HIGH SPEED
NPN POWER TRANSISTORS

GE13080T
GE13081T

400-450 VOLTS
8 AMP, 90 WATTS

The GE13080T and GE13081T transistors are designed for high-voltage, high-speed power switching in inductive circuits where fall time is critical. They are particularly suited for line-operated switch-mode applications such as:

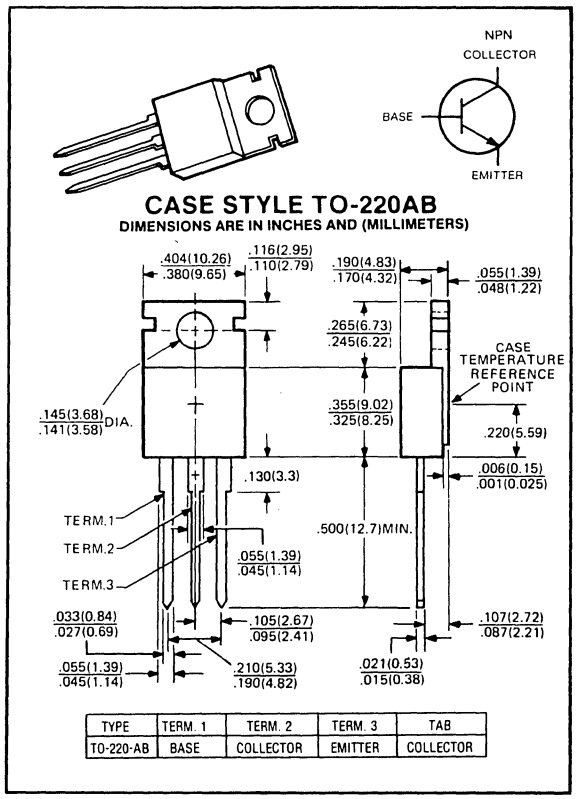
Features:

- Switching regulators
- Inverters
- Solenoid and relay drivers
- Motor controls
- Deflection circuits

Fast Turn-Off Times:
100 ns inductive fall time @ 25°C (Typ)
150 ns inductive crossover time @ 25°C (Typ)
400 ns inductive storage time @ 25°C (Typ)

Operating temperature range -65 to +150°C

100°C Performance Specified for:
Switching times with inductive loads —
Saturation voltages
Leakage currents



maximum ratings (T_A = 25°C) (unless otherwise specified)

RATING	SYMBOL	GE13080T	GE13081T	UNITS
Collector-Emitter Voltage	V_{CEO}	400	450	Volts
Collector-Emitter Voltage	V_{CES}	650	750	Volts
Emitter Base Voltage	V_{EBO}	6	6	Volts
Collector Current — Continuous Peak(1)	I_C I_{CM}	8 12	8 12	A
Base Current — Continuous	I_B	3	3	A
Total Power Dissipation @ Tc = 25°C @ Tc = 100°C Derate above 25°C	P_D	90 36 72	90 36 72	Watts W/°C
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +150	-65 to +150	°C

thermal characteristics

Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.0	1.0	°C/W
Maximum Lead Temperature for Soldering Purpose: ⅛" from Case for 5 Seconds	T_L	275	275	°C

(1) Pulse Test: Pulse Width = 5ms. Duty Cycle ≤ 10%.

electrical characteristics (T_C = 25° C) (unless otherwise specified)

