

2N5415, 2N5416 For Specifications, See 2N3439 Data.

T-27-21

2N5581/82 For Specifications, See 2N2218,A Data.

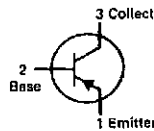
MAXIMUM RATINGS

| Rating | Symbol | 2N5679 2N5681 | 2N5680 2N5682 | Unit |
|-----------------------------------------------------------------------|-----------------------------------|------------------|------------------|-----------------|
| Collector-Emitter Voltage | V _{CEO} | 100 | 120 | V _{dc} |
| Collector-Base Voltage | V _{CBO} | 100 | 120 | V _{dc} |
| Emitter-Base Voltage | V _{EBO} | 4.0 | | V _{dc} |
| Base Current | I _B | 0.5 | | A _{dc} |
| Collector Current — Continuous | I _C | 1.0 | | A _{dc} |
| Total Device Dissipation @ T _A = 25°C Derate above 25°C | P _D | 1.0 5.7 | | Watt mW/°C |
| Total Device Dissipation @ T _C = 25°C Derate above 25°C | P _D | 10 57 | | Watts mW/°C |
| Operating and Storage Junction Temperature Range | T _J , T _{stg} | -65 to +200 | | °C |

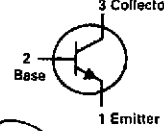
THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|-----------------------------------------|------------------|------|------|
| Thermal Resistance, Junction to Case | R _{θJC} | 17.5 | °C/W |
| Thermal Resistance, Junction to Ambient | R _{θJA} | 175 | °C/W |

**2N5679
2N5680**
PNP SILICON



**2N5681
2N5682**
NPN SILICON



**CASE 79-04, STYLE 1
TO-39 (TO-205AD)
GENERAL PURPOSE
TRANSISTORS**

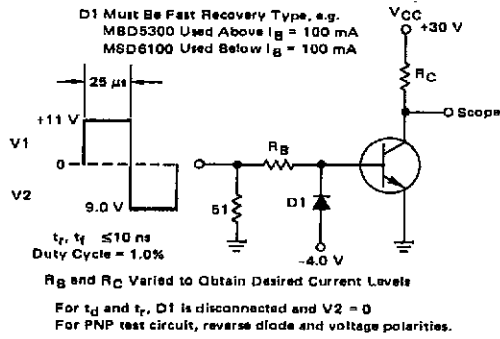
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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

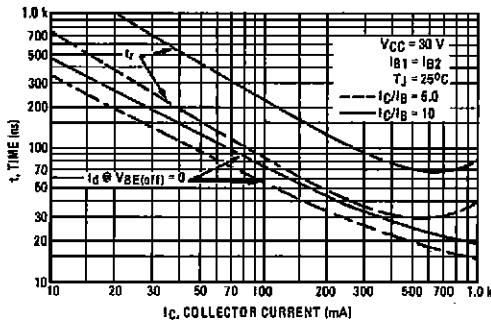
| Characteristic | Symbol | Min | Max | Unit |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------|-------------------|--------------------------------------|
| OFF CHARACTERISTICS | | | | |
| Collector-Emitter Sustaining Voltage (I _C = 10 mA _{dc} , I _B = 0) | V _{CEO(sus)} | 100 120 | — | V _{dc} |
| Collector Cutoff Current (V _{CE} = 70 V _{dc} , I _B = 0) (V _{CE} = 80 V _{dc} , I _B = 0) | I _{CEO} | — | 10 10 | μA _{dc} |
| Collector Cutoff Current (V _{CE} = 100 V _{dc} , V _{EB} = 1.5 V _{dc}) (V _{CE} = 120 V _{dc} , V _{EB} = 1.5 V _{dc}) | I _{CEx} | — | 1.0 1.0 | μA _{dc} mA _{dc} |
| (V _{CE} = 100 V _{dc} , V _{EB} = 1.5 V _{dc} , T _C = 150°C) (V _{CE} = 120 V _{dc} , V _{EB} = 1.5 V _{dc} , T _C = 150°C) | | — | 1.0 1.0 | |
| Collector Cutoff Current (V _{CB} = 100 V _{dc} , I _E = 0) (V _{CB} = 120 V _{dc} , I _E = 0) | I _{CBO} | — | 1.0 1.0 | μA _{dc} |
| Emitter Cutoff Current (V _{EB} = 4.0 V _{dc} , I _C = 0) | I _{EBO} | — | 1.0 | μA _{dc} |
| ON CHARACTERISTICS | | | | |
| DC Current Gain (I _C = 250 mA _{dc} , V _{CE} = 2.0 V _{dc}) (I _C = 1.0 A _{dc} , V _{CE} = 2.0 V _{dc}) | h _{FE} | 40 5.0 | 150 — | — |
| Collector-Emitter Saturation Voltage (I _C = 250 mA _{dc} , I _B = 25 mA _{dc}) (I _C = 500 mA _{dc} , I _B = 50 mA _{dc}) (I _C = 1.0 A _{dc} , I _B = 200 mA _{dc}) | V _{CE(sat)} | — | 0.6 1.0 2.0 | V _{dc} |
| Base-Emitter Saturation Voltage (I _C = 250 mA _{dc} , V _{CE} = 2.0 V _{dc}) | V _{BE(sat)} | — | 1.0 | V _{dc} |
| SMALL-SIGNAL CHARACTERISTICS | | | | |
| Current-Gain — Bandwidth Product (I _C = 100 mA _{dc} , V _{CE} = 10 V _{dc} , f = 10 MHz) | f _T | 30 | — | MHz |
| Output Capacitance (V _{CB} = 20 V _{dc} , I _E = 0, f = 1.0 MHz) | C _{obc} | — | 50 | pF |
| Small-Signal Current Gain (I _C = 0.2 A _{dc} , V _{CE} = 1.5 V _{dc} , f = 1.0 kHz) | h _{fe} | 40 | — | — |

