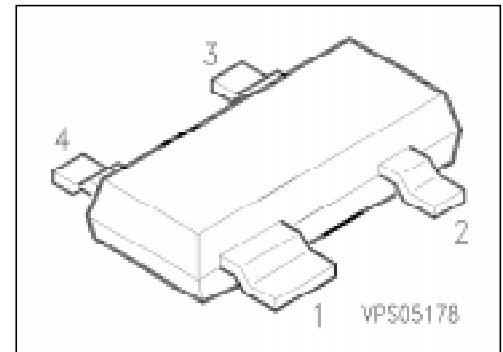


Features

- N-channel dual-gate GaAs MES FET
- Depletion mode transistor for tuned small-signal applications up to 2 GHz, e. g. VHF, UHF, Sat-TV tuners
- Low noise
- High gain
- Low input capacitance



ESD: Electrostatic discharge sensitive device, observe handling precautions!

| Type | Marking | Ordering Code (tape and reel) | Pin Configuration | | | | Package ¹⁾ |
|--------|---------|----------------------------------|-------------------|---|----------------|----------------|-----------------------|
| | | | 1 | 2 | 3 | 4 | |
| CF 739 | MS | Q62702-F1215 | S | D | G ₂ | G ₁ | SOT-143 |

Maximum Ratings

| Parameter | Symbol | Values | Unit |
|---|-------------|----------------|------|
| Drain-source voltage | V_{DS} | 10 | V |
| Gate 1-source voltage | $-V_{G1S}$ | 6 | |
| Gate 2-source voltage | $-V_{G2S}$ | 6 | |
| Drain current | I_D | 80 | mA |
| Gate 1-source peak current | $+I_{G1SM}$ | 1 | |
| Gate 2-source peak current | $+I_{G2SM}$ | 1 | |
| Total power dissipation, $T_s \leq 66\text{ °C}^2)$ | P_{tot} | 240 | mW |
| Channel temperature | T_{ch} | 150 | °C |
| Storage temperature range | T_{stg} | - 55 ... + 150 | |

Thermal Resistance

| | | | |
|---|-------------|------------|-----|
| Channel - soldering point ³⁾ | R_{thchS} | ≤ 350 | K/W |
|---|-------------|------------|-----|

¹⁾ For detailed information see chapter Package Outlines.

²⁾ Package mounted on alumina 15 mm × 16.7 mm × 0.7 mm.

³⁾ T_s is measured on the source lead at the soldering point to the pcb.

Electrical Characteristics

at $T_A = 25\text{ }^\circ\text{C}$, unless otherwise specified.

| Parameter | Symbol | Values | | | Unit |
|-----------|--------|--------|------|------|------|
| | | min. | typ. | max. | |

DC Characteristics

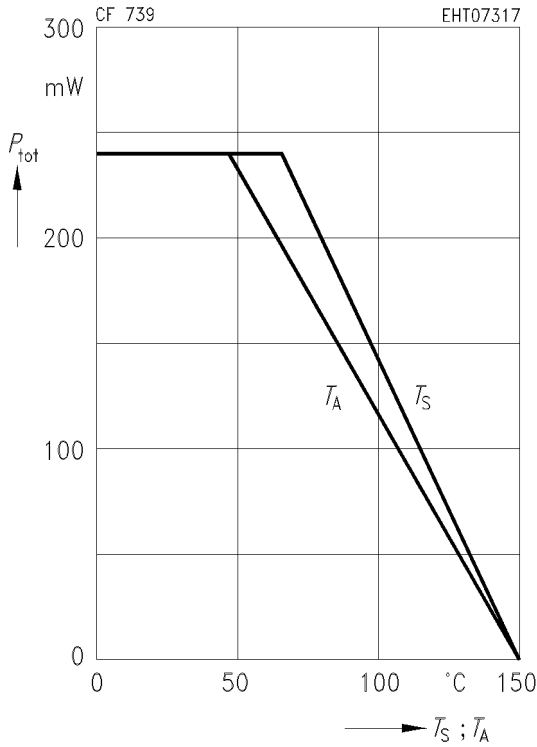
| | | | | | |
|---|---------------|----|---|-----|---------------|
| Drain-source breakdown voltage $I_D = 100\text{ }\mu\text{A}$, $-V_{G1S} = -V_{G2S} = 4\text{ V}$ | $V_{(BR)DS}$ | 10 | – | – | V |
| Gate 1 leakage current $-V_{G1S} = 5\text{ V}$, $V_{G2S} = V_{DS} = 0$ | $-I_{G1SS}$ | – | – | 20 | μA |
| Gate 2 leakage current $-V_{G2S} = 5\text{ V}$, $V_{G1S} = V_{DS} = 0$ | $-I_{G2SS}$ | – | – | 20 | |
| Drain current $V_{G1S} = 0$, $V_{G2S} = 0$, $V_{DS} = 3\text{ V}$ | I_{DSS} | 6 | – | 60 | mA |
| Gate 1-source pinch-off voltage $V_{G2S} = 0$, $V_{DS} = 5\text{ V}$, $I_D = 200\text{ }\mu\text{A}$ | $-V_{G1S(P)}$ | – | – | 2.5 | V |
| Gate 2-source pinch-off voltage $V_{G1S} = 0$, $V_{DS} = 5\text{ V}$, $I_D = 200\text{ }\mu\text{A}$ | $-V_{G2S(P)}$ | – | – | 2.5 | |

