# SURFACE-MOUNT
# NPN POWER TRANSISTORS

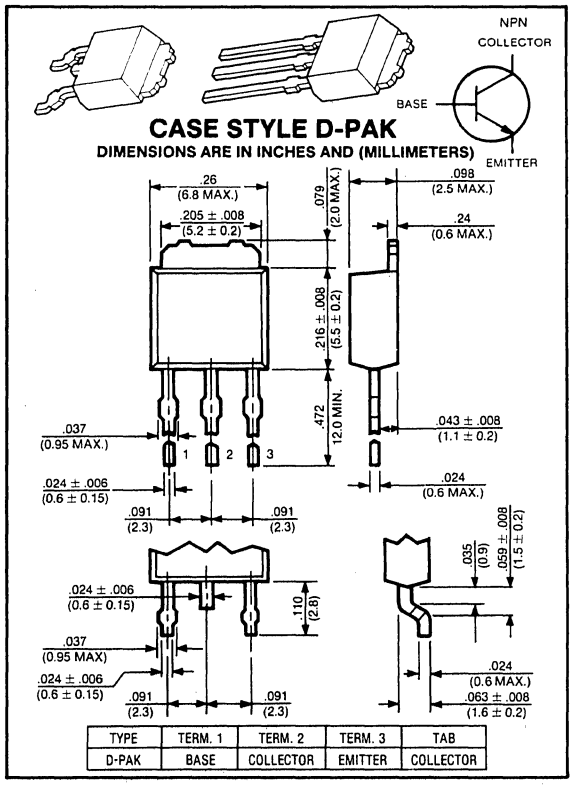
**D72F5T1,2**

**50 VOLTS**
**5 AMP, 20 WATTS**

Designed for high current switching applications.

**Features:**

- Low Collector Saturation Voltage
  : $V_{CE(sat)}$ = 0.4V (Max.) (at $I_C$ = 3A)
- High Speed Switching Time : $t_{stg}$ = 1.0$\mu$s (Typ.)
- Complementary to D73F5T1,2
- Suffix "2" designates lead formed version
- See page 840 for mounting and handling considerations.




| TYPE | TERM. 1 | TERM. 2 | TERM. 3 | TAB |
|---|---|---|---|---|
| D-PAK | BASE | COLLECTOR | EMITTER | COLLECTOR |

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

| RATING | SYMBOL | D72F5T1,2 | UNITS |
|---|---|---|---|
| Collector-Emitter Voltage | $V_{CEO}$ | 50 | Volts |
| Collector-Base Voltage | $V_{CBO}$ | 60 | Volts |
| Emitter Base Voltage | $V_{EBO}$ | 5 | Volts |
| Collector Current — Continuous | $I_C$ | 5 | A |
| Base Current — Continuous | $I_B$ | 1 | A |
| Total Power Dissipation @ $T_A$ = 25°C<br>@ $T_C$ = 25°C | $P_D$ | 1.0<br>20 | Watts |
| Operating and Storage Junction Temperature Range | $T_J$, $T_{STG}$ | -55 to +150 | °C |

## thermal characteristics(1)

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

(1) See page 841 for thermal considerations.

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

| CHARACTERISTIC | SYMBOL | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| **off characteristics** | | | | | |
| Collector-Emitter Breakdown Voltage ($I_C$ = 10mA, $I_B$ = 0) | $V_{(BR)CEO}$ | 50 | — | — | Volts |
| Collector Cut-off Current ($V_{CB}$ = 50V, $I_E$ = 0) | $I_{CBO}$ | — | — | 1 | μA |
| Emitter Cutoff Current ($V_{EB}$ = 5V, $I_C$ = 0) | $I_{EBO}$ | — | — | 1 | μA |
| **second breakdown** | | | | | |
| Second Breakdown with Base Forward Biased | FBSOA | SEE FIGURE 11 | | | |
| **on characteristics** | | | | | |
| DC Current Gain[2] ($I_C$ = 1A, $V_{CE}$ = 1V) | $h_{FE}$ | 70 | — | 240 | — |
| ($I_C$ = 3A, $V_{CE}$ = 1V) | $h_{FE}$ | 30 | — | — | |
| Collector-Emitter Saturation Voltage ($I_C$ = 3A, $I_B$ = 0.15A) | $V_{CE(sat)}$ | — | 0.2 | 0.4 | V |
| Base-Emitter Saturation Voltage ($I_C$ = 3A, $I_B$ = 0.15A) | $V_{BE(sat)}$ | — | 0.9 | 1.2 | Volts |
| **switching characteristics** | | | | | |
| Turn-on Time | $V_{CC}$ = 30V | $t_{on}$ | — | 0.1 | — | μs |
| Storage Time | $I_{B1}$ = $-I_{B2}$ = 0.15A | $t_{stg}$ | — | 1.0 | — | |
| Fall Time | Duty Cycle ≦ 1% | $t_f$ | — | 0.1 | — | |

