

Revision 0.b Release Date August 10th 2007

Revision Notes Full production release

Technical Specifications Summary

Frequency Range:	470 - 860 MHz	Gain:	16dB
P1dB:	20 Watts CW	Efficiency:	10%
Class:	A	Temperature Range:	-20 to 60°C
Supply Voltage:	28.0V	Max VSWR:	10:1

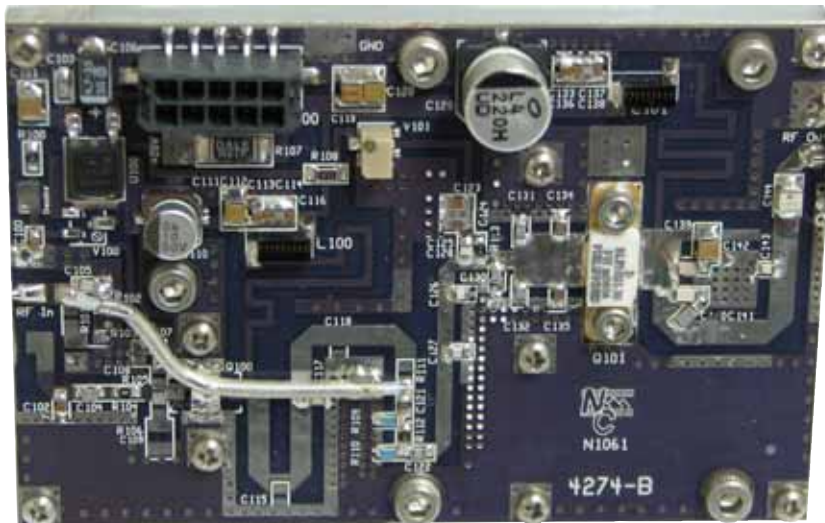
Amplifier General Description

The PA5-UHF-16 is a two stage ultra linear class A integrated TV linear amplifier designed for the television integrator in mind. Providing a minimum of 3W pk ultra linear power and as much as 15W of peak power, the PA5-UHF-25 is the perfect pre-amplifier for any broadband UHF transmitter. Featuring quadrature input and output combining, the amplifier is isolated from most external circuit problems.

- No RF assembly or circuit tuning!
- 15 Watts of Peak Output Power!
- 16dB typical gain at Channel 78!
- Combined **Video and Aural** at full rated power!
- Modular Construction for ease of Integration!

Heatsink required for operation.

Amplifier Picture



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Parameter	Min	Typ	Max	Units	Notes
Frequency	470		860	MHz	
P1dB	20			W, CW	
Linear Power Out		5		W	
IMD3		-45		dBc	For 2 tones, 4.5MHz spacing, 5 W PEP
Power Input		125		mW, CW	For 5W Output
Gain	16			dB	For 5W Output, ± 1.5 dB
Vsupply	24		32	V, DC	
Drain Current		1.8		A, DC	
Input VSWR			1.5:1		
Insertion Phase Variation		± 5		$^{\circ}$	Unit to unit
Gain Variation		± 1		dB	Unit to unit
F2 Second Harmonic		-50	-25	dBc	
F3 Third Harmonic		-50	-25	dBc	
Baseplate Operating Temperature	-20		+60	$^{\circ}$ C	

Physical Dimensions 2.5" x 3.8" x 1.0" / 6.4cm x 9.7cm x 2.5cm

All specifications valid for 50 Ω output load, $V_{sup} = +28$ VDC, $I_{dq} = 1.75$ A

