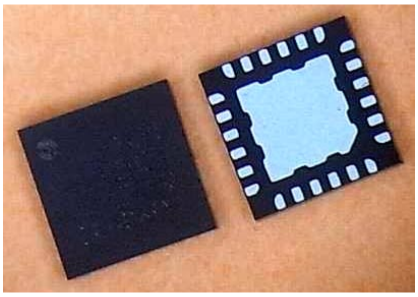
EMM5078ZV

C-Band Power Amplifier MMIC



FEATURES

- •Output Power; P1dB = 26 dBm (Typ.)
- •High Gain; GL = 30 dB(Typ.)
- •Wide Frequency Band ; 3.4 – 8.5 GHz
- •Impedance Matched Zin/Zout = 50Ω
- •QFN 24pin Plastic Mold Package(ZV)

DESCRIPTION

The EMM5078ZV is a wide band power amplifier MMIC that contains a three stage amplifier, internally matched, for standard communications band in 3.4 to 8.5GHz 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}	22	dBm
Storage Temperature	T_{stg}	-55 to +125	°C

RECOMMENDED OPERATING CONDITIONS

Item	Symbol	Condition	Unit
Drain-Source Voltage	V_{DD}	<=6	V
Input Power	P_{in}	<=2	dBm
Operating Backside Temperature	Top	-40 to +85	℃

ELECTRICAL CHARACTERISTICS (Case Temperature Tc=25°C)

Item	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
Frequency Range	f	V_{DD}=6V	3.4	-	8.5	GHz
Output Power at 1dB G.C.P.	P_{1dB}	I_{DD}(DC)=300mA typ.	23	26	-	dBm
Power Gain at 1dB G.C.P.	G_{1dB}	Zs=Zl=50ohm	24	29	-	dB
Power-added Efficiency at 1dB G.C.P.	ηadd		-	18	-	%
Third Order Intermodulation*	IM_3	*:Δf=10MHz ,	-35	-40	-	dBc
Drain Current at 1dB G.C.P.	IDD	2-Tone Test,	-	350	450	mA
Input Return Loss (at Pin=-20dBm)	RL_{in}	Pout=15dBm S.C.L.	-	-10	-	dB
Output Return Loss (at Pin=-20dBm)	RL_{out}		-	-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	**ZV**

MSL	**3**

Note : Based on IPC/JEDEC J-STD-020C

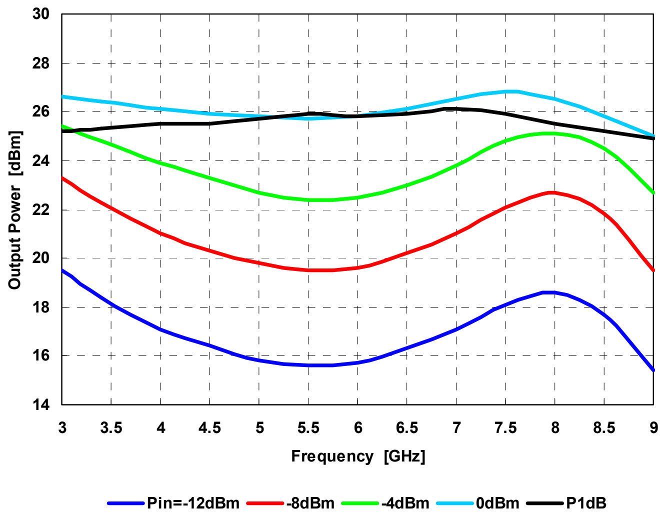
RoHs Compliance	**Yes**

ORDERING INFORMATION

Part Number	Order Unit	Packing
EMM5078ZV	No Limitation	490 pcs/Tray X 10 Trays=4900pcs/Packing
EMM5078ZVT	500 pcs	500 pcs./Reel × 1 Reel=500 pcs./Pack

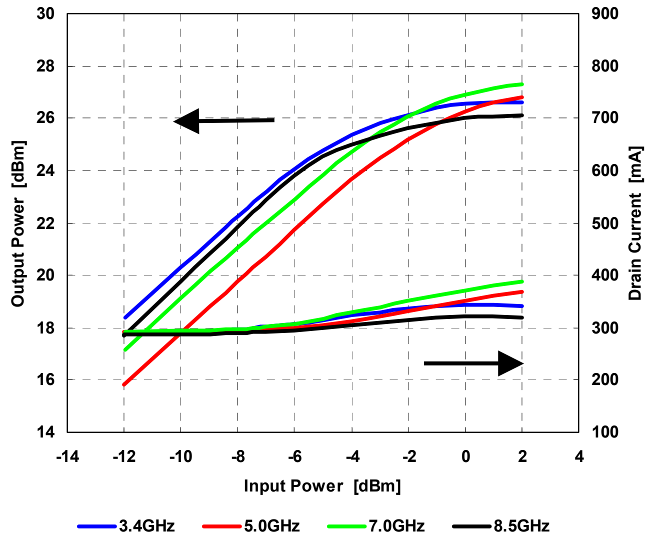
Output Power vs. Frequency

@VDD=6V, IDD(DC)=300mA



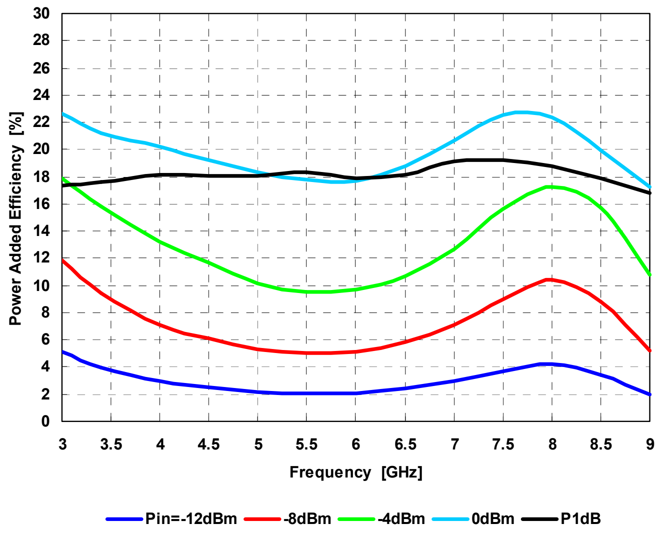
Output Power, Drain Current vs. Input Power

