

# 3538

Part Number

# P100-100-500-25

Amplifier Name

Revision 1.d Release Date July 29 2007  
Revision Notes Revised mechanical drawings

This document applies to part numbers 3538 and 4398

## Technical Specifications Summary

Frequency Range:	100 - 500 MHz	Gain:	25dB
P1dB:	120 Watts CW	Efficiency:	42%
Class:	AB	Temperature Range:	0 to 70°C
Supply Voltage:	28.0V	Max VSWR:	5:1

## Amplifier General Description

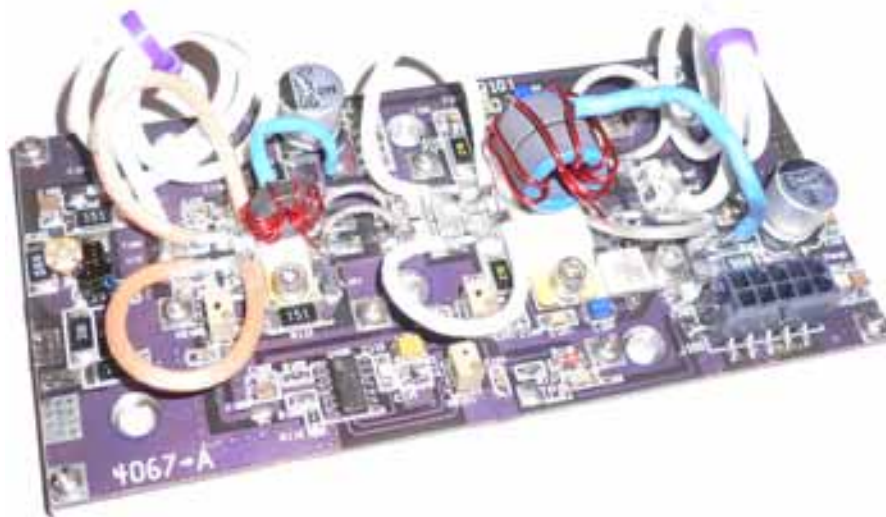
This broadband communications amplifier has been specifically designed for use in communications and jamming environments where poor VSWR is experienced. Using the latest LDMOS technology, this push-pull amplifier can withstand 5:1 VSWR under extreme environments, and 10:1 VSWR with current limiting and limited baseplate temperatures. Linear performance is assured, offering a minimum of 33W carrier power in AM communications systems.

The P100-100-500-25 is a two-stage amplifier requiring only 0.3W to drive to full power. Its compact footprint and good efficiency allow it to be used in a variety of applications mobile and base station.

Please refer to model PAB100-100-500-50 for higher gain version which requires only +0dBm for full power output. Also related is P100-100-500-25-A0 and P100-200-512-25 amplifiers which offer fast shutdown and fast enable capability (20uS).

Proper heatsinking is required, and protection from overdrive.

## 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](mailto:sales@drft.com)

Parameter	Min	Typ	Max	Units	Notes
Frequency	100		500	MHz	
P1dB	100	120		W, CW	
Psat		170		W, CW	Pout max recommended 140W
Linear Power Out		33		W	For AM Carrier SSB Applications
IMD3		-26		dBc	For 2 tones, 10kHz spacing, 100 W PEP
Power Input		0.3		W, CW	
Gain	23	25		dB	±1.5dB variation
Vsupply	26	28	32	V, DC	
Drain Current		4		A, DC	33W CW
Input VSWR		1.3:1	1.5:1		
Insertion Phase Variation		±5		°	Unit to unit
Gain Variation		±1		dB	Unit to unit
F2 Second Harmonic		-20		dBc	
F3 Third Harmonic		-15		dBc	
Baseplate Operating Temperature	0		70	°C	

## Physical Dimensions

2.3" x 4.8" x 1.5"

All specifications valid for output impedance 50  $\Omega$ ,  $V_{sup} = +28VDC$ ,  $I_{dq} = 1.5A$ 

