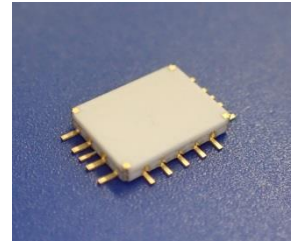


FEATURES

- High Output Power: Pout=33dBm (typ.)
- Linear Gain: GL=25dB (typ.)
- Frequency Band: 21.2 to 23.6GHz
- Impedance Matched Zin/Zout=50ohm
- Integrated Power Detector
- Small Hermetic Metal-Ceramic SMT Package(V1D)



DESCRIPTION

The SMM5855V1D is a MMIC amplifier that contains a four-stages amplifier, internally matched, for standard communications band in the 21.2 to 23.6 GHz frequency range.

Sumitomo 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
Output Power at used Detector	P _{OUT}	Up to 34	dBm
Storage Temperature	T _{stg}	-55 to +125	deg.C

RECOMMENDED OPERATING CONDITIONS

Item	Symbol	Recommend	Unit
Drain-Source Voltage	V _{DD}	Up to 6	V
Input Power	P _{IN}	Up to 14	dBm
Detective Power Level used Detector	P _{OUT}	-2 to 30	dBm
Operating Case Temperature	T _C	-40 to +85	deg.C

ELECTRICAL CHARACTERISTICS (Case Temperature Tc=25deg.C)

Item	Symbol	Test Conditions	Limits			Unit
			Min.	Typ.	Max.	
RF Frequency Range	f	V _{DD} =6.0V	21.2	-	23.6	GHz
Gate Bias Voltage	V _{GG}	I _{DD} (DC)=1400mA typ.	-0.50	-0.1	-0.04	V
Output Power at Pin=13dBm	P _{OUT}	V _{GG} -constant Z _S =Z _L =50ohm	30.5	33	-	dBm
Output Power at 1dB G.C.P.	P _{1dB}		-	33	-	dBm
Power Gain at 1dB G.C.P.	G _{1dB}	*1:Δf=+10MHz Pout=20dBm (S.C.L.)	20	24	28	dB
Power-added Efficiency at 1dB G.C.P.	PAE		-	18	-	%
Third Order Intermodulation Distortion *1	IM3		-40	-42	-	dBc
Drain Current at 1dB G.C.P.	I _{DDRF}		-	1800	2200	mA
Input Return Loss (at Pin=-20dBm)	RL _{IN}		-	8	-	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 0A	Up to 124V
-----	----------	------------

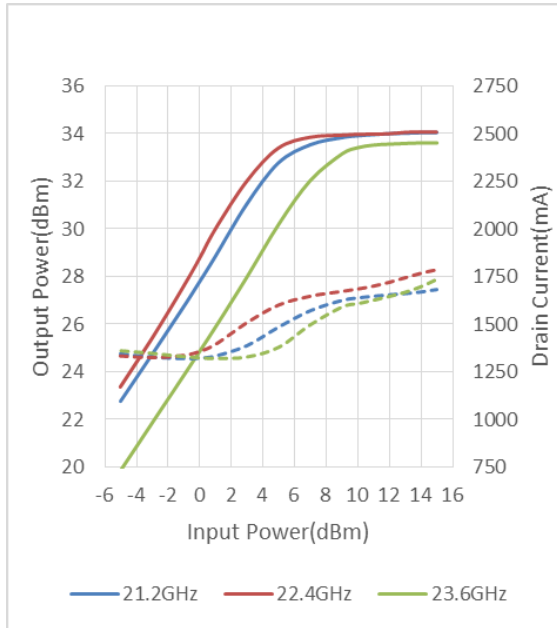
Note : Based on JEDEC JS-001-2012 (C=100pF, R=1.5kohm)

CASE STYLE	V1D
RoHS COMPLIANCE	YES

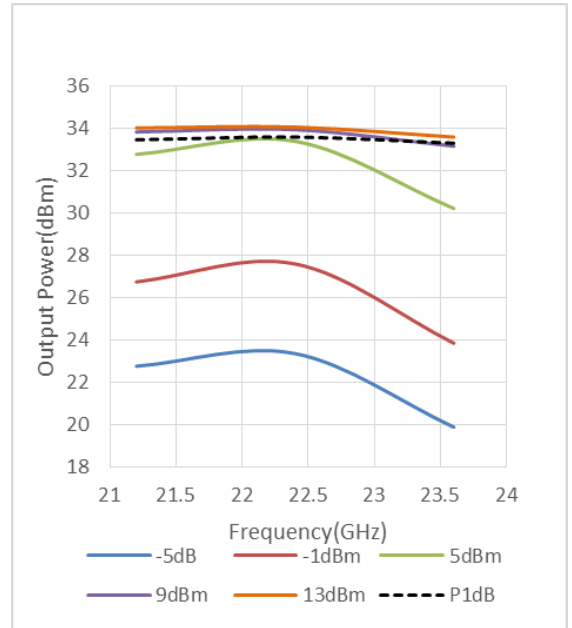
Ordering Information

Part Number	Order Unit	Packing
SMM5855V1D	No Limitation	48pcs. / Tray x4 Trays = 192pcs. / Packing
SMM5855V1DT	500pcs.	500pcs. / Reel x1 Reel = 500pcs. / Packing

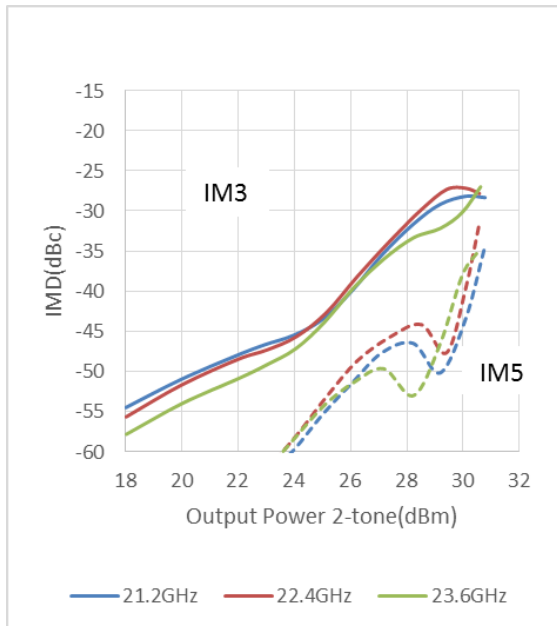
Output Power, Drain Current vs. Input Power



