"BIG IDEAS IN BIG POWER"

PowerTech

500 AMPERES

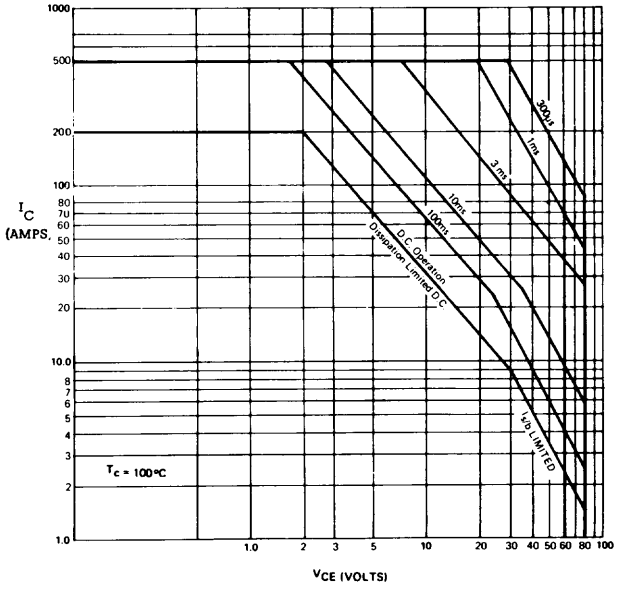
PT-9501
PT-9502

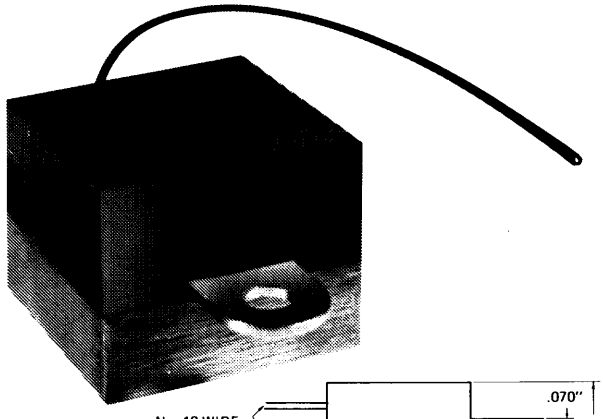
SILICON NPN TRANSISTOR

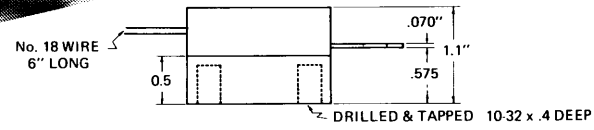
FEATURES:

$V_{CE(sat)}$	0.5V @ 300A	h_{FE}	5 @ 500A	P_D	625 Watts
V_{BE}	1.5V @ 300A	t_f	2μ sec.	$E_{S/b}$	6 Joules

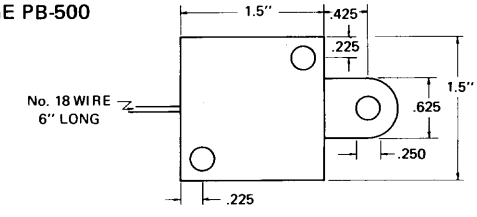
SAFE OPERATING AREA







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–9501	PT-9502
Collector-Base Voltage	V_{CBO}	80V	100V
Collector-Emitter Voltage	V_{CEO} (sus)	60V	80V
Emitter-Base Voltage	V_{EBO}	10V	10V
Peak Collector Current	I_C	500A	500A
D.C. Collector Current	I_C	300A	300A
Power Dissipation @ 25°C	P_D	625W	625W
Power Dissipation @ 100°C	P_D	400W	400W
Thermal Resistance	Θ_{J-C}	0.25° C/W	0.25° C/W
Operating Temperature Range	T_J	-65 to 200°C	-65 to 200°C
Storage Temperature Range	T_A	-65 to 150°C	-65 to 150°C

ELECTRICAL CHARACTERISTICS 25°C

TEST	SYMBOL	LIMITS				UNITS	TEST CONDITIONS
		PT-9501		PT-9502			
		MIN.	MAX.	MIN.	MAX.		
D.C. Current Gain*	h_{FE}	10	40	10	40	—	I_C = 300A, V_{CE} = 4V
D.C. Current Gain*	h_{FE}	5	—	5	—	—	I_C = 500A, V_{CE} = 4V
Collector Saturation Voltg.*	$V_{CE\ (sat)}$	—	0.5	—	0.5	V	I_C = 300A, I_B = 30A
Collector Saturation Voltg.*	$V_{CE\ (sat)}$	—	1.0	—	1.0	V	I_C = 500A, I_B = 100A
Base Emitter Voltage*	V_{BE}	—	1.5	—	1.5	V	I_C = 300A, V_{CE} = 4V
Base Emitter Voltage*	V_{BE}	—	2.5	—	2.5	V	I_C = 500A, V_{CE} = 4V
Collector-Emitter Voltage*	$V_{CEO\ (sus)}$	60	—	80	—	V	I_C = 200mA, I_B = 0
Collector Cutoff Current	I_{CBO}	—	5	—	—	mA	V_{CB} = 60V, I_{EB} = 0
Collector Cutoff Current	I_{CBO}	—	—	—	5	mA	V_{CB} = 80V, I_{EB} = 0
Collector Cutoff Current @ 150 °C	I_{CBO}	—	10	—	10	mA	V_{CB} = 60V, I_{EB} = 0
Emitter Cutoff Current	I_{EBO}	—	5	—	5	mA	V_{EB} = 10V, I_{CB} = 0
Gain Bandwidth Product (Typ.)	f_t	1	—	1	—	MHz	I_C = 5A. V_{CE} = 10V.
Collector Capacitance	C_{obo}	—	5000	—	5000	pf.	V_{CB} = 10V
Switching Speed (Typ.)	t_r		3.5		3.5	μ sec	I_C = 100A
	t_s		3		3	μ sec	
	t_f		2		2	μ sec	I_{B1} = 10A I_{B2} = 20A,

