



SANYO Semiconductors

DATA SHEET

LA7795T — Monolithic Linear IC AGC Amplifier with Step Gain Control

Overview

The LA7795T 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

Specifications

Absolute Maximum Ratings at $T_a = 25\text{ }^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum Supply Voltage	$V_{CC\text{ max}}$	Pin 1	7.0	V
Circuit Voltages	$V\text{ max}$	Pin 4, Pin 5	$V_{CC\text{ op}}$	V
Circuit Current	I_6 I_7	Pin 6 sink current Pin 7 sink current	2 2	mA
Allowable Power Dissipation	$P_d\text{ max}$	$T_a \leq 85\text{ }^\circ\text{C}$	190*	mW
Operating Temperature	T_{opr}		-20 to +85	$^\circ\text{C}$
Storage Temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

*Mounted on PCB (paper phenol $20.0 \times 10.0 \times 0.8\text{ t mm}$)

■ Any and all SANYO Semiconductor Co.,Ltd. products described or contained herein are, with regard to "standard application", intended for the use as general electronics equipment (home appliances, AV equipment, communication device, office equipment, industrial equipment etc.). The products mentioned herein shall not be intended for use for any "special application" (medical equipment whose purpose is to sustain life, aerospace instrument, nuclear control device, burning appliances, transportation machine, traffic signal system, safety equipment etc.) that shall require extremely high level of reliability and can directly threaten human lives in case of failure or malfunction of the product or may cause harm to human bodies, nor shall they grant any guarantee thereof. If you should intend to use our products for applications outside the standard applications of our customer who is considering such use and/or outside the scope of our intended standard applications, please consult with us prior to the intended use. If there is no consultation or inquiry before the intended use, our customer shall be solely responsible for the use.

■ Specifications of any and all SANYO Semiconductor Co.,Ltd. products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.

SANYO Semiconductor Co., Ltd.

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

LA7795T

Recommended Operating Conditions at $T_a = 25\text{ }^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Recommended Supply Voltage	V_{CC}	Pin 1	5.0	V
Operating Supply Voltage Range	$V_{CC\text{ op}}$	Pin 1	4.5 to 5.5	V

