



**RF2607**

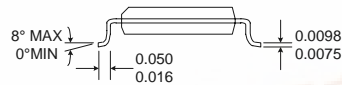
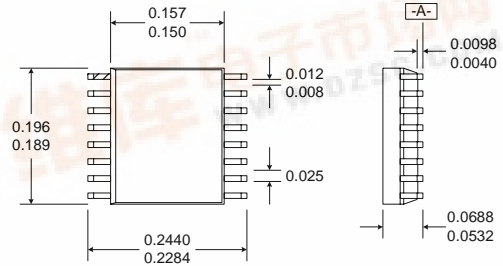
CDMA/FM RECEIVE AGC AMPLIFIER

Typical Applications

- CDMA/FM Cellular Systems
- Supports Dual-Mode AMPS/CDMA
- Supports Dual-Mode TACS/CDMA
- General Purpose Linear IF Amplifier
- Commercial and Consumer Systems
- Portable Battery-Powered Equipment

Product Description

The RF2607 is a complete AGC amplifier designed for the receive section of dual-mode CDMA/FM cellular applications. It is designed to amplify IF signals while providing more than 90dB of gain control range. Noise Figure, IP<sub>3</sub>, and other specifications are designed to be compatible with the IS-95 Interim Standard for CDMA cellular communications. This circuit is designed as part of the RFMD CDMA chipset, consisting of a Transmit IF AGC Amp, a Transmit Upconverter, a Receive LNA/Mixer, and this Receive IF AGC Amp. The IC is manufactured on an advanced high frequency Silicon Bipolar process, and is packaged in a standard miniature 16-lead plastic SSOP package.

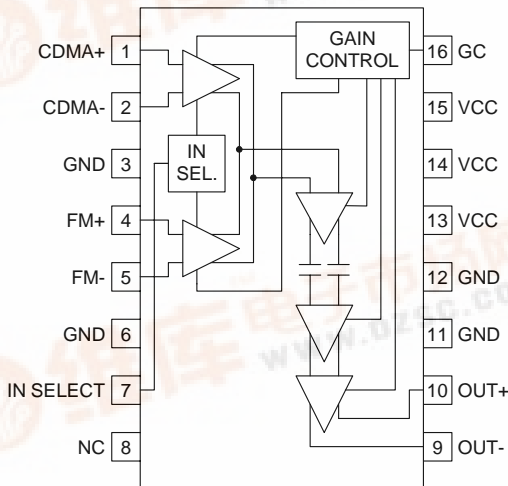


- NOTES:**
1. Shaded lead is Pin 1.
  2. All dimensions are excluding mold flash.
  3. Lead coplanarity - 0.005 with respect to datum "A".

Optimum Technology Matching® Applied

- Si BJT       GaAs HBT       GaAs MESFET  
 Si Bi-CMOS       SiGe HBT       Si CMOS

Package Style: SSOP-16



Functional Block Diagram

Features

- Supports Dual Mode Operation
- -48dB to +48dB Gain Control Range
- IS95 CDMA Compatible
- Digitally Selectable Inputs
- -2dBm Input IP<sub>3</sub>
- 12MHz to 285MHz Operation

Ordering Information

- RF2607      CDMA/FM Receive AGC Amplifier  
 RF2607 PCBA      Fully Assembled Evaluation Board

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# RF2607

## Absolute Maximum Ratings

Parameter	Value	Unit
Supply Voltage	-0.5 to +7.0	V <sub>DC</sub>
Control Voltage	-0.5 to +5.0	V <sub>DC</sub>
Input RF Power	+10	dBm
Operating Ambient Temperature	-40 to +85	°C
Storage Temperature	-40 to +150	°C



