

**HIGH FREQUENCY LOW NOISE AMPLIFIER
NPN SILICON EPITAXIAL TRANSISTOR
MINI MOLD**

FEATURES

- Low Noise, High Gain
- Low Voltage Operation
- Low Feedback Capacitance
 $C_{re} = 0.3 \text{ pF TYP.}$

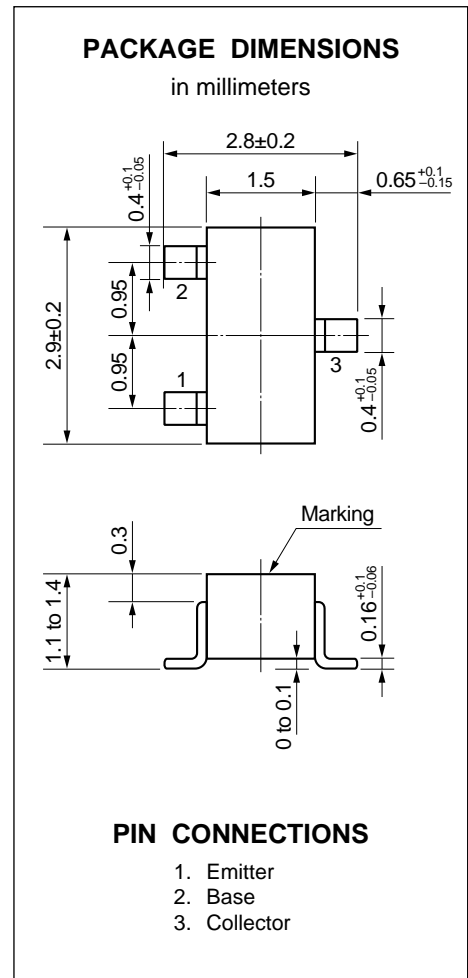
ORDERING INFORMATION

| PART NUMBER | QUANTITY | PACKING STYLE |
|-------------|--------------|---|
| 2SC4954-T1 | 3 Kpcs/Reel. | Embossed tape 8 mm wide. Pin3 (Collector) face to perforation side of the tape. |
| 2SC4954-T2 | 3 Kpcs/Reel. | Embossed tape 8 mm wide. Pin1 (Emitter), Pin2 (Base) face to perforation side of the tape. |

* Please contact with responsible NEC person, if you require evaluation sample. Unit sample quantity shall be 50 pcs. (Part No.: 2SC4954)

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

| | | | |
|------------------------------|------------------|-------------|----|
| Collector to Base Voltage | V _{CB0} | 9 | V |
| Collector to Emitter Voltage | V _{CE0} | 6 | V |
| Emitter to Base Voltage | V _{EBO} | 2 | V |
| Collector Current | I _c | 10 | mA |
| Total Power Dissipation | P _T | 60 | mW |
| Junction Temperature | T _j | 150 | °C |
| Storage Temperature | T _{stg} | -65 to +150 | °C |



Caution; Electrostatic Sensitive Device.

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

| CHARACTERISTIC | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITION |
|--------------------------|---------------------------------|------|------|------|------|--|
| Collector Cutoff Current | I _{CB0} | | | 0.1 | μA | V _{CB} = 5 V, I _E = 0 |
| Emitter Cutoff Current | I _{EB0} | | | 0.1 | μA | V _{EB} = 1 V, I _C = 0 |
| DC Current Gain | h _{FE} | 75 | | 150 | | V _{CE} = 3 V, I _C = 5 mA* ¹ |
| Gain Bandwidth Product | f _T | | 12 | | GHz | V _{CE} = 3 V, I _C = 5 mA, f = 2.0 GHz |
| Feed-back Capacitance | C _{re} | | 0.3 | 0.5 | pF | V _{CB} = 3 V, I _E = 0, f = 1 MHz* ² |
| Insertion Power Gain | S _{21e} ² | 7 | 8.5 | | dB | V _{CE} = 3 V, I _C = 5 mA, f = 2.0 GHz |
| Noise Figure | NF | | 2.5 | 4.0 | dB | V _{CE} = 3 V, I _C = 3 mA, f = 2.0 GHz |

