

Revision 0.D Release Date July 17, 2007

Revision Notes

Technical Specifications Summary

Frequency Range:	160 - 240 MHz	Gain:	18dB
P1dB:	150 Watts CW	Efficiency:	15%
Class:	A	Temperature Range:	-20 to +70°C
Supply Voltage:	24V	Max VSWR:	5:1

Amplifier General Description

The **PA40-VHF-H-18** is a true class A amplifier designed specifically for analog and digital television applications where a high power driver or IPA is required to drive a tube or high power solid state PA stages. Utilizing gold-metallized MOSFET technology, this PA offers unmatched performance and reliability. Capable of delivering in excess of 150W ultra linear VHF / Band III, this amplifier delivers optimum performance from microwatts to just under 50 Watts Pk Sync Power, or 25W average power for digital applications before any pre-correction is applied.

- No RF assembly or circuit tuning!
- 150W Pk Sync Analog / 25W CW Digital!
- 17.5dB typical gain at Channel 13!
- Modular Construction for ease of Integration!
- Proper Heatsinking is Required.

Amplifier Picture



Delta
RF Technology, Inc.

High Power RF Amplifiers and Accessories

350 South Rock Boulevard • Reno • NV • 89502 • USA

Phone +1.775 DELTA RF [775 335 8273]

Fax +1.775 DELTA FX [775 335 8239]

website: <http://www.drft.com>

email: sales@drft.com

Parameter	Min	Typ	Max	Units	Notes
Frequency	160		240	MHz	
P1dB	125	150		W, CW	
Analog Power Out, Pk Sync		40		W	
Digital Power Out, CW		50		W, CW	
Linear Power Out				W	
IMD3	-45			dBc	For 2 tones, 1MHz spacing, 40 W PEP
Power Input		600		MW, CW	
Gain	17	18		dB	
Vsupply	22	24	26	V, DC	
Gain Compression		0.1	0.2	dB	40W CW
Drain Current		8	12	A, DC	
Input VSWR		1.2:1	1.5:1		
Insertion Phase Variation		±5		°	Unit to unit
F2, F3 Second Harmonic		-46	-40	dBc	40W
Sync Compression			5	%	40W Pk Sync
Differential Gain			3	%	40W Pk Sync
Baseplate Operating Temperature	-20		+70	°C	

Physical Dimensions 2.0" x 4.0" x 1.0" / 10cm x 10cm x 3cm

All specifications valid for 50 Ω output load, $V_{sup} = +24VDC$, $I_{dq} = 8.0A$

Absolute Maximum Ratings

Parameter	Value	Units	Notes
Maximum Operating Voltage	+28.0	VDC	
Stable Operating Voltage	22-26	VDC	
Maximum Bias Current	8.0	A	
Maximum Drain Current	12	A	
Load Mismatch Survival	10:1		
Storage Temperature	-65 to +150	°C	
Maximum Operating Baseplate Temp	+65	°C	

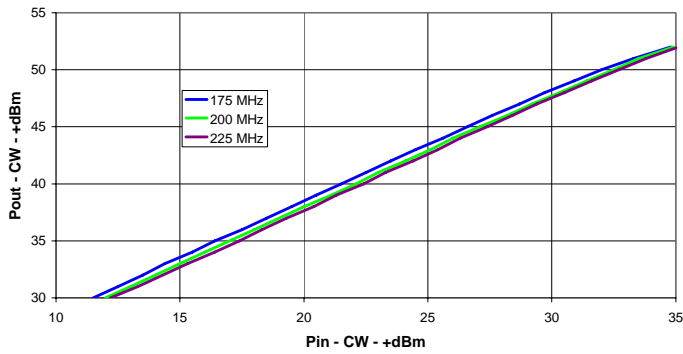
Features, Auxiliary Functions

- ◆ Temperature Compensated Bias
- ◆ Amplifier Disable
- ◆ Current Sense
- ◆ Connectorized Power and I/O

