File Number **2353**

D45D Series

T-37-29

6-Ampere P-N-P Darlington Power Transistors

Complementary to the D44D Series

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

Features:

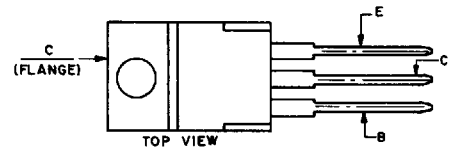
- *Operates from IC without predriver*

Applications:

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

The D45D-series p-n-p 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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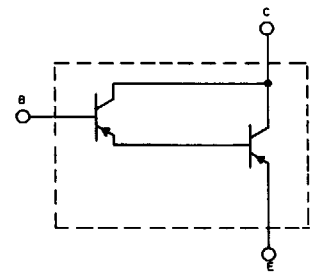

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Schematic diagram for all types.

POWER TRANSISTORS

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

RATING	SYMBOL	D45D1,2	D45D3,4	D45D5,6	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

D45D Series

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

CHARACTERISTIC		SYMBOL	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS(1)						
Collector-Emitter Breakdown Voltage (I_C = -50mA)	D45D1,2 D45D3,4 D45D5,6	$V_{CEO(BR)}$	-40 -60 -80	— — —	— — —	Volts
Collector Cut-off Current (V_{CE} = Rated V_{CES})	T_C = 25°C	I_{CES}	—	—	-10	μA
(V_{CE} = Rated V_{CES}, V_{BE} = 0.4V)	T_C = 125°C	I_{CEV}	—	—	-5	
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)		$V_{CE(sat)}$	—	—	-1.5	V
(I_C = -5A, I_B = -5mA)	D45D2,4,6 only		—	—	-2.0	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}	—	—	75	pF
SWITCHING CHARACTERISTICS						
Resistive Load						
Delay Time + Rise Time	I_C = -3A, I_{B1} = I_{B2} = -3mA	$t_d + t_r$	—	0.35	—	μs
Storage Time	V_{CC} = 40V, t_p = 25 μsec	t_s	—	0.4	—	
Fall Time		t_f	—	0.3	—	

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

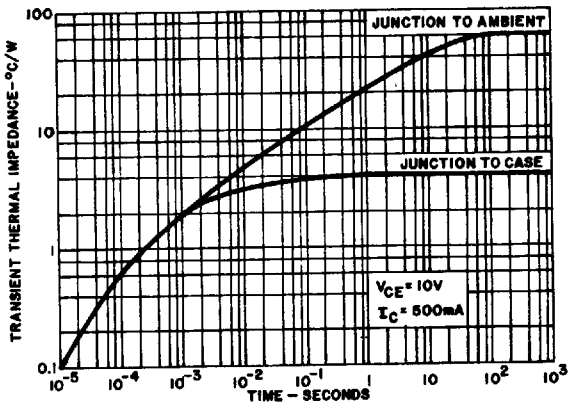

FIG. 1 MAXIMUM TRANSIENT THERMAL IMPEDANCE

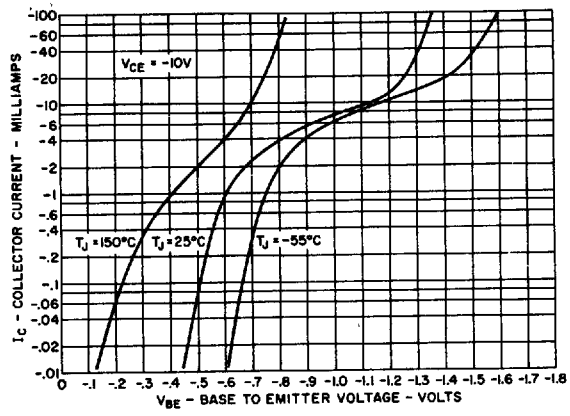

FIG. 2 TYPICAL TRANSCONDUCTANCE CHARACTERISTICS

T-37-29

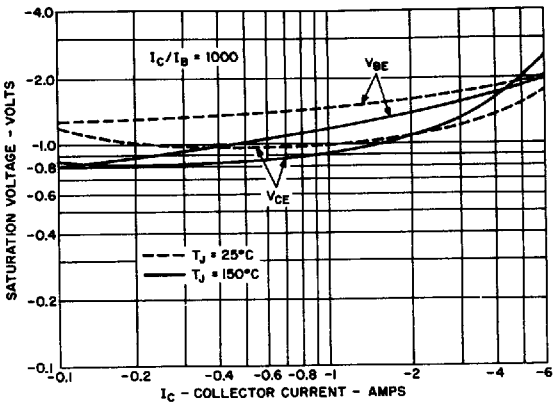

FIG. 3 TYPICAL SATURATION VOLTAGE CHARACTERISTICS

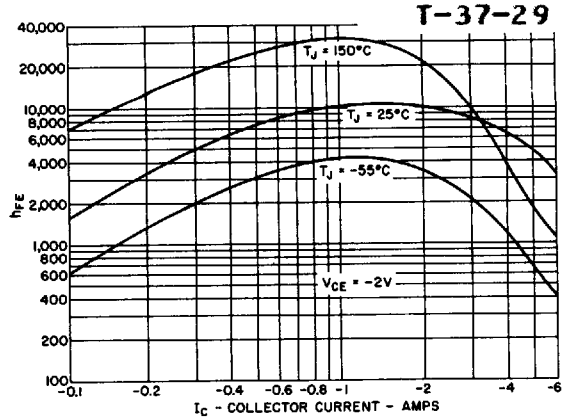

FIG. 4 TYPICAL h_{FE} VS. I_C

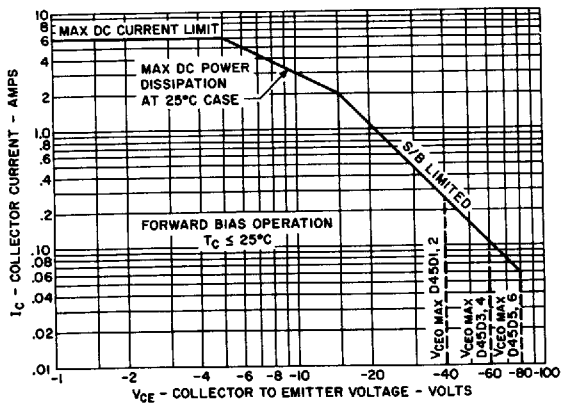

FIG. 5 SAFE REGION OF OPERATION