AC Characteristics

| | | | | | |
|---|------------------|---|------|---|----|
| Forward transconductance $V_{DS} = 5\text{ V}$, $V_{G2S} = 2\text{ V}$, $I_D = 10\text{ mA}$, $f = 1\text{ kHz}$ | g_{fs} | – | 25 | – | mS |
| Gate 1 input capacitance $V_{G2S} = 2\text{ V}$, $V_{DS} = 5\text{ V}$, $I_D = 10\text{ mA}$, $f = 1\text{ MHz}$ | C_{gfss} | – | 0.95 | – | pF |
| Output capacitance $V_{G2S} = 2\text{ V}$, $V_{DS} = 5\text{ V}$, $I_D = 10\text{ mA}$, $f = 1\text{ MHz}$ | C_{dss} | – | 0.5 | – | |
| Noise figure $V_{G2S} = 2\text{ V}$, $V_{DS} = 5\text{ V}$, $I_D = 10\text{ mA}$, $f = 1.75\text{ GHz}$ $V_{G2S} = 2\text{ V}$, $V_{DS} = 5\text{ V}$, $I_D = 10\text{ mA}$, $f = 800\text{ MHz}$ | F | – | 1.8 | – | dB |
| | | – | 1.1 | – | |
| Power gain $V_{G2S} = 2\text{ V}$, $V_{DS} = 5\text{ V}$, $I_D = 10\text{ mA}$, $f = 1.75\text{ GHz}$ $V_{G2S} = 2\text{ V}$, $V_{DS} = 5\text{ V}$, $I_D = 10\text{ mA}$, $f = 800\text{ MHz}$ | G_{ps} | – | 17 | – | |
| | | – | 22 | – | |
| Control range $V_{G2S} = 2\text{ V} \dots -3\text{ V}$ | ΔG_{psc} | – | 50 | – | |

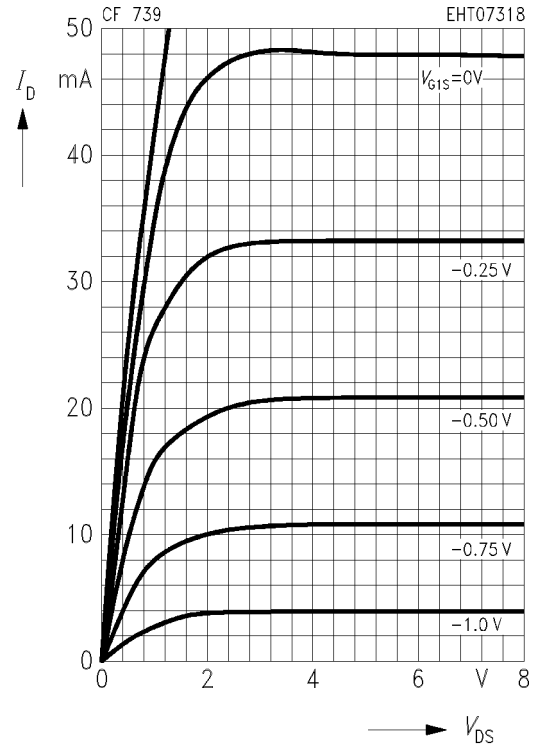
Total power dissipation $P_{tot} = f(T_A^*; T_S)$

