

Low Noise and Medium Power Packaged GaAs FETs

FEATURES

- 0.9dB Typical Noise Figure at 12GHz
- High Associated Gain: $G_a = 10\text{dB}$ Typical at 12GHz
- 23.5dBm Typical Power at 12GHz
- 11dB Typical Power Gain at 12GHz
- Breakdown Voltage : $BV_{DGO} \geq 9\text{V}$
- $L_g = 0.25 \mu\text{m}$, $W_g = 600 \mu\text{m}$
- Tight V_p ranges control
- High RF input power handling capability
- 100 % DC Tested
- Micro-X Metal Ceramic Package

PHOTO ENLARGEMENT



DESCRIPTION

The TC2384 is a high performance field effect transistor housed in a ceramic micro-x package with TC1304 PHEMT Chip. It has very low noise figure, high associated gain and high dynamic range that makes this device be 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 $V_{DS} = 4 \text{ V}$, $I_{DS} = 50 \text{ mA}$, $f = 12\text{GHz}$		0.9	1.2	dB
G_a	Associated Gain at $V_{DS} = 4 \text{ V}$, $I_{DS} = 50 \text{ mA}$, $f = 12\text{GHz}$	7.5	9		dB
P_{1dB}	Output Power at 1dB Gain Compression Point, $f = 12\text{GHz}$ $V_{DS} = 6 \text{ V}$, $I_{DS} = 80 \text{ mA}$	23.5	24.5		dBm
G_L	Linear Power Gain, $f = 12\text{GHz}$ $V_{DS} = 6 \text{ V}$, $I_{DS} = 80 \text{ mA}$	9	10		dB
I_{DSS}	Saturated Drain-Source Current at $V_{DS} = 2 \text{ V}$, $V_{GS} = 0 \text{ V}$		180		mA
g_m	Transconductance at $V_{DS} = 2 \text{ V}$, $V_{GS} = 0 \text{ V}$		200		mS
V_p	Pinch-off Voltage at $V_{DS} = 2 \text{ V}$, $I_D = 1.2\text{mA}$		-1.0*		Volts
BV_{DGO}	Drain-Gate Breakdown Voltage at $I_{DGO} = 0.3\text{mA}$	9	12		Volts
R_{th}	Thermal Resistance		75		$^\circ\text{C}/\text{W}$

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

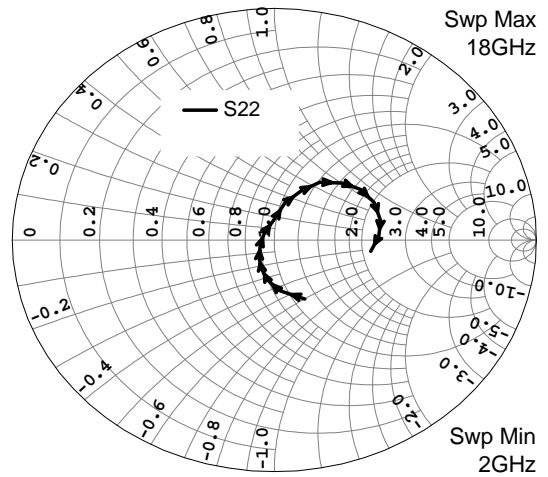
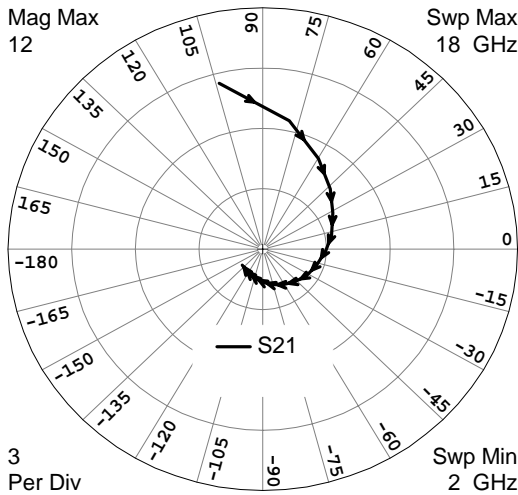
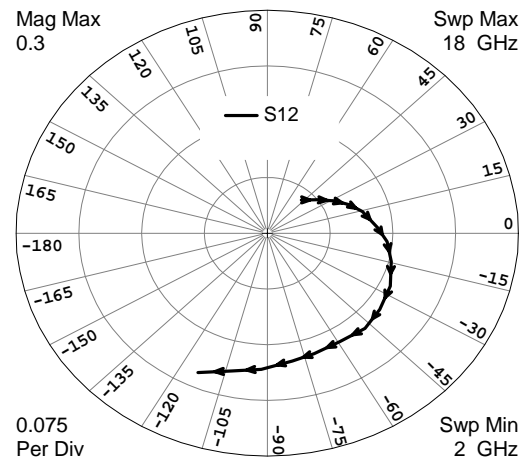
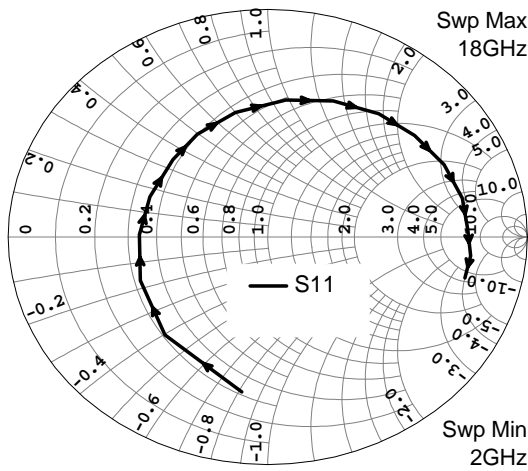
Symbol	Parameter	Rating
V_{DS}	Drain-Source Voltage	7.0 V
V_{GS}	Gate-Source Voltage	-3.0 V
I_{DS}	Drain Current	I_{DSS}
I_{GS}	Gate Current	600 μA
P_{in}	RF Input Power, CW	24 dBm
P_T	Continuous Dissipation	800 mW
T_{CH}	Channel Temperature	175 $^\circ\text{C}$
T_{STG}	Storage Temperature	- 65 $^\circ\text{C}$ to +175 $^\circ\text{C}$

