

## 0.5 W Low-Cost Packaged PHEMT GaAs Power FETs

### FEATURES

- 27 dBm Typical Output Power at 6 GHz
- 11 dB Typical Linear Power Gain at 6 GHz
- High Linearity: IP3 = 37 dBm Typical at 6 GHz
- High Power Added Efficiency:  
Nominal PAE of 37 % at 6 GHz
- Breakdown Voltage:  $BV_{DGO} \geq 15$  V
- $L_g = 0.35 \mu\text{m}$ ,  $W_g = 1.2$  mm
- Tight  $V_p$  ranges control
- High RF input power handling capability
- 100 % DC Tested
- Micro-X Metal Ceramic Package

### PHOTO ENLARGEMENT



### DESCRIPTION

The TC2481 is packaged with the TC1401 Pseudomorphic High Electron Mobility Transistor (PHEMT) chip. All devices are 100% DC tested to assure consistent quality. Typical applications include high dynamic range power amplifiers for commercial applications.

### ELECTRICAL SPECIFICATIONS ( $T_A=25$ °C)

| Symbol     | CONDITIONS  | MIN  | TYP    | MAX | UNIT  |
|------------|---|------|--------|-----|-------|
| $P_{1dB}$  | Output Power at 1dB Gain Compression Point, $f = 6\text{GHz}$ $V_{DS} = 8$ V, $I_{DS} = 120$ mA   | 26.5 | 27     |     | dBm   |
| $G_L$      | Linear Power Gain, $f = 6\text{GHz}$ $V_{DS} = 8$ V, $I_{DS} = 120$ mA  |      | 11     |     | dB    |
| IP3        | Intercept Point of the 3 <sup>rd</sup> -order Intermodulation, $f = 6\text{GHz}$ $V_{DS} = 8$ V, $I_{DS} = 120$ mA, $*P_{SCL} = 14$ dBm |      | 37     |     | dBm   |
| PAE        | Power Added Efficiency at 1dB Compression Power, $f = 6\text{GHz}$  |      | 37     |     | %     |
| $I_{DSS}$  | Saturated Drain-Source Current at $V_{DS} = 2$ V, $V_{GS} = 0$ V  |      | 300    |     | mA    |
| $g_m$      | Transconductance at $V_{DS} = 2$ V, $V_{GS} = 0$ V  |      | 200    |     | mS    |
| $V_P$      | Pinch-off Voltage at $V_{DS} = 2$ V, $I_D = 2.4$ mA   |      | -1.7** |     | Volts |
| $BV_{DGO}$ | Drain-Gate Breakdown Voltage at $I_{DGO} = 0.6$ mA  | 15   | 18     |     | Volts |
| $R_{th}$   | Thermal Resistance  |      | 50     |     | °C/W  |

**Note: \*  $P_{SCL}$ : Output Power of Single Carrier Level.**

\*\* For the tight control of the pinch-off voltage range, we divide TC2481 into 3 model numbers to fit customer design requirement

(1)TC2481P1519 :  $V_p = -1.5\text{V}$  to  $-1.9\text{V}$  (2)TC2481P1620 :  $V_p = -1.6\text{V}$  to  $-2.0\text{V}$  (3)TC2481P1721 :  $V_p = -1.7\text{V}$  to  $-2.1\text{V}$

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

**ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25 °C)**

| Symbol           | Parameter              | Rating             |
|------------------|------------------------|--------------------|
| V <sub>DS</sub>  | Drain-Source Voltage   | 12 V               |
| V <sub>GS</sub>  | Gate-Source Voltage    | -5 V               |
| I <sub>DS</sub>  | Drain Current          | I <sub>DSS</sub>   |
| P <sub>in</sub>  | RF Input Power, CW     | 26 dBm             |
| P <sub>T</sub>   | Continuous Dissipation | 1.9 W              |
| T <sub>CH</sub>  | Channel Temperature    | 175 °C             |
| T <sub>STG</sub> | Storage Temperature    | - 65 °C to +175 °C |

