

5G Ka-Band Power Amplifier Module



Key Features

- High Gain High Power 5G Ka-Band TDD Power Amplifier Module (PAM)
- 25 dB Minimum Gain from 27.5 to 28.35 GHz
- Gain Flatness ± 0.5 dB from 27.5 to 28.35 GHz
- +27 dBm OP1dB (CW Tone)
- +21 dBm Linear RF Power Output
- $< 2\%$ EVM RMS 256-QAM OFDMA Modulation
- Power Added Efficiency $> 40\%$ (+27 dBm OP1dB, 28 GHz)
- OIP3 = +40 dBm @ 28 GHz
- Single Power Supply Input (+3 Vdc)
- Operating Current = 400 mA Typical ($P_{diss} \approx 1.2$ Wdc)
- Advanced High Breakdown Voltage Indium Phosphide (InP) Power Amplifier Technology
- Low Profile Air-Cavity QFN-12 3 x 3 x 1.2 mm Surface Mount Package

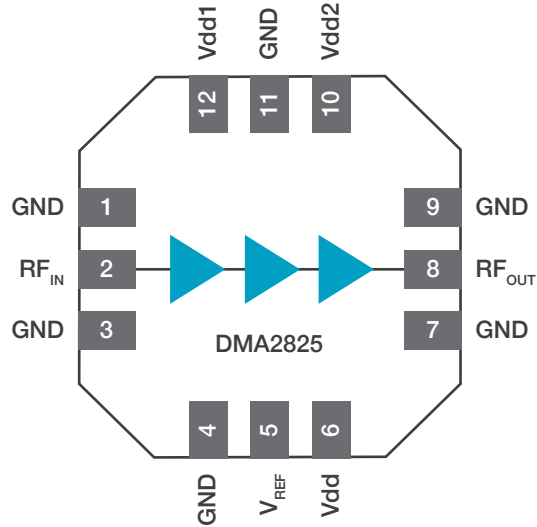
Applications

- 5G Ka-Band HetNet Antenna Array Transmitter Elements
- 5G Ka-Band Base Transceiver Station (BTS) Antenna Array Driver and Final Stage Transmitter Elements
- 5G Ka-Band MA-MIMO Transceiver Modules

Product Description

The 2825 is a high gain, high RF output power amplifier module (PAM) enabling 5G Ka-Band uplink (UL) and downlink (DL) TDD and full duplex (FD) transmitters, including BTS, HetNet, and user equipment (UE). Employing amplifier die manufactured on an advanced InP process, this high efficiency linear 50Ω input/output (I/O) amplifier is ideal for low power dissipation and low distortion applications. Designed for use as an easily cascaded gain block, its gain flatness of better than ± 0.5 dB within the LMDS A1 band make this part ideal for highly integrated MIMO and MA-MIMO applications. The part is available in a small outline, low profile SMT package.

Functional Block Diagram



Package Pin Out

Pin Number	Name	Description
1	GND	Ground
2	RF _{IN}	RF Input, 50 Ω, Single-Ended
3	GND	Ground
4	GND	PA Enable Voltage
5	V _{REF}	Reference Voltage Output
6	V _{DD}	Supply Voltage for Power Amplifier (PA) Input Stage
7	GND	Ground
8	RF _{OUT}	RF Output, 50 Ω, Single-Ended
9	GND	Ground
10	VDD2	Supply Voltage for Power Amplifier (PA) Output Stage
11	GND	Ground
12	VDD1	Supply Voltage for Power Amplifier (PA) Second Stage

Absolute Minimum and Maximum Ratings

Parameter	Min	Max	Units
Supply	0	+5.5	Vdc
RF Power at the Input	-	0	dBm
ESD Rating: Human Body Model ¹	100	-	V
Charged Device Model ²	250	-	
Moisture Sensitivity Level, MSL, Rating	3	-	-
Storage Temperature	-40	+150	°C
Soldering Temperature	-	+260	°C
Soldering Time	-	5	seconds

Notes: Stresses more than the absolute ratings may cause permanent damage. Functional operation is not implied under these conditions. Exposure to absolute ratings for extended periods of time may adversely affect reliability.

1. JEDEC Class 0A
2. JEDEC Class II
3. 260 °C Peak Reflow

Operating Ranges

Parameter	Min	Typ	Max	Units	Notes
RF Input/Output Frequency	27.5		28.35	GHz	
Supply Voltage	+2.7	+3	+3.6	V _{DC}	
RF Output Power, Linear	-	+21	-	dBm	TDD Uplink (UL)
Case Temperature, T _C	-40	-	+85	°C	

The device may be operated safely over these conditions; however, parametric performance is guaranteed only over the conditions defined in the Electrical Specification.

