

The TQ9113 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 TQ9113 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.

Electrical Specifications

Test Conditions: $V_{DD} = +5\text{ V}$, $T_A = 25^\circ\text{C}$, Frequency = 100 MHz

Parameter ⁽¹⁾	Min.	Typ.	Max.	Units
Frequency of Operation	30		500	MHz
Gain	12.0	15.0		dB
AGC Range ⁽²⁾		30		dB
DC Supply Current		2.2	3.0	mA
Gain Control Voltage ⁽³⁾	0		5	V

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

TQ9113

IF/AGC Amplifier

ICs

Features

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

Applications

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

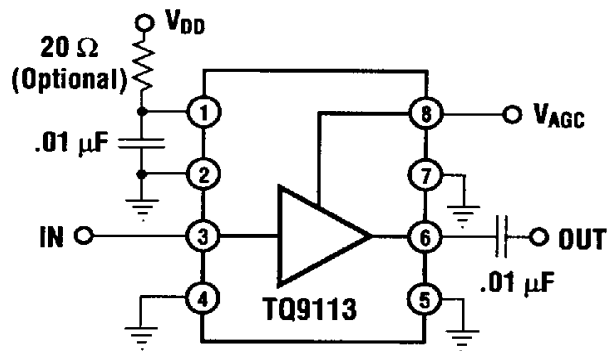
TQ9113

Electrical Specifications

Test Conditions: $V_{DD} = +5\text{ V}$, $T_A = 25^\circ\text{C}$, Frequency = 100 MHz

Parameters	Condition	Min.	Typ.	Max.	Units
Frequency of Operation		30		500	MHz
Gain	Freq. = 100 MHz	12.0	15.0		dB
Gain	Freq. = 500 MHz		8		dB
Noise Figure	50 Ω System		6.0		dB
AGC Range	Max. gain = 15 dB		30		dB
Output 3rd Order Intercept			-3.5		dBm
Output 1dB Gain Compression			-15		dBm
DC Supply Current			2.2	3.0	mA
Supply Voltage		4.5	5.0	5.5	V

Test Circuit



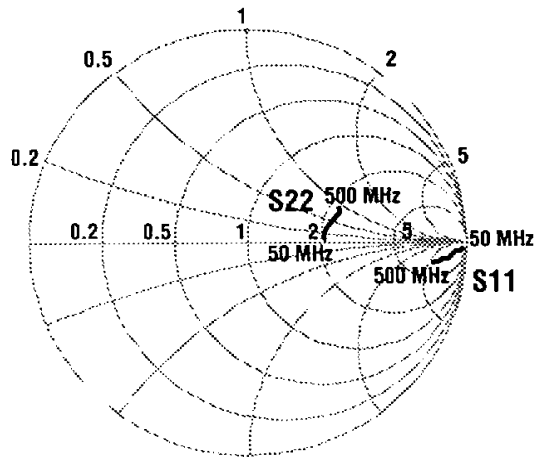
S-Parameters (typical)

Test Conditions: $V_{DD} = +5\text{ V}$, $T_A = 25^\circ\text{C}$, $V_{AGC} = 0\text{ V}$

Freq (MHz)	S11	$\angle S11$	S21	$\angle S21$	S12	$\angle S12$	S22	$\angle S22$	Gain (dB)
50	0.971	-2	5.50	-172	0.0008	102	0.360	4	14.8
100	0.954	-2	5.33	169	0.0007	-151	0.368	9	14.5
200	0.941	-3	4.60	148	0.0013	146	0.401	14	13.3
300	0.916	-3	3.84	135	0.0035	134	0.428	17	11.7
400	0.891	-3	3.18	126	0.0037	126	0.445	19	10.0
500	0.874	-4	2.71	120	0.00493	116	0.450	20	8.7

