

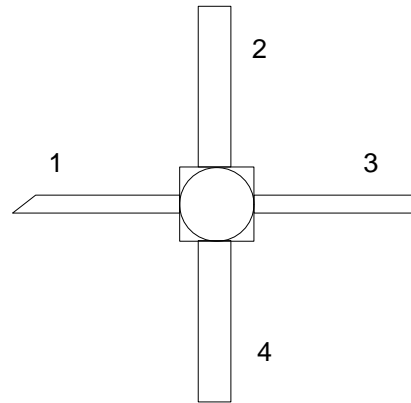
## 12GHz Super Low Noise HEMT

### AlGaAs/GaAs Field Effect Transistor

#### Description

The TC2623 is a X/Ku band Schottky barrier High Electron Mobility Transistor. This device is based on a 0.25 $\mu$ m mushroom Aluminium gate associated with an HEMT active layer and passivated with a Si<sub>3</sub>N<sub>4</sub> layer.

It is mounted in a 70mils hermetic ceramic-metal package, easy to match at X band. It is available in the BMH204 package and in chip form.



#### Main Features

- 0.3dB minimum noise figure @ 5GHz
- 0.65dB minimum noise figure @ 12GHz
- 14dB associated gain @ 5GHz
- 10.5dB associated gain @ 12GHz

1 : Gate  
2 : Source  
3 : Drain  
4 : Source

#### Main Characteristics

T<sub>amb</sub> = +25°C

Symbol	Parameter	Min	Typ	Max	Unit
I <sub>dss</sub>	Saturated drain current	10	30	60	mA
NF <sub>min</sub>	Minimum noise figure		0.3	0.55	dB
G <sub>a</sub>	Associated gain	13	14		dB

ESD Protections: Electrostatic discharge sensitive device observe handling precautions!

## Electrical Characteristics

Tamb = +25°C

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Idss	Saturated drain current	Vds = 1V Vgs = 0V	10	30	60	mA
Vp	Pinch off voltage	Vds = 1V Ids = Idss/100	-1.0	-0.6	-0.2	V
Gm	Transconductance	Vds = 1V Ids = 10mA	35	45		mS
Igsd	Gate to source/drain leakage current	Vgsd = -3V			30	μA

## Dynamic characteristics

Symbol	Parameter	Test Conditions		Min	Max	Unit
NF min	Minimum noise figure	Vds=2V	F= 5GHz		0.55	dB
			F= 12GHz		0.85	dB
Ga	Associated Gain	Ids=10mA	F= 5GHz	13		dB
			F= 12GHz	9.5		dB

## Absolute Maximum Ratings (1)

Tamb = +25°C

Symbol	Parameter	Values	Unit
Vds	drain to source voltage	3	V
Vgs	Gate to source voltage	-3	V
Pt	Total power dissipation	60	mW
Tch	Operating channel temperature	+175	°C
Tstg	Storage temperature range	-65 to +175	°C

(1) Operation of this device above any one of these parameters may cause permanent damage

## Typical Scattering Parameters

Tamb = +25°C

"S" Parameters

Vds = 2V, Ids = 26mA

Freq. MHz	S11 dB	S11 /°	S21 dB	S21 /°	S12 dB	S12 /°	S22 dB	S22 /°
1000	0.19	23.4	16.40	159.3	-34.07	75.2	-5.34	-18.6
2000	0.65	-44.9	15.77	140.8	-28.57	62.9	-5.72	-36.1
3000	-1.14	-63.8	14.94	124.3	-26.03	51.1	-5.98	-51.2
4000	-1.66	-79.5	14.06	109.6	-24.36	43.0	-6.32	-63.2
5000	-2.21	-93.1	13.27	96.9	-23.37	35.0	-6.54	-75.0
6000	-2.70	-106.2	12.47	84.4	-22.68	28.8	-6.58	-83.1
7000	-3.25	-115.6	11.74	74.0	-22.15	23.1	-6.94	-92.2
8000	-3.48	-125.5	11.27	63.8	-21.55	19.1	-6.60	-98.9
9000	-4.16	-135.8	10.74	53.1	-21.28	12.6	-6.93	-106.5
10000	-4.42	-140.5	10.40	44.9	-20.71	10.9	-6.52	-110.1
11000	-5.33	-154.4	10.56	33.7	-19.88	2.8	-7.20	-119.6
12000	-6.32	-168.4	10.20	22.2	-19.64	-2.6	-7.38	-128.4
13000	-6.87	179.0	10.32	12.1	-18.89	-9.9	-8.33	-137.1
14000	-8.28	153.4	10.24	-2.1	-18.43	-19.5	-8.94	-157.4
15000	-8.49	130.8	10.06	-14.4	-18.26	-28.4	-9.87	-167.6
16000	-8.53	102.5	9.73	-29.4	-17.75	-39.8	-11.74	166.8
17000	-7.64	75.6	9.48	-43.1	-18.01	-51.8	-12.20	138.1
18000	-6.91	55.2	8.77	-58.5	-17.73	-62.4	-12.32	114.4
19000	-6.44	41.4	8.18	-70.5	-18.12	-76.0	-10.96	88.9
20000	-6.19	25.02	7.71	-84.5	-17.97	-84.8	-10.85	86.4

