AMMC-6440

37-42 GHz 1W Power Amplifier

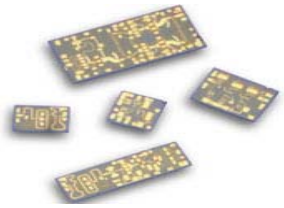
Description

AMMC-6440 is a broadband 1W power amplifier designed for use in transmitters that operate in various frequency bands between 37 GHz and 42 GHz.

It is fabricated in a PHEMT process for exceptional power and gain performance.

Lead (PB) Free
RoHS 6 fully compliant

Lifecycle status: Active



Features

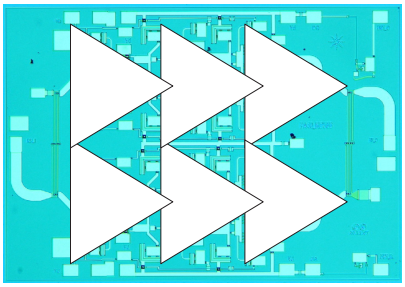
- Wide Frequency Range: 37-42 GHz
- High Gain: 14 dB
- Power: @42 GHz, P-1dB=28 dBm
- High linear: OIP3=39 dBm
- Integrated RF Power Detector
- 5.5v, -0.7v, 950 mA operation

Applications

- Microwave Radio Systems
- LMDS and Point-to-Point Millimeter Wave Long Haul Platforms
- 802.16 & 802.20 WiMax BWA
- WLL and MMDS Loops
- Commercial grade military
- Can be driven by AMMC-6345, increasing overall gain

AMMC - 6440
37 - 42 GHz Power Amplifier

Data Sheet



Chip Size: 2500 x 1750 µm (100 x 69 mils)
Chip Size Tolerance: ± 10 µm (±0.4 mils)
Chip Thickness: 100 ± 10 µm (4 ± 0.4 mils)
Pad Dimensions: 100 x 100 µm (4 ± 0.4 mils)

Description

The AMMC-6440 MMIC is a broadband 1W power amplifier designed for use in transmitters that operate in various frequency bands between 37GHz and 42GHz. This MMIC optimized for linear operation with an output third order intercept point (OIP3) of 38dBm. At 42GHz it provides 28dBm of output power (P-1dB) and 14dB of gain. The device has input and output matching circuitry for use in 50 Ω environments. The AMMC-6440 also integrates a temperature compensated RF power detection circuit that enables power detection of 0.25V/W. DC bias is simple and the device operates on widely available 5.5V for current supply (negative voltage only needed for Vg). It is fabricated in a PHEMT process for exceptional power and gain performance. For improved reliability and moisture protection, the die is passivated at the active areas.

Features

- Wide frequency range: 37 - 42 GHz
- High gain: 14 dB
- Power: @42 GHz, P-1dB=28 dBm
- Highly linear: OIP3=39dBm
- Integrated RF power detector
- 5.5 Volt, -0.7 Volt, 950mA operation

Applications

- Microwave Radio systems
- LMDS & Pt-Pt mmW Long Haul
- 802.16 & 802.20 WiMax BWA
- WLL and MMDS loops
- Can be driven by AMMC-6345, increasing overall gain

AMMC-6440 Absolute Maximum Ratings [1]

Symbol	Parameters/Conditions	Units	Min.	Max.
V_d	Positive Drain Voltage	V		7
V_g	Gate Supply Voltage	V	-3	0.5
I_d	Drain Current	mA		1500
P_{in}	CW Input Power	dBm		23
T_{ch}	Operating Channel Temp.	°C		+150
T_{stg}	Storage Case Temp.	°C	-65	+150
T_{max}	Maximum Assembly Temp (60 sec max)	°C		+300

Note:
1. Operation in excess of any one of these conditions may result in permanent damage to this device.

Note: These devices are ESD sensitive. The following precautions are strongly recommended. Ensure that an ESD approved carrier is used when dice are transported from one destination to another. Personal grounding is to be worn at all times when handling these devices

AMMC-6440 DC Specifications/Physical Properties [1]

Symbol	Parameters and Test Conditions	Units	Min.	Typ.	Max.
I_d	Drain Supply Current (under any RF power drive and temperature) (V_d=5.5 V, V_g set for I_d Typical)	mA		950	1050
V_g	Gate Supply Operating Voltage ($I_{d(Q)}$ = 950 (mA))	V	-0.85	-0.7	-0.65
q_{ch-b}	Thermal Resistance [2] (Backside temperature, T_b = 25°C)	°C/W		6.4	

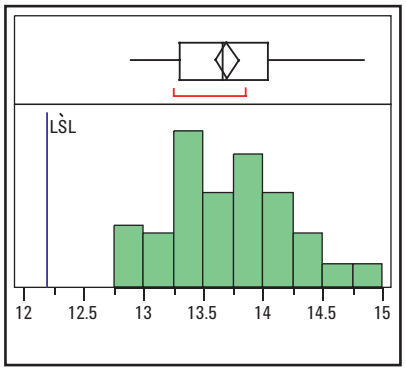
Notes:
1. Ambient operational temperature T_A=25°C unless otherwise noted.
2. Channel-to-backside Thermal Resistance (θ_{ch-b}) = 9.0°C/W at $T_{channel}$ (T_C) = 70°C as measured using infrared microscopy. Thermal Resistance at backside temperature (T_b) = 25°C calculated from measured data.

