VERY HIGH GAIN
NPN POWER DARLINGTON TRANSISTORS

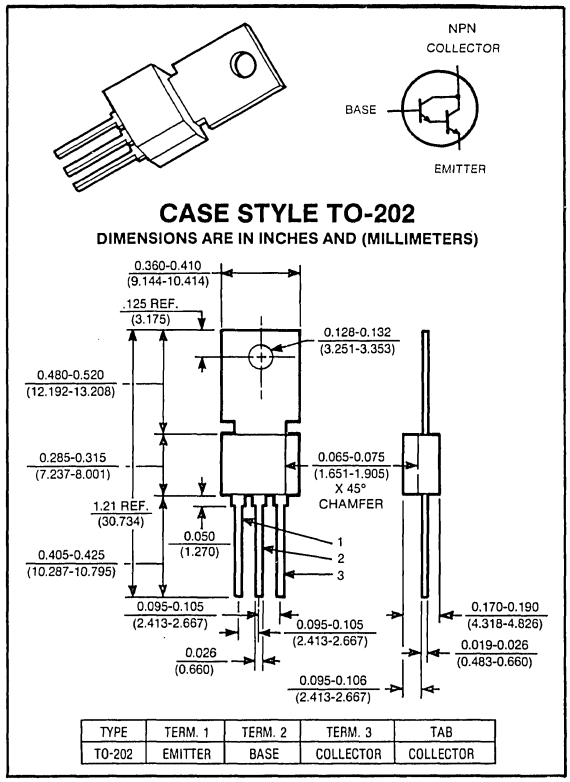
D40C Series

30-50 VOLTS
.5 AMP, 6.25 WATTS

Designed for driver, regulator, touch switch, I.C. driver, audio output, relay substitute, oscillator, servo-amplifier, and capacitor multiplier applications.

Features:

- h_{FE} Min. — 10,000 and 40,000
- 1.33 Watt power dissipation at T_A = 25°



TYPE	TERM. 1	TERM. 2	TERM. 3	TAB
TO-202	EMITTER	BASE	COLLECTOR	COLLECTOR

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

RATING	SYMBOL	D40C1	D40C4	D40C7	UNITS
Collector-Emitter Voltage	V_{CEO}	30	40	50	Volts
Collector-Emitter Voltage	V_{CES}	30	40	50	Volts
Emitter Base Voltage	V_{EBO}	13	13	13	Volts
Collector Current — Continuous Peak(1)	I_C I_{CM}	.5 1.0	.5 1.0	.5 1.0	A
Base Current — Continuous	I_B	0.1	0.1	0.1	A
Total Power Dissipation @ T_A = 25° C @ T_C = 25° C	P_D	1.33 6.25	1.33 6.25	1.33 6.25	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	$R_{\theta JA}$	75	75	75	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	20	20	20	°C/W
Maximum Lead Temperature for Soldering Purposes: ⅛" from Case for 5 Seconds	T_L	260	260	260	°C

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

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

CHARACTERISTIC		SYMBOL	MIN	TYP	MAX	UNIT
off characteristics[1]						
Collector-Emitter Voltage (I_C = 10mA)	D40C1	V_{CEO}	30	—	—	Volts
	D40C4		40	—	—	
	D40C7		50	—	—	
Collector Cut-off Current (V_{CE} = Rated V_{CES})	(T_C = 25°C)	I_{CES}	—	—	0.5	μA
	(T_C = 150°C)	I_{CBO}	—	—	20	
Emitter Cutoff Current (V_{EB} = 13V)		I_{EBO}	—	—	0.1	μA
second breakdown						
Second Breakdown with Base Forward Biased		FBSOA	SEE FIGURE 2			
on characteristics						
DC Current Gain (I_C = 200mA, V_{CE} = 5V)		h_{FE}	10K	—	60K	
Collector-Emitter Saturation Voltage (I_C = 500mA, I_B = 0.5mA)		$V_{CE(sat)}$	—	—	1.5	V
Base-Emitter Saturation Voltage (I_C = 500mA, I_B = 0.5mA)		$V_{BE(sat)}$	—	—	2.0	Volts
dynamic characteristics						
Collector Capacitance (V_{CE} = 10V, f = 1MHz)		C_{CBO}	—	—	220	pF
Current Gain - Bandwidth Product (I_C = 20mA, V_{CE} = 5V)		f_T	—	75	—	MHz
switching characteristics						
Resistive Load						
Delay Time + Rise Time	I_C = 1A, I_{B1} = I_{B2} = 1mA	$t_d + t_r$	—	100	—	ns
Storage Time	V_{CC} = 30V, t_p = 25 μsec	t_s	—	350	—	
Fall Time		t_f	—	800	—	

