

Product Features

- 7-9GHz GaN MMIC Power Amplifier
- Typical Small-signal Gain 32.7dB
- Typical Power Gain 26.7dB
- Typical Output Power 47.5dBm
- Typical PAE 45.9%
- 28V-32V operation

* Above Typical values measured at 8GHz and 28V

Applications

- General Purpose
- Communication System
- Radar System
- Satellite Communication



Absolute Maximum Rating

Parameter	Symbol	Rating	Units	Conditions
Drain-Source Voltage	V _{DSS}	120	Volts	25°C
Gate-to-Source Voltage ³	V _{GS}	-10, +2	Volts	25°C
Storage Temperature ³	T _{STG}	-65, +150	°C	
Operating Junction Temperature ^{1,3}	T _J	225	°C	
Maximum Forward Gate Current ³	I _{GMAX}	10	mA	25°C
Maximum Drain Current ²	I _{DMAX}	1.04	A	I _d @ V _d =10V, V _g = 1V
Soldering Temperature ³	T _s	245	°C	

1. Continuous use at maximum temperature will affect MTTF.

2. Current limit for long term, reliable operation.

3. After additional updates.

Specifications (T_c=25°C, F₀=8GHz, V_{DD}=28V, I_{DQ}=370mA)

Parameter	Symbol	MIN	TYP	MAX	Units	Conditions
Small Signal Gain	G		32.7		dB	Pulse Width=100μsec, Duty Cycle=10%
Power Gain	G _P		26.7		dB	P _{sat} @ I _{gs} =1mA
Saturated Output Power	P _{OUT}		47.5		dBm	P _{sat} @ I _{gs} =1mA
Power Added Efficiency	PAE		45.9		%	P _{sat} @ I _{gs} =1mA

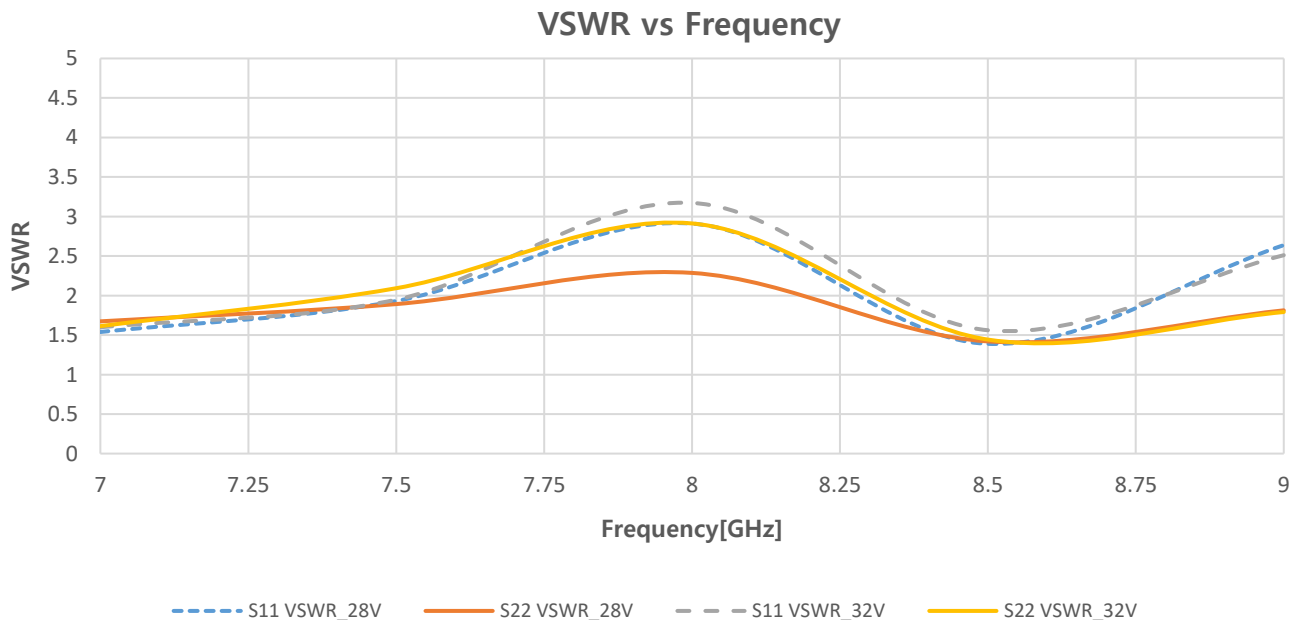
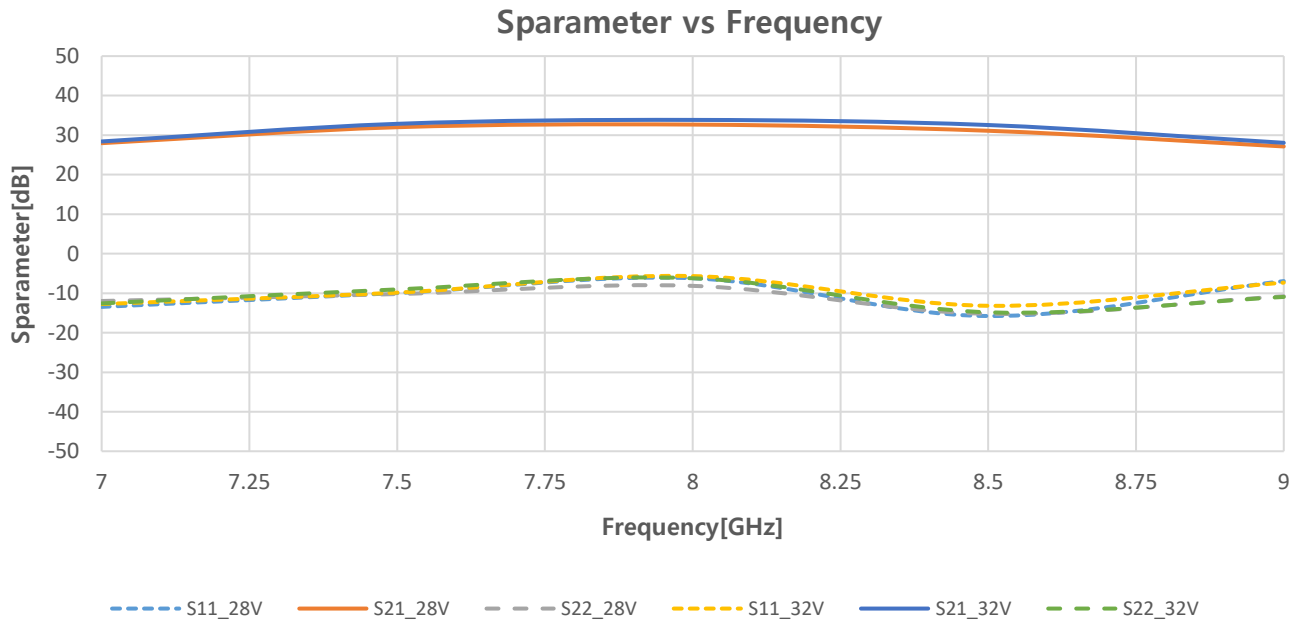
Specifications (T_c=25°C, F₀=8GHz, V_{DD}=32V, I_{DQ}=380mA)