*Package mounted on alumina



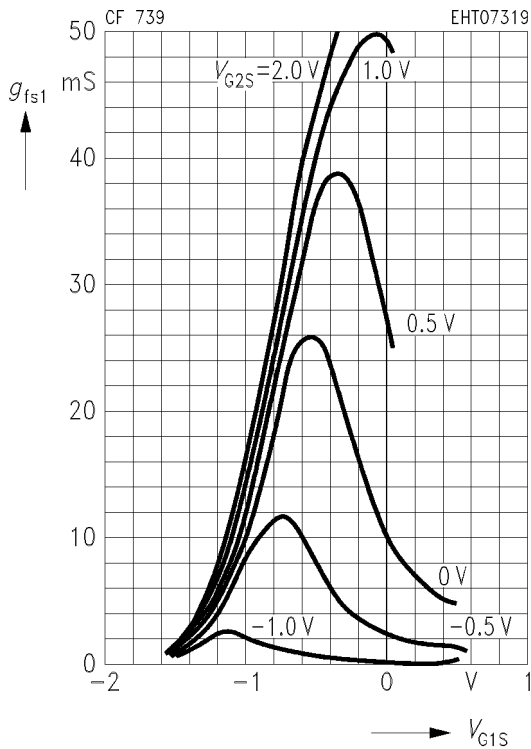
Output characteristics $I_D = f(V_{DS})$

$V_{G2S} = 2\text{ V}$



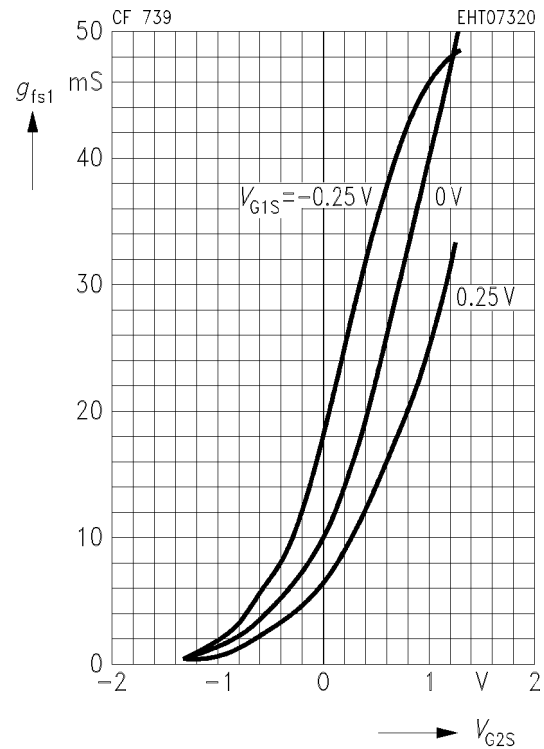
Gate 1 forward transconductance $g_{fs1} = f(V_{G1S})$

$V_{DS} = 5\text{ V}, f = 1\text{ kHz}$



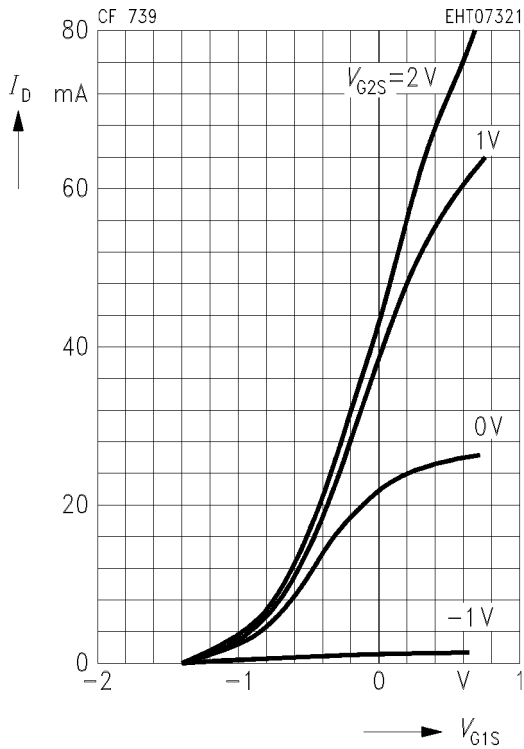
Gate 1 forward transconductance $g_{fs1} = f(V_{G2S})$