2N5679 thru 2N5682

FIGURE 1 — SWITCHING TIMES TEST CIRCUIT



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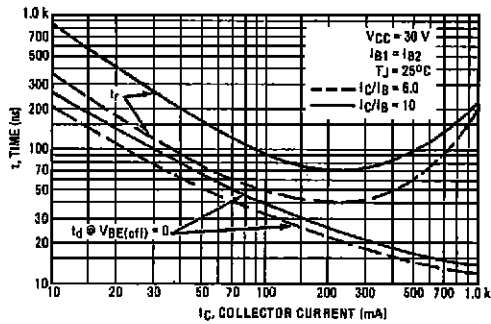
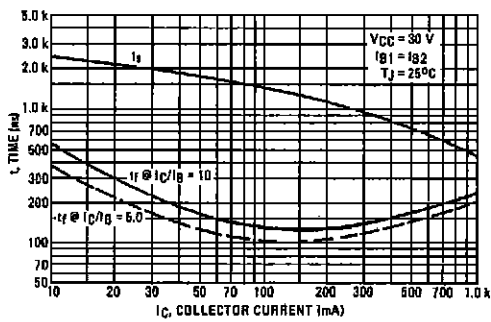
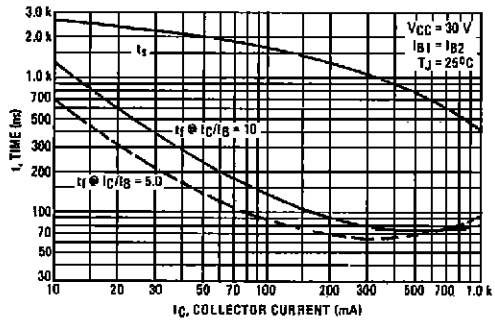


FIGURE 3 — TURN-OFF TIME



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FIGURE 4 — CURRENT-GAIN — BANDWIDTH PRODUCT

