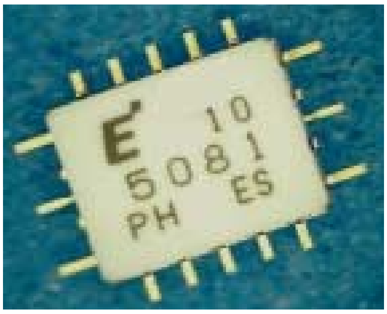
EMM5081V1B

Ku-Band Power Amplifier MMIC

FEATURES

- High Output Power: Pout=33.5dBm (typ.)
- High Linear Gain: GL=30dB (typ.)
- Impedance Matched Zin/Zout=50Ω
- Small Hermetic Metal-Ceramic SMT Package (V1B)



DESCRIPTION

The EMM5081V1B is a MMIC amplifier that contains a three-stages amplifier, internally matched, for standard communications band in the 13.75 to 14.5GHz frequency range. This product is well suited for VSAT applications as it offers high power, high gain, and low distortion. Eudyna Devices's stringent Quality Assurance Program assures the highest reliability and consistent performance.

ABSOLUTE MAXIMUM RATING

Item	Symbol	Rating	Unit
Drain-Source Voltage	VDD	10	V
Gate-Source Voltage	VGG	-3	V
Input Power	Pin	26	dBm
Storage Temperature	Tstg	-55 to +125	℃

RECOMMENDED OPERATING CONDITIONS

Item	Symbol	Recommend Condition	Unit
Drain-Source Voltage	VDD	≦6	V
Input Power	Pin	≦12	dBm
Operating Case Temperature	Tc	-40 to +85	℃

ELECTRICAL CHARACTERISTICS (Ambient Temperature Ta=25℃)

Item	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Frequency Range	f	VDD=6.0V	13.75	-	14.5	GHz
Gate Bias Voltage	VGG(DC)	IDD(DC)=1200mA typ.	-0.01	-0.1	-0.5	V
Output Power at 1dB G.C.P.	P1dB	ZS=ZL=50ohm	32.5	33.5	-	dBm
Power Gain at 1dB G.C.P.	G1dB		26	29	-	dB
Gain Flatness	delta-G		-	1.5	2	dB
Power-added Efficiency at 1dB G.C.P.	Nadd		-	28	-	%
Third Order Intermodulation*	IM3*	*delta f=10MHz	-26	-28	-	dBc
Drain Current at 1dB G.C.P.	IDD(RF)	2-tone Test	-	1400	1700	mA
Input Return Loss (at Pin=-20dBm)	RL-in	Pout=25.5dBm S.C.L	-	-6	-	dB
Output Return Loss (at Pin=-20dBm)	RL-out		-	-10	-	dB
Thermal Resistance	Rth		-	4.4	-	℃/W

1dB G.C.P. : 1dB Gain Compression Point
S.C.L. : Single Carrier Level

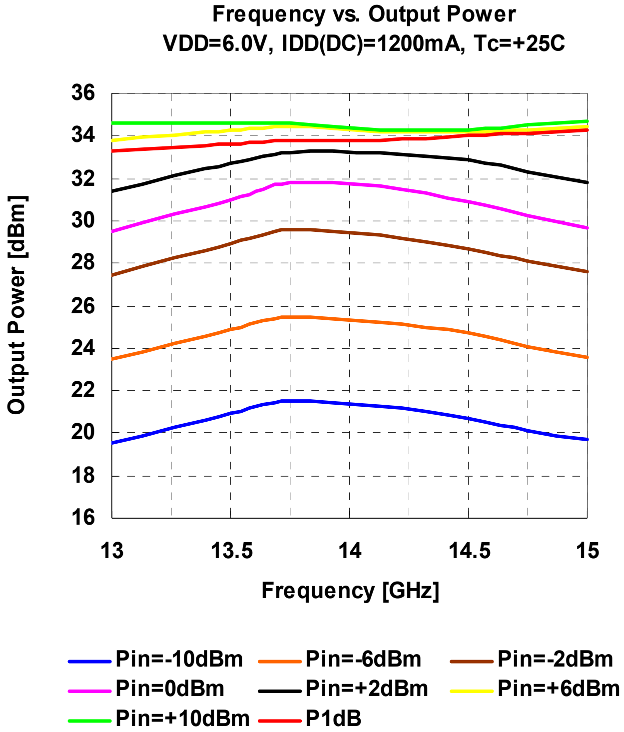
ESD	Class 0	~ 250V
Note: Based on JEDEC JESD22-A114-C		

Case Style	**V1B**
RoHS Compliance	**Yes**

Edition 2.0 October, 2008

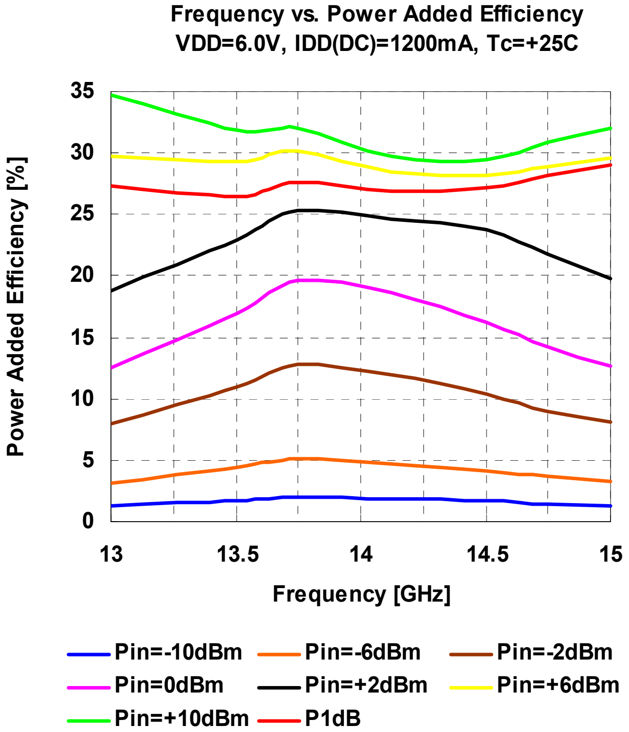
Frequency vs. Output Power

(VDD=6V, IDD(DC)=1200mA, Tc=+25C)



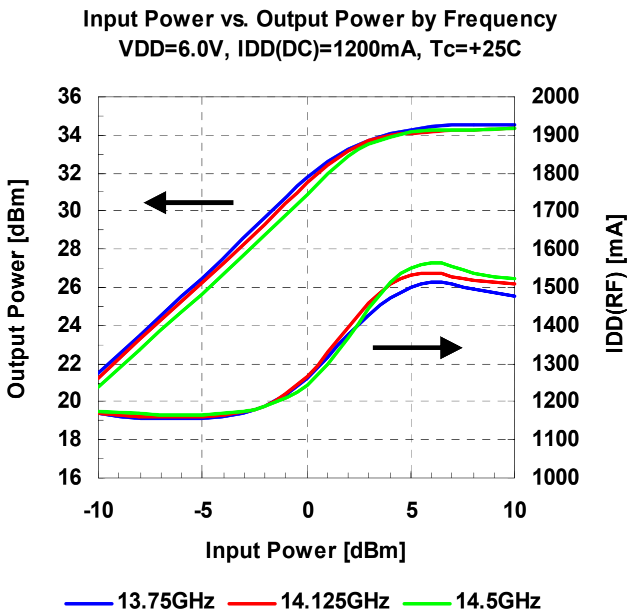
Frequency vs. Power Added-Efficiency

(VDD=6V, IDD(DC)=1200mA, Tc=+25C)



