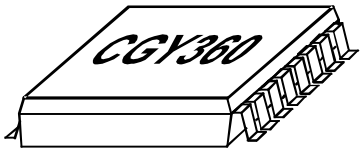
WLL Receive Downconverter IC for 3.5GHz

- Fully Integrated Two-Stage Preamplifier, Mixer, LO-Buffer, IF Amplifier and two Switched Attenuators
- Very high Input-IP3 of typical +5 dBm at max. gain and +28 dBm at min. gain
- Very low LO-Power demand of typ. -5 to 0 dBm
- High Conversion Gain: typ. 19dB
- Minimum of external components and easy matching
- Total Current Consumption: typ. 90mA @ 5V
- Temperature Range: -40°C to +85°C



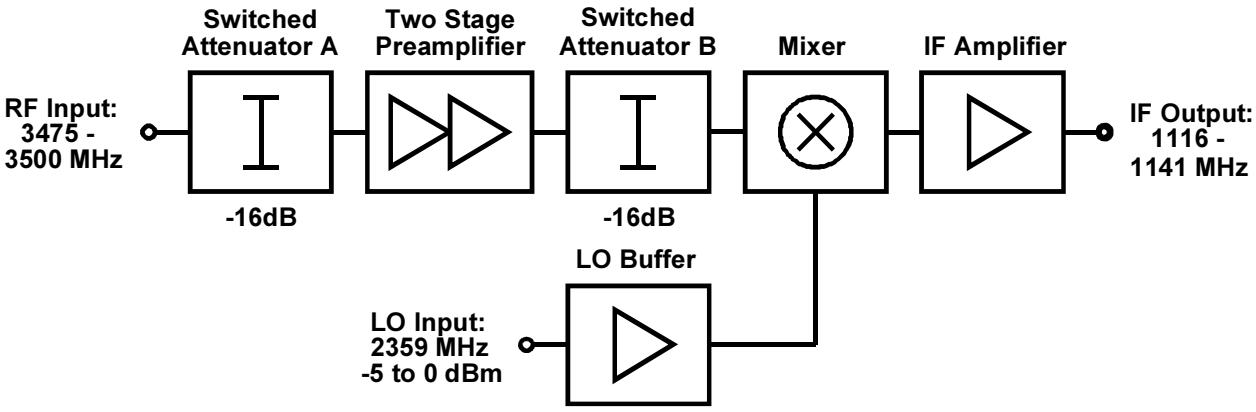
ESD: **E**lectro**s**tatic **d**ischarge sensitive device
Observe handling Precautions!

Type	Marking	Ordering code (tape and reel)	Package
CGY360	**CGY360**	**T.b.d.**	**MW-16**

Maximum Ratings	**Port**	**Symbol**	**Value**		**Unit**
			min	**max**	
Positive Supply Voltage	3, 4, 11, 15	V_{DLO}, V_{DRF2}, V_{DRF1}, V_{DIF}	0	+6	V
Negative Supply Voltage	13	V_G	0	-6	V
Voltage at Step Attenuators	6, 7, 9, 10	A, A bar, B bar, B	0	+6	V
Power into RF Input	8	RF		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			
Channel to Soldering Point (GND)	R_{thChS}	T.b.d.	K/W

RF Block Diagram



Electrical Characteristics

Test conditions: T_a = 25°C; V_{DD} = 5V, V_{GG} = -5V; f_{RF} = 3475-3500 MHz; f_{LO} = 2359 MHz; P_{LO} = 0 dBm; P_{RF} = -20 dBm; f_{IF} = 1116-1141 MHz, attenuators “OUT” or “IN”:

Parameter, Test Conditions	Symbol	min	typ	max	Unit
Operating Drain Current	I_{op}	-	90	-	mA
Operating Drain Current LO Buffer only (P_{LO} = 0 dBm)	I_{LO}	-	10	-	mA
Operating Gate Current	I_g	-	0.7	-	mA

Test conditions: As above, but attenuators “OUT” (for further information about the attenuators see “Attenuator State” on page 5).

