



# STPR1020CB/CG/CT/CF/CFP/CR

## ULTRA-FAST RECOVERY RECTIFIER DIODES

### MAIN PRODUCTS CHARACTERISTICS

$I_{F(AV)}$	2 x 5 A
$V_{RRM}$	200 V
$T_j(max)$	150°C
$V_F(max)$	0.99 V
$trr(max)$	30 ns

### FEATURES

- SUITED FOR SMPS
- LOW LOSSES
- LOW FORWARD AND REVERSE RECOVERY TIME
- HIGH SURGE CURRENT CAPABILITY
- INSULATED PACKAGES: ISOWATT220AB / TO-220FPAB  
Insulation Voltage = 2000V DC  
Capacitance = 12 pF

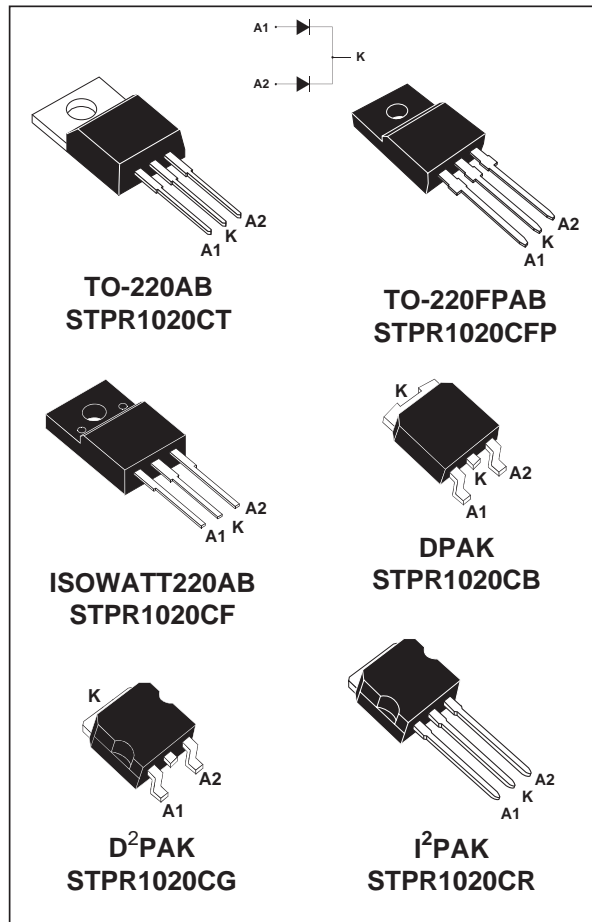
### DESCRIPTION

Dual center tap rectifier suited for Switched Mode Power Supplies and high frequency DC to DC converters.

Packaged in DPAK, D<sup>2</sup>PAK, I<sup>2</sup>PAK, TO-220AB, TO-220FPAB or ISOWATT220AB, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

### ABSOLUTE MAXIMUM (limiting values, per diode)

Symbol	Parameter			Value	Unit	
$V_{RRM}$	Repetitive peak reverse voltage			200	V	
$I_{F(RMS)}$	RMS forward current	D <sup>2</sup> PAK / TO-220AB / ISOWATT220AB / TO-220FPAB / I <sup>2</sup> PAK		10	A	
		DPAK		7	A	
$I_{F(AV)}$	Average forward current $\delta = 0.5$	D <sup>2</sup> PAK / DPAK	$T_c=125^\circ\text{C}$	Per diode	5	A
		TO-220AB / I <sup>2</sup> PAK				
		ISOWATT220AB	$T_c=115^\circ\text{C}$	Per device		
		TO-220FPAB	$T_c=110^\circ\text{C}$	Per device	10	
$I_{FSM}$	Surge non repetitive forward current		$t_p=10\text{ms}$ sinusoidal	50	A	
$T_{stg}$	Storage temperature range			- 65 to + 150	°C	



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### THERMAL RESISTANCES

Symbol	Parameter		Value	Unit	
R <sub>th(j-c)</sub>	Junction to case	TO-220AB / D <sup>2</sup> PAK / DPAK / I <sup>2</sup> PAK	Per diode	4.0	°C/W
			Total	2.4	
		ISOWATT220AB	Per diode	6.0	
			Total	4.0	
		TO-220FPAB	Per diode	6.5	
			Total	5	
R <sub>th(c)</sub>	Coupling	TO-220AB / D <sup>2</sup> PAK / DPAK / I <sup>2</sup> PAK	0.7		
		ISOWATT220AB	2.0		
		TO-220FPAB	3.5		

When diodes 1 and 2 are used simultaneously :

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

### STATIC ELECTRICAL CHARACTERISTICS (per diode)

Symbol	Parameters	Test conditions		Min.	Typ.	Max.	Unit
I <sub>R</sub> *	Reverse leakage current	T <sub>j</sub> = 25°C	V <sub>R</sub> = V <sub>RRM</sub>			50	μA
		T <sub>j</sub> = 100°C				0.6	mA
V <sub>F</sub> **	Forward voltage drop	T <sub>j</sub> = 125°C	I <sub>F</sub> = 5 A		0.8	0.99	V
		T <sub>j</sub> = 125°C	I <sub>F</sub> = 10 A		0.95	1.20	
		T <sub>j</sub> = 25°C	I <sub>F</sub> = 10 A			1.25	

