Spatium™ QPB1006

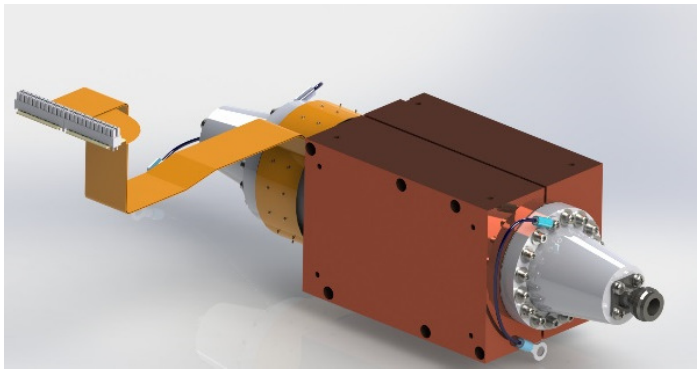
2.0 – 7.5 GHz 150 Watt Amplifier

General Description

The QPB1006 is a high power connectorized SSPA 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 – 7.5 GHz spectrum.

The QPB1006 incorporates Qorvo high efficiency GaN MMICs, spatially combined in a compact structure to achieve robust, high performance power amplification across the 2.0 – 7.5 GHz frequency range.

The included bias circuit card assembly provides and sequences all required DC voltages from a single customer supplied +28 volt input. Mute and pulse functionality, as well as a summary fault output are available. Individual device current monitoring in analog format is also available.

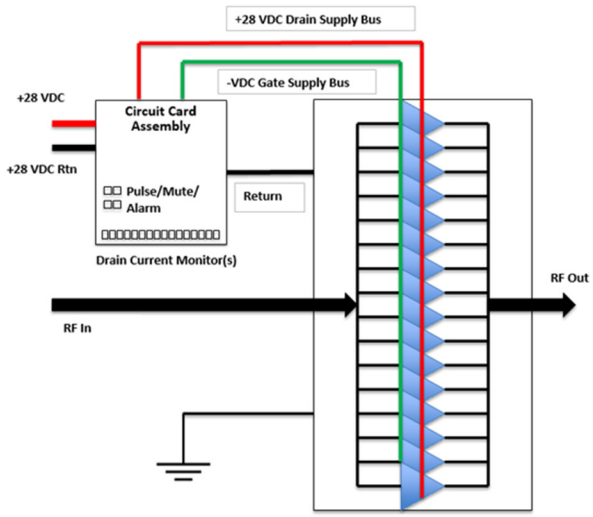


Product Features

- Frequency: 2.0 – 7.5 GHz
- Saturated Output Power: 150 watts (nom.)
- Small Signal Gain: 30 dB
- Bias Conditions: +28 V single supply, I_{DQ} = 9.6A
- Included gate and drain voltage generation
- Included gate and drain 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
QPB1006	3A001.b.4.b.1	2.0 – 7.5 GHz 150 Watt Amplifier

Absolute Maximum Ratings

Parameter	Rating
RF Input Power, CW, 50 Ω, T_{CASE}=25 °C	+28 dBm
Load VSWR	3.0:1
Device Voltage (V_{DD})	+29 V
Dissipated Power (P_{DISS})	700 W
Storage Temperature	–55 to +100 °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
Voltage (V_{DC})		+28		V
Operating Temperature	–40	+25	+71	°C
Quiescent Current (Idq)	8.0	9.6	12.0	A

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

Electrical Specifications

Please reference data plots for more details.

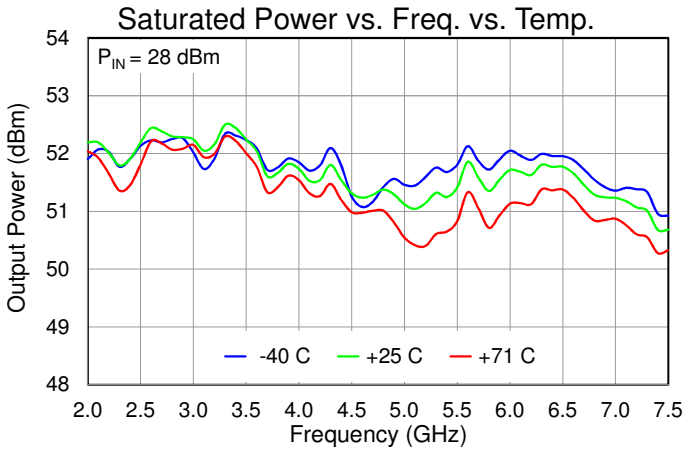
Parameter	Conditions[1]	Min	Typ	Max	Units
Operational Frequency Range		2.0		7.5	GHz
Output Power (P_{IN} = 28 dBm)	2.0 GHz		52.2		dBm
	4.0 GHz		51.7		dBm
	6.0 GHz		51.7		dBm
	7.5 GHz		50.7		dBm
Power Added Efficiency	2.0 GHz		35.6		%
(P_{IN} = 28 dBm)	4.0 GHz		28.4		%
	6.0 GHz		25.5		%
	7.5 GHz		22.0		%
Small Signal Gain	2.0 GHz		33.2		dB
	4.0 GHz		33.2		dB
	6.0 GHz		32.6		dB
	7.5 GHz		30.1		dB
Small Signal Gain Flatness			2.6		dB
Input Return Loss (average)			See plot		dB
Output 2nd Harmonic	F_0 = 2 – 7.5 GHz, P_{IN} = 28 dBm		See plot		dBc
Output 3rd Harmonic	F_0 = 2 – 7.5 GHz, P_{IN} = 28 dBm		See plot		dBc
Non-Harmonic Spurious	F_0 = 2 – 7.5 GHz, P_{IN} = 28 dBm			–60	dBc
DC Input Power (average)			590		W
Unit Weight	Spatium Only		13.40 (6.08)		Lbs. (kg)
Unit Weight	Spatium plus Bias Card		13.65 (6.19)		Lbs. (kg)

