



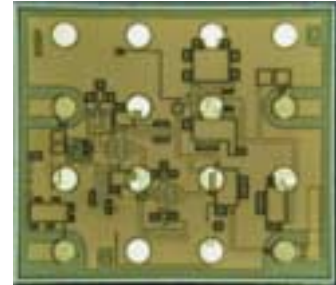
Preliminary

# ES/SMM5724XZ

24 – 30GHz Low Noise/ Driver Amplifier MMIC

## FEATURES

- Wafer Level Chip Size Package with Solder Ball
- Low Noise Figure : NF=3.2dB (typ.)
- High Associated Gain : Gas=22dB (typ.)
- +4dBm Input Third Order Intercept Point (IIP3)
- Impedance Matched Z<sub>in</sub>/ Z<sub>out</sub> = 50ohm



## DESCRIPTION

The ES/SMM5724XZ is a Low Noise/ Driver Amplifier MMIC for applications in the 24 to 30GHz frequency range. This product is well suited for satellite communications, radio link and wireless communications where low noise characteristics is required. The flip chip die can be used in solder reflow process.

Sumitomo Electric Device Innovations's stringent Quality Assurance Program assures the highest reliability and consistent performance.

## ABSOLUTE MAXIMUM RATING

Item	Symbol	Rating	Unit
Drain Voltage	V <sub>DD</sub>	6	V
Gate Voltage (for Gain Control)	V <sub>GC</sub>	-1	V
Input RF Power	P <sub>in</sub>	0	dBm
Storage Temperature	T <sub>stg</sub>	-40 to +125	deg.C

## RECOMMENDED OPERATING CONDITIONS

Item	Symbol	Conditions	Unit
Drain Voltage	V <sub>DD</sub>	5	V
Gate Voltage (for Gain Control)	V <sub>GC</sub>	-0.5 to 0	V
Input RF Power	P <sub>in</sub>	<= 0	dBm
Operating Case Temperature	T <sub>c</sub>	-40 to +85	deg.C

## ELECTRICAL CHARACTERISTICS (Case Temperature T<sub>c</sub>=25deg.C)

Item	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
RF Frequency Range	f <sub>RF</sub>	V <sub>DD</sub> =5V	24		30	GHz
Associated Gain @V <sub>gc</sub> =-0.2V	Gas	I <sub>DD</sub> =80mA *1	18	22	---	dB
Gain Control Range @V <sub>gc</sub> =0 to -0.5V	Δ Gain		---	10	---	dB
Noise Figure	NF		---	3.2	---	dB
Input 3rd.Order Intercept Point	IIP3		---	4	---	dBm
Output Power at 1dB G.C.P.	P1dB		---	14	---	dBm
Input Return Loss	RL <sub>in</sub>		---	8	---	dB
Output Return Loss	RL <sub>out</sub>		---	10	---	dB
V <sub>gc</sub> Voltage	V <sub>gc</sub>		-0.5	---	0.0	V

\*1. Adjust V<sub>gc</sub> voltage between 0 to -0.5V to set to I<sub>DD</sub>=80mA

<b>ESD</b>	Class 0	Up to 250V
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Note: Based on JEDEC JESD22-A114-C

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

Part Number	Order Unit	Packing
SMM5724XZ	100 pcs.	100pcs. / Tray = 100pcs. / Packing
SMM5724ZXT	500 pcs.	500pcs. / Reel = 500pcs. / Packing



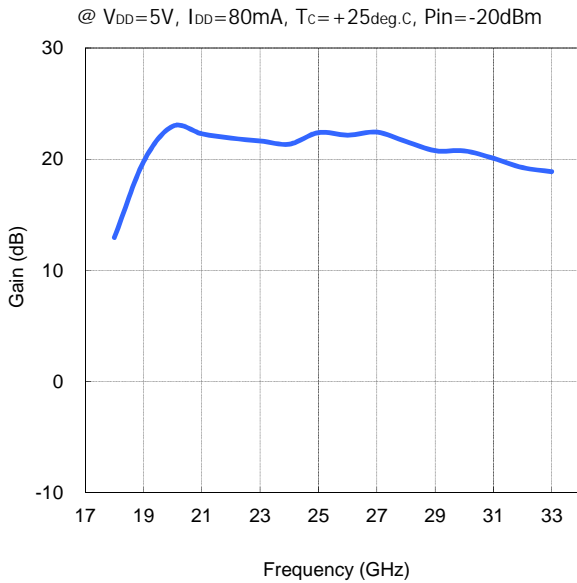


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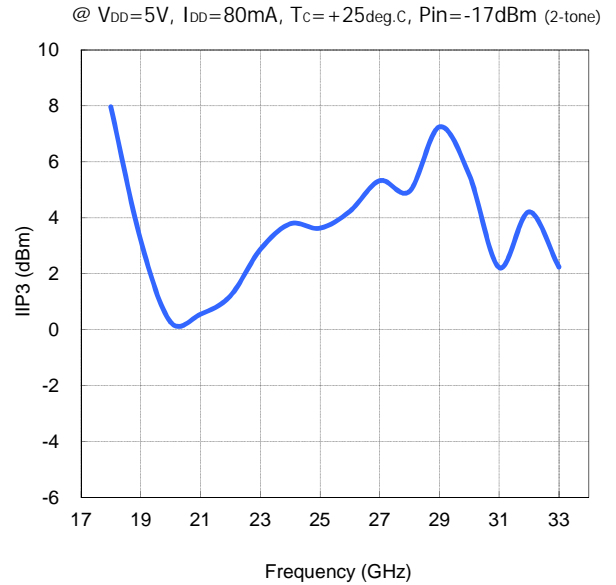
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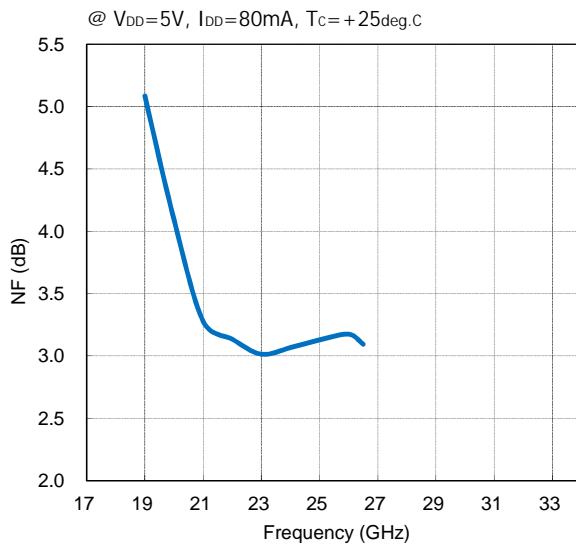
### Associated Gain vs. Frequency