Parameter	Symbol	MIN	TYP	MAX	Units	Conditions
Small Signal Gain	G		33.9		dB	Pulse Width=100μsec, Duty Cycle=10%
Power Gain	G _P		28.4		dB	P _{sat} @ I _{gs} =1mA
Saturated Output Power	P _{OUT}		48.1		dBm	P _{sat} @ I _{gs} =1mA
Power Added Efficiency	PAE		44.2		%	P _{sat} @ I _{gs} =1mA



Small-Signal Performance (Tc=25°C)

Drain Voltage= (28V IDQ=370mA), (32V IDQ=380mA)

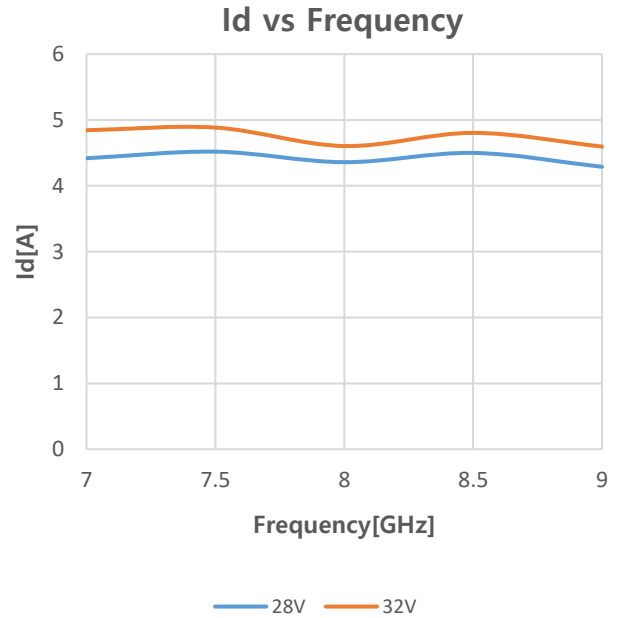
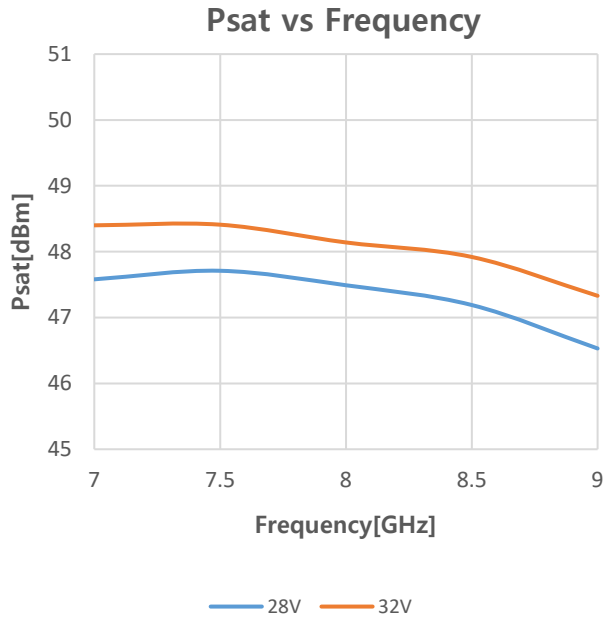




Psat, Id vs Frequency Performance (Tc=25°C)

Drain Voltage= (28V IDQ=370mA), (32V IDQ=380mA)

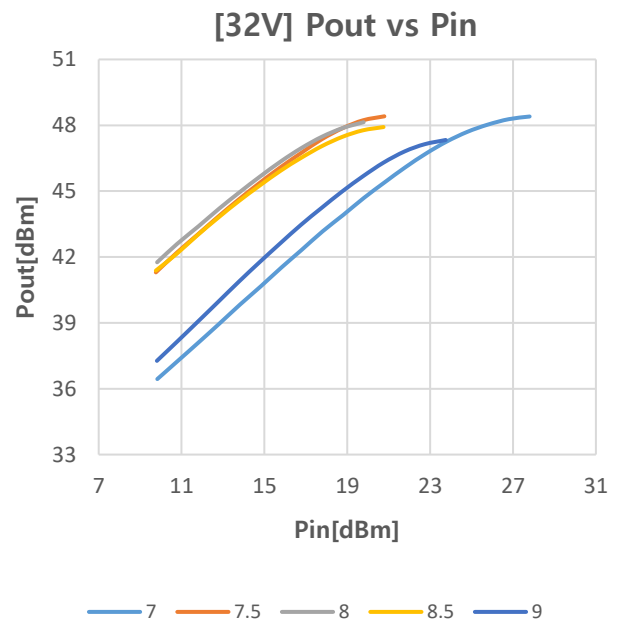
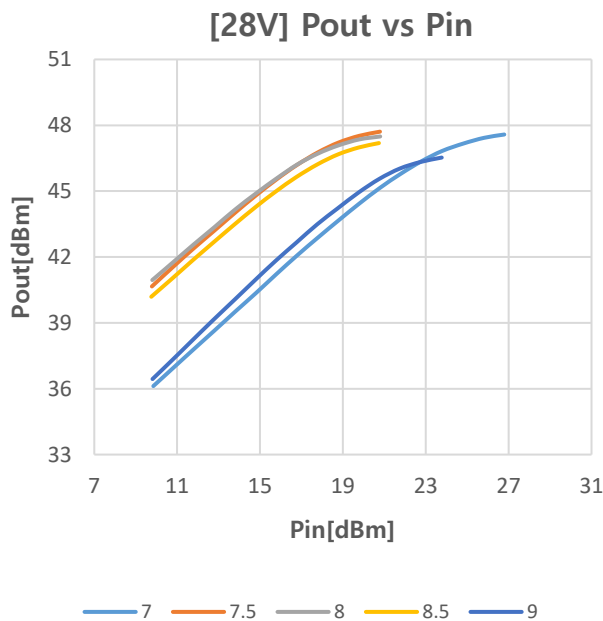
Pulse-Mode(Pulse Width=100μsec, Duty Cycle=10%)



