Wideband 300W EMC Solid State Power Amplifier
6-18GHz

Product Description
REMC06G18GG is a wideband EMC power amplifier with wide frequency range of 6 to 18GHz.

Features
1. Small Signal Gain 90dB Typical
2. Digital Control Attenuator 31.5dB max, 0.5db step
3. Psat 55dBm Typical
4. Power supply: 3-phase VAC
5. 50 Ohm Matched Input/Output
6. Protection Functions:
   • Over temperature
   • Over current
   • Current imbalance
   • RF input over drive protection
   • VSWR protection
7. Amplifier Automatic Calibration Function
8. RF Output Power Display
9. RF Output Enable Function
10. High Maximum RF Input Power Handling, 10W max
11. Ethernet Remote Control
12. 5-inch LCD Front Panel Display Screen

Typical Applications
- Wireless Infrastructure
- Military and Aerospace Applications
- Test Instrumentation
- Radar Systems
- 5G Wireless Communications
- Microwave Radio Systems
- TR Modules
- Research and Development
- Cellular Base Stations

Electrical Specifications ($T_A$=+25°C)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range</td>
<td>6 – 18</td>
<td>GHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small Signal Gain</td>
<td>90 dB</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Gain Flatness</td>
<td>+/-10</td>
<td>dB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gain Variation Over Temperature (-30°C to +50°C)</td>
<td>+/-5</td>
<td>dB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Return Loss</td>
<td>-18 dB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Output 1dB Compression Point (P1dB)</td>
<td>51 dBm</td>
<td></td>
<td></td>
<td>dBm</td>
</tr>
<tr>
<td>*Saturated Output Power (Psat)</td>
<td>55 dBm</td>
<td></td>
<td></td>
<td>dBm</td>
</tr>
<tr>
<td>Supply Current (3-phase 208VAC)</td>
<td>10 A</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IM3</td>
<td>-30 dBC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RF ON and OFF Speed</td>
<td>80/2500</td>
<td></td>
<td></td>
<td>us</td>
</tr>
<tr>
<td>Power Added Efficiency (PAE)</td>
<td>20 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>90/40.8</td>
<td>Lbs/KG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impedance</td>
<td>50 Ohms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input / Output Connectors</td>
<td>N-Type Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Package</td>
<td>Please see the mechanical drawing</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* P1dB, P3dB and Psat power test signal: 200μs pulse width with 10% duty cycle.
Absolute Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage Range</td>
<td>3-phase VAC</td>
</tr>
<tr>
<td>*RF Input Power (RFIN)</td>
<td>Psat – Large Signal Gain</td>
</tr>
</tbody>
</table>

Bias Up Procedure
1. Connect input and output with 50 Ohm source/load. (In band VSWR < 1.9:1 or >10dB return loss.)
2. Connect Power Cable
3. Turn On Back Panel AC Power Supply Air Breaker
4. Press Front Panel Power Switch to Power Display

Bias Down Procedure
1. Press Front Panel Power Switch to Power Off Display
2. Turn Off Back Panel AC Power Supply Breaker
3. Remove Power Cable (If Moving Equipment)
4. Disconnect input and output with 50 Ohm source/load. (In band VSWR < 1.9:1 or >10dB return loss.)

Environmental Specifications and Test Standards

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational Temperature</td>
<td>-30°C to +50°C (Case Temperature)</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-55°C to +125°C</td>
</tr>
<tr>
<td>Thermal Shock</td>
<td>-40°C → +85°C (5 Cycles / 10 hours)</td>
</tr>
<tr>
<td>**Random Vibration</td>
<td>MIL-STD-202G Table 214-I, Test Condition Letter C 1.5 Hours Per Axis</td>
</tr>
<tr>
<td>High Temperature Burn In</td>
<td>Temperature +85°C for 72 Hours</td>
</tr>
<tr>
<td>Shock</td>
<td>1. Weight &gt;20g, 50g half sine wave for 11ms, Speed variation 3.44m/s 2. Weight &lt;=20g, 100g Half sine wave for 6ms, Speed variation 3.75m/s 3. Total 18 times (6 directions, 3 repetitions per direction).</td>
</tr>
<tr>
<td>Altitude</td>
<td>Standard: 30,000 Ft (Epoxy Sealed Controlled Environment) Optional: Hermetically Sealed (60,000 ft. 1.0 PSI min)</td>
</tr>
<tr>
<td>Hermetically Sealed</td>
<td>MIL-STD-883 (For Hermetically Sealed Units)</td>
</tr>
</tbody>
</table>

