Solid State Broadband High Power Amplifier

2215  1900 - 6000 MHz / 200 Watts

The 2215 is suitable for octave bandwidth high power CW, modulated, and pulse applications. This amplifier utilizes high power GaN devices that provide wide frequency response, high gain, high peak power capability, and low distortions. Exceptional performance, long-term reliability and high efficiency are achieved by employing advanced broadband RF matching networks and combining techniques, EMI/RFI filters, and all qualified components. The amplifier is constructed within a single 5RU drawer including the forced air-cooling. Available operating voltage configurations are single-phase 220 VAC up to 400 Hz and 28 VDC.

The amplifier includes a built-in control and monitoring system, with protection functions which preserve high availability. Remote management and diagnostics are via an embedded web server allowing network managed site status and control simply by connecting the unit’s Ethernet port to a LAN. Using a web browser and the unit’s IP address (IPV4) allows ease of access with the benefit of multi-level security. The control system core runs an embedded OS (Linux), has a built-in non-volatile memory for event recording, and factory setup recovery features. The extended memory option allows storage of control parameters and event logs.


- Solid-state Class AB, compact modular design (Class “A” consult factory)
- Suitable for CW, AM, FM, Pulse and some linear applications (Consult factory for other modulation types)
- Embedded directional coupler – Eliminates the need for external component
- 50 ohm input/output impedance
- Built-in Control, Monitoring and Protection functions
- High reliability and ruggedness

**ELECTRICAL SPECIFICATIONS over temperature conditions (-10 to +40ºC)**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Frequency</td>
<td>BW</td>
<td>1900</td>
<td></td>
<td>6000</td>
<td>MHz</td>
</tr>
<tr>
<td>Power Output CW</td>
<td>P_{SAT}</td>
<td>200</td>
<td></td>
<td>200</td>
<td>Watt</td>
</tr>
<tr>
<td>Power Gain</td>
<td>G_P</td>
<td>53</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Input Power for Rated P_{SAT}</td>
<td>P_{IN}</td>
<td>0</td>
<td></td>
<td>5.0</td>
<td>dBm</td>
</tr>
<tr>
<td>Input Power Range</td>
<td>P_{IN}</td>
<td>-5.0</td>
<td></td>
<td>5.0</td>
<td>dBm</td>
</tr>
<tr>
<td>Small Signal Gain Flatness / Leveled ALC</td>
<td>ΔG</td>
<td>±3.5/±1.0</td>
<td></td>
<td>dB</td>
<td></td>
</tr>
<tr>
<td>Gain Adjustment Range</td>
<td>VVA</td>
<td>20</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Input Return Loss</td>
<td>S_{11}</td>
<td>-10</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Noise Figure @ maximum gain</td>
<td>NF</td>
<td>20</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Third Order Intermodulation Distortion @ 47dBm/Tone, 1MHz Spacing</td>
<td>IM3</td>
<td>-23</td>
<td></td>
<td>-20</td>
<td>dBc</td>
</tr>
<tr>
<td>Harmonics @ P_{OUT} = 200W</td>
<td>2^rd</td>
<td>-30</td>
<td></td>
<td>-25</td>
<td>dBc</td>
</tr>
<tr>
<td>Spurious Signals</td>
<td>Spur</td>
<td>-70</td>
<td></td>
<td>-60</td>
<td>dBc</td>
</tr>
<tr>
<td>Operating Voltage (1-phase)</td>
<td>V_{AC}</td>
<td>180</td>
<td>220</td>
<td>260</td>
<td>Volt</td>
</tr>
<tr>
<td>Power Consumption @ 200W CW</td>
<td>P_{O}</td>
<td>1500</td>
<td>2300</td>
<td></td>
<td>VA</td>
</tr>
<tr>
<td>Switching Speed</td>
<td>T_{ON/OFF}</td>
<td>1</td>
<td></td>
<td>2</td>
<td>μSec</td>
</tr>
</tbody>
</table>

**Notes:** 1. CW measurement performed in MGC Mode (Manual Gain Control)

**MECHANICAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions W x H x D (excludes connectors, handles and brackets)</td>
<td>17 x 8.75 x 22</td>
<td>Inch</td>
</tr>
<tr>
<td>Weight with Harmonic Suppression Filters</td>
<td>110</td>
<td>Pound</td>
</tr>
<tr>
<td>RF Connectors Input/Output</td>
<td>Type-N, Female</td>
<td></td>
</tr>
<tr>
<td>RF Sample Connectors</td>
<td>Type-SMA, Female</td>
<td>Forward/Reverse</td>
</tr>
<tr>
<td>Blanking Input</td>
<td>Type-BNC, Female</td>
<td>Blanking</td>
</tr>
<tr>
<td>Cooling</td>
<td>Built-in forced air cooling system – front to rear</td>
<td>Airflow Direction</td>
</tr>
</tbody>
</table>

