"BIG IDEAS IN BIG POWER"

PowerTech

70 AMPERES

PT-3512
PT-3513

HIGH VOLTAGE SILICON NPN TRANSISTOR

FEATURES

$V_{CE(sat)}$ ..... 0.5V @ 30A

V_{BE} ..... 1.2V @ 30A

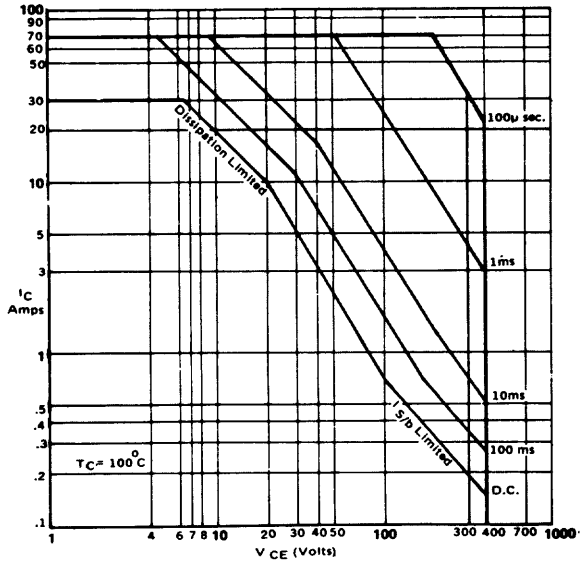
h_{FE} ..... 5 min. @ 70A

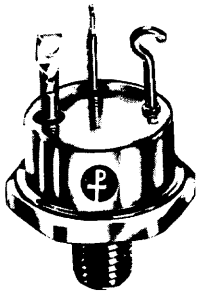
t_f ..... 0.5 µsec.

$I_{S/b}$ ..... .15A @ 400V

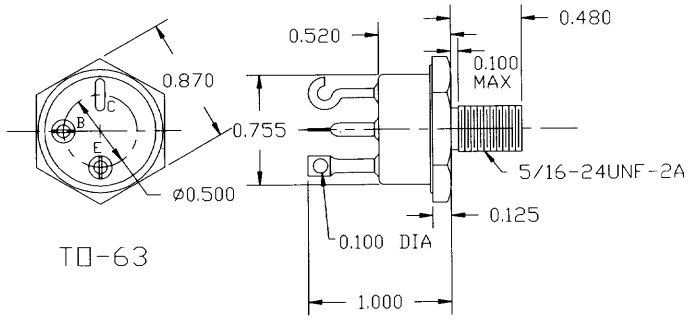
$E_{S/b}$ ..... 2.5 Joules

SAFE OPERATING AREA





JEDEC TO-63



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, 2A @ 100°C case temperature. These transistors exceed the requirements of MIL-S-19500 and are well-suited for the most severe military-aerospace applications.

ABSOLUTE MAXIMUM RATINGS	TYPE PT-3512	PT-3513
Collector-Base Voltage, V_{CBO}	400V	450V
Collector-Emitter Voltage, V_{CEO}	325V	400V
Emitter-Base Voltage, V_{EBO}	10V	
Peak Collector Current, I_{CM}*	70A	
D.C. Collector Current, I_C	30A	
Power Dissipation at 25°C Case Temperature, P_D	350W	
Power Dissipation at 100°C Case Temperature, P_D	200W	
Operating Junction Temperature Range, T_J	-65 to 200°C	
Storage Temperature Range, T_A	-65 to 200°C	
Package:	TO-63	
Thermal Resistance θ_{JC}	.5° C/W	

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ELECTRICAL SPECIFICATIONS (at 25°C unless otherwise noted)

TEST	SYMBOL	PT-3512		PT-3513		UNIT	TEST CONDITIONS
		MIN.	MAX.	MIN.	MAX.		
D.C. Current Gain*	h_{FE}	10	50	10	50	–	I_C=30A, V_{CE}=5V
D.C. Current Gain*	h_{FE}	5	–	5	–	–	I_C=70A, V_{CE}=5V
Collector Saturation Voltage*	$V_{CE(sat)}$	–	0.6	–	0.6	V	I_C=30A, I_B= 4A
Base Emitter Voltage*	V_{BE}	–	1.5	–	1.5	V	I_C=30A, V_{CE}=5V
Col. -Em. Breakdown Voltage*Ø	$V_{CEO(sus)}$	325	–	–	–	V	I_C=50mA, I_B=0
Col. -Em. Breakdown Voltage*Ø	$V_{CEO(sus)}$	–	–	400	–	V	I_C=50mA, I_B=0
Collector Cutoff Current	I_{CBO}	–	2	–	–	mA	V_{CB}=400V, I_{EB}=0
Collector Cutoff Current	I_{CBO}	–	–	–	2	mA	V_{CB}=450V, I_{EB}=0
Col. Cutoff Current @ 150°C	I_{CBO}	–	20	–	–	mA	V_{CB}=250V, I_{EB}=0
Emitter Cutoff Current	I_{EBO}	–	5	–	5	mA	V_{EB}=10V, I_{CB}=0
Gain Bandwith Product (Typ.)	f_t	10	–	10	–	MHz	I_C=5A, V_{CE}=10V
Collector Capacitance	C_{obo}	–	400	–	400	pf.	V_{CB}=150V
Switching Speed (Typ.)	t_r	–	.5	–	.5	μs	I_C=30A, V_{CC}=150V
	t_s	–	1.2	–	1.2	μs	I_{B_1} = -I_{B_2}=3A
	t_f	–	.5	–	.5	μs	

