"BIG IDEAS IN BIG POWER"

PowerTech

400 AMPERES

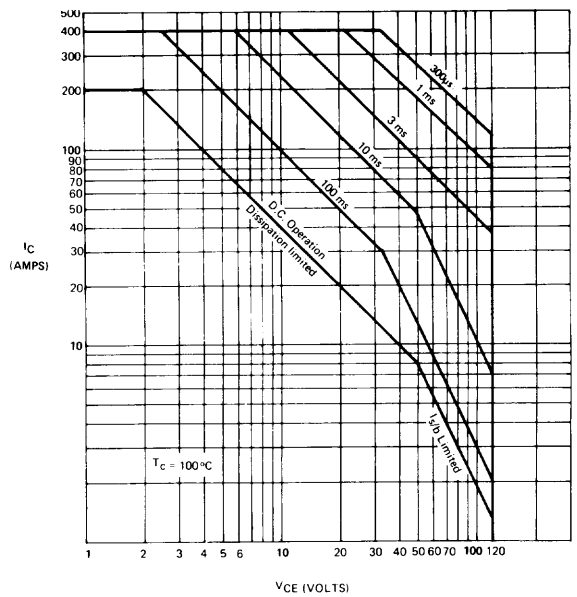
PT-9503

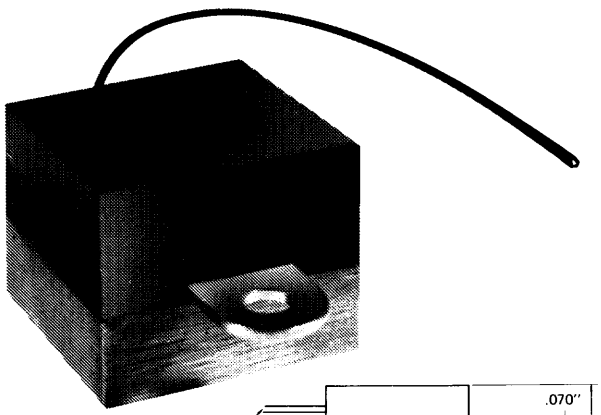
SILICON NPN TRANSISTOR

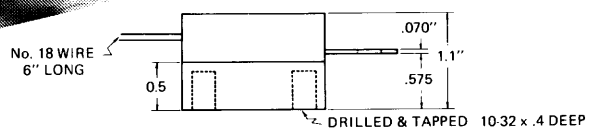
FEATURES:

$V_{CE(sat)}$ ····· V @ 200 A	h_{FE} ····· 5 min @ 400A	P_D ·····	625 Watts
V_{BE} ···· 1.5 V @ 200 A	t_f ····· 3 μ sec	$E_{S/b}$ ·····	6 Joules

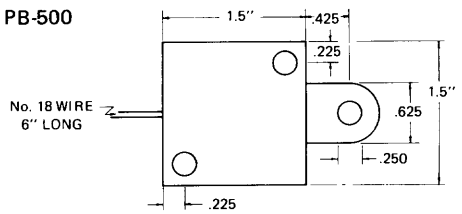
SAFE OPERATING AREA







PACKAGE PB-500



PowerTech's transistors offer high current capability, high breakdown voltage and the lowest available saturation voltage. They have exceptional resistance to both forward and reverse second breakdown. This unique combination of device characteristics makes them particularly suited for a wide variety of high current applications, which include series and switching regulators, motor controls, servoamplifiers and power control circuits. The transistors will provide outstanding performance when used as replacements for paralleled lower current devices, resulting in considerable reductions in weight, space and circuit complexity. Their reliability is assured through 100% power testing at 40V,10A @100°C case temperature.

MAXIMUM RATINGS	SYMBOL	PT–9503
Collector-Base Voltage	V_{CBO}	120V
Collector-Emitter Voltage	$V_{CEO\ (sus)}$	120V
Emitter-Base Voltage	V_{EBO}	10V
Peak Collector Current	I_C	400A
D.C. Collector Current	I_C	200A
Power Dissipation @ 25°C	P_D	625W
Power Dissipation @ 100°C	P_D	400W
Thermal Resistance	$\Theta_{J\text{-}C}$	0.25° C/W
Operating Temperature Range	T_J	-65 to 200°C
Storage Temperature Range	T_A	-65 to 150°C

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ELECTICAL CHARACTERISTICS 25°C

TEST	SYMBOL	LIMITS PT-9503 MIN.	LIMITS PT-9503 MAX.	UNITS	TEST CONDITIONS
D.C. Current Gain*	h_{FE}	10	40		I_C = 200A, V_{CE} = 4V
D.C. Current Gain*	h_{FE}	5	–	–	I_C = 400A, V_{CE} = 4V
Collector Saturation Voltg.*	$V_{CE\ (sat)}$	–	0.5	V	I_C = 200A, I_B = 20A
Collector Saturation Voltg.*	$V_{CE\ (sat)}$	–	1.0	V	I_C = 400A, I_B = 80A
Base Emitter Voltage*	V_{BE}	–	1.5	V	I_C = 200A, V_{CE} = 2V
Base Emitter Voltage*	V_{BE}	–	2.5	V	I_C = 400A, V_{CE} = 4V
Collector-Emitter Voltage*	$V_{CEO\ (sus)}$	120	–	V	I_C = 200mA, I_B = 0
Collector Cutoff Current	I_{CBO}	–	5	mA	V_{CB} = 120V, I_{EB} = 0
Collector Cutoff Current @ 150° C	I_{CBO}	–	10	mA	V_{CB} = 100V, I_{EB} = 0
Emitter Cutoff Current	I_{EBO}	–	5	mA	V_{EB} = 10V, I_{CB} = 0
Gain Bandwidth Product (Typ.)	f_t	1	–	MHz	I_C = 5A, V_{CE} = 10V, f = 100KHz
Collector Capacitance	C_{obo}	–	5000	pf.	V_{CB} = 10V, f = 100KHz
Switching Speed (Typ.)	t_r	–	3	μ sec	I_C = 75A
(Power Tech Test Circuit)	t_s	–	3	μ sec	
	t_f	–	3	μ sec	I_B = 15A, – I_{B2} = 7.5A