@VDD=6V, IDD(DC)=300mA



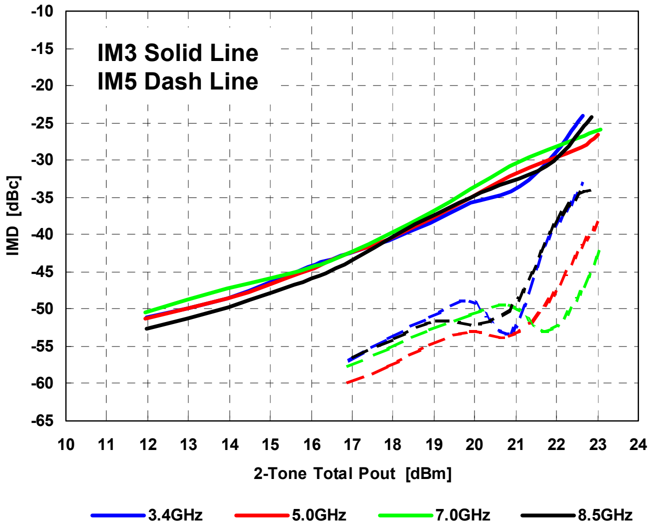
Power Added Efficiency vs. Frequency

@VDD=6V, IDD(DC)=300mA



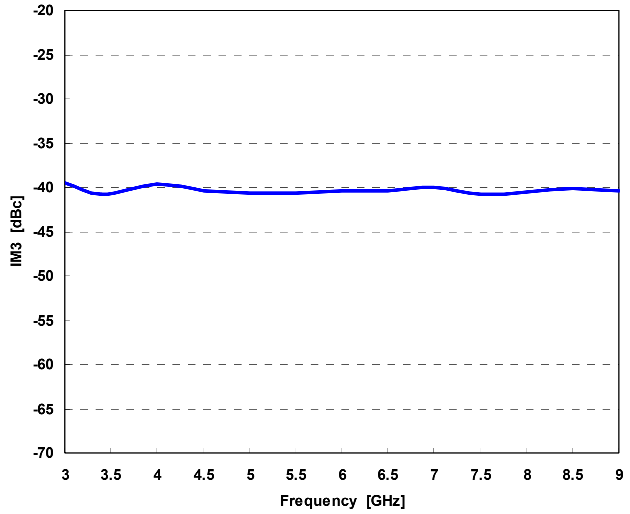
IMD vs. Output Power

@VDD=6V, IDD(DC)=300mA



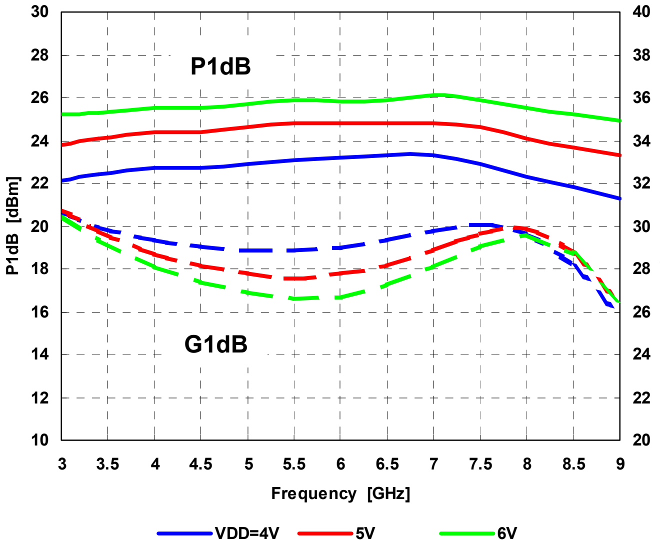
IM3 vs. Frequency

@VDD=6V, IDD(DC)=300mA, @Po=15dBm S.C.L.



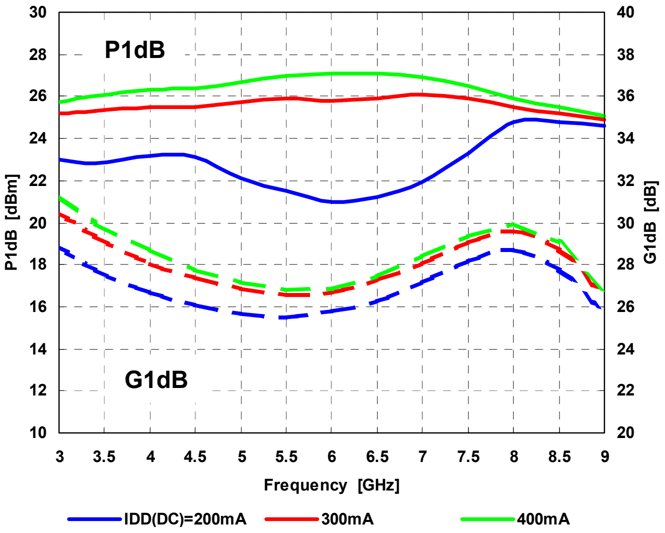
P1dB, G1dB vs. Frequency by Drain Voltage

@IDD(DC)=300mA

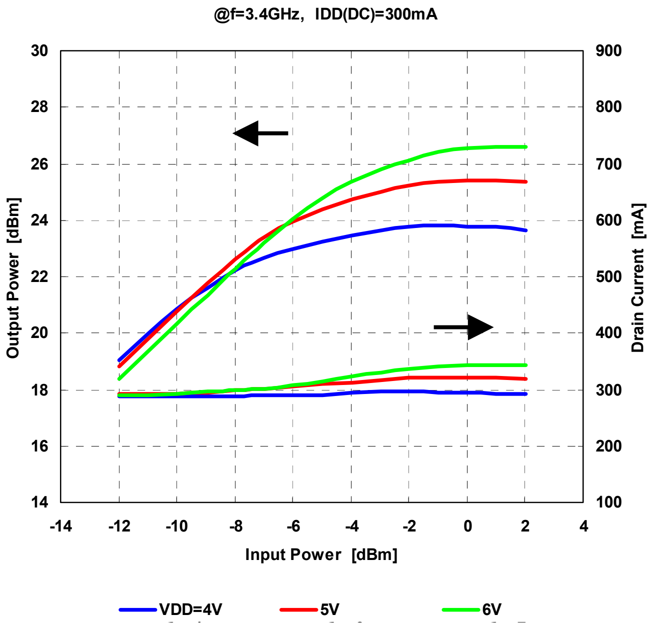


P1dB, G1dB vs. Frequency by Drain Current

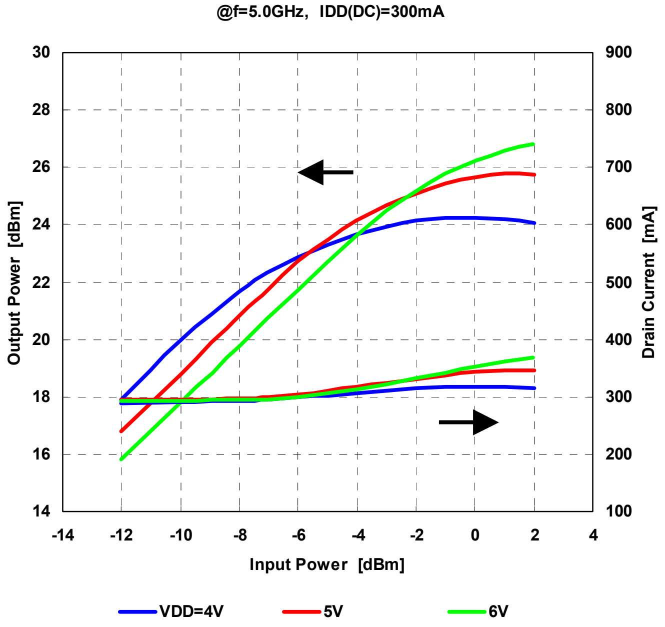
@VDD=6V



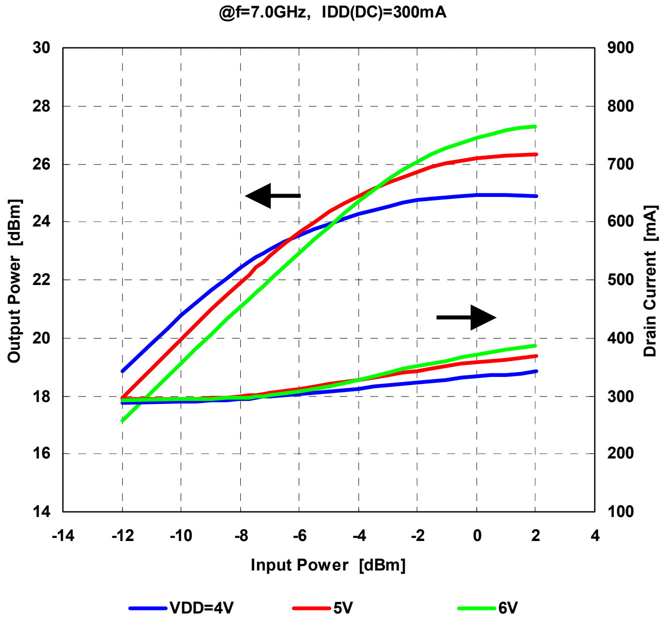
Output Power, Drain Current vs. Input Power by Drain Voltage



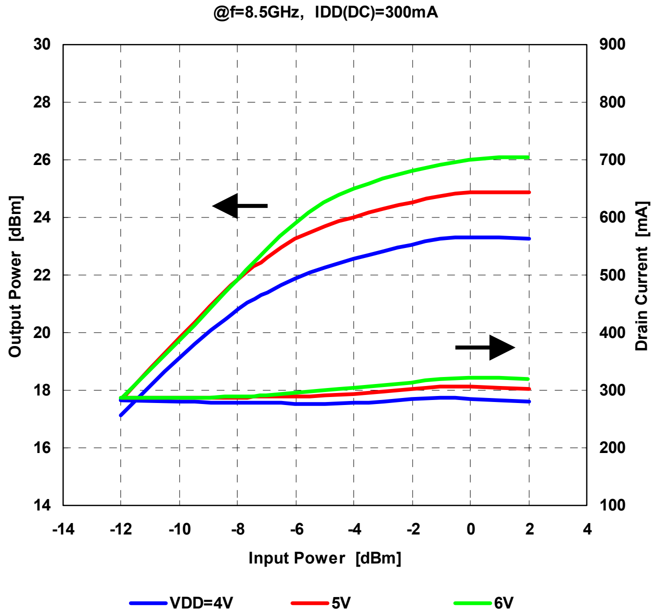
Output Power, Drain Current vs. Input Power by Drain Voltage



