



## COAXIAL

# Medium High Power Amplifier **ZHL-3A+**

50Ω 0.4 to 150 MHz

### FEATURES

- Medium-High Power, +29.5 dBm min.
- High IP3, +38 dBm typ.

### APPLICATIONS

- HF/VHF
- Instrumentation
- Communication Systems



Generic photo used for illustration purposes only

| Model No.  | ZHL-3A+ | ZHL-3A-S+ |
|------------|---------|-----------|
| Case Style | S32     |           |
| Connectors | BNC     | SMA       |

#### +RoHS Compliant

The +Suffix identifies RoHS Compliance.  
See our website for methodologies and qualifications

### ELECTRICAL SPECIFICATIONS

| Parameter                          | Frequency (MHz) | Min.  | Typ. | Max. | Units |
|------------------------------------|-----------------|-------|------|------|-------|
| Frequency Range                    |                 | 0.4   |      | 150  | MHz   |
| Gain                               | 0.4 - 150       | 24    |      |      | dB    |
| Gain Flatness                      | 0.4 - 150       |       |      | ±1.0 | dB    |
| Output Power at 1 dB compression   | 0.4 - 150       | +29.5 |      |      | dBm   |
| Output third order intercept point | 0.4 - 150       |       | +38  |      | dBm   |
| Noise Figure                       | 0.4 - 150       |       | 11.0 |      | dB    |
| Input VSWR                         | 0.4 - 150       |       |      | 2.0  | :1    |
| Output VSWR                        | 0.4 - 150       |       |      | 2.0  | :1    |
| DC Supply Voltage                  |                 |       | +24  |      | V     |
| Supply Current                     |                 |       |      | 0.6  | A     |

Open load is not recommended, potentially can cause damage.  
With no load derate max input power by 20 dB

### ABSOLUTE MAXIMUM RATINGS

| Parameter                  | Ratings         |
|----------------------------|-----------------|
| Operating Temperature      | -20°C to +65°C  |
| Storage Temperature        | -55°C to +100°C |
| DC Voltage                 | +25V Max.       |
| RF Input Power (no damage) | +20 dBm         |

Permanent damage may occur if any of these limits are exceeded.