Electrical Characteristics

AC Characteristics at $T_a = 25\text{ }^\circ\text{C}$, $V_{CC} = 5.0\text{ V}$

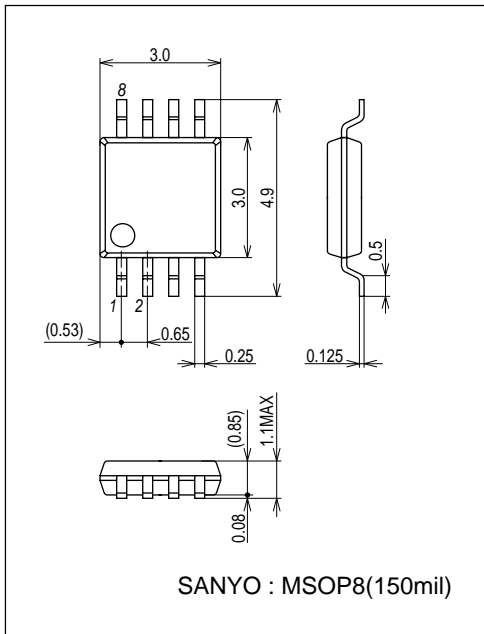
Parameter	Symbol	Pin No.	Conditions	Ratings			Unit	
				min	typ	max		
Circuit Current	I_{total}	1	No Signal	*1	18	24	30	mA
IF Input Frequency Range	$f(in)$	2, 3	$f_c : -3\text{ dB}$	*1	30	-	100	MHz
Noise Figure	NF	6, 7	$V_4 = 3.0\text{ V}$, $f = 45\text{ MHz}$ Pin 5 : V_{CC}	*2	-	5	-	dB
			$V_4 = 3.0\text{ V}$, $f = 45\text{ MHz}$ Pin 5 : GND	*2	-	5	-	dB
			$V_4 = 3.0\text{ V}$, $f = 45\text{ MHz}$ Pin 5 : OPEN	*2	-	8	-	dB
Intermodulation	IM3	6/2, 3 7/2, 3	$f_1 = 44\text{ MHz}$, $f_2 = 45\text{ MHz}$ Input = $90\text{ dB}\mu\text{Tone}$, Output = $104\text{ dB}\mu\text{Tone}$	*1	50	-	-	dBc
Total Amplifier Gain	$G(AGC1)$	6/2, 3	$V_4 = 3.0\text{ V}$, $f = 45\text{ MHz}$ Pin 5 : V_{CC}	*1	57.5	60	62.5	dB
	$G(AGC2)$	7/2, 3	$V_4 = 3.0\text{ V}$, $f = 45\text{ MHz}$ Pin 5 : GND	*1	47.5	50	52.5	dB
	$G(AGC3)$		$V_4 = 3.0\text{ V}$, $f = 45\text{ MHz}$ Pin 5 : OPEN	*1	33.5	36	38.5	dB
AGC Range 1	GR1	6/2, 3 7/2, 3	IF Output Level $< \pm 1\text{ dB}$, $f = 45\text{ MHz}$	*1	40	-	-	dB
IF Output Level	$V_O(IF)$	6, 7	Output Level, $f = 45\text{ MHz}$	*1	-	1.0	-	Vp-p
AGC Control Max. Voltage	V4H	4	Gain Max.	*1	2.5	-	3.3	V
AGC Control Min. Voltage	V4L	4	Gain Min.	*1	0	-	0.5	V
Input impedance	Z_{in}	2, 3	$V_4 = 0\text{ V}$, $f = 45\text{ MHz}$	*3	-	1 // 4.9	-	$k\Omega // pF$

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

Package Dimensions

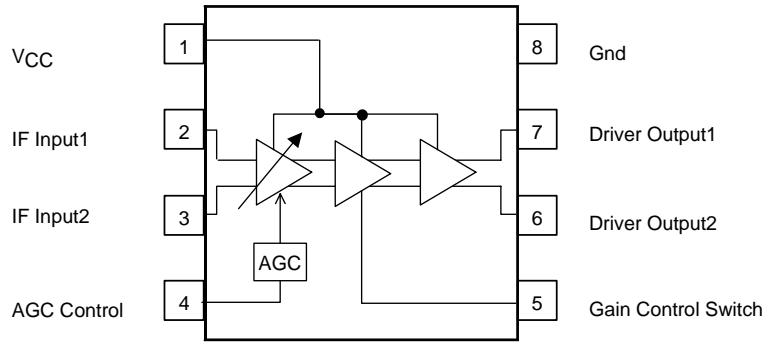
unit : mm (typ)