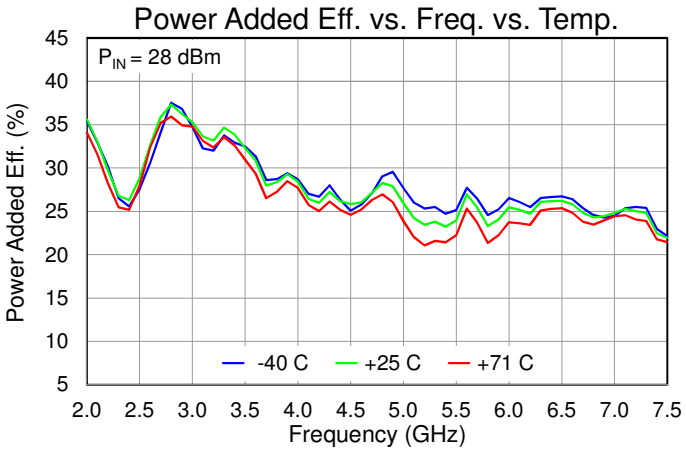
Notes:

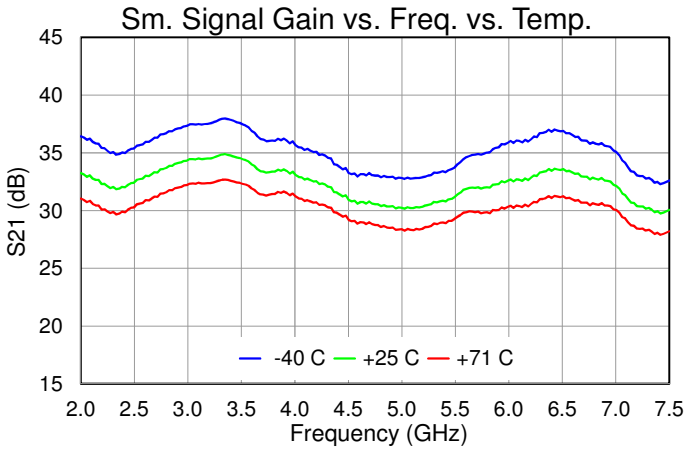
1. Test conditions unless otherwise noted: V_{DC} = +28 V, Outer Clamp Temperature = +25 °C, 50 Ohm system

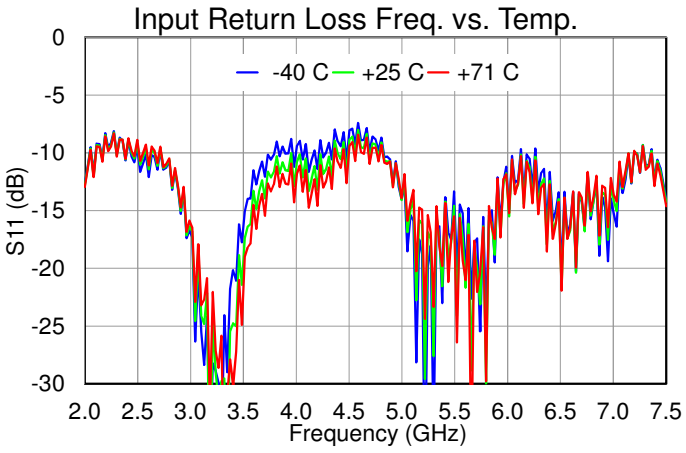
Performance Plots – QPB1006 Large Signal, Small Signal, Harmonics

