

Low Noise Ceramic Packaged PHEMT GaAs FETs

FEATURES

- 0.5 dB Typical Noise Figure at 12 GHz
- High Associated Gain: $G_a = 13$ dB Typical at 12 GHz
- $L_g = 0.25 \mu\text{m}$, $W_g = 160 \mu\text{m}$
- Tight V_p ranges control
- High RF input power handling capability
- 100 % DC Tested
- Micro-X Metal Ceramic Package

PHOTO ENLARGEMENT



DESCRIPTION

The TC2182 is a high performance field effect transistor housed in a ceramic micro-x package with TC1102 PHEMT Chip. It has very low noise figure, high associated gain and high dynamic range that makes this device suitable for use in low noise amplifiers. All devices are 100 % DC tested to assure consistent quality.

ELECTRICAL SPECIFICATIONS ($T_A=25^\circ\text{C}$)

| Symbol | CONDITIONS | MIN | TYP | MAX | UNIT |
|------------|---|-----|-------|-----|---------------------------|
| NF | Noise Figure at $V_{DS} = 2$ V, $I_{DS} = 10$ mA, $f = 12$ GHz | | 0.5 | 0.7 | dB |
| G_a | Associated Gain at $V_{DS} = 2$ V, $I_{DS} = 10$ mA, $f = 12$ GHz | 10 | 13 | | dB |
| I_{DSS} | Saturated Drain-Source Current at $V_{DS} = 2$ V, $V_{GS} = 0$ V | | 48 | | mA |
| g_m | Transconductance at $V_{DS} = 2$ V, $V_{GS} = 0$ V | | 55 | | mS |
| V_p | Pinch-off Voltage at $V_{DS} = 2$ V, $I_D = 0.32$ mA | | -1.0* | | Volts |
| BV_{DGO} | Drain-Gate Breakdown Voltage at $I_{DGO} = 0.08$ mA | 5 | 9 | | Volts |
| R_{th} | Thermal Resistance | | 250 | | $^\circ\text{C}/\text{W}$ |

ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ\text{C}$)

| Symbol | Parameter | Rating |
|-----------|------------------------|--|
| V_{DS} | Drain-Source Voltage | 5.0 V |
| V_{GS} | Gate-Source Voltage | -3.0 V |
| I_{DS} | Drain Current | I_{DSS} |
| I_{GS} | Gate Current | 160 μA |
| P_{in} | RF Input Power, CW | 17 dBm |
| P_T | Continuous Dissipation | 150 mW |
| T_{CH} | Channel Temperature | 175 $^\circ\text{C}$ |
| T_{STG} | Storage Temperature | - 65 $^\circ\text{C}$ to +175 $^\circ\text{C}$ |

TYPICAL NOISE PARAMETERS ($T_A=25^\circ\text{C}$)