Output Power vs. Frequency

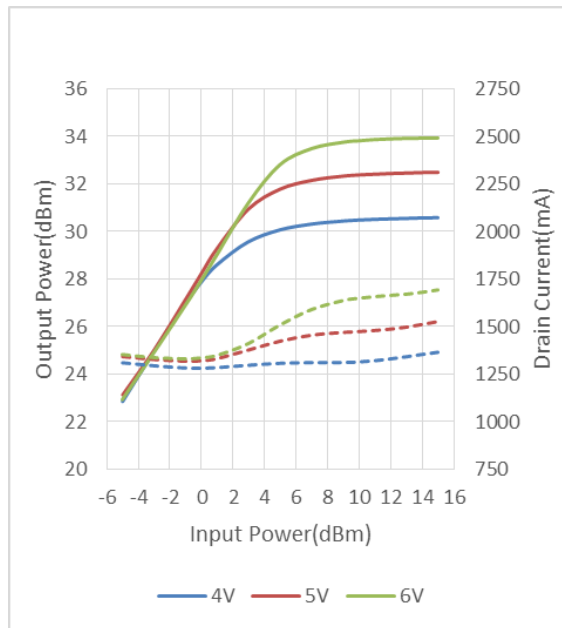


Output Power vs. IMD

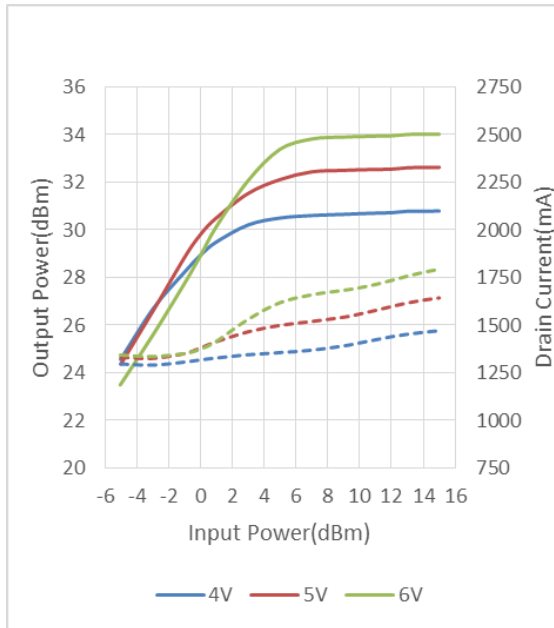


Output Power, Drain Current vs. Input Power by Drain Voltage

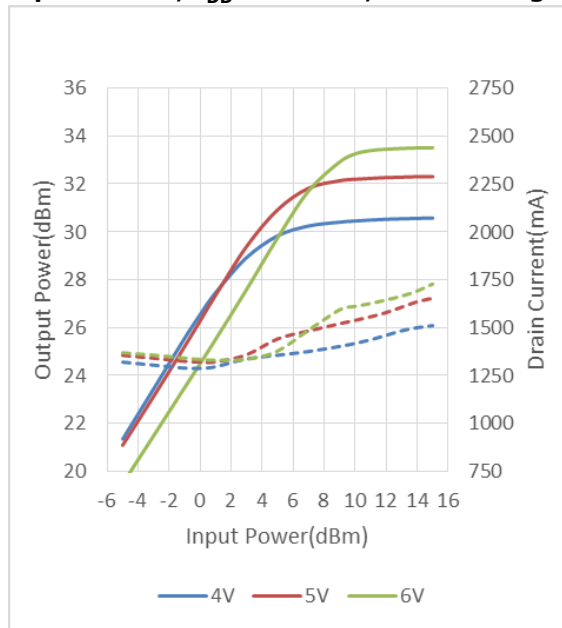
Freq=21.2GHz, $I_{DD}=1400\text{mA}$, $T_c=+25\text{ deg.C}$



Freq=22.4GHz, $I_{DD}=1400\text{mA}$, $T_c=+25\text{ deg.C}$

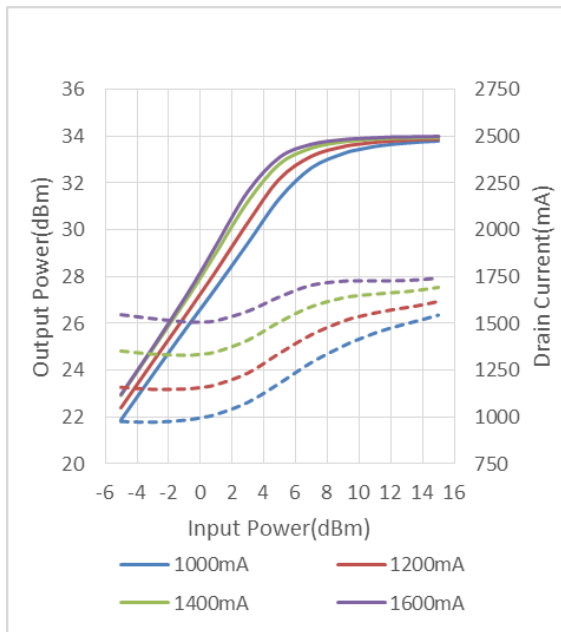


Freq=23.6GHz, $I_{DD}=1400\text{mA}$, $T_c=+25\text{ deg.C}$

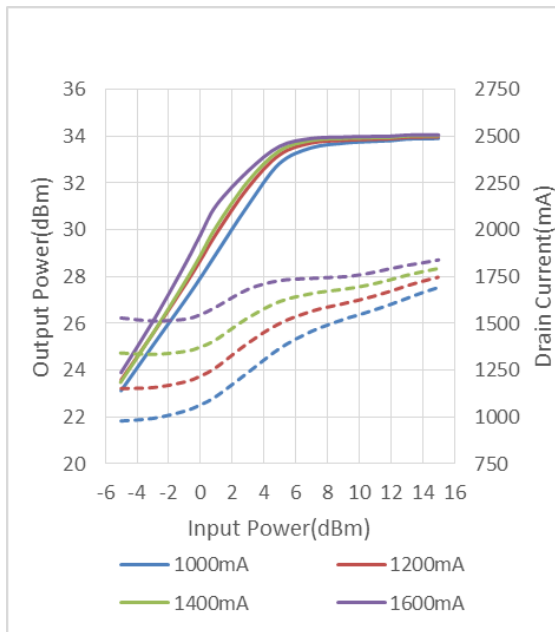


Output Power, Drain Current vs. Input Power by Drain Current

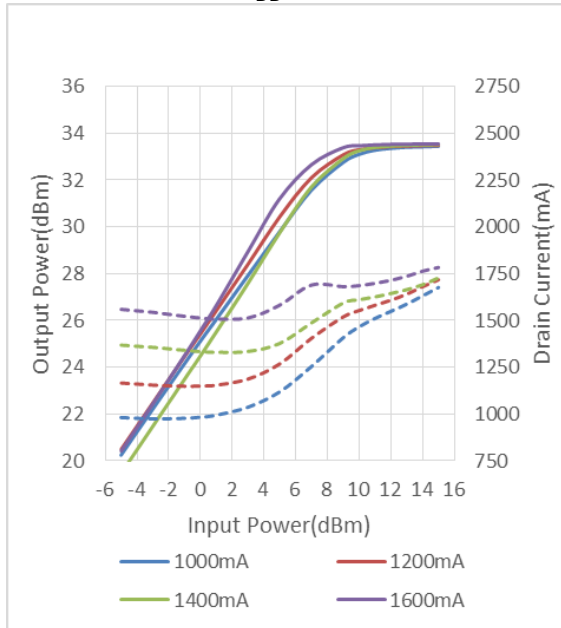
Freq=21.2GHz, $V_{DD}=6V$, $T_c=+25$ deg.C



