

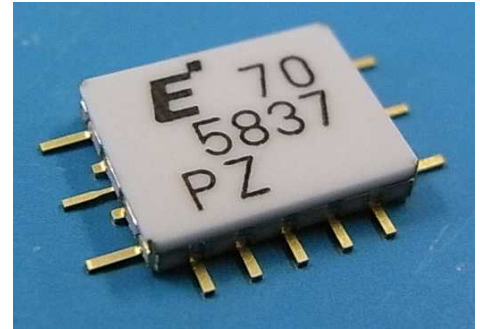
FEATURES

- High Output Power: Pout=33.0dBm (typ.)
- High Linear Gain: GL=22.0dB (typ.)
- Broad Band: 21.2~23.6GHz
- Impedance Matched Zin/Zout=50Ω
- Small Hermetic Metal-Ceramic SMT Package(V1B)

DESCRIPTION

The EMM5837V1B is a MMIC amplifier that contains a four-stage amplifier, internally matched, for standard communications band in the 21.2 to 23.6GHz frequency range.

SEDI's stringent Quality Assurance Program assures the highest reliability and consistent performance.



ABSOLUTE MAXIMUM RATING

Item	Symbol	Rating	Unit
Drain-Source Voltage	V _{DD}	10	V
Gate-Source Voltage	V _{GG}	-3	V
Input Power	P _{in}	23	dBm
Storage Temperature	T _{stg}	-55 to +125	degC

RECOMMENDED OPERATING CONDITIONS

Item	Symbol	Condition	Unit
Drain-Source Voltage	V _{DD}	≤ 6	V
Input Power	P _{in}	≤ 16	dBm
Operating Case Temperature	T _C	-40 to +85	degC

ELECTRICAL CHARACTERISTICS (Case Temperature Tc=25°C)

Item	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Frequency Range	f	VDD=6.0V	21.2	-	23.6	GHz
Gate Bias Voltage	V _{gg} (DC)	IDD(DC)=1400mA typ.	-0.50	-0.15	-0.01	V
Output Power at 1dB G.C.P.	P1dB	V _{gg} -Const.	30.5	33	-	dBm
Power Gain at 1dB G.C.P.	G1dB	Z _s =Z _l =50ohm	18	21	-	dB
Power-added Efficiency at 1dB G.C.P.	Nadd	* : df=+10MHz	-	20	-	%
Third Order Intermodulation Distortion	IM3	Pout=20.0dBm	-38	-42	-	dBc
Drain Current at 1dB G.C.P.	I _{ddrf}	(S.C.L)	-	1800	2200	mA
Input Return Loss at Pin=-20dBm	RLin		-	8	-	dB
Output Return Loss at Pin=-20dBm	RLout		-	10	-	dB

G.C.P. : Gain Compression Point

S.C.L. : Single Carrier Level

ESD	Class 0	≤ 250V
------------	----------------	---------------

Note : Based on JEDEC JESD22-A114C (C=100pF, R=1.5kohm)

CASE STYLE	V1B
RoHS COMPLIANCE	YES

ORDERING INFORMATION

Part Number	Order Unit	Packing
EMM5837V1B	No Limitation	48 pcs./Tray × 4 Tray = 192 pcs./Packing
EMM5837V1BT	500pcs.	500 pcs./Reel × 1 Reel = 500 pcs./Packing