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

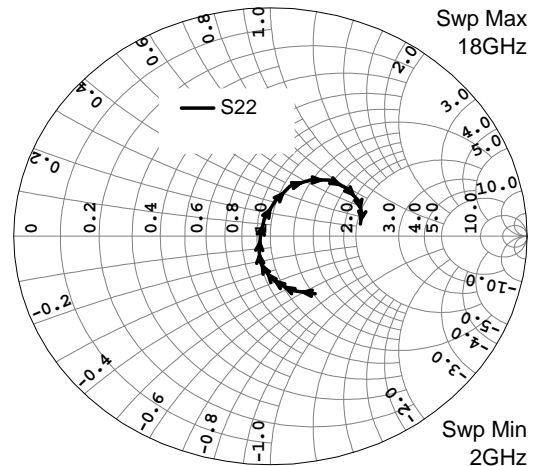
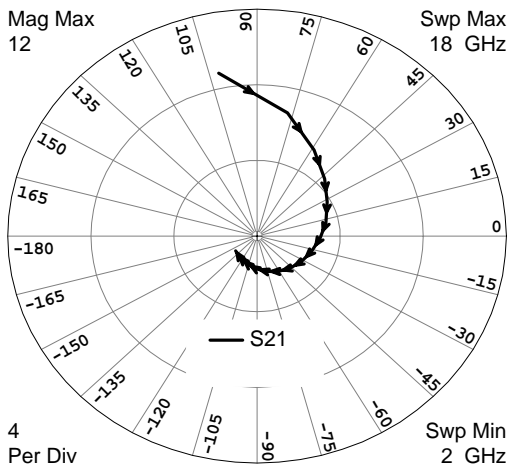
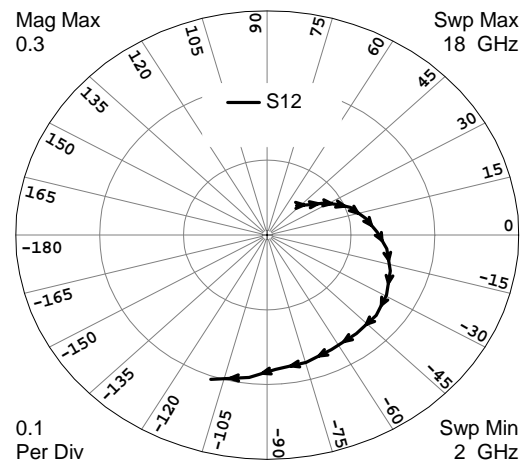
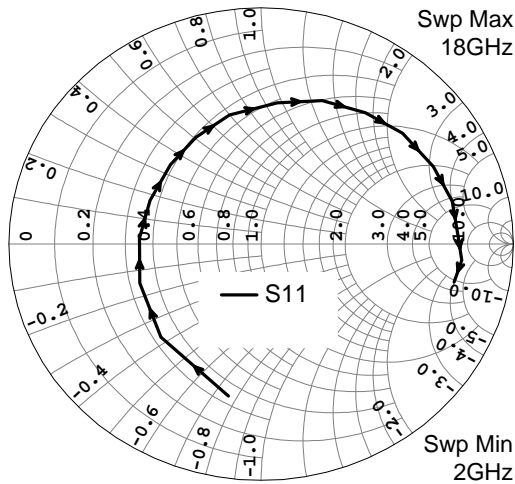
$V_{DS} = 4 \text{ V}$, $I_{DS} = 50 \text{ mA}$