3245B



LA7795T

Block Diagram

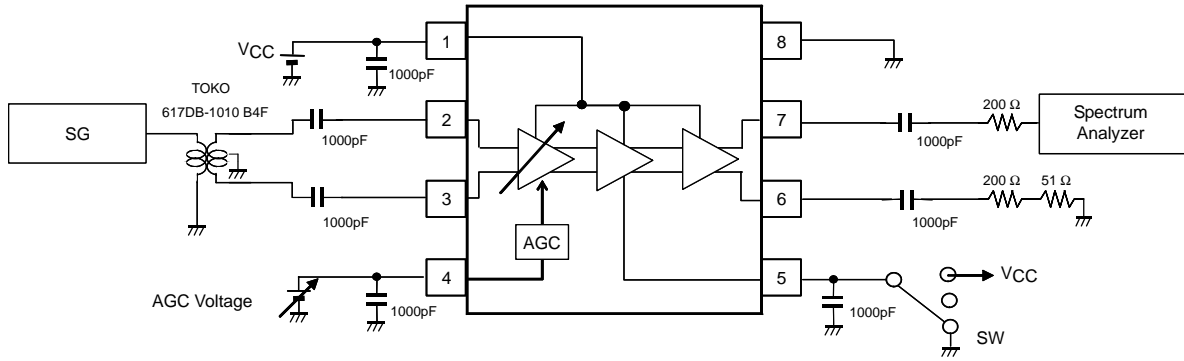


Pin Functions

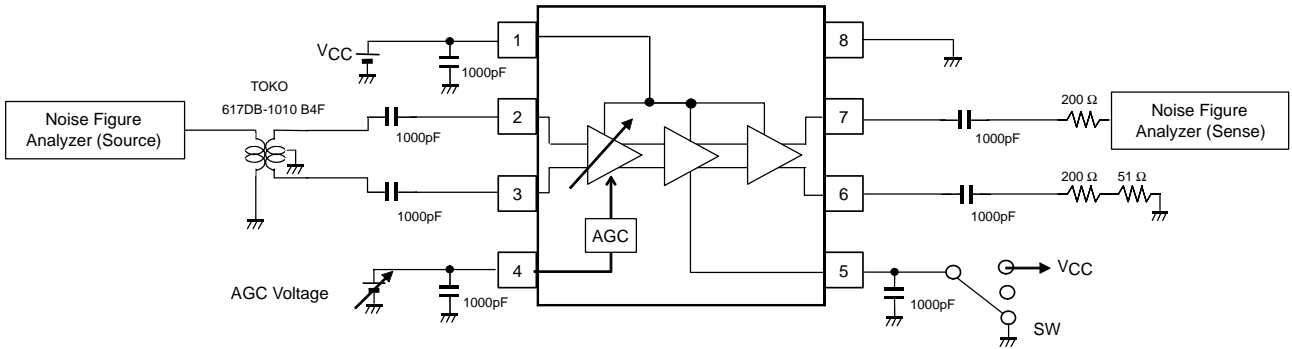
Pin Number	Pin Name	Descriptions
1	V _{CC}	
2 3	IF Input	
4	AGC Control	
5	Gain Control Switch	
6 7	Driver Output	
8	GND	

