

**2SC5375**

VHF to UHF Band OSC, High-Frequency Amplifiers Applications

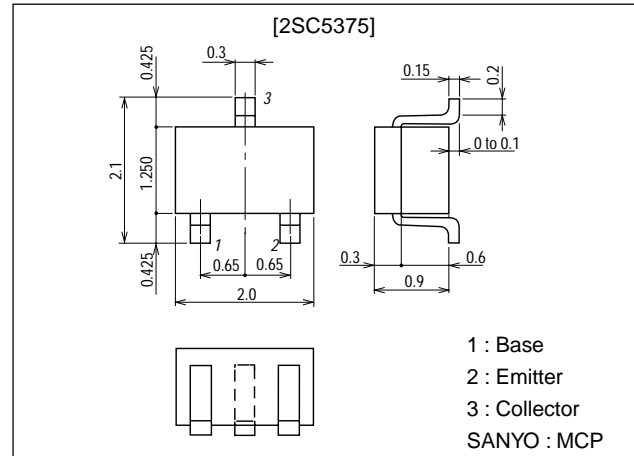
Features

- High gain : $|S_{21e}|^2=10\text{dB typ (f=1GHz)}$.
- High cutoff frequency : $f_T=5.2\text{GHz typ}$.

Package Dimensions

unit:mm

2059B



Specifications

Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

| Parameter | Symbol | Conditions | Ratings | Unit |
|------------------------------|-----------|------------|-------------|------------------|
| Collector-to-Base Voltage | V_{CB0} | | 20 | V |
| Collector-to-Emitter Voltage | V_{CE0} | | 10 | V |
| Emitter-to-Base Voltage | V_{EBO} | | 2 | V |
| Collector Current | I_C | | 100 | mA |
| Collector Dissipation | P_C | | 150 | mW |
| Junction Temperature | T_J | | 150 | $^\circ\text{C}$ |
| Storage Temperature | T_{stg} | | -55 to +150 | $^\circ\text{C}$ |

Electrical Characteristics at $T_a = 25^\circ\text{C}$

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|------------------------------|---------------|---|---------|-----|-----|---------------|
| | | | min | typ | max | |
| Collector Cutoff Current | I_{CBO} | $V_{CB}=10\text{V}, I_E=0$ | | | 1.0 | μA |
| Emitter Cutoff Current | I_{EBO} | $V_{EB}=1\text{V}, I_C=0$ | | | 10 | μA |
| DC Current Gain | h_{FE1} | $V_{CE}=3\text{V}, I_C=7\text{mA}$ | 110 | | 180 | |
| | h_{FE2} | $V_{CE}=3\text{V}, I_C=30\text{mA}$ | 100 | | | |
| Gain-Bandwidth Product | f_T | $V_{CE}=3\text{V}, I_C=7\text{mA}$ | 3 | 5.2 | | GHz |
| Output Capacitance | C_{ob} | $V_{CB}=3\text{V}, f=1\text{MHz}$ | | 1.0 | 1.5 | pF |
| Reverse Transfer Capacitance | C_{re} | $V_{CB}=3\text{V}, f=1\text{MHz}$ | | 0.7 | | pF |
| Forward Transfer Gain | $ S_{21e} ^2$ | $V_{CE}=3\text{V}, I_C=7\text{mA}, f=1\text{GHz}$ | 8 | 10 | | dB |
| Noise Figure | NF | $V_{CE}=3\text{V}, I_C=7\text{mA}, f=1\text{GHz}$ | | 1.4 | 2.5 | dB |