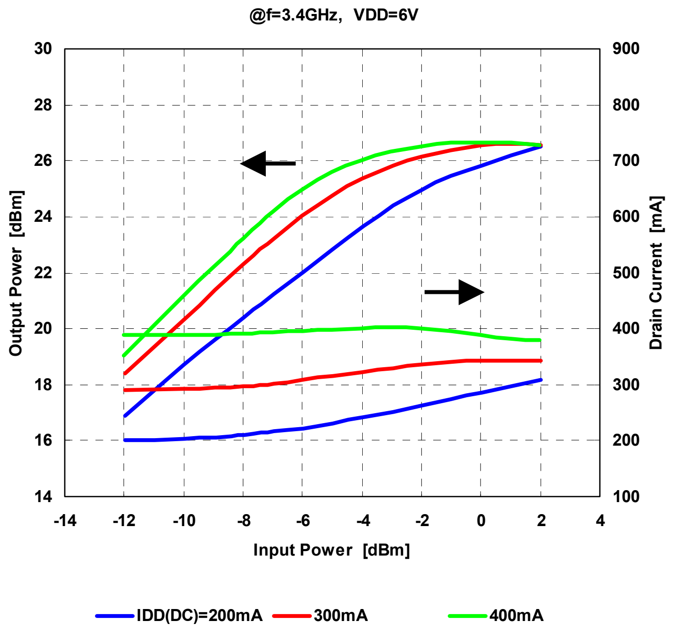
Output Power, Drain Current vs. Input Power by Drain Voltage



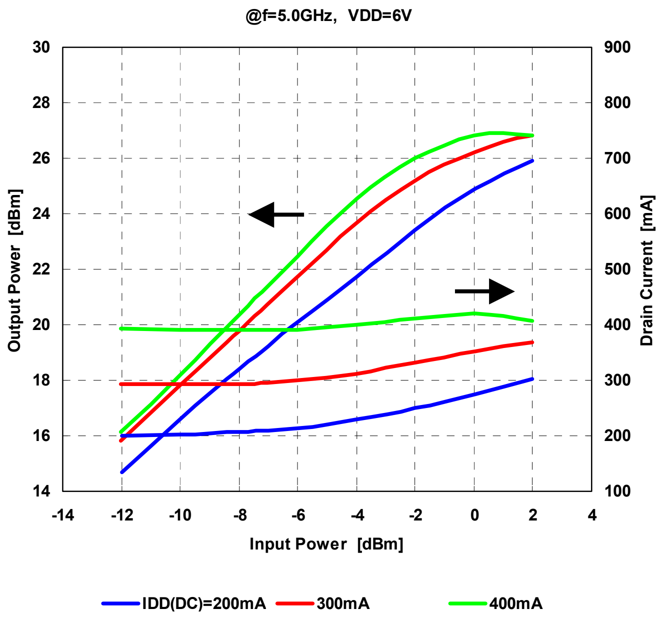
Output Power, Drain Current vs. Input Power by Drain Voltage



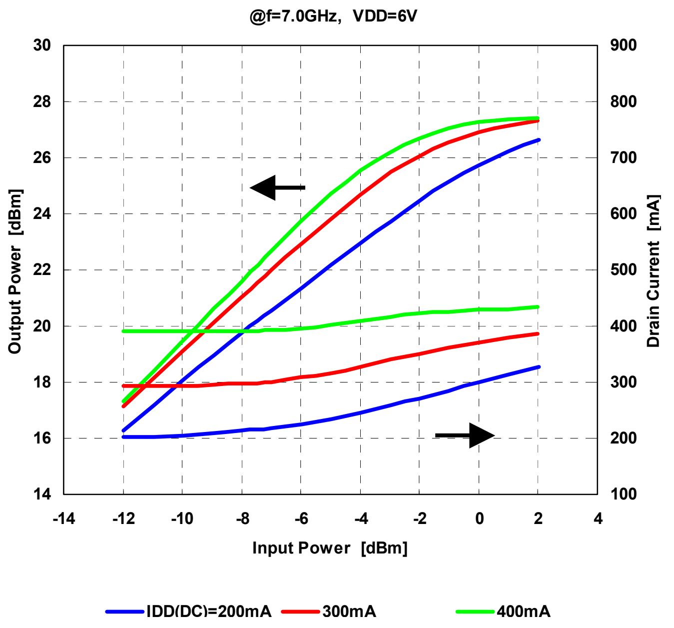
Output Power, Drain Current vs. Input Power by Drain Current



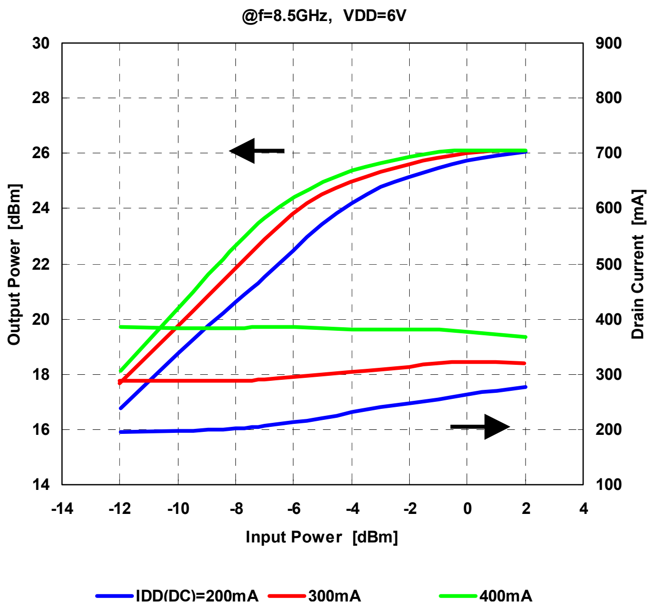
Output Power, Drain Current vs. Input Power by Drain Current



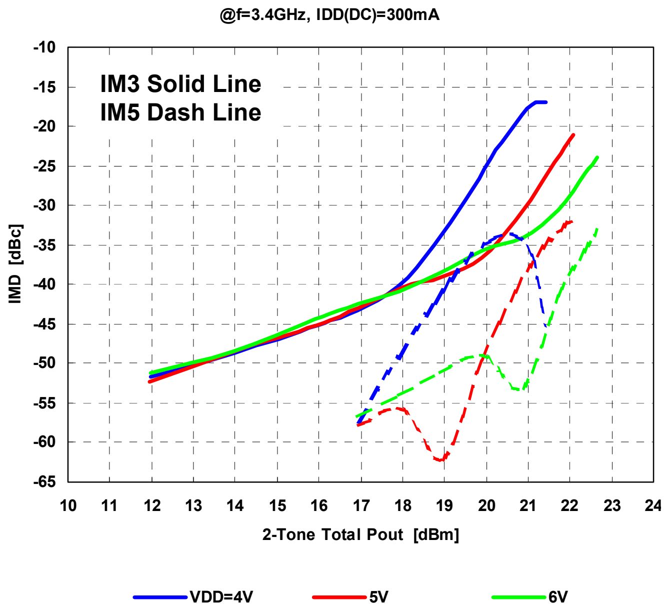
Output Power, Drain Current vs. Input Power by Drain Current



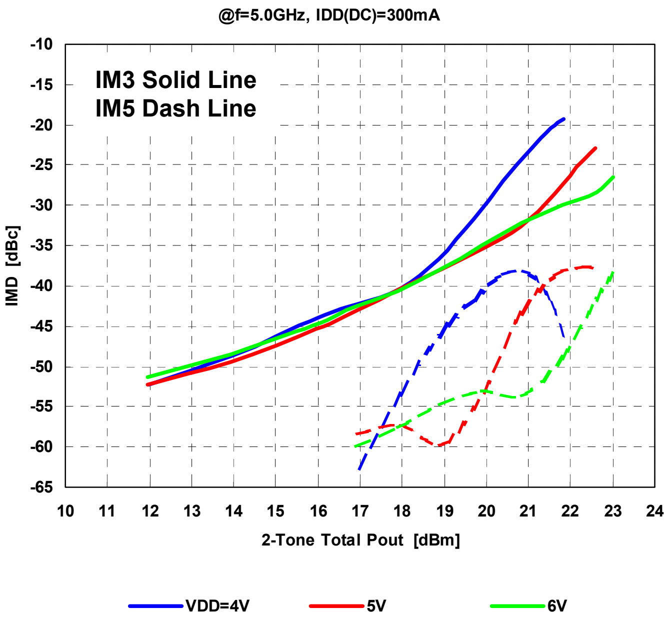
Output Power, Drain Current vs. Input Power by Drain Current