* ≤ 300 μ sec Pulse 2% Duty Cycle

Fig. 1

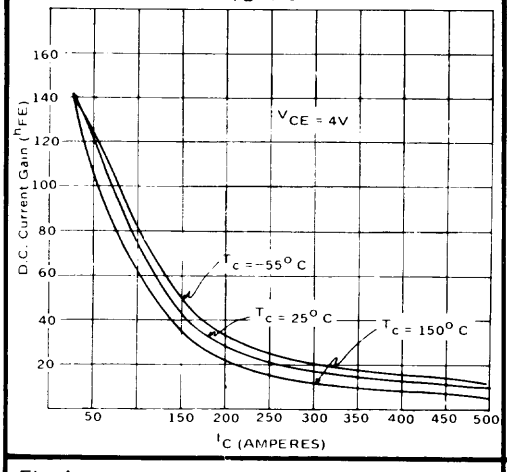


Fig. 2

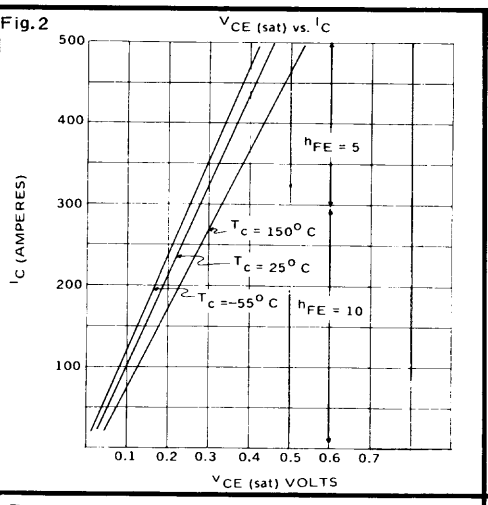


Fig. 3

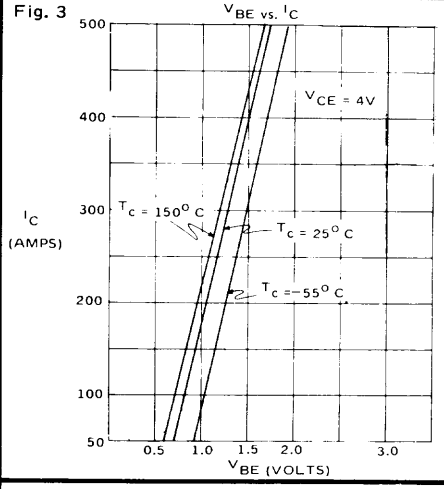


Fig. 4

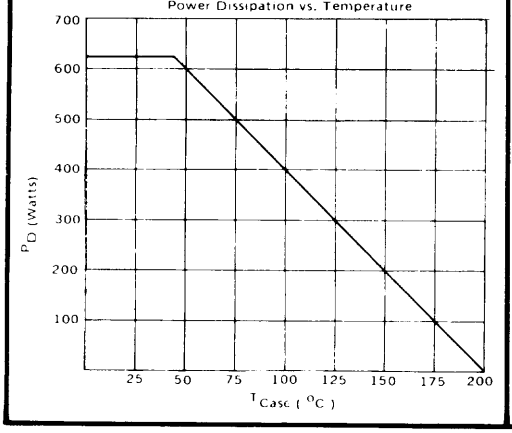
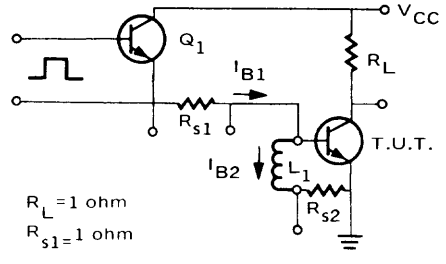


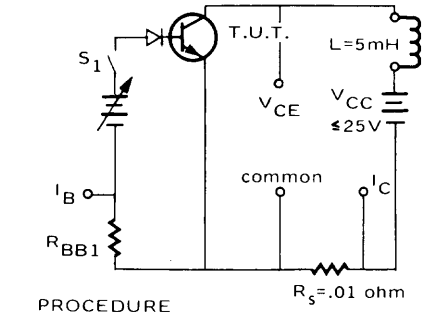
Fig. 5

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