Marking : NA

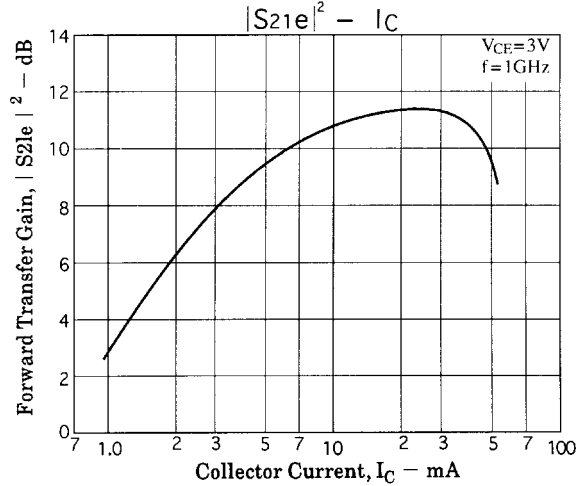
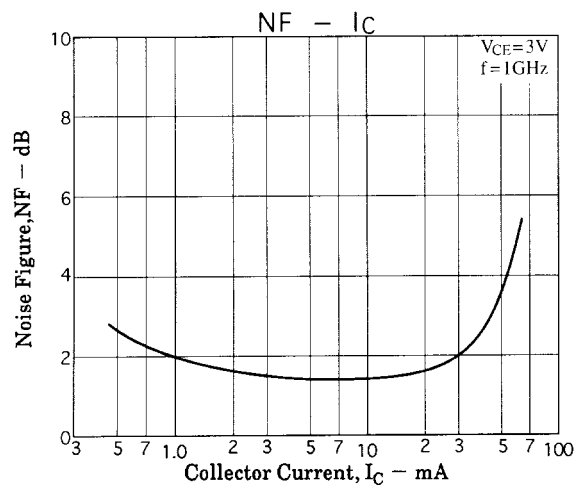
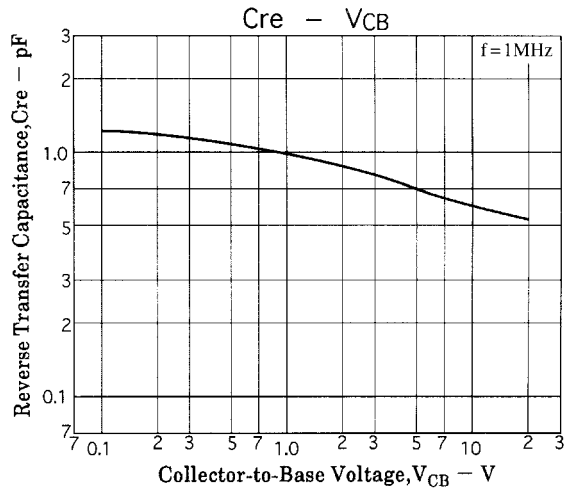
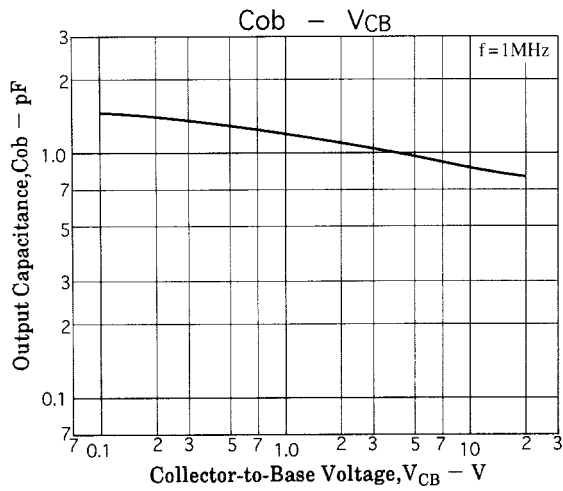
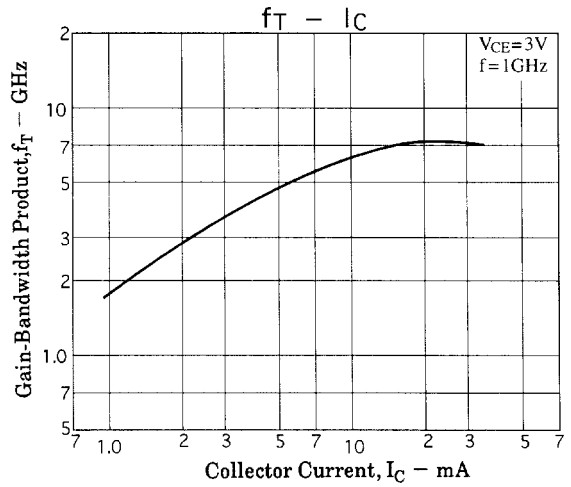
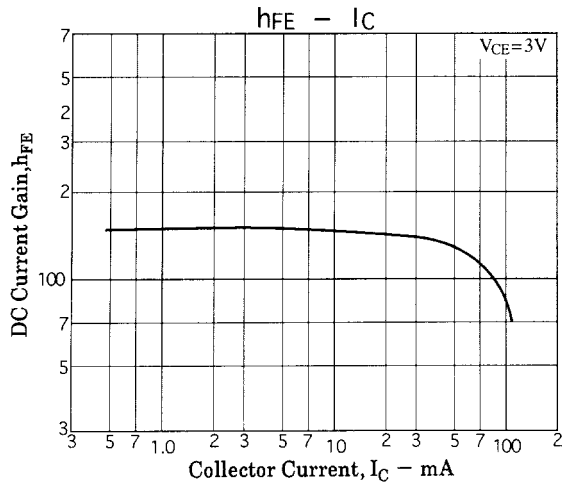