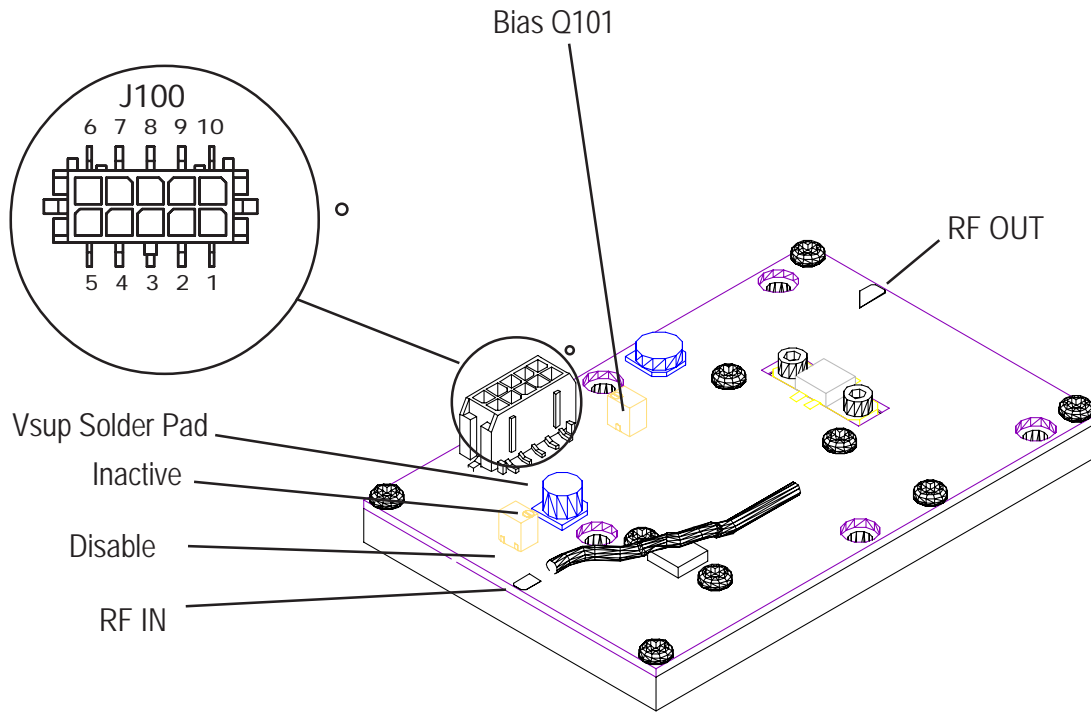
Absolute Maximum Ratings

Parameter	Value	Units	Notes
Maximum Operating Voltage	32	VDC	
Stable Operating Voltage	24 - 32	VDC	
Maximum Bias Current, Q101	2.5	A,DC	Factory Set to 1.75A
Maximum Drain Current	2.5	A,DC	
Load Mismatch Survival	10:1		
Storage Temperature	-40 to +105	$^{\circ}$ C	
Maximum Operating Baseplate Temp	60	$^{\circ}$ C	

Features, Auxillary Functions

- ◆ Amplifier Disable
- ◆ Current Sense
- ◆ Connectorized Power





I/O Standard 0.100" pitch DIP / IDC header: SAMTEC type IDSD, HCSD 3M type 89106-0101 AMP 102393-1, 102398-1 BERG 71602-306 -or- Solder directly to Pin in I/O connector	J1-1	ALARM_OUT	TTL Hi when baseplate exceeds 70C
	J1-2	ALARM_IN	Jumper to J1-1 for automatic shutdown at 70C, automatically re-enables at 60C
	J1-3	GROUND	
	J1-4	BIAS_SUP	Not used for this amplifier. Vsup internally connected here.
	J1-5	TEMP	Baseplate Temperature
	J1-6	DISABLE	TTL Hi to Disable amplifier
Power 3.0mm Micro Connector: MOLEX 43025-1000 MOLEX Pin 43030-0001, 43030-0007 AMP 1-794617-0 AMP Pin 794610, 794606 -or- Solder directly to pad adjacent to connector	J2-1,10	CURRENT	Current Sense, Transistor Q1, Q4
	J2-2,3,8,9	GROUND	System Ground
	J2-4,5,6,7	Vsup	+28 to +32 VDC

Connections:

Connections:

Connect amplifier to +Vsup and Ground using either 3.0mm modular 10-position plug (J100) or soldering directly to pad adjacent to connector. If using Single connection, 14 gauge wire to each side is recommended. 20 gauge wire is recommended for use in modular connector, and all power connections must be used! In all cases, use of teflon insulated wire is highly recommended.