Pulse test : \* tp = 5 ms, δ < 2 %

\*\* tp = 380 μs, δ < 2 %

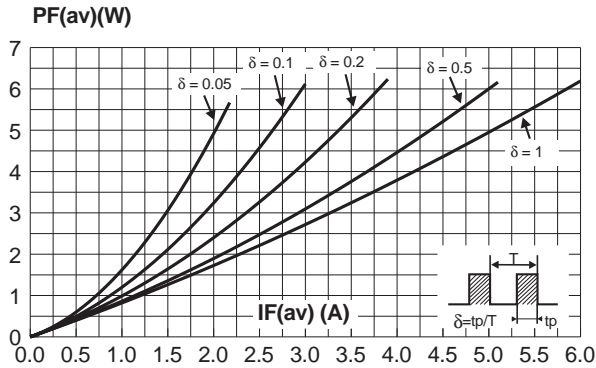
To evaluate the conduction losses use the following equation :

$$P = 0.78 \times I_{F(AV)} + 0.042 \times I_{F(RMS)}^2$$

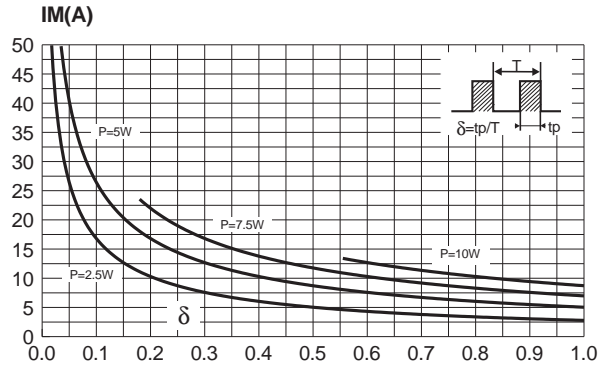
### RECOVERY CHARACTERISTICS

Symbol	Test conditions			Min.	Typ.	Max.	Unit
trr	T <sub>j</sub> = 25°C	I <sub>F</sub> = 0.5A I <sub>R</sub> = 1A	I <sub>rr</sub> = 0.25A			30	ns
tfr	T <sub>j</sub> = 25°C	I <sub>F</sub> = 1A V <sub>FR</sub> = 1.1 x V <sub>F</sub> max	dI <sub>F</sub> /dt = 50 A/μs		20		ns
V <sub>FP</sub>	T <sub>j</sub> = 25°C	I <sub>F</sub> = 1A	dI <sub>F</sub> /dt = 50 A/μs		3		V

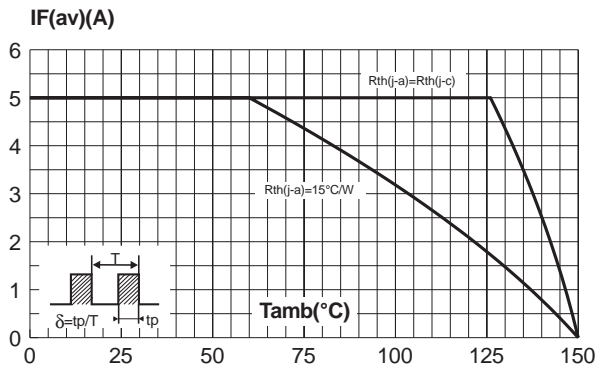
**Fig. 1:** Average forward power dissipation versus average forward current (per diode).



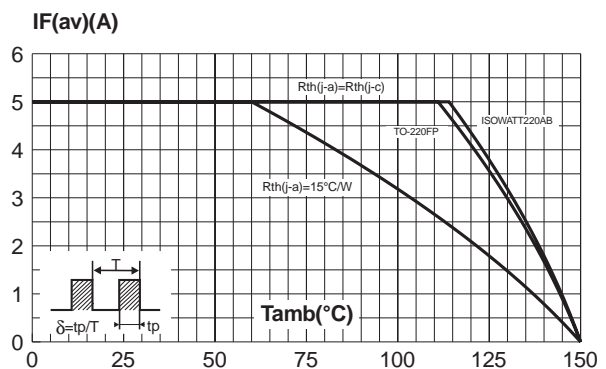
**Fig. 2:** Peak current versus form factor (per diode).



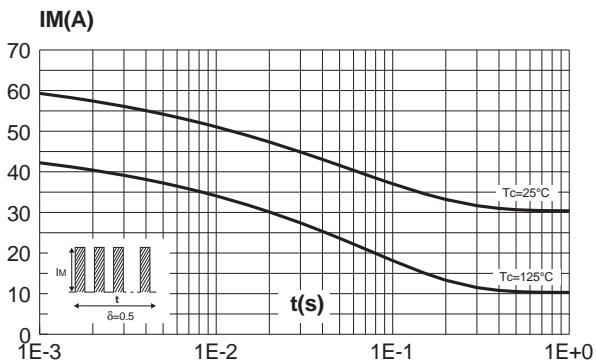
**Fig. 3-1:** Average forward current versus ambient temperature ( $\delta = 0.5$ , TO-220AB, DPAK, D<sup>2</sup>PAK).