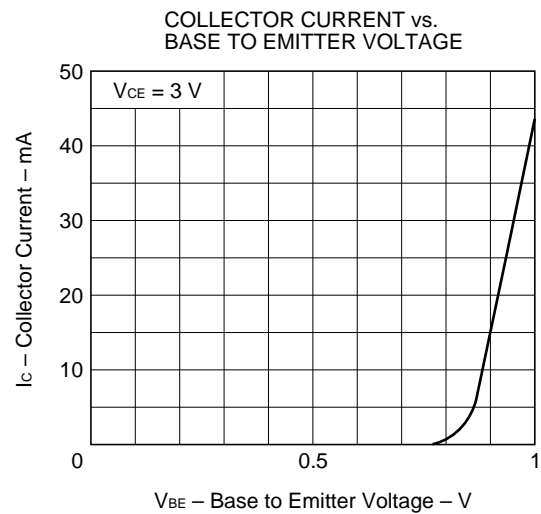
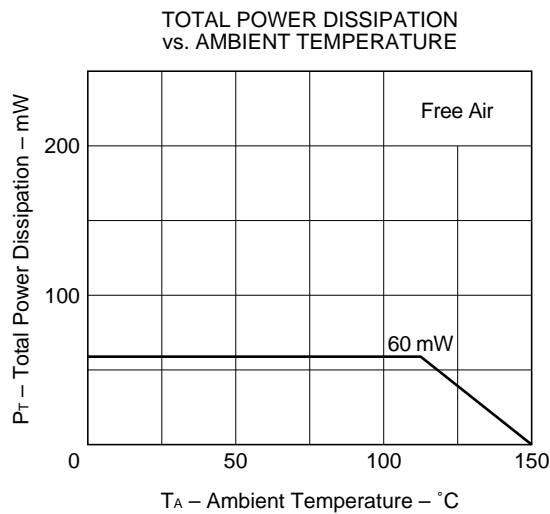
*1 Pulse Measurement; PW ≤ 350 μs, Duty Cycle ≤ 2 % Pulsed.