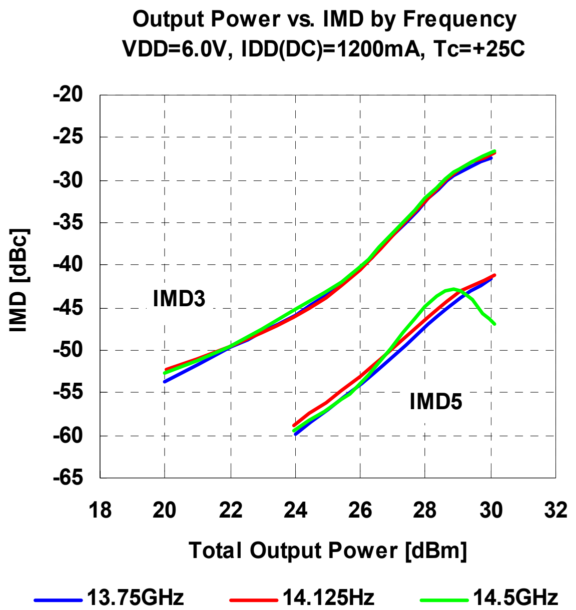
Input Power vs. Output Power, Idsr

(VDD=6V, IDD(DC)=1200mA, Tc=+25C)

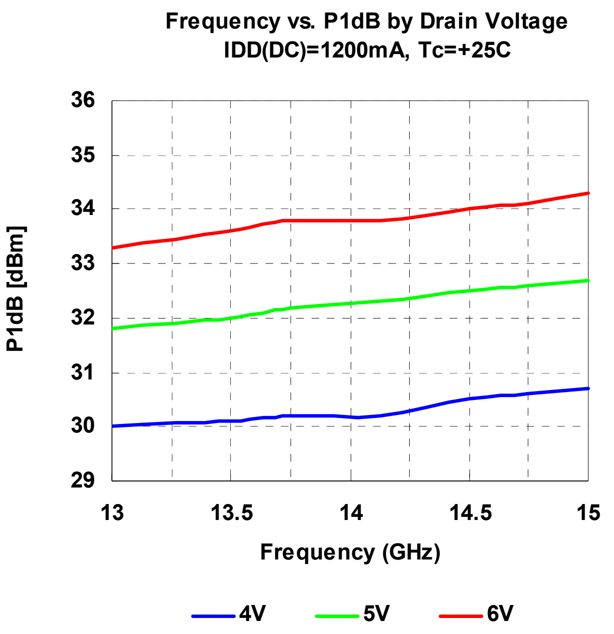


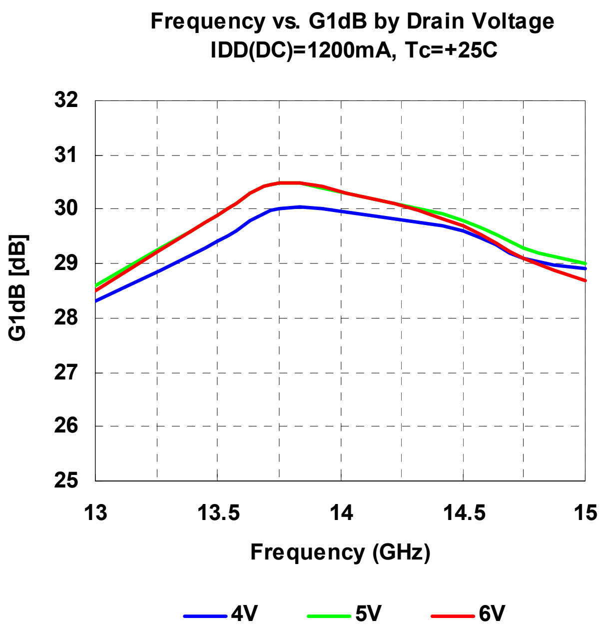
Output Power vs. IMD

(VDD=6V, IDD(DC)=1200mA, Tc=+25C)

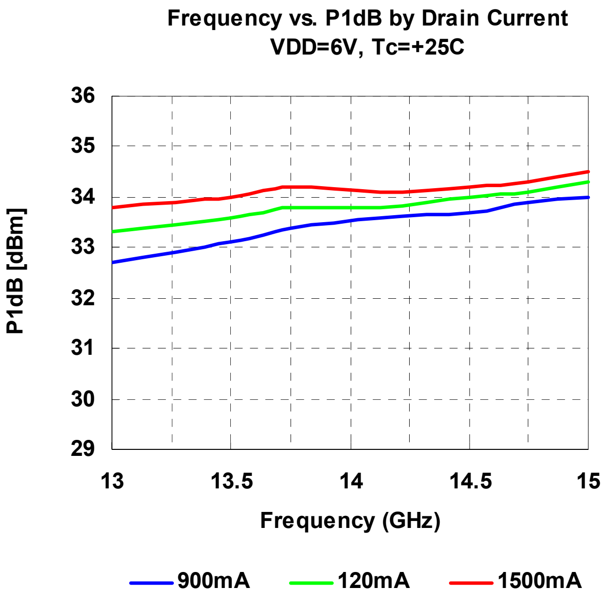


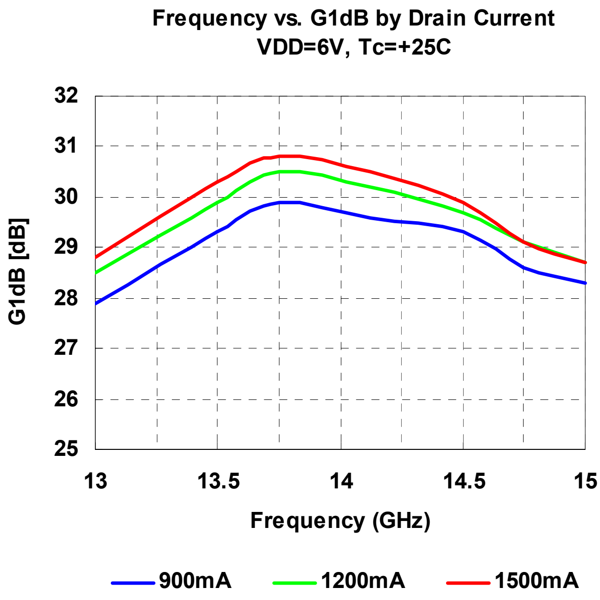
Frequency vs. P1dB,G1dB by Drain Voltage
(IDD(DC)=1200mA, Tc=+25C)





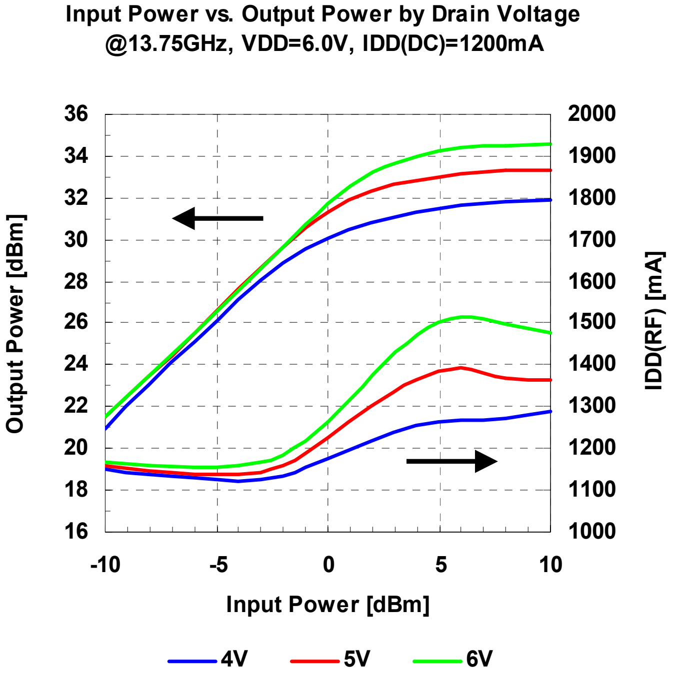
Frequency vs. P1dB,G1dB by Drain Current
(VDD=6V, Tc=+25C)