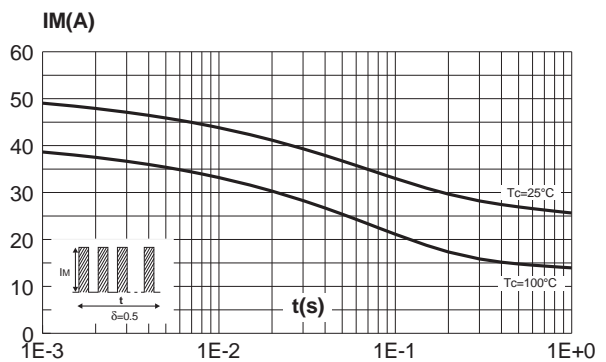
**Fig. 3-2:** Average forward current versus ambient temperature ( $\delta = 0.5$ , ISOWATT220AB, TO-220FPAB).



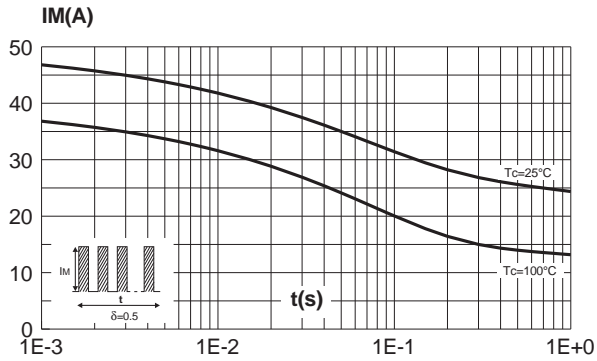
**Fig. 4-1:** Non repetitive surge peak forward current versus overload duration (TO-220AB, DPAK, D<sup>2</sup>PAK).



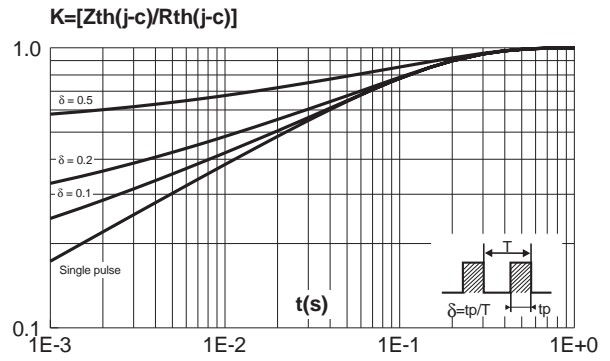
**Fig. 4-2:** Non repetitive surge peak forward current versus overload duration (ISOWATT220AB).



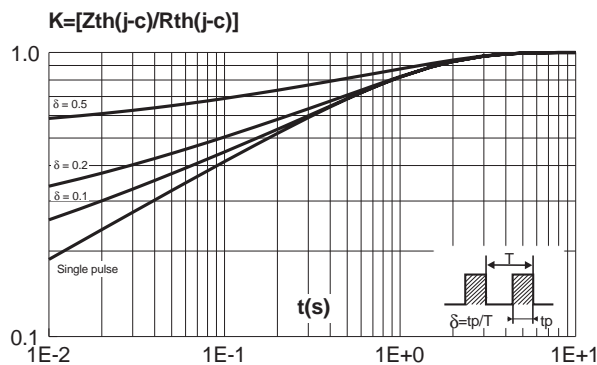
**Fig. 4-3:** Non repetitive surge peak forward current versus overload duration (TO-220FPAB).



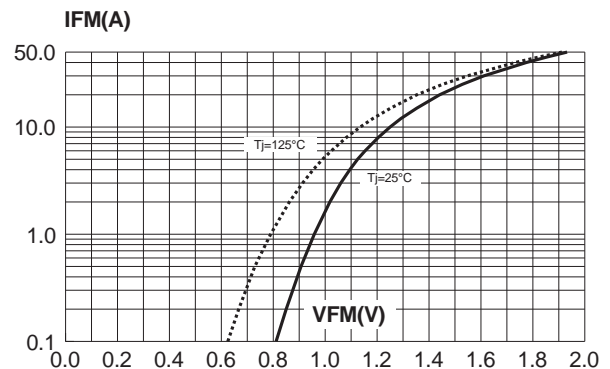
**Fig. 5-1:** Relative variation of thermal impedance junction to case versus pulse duration (D<sup>2</sup>PAK, DPAK, TO-220AB).



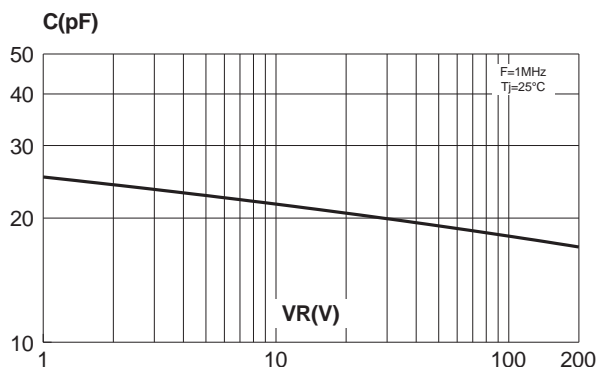
**Fig. 5-2:** Relative variation of thermal impedance junction to case versus pulse duration (ISOWATT220AB, TO-220FPAB).



