# NPN POWER DARLINGTON TRANSISTORS

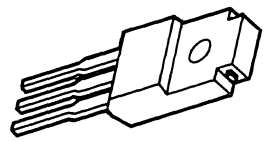
**D54D6D**

**400 VOLTS**
**6 AMP, 25 WATTS**

Designed for igniter applications, high voltage switching applications.

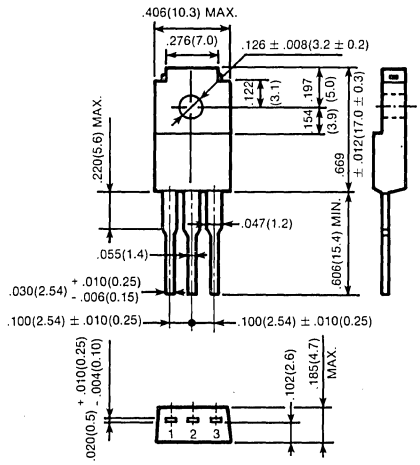
**Features:**

- High DC Current Gain:
  $h_{FE}$ = 600 (Min.) (at $V_{CE}$ = 2V, $I_C$ = 3A)
- Monolithic construction with built-in base-emitter shunt resistor.
- Isolated TO-220 package.



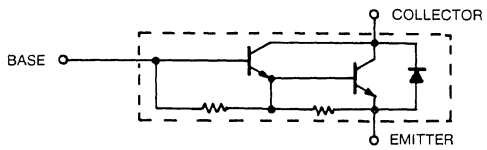
**CASE STYLE TO-220IS**

DIMENSIONS ARE IN INCHES AND (MILLIMETERS)




| TYPE | TERM. 1 | TERM. 2 | TERM. 3 | TAB |
|---|---|---|---|---|
| TO-220IS | BASE | COLLECTOR | EMITTER | COLLECTOR |

**EQUIVALENT CIRCUIT**




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

| RATING | SYMBOL | D54D6D | UNITS |
|---|---|---|---|
| Collector-Emitter Voltage | $V_{CEO}$ | 400 | Volts |
| Collector-Base Voltage | $V_{CBO}$ | 600 | Volts |
| Emitter Base Voltage | $V_{EBO}$ | 5 | Volts |
| Collector Current — Continuous | $I_C$ | 6 | A |
| Base Current — Continuous | $I_B$ | 1 | A |
| Total Power Dissipation @ $T_A$ = 25°C<br>@ $T_C$ = 25°C | $P_D$<br>$P_D$ | 2.0<br>25 | Watts |
| Operating and Storage Junction Temperature Range | $T_J$, $T_{STG}$ | -55 to +150 | °C |

## thermal characteristics

| | | | |
|---|---|---|---|
| Maximum Lead Temperature for Soldering Purposes: ⅛" from Case for 5 Seconds | $T_L$ | 260 | °C |

## electrical characteristics ($T_A$ = 25° C) (unless otherwise specified)

| CHARACTERISTIC | SYMBOL | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| **off characteristics** | | | | | |
| Collector-Emitter Breakdown Voltage ($I_C$ = 10mA) | $V_{(BR)CEO}$ | 400 | — | — | Volts |
| Collector Cutoff Current ($V_{CB}$ = 600V) | $I_{CBO}$ | — | — | 0.5 | mA |
| Emitter Cutoff Current ($V_{EB}$ = 5V) | $I_{EBO}$ | — | — | 3.0 | mA |
| **second breakdown** | | | | | |
| Second Breakdown with Base Forward Biased | FBSOA | SEE FIGURE 6 | | | |
| **on characteristics** | | | | | |
| DC Current Gain ($I_C$ = 2A, $V_{CE}$ = 2V) ($I_C$ = 4A, $V_{CE}$ = 2V) | $h_{FE}$ | 600 100 | — — | — — | — |
| Collector-Emitter Saturation Voltage ($I_C$ = 4A, $I_B$ = 0.04A) | $V_{CE(sat)}$ | — | — | 2.0 | Volts |
| Emitter-Collector Forward Voltage ($I_E$ = 4A, $I_B$ = 0) | $V_{ECF}$ | — | — | 3.0 | Volts |
| Base-Emitter Saturation Voltage ($I_C$ = 4A, $I_B$ = 0.04A) | $V_{BE(sat)}$ | — | — | 2.5 | Volts |
| **switching characteristics** | | | | | |
| Turn-on Time | $V_{CC}$ = 100V | $t_{on}$ | — | — | 1.0 | μs |
| Storage Time | $I_{B1}$ = $I_{B2}$ = 0.04A | $t_{stg}$ | — | — | 8.0 | |
| Fall Time | Duty Cycle ≤ 1% | $t_f$ | — | — | 5.0 | |

