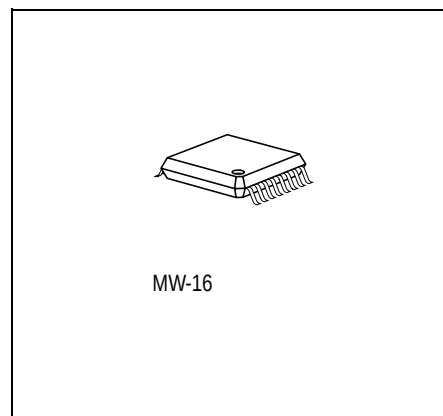


GaAs MMIC

Data Sheet

CGY 340

- WLL transmit upconverter IC for 3.5 GHz
- Fully Integrated IF Variable Gain Amplifier, Mixer, LO-Buffer, three RF Amplifier Stages and a switched Attenuator
- High Conversion Gain: typ. 29 dB
- Gain Control Range: > 75 dB
- 1 dB-Compression Point P_{1dB} : + 17.0 dBm
- Output 3rd Order Intercept Point (OIP3) at G_{max} : + 28 dBm
- Very low LO-Power demand of typ. – 5 to 0 dBm
- Minimum of external components and easy matching
- Total Current Consumption: typ. 270 mA @ 5 V
- Temperature Range: – 40 °C to + 85 °C

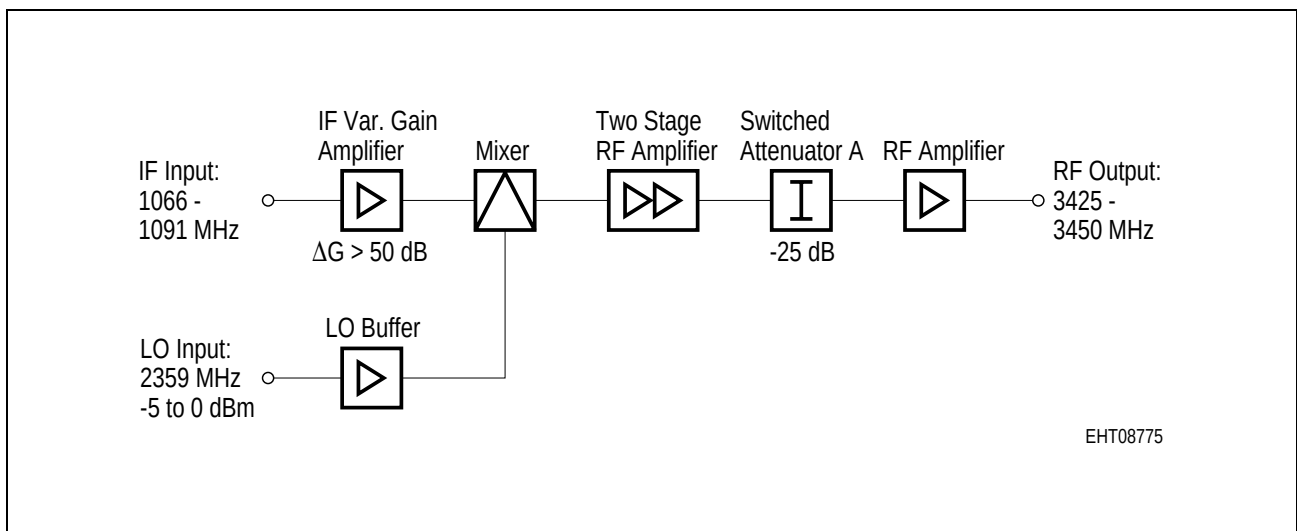


ESD: **E**lectrostatic **d**ischarge sensitive device, observe handling precautions!