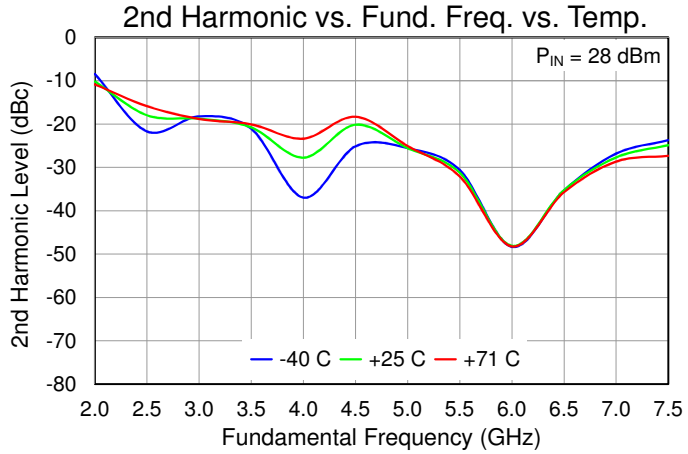
Test conditions unless otherwise noted: V_{DC} = +28 V, Outer Clamp Temperature = +25 °C, 50 Ohm system

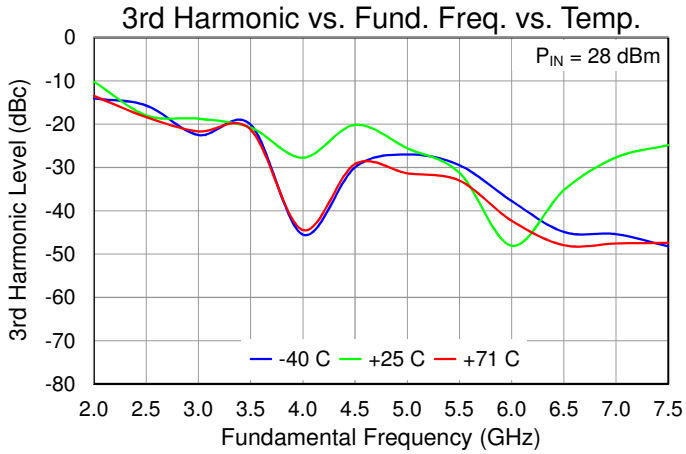






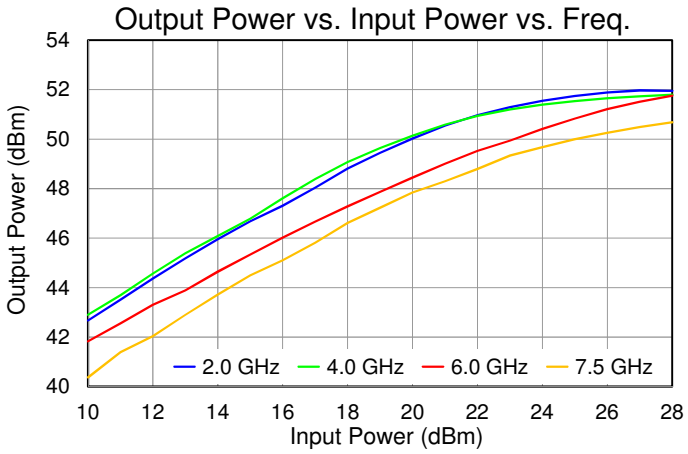


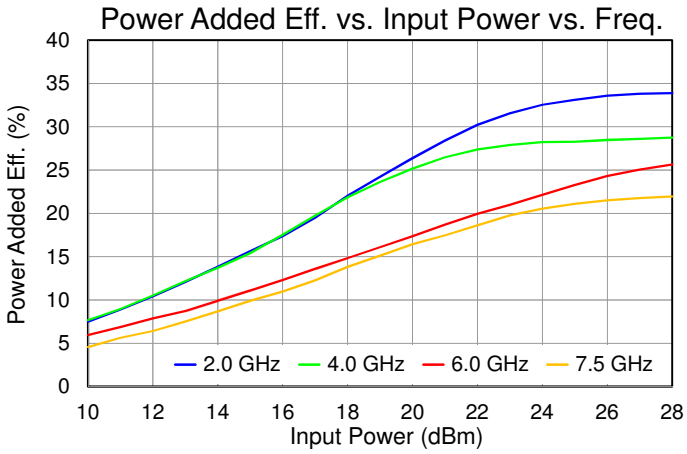