Electrical Specifications

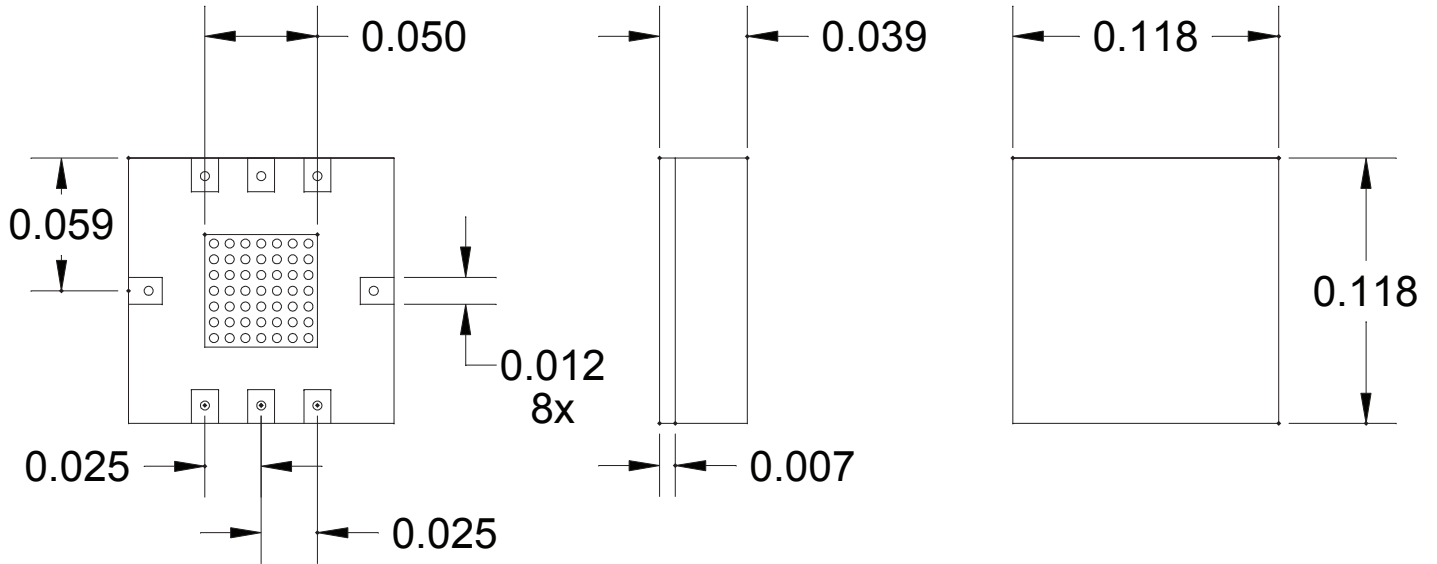
(Ta = +25 °C, Vdd = +3 VDC, f = as stated below, 50 Ω Input/Output)

Parameter	Min	Typ	Max	Units	Comments
Gain	14.5	25	25.5	dB	See Note 1; Pout = +18 dBm Linear RF Power Output TDD UL
Gain Flatness	-	-	± 0.5	dB	F = 27.5 to 28.35 GHz
OP1dB	-	+27	-	dBc	CW Tone; F = 28 GHz
Power-Added-Efficiency (PAE)	-	41	-	%	+27 dBm OP1dB, F = 27.5 to 28.35 GHz
OIP3	-	+40	-	dBm	F = 28 GHz
Noise Figure (NF)	-	-	4.9	dB	F = 28.35 GHz
Input Return Loss (IRL)	-14	-15	-	dB	See Note 1
Output Return Loss (ORL)	-15	-20	-	dB	See Note 1
Tx Error Vector Magnitude (EVM)	-	2	-	%RMS	5G NR 256-QAM UL, F = 28 GHz
Ruggedness	8:1			VSWR	No degradation or failure
ENABLE 'OFF' Time, T _{OFF}	-	0.10	0.2	μs	For Time Division Duplex (TDD) Operation
ENABLE 'ON' Time, T _{ON}	-	0.10	0.2	μs	For Time Division Duplex (TDD) Operation
Supply Current	-	400	-	mA	@ +3 Vdc for +27 dBm OP1dB

Notes: All specifications as measured using Duet evaluation assembly.

1. Measured in application circuit, F = 27.5 to 28.35 GHz.

Package Dimensions



NOTE: All dimensions in inches

Ordering Information

Order Number	Temperature Range	Package Description	Component Packaging
DMA2825P0	-40 to +85 °C	3 x 3 x 1.2 mm, Air-Cavity QFN-12	Gel Pak, 1 to 100 each
DMA2825V0	-40 to +85 °C	3 x 3 x 1.2 mm, Air-Cavity QFN-12	1500 each, T&R
DMA2825PCBA	-40 to +85 °C	50 Ω I/O Evaluation Board (EVB)	EVB Kit with five (5) piece IC sample ESD bag

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