AMMC-6440 RF Specifications [3, 4, 5]

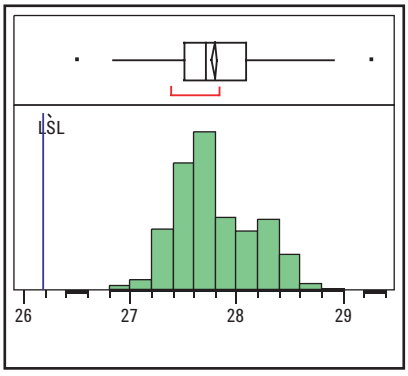
T_A= 25°C, V_d=5.5V, $I_{d(Q)}$=950 mA, Z_o=50 Ω

Symbol	Parameters and Test Conditions	Units	Minimum	Typical	Maximum	Sigma
Gain	Small-signal Gain[4]	dB	12	14		0.5
P_{-1dB}	Output Power at 1dB Gain Compression	dBm	26	28		0.39
P_{-3dB}	Output Power at 3dB Gain Compression	dBm		28.5		0.36
OIP3	Third Order Intercept Point; Δf=10MHz; Pin=-20dBm	dBm		38		0.86
RLin	Input Return Loss[4]	dB		-16		0.70
RLout	Output Return Loss[4]	dB		-18		0.71
Isolation	Min. Reverse Isolation	dB		-47		3.00

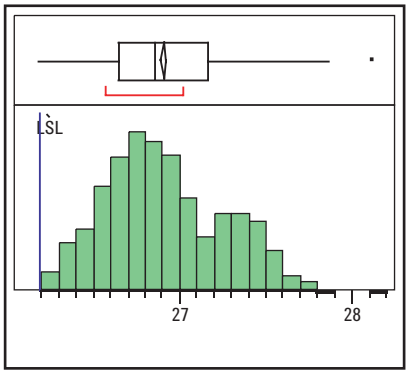
Notes:
3. Small/Large -signal data measured in wafer form T_A = 25°C.
4. 100% on-wafer RF test is done at frequency = 38, 40, and 42 GHz. Statistics based on 1500 part sample
5. Specifications are derived from measurements in a 50 Ω test environment. Aspects of the amplifier performance may be improved over a more narrow bandwidth by application of additional conjugate, linearity, or power matching.



Gain at 40 GHz

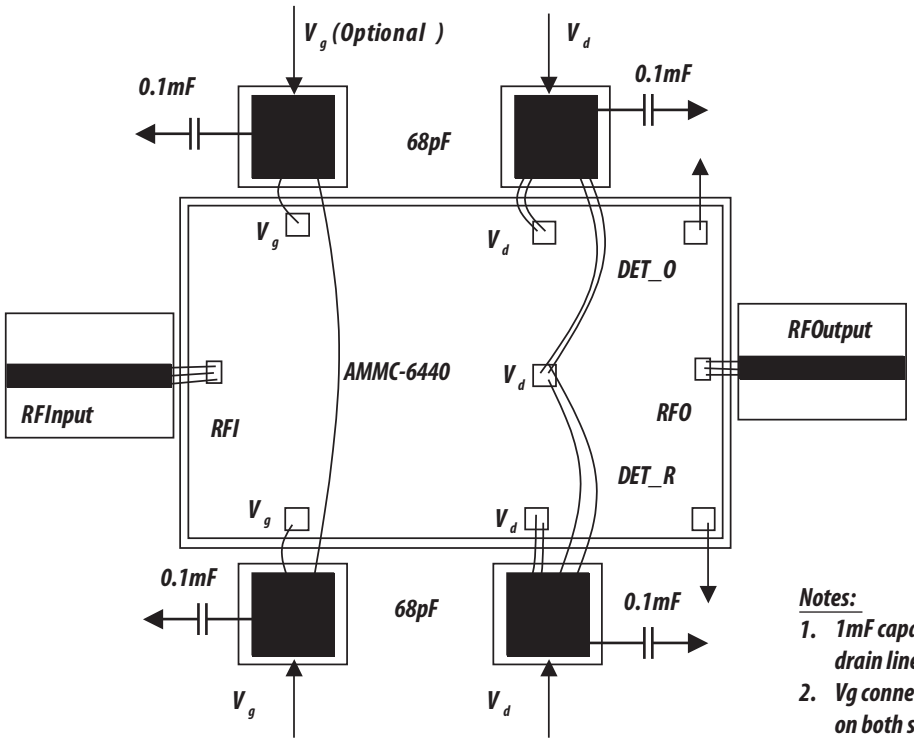


P-1dB at 40 GHz



P-1dB at 42 GHz

Typical distribution of Small Signal Gain and Output Power @P-1dB. Based on 1500 part sampled over several production lots.



Notes:

1. ***1mF capacitors on gate and drain lines not shown required.***
2. ***Vg connection is recommended on both sides for devices operating at or above P1dB.***

Figure 13. AMMC-6440 Assembly diagram

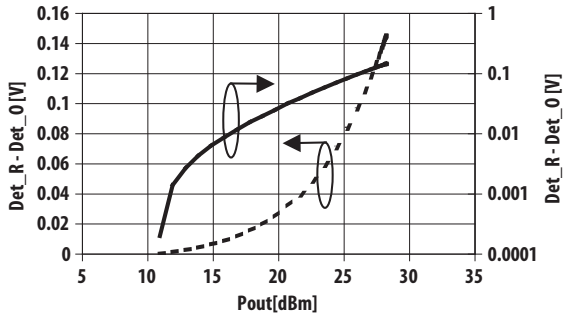


Figure 14. AMMC-6440 Typical Detector Voltage and Output Power, Freq=40 GHz

Ordering Information:

AMMC-6440-W10 = 10 devices per tray

AMMC-6440-W50 = 50 devices per tray

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