Ordering number : EN8130B

SANYO Semiconductors
DATA SHEET

LA8120T — Monolithic Linear IC
AGC Amplifier with Step Gain Control

Overview

The LA8120T bipolar monolithic IC is an AGC amplifier with driver amplifier for analog-to-digital converters. It is ideally suited for use with receiver systems that receive QPSK and/or QAM data transmissions.

Functions

- IF AGC control
- IF AGC amplifier
- IF Step Gain Controlled Amplifier
- Driver amplifier

Applications

- Digital CATV
- Cable modem receivers
- IP Telephony receivers

Specitications

Absolute Maximum Ratings at Ta = 25 °C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum Supply voltage	V_{CC} max	Pin 1	7.0	V
Circuit Voltages	V max	Pin 4, Pin 5	V_{CC} op	V
Circuit Current	I_6 I_7	Pin 6 sink current Pin 7 sink current	2 2	mA
Allowable Power Dissipation	Pd max	Ta ≤ 85°C *	220	mW
Operating Temperature	Topr		-20 to +85	°C
Storage Temperature	Tstg		-55 to +150	°C

*Mounted on PCB : 20.0mm × 10.0mm × 0.8 mm, paper phenol.

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TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

Recommended Operating Conditions at Ta = 25 °C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended Supply Voltage	V_{CC}	Pin 1	5.0	V
Operating Supply Voltage Range	V_{CC} op	Pin 1	4.5 to 5. 5	V

Electrical Characteristics

AC Characteristics at Ta = 25 °C, V_{CC} = 5.0 V

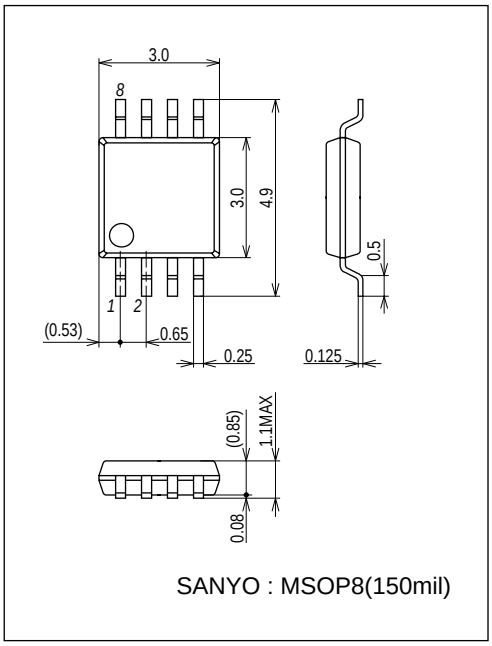
Parameter	Symbol	Pin No.	Conditions			Ratings min	Ratings typ	Ratings max	Unit
Circuit Current	Itotal	1	No Signal		*1	25	30	35	mA
IF Input Frequency Range	f(in)	2, 3	fc : -3 dB		*1	30		100	MHz
Noise Figure	NF	6, 7	V4 = 3.0 V, f = 45 MHz	Pin 5 : V_{CC}	*2		5		dB
			V4 = 3.0 V, f = 45 MHz	Pin 5 : GND	*2		6		dB
			V4 = 3.0 V, f = 45 MHz	Pin 5 : OPEN	*2		8		dB
Intermodulation	IM3	6/2, 3 7/2, 3	f1 = 44 MHz, f2 = 45 MHz Input = 90 dBμ/Tone, Output = 104 dBμ/Tone		*1	50			dBc
Total Amplifier Gain	$G_{(AGC1)}$	6/2, 3 7/2, 3	V4 = 3.0 V, f = 45 MHz	Pin 5 : V_{CC}	*1	45.5	48	50.5	dB
	$G_{(AGC2)}$	6/2, 3 7/2, 3	V4 = 3.0 V, f = 45 MHz	Pin 5 : GND	*1	41.5	44	46.5	dB
	$G_{(AGC3)}$	6/2, 3 7/2, 3	V4 = 3.0 V, f = 45 MHz	Pin 5 : OPEN	*1	33.5	36	38.5	dB
AGC Range 1	GR1	6/2, 3 7/2, 3	IF Output Level < ±1 dB, f = 45 MHz		*1	40			dB
IF Output Level	V_O(IF)	6, 7	Output Level, f = 45 MHz		*1		1.0		Vp-p
AGC Control Max. Voltage	V4H	4	Gain Max.		*1	2.5		3	V
AGC Control Min. Voltage	V4L	4	Gain Min.		*1	0		0.5	V
Input impedance	Zin	2, 3	V4 = 0 V, f = 45 MHz		*3		1 // 4.9		kΩ // pF

