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Linear Amplifier SG206

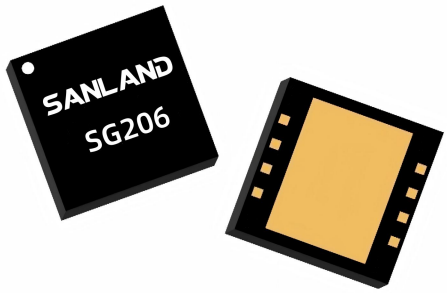
DESCRIPTION

Sanland's SG206 is an ultra-linear, GaAs pHEMT, differential RF amplifier. The device features a cascode design which provides 21.3dB of flat gain along with very low distortion from 5MHz to 1.8GHz. This ultra-linear IC is designed to support Broadband CATV DOCSIS 4.0 applications, such as Nodes, Amplifiers, and Remote PHY Devices, as well as Fiber to The Home (FTTH), Home Gateways, and Cable Modems. The device is powered by a single supply that can operate from 8V and current can be set 325 mA. When driven with 8V and 325mA the output is 66dBmV TCP with a MER of 45dB. The SG206 is packaged in a 8-pin 5x5 mm^2 Laminate Module

KEY FEATURES

- 5 MHz to 1800 MHz Operation
- 5V & 8V Operation
- Gain: 21.3 dB Typical
- TCP: 66dBmV @ 8V
- Noise Figure: 1.7/3.5 dB @ 50/1800MHz
- RoHS Compliant

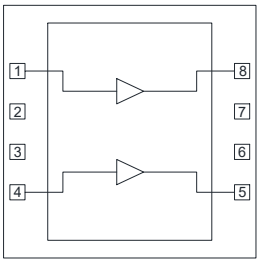
RoHS Compliant & Green Package



Major Applications

- DOCSIS 4.0 Amplifiers
- DOCSIS 4.0 Optical Nodes
- DOCSIS 4.0 Remote PHY Devices
- FTTH GPON and GEPON
- DOCSIS 4.0 Cable Modem and Home Gateways
- Single Ended Gain Block

Pin Assignment



Pin Details

Pin	Name	Description	Pin	Name	Description
1	RFIN+	RF Input +	5	RFOUT-/VDD2	RF output - and VDD through RF choke
2	G1	Degenerated device source to GND resistor	6	VG2	Cascode device bias resistor divider
3	G2	Degenerated device source to GND resistor	7	NC	No connection
4	RFIN-	RF Input -	8	RFOUT+/VDD1	RF output + and VDD through RF choke

Absolute Maximum Ratings

Parameter	Rating	Unit
Supply Voltage (VDD)	+10	V
Supply Current (I_{DD})	400	mA
Maximum RF Input Level	+65	dBmV
Operating Ambient Temperature	-40~100	℃
Storage Temperature	-65~150	℃
Max. Junction Temp. (TJ)	150	℃

Important Note:

The information provided in this datasheet is deemed to be accurate and reliable only at present time. Sanland Technology Corp. reserves the right to make any changes to the specifications in this datasheet without prior notice.

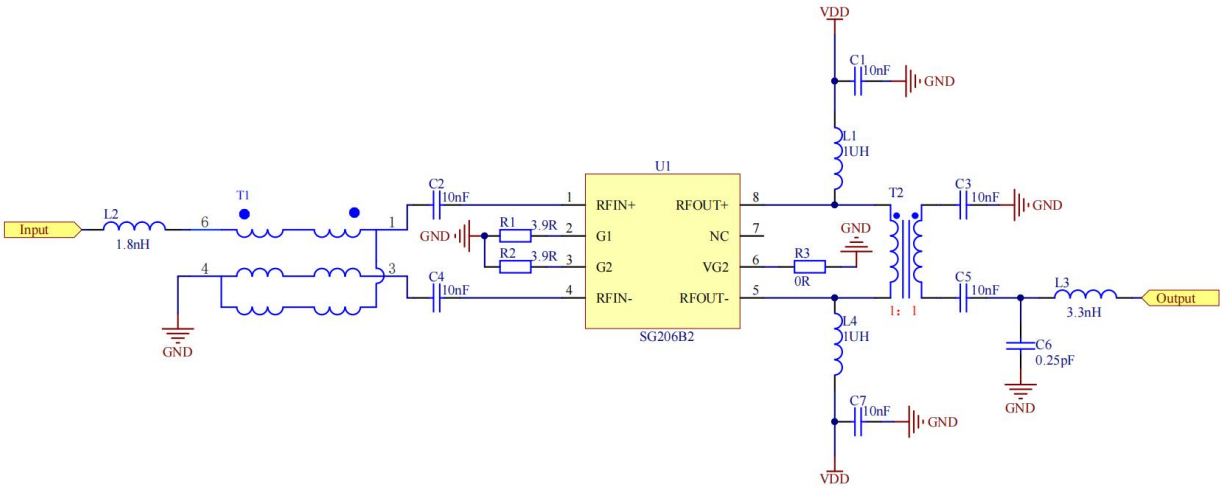
Caution: ESD Sensitive
Appropriate precaution in handling, packaging And testing devices must be observed.

