Spatium™ QPB1005

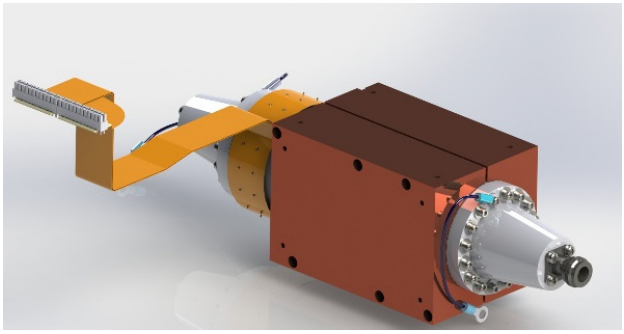
2 – 6 GHz 400 W Amplifier

Product Description

The QPB1005 is a high power connectorized amplifier module with bias circuit card suitable for installation into OEM assemblies. The amplifier requires +28 Volts DC and customer supplied thermal management The device is an excellent candidate for high power test equipment, communications, jamming applications, or any application requiring capability for simultaneous power amplification of signals across the 2.0 – 6.0 GHz spectrum.

The QPB1005 incorporates Qorvo high efficiency GaN MMICs, spatially combined in a compact structure to achieve robust, high performance power amplification across the 2.0 – 6.0 GHz frequency range.

The included circuit card assembly provides and sequences all required DC voltages from a single customer supplied 28 volt input. Individual device current monitoring in analog format is also available.



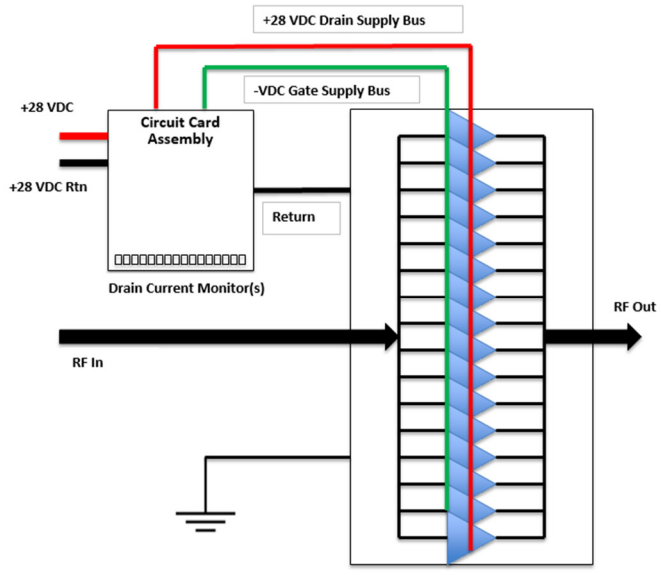
Spatium 220 SMA (F) x N (F)

Product Features

- 2.0 – 6.0 GHz
- Output Power: 400 Watts P_{SAT} Typical (56 dBm)
- Small Signal Gain: > 26 dB
- Power Gain: > 18 dB
- +28 V Single Supply, I_{DQ} = 9.6 A
- Includes Gate voltage generation
- Includes Gate voltage sequencing

Performance characteristics vary across the product's operating band. Refer to the electrical specification table and data plots for details, including variance across operating temperature.

Functional Block Diagram



Applications

- Jamming
- Radar
- Military Communications
- Defense Communications
- Test & Measurement
- EMI Testing

Ordering Information

Part No.	ECCN	Description
QPB1005	3A001.b.4.a.4	2-6 GHz 400 Watt Amplifier

Absolute Maximum Ratings

Parameter	Rating
Storage Temperature	–40 to +85 °C
RF Input Power, CW, 50 Ω, T=25 °C	+36 dBm
Device Voltage (V_{DD})	+30 V
Dissipated Power (P_{DISS})	1700 W
T_{CLAMP} (min, max)	–40 °C, +71 °C

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability.

Recommended Operating Conditions

Parameter	Min	Typ	Max	Units
Device Voltage (V_D)		28		V
Quiescent Current (I_{DQ})		9.6		A
Operating Current (I_{D_DRIVE})	See plot, page 3			A
T_{CLAMP}		25		°C

Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions.

