EMPOWER RF SYSTEMS, INC.

Solid State Personal Communication Power Amplifier

7026 - PCM5C5EDM

2110 – 2170 MHz / 20 Watts 3 GPP W-CDMA

UMTS AMPLIFIER MODULE FOR SMALL BASE STATIONS AND REPEATERS

The PCM5C5EDM (SKU 7026) is designed for single and multi-channel 3GPP W-CDMA repeater applications in the UMTS frequency range. This amplifier utilizes linear LDMOS power devices that provide high gain, wide dynamic range, low distortions, and excellent group delay and phase linearity. Exceptional performance, long term reliability, and high efficiency are achieved by employing Direct Injection Pre-D™, advanced matching networks and combining techniques, EMI/RFI filters, machined housings, and qualified components. Empower RF's ISO9001 Quality Assurance Program assures consistent performance and the highest reliability.

- Solid-state linearized design
- Small and lightweight
- Suitable for single & multi-FA W-CDMA
- 50 ohm input/output impedance
- High reliability and ruggedness
- Built-in Control & Monitoring Circuits
- High Dynamic range ALC circuit
- Built-in Output Isolator

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

Parameter	Symbol	Min	Typ	Max	Unit
Operating Frequency	BW	2110		2170	MHz
Small Signal Gain @ P_{IN} = -20dBm	G_{SS}	45	46	47	dB
Small Signal Gain Flatness, P_{IN} = -20dBm	ΔG_{SS}		±0.75	±1.0	dB
Gain Flatness @ 43dBm, P_{IN} = 0dBm, (ALC ON)	ΔG_{ALC}			±0.75	dB
Gain variation over operating temperature range	ΔG_{TEMP}			±0.75	dB
Input/Output Return Loss	S_{11} / S_{22}			-14	dB
Power Output W-CDMA per 3 GPP standard	P_{WCDMA}	20			Watt
ALC Dynamic Range @ 20W P_{OUT}	Δ_{ALC}	12			dB
ACLR @ P_{OUT} = 43dBm,1-Tone W-CDMA, 64 DPCH BW = 3.84 MHz, P_{IN} = 0dBm (ALC ON) Spectrum Analyzer Settings: Res BW = 30 KHz, Video BW = 100 Hz	Δ=5MHz			-48	dBc
	Δ=10MHz			-53	
ACLR @ P_{OUT} = 40.5dBm, 2-Tone W-CDMA 64 DPCH, P_{IN} = 0dBm (ALC ON) BW = 3.84MHz, Δ = 5MHz Spectrum Analyzer Settings: Res BW = 30kHz, Video BW = 100Hz	Δ=5MHz			-48	dBc
	Δ=10MHz			-53	
IMD @ P_{OUT} = 12W 2-Tone, 38dBm/tone, P_{IN} = 0dBm Avg. Δ = 25kHz – 3MHz (ALC ON)	IMD			-46	dBc
Harmonics @ 43dBm CW	2^{ND} / 3^{RD}			-45 / -50	dBc
Spurious Signals @ 20W CW	Spur			-76	dBc
Noise Figure @ Max Gain	NF		7	10	dB
Operating Voltage	V_{DD}	26	28	30	Volt
Current Consumption @ 20W 1F, W-CDMA	I_{DD}		6	8	Amp

MECHANICAL SPECIFICATIONS

Parameter	Value	Units
Dimensions	7.0" x 6.3" x 1.0"	Max
Weight	3.0lb.	Max
RF Connectors Input / Output	Input: Type-SMA Female Output: Type-N, Female	
DC Interface Connectors	Control: D-sub 9-pin, Male DC Power: Hybrid, D-sub 3-pin, Male	
Cooling	External Heatsink (not supplied)	

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ENVIRONMENTAL CHARACTERISTICS (Design to Meet)

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	T_C	-20		+75	°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		

LIMITS

Input RF drive level without damage (ALC ON)	+10dBm	Max
Over Power Shutdown	48dBm	Min
Load VSWR @ P_{OUT}= 41dBm	∞:1 VSWR, all phases & magnitude (built-in circulator)	-
Thermal Overload	85°C shutdown	Max