Freq=22.4GHz, $V_{DD}=6V$, $T_c=+25$ deg.C

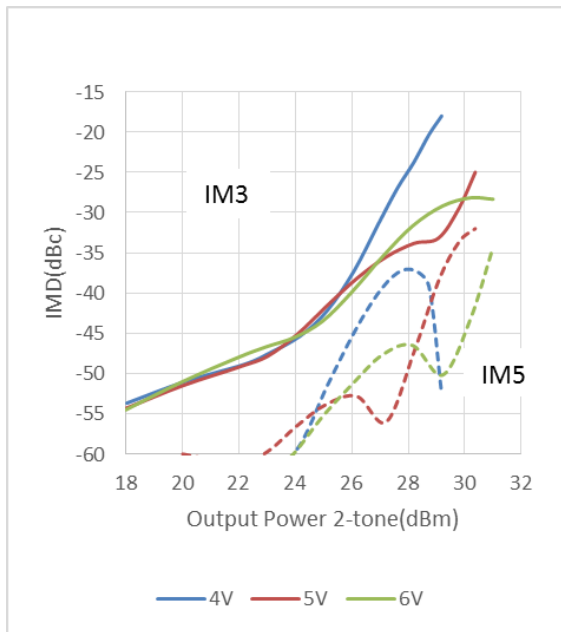


Freq=23.6GHz, $V_{DD}=6V$, $T_c=+25$ deg.C

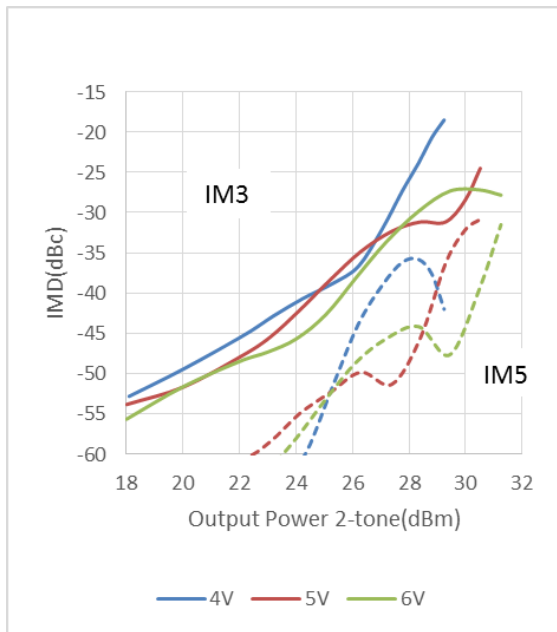


Inter-modulation Distortion vs. Output Power by Drain Voltage

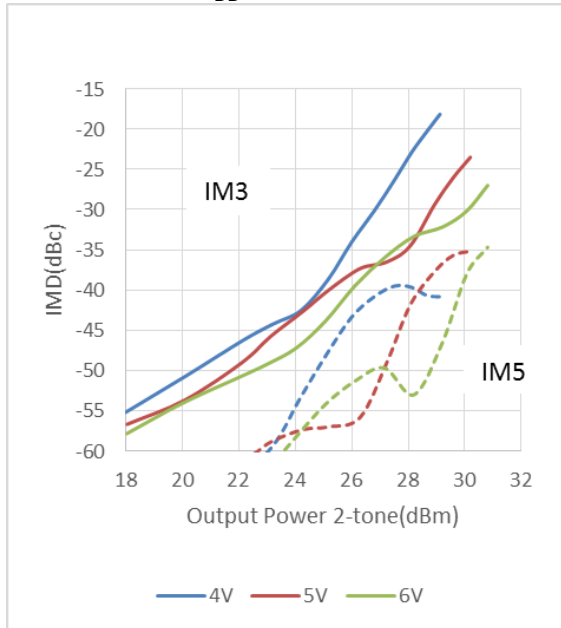
Freq=21.2GHz, $I_{DD}=1400\text{mA}$, $T_c=+25\text{ deg.C}$



Freq=22.4GHz, $I_{DD}=1400\text{mA}$, $T_c=+25\text{ deg.C}$

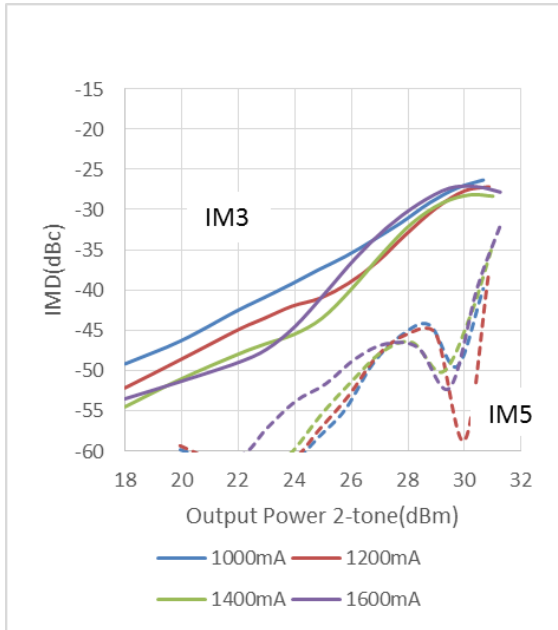


Freq=23.6GHz, $I_{DD}=1400\text{mA}$, $T_c=+25\text{ deg.C}$

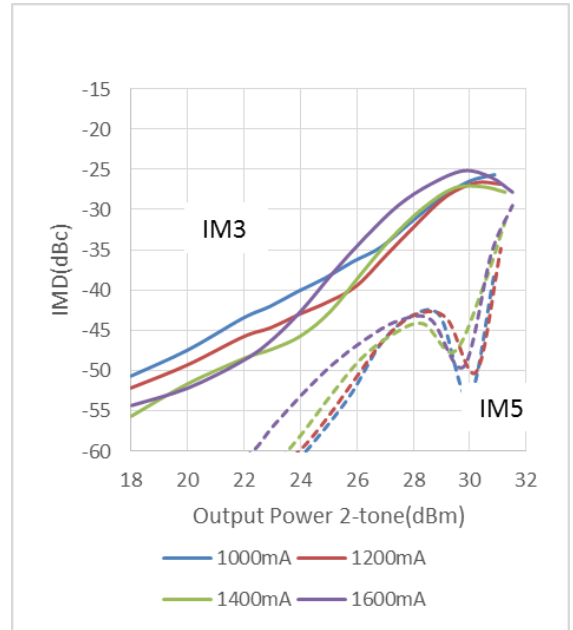


Inter-modulation Distortion vs. Output Power by Drain Current

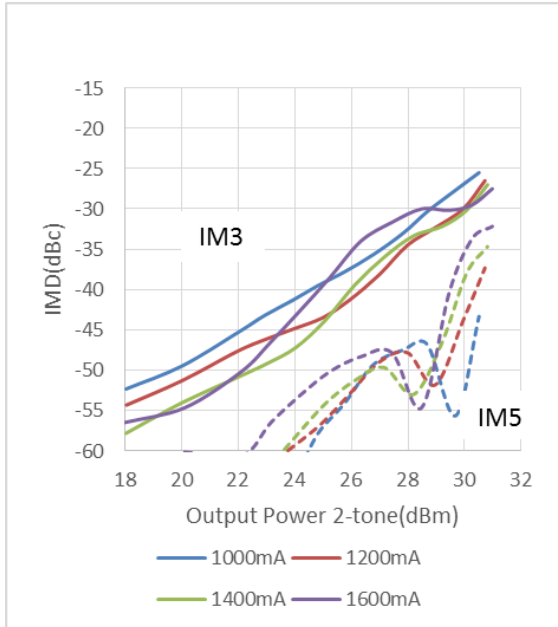
Freq=21.2GHz, $V_{DD}=6V$, $T_c=+25$ deg.C