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

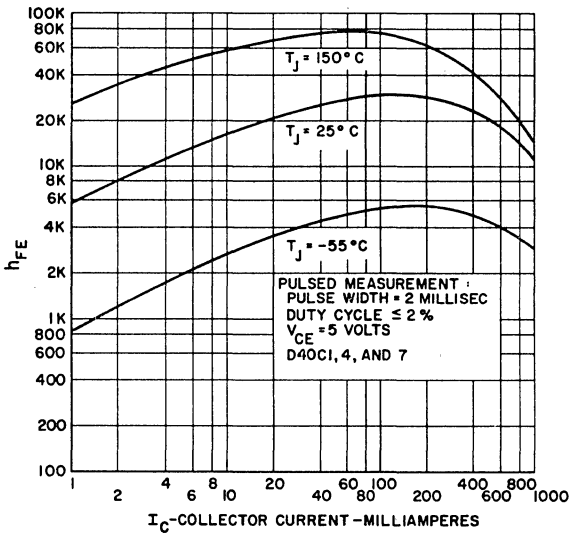


FIG 1. TYPICAL h_{FE} vs. I_C

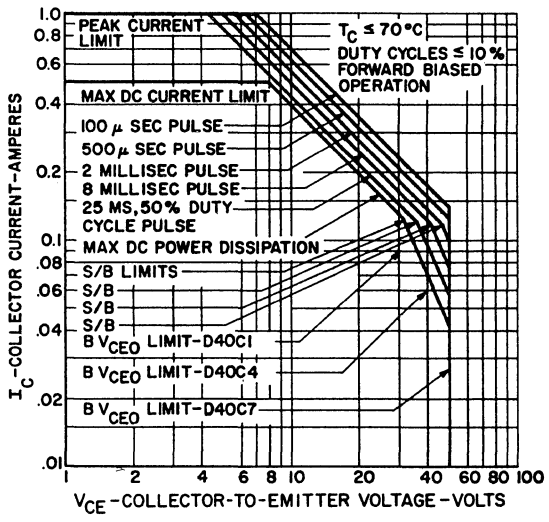


FIG. 2 SAFE REGION OF OPERATION

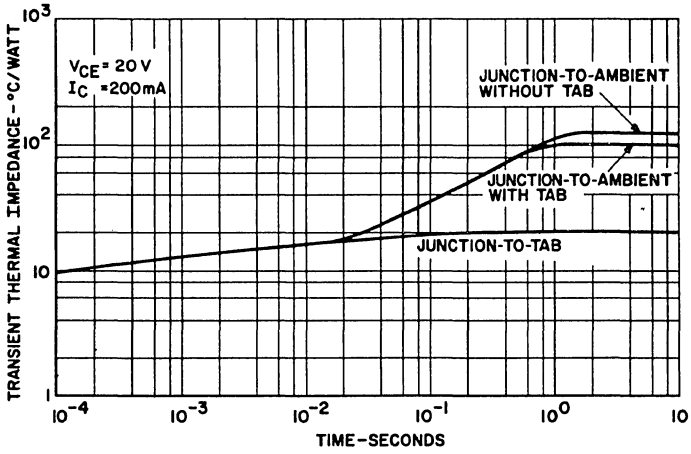


FIG. 3 MAXIMUM TRANSIENT THERMAL IMPEDANCE