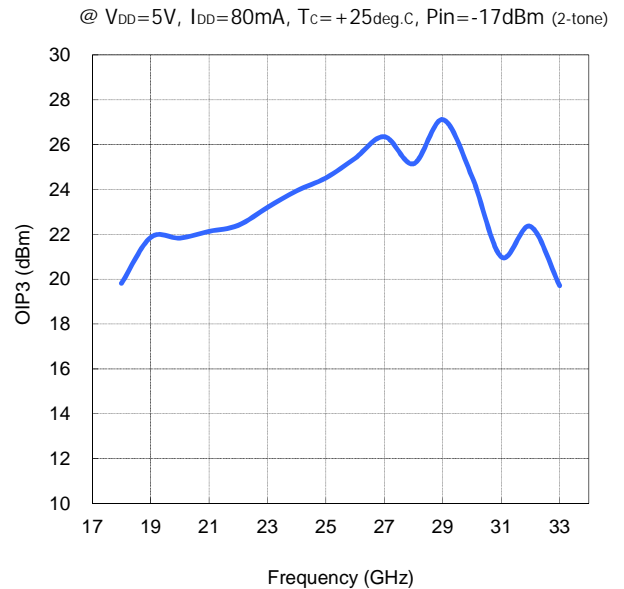
### Input IP3 vs. Frequency



### Noise Figure vs. Frequency



### Output IP3 vs. Frequency





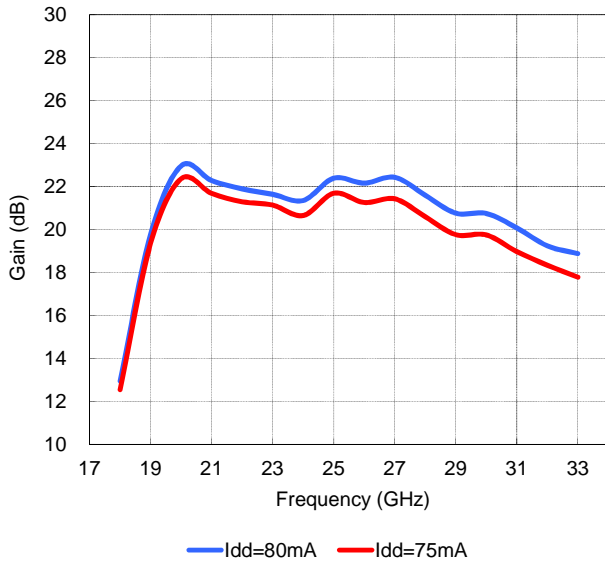
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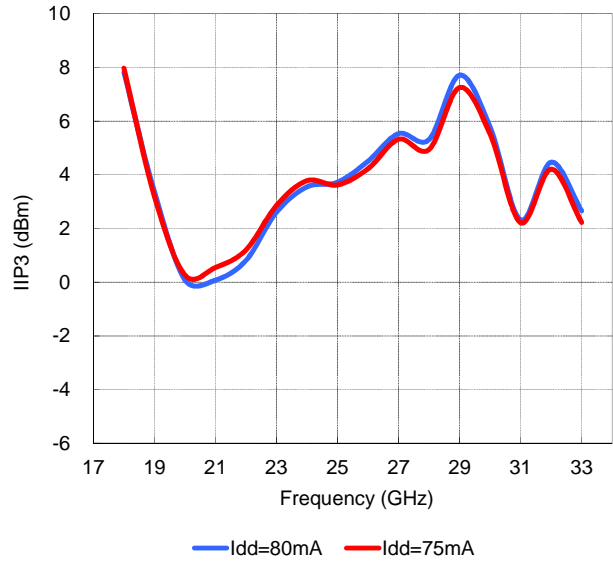
### Associated Gain vs. IDD

@  $V_{DD}=5V$ ,  $T_c=+25deg.C$ ,  $P_{in}=-20dBm$



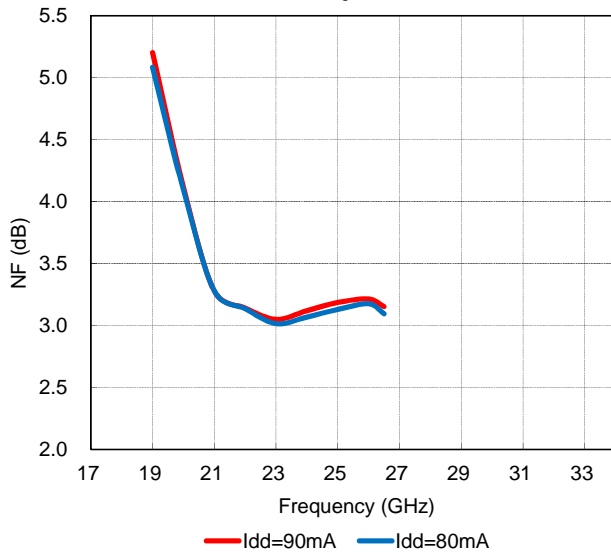
### Input IP3 vs. IDD

@  $V_{DD}=5V$ ,  $T_c=+25deg.C$ ,  $P_{in}=-17dBm$  (2-tone)