CONTROL INTERFACE CONNECTOR – D-sub 9-pin, Male

Pin #	Description	Specifications
1	Forward Power Monitor	Continuous Analog voltage relative to forward power level FWDM: 27-47dBm, 1.0-4.6V_{DC} @ 180mV/dB (Typical)
2	Reverse Power Monitor	Continuous Analog voltage relative to reflected power level REVM: 19-39dBm, 1.5-4.0V_{DC} @ 120mV/dB (typical) with open load
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): 32-44dBm @ 0-5V_{DC}, 250mV/dB (typical) Error Range (AER): ±1.5dB, Input Impedance: >50k Ohm Response Time (ART): 100mS/dB
5	Mute	Disable Amplifier: TTL Logic High (5V) (*Internally Pulled-low*)
6	Over Temp Shutdown	Temp Alarm= TTL Logic High (5V) @ 85°C, unit shutdown, operation resume @ 75°C
7	Over Power Alarm	Alarm= TTL Logic High (5V) @ +48dBm ±0.5dB
8	VSWR Alarm	Alarm= TTL Logic High (5V) ≥3:1 VSWR
9	GND	Ground

DC POWER CONNECTOR – Hybrid D-sub 3-pin, Male

Pin #	Description	Specifications
A1	VDD	+26.0-30.0V_{DC}
A2	GND	Ground
A3	N/C	No Connection

LED	LED Indicator	Output Power level indicator referenced to ALC setting (Independent of ALC ON or OFF)

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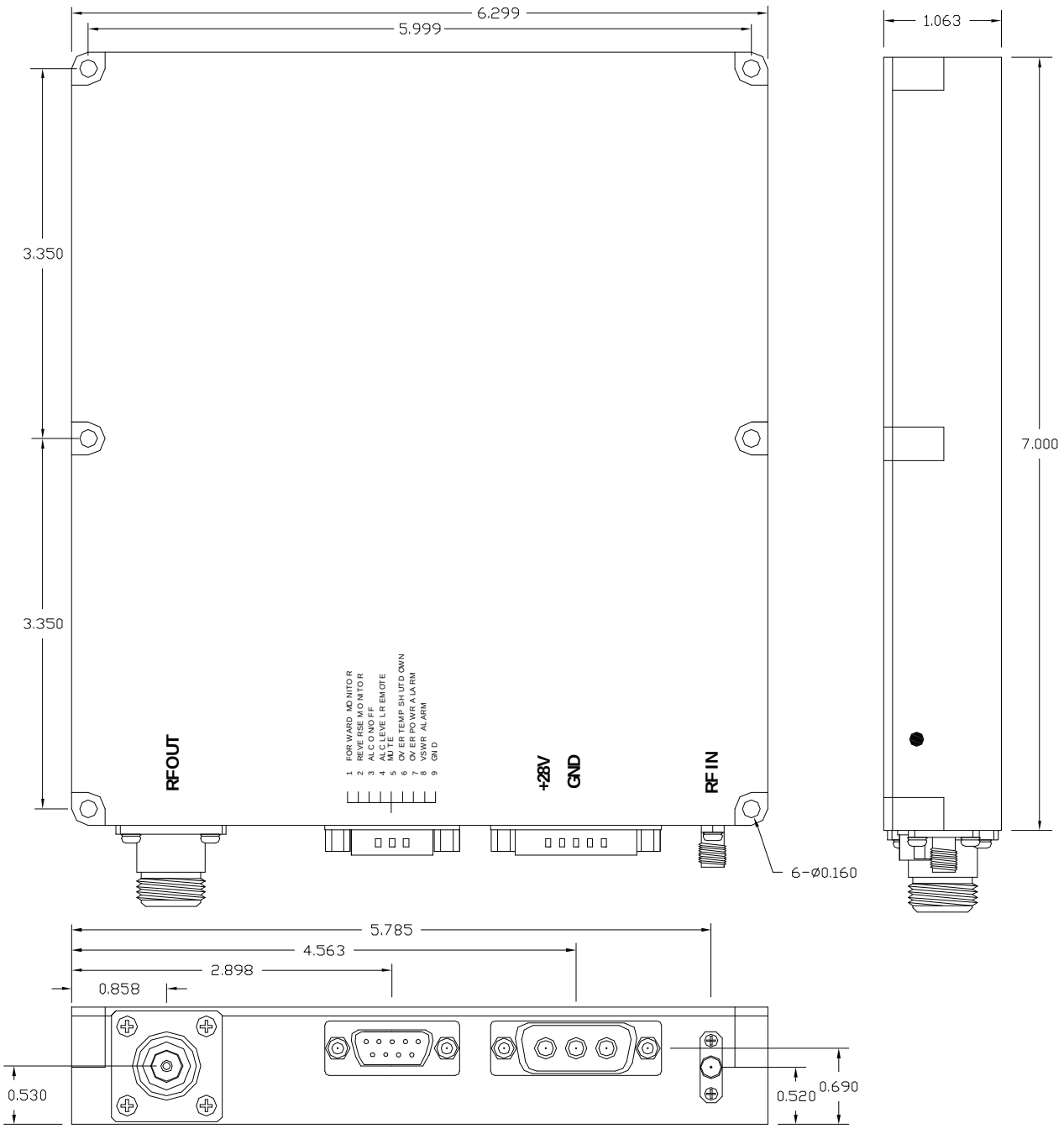
OUTLINE DRAWING



