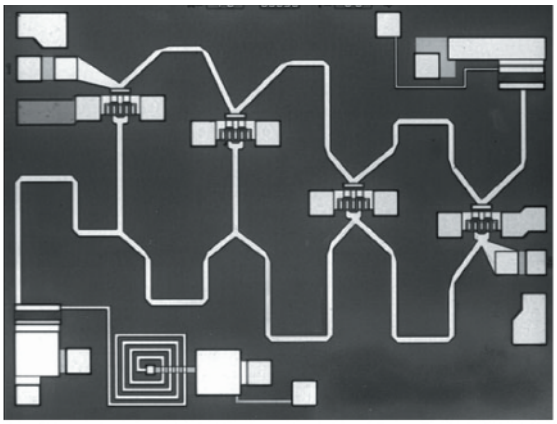
Data sheet

# MMIC Broadband Amplifier, 6- 18GHz

The **P35-4140-000-200** is a high performance monolithic broadband amplifier designed for use in a wide range of applications including telecommunications, instrumentation and electronic warfare. The amplifier gives typically 5.5dB gain over the frequency range 6GHz to 18GHz. On chip input and output blocking capacitors simplify assembly and allow the amplifier to be cascaded easily.

The die is fabricated using Bookham Technology's F20 Gallium Arsenide MESFET MMIC process. It is fully protected using Silicon Nitride passivation for excellent performance and reliability.



**Features**

- Broadband cascadable gain block
- AGC control with gate bias
- 15dBm output power typical
- Noise Figure 5.5dB typical
- On chip DC blocking capacitors at input and output

## Electrical Performance

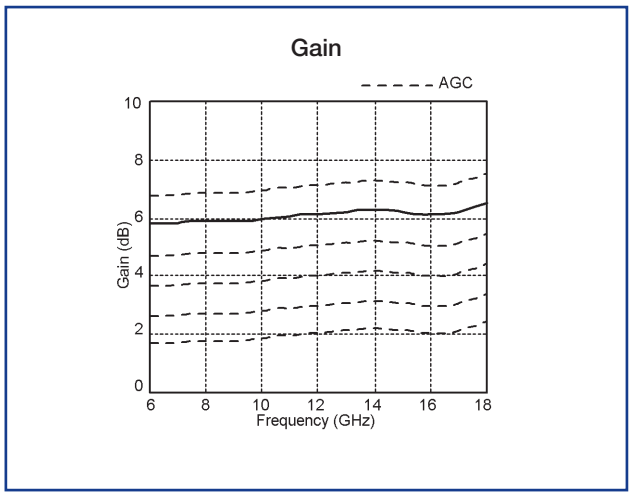
Ambient temperature = 22 ±3 Deg C , Zo = 50 ohms, Vd = 5V, Id = 50% Idss

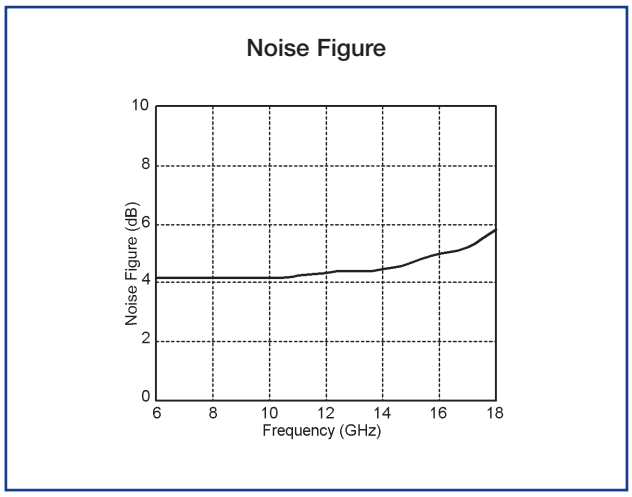
| Parameter | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|
| Small signal gain [1] | 6GHz - 18GHz | 5.0 | 5.5 | - | dB |
| Gain Flatness | 6GHz - 18GHz | - | ±0.5 | ±1.0 | dB |
| Input Return Loss [2] | 6GHz - 14GHz | 6.5 | 8 | - | dB |
| | 14GHz - 18GHz | 4.5 | 8 | - | |
| Output Return Loss | 6GHz - 18GHz | 10 | 15 | - | dB |
| Noise figure | 6GHz - 18GHz | - | 5.5 | 7.0 | dB |
| Output Power at 1dB Compression | 6GHz | - | 18.0 | - | dBm |
| | 18GHz | 14.0 | 15.0 | - | |
| Reverse Isolation | 6GHz | - | 25.0 | - | dB |
| | 18GHz | - | 14.0 | - | dB |
| Gate Voltage Vg [3] | For Id = 60mA | 0 | -0.6 | -5 | Volts |
| Drain Voltage Vd | | +4.5 | +5.0 | +6.0 | Volts |