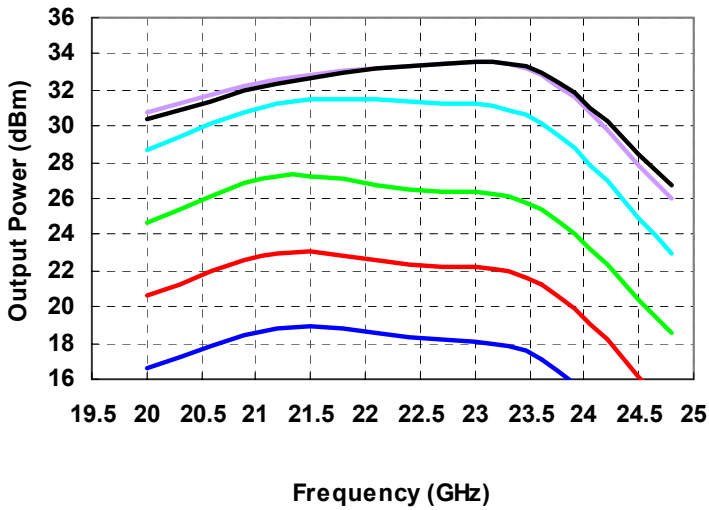


EMM5837V1B

K-Band Power Amplifier MMIC

Output Power vs. Frequency

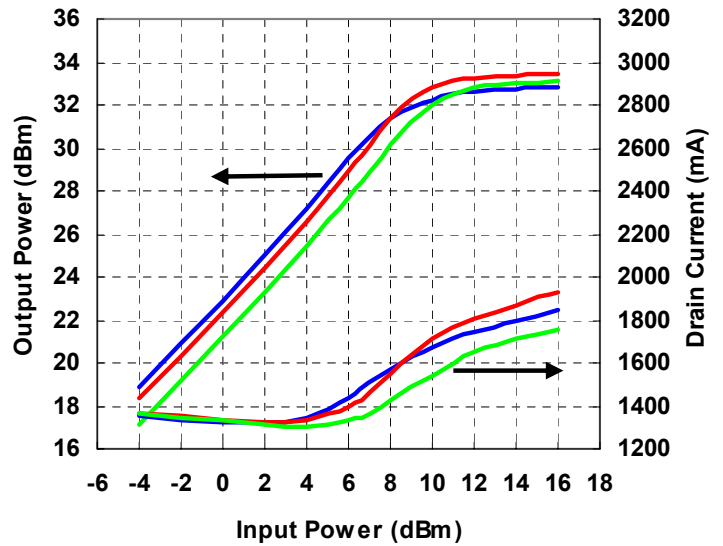
@VDD=6V, IDD(DC)=1400mA



Pin=-4dBm 0dBm +4dBm
 +8dBm +12dBm P1dB

Output Power, Drain Current vs. Input Power

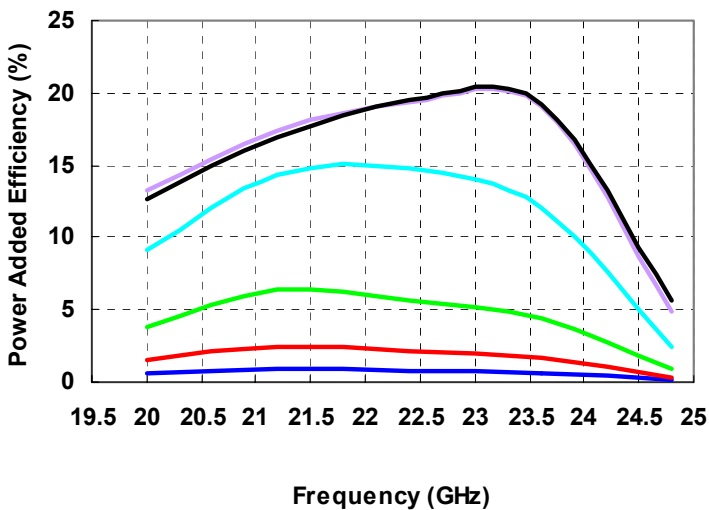
@VDD=6V, IDD(DC)=1400mA



21.2GHz 22.4GHz 23.6GHz

Power Added Efficiency vs. Frequency

@VDD=6V, IDD(DC)=1400mA



Pin=-4dBm 0dBm +4dBm
 +8dBm +12dBm P1dB

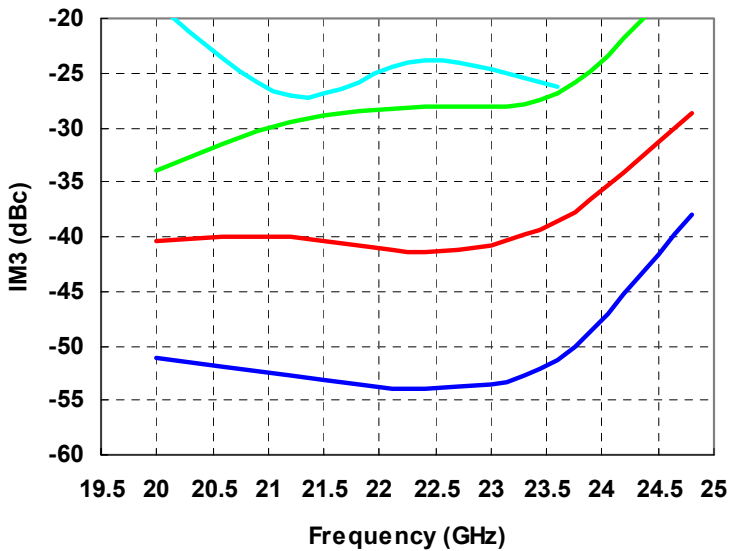


EMM5837V1B

K-Band Power Amplifier MMIC

IM3 vs. Frequency

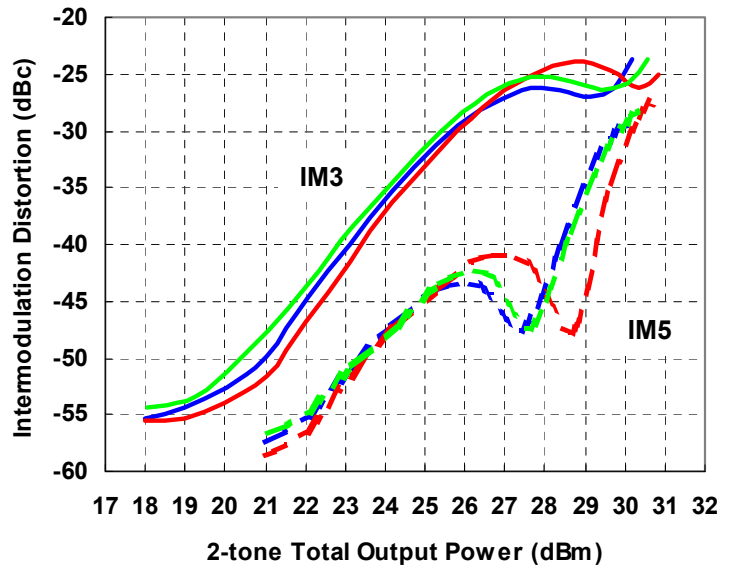
@VDD=6V, IDD(DC)=1400mA



— Pout(S.C.L.)=17dBm — 20dBm — 23dBm — 26dBm

IMD vs Output Power

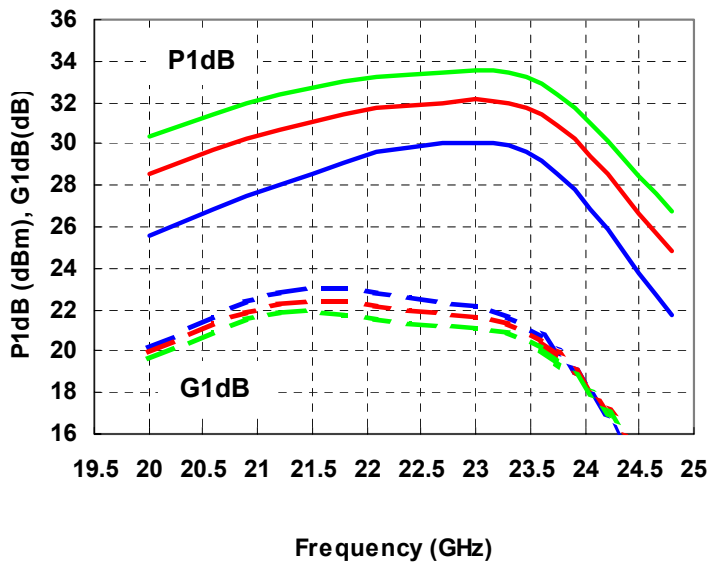
@VDD=6V, IDD(DC)=1400mA



— 21.2GHz — 22.4GHz — 23.6GHz

P1dB, G1dB vs. Frequency by Drain Voltage

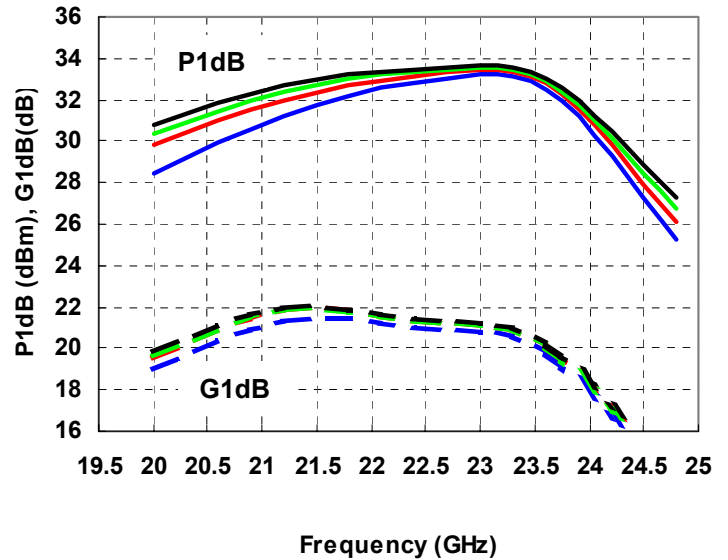
@IDD(DC)=1400mA



— VDD=4V — 5V — 6V

P1dB, G1dB vs. Frequency by Drain Current

@VDD=6V



— 1000mA — 1200mA — 1400mA — 1600mA

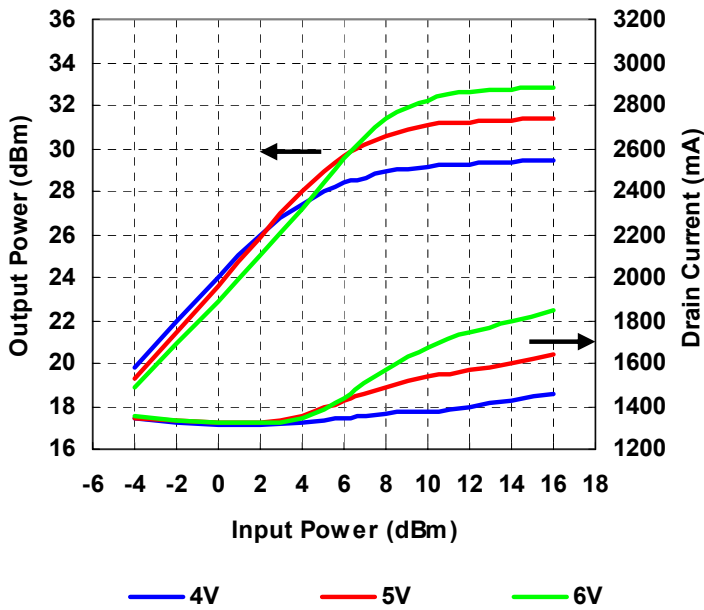


EMM5837V1B

K-Band Power Amplifier MMIC

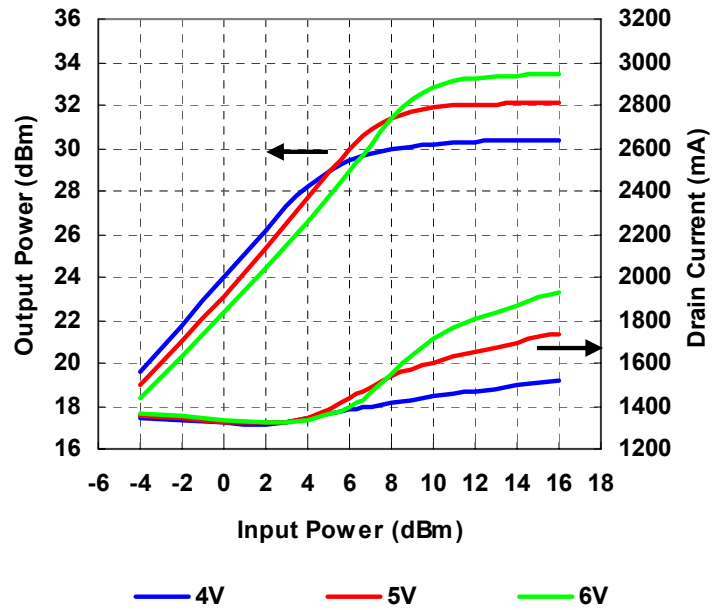
Output Power, Drain Current vs. Input Power by Drain Voltage

@IDD(DC)=1400mA, Freq.=21.2GHz



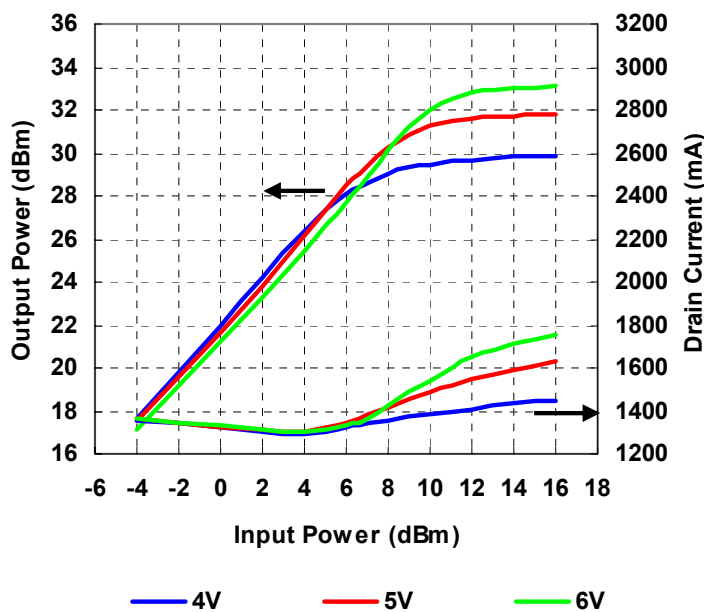
Output Power, Drain Current vs. Input Power by Drain Voltage