*1 : Measurement circuit 1, *2 : Measurement circuit 2, *3 : Measurement circuit 3

Package Dimensions

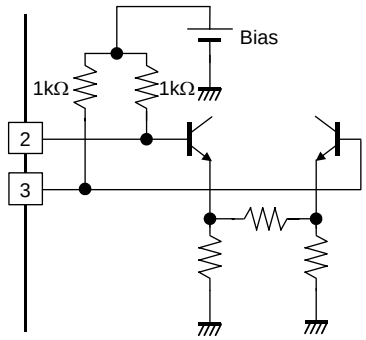
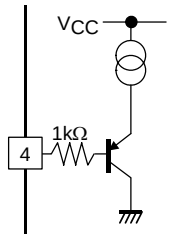
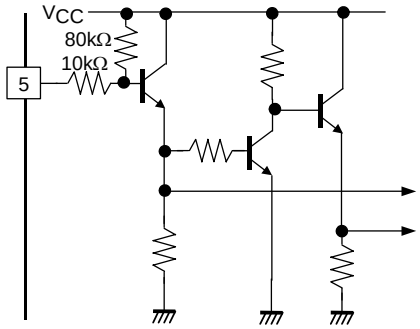
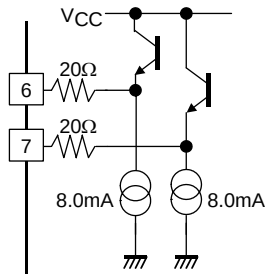
unit : mm (typ)

3245B

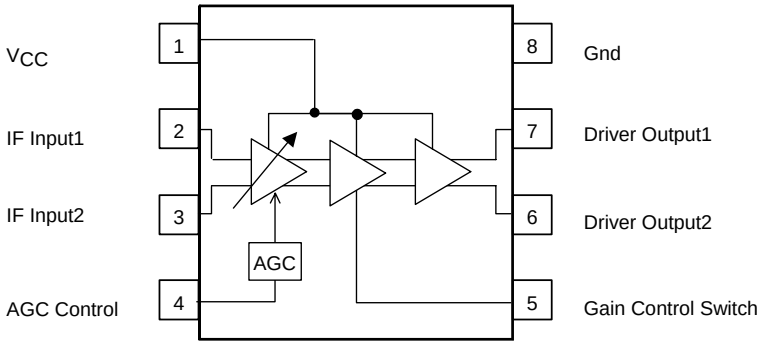


SANYO : MSOP8(150mil)