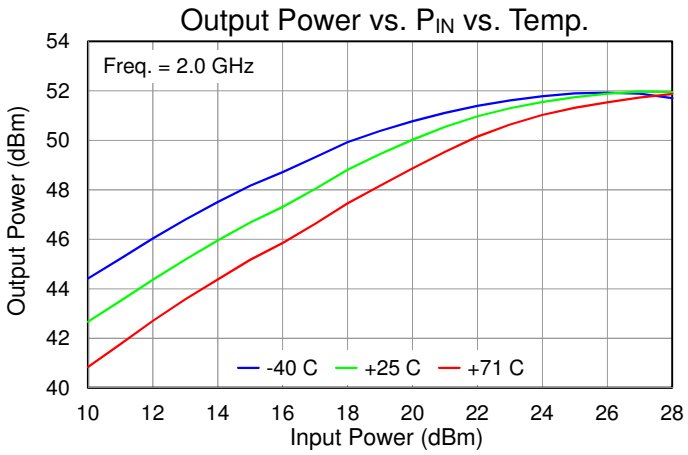


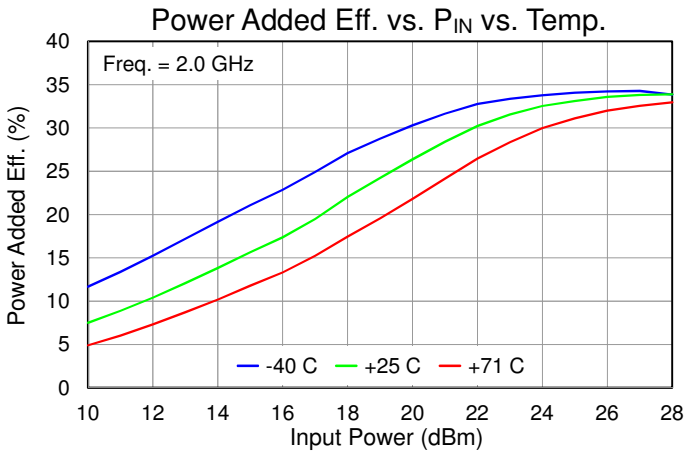
Performance Plots – QPB1006 Large Signal

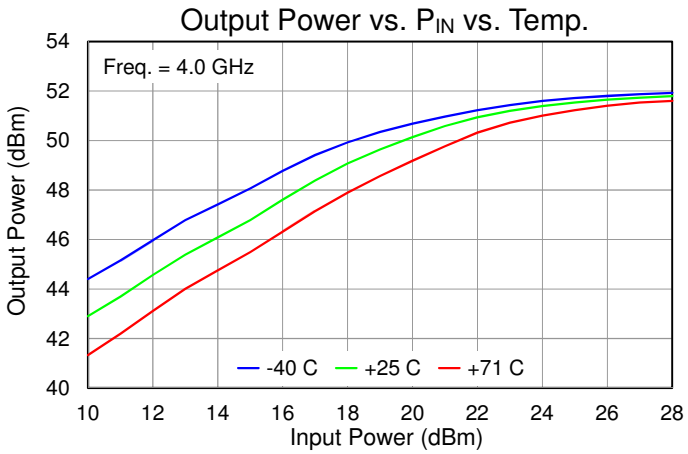
Test conditions unless otherwise noted: V_{DC} = +28 V, Outer Clamp Temperature = +25 °C, 50 Ohm system