$V_{DS} = 5\text{ V}, f = 1\text{ kHz}$



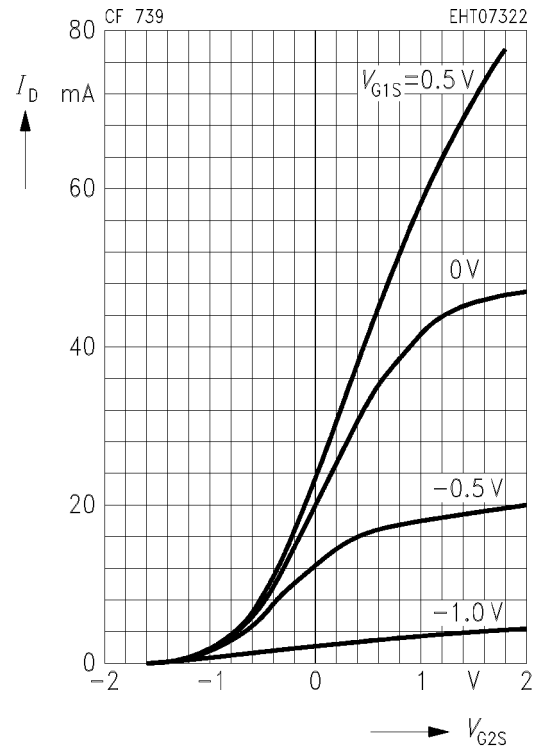
Drain current $I_D = f(V_{G1S})$

$V_{DS} = 5\text{ V}$



Drain current $I_D = f(V_{G2S})$

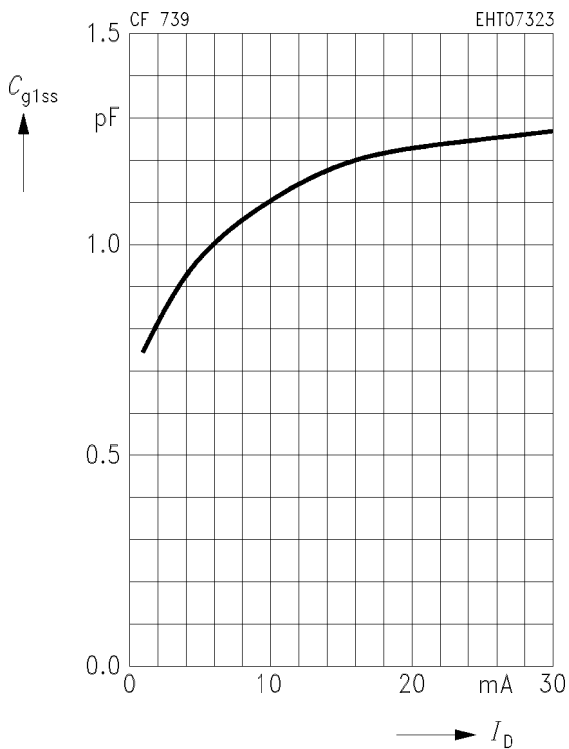
$V_{DS} = 5\text{ V}$



Gate 1 input transconductance

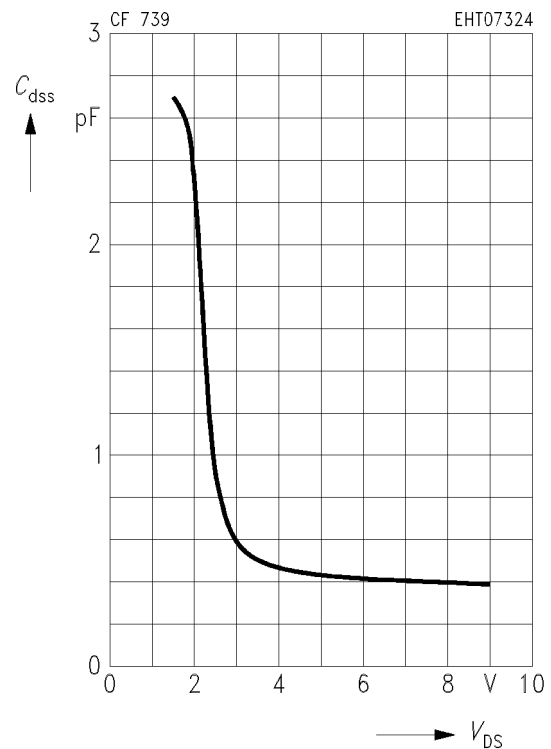
$C_{g1ss} = f(I_D)$