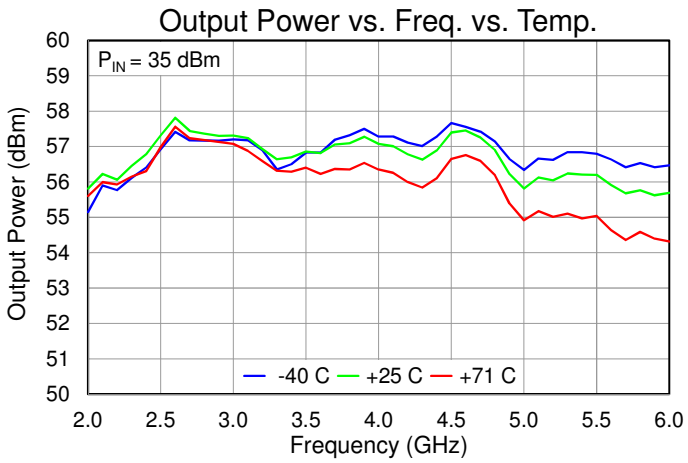
Electrical Specifications

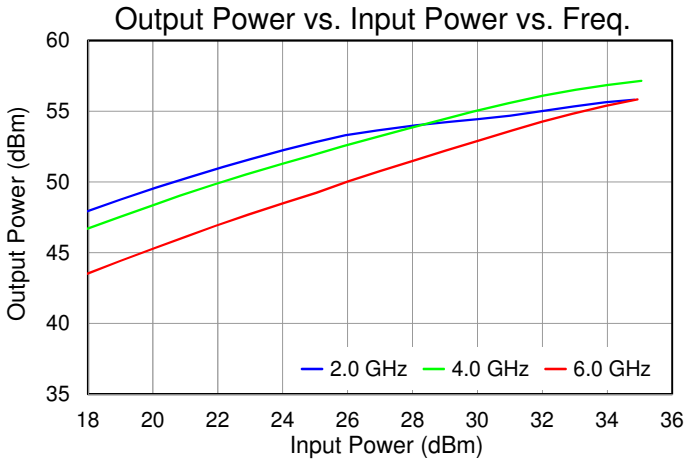
Parameter	Conditions[1]	Min	Typ	Max	Units
Operational Frequency Range		2		6	GHz
Output Power (P_{IN} = 35 dBm)	2 GHz		55.8		dBm
	4 GHz		57.1		dBm
	6 GHz		55.7		dBm
Power Added Eff. (P_{IN} = 35 dBm)	2 GHz		39.0		%
	4 GHz		37.7		%
	6 GHz		27.3		%
Power Gain (P_{IN} = 35 dBm)	2 GHz		20.8		dB
	4 GHz		22.1		dB
	6 GHz		20.7		dB
Small Signal Gain	2 GHz		32.5		dB
	4 GHz		30.6		dB
	6 GHz		26.6		dB
Input Return Loss	2 GHz		8		dB
	4 GHz		23		dB
	6 GHz		20		dB
Output 2nd Harmonic (P_{IN} = 35 dBm)			See plot		dBc
Output 3rd Harmonic (P_{IN} = 35 dBm)			See plot		dBc
Unit Weight	Spatium Only		13.40 (6.08)		Lbs. (kg)
Unit Weight	Spatium plus Bias Card		13.65 (6.19)		Lbs. (kg)

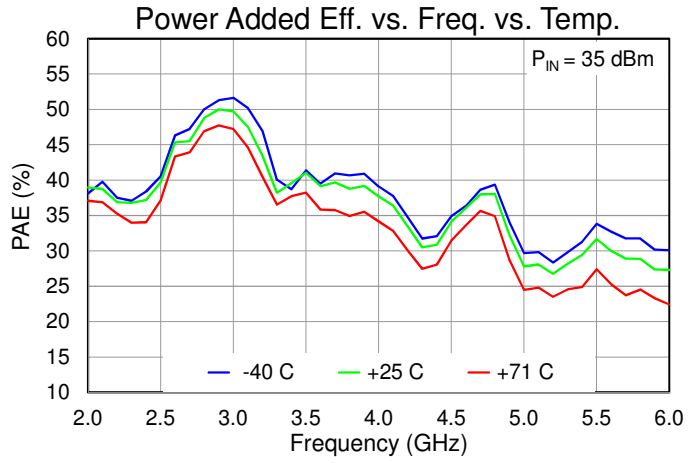
Notes:
1. Test conditions unless otherwise noted: V_D = +28 V, I_{DQ}=9.6 A, Clamp Temp = +25 °C, 50 Ω system.