REV. H  
ECO-017949  
ZHL-3A+  
MCL NY  
230524



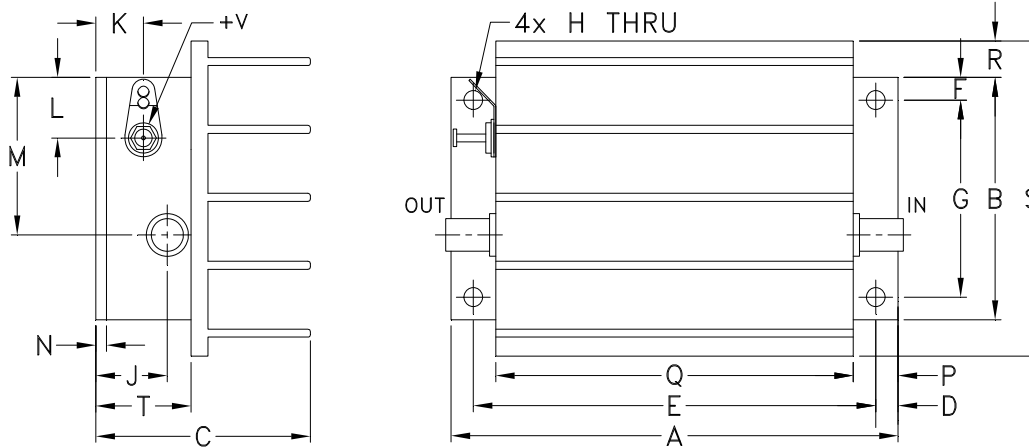


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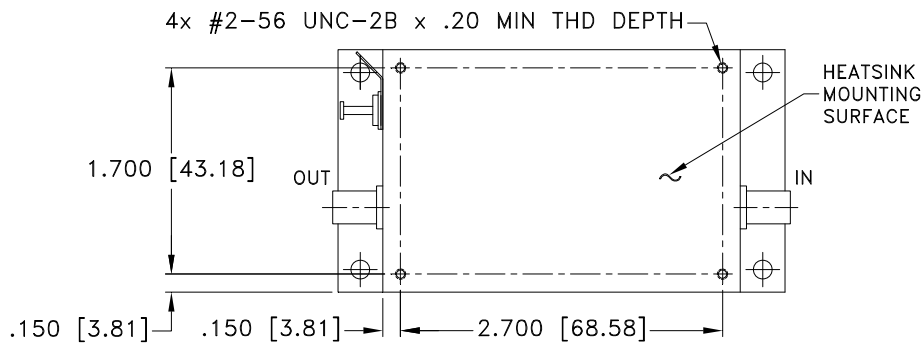
# Medium High Power Amplifier **ZHL-3A+**

50Ω 0.4 to 150 MHz

## OUTLINE DRAWING



## MOUNTING INFORMATION FOR MODELS WITHOUT HEATSINK



## OUTLINE DIMENSIONS (Inch/mm)

| A     | B     | C     | D    | E     | F    | G     | H    | J     | K     | L     | M     | N    | P    | Q     | R    | S     | T     | wt                |
|-------|-------|-------|------|-------|------|-------|------|-------|-------|-------|-------|------|------|-------|------|-------|-------|-------------------|
| 3.75  | 2.00  | 1.80  | .19  | 3.375 | .19  | 1.625 | .144 | .50   | .40   | .50   | 1.30  | .10  | .38  | 3.00  | .30  | 2.60  | .80   | grams             |
| 95.25 | 50.80 | 45.72 | 4.83 | 85.73 | 4.83 | 41.28 | 3.66 | 12.70 | 10.16 | 12.70 | 33.02 | 2.54 | 9.65 | 76.20 | 7.62 | 66.04 | 20.32 | 220.0             |
|       |       |       |      |       |      |       |      |       |       |       |       |      |      |       |      |       |       | wt. w/o heat sink |
|       |       |       |      |       |      |       |      |       |       |       |       |      |      |       |      |       |       | 150               |



Mini-Circuits

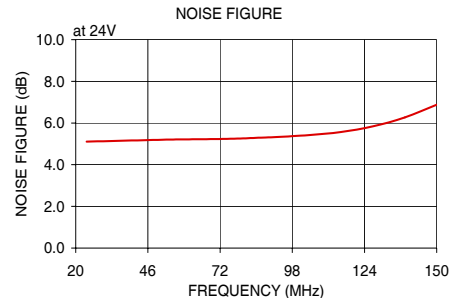
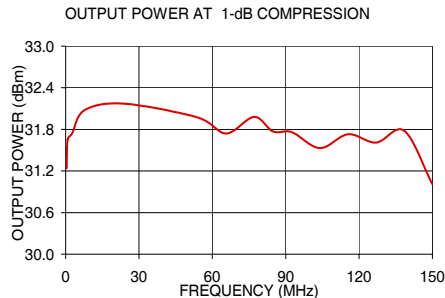
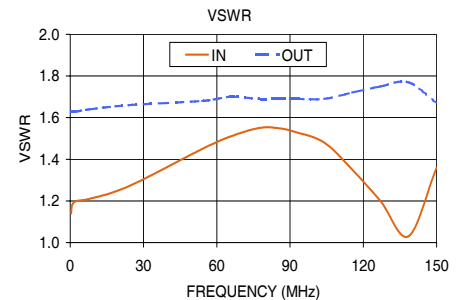
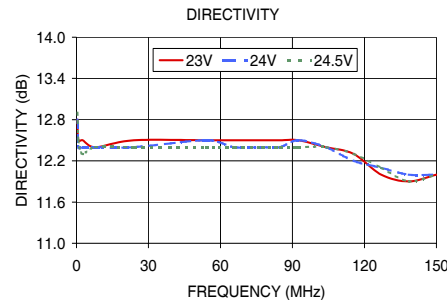
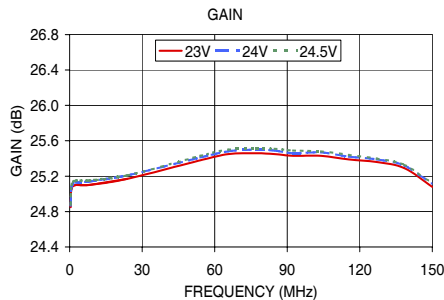
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# Medium High Power Amplifier ZHL-3A+