Freq=22.4GHz, $V_{DD}=6V$, $T_c=+25$ deg.C

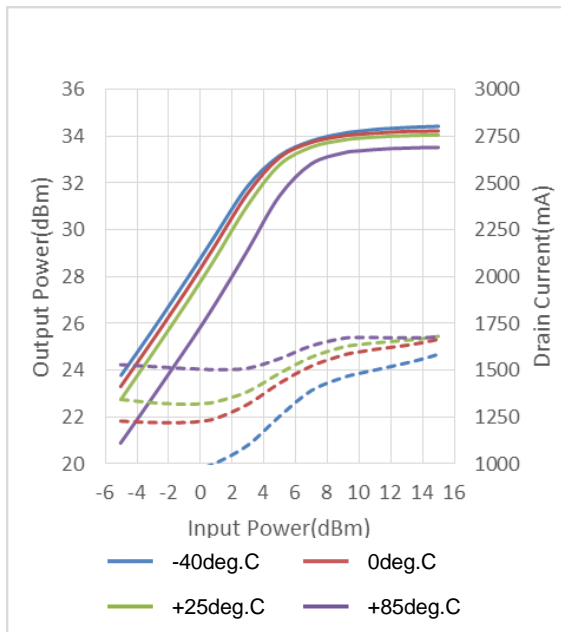


Freq=23.6GHz, $V_{DD}=6V$, $T_c=+25$ deg.C

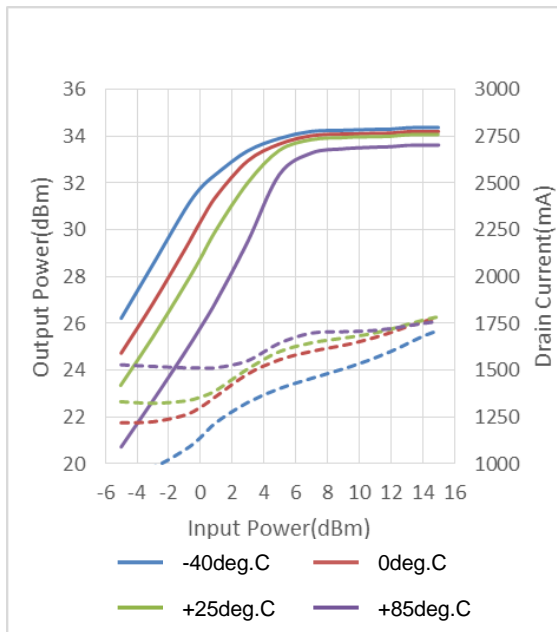


Output Power, Drain Current vs. Input Power by Case Temperature

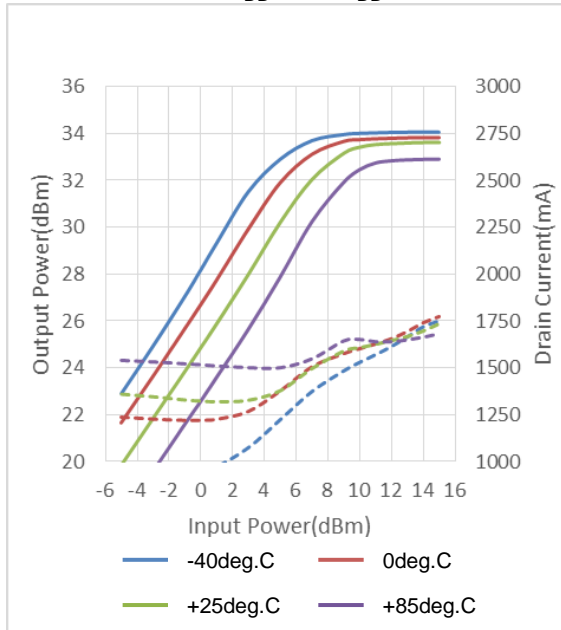
Freq=21.2GHz, $V_{DD}=6V$, $I_{DD}=1400mA$



Freq=22.4GHz, $V_{DD}=6V$, $I_{DD}=1400mA$

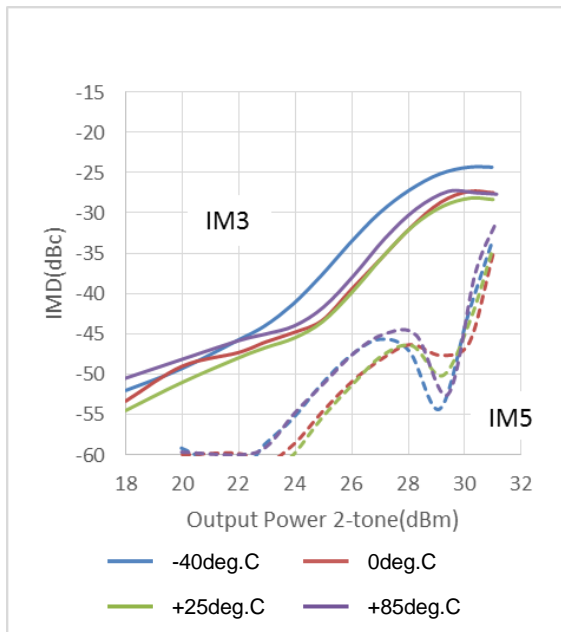


Freq=23.6GHz, $V_{DD}=6V$, $I_{DD}=1400mA$

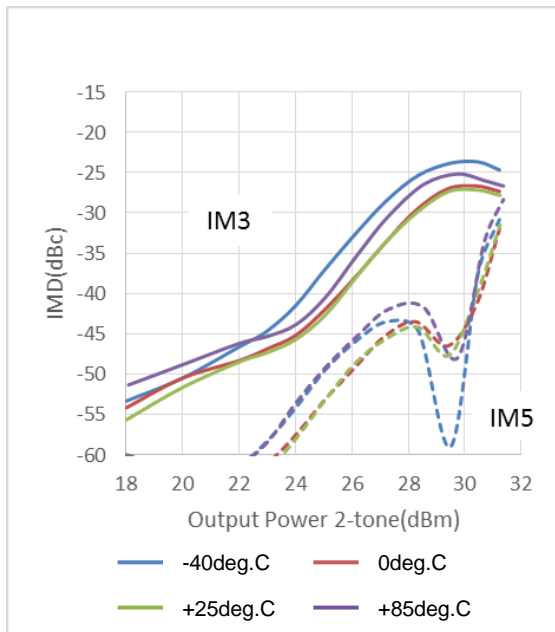


Inter-modulation Distortion vs. Input Power by Case Temperature

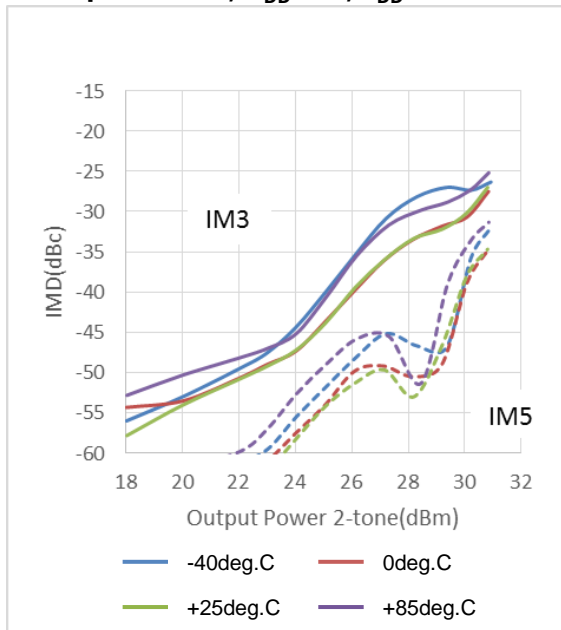
Freq=21.2GHz, $V_{DD}=6V$, $I_{DD}=1400mA$