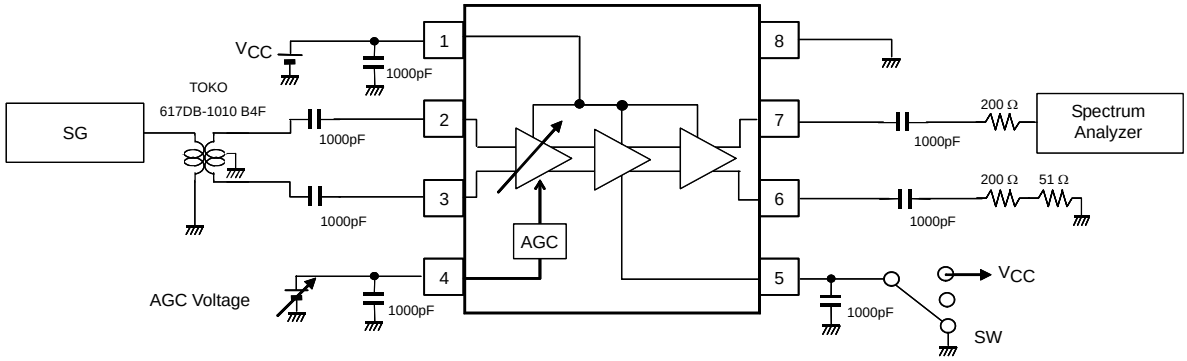
Pin Functions

Pin Number	Pin Name	Equivalent Circuit
1	V_{CC}	
2 3	IF Input	
4	AGC Control	
5	Gain Control Switch	
6 7	Driver Output	
8	GND	