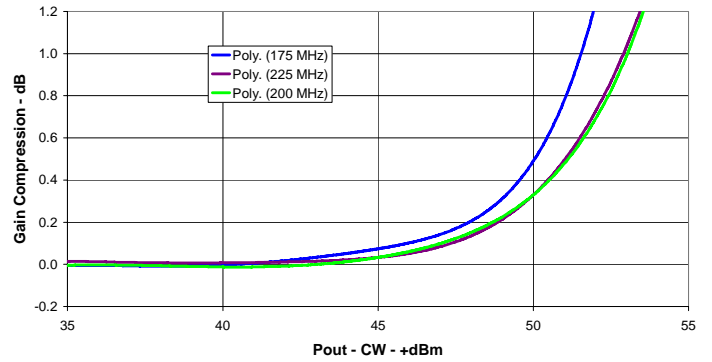


Single Tone CW Measurements

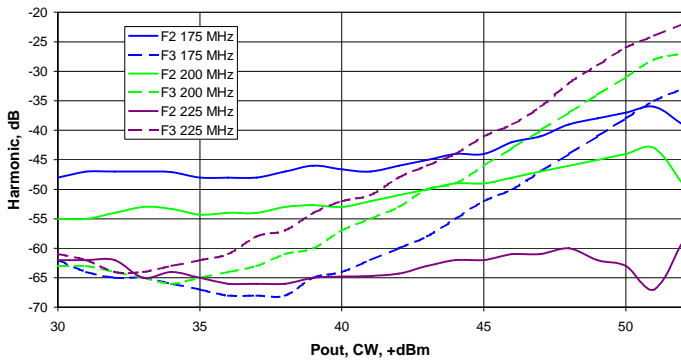
Pout vs. Pin



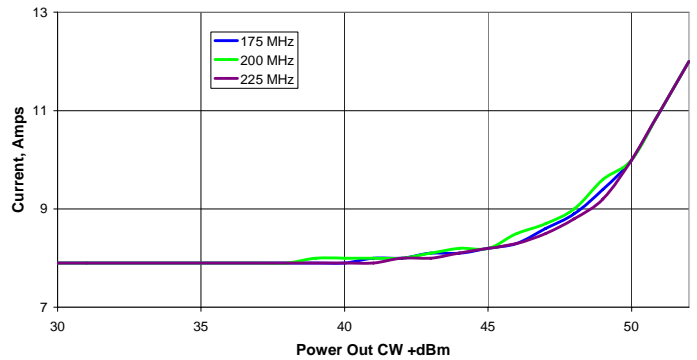
Gain Compression



Second, Third Harmonics

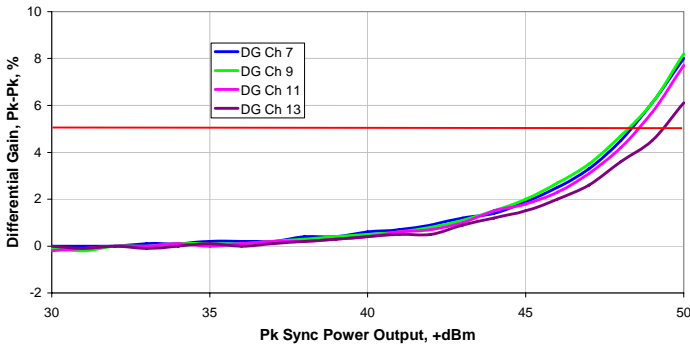


Current vs. Power Out

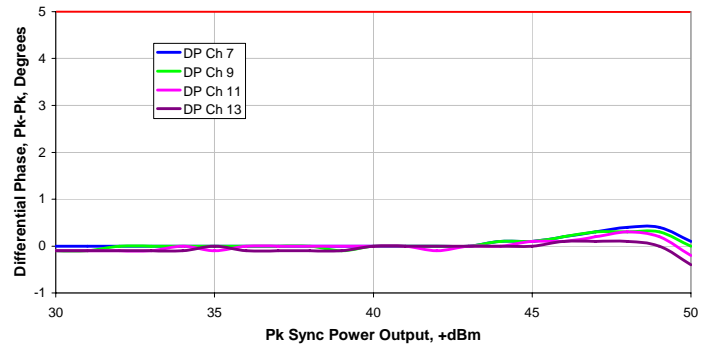


Video Measurements

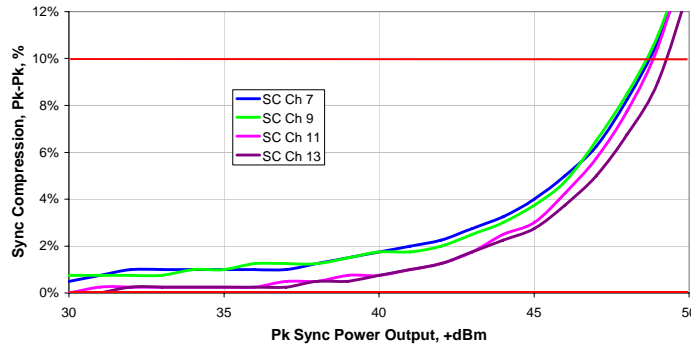
Differential Gain



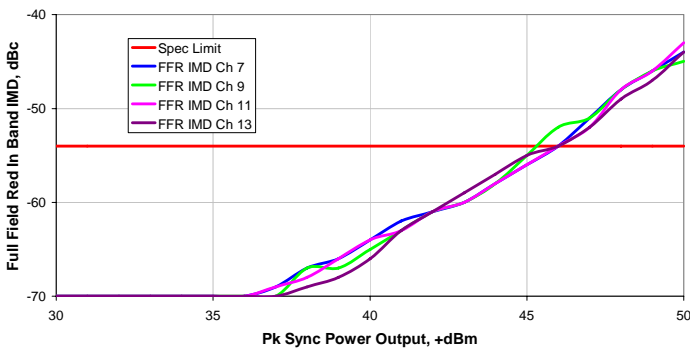
Differential Phase