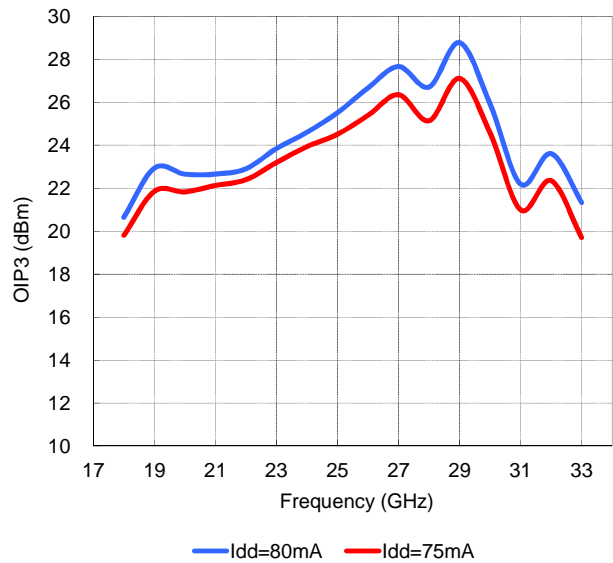
### Noise Figure vs. IDD

@  $V_{DD}=5V$ ,  $T_c=+25deg.C$



### Output IP3 vs. IDD

@  $V_{DD}=5V$ ,  $T_c=+25deg.C$ ,  $P_{in}=-17dBm$  (2-tone)



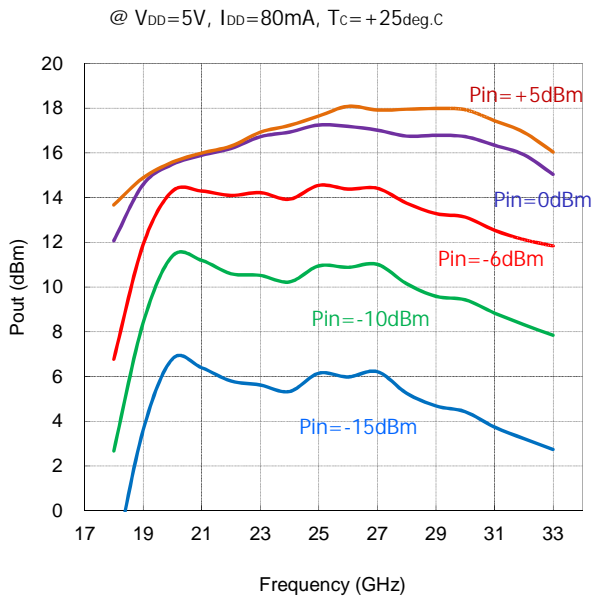


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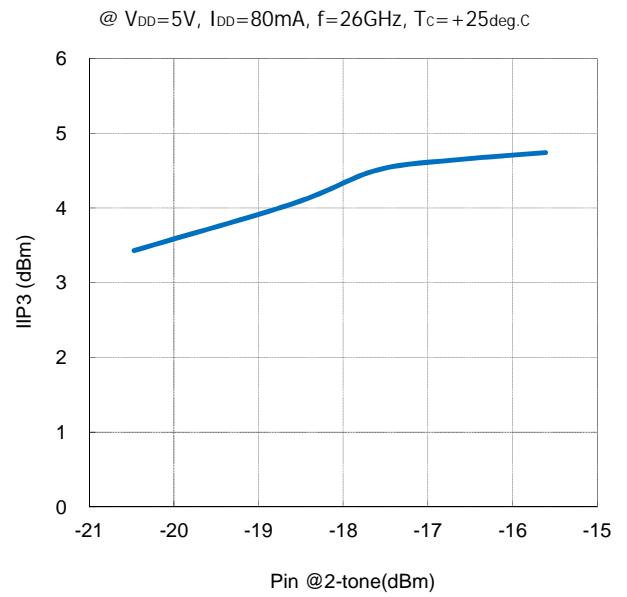
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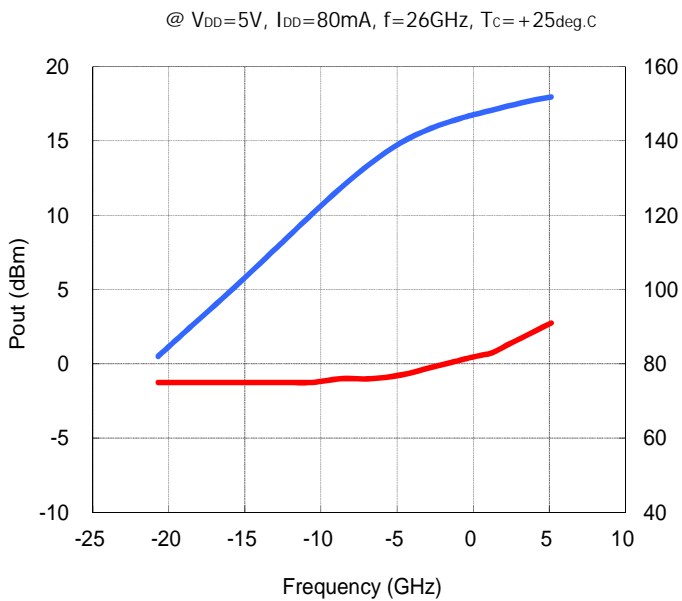
### Pout vs. FREQUENCY



