



VERY HIGH GAIN NPN POWER DARLINGTON TRANSISTORS

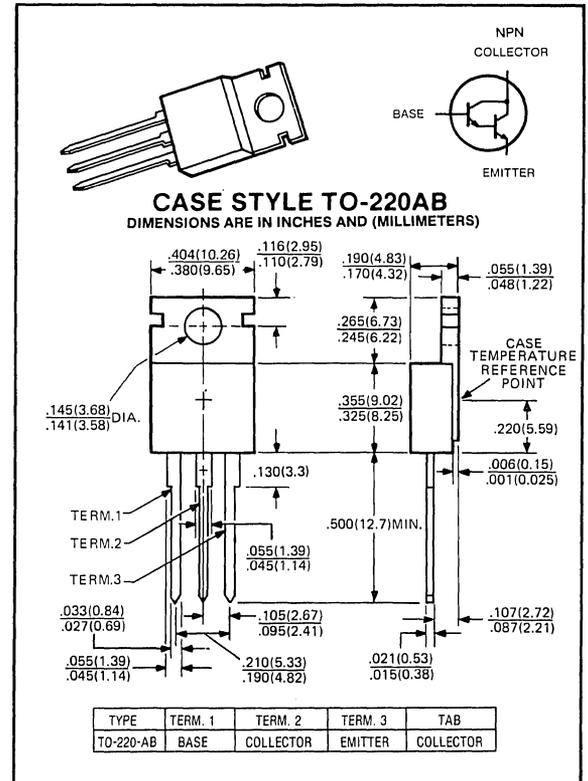
COMPLEMENTARY TO THE D45E SERIES

D44E Series

**40-80 VOLTS
10 AMP, 50 WATTS**

Applications:

- Solenoid Driver
- Lamp Driver
- Relay Substitute
- Switching Regulator
- Inverter/Converter



maximum ratings ($T_A = 25^\circ\text{C}$) (unless otherwise specified)

RATING	SYMBOL	D44E1	D44E2	D44E3	UNITS
Collector-Emitter Voltage	V_{CEO}	40	60	80	Volts
Collector-Emitter Voltage	V_{CES}	40	60	80	Volts
Emitter Base Voltage	V_{EBO}	7	7	7	Volts
Collector Current — Continuous	I_C	10	10	10	A
Peak ⁽¹⁾	I_{CM}	20	20	20	A
Base Current — Continuous	I_B	1	1	1	A
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ @ $T_C = 25^\circ\text{C}$	P_D	1.67 50	1.67 50	1.67 50	Watts
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-55 to +150	-55 to +150	-55 to +150	$^\circ\text{C}$

thermal characteristics

Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	75	75	75	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.5	2.5	2.5	$^\circ\text{C/W}$
Maximum Lead Temperature for Soldering Purposes: 1/8" from Case for 5 Seconds	T_L	260	260	260	$^\circ\text{C}$

(1) Pulse Test: Pulse Width = 300ms. Duty Cycle \leq 2%.

electrical characteristics ($T_C = 25^\circ\text{C}$) (unless otherwise specified)

CHARACTERISTIC	SYMBOL	MIN	TYP	MAX	UNIT
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off characteristics⁽¹⁾

Collector-Emitter Voltage ($I_C = 100\text{mA}$)	D44E1 D44E2 D44E3	V_{CEO}	40 60 80	— — —	— — —	Volts
Collector Cut-off Current ($V_{CE} = \text{Rated } V_{CES}$)		I_{CES}	—	—	10	μA
Emitter Cutoff Current ($V_{EB} = 7\text{V}$)		I_{EBO}	—	—	1.0	μA

second breakdown

Second Breakdown with Base Forward Biased	FBSOA	SEE FIGURE 6
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on characteristics

DC Current Gain ($I_C = 5\text{A}, V_{CE} = 5\text{V}$)	h_{FE}	1,000	—	—	—
Collector-Emitter Saturation Voltage ($I_C = 5.0\text{A}, I_B = 10\text{mA}$) ($I_C = 10.0\text{A}, I_B = 20\text{mA}$)	$V_{CE(sat)}$	— —	— —	1.5 2.0	V V
Base-Emitter Saturation Voltage ($I_C = 5.0\text{A}, I_B = 10\text{mA}$)	$V_{BE(sat)}$	—	—	2.5	Volts

dynamic characteristics

Collector Capacitance ($V_{CE} = 10\text{V}, f = 1\text{MHz}$)	C_{CBO}	—	—	130	pF
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switching characteristics

Resistive Load					
Delay Time + Rise Time	$I_C = 10\text{A}, I_{B1} = I_{B2} = 20\text{mA}$ $V_{CC} = 40\text{V}, t_p = 25 \mu\text{sec}$	$t_d + t_r$	—	0.6	—
Storage Time		t_s	—	2.0	—
Fall Time		t_f	—	0.5	—

(1) Pulse Test: $PW \leq 300\text{ms}$ Duty Cycle $\leq 2\%$.