50Ω 0.4 to 150 MHz

## TYPICAL PERFORMANCE DATA/CURVES

| FREQUENCY<br>(MHz) | GAIN<br>(dB) |       |       | DIRECTIVITY<br>(dB) |       |       | VSWR<br>(:1) |      | NOISE<br>FIGURE<br>(dB) | POUT<br>at 1 dB<br>COMPR.<br>(dBm) |
|--------------------|--------------|-------|-------|---------------------|-------|-------|--------------|------|-------------------------|------------------------------------|
|                    | 23V          | 24V   | 24.5V | 23V                 | 24V   | 24.5V | IN           | OUT  | 24V                     | 24V                                |
| 0.40               | 24.85        | 24.87 | 24.88 | 12.80               | 12.80 | 12.90 | 1.14         | 1.63 | —                       | 31.24                              |
| 0.80               | 25.06        | 25.08 | 25.10 | 12.50               | 12.40 | 12.50 | 1.18         | 1.63 | —                       | 31.65                              |
| 2.60               | 25.10        | 25.13 | 25.15 | 12.50               | 12.40 | 12.30 | 1.20         | 1.63 | —                       | 31.74                              |
| 7.80               | 25.10        | 25.14 | 25.15 | 12.40               | 12.40 | 12.40 | 1.21         | 1.64 | —                       | 32.08                              |
| 23.90              | 25.17        | 25.21 | 25.21 | 12.50               | 12.40 | 12.40 | 1.27         | 1.66 | 5.11                    | 32.17                              |
| 54.10              | 25.38        | 25.41 | 25.43 | 12.50               | 12.50 | 12.40 | 1.45         | 1.68 | 5.21                    | 31.97                              |
| 65.60              | 25.45        | 25.48 | 25.50 | 12.50               | 12.40 | 12.40 | 1.51         | 1.70 | 5.22                    | 31.74                              |
| 77.10              | 25.46        | 25.50 | 25.51 | 12.50               | 12.40 | 12.40 | 1.55         | 1.69 | 5.25                    | 31.98                              |
| 84.80              | 25.45        | 25.49 | 25.51 | 12.50               | 12.40 | 12.40 | 1.55         | 1.69 | 5.29                    | 31.77                              |
| 92.50              | 25.43        | 25.46 | 25.49 | 12.50               | 12.50 | 12.40 | 1.53         | 1.69 | 5.33                    | 31.76                              |
| 104.00             | 25.43        | 25.47 | 25.48 | 12.40               | 12.40 | 12.40 | 1.48         | 1.69 | 5.42                    | 31.53                              |
| 115.50             | 25.39        | 25.42 | 25.44 | 12.30               | 12.20 | 12.30 | 1.35         | 1.72 | 5.57                    | 31.73                              |
| 127.00             | 25.36        | 25.39 | 25.40 | 12.00               | 12.10 | 12.10 | 1.20         | 1.75 | 5.84                    | 31.61                              |
| 138.50             | 25.29        | 25.32 | 25.33 | 11.90               | 12.00 | 11.90 | 1.03         | 1.77 | 6.27                    | 31.78                              |
| 150.00             | 25.08        | 25.11 | 25.12 | 12.00               | 12.00 | 12.00 | 1.36         | 1.67 | 6.88                    | 31.01                              |



### NOTES

- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuits' applicable established test performance criteria and measurement instructions.
- C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the standard terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at [www.minicircuits.com/terms/viewterm.html](http://www.minicircuits.com/terms/viewterm.html)