$V_{DS} = 2$ V, $I_{DS} = 10$ mA

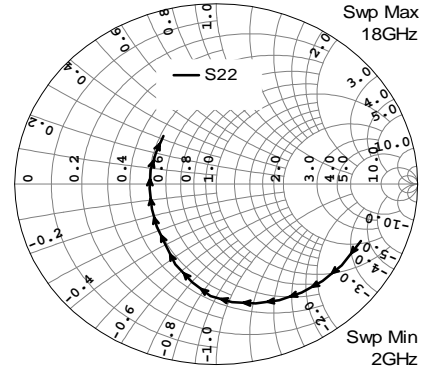
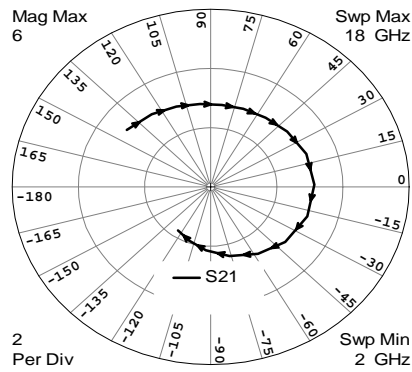
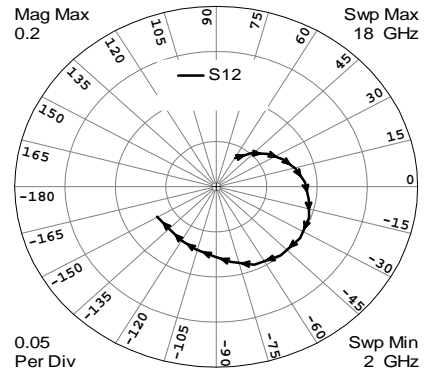
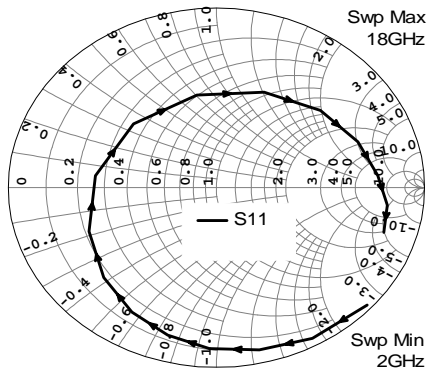
| Frequency | NF _{opt} | G_a | Γ_{opt} | | Rn/50 |
|-----------|-------------------|-------|----------------|------|-------|
| | | | MAG | ANG | |
| 2 | 0.32 | 19.0 | 0.98 | 15 | 0.40 |
| 4 | 0.33 | 17.4 | 0.84 | 30 | 0.35 |
| 6 | 0.35 | 15.7 | 0.68 | 50 | 0.26 |
| 8 | 0.39 | 14.3 | 0.51 | 76 | 0.19 |
| 10 | 0.44 | 12.9 | 0.38 | 107 | 0.12 |
| 12 | 0.50 | 11.9 | 0.28 | 146 | 0.08 |
| 14 | 0.58 | 11.4 | 0.25 | -167 | 0.07 |
| 16 | 0.74 | 11.2 | 0.32 | -110 | 0.11 |
| 18 | 0.91 | 10.9 | 0.49 | -43 | 0.23 |

* For the tight control of the pinch-off voltage range, we divide TC2182 into 3 model numbers to fit customer design requirement

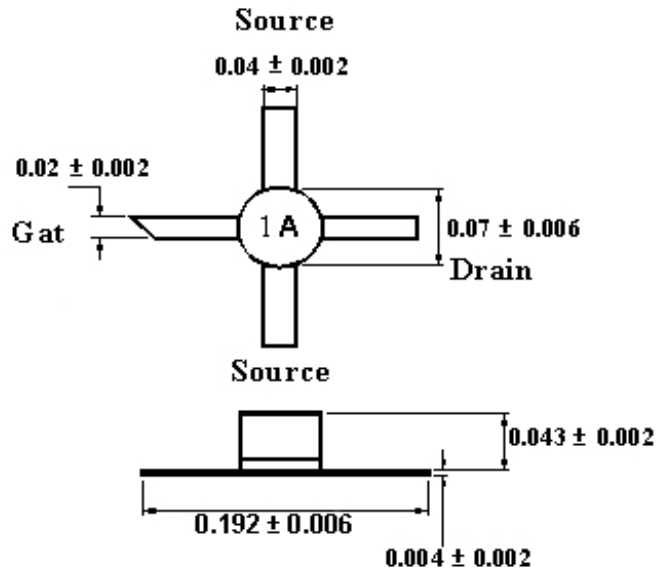
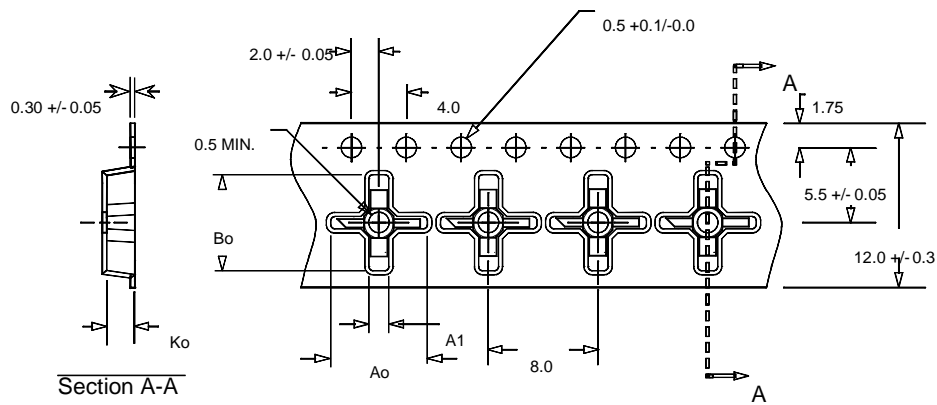
(1)TC2182P0710 : $V_p = -0.7$ V to -1.0 V (2)TC2182P0811 : $V_p = -0.8$ V to -1.1 V (3)TC2182P0912 : $V_p = -0.9$ V to -1.2 V