@IDD(DC)=1400mA, Freq.=22.4GHz



Output Power, Drain Current vs. Input Power by Drain Voltage

@IDD(DC)=1400mA, Freq.=23.6GHz



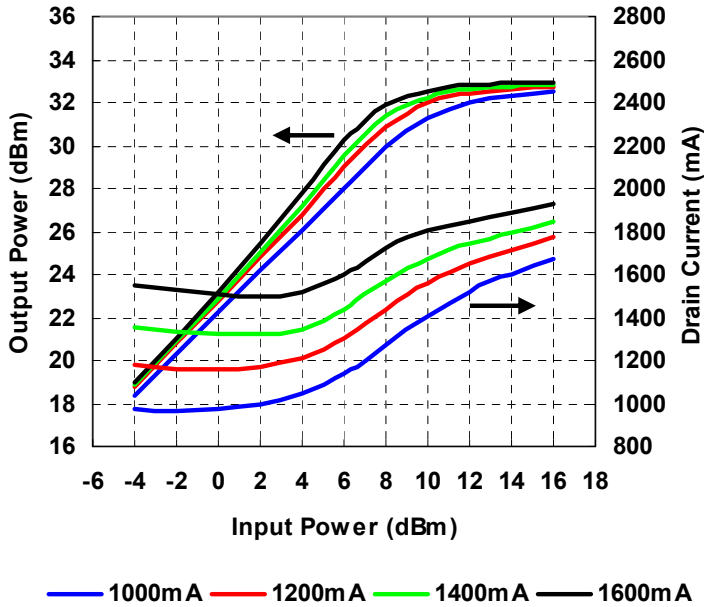


EMM5837V1B

K-Band Power Amplifier MMIC

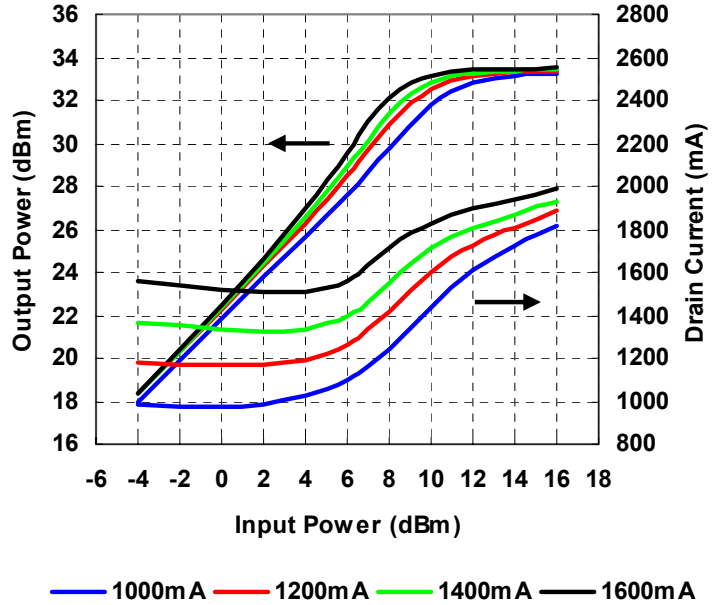
Output Power, Drain Current vs. Input Power by Drain Current

@VDD=6V, Freq.=21.2GHz



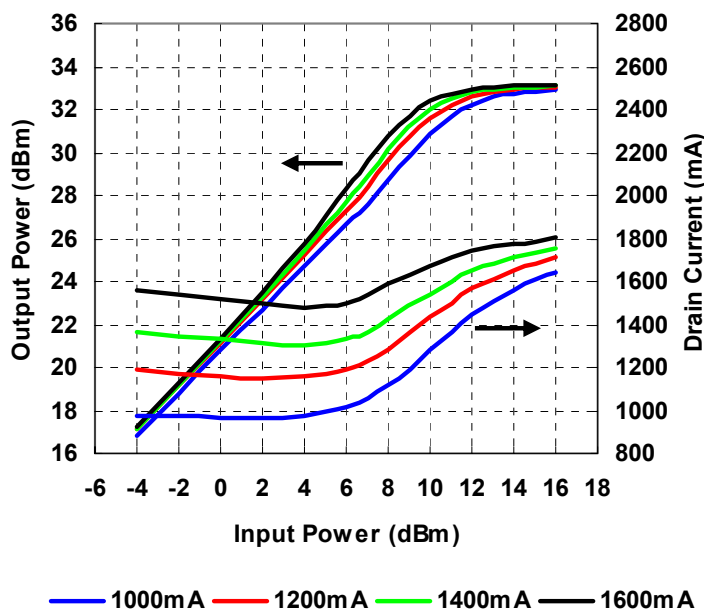
Output Power, Drain Current vs. Input Power by Drain Current

@VDD=6V, Freq.=22.4GHz



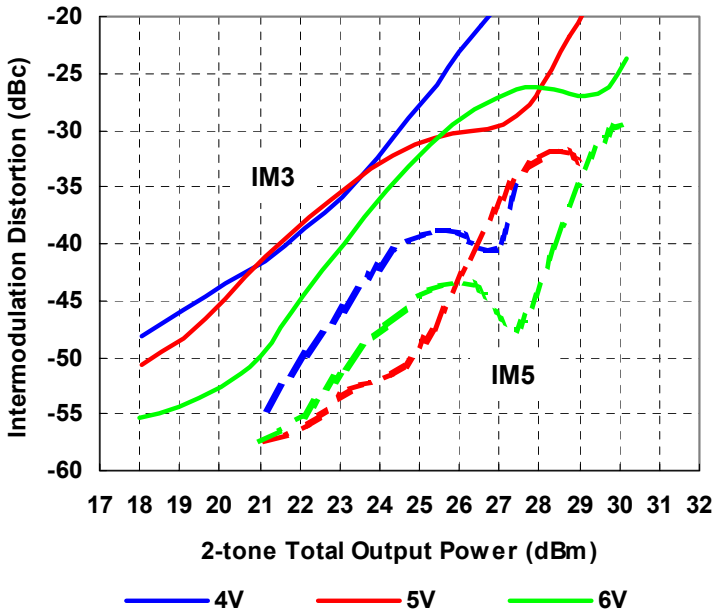
Output Power, Drain Current vs. Input Power by Drain Current

@VDD=6V, Freq.=23.6GHz



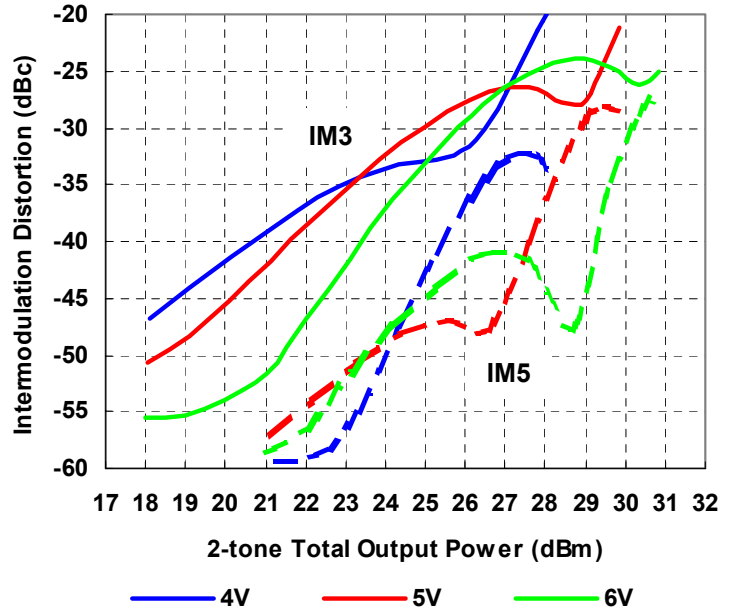
IMD Performance vs. Output Power by Drain Voltage

@IDD(DC)=1400mA, Freq.=21.2GHz



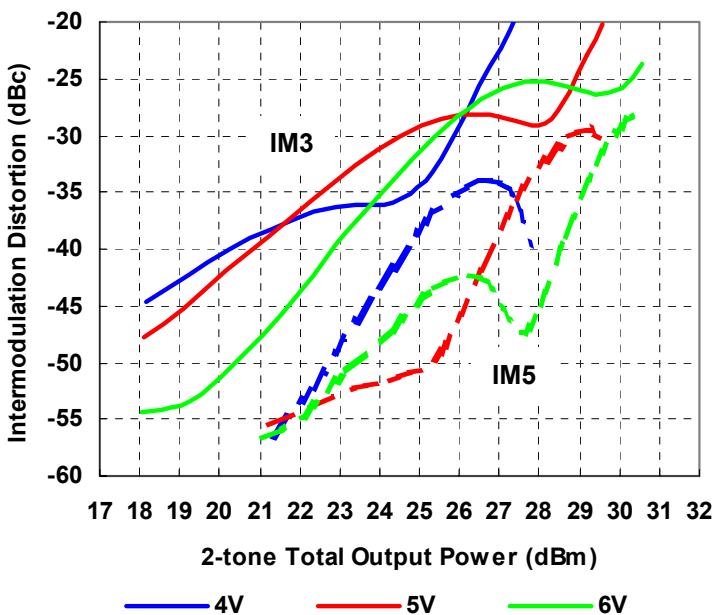
IMD Performance vs. Output Power by Drain Voltage

@IDD(DC)=1400mA, Freq.=22.4GHz



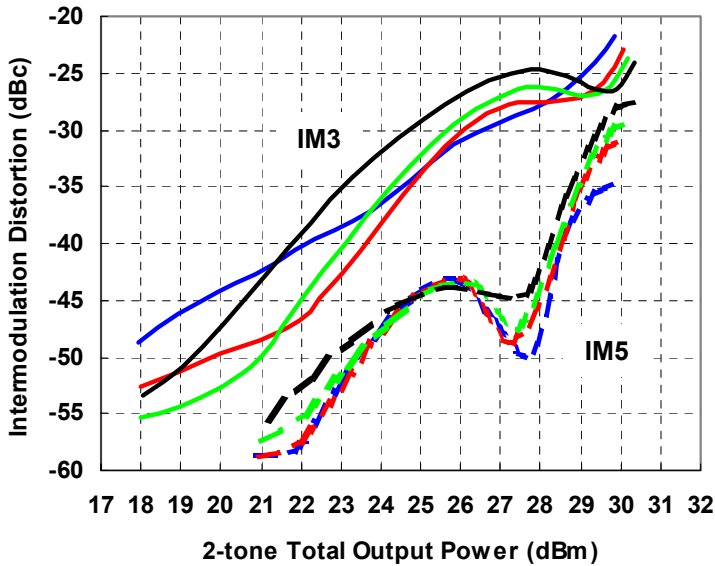
IMD Performance vs. Output Power by Drain Voltage

