6-Ampere N-P-N Darlington Power Transistors

Complementary to the D45D Series

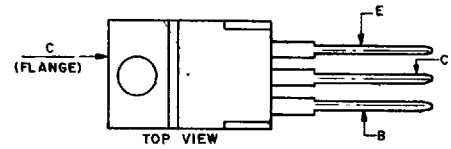
40, 60, and 80 Volts, 30 Watts
Gain of 2000 at 1 A

Features:
- *Operates from IC without predriver*

Applications:
- *Solenoid Driver*
- *Lamp Driver*
- *Relay Substitute*
- *Switching Regulator*
- *Inverter/Converter*

The D44D-series n-p-n Darlington power transitors are designed for general purpose switching of multi-ampere loads directly from low-level logic circuitry. The monolithic base-to-emitter resistors have been deleted from the structure to enhance the gain characteristics. These devices feature minimum gains of 2000.

TERMINAL DESIGNATIONS



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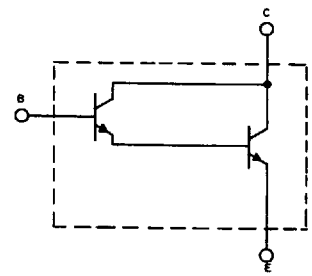

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Schematic diagram for all types.

MAXIMUM RATINGS (T_A = 25° C) (unless otherwise specified)

RATING	SYMBOL	D44D1,2	D44D3,4	D44D5,6	UNITS
Collector-Emitter Voltage	V_{CEO}	40	60	80	Volts
Collector-Emitter Voltage	V_{CES}	50	70	90	Volts
Emitter Base Voltage	V_{EBO}	5	5	5	Volts
Collector Current — Continuous	I_C	6	6	6	A
Base Current — Continuous	I_B	0.5	0.5	0.5	A
Total Power Dissipation @ T_A = 25°C @ T_C = 25°C	P_D	2.1 30	2.1 30	2.1 30	Watts
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-55 to +150	-55 to +150	-55 to +150	°C

THERMAL CHARACTERISTICS

Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	60	60	60	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	4.2	4.2	4.2	°C/W
Maximum Lead Temperature for Soldering Purposes: ⅛" from Case for 5 Seconds	T_L	260	260	260	°C

ELECTRICAL CHARACTERISTICS (T_C = 25°C) (unless otherwise specified)

CHARACTERISTIC		SYMBOL	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS(1)						T-35-29
Collector-Emitter Breakdown Voltage (I_C = 50mA)	D44D1,2 D44D3,4 D44D5,6	$V_{CEO(BR)}$	40 60 80	— — —	— — —	Volts
Collector Cut-off Current (V_{CE} = Rated V_{CES}) (V_{CE} = Rated V_{CES}, V_{BE} = 0.4V)	T_C = 25°C T_C = 125°C	I_{CES} I_{CEV}	— —	— —	10 5	μA
Emitter Cutoff Current (V_{EB} = 5V)		I_{EBO}	—	—	10	μA
SECOND BREAKDOWN						
Second Breakdown with Base Forward Biased		FBSOA	SEE FIGURE 5			
ON CHARACTERISTICS(1)						
DC Current Gain (I_C = 1A, V_{CE} = 2V)		h_{FE}	2,000	5,000	—	—
Collector-Emitter Saturation Voltage (I_C = 3A, I_B = 3mA) (I_C = 5A, I_B = 5mA)	D44D2,4,6 only	$V_{CE(sat)}$	— —	— —	1.5 1.5	V V
Base-Emitter Saturation Voltage (I_C = 5A, I_B = 5mA)		$V_{BE(sat)}$	—	—	2.5	Volts
DYNAMIC CHARACTERISTICS						
Collector Capacitance (V_{CB} = 10V, f = 1MHz)		C_{CBO}	—	—	45	pF
SWITCHING CHARACTERISTICS						
Resistive Load						
Delay Time + Rise Time	I_C = 3A, I_{B1} = I_{B2} = 3mA	$t_d + t_r$	—	0.5	—	μS
Storage Time	V_{CC} = 40V, t_p = 25 μsec	t_s	—	1.2	—	
Fall Time		t_f	—	0.8	—	

(1) Pulse Test: PW ≤ 300ms Duty Cycle ≤ 2%.