Parameter, Test Conditions	Symbol	min	typ	max	Unit
Conversion Gain	G_c	-	19,0	-	dB
SSB Noise Figure	F_{ssb}	-	6,0	-	dB
3rd Order Input Intercept Point at max. gain	$IP3_{in}$	-	+5	-	dBm
LO Leakage at RF-Port with 0 dBm LO Input	P_{LO}	-	-28	-	dBm
LO Leakage at IF-Port with 0 dBm LO Input	P_{LO}	-	-19	-	dBm
Return Loss RF Port [1)]	S_{11}	-	14	-	dB
Return Loss IF Port [1)]	S_{22}	-	11	-	dB
Return Loss LO Port [1)]	S_{11}	-	9	-	dB

Test conditions: As above, but attenuator A “OUT” and attenuator B “IN” or attenuator A “IN” and attenuator B “OUT” (for further information about the attenuators see “Attenuator State” on page 5).

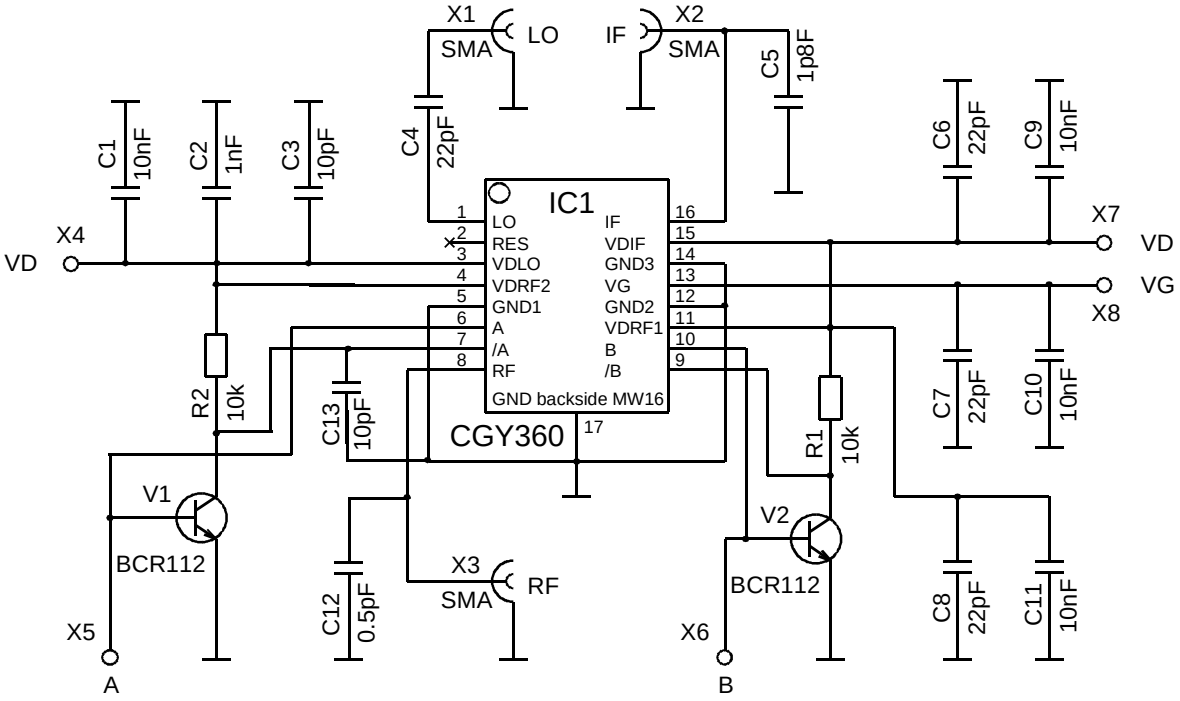
Parameter, Test Conditions	Symbol	min	typ	max	Unit
Conversion Gain	G_c	-	3,0	-	dB
SSB Noise Figure (A “IN”, B “OUT”)	F_{ssb}	-	16,0	-	dB
3rd Order Input Intercept Point (A “IN”, B “OUT”)	$IP3_{in}$	-	+18	-	dBm

Test conditions: As above, but attenuator A “IN” and attenuator B “IN” (for further information about the attenuators see “Attenuator State” on page 5).