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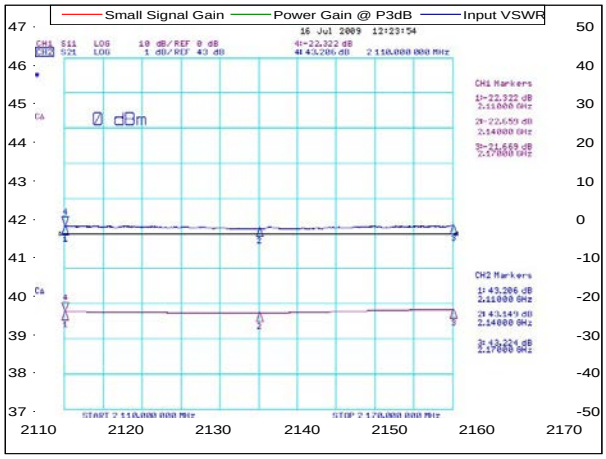
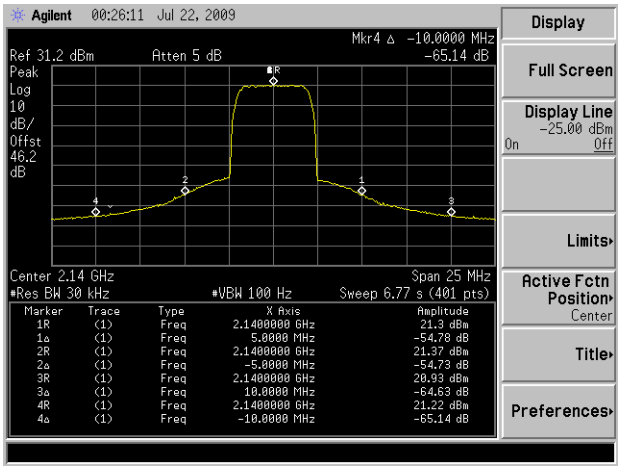
TYPICAL PERFORMANCE PLOTS

Plot 1 – Broadband Plot 1600-2400MHz
Top Curve: Small Signal Gain @ P_{IN} = -20dBm
Reference: 45dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.

Plot 2 – 2110-2170MHz
Top Curve: Power Gain @ P_{IN} = 0dBm ALC ON
Reference: 43dB, 1dB/div.
Bottom Curve: Input Return Loss
Reference: 0dB, 10dB/div.



Plot 3 – ACLR @ 20W
Center Frequency: 2140MHz, 1FA W-CDMA



Plot 4 – ACLR @ 11W
Center Frequency: 2140MHz, 2FA W-CDMA