*PW ≤ 300 μs, D.C. ≤ 2%

Ø V_{CE} measured with pulse 300 μs max., I_B=100μA

Do Not Use Curve Tracer

Fig. 1 V_{CE} (sat) vs I_C

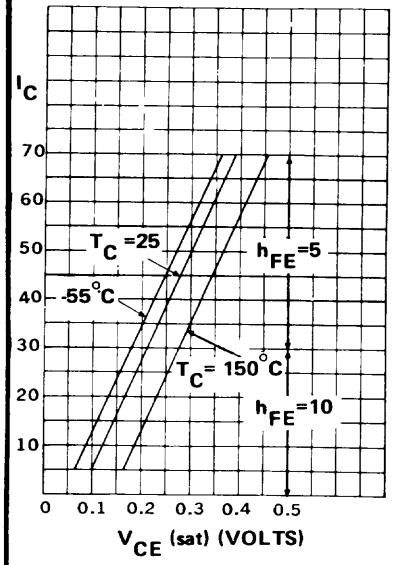


Fig. 2 h_{FE} vs I_C

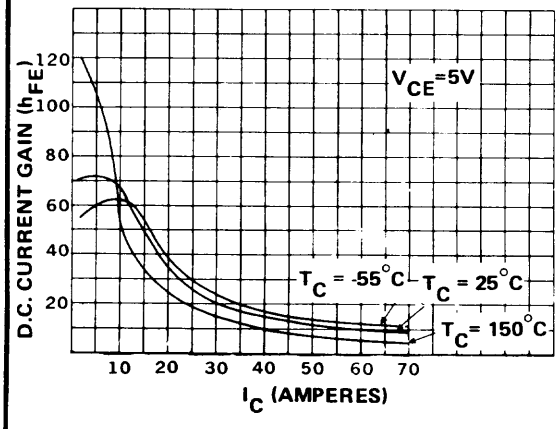


Fig. 3 V_{BE} vs I_C

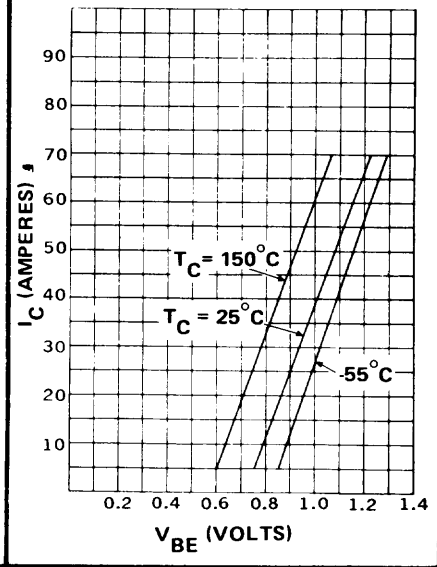


Fig. 4 POWER DISSIPATION vs TEMPERATURE

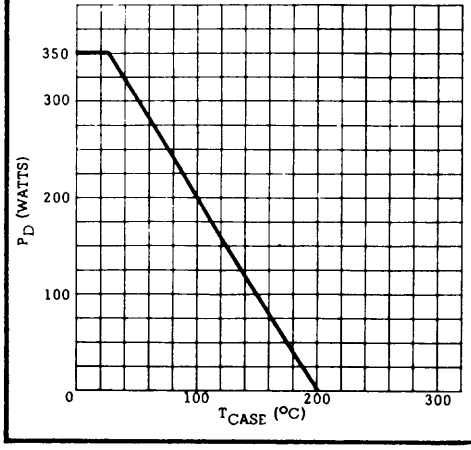
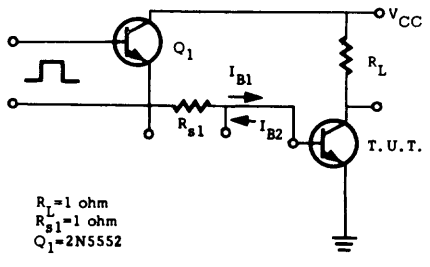
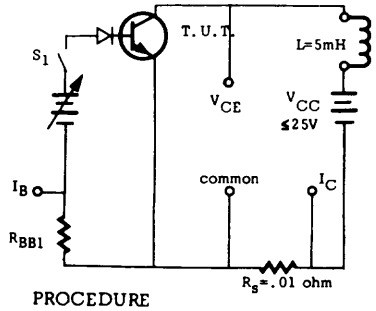


Fig. 5 SWITCHING TEST CIRCUIT



R_L=1 ohm
R_{s1}=1 ohm
Q_1=2N5552

Fig. 6 UNCLAMPED INDUCTIVE SWEEP TEST



PROCEDURE

With S_1 closed, I_C=35A

Open S_1

$E_{S/b}$=1/2LI^2=2.5 Joules