



2.0-6.0GHz, 300W, GaN Fully matched PA iModule

No Photo

Description

The SMAV2060-300F is a 300-watt, single stage integrated Power Amplifier iModule, designed for broad band applications, with frequencies from 2.0 to 6.0GHz. The module is 50 Ω input/output matched and requires minimal external components.

It is only recommended for pulsed CW condition, NOT CW.

This iModule implements multiple GaN active dice and its matching network and DC block function etc, within highly compact 20*23*2mm flange, with excellent capability for heat dissipation.

It is recommended to solder this iModule onto the heatsink and do additional wire-bonding for power supply and RF input and output with external circuit

- Typical Pulsed CW performance within 2-6GHz with device solderd: Vds=50V, Idq=200mA, 100us, 10%

| Freq(MHz) | Pin(dBm) | Psat(dBm) | Psat(W) | Ids(A) | Gain(dB) | Eff(%) |
|-----------|----------|-----------|---------|--------|----------|--------|
| 2000 | 47.237 | 54.8 | 302.0 | 1.13 | 7.563 | 53.5 |
| 2100 | 47.384 | 54.8 | 302.0 | 1.16 | 7.416 | 52.1 |
| 2200 | 47.274 | 54.8 | 302.0 | 1.2 | 7.526 | 50.3 |
| 2300 | 47.067 | 54.8 | 302.0 | 1.56 | 7.733 | 38.7 |
| 2400 | 47.05 | 54.8 | 302.0 | 1.49 | 7.75 | 40.5 |
| 2500 | 45.972 | 54.8 | 302.0 | 1.49 | 8.828 | 40.5 |
| 2600 | 47.874 | 54.8 | 302.0 | 1.46 | 6.926 | 41.4 |
| 2700 | 47.255 | 54.8 | 302.0 | 1.41 | 7.545 | 42.8 |
| 2800 | 46.287 | 54.8 | 302.0 | 1.49 | 8.513 | 40.5 |
| 2900 | 46.504 | 54.8 | 302.0 | 1.63 | 8.296 | 37.1 |
| 3000 | 46.309 | 54.8 | 302.0 | 2.03 | 8.491 | 29.8 |
| 3100 | 46.156 | 54.8 | 302.0 | 1.84 | 8.644 | 32.8 |
| 3200 | 46.548 | 54.8 | 302.0 | 1.85 | 8.252 | 32.6 |
| 3300 | 47.814 | 54.8 | 302.0 | 1.87 | 6.986 | 32.3 |
| 3400 | 47.655 | 54.8 | 302.0 | 1.94 | 7.145 | 31.1 |
| 3500 | 46.659 | 54.8 | 302.0 | 1.86 | 8.141 | 32.5 |
| 3600 | 47.518 | 54.8 | 302.0 | 1.84 | 7.282 | 32.8 |
| 3700 | 47.729 | 54.8 | 302.0 | 1.88 | 7.071 | 32.1 |
| 3800 | 47.516 | 54.8 | 302.0 | 1.87 | 7.284 | 32.3 |
| 3900 | 48.143 | 54.8 | 302.0 | 1.88 | 6.657 | 32.1 |
| 4000 | 47.668 | 54.8 | 302.0 | 1.88 | 7.132 | 32.1 |
| 4100 | 46.969 | 54.8 | 302.0 | 1.83 | 7.831 | 33.0 |
| 4200 | 46.968 | 54.8 | 302.0 | 1.83 | 7.832 | 33.0 |
| 4300 | 46.245 | 54.8 | 302.0 | 1.79 | 8.555 | 33.7 |



| | | | | | | |
|------|--------|------|-------|------|-------|------|
| 4400 | 46.001 | 54.8 | 302.0 | 1.68 | 8.799 | 36.0 |
| 4500 | 45.124 | 54.8 | 302.0 | 1.68 | 9.676 | 36.0 |
| 4600 | 45.221 | 54.8 | 302.0 | 1.78 | 9.579 | 33.9 |
| 4700 | 45.62 | 54.8 | 302.0 | 1.85 | 9.18 | 32.6 |
| 4800 | 46.058 | 54.8 | 302.0 | 1.85 | 8.742 | 32.6 |
| 4900 | 46.261 | 54.8 | 302.0 | 1.76 | 8.539 | 34.3 |
| 5000 | 46.409 | 54.8 | 302.0 | 1.67 | 8.391 | 36.2 |
| 5100 | 45.669 | 54.8 | 302.0 | 1.61 | 9.131 | 37.5 |
| 5200 | 45.882 | 54.8 | 302.0 | 1.53 | 8.918 | 39.5 |
| 5300 | 46.93 | 54.8 | 302.0 | 1.64 | 7.87 | 36.8 |
| 5400 | 47.599 | 54.8 | 302.0 | 1.82 | 7.201 | 33.2 |
| 5500 | 47.906 | 54.8 | 302.0 | 2.06 | 6.894 | 29.3 |
| 5600 | 47.885 | 54.8 | 302.0 | 2.05 | 6.915 | 29.5 |
| 5700 | 47.175 | 54.8 | 302.0 | 2.05 | 7.625 | 29.5 |
| 5800 | 48.14 | 54.8 | 302.0 | 2.05 | 6.66 | 29.5 |
| 5900 | 47.545 | 54.8 | 302.0 | 2.06 | 7.255 | 29.3 |
| 6000 | 47.526 | 54.8 | 302.0 | 1.83 | 7.274 | 33.0 |