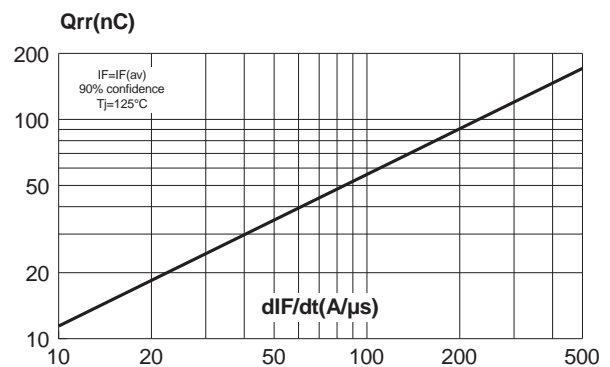
**Fig. 6:** Forward voltage drop versus forward current (maximum values, per diode).



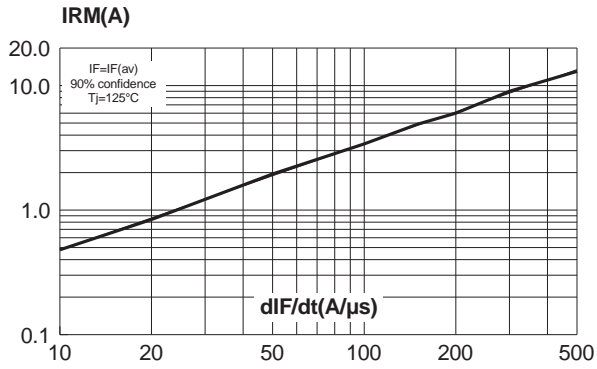
**Fig. 7:** Junction capacitance versus reverse voltage applied (typical values, per diode).



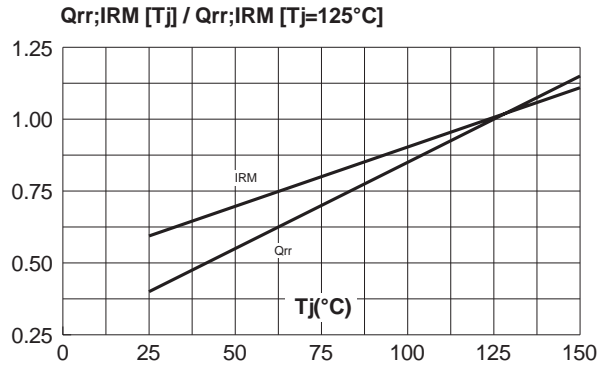
**Fig. 8:** Reverse recovery charges versus dIF/dt (per diode).



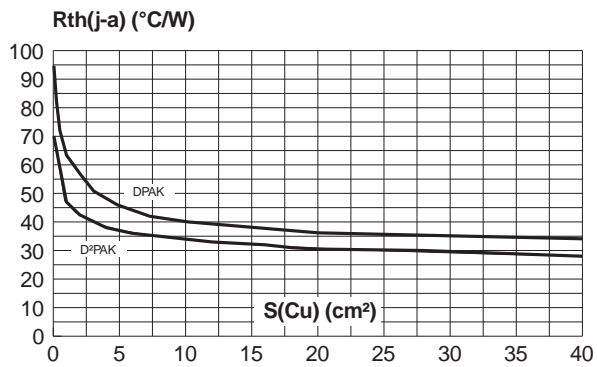
**Fig. 9:** Peak reverse recovery current versus  $dI_F/dt$  (per diode).