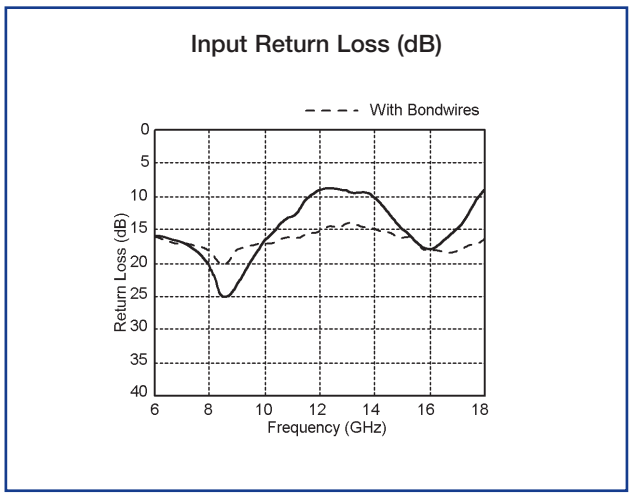
### Notes

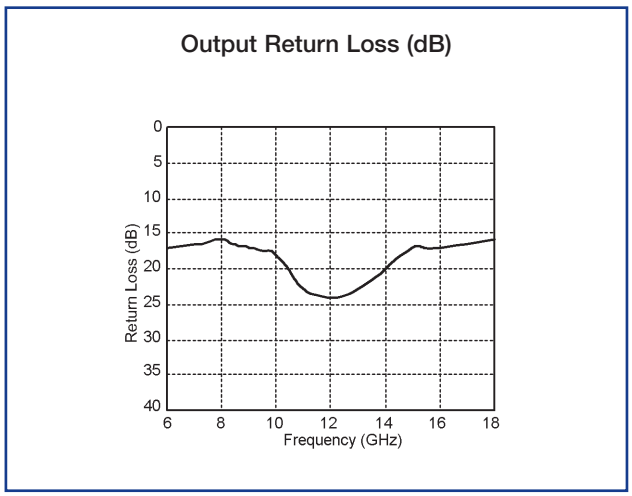
1. At 50% Idss, which will be in the range 40-80mA.
2. Improved input return loss can be achieved at the bondwire/microstrip interface.
3. Gain control can be achieved with variation of Vg typically 5dB/vo

## Typical Performance at 22° C




## Absolute Maximum Ratings

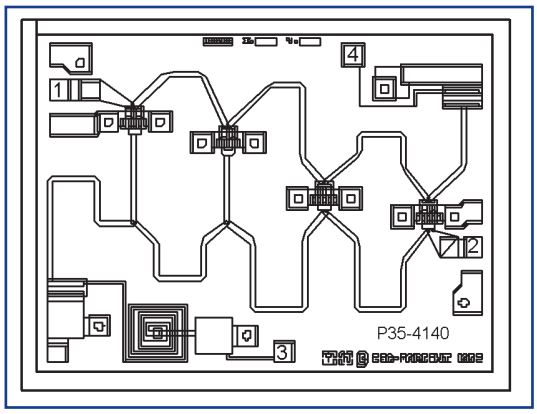
| | |
|---|---|
| Max supply voltage | +6.0V |
| Max Vgs | -5.0V |
| Chip operating temperature | -55°C to 125°C |
| Storage temperature | -65°C to +150° |

