



# EMM5079ZB

## X / Ku-Band Power Amplifier MMIC

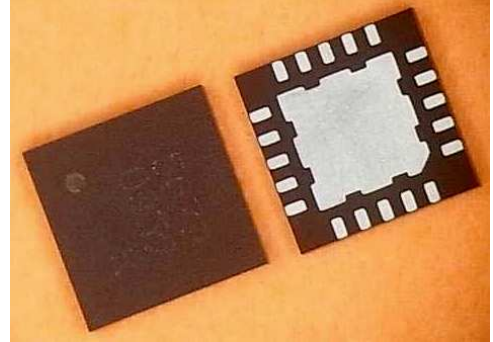
### FEATURES

- Output Power; P1dB = 24.0 dBm (Typ.)
- High Gain; GL = 23 dB(Typ.)
- Wide Frequency Band ; 10.0 – 15.4 GHz
- Impedance Matched Zin/Zout = 50Ω
- QFN 20pin Plastic Mold Package(ZB)

### DESCRIPTION

The EMM5079ZB is a wide band power amplifier MMIC that contains a four stage amplifier, internally matched, for standard communications band in 10.0 to 15.4GHz frequency range. This product is well suited for point-to-point radio and VSAT applications.

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



### ABSOLUTE MAXIMUM RATING

Item	Symbol	Rating	Unit
Drain-Source Voltage	V <sub>DD</sub>	10	V
Gate-Source Voltage	V <sub>GG</sub>	-3	V
Input Power	P <sub>in</sub>	16	dBm
Storage Temperature	T <sub>stg</sub>	-55 to +125	°C

### RECOMMENDED OPERATING CONDITIONS

Item	Symbol	Condition	Unit
Drain-Source Voltage	V <sub>DD</sub>	≤6	V
Input Power	P <sub>in</sub>	≤6	dBm
Operating Case Temperature	Top	-40 to +85	°C

### ELECTRICAL CHARACTERISTICS (Case Temperature Tc=25°C)

Item	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Frequency Range	f	V <sub>DD</sub> =6V	10.0	-	15.4	GHz
Output Power at 1dB G.C.P.	P <sub>1dB</sub>	I <sub>DD</sub> (DC)=350mA typ. Z <sub>s</sub> =Z <sub>l</sub> =50ohm	23 <sup>*1</sup> 21.5 <sup>*2</sup>	25.5 <sup>*1</sup> 24 <sup>*2</sup>	-	dBm
Power Gain at 1dB G.C.P.	G <sub>1dB</sub>		19	22	-	dB
Power-added Efficiency at 1dB G.C.P.	η <sub>add</sub>	*1 : f=10.0~11.7GHz *2 : f=11.7~15.4GHz	-	17 <sup>*1</sup> 15 <sup>*2</sup>	-	%
Third Order Intermodulation <sup>*3</sup>	IM3 <sup>*3</sup>	*3 : Δf=10MHz , 2-Tone Test,	-25 <sup>*1</sup> -30 <sup>*2</sup>	-32 <sup>*1</sup> -40 <sup>*2</sup>	-	dBc
Drain Current at 1dB G.C.P.	I <sub>DD</sub>	P <sub>out</sub> =15dBm S.C.L.	-	380	500	mA
Input Return Loss (at Pin=-20dBm)	RL <sub>in</sub>		-	10	-	dB
Output Return Loss (at Pin=-20dBm)	RL <sub>out</sub>		-	10	-	dB

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

<b>ESD</b>	<b>Class 0</b>	<b>≤250V</b>
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Note : Based on JEDEC JESD22-A114C (C=100pF, R=1.5kohm)

<b>CASE STYLE</b>	<b>ZB</b>
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<b>MSL</b>	<b>3</b>
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Note : Based on IPC/JEDEC J-STD-020C

<b>RoHs Compliance</b>	<b>Yes</b>
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### ORDERING INFORMATION

Part Number	Order Unit	Packing
EMM5079ZB	No Limitation	490 pcs/Tray X 10 Trays=4900pcs/Packing
EMM5079ZBT	500 pcs	500 pcs./Reel × 1 Reel=500 pcs./Pack

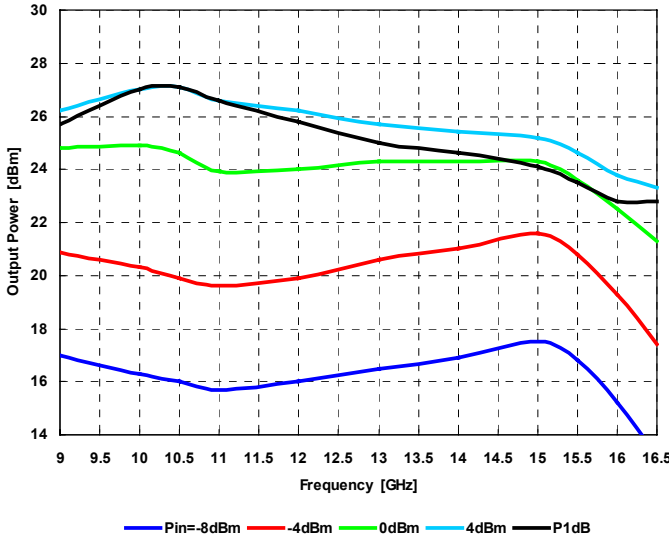


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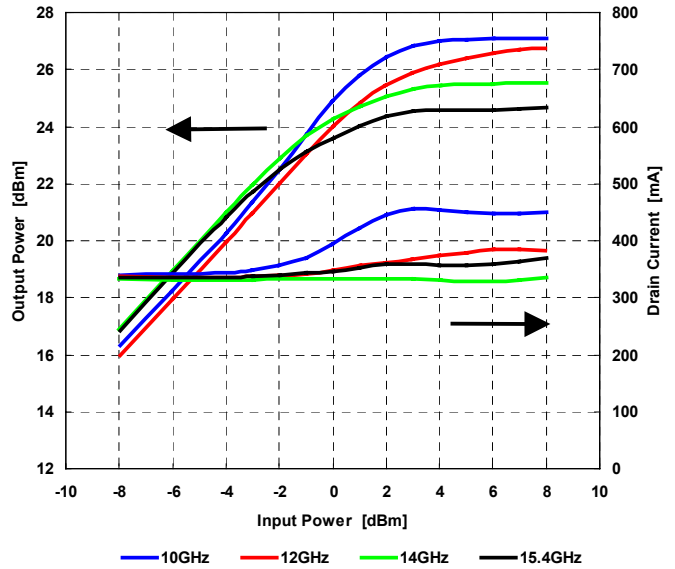
**Output Power vs. Frequency**

@VDD=6V, IDD(DC)=350mA



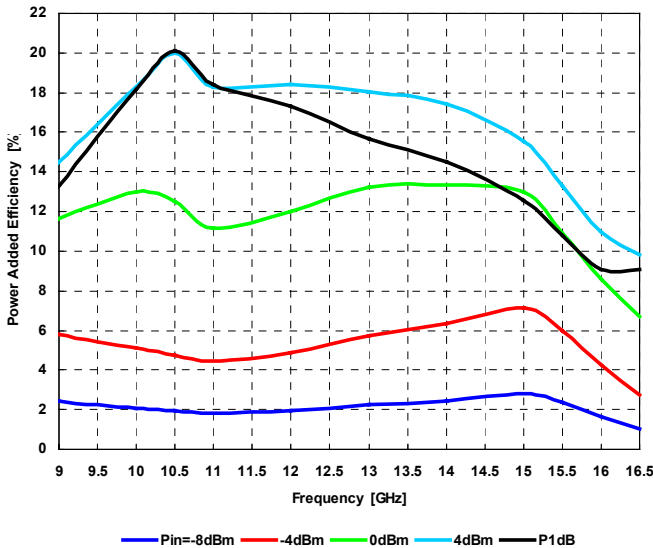
**Output Power, Drain Current vs. Input Power**