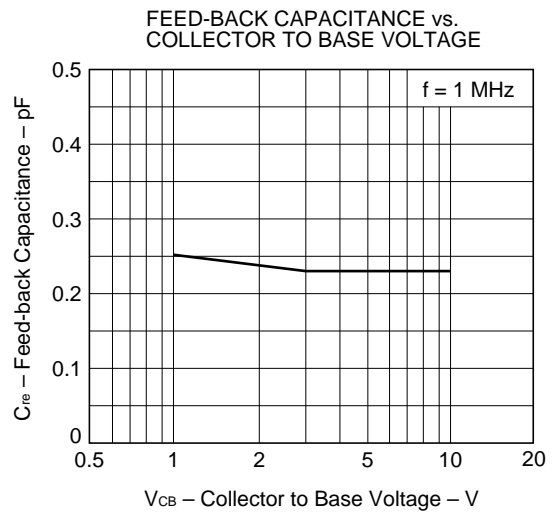
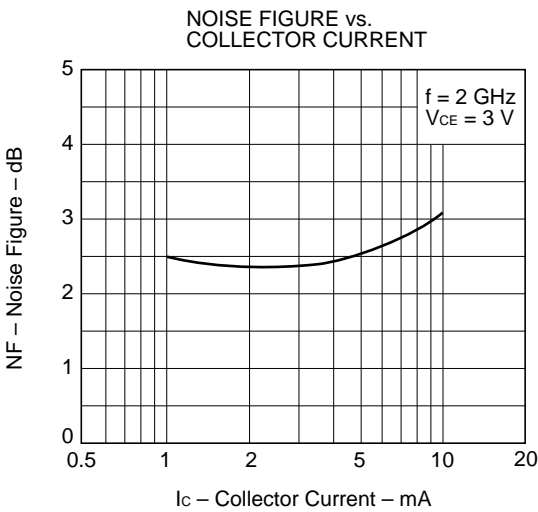
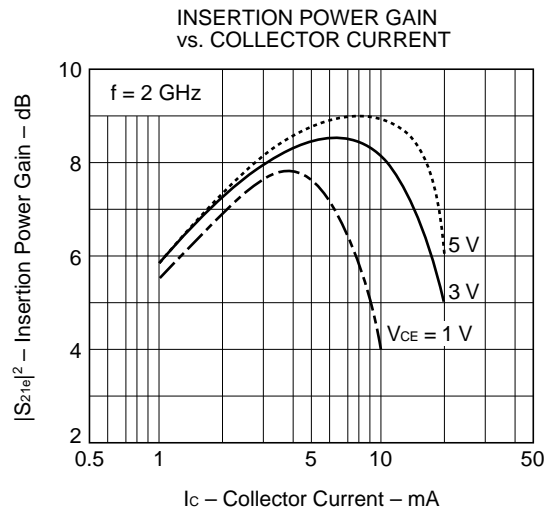
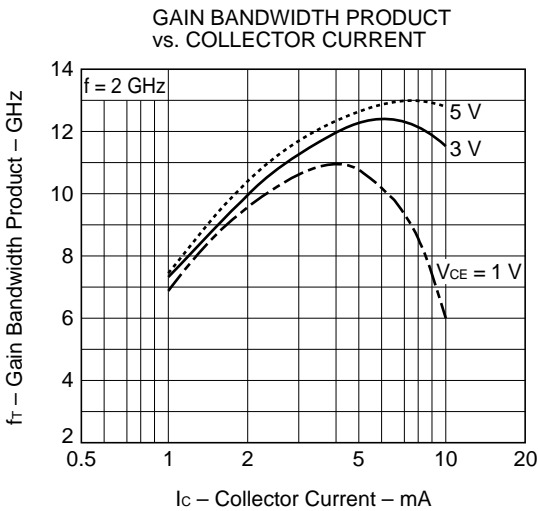
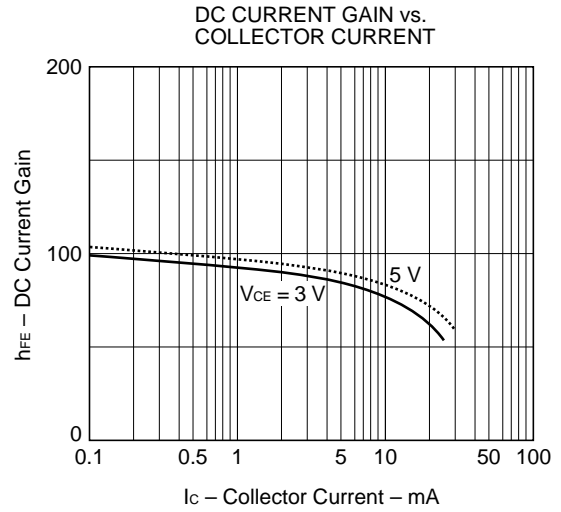
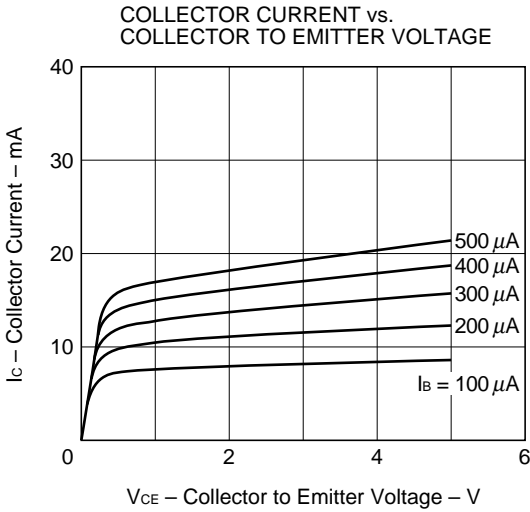
*2 Measured with 3 terminals bridge, Emitter and Case should be grounded.