Electrical Specifications at +8 V, 50-1800 MHz_

Temp = +25 ° C, VDD = +8V, 75 Ω system, Full band unless otherwise noted

Parameter	Specification			Unit	Notes
	Min	Typ.	Max		
Frequency	50		1800	MHz	
Supply Voltage (VDD)		8		V	
Supply Current (IDD)		325		mA	
Gain at 50 MHz		20.4		dB	
Gain at 1800 MHz		21.3		dB	
Gain Slope		0.9		dB	
Reverse Isolation		24		dB	
Input return loss		18		dB	
Output return loss		17		dB	
MER		45		dB	At +66dBmV @ 8V Total Composite Output power. 108MHz to 1791MHz, 280 Ch, SC-QAM, 10dB tilt, 0dB Offset(Source corrected)
Noise Figure	1.7		3.5	dB	
OIP2L		75		dBm	+15dBm @8V / tone output, Δf =53MHz
OIP2U		63		dBm	+15dBm @8V / tone output, Δf =53MHz
OIP3	40	42		dBm	+15dBm @8V / tone output, Δf =1MHz
OP1dB	27.5	29		dBm	
Thermal Resistance		45		˚C/W	

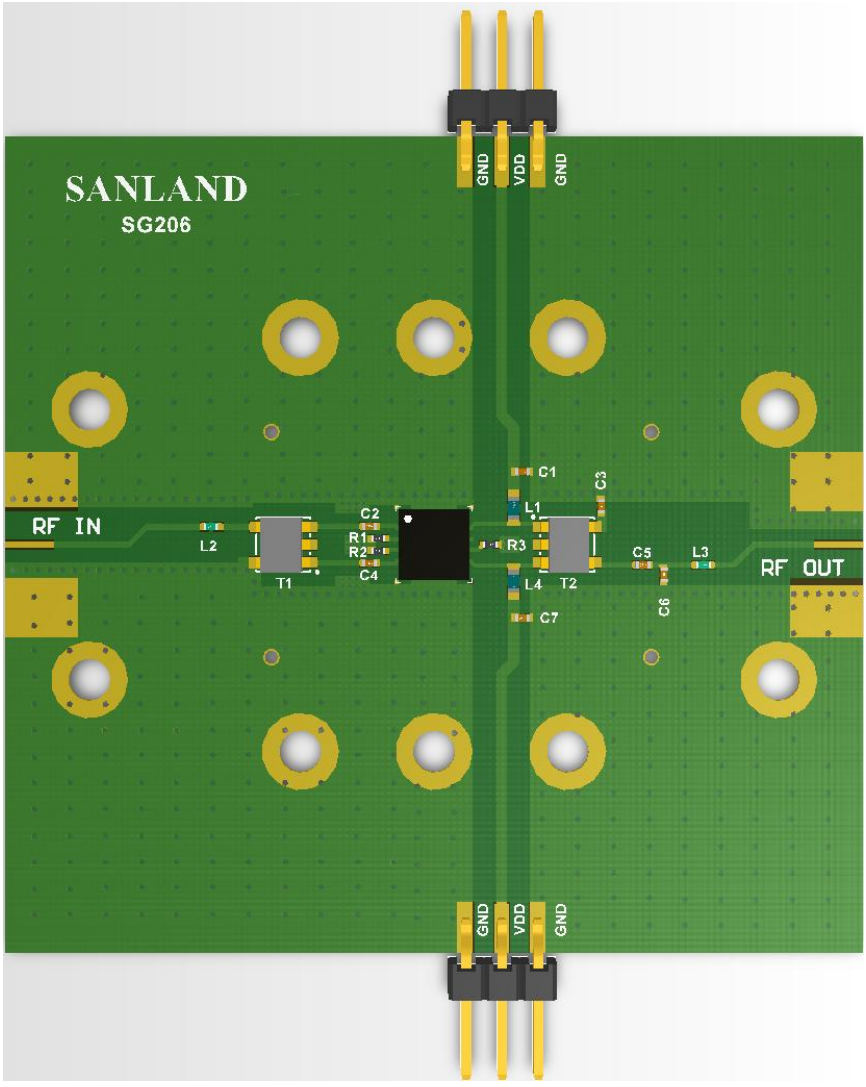
Application Circuit, 50-1800 MHz



Evaluation Board Bill of Materials, 50-1800 MHz

Component	Value	Size	Vendor	Part Number
U1			SANLAND	
PCB			SANLAND	
C1, C2, C3, C4, C5, C7	10nF	0402	MURATA	GRM1555C1E103JE01D
C6	0.25pF	0402	MURATA	GJM1555C1HR25RB12D
L1, L4	1uH	0603	FH	FHW0603UF1R0JST
L2	1.8nH	0402	MURATA	LQG15HS1N8S02D
L3	3.3nH	0402	MURATA	LQG15HS3N3S02D
R1, R2	3.9R	0402	UNI-ROYAL	0402WGF390KTCE
R3	0R	0402	UNI-ROYAL	0402WGF0000TCE
T1	1:1, 5-3000MHz		MINI	TC1-33-75G2+
T2	1:1, 5-3000MHz			