**Fig. 10:** Dynamic parameters versus junction temperature (per diode).

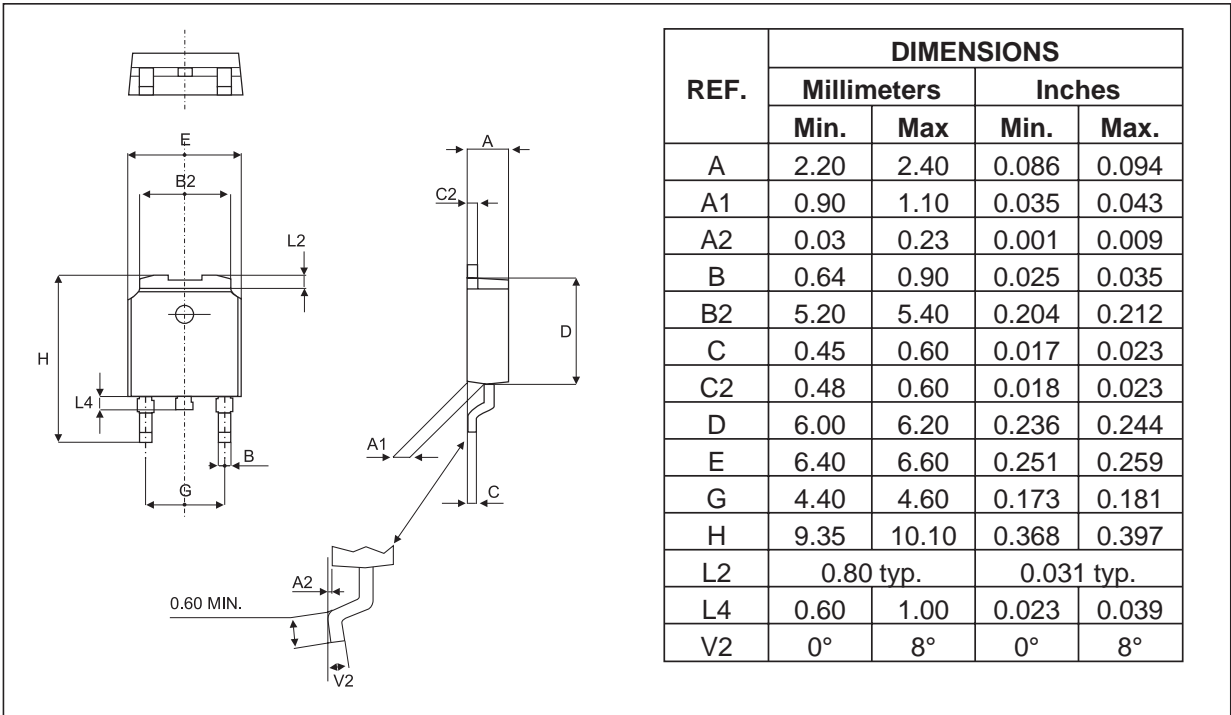


**Fig. 11:** Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, copper thickness: 35 $\mu\text{m}$ ).

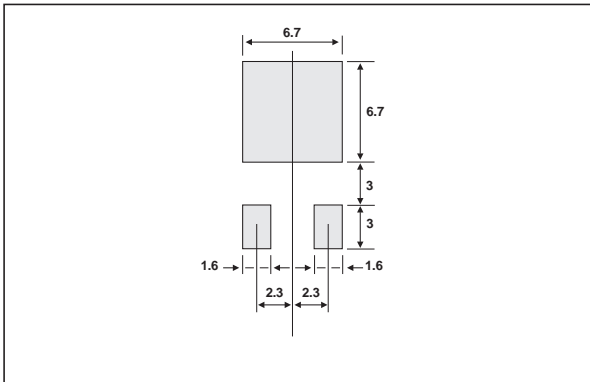