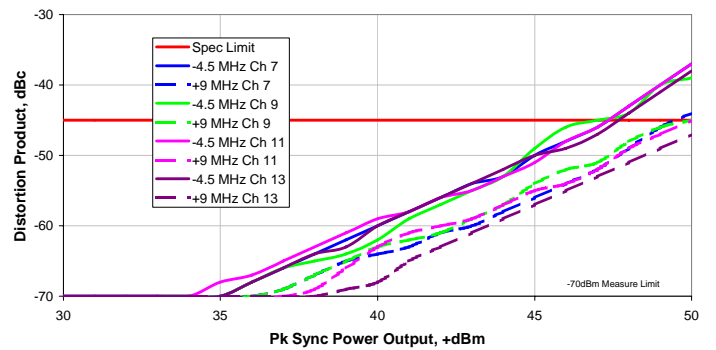
Sync Compression



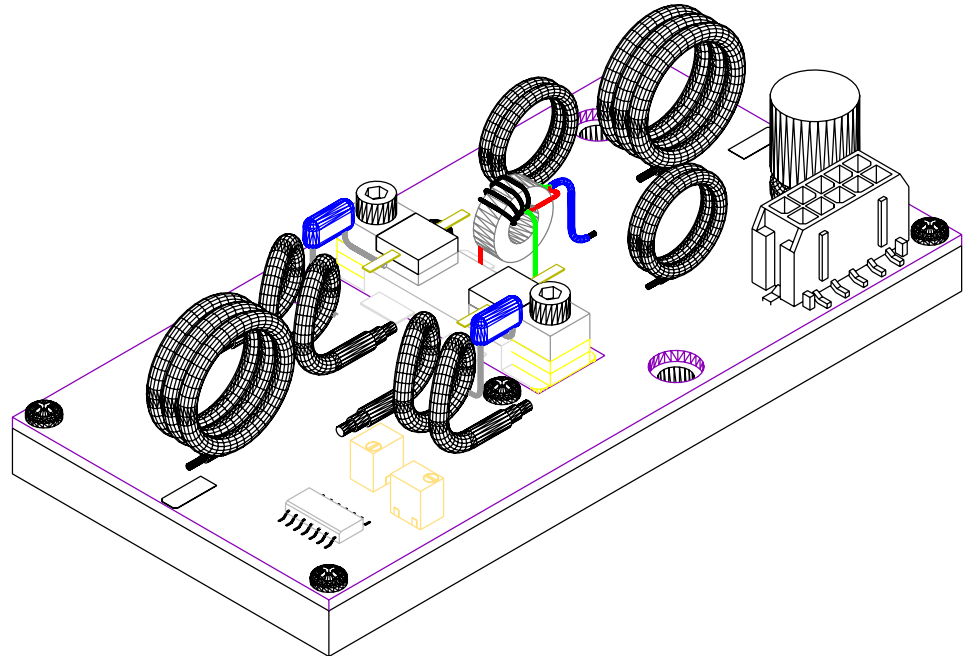
NTSC Full Field Red In Band Inter Modulation Distortion



-4.5MHz +9MHz Distortion Product



Electrical Connections:



Connections:

Connect amplifier to +Vsup and Ground by soldering directly to pads on top of amplifier. If using Single connection, 12 gauge wire is recommended, 12 gauge ground wire. 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

