

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

### FEATURES

- 2 W Typical Output Power at 6 GHz
- 9 dB Typical Linear Power Gain at 6 GHz
- High Linearity: IP3 = 43 dBm Typical at 6 GHz
- High Power Added Efficiency: Nominal PAE of 43 % at 6 GHz
- Suitable for High Reliability Application
- Breakdown Voltage:  $BV_{DGO} \geq 18$  V
- $L_g = 0.6 \mu\text{m}$ ,  $W_g = 5 \text{ mm}$
- Tight  $V_p$  ranges control
- High RF input power handling capability
- 100 % DC Tested
- Low Cost Ceramic Package

### PHOTO ENLARGEMENT



### DESCRIPTION

The TC2676 is packaged with the TC1606 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, $f = 6 \text{ GHz}$ , $V_{DS} = 8 \text{ V}$ , $I_{DS} = 500 \text{ mA}$	32.5	33		dBm
$G_L$	Linear Power Gain, $f = 6 \text{ GHz}$ , $V_{DS} = 8 \text{ V}$ , $I_{DS} = 500 \text{ mA}$		9		dB
IP3	Intercept Point of the 3 <sup>rd</sup> -order Intermodulation, $f = 6 \text{ GHz}$ , $V_{DS} = 8 \text{ V}$ , $I_{DS} = 500 \text{ mA}$ , $*P_{SCL} = 20 \text{ dBm}$		43		dBm
PAE	Power Added Efficiency at 1dB Compression Power, $f = 6 \text{ GHz}$		43		%
$I_{DSS}$	Saturated Drain-Source Current at $V_{DS} = 2 \text{ V}$ , $V_{GS} = 0 \text{ V}$		1.25		A
$g_m$	Transconductance at $V_{DS} = 2 \text{ V}$ , $V_{GS} = 0 \text{ V}$		850		mS
$V_p$	Pinch-off Voltage at $V_{DS} = 2 \text{ V}$ , $I_D = 10 \text{ mA}$		-1.7**		Volts
$BV_{DGO}$	Drain-Gate Breakdown Voltage at $I_{DGO} = 2.5 \text{ mA}$	18	22		Volts
$R_{th}$	Thermal Resistance		8		$^\circ\text{C}/\text{W}$

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

\*\* For the tight control of the pinch-off voltage range, we divide TC2676 into 3 model numbers to fit customer design requirement (1)TC2676P1519 :  $V_p = -1.5\text{V}$  to  $-1.9\text{V}$  (2)TC2676P1620 :  $V_p = -1.6\text{V}$  to  $-2.0\text{V}$  (3)TC2676P1721 :  $V_p = -1.7\text{V}$  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) RECOMMENDED OPERATING CONDITION**

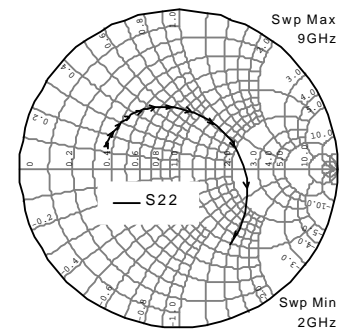
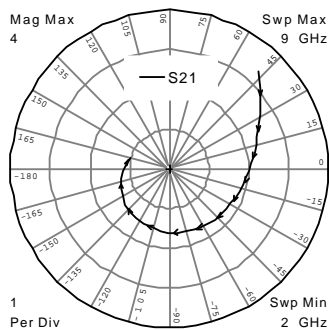
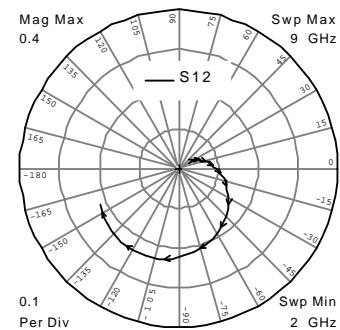
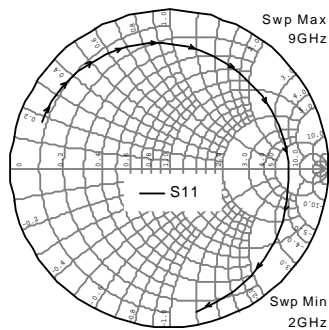
Symbol	Parameter	Rating
V <sub>DS</sub>	Drain-Source Voltage	12 V
V <sub>GS</sub>	Gate-Source Voltage	-5 V
I <sub>DS</sub>	Drain Current	I <sub>DSS</sub>
P <sub>in</sub>	RF Input Power, CW	30 dBm
P <sub>T</sub>	Continuous Dissipation	7.7 W
T <sub>CH</sub>	Channel Temperature	175 °C
T <sub>STG</sub>	Storage Temperature	- 65 °C to +175 °C

