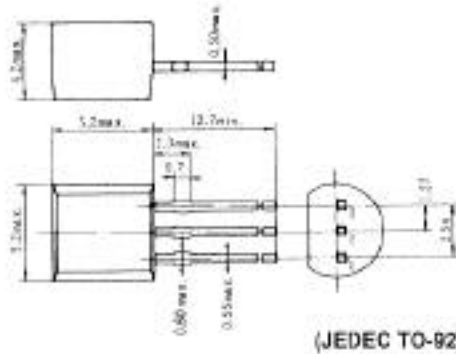


2SA1190, 2SA1191

SILICON PNP EPITAXIAL

LOW FREQUENCY LOW NOISE AMPLIFIER

Complementary pair with 2SC2855 and 2SC2856



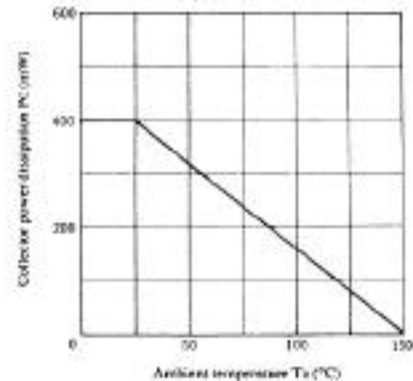
(JEDEC TO-92)

1. Emitter
 2. Collector
 3. Base
- (Dimensions in mm)

■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

| Item | Symbol | 2SA1190 | 2SA1191 | Unit |
|------------------------------|------------------|-------------|-------------|------|
| Collector to base voltage | V _{CB0} | -90 | -120 | V |
| Collector to emitter voltage | V _{CE0} | -90 | -120 | V |
| Emitter to base voltage | V _{EB0} | -5 | -5 | V |
| Collector current | I _C | -100 | -100 | mA |
| Emitter current | I _E | 100 | 100 | mA |
| Collector power dissipation | P _C | 400 | 400 | mW |
| Junction temperature | T _J | 150 | 150 | °C |
| Storage temperature | T _{stg} | -55 to +150 | -55 to +150 | °C |

MAXIMUM COLLECTOR DISSIPATION CURVE



■ ELECTRICAL CHARACTERISTICS (Ta=25°C)

| Item | Symbol | Test Condition | 2SA1190 | | | 2SA1191 | | | Unit |
|---|----------------------|--|---------|-------|-------|---------|-------|-------|--------|
| | | | min. | typ. | max. | min. | typ. | max. | |
| Collector to base breakdown voltage | V _{BR0CB0} | I _C = -10μA, I _E = 0 | -90 | — | — | -120 | — | — | V |
| Collector to emitter breakdown voltage | V _{BR0CE0} | I _C = -1mA, R _{BE} = ∞ | -90 | — | — | -120 | — | — | V |
| Emitter to base breakdown voltage | V _{BR0EB0} | I _E = -10μA, I _C = 0 | -5 | — | — | -5 | — | — | V |
| Collector cutoff current | I _{CS0} | V _{CB} = -70V, I _E = 0 | — | — | -0.1 | — | — | -0.1 | μA |
| Emitter cutoff current | I _{ES0} | V _{EB} = -2V, I _C = 0 | — | — | -0.1 | — | — | -0.1 | μA |
| DC current transfer ratio | h _{FE} * | V _{CB} = -12V, I _C = -2mA** | 250 | — | 800 | 250 | — | 800 | |
| Collector to emitter saturation voltage | V _{CE(sat)} | I _C = -10mA, I _E = -1mA** | — | -0.05 | -0.15 | — | -0.05 | -0.15 | V |
| Base to emitter saturation voltage | V _{BE(sat)} | | — | -0.7 | -1.0 | — | -0.7 | -1.0 | V |
| Gain bandwidth product | f _T | V _{CB} = -6V, I _C = -10mA | — | 130 | — | — | 130 | — | MHz |
| Collector output capacitance | C _{ob} | V _{CB} = -10V, I _C = 0, f = 1MHz | — | 3.2 | — | — | 3.2 | — | pF |
| Noise figure | NF | V _{CB} = -6V, I _C = -0.1mA, R _g = 10kΩ, f = 1kHz | — | 0.15 | 1.5 | — | 0.15 | 1.5 | dB |
| | | V _{CB} = -6V, I _C = -0.1mA, R _g = 10kΩ, f = 10Hz | — | 0.2 | 2.0 | — | 0.2 | 2.0 | dB |
| Noise voltage referred to input | e _n | V _{CB} = -6V, I _C = -10mA, R _g = 0, f = 1kHz | — | 0.7 | — | — | 0.7 | — | nV/√Hz |