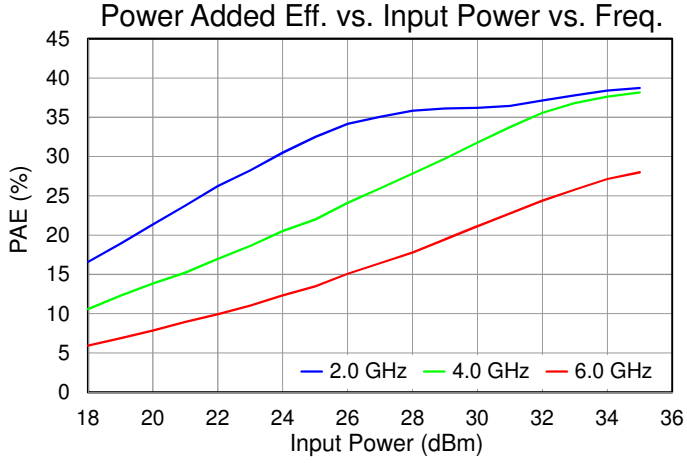
Performance Plots – Large Signal

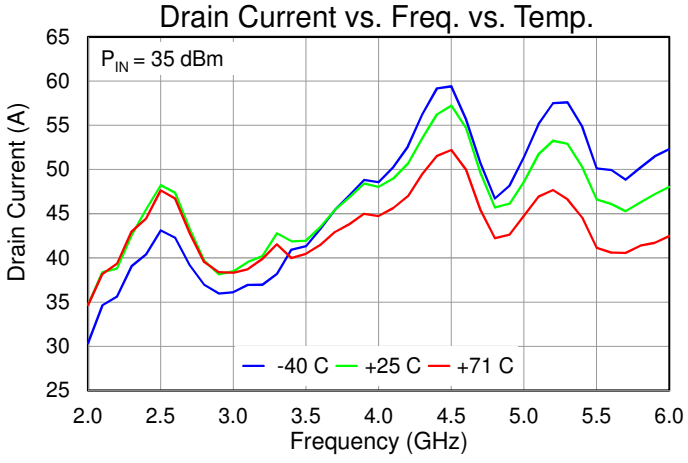
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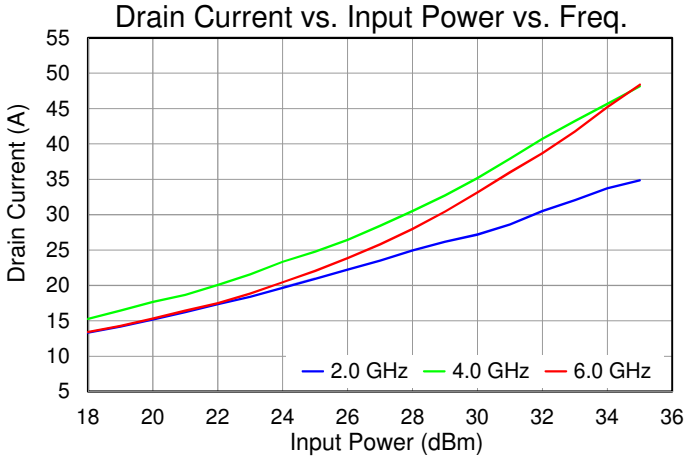