Type	Marking	Ordering Code (tape and reel)	Package
CGY 340	CGY 340	Q62702-G81	MW-16

Maximum Ratings	Port	Symbol	Values		Unit
			min.	max.	
Positive Supply Voltage	3, 5, 6, 11, 12	$V_{DLO}, V_{DRF1},$ $V_{DRF3}, V_{DRF2},$ V_{DVGA}	0	+ 8	V
Negative Supply Voltage	13	V_G	0	– 6	V
IF VGA Control Voltage	14	VGA	– 2.0	+ 8	V
Voltage at Step Attenuator	9, 10	A, A bar	– 0.5	+ 8	V
Power into IF Input	16	IF	–	10	dBm
Power into LO Input	1	LO	–	10	dBm
Channel Temperature	–	T_{Ch}	–	150	°C
Storage Temperature	–	T_{stg}	– 55	150	°C

Thermal Resistance	Symbol	Value	Unit
Channel to Soldering Point (GND)	R_{thChS}	t.b.d.	K/W


Figure 1 RF Block Diagram

Electrical Characteristics

Test Conditions: $T_a = 25\text{ }^{\circ}\text{C}$; $V_{DD} = 5\text{ V}$, $V_{GG} = -5\text{ V}$; $f_{IF} = 1066 - 1091\text{ MHz}$; $P_{IF} = -20\text{ dBm}$; $f_{LO} = 2359\text{ MHz}$; $P_{LO} = 0\text{ dBm}$; $f_{RF} = 3425 - 3450\text{ MHz}$, VGA adjusted to max. gain, attenuator A “OUT” or “IN” (for further information about the VGA and the attenuator see “Attenuator State” on **Page 7**).:

Parameter	Symbol	Limit Values			Unit
		min.	typ.	max.	
Operating Drain Current	I_{op}	–	270	–	mA
Operating Drain Current LO Buffer only	I_{LO}	–	10	–	mA
Operating Gate Current	I_g	–	1.3	–	mA

Test Conditions: As above, but VGA adjusted to max. gain and attenuator A “OUT” (for further information about the VGA and the attenuator see “Attenuator State” on **Page 7**).

Parameter, Test Conditions	Symbol	Limit Values			Unit
		min.	typ.	max.	
Conversion Gain ¹⁾	G_c	–	29.0	–	dB
Total Dynamic Range Output Power	ΔG_{tot}	–	> 75	–	dB
VGA Dynamic Range Output Power	ΔG_{VGA}	–	> 50	–	dB
SSB Noise Figure	F_{ssb}	–	5.5	–	dB
1 dB-Compression Point	P_{1dB}	–	17.0	–	dBm
Output 3 rd Order Intercept Point (OIP3) at G_{max}	OIP3	–	+ 28	–	dBm

Signal Breakthrough at $P_{LO} = 0\text{ dBm}$ and $P_{RF} = +8.5\text{ dBm}$

LO Leakage at RF-Port	P_{LO}	–	– 38	–	dBm
LO Leakage at IF-Port	P_{LO}	–	– 31	–	dBm

Spectral Regrowth at G_{max} and $P_{out} = +8.5\text{ dBm}$ ²⁾

Offset: $\pm 256\text{ kHz}$	–	– 46	–	dBc
Offset: $\pm 512\text{ kHz}$	–	– 66	–	dBc
Offset: $\pm 768\text{ kHz}$	–	> – 70	–	dBc

Test Conditions: As above, but VGA adjusted to max. gain and attenuator A “OUT” (for further information about the VGA and the attenuator see “Attenuator State” on **Page 7**).

Parameter, Test Conditions	Symbol	Limit Values			Unit
		min.	typ.	max.	

Return Loss

IF Port ³⁾	S_{11}	–	14	–	dB
RF Port ³⁾	S_{22}	–	10	–	dB
LO Port ³⁾	S_{11}	–	20	–	dB

¹⁾ Variable Gain Amplifier (VGA) and Switched Attenuator A.

²⁾ Modulation: $\pi/4$ DQPSK (2 b/sym). Symbol Rate: 256 ksym/s. Mode: PHS. Filter: RNYQ. Filter Alpha: 0.40.

³⁾ Configuration as shown on application board.

Test Conditions: As above, but VGA adjusted to max. gain and attenuator A “IN” (for further information about the VGA and the attenuator see “Attenuator State” on **Page 7**).