Output Power (Pout) vs Input Power (Pin) Performance (Tc=25°C)

Drain Voltage= (28V IDQ=370mA), (32V IDQ=380mA)

Pulse-Mode(Pulse Width=100μsec, Duty Cycle=10%)

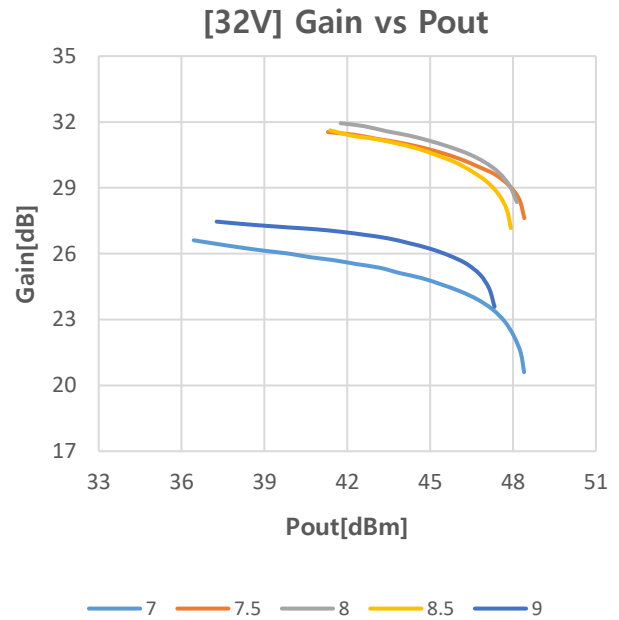
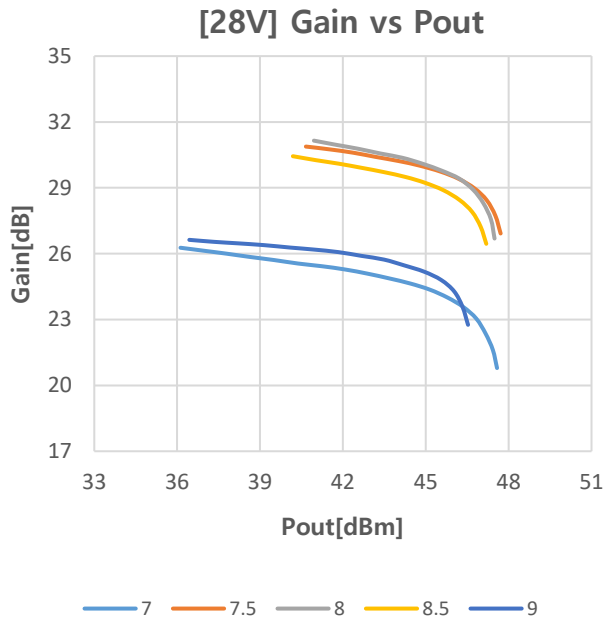




Gain vs Output Power (Pout) Performance (Tc=25°C)

Drain Voltage= (28V IDQ=370mA), (32V IDQ=380mA)

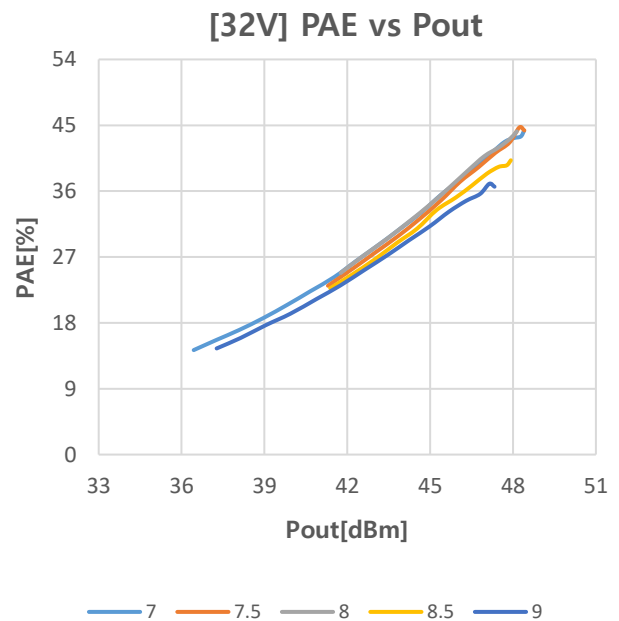
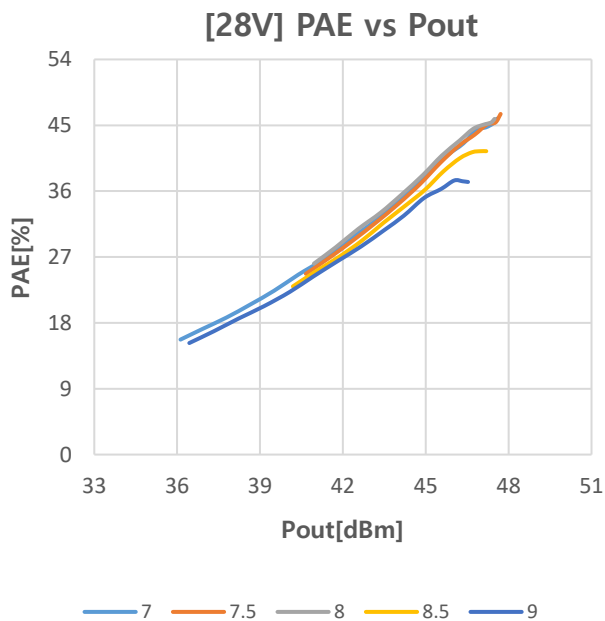
Pulse-Mode(Pulse Width=100μsec, Duty Cycle=10%)



PAE vs Output Power (Pout) Performance (Tc=25°C)

Drain Voltage= (28V IDQ=370mA), (32V IDQ=380mA)

Pulse-Mode(Pulse Width=100μsec, Duty Cycle=10%)

