

Revision 1.b Release Date July 6 2007  
Revision Notes Revised gain specification

## Technical Specifications Summary

Frequency Range:	2 - 30 MHz	Gain:	20dB
P1dB:	10 Watts CW	Efficiency:	20%
Class:	A	Temperature Range:	0 to 70°C
Supply Voltage:	28.0V	Max VSWR:	1.5:1

## Amplifier General Description

The **P10-2-30-20** is an integrated communications linear amplifier designed for driving higher power HF systems. Providing a minimum of 10W PEP linear power, and featuring gold metallized MOSFET construction, the P10-2-30-20 is the perfect driver for use in any HF comm or data amplifier.

- No RF assembly or circuit tuning!
- 10 Watts of Linear Output Power!
- 21 dB typical gain at 30 MHz!
- Amplifier Disable Input!
- Class A Linear Amplifier

## Amplifier Picture



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Parameter	Min	Typ	Max	Units	Notes
Frequency	2		30	MHz	
P1dB	10			W, CW	
Linear Power Out	10			W	
IMD3		-35	-30	dBc	For 2 tones, 10KHz spacing, 10 W PEP
Power Input		80		mW, CW	
Gain	19	21		dB	
Vsupply	26		30	V, DC	
Drain Current		1.5		A, DC	
Input VSWR		1.3:1	1.5:1		
Insertion Phase Variation		±10		°	Unit to unit
Gain Variation		±2		dB	Unit to unit
F2 Second Harmonic		-35		dBc	
F3 Third Harmonic		-15		dBc	
Baseplate Operating Temperature	0		+70	°C	

Physical Dimensions 3.4" x 2.2" x 1.5" / 8cm x 5cm x 4cm

All specifications valid for 50  $\Omega$  output load,  $V_{sup} = +28VDC$ ,  $I_{dq} = 1.0A$

Absolute Maximum Ratings

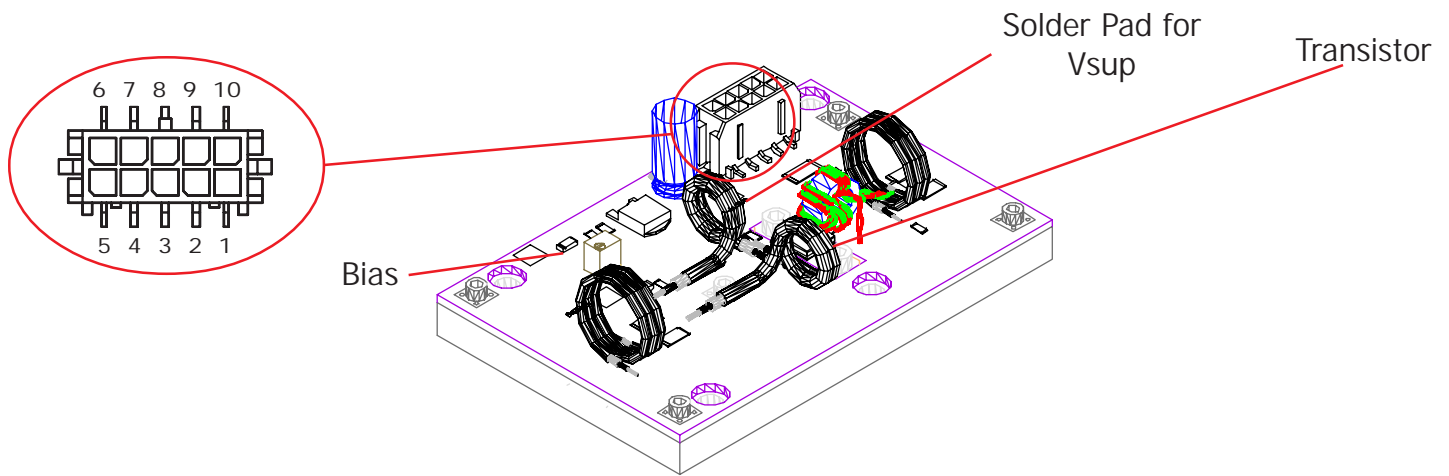
Parameter	Value	Units	Notes
Maximum Operating Voltage	+34.0	VDC	
Stable Operating Voltage	+26.0 to +32.0	VDC	
Maximum Bias Current, Q100	1.5	A	
Maximum Drain Current	3	A	
Load Mismatch Survival	5:1		
Storage Temperature	-40 to +105	°C	
Maximum Operating Baseplate Temp	+70	°C	