h_{FE} Classification

| | |
|-----------------|-----------|
| Rank | T82 |
| Marking | T82 |
| h _{FE} | 75 to 150 |

TYPICAL CHARACTERISTICS (T_A = 25 °C)





S-PARAMETER

(V_{CE} = 3 V, I_c = 1 mA, Z_o = 50 Ω)

| f (GHz) | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------|-----------------|-------|-----------------|-------|-----------------|------|-----------------|-------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.200 | 0.9550 | -9.0 | 3.2340 | 168.1 | 0.0340 | 77.3 | 0.9870 | -6.8 |
| 0.400 | 0.9140 | -17.3 | 3.0460 | 154.7 | 0.0650 | 76.7 | 0.9640 | -13.4 |
| 0.600 | 0.8630 | -25.8 | 2.9630 | 144.2 | 0.0930 | 71.6 | 0.9250 | -19.5 |
| 0.800 | 0.7880 | -33.1 | 2.7870 | 133.1 | 0.1180 | 66.7 | 0.8850 | -24.3 |
| 1.000 | 0.7320 | -39.1 | 2.6480 | 123.5 | 0.1360 | 63.7 | 0.8330 | -28.9 |
| 1.200 | 0.6720 | -45.2 | 2.5390 | 114.4 | 0.1570 | 57.2 | 0.7820 | -33.2 |
| 1.400 | 0.5910 | -50.5 | 2.3460 | 106.8 | 0.1780 | 56.3 | 0.7570 | -37.1 |
| 1.600 | 0.5430 | -55.0 | 2.2000 | 99.0 | 0.1870 | 51.7 | 0.7250 | -40.1 |
| 1.800 | 0.4830 | -57.4 | 2.0710 | 91.6 | 0.2030 | 51.3 | 0.6720 | -43.2 |
| 2.000 | 0.4240 | -60.7 | 1.9590 | 85.7 | 0.2090 | 50.4 | 0.6490 | -46.1 |
| 2.200 | 0.3710 | -66.9 | 1.8970 | 79.8 | 0.2240 | 50.9 | 0.6230 | -49.1 |
| 2.400 | 0.3390 | -68.0 | 1.8100 | 74.8 | 0.2440 | 47.8 | 0.5970 | -49.4 |
| 2.600 | 0.3030 | -71.3 | 1.6980 | 70.2 | 0.2530 | 47.7 | 0.5740 | -54.1 |
| 2.800 | 0.2460 | -72.2 | 1.6530 | 64.7 | 0.2550 | 44.5 | 0.5610 | -56.8 |
| 3.000 | 0.1990 | -68.9 | 1.5750 | 59.9 | 0.2830 | 43.0 | 0.5130 | -61.6 |

(V_{CE} = 3 V, I_c = 3 mA, Z_o = 50 Ω)