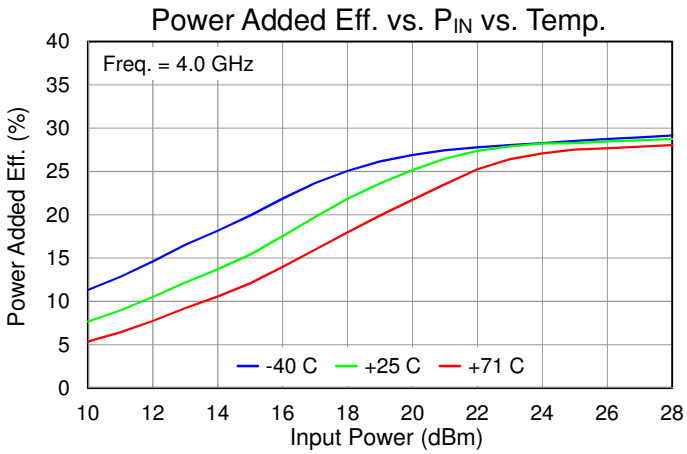












Performance Plots – QPB1006 Large Signal

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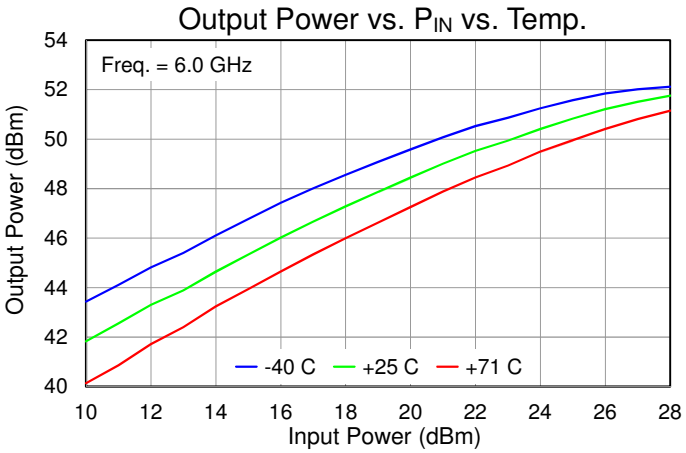
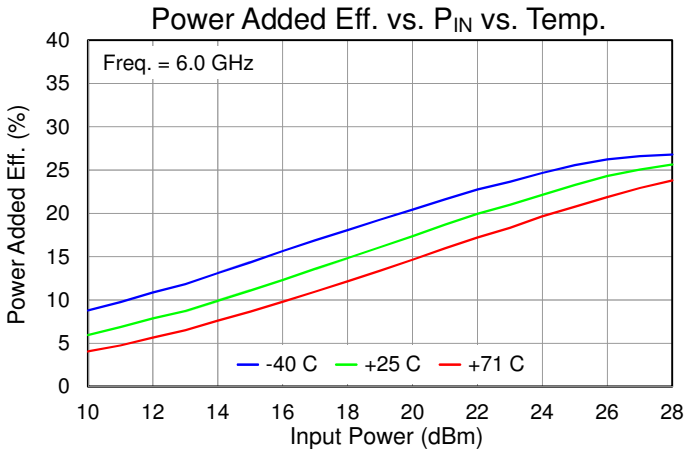
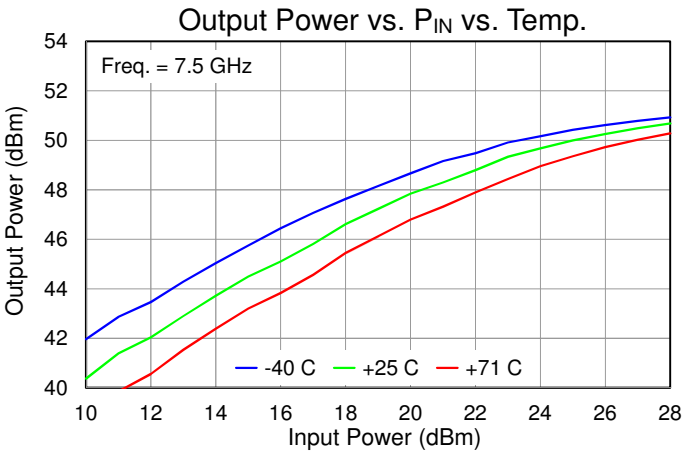
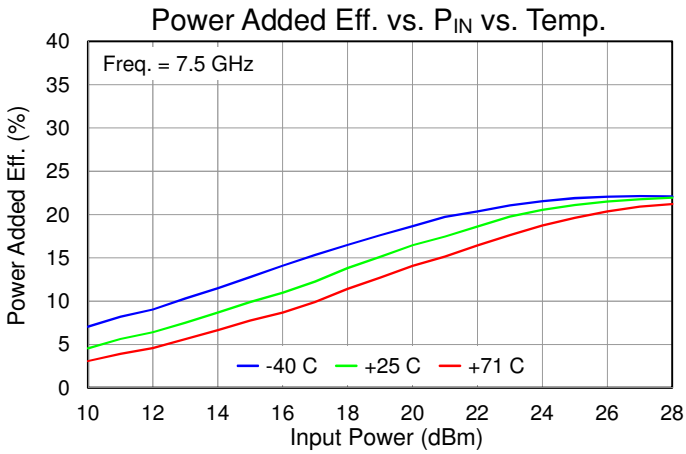
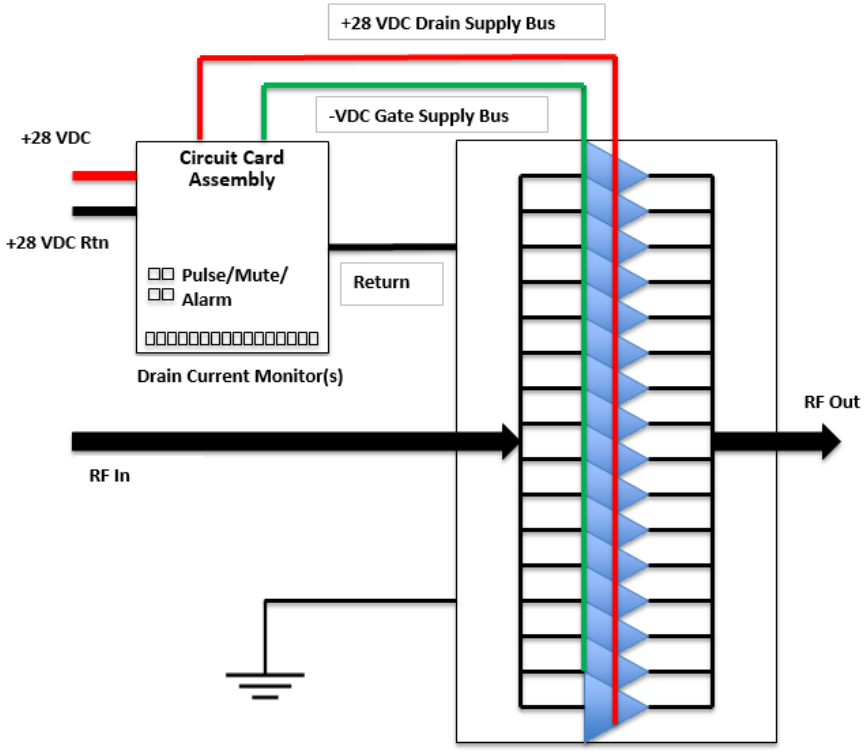