Features, Auxillary Functions

**Features Include:**

- Amplifier Disable
- Current Sense
- Connectorized Power





Power	J1-1	CURRENT	Current Sense
3.0mm Micro Connector: MOLEX 43025-1000	J1-2,3,8,9	GROUND	System Ground
MOLEX Pin 43030-0001, 43030-0007	J1-4,5	Vsup	+28 to +32 VDC
AMP Pin 794610, 794606	J1-6,7,10	N/C	No Connection
-or- Solder directly to pad adjacent to connector			

### Connections:

Connect amplifier to +Vsup and Ground using either 3.0mm modular 10-position plug (J1) or soldering directly to pad adjacent to connector. If using Single connection, 14 gauge wire is recommended, 14 gauge ground wire. 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.

### Amplifier Startup

+Vsup should be applied to amplifier with no drive applied. The system must allow drain voltage to reach +26V minimum before applying 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. The amplifier may be disabled by applying ground to DISABLE, which is the solder pad to the left of bias pot. This point must be allowed to float for proper operation.

### Bias Current:

Bias current is controlled via voltage divider. Bias current is set by adjusting potentiometer. Bias has been pre-set at the factory to 1.0A at +28.0V DC. This bias point has been selected to offer the optimum balance between IMD performance, efficiency, and gain. If the bias point is changed, take great care to set the same bias point on each transistor in your system, and not to exceed the bias maximum listed on page 1.

### Fault Condition - Bad VSWR

Current sense J101-1 should be monitored for excessive current. The voltage difference between J100-1 to J100-4,5 is scaled 1A per 0.010 V. If the transistor experiences currents in excess of normal operation, a fault condition exists, and the amplifier should be disabled through TP1 or removing drain voltage. If current on the transistor drops to below 1.0A indicated, a fault condition exists, and the amplifier should be disabled through DISABLE or by removing drain voltage.

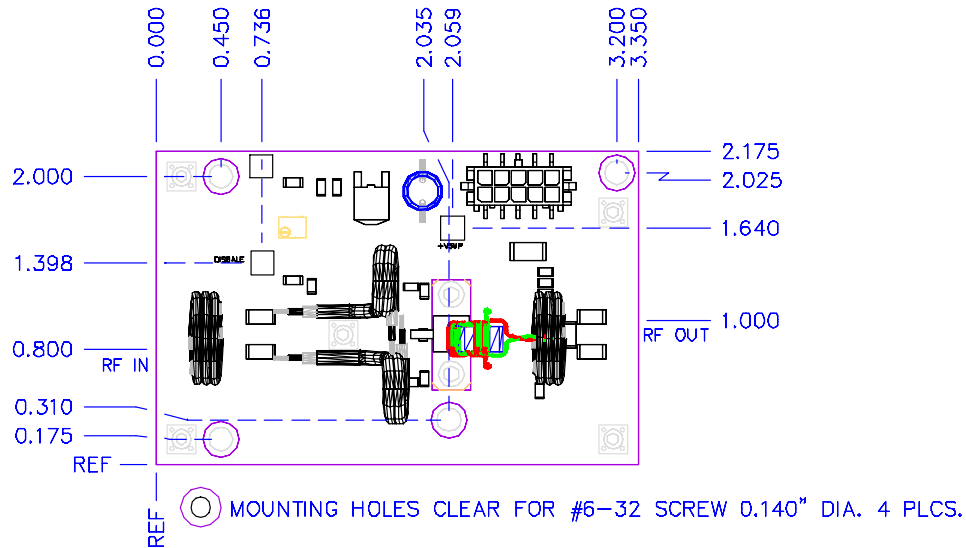
### Amplifier Shutdown

To prevent damage to amplifier and surrounding systems, bias and drive should be removed prior to powering down PA. This can be accomplished by grounding DISABLE and removing drive then powering down PA, or simply removing drive and powering down PA.

### Miscellaneous:

It is normal for the output transformers (flexible coax on the output of transistor) to get warm during operation. These components are rated for continuous operation in excess of 150°C. 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
P10-2-30-20	10 W HF Power Amplifier	2698
PAB10-2-30-20	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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