WESTCODE SEMICONDUCTORS

Technical Publication DF 070 Issue 1

Fast Recovery Stud-Base Diode Type PCN/PCR070 - 1 & 2

70 amperes average: up to 1000 volts V_{RRM}

Ratings (Maximum values at Tj 125°C unless stated otherwise)

RATING	CONDITIONS	SYMBOL	
Average forward current	Half sinewave 75°C case temperature	$I_{F(AV)}$	70A
R.M.S. current max.		$I_{F(RMS)}$	110A
Peak one-cycle surge non-repetitive	10m.s. sine pulse { 100% V_{RRM} re-applied max. $V_{RM} \leq$ 10 Volts	$I_{FSM\ (1)}$ $I_{FSM\ (2)}$	700A 830A
Maximum surge I^2t	10m.s. sine pulse { 100% V_{RRM} re-applied max. $V_{RM} \leq$ 10 Volts	I^2t (1) I^2t (2)	$2450A^2s$ $3460A^2s$
Operating temperature range		T_{case}	-40 +125°C
Storage temperature range		T_{stg}	-40 +150°C

Characteristics (Maximum values at Tj 125 °C unless stated otherwise)

CHARACTERISTIC	CONDITIONS	SYMBOL	
Peak forward voltage drop	At 220A	V_{FM}	1.85V
Forward conduction threshold voltage		V_O	1.08V
Forward conduction slope resistance		r	3.4mΩ
Thermal resistance	Junction to case	$R_{th(j-c)}$	0.5kW
	Case to heatsink	$R_{th(c-hs)}$	0.1kW
-1 Reverse Recovery Time	I_{FM} = 220A di/dt = 25A/uS	trr	200nS
Reverse recovered charge up to 600 volts V_{RRM}	Tj = 25°C	Qrr	240nC
-2 Reverse Recovery Time	I_{FM} = 220A di/dt = 25A/uS	trr	500nS
Reverse recovered charge	Tj = 25°C	Qrr	1300nC

VOLTAGE CODE ⟶	02	04	06	08	10	
*Repetitive voltage V_{RRM}	200	400	600	800	1000	
Non-repetitive voltage V_{RSM}	300	500	700	900	1100	

*Maximum heatsink to free air thermal resistance for which repetitive voltage ratings apply is 6.6°C/W

Ordering Information (Please quote device code as explained below — 10 digits)

S M	● ●	P C	●	0
FIXED BASIC CODE	VOLTAGE CODE (see above)	FIXED OUTLINE CODE	BASE POLARITY N = cathode R = anode	FIXED TYPE CODE

NOTES ON OPERATION

1. For rectangular wave operation, allowance must be made with regard to the maximum permissible case temperature for both the heating caused by the average reverse switching dissipation and the rise in junction temperature per reverse power pulse. Failure to correct for both average and peak temperature rises could result in the failure of the device to withstand the full reverse voltage which is assumed to be applied at the instant of junction recovery.

   Allowance may be made for average and peak reverse switching power dissipation as follows:

   $T_{CASE(2)} = T_{CASE(1)} - (E/pulse/volt)\ f.V_{RRM}\ R_{th(J-C)} - \Delta T_J/volt\ V_{RRM}$

   where: $T_{CASE(1)}$ is the maximum permissible case temperature for zero reverse losses.

   $T_{CASE(2)}$ is the maximum permissible case temperature when allowance for reverse switching losses has been made.

   E/pulse/voit is the reverse energy (in joules) in the recovery period per volt of reverse applied voltage.

   f is the frequency of operation in Hz

   V_{RRM} is the repetitive peak reverse voltage

   ΔT_J/volt is the junction temperature rise in deg. C per volt of reverse applied voltage per reverse recovery pulse

   $R_{th(J-C)}$ is 0.5°C/W

2. For sinusoidal operation, the same derating expression may be used, and will offer a considerable safety factor. The commutation rate of forward current may be taken as that obtaining at the instant at which the forward current passes through zero.