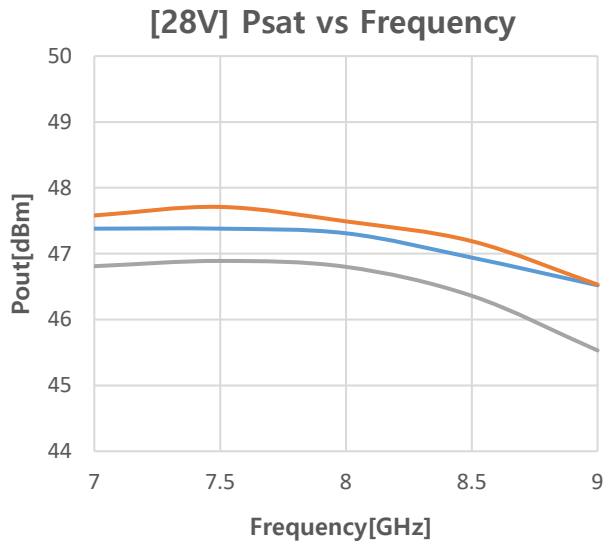




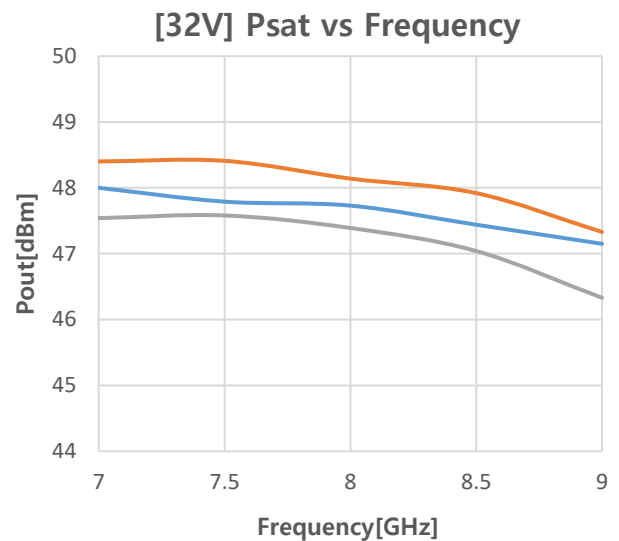
Psat vs Frequency Temperatures Performance

Drain Voltage= (28V IDQ=370mA), (32V IDQ=380mA)

Pulse-Mode(Pulse Width=100μsec, Duty Cycle=10%)



— -40°C — +25°C — +85°C

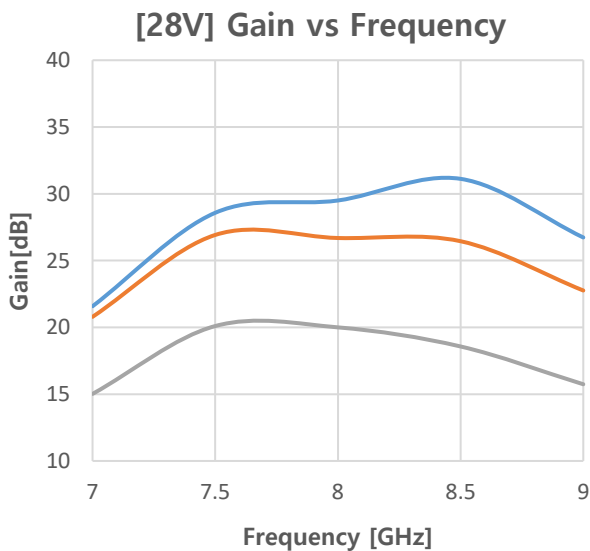


— -40°C — +25°C — +85°C

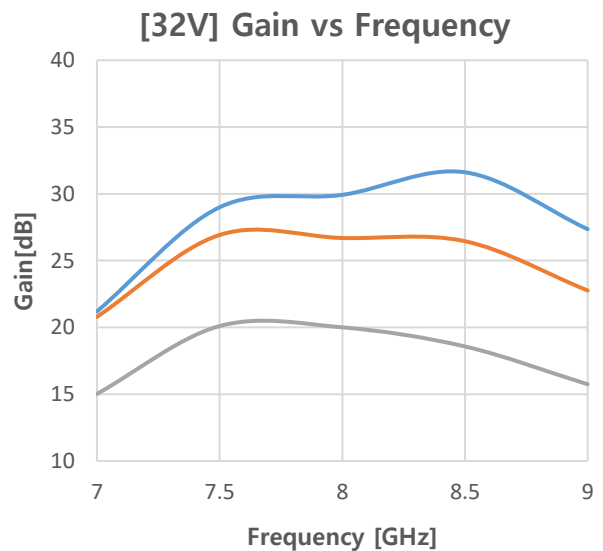
Gain vs Frequency Temperatures Performance

Drain Voltage= (28V IDQ=370mA), (32V IDQ=380mA)

Pulse-Mode(Pulse Width=100μsec, Duty Cycle=10%)



— -40°C — +25°C — +85°C



— -40°C — +25°C — +85°C

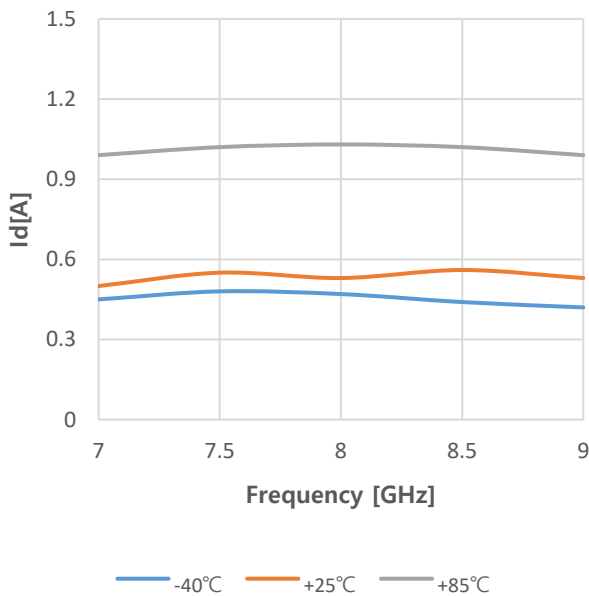


Id vs Frequency Temperatures Performance

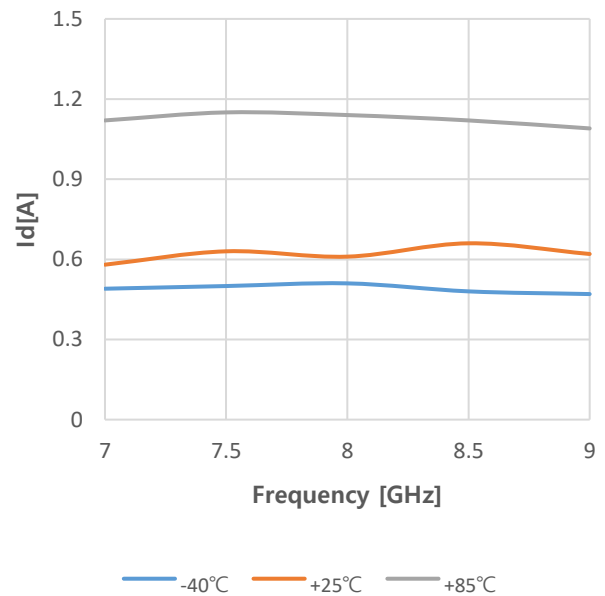
Drain Voltage= (28V IDQ=370mA), (32V IDQ=380mA)

