

TOSHIBA

2SC5098

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

2SC5098

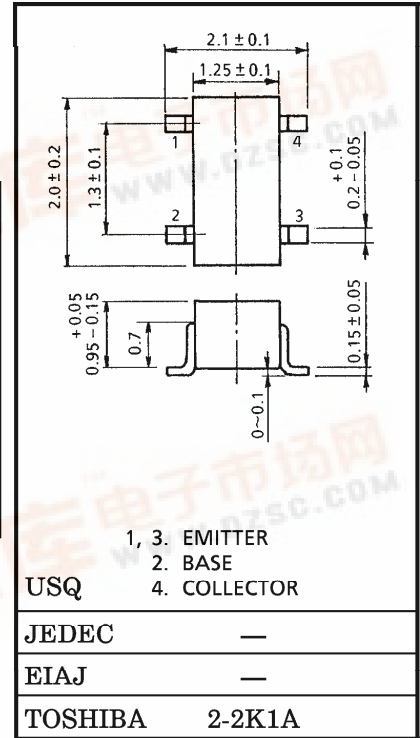
VHF~UHF BAND LOW NOISE AMPLIFIER APPLICATIONS

Unit in mm

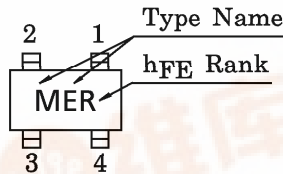
- Low Noise Figure, High Gain.
- $NF = 1.8dB$, $|S_{21e}|^2 = 10dB$ ($f = 2GHz$)

MAXIMUM RATINGS ($T_a = 25^\circ C$)

| CHARACTERISTIC | SYMBOL | RATING | UNIT |
|-----------------------------|-----------|---------|------------|
| Collector-Base Voltage | V_{CB0} | 20 | V |
| Collector-Emitter Voltage | V_{CEO} | 10 | V |
| Emitter-Base Voltage | V_{EBO} | 1.5 | V |
| Base Current | I_B | 7 | mA |
| Collector Current | I_C | 15 | mA |
| Collector Power Dissipation | P_C | 100 | mW |
| Junction Temperature | T_j | 125 | $^\circ C$ |
| Storage Temperature Range | T_{stg} | -55~125 | $^\circ C$ |



MARKING



Weight : 0.006g

MICROWAVE CHARACTERISTICS ($T_a = 25^\circ C$)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|----------------------|-------------------|------------------------------------|------|------|------|------|
| Transition Frequency | f_T | $V_{CE} = 6V, I_C = 7mA$ | 7 | 10 | — | GHz |
| Insertion Gain | $ S_{21e} ^2$ (1) | $V_{CE} = 6V, I_C = 7mA, f = 1GHz$ | 12.5 | 15.5 | — | dB |
| | $ S_{21e} ^2$ (2) | $V_{CE} = 6V, I_C = 7mA, f = 2GHz$ | 7 | 10 | — | |
| Noise Figure | NF (1) | $V_{CE} = 6V, I_C = 3mA, f = 1GHz$ | — | 1.3 | 2.5 | dB |
| | NF (2) | $V_{CE} = 6V, I_C = 3mA, f = 2GHz$ | — | 1.8 | 3.0 | |

ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ C$)

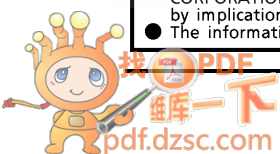
| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|------------------------------|-------------------|-----------------------------------|------|------|------|---------|
| Collector Cut-off Current | I_{CBO} | $V_{CB} = 10V, I_E = 0$ | — | — | 1 | μA |
| Emitter Cut-off Current | I_{EBO} | $V_{EB} = 1V, I_C = 0$ | — | — | 1 | μA |
| DC Current Gain | h_{FE} (Note 1) | $V_{CE} = 6V, I_C = 7mA$ | 50 | — | 160 | — |
| Output Capacitance | C_{ob} | $V_{CB} = 10V, I_E = 0, f = 1MHz$ | — | 0.5 | 0.9 | pF |
| Reverse Transfer Capacitance | C_{re} | (Note 2) | — | 0.34 | 0.75 | pF |