@IDD(DC)=1400mA, Freq.=23.6GHz



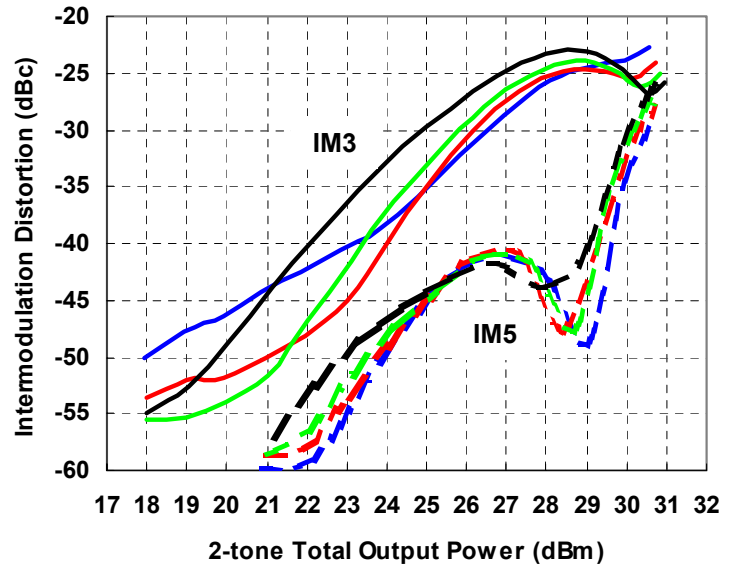
IMD Performance vs. Output Power
by Drain Current

@VDD=6V, Freq.=21.2GHz



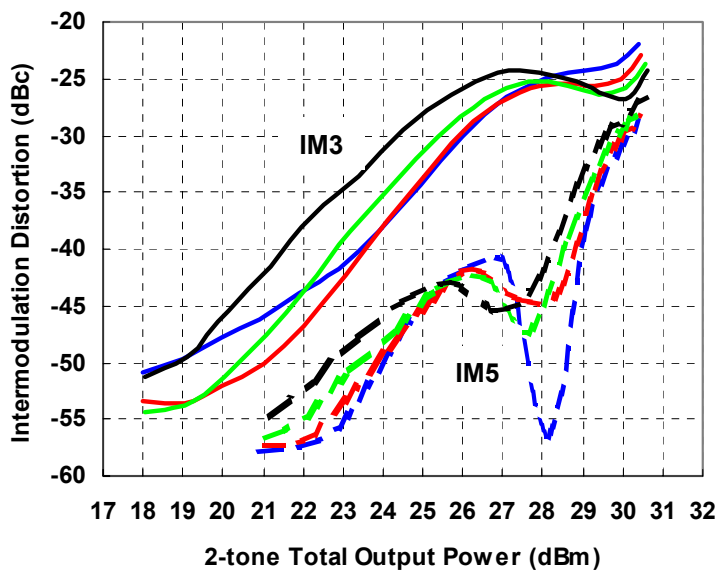
IMD Performance vs. Output Power
by Drain Current

@VDD=6V, Freq.=22.4GHz



IMD Performance vs. Output Power
by Drain Current

@VDD=6V, Freq.=23.6GHz

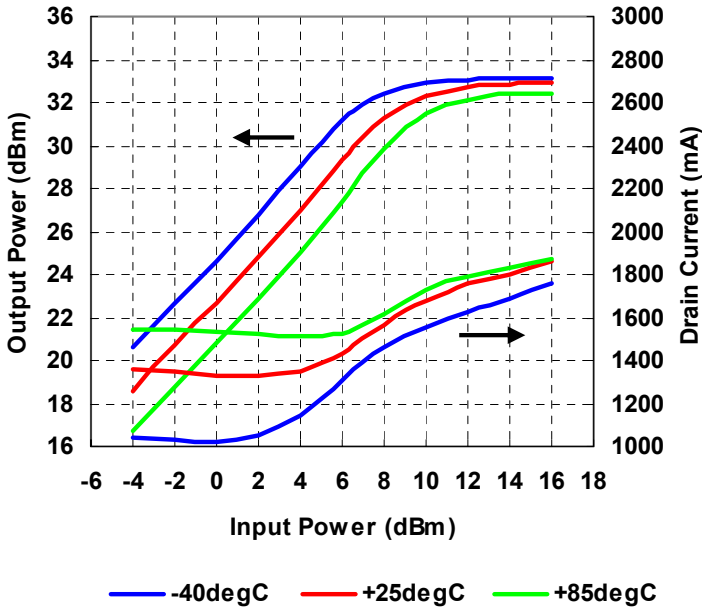


— 1000mA — 1200mA — 1400mA — 1600mA

— 1000mA — 1200mA — 1400mA — 1600mA

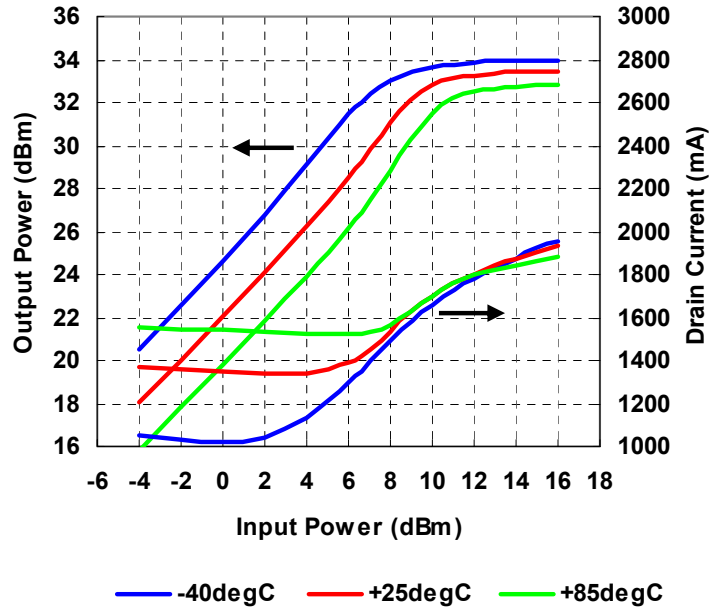
Output Power, Drain Current vs. Input Power by Temperature

@VDD=6V, IDD(DC)=1400mA(@Tc=+25degC),
Freq.=21.2GHz



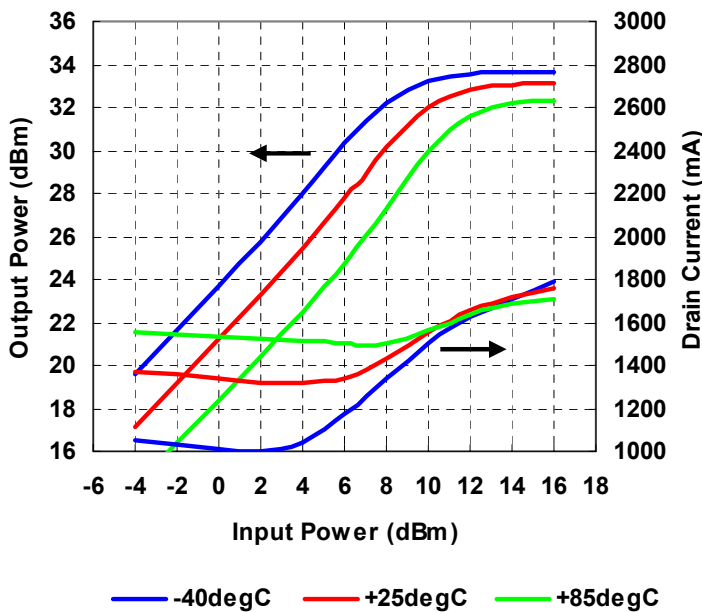
Output Power, Drain Current vs. Input Power by Temperature

@VDD=6V, IDD(DC)=1400mA(@Tc=+25degC),
Freq.=22.4GHz



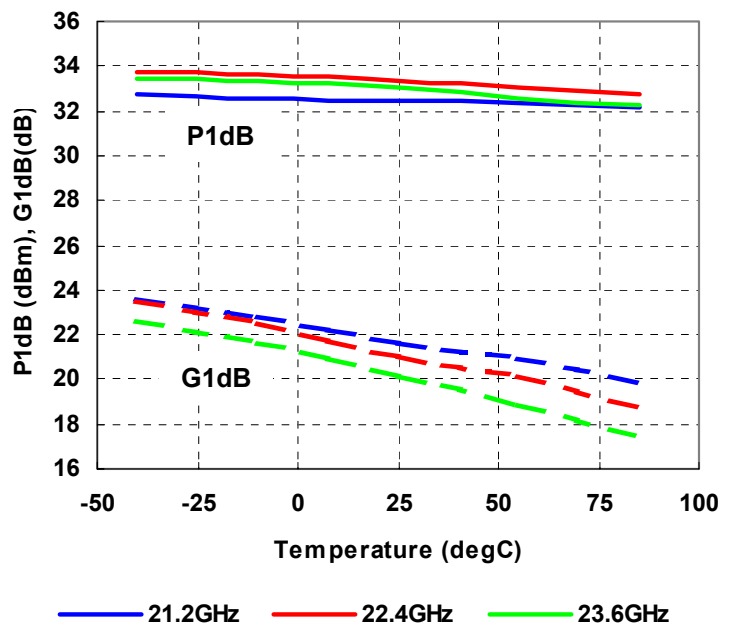
Output Power, Drain Current vs. Input Power by Temperature