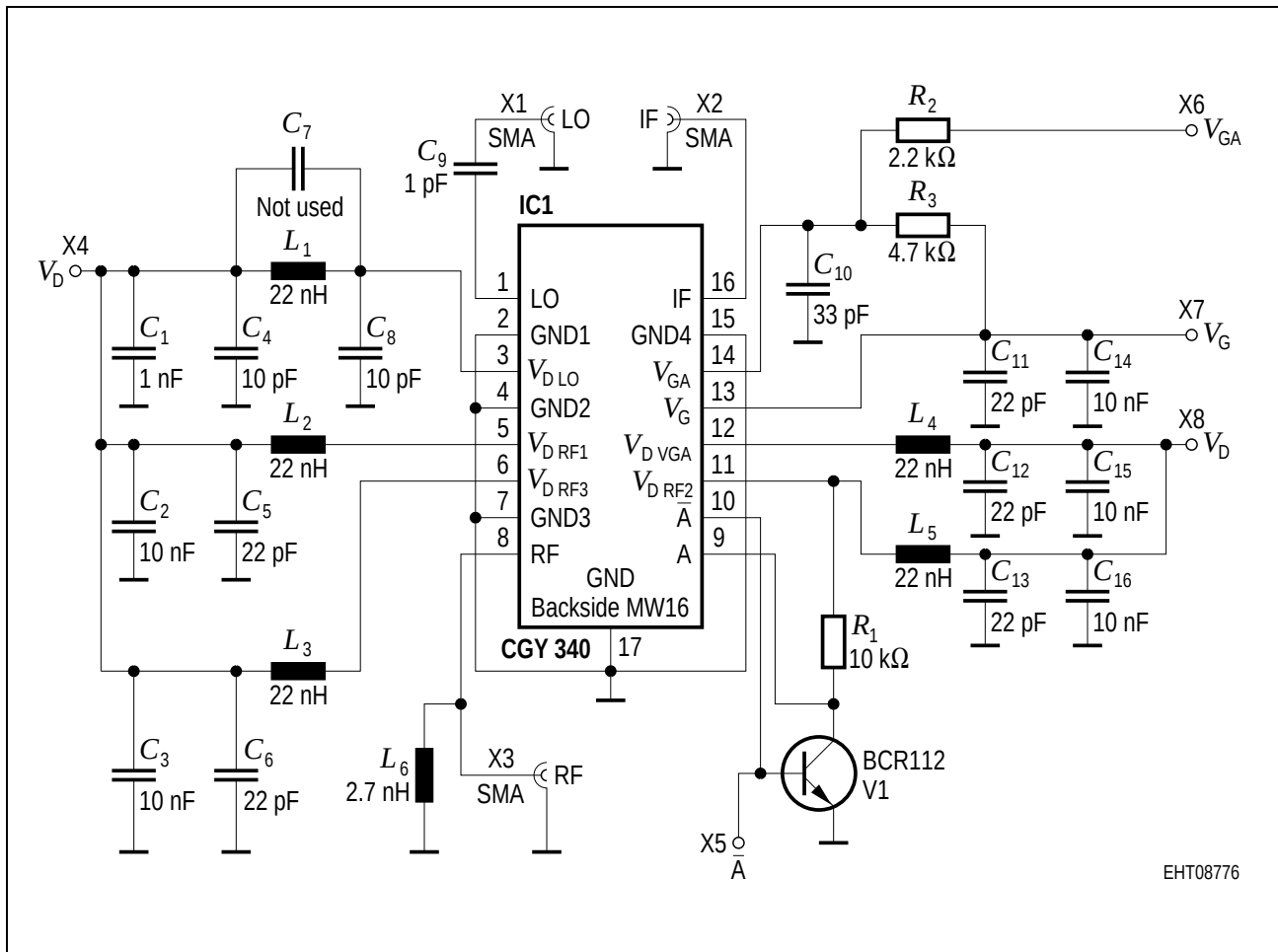
Parameter	Symbol	Limit Values			Unit
		min.	typ.	max.	
Conversion Gain	G_c	–	3.0	–	dB

Test Conditions: As above, but VGA adjusted to min. gain and attenuator A “OUT” (for further information about the VGA and the attenuator see “Attenuator State” on **Page 7**).

Parameter	Symbol	Limit Values			Unit
		min.	typ.	max.	
Conversion Gain	G_c	–	< – 29.0	–	dB

Test Conditions: As above, but VGA adjusted to min. gain and attenuator A “IN” (for further information about the VGA and the attenuator see “Attenuator State” on **Page 7**).