(2) See page 43 for $h_{FE}$ ranges.

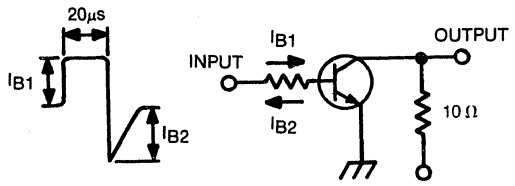



**FIG. 1 SWITCHING TIME TEST CIRCUIT**

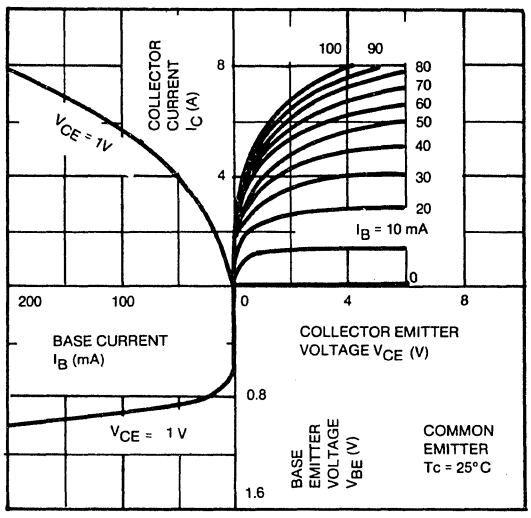



**FIG. 2 STATIC CHARACTERISTICS**

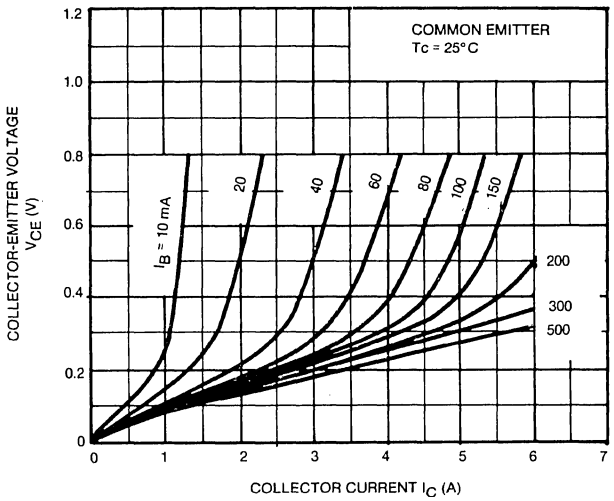



FIG. 3 $V_{CE}$ - $I_C$