**Caution!** ESD sensitive device.

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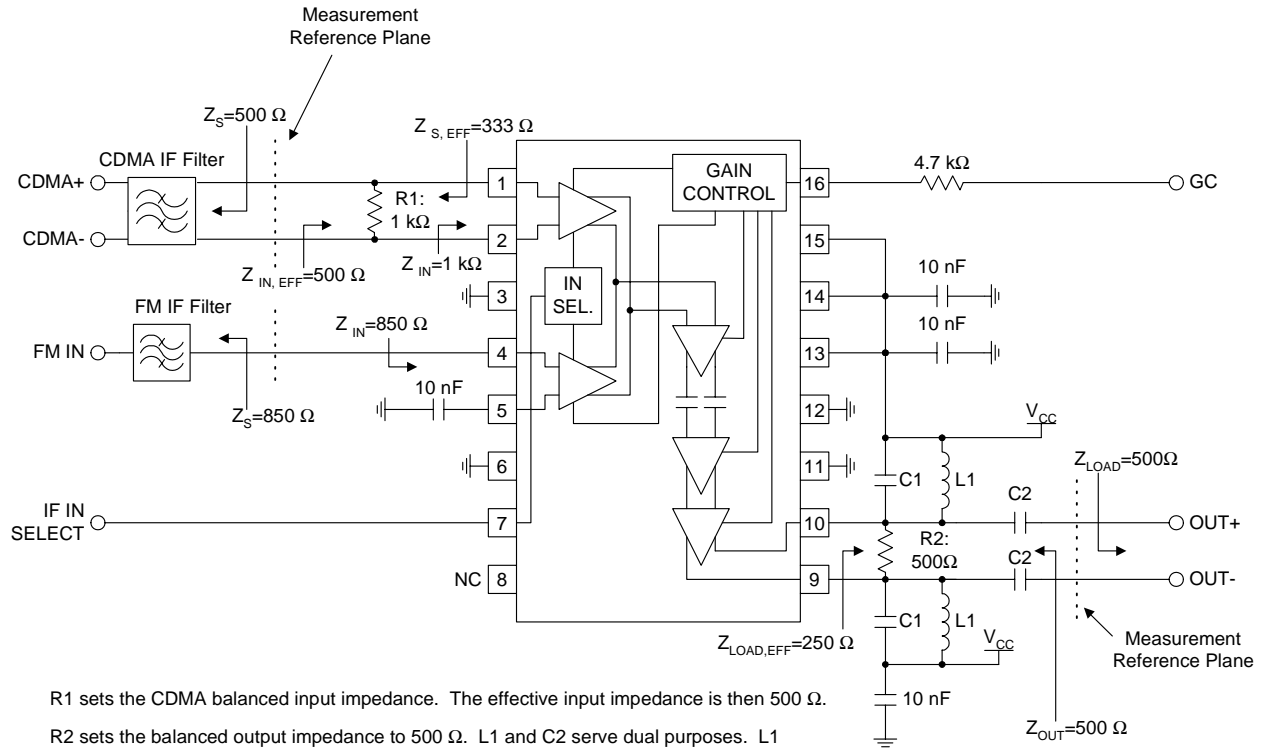
Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
<b>Overall</b>					T=25°C, 85MHz, V <sub>CC</sub> =3.6V, Z <sub>S</sub> =500Ω, Z <sub>L</sub> =500Ω, 500Ω External CDMA Input Terminating Resistor, 500Ω External Output Terminating Resistor (Effective Z <sub>S</sub> =333Ω, Effective Z <sub>L</sub> =250Ω) (See application schematic)
Frequency Range		12 to 285		MHz	
CDMA Maximum Gain	+45	+48		dB	V <sub>GC</sub> =2.9V
CDMA Minimum Gain		-48	-45	dB	V <sub>GC</sub> =0.2V
FM Maximum Gain	+45	+49		dB	V <sub>GC</sub> =2.9V
FM Minimum Gain		-48	-45	dB	V <sub>GC</sub> =0.2V
Gain Slope		47		dB/V	Measured in 0.5V increments
Gain Control Voltage Range		0 to 3		V <sub>DC</sub>	Source impedance of 4.7kΩ
Gain Control Input Impedance		30		kΩ	
Noise Figure		5		dB	At maximum gain and 85MHz
Input IP <sub>3</sub>	-44	-40		dBm	At +40dB gain, referenced to 500Ω
Stability (Max VSWR)	10:1	-2		dBm	At minimum gain, referenced to 500Ω Spurious < -70dBm
<b>IF Input</b>					
Input Impedance		1		kΩ	CDMA, differential
Input Impedance		850		Ω	FM, single-ended
CDMA to FM Isolation		30		dB	
<b>Power Supply</b>					
Voltage		3.3 to 3.6		V	
Current Consumption		13		mA	Minimum gain
Current Consumption		14	17	mA	Maximum gain