Product Features

- Operating Frequency Range: 2.0-6.0GHz
- Operating Drain Voltage(Recommended): +50V up to 55V
- 50 Ω Input/Output (External DC block capacitor needed)
- $P_{sat} \geq 300W$ (Pulsed CW)
- Small signal gain:>8dB, Power gain:>6.5dB @ $P_{out}=300W$
- Typical P_{sat} efficiency:>30%
- 20*23 mm metal flange with 2mm thickness
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

Applications

- Ultra Broadband Amplifiers within S/C band
- Test Instrumentation
- EMC Amplifier Drivers
- 2-way Radios

Table 1. Maximum Ratings

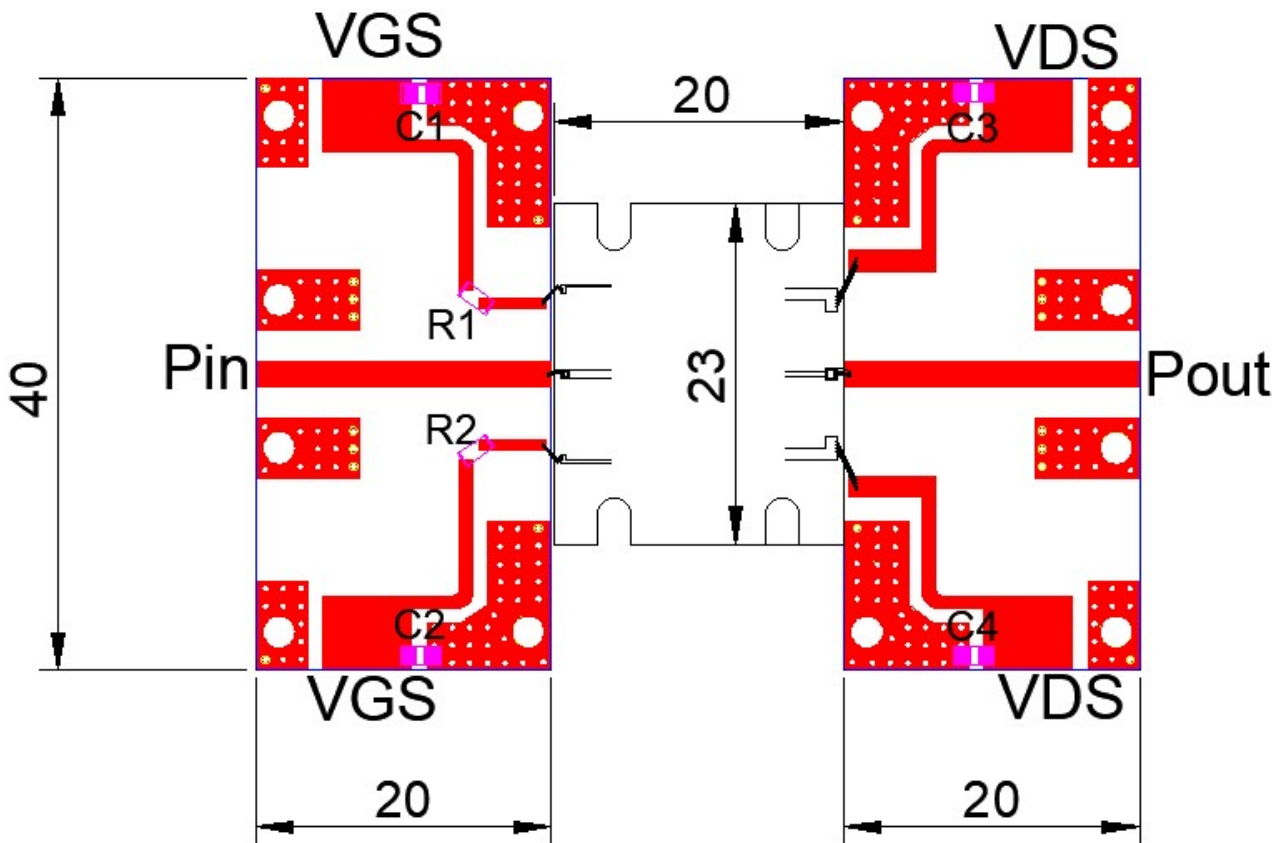
| Rating | Symbol | Value | Unit |
|-----------------------|----------|-----------|------|
| Drain--Source Voltage | V_{DS} | 200 | Vdc |
| Gate--Source Voltage | V_{GS} | -10 to +2 | Vdc |
| Operating Voltage | V_{DD} | +55 | Vdc |

| | | | |
|--------------------------------|-----------|-------------|----|
| Storage Temperature Range | T_{stg} | -65 to +150 | °C |
| Case Operating Temperature | T_c | +150 | °C |
| Operating Junction Temperature | T_j | +225 | °C |