Frequency (GHz)	NF_{opt} (dB)	G_A (dB)	Γ_{opt}		$Rn/50$
			MAG	ANG	
2	0.36	19.7	0.80	15	0.28
4	0.48	16.6	0.67	39	0.18
6	0.59	14.3	0.56	64	0.15
8	0.70	12.7	0.49	92	0.12
10	0.82	11.7	0.46	120	0.09
12	0.93	10.9	0.45	148	0.06
14	1.05	10.4	0.46	174	0.04
16	1.16	9.8	0.47	-162	0.04
18	1.27	9.0	0.48	-141	0.07

* For the tight control of the pinch-off voltage range, we divide TC2384 into 3 model numbers to fit customer design requirement
 (1)TC2384P0710 : $V_p = -0.7\text{V}$ to -1.0V (2)TC2384P0811 : $V_p = -0.8\text{V}$ to -1.1V (3)TC2384P0912 : $V_p = -0.9\text{V}$ to -1.2V
 If required, customer can specify the requirement in purchasing document. For special V_p requirement, please contact factory for details.

TYPICAL SCATTERING PARAMETERS (T_A=25 °C) V_{DS} = 4 V, I_{DS} = 50 mA


FREQUENCY (GHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
2	0.6887	-98.44	8.4885	103.97	0.0606	47.57	0.2794	-65.35
3	0.5850	-132.64	6.4990	78.93	0.0759	36.22	0.2177	-85.58
4	0.5264	-158.74	5.2043	59.81	0.0919	28.04	0.1723	-99.14
5	0.4954	178.78	4.3608	43.36	0.1055	21.17	0.1336	-111.33
6	0.4877	158.68	3.7586	28.55	0.1175	14.32	0.0953	-127.33
7	0.4998	137.01	3.3116	11.76	0.1320	3.22	0.0574	-159.60
8	0.5272	120.98	2.9721	-1.58	0.1436	-4.42	0.0495	139.51
9	0.5620	102.89	2.6696	-17.04	0.1528	-14.37	0.0928	88.70
10	0.6062	83.36	2.4464	-32.80	0.1634	-25.87	0.1640	75.88
11	0.6485	67.12	2.2199	-47.17	0.1690	-37.32	0.2321	64.69
12	0.6899	51.77	2.0086	-61.93	0.1732	-47.68	0.3052	55.28
13	0.7209	38.28	1.8199	-76.38	0.1699	-59.20	0.3602	43.20
14	0.7492	25.12	1.6399	-90.61	0.1716	-71.01	0.3952	33.42
15	0.7684	12.80	1.4874	-104.27	0.1745	-80.13	0.4143	23.09
16	0.7717	2.46	1.3646	-117.52	0.1831	-92.17	0.4137	11.53
17	0.7856	-6.06	1.2956	-129.44	0.1903	-102.81	0.3990	2.27
18	0.7801	-13.35	1.2543	-140.72	0.2048	-113.75	0.3711	-7.60

TYPICAL SCATTERING PARAMETERS (T_A=25 °C) V_{DS} = 6 V, I_{DS} = 80 mA


FREQUENCY (GHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
2	0.6559	-101.42	8.8014	102.10	0.0529	48.53	0.3060	-55.14
3	0.5593	-135.25	6.6701	77.33	0.0667	37.63	0.2514	-70.66
4	0.5077	-161.12	5.3165	58.86	0.0806	32.26	0.2141	-79.92
5	0.4832	177.01	4.4496	42.81	0.0943	25.52	0.1859	-88.34
6	0.4770	157.25	3.8380	28.27	0.1059	20.25	0.1526	-97.77
7	0.4928	136.83	3.3923	11.97	0.1192	10.68	0.1177	-110.32
8	0.5202	119.77	3.0403	-2.02	0.1312	1.68	0.0735	-125.90
9	0.5607	102.92	2.7518	-17.09	0.1436	-7.43	0.0383	176.78
10	0.6016	83.77	2.5281	-32.72	0.1546	-18.09	0.0808	106.46
11	0.6547	68.23	2.3173	-47.73	0.1634	-29.48	0.1524	83.34
12	0.6928	53.33	2.1133	-62.30	0.1685	-39.66	0.2316	70.85
13	0.7311	39.90	1.9055	-77.43	0.1694	-51.11	0.2935	57.27
14	0.7576	25.70	1.7215	-92.81	0.1714	-63.42	0.3390	46.50
15	0.7794	13.55	1.5553	-106.68	0.1764	-74.73	0.3648	35.11
16	0.7819	2.70	1.4252	-120.08	0.1801	-86.87	0.3774	24.30
17	0.7981	-4.90	1.3466	-132.09	0.1916	-96.44	0.3697	15.38
18	0.7817	-11.91	1.2907	-143.23	0.2043	-109.22	0.3548	8.72

OUTLINE DIMENSIONS (Unit: inch)
