

## Packaged Single-Bias Low Noise PHEMT GaAs FETs

### FEATURES

- 0.7 dB Typical Noise Figure at 12 GHz
- High Associated Gain:  $G_a = 13$  dB Typical at 12 GHz
- 18dBm Typical Power at 12 GHz
- 13 dB Typical Linear Power Gain at 12 GHz
- $L_g = 0.25 \mu\text{m}$ ,  $W_g = 160 \mu\text{m}$
- 100 % DC Tested
- Micro-X Metal Ceramic Package

### PHOTO ENLARGEMENT



### DESCRIPTION

The TC3918 is a single-bias low noise ceramic micro-x packaged device with TC1101 PHEMT GaAs FETs, which is designed to provide the single power supply application. The device is suitable for oscillator, low noise amplifier in a wide range of commercial applications. 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 $V_{DS} = 2 \text{ V}$ , $f = 12\text{GHz}$		0.7	1.2	dB
$G_a$	Associated Gain at $V_{DS} = 2 \text{ V}$ , $f = 12\text{GHz}$	11	13		dB
$P_{1dB}$	Output Power at 1dB Gain Compression Point, $f = 12\text{GHz}$ $V_{DS} = 4 \text{ V}$	16.5			
$G_L$	Linear Power Gain, $f = 12\text{GHz}$ $V_{DS} = 4 \text{ V}$	11	13		dB
$I_{DS}$	Drain-Source Current at $V_{DS} = 4 \text{ V}$		25		mA
$R_{th}$	Thermal Resistance		230		$^\circ\text{C/W}$

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

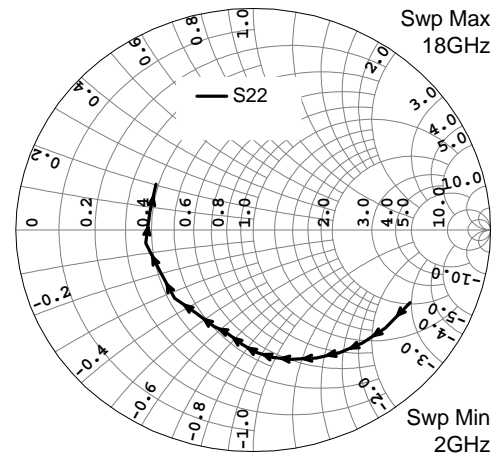
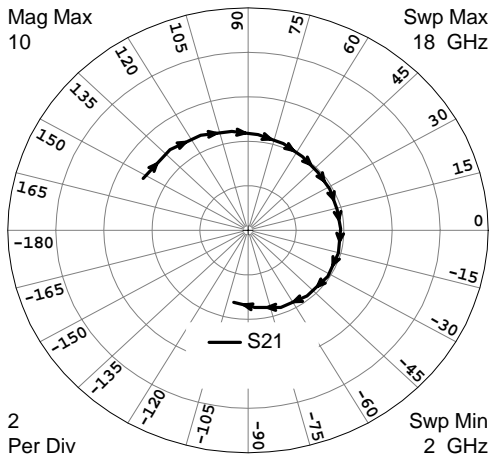
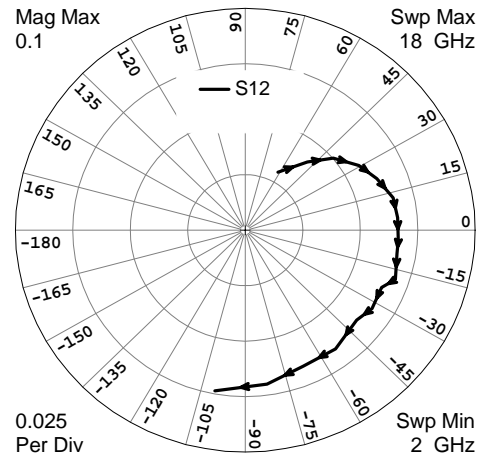
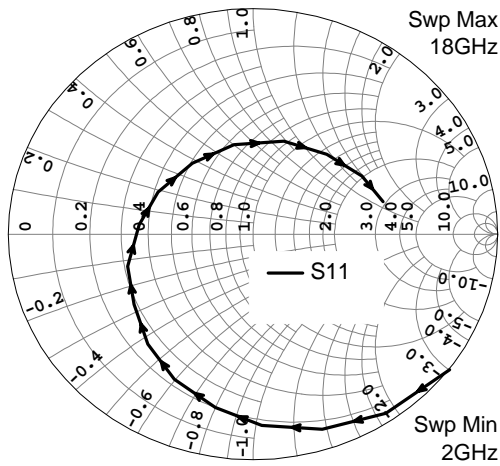
Symbol	Parameter	Rating
$V_{DS}$	Drain-Source Voltage	7.0 V
$P_{in}$	RF Input Power, CW	18 dBm
$P_T$	Continuous Dissipation	150 mW
$T_{CH}$	Channel Temperature	175 $^\circ\text{C}$
$T_{STG}$	Storage Temperature	-65 $^\circ\text{C}$ to +175 $^\circ\text{C}$