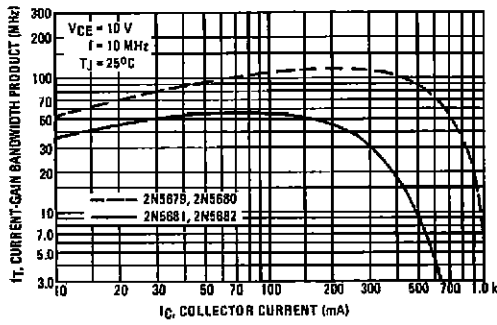


FIGURE 5 — CAPACITANCE

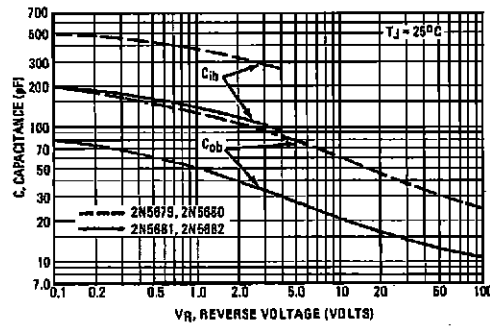


FIGURE 6 — THERMAL RESISTANCE

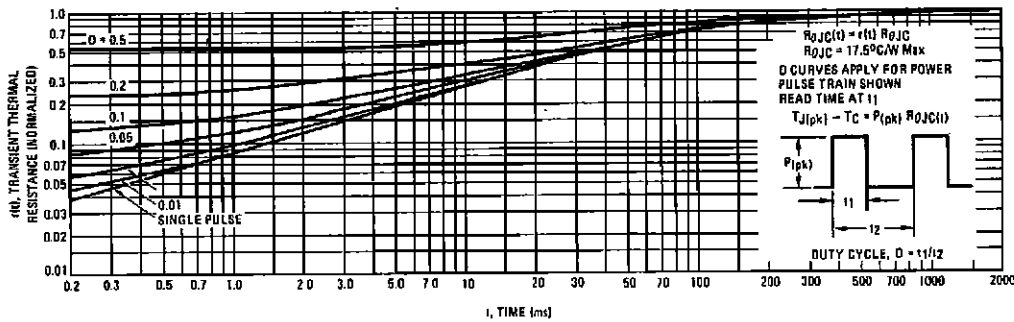


FIGURE 7 — ACTIVE-REGION SAFE OPERATING AREA

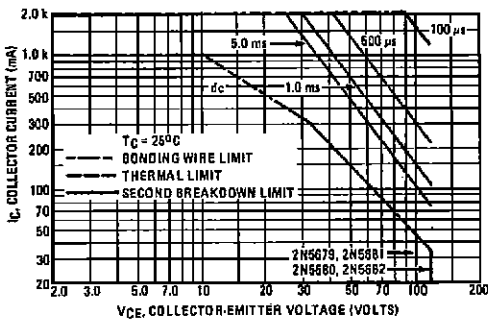
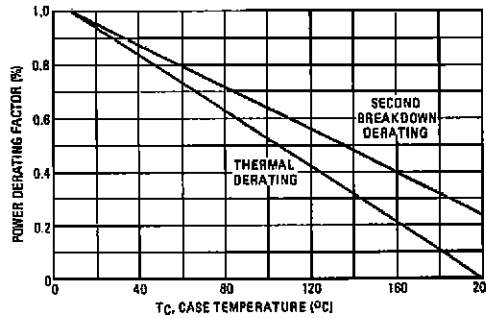


FIGURE 8 — POWER DERATING



There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 7 is based on $T_C = 25^\circ\text{C}$; $T_{J(pk)}$ is variable depending on power level. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \leq 200^\circ\text{C}$. $T_{J(pk)}$

may be calculated from the data in Figure 6. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown. Second breakdown limitations do not derate the same as thermal limitations. Allowable current at the voltages shown on Figure 7 may be found at any case temperature by using the appropriate curve on Figure 8.

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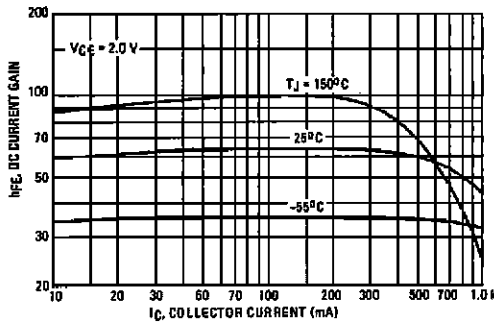


FIGURE 9 — DC CURRENT GAIN

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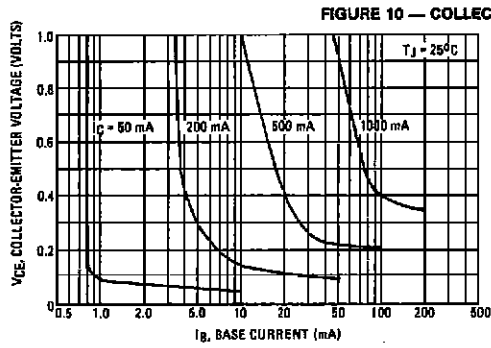
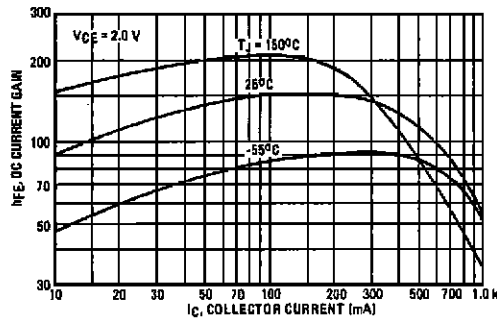


