

DARLINGTON SILICON POWER TRANSISTORS

...designed for general-purpose amplifier, hammer drive, pulse motor drive and low speed switching, applications.

FEATURES:

- * Collector-Emitter Sustaining Voltage-

$$V_{CE0(SUS)} = 60 \text{ V (Min) - 2SD635}$$

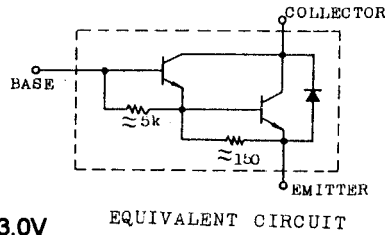
$$= 80 \text{ V (Min) - 2SD634}$$

$$= 100 \text{ V (Min) - 2SD633}$$

- * Collector-Emitter Saturation Voltage

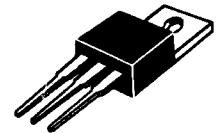
$$V_{CE(sat)} = 2.0 \text{ V (Max.) @ } I_C = 7.0 \text{ A, } I_B = 14 \text{ mA}$$

- * DC Current Gain $h_{FE} = 2000(\text{Min}) @ I_C = 3.0 \text{ A, } V_{CE} = 3.0 \text{ V}$



NPN
2SD633
2SD634
2SD635

7 AMPERE
DARLINGTON
POWER TRANSISTORS
NPN SILICON
60-100 VOLTS
40 WATTS



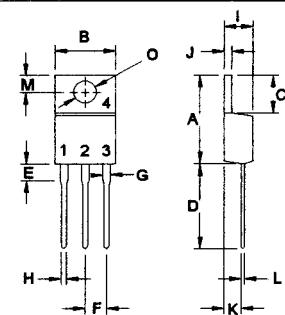
TO-220

MAXIMUM RATINGS

| Characteristic | Symbol | 2SD635 | 2SD634 | 2SD633 | Unit |
|---|-------------------|--------------|--------|--------|--------------------------|
| Collector-Emitter Voltage | V_{CEO} | 60 | 80 | 100 | V |
| Collector-Base Voltage | V_{CBO} | 60 | 80 | 100 | V |
| Emitter-Base Voltage | V_{EBO} | 5.0 | | | V |
| Collector Current-Continuous -Peak | I_C I_{CM} | 7.0 10 | | | A |
| Base Current | I_B | 0.2 | | | A |
| Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 40 0.32 | | | W W/ $^\circ\text{C}$ |
| Operating and Storage Junction Temperature Range | T_J, T_{STG} | - 65 to +150 | | | $^\circ\text{C}$ |

THERMAL CHARACTERISTICS

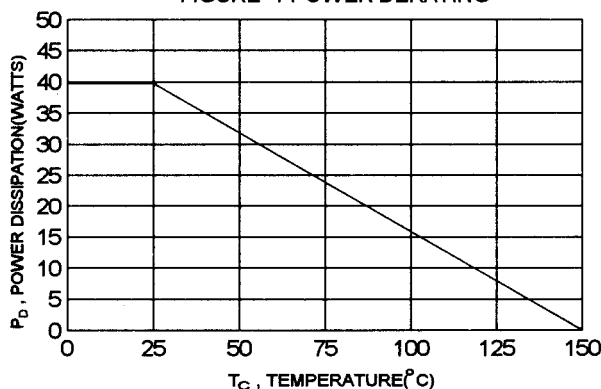
| Characteristic | Symbol | Max | Unit |
|-------------------------------------|-----------------|-------|--------------------|
| Thermal Resistance Junction to Case | $R_{\theta jc}$ | 3.125 | $^\circ\text{C/W}$ |