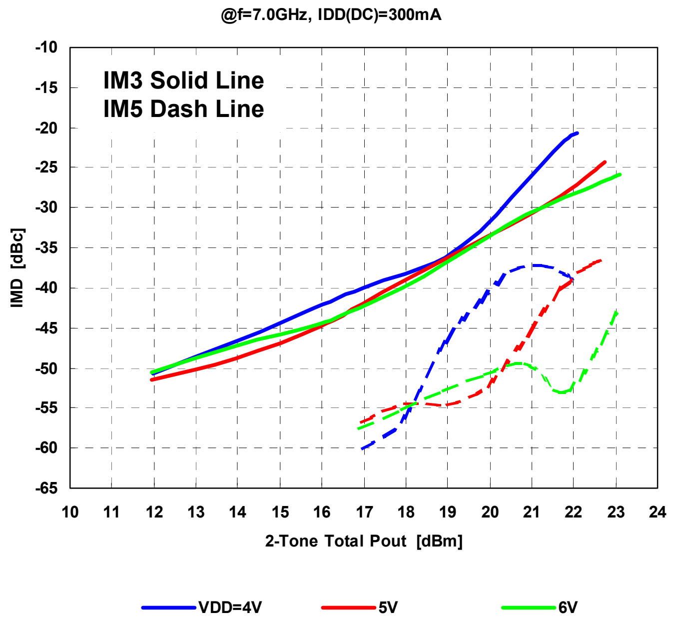
IMD Performance vs. Output Power by Drain Voltage



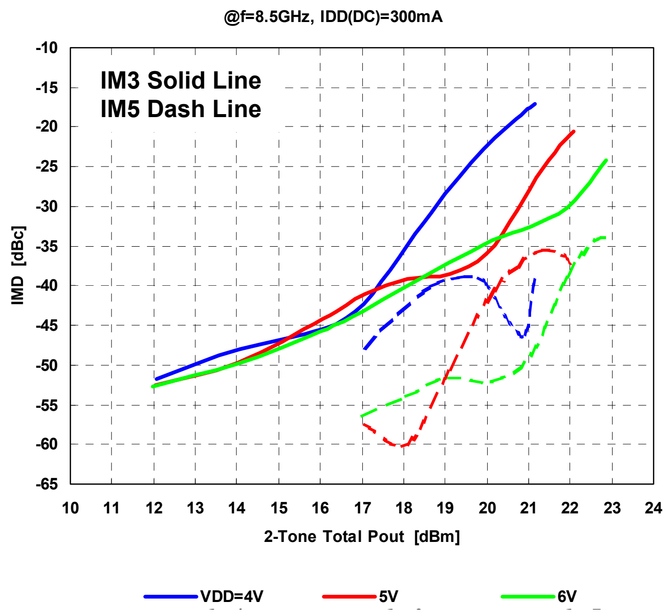
IMD Performance vs. Output Power by Drain Voltage



IMD Performance vs. Output Power by Drain Voltage

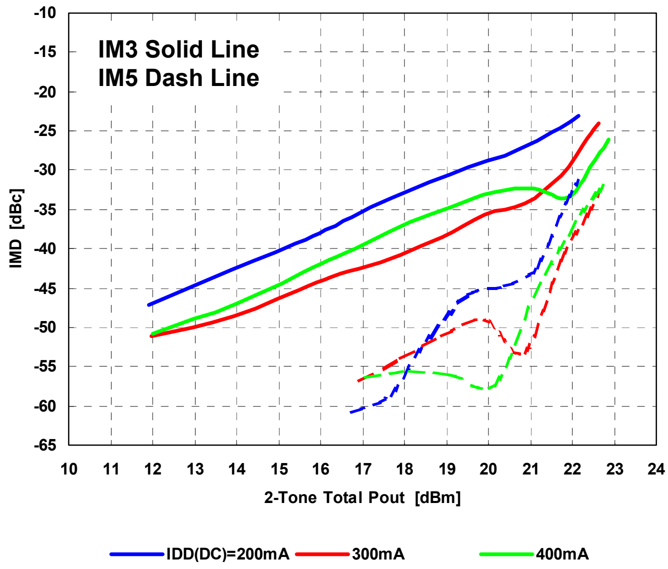


IMD Performance vs. Output Power by Drain Voltage



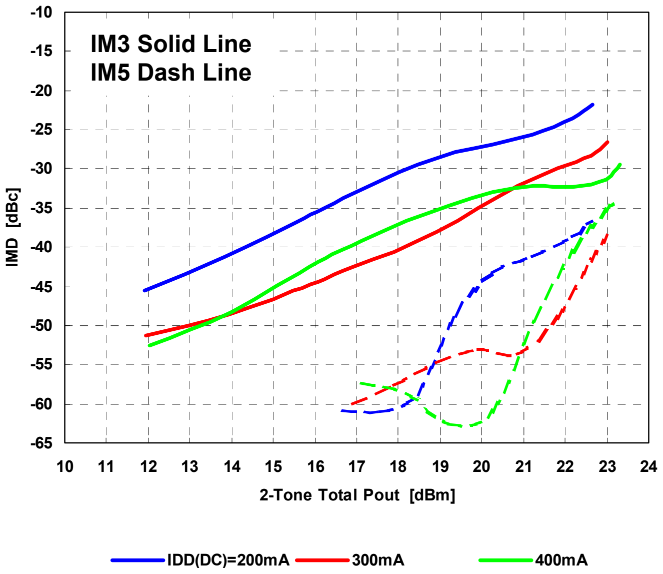
IMD Performance vs. Output Power by Drain Current

@f=3.4GHz, VDD=6V



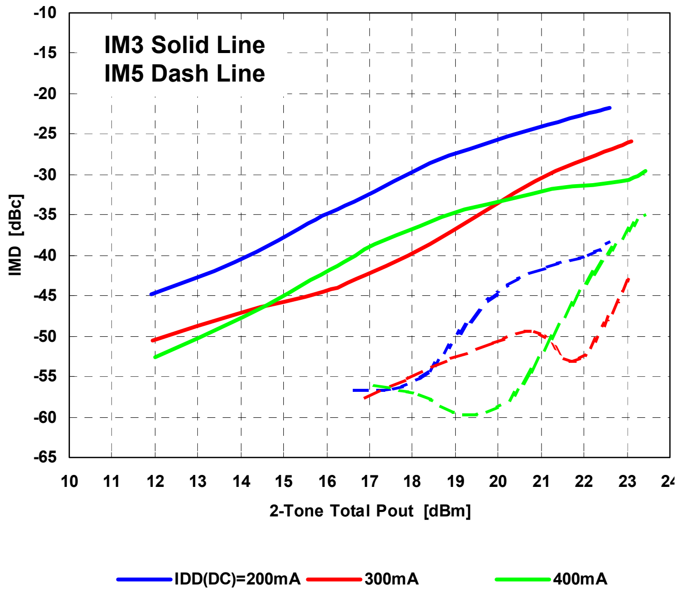
IMD Performance vs. Output Power by Drain Current

@f=5.0GHz, VDD=6V



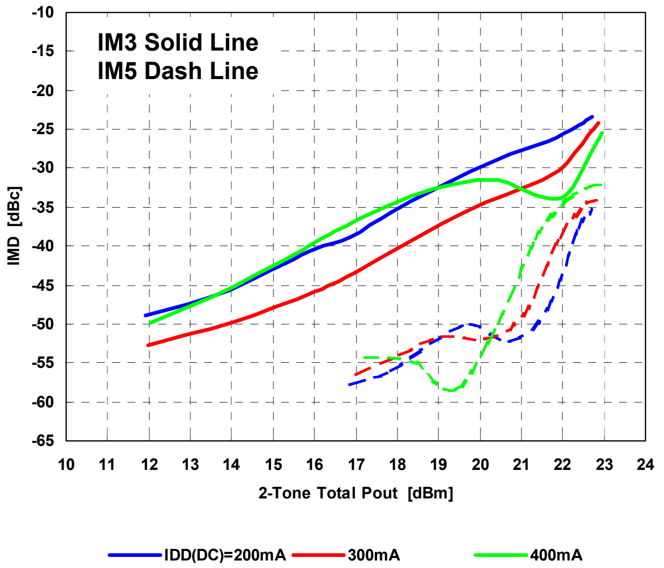
IMD Performance vs. Output Power by Drain Current