FIGURE 10 — COLLECTOR SATURATION REGION

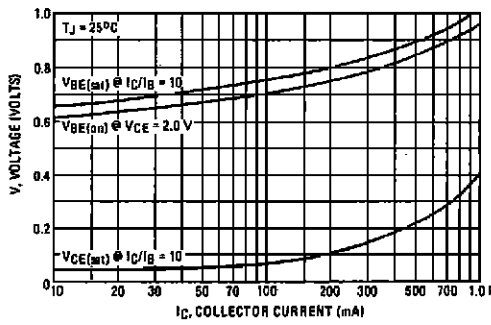
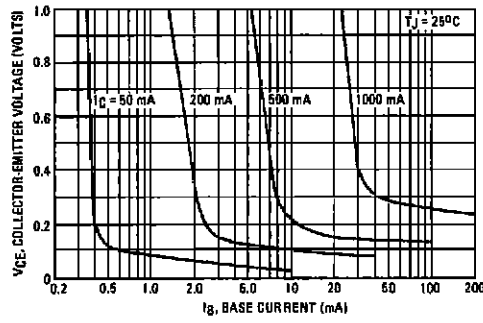
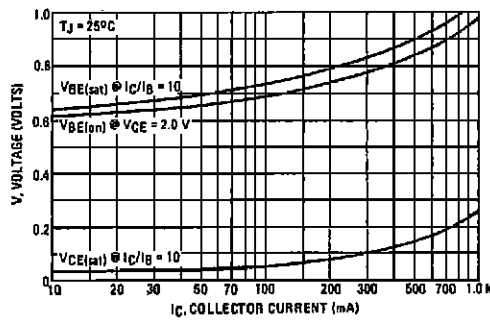


FIGURE 11 — "ON" VOLTAGES

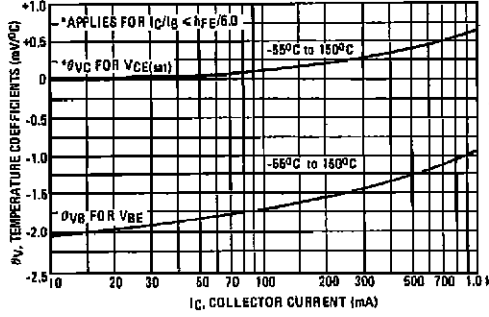
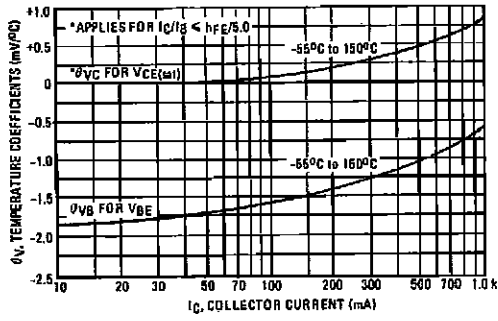


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FIGURE 12 — TEMPERATURE COEFFICIENTS



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FIGURE 13 — COLLECTOR CUTOFF REGION

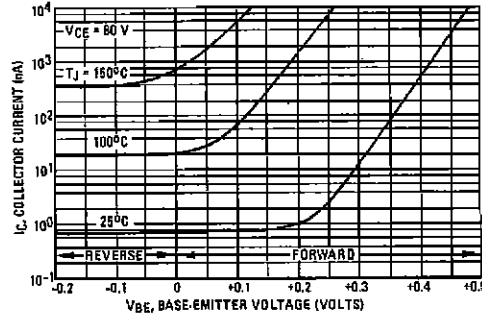
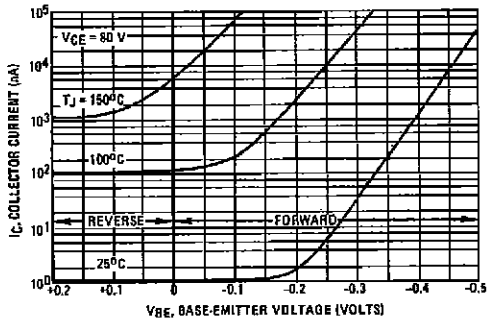


FIGURE 14 — BASE CUTOFF REGION