PIN 1.BASE
 2.COLLECTOR
 3.EMITTER
 4.COLLECTOR(CASE)

| DIM | MILLIMETERS | |
|-----|-------------|-------|
| | MIN | MAX |
| A | 14.68 | 15.31 |
| B | 9.78 | 10.42 |
| C | 5.01 | 6.52 |
| D | 13.06 | 14.62 |
| E | 3.57 | 4.07 |
| F | 2.42 | 3.66 |
| G | 1.12 | 1.36 |
| H | 0.72 | 0.96 |
| I | 4.22 | 4.98 |
| J | 1.14 | 1.38 |
| K | 2.20 | 2.97 |
| L | 0.33 | 0.55 |
| M | 2.48 | 2.98 |
| O | 3.70 | 3.90 |

FIGURE -1 POWER DERATING



ELECTRICAL CHARACTERISTICS ($T_c = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic | Symbol | Min | Max | Unit |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

OFF CHARACTERISTICS

| | | | | |
|---|----------------------------|---------------|-------------------|---------------|
| Collector - Emitter Breakdown Voltage ($I_c = 50 \text{ mA}, I_B = 0$) | 2SD633 2SD634 2SD635 | $V_{(BR)CEO}$ | 100 80 60 | V |
| Collector Cutoff Current ($V_{CE} = 100 \text{ V}, I_E = 0$) ($V_{CE} = 80 \text{ V}, I_E = 0$) ($V_{CE} = 60 \text{ V}, I_E = 0$) | 2SD633 2SD634 2SD635 | I_{CBO} | 100 100 100 | μA |
| Emitter Cutoff Current ($V_{EB} = 5.0 \text{ V}, I_C = 0$) | | I_{EBO} | 3.0 | mA |

ON CHARACTERISTICS (1)

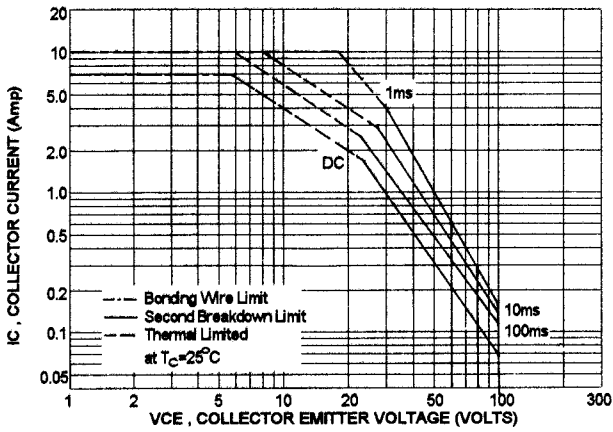
| | | | | | |
|---|--|---------------|--------------|------------|---|
| DC Current Gain ($I_c = 3.0 \text{ A}, V_{CE} = 3.0 \text{ V}$) ($I_c = 7.0 \text{ A}, V_{CE} = 3.0 \text{ V}$) | | hFE | 2000 1000 | 15000 | |
| Collector-Emitter Saturation Voltage ($I_c = 3.0 \text{ A}, I_B = 6.0 \text{ mA}$) ($I_c = 7.0 \text{ A}, I_B = 14 \text{ mA}$) | | $V_{CE(sat)}$ | | 1.5 2.0 | V |
| Base-Emitter On Voltage ($I_c = 3.0 \text{ A}, I_B = 6.0 \text{ mA}$) | | $V_{BE(sat)}$ | | 2.5 | V |