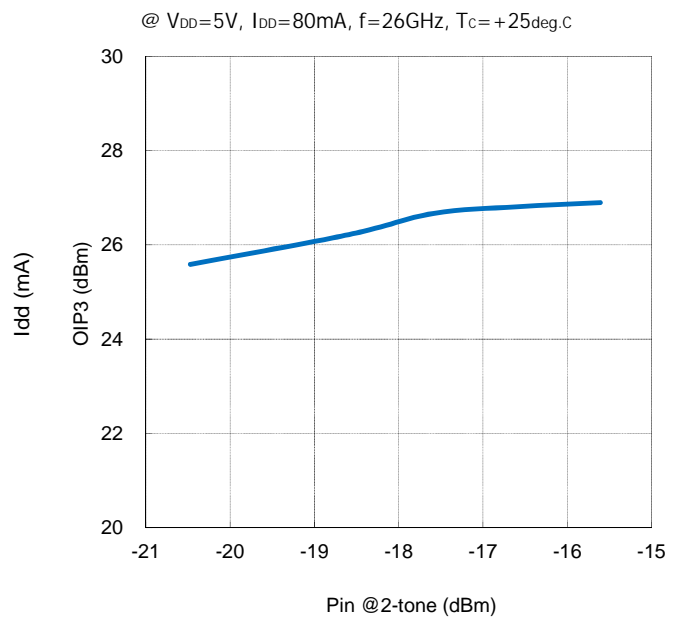
### Input IP3 vs. Pin



### Pout, Idd vs. Pin



### Output vs. Pin





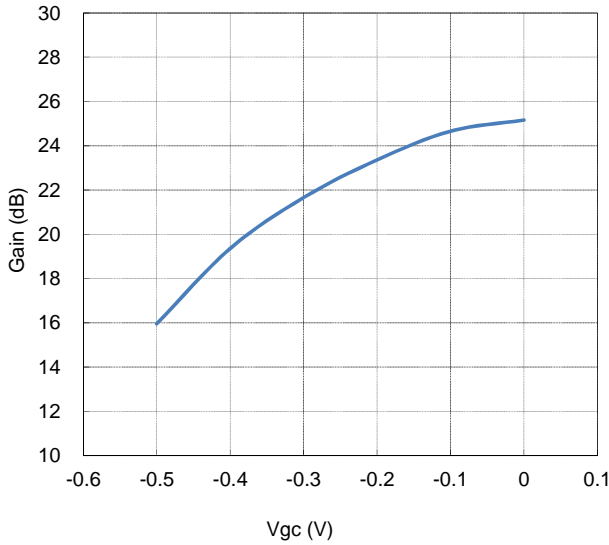
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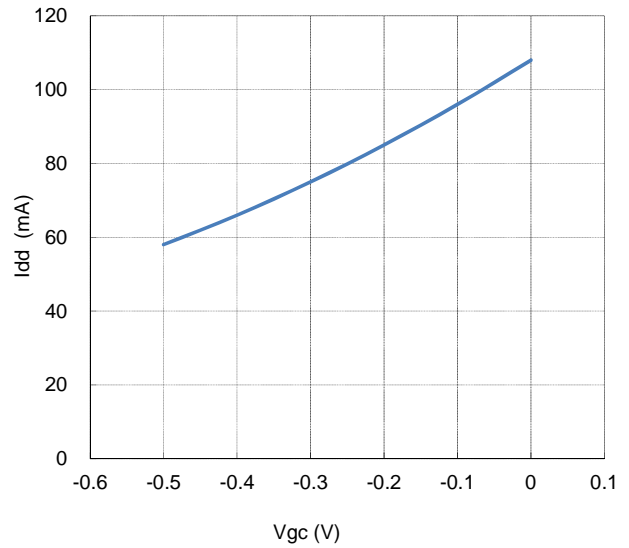
**Associated Gain vs. Vgc**