LA7795T

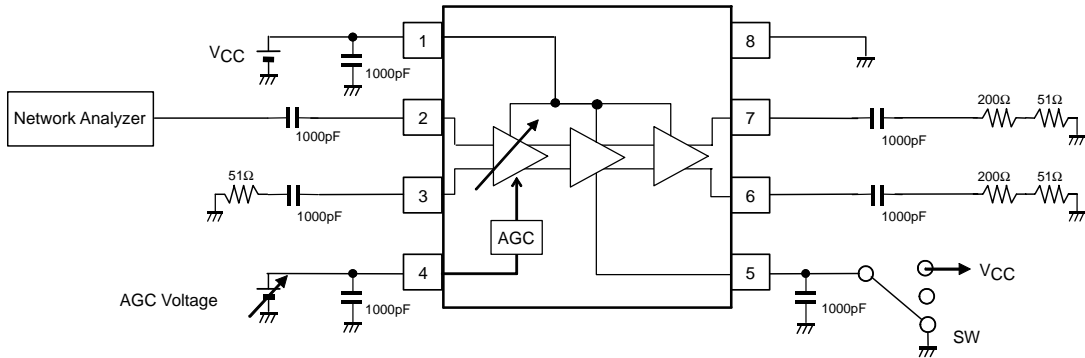
LA7795T Gain Measurement Circuit 1



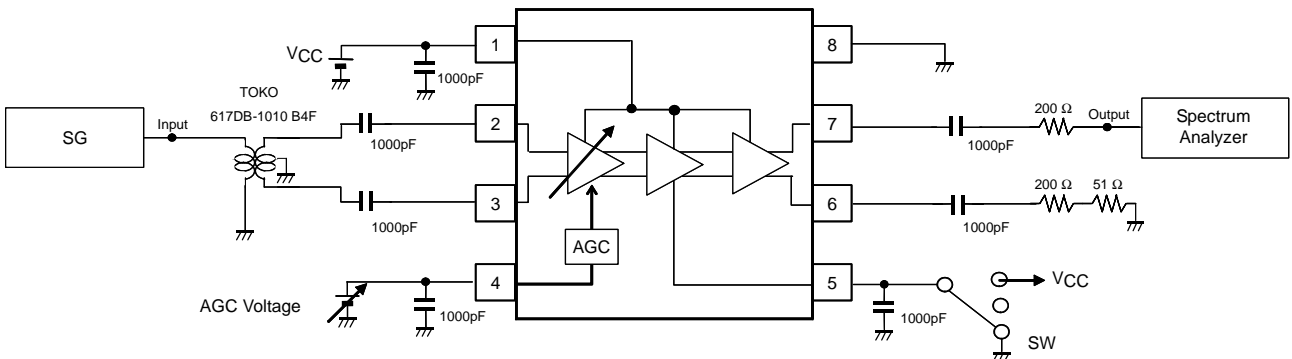
LA7795T Noise Figure Measurement Circuit 2



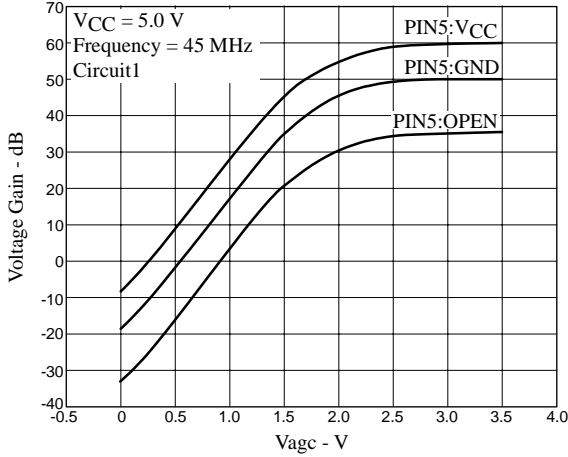
LA7795T Input Impedance Measurement Circuit 3



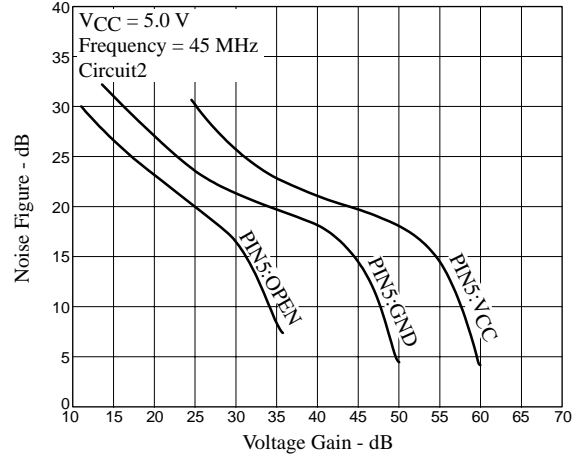
LA7795T Intermodulation Measurement Circuit 4