Freq=22.4GHz, $V_{DD}=6V$, $I_{DD}=1400mA$

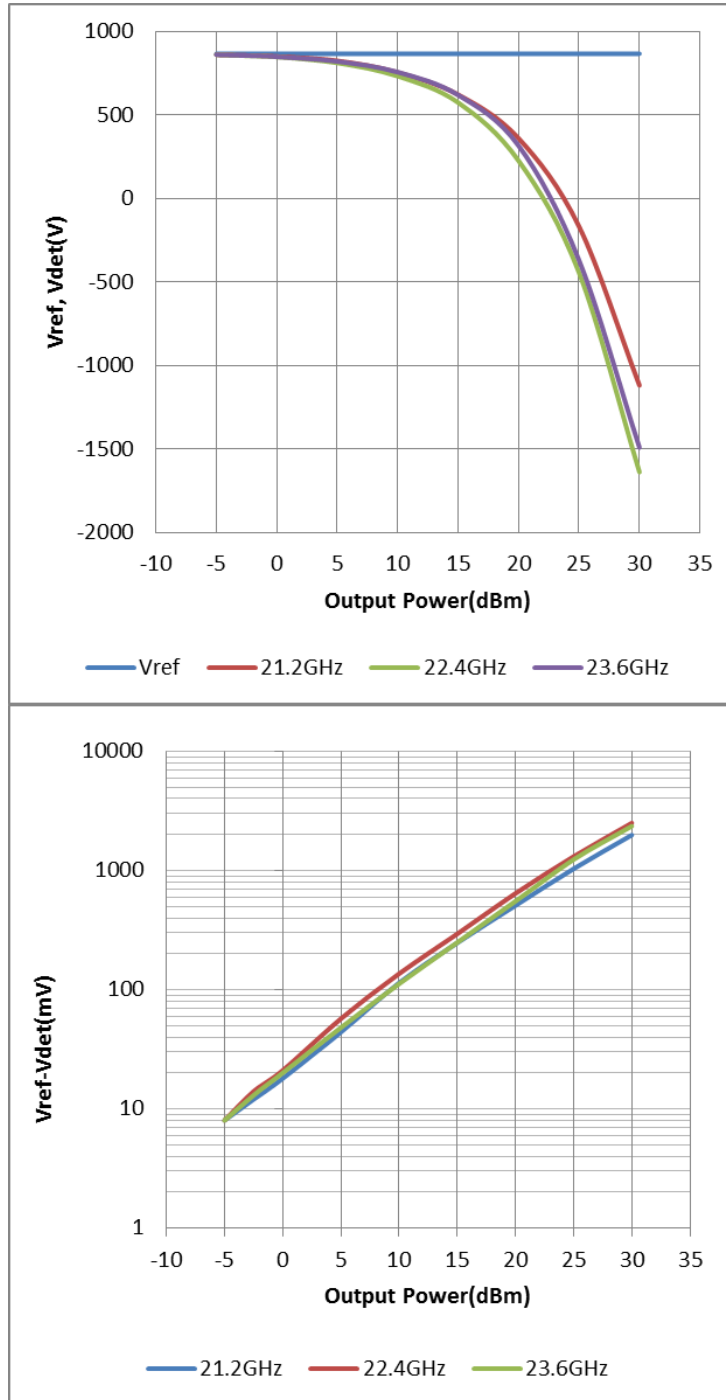


Freq=23.6GHz, $V_{DD}=6V$, $I_{DD}=1400mA$



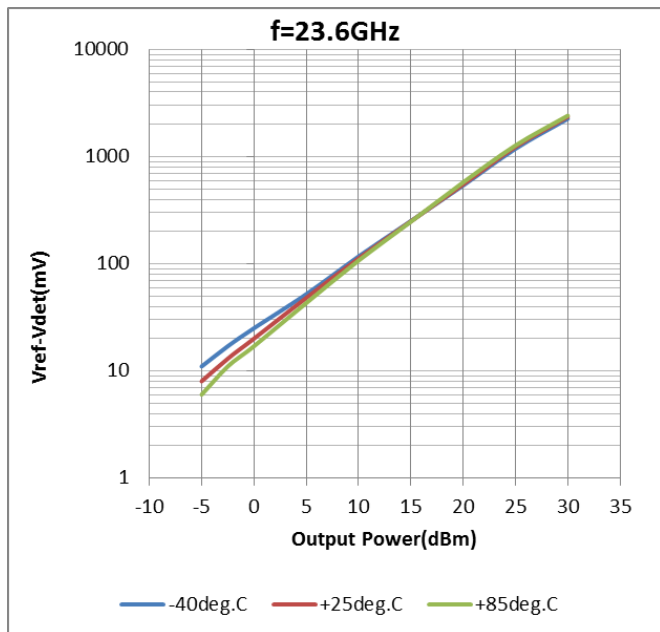
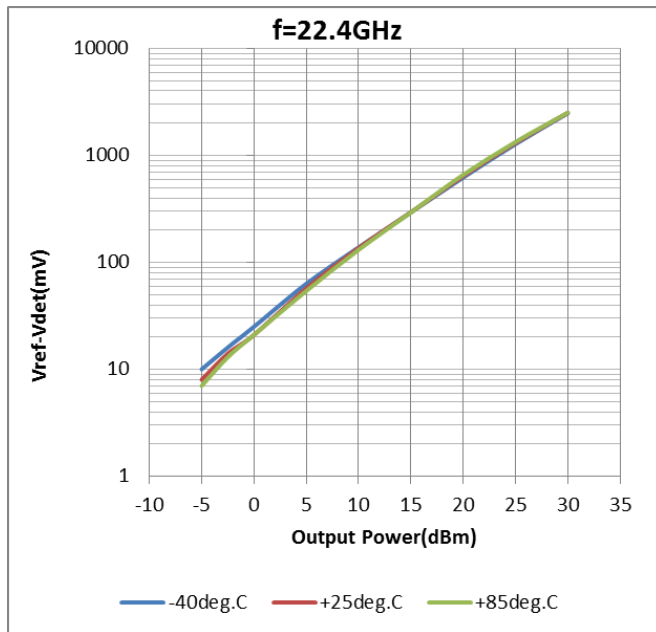
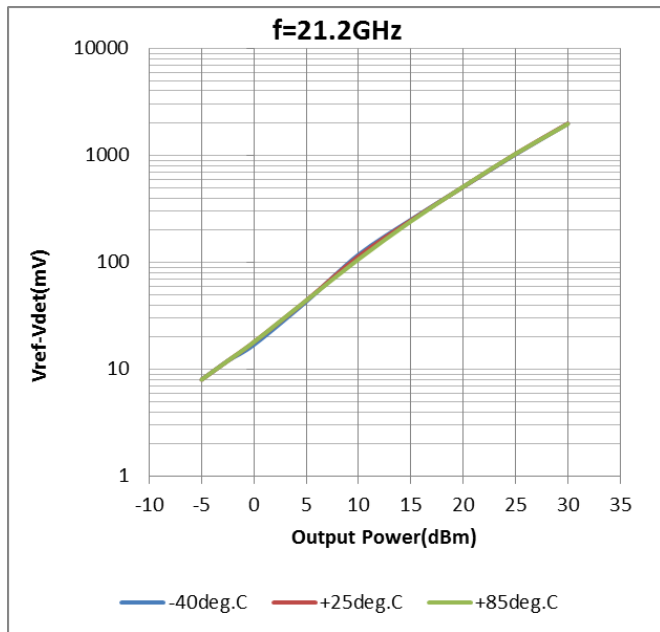
Power Detector vs. Output Power vs. frequency

$V_{DD}/I_{DD}(DC)=6V/1400mA$, $V_{det.Bias}=V_{ref.Bias}=5V$, $T_c=+25deg.C$

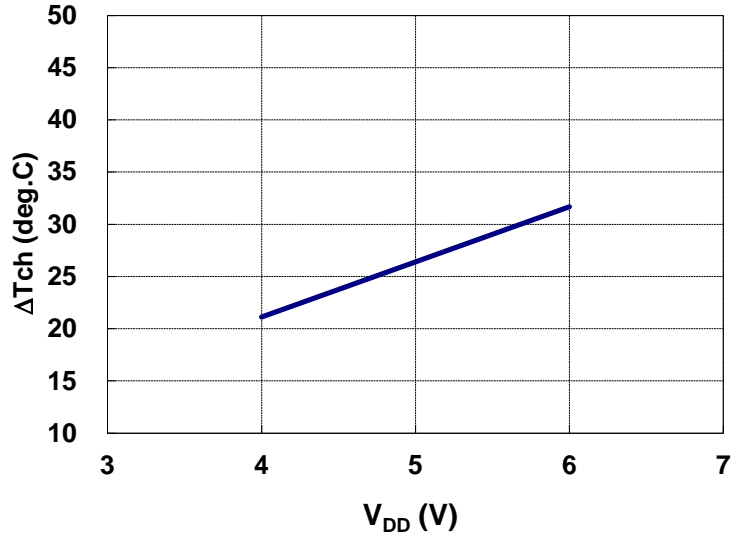


Power Detector vs. Output Power vs. Case Temperature

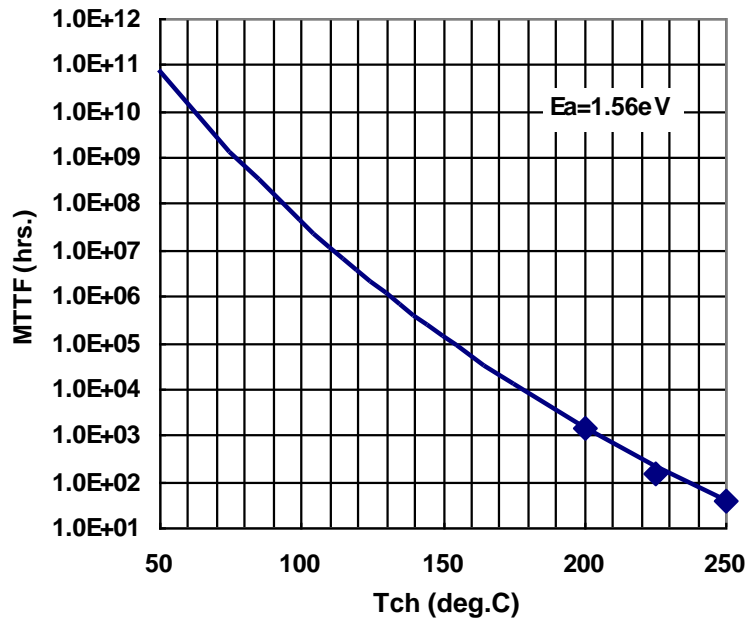
$V_{DD}/I_{DD}(DC)=6V/1400mA$, $V_{det.Bias}=V_{ref.Bias}=5V$, $T_c=+25deg.C$