$V_{G2S} = 2\text{ V}, V_{DS} = 5\text{ V}, f = 0.1 - 1\text{ GHz}$



Output capacitance $C_{dss} = f(V_{DS})$

$V_{G2S} = 2\text{ V}, I_D = 10\text{ mA}, f = 0.1 - 1\text{ GHz}$



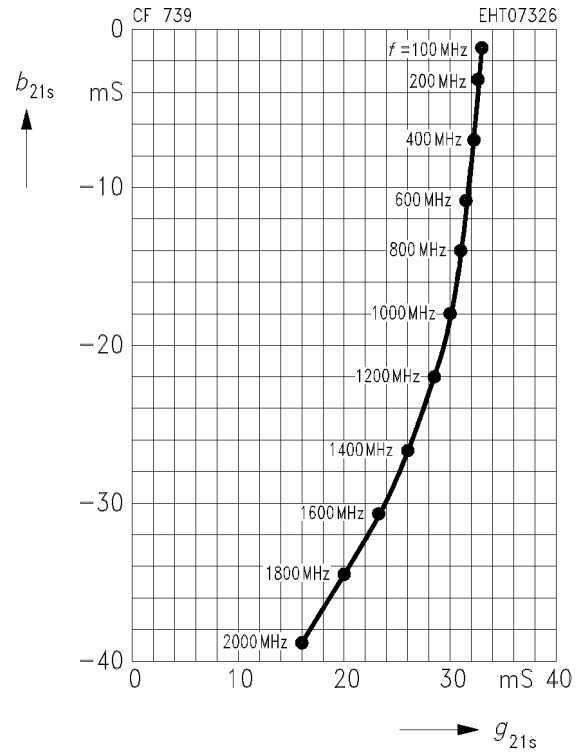
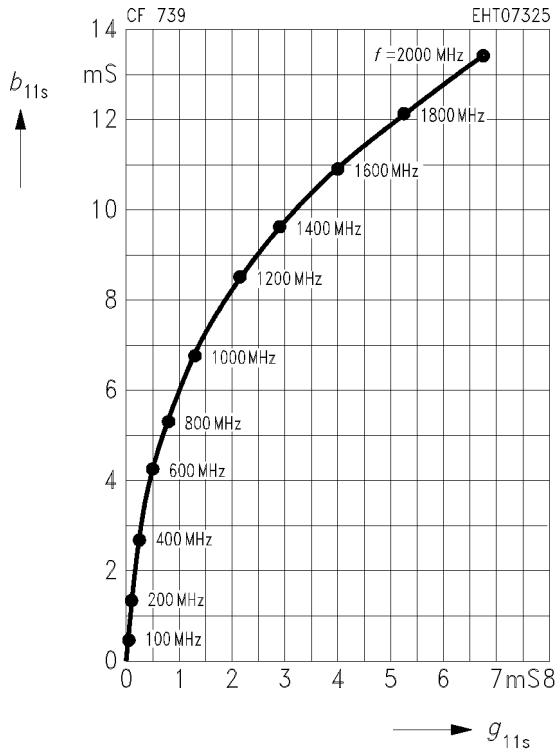
Common Source Admittance Parameters, G_2 RF grounded