## Typical results

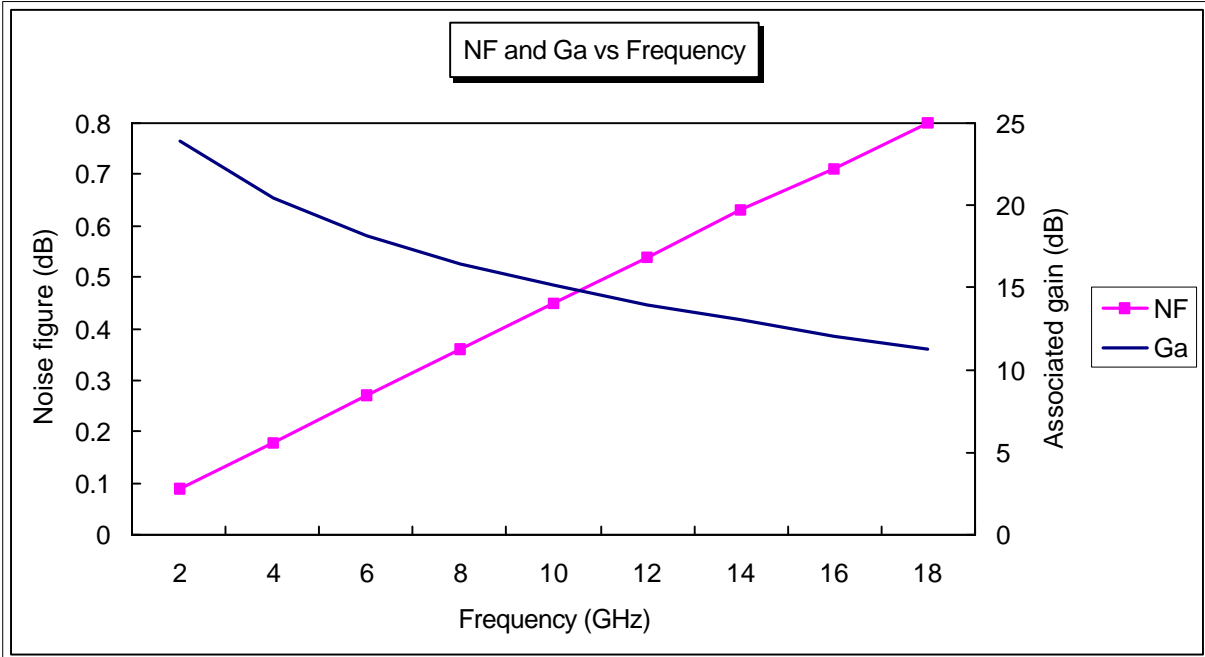
Tamb = +25°C

Typical noise parameters at Vds = 2v, Ids = 10mA,  
including 0.1nH gate and drain series inductance