@VDD=6V, IDD(DC)=350mA



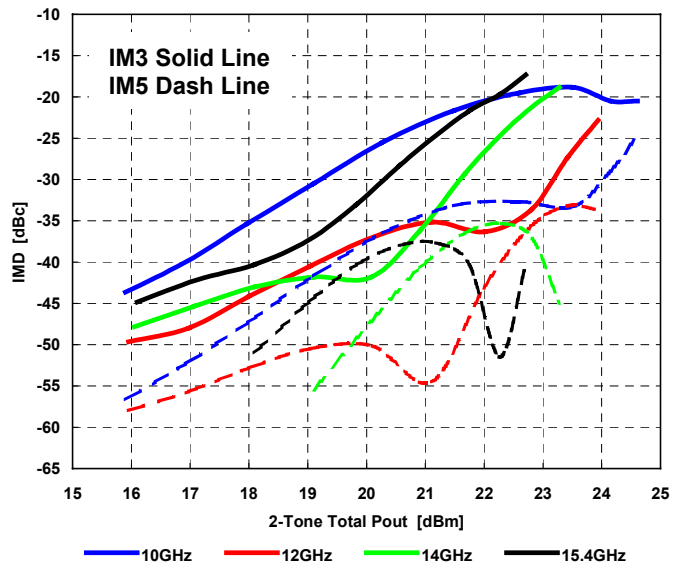
**Power Added Efficiency vs. Frequency**

@VDD=6V, IDD(DC)=350mA



**IMD vs. Output Power**

@VDD=6V, IDD(DC)=350mA

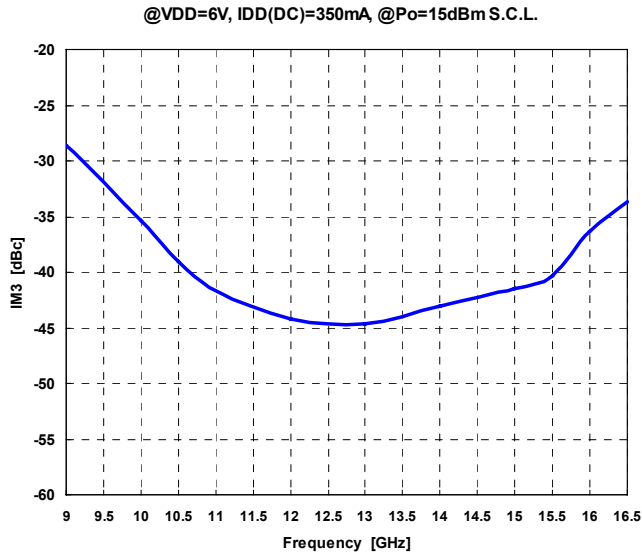




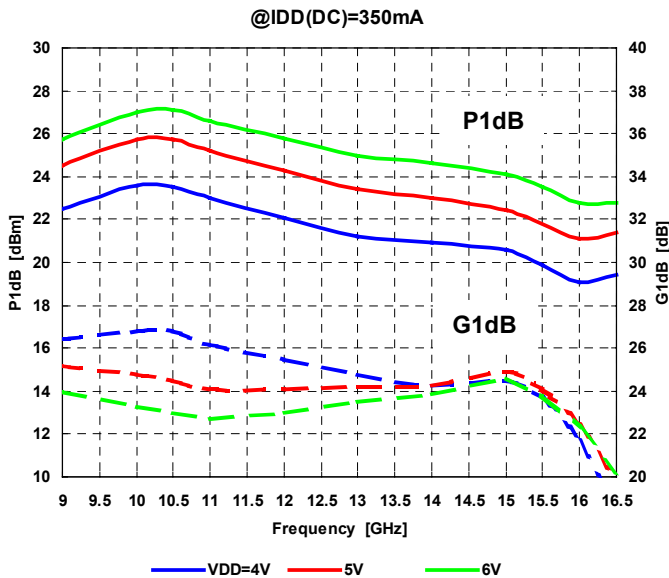
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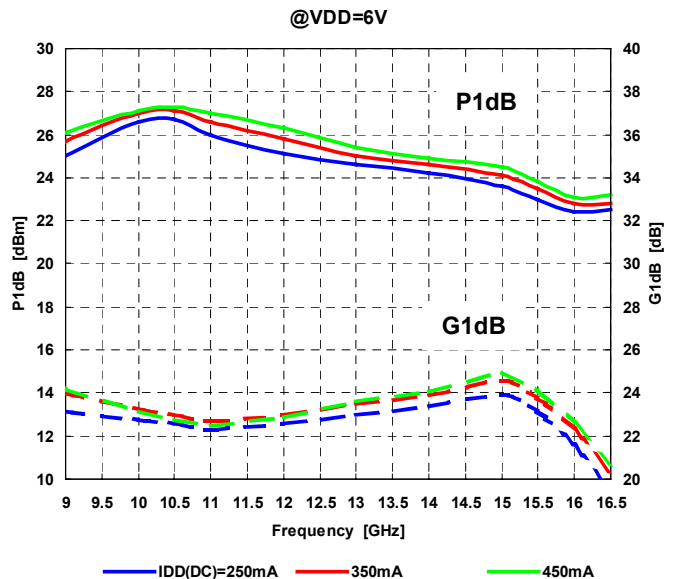
## IM3 vs. Frequency



## P1dB, G1dB vs. Frequency by Drain Voltage



## P1dB, G1dB vs. Frequency by Drain Current



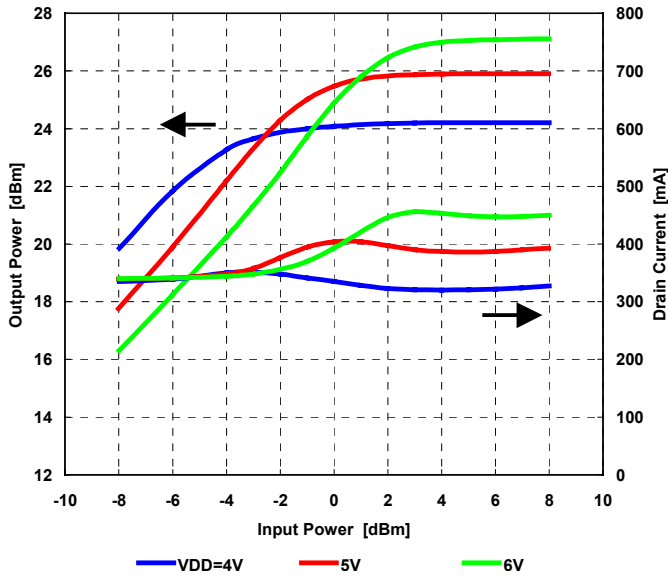


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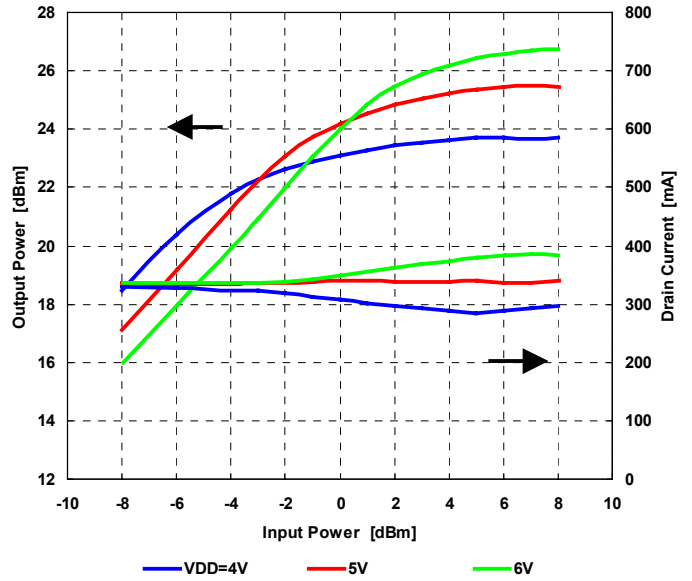
Output Power, Drain Current vs. Input Power by Drain Voltage

@f=10GHz, IDD(DC)=350mA



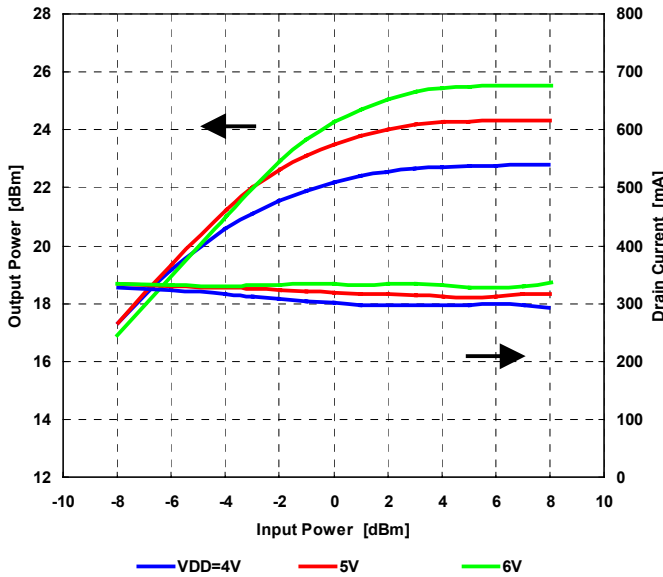
Output Power, Drain Current vs. Input Power by Drain Voltage