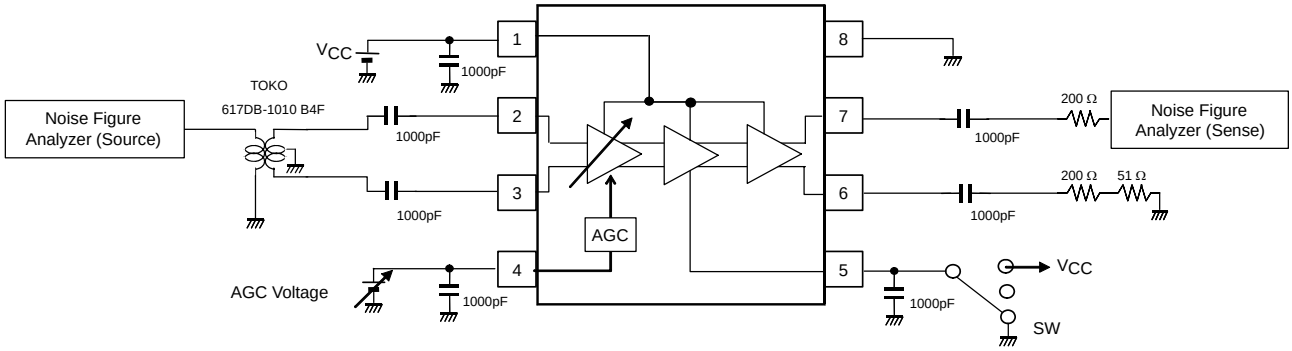
Block Diagram



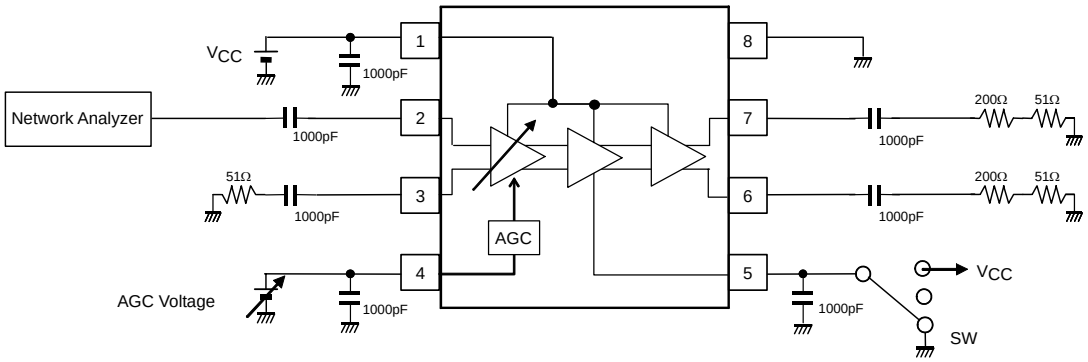
LA8120T Gain, Measurement Circuit 1



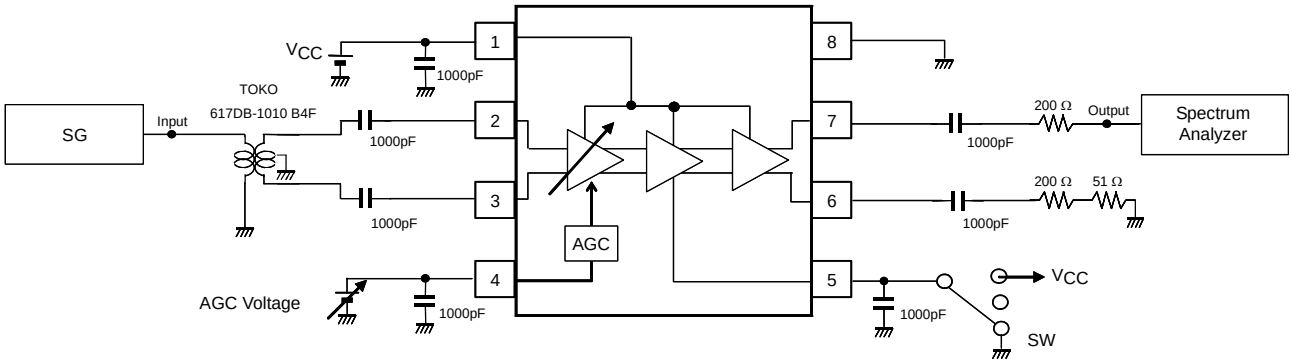
LA8120T Noise Figure Measurement Circuit 2