Pulse-Mode(Pulse Width=100μsec, Duty Cycle=10%)

[28V] Id vs Frequency



[32V] Id vs Frequency

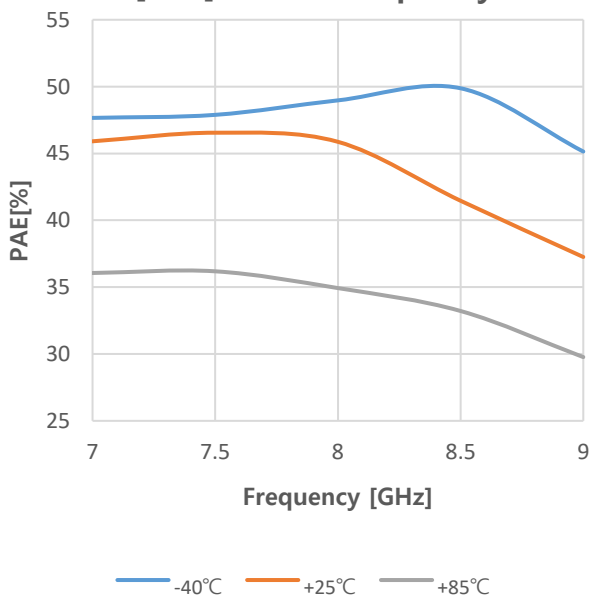


PAE vs Frequency Temperatures Performance

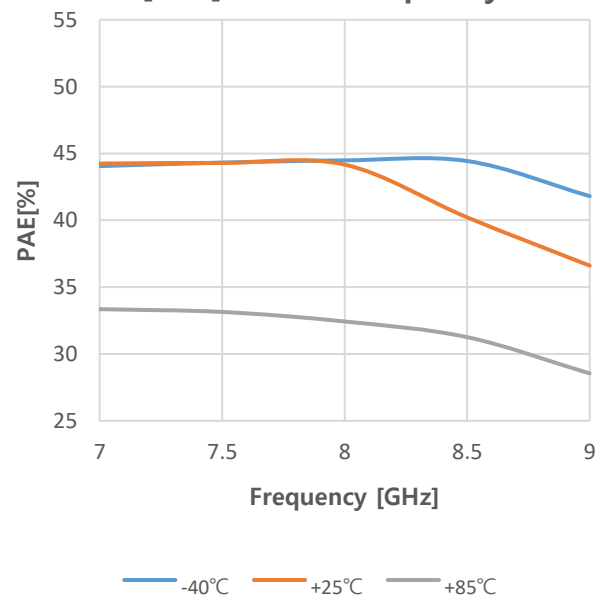
Drain Voltage= (28V IDQ=370mA), (32V IDQ=380mA)

Pulse-Mode(Pulse Width=100μsec, Duty Cycle=10%)

[28V] PAE vs Frequency



[32V] PAE vs Frequency

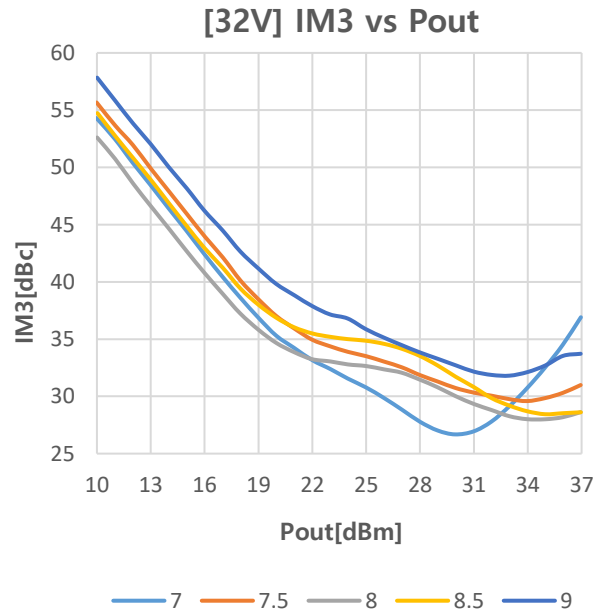
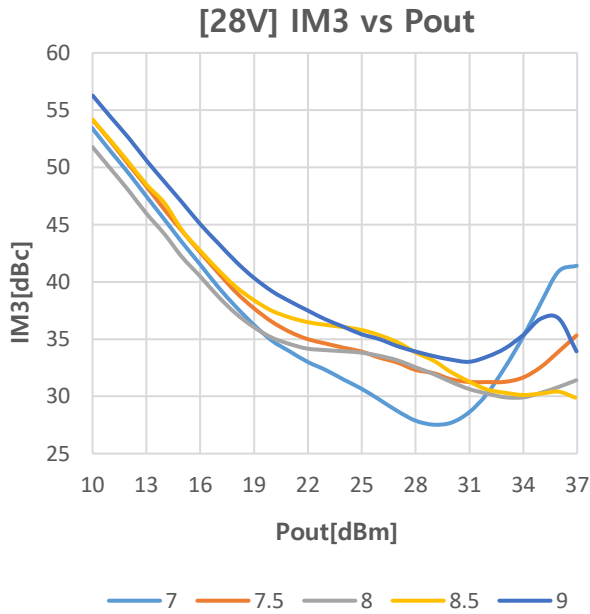




IM3 vs Output Power (Pout) vs Frequency Performance (Tc=25°C)

Drain Voltage= (28V IDQ=370mA), (32V IDQ=380mA)