Evaluation Board Assembly Drawing , 50-1800 MHz

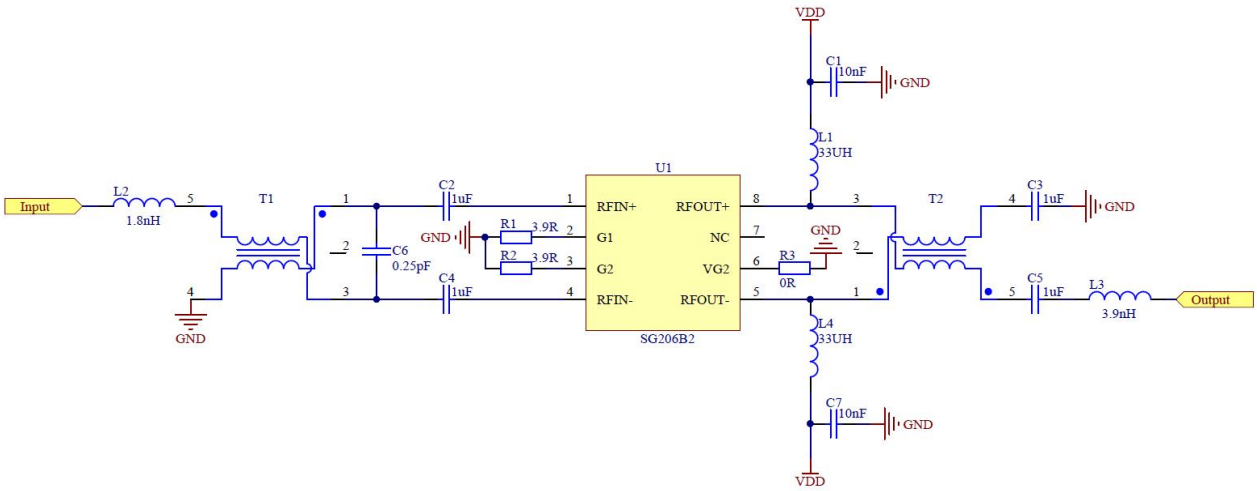


Electrical Specifications at +5 V & +8 V, 5-700 MHz_

Temp = +25 ° C, VDD = +5V & +8V , 75 Ω system, Full band unless otherwise noted

Parameter	Specification			Unit	Notes
	Min	Typ.	Max		
Frequency	5		700	MHz	
Supply Voltage (VDD)		5/8		V	
Supply Current (IDD)		308/317		mA	
Gain at 5 MHz		20.6		dB	
Gain at 700 MHz		20.6		dB	
Gain Slope		0.2		dB	
Reverse Isolation		24		dB	
Input return loss		25		dB	
Output return loss		24		dB	
MER		45		dB	At +65dBmV @ 5V and +67dBmV @ 8V Total Composite Output power. 108MHz to 1791MHz, 280 Ch, SC-QAM, 10dB tilt, 0dB Offset(Source corrected)
Noise Figure		1.7		dB	
OIP2L		68/75		dBm	+15dBm @8V / tone output, Δf =53MHz +10dBm @5V / tone output, Δf =53MHz
OIP2U		60/65		dBm	+15dBm @8V / tone output, Δf =53MHz +10dBm @5V / tone output, Δf =53MHz
OIP3		37/42		dBm	+15dBm @8V / tone output, Δf =1MHz +10dBm @5V / tone output, Δf =1MHz
OP1dB		23.5/29		dBm	
Thermal Resistance		45		˚C/W	