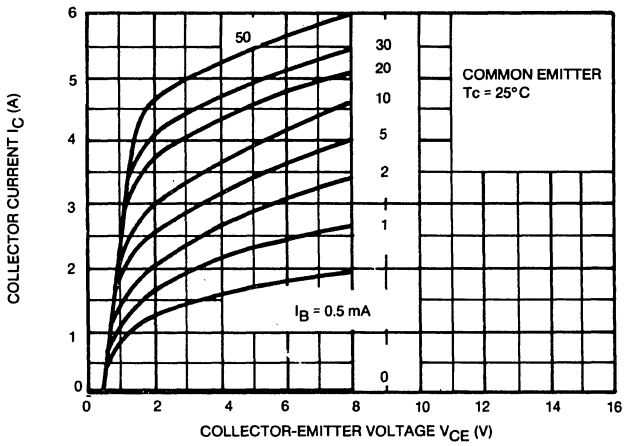



FIG. 1 $I_C$ - $V_{CE}$

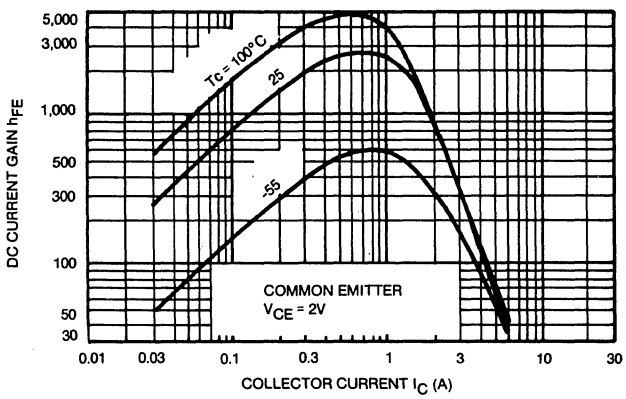



FIG. 2 $h_{FE}$ - $I_C$

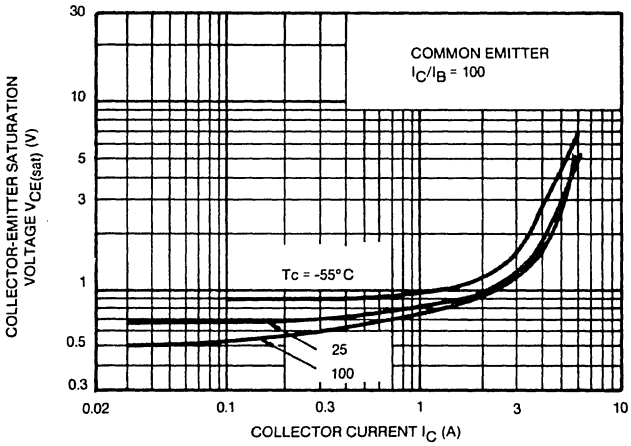



**FIG. 3 $V_{CE(sat)}$ - $I_C$**

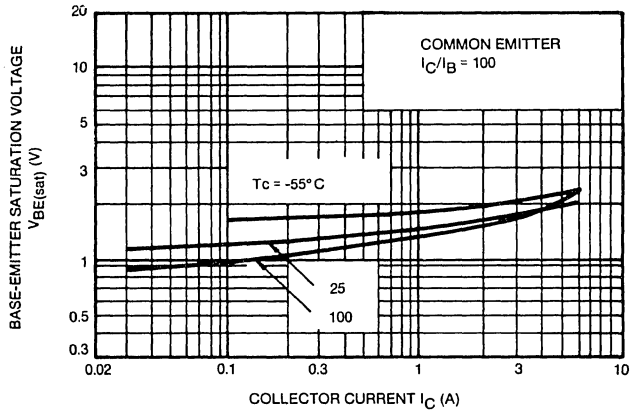



**FIG. 4 $V_{BE(sat)}$ - $I_C$**

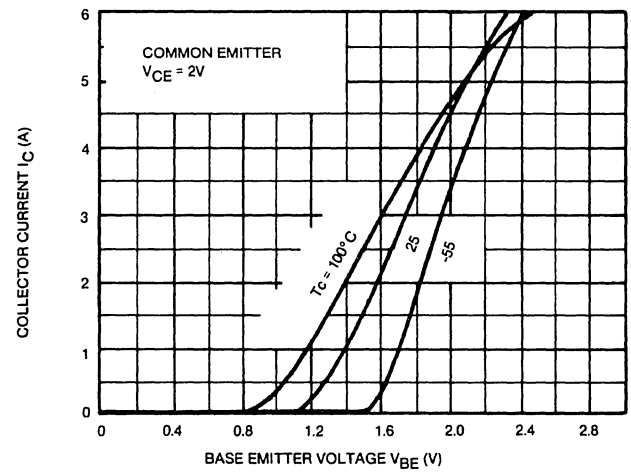



**FIG. 5 $I_C$ - $V_{BE}$**

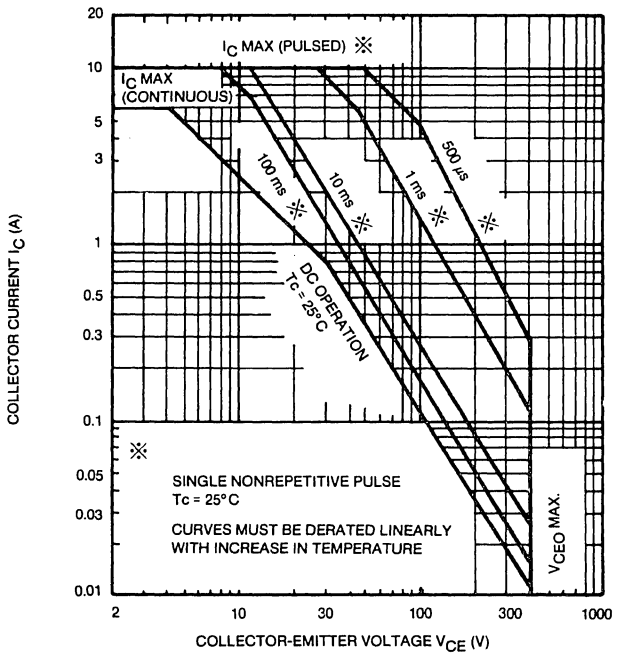



**FIG. 6 SAFE OPERATING AREA**