Parameter, Test Conditions	Symbol	min	typ	max	Unit
Conversion Gain	G_c	-	-13,0	-	dB
SSB Noise Figure	F_{ssb}	-	35,0	-	dB
3rd Order Input Intercept Point at min. gain	$IP3_{in}$	-	+28	-	dBm

Note 1: Configuration as shown on application board

Application Circuit



Notes: Package of capacitor C12: 0402.

Package of all other capacitors and of all resistors: 0603.

The attenuators A and B are “OUT” without supplying the ports A and B (for further information about the attenuators see “Attenuator State” on page 5).

Pin Definitions and Functions

Pin No.	Symbol	Function	Bias Voltage
1	**LO**	LO Input	---
2	**Res**	Reserved	Leave open
3	**VDLO**	Mixer Drain Bias	+5V
4	**VDRF2**	2nd RF Amp Drain Bias	+5V
5	**GND1**	GND	0V
6	**A**	1st Attenuator Control	+5V, 0V
7	**A bar**	1st Attenuator Control bar	0V, +5V
8	**RF**	RF Input	---
9	**B bar**	2nd Attenuator Control bar	+5V, 0V
10	**B**	2nd Attenuator Control	0V, +5V
11	**VDRF1**	1st RF Amp Drain Bias	+5V
12	**GND2**	GND	0V
13	**VG**	Amplifier Gate Bias	-5V
14	**GND3**	GND	0V
15	**VDIF**	IF Amp Drain Bias	+5V
16	**IF**	IF Output	---
MW16 Heatsink Slug	**GND**	OWP Ground	0V

Attenuator State

Attenuator A "IN" Pin 6 = High, Pin 7 = Low
"OUT" Pin 6 = Low, Pin 7 = High
Attenuator B "IN" Pin 9 = Low, Pin 10 = High
"OUT" Pin 9 = High, Pin 10 = Low

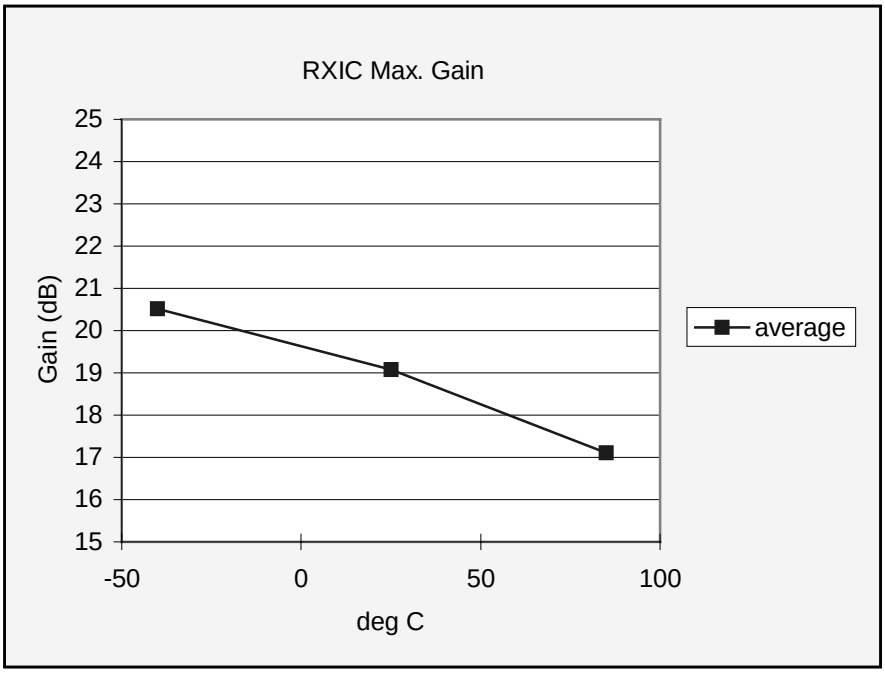
Logic level High: $V_{High}>V_D-0.15V$
Logic level Low: $V_{Low}<+0.5V$