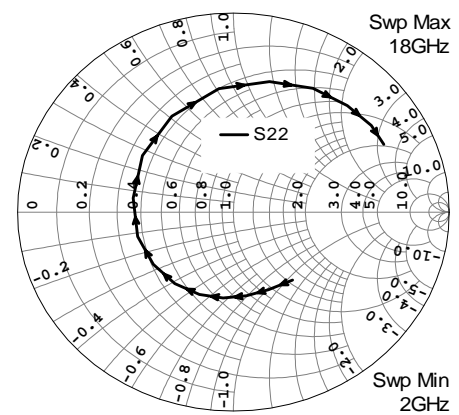
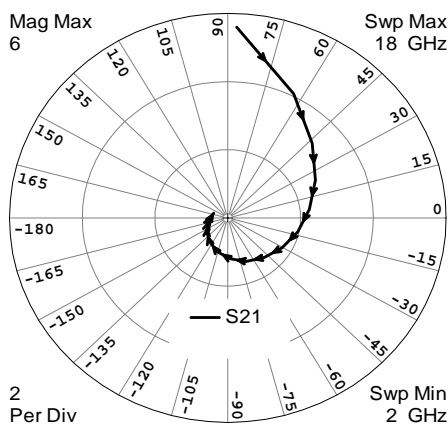
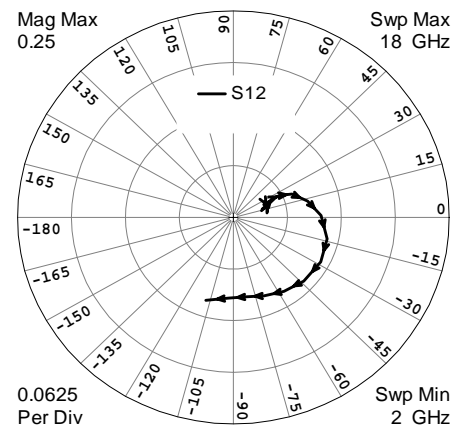
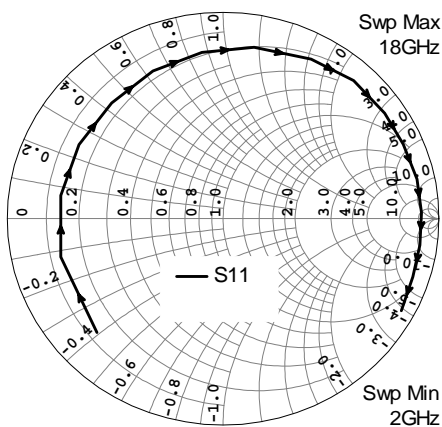
**RECOMMENDED OPERATING CONDITION**

| Symbol          | Parameter               | Rating |
|-----------------|-------------------------|--------|
| V <sub>DS</sub> | Drain to Source Voltage | 8 V    |
| I <sub>D</sub>  | Drain Current           | 120 mA |