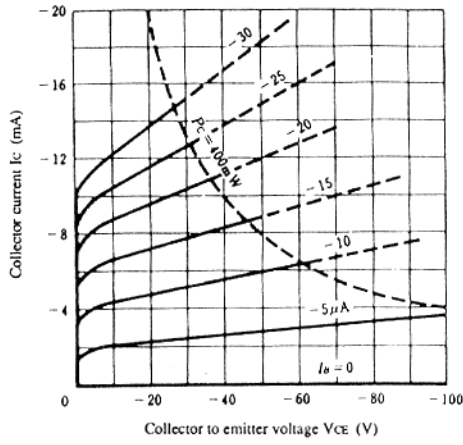
* The 2SA1190 and 2SA1191 are grouped by h_{FE} as follows.

** Pulse Test

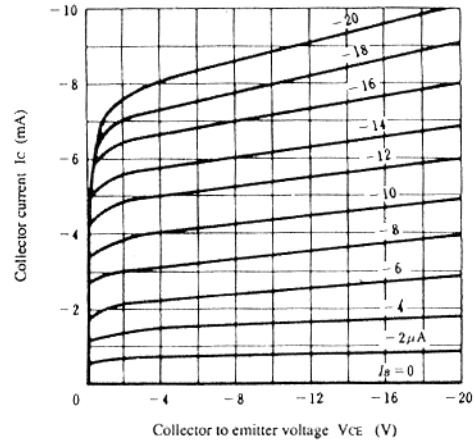
| D | E |
|------------|------------|
| 250 to 500 | 400 to 800 |

2SA1190, 2SA1191

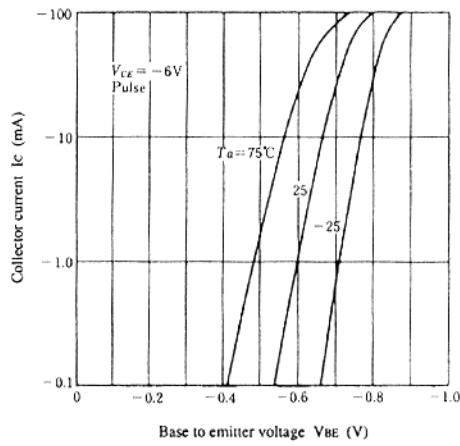
TYPICAL OUTPUT CHARACTERISTICS (1)



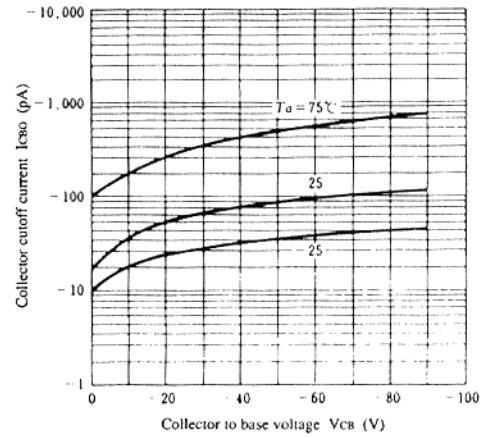
TYPICAL OUTPUT CHARACTERISTICS (2)