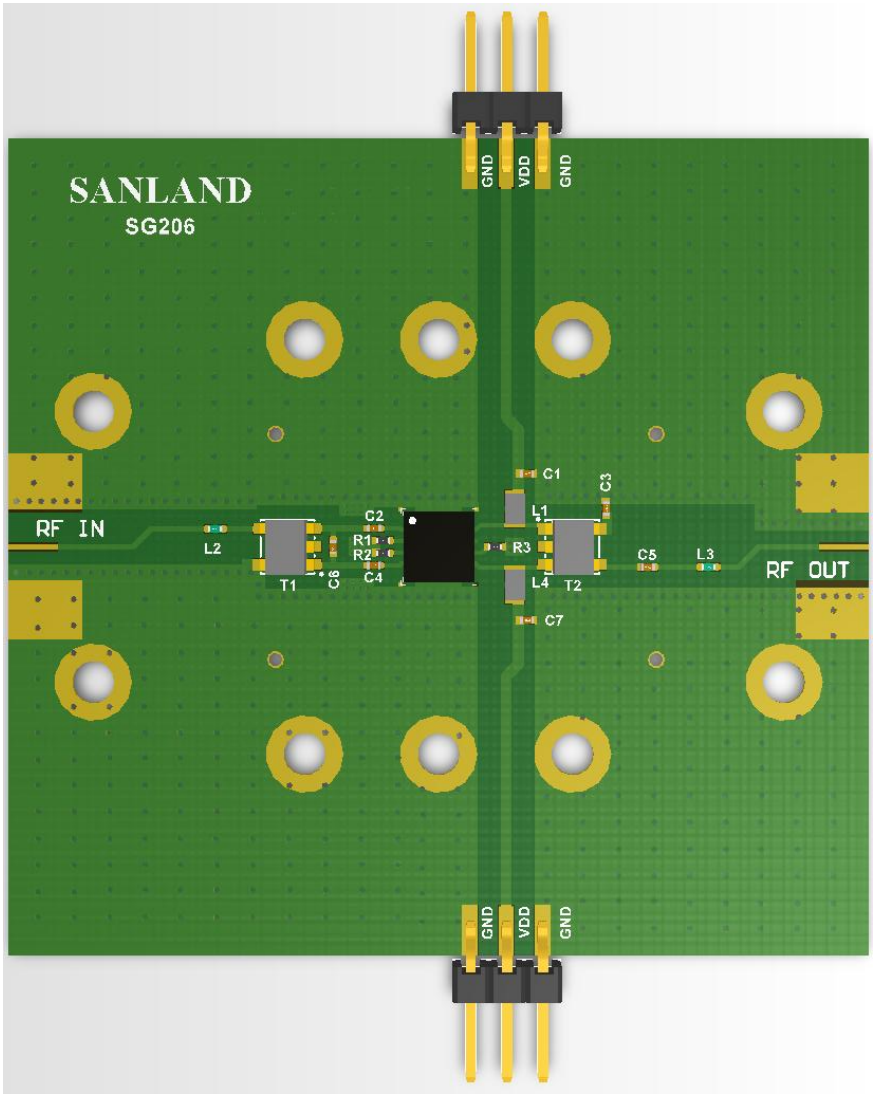
Application Circuit, 5-700 MHz



Evaluation Board Bill of Materials, 5-700 MHz

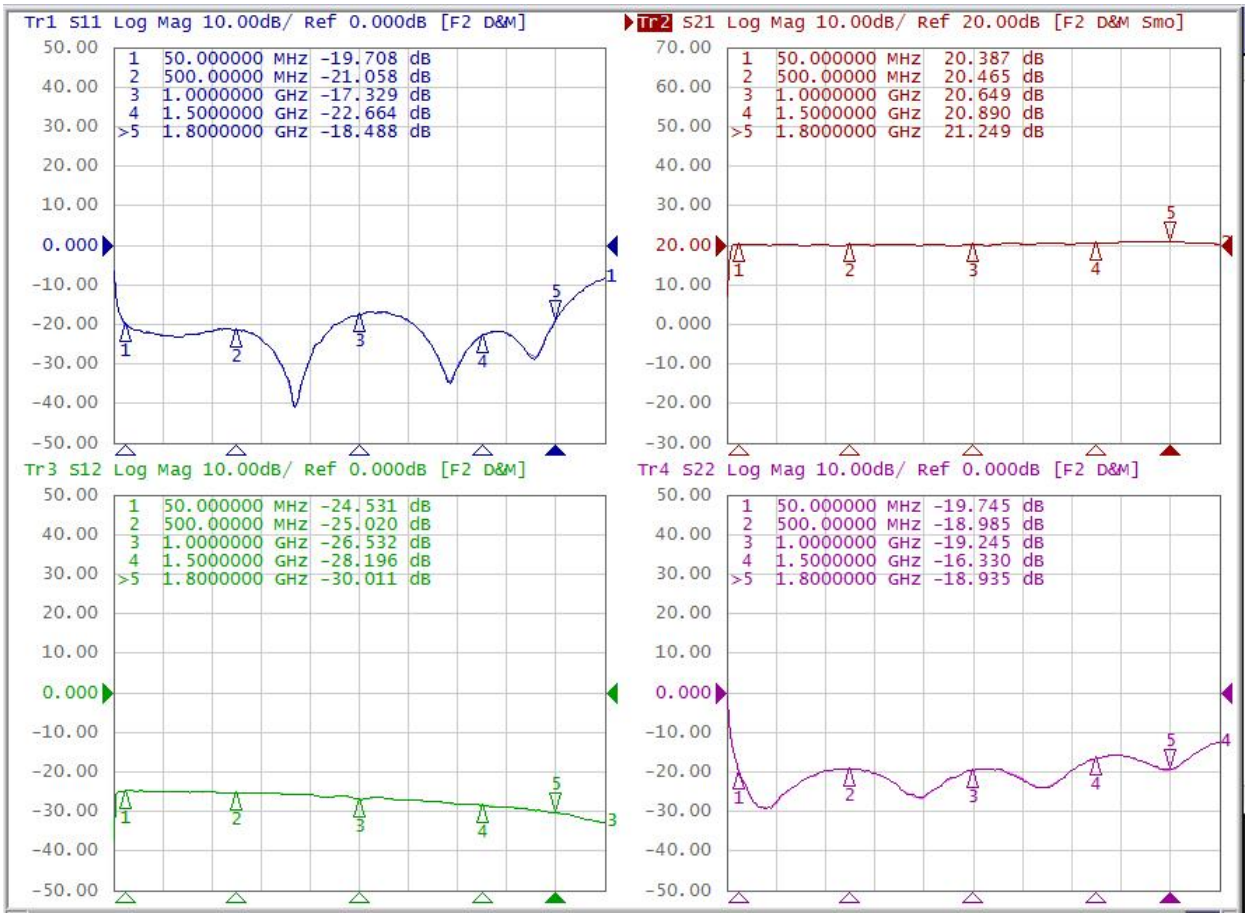
Component	Value	Size	Vendor	Part Number
U1			SANLAND	
PCB			SANLAND	
C1, C7	10nF	0402	MURATA	GRM1555C1E103JE01D
C2, C3, C4, C5	1uF	0402	MURATA	GRM155R61E105KA12D
C6	0.25pF	0402	MURATA	GJM1555C1HR25RB12D
L1, L4	10uH	1008	COILCRAFT	1008LS-103XJLC
L2	1.8nH	0402	MURATA	LQG15HS1N8S02D
L3	3.9nH	0402	MURATA	LQG15HS3N9S02D
R1, R2	3.9R	0402	UNI-ROYAL	0402WGF390KTCE
R3	0R	0402	UNI-ROYAL	0402WGF0000TCE
T1, T2	1:1, 5-1225MHz		EASTEVER	EBE1094-A013187