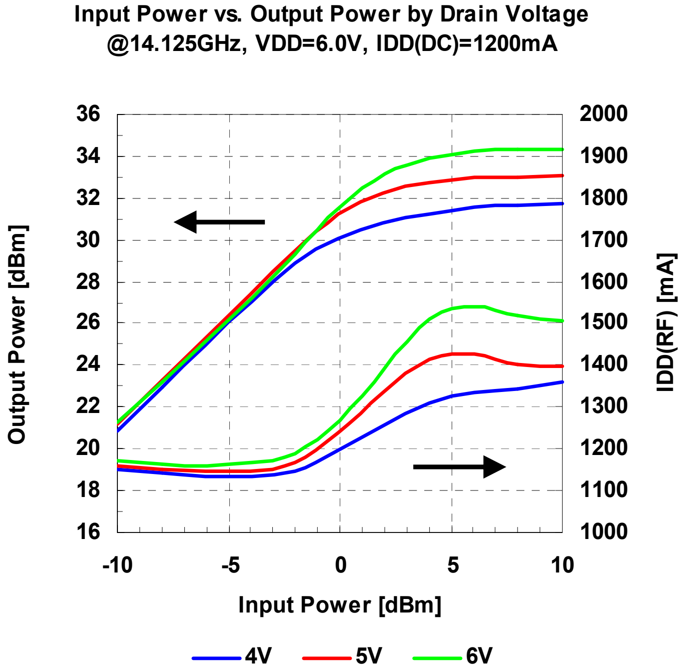


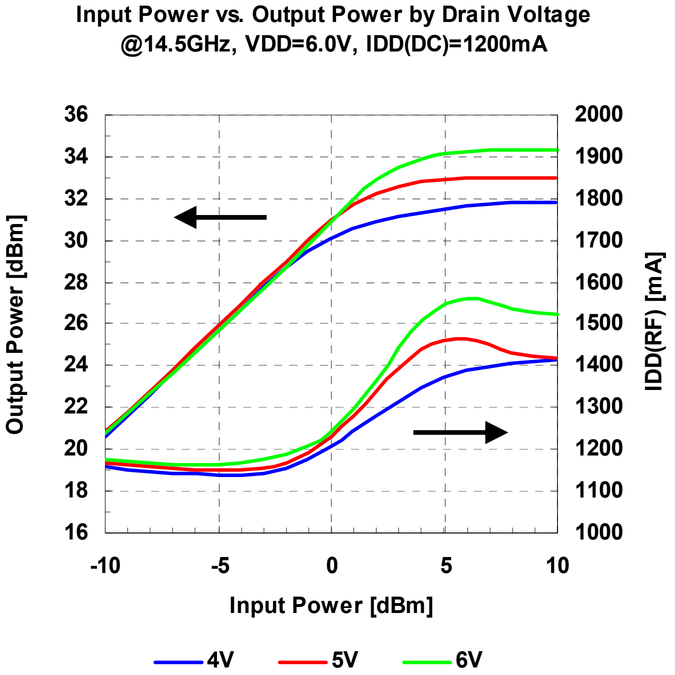


Input Power vs. Output Power, Idsr by Drain Voltage

(Idd(DC)=1200mA, Tc=+25C)

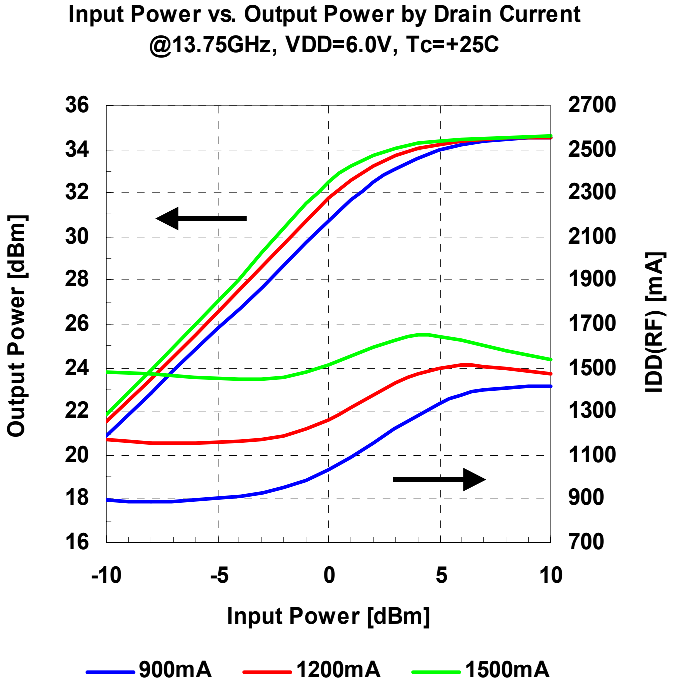


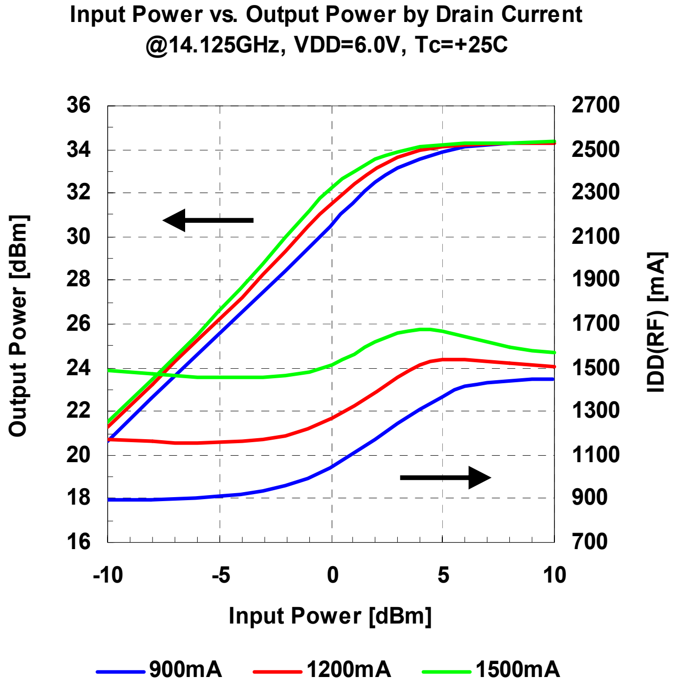


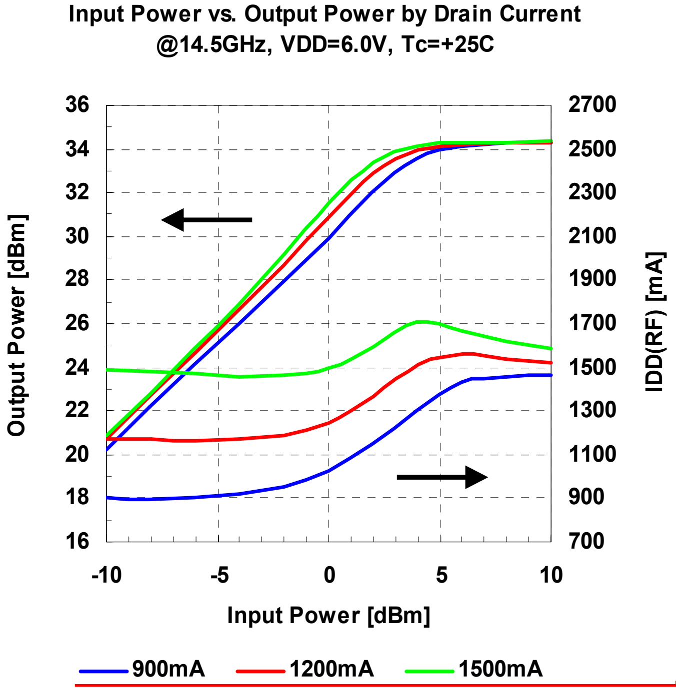


Input Power vs. Output Power, Idsr by Drain Current

(VDD=6V, Tc=+25C)