Parameter	Symbol	Limit Values			Unit
		min.	typ.	max.	
Conversion Gain	G_c	–	< – 50.0	–	dB



EHT08776

Figure 2 Application Circuit

Notes: Package of all resistors and capacitors: 0603.

All inductors: TOKO LL-1608-FH.

The attenuator A is "OUT" without supplying port A, the gain of the variable gain amplifier is maximum when X6 (VGA) is supplied with + 5.0 V (for further information about the VGA and the attenuator see "Attenuator State" on **Page 7**).

Pin Definitions and Functions

Pin No.	Symbol	Function	Bias Voltage
1	LO	LO Input	–
2	GND1	GND	0 V
3	VDLO	Mixer Drain Bias	+ 5 V
4	GND2	GND	0 V
5	VDRF1	1 st RF Amp Drain Bias	+ 5 V
6	VDRF3	3 rd RF Amp Drain Bias	+ 5 V
7	GND3	GND	0 V
8	RF	RF Output	–
9	A	Attenuator Control	+ 5 V, 0 V
10	A bar	Attenuator Control bar	0 V, + 5 V
11	VDRF2	2 nd RF Amp Drain Bias	+ 5 V
12	VDVGA	IF VGA Drain Bias	+ 5 V
13	VG	Negative Supply	– 5 V
14	VGA	IF VGA Control Voltage	– 1.6 V to + 1.8 V ¹⁾
15	GND4	GND	0 V
16	IF	IF Input	–
MW-16 Heatsink Slug	GND	OWP Ground	0 V

¹⁾ A voltage of – 1.6 V to + 1.8 V on Pin 14 is equal to a voltage of 0 V to + 5 V on pad X6 of the application circuit.

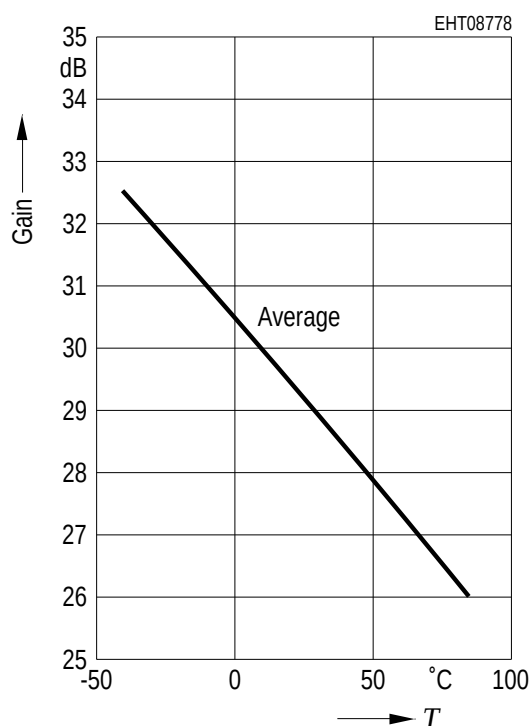
Attenuator State

Attenuator A	"IN"	Pin 9 = Low, Pin 10 = High
	"OUT"	Pin 9 = High, Pin 10 = Low
Logic level High:	$V_{\text{High}} > V_D - 0.15 \text{ V}$	
Logic level Low:	$V_{\text{Low}} < + 0.5 \text{ V}$	
Note:	Attenuator "OUT" is defined as maximum gain state.	
	Attenuator "IN" is defined as minimum gain state.	
VGA	Min. Gain	Pin 14 = – 1.5 V (equal to a voltage of 0 V on pad X6 of the application circuit)
	Max. Gain	Pin 14 = + 1.8 V (equal to a voltage of 5 V on pad X6 of the application circuit)