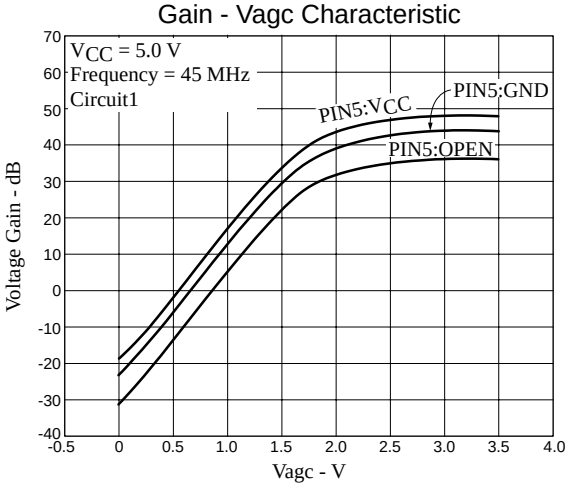
LA8120T Input Impedance Measurement Circuit 3



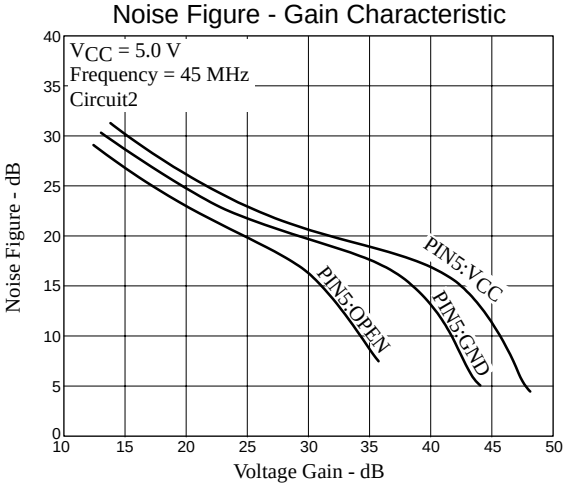
LA8120T Intermodulation Measurement Circuit 4