@VDD=6V, IDD(DC)=1400mA(@Tc=+25degC),
Freq.=23.6GHz



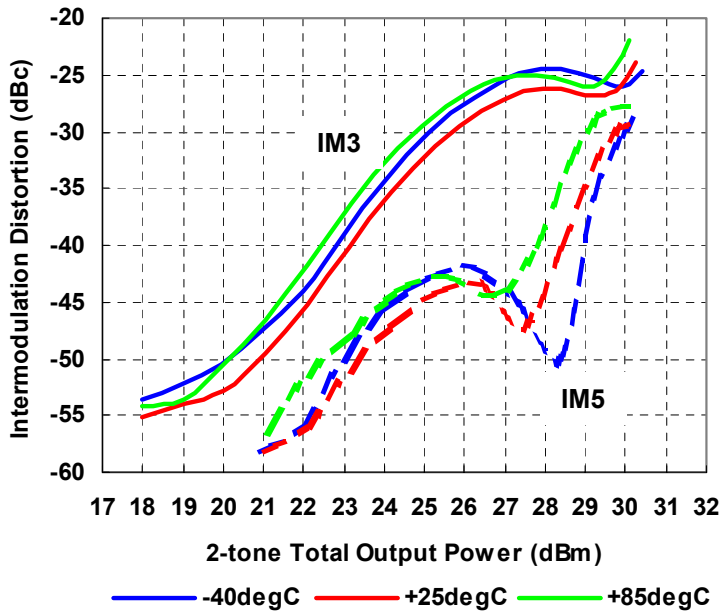
P1dB, G1dB vs. Temperature

@VDD=6V, IDD(DC)=1400mA(@Tc=+25degC)



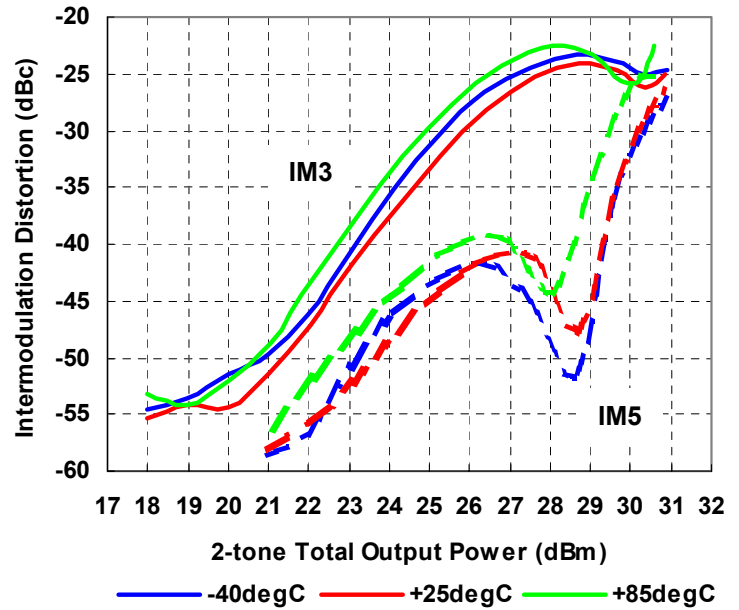
IMD Performance vs. Output Power by Temperature

@VDD=6V, IDD(DC)=1400mA(@Tc=+25degC),
Freq.=21.2GHz



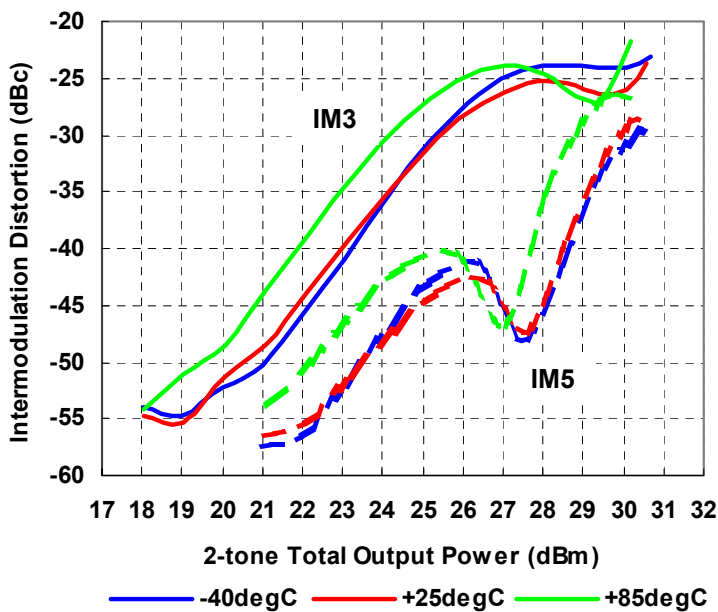
IMD Performance vs. Output Power by Temperature

@VDD=6V, IDD(DC)=1400mA(@Tc=+25degC),
Freq.=22.4GHz



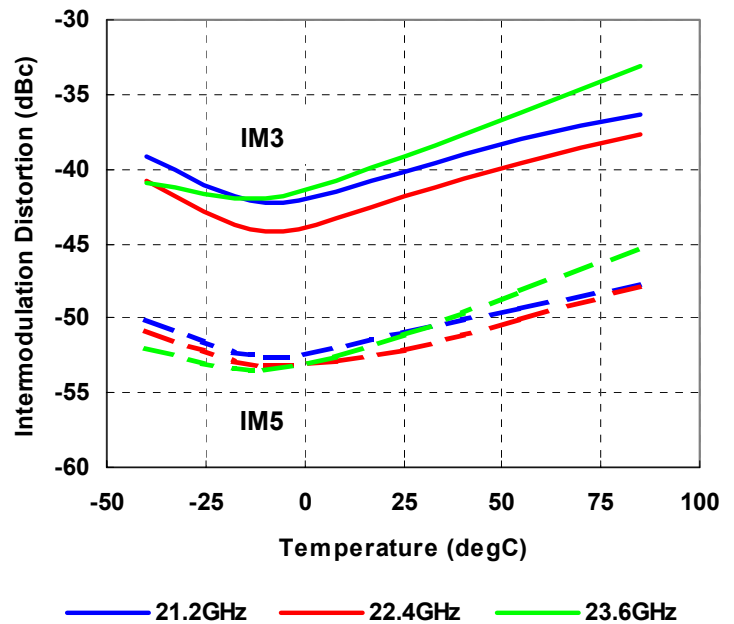
IMD Performance vs. Output Power by Temperature

@VDD=6V, IDD(DC)=1400mA(@Tc=+25degC),
Freq.=23.6GHz



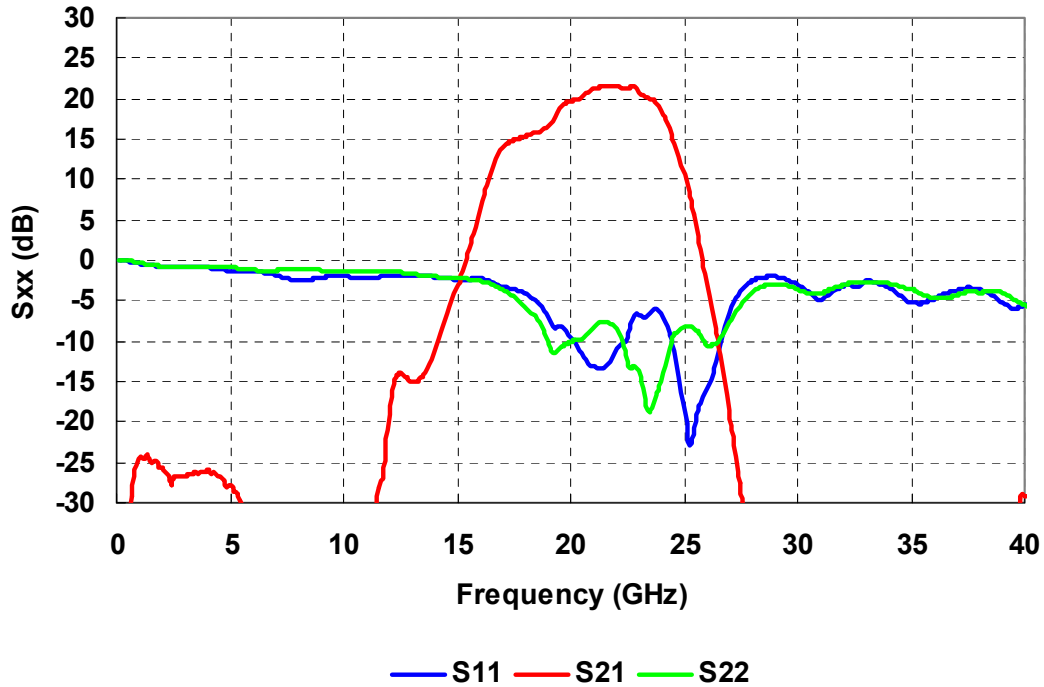
IMD vs. Temperature

@VDD=6V, IDD(DC)=1400mA(@Tc=+25degC)
Pout=20dBm(S.C.L.)