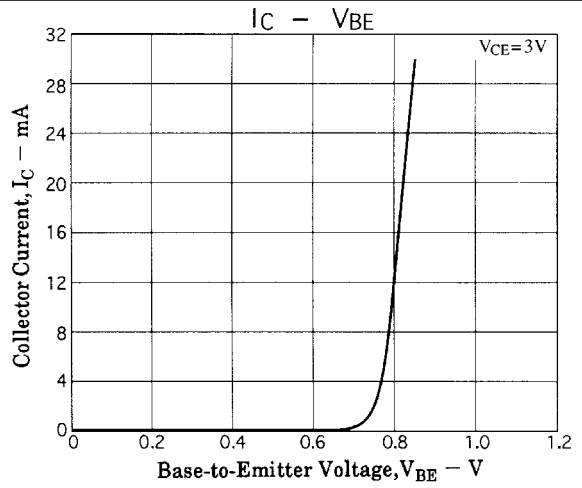
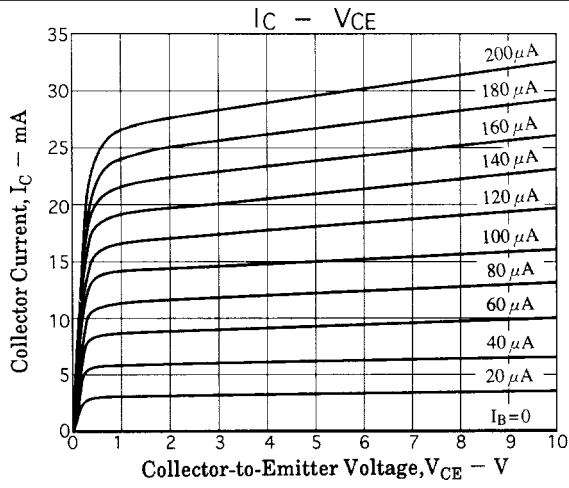
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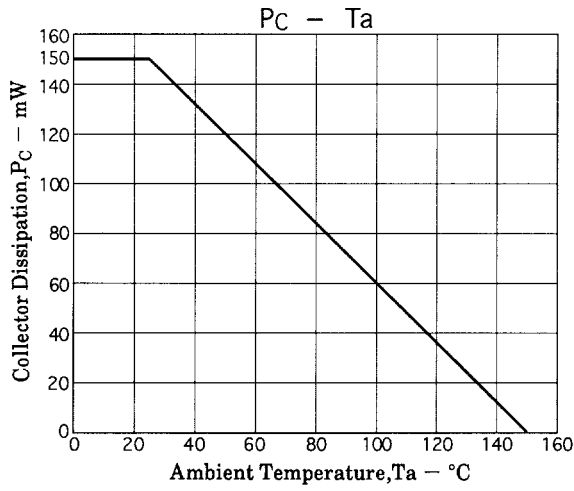
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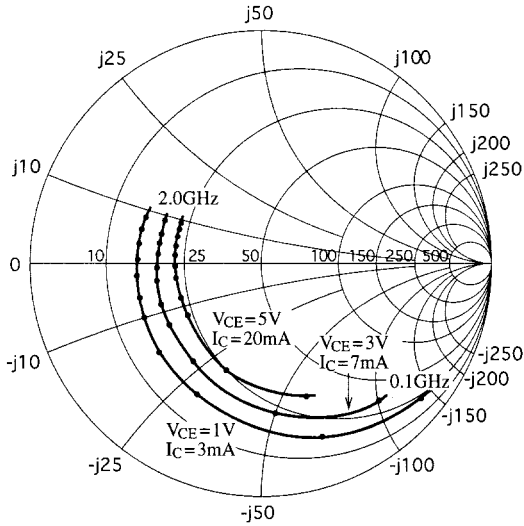