@f=7.0GHz, VDD=6V



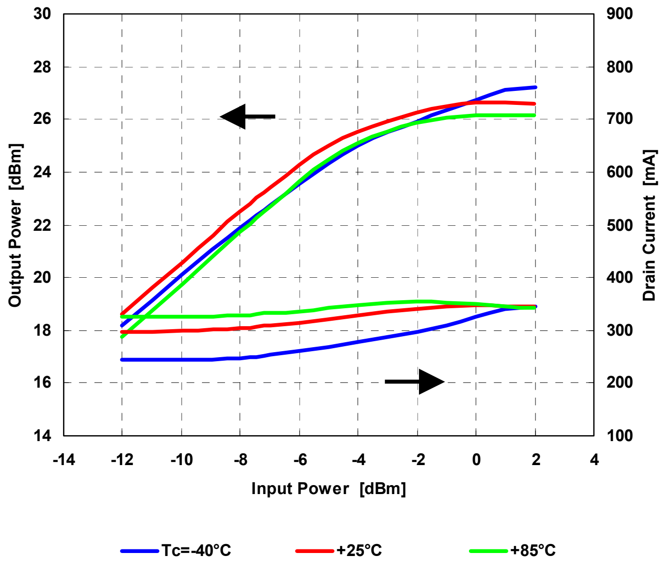
IMD Performance vs. Output Power by Drain Current

@f=8.5GHz, VDD=6V



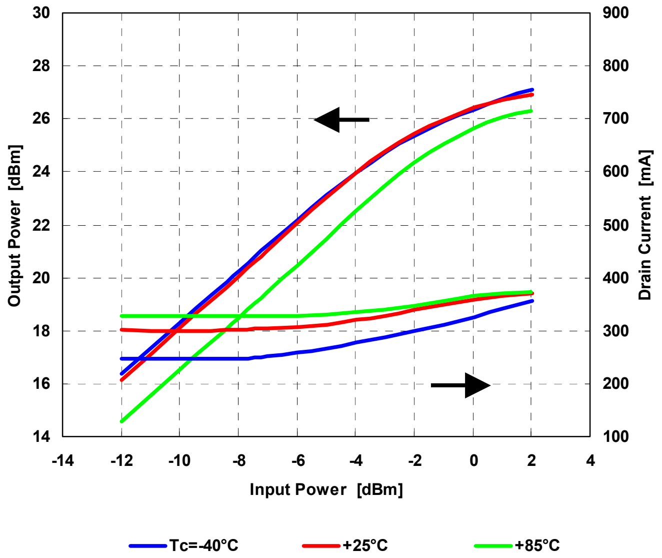
Output Power, Drain Current vs. Input Power by Temperature

@VDD=6V, IDD(DC)=300mA(Tc=25°C), Freq=3.4GHz



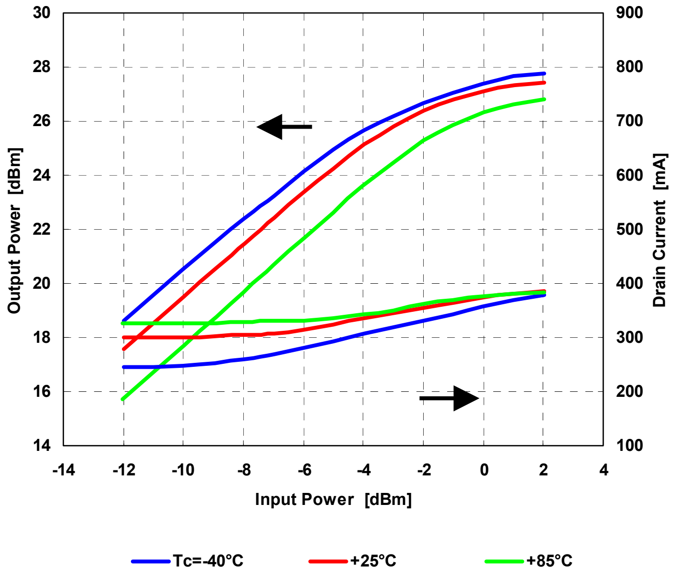
Output Power, Drain Current vs. Input Power by Temperature

@VDD=6V, IDD(DC)=300mA(Tc=25°C), Freq=5.0GHz



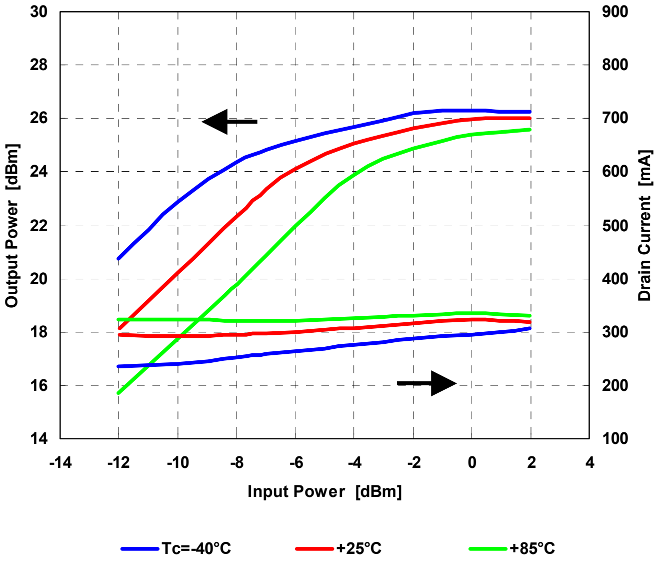
Output Power, Drain Current vs. Input Power by Temperature

@VDD=6V, IDD(DC)=300mA(Tc=25°C), Freq=7.0GHz



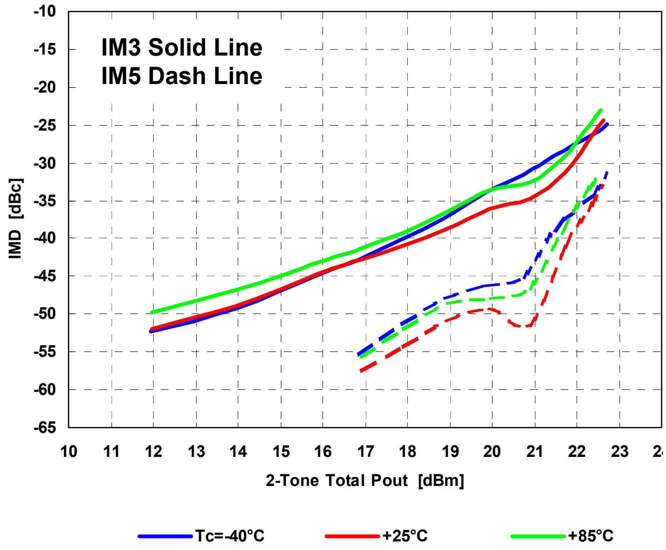
Output Power, Drain Current vs. Input Power by Temperature

@VDD=6V, IDD(DC)=300mA(Tc=25°C), Freq=8.5GHz



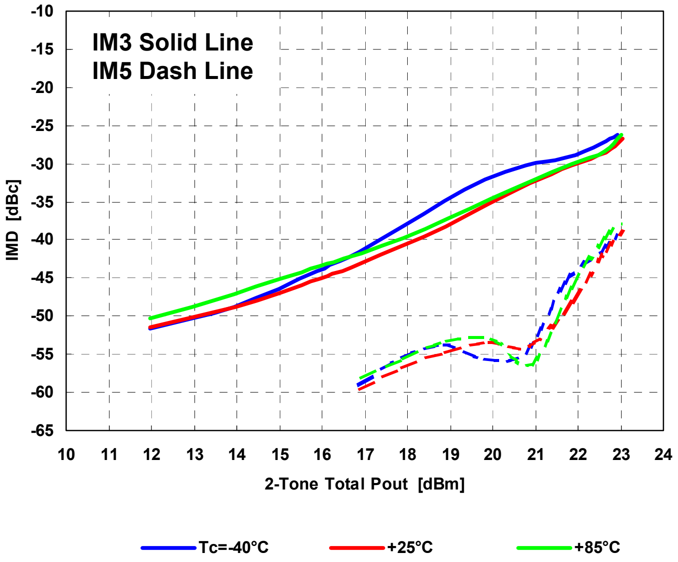
IMD Performance vs. Output Power by Temperature