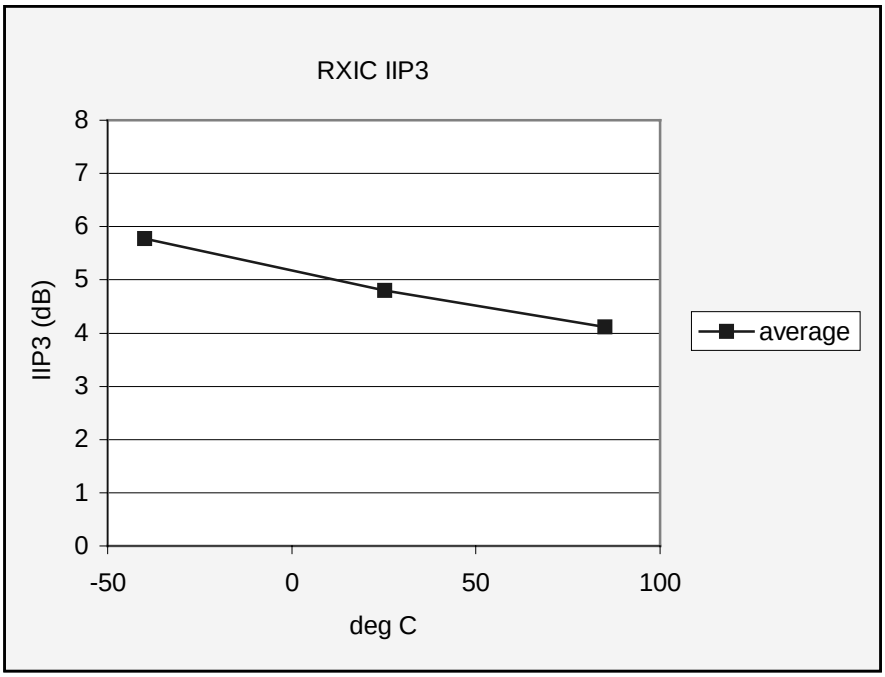
Note: Attenuator "OUT" is defined as maximum gain state.
Attenuator "IN" is defined as minimum gain state.

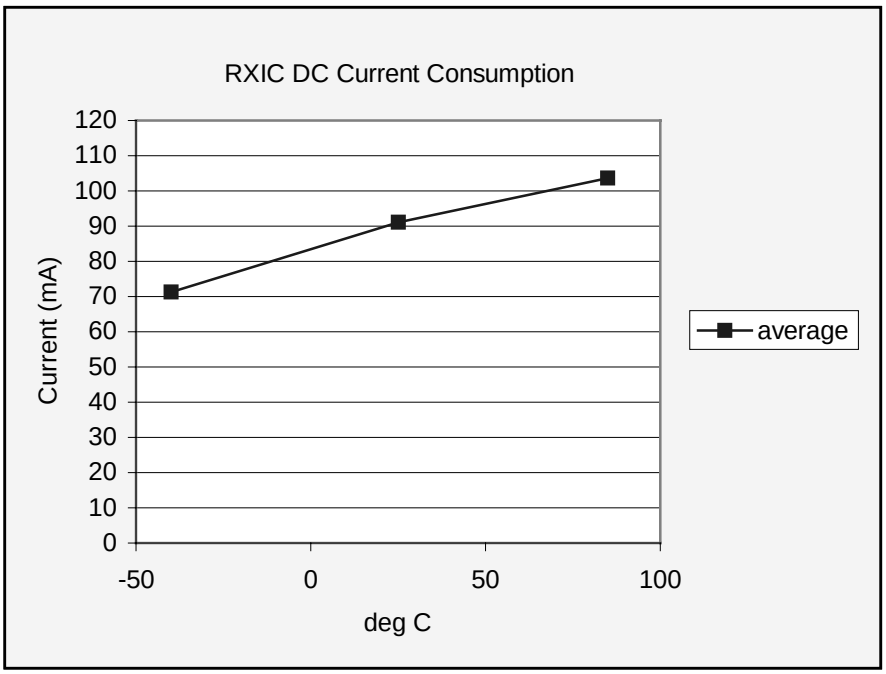
Electrical Characteristics versus Temperature