## Absolute Maximum Ratings

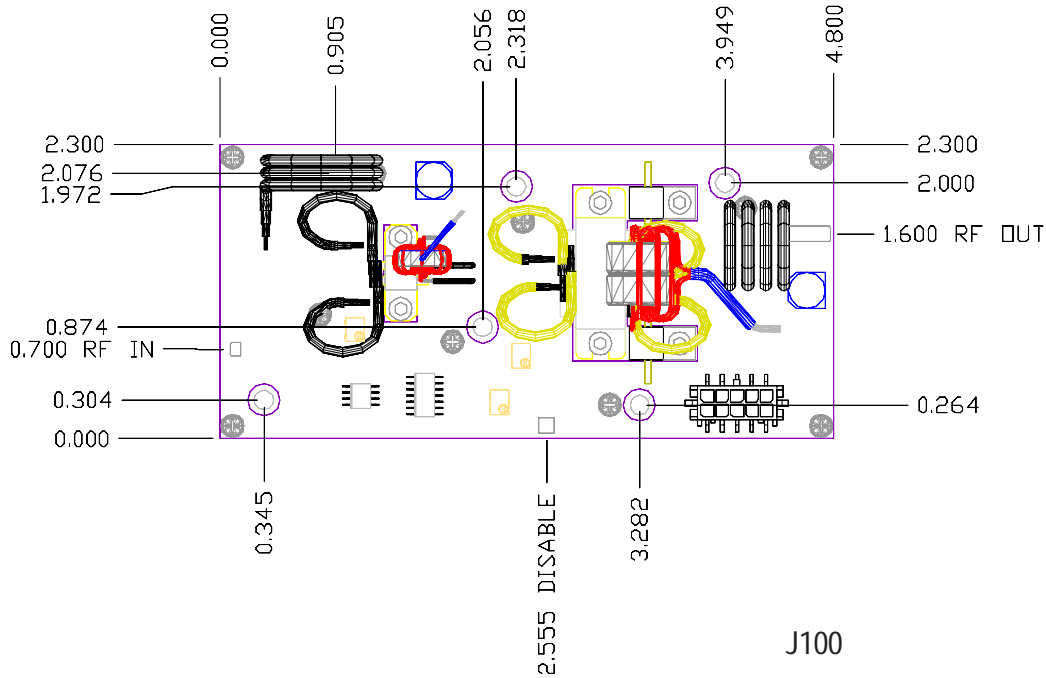
Parameter	Value	Units	Notes
Maximum Operating Voltage	34	V DC	
Stable Operating Voltage	26 - 32	V DC	
Maximum Bias Current, Q1	1.5	A DC	Factory set to 1.0A
Maximum Bias Current, Q2	2	A DC	Factory set to 0.5A
Maximum Drain Current	14	A DC	
Load Mismatch Survival	5:1		
Storage Temperature	-40 to +105	°C	
Maximum Operating Baseplate Temp	+70	°C	

## Features, Auxillary Functions

- ◆ Temperature Compensated Bias
- ◆ Amplifier Disable
- ◆ Current Sense
- ◆ Connectorized Power

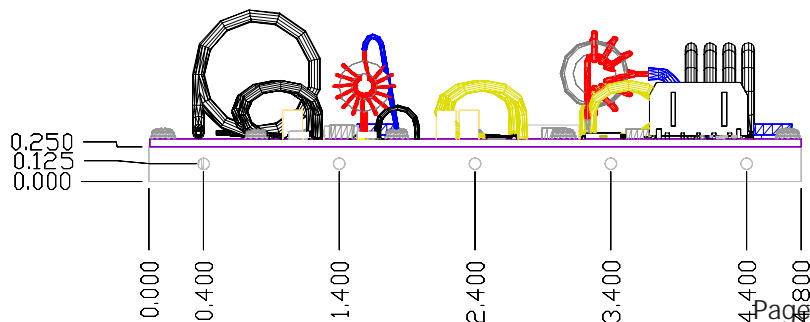


Customer mounting locations. All holes clear for #6 screw, recommended torque 12 - 18 in-lbs. Use of a thin layer of proper thermal grease and proper heat sink is required. RF IN and RF OUT locations are solder pad and represent center of pad. Use best RF practices to solder coaxial cable, or order optional SMA connectors. Use of stainless steel hardware and lockwashers is highly recommended.