## Typical Performance Data

| FREQUENCY<br>(MHz) | GAIN<br>(dB) |       |       | DIRECTIVITY<br>(dB) |       |       | VSWR<br>IN<br>(:1)<br>24V | VSWR OUT<br>(:1)<br>24V | NOISE<br>FIGURE<br>(dB)<br>24V | Pout at<br>1dB Comp.<br>(dBm)<br>24V |
|--------------------|--------------|-------|-------|---------------------|-------|-------|---------------------------|-------------------------|--------------------------------|--------------------------------------|
|                    | 23V          | 24V   | 24.5V | 23V                 | 24V   | 24.5V |                           |                         |                                |                                      |
| 0.40               | 24.85        | 24.87 | 24.88 | 12.80               | 12.80 | 12.90 | 1.14                      | 1.63                    |                                | 31.24                                |
| 0.80               | 25.06        | 25.08 | 25.10 | 12.50               | 12.40 | 12.50 | 1.18                      | 1.63                    |                                | 31.65                                |
| 2.60               | 25.10        | 25.13 | 25.15 | 12.50               | 12.40 | 12.30 | 1.20                      | 1.63                    |                                | 31.74                                |
| 7.80               | 25.10        | 25.14 | 25.15 | 12.40               | 12.40 | 12.40 | 1.21                      | 1.64                    |                                | 32.08                                |
| 23.90              | 25.17        | 25.21 | 25.21 | 12.50               | 12.40 | 12.40 | 1.27                      | 1.66                    | 5.11                           | 32.17                                |
| 54.10              | 25.38        | 25.41 | 25.43 | 12.50               | 12.50 | 12.40 | 1.45                      | 1.68                    | 5.21                           | 31.97                                |
| 65.60              | 25.45        | 25.48 | 25.50 | 12.50               | 12.40 | 12.40 | 1.51                      | 1.70                    | 5.22                           | 31.74                                |
| 77.10              | 25.46        | 25.50 | 25.51 | 12.50               | 12.40 | 12.40 | 1.55                      | 1.69                    | 5.25                           | 31.98                                |
| 84.80              | 25.45        | 25.49 | 25.51 | 12.50               | 12.40 | 12.40 | 1.55                      | 1.69                    | 5.29                           | 31.77                                |
| 92.50              | 25.43        | 25.46 | 25.49 | 12.50               | 12.50 | 12.40 | 1.53                      | 1.69                    | 5.33                           | 31.76                                |
| 104.00             | 25.43        | 25.47 | 25.48 | 12.40               | 12.40 | 12.40 | 1.48                      | 1.69                    | 5.42                           | 31.53                                |
| 115.50             | 25.39        | 25.42 | 25.44 | 12.30               | 12.20 | 12.30 | 1.35                      | 1.72                    | 5.57                           | 31.73                                |
| 127.00             | 25.36        | 25.39 | 25.40 | 12.00               | 12.10 | 12.10 | 1.20                      | 1.75                    | 5.84                           | 31.61                                |
| 138.50             | 25.29        | 25.32 | 25.33 | 11.90               | 12.00 | 11.90 | 1.03                      | 1.77                    | 6.27                           | 31.78                                |
| 150.00             | 25.08        | 25.11 | 25.12 | 12.00               | 12.00 | 12.00 | 1.36                      | 1.67                    | 6.88                           | 31.01                                |

REV. X1

ZHL-3A+

110410

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IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED RoHS compliant

