TQS

WIRELESS COMMUNICATIONS

TQ9114

IF/AGC Amplifier

ICs

The TQ9114 IF/AGC (Intermediate Frequency/Automatic Gain Control) Amplifier is part of TriQuint's RFIC Downconverter Building Block family. Intended for use as an Automatic Gain Control Amplifier in an IF stage, a wide range of gain control is available. The TQ9114 provides wide-bandwidth operation from a standard +5 V power supply. Its low current consumption and small, plastic surface-mount package are ideally suited for low-cost hand-held and battery-powered applications.

Features

- *30 – 500 MHz operation*
- *30 dB gain @ 100 MHz*
- *60 dB AGC range*
- *Single + 5 V supply*
- *3.1 mA supply current*
- *SO-8 plastic package*

Applications

- *GPS (Global Positioning Systems)*
- *Cellular Communications*
- *Spread-Spectrum Receivers*

Electrical Specifications

Test Conditions: V_{DD} = +5 V, T_A = 25 °C, Frequency = 100 MHz

Parameter[1]	*Min.*	*Typ.*	*Max.*	*Units*
Frequency of operation	30		500	MHz
Gain MHz	27	30		dB
AGC Range [2]	50	60		dB
DC Supply Current		3.1	4.5	mA
Gain Control Voltage	0		5	V

Note: 1. Min/Max values listed are production tested.
2. V_{AGC} = 0 V, Max. Gain; V_{AGC} = +5 V, Min. Gain
3. Voltages which produce Min. and Max. Gain

Electrical Specifications

Test Conditions: V_{DD} = 5 V, T_A = 25 °C, Frequency = 100 MHz

Parameters	Condition	Min.	Typ.	Max.	Units
Frequency of Operation		30		500	MHz
Gain	Freq. = 100 MHz	27	30		dB
Gain	Freq. = 500 MHz	17	21		dB
Gain Control Range	Max. gain = 30 dB		60		dB
Noise Figure	50 Ω System		6.0		dB
Output 3rd Order Intercept			-5		dBm
Output 1dB Compression			-15		dBm
Gain Control Voltage		0		5	V
Supply Current			3.1	4.5	mA
Supply Voltage		4.5	5.0	5.5	V

Test Circuit
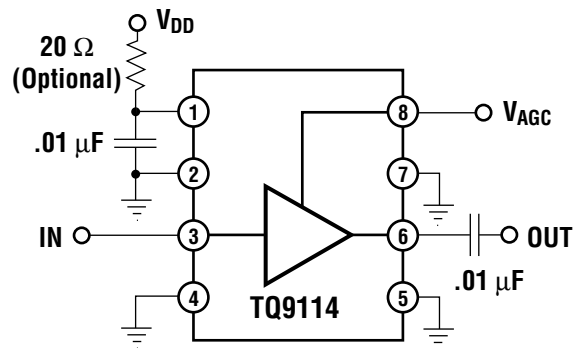
S-Parameters (typical)

Test Conditions: V_{DD} = 5 V, T_A = 25 °C, V_{AGC} = 0 V

Freq (MHz)	IS11I	∠S11	IS21I	∠S21	IS12I	<S12	IS22I	<S22	Gain (dB)
50	0.972	-1	38.3	19	0.0006	-90	0.356	4	31.7
100	0.968	0	35.6	-17	0.0008	157	0.365	4	31.0
200	0.971	-1	29.2	-53	0.0004	103	0.358	7	29.3
300	0.973	-2	27.7	-78	0.0004	48	0.358	13	27.1
400	0.947	-1	17.2	-96	0.0007	83	0.371	18	24.7
500	0.931	-3	13.1	-110	0.0012	105	0.387	20	22.4