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IF AMPLIFIERS

Pin	Function	Description	Interface Schematic
1	CDMA+	CDMA balanced input pin. This pin is internally DC-biased and should be DC blocked if connected to a device with a DC level other than $V_{CC}$ present. A DC to connection to $V_{CC}$ is acceptable. For single-ended input operation, one pin is used as an input and the other CDMA input is AC-coupled to ground. The balanced input impedance is $1\text{ k}\Omega$ , while the single-ended input impedance is $500\Omega$ .	
2	CDMA-	Same as pin 2, except complementary input.	See pin 1.
3	GND	Ground connection. For best performance, keep traces physically short and connect immediately to ground plane.	
4	FM+	FM balanced input pin. This pin is internally DC-biased and should be DC blocked if connected to a device with DC present. For single-ended input operation, one pin is used as an input and the other FM input is AC-coupled to ground. The balanced input impedance is $1.7\text{ k}\Omega$ , while the single-ended input impedance is $850\Omega$ .	
5	FM-	Same as pin 4, except complementary input.	See pin 4.
6	GND	Same as pin 3.	
7	IN SELECT	Selects which IF input (CDMA or FM) is used. This is a digitally controlled input. A logic "high" selects the CDMA input amplifier. A logic "low" selects the FM input amplifier. The threshold voltage is approximately $1.3\text{V}$ .	
8	NC	No Connection pin. This pin is internally biased and should not be connected to any external circuitry, including ground or $V_{CC}$ .	
9	OUT-	Balanced output pin. This is an open-collector output, designed to operate into a $250\Omega$ balanced load. The load sets the operating impedance, but an external choke or matching inductor to $V_{CC}$ must also be supplied in order to correctly bias this output. This bias inductor is typically incorporated in the matching network between the output and next stage. Because this pin is biased to $V_{CC}$ , a DC-blocking capacitor must be used if the next stage's input has a DC path to ground.	
10	OUT+	Same as pin 9, except complementary output.	See pin 9.
11	GND	Same as pin 3.	
12	GND	Same as pin 3.	
13	VCC	Supply voltage pin. External bypassing is required. The trace length between the pin and the bypass capacitors should be minimized. The ground side of the bypass capacitors should connect immediately to ground plane.	
14	VCC	Same as pin 13.	
15	VCC	Same as pin 13.	
16	GC	Analog gain adjustment for all amplifiers. Valid control ranges are from $0\text{V}$ to $3.0\text{V}$ . Maximum gain is selected with $3.0\text{V}$ . Minimum gain is selected with $0\text{V}$ . These voltages are only valid for a $4.7\text{ k}\Omega$ DC source impedance.	