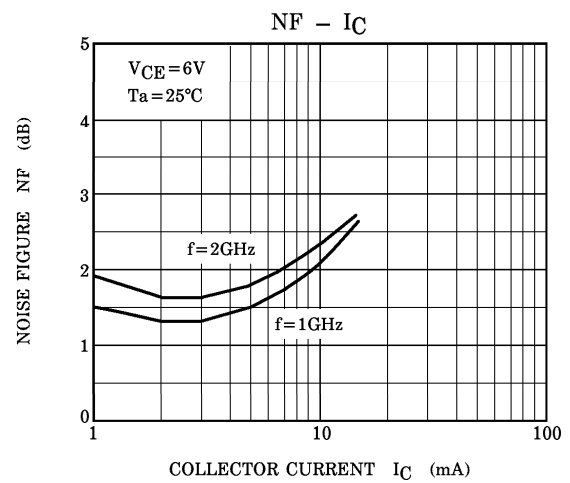
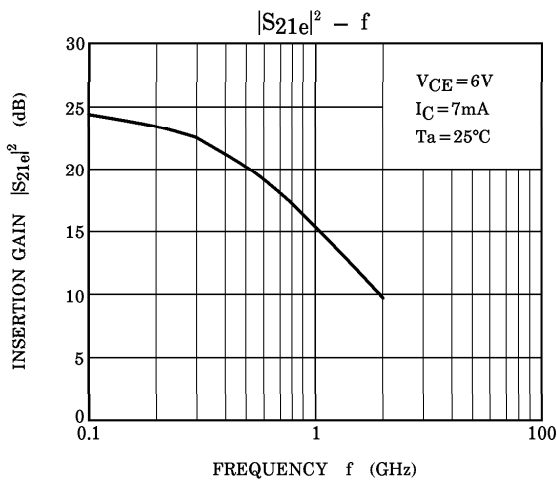
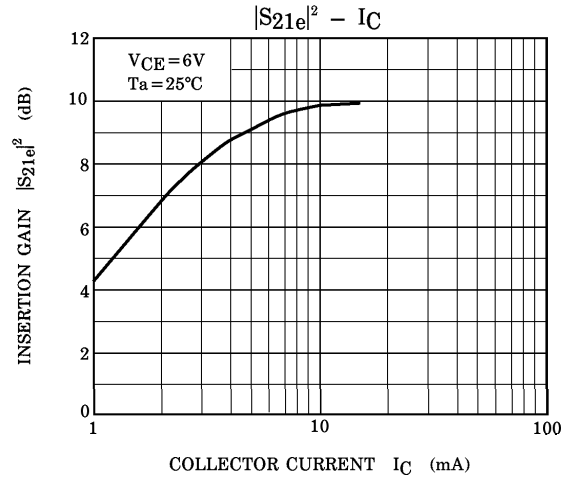
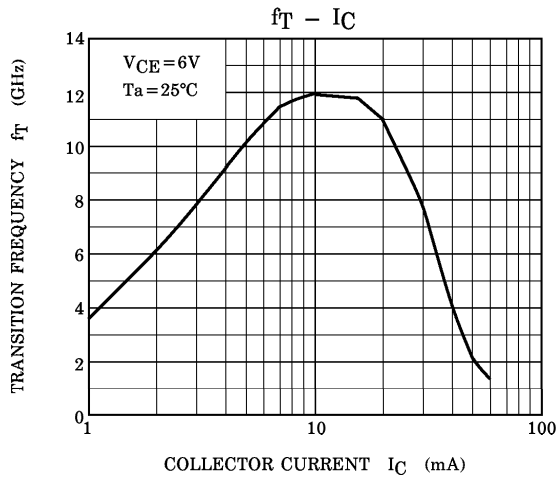
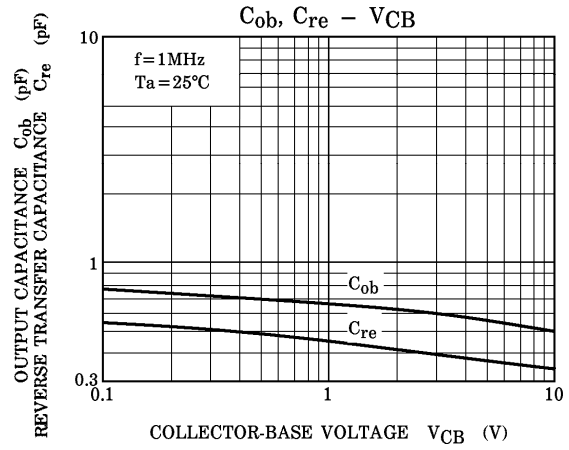
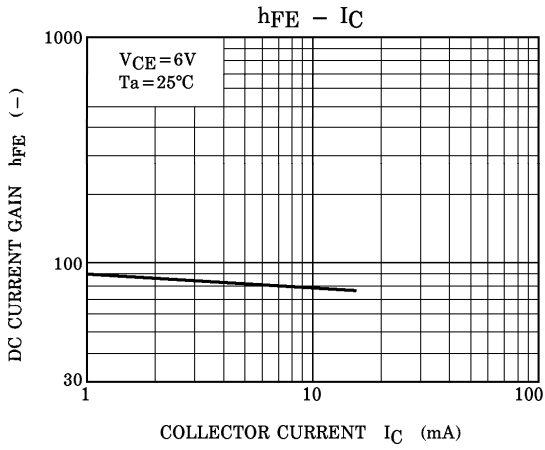
(Note 1) h_{FE} Classification R : 50~100, O : 80~160