@f=12GHz, IDD(DC)=350mA



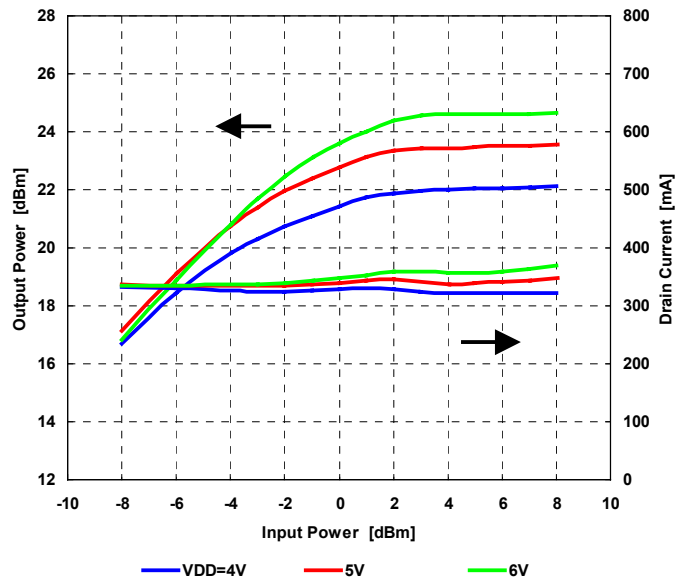
Output Power, Drain Current vs. Input Power by Drain Voltage

@f=14GHz, IDD(DC)=350mA



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

@f=15.4GHz, IDD(DC)=350mA



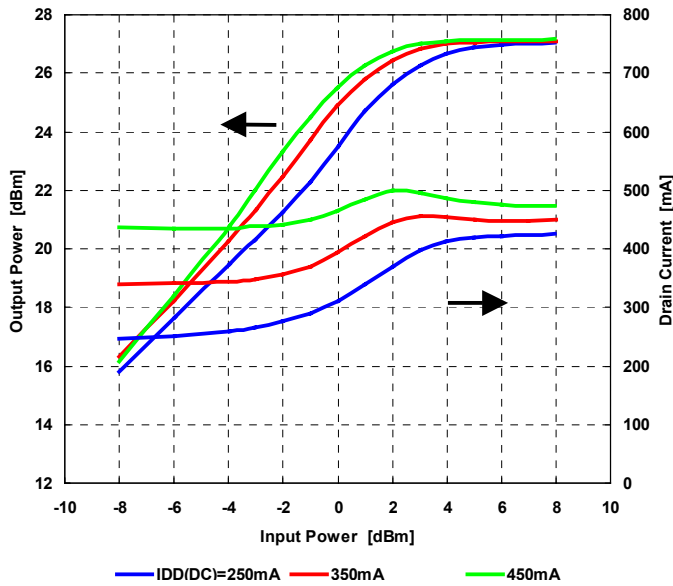


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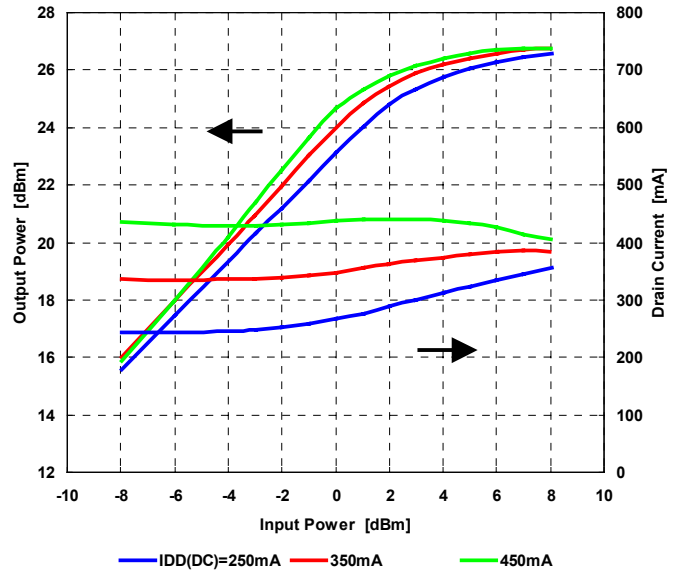
### Output Power, Drain Current vs. Input Power by Drain Current

@f=10GHz, VDD=6V



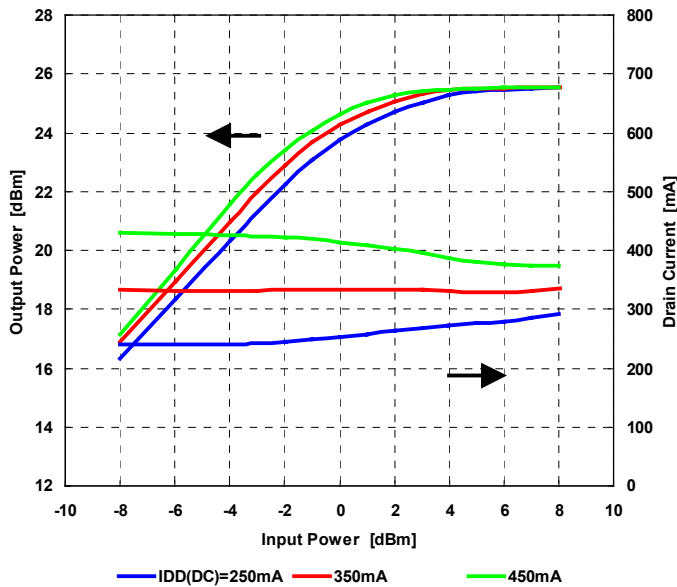
### Output Power, Drain Current vs. Input Power by Drain Current

@f=12GHz, VDD=6V



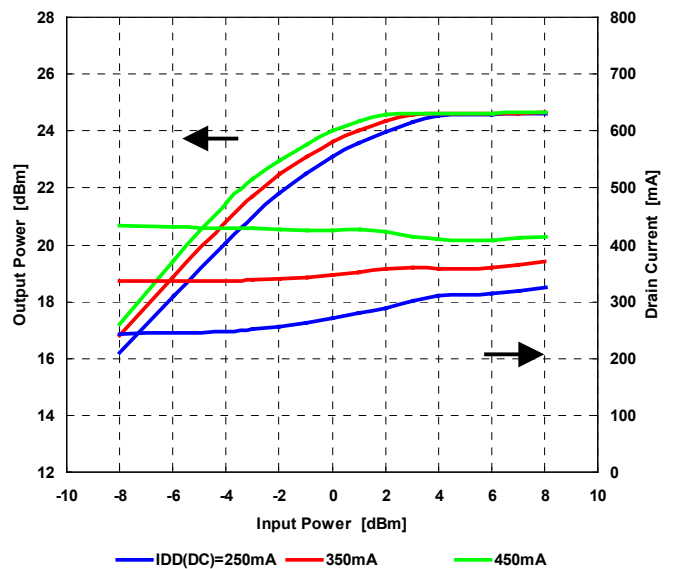
### Output Power, Drain Current vs. Input Power by Drain Current