Symbol	Parameter	Rating
V <sub>DS</sub>	Drain to Source Voltage	8 V
I <sub>D</sub>	Drain Current	500 mA

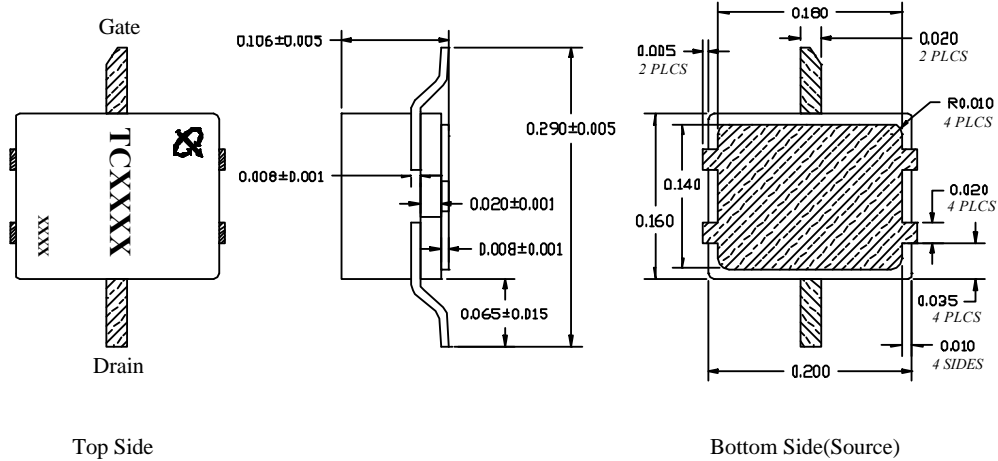
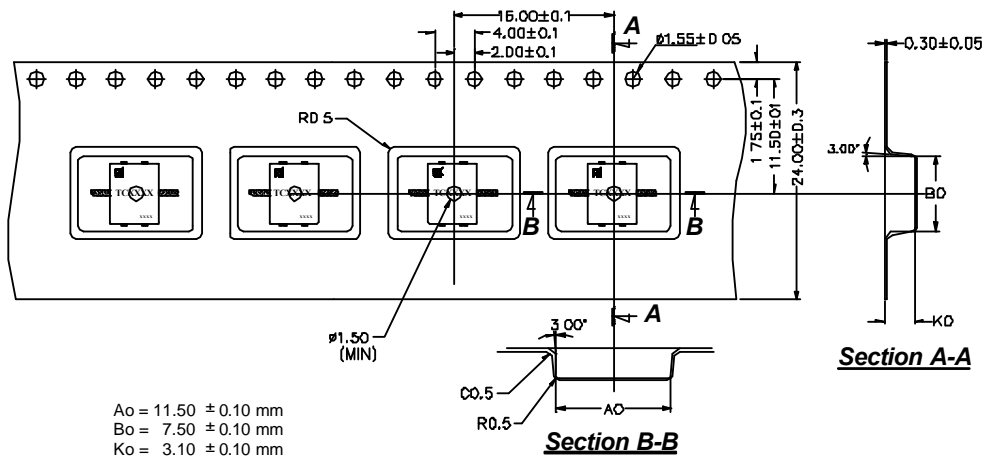
**HANDLING PRECAUTIONS:**

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> = 500 mA


FREQUENCY (GHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
2	0.8583	159.78	3.3298	47.16	0.0396	28.75	0.4800	163.15
3	0.8419	137.46	2.3730	20.35	0.0580	20.43	0.4735	149.56
4	0.8171	114.30	1.9527	-6.75	0.0832	6.31	0.4560	134.61
5	0.7833	87.34	1.7538	-35.79	0.1169	-13.20	0.4254	116.87
6	0.7492	53.95	1.6530	-68.43	0.1597	-38.78	0.3866	93.67
7	0.7445	12.53	1.5564	-106.23	0.2058	-71.41	0.3603	58.23
8	0.8082	-34.29	1.3586	-149.76	0.2347	-111.25	0.4064	3.35
9	0.9125	-79.43	1.0009	164.08	0.2175	-154.91	0.5776	-56.08

**OUTLINE DIMENSIONS (Unit: inch)**

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


Standard Reel Size	7"
Standard Reel Quantity	400