

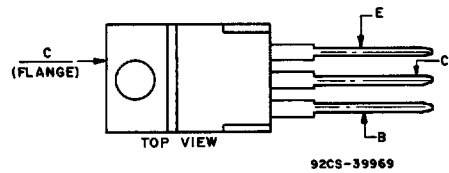
**D44C Series**File Number **2343**

T-33-05

**Silicon N-P-N Transistors****Complementary to the D45C Series****General-Purpose Types for Medium-Power Switching and Amplifier Applications****Features:**

- *Very low collector saturation voltage* [0.5V typ. @ 3.0A  $I_C$ ]
- *Excellent linearity*
- *Fast switching*

D44C-series 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 1.0 MHz, series, shunt and switching regulators, and low and high frequency inverters/converters.

**TERMINAL DESIGNATIONS****JEDEC TO-220AB****MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ ) (unless otherwise specified)**

| RATING   | SYMBOL         | D44C1, 2, 3 | D44C4, 5, 6 | D44C7, 8, 9 | D44C10, 11, 12 | UNITS            |
|--|----------------|-------------|-------------|-------------|----------------|------------------|
| Collector-Emitter Voltage  | $V_{CEO}$      | 30          | 45          | 60          | 80             | Volts            |
| Collector-Emitter Voltage  | $V_{CES}$      | 40          | 55          | 70          | 90             | Volts            |
| Emitter Base Voltage   | $V_{EBO}$      | 5           | 5           | 5           | 5              | Volts            |
| Collector Current — Continuous   | $I_C$          | 4           | 4           | 4           | 4              | A                |
| Peak(1)  | $I_{CM}$       | 6           | 6           | 6           | 6              |                  |
| Base Current — Continuous  | $I_B$          | 2           | 2           | 2           | 2              | A                |
| Total Power Dissipation @ $T_A = 25^\circ\text{C}$<br>@ $T_C = 25^\circ\text{C}$ | $P_D$          | 1.67<br>30  | 1.67<br>30  | 1.67<br>30  | 1.67<br>30     | Watts            |
| Operating and Storage Junction Temperature Range                                 | $T_J, T_{stg}$ | -55 to +150 | -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   | 75   | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Case   | $R_{\theta JC}$ | 4.2  | 4.2  | 4.2  | 4.2  | $^\circ\text{C/W}$ |
| Maximum Lead Temperature for Soldering Purposes: $\frac{1}{8}$ " from Case for 5 Seconds | $T_L$           | +260 | +260 | +260 | +260 | $^\circ\text{C}$   |

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

**D44C Series****ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ ) (unless otherwise specified)**

| CHARACTERISTIC | SYMBOL | MIN | TYP | MAX | UNIT |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

**OFF CHARACTERISTICS<sup>(1)</sup>****T-33-05**

|  |   |               |                      |                  |                  |               |
|--|---|---------------|----------------------|------------------|------------------|---------------|
| Collector-Emitter Sustaining Voltage<br>( $I_C = 100\text{mA}$ ) | D44C1, 2, 3<br>D44C4, 5, 6<br>D44C7, 8, 9<br>D44C10, 11, 12 | $V_{CE(sus)}$ | 30<br>45<br>60<br>80 | —<br>—<br>—<br>— | —<br>—<br>—<br>— | Volts         |
| Collector Cutoff Current<br>( $V_{CE} = \text{Rated } V_{CES}$ ) |   | $I_{CES}$     | —                    | —                | 10               | $\mu\text{A}$ |
| Emitter Cutoff Current<br>( $V_{EB} = 5\text{V}$ )               |   | $I_{EBO}$     | —                    | —                | 100              | $\mu\text{A}$ |

**SECOND BREAKDOWN**

|   |       |              |
|---|-------|--------------|
| Second Breakdown with Base Forward Biased | FBSOA | SEE FIGURE 3 |
|---|-------|--------------|

**ON CHARACTERISTICS<sup>(1)</sup>**

|   |   |               |                 |             |                   |       |
|---|---|---------------|-----------------|-------------|-------------------|-------|
| DC Current Gain<br>( $I_C = 0.2\text{A}, V_{CE} = 1\text{V}$ )  | D44C1, 4, 7, 10<br>D44C2, 5, 8, 11<br>D44C3, 6, 9, 12 | $h_{FE}$      | 25<br>100<br>40 | —<br>—<br>— | —<br>220<br>120   | —     |
| ( $I_C = 1\text{A}, V_{CE} = 1\text{V}$ )<br>( $I_C = 2\text{A}, V_{CE} = 1\text{V}$ )  | D44C1, 4, 7, 10<br>D44C2, 5, 8, 11<br>D44C3, 6, 9, 12 | $h_{FE}$      | 10<br>20<br>20  | —<br>—<br>— | —<br>—<br>—       | —     |
| Collector-Emitter Saturation Voltage<br>( $I_C = 1\text{A}, I_B = 50\text{mA}$ )<br>( $I_C = 1\text{A}, I_B = 100\text{mA}$ ) | D44C2, 5, 8, 11<br>D44C3, 6, 9, 12<br>D44C1, 4, 7, 10 | $V_{CE(sat)}$ | —<br>—<br>—     | —<br>—<br>— | 0.5<br>0.5<br>0.5 | Volts |
| Base-Emitter Saturation Voltage<br>( $I_C = 1\text{A}, I_B = 100\text{mA}$ )  |   | $V_{BE(sat)}$ | —               | —           | 1.3               | Volts |