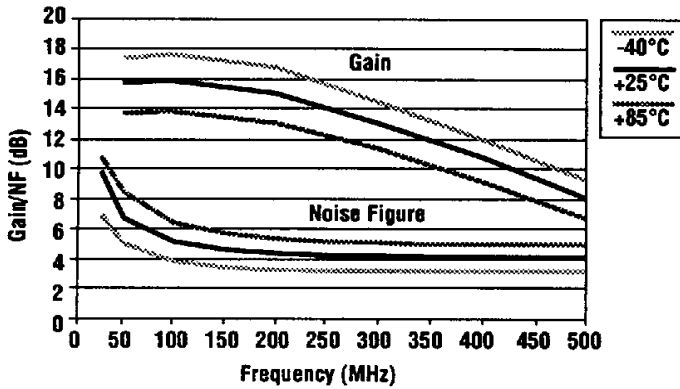
S11

Input and Output Impedance

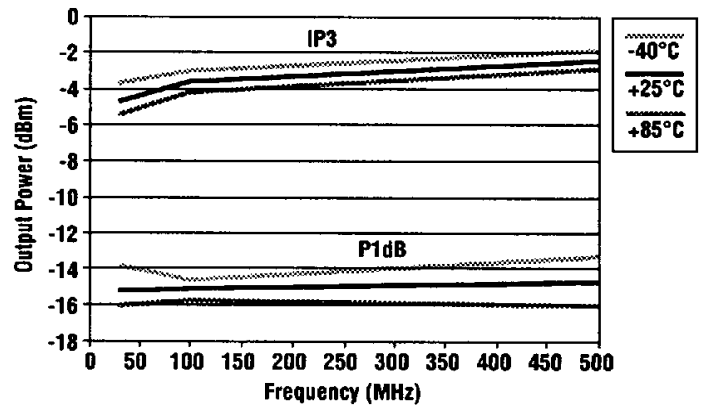


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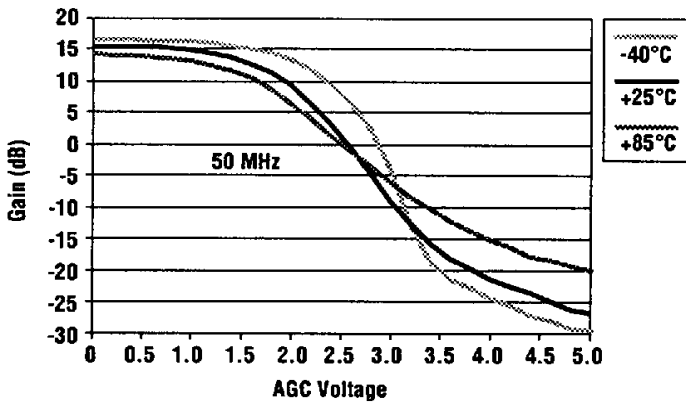
Gain / NF vs. Frequency vs. Temperature



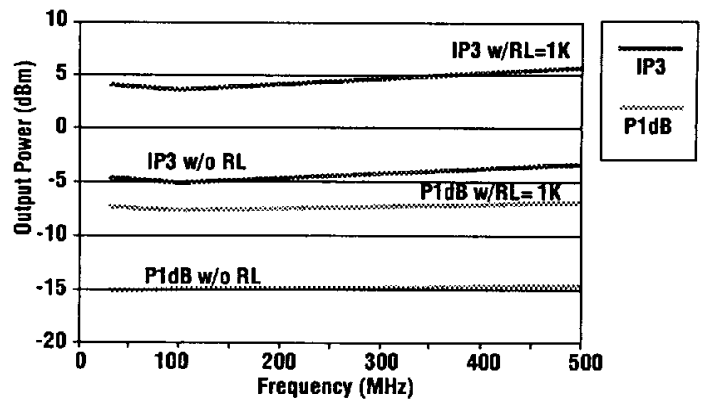
P1dB and IP3 vs. Frequency vs. Temperature



