EMPOWER
RF SYSTEMS, INC.

Solid State Personal Communication Power Amplifier

7046 - PCM3Q4AEM

935 – 960 MHz / 25Watts CW, 4Watts CDMA

The PCM3Q4AEM (SKU 7046) is suitable for Ultra linear Cellular GSM repeaters and MicroCell applications. Also suitable for CDMA and TDMA applications, this amplifier utilizes proprietary DIP^{TM} (Direct Injection Pre-D) circuit and linear LDMOS power devices that provide ample output power margins, high gain, wide dynamic range, and excellent group delay and phase linearity. Exceptional performance, long term reliability, and high efficiency are achieved by employing advanced matching networks and combining techniques, EMI/RFI filters, machined housings, and qualified components. This rugged module is input overdrive and output isolator protected, and proprietary ALC circuits ensure stable, ripple free output power under multi-channel conditions. Empower RF's ISO9001 Quality Assurance Program assures consistent performance and the highest reliability.

- Solid-state linear design
- Small and lightweight
- Suitable for CW, GSM, ESMR, iDEN, TDMA & multi FA CDMA
- 50 ohm input/output impedance
- High reliability and ruggedness
- Built in Output Isolator and Monitoring circuit
- Built in monitoring circuit

ELECTRICAL SPECIFICATIONS @ +28V_{DC}, 25°C, 50 Ω System

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	935		960	MHz
Output Power CW	P_{SAT}	40			Watt
Output Power @ 1dB Gain Compression	P_{1dB}	25			Watt
Output Power CDMA	P_{CDMA}	4			Watt
Small Signal Gain	G_{SS}	44	46	48	dB
Gain Flatness (ALC On)	ΔG			±0.5	dB
Third Order Intercept Point 2–Tones @ 33dBm/Tone, 500 kHz Spacing	IP3	+56	+58		dBm
Input/Output Return Loss	S_{11} / S_{22}			-14	dB
Noise Figure	NF		7	10	dB
Harmonics @ P_{OUT} = 25W	H			-45	dBc
Spurious Signals	Spur		-70	-60	dBc
Operating Voltage	V_{DC}	26	28	30	Volt
Current Consumption P_{OUT} = 25W CW	I_{DD}		3.0		Amp
Current Consumption @ P_{OUT} = 4Wavg. 2-tones	I_{DD}		2.0	2.5	Amp

MECHANICAL SPECIFICATIONS

Parameter	Value	Units	Limits
Dimensions	5.0 x 3.75 x 1.0	Inch	Max
Weight	1.0	lb.	Max
RF Connectors Input/Output	Type-SMA, Female		
DC Interface Connector	D-Sub 9-Pin, Male		
Cooling	External Heatsink (not supplied)		

ENVIRONMENTAL CHARACTERISTICS (Designed to Meet)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	T_C	-10		+50	°C
Storage Temperature	T_{STG}	-40		+85	°C
Relative Humidity (non-condensing)	RH			95	%
Altitude (MIL-STD-810F Method 500.4)	ALT			30,000	Feet
Vibration / Shock MIL-STD-810F - Method 514.5/516.5 –Proc I	VI / SH		Airborne		

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LIMITS

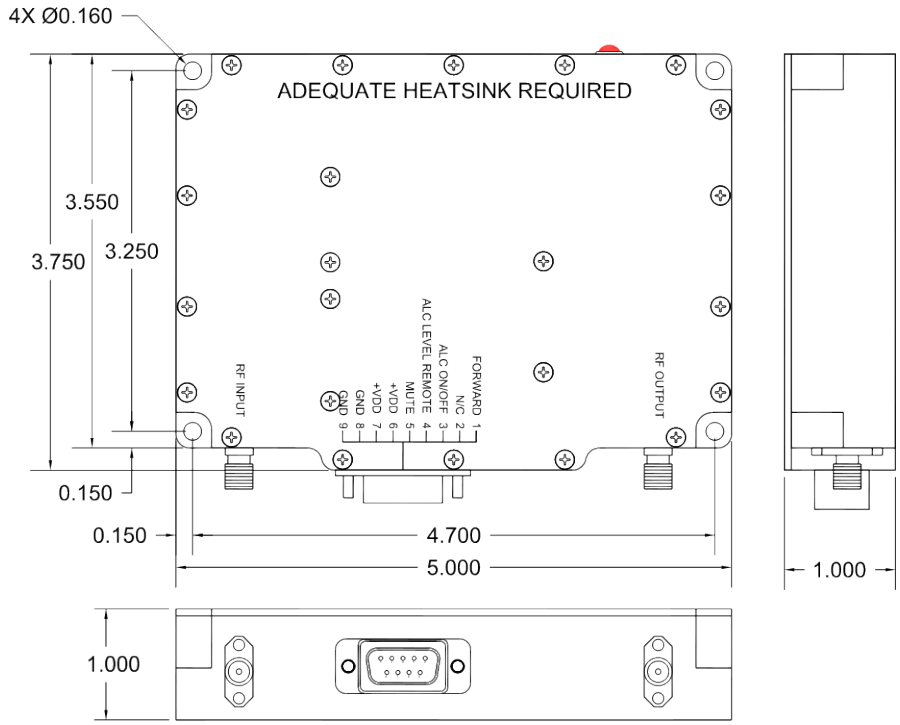
Input RF drive level without damage	+6 dBm	Max
Load VSWR @ P_{OUT} = 25W	∞ @ all load phase & amplitude for duration of 1 minute 3:1 @ all load phase & amplitude continuous	-
Thermal Overload	85°C shutdown	Max

