

MICRO ELECTRONICS

BC177,8,9
BC257,8,9
BC307,8,9
BC320,1,2

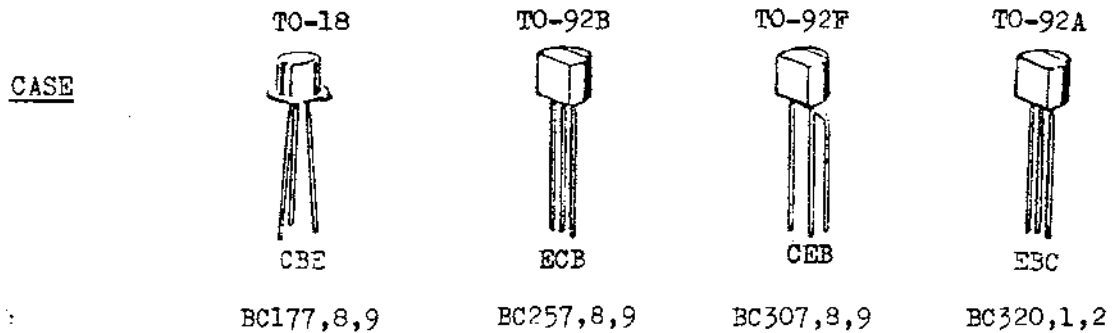
THE ABOVE TYPES ARE PNP SILICON PLANAR EPITAXIAL TRANSISTORS FOR USE IN AF SMALL SIGNAL AMPLIFIER STAGES AND DIRECT COUPLED CIRCUITS.

BC177, 8, 9 are complementary to BC107, 8, 9.

BC257, 8, 9 are complementary to BC167, 8, 9.

BC307, 8, 9 are complementary to BC237, 8, 9.

BC320, 1, 2 are complementary to BC317, 8, 9.



ABSOLUTE MAXIMUM RATINGS

| TYPE | -V _{CBO} (V) | -V _{CES} (V) | -V _{CEO} (V) | -V _{EBO} (V) | -I _C (DC) (mA) | P _{tot} * (mW) | T _j , T _{stg} |
|-------|--------------------------|--------------------------|--------------------------|--------------------------|------------------------------|----------------------------|-----------------------------------|
| BC177 | 50 | 50 | 45 | 5 | 100 | 300 | -55 to 175°C |
| BC178 | 30 | 30 | 25 | 5 | 100 | 300 | |
| BC179 | 25 | 25 | 20 | 5 | 100 | 300 | |
| BC257 | 50 | 50 | 45 | 5 | 100 | 300 | -55 to 150°C |
| BC258 | 30 | 30 | 25 | 5 | 100 | 300 | |
| BC259 | 25 | 25 | 20 | 5 | 100 | 300 | |
| BC307 | 50 | 50 | 45 | 5 | 100 | 300 | -55 to 150°C |
| BC308 | 30 | 30 | 25 | 5 | 100 | 300 | |
| BC309 | 25 | 25 | 20 | 5 | 100 | 300 | |
| BC320 | 50 | | 45 | 6 | 150 | 310 | -55 to 150°C |
| BC321 | 45 | | 30 | 5 | 150 | 310 | |
| BC322 | 30 | | 20 | 5 | 150 | 310 | |