@f=14GHz, VDD=6V



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

@f=15.4GHz, VDD=6V



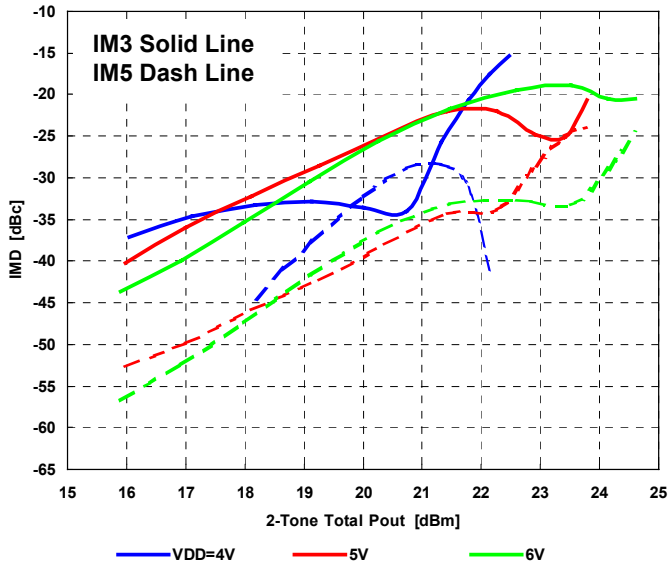


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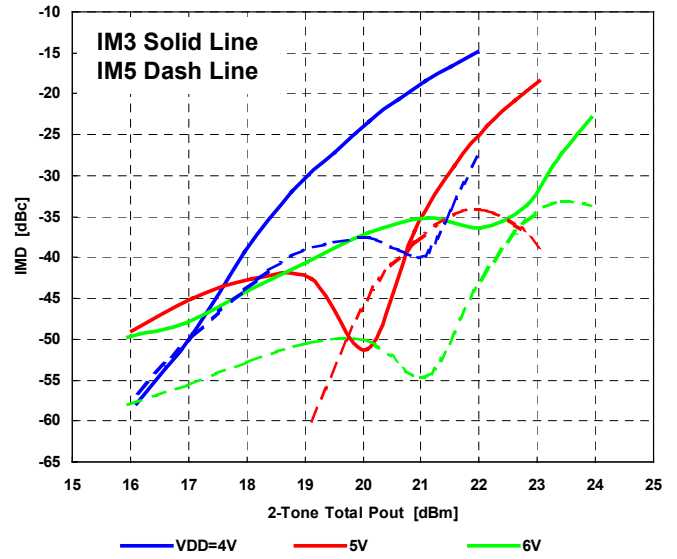
### IMD Performance vs. Output Power by Drain Voltage

@f=10GHz, IDD(DC)=350mA



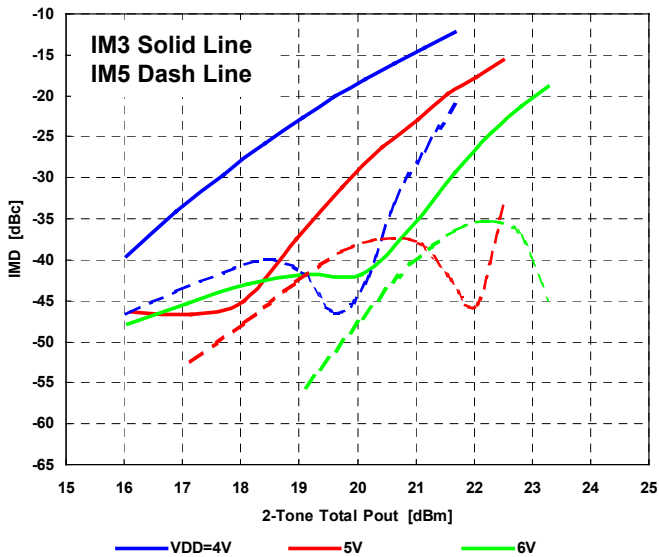
### IMD Performance vs. Output Power by Drain Voltage

@f=12GHz, IDD(DC)=350mA



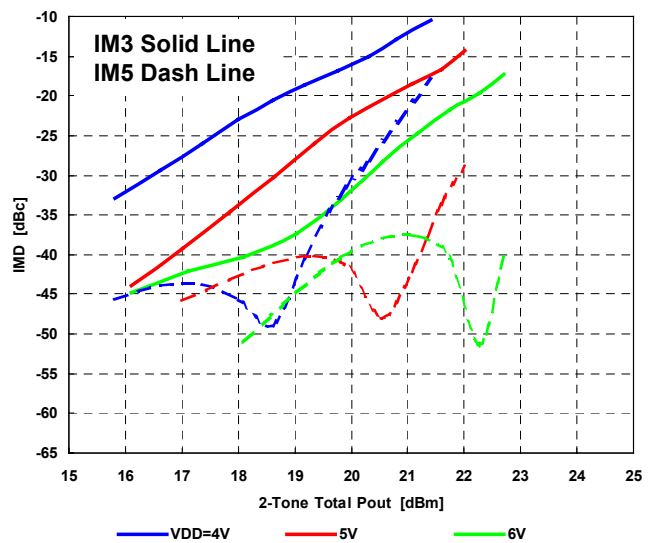
### IMD Performance vs. Output Power by Drain Voltage

@f=14GHz, IDD(DC)=350mA



### IMD Performance vs. Output Power by Drain Voltage

@f=15.4GHz, IDD(DC)=350mA



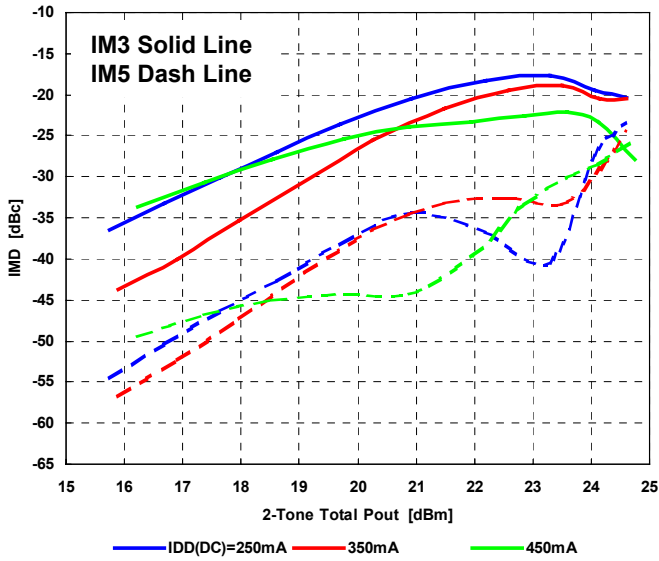


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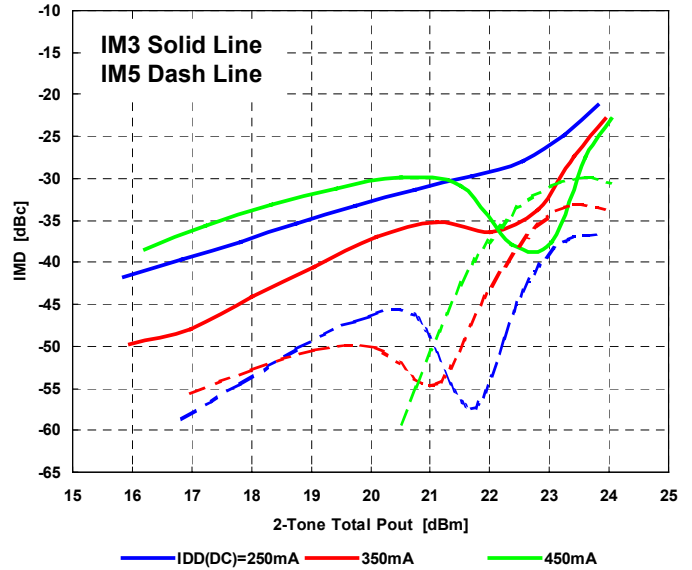
**IMD Performance vs. Output Power by Drain Current**

@f=10GHz, VDD=6V



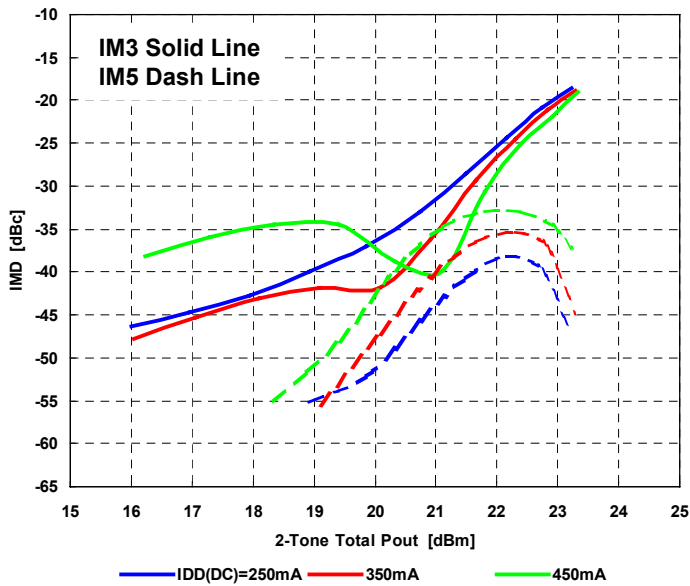
**IMD Performance vs. Output Power by Drain Current**