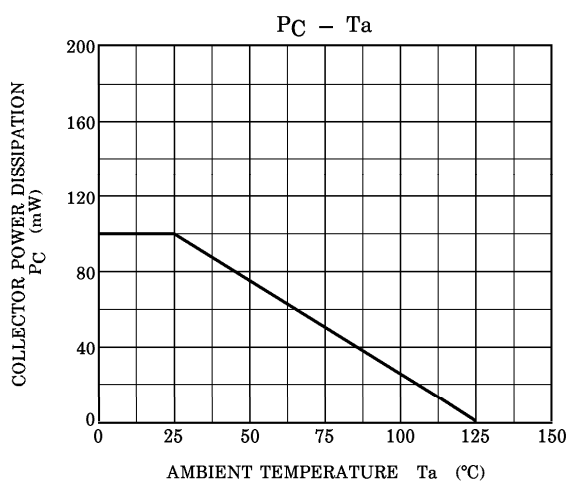
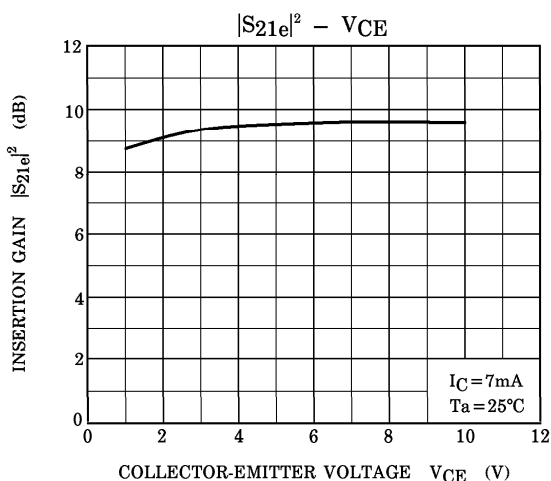
(Note 2) C_{re} is measured by 3 terminal method with capacitance bridge.