@VDD=6V, IDD(DC)=300mA(Tc=25°C), Freq=3.4GHz



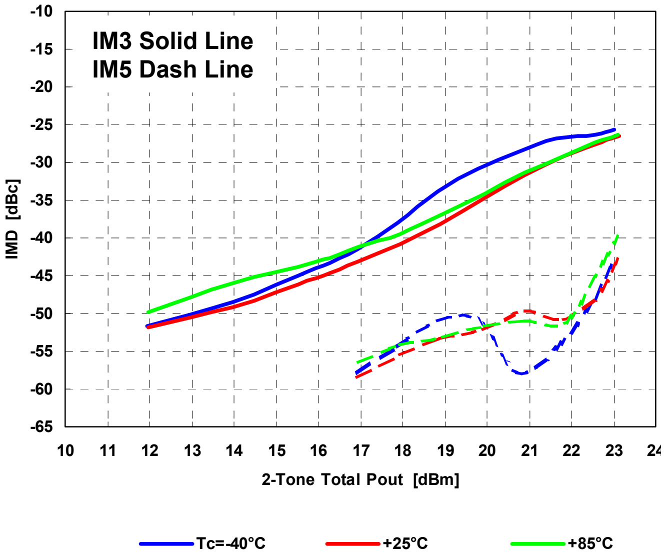
IMD Performance vs. Output Power by Temperature

@VDD=6V, IDD(DC)=300mA(Tc=25°C), Freq=5.0GHz



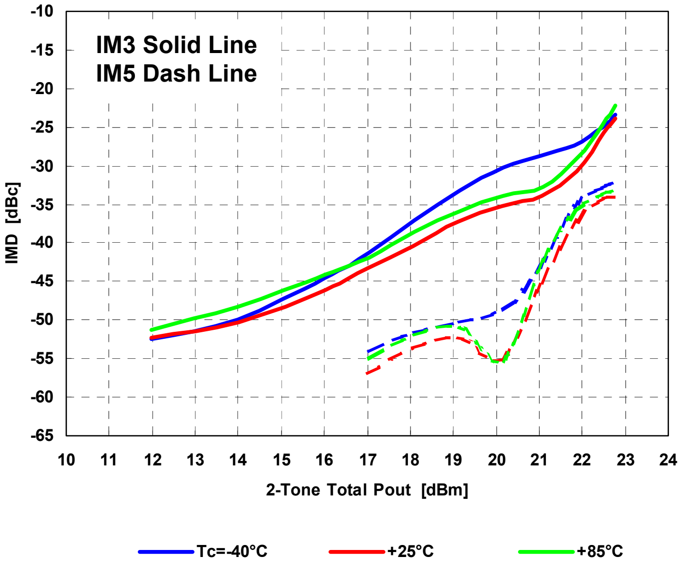
IMD Performance vs. Output Power by Temperature

@VDD=6V, IDD(DC)=300mA(Tc=25°C), Freq=7.0GHz

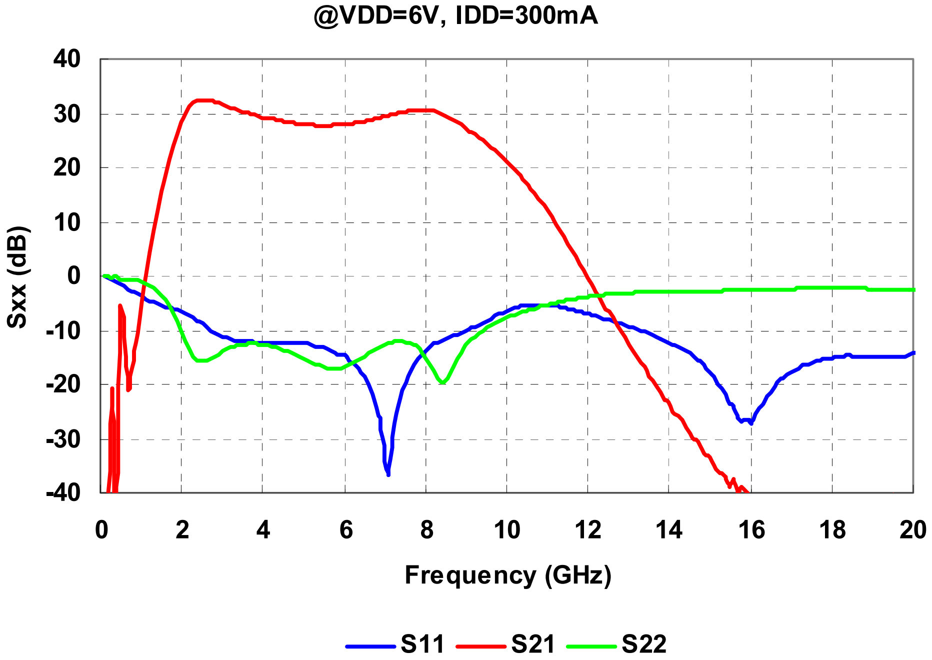


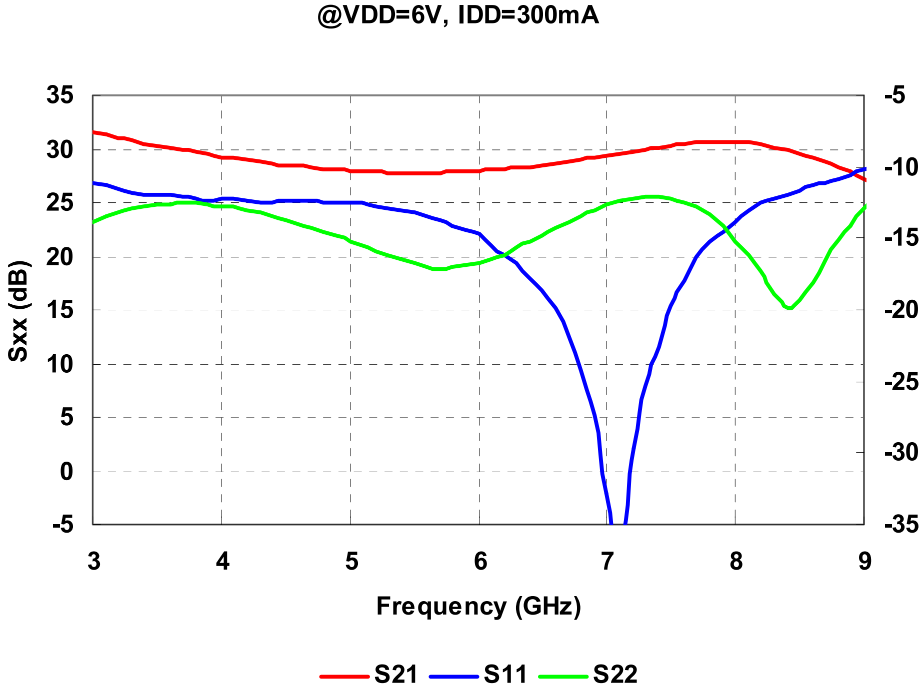
IMD Performance vs. Output Power by Temperature