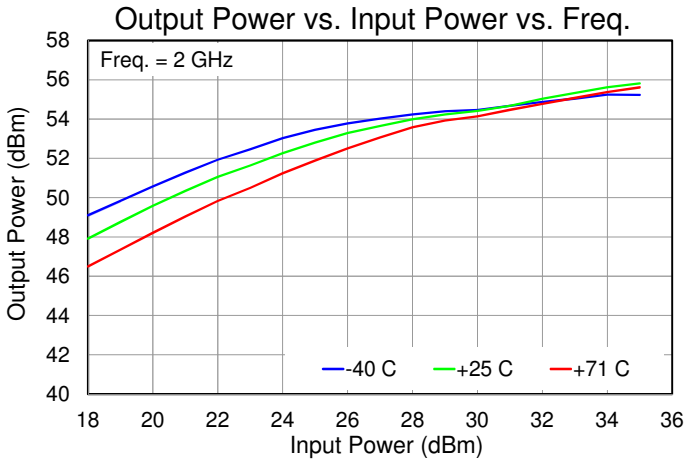


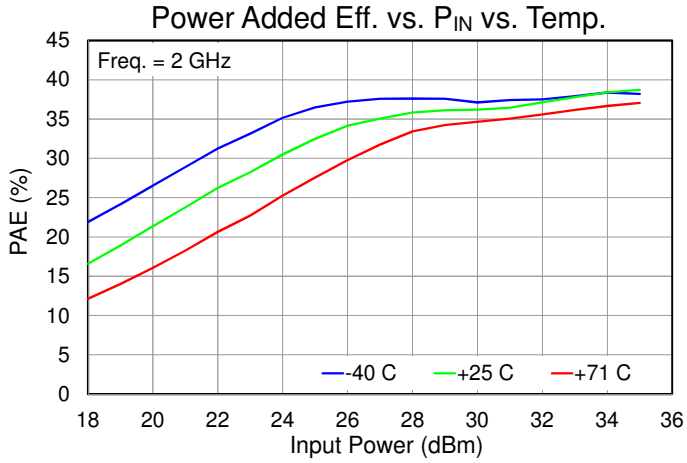


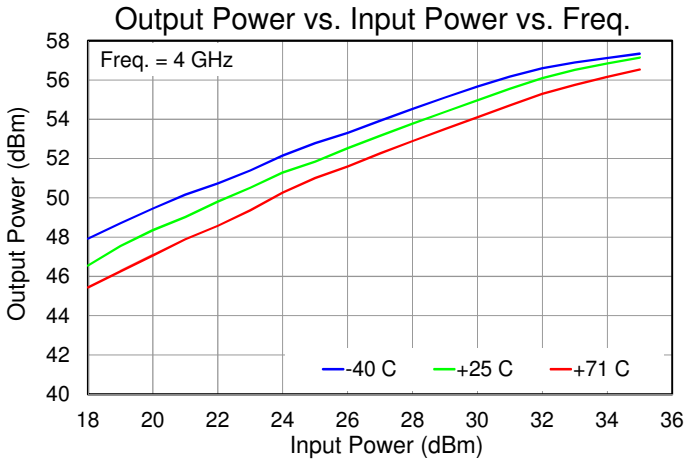


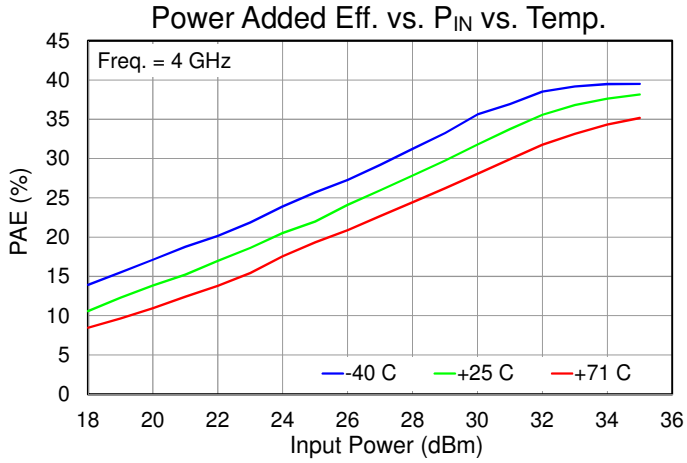
Performance Plots – Large Signal

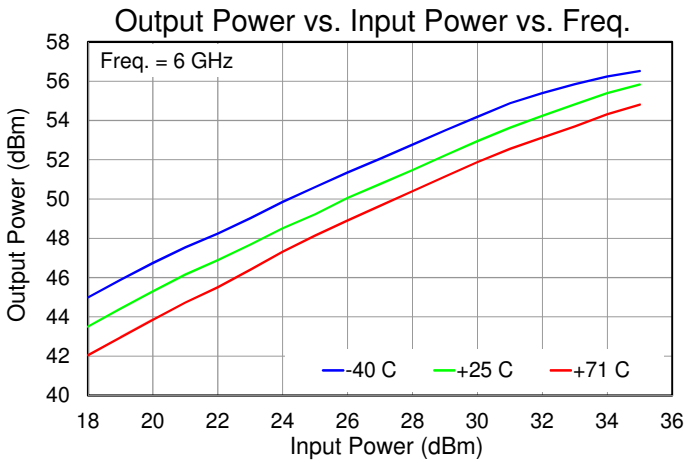
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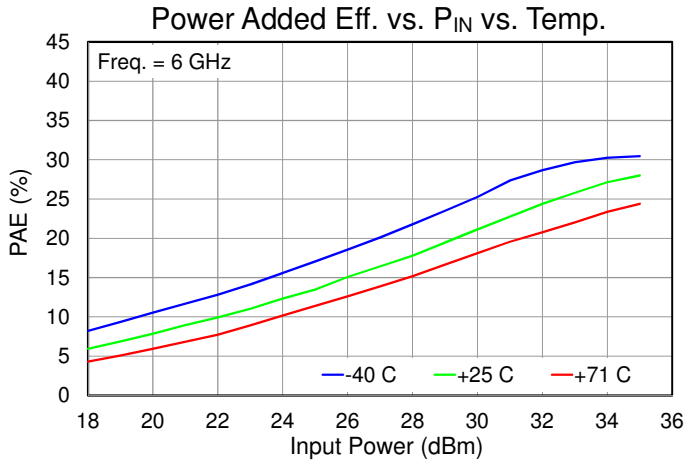