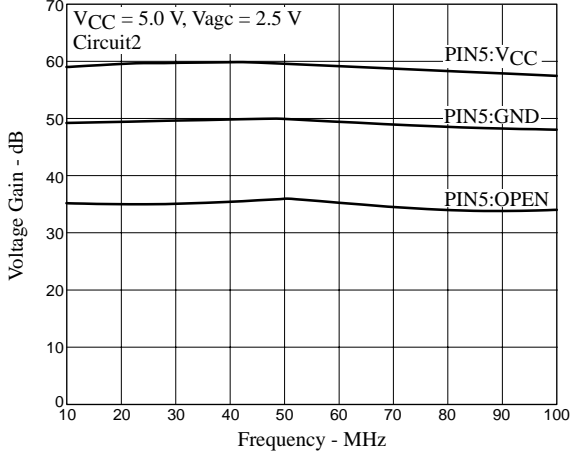
Gain - Vagc Characteristic



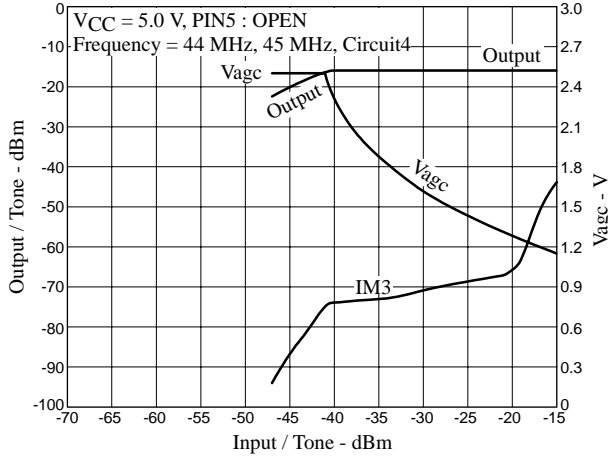
Noise Figure - Gain Characteristic



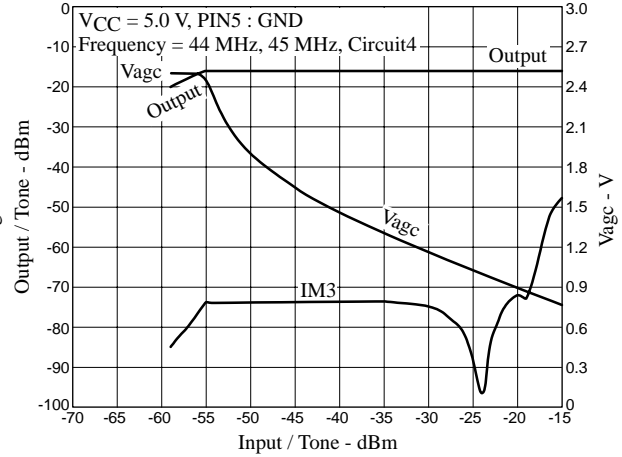
Gain - Frequency Characteristic



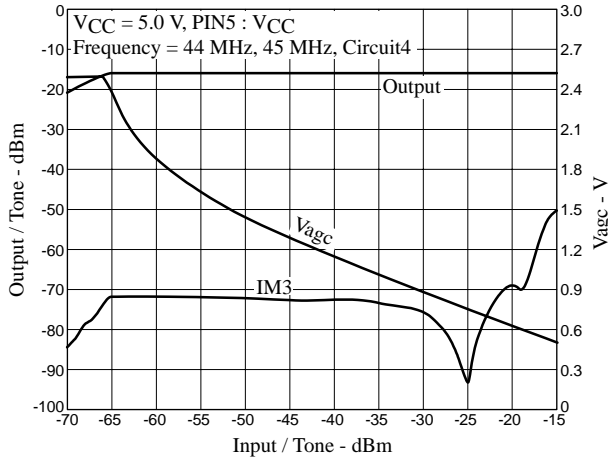
Intermodulation Characteristic



Intermodulation Characteristic



Intermodulation Characteristic

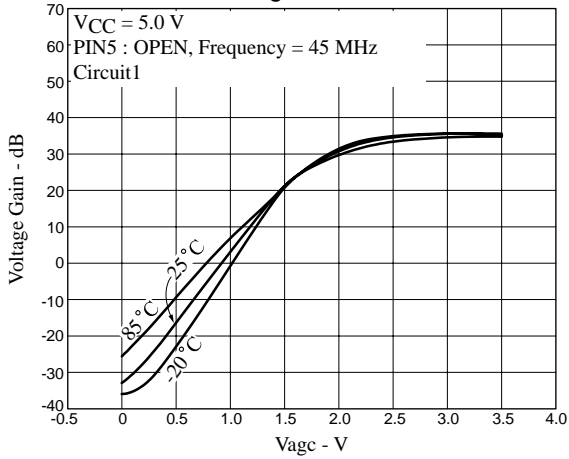


The vertical axis (Output/Tone) on this graph shows the values displayed by the spectrum analyzer for circuit 4.