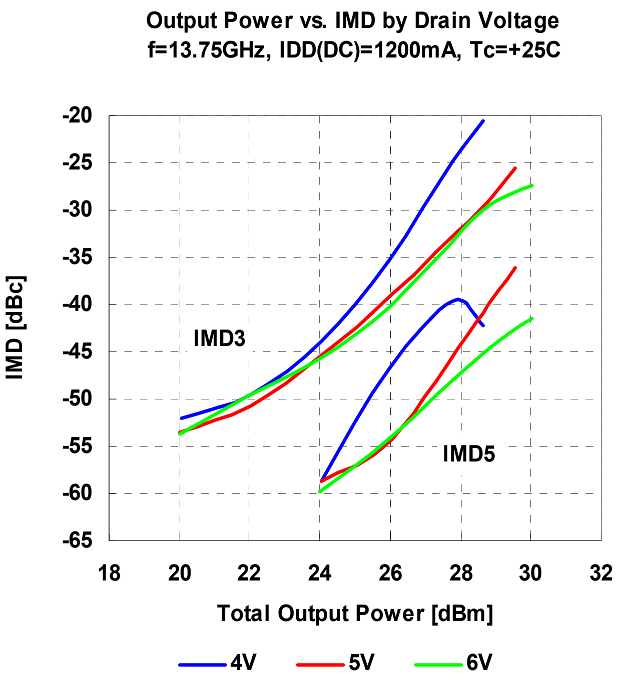


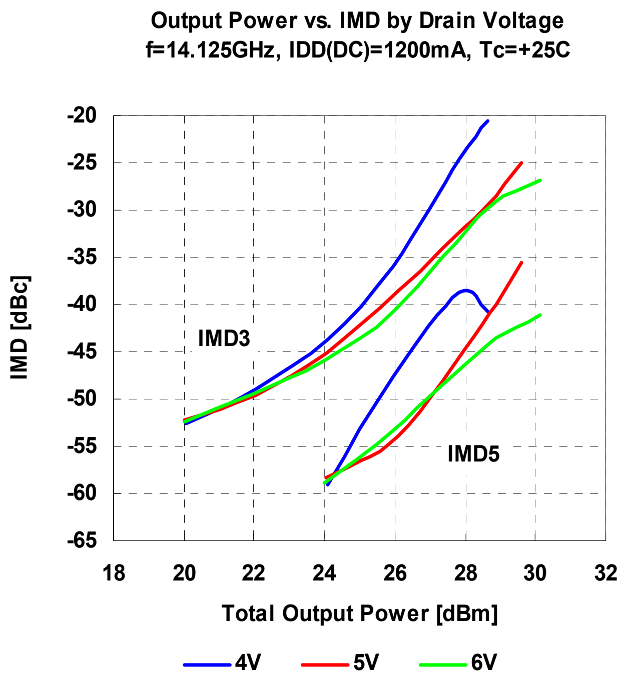


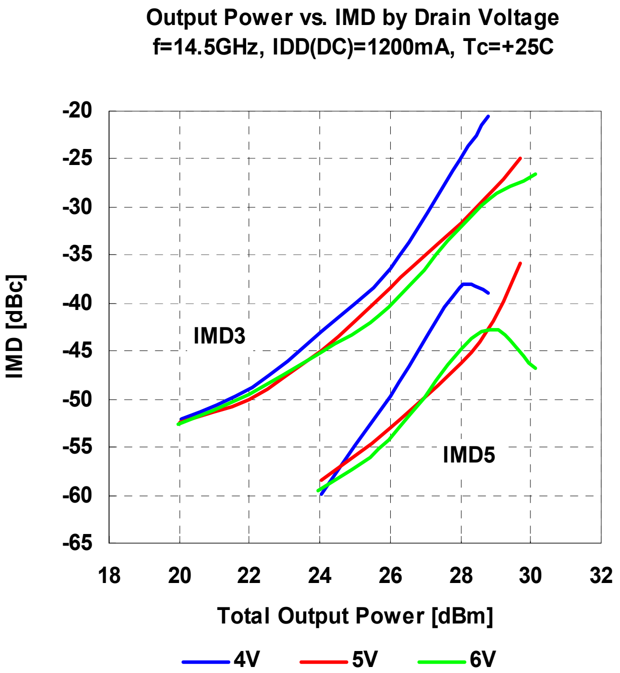


Output Power vs. IMD by Drain Voltage

(Idd(DC)=1200mA, Tc=+25C)

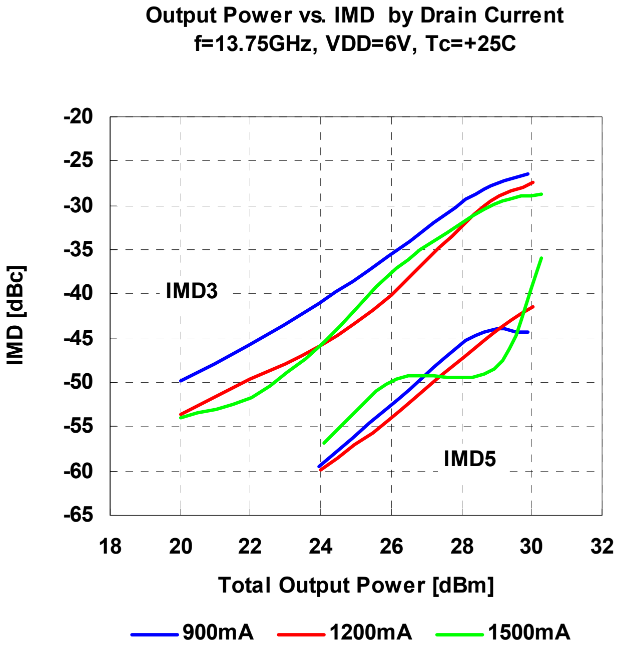


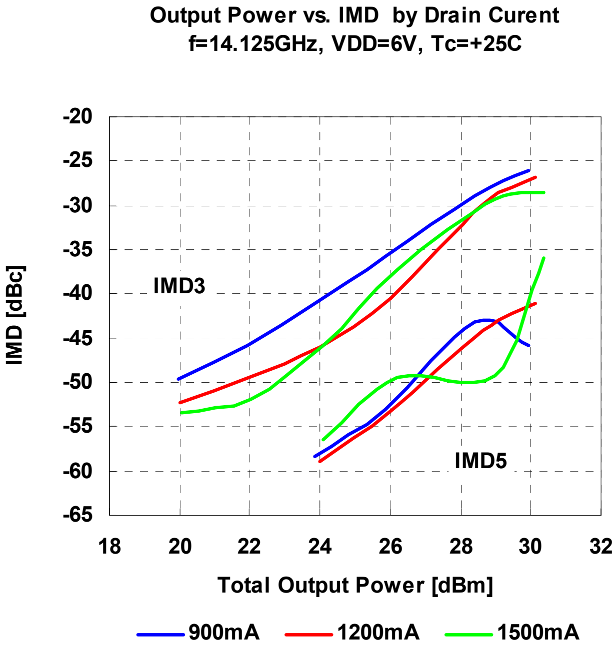


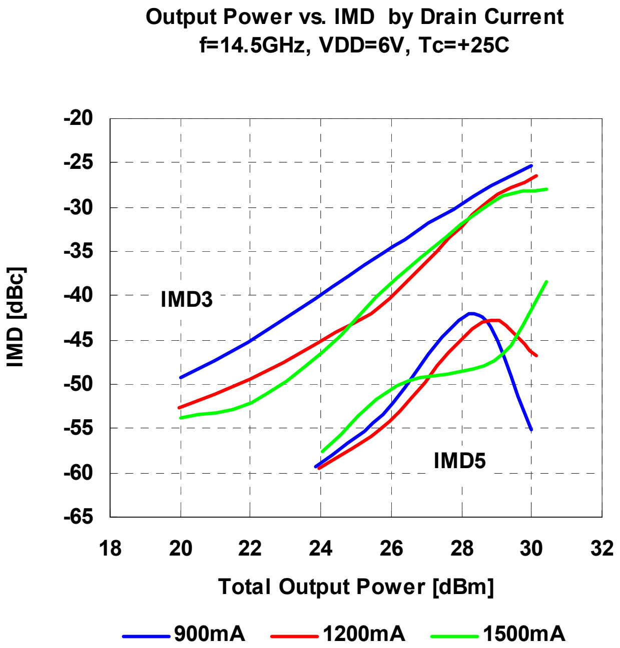


Output Power vs. IMD by Drain Current

(VDD=6V, Tc=+25C)

