POWERTECH INC

"BIG IDEAS IN BIG POWER"

PowerTech

80 AMPERES

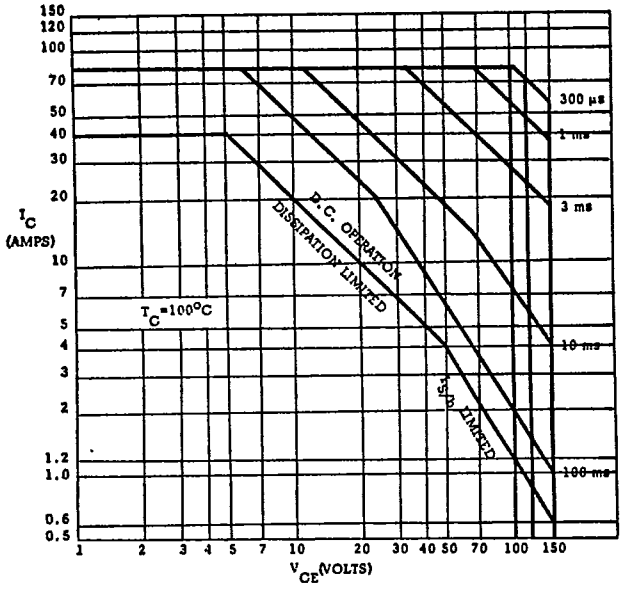
PT-7504
PT-7505
PT-7506

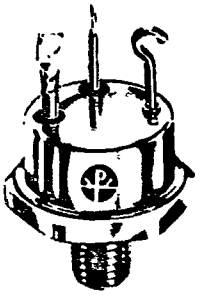
SILICON NPN TRANSISTOR

FEATURES:

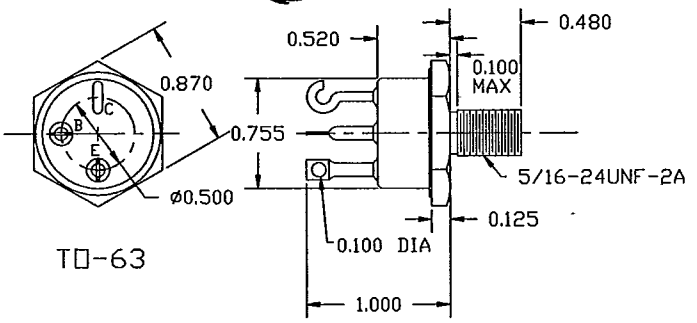
$V_{CE(sat)}$	0.6 V @ 40 A	h_{FE}	5 min @ 80 A	$I_{S/b}$	1.2 A @ 100 V
V_{BE}	1.2 V @ 40 A	t_f	2 μ sec	$E_{S/b}$	6 Joules

SAFE OPERATING AREA





JEDEC TO-63 PKG.



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 50V, 4A @ 100°C case temperature. These transistors exceed the requirements of MIL-S-19500 and are well suited for the most severe military-aerospace applications.

MAXIMUM RATINGS	SYMBOL	PT-7504	PT-7505	PT-7506
Collector-Base Voltage	V_{CBO}	120V	150V	175V
Collector-Emitter Voltage	$V_{CEO\ (sus)}$	100V	120V	150V
Emitter-Base Voltage	V_{EBO}		10V	
Peak Collector Current	I_C		80A	
D.C. Collector Current	I_C		40A	
Power Dissipation @ 25°C	P_D		350W	
Power Dissipation @ 100°C	P_D		200W	
Thermal Resistance	θ_{J-C}		0.5° C/W	
Operating Temperature Range			-65 to 200°C	
Storage Temperature Range			-65 to 200°C	

POWERTECH, INC. ■ 0-02 FAIR LAWN AVENUE ■ FAIR LAWN, NEW JERSEY 07410 ■ TEL. (201) 791-5050

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TEST	SYMBOL	LIMITS PT7504 MIN.	PT7504 MAX.	PT7505 MIN.	PT7505 MAX.	PT7506 MIN.	PT7506 MAX.	UNITS	TEST CONDITIONS
D.C. Current Gain*	h_{FE}	10	40	10	40	10	40	–	I_C = 40A, V_{CE} = 2V
D.C. Current Gain*	h_{FE}	5	–	5	–	5	–	–	I_C = 80A, V_{CE} = 4V
Collector Saturation Voltg.*	$V_{CE\ (sat)}$	–	0.60	–	0.60	–	0.60	V	I_C = 40A, I_B = 5A
Collector Saturation Voltg.*	$V_{CE\ (sat)}$	–	1.5	–	1.5	–	1.5	V	I_C = 80A, I_B = 20A
Base Emitter Voltage*	V_{BE}	–	1.2	–	1.2	–	1.2	V	I_C = 40A, V_{CE} = 2V
Base Emitter Voltage*	V_{BE}	–	2.5	–	2.5	–	2.5	V	I_C = 80A, V_{CE} = 4V
Collector-Emitter Voltage*	$V_{CEO\ (sus)}$	100	–	120	–	150	–	V	I_C = 200mA, I_B = 0
Collector Cutoff Current	I_{CBO}	–	2	–	–	–	–	mA	V_{CB} = 120V, I_{EB} = 0
Collector Cutoff Current	I_{CBO}	–	–	–	2	–	–	mA	V_{CB} = 150V, I_{EB} = 0
Collector Cutoff Current	I_{CBO}	–	–	–	–	–	2	mA	V_{CB} = 175V, I_{EB} = 0
Collector Cutoff Current @ 150°C	I_{CBO}	–	10	–	10	–	10	mA	V_{CB} = 100V, I_{EB} = 0
Emitter Cutoff Current	I_{EBO}	–	1	–	1	–	1	mA	V_{EB} = 10V, I_{CB} = 0
Gain Bandwidth Product (Typ.)	f_t	1	–	1	–	1	–	MHz	I_C = 5A, V_{CE} = 10V, f= 100KHz
Collector Capacitance	C_{obo}	–	1800	–	1800	–	1800	pf.	V_{CB} = 10V
Switching Speed (Typ.) (PowerTech Test Circuit)	t_r	–	2	–	2	–	2	μ sec	I_C = 40A,
	t_s	–	3	–	3	–	3	μ sec	
	t_f	–	2	–	2	–	2	μ sec	I_{B1} = – I_{B2} = 8A