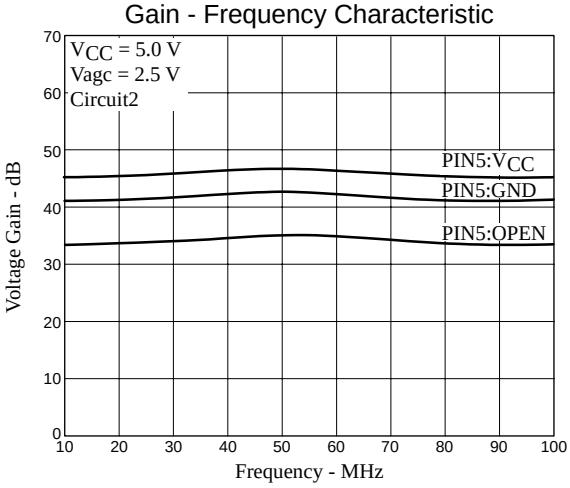
Gain - Vagc Characteristic



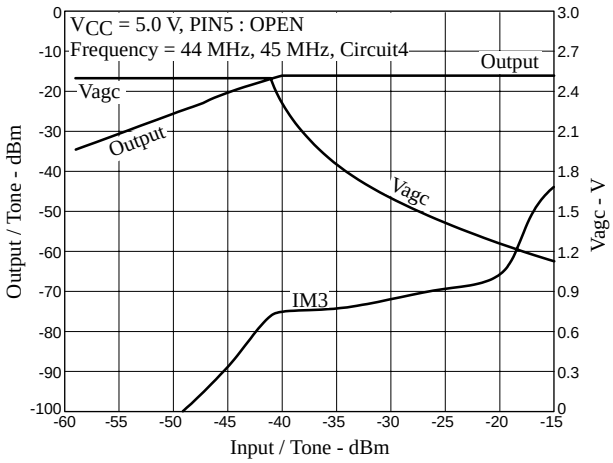
Noise Figure - Gain Characteristic



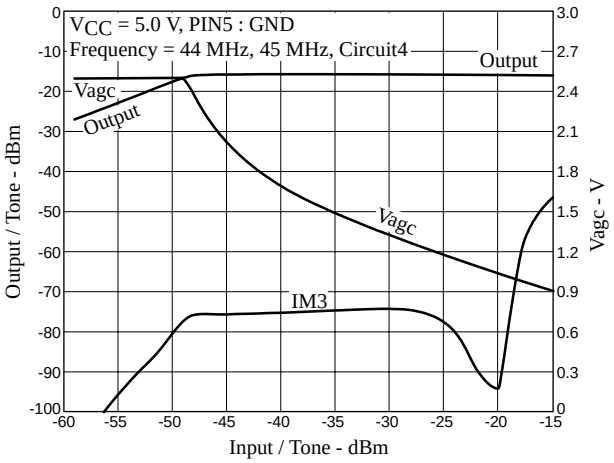
Gain - Frequency Characteristic



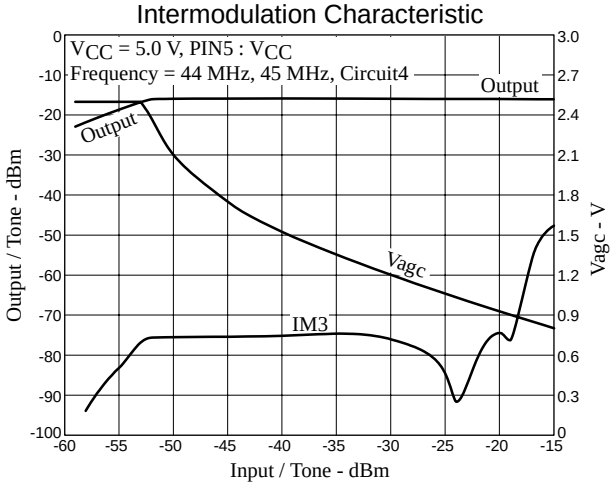
Intermodulation Characteristic



Intermodulation Characteristic



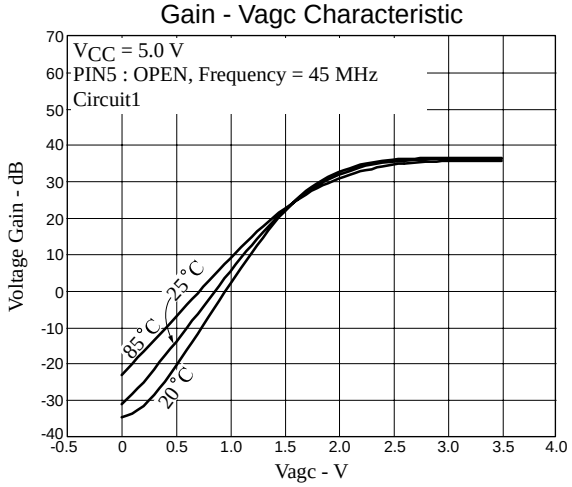
Intermodulation Characteristic



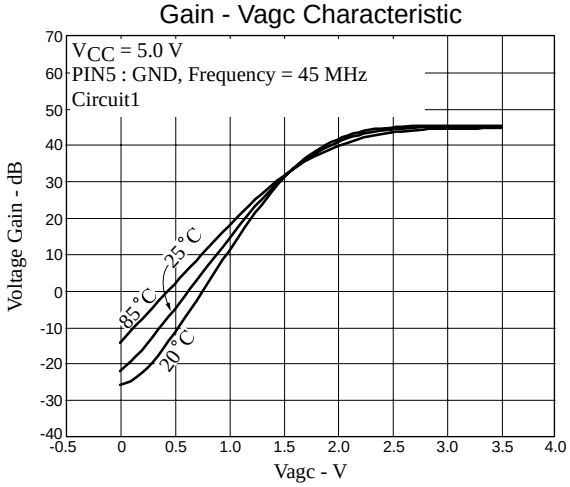
The vertical axis (Output/Tone) on this graph shows the values displayed by the spectrum analyzer for circuit 4.
The actual output power for the corresponding pins is given by the following formula.

{output power [dBm]}=
{displayed value [dBm]}+10 · log (250 Ω/50 Ω)