**STPR1020CB/CG/CT/CF/CFP/CR**

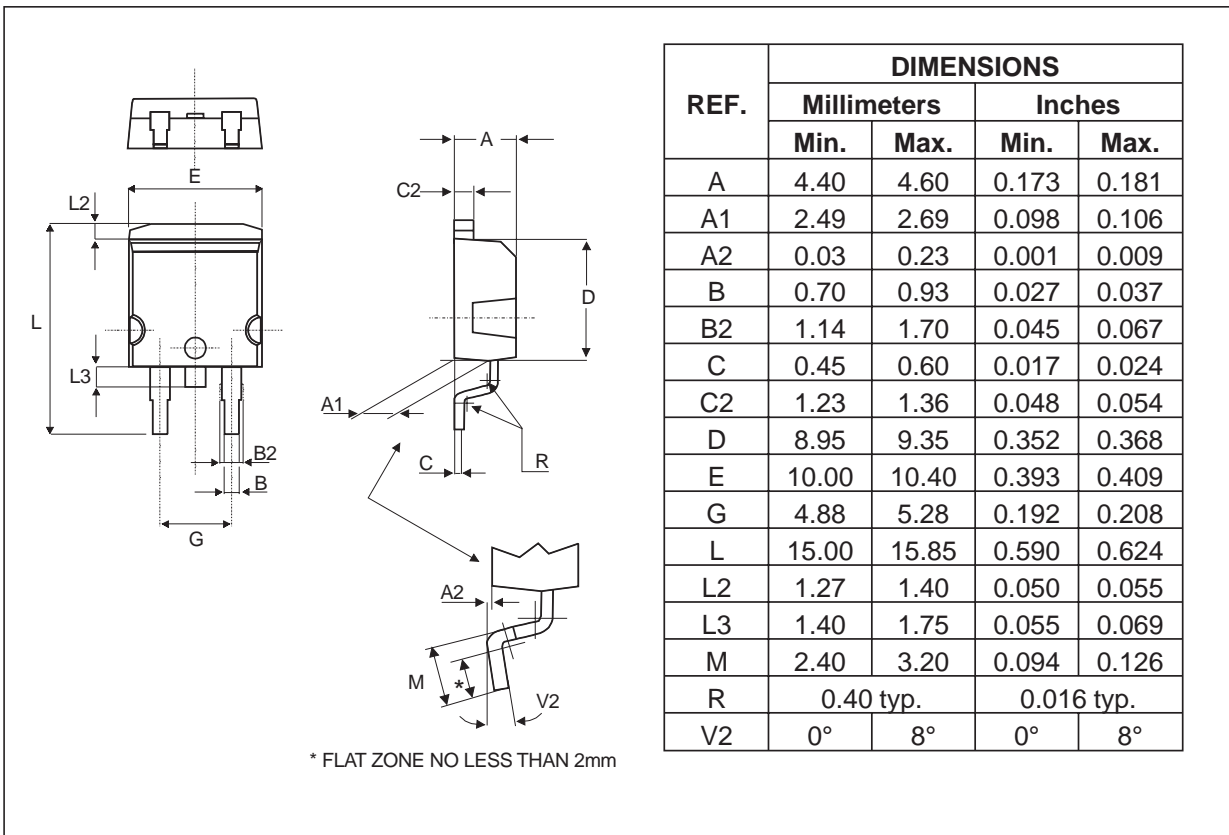
**PACKAGE MECHANICAL DATA**  
DPAK



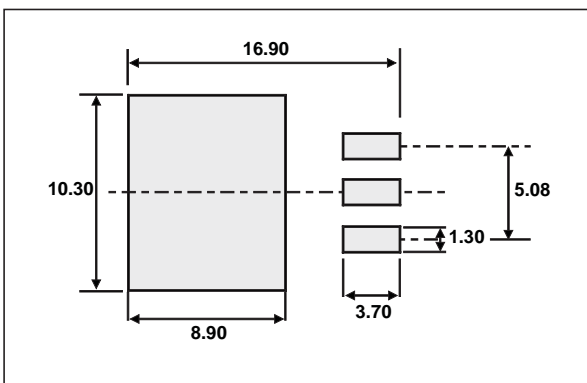
**FOOT PRINT (in millimeters)**  
DPAK



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

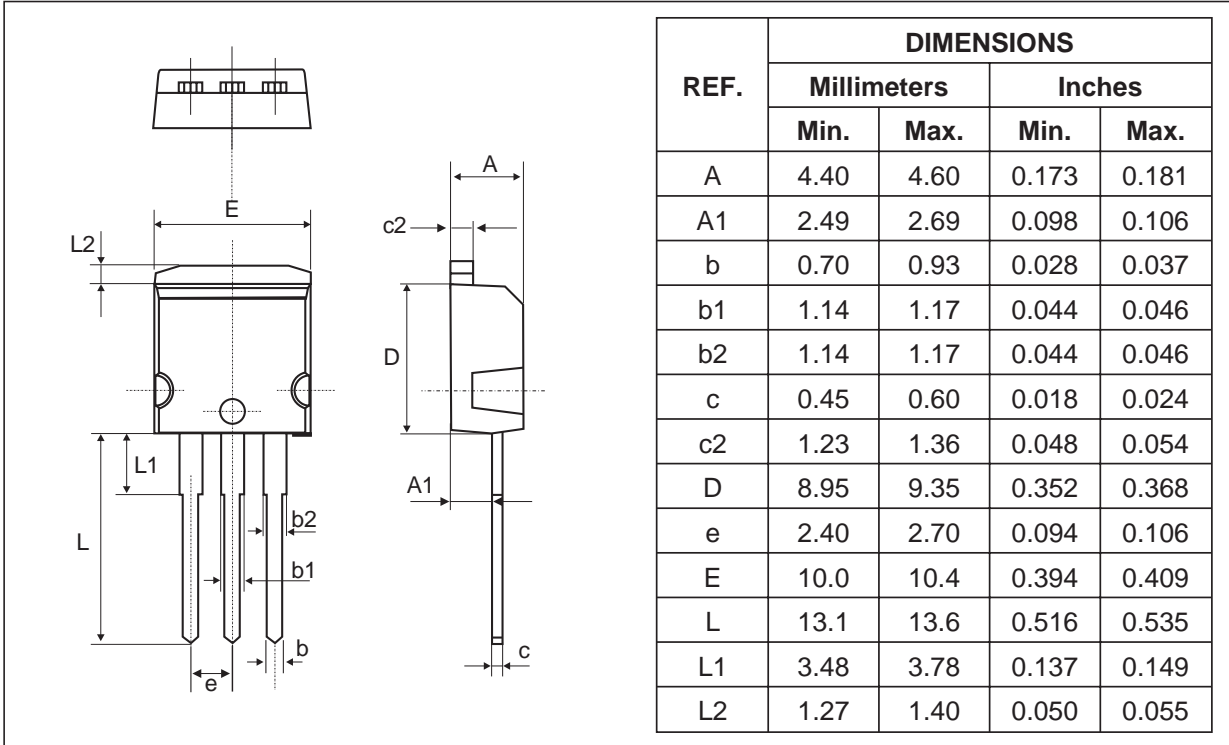