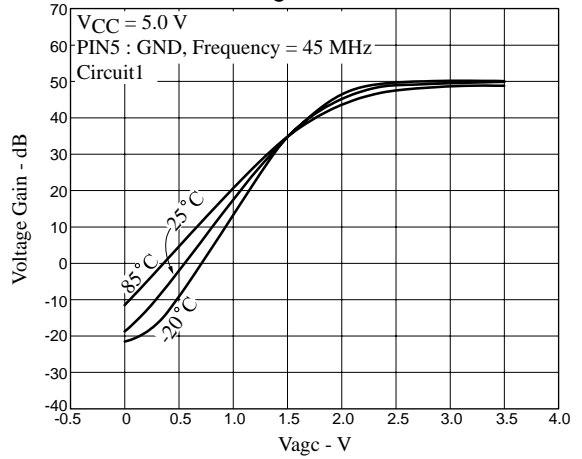
The actual output power for the corresponding pins is given by the following formula.

$$\{\text{output power [dBm]}\} = \{\text{displayed value [dBm]}\} + 10 \cdot \log(250 \Omega / 50 \Omega)$$

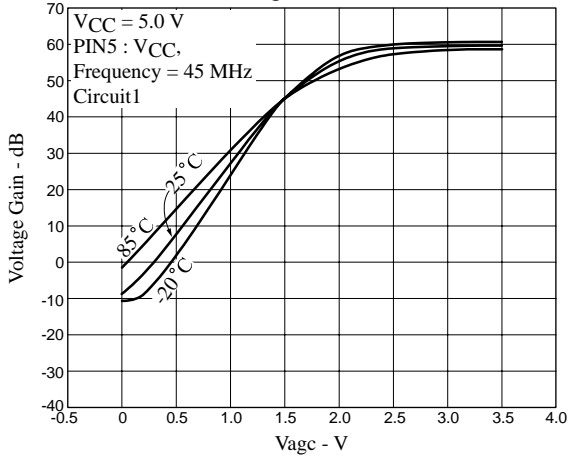
Gain - V_{agc} Characteristic



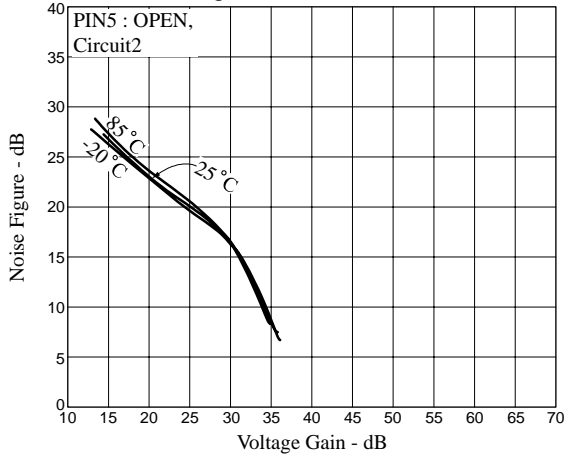
Gain - V_{agc} Characteristic



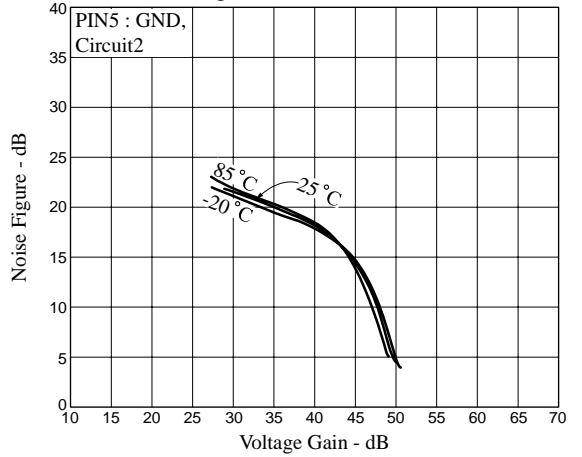
Gain - V_{agc} Characteristic



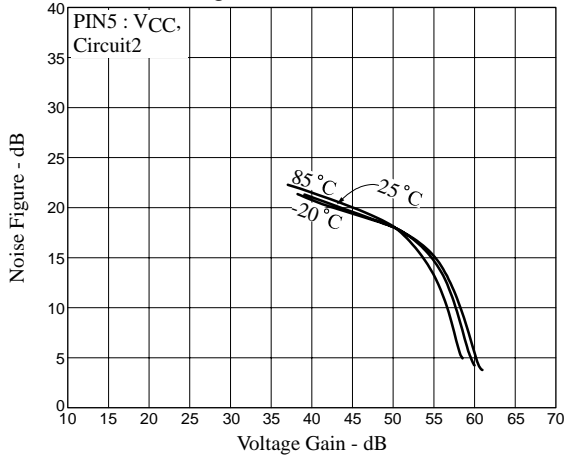
Noise Figure - Gain Characteristic



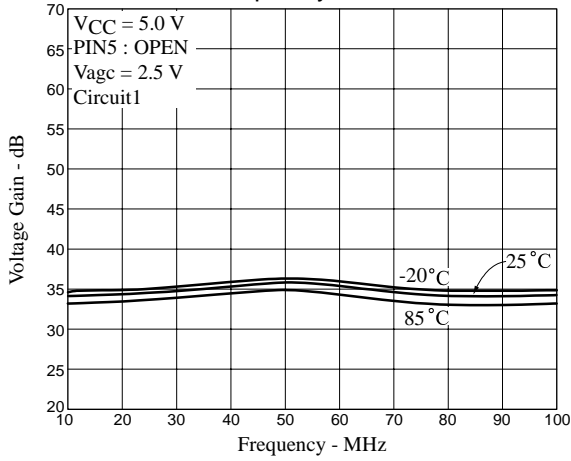
Noise Figure - Gain Characteristic



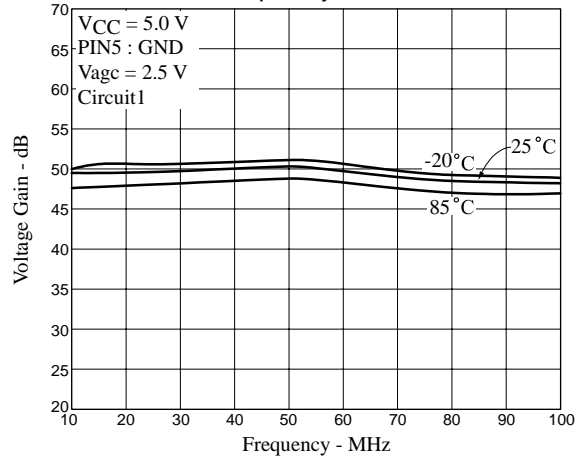
Noise Figure - Gain Characteristic



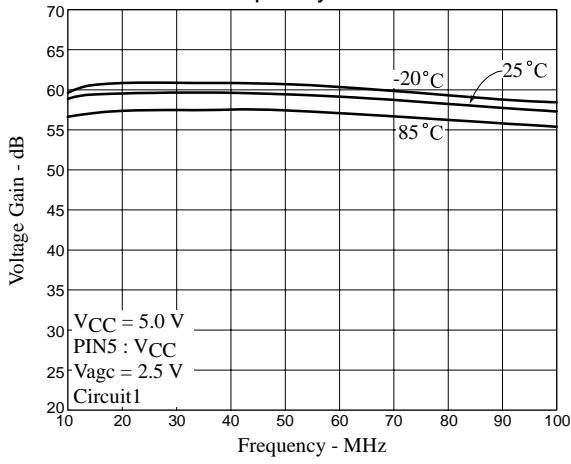
Gain - Frequency Characteristic



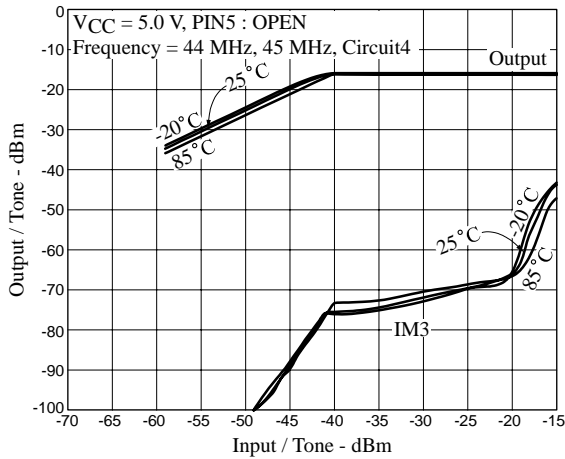
Gain - Frequency Characteristic



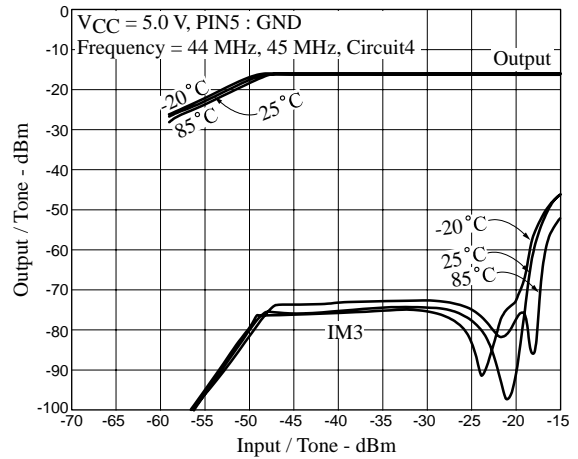
Gain - Frequency Characteristic



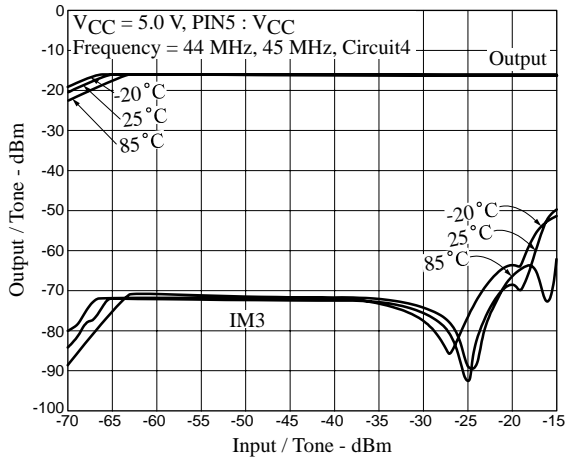
Intermodulation Characteristic



Intermodulation Characteristic