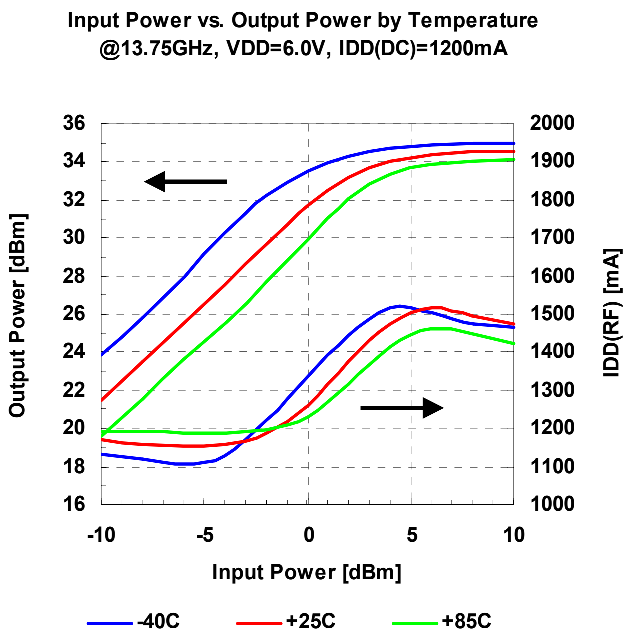


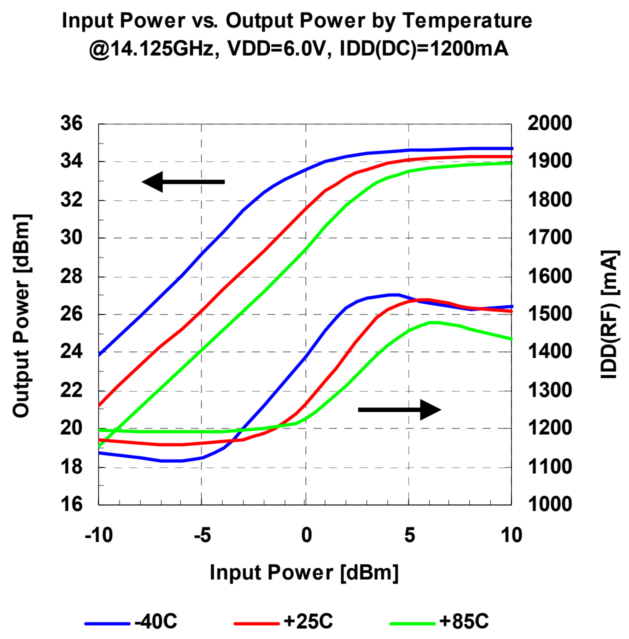


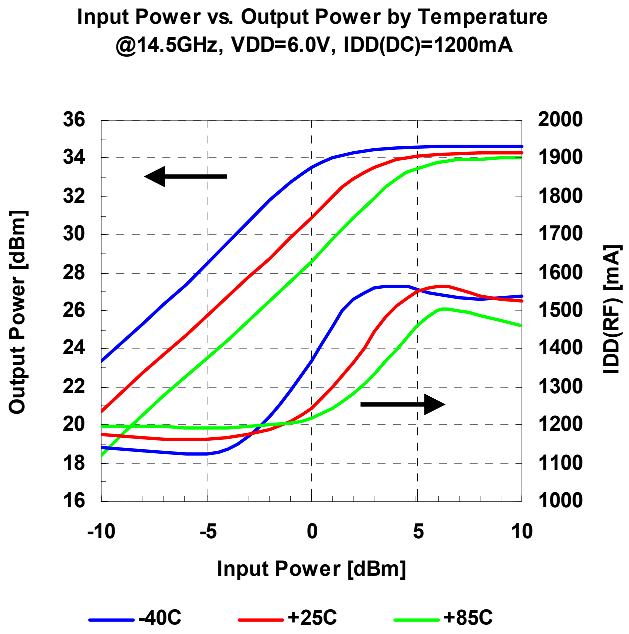


Input Power vs. Output Power by Temperature

(VDD=6V, Idd(DC)=1200mA)

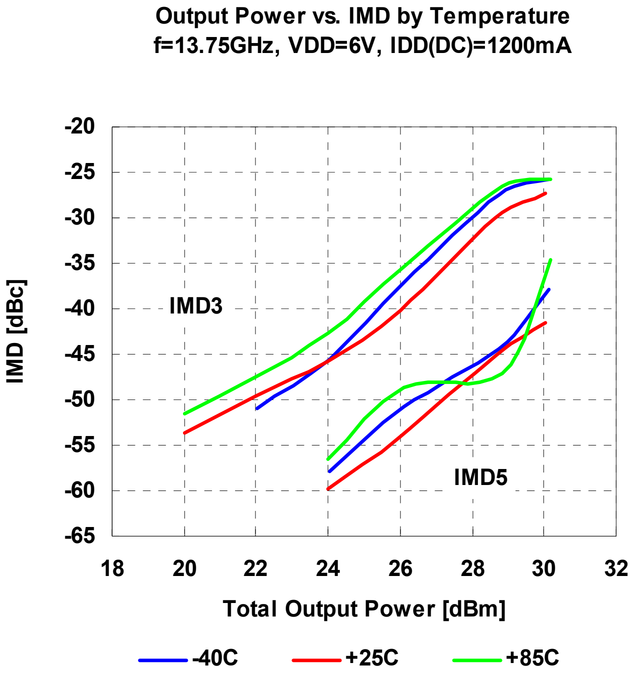


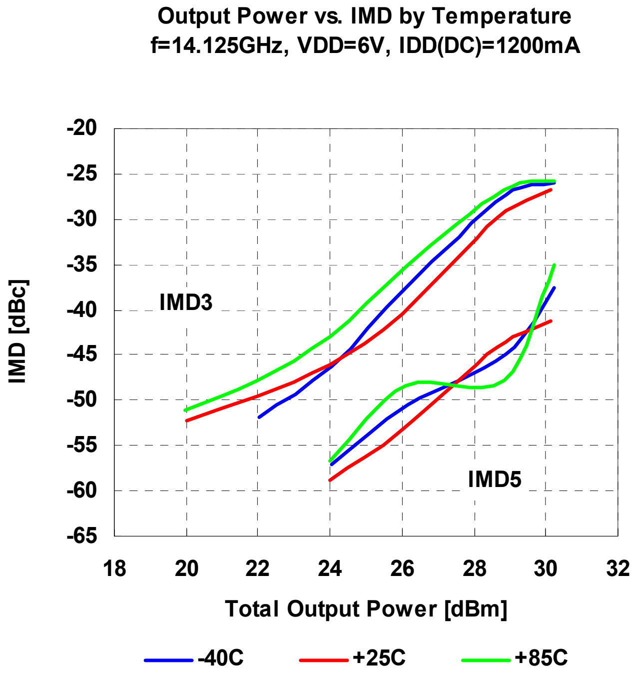


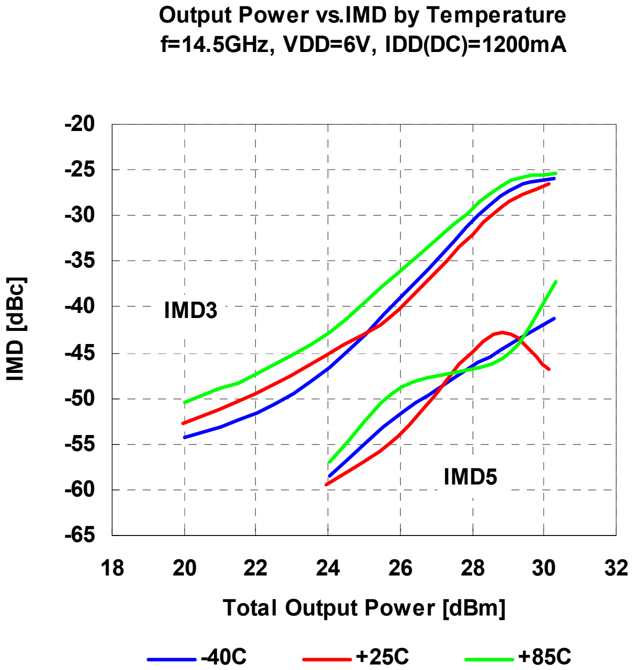


Output Power vs. IMD by Temperature

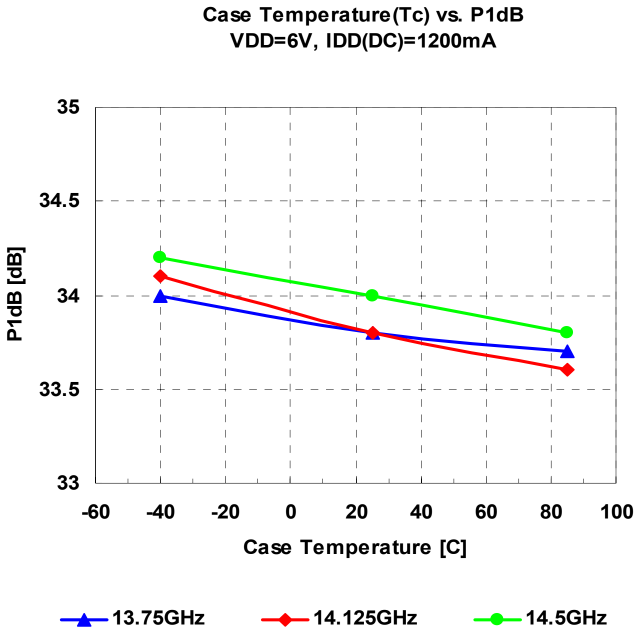
(VDD=6V, IDD(DC)=1200mA)