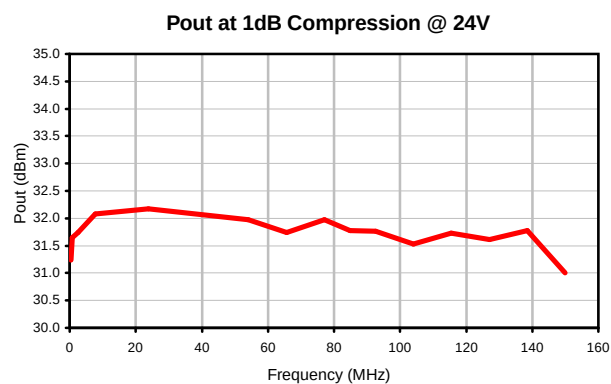
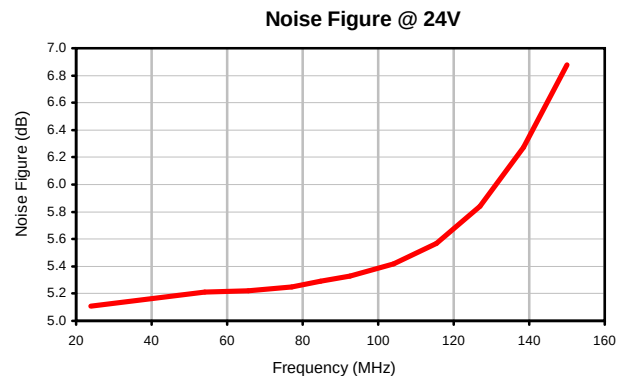
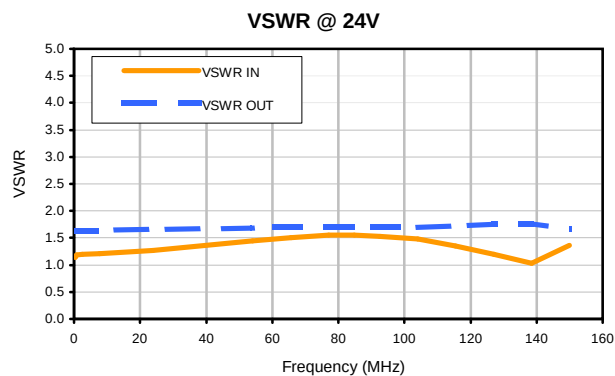
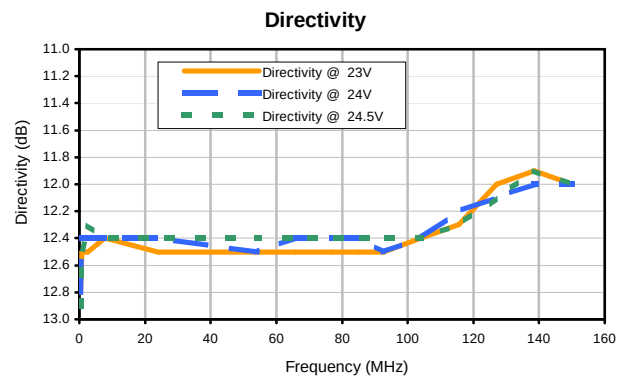
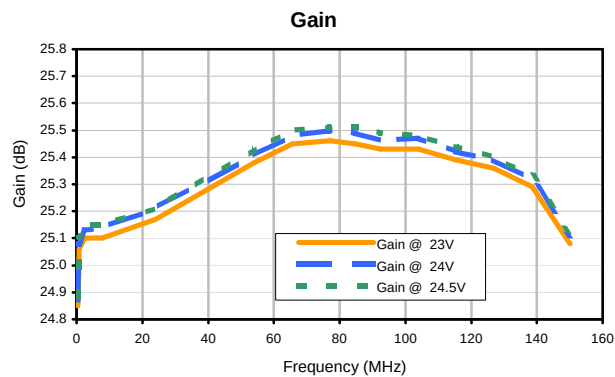
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661