@f=12GHz, VDD=6V



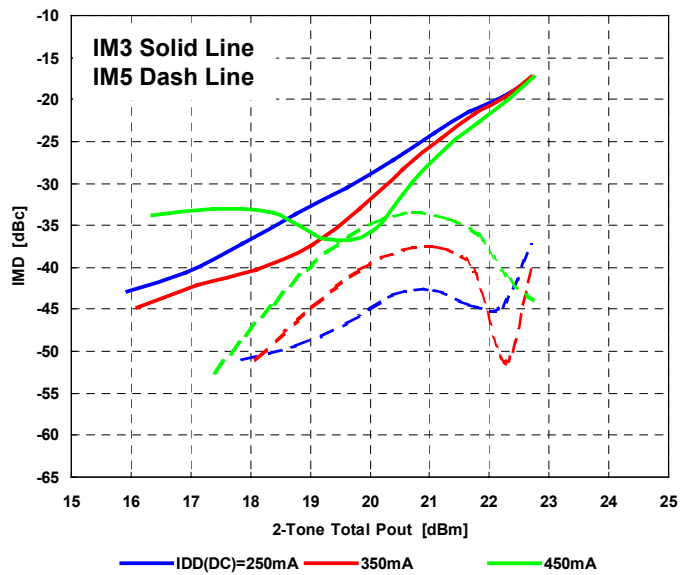
**IMD Performance vs. Output Power by Drain Current**

@f=14GHz, VDD=6V



**IMD Performance vs. Output Power by Drain Current**

@f=15.4GHz, VDD=6V



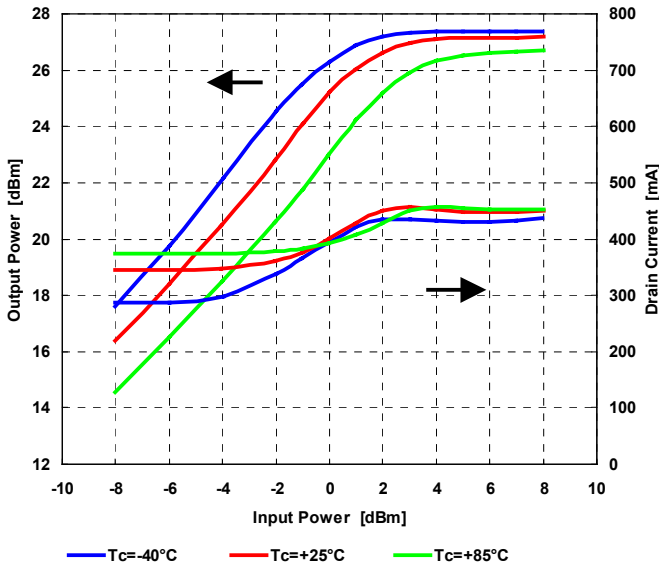


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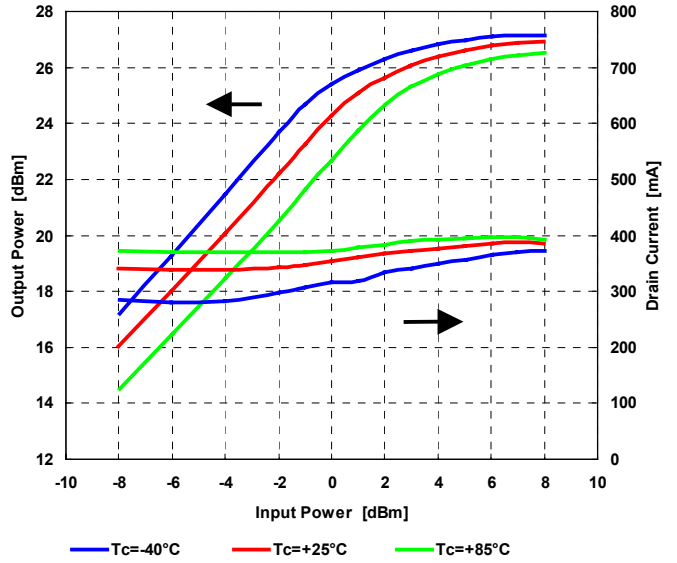
### Output Power, Drain Current vs. Input Power by Temperature

@VDD=6V, IDD(DC)=350mA(Tc=25°C), Freq=10GHz



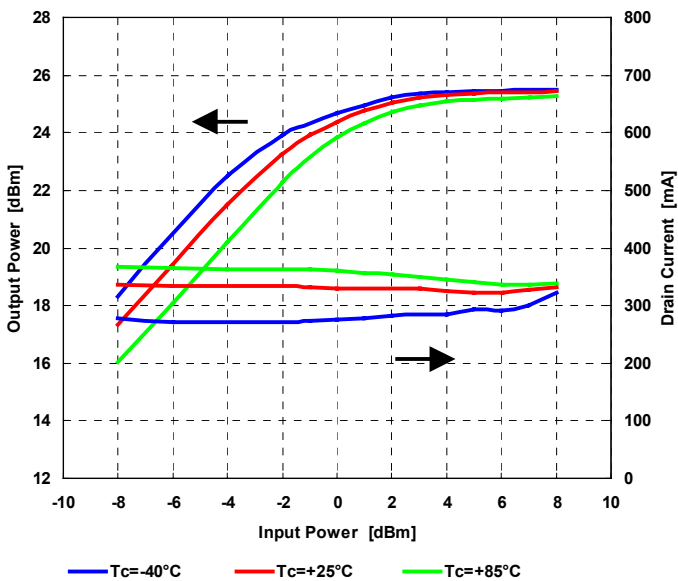
### Output Power, Drain Current vs. Input Power by Temperature

@VDD=6V, IDD(DC)=350mA(Tc=25°C), Freq=12GHz



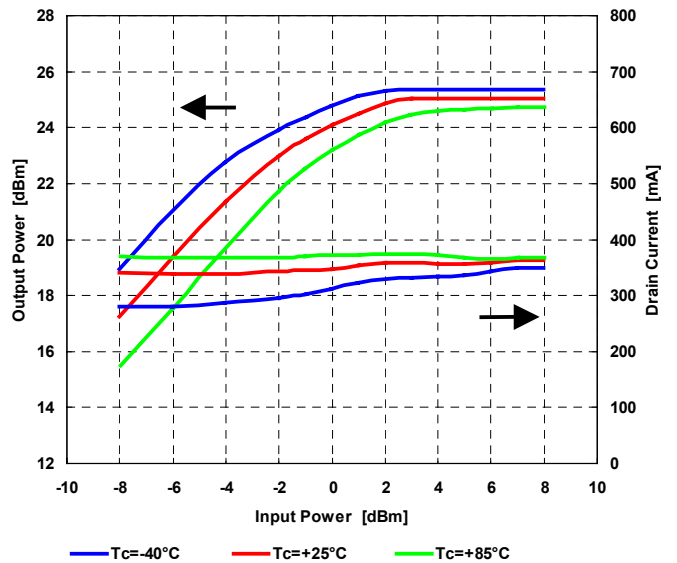
### Output Power, Drain Current vs. Input Power by Temperature