@  $V_{DD}=5V$ ,  $f=26GHz$ ,  $P_{in}=-20dBm$ ,  $T_c=+25deg.C$



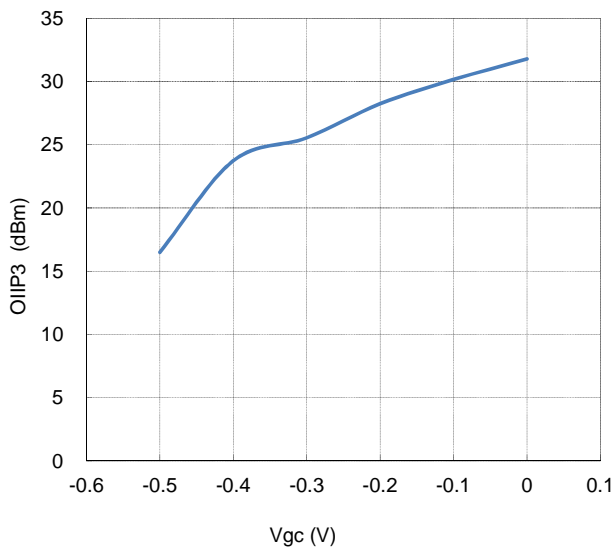
**Current consumption vs. Vgc**

@  $V_{DD}=5V$ ,  $f=26GHz$ ,  $P_{in}=-20dBm$ ,  $T_c=+25deg.C$



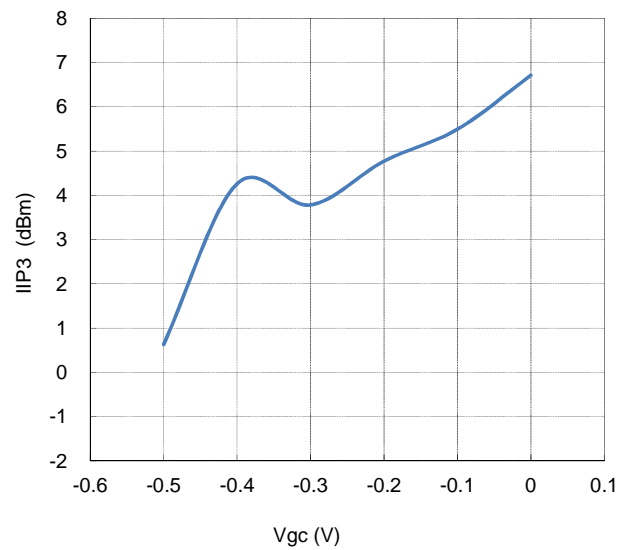
**Output IP3 vs. Vgc**

@  $V_{DD}=5V$ ,  $f=26GHz$ ,  $P_{in}=-17dBm(2-tone)$ ,  $T_c=+25deg.C$



**Input IP3 vs. Vgc**

@  $V_{DD}=5V$ ,  $f=26GHz$ ,  $P_{in}=-17dBm(2-tone)$ ,  $T_c=+25deg.C$



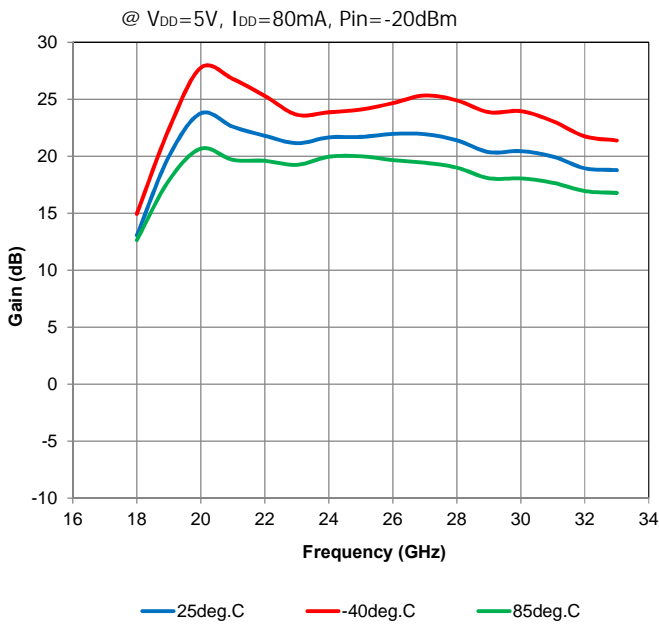


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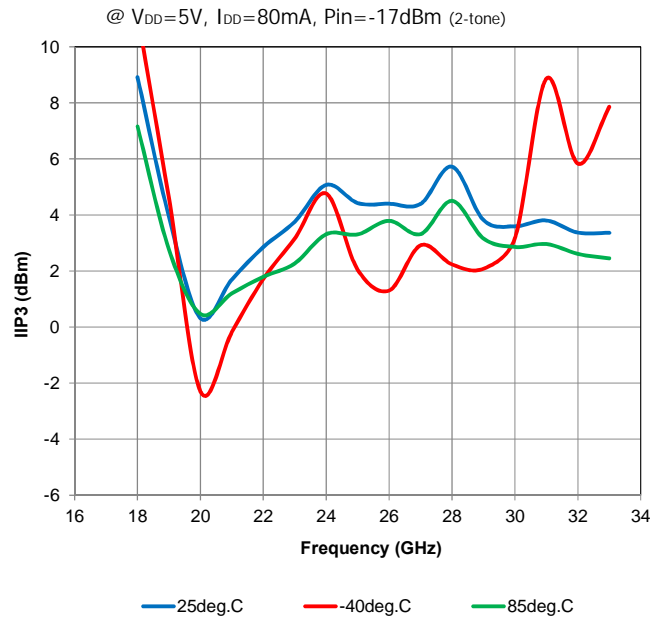
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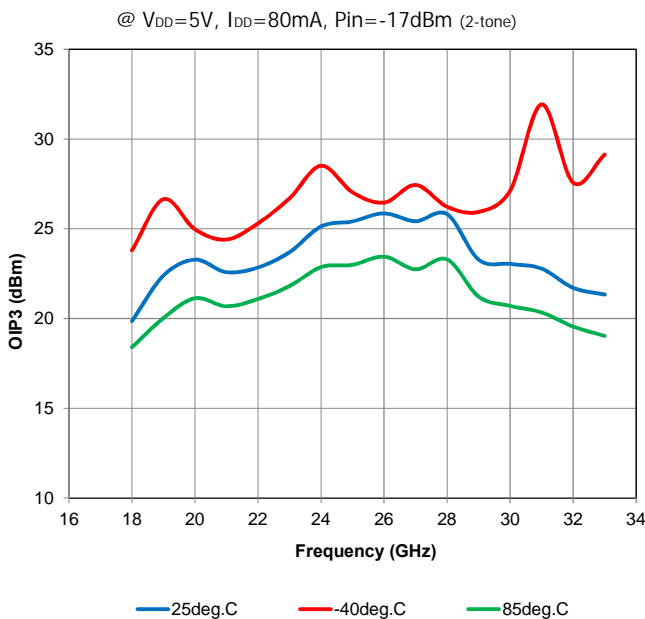
## Associated Gain vs. Temperature