ICs

Input and Output Impedance
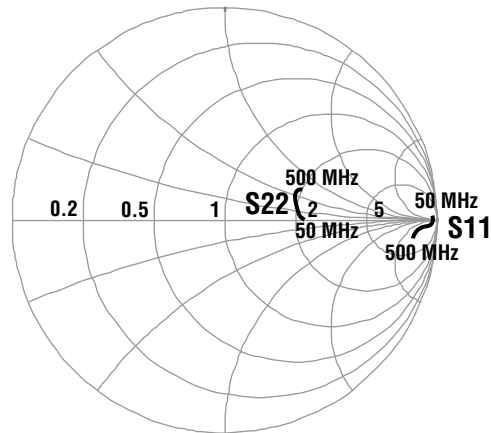
TQ9114

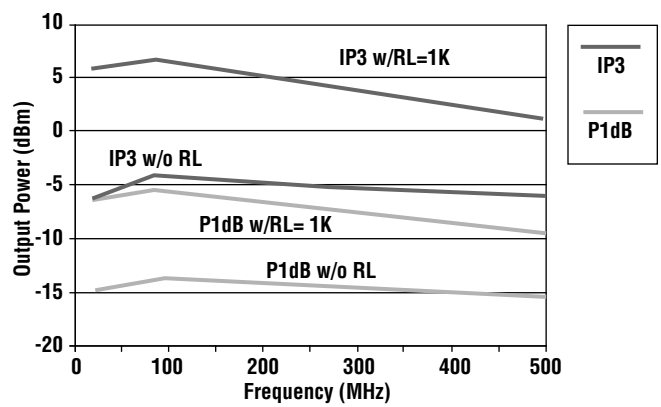## Gain / NF vs. Frequency vs. Temperature
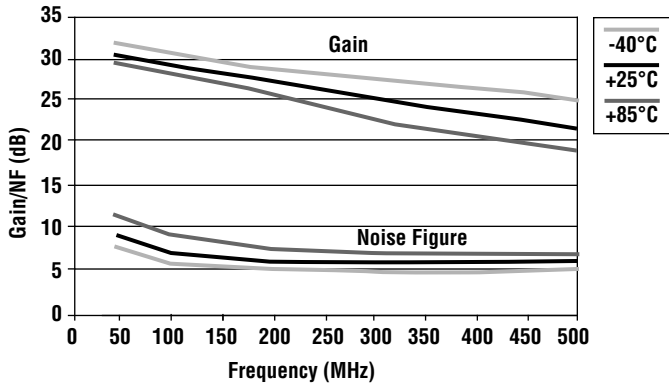
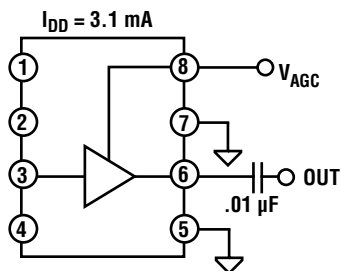## P1dB and IP3 vs. Frequency vs. Temperature
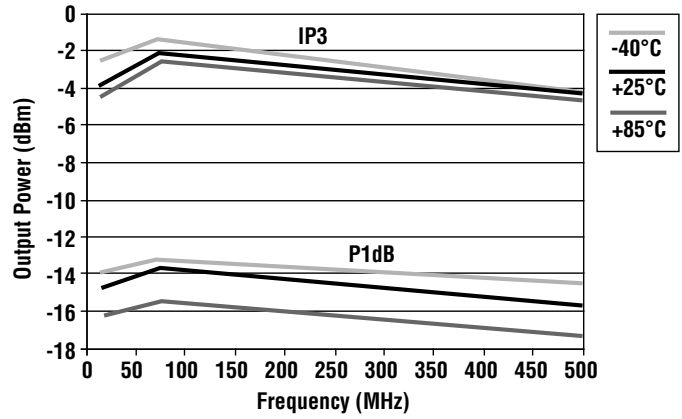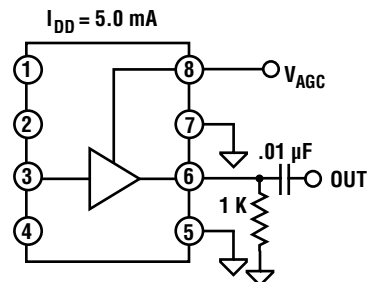

AGC Transfer Curve vs. Temperature
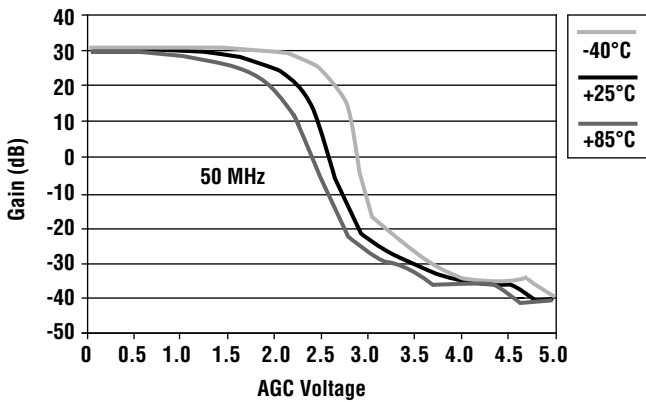
P1dB and IP3 vs. Frequency vs. Load Resistor