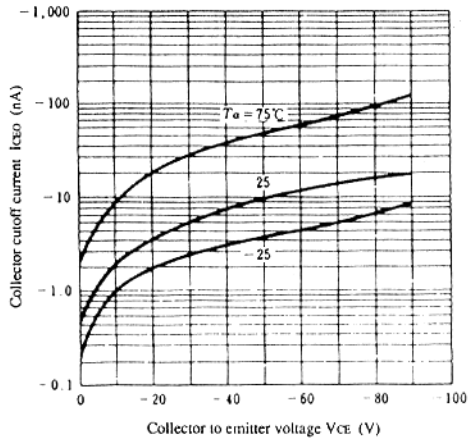
TYPICAL TRANSFER CHARACTERISTICS



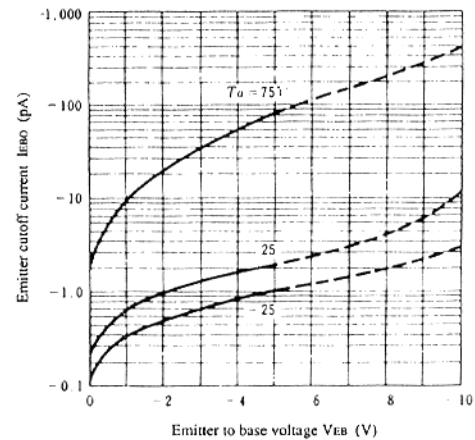
COLLECTOR CUTOFF CURRENT VS. COLLECTOR TO BASE VOLTAGE



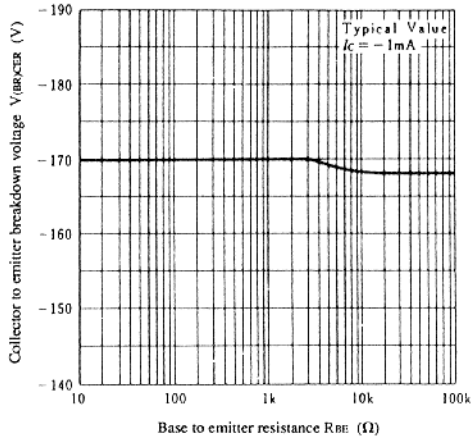
COLLECTOR CUTOFF CURRENT VS. COLLECTOR TO EMITTER VOLTAGE



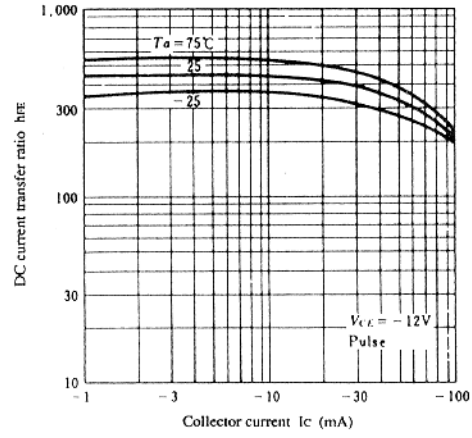
EMITTER CUTOFF CURRENT VS. EMITTER TO BASE VOLTAGE



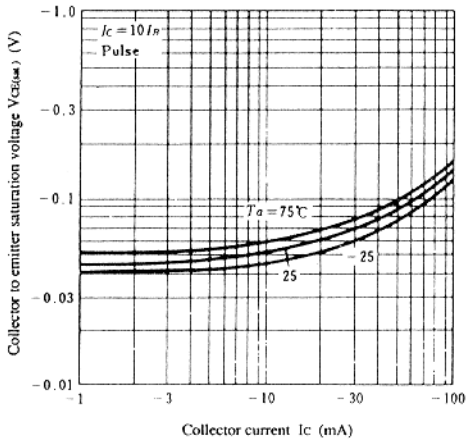
COLLECTOR TO EMITTER BREAKDOWN VOLTAGE VS. BASE TO EMITTER RESISTANCE



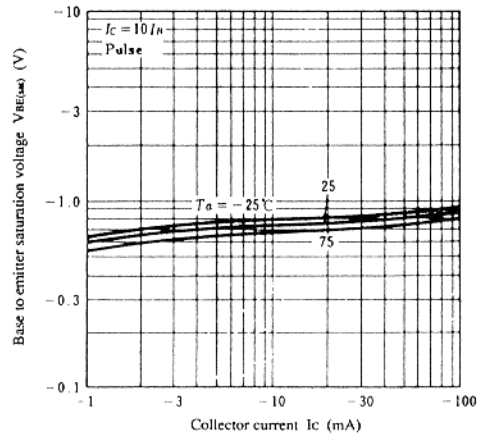
DC CURRENT TRANSFER RATIO VS. COLLECTOR CURRENT



