

T-33-05

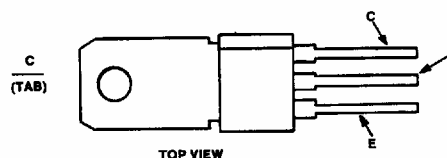
1-Ampere Silicon N-P-N Power Transistors

Complementary to the D41D Series

Features:

- High free-air power dissipation
- Low collector saturation voltage (0.5V typ. @ 1.0A I_C)
- Excellent linearity
- Fast switching

TERMINAL DESIGNATIONS



92CS-43222

JEDEC TO-202AB

The D40D-series of silicon n-p-n power transistors are designed for various specific and general purpose applications, such as: output and driver stages of amplifiers operating at frequencies from DC to greater than 1 MHz; series, shunt and switching regulators; and low and high frequency inverters/converters.

These devices are supplied in the JEDEC TO-202AB plastic package.

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

RATING	SYMBOL	D40D1, 2	D40D4, 5	D40D7, 8	UNITS
Collector-Emitter Voltage	V_{CEO}	30	45	60	Volts
Collector-Emitter Voltage	V_{CES}	45	60	75	Volts
Emitter Base Voltage	V_{EBO}	5	5	5	Volts
Collector Current — Continuous	I_C	1	1	1	A
Collector Current — Peak ⁽¹⁾	I_{CM}	1.5	1.5	1.5	A
Base Current — Continuous	I_B	0.5	0.5	0.5	A
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ @ $T_C = 25^\circ\text{C}$	P_D	1.67 6.25	1.67 6.25	1.67 6.25	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	$R_{\theta JC}$	20	20	20	$^\circ\text{C/W}$
Maximum Lead Temperature for Soldering Purposes: $\frac{1}{8}$ " 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
OFF CHARACTERISTICS⁽¹⁾ HARRIS SEMICOND SECTOR T-33-05					
Collector-Emitter Sustaining Voltage ($I_C = 10\text{mA}$)	D40D1, 2 D40D4, 5 D40D7, 8	$V_{CE(sus)}$	30 45 60	— — —	Volts
Collector Cutoff Current ($V_{CE} = \text{Rated } V_{CEO}$) ($V_{CE} = \text{Rated } V_{CES}$)	$T_C = 25^\circ\text{C}$ $T_C = 150^\circ\text{C}$	I_{CES}	— —	— 1.0	μA
Emitter Cutoff Current ($V_{EB} = 5\text{V}$)		I_{EBO}	—	—	0.1 μA

SECOND BREAKDOWN

Second Breakdown with Base Forward Biased	FBSOA	SEE FIGURE 4
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ON CHARACTERISTICS⁽¹⁾

DC Current Gain ($I_C = 100\text{mA}$, $V_{CE} = 2\text{V}$)	D40D1, 4, 7 D40D2, 5, 8	h_{FE}	50 120	— —	150 360	—
($I_C = 1\text{A}$, $V_{CE} = 2\text{V}$)	D40D1, 4, 7 D40D2 D40D5, 8	h_{FE}	10 20 10	— — —	— — —	—
Collector-Emitter Saturation Voltage ($I_C = 500\text{mA}$, $I_B = 50\text{mA}$)	D40D1, 2, 4, 5 D40D7, 8	$V_{CE(sat)}$	— —	— —	0.5 1.0	Volts
Base-Emitter Saturation Voltage ($I_C = 500\text{mA}$, $I_B = 50\text{mA}$)		$V_{BE(sat)}$	—	—	1.5	Volts

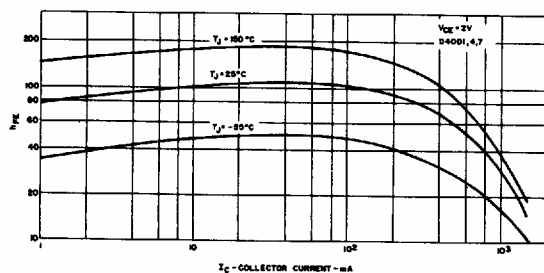
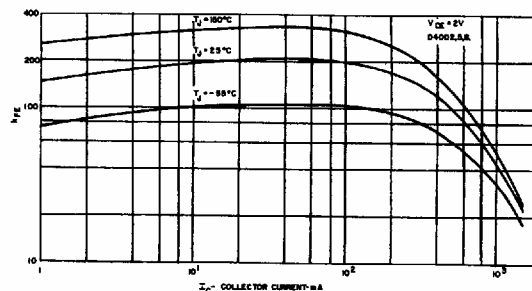
DYNAMIC CHARACTERISTICS

Collector Capacitance ($V_{CB} = 10\text{V}$, $f = 1\text{MHz}$)	C_{CBO}	—	8	—	pF
Current-Gain — Bandwidth Product ($I_C = 20\text{mA}$, $V_{CE} = 10\text{V}$)	f_T	—	200	—	MHz

SWITCHING CHARACTERISTICS

Resistive Load					
Delay Time + Rise Time	$I_C = 1\text{A}$, $I_{B1} = I_{B2} = 0.1\text{A}$	$t_d + t_r$	—	25	—
Storage Time	$V_{CC} = 30\text{V}$, $t_p = 25 \mu\text{sec}$	t_s	—	200	—
Fall Time		t_f	—	50	—

(1) Pulse Test PW = 300ms Duty Cycle $\leq 2\%$.


FIG. 1

FIG. 2

TYPICAL h_{FE} VS I_C

2-509

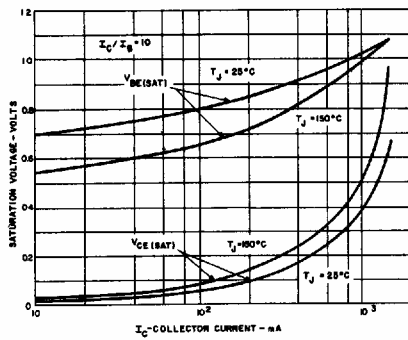


FIG. 3 TYPICAL SATURATION VOLTAGE CHARACTERISTICS

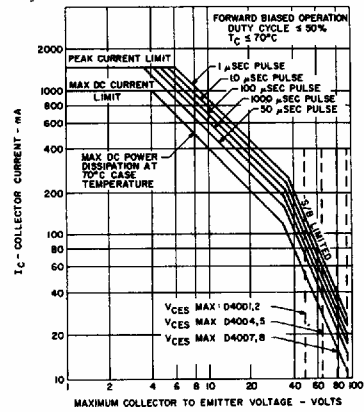


FIG. 4 SAFE REGION OF OPERATION

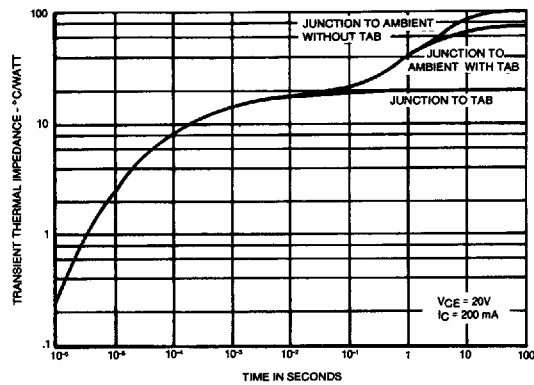


FIG. 5 MAXIMUM TRANSIENT THERMAL IMPEDANCE