

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

### FEATURES

- 0.5 W Typical Output Power at 6 GHz
- 14 dB Typical Linear Power Gain at 6 GHz
- High Linearity: IP3 = 37 dBm Typical at 6 GHz
- High Power Added Efficiency:
  - Nominal PAE of 40 % at 6 GHz
- Suitable for High Reliability Application
- 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
- Low Cost Ceramic Package

### PHOTO ENLARGEMENT



### DESCRIPTION

The TC2471 is packaged with the TC1401 Pseudomorphic High Electron Mobility Transistor (PHEMT) chip. The Cu-based ceramic package provides excellent thermal conductivity for the GaAs FET. All devices are 100% DC tested to assure consistent quality. Typical applications include high dynamic range power amplifiers for commercial and military high performance power applications.

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

Symbol	CONDITIONS	MIN	TYP	MAX	UNIT
$P_{1dB}$	Output Power at 1dB Gain Compression Point, $f = 6\text{GHz}$ , $V_{DS} = 8\text{V}$ , $I_{DS} = 120\text{mA}$	26.5	27		dBm
$G_L$	Linear Power Gain, $f = 6\text{GHz}$ , $V_{DS} = 8\text{V}$ , $I_{DS} = 120\text{mA}$	12	14		dB
IP3	Intercept Point of the 3 <sup>rd</sup> -order Intermodulation, $f = 6\text{GHz}$ , $V_{DS} = 8\text{V}$ , $I_{DS} = 120\text{mA}$ , $*P_{SCL} = 14\text{dBm}$		37		dBm
PAE	Power Added Efficiency at 1dB Compression Power, $f = 6\text{GHz}$		40		%
$I_{DSS}$	Saturated Drain-Source Current at $V_{DS} = 2\text{V}$ , $V_{GS} = 0\text{V}$		300		mA
$g_m$	Transconductance at $V_{DS} = 2\text{V}$ , $V_{GS} = 0\text{V}$		200		mS
$V_p$	Pinch-off Voltage at $V_{DS} = 2\text{V}$ , $I_D = 2.4\text{mA}$		-1.7**		Volts
$BV_{DGO}$	Drain-Gate Breakdown Voltage at $I_{DGO} = 0.6\text{mA}$	15	18		Volts
$R_{th}$	Thermal Resistance		30		$^\circ\text{C}/\text{W}$

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

\*\* For the tight control of the pinch-off voltage range, we divide TC2471 into 3 model numbers to fit customer design requirement  
 (1)TC2471P1519 :  $V_p = -1.5\text{V}$  to  $-1.9\text{V}$  (2)TC2471P1620 :  $V_p = -1.6\text{V}$  to  $-2.0\text{V}$  (3)TC2471P1721 :  $V_p = -1.7\text{V}$  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

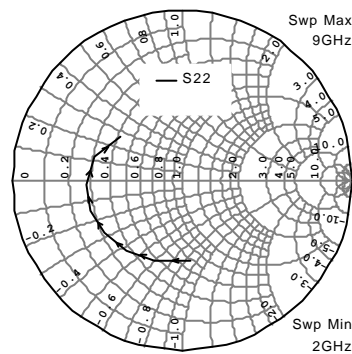
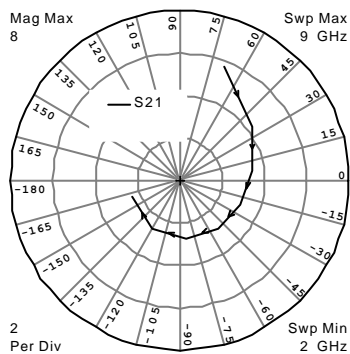
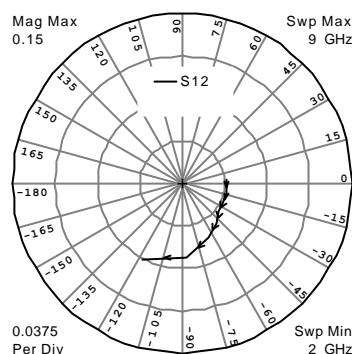
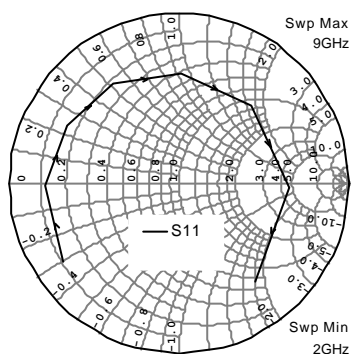
**RECOMMENDED OPERATING CONDITION**