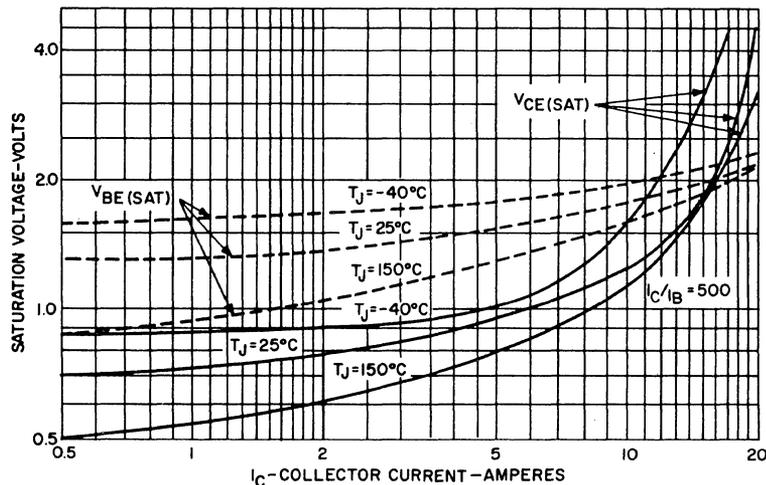


FIG. 1 TYPICAL SATURATION VOLTAGE CHARACTERISTICS

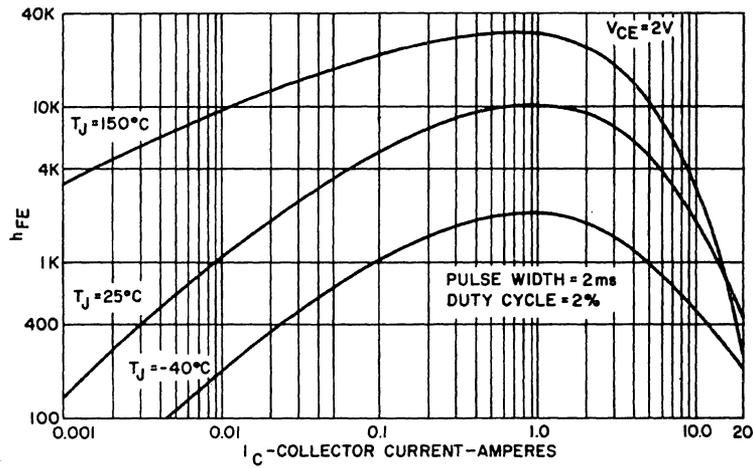


FIG. 2 TYPICAL GAIN CHARACTERISTIC

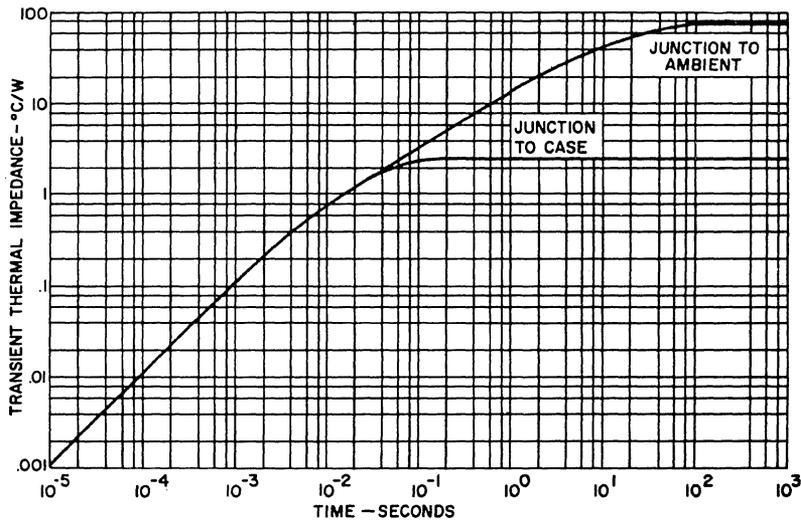


FIG. 3 TRANSIENT THERMAL IMPEDANCE