Evaluation Board Assembly Drawing , 5-700 MHz



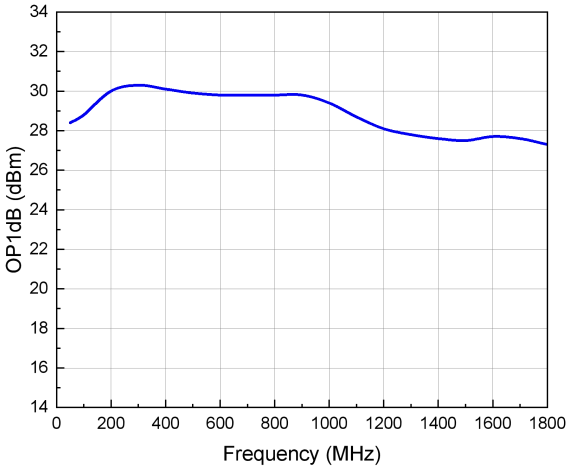
Performance Data at +8V, 50-1800 MHz

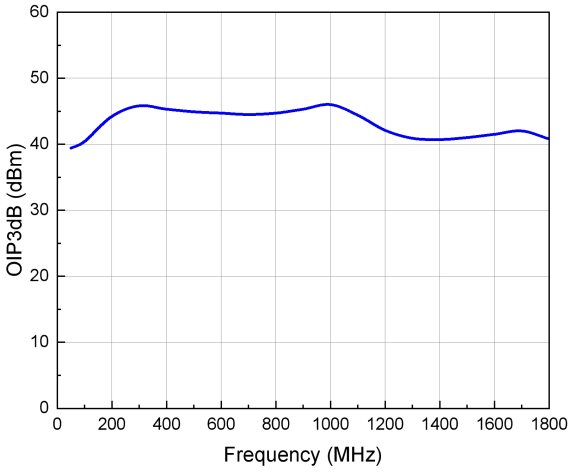
(VDD = +8V, Temp = +25C, Zo = 75Ω)

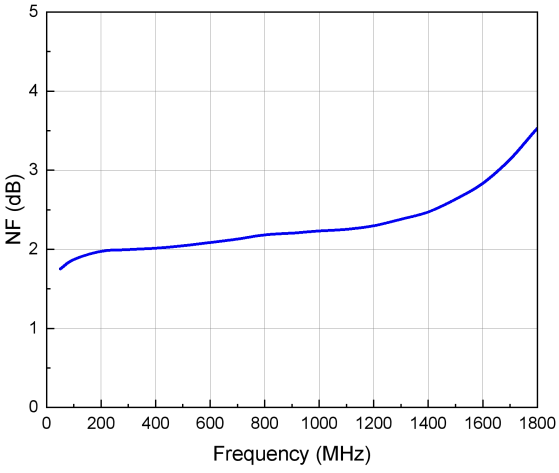


Performance Data at +8V, 50-1800 MHz

(VDD = +8V, Temp = +25C, Zo = 75Ω)