## Input IP3 vs. Temperature

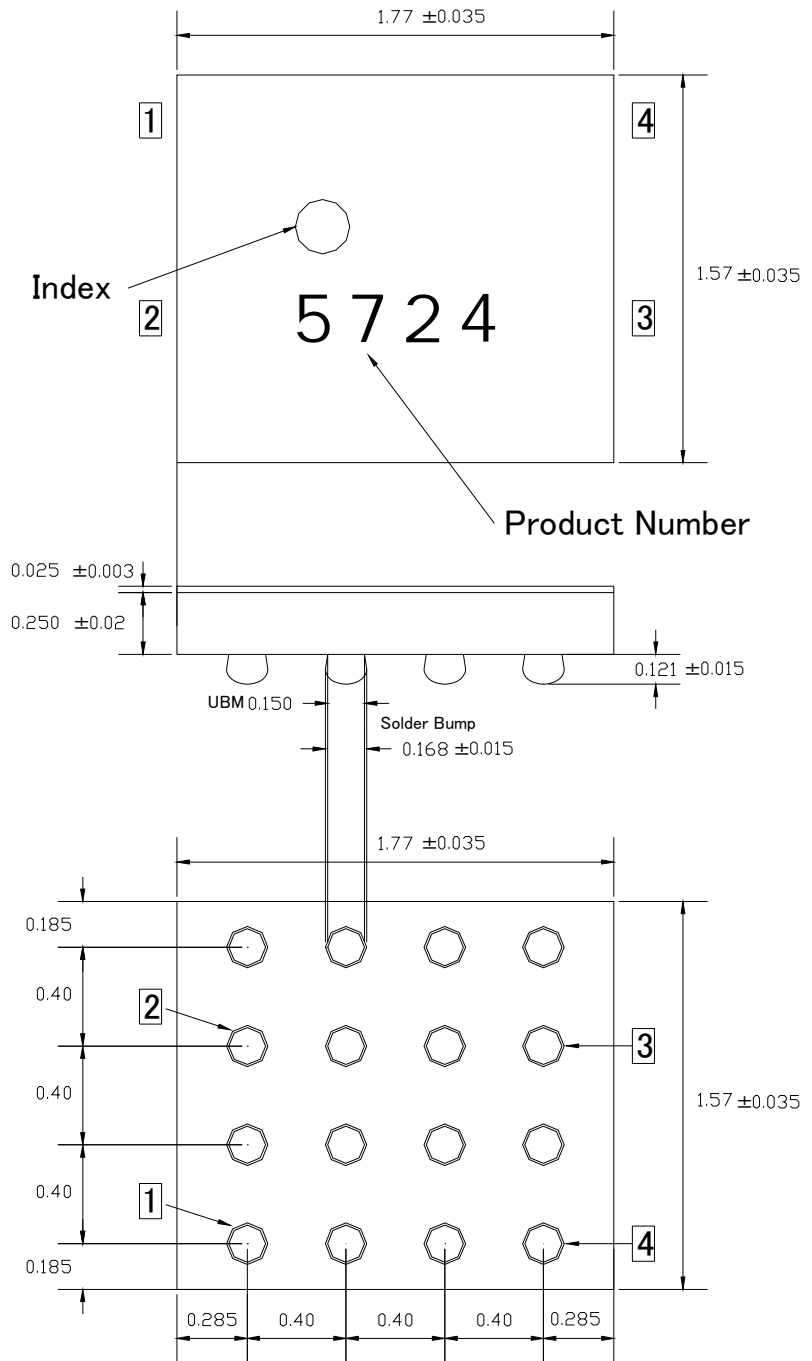


## Output IP3 vs. Temperature

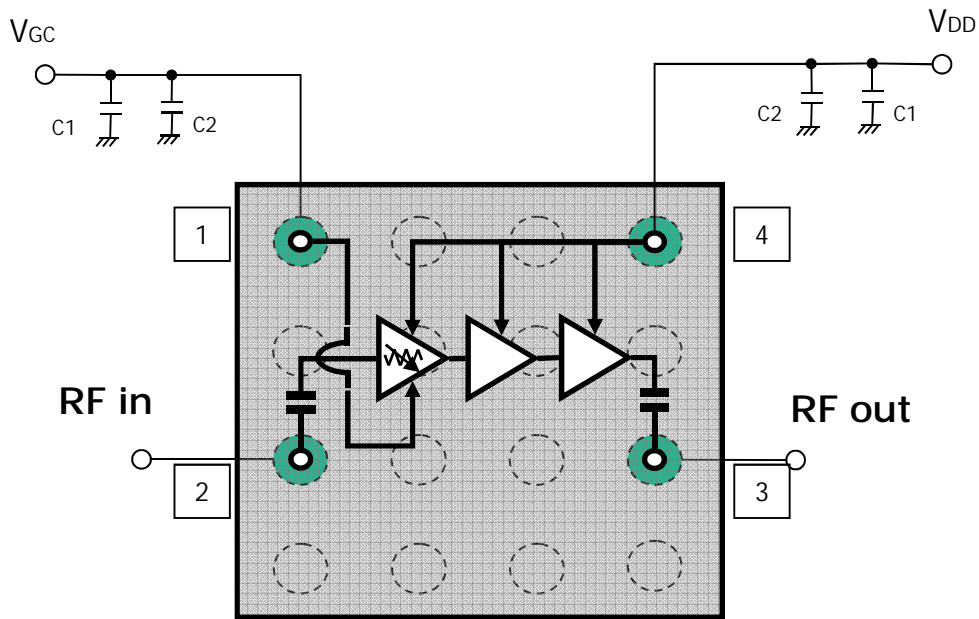


■ Chip outline and Functional Diagram

Die Size : 1.77mm x 1.57mm  
 Die Thickness : 275um  
 Solder ball diameter : 168um  
 Solder ball thickness : 121um  
 Pad Pitch : 400um  
 Alloy of solder ball : Sn-3.0Ag-0.5Cu