@VDD=6V, IDD(DC)=350mA(Tc=25°C), Freq=14GHz



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

@VDD=6V, IDD(DC)=350mA(Tc=25°C), Freq=15.4GHz



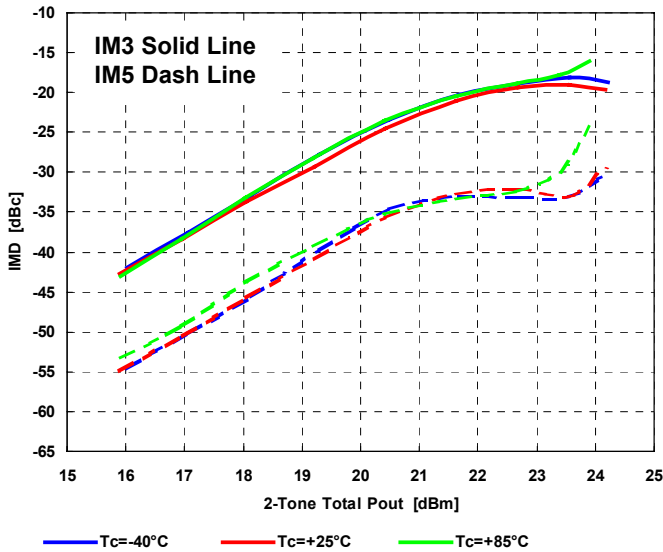


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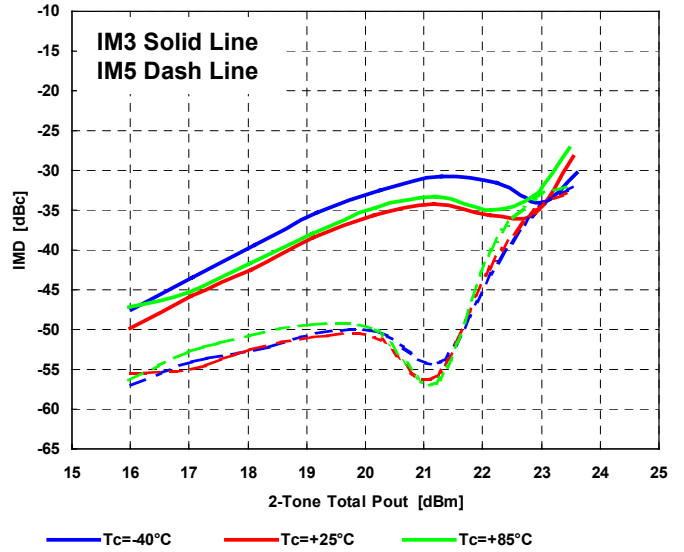
### IMD Performance vs. Output Power by Temperature

@VDD=6V, IDD(DC)=350mA(Tc=25°C), Freq=10GHz



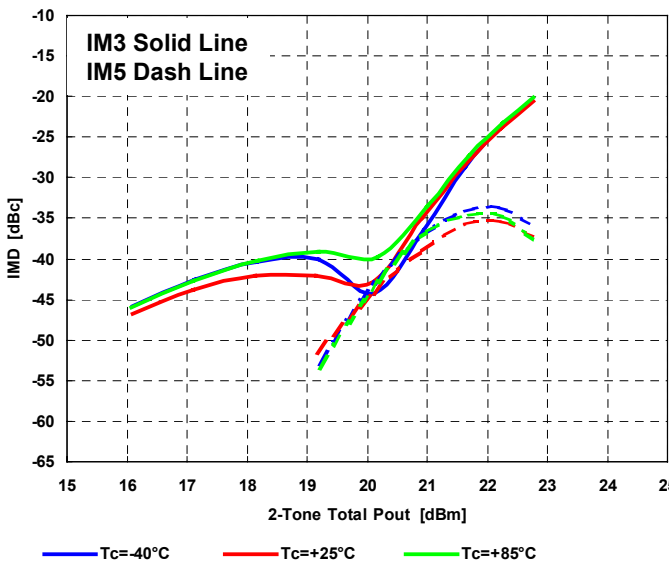
### IMD Performance vs. Output Power by Temperature

@VDD=6V, IDD(DC)=350mA(Tc=25°C), Freq=12GHz



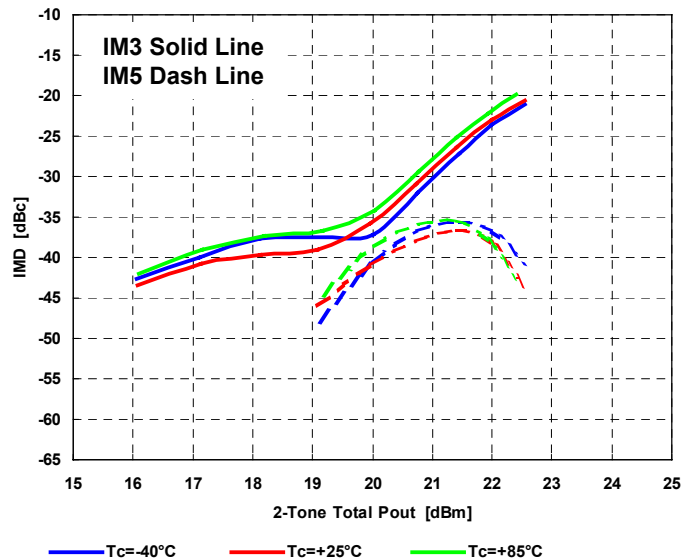
### IMD Performance vs. Output Power by Temperature

@VDD=6V, IDD(DC)=350mA(Tc=25°C), Freq=14GHz



### IMD Performance vs. Output Power by Temperature

@VDD=6V, IDD(DC)=350mA(Tc=25°C), Freq=15.4GHz

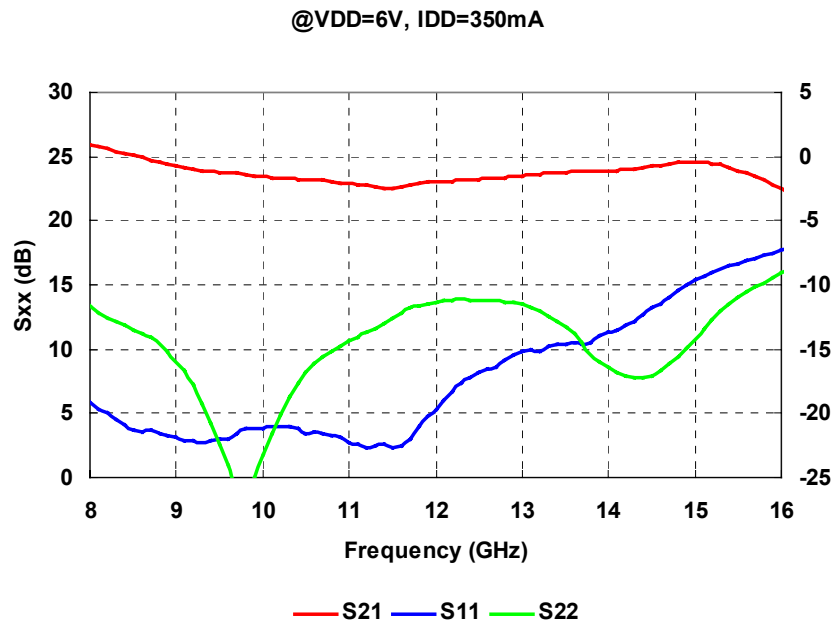
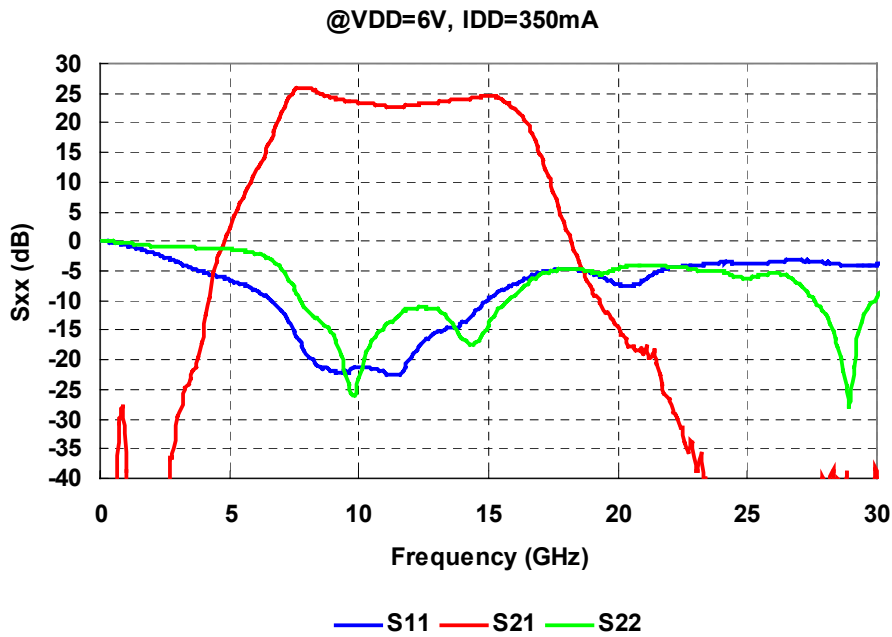