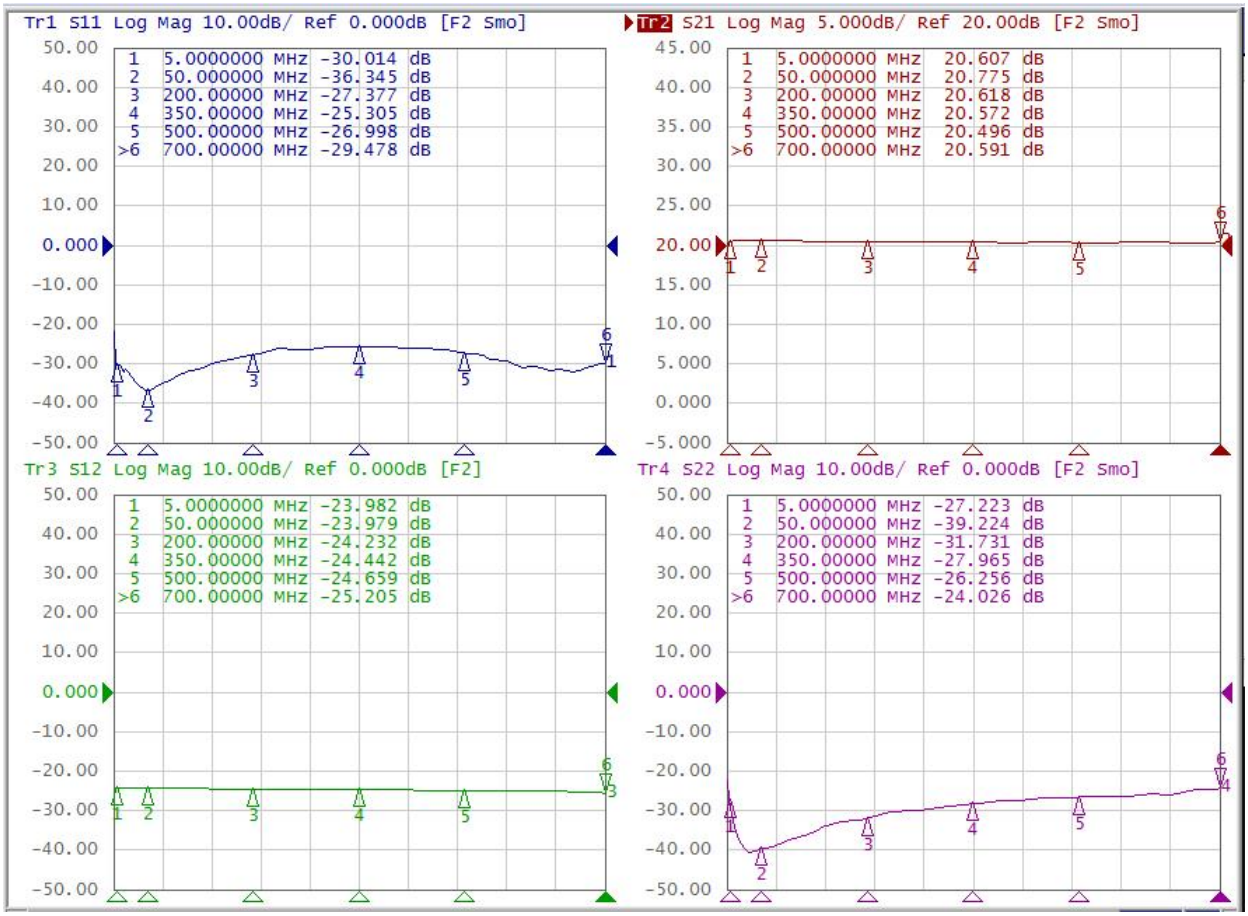


Note:

(1) 8V OIP3: +15dBm / tone output @ ∆f = 1MHz

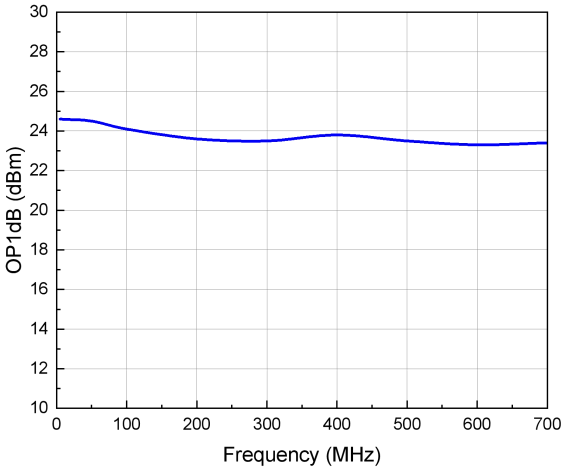
Performance Data at +5V, 5-700 MHz

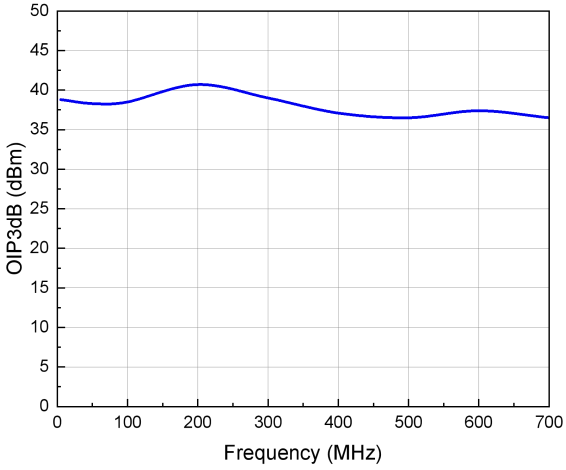
(VDD = +5V, Temp = +25C, Zo = 75Ω)

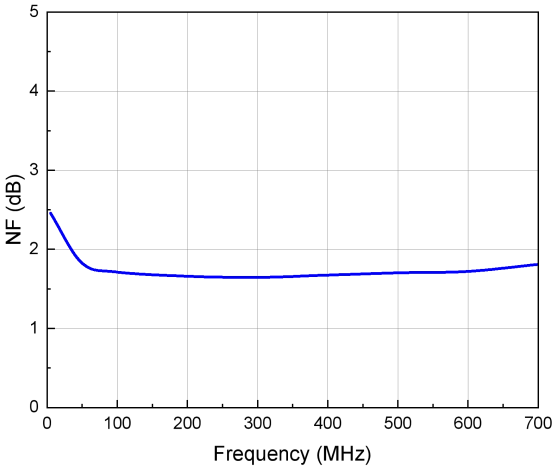


Performance Data at +5V, 5-700 MHz

(VDD = +5V, Temp = +25C, Zo = 75Ω)