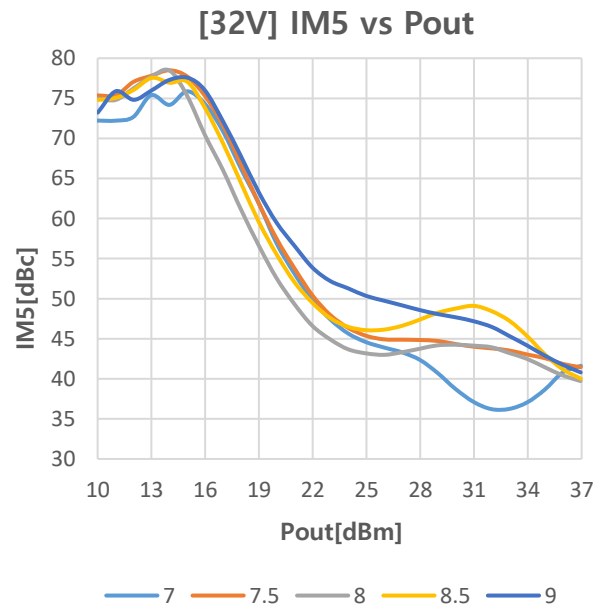
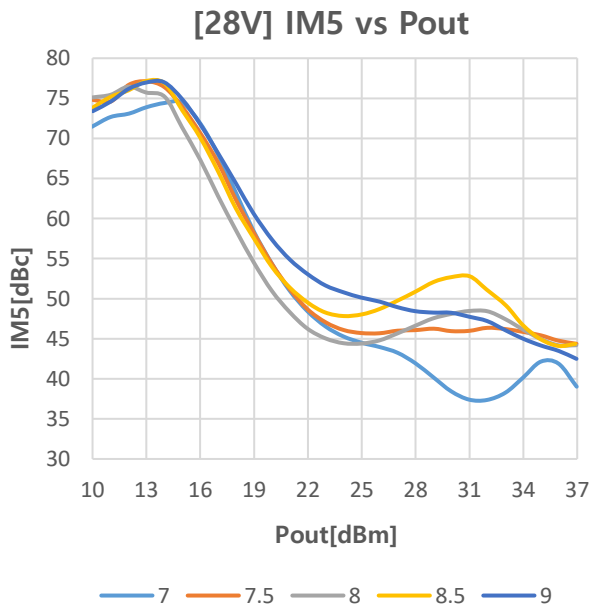
Tone Spacing = 10MHz



IM5 vs Output Power (Pout) vs Frequency Performance (Tc=25°C)

Drain Voltage= (28V IDQ=370mA), (32V IDQ=380mA)

Tone Spacing =10MHz

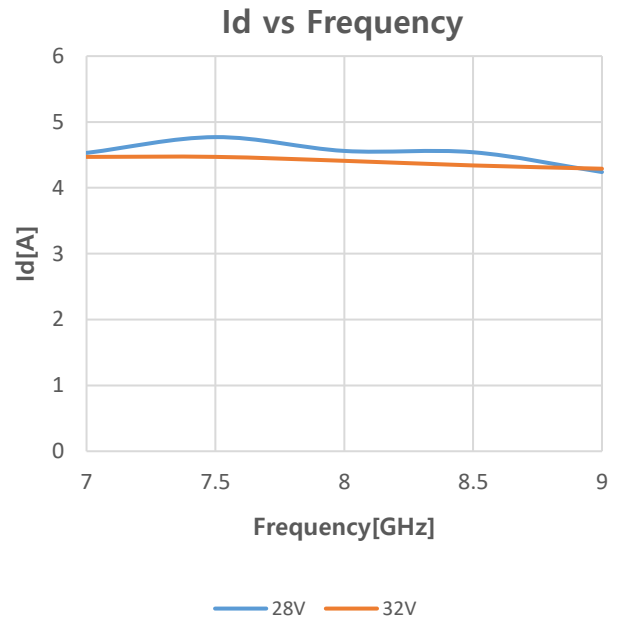
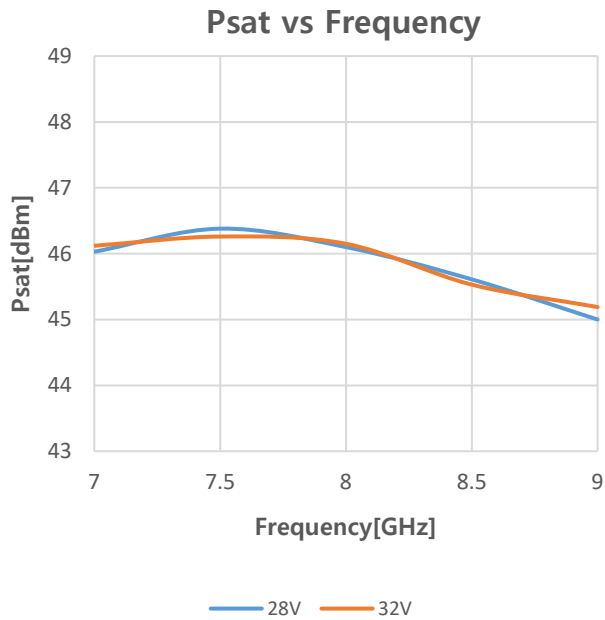




Psat, Id vs Frequency Performance (Tc=25°C)

Drain Voltage= (28V IDQ=370mA), (32V IDQ=380mA)

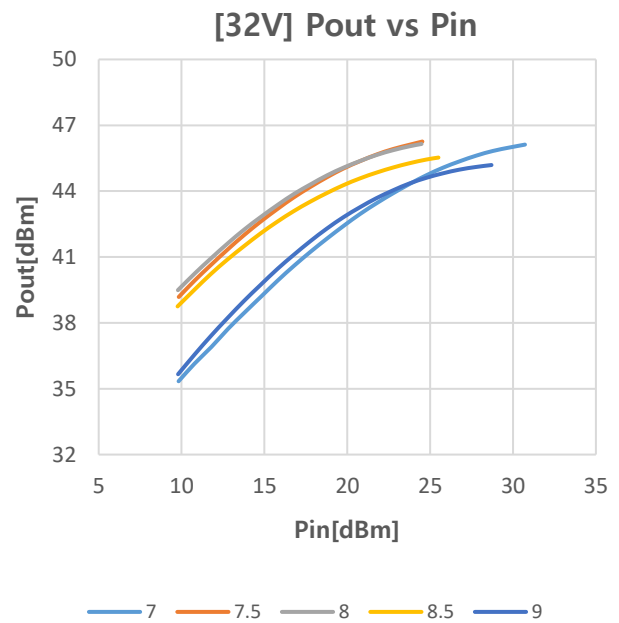
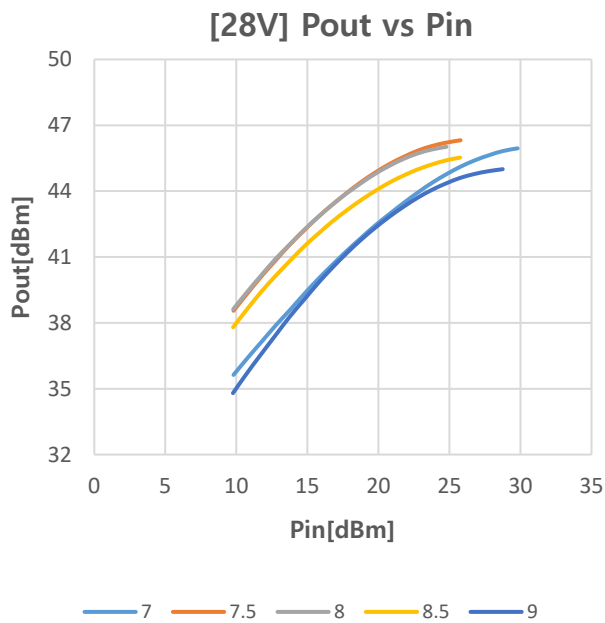
CW-Mode