* ≤300μ sec Pulse 2% Duty Cycle

Fig. 1

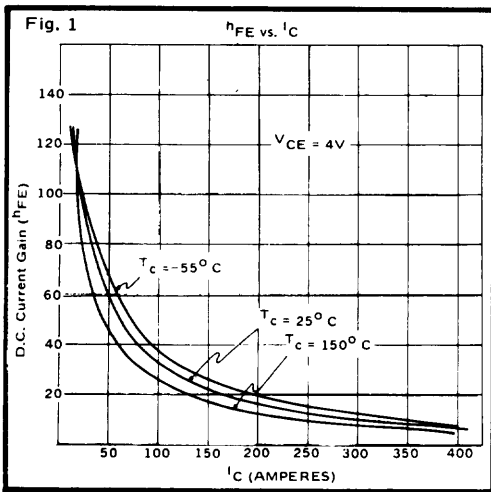


Fig. 2

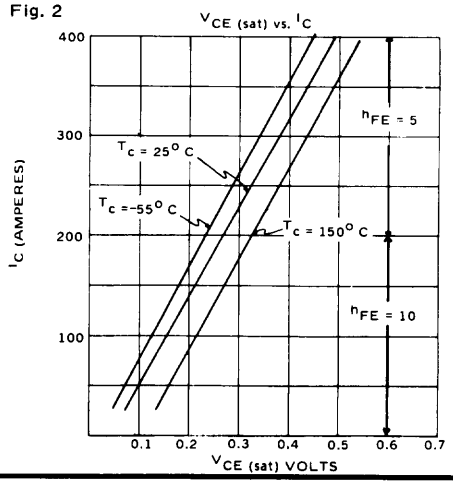


Fig. 3

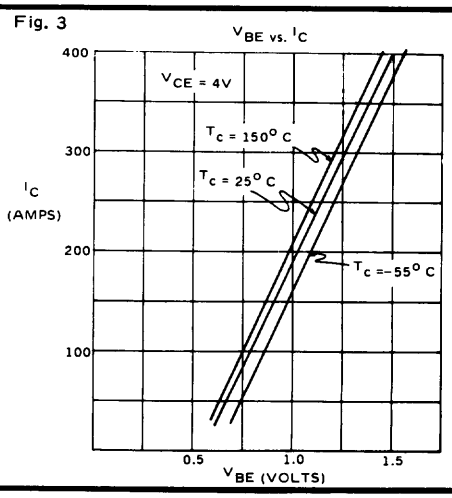


Fig. 4

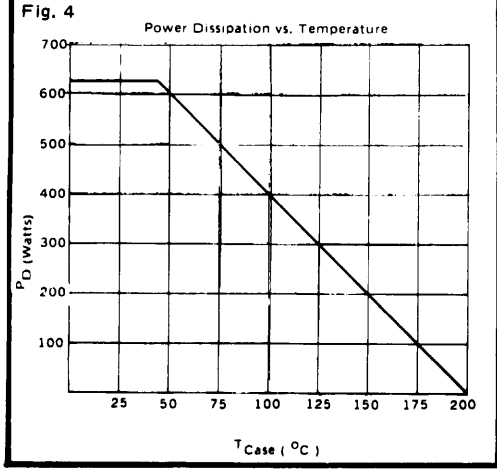
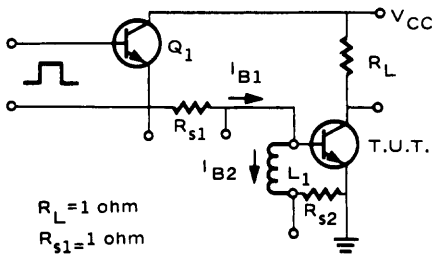
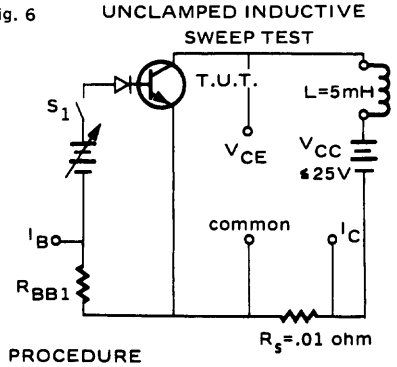


Fig. 5 SWITCHING TEST CIRCUIT



R_L=1 ohm
R_{s1}=1 ohm
R_{s2}=0.1 ohm
L_1= 15μH
Q_1 =2N5552

Fig. 6 UNCLAMPED INDUCTIVE SWEEP TEST



PROCEDURE

With S_1 closed, set I_B=8A, I_C=50A
Open S_1
$E_{S/b}=1/2LI^2=6.25$ Joules