@VDD=6V, IDD(DC)=300mA(Tc=25°C), Freq=8.5GHz

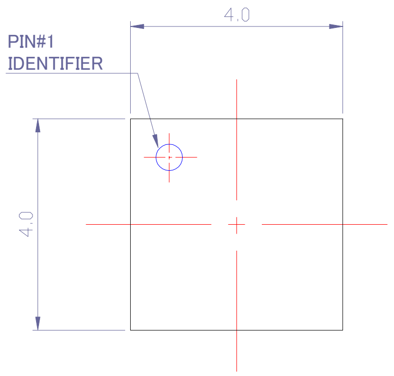


■**S-PARAMETERS**

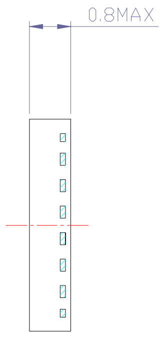




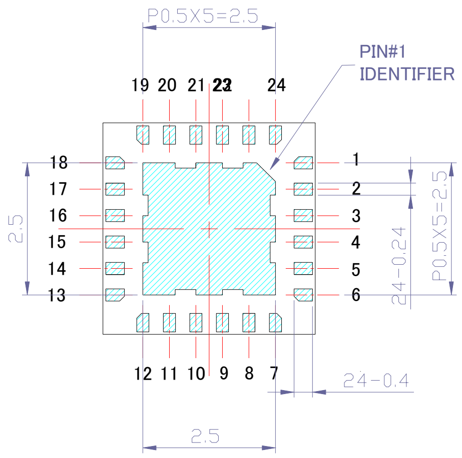
■Package Outline and Pin Assignment



TOP VIEW



SIDE VIEW



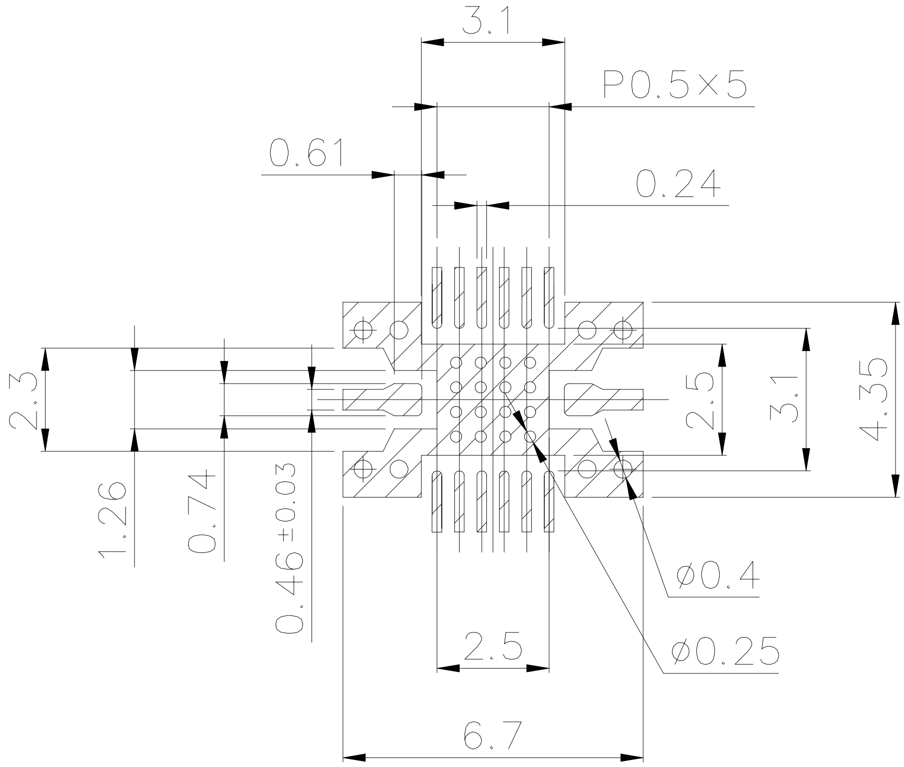
BOTTOM VIEW

PIN Assignment

RF IN : 3,4
RF OUT : 15,16
VGG1 : 24
VGG2 : 22
VGG3 : 20
VDD1 : 7
VDD2 : 9
VDD3 : 11
N/C : 1,2,5,6,8,10,12,13,14,17,18,19,21,23

