



## Interface Technologies

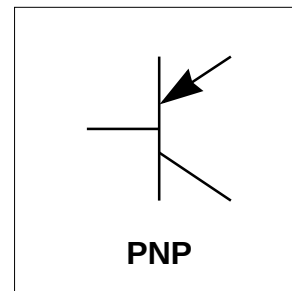
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# 2sa1242

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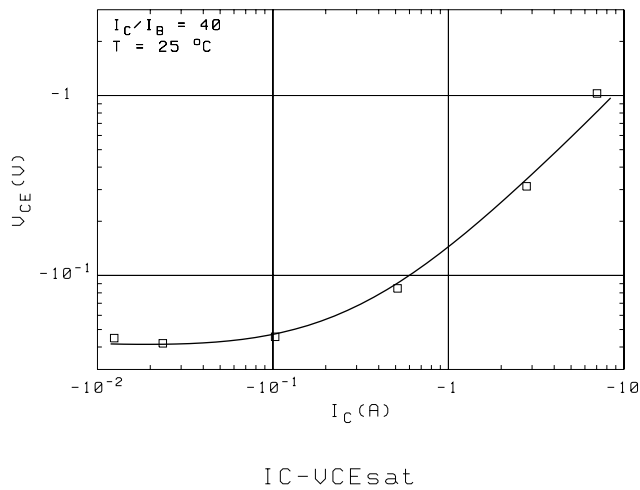
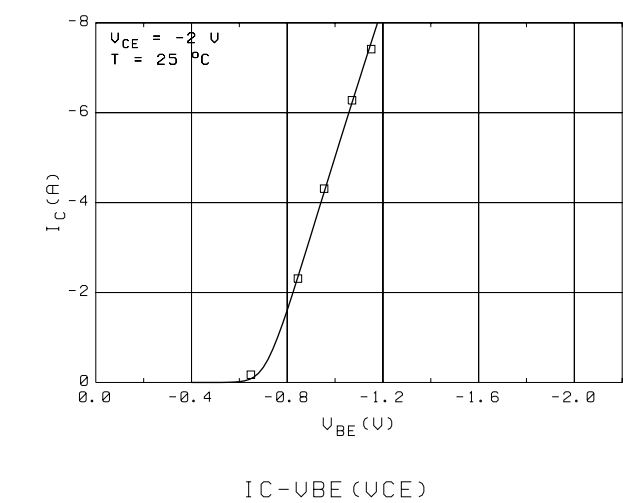
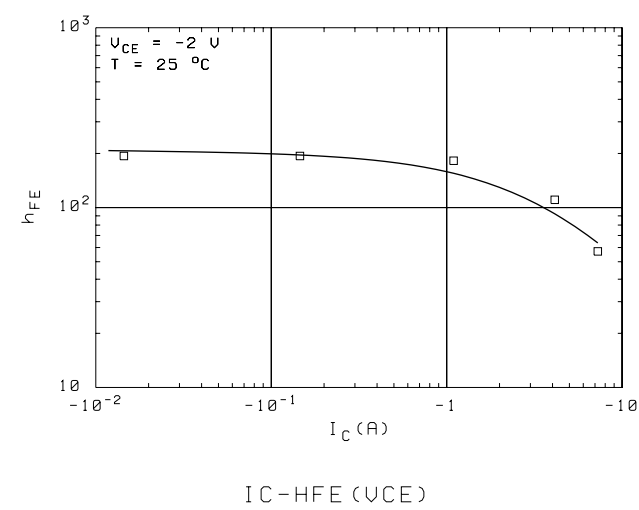
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### Electrical Characteristics (Ta = 25°C unless otherwise noted)

Testing Simulator: MODPEX

| Spec.  | Test Conditions          | Min | Typ | Max  | Model   | Unit |
|--------|--------------------------|-----|-----|------|---------|------|
| HFE    | IC = -4000mA, VCE = -2V  | 70  |     |      | 94.04   |      |
| HFE    | IC = -500mA, VCE = -2V   | 100 | 320 |      | 178.2   |      |
| VCEsat | IC = -4000mA, IC/IB = 40 |     |     | -1   | -0.4764 | V    |
| VBESat | IC = -4000mA, IC/IB = 40 |     |     | -1.5 | -1.078  | V    |
| FT     | IC = -0.5mA, VCE = -2V   |     | 170 |      | 69.93   | MHz  |