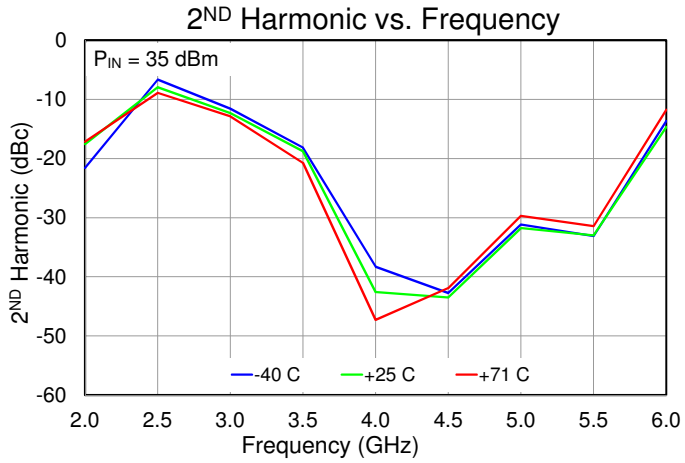


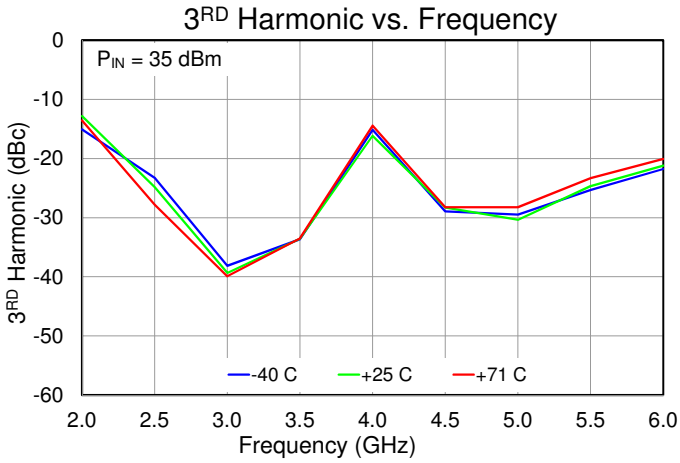


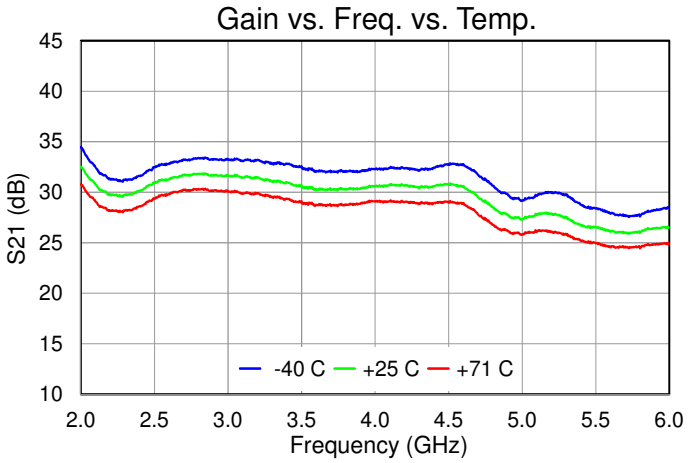


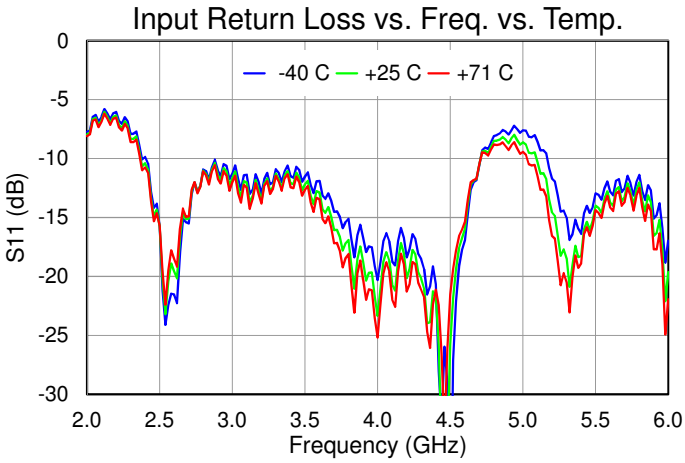
Performance Plots – Harmonics and Small Signal

Test conditions unless otherwise noted: V_D = +28V, I_{DQ} = 9.6 A, Clamp Temp.=+25 °C