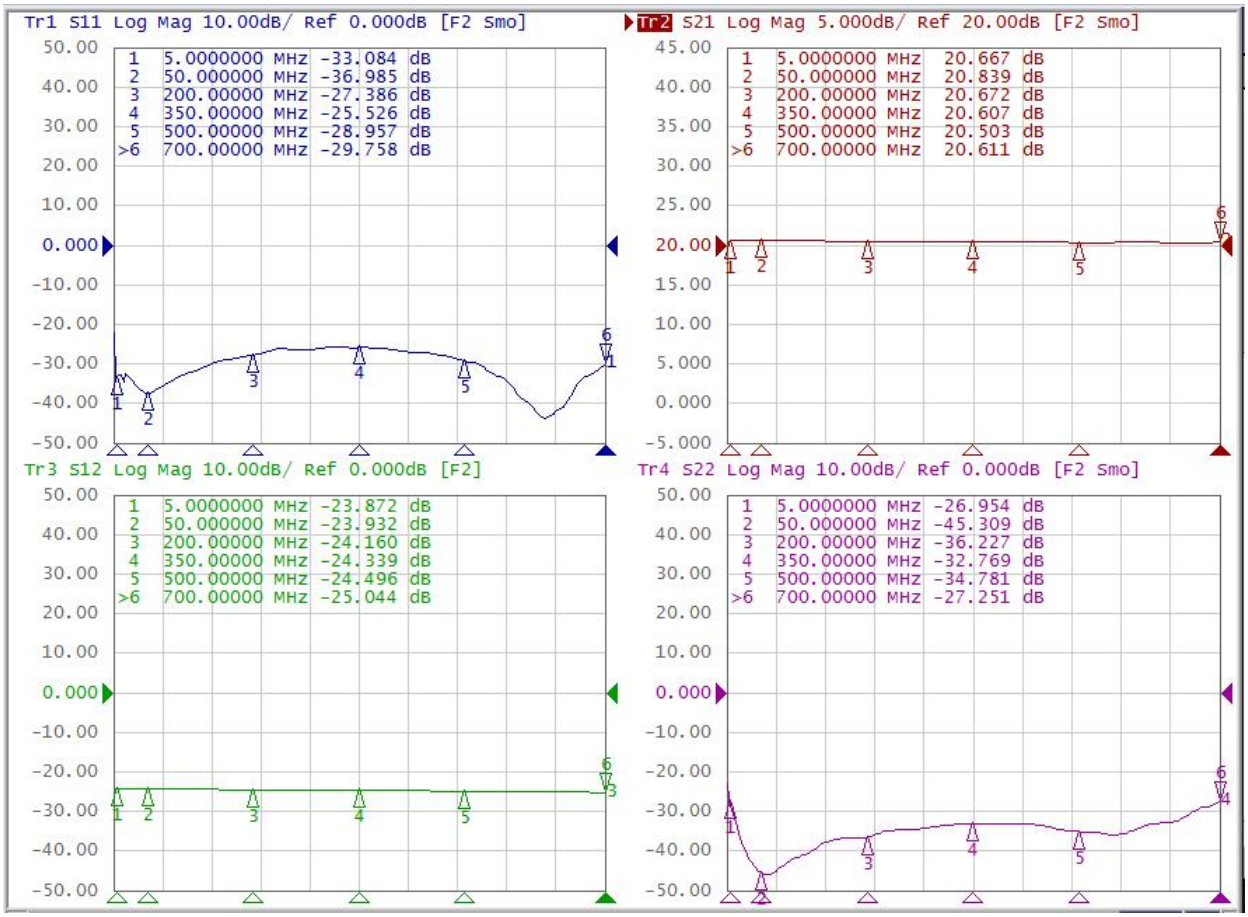


Note:

(1) 5V OIP3: +10dBm / tone output @ ∆f = 1MHz

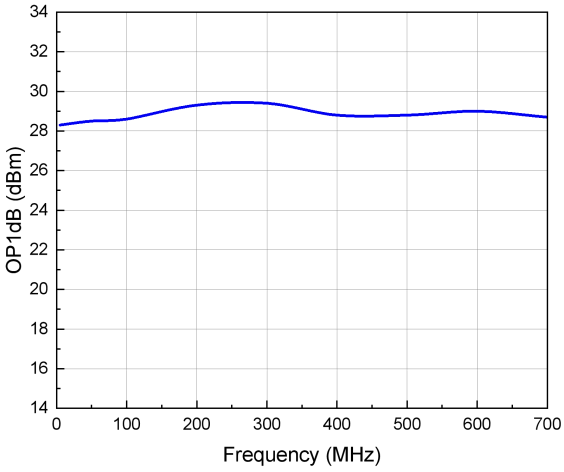
Performance Data at +8V, 5-700 MHz

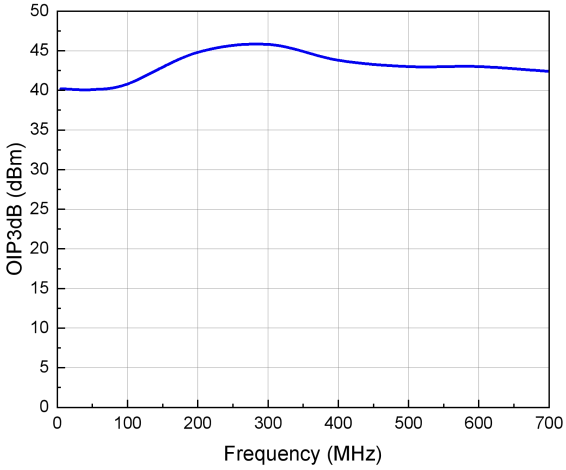
(VDD = +8V, Temp = +25C, Zo = 75Ω)