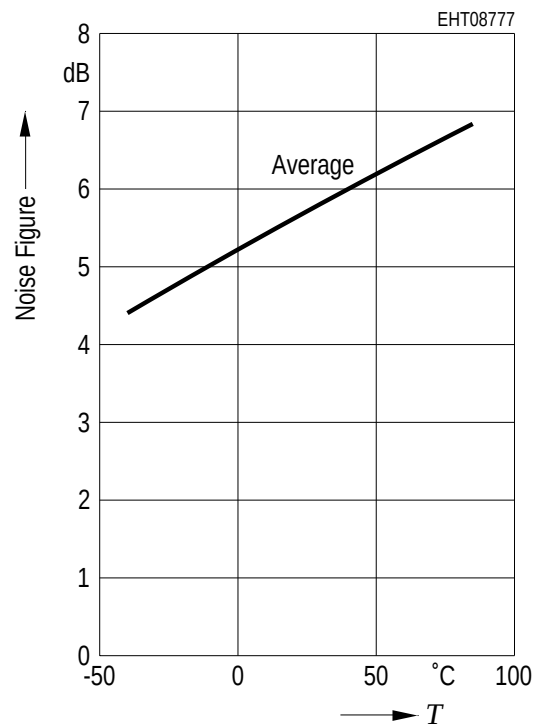
Electrical Characteristics vs. Temperature

Test Conditions: $V_{\text{DD}} = 5 \text{ V}$, $V_{\text{GG}} = -5 \text{ V}$; $f_{\text{IF}} = 1066 - 1091 \text{ MHz}$; $P_{\text{IF}} = -20 \text{ dBm}$; $f_{\text{LO}} = 2359 \text{ MHz}$; $P_{\text{LO}} = 0 \text{ dBm}$; $f_{\text{RF}} = 3425 - 3450 \text{ MHz}$, VGA adjusted to max. gain and attenuator A "OUT" (for further information about the VGA and the attenuator see "Attenuator State" on **Page 7**).

TXIC Max. Gain



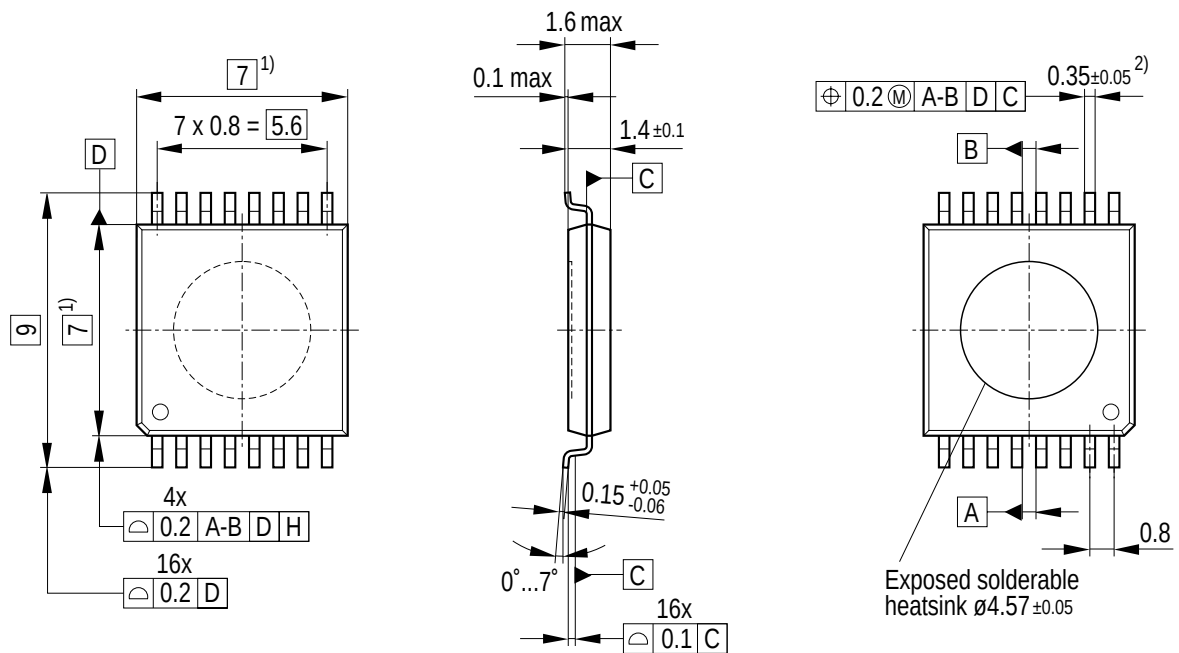
TXIC Noise Figure



Package Outlines

MW-16

(Special Package)



GPW05969

Sorts of Packing

Package outlines for tubes, trays etc. are contained in our Data Book "Package Information".

SMD = Surface Mounted Device

Dimensions in mm