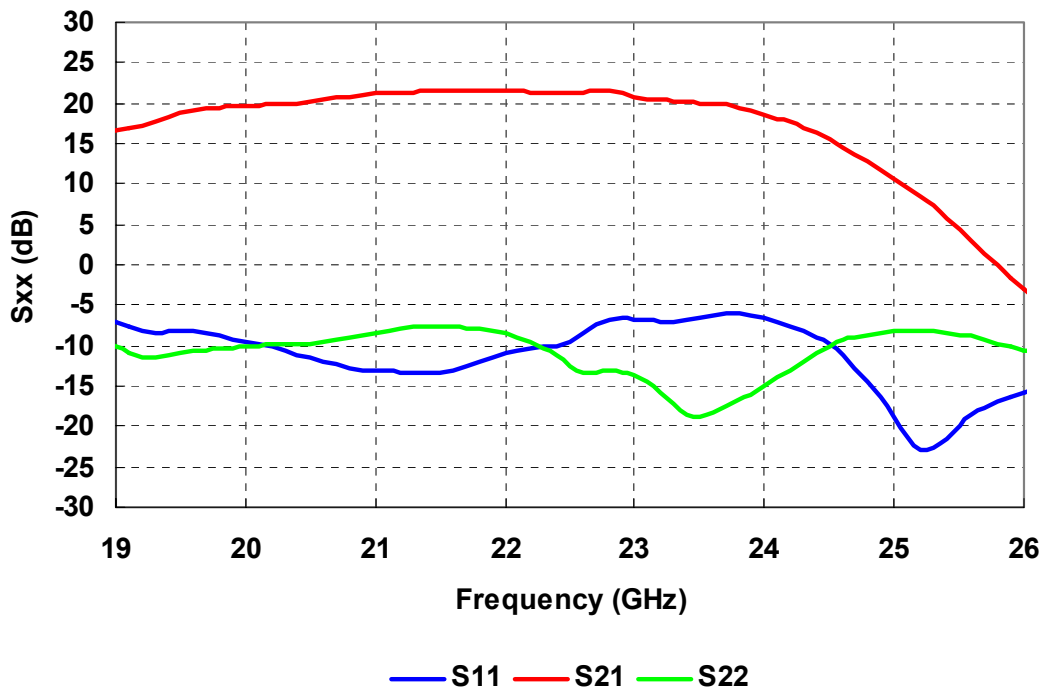


S-PARAMETERS

@VDD=6V, IDD=1400mA

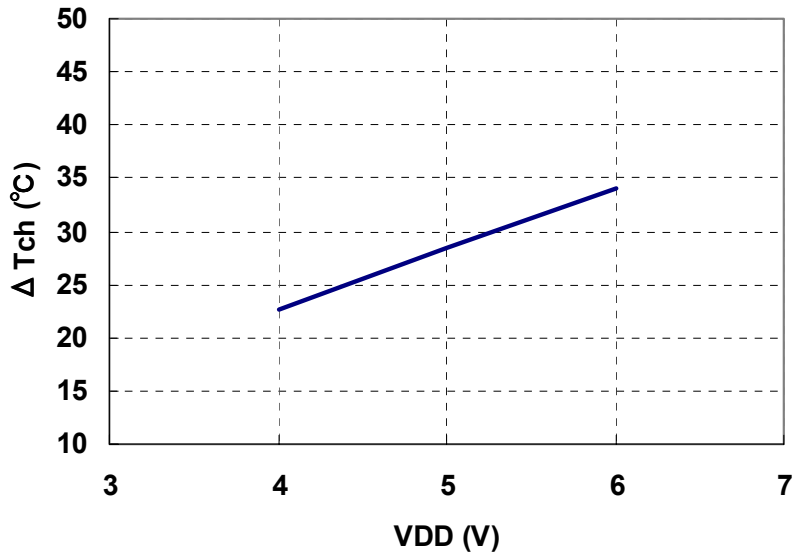


@VDD=6V, IDD=1400mA



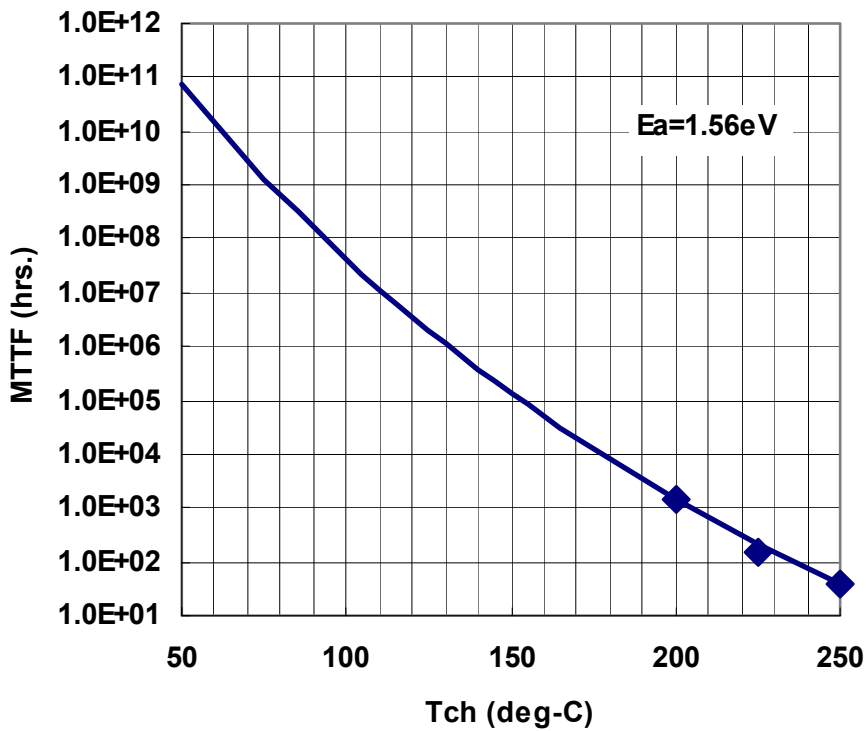
**ΔTch vs. Drain Voltage
(Reference)**

IDD=1400mA

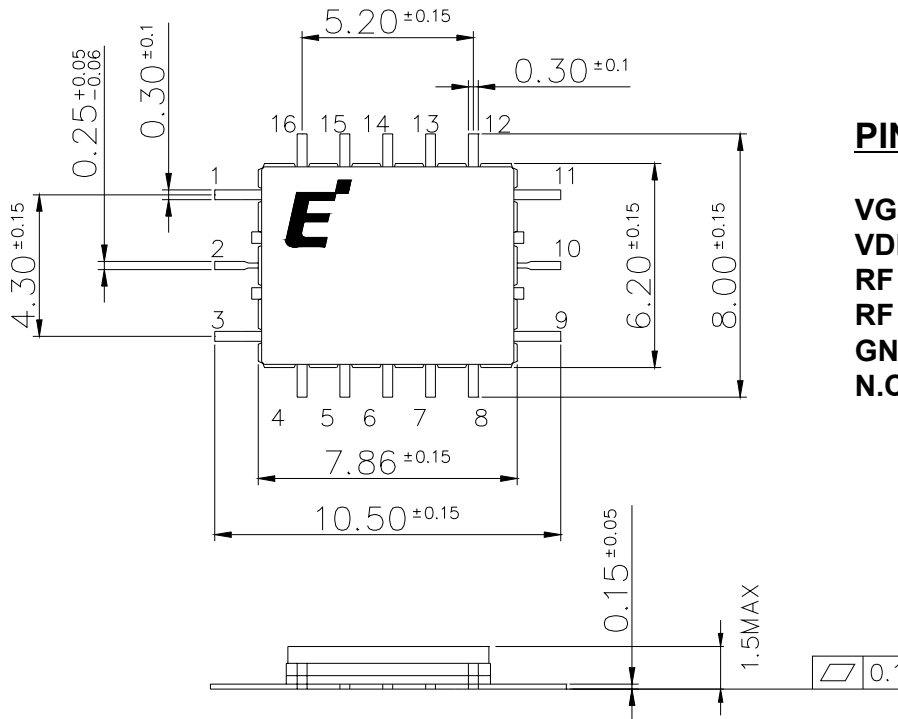


Note: ΔTch : Temperature Rise from Backside of the Package to Channel.