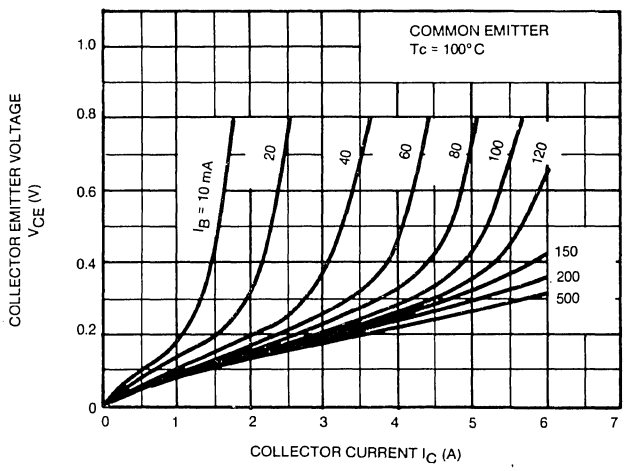



FIG. 4 $V_{CE}$ - $I_C$

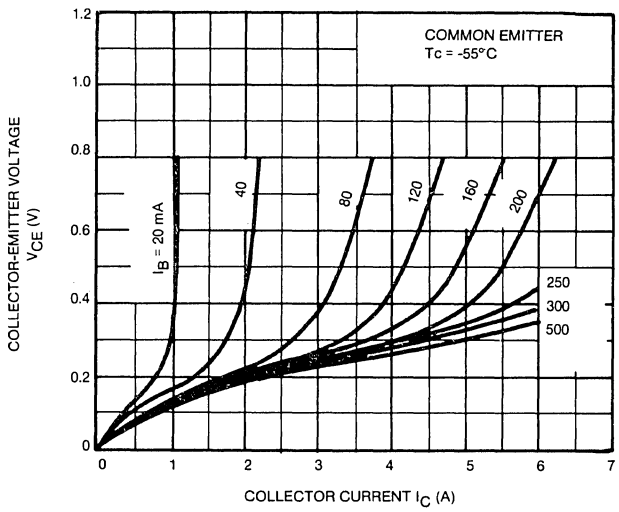



FIG. 5 $V_{CE}$ - $I_C$

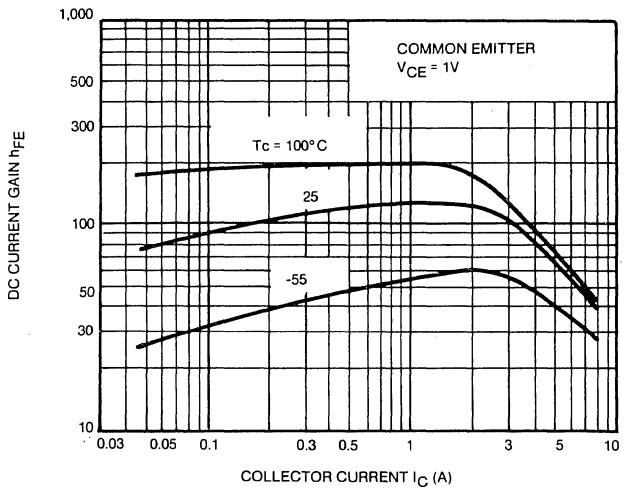



FIG. 6 $h_{FE}$ - $I_C$

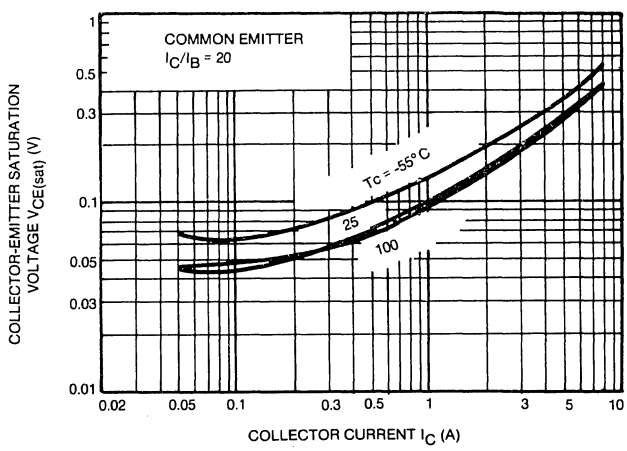



FIG. 7 $V_{CE(sat)}$ - $I_C$