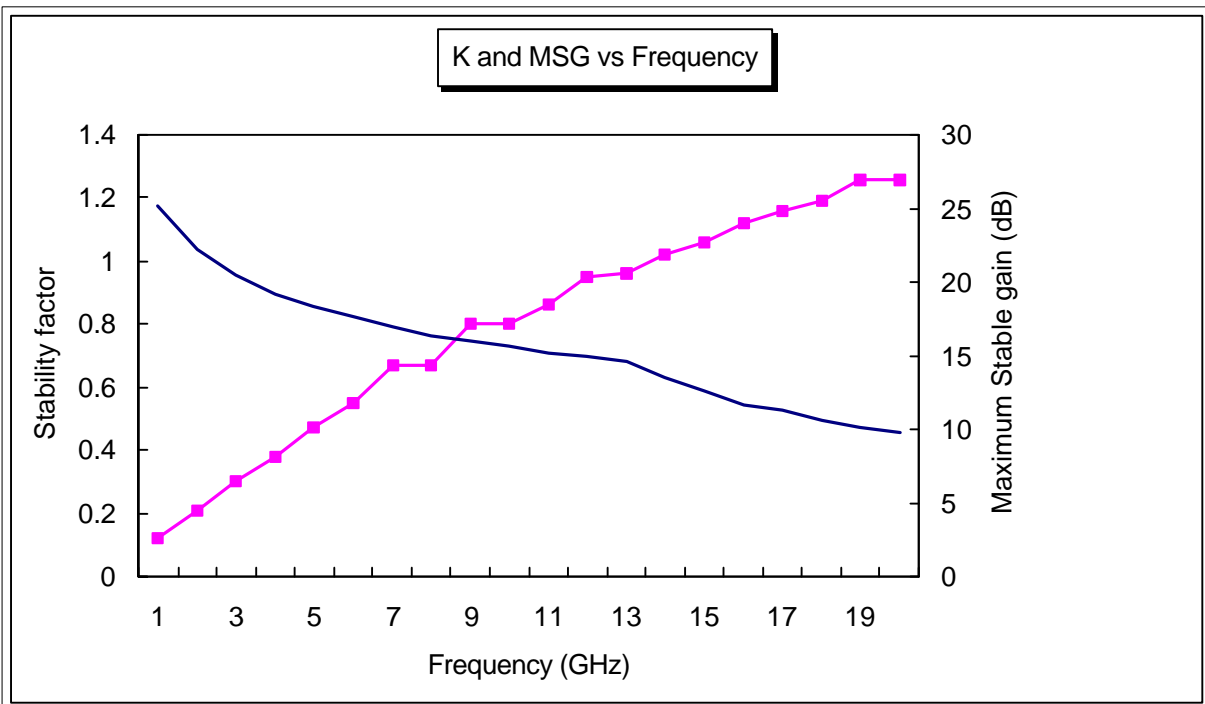
Frequency MHz	NF min dB	Ga dB	Γopt		Rn
			MOD.	Ang-deg.	
2000	0.09	23.9	0.912	15.4	11.00
4000	0.18	20.4	0.835	30.8	10.60
6000	0.27	18.1	0.770	46.1	10.10
8000	0.36	16.4	0.720	61.4	9.30
10000	0.45	15.1	0.680	76.4	8.40
12000	0.54	13.9	0.650	91.1	7.40
14000	0.63	13.0	0.635	105.0	6.35
16000	0.71	12.1	0.625	119.0	5.25
18000	0.80	11.3	0.625	131.0	4.20

Typical Parameters

Tamb = +25°C

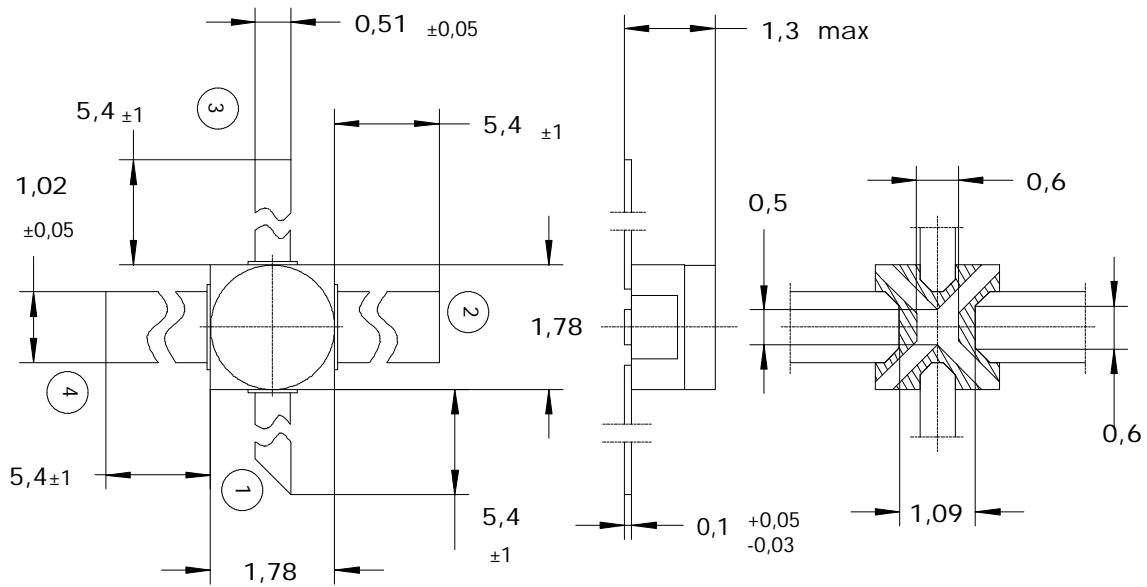


Vds = 2V, Ids = 10mA



Vds = 2V, Ids = 26mA

**BMH204 Package**



Dimensions in mm

- 1: Gate
- 2: Source
- 3: Drain
- 4: Source

## Ordering Information

Package : TC2623-A3X/00  
Chip form : EC2623-99X/00 (see Data Sheet EC2623 for more informations)

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