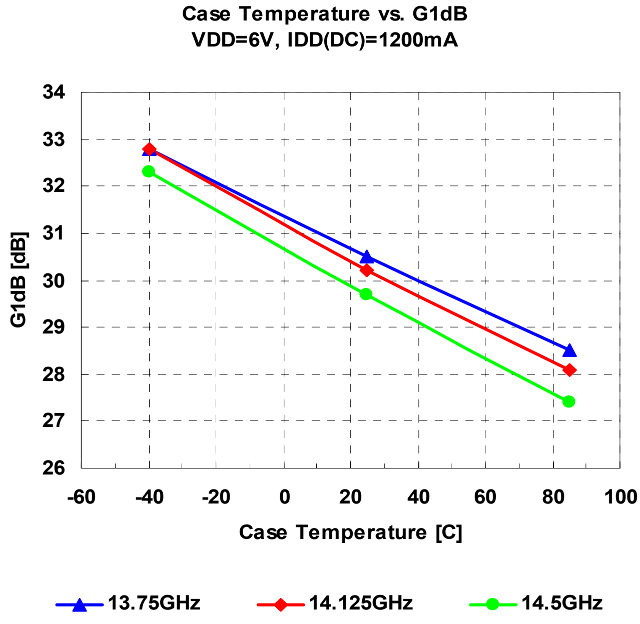






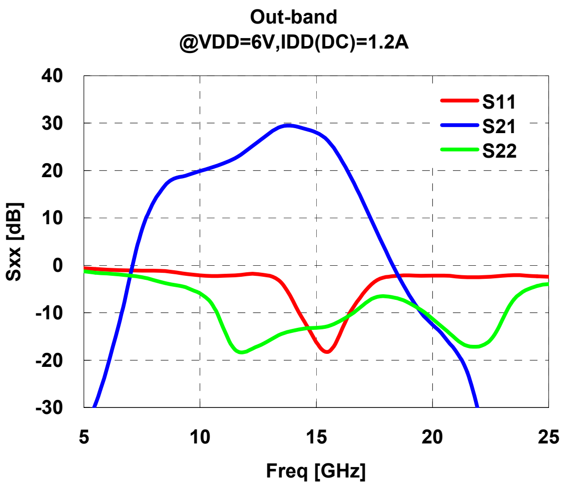
Temperature vs. P1dB, G1dB
(VDD=6V, IDD(DC)=1200mA)

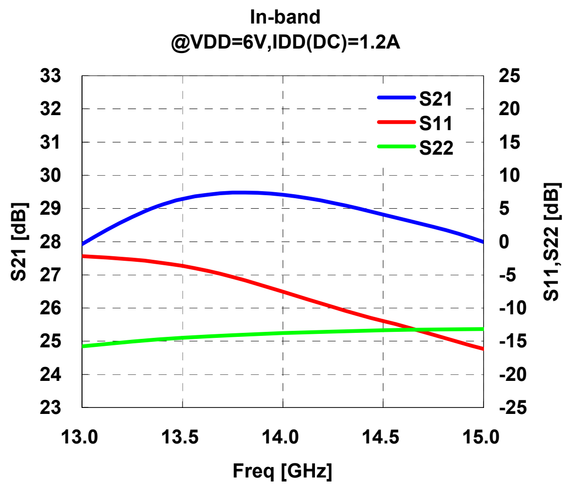




S-parameter

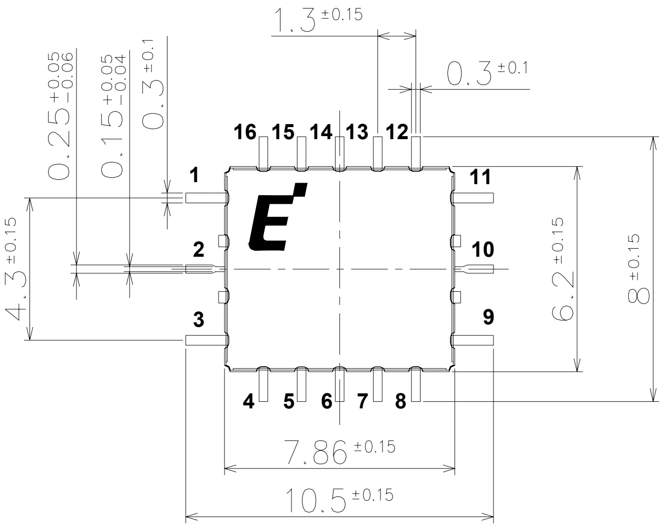
(VDD=6V, Idd(DC)=1200mA, Tc=+25C)





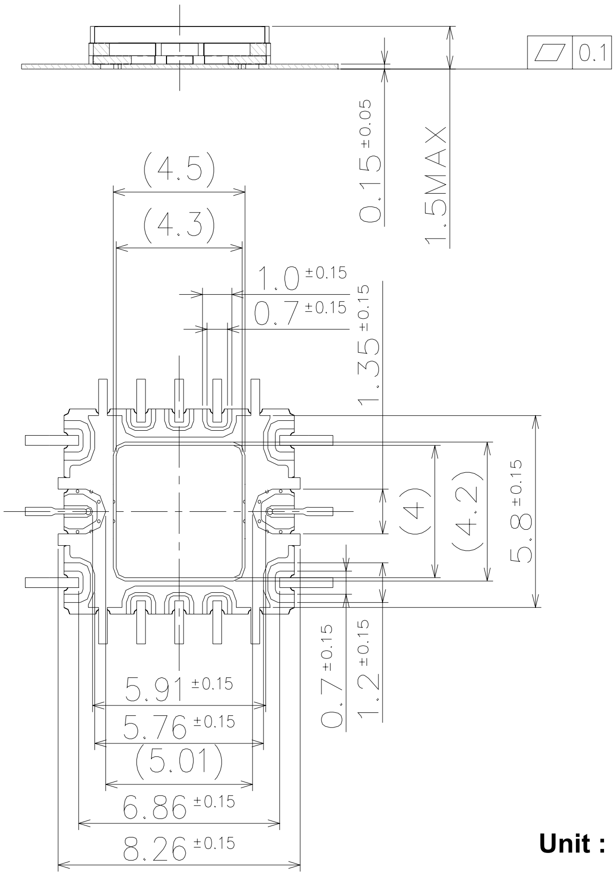
Freq. [GHz]	S11 MAG	ANG	S21 MAG	ANG	S12 MAG	ANG	S22 MAG	ANG
1	9.81E-01	-114.7	1.06E-01	99.0	2.57E-05	-67.5	9.63E-01	-118.1
2	9.36E-01	133.6	2.44E-02	-41.8	1.55E-04	141.7	9.03E-01	129.3
3	9.25E-01	27.9	1.99E-02	-159.9	1.59E-04	16.2	9.12E-01	23.8
4	9.46E-01	-76.7	7.10E-03	130.6	5.44E-04	-138.4	9.18E-01	-85.3
5	9.34E-01	175.0	1.92E-02	94.6	6.85E-04	89.0	8.65E-01	155.2
6	9.01E-01	64.9	8.04E-02	24.6	6.49E-04	-23.7	8.18E-01	35.0
7	8.73E-01	-41.5	7.91E-01	-91.6	1.89E-04	-144.5	7.86E-01	-85.4
8	8.76E-01	-144.6	5.41E+00	49.8	5.55E-04	44.7	6.97E-01	135.4
9	8.34E-01	104.6	8.86E+00	-165.2	4.35E-04	-108.9	6.19E-01	-0.5
10	7.79E-01	-11.4	9.74E+00	8.6	4.75E-04	144.2	5.15E-01	-113.0
11	7.78E-01	-127.6	1.19E+01	-168.4	9.02E-04	68.3	2.48E-01	144.7
12	7.96E-01	122.9	1.60E+01	18.6	1.09E-03	-7.6	1.05E-01	101.4
13	7.50E-01	10.6	2.52E+01	-168.8	3.30E-04	50.6	1.98E-01	-13.1
14	4.87E-01	-115.4	3.01E+01	-19.1	9.85E-04	-140.5	1.92E-01	-140.4
15	4.32E-02	114.3	2.44E+01	130.8	9.14E-04	158.9	2.37E-01	93.3
16	2.06E-01	158.3	1.36E+01	-89.2	3.07E-03	61.5	2.39E-01	-90.7
17	5.33E-01	45.5	4.90E+00	70.4	4.08E-03	-84.8	3.96E-01	139.9
18	7.43E-01	-74.0	1.40E+00	-105.0	2.23E-03	105.2	4.66E-01	37.6
19	7.84E-01	-173.4	4.91E-01	100.1	3.88E-03	-59.3	4.08E-01	-55.2
20	7.80E-01	90.1	2.41E-01	-53.3	7.40E-03	72.7	2.80E-01	-156.3
21	7.64E-01	-22.6	1.25E-01	128.3	3.09E-03	-112.8	1.72E-01	82.7
22	7.51E-01	-140.4	3.14E-02	-75.6	3.56E-03	58.1	1.15E-01	-0.2
23	7.73E-01	120.7	2.56E-03	-164.2	3.13E-03	-96.3	2.94E-01	-33.9
24	7.74E-01	33.3	1.42E-03	-99.5	9.18E-04	-60.5	5.27E-01	-121.1
25	7.65E-01	-54.2	4.92E-03	-1.9	5.07E-03	23.5	6.30E-01	152.7
26	7.51E-01	-151.6	1.82E-03	-39.2	2.74E-03	-84.4	6.16E-01	58.1
27	7.56E-01	102.0	4.18E-03	35.4	1.47E-03	123.3	6.54E-01	-53.6
28	7.20E-01	-7.7	2.04E-03	72.5	1.48E-03	88.2	7.24E-01	-163.8
29	6.33E-01	-113.9	2.69E-03	0.4	2.41E-03	1.2	7.37E-01	102.7
30	5.69E-01	147.8	4.70E-03	-41.8	1.89E-03	-53.8	7.09E-01	16.0