* Total Power Dissipation @ T_A ≤ 25°C



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ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNIT | TEST CONDITIONS |
|--|-------------------------|--------|------|------|------|---|
| Collector-Base Breakdown Voltage | -BV _{CB0} | Note 1 | | | V | -I _C =10μA I _E =0 |
| Collector-Emitter Breakdown Voltage | -LV _{CEO} * | | V | | | -I _C =2mA I _B =0 |
| Emitter-Base Breakdown Voltage | -BV _{EB0} | | V | | | -I _E =1μA I _C =0 |
| Collector Cutoff Current BC177, 178, 179 } BC257, 258, 259 } only BC307, 308, 309 } | -I _{CES} | | | 15 | nA | V _{CE} =V _{CES} V _{BE} =0 |
| | | | | 4 | μA | V _{CE} =V _{CES} V _{BE} =0 T _A =125°C |
| Collector Cutoff Current BC320, 321, 322 only | -I _{CBO} | | | 30 | nA | -V _{CB} =20V I _E =0 |
| | | | | 15 | μA | -V _{CB} =20V I _E =0 T _A =100°C |
| Collector-Emitter Saturation Voltage All types | -V _{CE(sat)} * | | 0.1 | 0.3 | V | -I _C =10mA -I _B =0.5mA |
| | | | 0.25 | | V | -I _C =100mA -I _B =5mA |
| Collector-Emitter Knee Voltage BC177, 178, 179 } only BC307, 308, 309 } | -V _{CEK} | | 0.3 | 0.6 | V | -I _C =10mA, I _B =value at which -I _C =11mA -V _{CE} =1V |
| Base-Emitter Saturation Voltage All types | -V _{BE(sat)} * | | 0.72 | | V | -I _C =10mA -I _B =0.5mA |
| | | | 0.92 | | V | -I _C =100mA -I _B =5mA |
| Base-Emitter Voltage All types | -V _{BE} * | 0.6 | 0.65 | 0.75 | V | -I _C =2mA -V _{CE} =5V |
| BC320, 321, 322 only | -V _{BE} * | | 0.7 | 0.77 | V | -I _C =10mA -V _{CE} =5V |
| Current Gain-Bandwidth Product | f _T | | 180 | | MHz | -I _C =10mA -V _{CE} =5V |
| Collector-Base Capacitance BC177, 178, 179 | C _{ob} | | 3.6 | 7 | pF | -V _{CB} =10V I _E =0 f=1MHz |
| BC257, 258, 259 | | | 3.2 | 6 | pF | |
| BC307, 308, 309 | | | 3.2 | 6 | pF | |
| BC320, 321, 322 | | | 3.2 | 4 | pF | |
| | | | | | | |
| Noise Figure BC177, 178 | NF | | 2 | 10 | dB | -I _C =0.2mA -V _{CE} =5V R _G =2KΩ f=1kHz |
| | | | | | dB | Δf=200Hz |
| BC257, 258 | | | 2 | 10 | dB | |
| BC307, 308 | | | 2 | 10 | dB | |
| BC320, 321 | | | 2 | 6 | dB | |

* Pulse Test : Pulse Width=0.3ms, Duty Cycle=1%

Note 1 : equal to the value of absolute maximum ratings.

- - - Continued - - -

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNIT | TEST CONDITIONS |
|---|--------|-----|-----|-----|------|---|
| Noise Figure BC179 } BC259 } only BC309 } BC322 } | NF | | 1.2 | 4 | dB | -I _C =0.2mA -V _{CE} =5V R _G =2KΩ f=1KHz Δf=200Hz |
| | | | 1.2 | 4 | dB | -I _C =0.2mA -V _{CE} =5V R _G =2KΩ f=30Hz-15KHz |

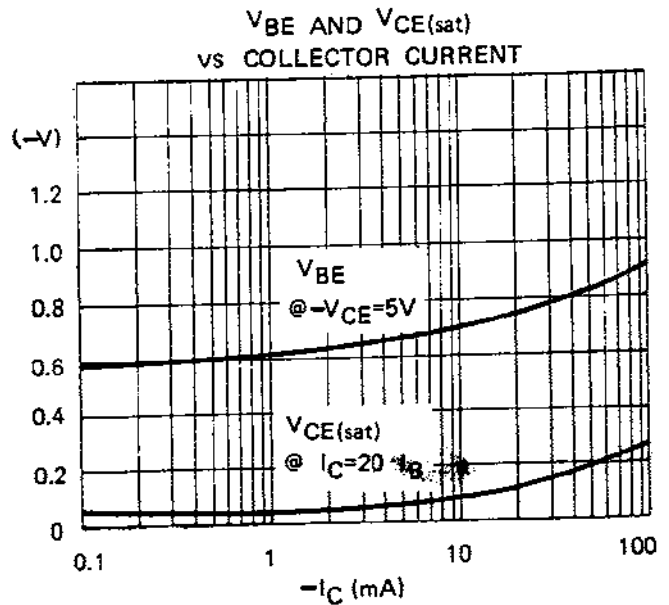
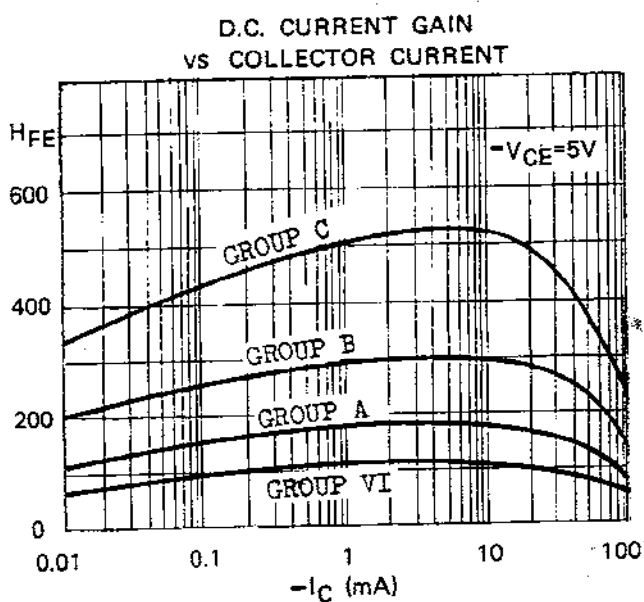
D.C. CURRENT GAIN (HFE) @ -V_{CE}=5V TA=25°C