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## S-PARAMETERS

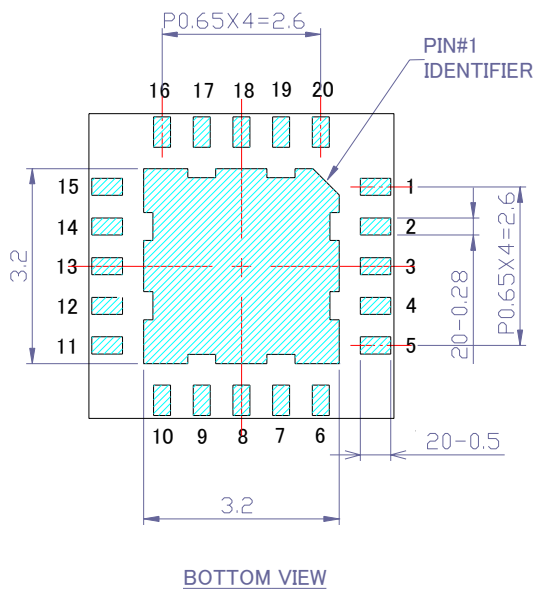
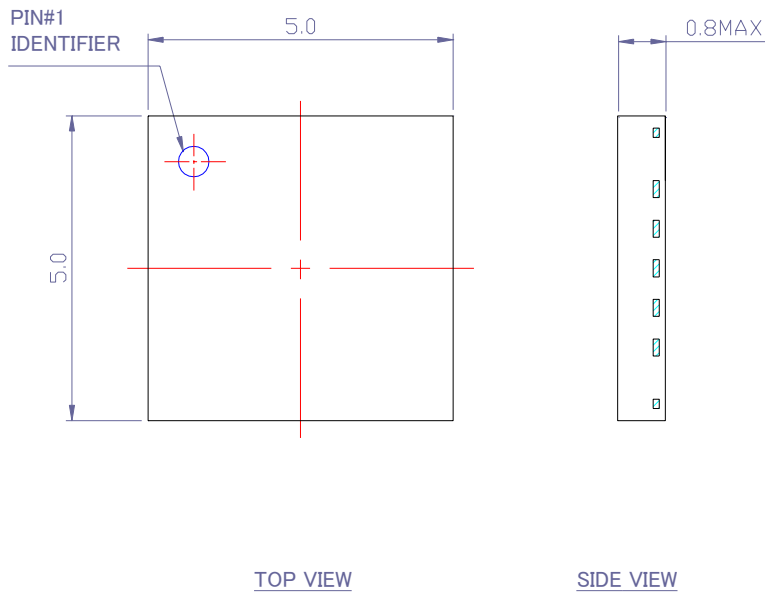




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## Package Outline and Pin Assignment



## PIN Assignment

- RF IN : 2,3
- RF OUT : 13,14
- VGG : 20
- VDD1 : 7
- VDD2 : 8
- VDD3 : 9
- VDD4 : 10
- N/C : 1,4,5,6,11,12,  
15,16,17,18,19