| f (GHz) | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------|-----------------|-------|-----------------|-------|-----------------|------|-----------------|-------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.200 | 0.8730 | -15.0 | 7.3980 | 159.5 | 0.0340 | 74.6 | 0.9590 | -11.1 |
| 0.400 | 0.7600 | -26.2 | 6.3600 | 140.6 | 0.0580 | 71.3 | 0.8830 | -18.9 |
| 0.600 | 0.6530 | -35.6 | 5.5680 | 127.0 | 0.0840 | 69.6 | 0.7970 | -25.7 |
| 0.800 | 0.6530 | -35.6 | 5.5680 | 127.0 | 0.0840 | 69.6 | 0.7970 | -25.7 |
| 1.000 | 0.4750 | -45.3 | 4.1940 | 105.8 | 0.1160 | 64.0 | 0.6690 | -32.7 |
| 1.200 | 0.4110 | -48.3 | 3.7680 | 98.0 | 0.1330 | 64.0 | 0.6690 | -32.7 |
| 1.400 | 0.3470 | -49.3 | 3.3170 | 91.8 | 0.1510 | 61.9 | 0.6060 | -36.3 |
| 1.600 | 0.3190 | -50.4 | 3.0080 | 85.7 | 0.1600 | 62.5 | 0.5720 | -37.6 |
| 1.800 | 0.2830 | -46.5 | 2.7180 | 79.4 | 0.1820 | 58.0 | 0.5510 | -39.9 |
| 2.000 | 0.2510 | -45.6 | 2.5040 | 74.9 | 0.1980 | 57.5 | 0.5290 | -41.8 |
| 2.200 | 0.2020 | -48.2 | 2.3810 | 70.4 | 0.2150 | 56.6 | 0.5170 | -44.1 |
| 2.400 | 0.1940 | -47.4 | 2.2280 | 66.0 | 0.2290 | 53.2 | 0.5070 | -45.2 |
| 2.600 | 0.1850 | -47.8 | 2.0580 | 62.7 | 0.2310 | 56.3 | 0.4920 | -49.6 |
| 2.800 | 0.1710 | -39.0 | 1.9740 | 57.8 | 0.2620 | 54.7 | 0.4670 | -51.7 |
| 3.000 | 0.1430 | -31.7 | 1.8480 | 54.4 | 0.2940 | 53.6 | 0.4160 | -54.9 |

S-PARAMETER

(V_{CE} = 3 V, I_c = 5 mA, Z_o = 50 Ω)

| f (GHz) | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------|-----------------|-------|-----------------|-------|-----------------|------|-----------------|-------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 0.200 | .775 | -19.9 | 10.233 | 153.0 | .029 | 78.0 | .931 | -14.1 |
| 0.400 | .653 | -32.4 | 8.408 | 133.2 | .056 | 66.1 | .815 | -23.3 |
| 0.600 | .527 | -39.8 | 6.761 | 119.0 | .073 | 70.0 | .717 | -27.3 |
| 0.800 | .447 | -45.7 | 5.598 | 108.5 | .088 | 67.6 | .639 | -30.3 |
| 1.000 | .359 | -49.6 | 4.670 | 100.0 | .111 | 66.9 | .595 | -31.2 |
| 1.200 | .314 | -50.3 | 4.118 | 92.7 | .123 | 67.5 | .565 | -32.4 |
| 1.400 | .279 | -48.1 | 3.630 | 87.1 | .140 | 66.8 | .545 | -34.4 |
| 1.600 | .246 | -46.9 | 3.246 | 82.1 | .154 | 64.1 | .519 | -35.9 |
| 1.800 | .219 | -46.8 | 2.885 | 78.1 | .178 | 62.0 | .521 | -37.0 |
| 2.000 | .178 | -43.6 | 2.747 | 73.7 | .194 | 62.9 | .500 | -38.9 |
| 2.200 | .165 | -44.7 | 2.581 | 68.8 | .201 | 62.0 | .478 | -43.1 |
| 2.400 | .149 | -37.6 | 2.382 | 64.8 | .224 | 60.1 | .455 | -43.1 |
| 2.600 | .137 | -50.0 | 2.244 | 61.4 | .241 | 60.9 | .471 | -43.9 |
| 2.800 | .132 | -47.6 | 2.138 | 59.0 | .253 | 57.7 | .449 | -47.9 |
| 3.000 | .103 | -33.7 | 2.044 | 55.3 | .265 | 55.3 | .438 | -47.0 |

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Anti-radioactive design is not implemented in this product.