CHARACTERISTIC		SYMBOL	MIN	TYP	MAX	UNIT
off characteristics[1]						
Collector-Emitter Sustaining Voltage (I_C = 100mA, I_B = 0)	GE13080T GE13081T	$V_{CEO(sus)}$	400 450	— —	— —	Volts
Collector Cutoff Current (V_{CEV} = Rated Value, $V_{BE(off)}$ = 1.5V) (V_{CEV} = Rated Value, $V_{BE(off)}$ = 1.5V, T_C = 100° C)		I_{CEV}	— —	— —	0.5 2.5	mA
Collector Cutoff Current (V_{CE} = Rated V_{CEV}, R_{BE} = 50Ω, T_C = 100° C)		I_{CER}	—	—	3.0	mA
Emitter Cutoff Current (V_{EB} = 6V, I_C = 0)		I_{EBO}	—	—	1.0	mA
second breakdown						
Second Breakdown with Base Forward Biased		$I_{S/b}$	SEE FIGURE 12			
Clamped Inductive SOA with Base Reversed Bias		RBSOA	SEE FIGURE 13			
on characteristics[1]						
DC Current Gain (I_C = 5A, V_{CE} = 3V)		h_{FE}	8.0	—	—	—
Collector-Emitter Saturation Voltage (I_C = 5A, I_B = 1A) (I_C = 8A, I_B = 1.6A) (I_C = 5A, I_B = 1A, T_C = 100° C)		$V_{CE(sat)}$	— — —	— — —	1 3 2	V
Base-Emitter Saturation Voltage (I_C = 5A, I_B = 1A) (I_C = 5A, I_B = 1A, T_C = 100° C)		$V_{BE(sat)}$	— —	— —	1.5 1.5	V
dynamic characteristics						
Output Capacitance (V_{CB} = 10V, I_E = 0, f_{test} = 1 kHz)		C_{ob}	—	—	300	pF
switching characteristics						
Resistive Load						
Delay Time	(V_{CC} = 250V, I_C = 5A	t_d	—	.025	.05	μs
Rise Time	I_{B1} = .7A, t_p = 30 μs	t_r	—	.10	.50	
Storage Time	Duty Cycle < 2%, $V_{BE(OFF)}$ = 5V)	t_s	—	.5	1.5	
Fall Time		t_f	—	.15	.5	
Inductive Load, Clamped						
Storage Time	$I_{CC(PK)}$ = 5A	t_{sv}	—	.75	2.2	μs
Crossover Time	I_{B1} = .7A (T_J = 100° C)	t_c	—	.22	.4	
Fall Time	$V_{BE(OFF)}$ = 5V	t_{fi}	—	.175	.35	
Storage Time	$V_{CE(PK)}$ = 250V	t_{sv}	—	.40	—	
Crossover Time	(T_J = 25° C)	t_c	—	.15	—	
Fall Time		t_{fi}	—	.10	—	

(1) Pulse Test: Pulse Width - 300μs Duty Cycle ≤ 2%.