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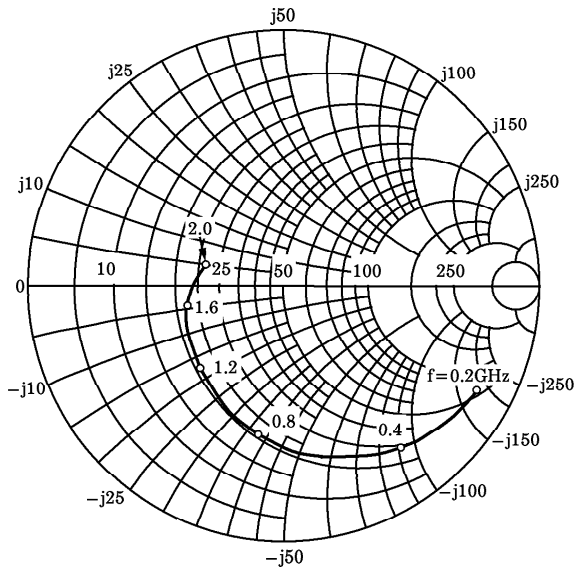
S-Parameter $Z_0 = 50\Omega$, $T_a = 25^\circ\text{C}$
 $V_{CE} = 5\text{V}$, $I_C = 5\text{mA}$

| frequency (MHz) | S11 | | S21 | | S12 | | S22 | |
|--------------------|-------|--------|-------|-------|-------|------|-------|--------|
| | Mag. | Ang. | Mag. | Ang. | Mag. | Ang. | Mag. | Ang. |
| 200 | 0.870 | -27.8 | 8.387 | 159.6 | 0.041 | 76.0 | 0.962 | -20.1 |
| 400 | 0.791 | -54.0 | 7.700 | 141.8 | 0.074 | 63.5 | 0.876 | -38.7 |
| 600 | 0.692 | -77.8 | 6.701 | 125.7 | 0.097 | 54.2 | 0.774 | -54.4 |
| 800 | 0.599 | -99.2 | 5.798 | 112.6 | 0.113 | 47.9 | 0.677 | -67.7 |
| 1000 | 0.518 | -118.1 | 4.928 | 102.0 | 0.122 | 43.8 | 0.596 | -78.6 |
| 1200 | 0.462 | -135.9 | 4.239 | 93.5 | 0.129 | 40.7 | 0.524 | -87.8 |
| 1400 | 0.406 | -151.0 | 3.692 | 86.5 | 0.132 | 39.7 | 0.463 | -95.9 |
| 1600 | 0.376 | -166.0 | 3.256 | 80.5 | 0.137 | 39.6 | 0.420 | -102.4 |
| 1800 | 0.334 | 179.9 | 2.897 | 75.9 | 0.143 | 39.9 | 0.382 | -107.7 |
| 2000 | 0.305 | 166.3 | 2.623 | 71.3 | 0.147 | 40.7 | 0.350 | -111.0 |

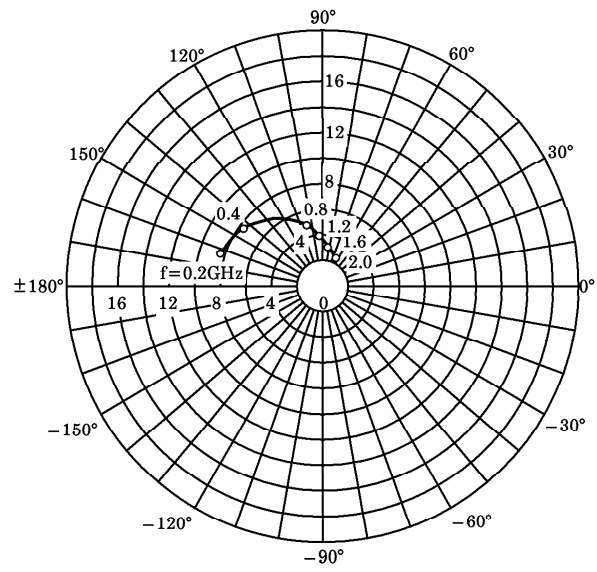
$V_{CE} = 5\text{V}$, $I_C = 10\text{mA}$