S Parameters

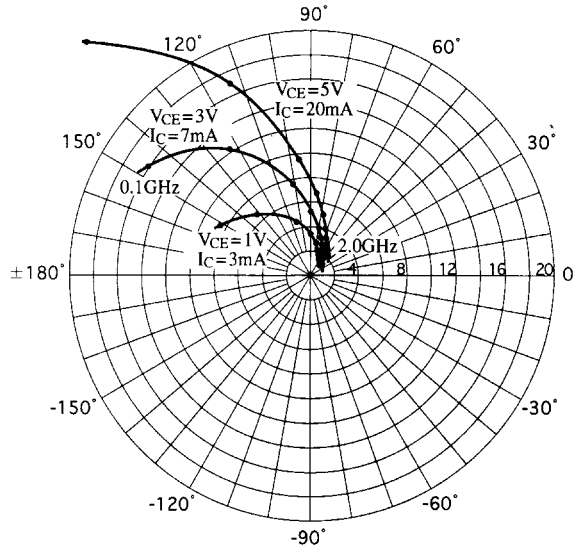
S11e

$f = 100\text{MHz}, 200 \text{ to } 2000\text{MHz} (200\text{MHz step})$



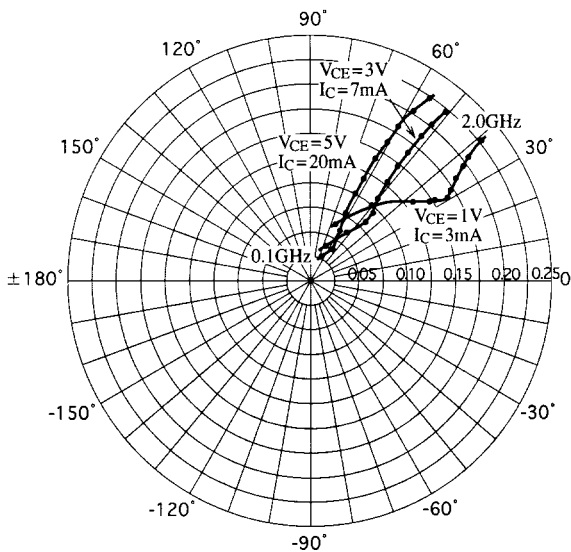
S21e

$f = 100\text{MHz}, 200 \text{ to } 2000\text{MHz} (200\text{MHz step})$



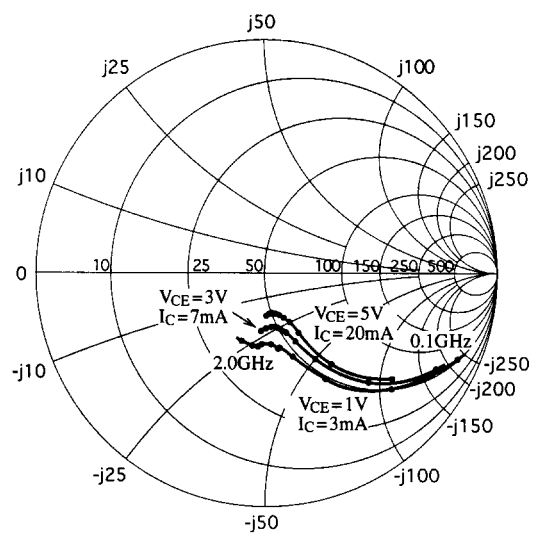
S12e

$f = 100\text{MHz}, 200 \text{ to } 2000\text{MHz} (200\text{MHz step})$



S22e

$f = 100\text{MHz}, 200 \text{ to } 2000\text{MHz} (200\text{MHz step})$



2SC5375

S parameters (Common emitter)