Gate 1 input admittance y_{11s}

$V_{DS} = 5\text{ V}$, $V_{G2S} = 2\text{ V}$, $I_D = 10\text{ mA}$

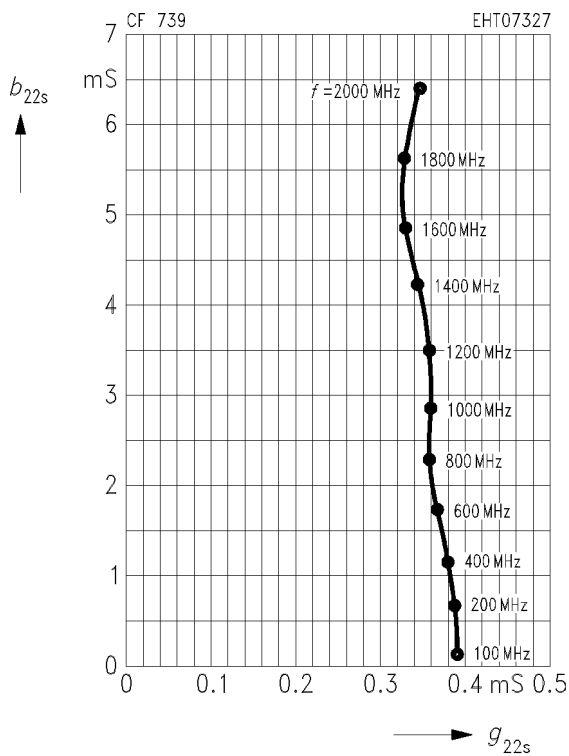
Gate 1 forward transfer admittance y_{21s}