INTERFACE CONNECTOR – D-Sub 9-Pin, Male

Pin #	Description	Specifications
1	Forward Power Monitor	Continuous Analog voltage relative to forward power level via RMS detector FWDM: 23 – 40 dBm @ 0 – 5V (200 mV/dB) 28dBm Output = V_{FWD} = 2.5V_{DC}
2	Reverse Power Monitor	Continuous Analog voltage relative to reflected power level REVM: 26 – 36dBm @ 0.5 - 5V (150mV/dB) typical
3	ALC ON/OFF	ALC OFF: TTL Logic High (5V) (*Internally Pulled Low*)
4	ALC Level	Continuous adjustable range via analog input levels Setting Point (ASP): 29 – 40 dBm @ 0 – 5 V (300 mV/dB) Error Range (AER): ±1.5dB Response Time (ART): 100 mS/dB
5	Mute	Amplifier Disable: TTL Logic High (5V) (*Internally Pulled-low*)
6&7	VDD	+26.0-30.0V_{DC}
8&9	GND	Ground

LED	LED Indicator	Output Power level indicator referenced to ALC setting

OUTLINE DRAWING



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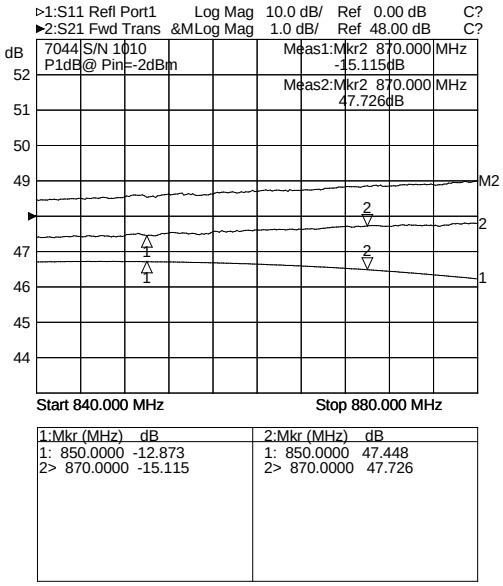
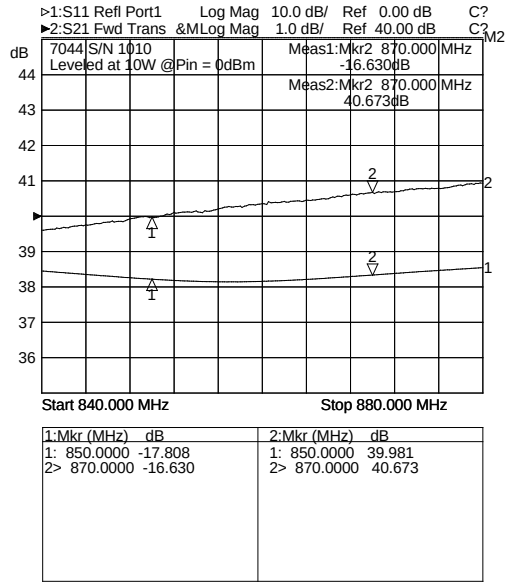
TYPICAL PERFORMANCE PLOTS

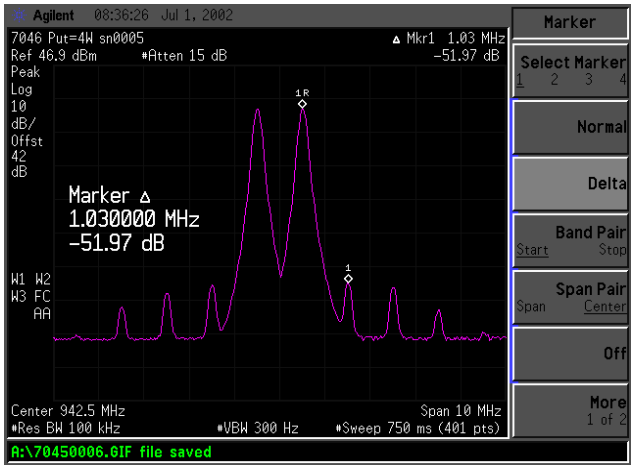
Plot 1 – Small Signal Gain and P_{1dB}
Top curve: Small Signal Gain @ Pin = -20dBm
Middle: Output Power @ P_{IN} = -2dBm
Reference: 48dB, 1dB/Div.
Bottom: Input Return Loss
Reference: 0dB, 10dB/Div.



Plot 2 – ALC Flatness
Top Curve: ALC ON @ P_{OUT} = 10W, P_{IN} = 0dBm
Reference: 40dB, 1dB/Div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/Div.



Plot 3 – 2-Tone Performance @ 4W (36dBm)
2-Tone @ P_{OUT} = 4W, Fc = 860MHz
I_D = 1.8A



Plot 4 – 2-Tone Performance @ 1.25W (31dBm)
2-Tone @ P_{OUT} = 1.25W, Fc = 953MHz
Id = 1.17A