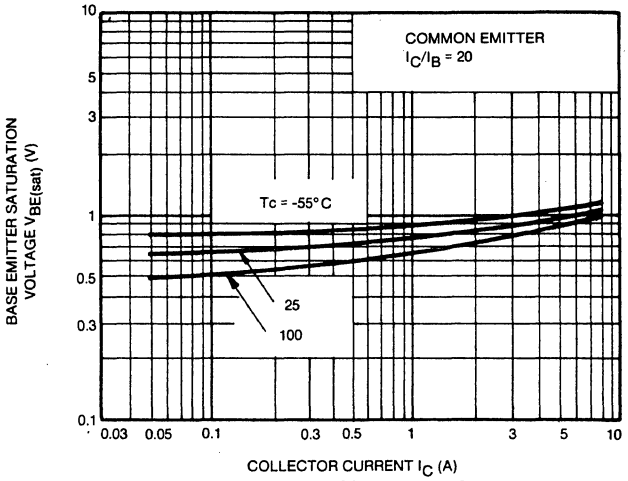



**FIG. 8 $V_{BE(sat)}$ - $I_C$**

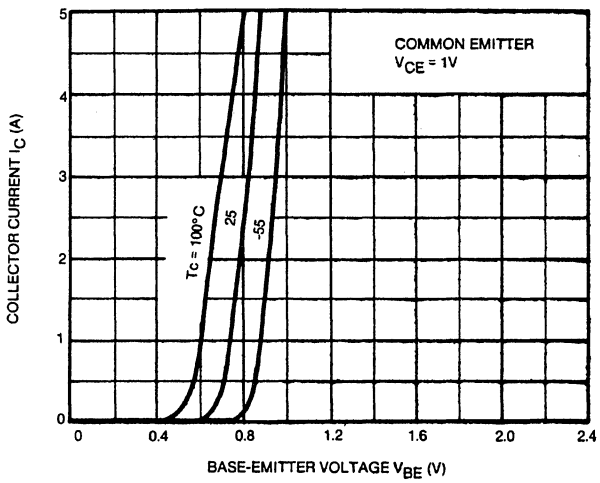



**FIG. 9 $I_C$ - $V_{BE}$**

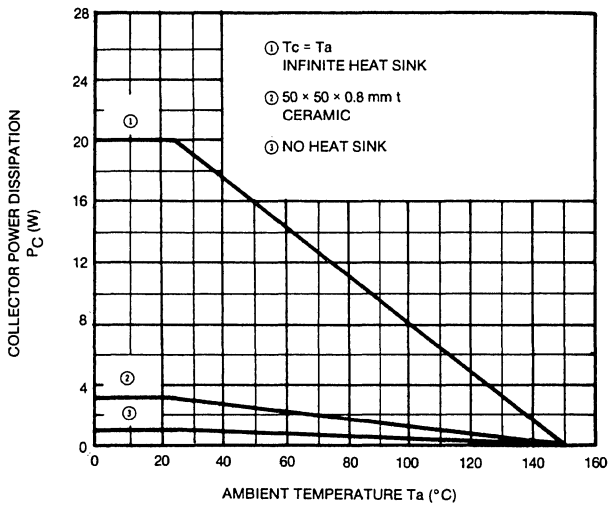



**FIG. 10 $P_C$ - Ta**

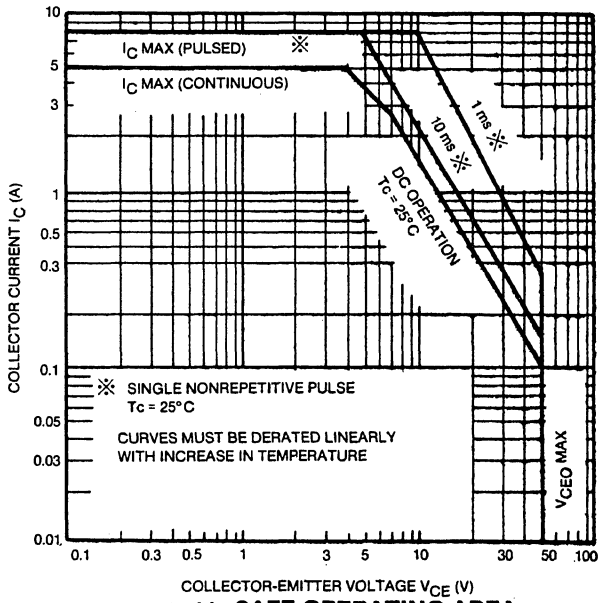



**FIG. 11 SAFE OPERATING AREA**