Standard Output Circuit


Increased-Dynamic-Range Output Circuit

Pin Descriptions

Pin Name	Pin #	Description
V_{DD}	1	+5 V Power Supply. Decouple with 0.01 uF within 0.25 inch of package.
IN	3	Input is DC-blocked. VSWR and gain may be improved with external impedance matching, if desired.
V_{AGC}	8	Gain control input. 0 V = maximum gain, +5 V = minimum gain. Slope of gain vs. voltage transfer function can be decreased by the addition of a series resistance in the V_{AGC} line. (See schematic.)
GND	2, 4, 5, 7	Ground connection. Keep physically short for stability and performance. Pins are internally connected.

Note: Refer to block diagram for pin location
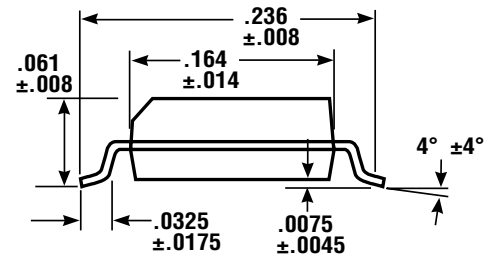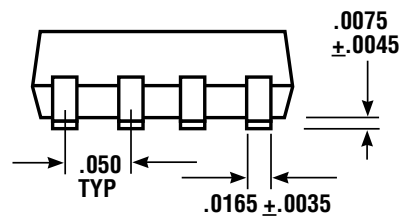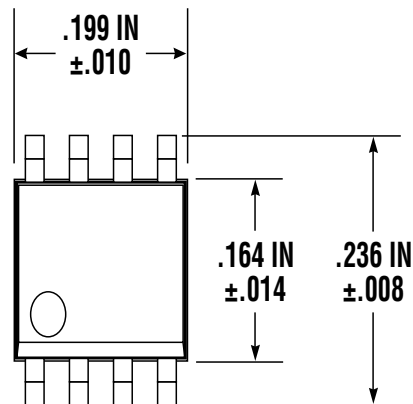
TQ9114 Pinout
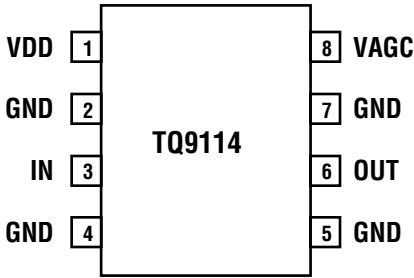
Circuit Schematic
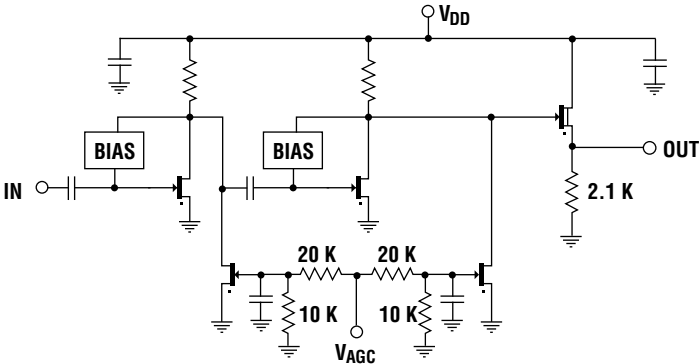
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Absolute Maximum Ratings

Parameter	Min.	Typ.	Max.	Units
DC Power Supply			7	V
V_{AGC}			7	V
Power Dissipation			70	mW
Input Power			+10	dBm
Storage Temperature	-55		+150	°C
Operating Temperature	-40		+85	°C

Note: ESD-sensitive device - Class 1

SO-8 Plastic Package
(N Suffix)

.199 IN
±.010

.164 IN
±.014

.236 IN
±.008

.0075
±.0045

.050
TYP

.0165 ±.0035

9114
TQ

.236
±.008

.164
±.014

.061
±.008

4° ±4°

.0325
±.0175

.0075
±.0045

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