| at -I _C (Pulsed) | HFE GROUP VI | | | HFE GROUP A | | | HFE GROUP B | | | HFE GROUP C | | |
|--------------------------------|--------------|-----|-----|-------------|-----|-----|-------------|-----|-----|-------------|-----|-----|
| | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX |
| 0.01mA | | 70 | | | 110 | | | 200 | | | 330 | |
| 2mA | 70 | 110 | 140 | 110 | 170 | 220 | 200 | 300 | 450 | 420 | 520 | 800 |
| 100mA | | 60 | | | 80 | | | 140 | | | 240 | |

h - PARAMETERS @ -I_C=2mA -V_{CE}=5V f=1kHz TA=25°C

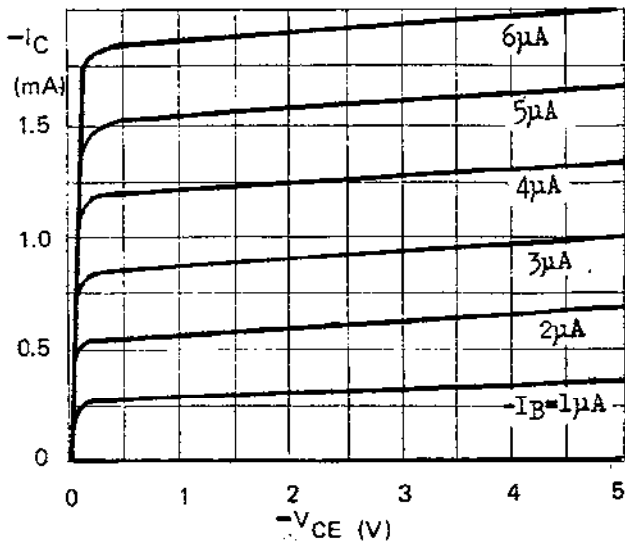
| h - PARAMETER | SYMBOL | HFE GROUP VI | | | HFE GROUP A | | | HFE GROUP B | | | HFE GROUP C | | | UNIT |
|---------------------------|-----------------|--------------|-----|-----|-------------|-----|-----|-------------|-----|-----|-------------|-----|-----|-------------------|
| | | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX | |
| Input Impedance | h _{ie} | | 1.4 | | | 2.7 | | | 4.5 | | | 8.7 | | KΩ |
| Voltage Feedback Ratio | h _{re} | | 2.5 | | | 3 | | | 3.5 | | | 4 | | x10 ⁻⁴ |
| Small Signal Current Gain | h _{fe} | 75 | 110 | 150 | 125 | 190 | 260 | 240 | 330 | 500 | 450 | 580 | 900 | |
| Output Admittance | h _{oe} | | 20 | | | 25 | | | 35 | | | 60 | | μ ^s |

TYPICAL CHARACTERISTICS AT TA=25°C (Pulse Test)

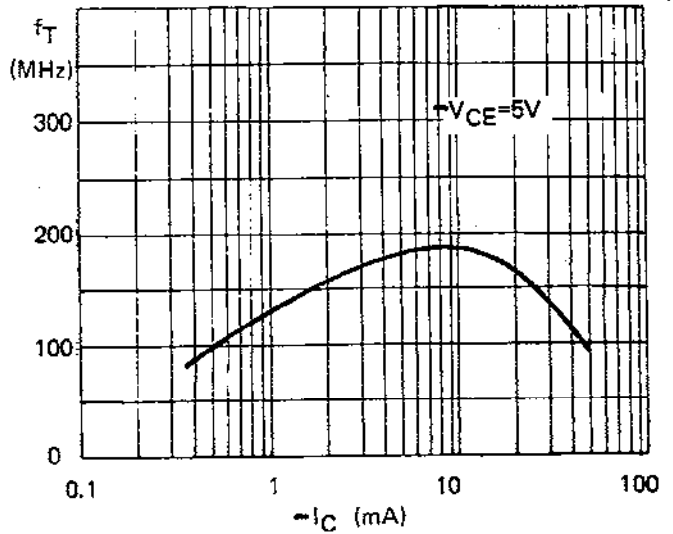


TYPICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$ UNLESS OTHERWISE SPECIFIED)