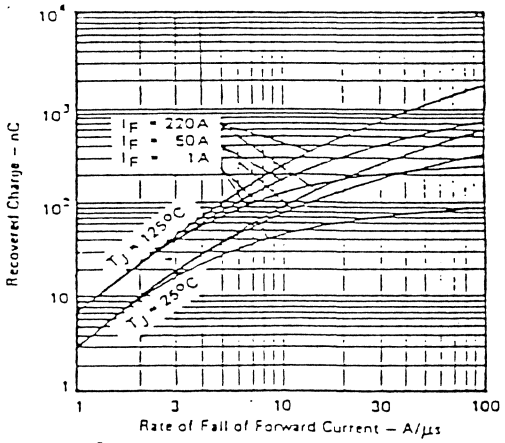


Fig. 1 – Maximum Recovered Charge Vs. Rate of of Fall of Forward Current, -1

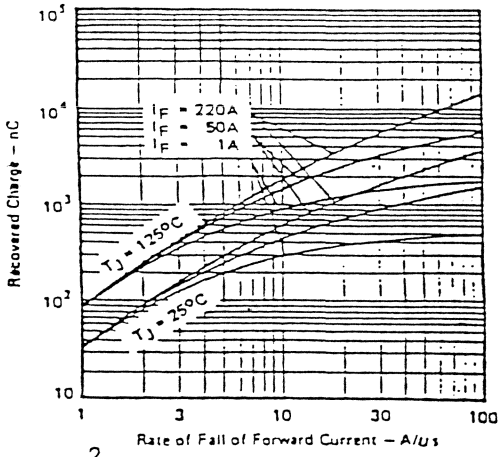


Fig. 2 – Maximum Recovered Charge Vs. Rate of of Fall of Forward Current, -2

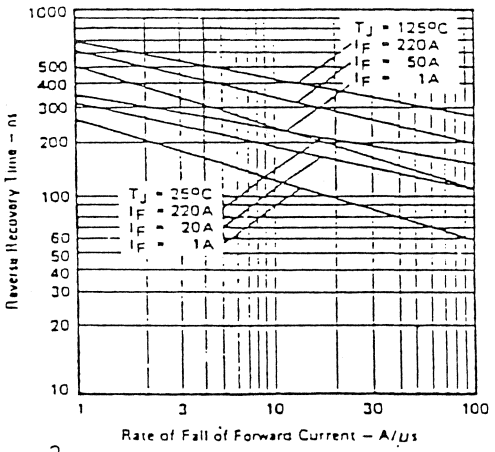


Fig. 3 – Maximum Reverse Recovery Time Vs. Rate of of Fall of Forward Current, -1

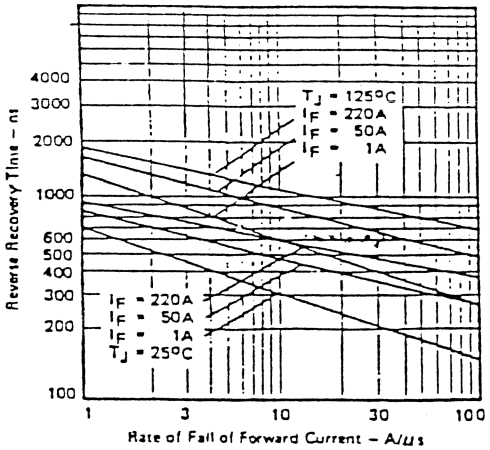


Fig. 4 – Maximum Reverse Recovery Time Vs. Rate of of Fall of Forward Current, -2