Package Outline and Pin Assignment



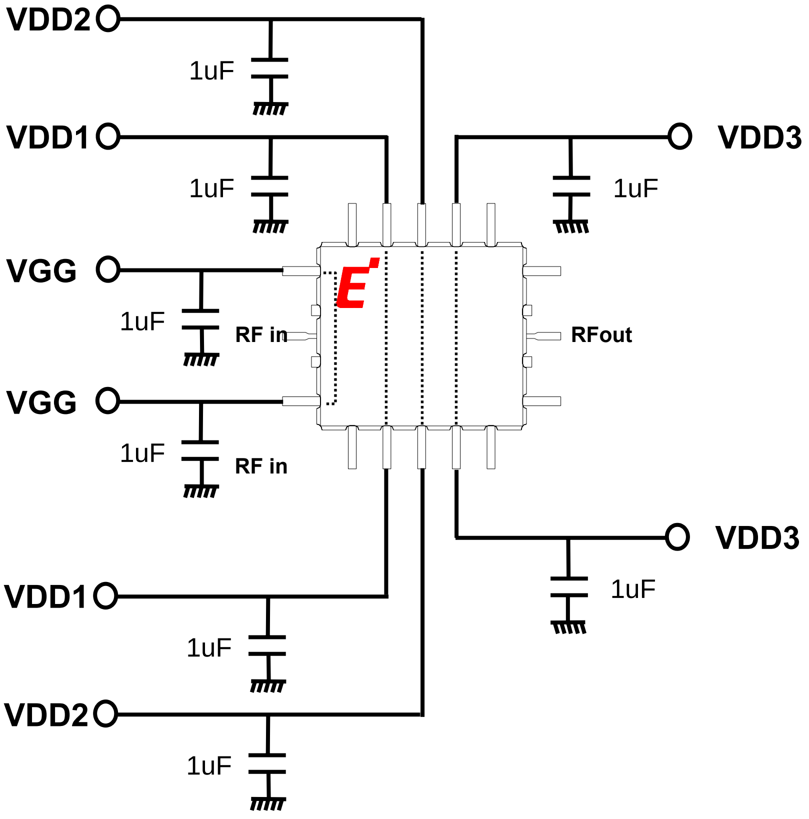
PIN Assignment

VGG : 1, 3
VDD : 5, 6, 7, 13, 14, 15
RF IN : 2
RF OUT : 10
GND : 4, 8, 12, 16
N.C. : 9, 11

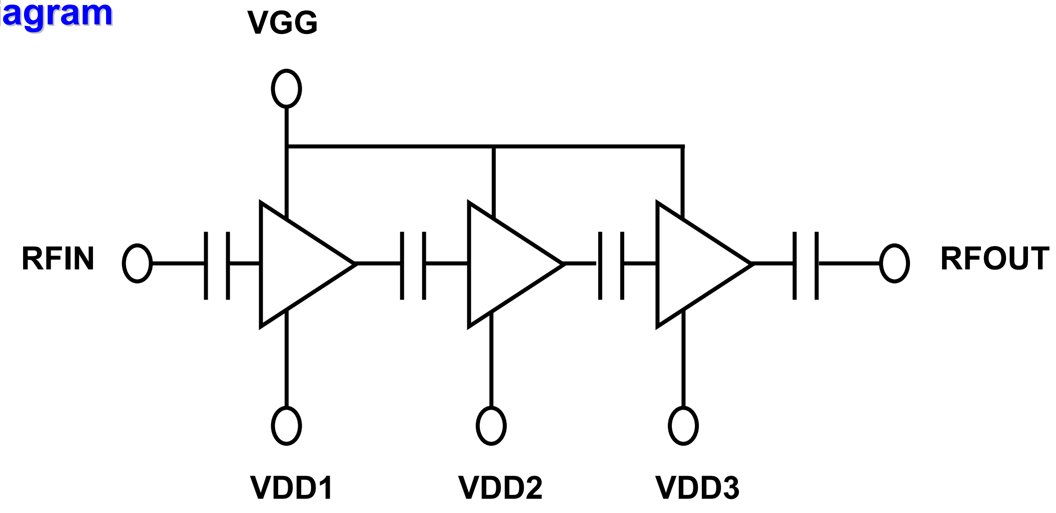


Unit : mm

Recommended Bias Network



Block Diagram

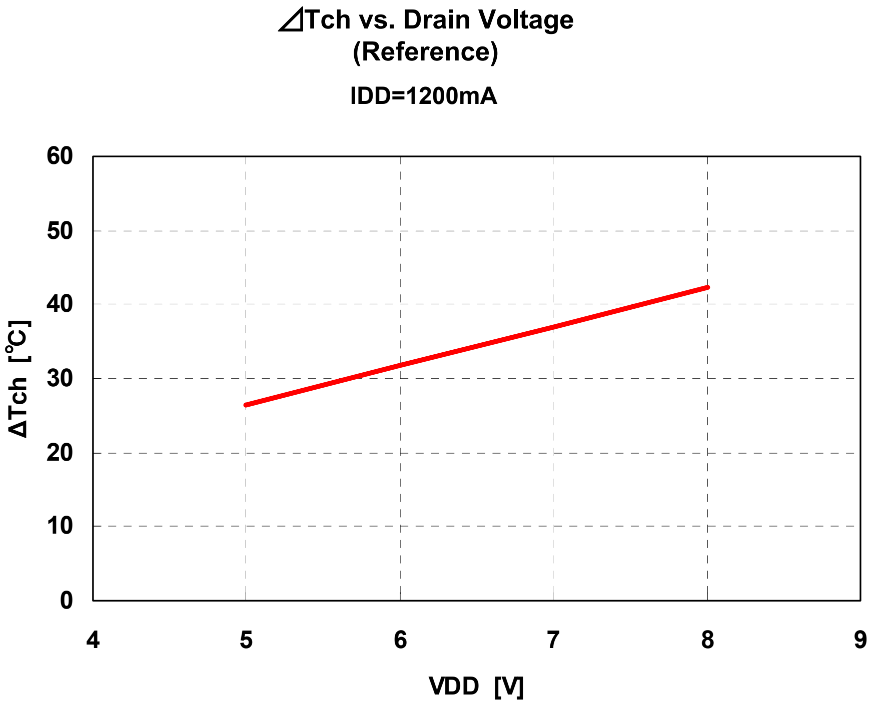


Note

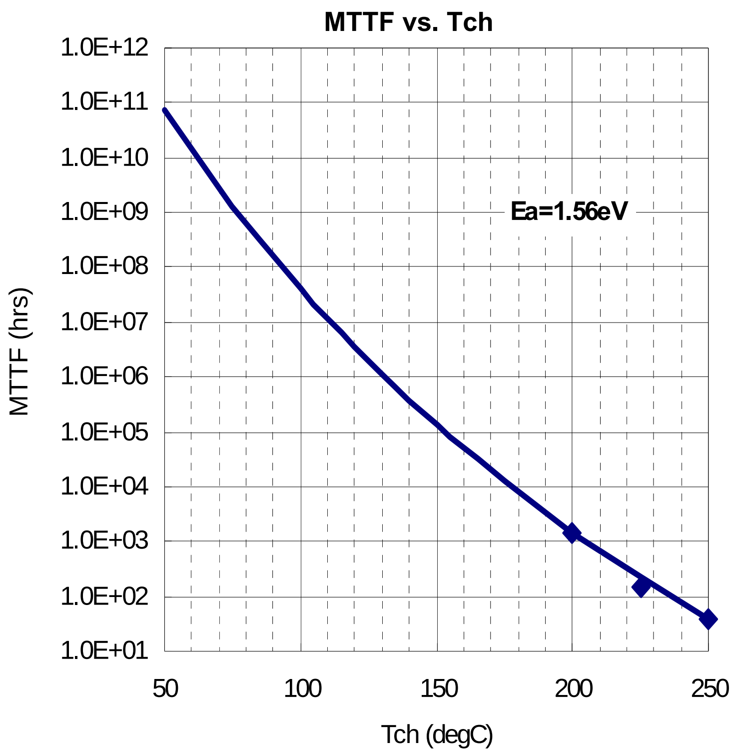
1) The capacitors are recommended on the bias supply line, close to the package, in order to prevent video oscillations which could damage the module.

2) The same named VDD pins are internally connected.

Reliability Data



Note: ⊿Tch : Temperature Rise from Backside of the Package to Channel.



Mounting Method of SMD (Surface Mount Devices) for Lead-free Solder

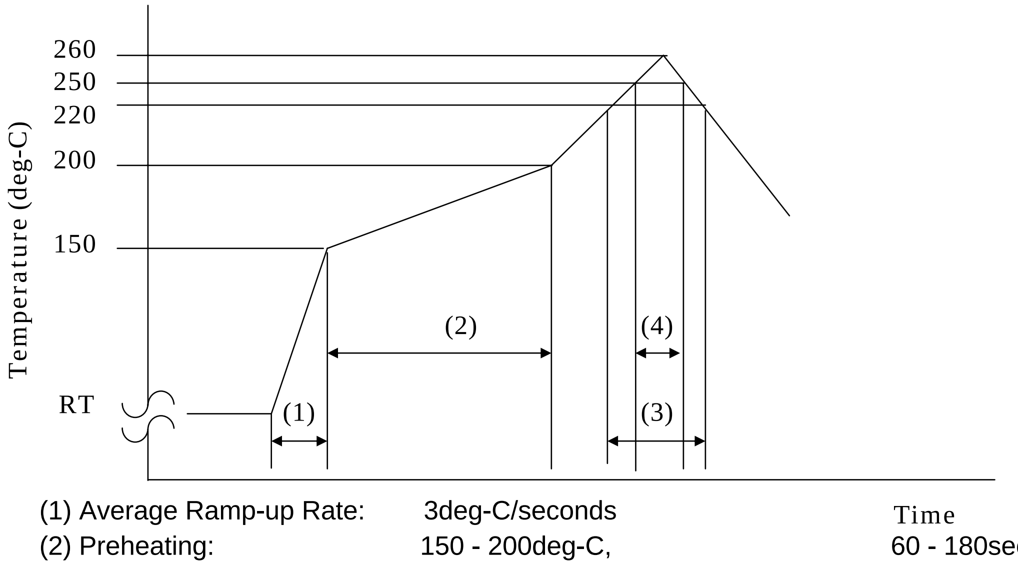
Mounting Condition

1. For soldering, Lead-free solder (Sn-3.0Ag-0.5Cu)*1 or equivalent shall be used.
   (*1:The figure displays with weight %. A predominantly tin-rich alloy with 3.0% silver and 0.5% copper.)
2. A rosin type flux with a chlorine content of 0.2% or less shall be used. The rosin flux with low halogen content is recommended.
3. When soldering, use one of the following time/ temperature methods for acceptable solder joints. Make sure the devices have been properly prepared with flux prior soldering.

*** Reflow soldering method (Infrared reflow / Heat circulation reflow / Hot plate reflow):**

Limit solder to 3 reflow cycles because resin is used in the modules manufacturing process. Excessive reflow cycles will effect the resin resulting in a potential failure or latent defect. The recommended reflow temperature profile is shown below. The temperature of the reflow profile must be measured at the device lead.

Reflow temperature profile and condition:



(1) Average Ramp-up Rate: 3deg-C/seconds
(2) Preheating: 150 - 200deg-C, 60 - 180seconds
(3) Main heating: 220deg-C, 60seconds max.
(4) Peak Temperature: 260deg-C max., more than 250deg-C, 10 seconds max.