## Operation

To operate the P35-4140-0, a drain supply of 5V is connected to pad 3. The amplifier circuit is controlled by the voltage applied at pad 4 and should be set to give a drain current of 50% Idss which will be in the range of 40-80mA, typically 60mA. The voltage required for this is typically -0.6V. Gain control achieved with the variation of Vg is typically 5dB/volt at 50% Idss. Improved input return loss (approx. 10dB) can be achieved at the bondwire/microstrip interface once the die is mounted by the addition of an input microstrip transformer (see input return loss plot). Decoupling capacitors of 470pF are required at the gate and drain bias inputs. Additional drain decoupling with a 4.7 µF capacitor is recommended. The RF connections should be made with two wires (25 µm diam), Maximum length 0.3mm at RF in and a single wire, length 0.4mm at RF out.

See application note P35-41AN2 for more details. It is recommended that the die is mounted with silver loaded epoxy and bonding to all pads is with 25 µm diameter gold wire using thermal compression bonding. Gain variation with temperature is typically 0.015dB/°C

## Die Outline

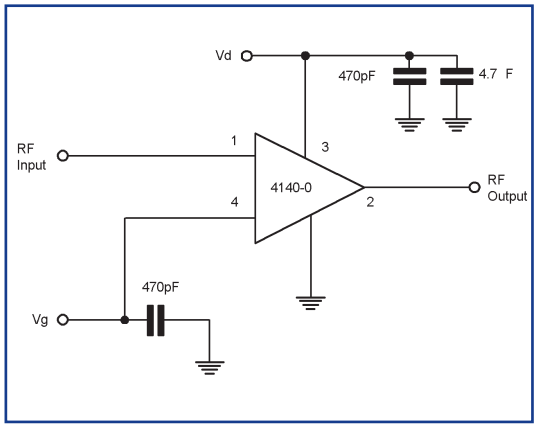



## Pad Details

| Pad | Function |
|---|---|
| 1 | RF IN |
| 2 | RF OUT |
| 3 | Drain Voltage Vd |
| 4 | Gate Voltage Vg |

| | |
|---|---|
| Chip size: | 2.69 x 2.06mm |
| Bond pad size: | 120 µm square |
| Chip thickness: | 200 µm |

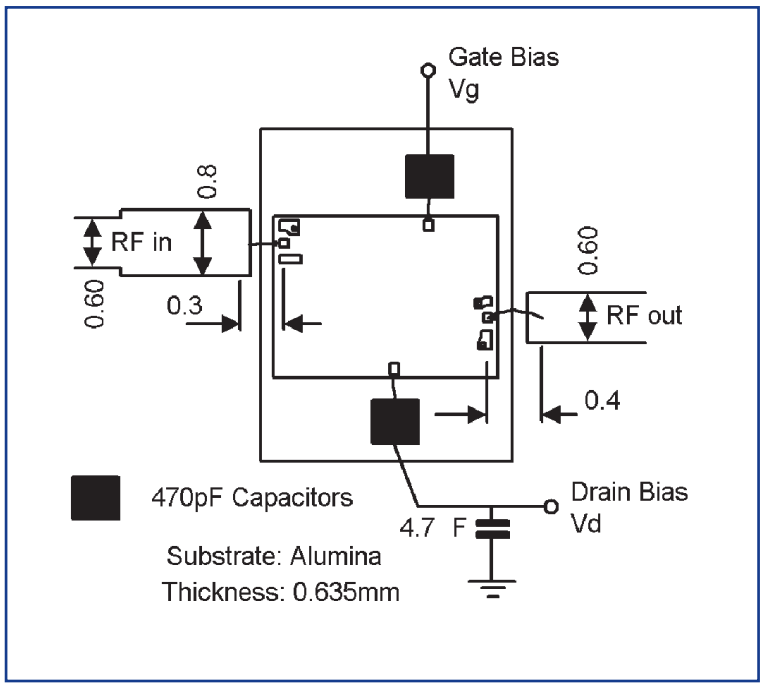
## De bias connections




## Ordering Information

P35-4140-000-200

## Bond Pad Configuration

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