 $V_{DS} = 4 \text{ V}$ 

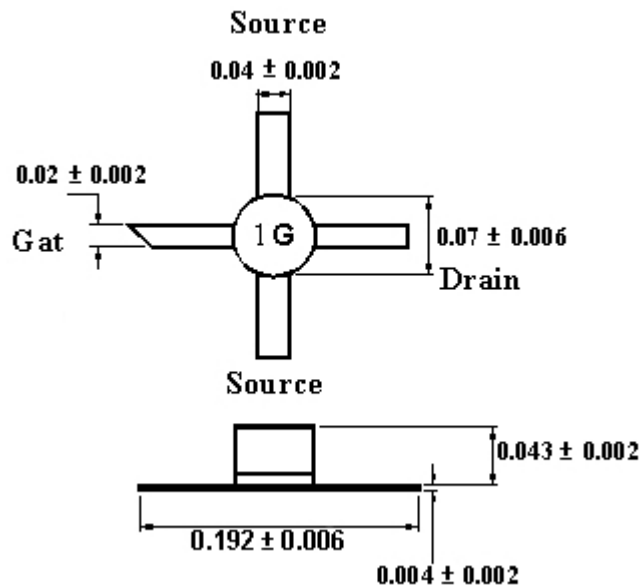
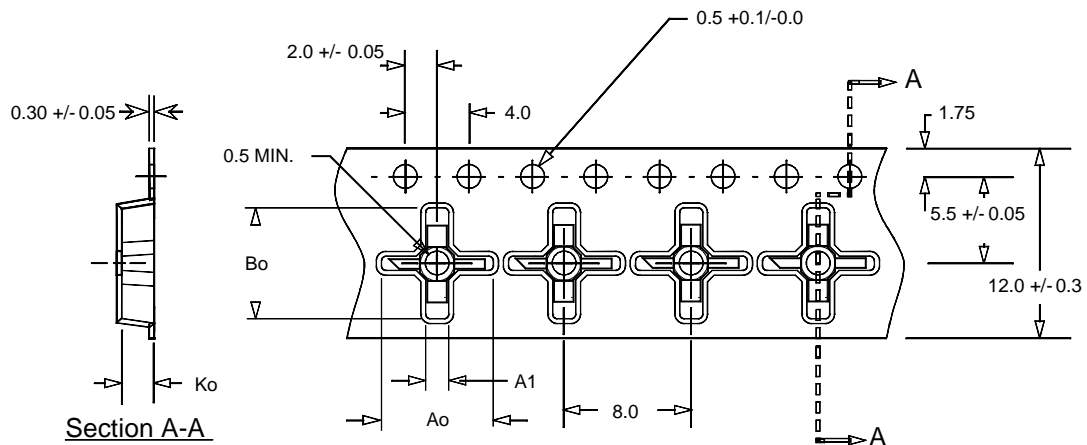
Frequency (GHz)	NF <sub>opt</sub> (dB)	$G_A$ (dB)	$\Gamma_{opt}$		Rn/50
			MAG	ANG	
2	0.46	17.7	0.80	20	0.67
4	0.49	16.1	0.69	42	0.58
6	0.52	14.6	0.56	69	0.45
8	0.56	13.2	0.42	103	0.32
10	0.64	12.0	0.31	146	0.19
12	0.73	11.0	0.23	-161	0.14
14	0.85	10.6	0.21	-97	0.13
16	1.08	10.5	0.26	-19	0.18
18	1.33	10.2	0.41	72	0.38

### 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> = 4 V**


FREQUENCY (GHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
2	1.0037	-36.81	4.9472	151.92	0.0297	61.58	0.7379	-26.31
3	0.9618	-55.65	4.8706	131.81	0.0409	48.73	0.7117	-38.42
4	0.9101	-71.88	4.7020	114.73	0.0502	40.35	0.6877	-47.93
5	0.8490	-87.59	4.4937	98.67	0.0574	30.54	0.6615	-56.85
6	0.7843	-101.26	4.3157	84.48	0.0618	22.18	0.6355	-65.26
7	0.7184	-116.51	4.1587	69.36	0.0660	12.79	0.6046	-74.72
8	0.6503	-131.33	4.0117	55.37	0.0665	4.84	0.5806	-82.01
9	0.5768	-147.39	3.9100	41.80	0.0667	-3.78	0.5505	-89.25
10	0.5321	-164.51	3.8820	28.54	0.0669	-9.08	0.5182	-95.25
11	0.4670	174.87	3.8295	14.03	0.0690	-18.73	0.4748	-104.16
12	0.4302	154.30	3.8617	1.13	0.0647	-23.54	0.4659	-110.86
13	0.4003	128.28	3.9013	-15.12	0.0656	-32.69	0.4455	-123.28
14	0.4038	101.23	3.9206	-31.94	0.0631	-39.91	0.4519	-137.07
15	0.4313	73.02	3.8471	-50.20	0.0663	-53.76	0.4355	-154.84
16	0.4645	49.63	3.7261	-68.48	0.0663	-67.67	0.4571	-172.48
17	0.5138	30.09	3.4825	-85.38	0.0699	-82.26	0.4426	169.29
18	0.5504	15.19	3.2919	-100.35	0.0736	-100.33	0.4585	153.28

**OUTLINE DIMENSIONS (in inch)**

**Tape & Reel Package Orientation (in mm)**


A<sub>0</sub> = 7.0 mm  
 A<sub>1</sub> = 1.45 mm  
 B<sub>0</sub> = 7.0 mm  
 B<sub>1</sub> = 0.9 mm  
 K<sub>0</sub> = 2.0 mm

Standard Reel Size	7"
Standard Reel Quantity	1000