**FOOT PRINT (in millimeters)**  
D<sup>2</sup>PAK

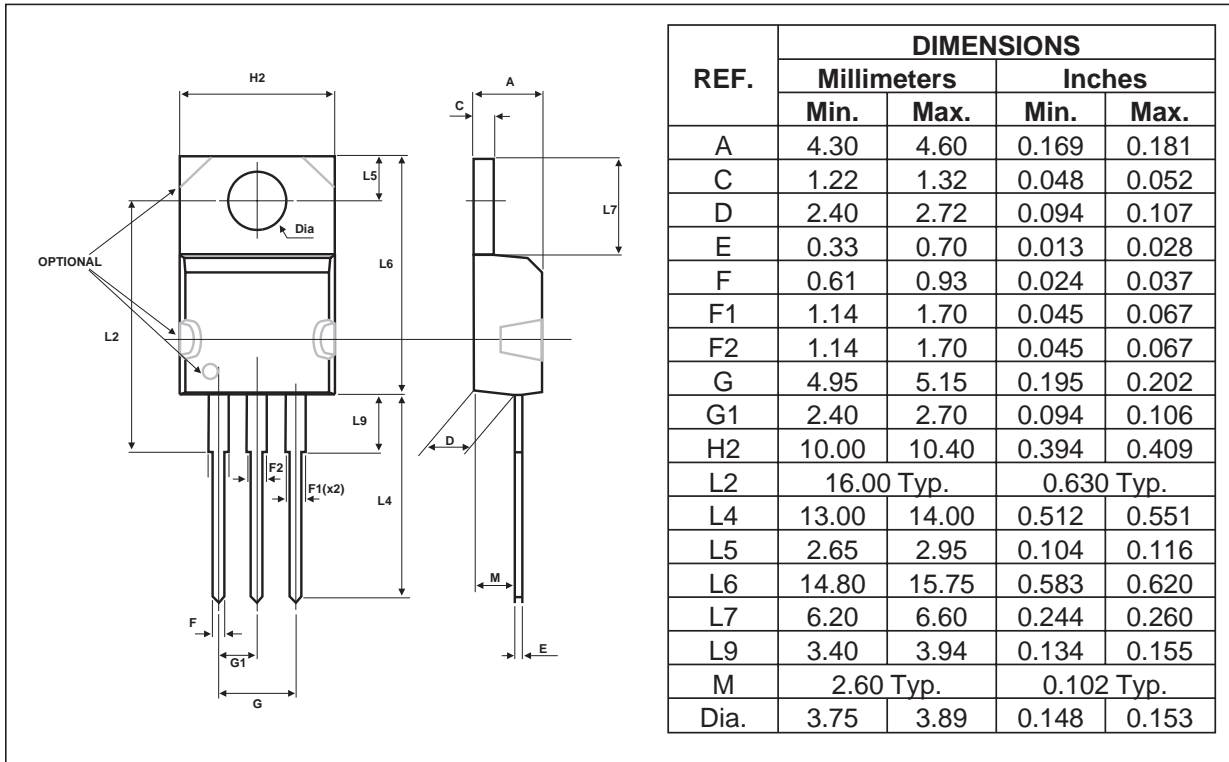


**STPR1020CB/CG/CT/CF/CFP/CR**

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



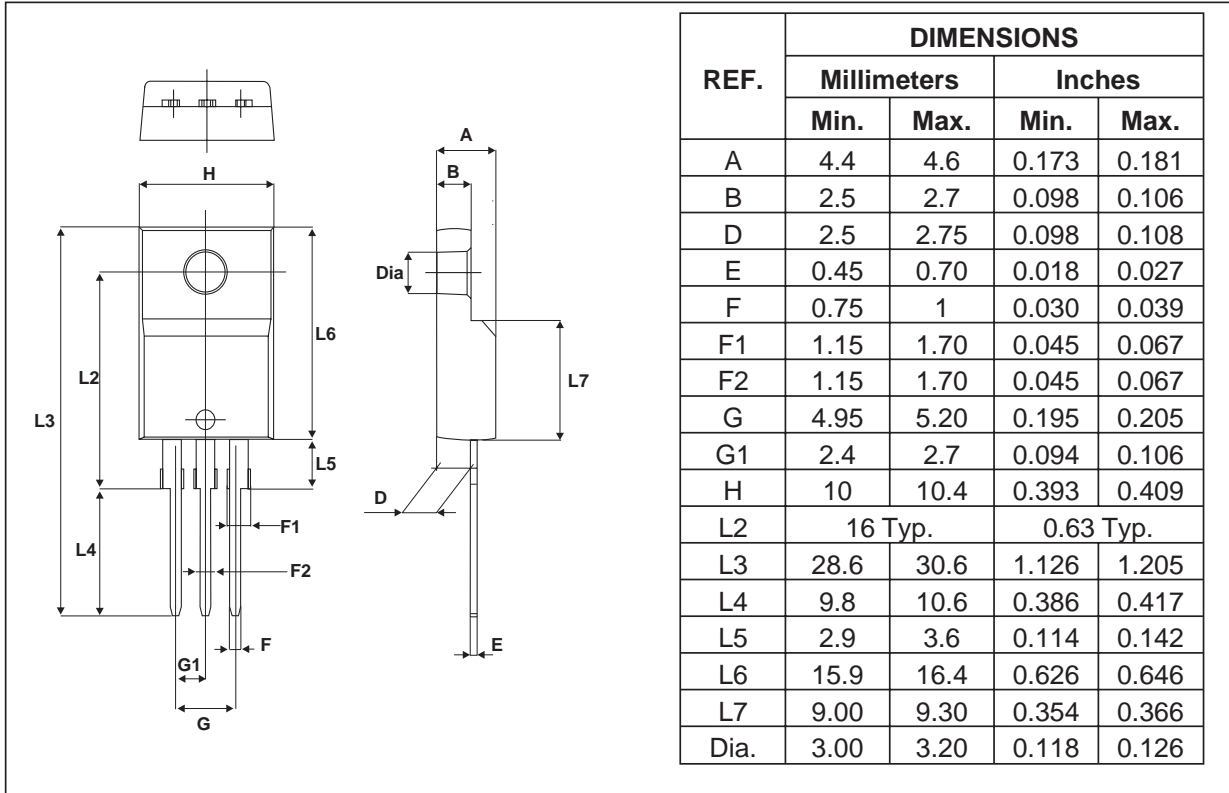
**PACKAGE MECHANICAL DATA**  
TO-220AB (JEDEC compatible)