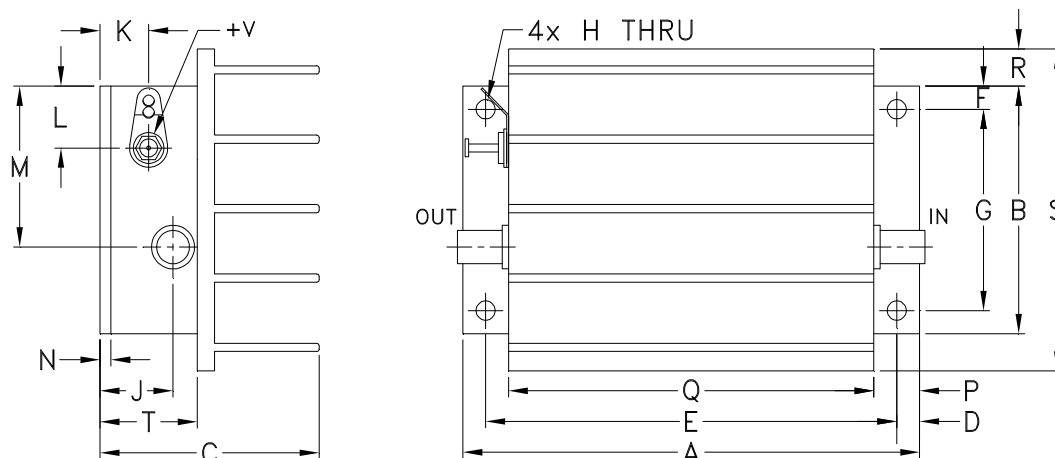
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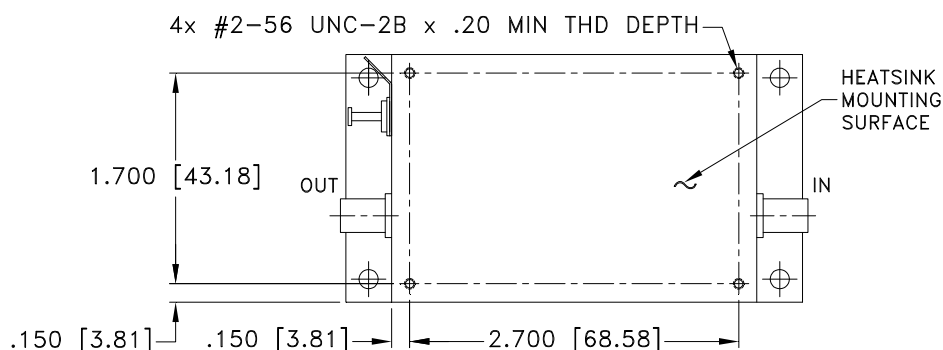
## Typical Performance Curves



### Outline Dimensions



### MOUNTING INFORMATION FOR MODELS WITHOUT HEATSINK



| CASE# | A               | B               | C               | D             | E                | F             | G                | H              | J              | K              | L              | M               | N             |
|-------|-----------------|-----------------|-----------------|---------------|------------------|---------------|------------------|----------------|----------------|----------------|----------------|-----------------|---------------|
| S32   | 3.75<br>(95.25) | 2.00<br>(50.80) | 1.80<br>(45.72) | .19<br>(4.83) | 3.375<br>(85.73) | .19<br>(4.83) | 1.625<br>(41.28) | .144<br>(3.66) | .50<br>(12.70) | .40<br>(10.16) | .50<br>(12.70) | 1.30<br>(33.02) | .10<br>(2.54) |

| CASE# | P             | Q               | R             | S               | T              | WT. GRAMS | WT. WITHOUT HEATSINK GRAMS |
|-------|---------------|-----------------|---------------|-----------------|----------------|-----------|----------------------------|
| S32   | .38<br>(9.65) | 3.00<br>(76.20) | .30<br>(7.62) | 2.60<br>(66.04) | .80<br>(20.32) | 220.0     | 150.0                      |

Dimensions are in inches (mm). Tolerances: 2 Pl.  $\pm .03$ ; 3 Pl.  $\pm .015$

### Notes:

- Case material: Aluminum alloy.
- Case finish:  
For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.
- Heat sink finish: Black anodize.



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: [www.minicircuits.com](http://www.minicircuits.com)

RF/IF MICROWAVE COMPONENTS



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

| Specification             | Test/Inspection Condition             | Reference/Spec                                     |
|---------------------------|---------------------------------------|----------------------------------------------------|
| Operating Temperature     | -20° to 65° C<br>Ambient Environment  | Individual Model Data Sheet                        |
| Storage Temperature       | -55° to 100° C<br>Ambient Environment | Individual Model Data Sheet                        |
| Stabilization Bake        | (non-operating)<br>125°C, 24 hours    | - - -                                              |
| Burn-in at Elevated Temp. | (DC on)<br>160 hours at 85° C         | MIL-STD-202, Method 108                            |
| Thermal Shock             | -55° to 100°C, 5 cycles               | MIL-STD-202, Method 107, Condition A, except 100°C |