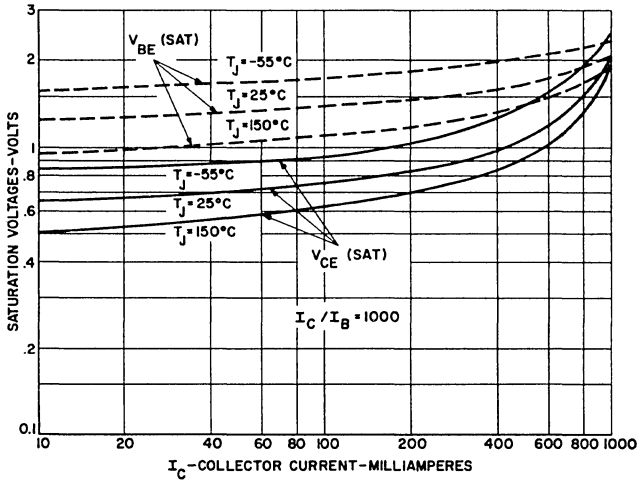


FIG. 4 TYPICAL SATURATION VOLTAGES

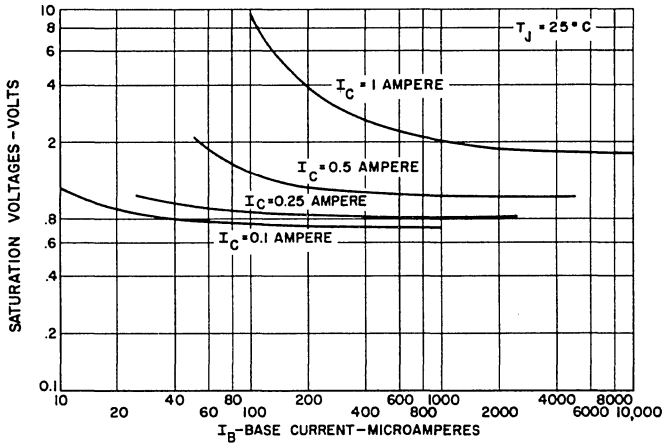


FIG. 5 TYPICAL SATURATION VOLTAGES

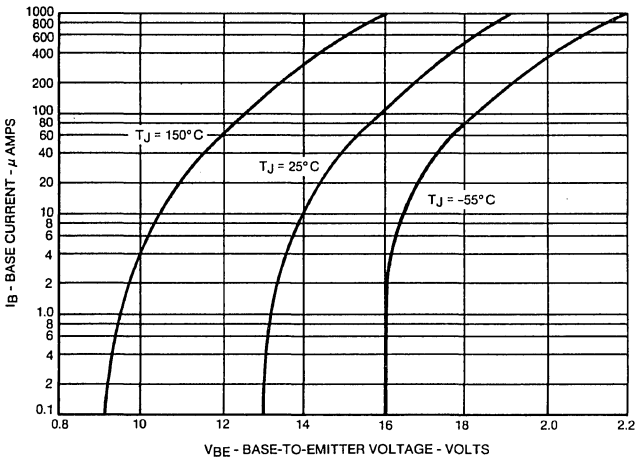


FIG. 6 TYPICAL INPUT CHARACTERISTICS

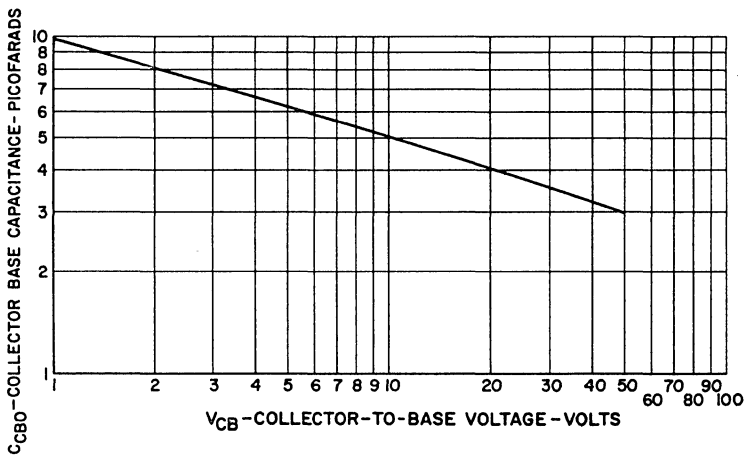


FIG. 7 TYPICAL C_{CBO} vs. VOLTAGE