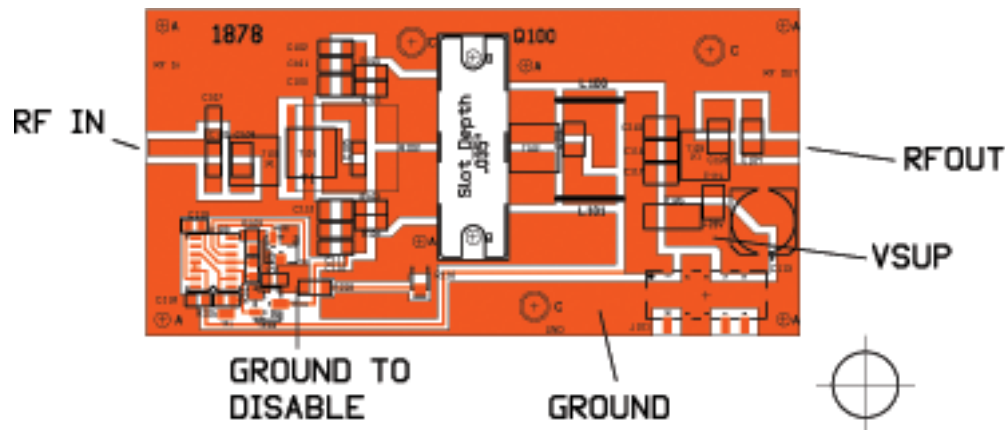
+Vsup should be applied to amplifier with no drive applied. The system must allow drain voltage to reach +40V minimum before applying drive or damage will result to the amplifier and void warranty. This typically takes between 1-2 seconds and should be verified by the system integrator.

Bias Current:

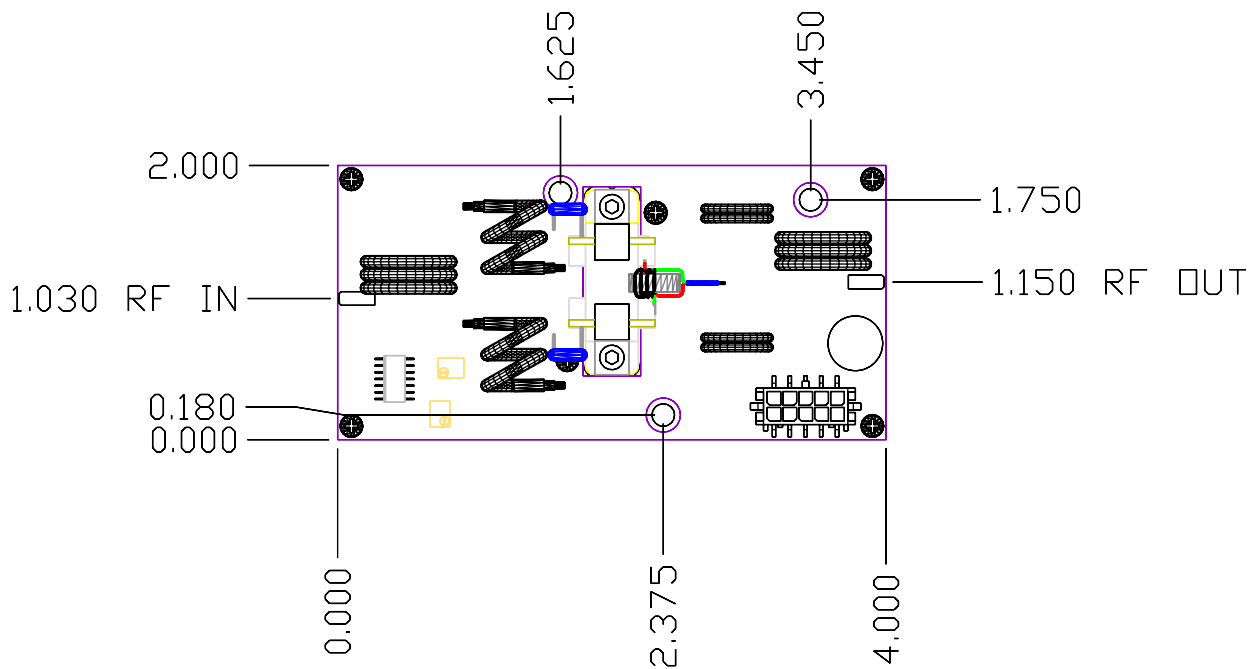
Bias has been pre-set at the factory to 1.0A at +50.0V DC. This bias point has been selected to offer the optimum balance between gain and efficiency. This unit is intended for class AB operation. If the bias point is changed, take great care not to exceed the maximum bias listed on page 1.

Amplifier Shutdown

To prevent damage to amplifier and surrounding systems, drive should be removed prior to powering down PA. Please note that as with any class AB amplifier, even when no drive is applied, the output of the amplifier can still be active when presented with an odd load.



Mechanical Specifications

**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
PA40-VHF-H-18	VHF Band III TV Ultra Linear PA Driver - Digital and Analog	1774
PAB40-VHF-H-18	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.

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