TYPICAL ELECTRICAL CHARACTERISTICS

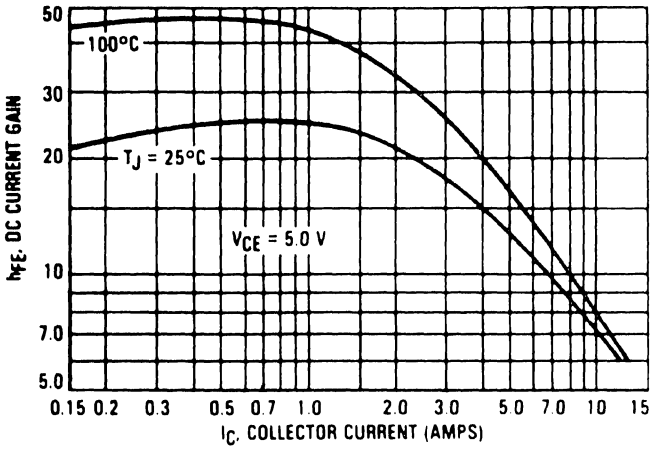


FIGURE 1 — DC CURRENT GAIN

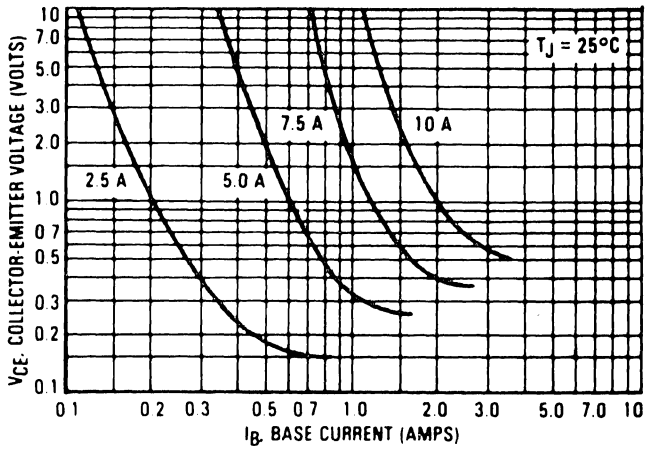


FIGURE 2 — COLLECTOR SATURATION REGION

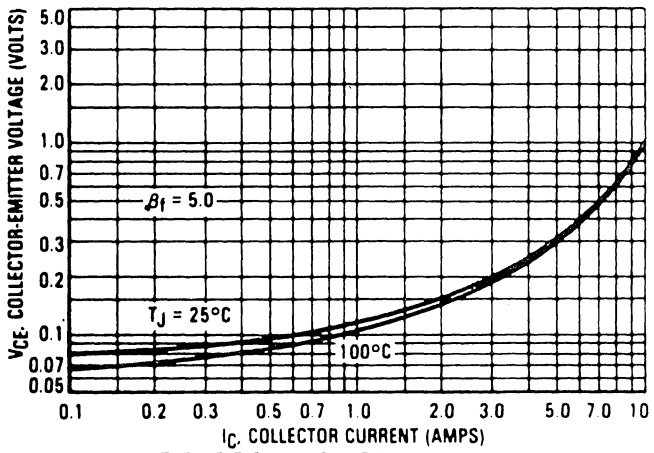


FIGURE 3 — COLLECTOR-EMITTER SATURATION VOLTAGE

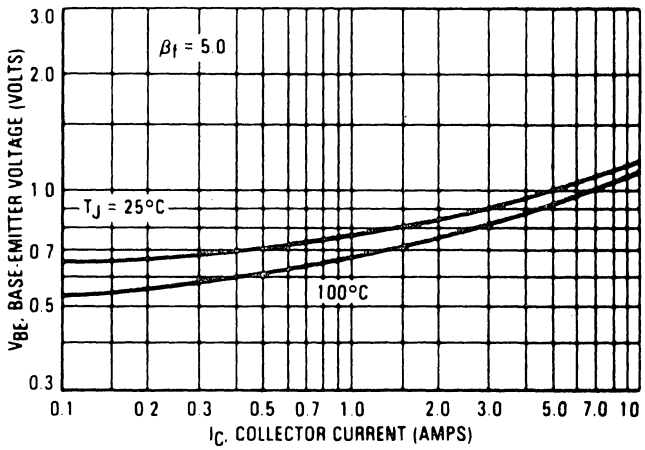


FIGURE 4 — BASE-EMITTER VOLTAGE