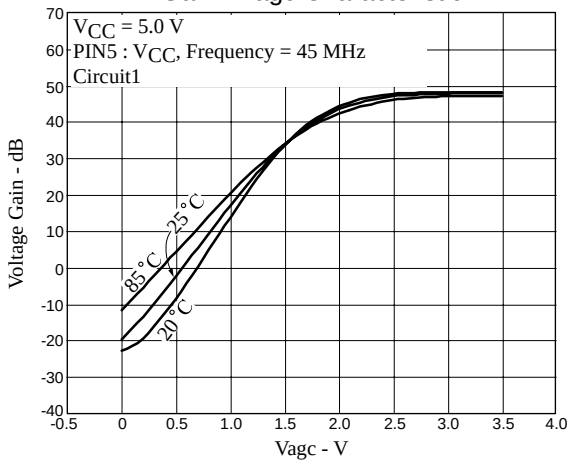
Gain - Vagc Characteristic



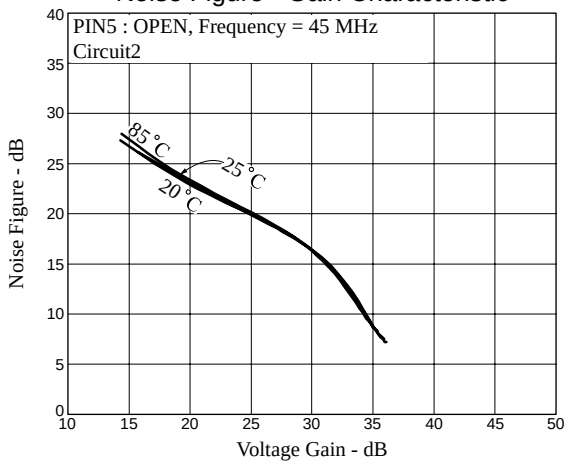
Gain - Vagc Characteristic



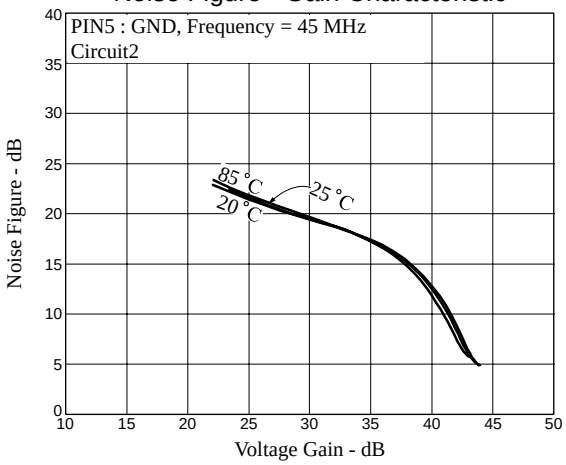
Gain - Vagc Characteristic



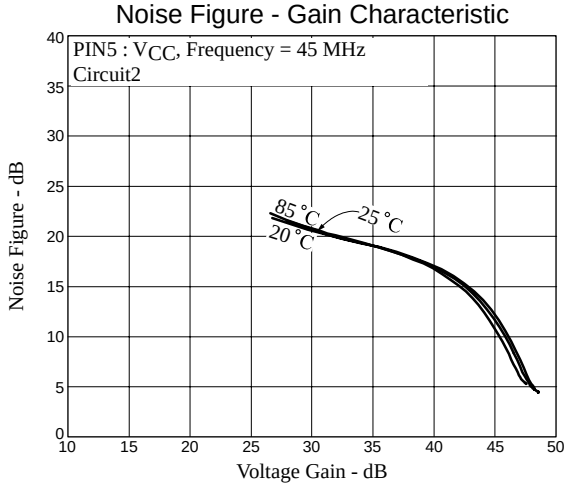
Noise Figure - Gain Characteristic



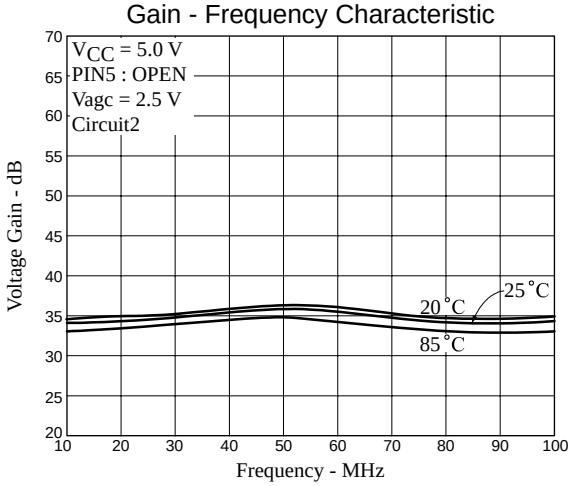
Noise Figure - Gain Characteristic



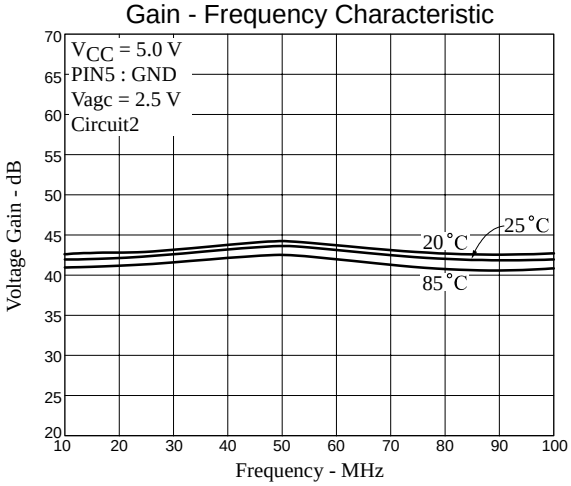
Noise Figure - Gain Characteristic



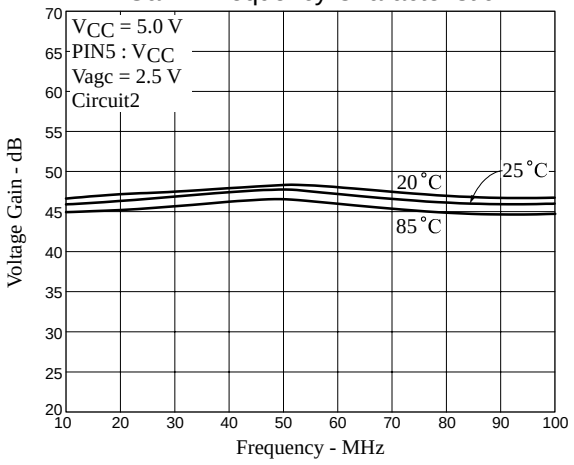
