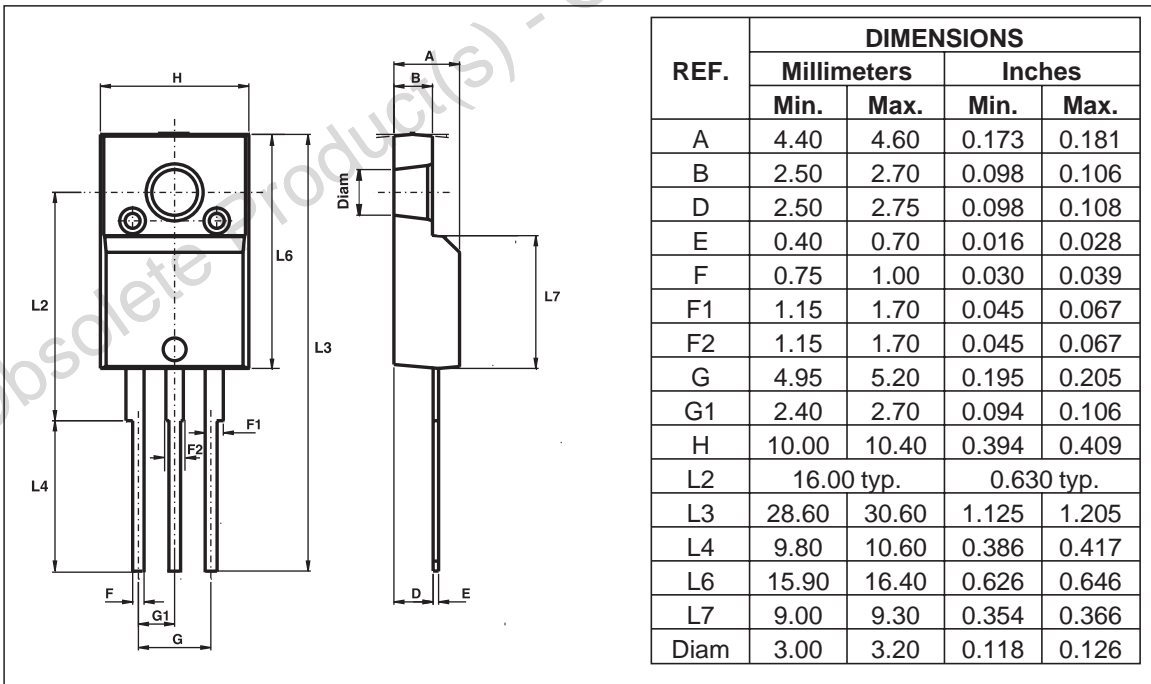
**FOOT PRINT (in millimeters)**  
D<sup>2</sup>PAK



**PACKAGE MECHANICAL DATA**  
TO-220FPAB



**PACKAGE MECHANICAL DATA**  
ISOWATT220AB (JEDEC compatible)





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 <sup>2</sup> PAK	1.48 g.	50	Tube
BYW51FP-200	BYW51FP-200	TO-220FPAB	2g	50	Tube
BYW51R-200	BYW51R-200	I <sup>2</sup> PAK	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

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