| frequency (MHz) | S11 | | S21 | | S12 | | S22 | |
|--------------------|-------|--------|--------|-------|-------|------|-------|--------|
| | Mag. | Ang. | Mag. | Ang. | Mag. | Ang. | Mag. | Ang. |
| 200 | 0.737 | -42.4 | 14.597 | 150.5 | 0.037 | 70.4 | 0.900 | -28.4 |
| 400 | 0.625 | -77.4 | 11.757 | 128.3 | 0.060 | 58.8 | 0.735 | -50.2 |
| 600 | 0.521 | -105.4 | 9.204 | 112.6 | 0.074 | 52.5 | 0.600 | -65.3 |
| 800 | 0.455 | -128.8 | 7.420 | 101.5 | 0.085 | 50.0 | 0.503 | -77.3 |
| 1000 | 0.412 | -147.7 | 6.078 | 92.9 | 0.093 | 49.5 | 0.433 | -86.9 |
| 1200 | 0.388 | -165.4 | 5.105 | 86.1 | 0.100 | 49.3 | 0.376 | -95.4 |
| 1400 | 0.370 | 179.0 | 4.377 | 80.9 | 0.108 | 50.4 | 0.330 | -102.8 |
| 1600 | 0.360 | 165.6 | 3.855 | 76.2 | 0.116 | 51.4 | 0.295 | -108.7 |
| 1800 | 0.348 | 151.3 | 3.441 | 72.3 | 0.126 | 52.3 | 0.265 | -113.4 |
| 2000 | 0.333 | 137.7 | 3.114 | 68.4 | 0.135 | 53.2 | 0.238 | -115.5 |

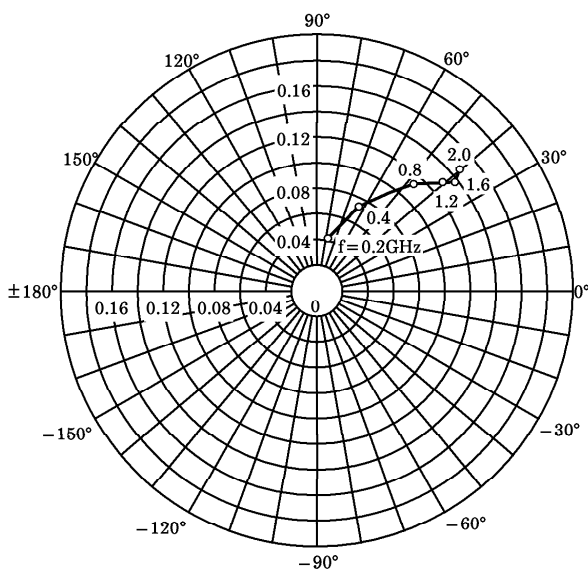
S_{11e}
 V_{CE}=6V
 I_C=3mA
 T_a=25°C
 (Unit : Ω)