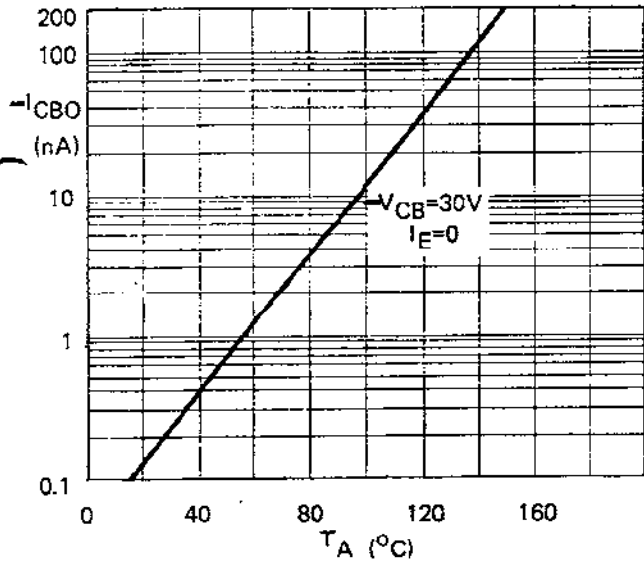
COMMON EMITTER
OUTPUT CHARACTERISTICS



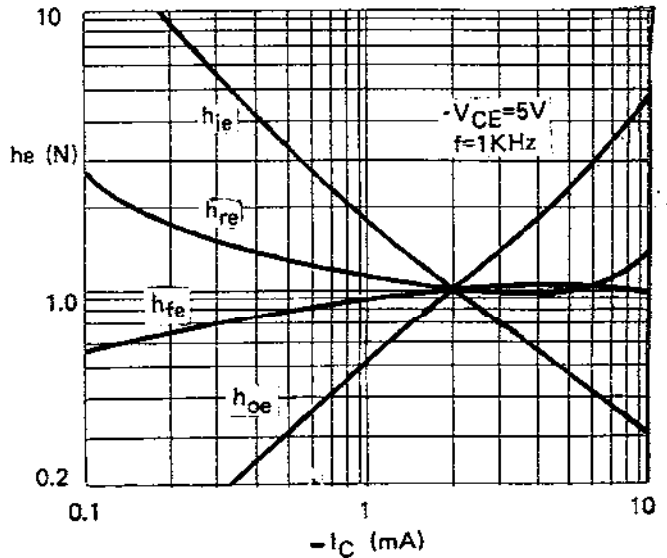
CURRENT GAIN - BANDWIDTH PRODUCT
VS COLLECTOR CURRENT



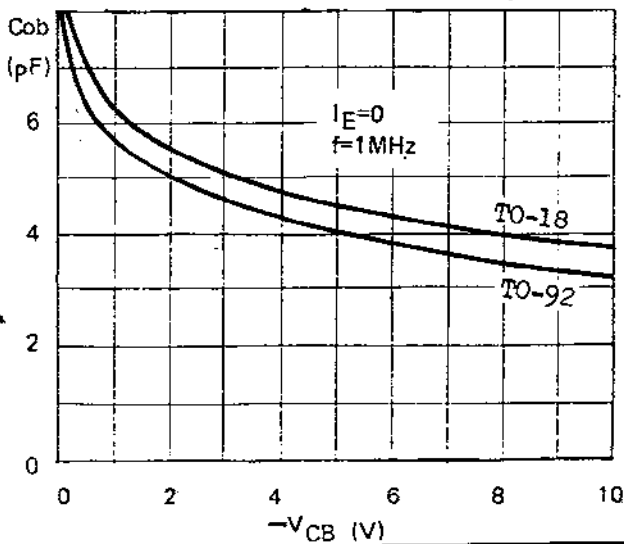
COLLECTOR CUTOFF CURRENT
VS AMBIENT TEMPERATURE



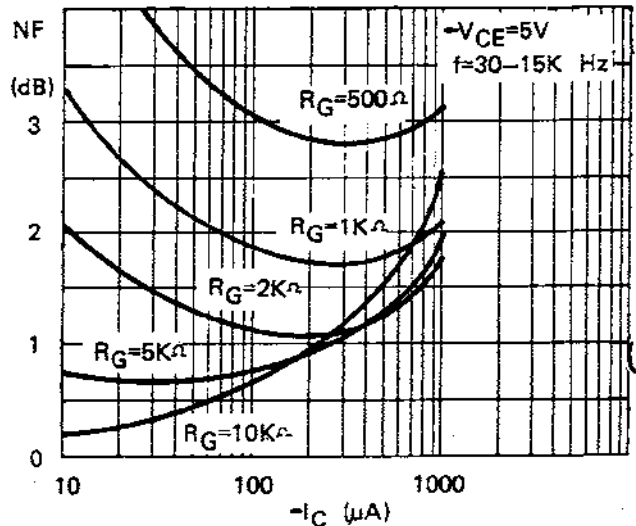
h-PARAMETERS (NORMALIZED)
VS COLLECTOR CURRENT



COLLECTOR-BASE CAPACITANCE
VS COLLECTOR-BASE VOLTAGE



BROAD BAND NOISE FIGURE
VS COLLECTOR CURRENT



BC177 family

BC177 family