* Measurement point: Device lead.

4. The above-recommended conditions were confirmed using the manufacture's equipment and materials. However, when soldering these products, the soldering condition should be verified by customer using their equipment and materials.

For further information please contact :

Eudyna Devices USA Inc.
2355 Zanker Rd.
San Jose, CA 95131-1138, U.S.A.
TEL: +1 408 232-9500
FAX: +1 408 428-9111

Eudyna Devices Europe Ltd.
150 Edinburgh Avenue
Slough, Berkshire, SL1 4SS
United Kingdom
TEL: +44 (0) 1753 849950
FAX: +44 (0) 1753 577128

Eudyna Devices International Srl
Via Teglio 8/2 - 20158
Milano, Italy
TEL: +39-02-3705 2921
FAX: +39-02-3705 2920

Eudyna Devices Asia Pte. Ltd.
Hong Kong Branch
Suite 1906B, Tower 6, China Hong Kong City
33 Canton Road, Tsimshatsui, Kowloon
Hong Kong
TEL: +852-2377-0227
FAX: +852-2377-3921

Eudyna Devices Inc.
1000 Kamisukiahara, showa-cho
Nakakomagun, Yamanashi
409-3883, Japan
(Kokubo Industrial Park)
TEL +81-55-275-4411
FAX +81-55-275-9461

Sales Division
1, Kanai-cho, Sakae-ku
Yokohama, 244-0845, Japan
TEL +81-45-853-8156
FAX +81-45-853-8170

CAUTION

Eudyna Devices Inc. products contain **gallium arsenide (GaAs)** which can be hazardous to the human body and the environment. For safety, observe the following procedures:

・Do not put these products into the mouth.

・Do not alter the form of this product into a gas, powder, or liquid through burning, crushing, or chemical processing as these by-products are dangerous to the human body if inhaled, ingested, or swallowed.

・Observe government laws and company regulations when discarding this product. This product must be discarded in accordance with methods specified by applicable hazardous waste procedures.

Eudyna Devices Inc. reserves the right to change products and specifications without notice.The information does not convey any license under rights of Eudyna Devices Inc. or others.

© 2008 Eudyna Devices Inc.