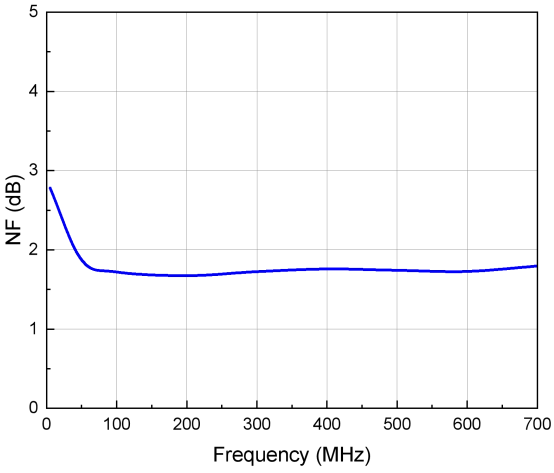


Performance Data at +8V, 5-700 MHz

(VDD = +8V, Temp = +25C, Zo = 75Ω)



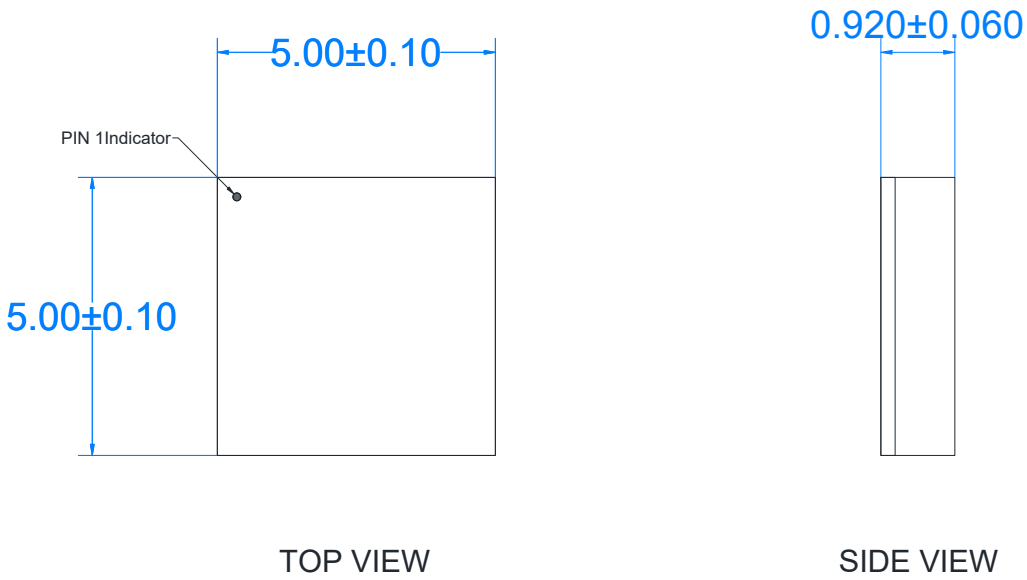




Note:

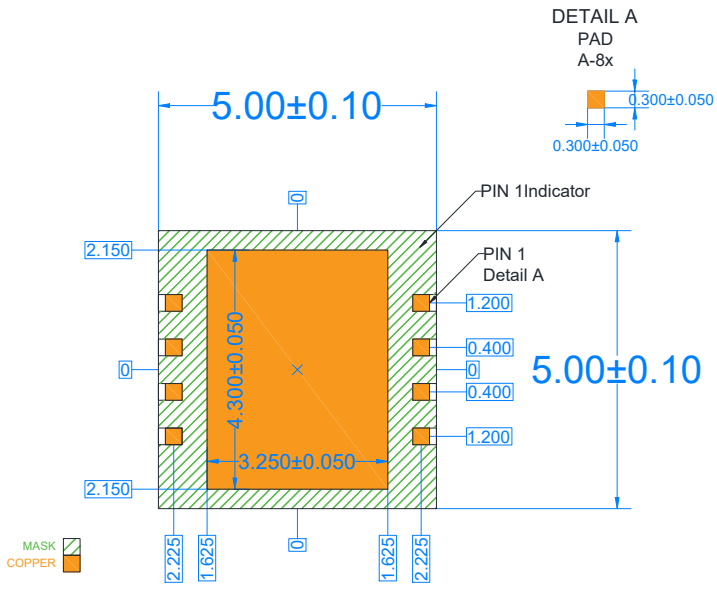
(1) 8V OIP3: +15dBm / tone output @ ∆f = 1MHz

Package Outline



TOP VIEW

SIDE VIEW



BOTTOM VIEW