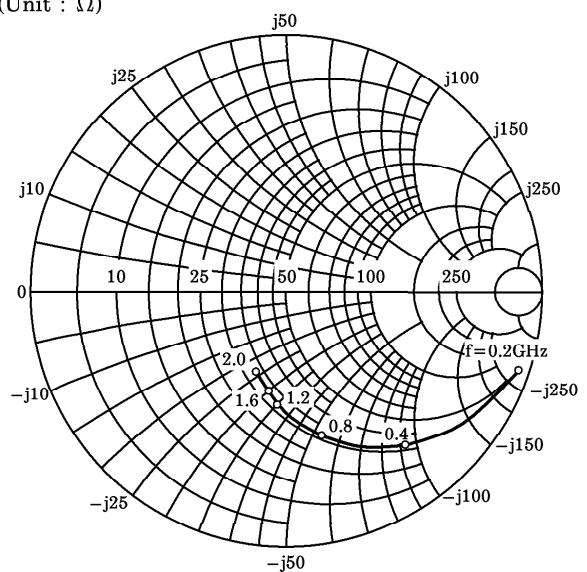
S_{21e}
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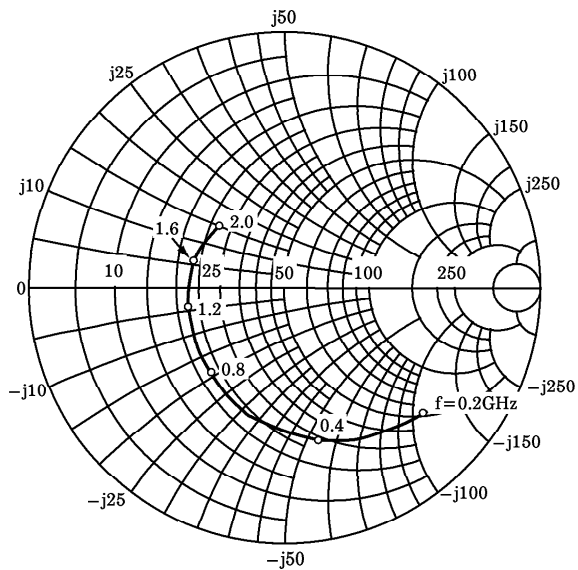
S_{12e}
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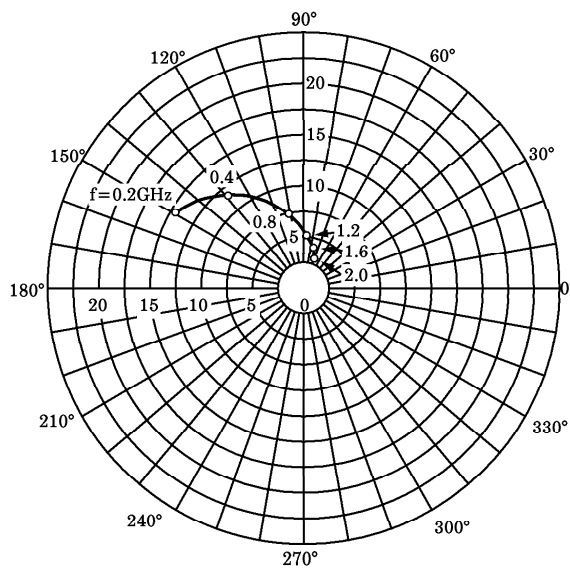
S_{22e}
 V_{CE}=6V
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 (Unit : Ω)



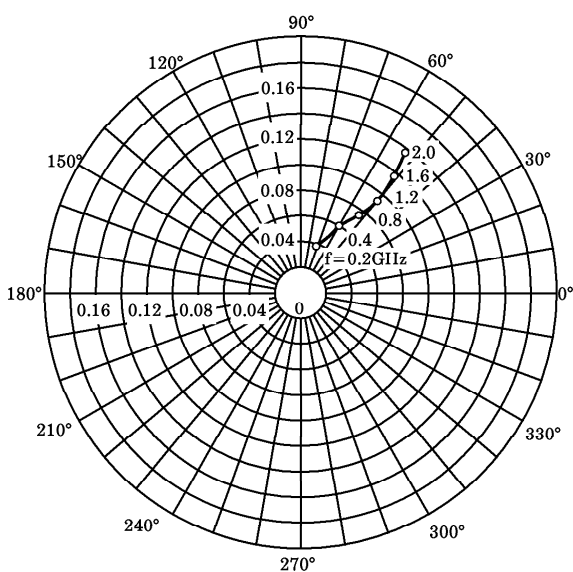
S_{11e}
 V_{CE} = 6V
 I_C = 7mA
 T_a = 25°C
 (Unit : Ω)



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 V_{CE} = 6V
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