Output Power (Pout) vs Input Power (Pin) Performance (Tc=25°C)

Drain Voltage= (28V IDQ=370mA), (32V IDQ=380mA)

CW-Mode

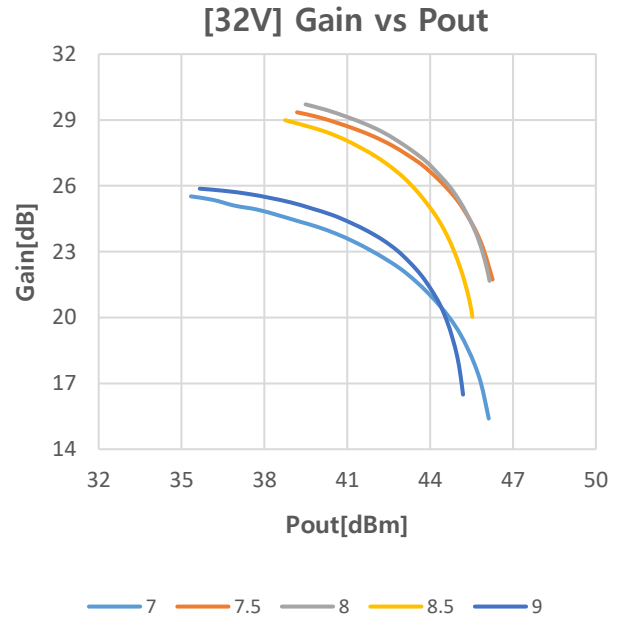
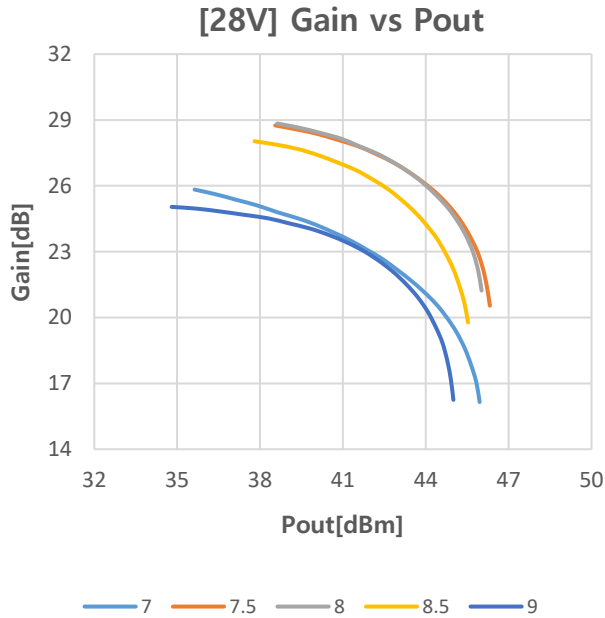




Gain vs Output Power (Pout) Performance (Tc=25°C)

Drain Voltage= (28V IDQ=370mA), (32V IDQ=380mA)

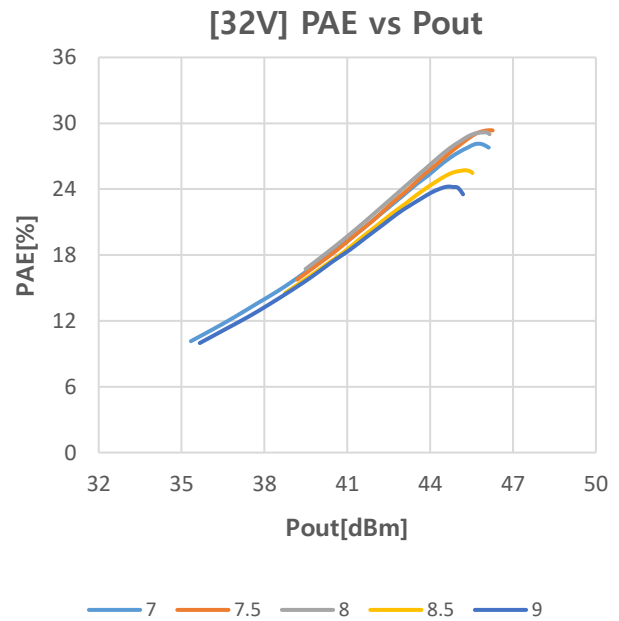
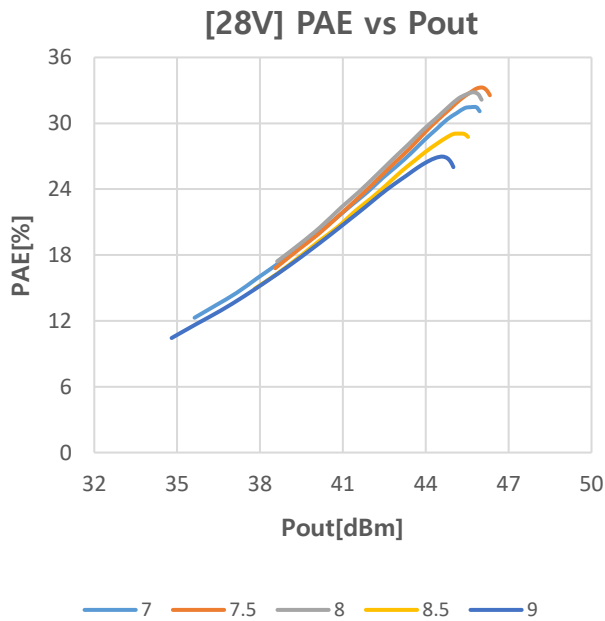
CW-Mode



PAE vs Output Power (Pout) Performance (Tc=25°C)

Drain Voltage= (28V IDQ=370mA), (32V IDQ=380mA)