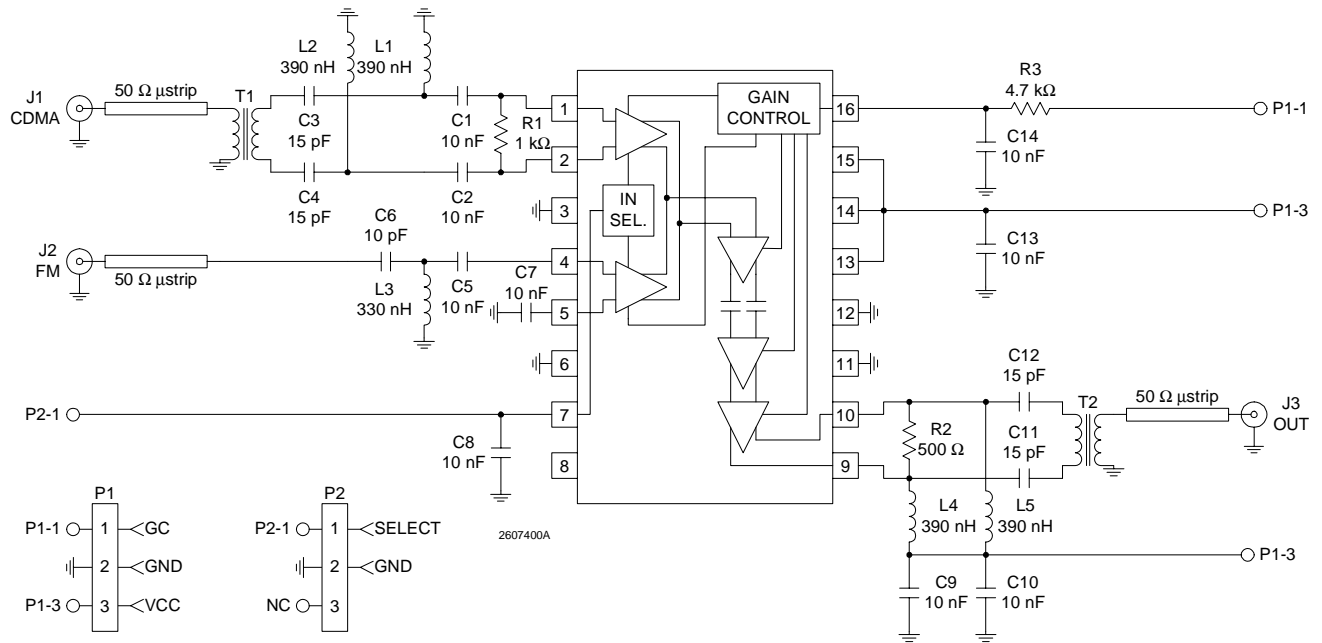
## Application Schematic



R1 sets the CDMA balanced input impedance. The effective input impedance is then 500 Ω.

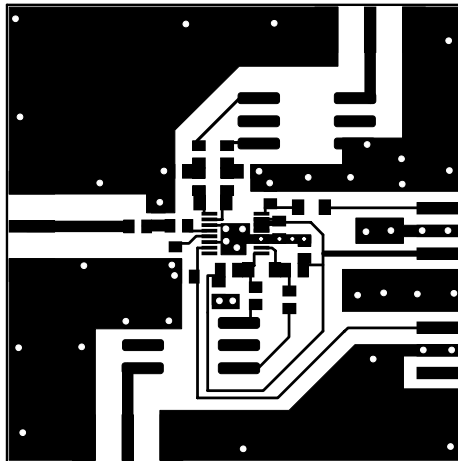
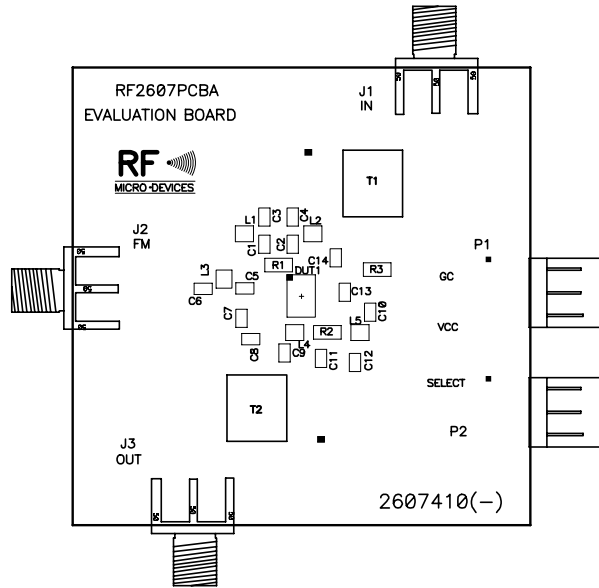
R2 sets the balanced output impedance to 500 Ω. L1 and C2 serve dual purposes. L1 serves as an output bias choke, and C2 serves as a series DC block. In addition, the values of L1 and C2 may be chosen to form an impedance matching network of the load impedance is not 500 Ω. Otherwise, the values of L1 and C1 are chosen to form a parallel-resonant tank circuit at the IF when the load impedance is 500 Ω.

## Evaluation Board Schematic (Download [Bill of Materials](http://www.rfmd.com) from [www.rfmd.com](http://www.rfmd.com).)