$V_{DS} = 5\text{ V}$, $V_{G2S} = 2\text{ V}$, $I_D = 10\text{ mA}$



Output admittance y_{22s}

$V_{DS} = 5\text{ V}$, $V_{G2S} = 2\text{ V}$, $I_D = 10\text{ mA}$

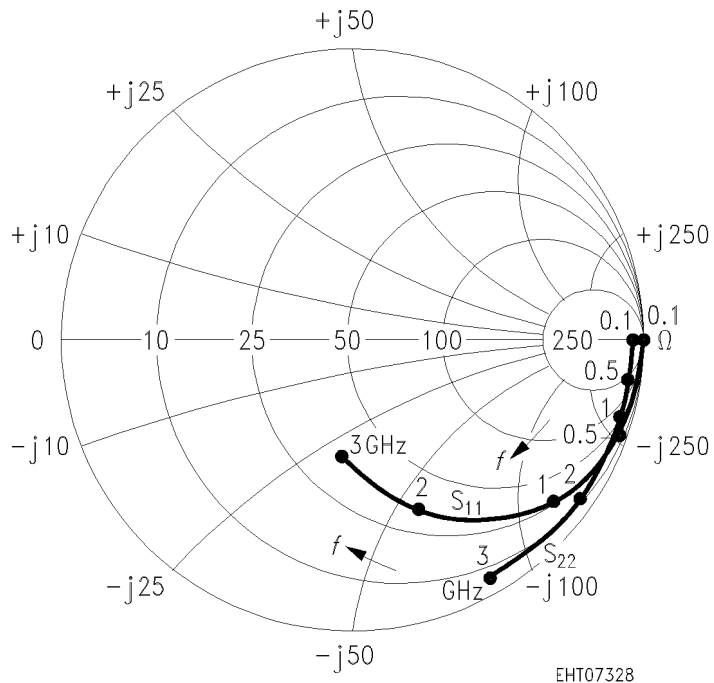


Common Source S-Parameters, G_2 RF grounded

| f | S_{11} | | S_{21} | | S_{12} | | S_{22} | |
|---|------------|------------|------------|------------|------------|------------|------------|------------|
| GHz | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| $V_{DS} = 5\text{ V}, V_{G2S} = 2\text{ V}, I_D = 10\text{ mA}, Z_0 = 50\ \Omega$ | | | | | | | | |
| 0.06 | 0.999 | - 2.4 | 3.21 | 176.9 | 0.001 | 81.8 | 0.963 | - 1.0 |
| 0.08 | 0.998 | - 3.2 | 3.21 | 175.5 | 0.001 | 85.8 | 0.963 | - 1.4 |
| 0.10 | 0.998 | - 4.1 | 3.21 | 174.3 | 0.001 | 90.8 | 0.962 | - 1.7 |
| 0.15 | 0.997 | - 6.0 | 3.22 | 171.4 | 0.002 | 84.2 | 0.962 | - 2.5 |
| 0.20 | 0.993 | - 8.0 | 3.22 | 168.4 | 0.002 | 88.1 | 0.962 | - 3.4 |
| 0.25 | 0.989 | - 10.1 | 3.21 | 165.5 | 0.003 | 84.4 | 0.962 | - 4.3 |
| 0.30 | 0.987 | - 12.1 | 3.21 | 162.5 | 0.003 | 83.3 | 0.962 | - 5.2 |
| 0.40 | 0.975 | - 16.0 | 3.18 | 156.6 | 0.004 | 79.6 | 0.961 | - 6.8 |
| 0.50 | 0.965 | - 19.9 | 3.15 | 150.7 | 0.005 | 78.6 | 0.960 | - 8.5 |
| 0.60 | 0.951 | - 23.8 | 3.12 | 145.0 | 0.006 | 78.0 | 0.960 | - 10.3 |
| 0.70 | 0.935 | - 27.5 | 3.09 | 139.3 | 0.007 | 76.6 | 0.961 | - 12.0 |
| 0.80 | 0.918 | - 31.4 | 3.05 | 134.0 | 0.008 | 73.3 | 0.958 | - 13.7 |
| 0.90 | 0.900 | - 35.2 | 3.03 | 128.5 | 0.009 | 70.4 | 0.956 | - 15.4 |
| 1.00 | 0.877 | - 39.0 | 3.02 | 122.9 | 0.009 | 69.5 | 0.955 | - 17.0 |
| 1.20 | 0.883 | - 46.6 | 2.96 | 111.4 | 0.010 | 66.4 | 0.953 | - 20.6 |
| 1.40 | 0.773 | - 53.7 | 2.85 | 99.7 | 0.011 | 59.9 | 0.949 | - 24.3 |
| 1.50 | 0.744 | - 56.8 | 2.77 | 94.4 | 0.012 | 59.9 | 0.949 | - 26.2 |
| 1.60 | 0.720 | - 60.1 | 2.74 | 89.2 | 0.012 | 57.5 | 0.949 | - 27.9 |
| 1.80 | 0.666 | - 66.2 | 2.64 | 78.9 | 0.012 | 54.1 | 0.948 | - 31.5 |
| 2.00 | 0.614 | - 72.8 | 2.59 | 68.6 | 0.012 | 49.2 | 0.945 | - 35.3 |
| 2.20 | 0.556 | - 80.3 | 2.53 | 57.4 | 0.012 | 43.7 | 0.941 | - 39.4 |
| 2.40 | 0.497 | - 87.2 | 2.45 | 45.6 | 0.010 | 39.4 | 0.937 | - 44.4 |
| 2.50 | 0.466 | - 90.2 | 2.38 | 40.0 | 0.009 | 35.2 | 0.936 | - 47.0 |
| 2.60 | 0.449 | - 92.8 | 2.34 | 34.5 | 0.008 | 32.2 | 0.936 | - 49.6 |
| 2.80 | 0.408 | - 97.1 | 2.24 | 23.6 | 0.005 | 25.1 | 0.937 | - 54.6 |
| 3.00 | 0.375 | - 101.7 | 2.17 | 12.2 | 0.002 | - 25.0 | 0.934 | - 59.1 |

$S_{11}, S_{22} = f(f), Z\text{-plane}$

$V_{DS} = 5\text{ V}, V_{GS} = 2\text{ V}, I_D = 10\text{ mA}, Z_0 = 50\ \Omega$



$S_{12}, S_{21} = f(f)$

$V_{DS} = 5\text{ V}, V_{GS} = 2\text{ V}, I_D = 10\text{ mA}, Z_0 = 50\ \Omega$