Gain - Frequency Characteristic



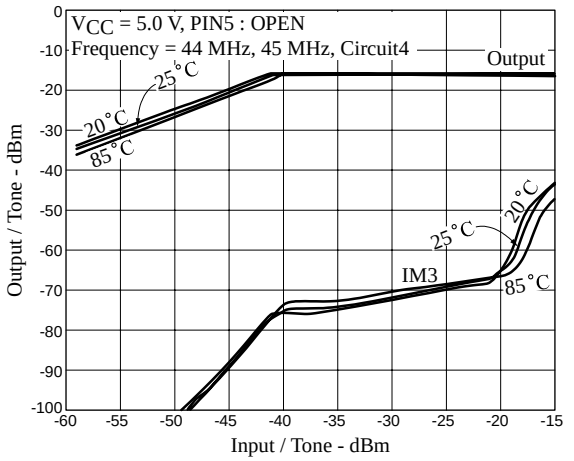
Gain - Frequency Characteristic



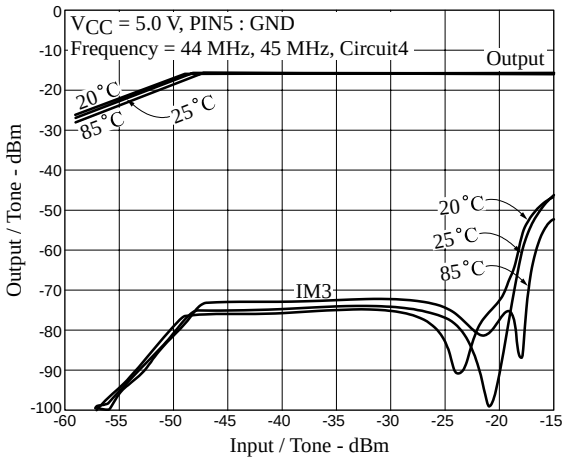
Gain - Frequency Characteristic



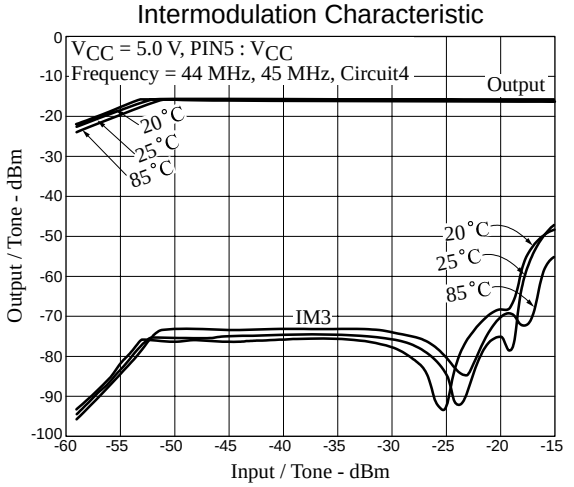
Intermodulation Characteristic



Intermodulation Characteristic



Intermodulation Characteristic



The vertical axis (Output/Tone) on this graph shows the values displayed by the spectrum analyzer for circuit 4.
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