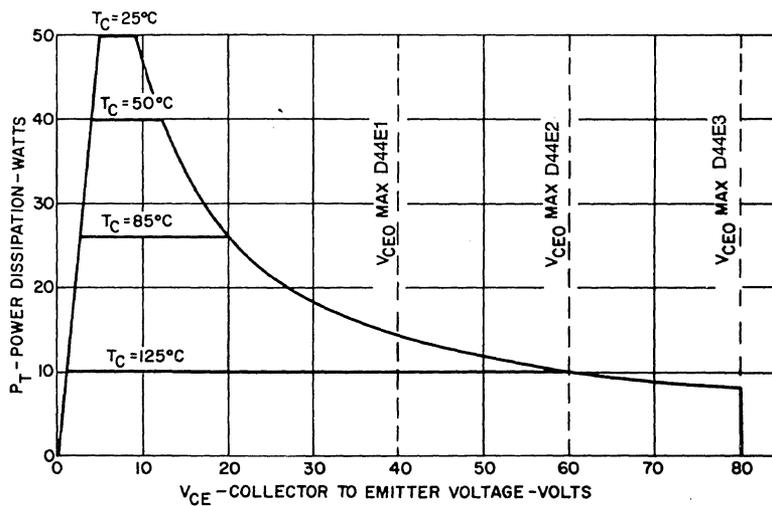


FIG. 4 MAXIMUM PERMISSIBLE DC POWER DISSIPATION

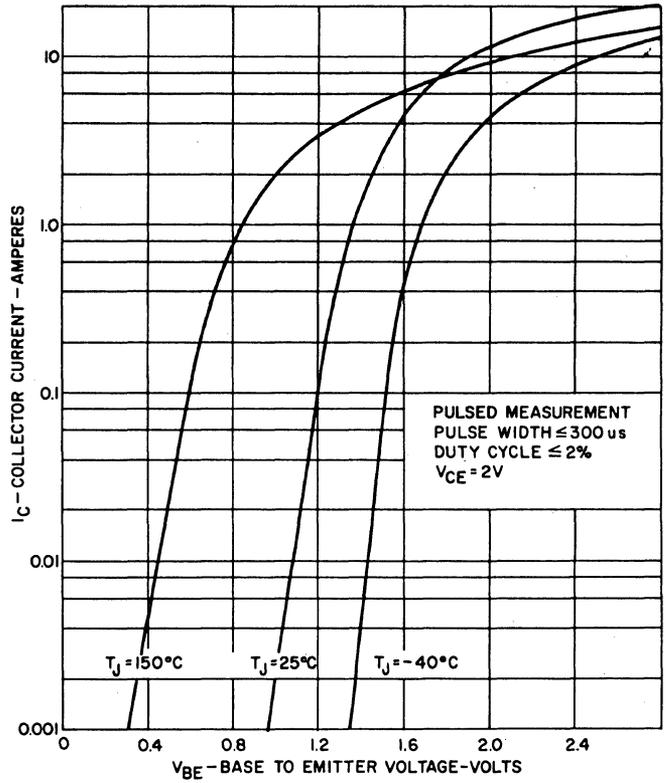


FIG. 5 TYPICAL TRANSCONDUCTANCE CHARACTERISTICS

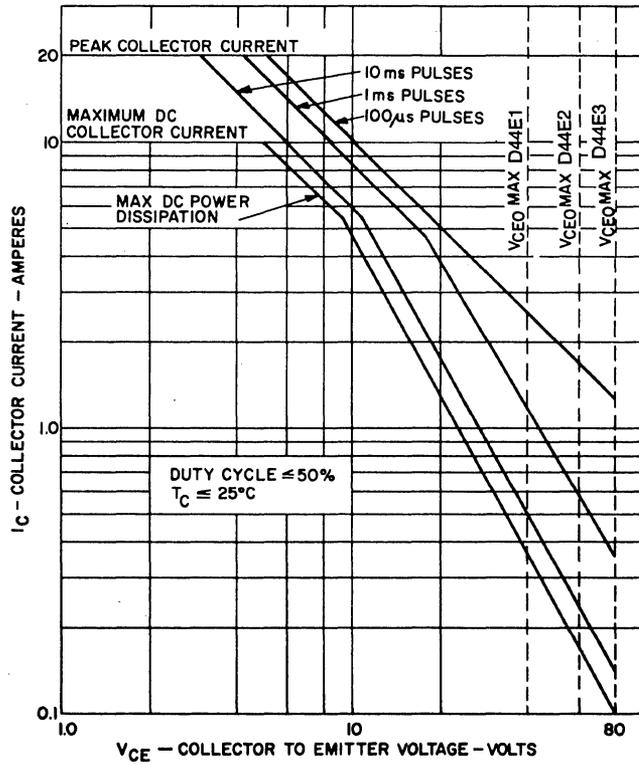


FIG. 6 SAFE REGION OF OPERATION