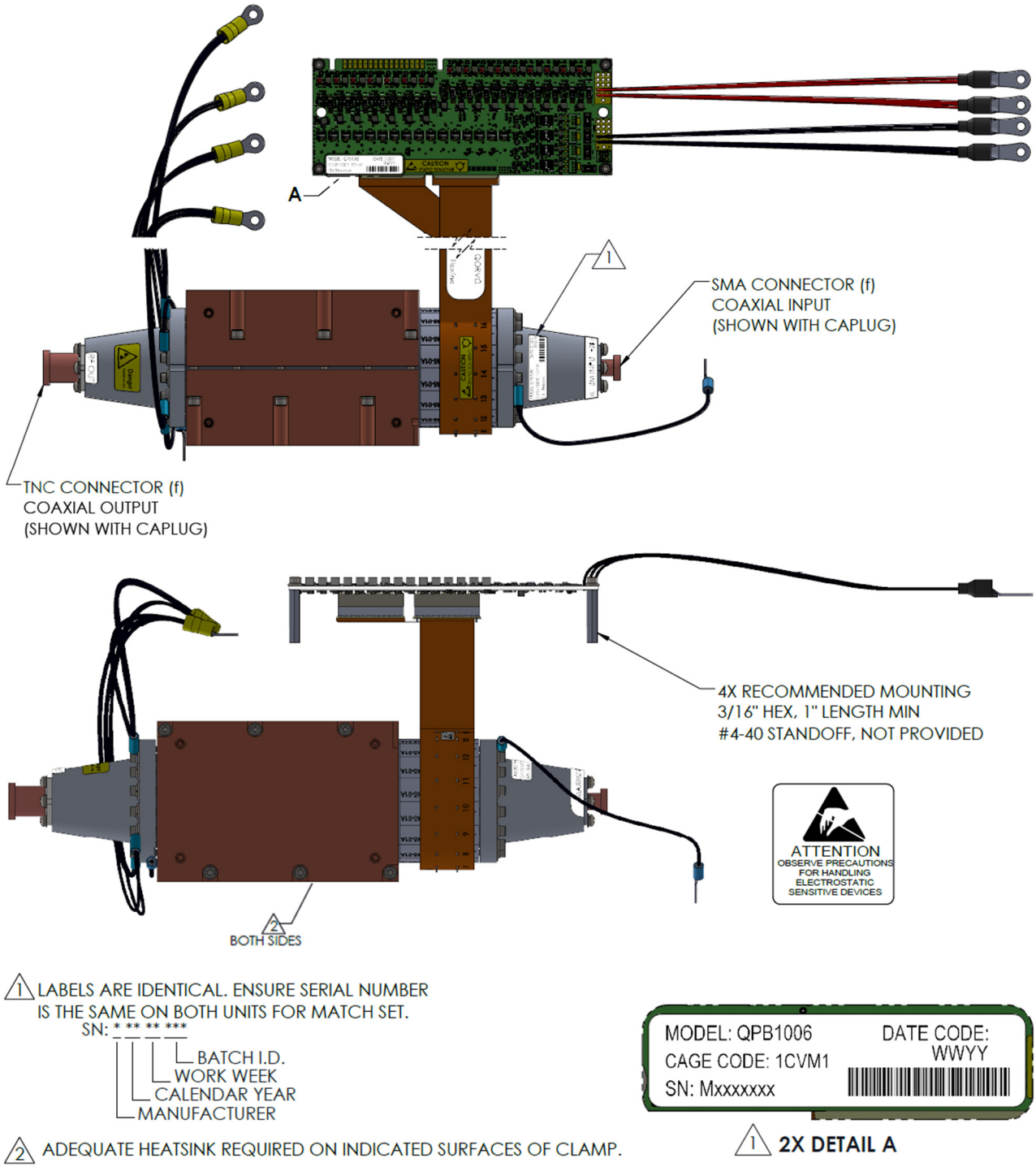


Block Diagram and Description



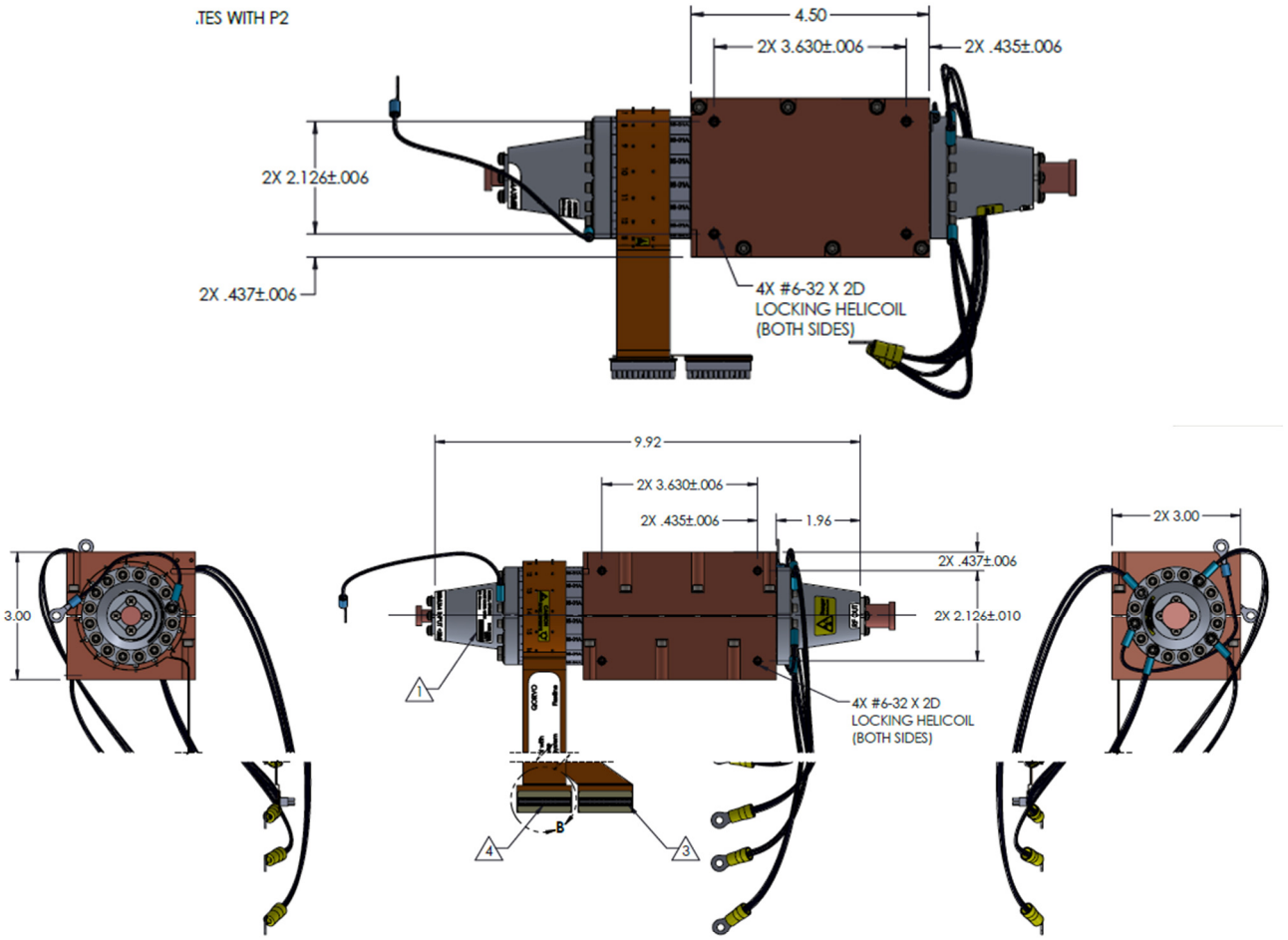
I/O Port	Label	Description
RF In	N/A	SMA (F) RF Input
RF Out	N/A	TNC (F) High Power RF Output
+28 VDC	N/A	Six 14 Ga x 8” Red Wires Ring Lug #10 Stud Terminated
+28 VDC Return	N/A	Six 14 Ga x 8” Black Wires Ring Lug #10 Stud Terminated