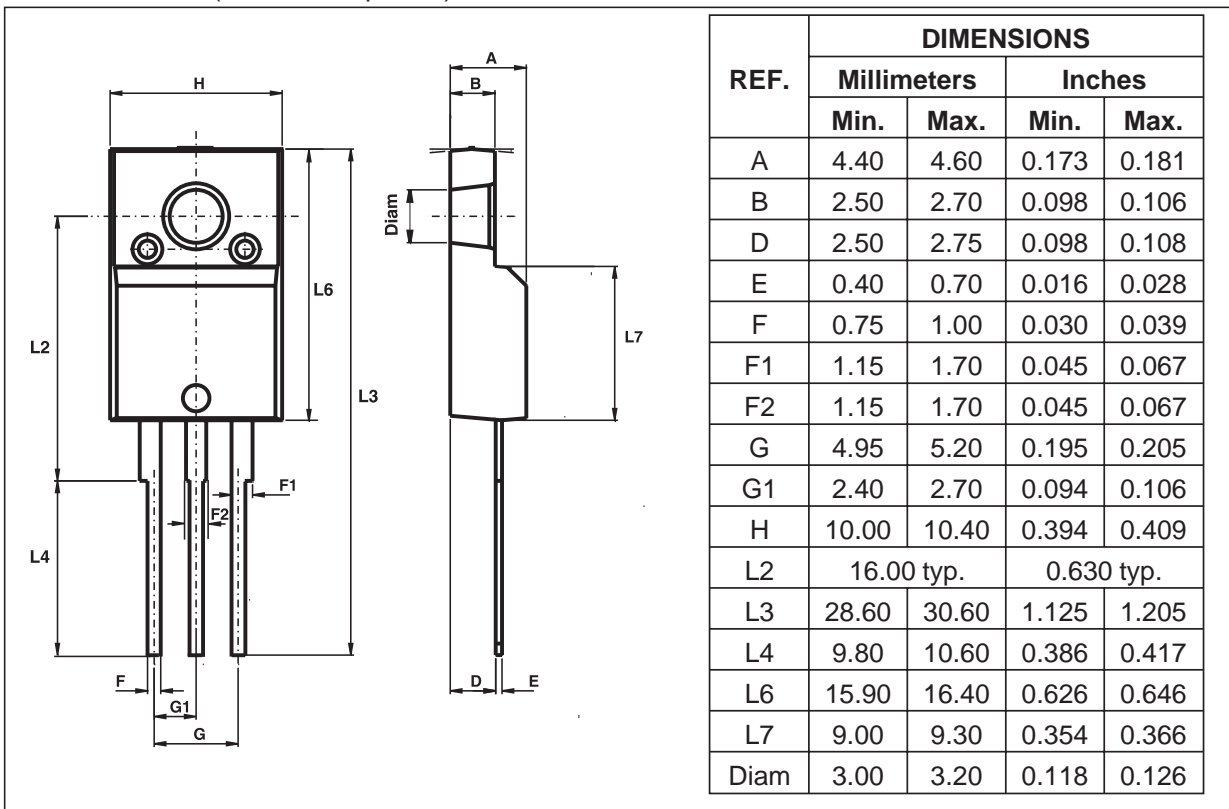


**STPR1020CB/CG/CT/CF/CFP/CR**

**PACKAGE MECHANICAL DATA**  
TO-220FPAB



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



Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPR1020CB	STPR1020CB	DPAK	0.3g	75	Tube
STPR1020CB-TR	STPR1020CB	DPAK	0.3g	2500	Tape & reel
STPR1020CT	STPR1020CT	TO-220AB	2.23g	50	Tube
STPR1020CF	STPR1020CF	ISOWATT220AB	2.2g	50	Tube
STPR1020CG	STPR1020CG	D <sup>2</sup> PAK	1.48g	50	Tube
STPR1020CFP	STPR1020CFP	TO-220FP	2.0g	50	Tube
STPR1020CR	STPR1020CR	I <sup>2</sup> PAK	1.49 g	50	Tube

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

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