Connect coaxial cable to input and output RF connections (semi rigid or flexible) using best RF practices. Ensure output cable is of sufficient power handling rating. Pads are provided for ground on co-axial connections.

Amplifier Startup

+Vsup should be applied to amplifier with no drive applied. The system must allow

drain voltage to reach +26V minimum before drive or damage can

result to the amplifier and void warranty. This typically takes between 2 - 10 seconds and should be verified by the system integrator.

Bias Current:

Bias current is controlled via voltage regulator and voltage divider. Bias has been pre-set at the factory to 1.75A for output stage at +28.0V DC. This bias point has been selected to offer optimum IMD performance and linearity. If the bias point is changed, take great care not to exceed the bias listed on page 2.

Fault Condition - Bad VSWR

Current sense J100-1,10 should be monitored for excessive or no current. The voltage difference between J100-1,10 to J100-4,5,6,7 is scaled 1A per 0.010 V. If transistor experiences currents in excess of normal operation, a fault condition exists, and the amplifier should be disabled through DISABLE. If current drops to below 1.0A indicated, a fault condition exists, and the amplifier should be disabled through DISABLE.

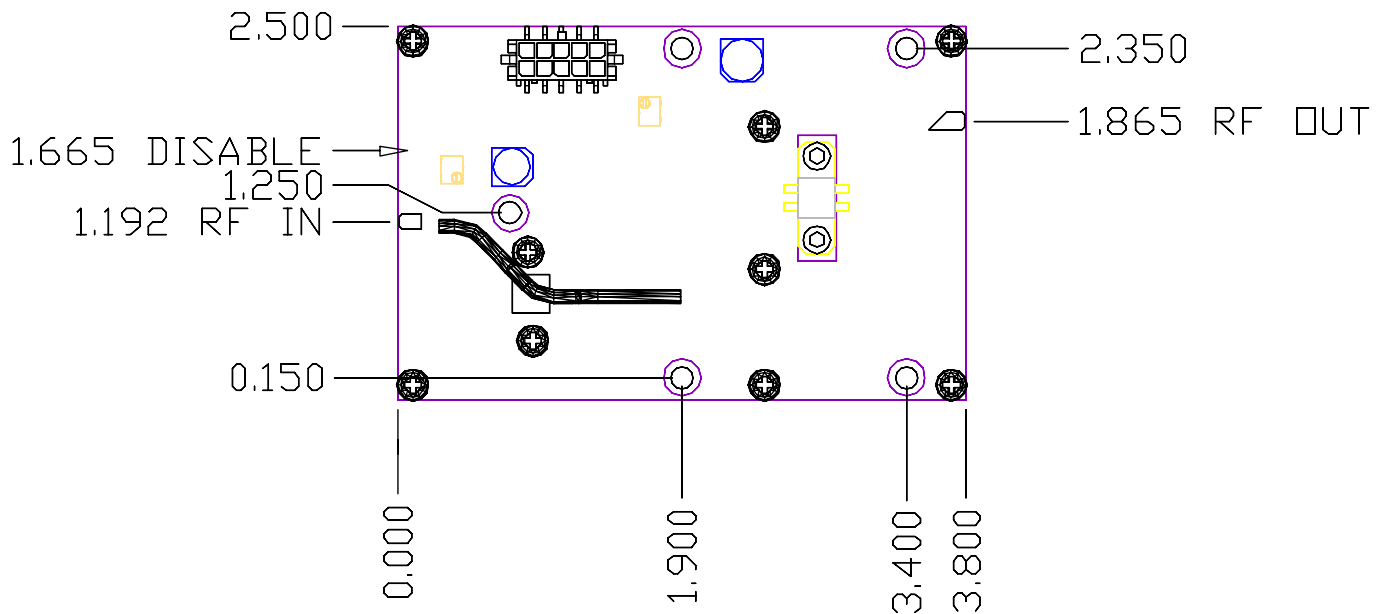
Amplifier Shutdown

To prevent damage to amplifier and surrounding systems, bias and drive should be removed prior to powering down PA. This can be accomplished by removing drive or by grounding DISABLE. Power can safely be removed from PA. Please use open collector circuit to control as applying positive voltage to this point will harm operation.