316 W. Florence Ave. Inglewood, CA 90301
Ph. 1 (310) 412-8100 Fax. 1 (310) 412-9232
www.EmpowerRF.com
Stock No. 2215
D.S Rev. 1.1 / 2-05-2020
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ENVIRONMENTAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Ambient Temperature</td>
<td>TA</td>
<td>-10</td>
<td>+40</td>
<td>0</td>
<td>°C</td>
</tr>
<tr>
<td>Non-operating Temperature</td>
<td>TSTG</td>
<td>-40</td>
<td>+85</td>
<td>0</td>
<td>°C</td>
</tr>
<tr>
<td>Relative Humidity (non-condensing)</td>
<td>RH</td>
<td>95</td>
<td>-</td>
<td>-</td>
<td>%</td>
</tr>
<tr>
<td>Shock / Vibration - MIL-STD-810F</td>
<td>SH / VI</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

PROTECTIONS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Overdrive</td>
<td>+10 dBm Max</td>
</tr>
<tr>
<td>VSWR protection</td>
<td>At 3:1 – PA backs-off output power to a safe operating level – no system shutdown, “On Air” time is maximized</td>
</tr>
<tr>
<td>Thermal – Graceful Degradation</td>
<td>Ambient 40°C Min</td>
</tr>
<tr>
<td>Default Data Recovery</td>
<td>Factory Default Calibration Recovery</td>
</tr>
</tbody>
</table>

COMMUNICATION INTERFACES

<table>
<thead>
<tr>
<th>Function</th>
<th>Utility</th>
<th>Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet</td>
<td>Network management of device / web interface</td>
<td>RJ45</td>
</tr>
<tr>
<td>USB</td>
<td>Mass storage / Expansion Bus</td>
<td>USB 1.x/2.0 compatible</td>
</tr>
<tr>
<td>RS-232, RS-422</td>
<td>Serial management of device / local operator access</td>
<td>D-Sub 9-position Male</td>
</tr>
</tbody>
</table>

SYSTEM I/O CONNECTOR – 14-Position

<table>
<thead>
<tr>
<th>Pin #</th>
<th>Description</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FWD Test Point</td>
<td>Forward detected power (analog voltage: 0-5 Volt)</td>
</tr>
<tr>
<td>2</td>
<td>REV Test Point</td>
<td>Reverse detected power (analog voltage: 0-5 Volt)</td>
</tr>
<tr>
<td>3</td>
<td>Summary Fault</td>
<td>Summary Fault: Active TTL Logic Low (≤0.7V), (Internally Pulled-High)</td>
</tr>
<tr>
<td>4</td>
<td>N/C</td>
<td>No Connection (reserved)</td>
</tr>
<tr>
<td>5</td>
<td>Shutdown</td>
<td>Amplifier Disable: TTL Logic Low (≤0.7V), (Internally Pulled-High)</td>
</tr>
<tr>
<td>6</td>
<td>Aux P/S Test Point</td>
<td>+12.0VDC ±2.0V (resettable 0.5amp fuse)</td>
</tr>
<tr>
<td>7</td>
<td>Main P/S Test Point</td>
<td>+44.0VDC ±4.8V (resettable 0.5amp fuse)</td>
</tr>
<tr>
<td>8</td>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>9-11</td>
<td>Open drain control</td>
<td>Site management utility (reserved)</td>
</tr>
<tr>
<td>12&amp;13</td>
<td>Digital I/O (configurable)</td>
<td>Site management utility (reserved)</td>
</tr>
<tr>
<td>14</td>
<td>GND</td>
<td>Ground</td>
</tr>
</tbody>
</table>

Available Options

2215-xxx

-002 28 VDC, Rear RF Connectors
-003 180-260 VAC, 1-phase, 47-63 Hz, Front RF Connectors
-004 28 VDC, Front RF Connectors
-006 180-260 VAC, 1-phase, 47-63 Hz, Rear RF Connectors
-00X TBD

Contact us for other available options; sales@empowerrf.com

Standard Feature:

- LCD Control, Ethernet & Serial Com
- Main RF Connectors: Type-N, Female
- Sample Port: SMA-F [Forward & Reverse]
- Blanking/Gating Port: BNC-F
- Rack Slides, Handles and Rack mount Bracket
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AMPLIFIER w/o FILTER TYPICAL PERFORMANCE

Plot 1 – Small Signal Gain @ P_{IN} = -30dBm

Plot 2 – Leveled ALC Flatness @ 200 watts (53dBm)
Reference: 53dB, 1dB/div.

Plot 3 – Gain Adjustment Range @ P_{IN} = -30dBm
Top Curve: Maximum Gain
Bottom Curve: Minimum Gain
Reference: 50dB, 10dB/div.

Plot 4 – Input Return Loss
Reference: -10dB, 10dB/div.