$V_{CE}=1V, I_C=3mA, Z_O=50\Omega$

| Freq (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 100 | 0.875 | -40.1 | 8.529 | 152.1 | 0.062 | 67.4 | 0.905 | -24.3 |
| 200 | 0.782 | -70.7 | 6.673 | 131.8 | 0.101 | 51.6 | 0.745 | -42.0 |
| 400 | 0.621 | -115.9 | 4.733 | 104.7 | 0.135 | 37.2 | 0.524 | -59.1 |
| 600 | 0.576 | -138.2 | 3.353 | 90.2 | 0.143 | 33.3 | 0.387 | -71.5 |
| 800 | 0.547 | -155.7 | 2.686 | 79.1 | 0.151 | 33.0 | 0.329 | -79.4 |
| 1000 | 0.542 | -165.4 | 2.165 | 70.4 | 0.165 | 31.2 | 0.330 | -80.5 |
| 1200 | 0.534 | -174.7 | 1.873 | 62.4 | 0.173 | 33.0 | 0.310 | -86.0 |
| 1400 | 0.529 | 178.3 | 1.638 | 55.7 | 0.184 | 35.1 | 0.295 | -91.9 |
| 1600 | 0.529 | 170.8 | 1.480 | 49.7 | 0.194 | 35.6 | 0.308 | -95.7 |
| 1800 | 0.533 | 165.4 | 1.321 | 43.4 | 0.208 | 36.8 | 0.312 | -101.6 |
| 2000 | 0.532 | 159.3 | 1.215 | 38.3 | 0.227 | 38.6 | 0.304 | -109.1 |

$V_{CE}=3V, I_C=7mA, Z_O=50\Omega$

| Freq (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 100 | 0.777 | -48.9 | 16.116 | 146.5 | 0.040 | 65.9 | 0.852 | -29.0 |
| 200 | 0.643 | -84.8 | 12.223 | 124.2 | 0.061 | 52.9 | 0.646 | -46.3 |
| 400 | 0.505 | -126.1 | 7.484 | 101.5 | 0.083 | 46.6 | 0.428 | -58.8 |
| 600 | 0.473 | -146.2 | 5.198 | 89.7 | 0.096 | 48.3 | 0.317 | -65.6 |
| 800 | 0.454 | -160.6 | 3.984 | 80.7 | 0.112 | 49.9 | 0.273 | -70.2 |
| 1000 | 0.446 | -170.4 | 3.275 | 73.6 | 0.129 | 51.4 | 0.248 | -74.1 |
| 1200 | 0.449 | -177.6 | 2.738 | 66.9 | 0.147 | 52.0 | 0.239 | -76.3 |
| 1400 | 0.445 | 175.5 | 2.391 | 61.2 | 0.165 | 52.4 | 0.229 | -79.6 |
| 1600 | 0.443 | 168.9 | 2.135 | 55.9 | 0.184 | 52.4 | 0.225 | -84.6 |
| 1800 | 0.439 | 164.1 | 1.944 | 50.5 | 0.203 | 51.5 | 0.227 | -90.0 |
| 2000 | 0.443 | 157.7 | 1.760 | 45.7 | 0.222 | 50.4 | 0.240 | -93.0 |

$V_{CE}=5V, I_C=20mA, Z_O=50\Omega$

| Freq (MHz) | $ S_{11} $ | $\angle S_{11}$ | $ S_{21} $ | $\angle S_{21}$ | $ S_{12} $ | $\angle S_{12}$ | $ S_{22} $ | $\angle S_{22}$ |
|------------|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 100 | 0.595 | -70.3 | 26.610 | 134.3 | 0.028 | 62.1 | 0.724 | -39.3 |
| 200 | 0.480 | -107.7 | 17.090 | 113.5 | 0.041 | 56.3 | 0.482 | -54.3 |
| 400 | 0.406 | -143.8 | 9.432 | 95.7 | 0.060 | 58.8 | 0.296 | -61.9 |
| 600 | 0.393 | -160.3 | 6.459 | 86.2 | 0.079 | 61.8 | 0.227 | -64.4 |
| 800 | 0.388 | -171.0 | 4.909 | 79.0 | 0.100 | 62.8 | 0.200 | -67.5 |
| 1000 | 0.387 | -178.6 | 3.989 | 73.3 | 0.121 | 62.8 | 0.188 | -70.3 |
| 1200 | 0.390 | 175.1 | 3.356 | 67.3 | 0.142 | 62.0 | 0.182 | -72.4 |
| 1400 | 0.385 | 169.8 | 2.918 | 62.1 | 0.163 | 61.0 | 0.176 | -75.0 |
| 1600 | 0.386 | 163.9 | 2.588 | 57.7 | 0.184 | 59.9 | 0.173 | -80.1 |
| 1800 | 0.388 | 159.8 | 2.322 | 52.8 | 0.205 | 57.9 | 0.177 | -85.8 |
| 2000 | 0.394 | 154.7 | 2.117 | 48.5 | 0.226 | 56.0 | 0.185 | -89.4 |

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