* ≤300μ sec Pulse 2% Duty Cycle

Fig. 1 h_{FE} vs I_C

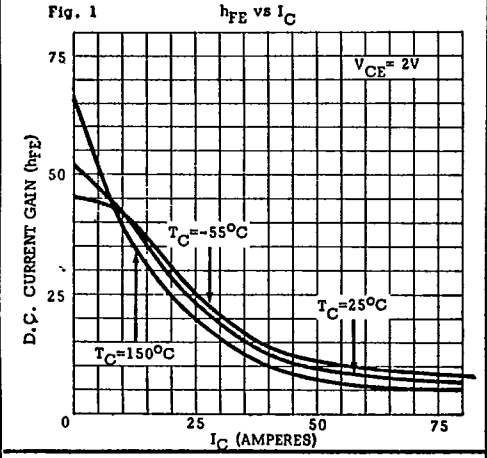


Fig. 2 $V_{CE(sat)}$ vs I_C

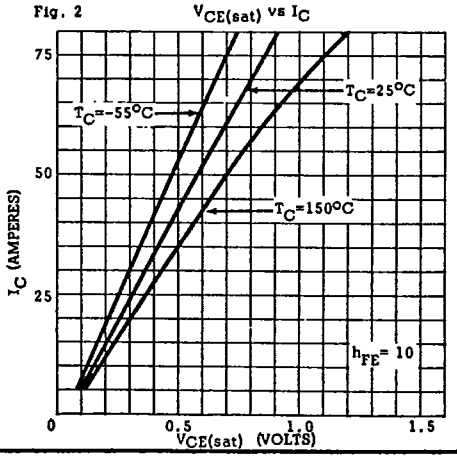


Fig. 3 V_{BE} vs I_C

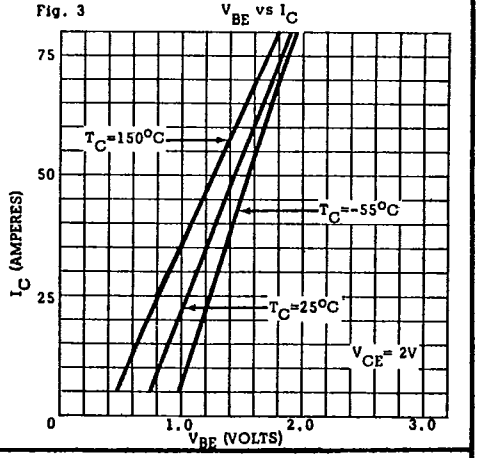


Fig. 4 POWER DISSIPATION vs TEMPERATURE

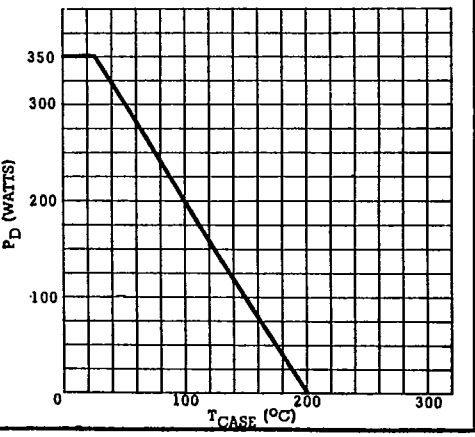
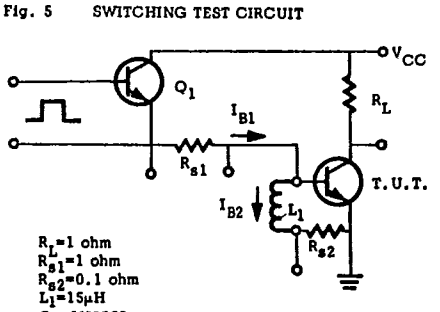
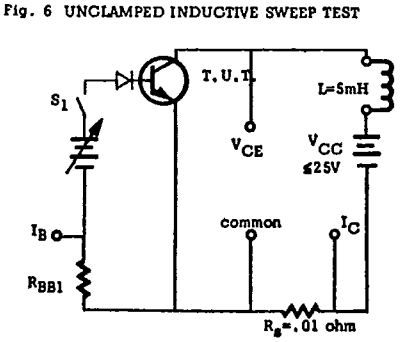


Fig. 5 SWITCHING TEST CIRCUIT



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