



### Low Noise Ceramic Packaged PHEMT GaAs FETs

#### FEATURES

- 0.5 dB Typical Noise Figure at 12 GHz
- High Associated Gain:  
Ga = 13 dB Typical at 12 GHz
- Lg = 0.25  $\mu\text{m}$ , Wg = 160  $\mu\text{m}$
- 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 $V_{DS} = 2\text{ V}$ , $I_{DS} = 10\text{ mA}$ , $f = 12\text{ GHz}$		0.5	0.7	dB
G <sub>a</sub>	Associated Gain at $V_{DS} = 2\text{ V}$ , $I_{DS} = 10\text{ mA}$ , $f = 12\text{ GHz}$	10	13		dB
I <sub>DSS</sub>	Saturated Drain-Source Current at $V_{DS} = 2\text{ V}$ , $V_{GS} = 0\text{ V}$		40		mA
g <sub>m</sub>	Transconductance at $V_{DS} = 2\text{ V}$ , $V_{GS} = 0\text{ V}$		55		mS
V <sub>p</sub>	Pinch-off Voltage at $V_{DS} = 2\text{ V}$ , $I_D = 0.32\text{ mA}$	-0.5	-1.0	-2.0	Volts
BV <sub>DGO</sub>	Drain-Gate Breakdown Voltage at $I_{DGO} = 0.08\text{ mA}$	5	9		Volts
R <sub>th</sub>	Thermal Resistance		130		$^\circ\text{C/W}$

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

Symbol	Parameter	Rating
V <sub>DS</sub>	Drain-Source Voltage	5.0 V
V <sub>GS</sub>	Gate-Source Voltage	-3.0 V
I <sub>DS</sub>	Drain Current	I <sub>DSS</sub>
I <sub>GS</sub>	Gate Current	160 $\mu\text{A}$
P <sub>in</sub>	RF Input Power, CW	14 dBm
P <sub>T</sub>	Continuous Dissipation	150 mW
T <sub>CH</sub>	Channel Temperature	175 $^\circ\text{C}$
T <sub>STG</sub>	Storage Temperature	- 65 $^\circ\text{C}$ to +175 $^\circ\text{C}$

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

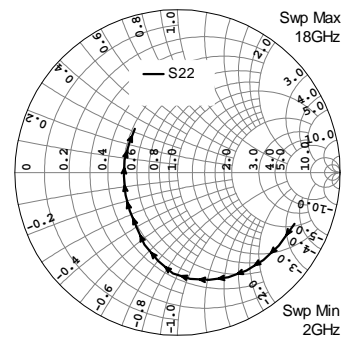
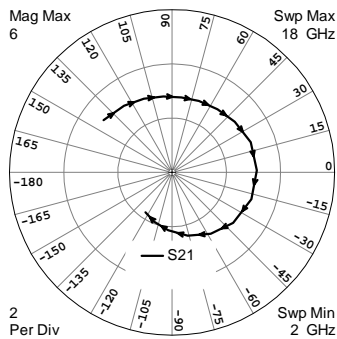
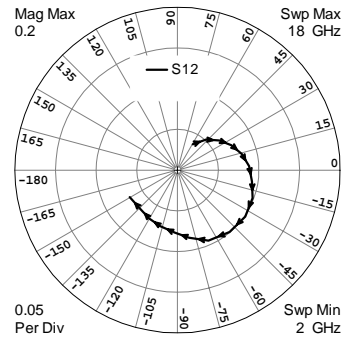
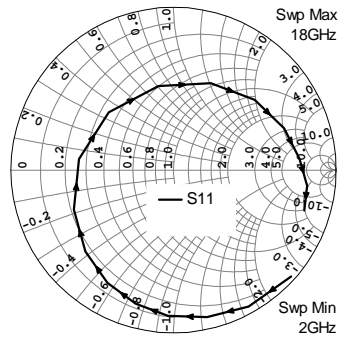
$V_{DS} = 2\text{ V}$ ,  $I_{DS} = 10\text{ mA}$

Frequency (GHz)	NF <sub>opt</sub> (dB)	G <sub>A</sub> (dB)	$\Gamma_{opt}$		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

# TC2182

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

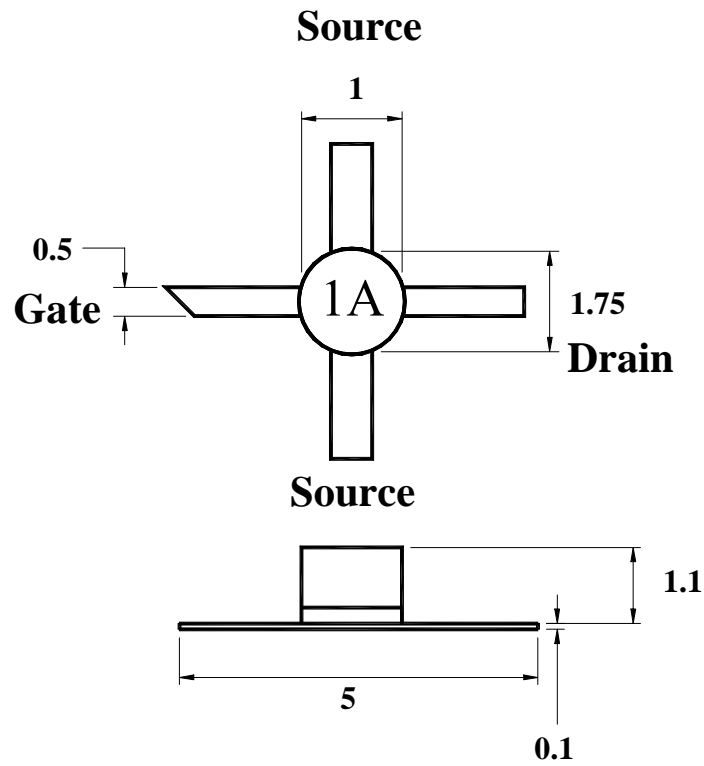
$V_{DS} = 2\text{ V}$ ,  $I_{DS} = 10\text{ mA}$



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 mm)**



TC2182

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## Notes