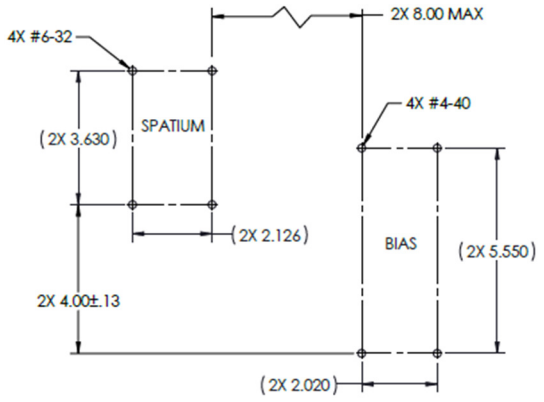
Package Marking and Dimensions



Units in INCHES

Package Marking and Dimensions (continued)

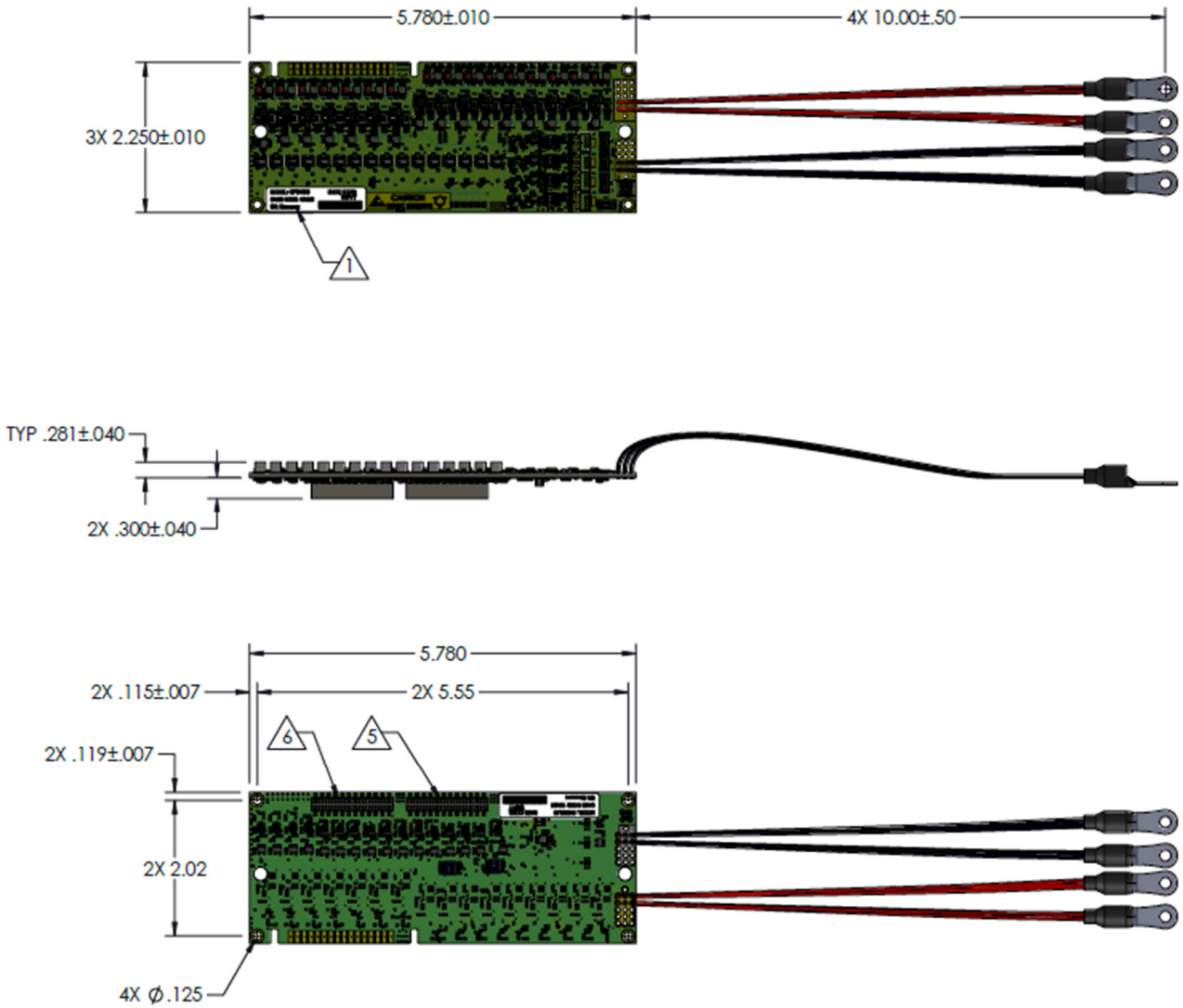




SPATIUM AND BIAS
RECOMMENDED MOUNTING HOLE LOCATIONS

Units in INCHES

Package Marking and Dimensions (continued)



Bias Circuit Card Detail

Units in INCHES

Handling Precautions

Caution!
ESD-Sensitive Device

Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations:

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Email: customer.support@qorvo.com

For technical questions and application information: **Email:** spatium-info.engineering@qorvo.com

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