*Maximum RF input power is set to assure safety of amplifier. Input power may be increased at own risk to achieve full power of amplifier. Please reference gain and power curves.
**For vibration testing details please see additional information section.
Typical Performance Plots

Gain vs. Frequency @+25°C

Gain vs. Output Power @+25°C

Right IM3 @+25°C

Left IM3 @+25°C

Note: Small signal VNA measurements include attenuators to protect equipment
Typical Performance Plots

Output Power vs. input Power @+25°C

Note: Small signal VNA measurements include attenuators to protect equipment
EMC Equipment Specifications

Front Panel

- LCD Display
- Keypad
- Gain Adjustment Knob
- RF Output
- RF Input
- Front Panel ON/OFF switch

Rear Panel

- AC power supply ON/OFF air breaker
- AC power cord
- -40dB Output
- GND connector
- USER Interface, D-SUB Connector
  See page below for more information.
- USB Port
- LAN Port (upon request)
Switching On Instrument

Please follow the instructions on the front panel LCD screen after switching on the power. Press “1” on keypad to continue.

Self Calibration Screen

Calibration is may be recommended

’[1] Calibrate’ to execute instrument self calibration process.

’[2] Reset’ to reboot the instrument.

*Please turn OFF RF input power, and terminate the RF output port while applying calibration function

Instrument Protection Alarms

The front panel LCD screen will display the error code or error message when instrument self protection is triggered. Front panel alarm indicator will light up.

To eliminate the error code, press “RESET” on front panel keypad to reboot the instrument and clear the alarms.

If error code can not be eliminated after reboot, please contact support@rflambda.com
Instrument Status Display Page

Indicates instrument RF output status. It will display:
- Output is Ready to Turn on or RF Output is ON
- Instrument temperature
- RF output attenuation (change with adjustment knob)
- RF input signal center frequency
- Instrument RF output power
- Press "Menu" on keypad to enter instrument functions selection menu
- User can set a constant gain for the unit. Equipment will automatically adjust the gain at certain frequency
- Switches On or Off for instrument RF output port

Instrument Function Selection Page

To enter this function selection page, press "Menu" on front panel keypad while the instrument is showing the status page. Press the corresponding number on front panel keypad to select:
- "[1] Calibrate" calibrates the instruments.
- "[2] Frequency" enters RF input signal center frequency.
- "[3] RF ON/OFF" switches the RF output port on or off.
- "[4] Reset" Restarts the instrument (Turns RF output off)
- "[5] Status" enters instrument status display page.
- "[6] Product Info" displays product part number and serial number

All action functions will ask for confirming execution when selected from function selection menu.
## Protection Connector Table