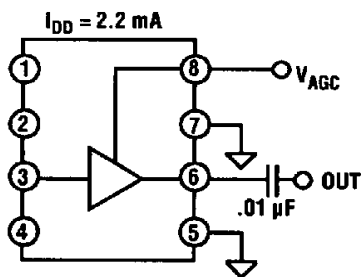
AGC Transfer Curve vs. Temperature



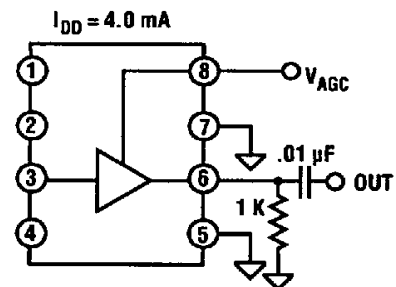
P1dB and IP3 vs. Frequency vs. Load Resistor



Standard Output Circuit



Increased-Dynamic-Range Output Circuit

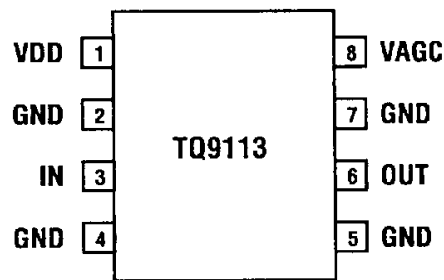


Pin Descriptions

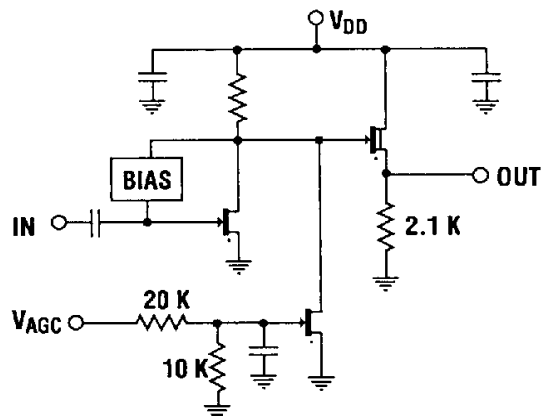
Pin Name	Pin #	Description
V _{DD}	1	+5 V Power Supply. Decouple with 0.01 uF within 0.25 inch of package.
IN	3	Input is DC-blocked. VSWR and gain may be improved with external impedance matching, if desired.
OUT	6	Output port requires a DC block. Output gain compression point and third order intercept point can be increased by the addition of a shunt resistor. (See note on output circuit options.)
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

TQ9113 Pinout



Circuit Schematic



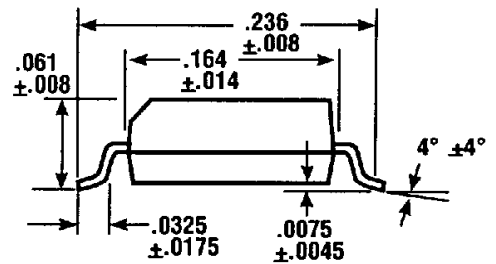
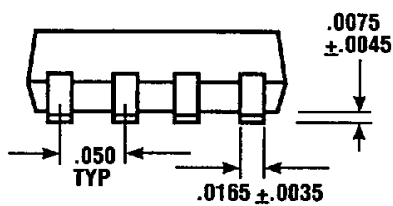
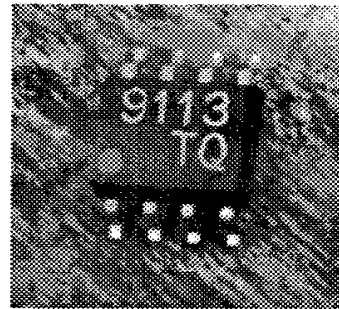
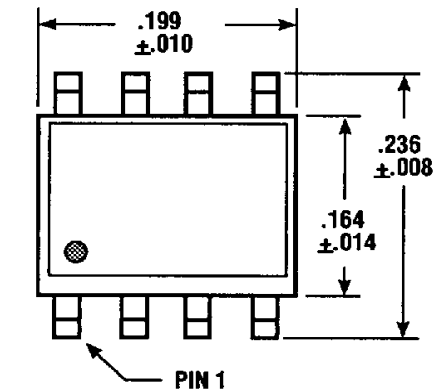
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Absolute Maximum Ratings

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



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