Intermodulation Characteristic



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

The actual output power for the corresponding pins is given by the following formula.

$$\{\text{output power [dBm]}\} = \{\text{displayed value [dBm]}\} + 10 \cdot \log(250 \Omega / 50 \Omega)$$

- SANYO Semiconductor Co.,Ltd. assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all SANYO Semiconductor Co.,Ltd. products described or contained herein.
- SANYO Semiconductor Co.,Ltd. strives to supply high-quality high-reliability products, however, any and all semiconductor products fail or malfunction with some probability. It is possible that these probabilistic failures or malfunction could give rise to accidents or events that could endanger human lives, trouble that could give rise to smoke or fire, or accidents that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.
- In the event that any or all SANYO Semiconductor Co.,Ltd. products described or contained herein are controlled under any of applicable local export control laws and regulations, such products may require the export license from the authorities concerned in accordance with the above law.
- No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written consent of SANYO Semiconductor Co.,Ltd.
- Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the SANYO Semiconductor Co.,Ltd. product that you intend to use.
- Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production.
- Upon using the technical information or products described herein, neither warranty nor license shall be granted with regard to intellectual property rights or any other rights of SANYO Semiconductor Co.,Ltd. or any third party. SANYO Semiconductor Co.,Ltd. shall not be liable for any claim or suits with regard to a third party's intellectual property rights which has resulted from the use of the technical information and products mentioned above.

This catalog provides information as of May, 2007. Specifications and information herein are subject to change without notice.