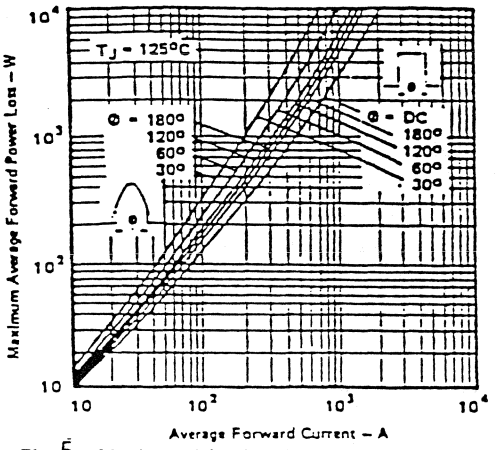


Fig. 5 – Maximum High Level Forward Power Loss Vs. Average Forward Current,

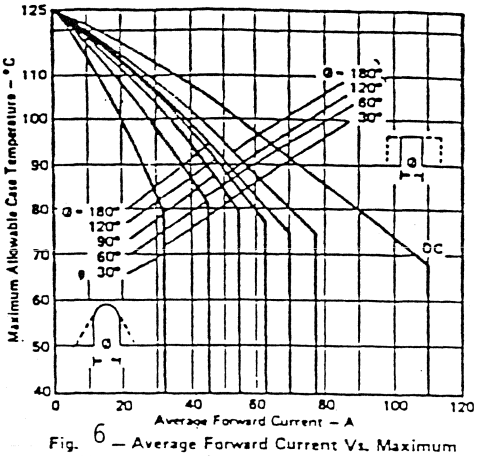


Fig. 6 – Average Forward Current Vs. Maximum Allowable Case Temperature,

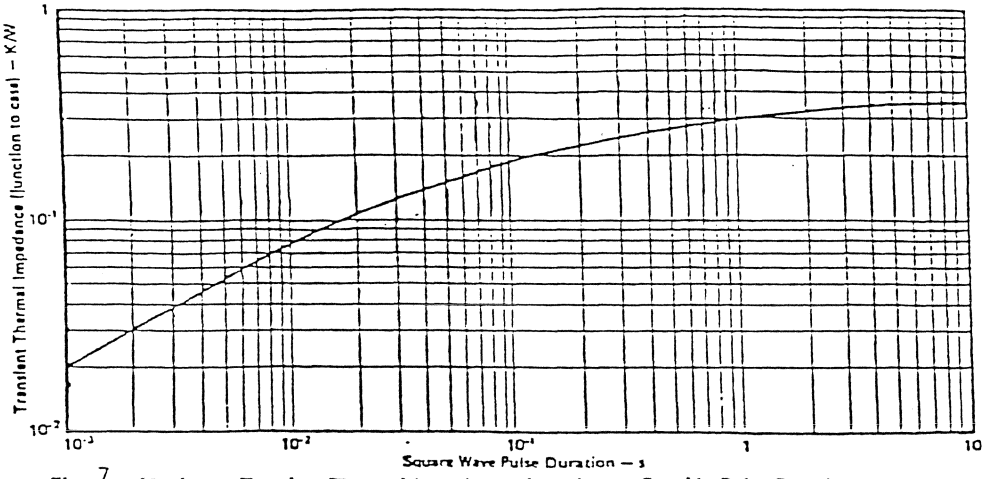


Fig. 7 – Maximum Transient Thermal Impedance, Junction-to-Case Vs. Pulse Duration,

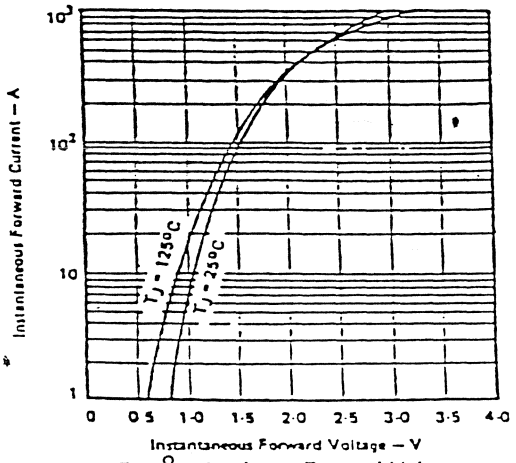
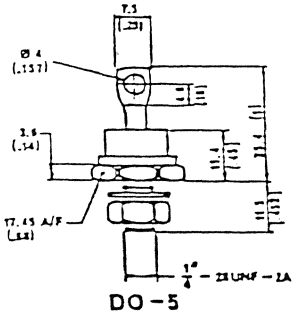


Fig. 8 – Maximum Forward Voltage Vs. Forward Current



DO-5

Dimensions in m.m. (inches)

Mounting torque:
4—4.7 Nm (0.4—0.48 Kgf m)
Threads not to be lubricated
Weight: 20 grams

In the interest of product improvement, Westcode reserves the right to change specifications at any time without notice.

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Westinghouse Brake and Signal Co. Ltd.

Printed by Bailey Litho Limited, Dursley, Glos.