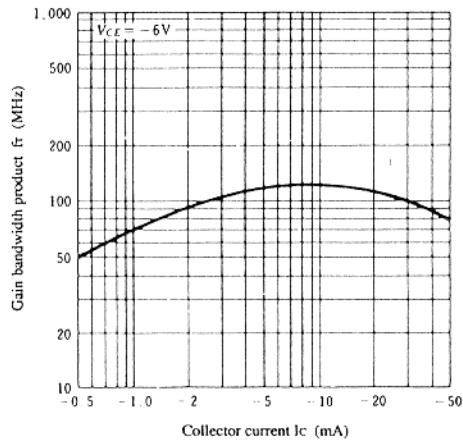
COLLECTOR TO EMITTER SATURATION VOLTAGE VS. COLLECTOR CURRENT



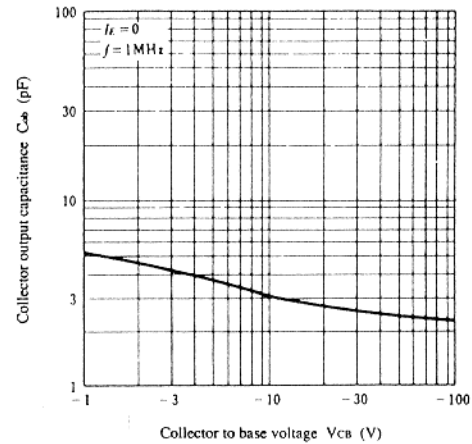
BASE TO EMITTER SATURATION VOLTAGE VS. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT VS. COLLECTOR CURRENT

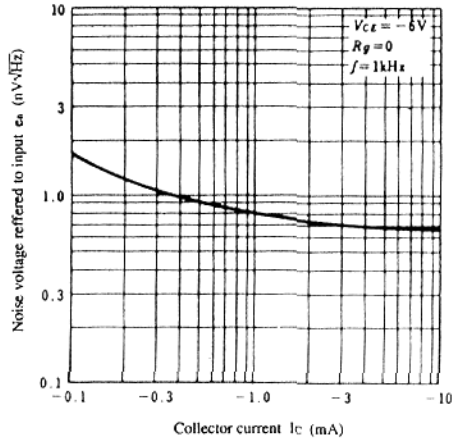


COLLECTOR OUTPUT CAPACITANCE VS. COLLECTOR TO BASE VOLTAGE

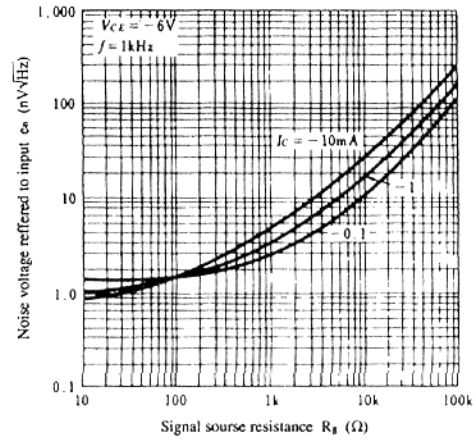


2SA1190, 2SA1191

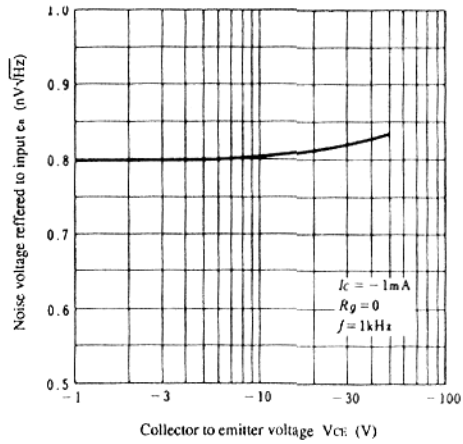
NOISE VOLTAGE REFERRED TO INPUT VS. COLLECTOR CURRENT



NOISE VOLTAGE REFERRED TO INPUT VS. SIGNAL SOURCE RESISTANCE



NOISE VOLTAGE REFERRED TO INPUT VS. COLLECTOR TO EMITTER VOLTAGE



NOISE VOLTAGE REFERRED TO INPUT VS. FREQUENCY