■ Typical Application



Pin Assignment

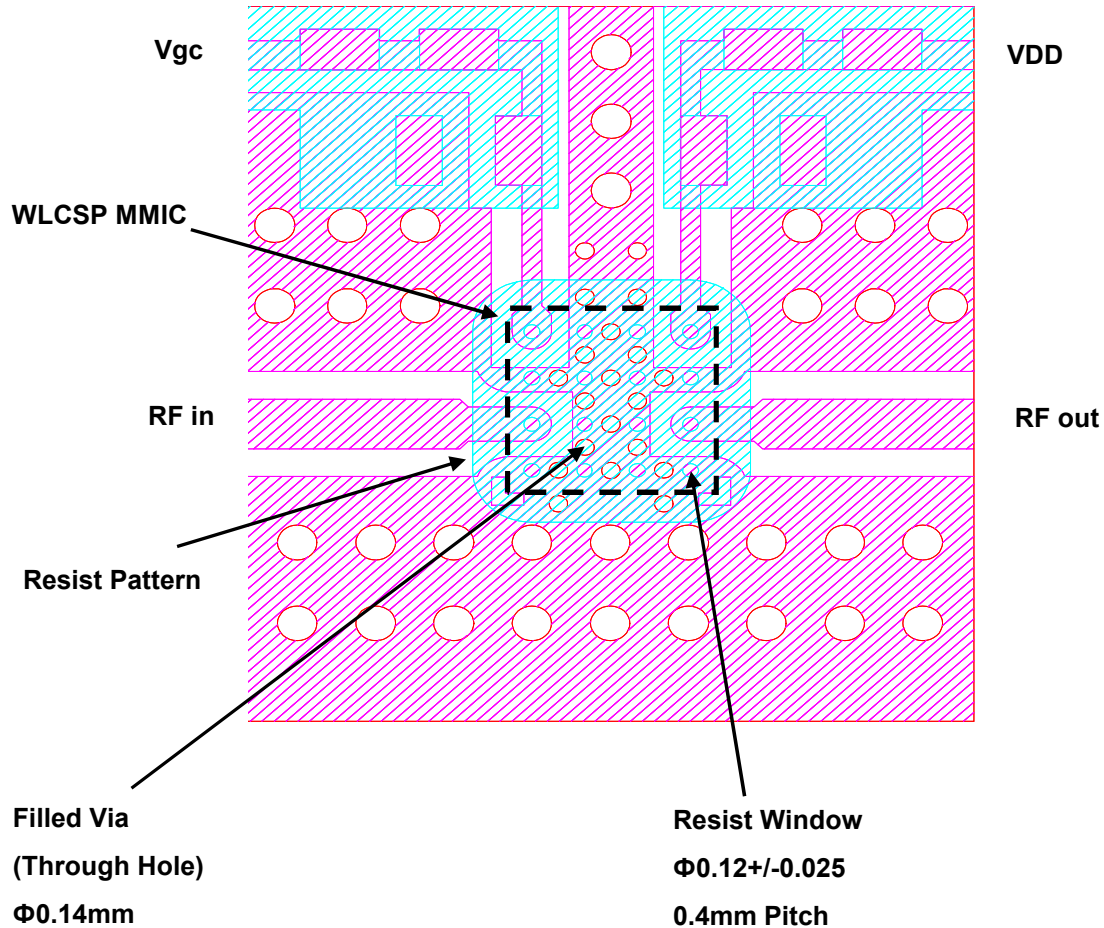
Pin	Name
1	VGC
2	RF input
3	RF output
4	VDD

Component List

Name	Description	Value
C1	Capacitor	0.1uF
C2	Capacitor	100pF

\*All bumps except Pin 1 to 4 are GND

■ PCB and Solder-resist Pattern



NOTES.

- 1) CORE MATERIAL ; ROGERS CORP. 4003  
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 ; +/- 25UM.
- 5) ALL DIMENSIONS ARE IN MM.

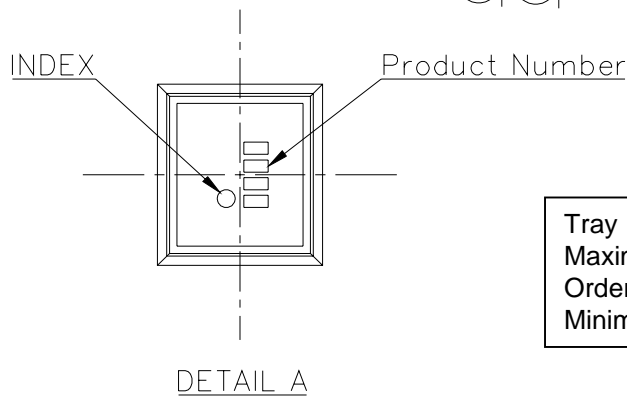
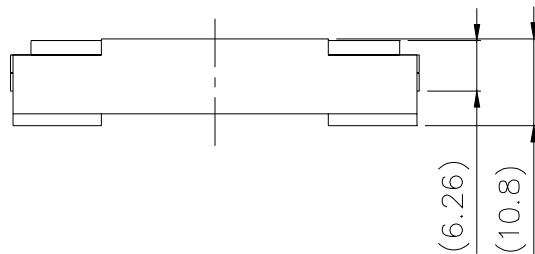
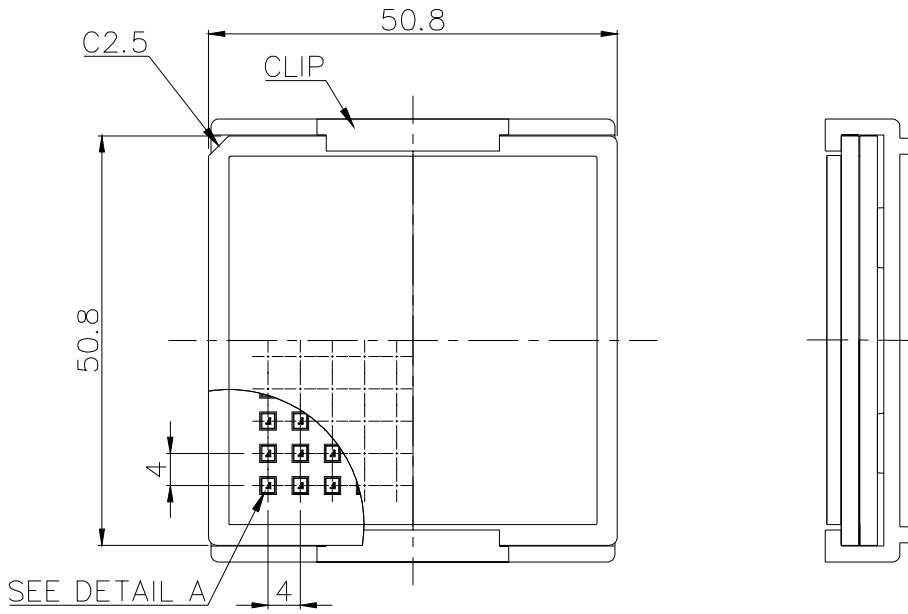