Table 2. Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|-----------------|-------|------|
| Thermal Resistance, Junction to Case $T_c=25^\circ\text{C}$, $P_{out}=300\text{W}$, Pulsed CW, FEA | $R_{\theta JC}$ | 0.3 | °C/W |

Typical application circuit



| Component | Description | Suggestion |
|----------------|--------------------|------------|
| C1, C2, C3, C4 | 10uF | 1210 |
| R1, R2 | Chip Resistor, 10Ω | 0805 |
| PCB | Rogers4350b, 30mil | |



TYPICAL CHARACTERISTICS

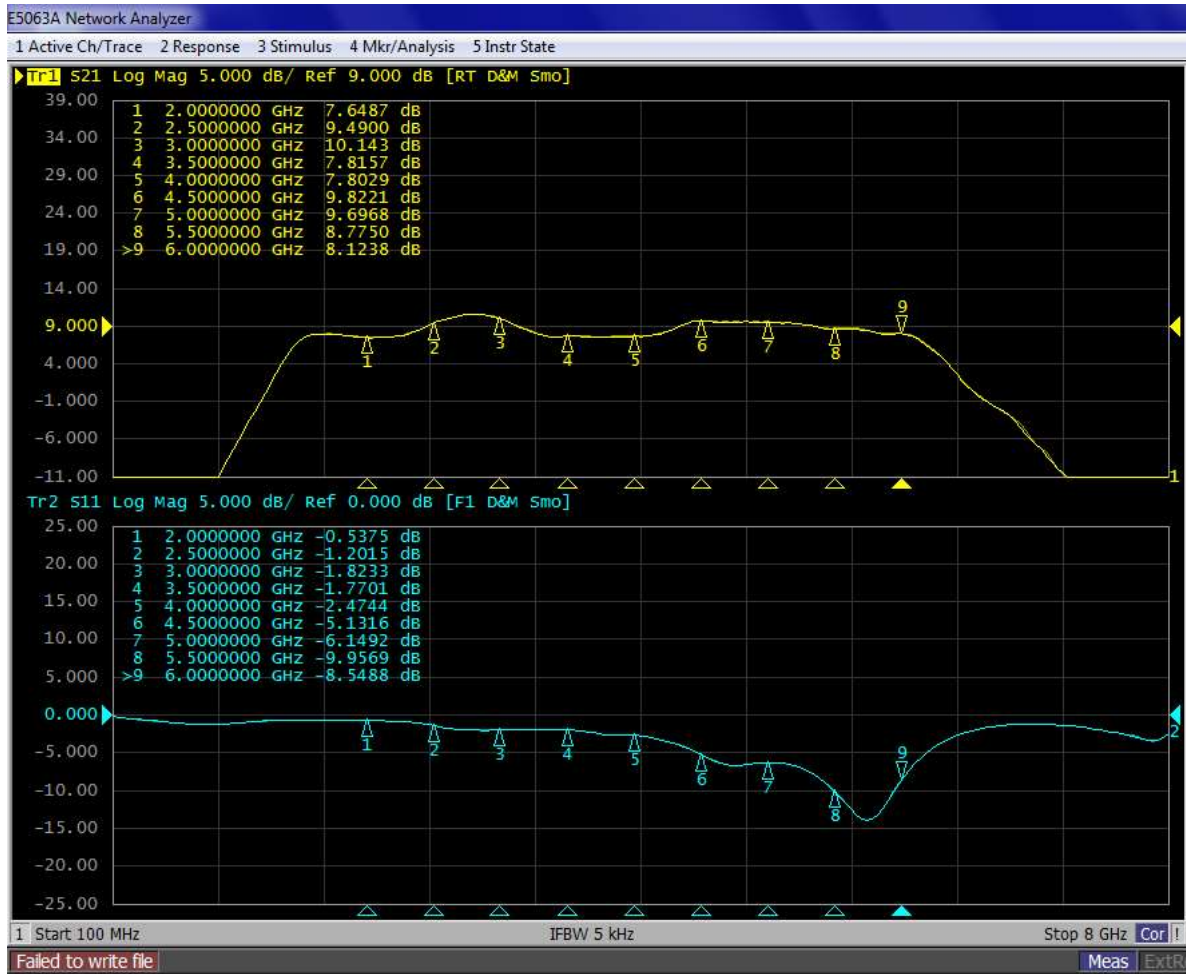


Figure 1. Network analyzer output S11/S21 (Pin=0dBm)



Figure 3. Psat, Eff@Psat, Gain@Psat Vs Frequency across the band





Revision history

Table 6. Document revision history

| Date | Revision | Datasheet Status |
|----------|----------|--------------------|
| 2024/3/7 | Rev 1.0 | Advanced Datasheet |
| | | |
| | | |

Application data based on JF-24-04

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