POWER  
TRANSISTORS**DYNAMIC CHARACTERISTICS**

|   |           |   |    |     |     |
|---|-----------|---|----|-----|-----|
| Collector Capacitance<br>( $V_{CB} = 10\text{V}, f = 1\text{MHz}$ )             | $C_{CBO}$ | — | —  | 100 | pF  |
| Current-Gain — Bandwidth Product<br>( $I_C = 20\text{mA}, V_{CE} = 4\text{V}$ ) | $f_T$     | — | 50 | —   | MHz |

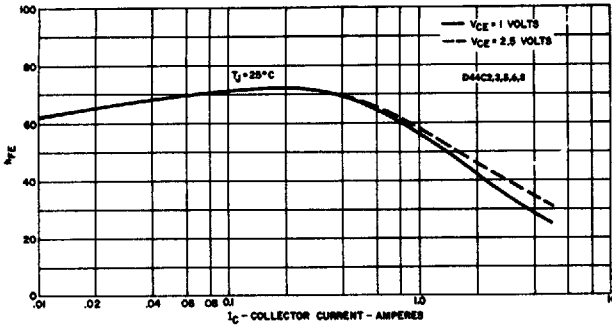
**SWITCHING CHARACTERISTICS**

|                        |  |             |   |     |   |    |
|------------------------|--|-------------|---|-----|---|----|
| Resistive Load         |  |             |   |     |   |    |
| Delay Time + Rise Time | $I_C = 1\text{A}, I_{B1} = I_{B2} = 0.1\text{A},$<br>$V_{CC} = 30\text{A}, t_p = 25 \mu\text{sec}$ | $t_d + t_r$ | — | 100 | — | nS |
| Storage Time           |  | $t_s$       | — | 500 | — |    |
| Fall Time              |  | $t_f$       | — | 75  | — |    |

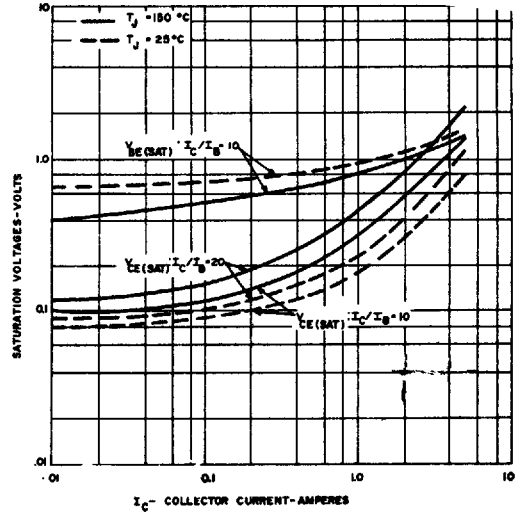
(1) Pulse Test PW = 300ms Duty Cycle  $\leq$  2%.

**D44C Series**

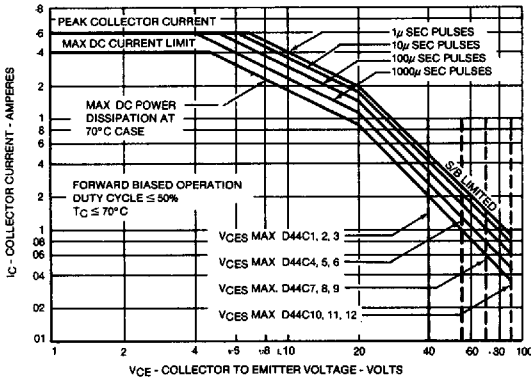
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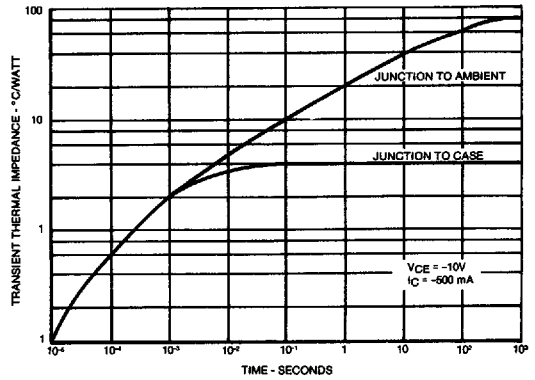
**FIG. 1 TYPICAL  $h_{FE}$  VS.  $I_C$**



**FIG. 2 TYPICAL SATURATION VOLTAGE CHARACTERISTICS**



**FIG. 3 SAFE REGION OF OPERATION**



**FIG. 4 MAXIMUM TRANSIENT THERMAL IMPEDANCE**