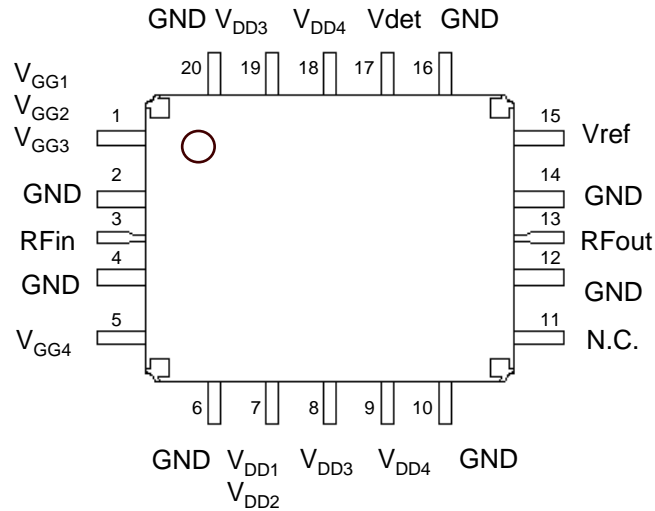
**ΔTch vs. Drain Voltage
(Reference)**
I_{DD}=1400mA



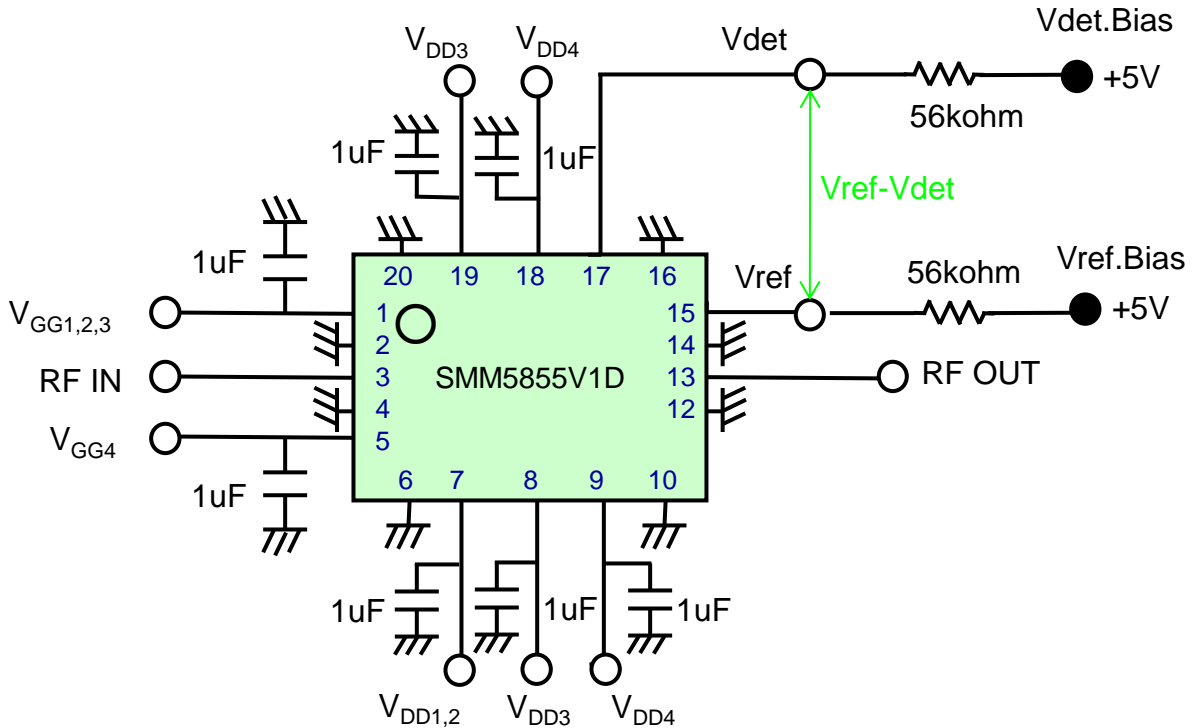
MTTF vs. Tch



■PIN Assignment



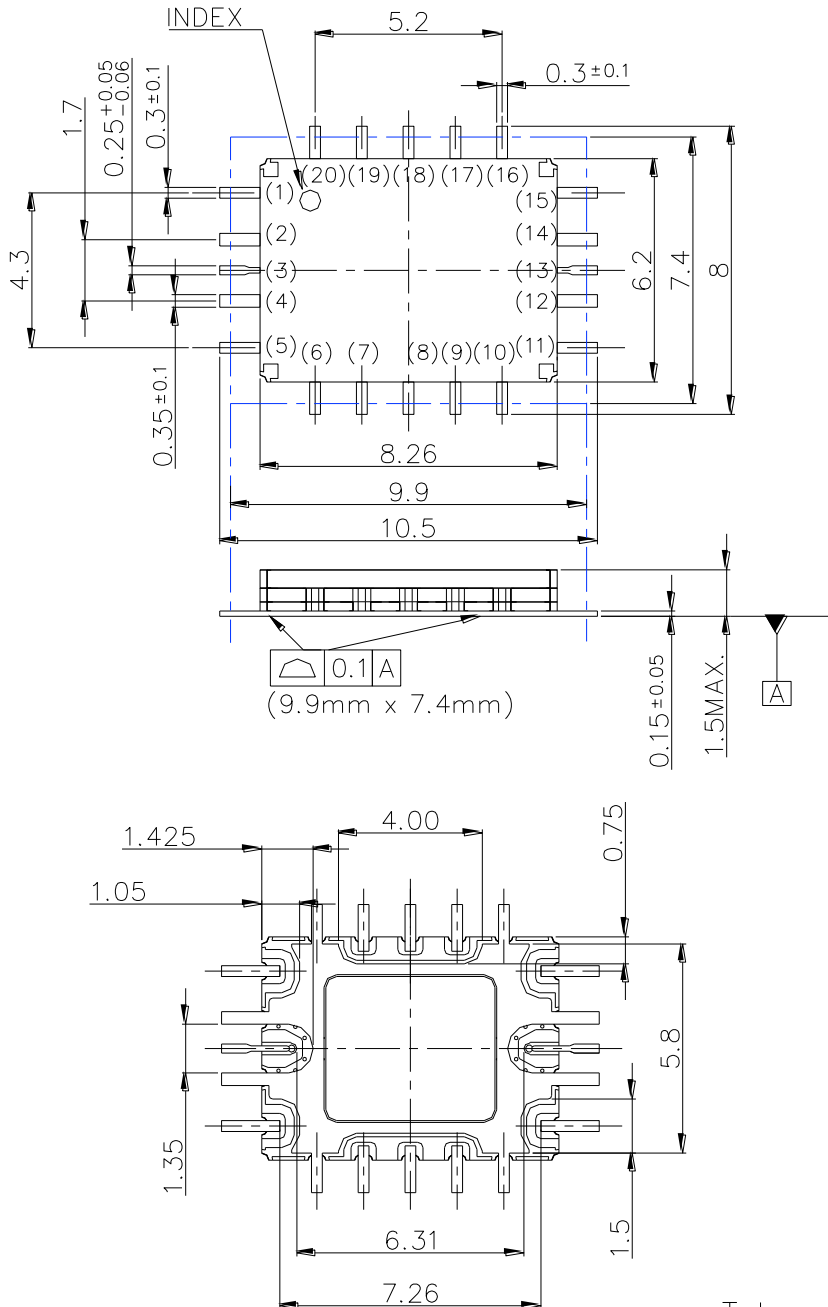
■Recommended Bias Network



NOTE:

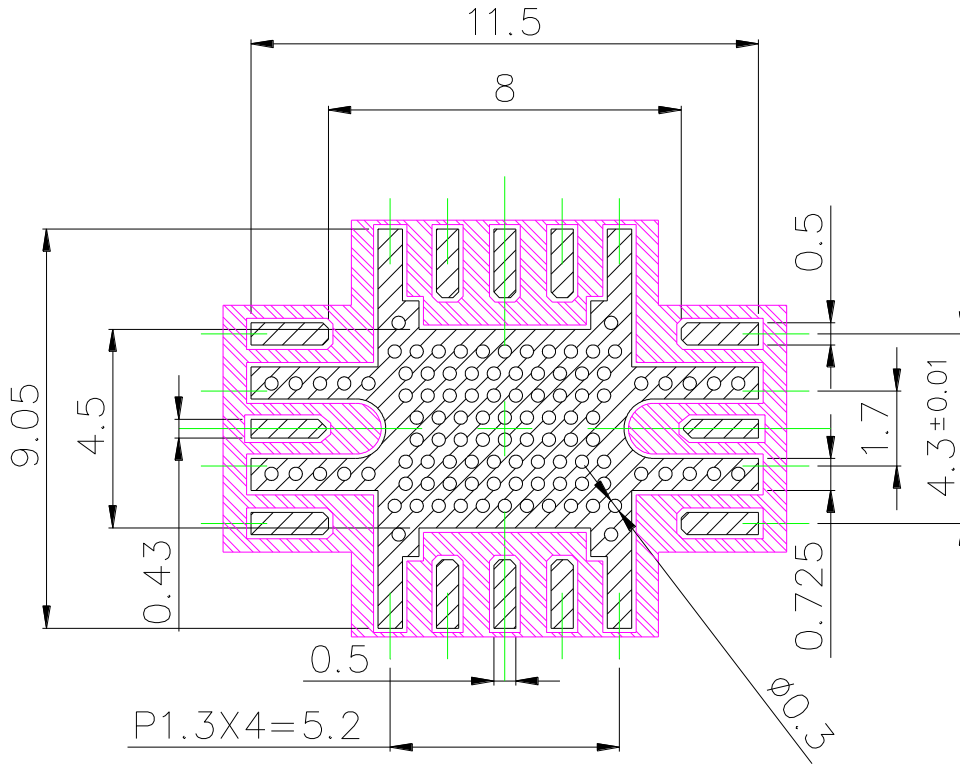
1. The capacitors are recommended on each bias supply lines, close to the package, in order to prevent video oscillations which could damage the module.
2. The same pins named V_{DD} are also internally connected.

Package Outline



Tolerance : ± 0.15
Unit : mm

■PCB Pads and Solder-resist Pattern

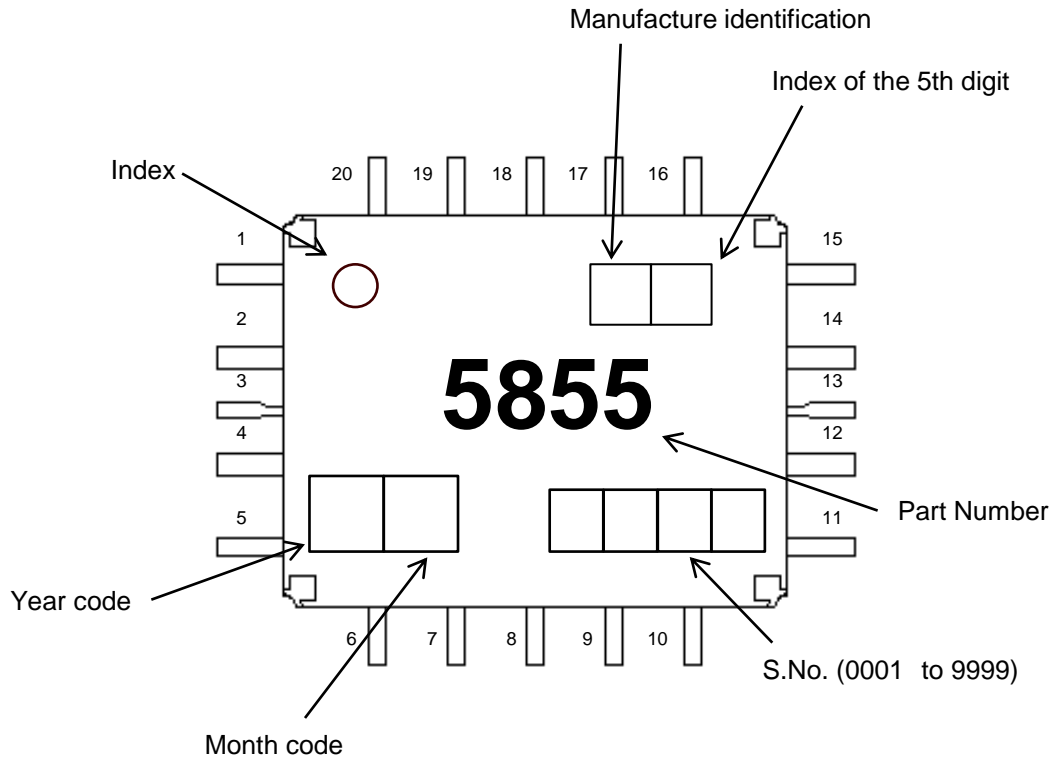


NOTES.