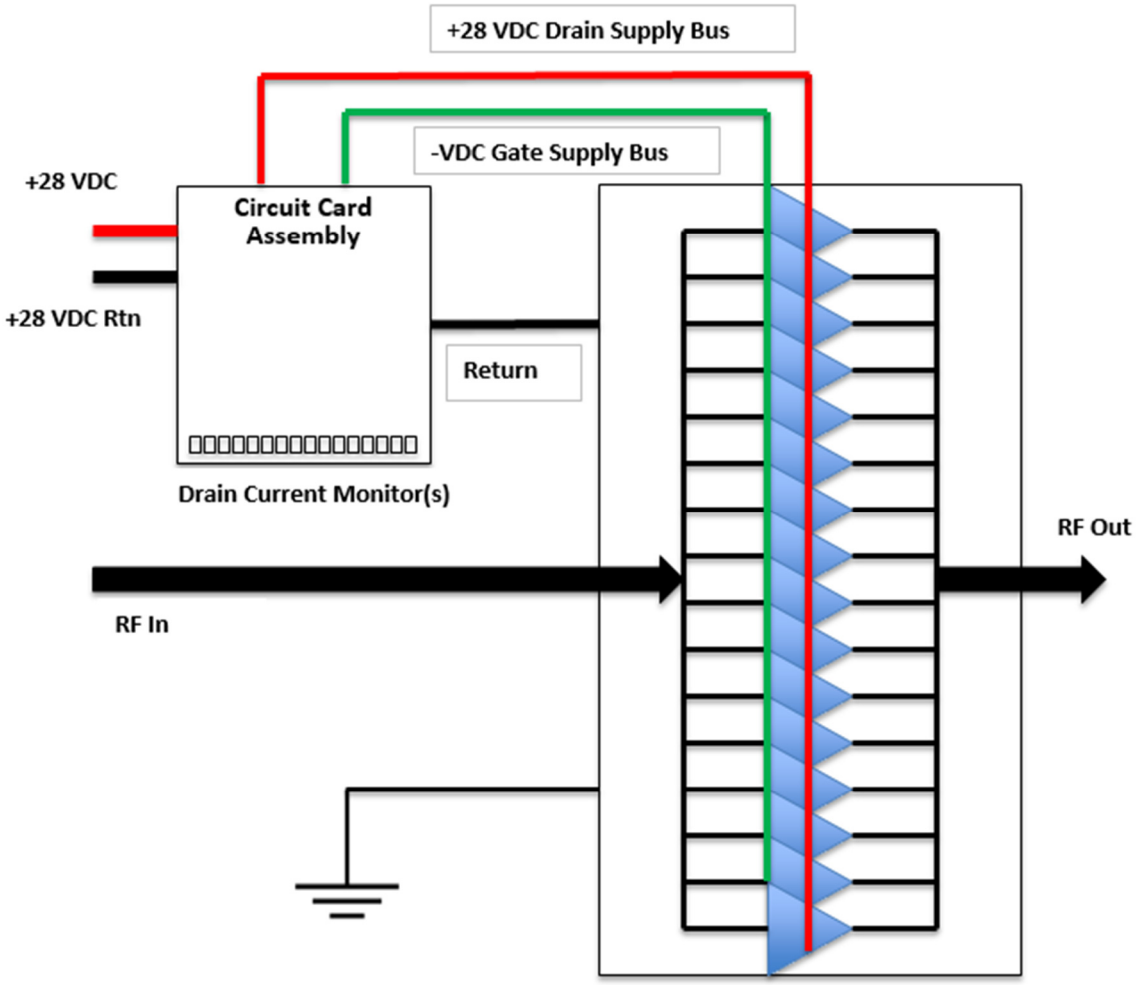






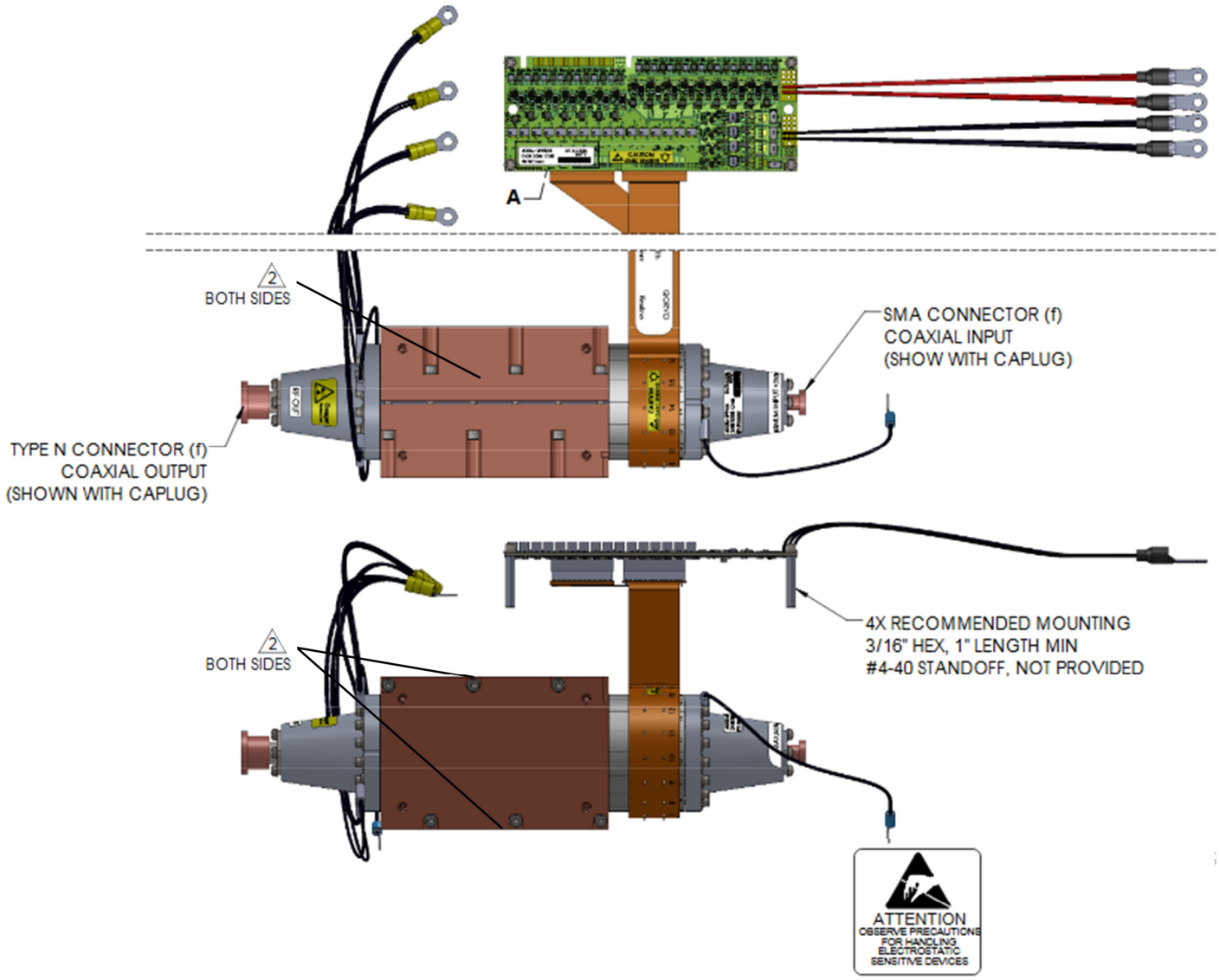


Block Diagram and Description



Pin No.	Label	Description
RF In	N/A	SMA(F) RF Input.
RF Out	N/A	N(F) High Power RF Output
+28 VDC	N/A	Six 14 Ga x 8” Red Wires Ring Lug #10 Stud Terminated
+28 VDC Return	N/A	Six 14 Ga x 8” Black Wires Ring Lug #10 Stud Terminated