Unit : mm

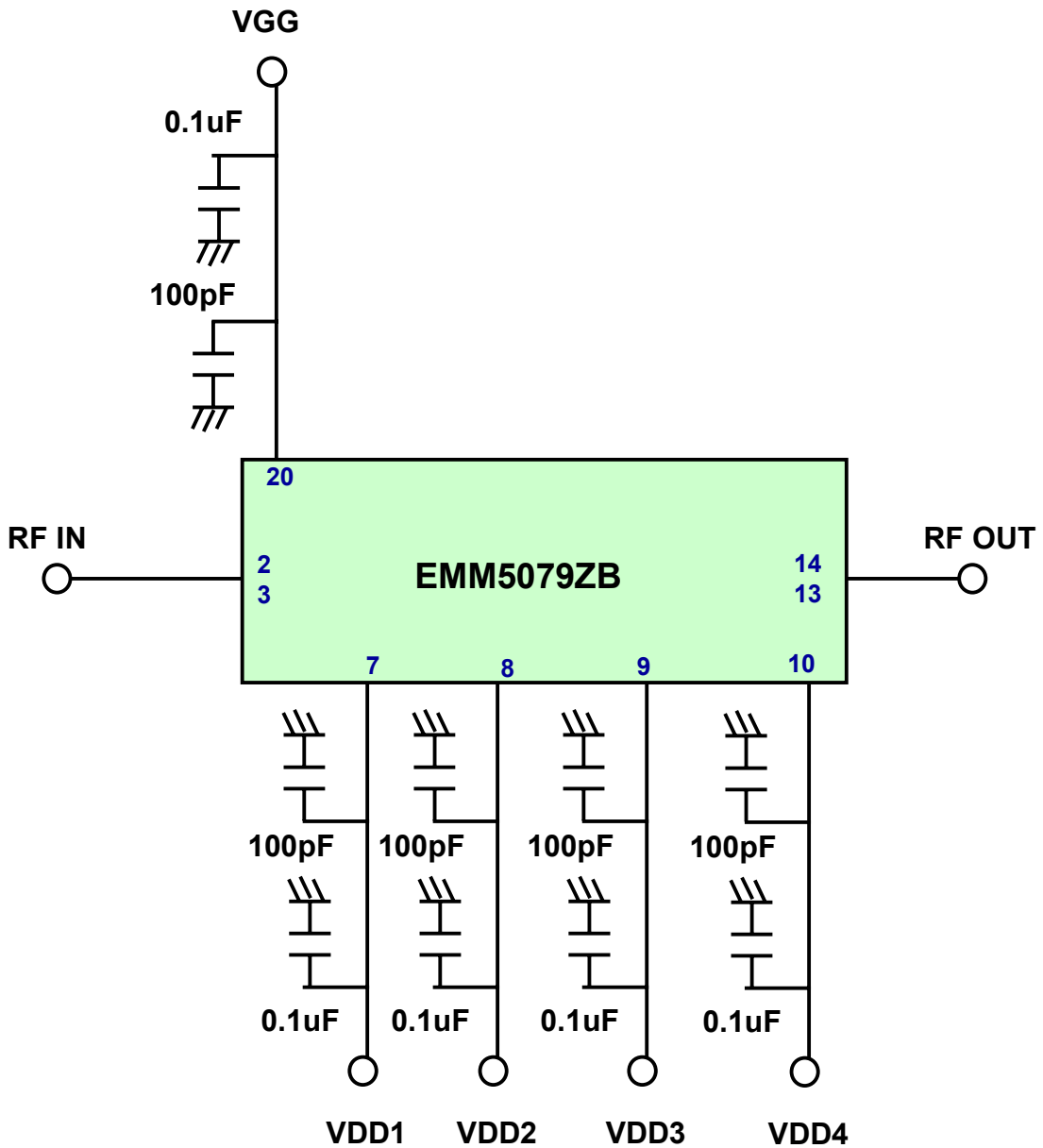




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## Recommended Bias Network

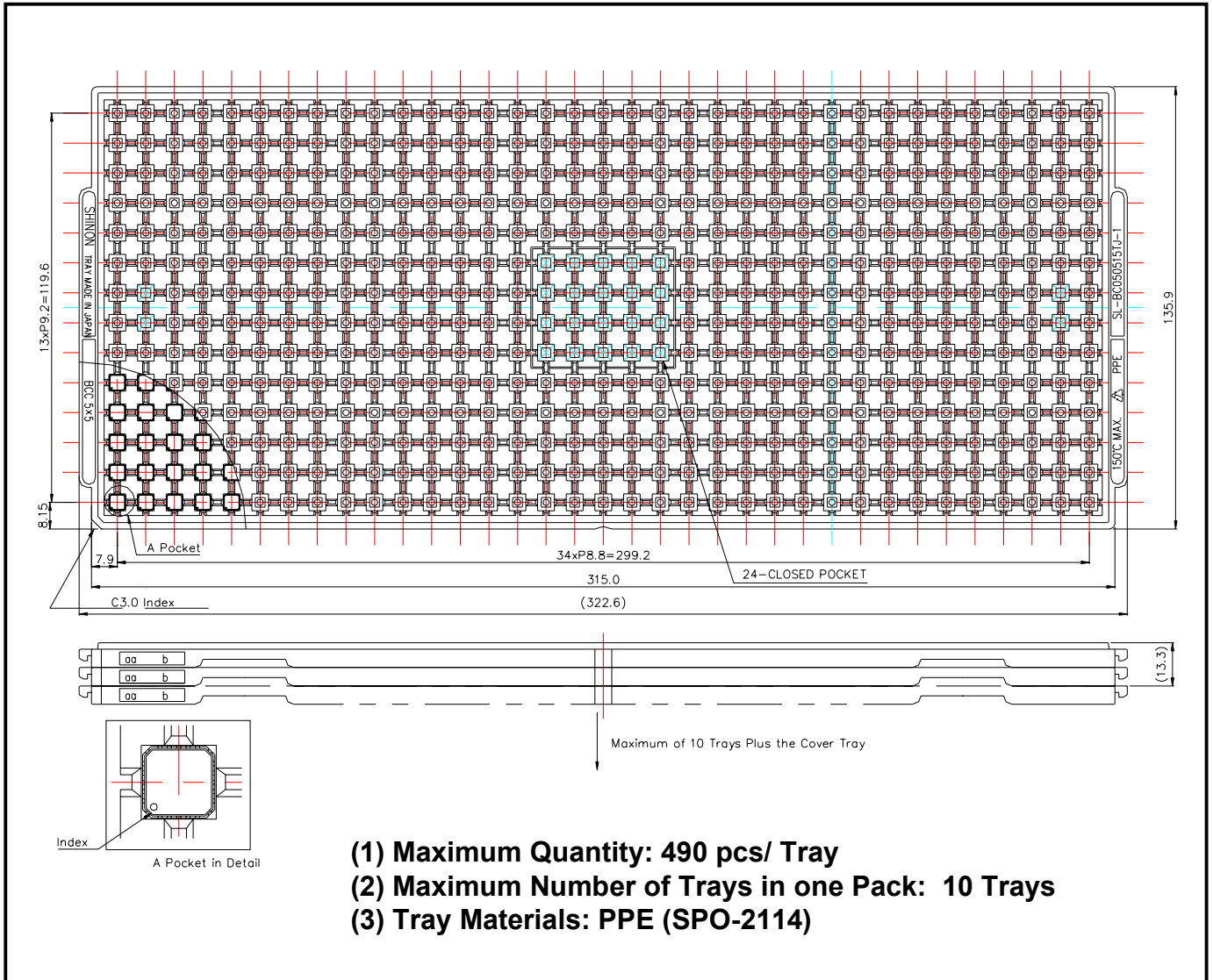




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## JDEC Tray Packing (Part No. : EMM5079ZB)

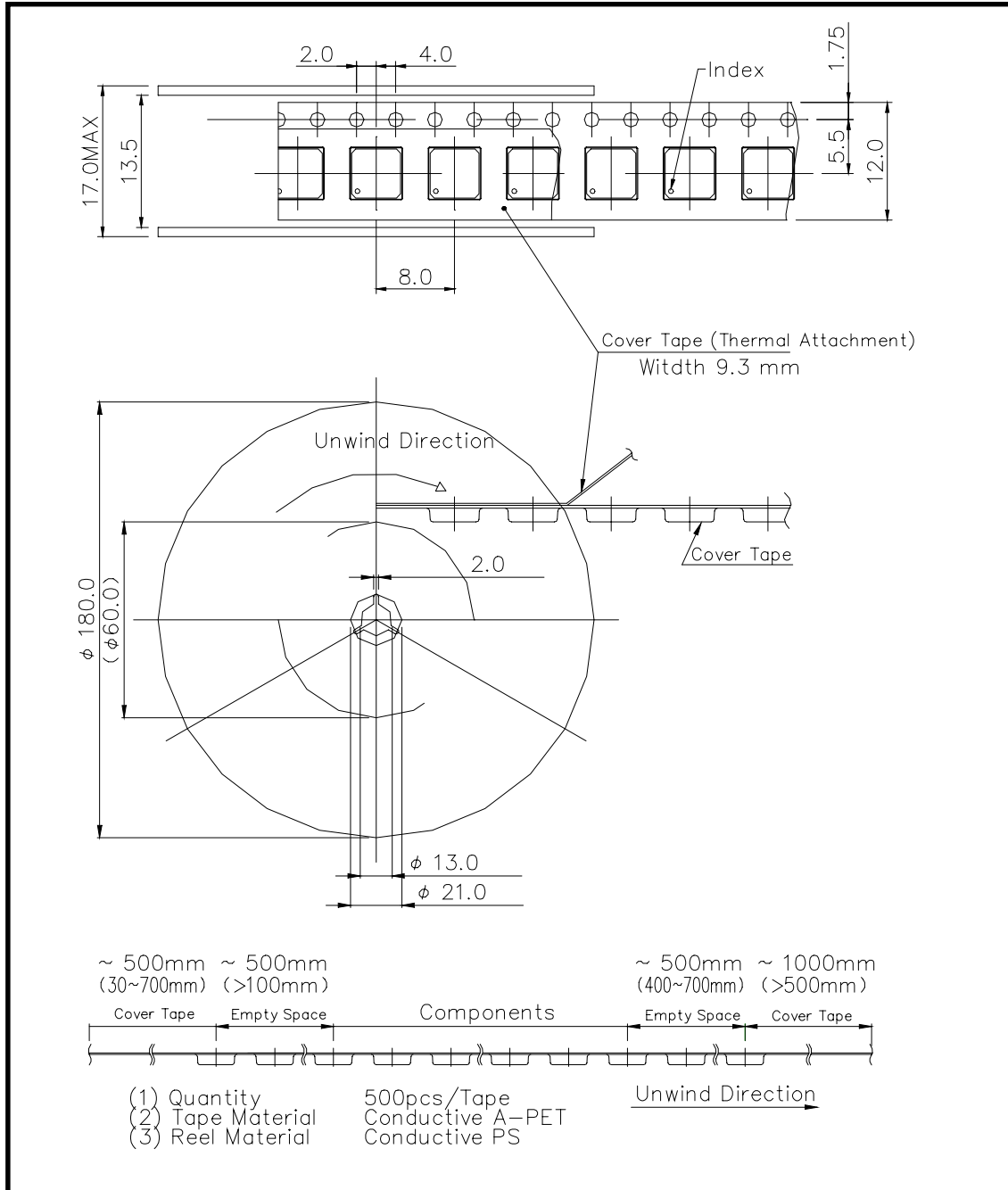




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## ■ Tape and Reel Packing (Part No. : EMM5079ZBT)



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

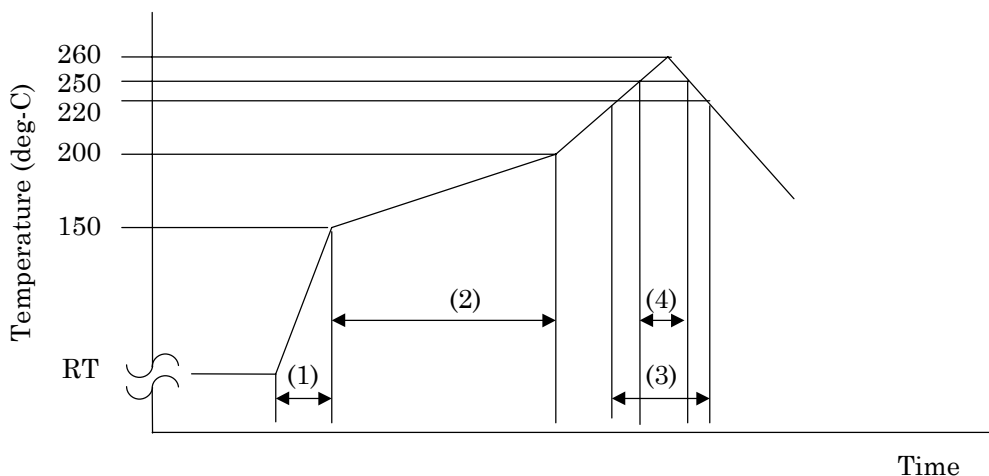
**Mounting Condition**

1. For soldering, Lead-free solder (Sn-3.0Ag-0.5Cu)\*<sup>1</sup> 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:	3 deg-C/seconds	
(2) Preheating:	150 - 200 deg-C,	60 - 180 seconds
(3) Main heating:	220 deg-C,	60 seconds max.
(4) Peak Temperature:	260 deg-C max., more than 250 deg-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 :**

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**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.

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