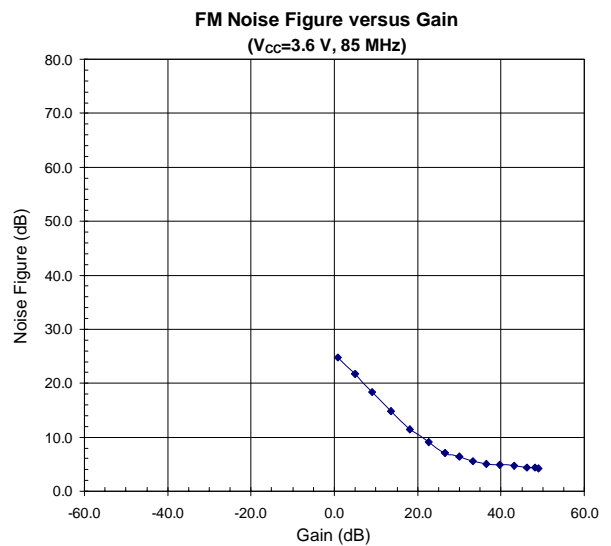
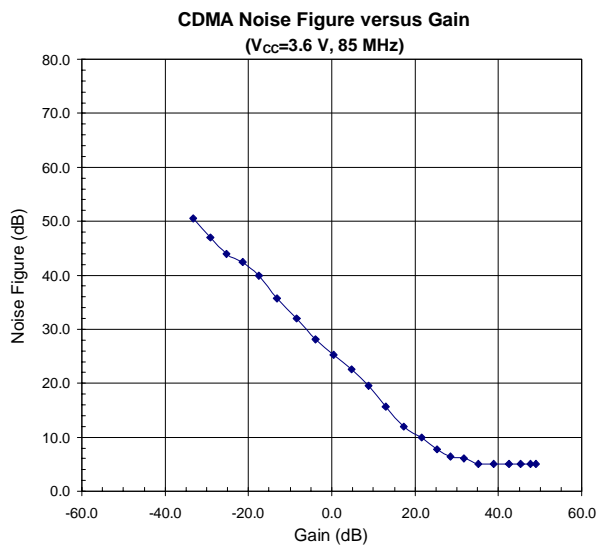
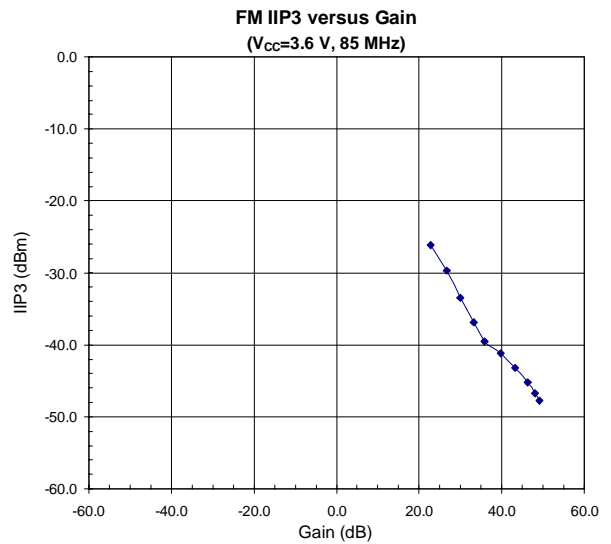
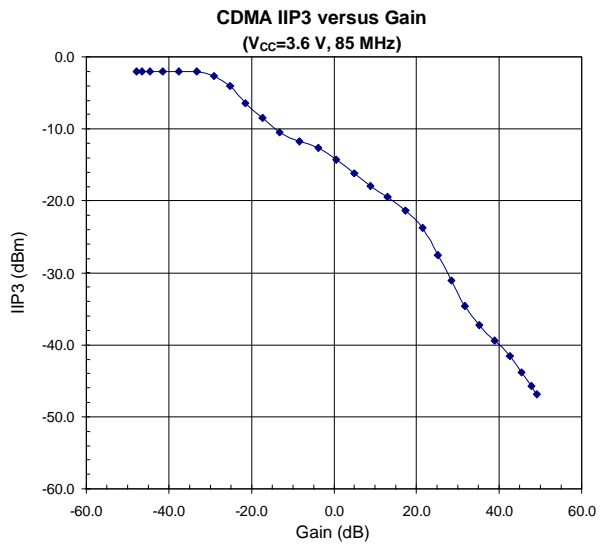
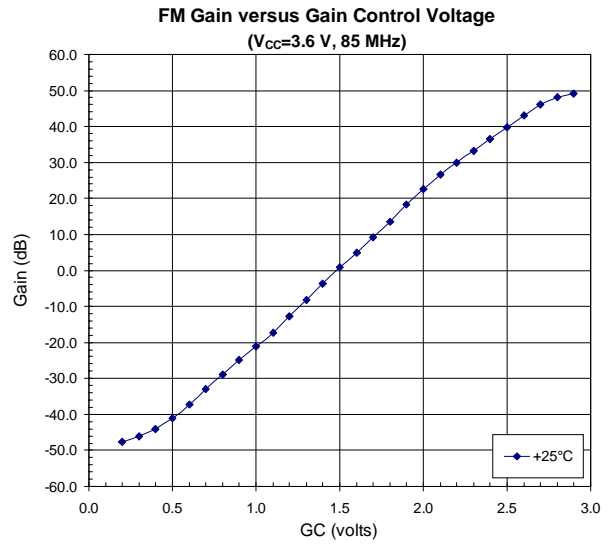
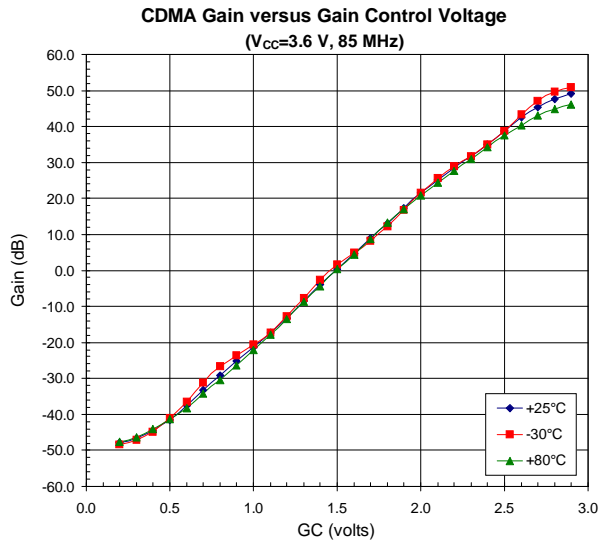
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## Evaluation Board Layout