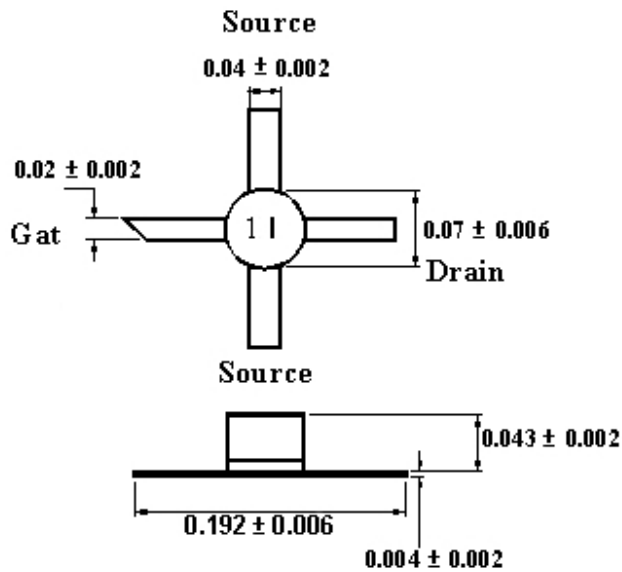
**HANDLING PRECAUTIONS:**

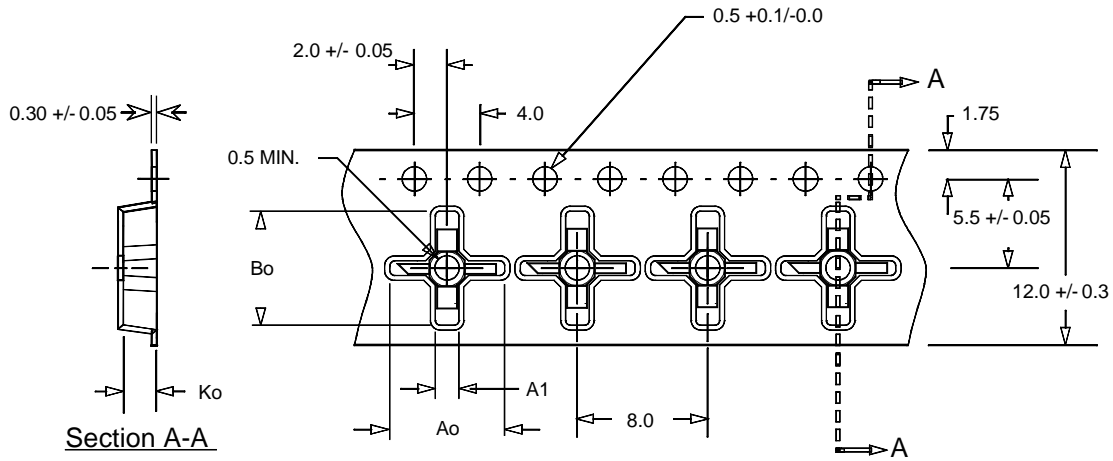
The user must operate in a clean, dry environment. Electrostatic Discharge (ESD) precautions should be observed at all stages of storage, handling, assembly, and testing. The static discharge must be less than 300V.

**TYPICAL SCATTERING PARAMETERS (T<sub>A</sub>=25 °C)**

 V<sub>DS</sub> = 8 V, I<sub>DS</sub> = 120 mA


| FREQUENCY<br>(GHz) | S11    |         | S21    |         | S12    |         | S22    |         |
|--------------------|--------|---------|--------|---------|--------|---------|--------|---------|
|                    | MAG    | ANG     | MAG    | ANG     | MAG    | ANG     | MAG    | ANG     |
| 2                  | 0.8032 | -136.63 | 5.5988 | 87.50   | 0.0409 | 26.99   | 0.4377 | -51.36  |
| 3                  | 0.7749 | -166.09 | 4.0646 | 63.59   | 0.0413 | 19.35   | 0.4223 | -67.29  |
| 4                  | 0.7596 | 171.59  | 3.1927 | 43.25   | 0.0420 | 20.20   | 0.4255 | -81.72  |
| 5                  | 0.7572 | 151.76  | 2.6479 | 24.67   | 0.0443 | 22.85   | 0.4343 | -96.23  |
| 6                  | 0.7624 | 132.64  | 2.2554 | 6.40    | 0.0507 | 26.86   | 0.4433 | -110.80 |
| 7                  | 0.7862 | 114.43  | 1.9690 | -11.83  | 0.0603 | 26.12   | 0.4510 | -127.09 |
| 8                  | 0.8118 | 96.88   | 1.7325 | -30.21  | 0.0733 | 22.60   | 0.4549 | -144.68 |
| 9                  | 0.8421 | 80.20   | 1.5329 | -48.83  | 0.0881 | 12.91   | 0.4604 | -164.61 |
| 10                 | 0.8733 | 62.17   | 1.3715 | -68.33  | 0.1015 | 1.29    | 0.4701 | 171.32  |
| 11                 | 0.9024 | 47.87   | 1.2003 | -87.33  | 0.1115 | -13.43  | 0.5072 | 146.04  |
| 12                 | 0.9065 | 34.32   | 1.0285 | -106.37 | 0.1148 | -28.10  | 0.5596 | 120.64  |
| 13                 | 0.9086 | 23.39   | 0.8658 | -125.06 | 0.1122 | -43.31  | 0.6243 | 96.18   |
| 14                 | 0.9181 | 11.98   | 0.7218 | -142.69 | 0.1067 | -56.87  | 0.6769 | 75.72   |
| 15                 | 0.9199 | 1.79    | 0.6003 | -158.30 | 0.1014 | -69.46  | 0.7228 | 59.28   |
| 16                 | 0.9213 | -8.00   | 0.5110 | -172.76 | 0.0975 | -81.21  | 0.7517 | 45.41   |
| 17                 | 0.9237 | -17.81  | 0.4432 | 173.68  | 0.0978 | -93.09  | 0.7725 | 34.26   |
| 18                 | 0.9381 | -28.37  | 0.4147 | 160.89  | 0.1054 | -107.70 | 0.7753 | 25.98   |

**OUTLINE DIMENSIONS (Unit: inch)**


**TAPE & REEL PACKAGE ORIENTATION (Unit: 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 |