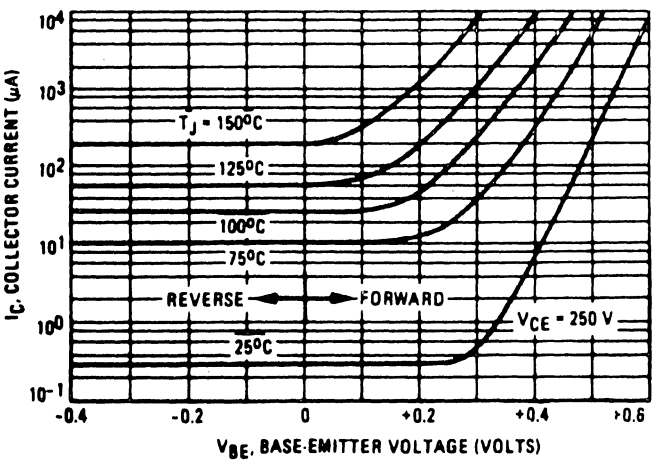


FIGURE 5 — COLLECTOR CUTOFF REGION

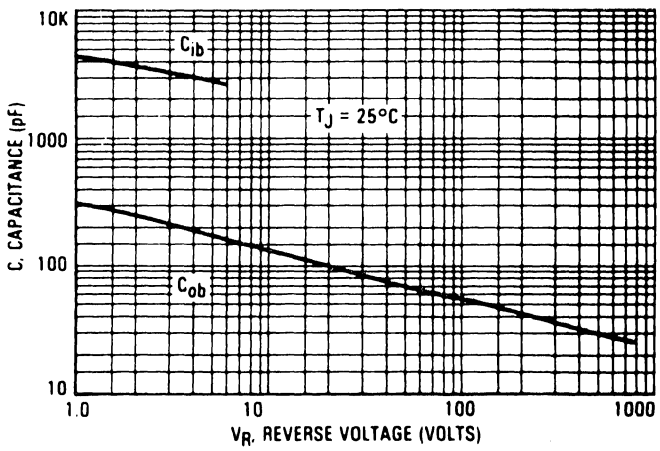


FIGURE 6 — CAPACITANCE

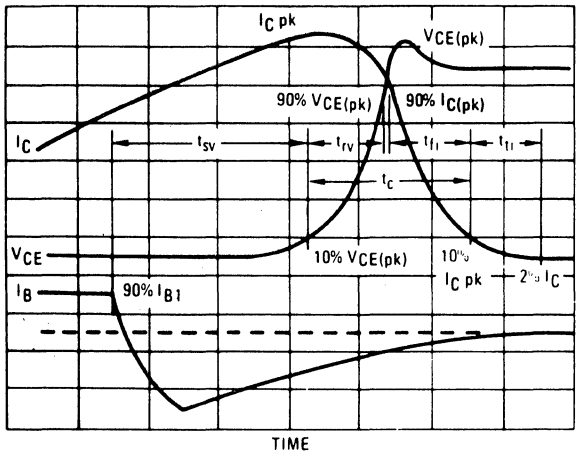


FIGURE 7 — INDUCTIVE SWITCHING MEASUREMENTS

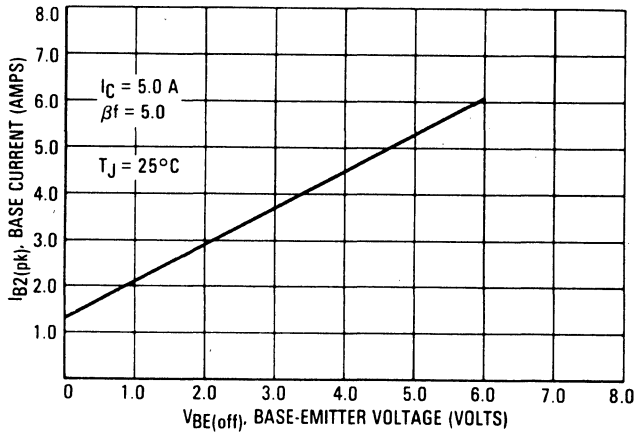


FIGURE 8 — PEAK REVERSE CURRENT

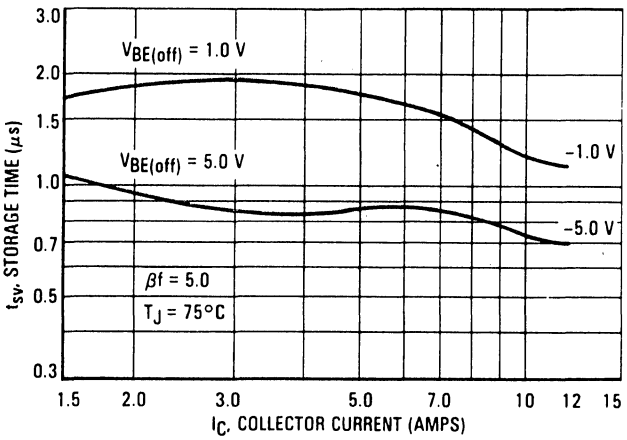


FIGURE 9 — STORAGE TIME