Unit : mm

■ PCB Pads and Solder-resist Pattern

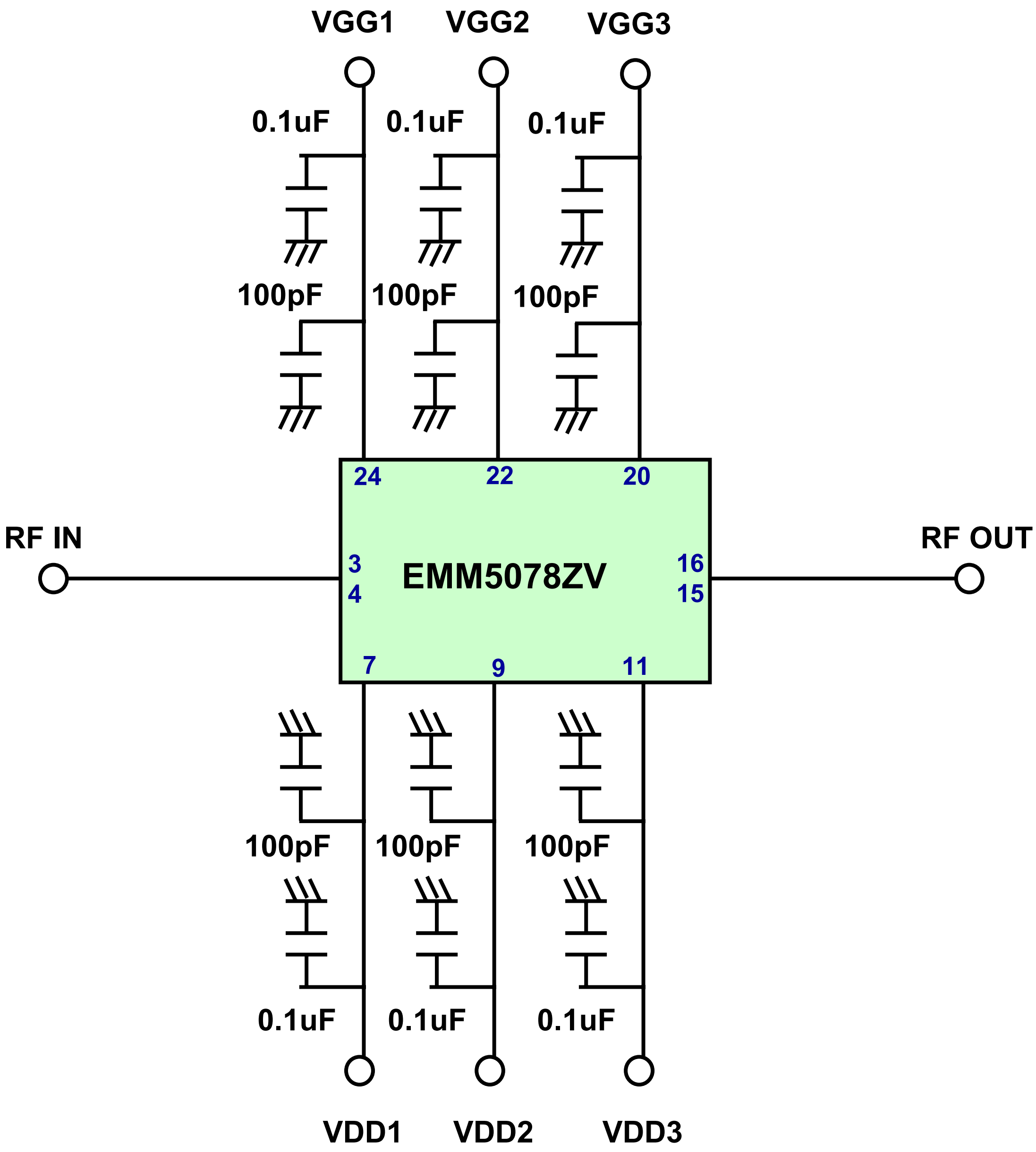


Unit : mm

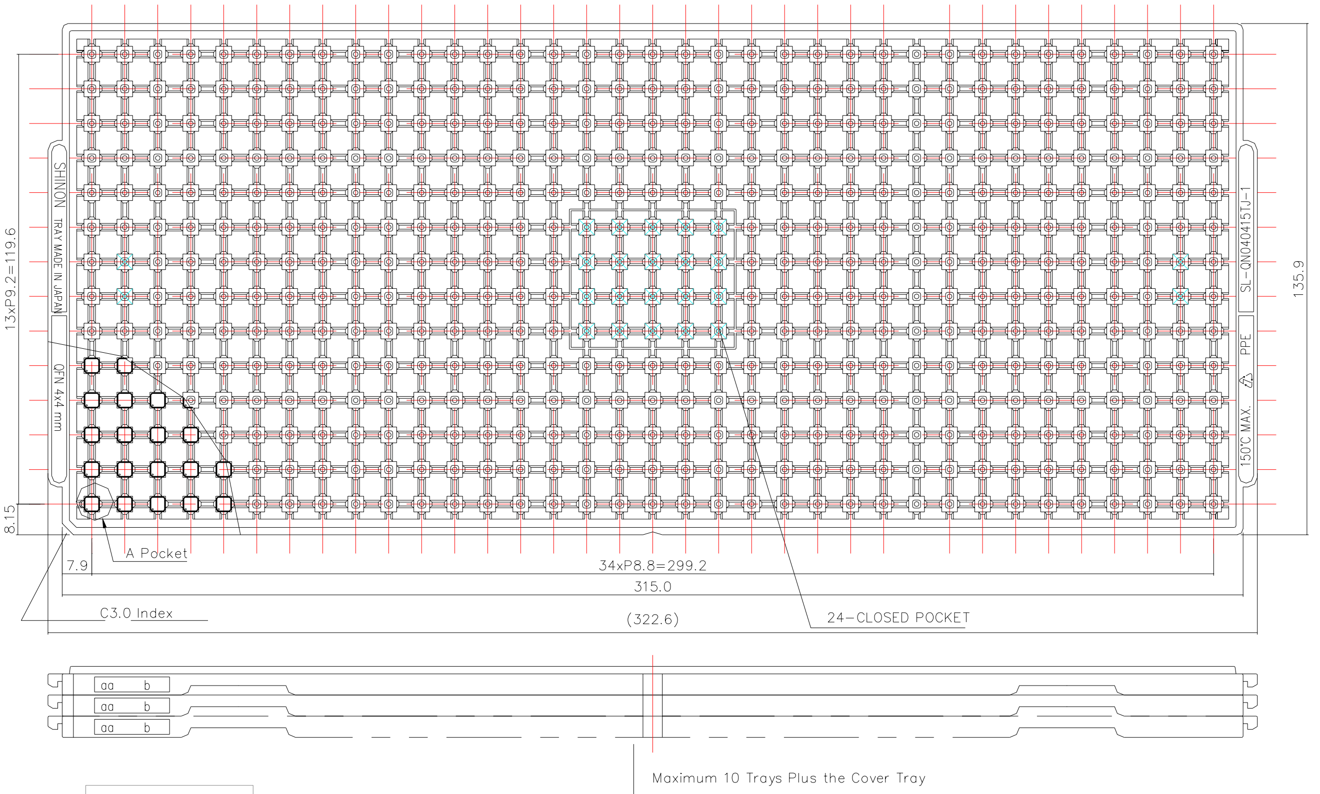
Notes :

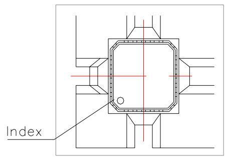
1.LAMINATE : Rogers Corporation RO4003, Thickness t=0.2mm, Cu Foil 18 μm
Finish to copper foil ; Ni 0.1 μm min./Au 0.1±0.08 μm (Both side)

■Recommended Bias Network



■ JDEC Tray Packing (Part No. : EMM5078ZV)

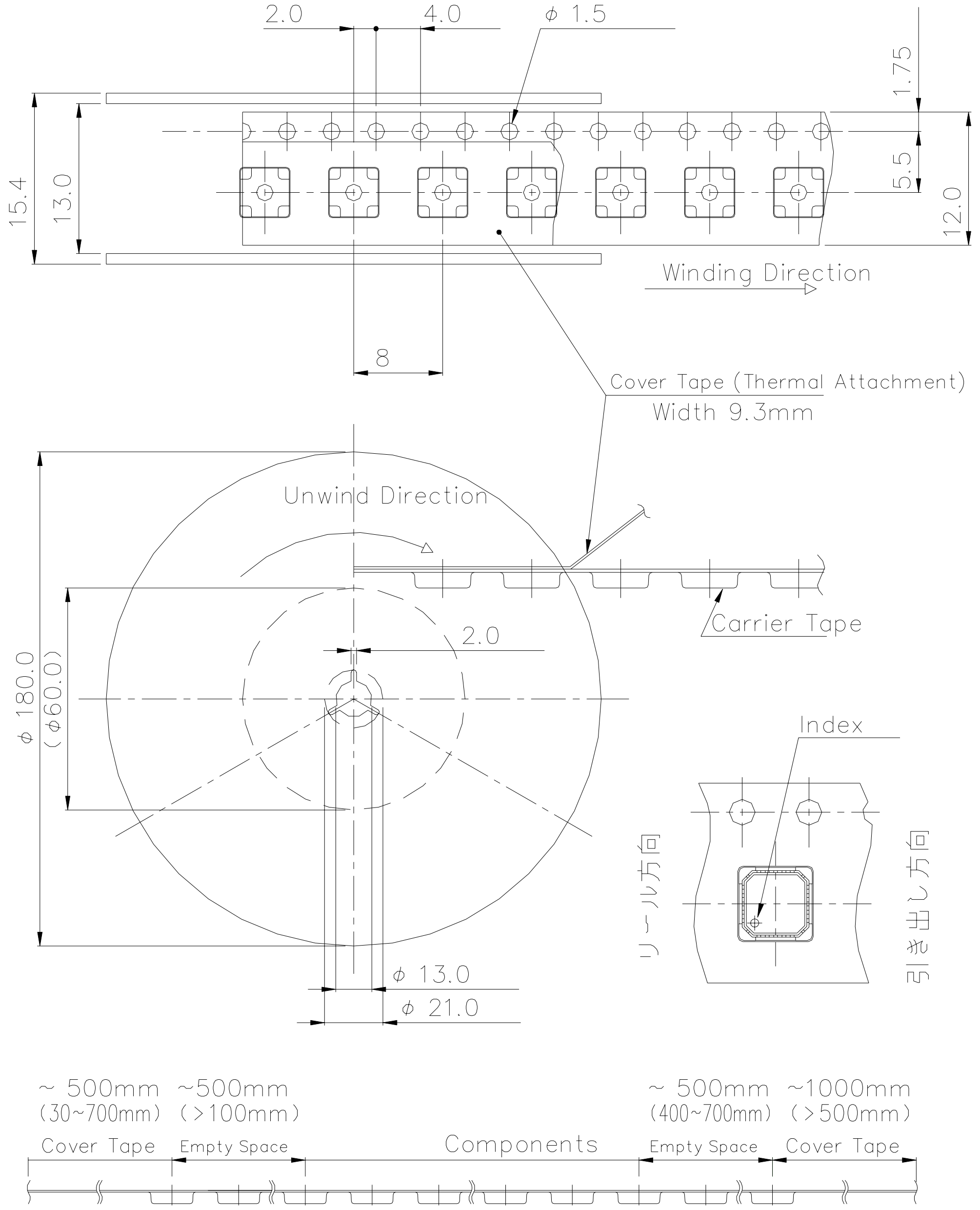




A Pocket in Detail

(1) Maximum Quantity: 490 pcs/ Tray
(2) Maximum Number of Trays in one Pack: 10 Trays
(3) Tray Materials: PPE (SPO-2114)

■ Tape and Reel Packing (Part No. : EMM5078ZVT)



(1) Quantity: 500pcs/Tape
(2) Tape Material: Conductive A-PET
(3) Reel Material: Conductive PS

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

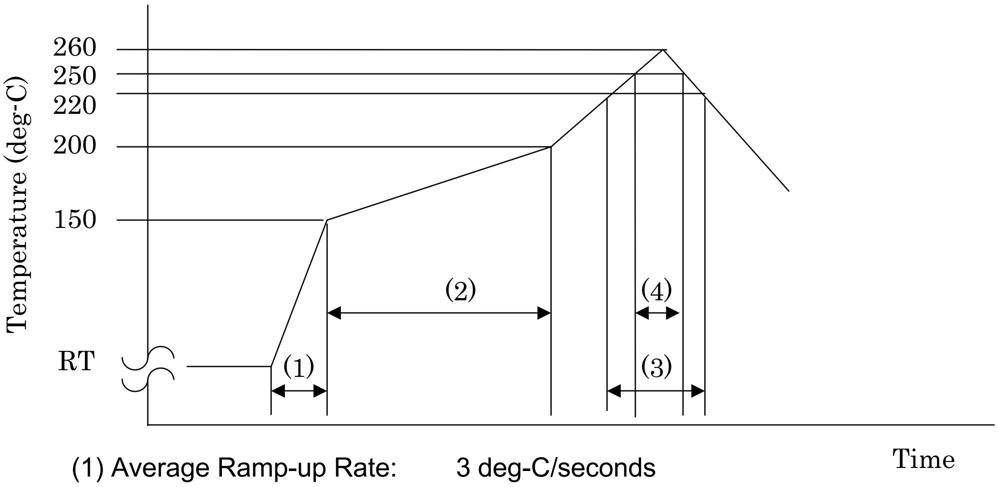
Mounting Condition

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:



(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.