Package Marking and Dimensions



NOTES: UNLESS OTHERWISE SPECIFIED

1. LABELS ARE IDENTICAL. ENSURE SERIAL NUMBER IS THE SAME ON BOTH UNITS FOR MATCH SET.
   SN: * ** ** ***
   - BATCH I.D.
   - WORK WEEK
   - CALENDAR YEAR
   - MANUFACTURER

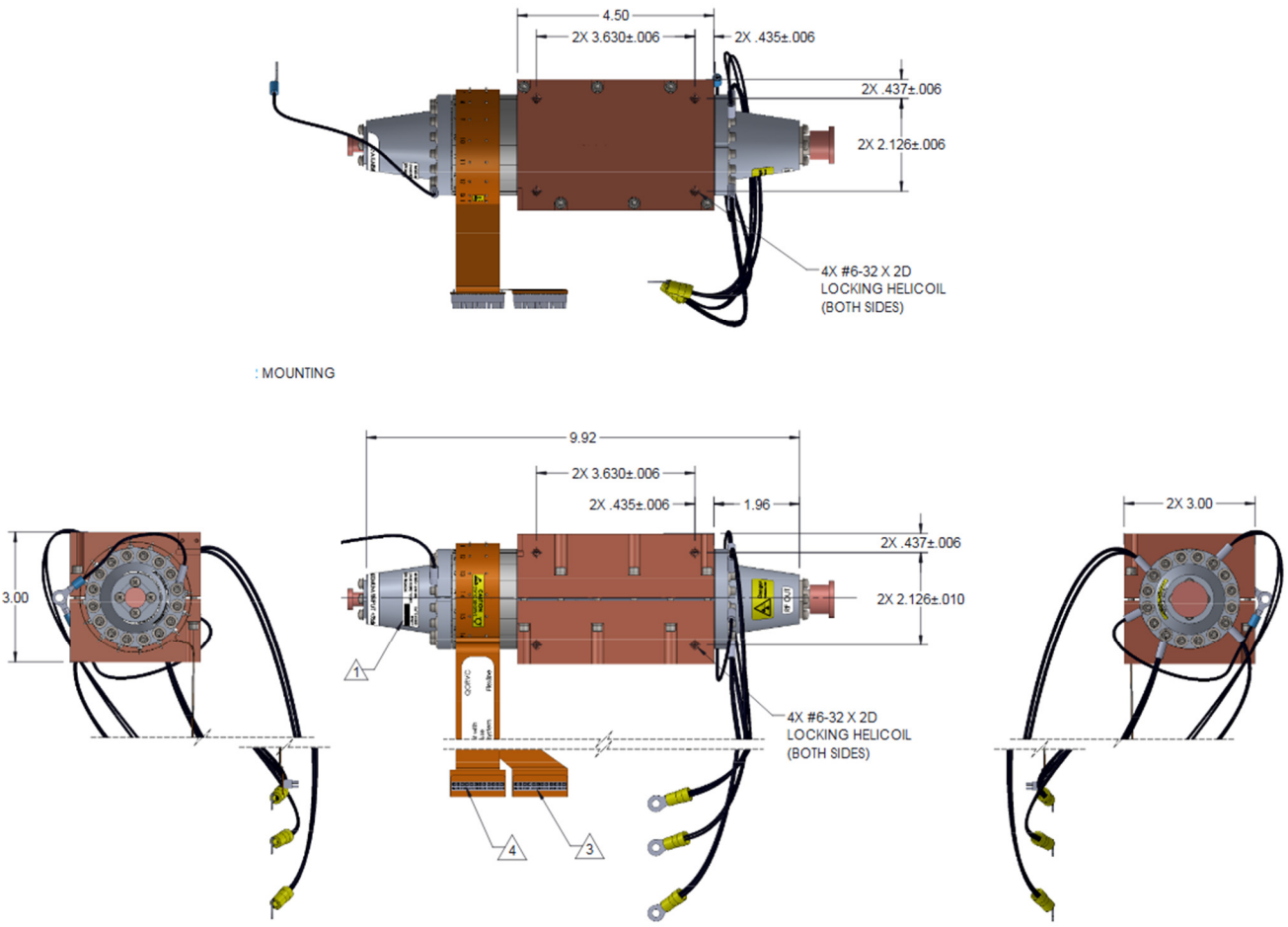
2. ADEQUATE HEATSINK REQUIRED ON INDICATED SURFACES OF CLAMP.