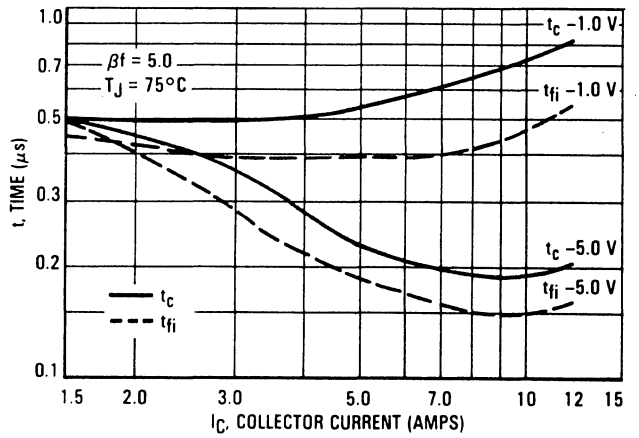


FIGURE 10 — CROSSOVER AND FALL TIMES

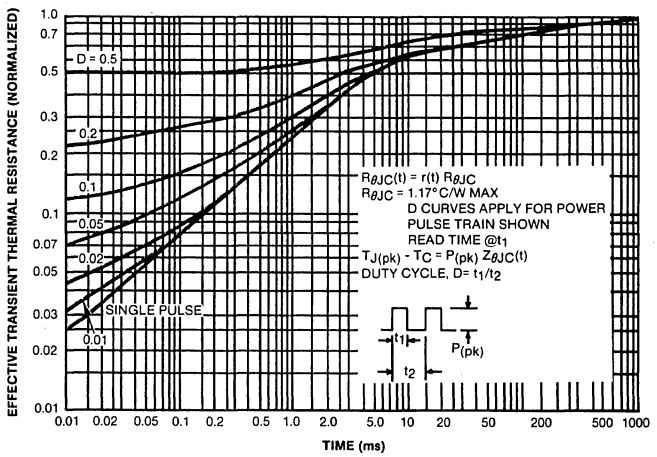


FIG. 11 THERMAL RESPONSE

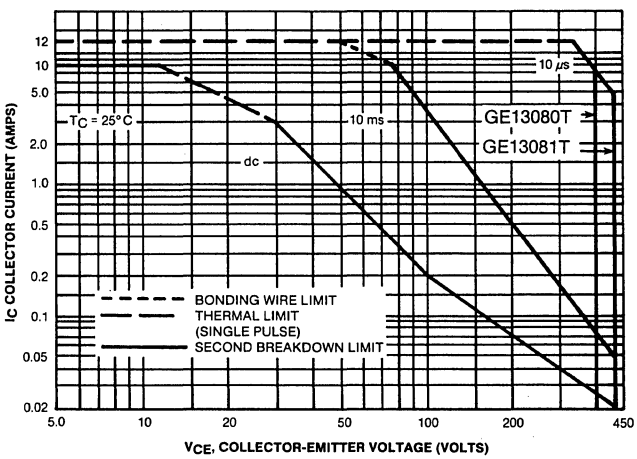


FIGURE 12 — FORWARD BIAS SAFE OPERATING AREA

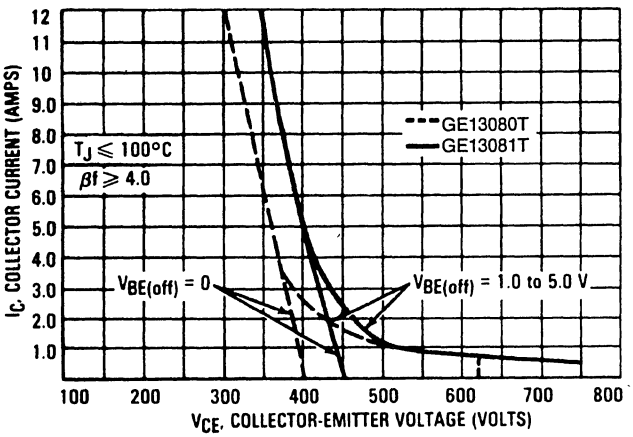


FIGURE 13 — REVERSE BIAS SAFE OPERATING AREA

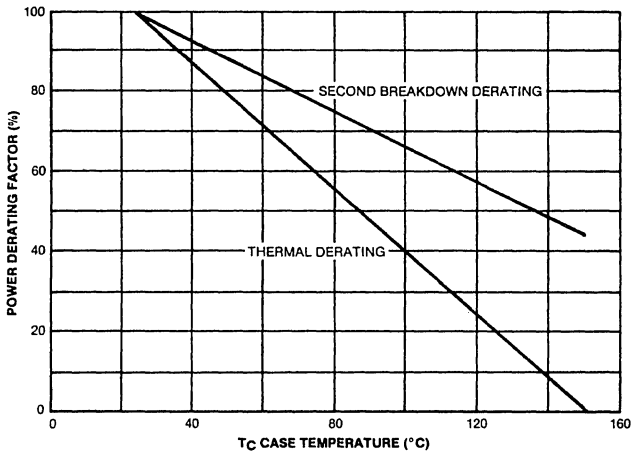


FIG. 14 POWER DERATING