If required, customer can specify the requirement in purchasing document. For special V_p requirement, please contact factory for details.

TYPICAL SCATTERING PARAMETERS (T_A=25 °C)

 V_{DS} = 2 V, I_{DS} = 10 mA


| FREQUENCY (GHz) | S11 | | S21 | | S12 | | S22 | |
|--------------------|--------|---------|--------|---------|--------|---------|--------|---------|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |
| 2 | 0.9753 | -42.07 | 3.1849 | 142.77 | 0.0369 | 59.34 | 0.7846 | -23.66 |
| 3 | 0.9569 | -61.12 | 3.0294 | 125.98 | 0.0513 | 46.68 | 0.7686 | -35.81 |
| 4 | 0.9265 | -77.16 | 2.9072 | 110.95 | 0.0630 | 35.35 | 0.7527 | -45.49 |
| 5 | 0.8962 | -92.19 | 2.8197 | 96.54 | 0.0730 | 24.64 | 0.7363 | -54.79 |
| 6 | 0.8537 | -105.88 | 2.7887 | 83.04 | 0.0814 | 14.13 | 0.7155 | -64.11 |
| 7 | 0.8033 | -120.43 | 2.8169 | 69.49 | 0.0881 | 3.31 | 0.6888 | -73.57 |
| 8 | 0.7371 | -137.29 | 2.8673 | 54.47 | 0.0928 | -8.79 | 0.6577 | -83.22 |
| 9 | 0.6585 | -158.26 | 2.9755 | 38.95 | 0.0983 | -20.39 | 0.6205 | -92.67 |
| 10 | 0.5848 | 173.39 | 3.1034 | 21.12 | 0.1008 | -34.42 | 0.5566 | -102.37 |
| 11 | 0.5334 | 138.30 | 3.1303 | 1.49 | 0.0994 | -49.95 | 0.4882 | -114.51 |
| 12 | 0.5244 | 100.31 | 3.0858 | -18.68 | 0.0944 | -66.31 | 0.4195 | -127.04 |
| 13 | 0.5796 | 66.75 | 2.9214 | -39.53 | 0.0845 | -80.16 | 0.3765 | -141.50 |
| 14 | 0.6593 | 40.81 | 2.6705 | -57.67 | 0.0772 | -92.37 | 0.3475 | -156.59 |
| 15 | 0.7259 | 20.68 | 2.4002 | -76.28 | 0.0721 | -106.83 | 0.3306 | -175.60 |
| 16 | 0.7778 | 5.14 | 2.1397 | -93.90 | 0.0687 | -120.22 | 0.3351 | 166.49 |
| 17 | 0.8265 | -6.70 | 1.9291 | -109.65 | 0.0660 | -133.41 | 0.3471 | 149.44 |
| 18 | 0.8424 | -17.16 | 1.7749 | -123.77 | 0.0674 | -150.56 | 0.3744 | 134.41 |

OUTLINE DIMENSIONS (in inch)

Tape & Reel Package Orientation (mm)


$A_0 = 7.0 \text{ mm}$
 $A_1 = 1.45 \text{ mm}$
 $B_0 = 7.0 \text{ mm}$
 $B_1 = 0.9 \text{ mm}$
 $K_0 = 2.0 \text{ mm}$

| | |
|------------------------|------|
| Standard Reel Size | 7" |
| Standard Reel Quantity | 1000 |