SWITCHING CHARACTERISTICS

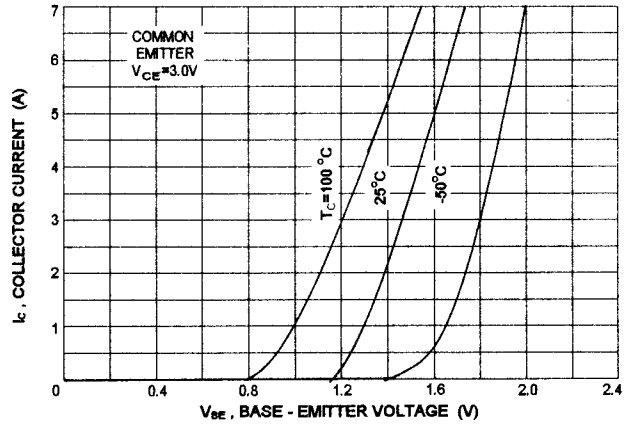
| | | | | |
|--------------|---|----------|-----|---------------|
| On Time | $I_c = 3.0 \text{ A}, V_{CC} = 45 \text{ V}$ $I_{B1} = -I_{B2} = 6.0 \text{ mA}$ PW= 20 μs , Duty<1% | t_{on} | 1.2 | μs |
| Storage Time | | t_s | 3.5 | μs |
| Fall Time | | t_f | 3.0 | μs |

(1) Pulse Test: Pulse width = 300 μs , Duty Cycle $\leq 2.0\%$

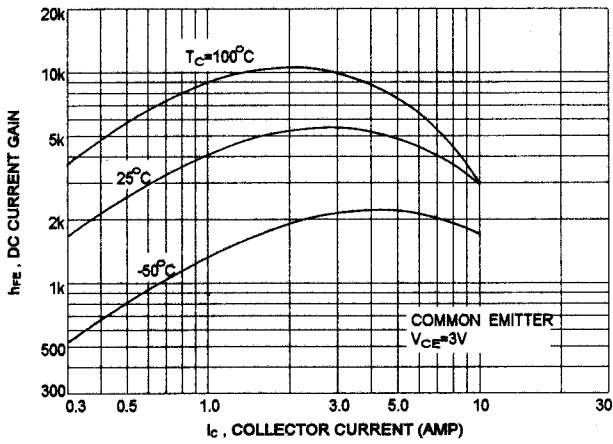
SAFE OPERATING AREA



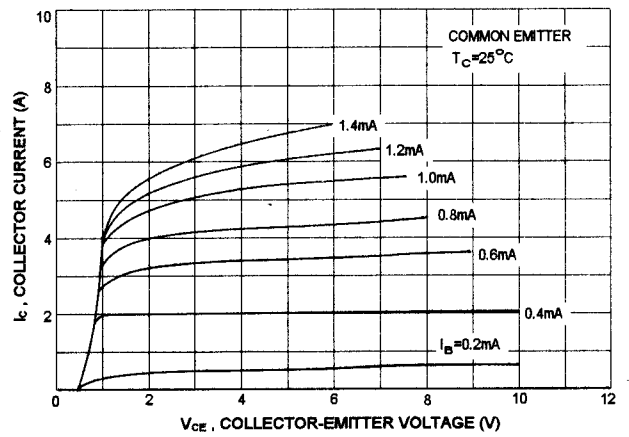
$I_C - V_{BE}$



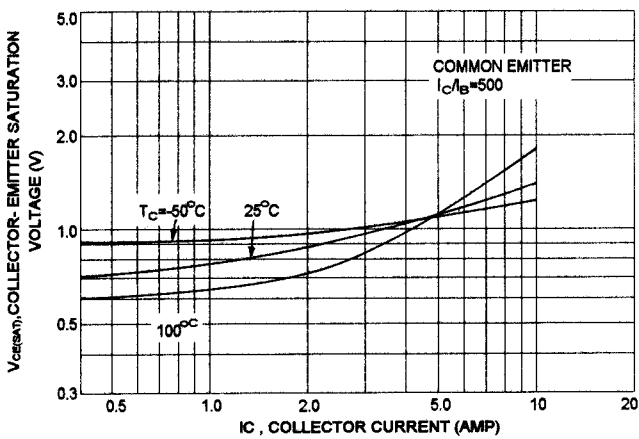
DC CURRENT GAIN



$I_C - V_{CE}$



$V_{CE(sat)} - I_C$



$V_{BE(sat)} - I_C$