CW-Mode





Product Dimension

- Product Type: MPKG, 10-lead bolt-down
- Unit: mm





Evaluation Board Circuit Outline





Bias Sequence

1. VG connection must be biased from both sides.
2. VD connection must be biased from both sides.
3. VG bias must be applied before VD

Test Condition

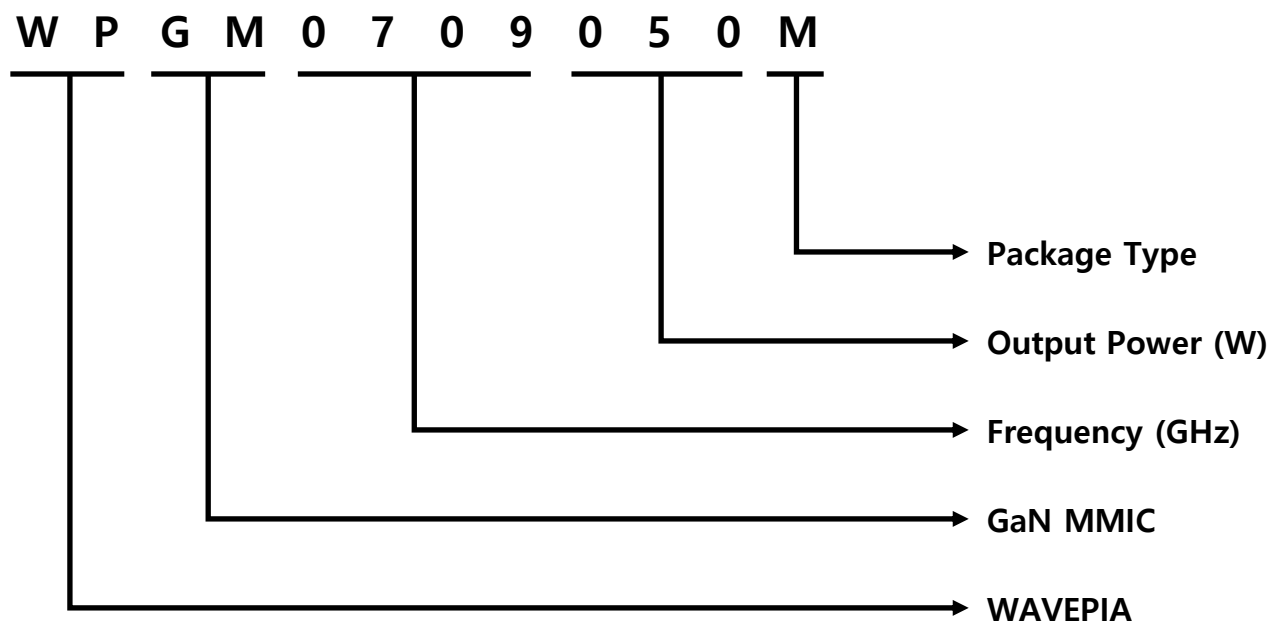
1. VD=28V, IDQ=370mA, VG=-2.56V
2. VD=32V, IDQ=380mA, VG=-2.56V

Evaluation Board Circuit Bill of Materials

Reference	Part Number	Value	Description	Package	Manufacturer	EA
C1, C2	293D476X9016D2TE3	47uF / 16V	Tantalium Capacitor	2917	MICRO TECHNOLOGY	2
C3, C4	TAJD106K035RNJ	10uF / 35V	Tantalium Capacitor	2917	KYOCERA AVX	2
C17, C18	CGA8N3X7R2E474K230KA	470nF / 250V	Ceramic Capacitor	1812	TDK	2
C19, C20	22201C106KAT2A	10uF / 100V	Ceramic Capacitor	2020	KYOCERA AVX	2
C5, C6, C15, C16	C2012X7S2A474K125AB	470nF / 100V	Ceramic Capacitor	0805	TDK	4
C7, C8, C13, C14	CL21B103KCANNNC	10nF / 100V	Ceramic Capacitor	0805	SAMSUNG	4
C9, C10, C11, C12	251R15S101JV4E	100pF / 250V	Ceramic Capacitor	0805	JOHANSON	4
R1, R2	WR06X100 JTL	10ohm	Chip Resistor	0603	WALSIN	2
C21, C22	KMG 50V 47uF 6.3*11	E-Cap (Dip Type)	electrolytic capacitor	0603	SAMYOUNG	2
J1, J2	SM06FS064	SMA / 4 Hole	SMA_4 Hole (DC to 26.5 GHz)	-	WITHWAVE	2
P1	-	-	RO4003C 12mil	-	Rogers	1
P2	-	-	RO4003C 12mil	-	Rogers	2
Q1	WPGM0709050M	-	GaN MMIC	-	WAVEPIA	1



Part Number System



Parameter	Value	Units
Lower Frequency	7	GHz
Upper Frequency	9	GHz
Output Power	50	W
Transistor Type	GaN MMIC	-
Package	MPKG	-

Handling Precautions

Parameter	Classification	Standard
ESD - Human Body Model (HBM)	Class 1A	ANSI/ESDA/JEDEC JS-001-2017
ESD - Charge Device Model (CDM)	Class C2	ANSI/ESDA/JEDEC JS-002-2018
MSL - Moisture Sensitivity Level	N/A	



ATTENTION
Electrostatic
Sensitive Device

Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations:

Web : www.wavepia.com
Tel : 82 - (0)31 - 8058 - 3374
Email : sales@wavepia.com

Important Notice

Specifications are subject to change without notice. WAVEPIA believes the information contained within this datasheet to be accurate and reliable. However, WAVEPIA assumes no responsibility or liability whatsoever for any of the information contained herein. The information contained herein is provided "AS IS, WHERE IS" and with all faults, and the entire risk associated with such information is entirely with the user.

Customers should obtain and verify the latest relevant information before placing orders for WAVEPIA products. All operating parameters should be validated by customer's technical experts for each application. WAVEPIA products are not designed, intended, or authorized for the use as components or amplifiers in applications intended for surgical implant into the body or to support or sustain life, in applications in which the failure of the WAVEPIA product could result in personal injury or death. WAVEPIA products should not be used in applications for planning, construction, maintenance, or direct operation of a nuclear facility. Customers shall comply fully with all export administration and control laws and regulations of the Republic of Korea and/or other national or international (e.g., UN) laws and regulations as may be applicable to the export, re-export, resale of any WAVEPIA products.

Any unauthorized dissemination, distribution, copying or use of the information contained in this file is strictly prohibited.
All information contained in this file must be kept and treated as CONFIDENTIAL.