Miscellaneous:

Placing noisy analog or digital systems, such as additional control circuitry, directly over the top of transistors or RF path can cause improper operation. Care should be taken to locate these components where they will not cause interference.





Tips for Mechanical Mounting:

- 1 All holes are clear for #6 Screw. Stainless Steel mounting hardware is recommended, grade 18-8 or better. A lock washer of same material should also be used.
- 2 Ensure mounting surface is flat to better than 0.003" / "
- 3 Use a thin layer of thermal compound on the backside of the PA - no more than 0.001" - 0.002" thickness!
- 4 Torque all screws to 10-12 in-lbs

Considerations for Mechanical Mounting:

- Considerations for proper thermal design include
- Total power dissipated = Total DC Power Consumed x (1-Efficiency)
- Ambient Airflow
- Thermal Resistance of Heat Sink



Ordering Information:

Order Code	Description	DRFT Reference
PA5-UHF-16	Single stage ultra linear UHF TV amplifier	4758
PAB5-UHF-16	Amplifier in Enclosure	TBD

Options

-A11	SMA Female Connectors In / Out	0201
-A12	Heat Sink Option	0202
-A13	Heat Sink Option with DC Fan, pre wired	0203
-A14	Ruggedized for vibration	0204
-A15	Wire harness, 1' length, 10 wires for pallet amplifier only (NON-FM)	0205
-A16	Wire harness, customer specified length for pallet amplifier only	0206
-T2	Extended Burn In	0271
-T3	Extended Data Collection	0272

Standard Pallet Options:

SMA Female Connectors, Input and Output. Stainless Body, Gold Center pin, 4-hole SMA bolted to pallet amplifier edge through bottom two holes located at amplifiers RF IN and RF OUT locations. All stainless steel hardware.

Enclosure- all aluminum machined enclosure available for most pallet amplifiers. Alodined aluminum, alloy 6061-T6. SMA Female input and output RF connectors. Supply voltage and ground through solder / feedthrough connections. Module must be bolted to appropriate heatsink.

Heat Sink - aluminum extruded heat sink, black anodized. Pallet amplifier or module will be bolted to heatsink. Customer will be required to provide adequate airflow.

Heat sink with fan - aluminum extruded heat sink as above, with included fan bolted to push air through the heat sink. Depending on heat requirements, a second fan may also be provided on the output of the unit.

Ruggedized - all screws have threadlocking compound applied, and all flying components are staked and attached to base. Designed to withstand MIL-STD-810E 514.4 Category 8.

Power Connector - a 10 pin molex connector is used on all standard pallet amplifiers to supply +Vsup and Ground connections, as well as hi-side current shunts for current monitoring. Delta RF offers the mating connector with 1' wires - Red (Vsup), Black (Ground), Yellow (Current monitor). All wires are 18 gauge teflon insulated wires. Customer may optionally specify wire length and wire color.

Testing Options:

Standard - includes power test and brief burn - in under laboratory conditions. Printed test report gives graph of Gain and Input Return Loss at rated P1dB and Voltage Conditions. Report shows pass/fail criteria. All amplifiers include this test.

Extended burn in - 8-hour burn in at P1dB with standard test run at completion. Unit is monitored during test and any discrepancy reported. Standard test data is included.

Extended data collection - Standard data is run and included. Detailed data is taken point by point giving the customer 25 - 70 frequency points, depending on the amplifier model. For each frequency point, data is generated to include gain, input power, input return loss, current, second harmonic, third harmonic, efficiency, audio distortion.

Other tests available - Vibration, Temp cycling, Shock. Please inquire.

The specifications contained herein are subject to change without notice. Delta RF Technology, Inc. assumes no liability for the use of this information.

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