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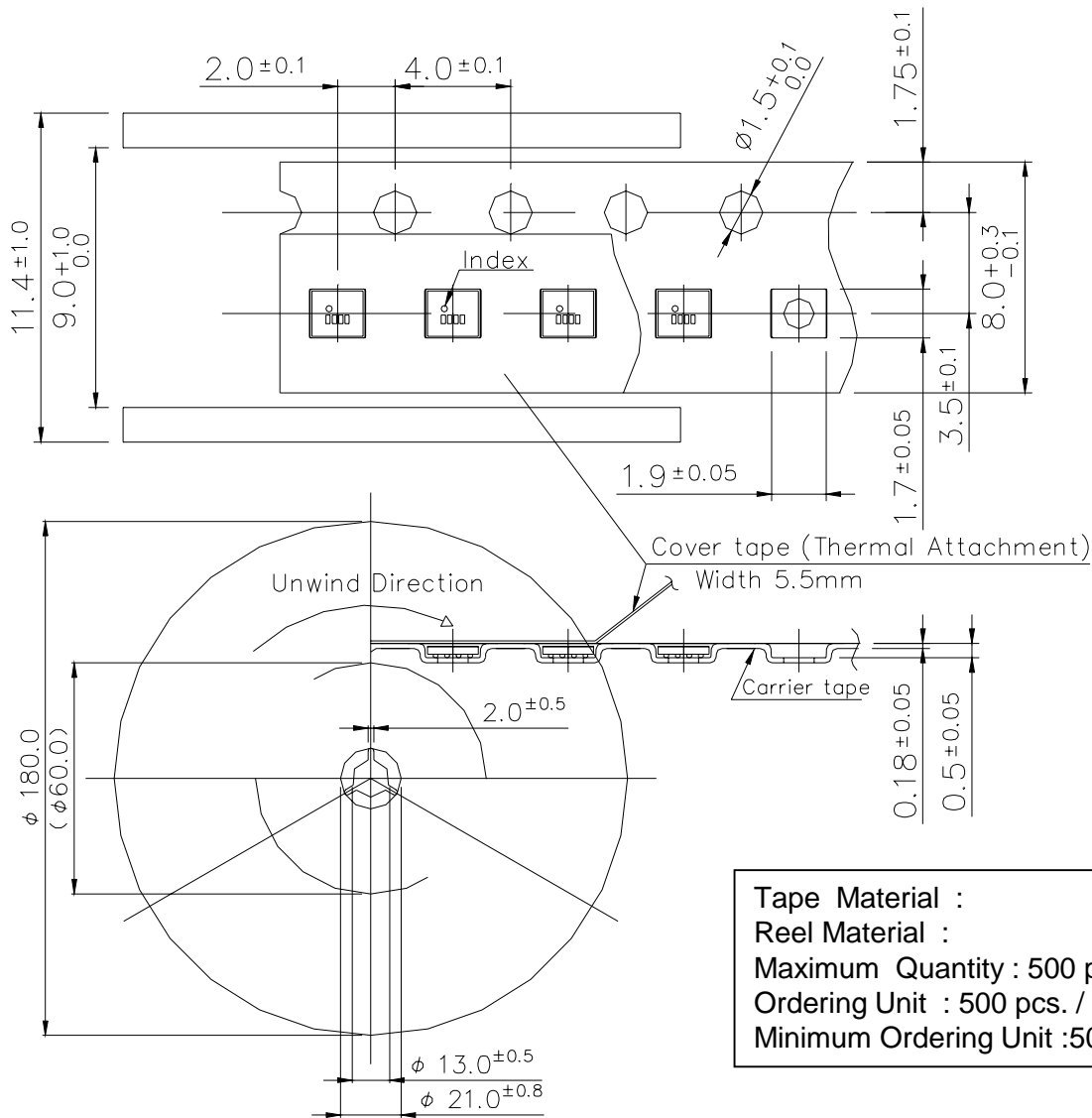
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■ 2-inch Tray Packing (Part No. : SMM5724XZ)



Tray Material : ABS – TP10  
Maximum Quantity : 100 pcs. / Tray  
Ordering Unit : 100 pcs. / order  
Minimum Order ing Unit : 100 pcs. ( 1 Tray)

■ Tape and Reel Packing (Part No. : SMM5724XZT)



- (1) Quantity 500pcs.
- (2) Tape material Conductive Polycarbonate
- (3) Reel material Conductive Polystyrene



*Preliminary*

**ES/SMM5724XZ**

**24 – 30GHz Low Noise/ Driver Amplifier MMIC**

**For further information please contact:**

<http://global-sei.com/Electro-optic/about/office.html>

**CAUTION**

This product contains **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.