1 2X DETAIL A

DIMENSIONS ARE IN INCHES

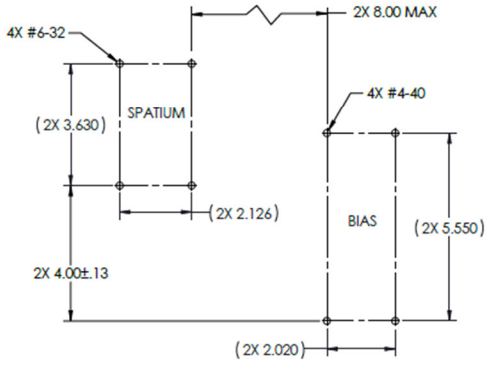
Package Marking and Dimensions



3 J1 (SAMTEC IPS1 CONN): MATES WITH P1
PIN OUT MATCHES PLUG.

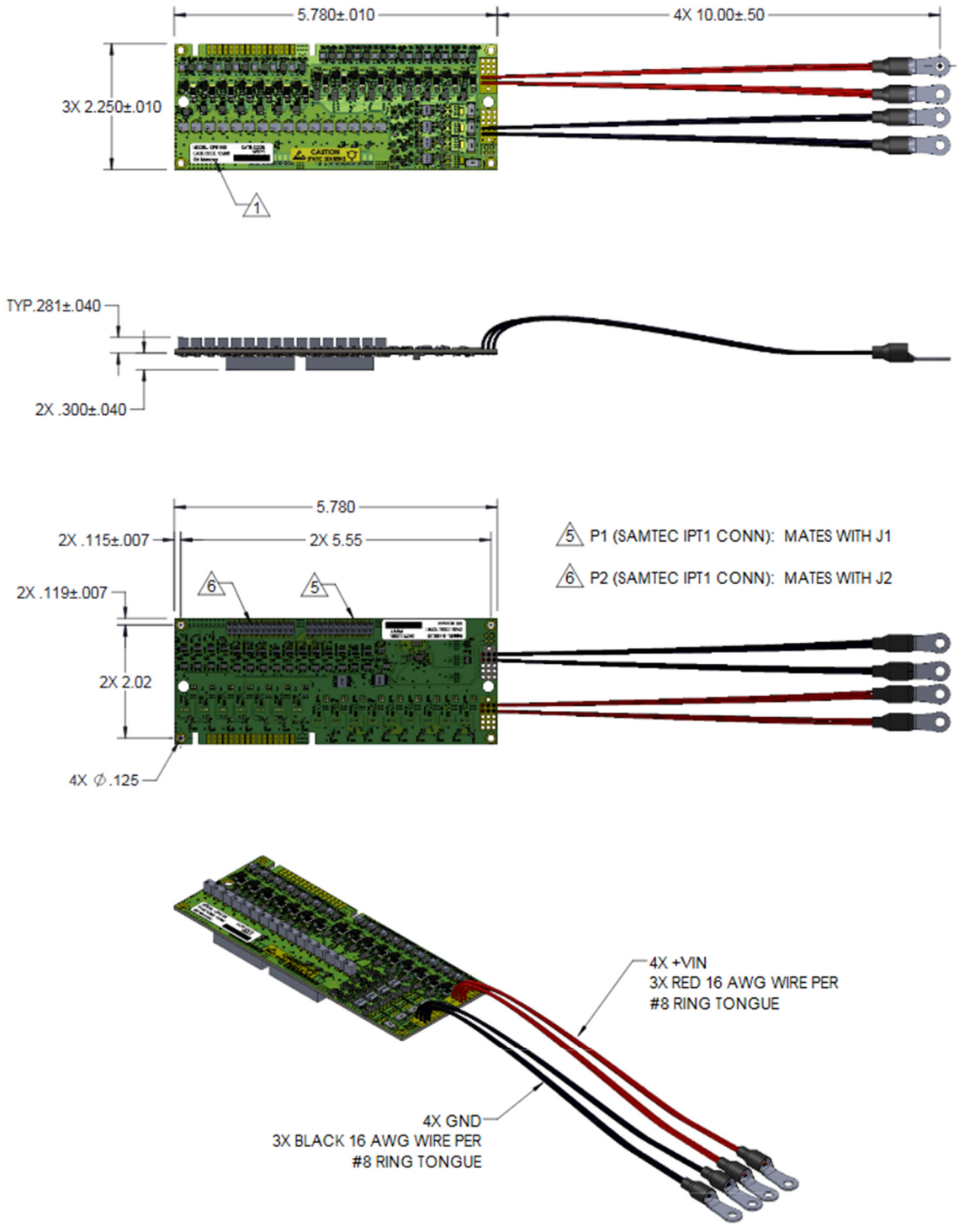
4 J2 (SAMTEC IPS1 CONN): MATES WITH P2
PIN OUT MATCHES PLUG.

DIMENSIONS ARE IN INCHES



SPATIUM AND BIAS
RECOMMENDED MOUNTING HOLE LOCATIONS

Package Marking and Dimensions



DIMENSIONS ARE IN INCHES

Handling Precautions



Caution!
ESD-Sensitive Device

Contact Information

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