SUPER WIDEBAND, HIGH GAIN

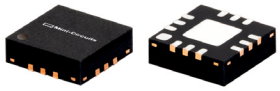
Monolithic Amplifier

PMA3-453+

50Ω 10 to 45 GHz

THE BIG DEAL

- Wideband, 10 to 45 GHz
- Usable down to 9 GHz
- High Gain, 25.5 dB typ. at 20 GHz
- Low NF, 1.6 dB typ. at 20 GHz
- P1dB, 10 dBm typ. at 20 GHz
- OIP3, 22 dBm typ. at 20 GHz
- Built-in Bias Tee and DC Blocks
- Patent Pending



Generic photo used for illustration purposes only

CASE STYLE: DQ1225

+RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

APPLICATIONS

- 5G
- Lab Instrument
- Satellite

PRODUCT OVERVIEW

The PMA3-453+ is a PHEMT based wideband, low noise MMIC amplifier with a unique combination of high gain and low noise figure over a very board bandwidth making it ideal for using as the first stage driver amplifier of receiver applications. This design operates on a single 4V supply, is matched to 50 Ohm and comes in a tiny plastic package (3 x 3 x 0.89mm), accommodating dense circuit board layouts.

KEY FEATURES

Feature	Advantages
Low NF (<3.0dB typ.) up to 30GHz	Enables lower system noise figure performance.
High Gain 20dB typ. up to 30GHz	Enables signal amplification without the need for multiple gain stage, minimizing the effect of subsequent stages on noise figure.
Built-in Bias Tee & DC Blocks	Minimizes the external component count & PC board space, making it less expensive and user friendly for system designers.
3 x 3mm 12-lead MCLP package	Tiny footprint saves space in dense layouts while providing low inductance, repeatable transitions, and excellent thermal contact to the PCB.

REV. C
ECO-011519
PMA3-453+
GY/RS/CP/AM
220120

ELECTRICAL SPECIFICATIONS[1] AT 25°C, Vs=4V AND R1=18Ω, UNLESS NOTED OTHERWISE

Parameter	Condition (GHz)	Vs=4.0V Min.	Typ.	Max.	Units
Frequency Range	—	10		45	GHz
Noise Figure	10 20 30 40 45		1.9 1.6 2.4 3.8 5.2		dB
Gain	10 20 30 40 45	22.5 22.2 14.5 10.4 —	25.3 25.5 18.2 14.1 9.1	29.2 31.1 23.9 18.1 —	dB
Input Return Loss	10 20 30 40 45		13 21 8 5 5		dB
Output Return Loss	10 20 30 40 45		12 10 9 15 7		dB
Output Power @ 1 dB compression	10 20 30 40 45		8.5 10.0 11.0 11.7 10.1		dBm
Output IP3	10 20 30 40 45		18.6 22.0 23.4 21.9 21.4		dBm
Supply Voltage (Vs)		3.75	4.0	4.25	V
Device Operating Current (I_{DD})			68	112	mA
Device Current Variation vs. Temperature[2]			-50		µA/°C
Device Current Variation vs. Voltage			0.02		mA/mV
Thermal Resistance, junction-to-ground lead			106		°C/W

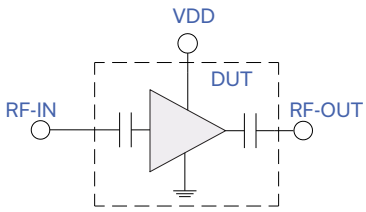
1. Measured on Mini-Circuits Characterization test board TB-PMA3-453+ with thru-line loss being deducted. See Characterization Test Circuit (Fig. 1)
2. Device Current Variation vs. Temperature = (Current at 85°C - Current at -45°C)/130°C

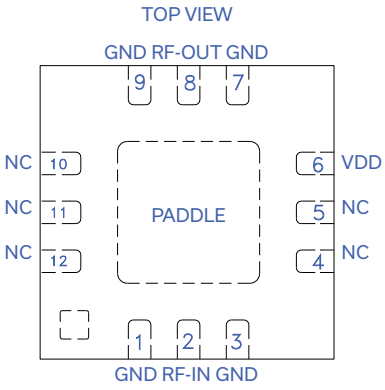
MAXIMUM RATINGS[3]

Parameter	Ratings
Operating Temperature (ground lead)	-40°C to 85°C
Storage Temperature	-65°C to 150°C
Junction Temperature	146°C
Total Power Dissipation	0.65W
Input Power (CW), Vs=4V	+23 dBm (5 minutes max.) +13 dBm (continuous)
DC Voltage at Port 2 & 8	2V
DC Voltage (Vs)	6V

3.Permanent damage may occur if any of these limits are exceeded. Electrical maximum ratings are not intended for continuous normal operation.

SIMPLIFIED SCHEMATIC AND PAD DESCRIPTION





Function	Pad Number	Description (Fig. 1)
RF-IN	2	RF Input Pad. Connects to RF input
RF-OUT	8	RF Output Pad. Connects to RF output
VDD	6	DC Power Supply Pad. Connects to Voltage Source Vs via R1
Ground	1,3,7,9 & Paddle	Connects to ground
No Connection	4,5,10,11& 12	Not used internally. Connected to ground on test board

RECOMMENDED APPLICATION AND CHARACTERIZATION TEST CIRCUIT

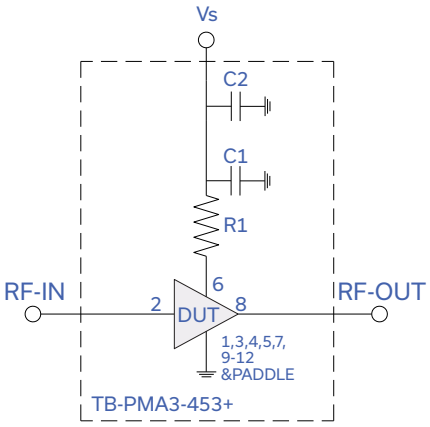
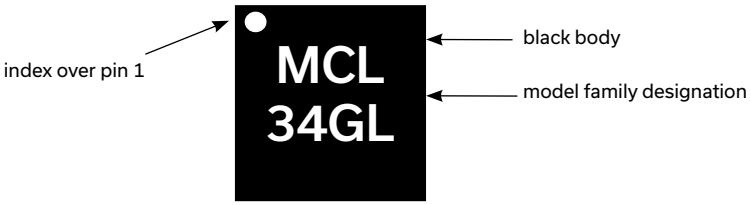


Fig 1. Application and Characterization Circuit
Note: This block diagram is used for characterization. (DUT is soldered on Mini-Circuits Characterization test board TB-PMA3-453+) Gain, Return loss, Output power at 1dB compression (P1 dB), output IP3 (OIP3) and noise figure measured using Agilent's N5245A microwave network analyzer.

Conditions:
1. Gain and Return loss: Pin= -25dBm
2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, -5dBm/tone at output.

Component	Size	Value	Part Number	Manufacturer
R1	0603	18 Ohm	SG73G1JTTD18R0C	KOA
C1	0402	5 pF	GJM1555C1H5R0CB01D	Murata
C2	0402	0.1 uF	GRM155R71C104KA88D	Murata

PRODUCT MARKING



Marking may contain other features or characters for internal lot control