Male D-Sub is on the housing  
The mating male part number: 172-E15-203R001

<table>
<thead>
<tr>
<th>Pin #</th>
<th>Name</th>
<th>Function</th>
<th>Initial State</th>
<th>Description</th>
<th>Applied</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reset</td>
<td>Control</td>
<td></td>
<td>Resets PA when logic <strong>LOW</strong> is applied and released</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>Driver Disable</td>
<td>Control</td>
<td>LOW</td>
<td>Applying logic <strong>HIGH</strong> disables drains of amplifiers</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Last Amplifier Disable</td>
<td>Control</td>
<td>LOW</td>
<td>Applying logic <strong>HIGH</strong> disables gates of amplifiers</td>
<td>Yes</td>
</tr>
<tr>
<td>4</td>
<td>RF IN Over Indicator</td>
<td>HIGH</td>
<td></td>
<td>Pin will be latched to logic <strong>LOW</strong> when input signal is over limit</td>
<td>Yes</td>
</tr>
<tr>
<td>5</td>
<td>Temp Over Indicator</td>
<td>HIGH</td>
<td></td>
<td>Pin will be latched to logic <strong>LOW</strong> when amplifier is driven over temperature</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>Current Over Indicator</td>
<td>HIGH</td>
<td></td>
<td>Pin will be latched to logic <strong>LOW</strong> when drain current limit is reached</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td>ID Imbalance Indicator</td>
<td>HIGH</td>
<td></td>
<td>Pin will be latched to logic <strong>LOW</strong> when an imbalance in the drain current of the combining branches occurs</td>
<td>Yes</td>
</tr>
<tr>
<td>8</td>
<td>PA Off Alarm Indicator</td>
<td>HIGH</td>
<td></td>
<td>Pin will be latched to logic <strong>LOW</strong> when any of the protection limit is reached</td>
<td>Yes</td>
</tr>
<tr>
<td>9</td>
<td>Fan Alarm Indicator</td>
<td>HIGH</td>
<td></td>
<td>Pin will be latched to logic <strong>LOW</strong> when Fan limit is reached</td>
<td>Yes</td>
</tr>
<tr>
<td>10</td>
<td>GND</td>
<td>Ground</td>
<td>GND</td>
<td>PA output reflection power is represented by voltage</td>
<td>Yes</td>
</tr>
<tr>
<td>11</td>
<td>VSWR</td>
<td>Indicator</td>
<td>HIGH</td>
<td>Pin will be latched to logic <strong>LOW</strong> when output reflection is over limit</td>
<td>Yes</td>
</tr>
<tr>
<td>12</td>
<td>GND</td>
<td>Ground</td>
<td>GND</td>
<td>PA carrier case temperature is represented by voltage</td>
<td>Yes</td>
</tr>
<tr>
<td>13</td>
<td>+5V</td>
<td>Power Supply</td>
<td>+5V</td>
<td>+5V DC is available for reference 400mA current ability</td>
<td>Yes</td>
</tr>
<tr>
<td>14</td>
<td>GND</td>
<td>Ground</td>
<td>GND</td>
<td>Ground</td>
<td>Yes</td>
</tr>
<tr>
<td>15</td>
<td>NC</td>
<td>NC</td>
<td>NC</td>
<td>Ground</td>
<td>No</td>
</tr>
</tbody>
</table>

Notes:
- HIGH/LOW voltages are standard TTL signals 0.0V-0.8V = LOW, 2V-5V = HIGH. Input current is 10uA.
- Matching connector and cable will be shipped with the product.
- Applied=Yes means the feature is included. Applied=No means the feature is not included with this model.
- 5V reference supply can source 700mA.
- Indicator output signals can source 24mA.
All dimensions are in mm [inches]

Notes:
1. All dimensions are in millimeters [inches].

Additional Information

<table>
<thead>
<tr>
<th>Documentation</th>
<th>Webpage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heatsink Lookup Specifications</td>
<td><a href="https://rflambda.com/search_heatsink.jsp">https://rflambda.com/search_heatsink.jsp</a></td>
</tr>
</tbody>
</table>
NEMA Configuration: L21-30P PLUG

X = Phase A
Y = Phase B
Z = Phase C
W = Neutral
G = Ground
Ensure that the amplifier input and output ports are safely terminated into a proper 50 ohm load before turning on the power. Never operate the amplifier without a load. A proper 50 ohm load is defined as a load with impedance less than 1.9:1 or return loss larger than 10dB relative to 50 Ohm within the specified operating band width.

**Power Supply Requirements**

Power supply must be able to provide adequate current for the amplifier. Power supply should be able to provide 1.5 times the typical current or 1.2 times the maximum current (whichever is greater).

In most cases, RF - Lambda amplifiers will withstand severe mismatches without damage. However, operation with poor loads is discouraged. If prolonged operation with poor or unknown loads is expected, an external device such as an isolator or circulator should be used to protect the amplifier.

Ensure that the power is off when connecting or disconnecting the input or output of the amp.

Prevent overdriving the amplifier. Do not exceed the recommended input power level.

Adequate heat-sinking required for RF amplifier modules. Please inquire.

Amplifiers do not contain Thermal protection, Reverse DC polarity or Over voltage protection with the exception of a few models. Please inquire.

Proper electrostatic discharge (ESD) precautions are recommended to avoid performance degradation or loss of functionality.

**What is not covered with warranty?**

Each RF - Lambda amplifier will go through power and temperature stress testing. Since the die, ICs or MMICs are fragile, these are not covered by warranty. Any damage to these will NOT be free to repair.

**Important Notice**

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