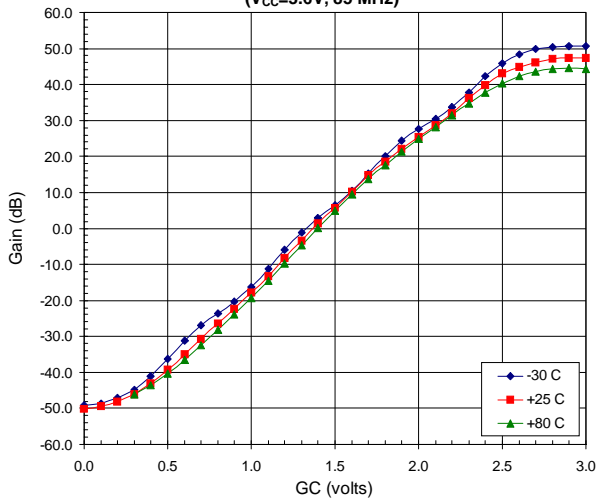
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IF AMPLIFIERS

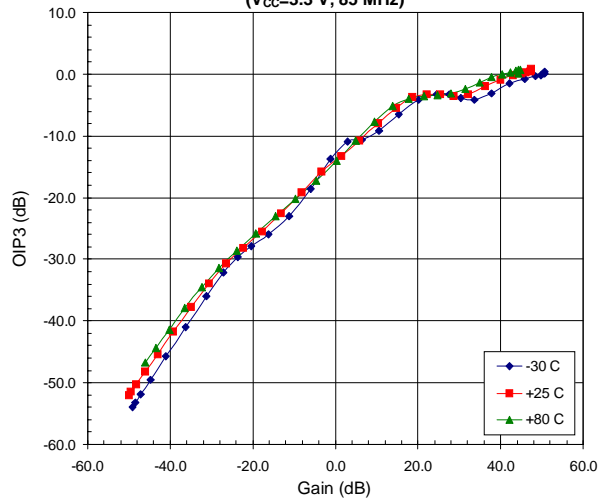


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CDMA Gain versus Gain Control Voltage  
(V<sub>CC</sub>=3.6V, 85 MHz)



CDMA OIP3 versus Gain  
(V<sub>CC</sub>=3.3 V, 85 MHz)



CDMA IIP3 versus Gain  
(V<sub>CC</sub>=3.3 V, 85 MHz)