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

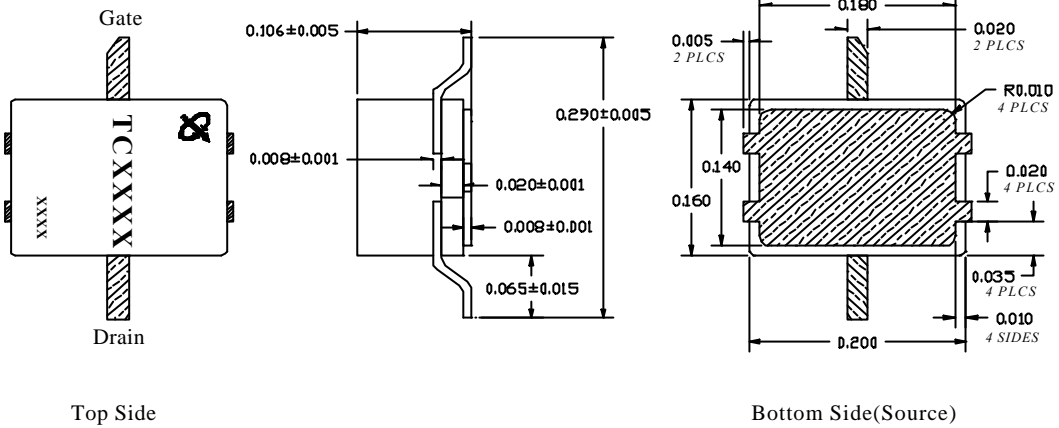
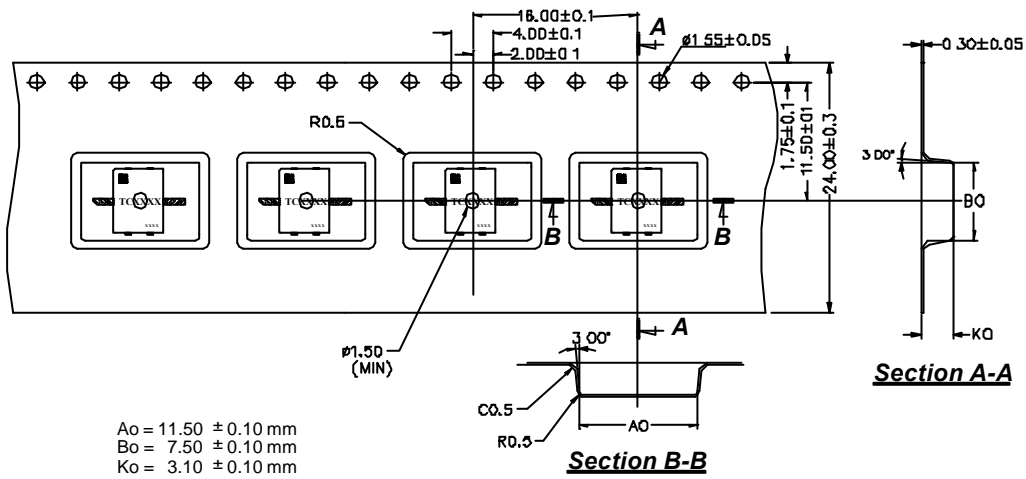
**HANDLING PRECAUTIONS:**

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 (GHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
2	0.8199	-145.81	5.7658	68.93	0.0387	4.89	0.4708	-84.58
3	0.7843	-179.36	4.2624	36.13	0.0399	-13.26	0.4977	-109.23
4	0.7452	152.75	3.4804	7.01	0.0403	-26.19	0.5295	-128.52
5	0.6992	123.46	3.0675	-21.51	0.0415	-38.13	0.5523	-145.68
6	0.6519	88.70	2.8445	-51.64	0.0462	-48.77	0.5654	-161.74
7	0.6272	46.67	2.7416	-84.42	0.0538	-63.69	0.5626	-177.61
8	0.6475	-1.92	2.6175	-120.45	0.0652	-86.78	0.5367	164.94
9	0.7296	-52.48	2.3753	-161.03	0.0752	-117.25	0.4441	144.53

**OUTLINE DIMENSIONS (Unit: inch)**

**TAPE & REEL PACKAGE ORIENTATION (Unit: mm)**


Standard Reel Size	7 <sup>3</sup>
Standard Reel Quantity	400