MTTF vs. Tch

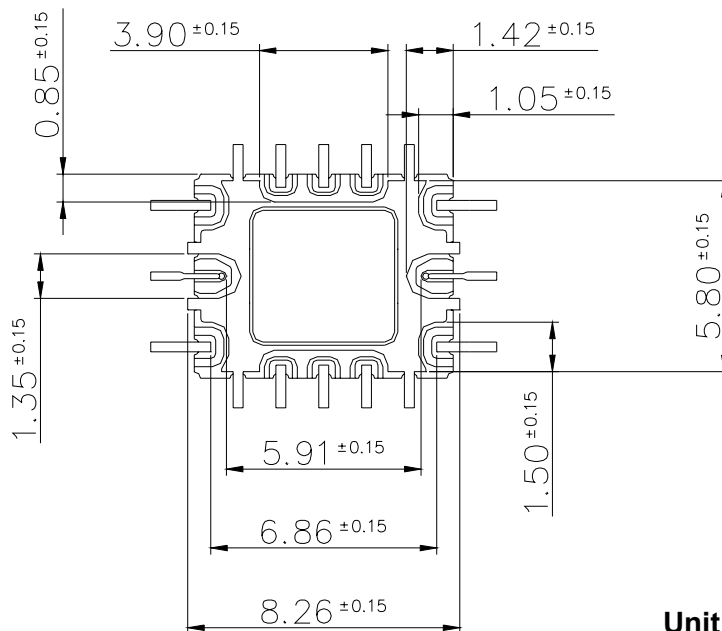


Package Outline and Pin Assignment



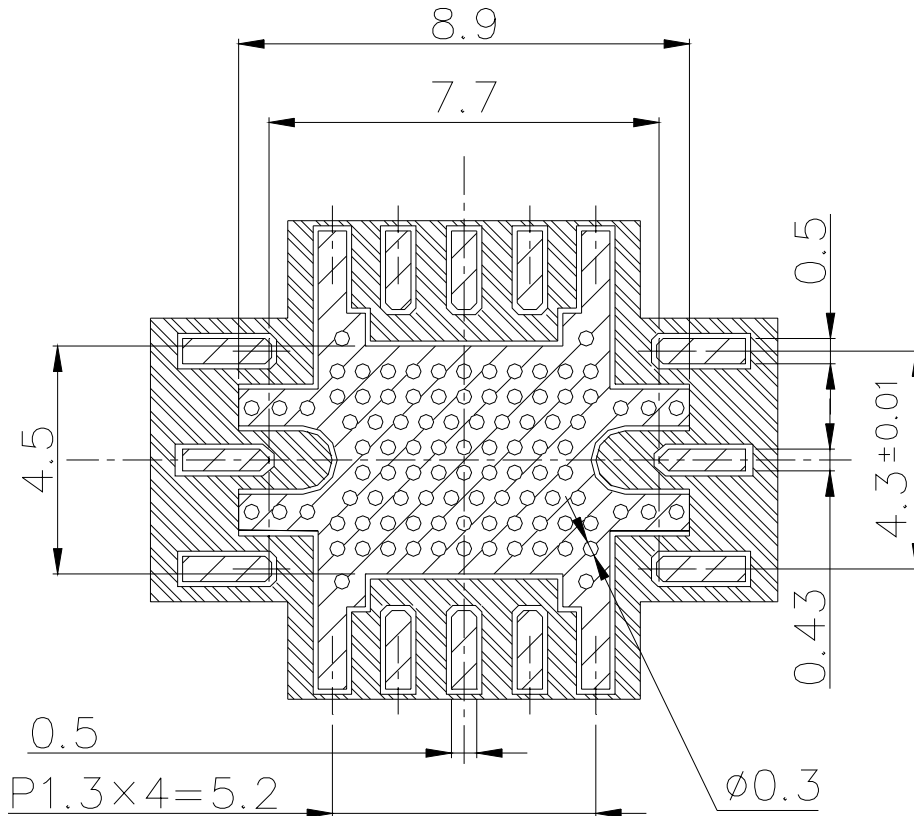
PIN Assignment

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





Unit : mm

■ PCB Pads and Solder-resist Pattern

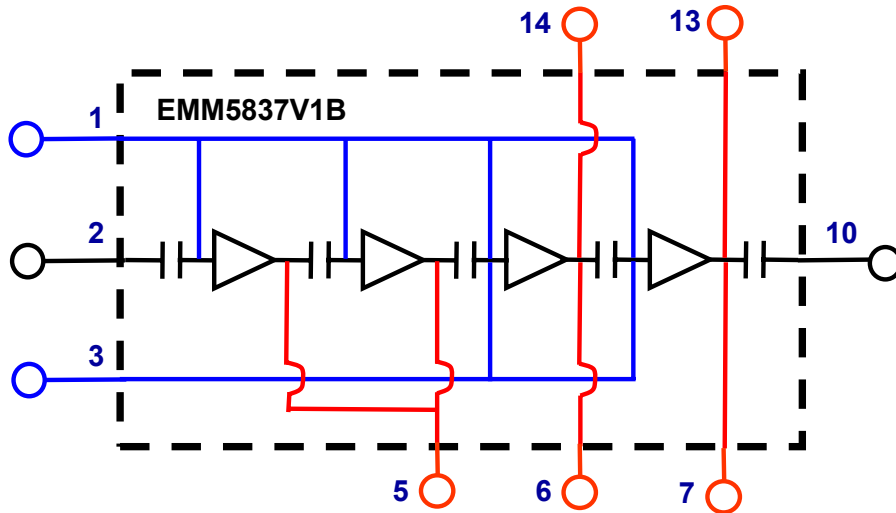


NOTES.

- 1). CORE MATERIAL; Rogers CORP. R04003
THICKNESS 0.2mm typ., Er=3.38 typ.
- 2). COPPER FOIL THICKNESS 18um typ.
- 3). ; FINISH COPPER FOIL; Ni 1um min./Au 0.1um max.
- 4). ; RESIST.