1. CORE MATERIAL: Rogers CORP. RO4003
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

■ Marking Information



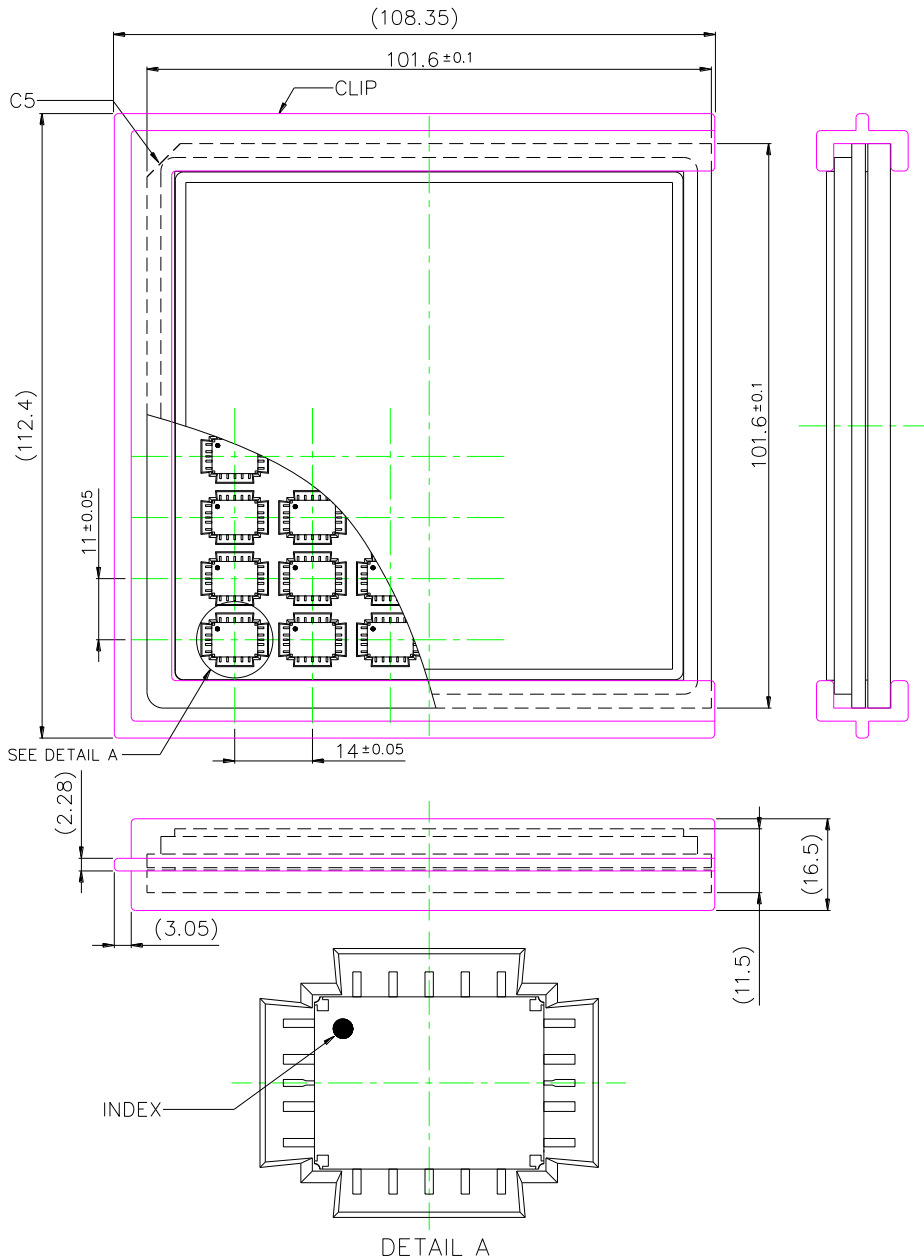
<Year code>

Code	T	U	V	W	X	Y	Z	A	B
Year	2011	2012	2013	2014	2015	2016	2017	2018	2019

<Month code>

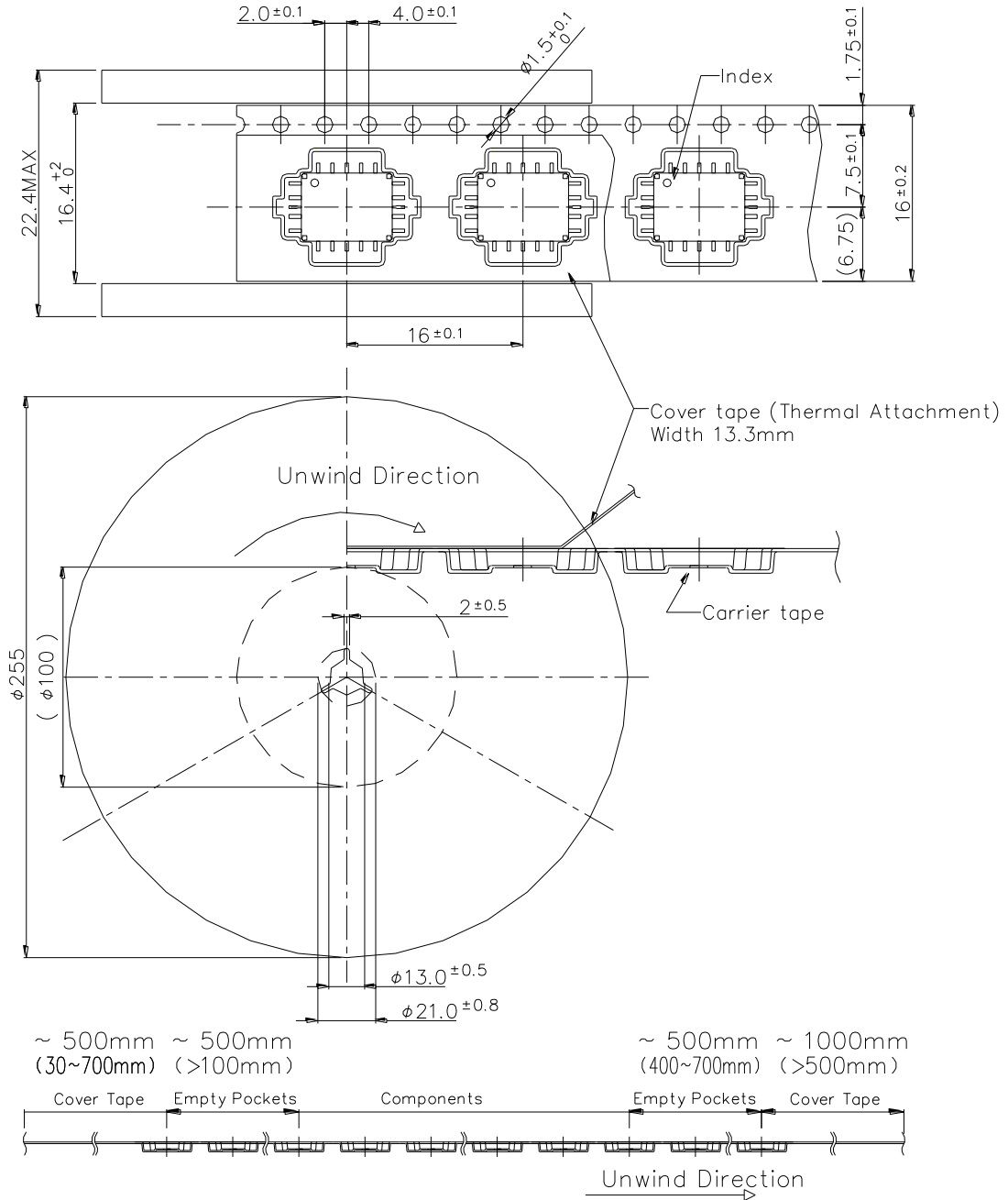
Code	H	M	N	P	R	S	T	U	W	X	Y	Z
Month	1	2	3	4	5	6	7	8	9	10	11	12

■4-inch Tray Packing (Part No. : SMM5855V1D)



(1) Maximum Quantity : 48 pcs. / Tray

■Tape and Reel Packing (Part No. : SMM5855V1DT)



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

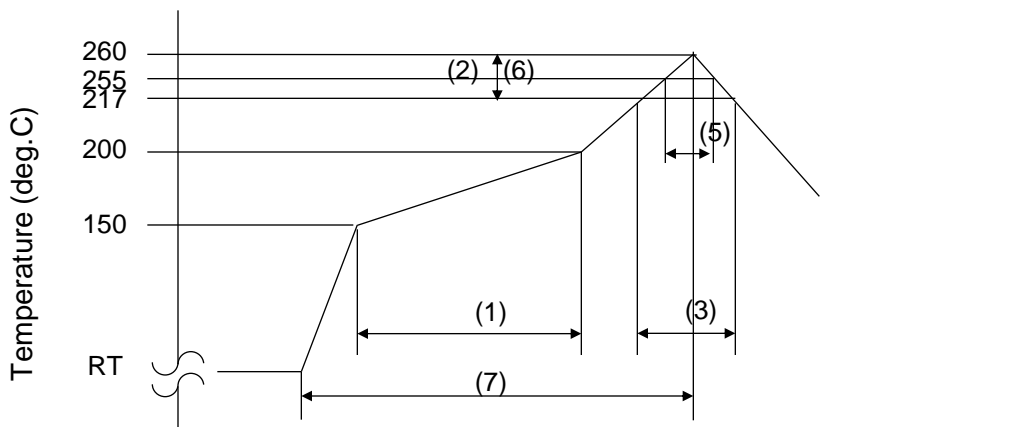
Mounting Condition

- (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 body surface.

Reflow temperature profile and condition:



- | | |
|---|-------------------------------------|
| (1) Preheating: | 150 to 200 deg.C, 60 to 120 seconds |
| (2) Ramp-up Rate: | 3 deg.C / seconds max |
| (3) Liquidous temperature and time: | 217 deg.C, 60 to 150 seconds |
| (4) Peak Temperature: | 260 deg.C |
| (5) Time Peak Temperature within 5 deg.C: | under 30 seconds |
| (6) Ramp-down Rate: | 6 deg.C / seconds max |
| (7) Time RT to peak temperature: | 8 minutes max |

* Measurement point: Center of the package body surface

- (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.

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.