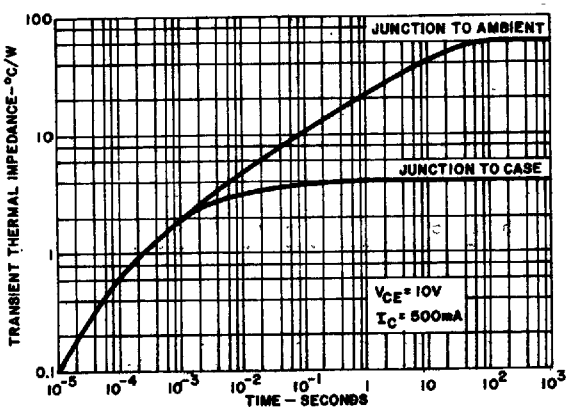

FIG. 1
MAXIMUM TRANSIENT THERMAL IMPEDANCE

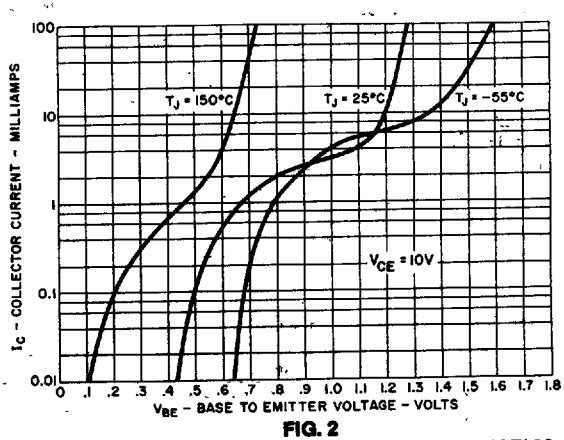

FIG. 2
TYPICAL TRANSCONDUCTANCE CHARACTERISTICS

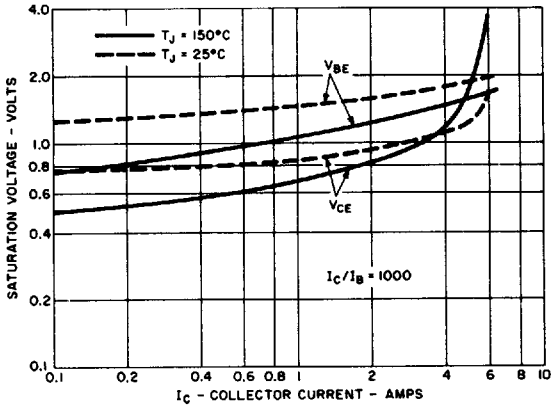

FIG. 3
TYPICAL SATURATION VOLTAGE CHARACTERISTICS

T-35-29

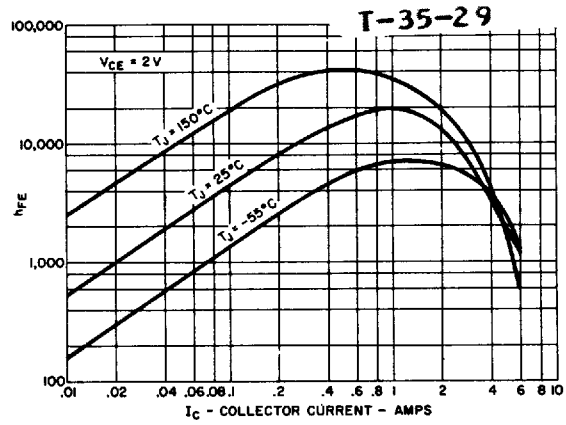

FIG. 4 TYPICAL h_{FE} VS. I_C

HARRIS SEMICOND SECTOR

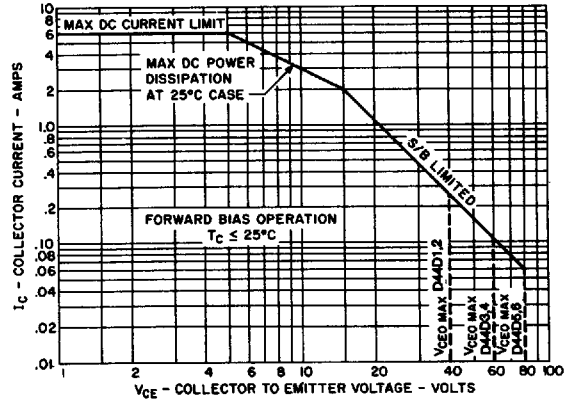

FIG. 5 SAFE REGION OF OPERATION