Unit : mm

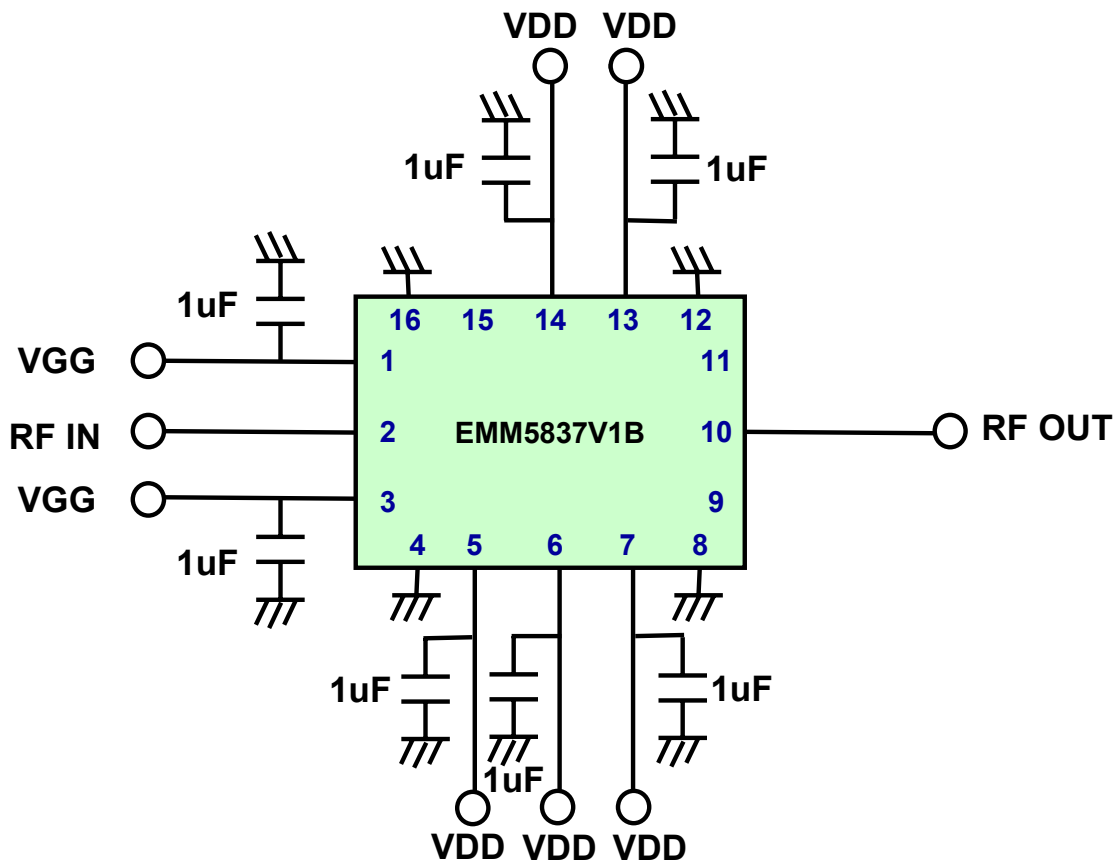
Block Diagram



PIN Assignment

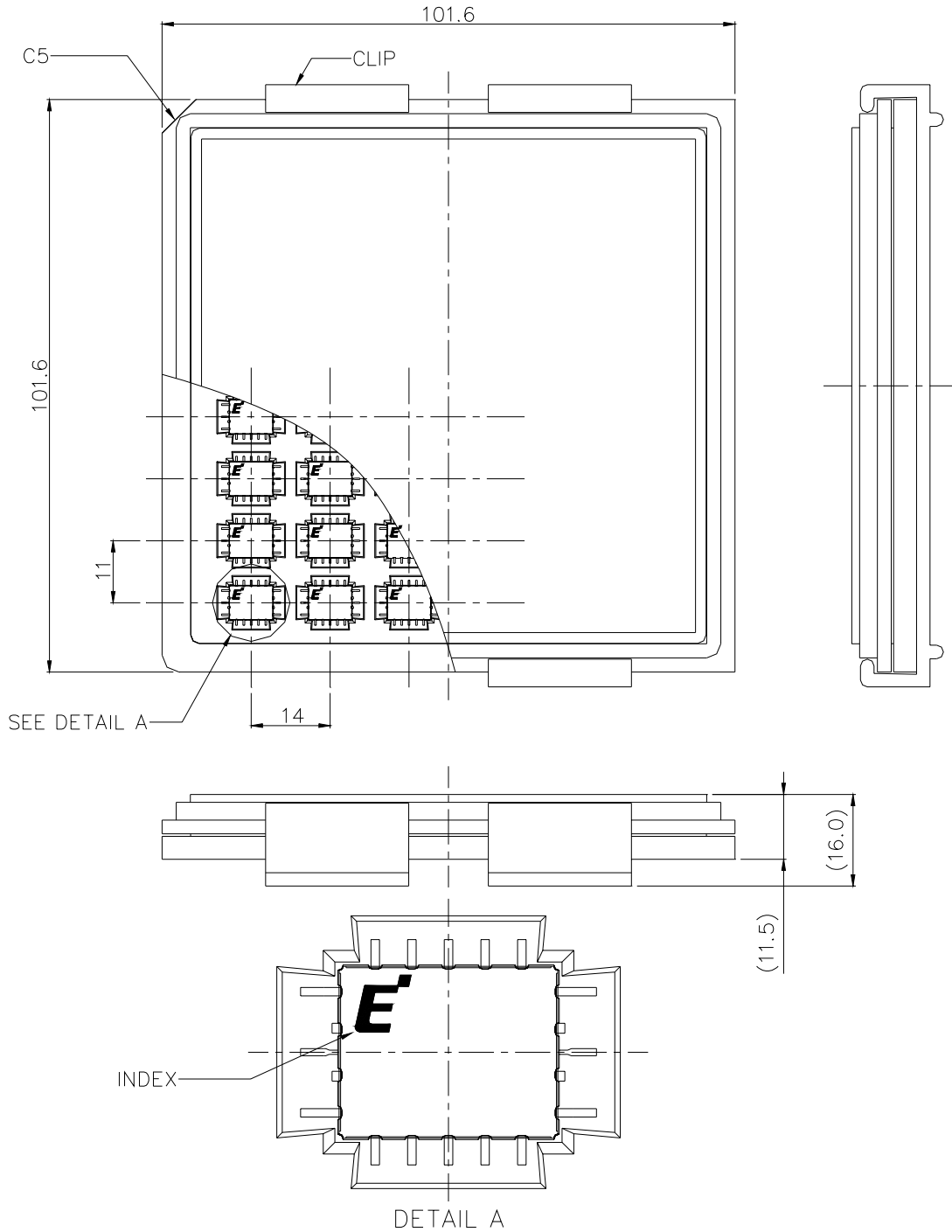
- VGG : 1, 3
- VDD : 5, 6, 7, 13, 14
- RF IN : 2
- RF OUT : 10
- GND : 4, 8, 12, 16
- N.C. : 9, 11, 15

Recommended Bias Network



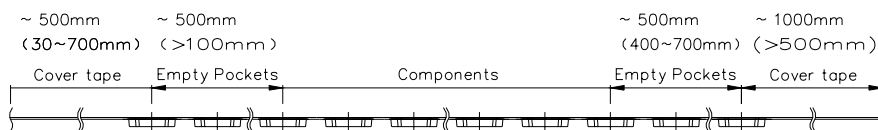
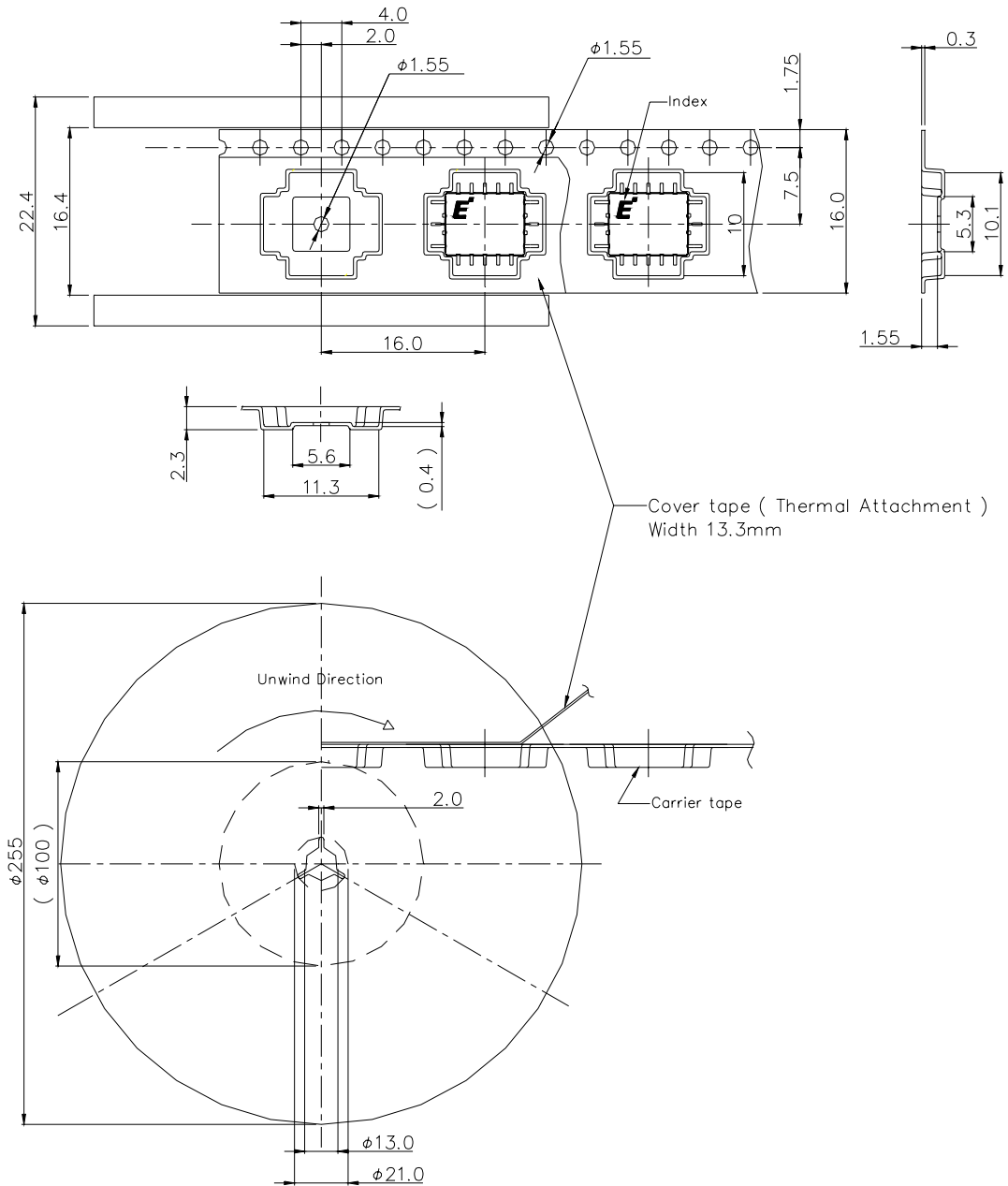
NOTE: All the VDD and VGG should be biased.

■ 4-inch Tray Packing (Part No. : EMM5837V1B)



- (1) Maximum Quantity : 48 pcs./Tray
- (2) Tray Material : Conductive PS

■ Tape and Reel Packing (Part No. : EMM5837V1BT)



- | | |
|-------------------|------------------|
| (1) Quantity | 500pcs/tape |
| (2) Tape material | Conductive A-PET |
| (3) Reel material | PS |

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

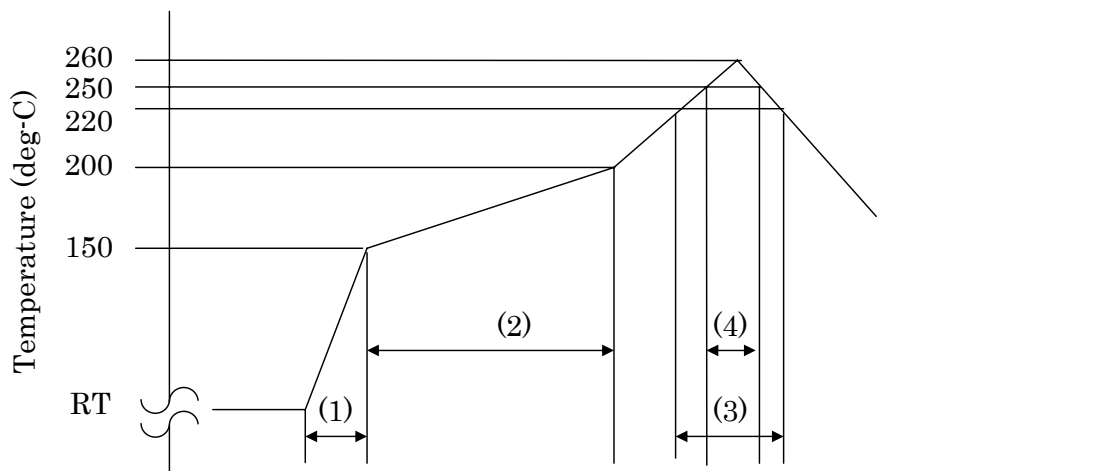
Mounting Condition

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:



	Time
(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 :

**Sumitomo Electric Device Innovations,
U.S.A., 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: +39-02-37052921
FAX: +39-02-37052920

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

Sumitomo Electric Device Innovations, Inc.

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

Sumitomo Electric Industries, Ltd.

Head Office (Tokyo)
3-9-1, Shibaura, Minato-ku, Tokyo 108-8539,
Japan
TEL +81-3-6722-3287
FAX +81-3-6722-3284

CAUTION

Sumitomo Electric Device Innovations, 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.

Sumitomo Electric Device Innovations, Inc. reserves the right to change products and specifications without notice. The information does not convey any license under rights of Sumitomo Electric Device Innovations, Inc. or others.

© 2009 Sumitomo Electric Device Innovations, Inc.



SUMITOMO ELECTRIC DEVICE INNOVATIONS