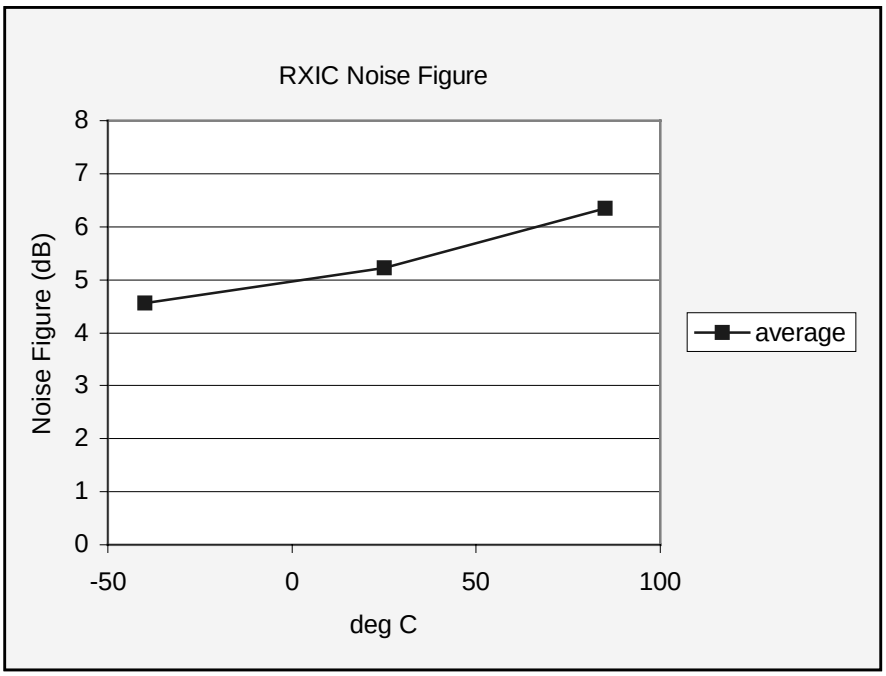
Test conditions: V_{DD} = 5V, V_{GG} = -5V; f_{RF} = 3475-3500 MHz; P_{RF} = -20 dBm;

f_{LO} = 2359 MHz; P_{LO} = 0 dBm; f_{IF} = 1116-1141MHz, both attenuators “OUT” (for further information about the attenuators see “Attenuator State” on page 5).

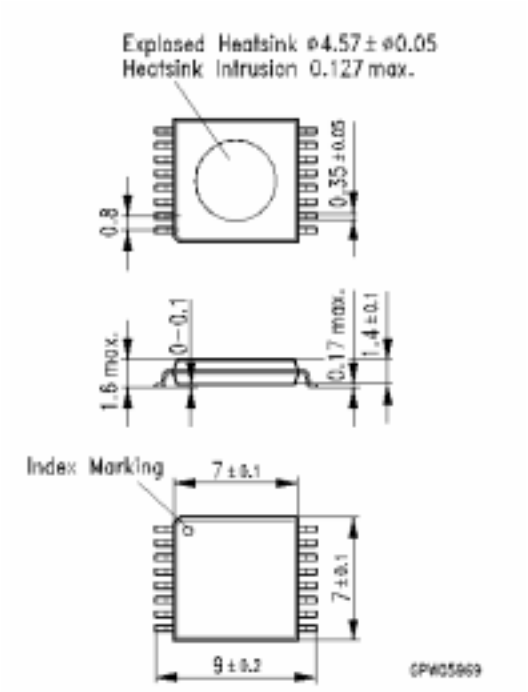








Semiconductor Device Outline MW-16



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