# 2sa1242: DC Extraction



## 2sa1242: BJT Parameters

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| Symbol | Parameter Name                                                           | Value                 | Unit     |
|--------|--------------------------------------------------------------------------|-----------------------|----------|
| IS     | Transport saturaton current                                              | $7.7 \times 10^{-11}$ | A        |
| BF     | Ideal maximum forward beta                                               | 225.5                 |          |
| NF     | Forward current emission coefficient                                     | 1.185                 |          |
| VAF    | Foward early voltage                                                     | 25.21                 | V        |
| IKF    | Corner for foward beta high current roll-off                             | 4.486                 | A        |
| ISE    | B-E leakage saturation current                                           | $6.4 \times 10^{-12}$ | A        |
| NE     | B-E leakage emission coefficient                                         | 3.399                 |          |
| BR     | Ideal maximum reverse beta                                               | 4.418                 |          |
| NR     | Reverse current emission coefficient                                     | 1.284                 |          |
| VAR    | Reverse early voltage                                                    | 4.41                  | V        |
| IKR    | Corner for reverse beta high current roll-off                            | 4.381                 | A        |
| ISC    | B-C leakage saturation current                                           | $3.9 \times 10^{-13}$ | A        |
| NC     | B-C leakage emission coefficient                                         | 3.99                  |          |
| RB     | Zero bias base resistance                                                | 5.37                  | $\Omega$ |
| IRB    | Current where base resistance<br>falls halfway to its min value          | 0.1067                | A        |
| RBM    | Minimum base resistance at high currents                                 | 0.1005                | $\Omega$ |
| RE     | Emitter resistance                                                       | $9.79 \times 10^{-4}$ | $\Omega$ |
| RC     | Collector resistance                                                     | 0.1021                | $\Omega$ |
| XTB    | Forward and reverse beta temperature exponent                            | 0.1                   |          |
| XTI    | Temperature exponent for effect on IS                                    | 1                     |          |
| EG     | Energy gap for temperature effect on IS                                  | 1.113                 | eV       |
| CJE    | B-E zero-bias depletion capacitance                                      | $1 \times 10^{-11}$   | F        |
| VJE    | B-E built-in potential                                                   | 0.75                  | V        |
| MJE    | B-E junction exponential factor                                          | 0.33                  |          |
| TF     | Ideal forward transit time                                               | $1 \times 10^{-9}$    | Sec      |
| XTF    | Coefficient for bias dependence of TF                                    | 1                     |          |
| VTF    | Voltage describing VBC dependence of TF                                  | 10                    | V        |
| ITF    | High-current parameter for effect on TF                                  | 0.01                  | A        |
| CJC    | B-C zero-bias depletion capacitance                                      | $1 \times 10^{-11}$   | F        |
| VJC    | B-C built-in potential                                                   | 0.75                  | V        |
| MJC    | B-C junction exponential factor                                          | 0.33                  |          |
| XCJC   | Fraction of B-C depletion capacitance<br>connected to internal base node | 0.9                   |          |
| FC     | Coefficient for forward-bias<br>depletion capacitance formula            | 0.5                   |          |
| CJS    | C-S zero-bias depletion capacitance                                      | 0                     | F        |
| VJS    | Substrate junction built-in potential                                    | 0.75                  | V        |
| MJS    | Substrate junction exponential factor                                    | 0.5                   |          |
| TR     | Ideal reverse transit time                                               | $1 \times 10^{-7}$    | Sec      |
| PTF    | Excess phase at Freq=1.0/(TF*2PI)Hz                                      | 0                     | deg      |
| KF     | Flicker-noise coefficient                                                | 0                     |          |
| AF     | Flicker-noise exponent                                                   | 1                     |          |