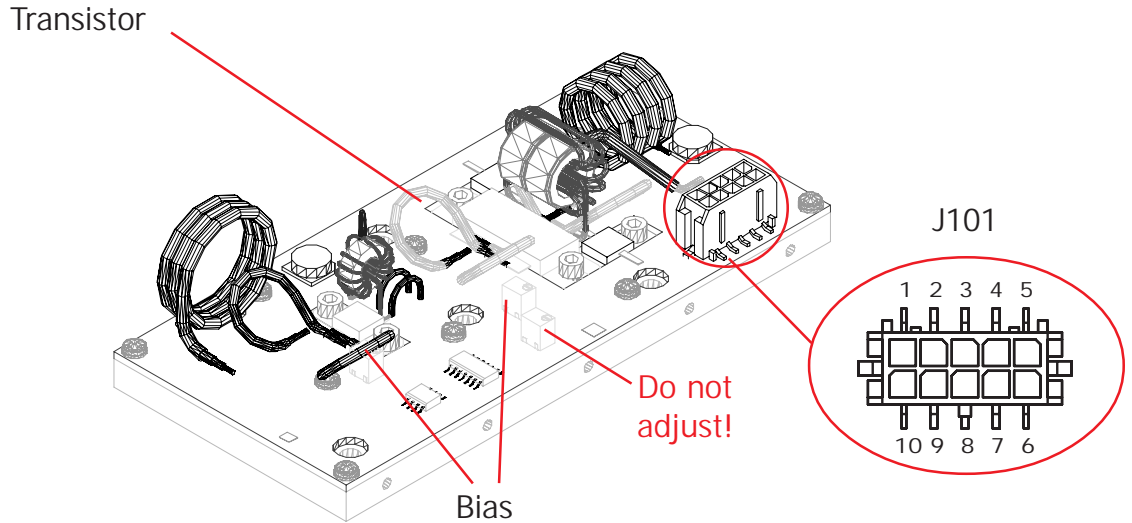


Optional side mounting locations (-A1 version). Holes are threaded for #2-56 screw and are located along centerline of long edges. Minimum hole depth is 0.25". Use of stainless steel hardware and lockwashers is highly recommended.

- J100-1 Ground
- J100-2 N/A
- J100-3 Disable
- J100-4 N/A
- J100-5 Ground
- J100-6 Vsupply
- J100-7 N/A
- J100-8 N/A
- J100-9 N/A
- J100-10 Current Sense



## Electrical Connections:



Power	J101-1	CURRENT	Current Sense
3.0mm Micro Connector: MOLEX 43025-1000	J101-2,3,8,9	GROUND	System Ground
MOLEX Pin 43030-0001, 43030-0007 AMP 1-794617-0	J101-4,5	Vsup	+28 to +32 VDC
AMP Pin 794610, 794606 -or- Solder directly to pad adjacent to connector	J101-6,7,10	N/C	No Connection

### Connections:

Connect amplifier to +Vsup and Ground using either 3.0mm modular 10-position plug (J101) 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 TP1, 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 temperature compensated bias system that uses a hermetically sealed glass thermistor as reference. If excessive air is directed above the amplifier such that the thermistor is cooled below the temperature of the baseplate, this circuitry may not perform properly. Bias has been pre-set at the factory to 0.5A at +32.0V 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 0.5A indicated, a fault condition exists, and the amplifier should be disabled through TP1 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 TP1 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.



**Ordering Information:**

Order Code	Description	DRFT Reference
P100-100-500-25	100-500 MHz 100W Minimum Communications Amplifier	3538
P100-100-500-25-A1	Same as above with edge mounting holes	4398

**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	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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