PIN-DIODE ATTENUATORS

NEW PRODUCT DEVELOPMENTS AT AMERICAN MICROWAVE CORPORATION JUNE 22, 1993
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DESCRIPTION
AMC MODEL AGH-0612-60DDSF IS AN ULTRA HIGH SPEED OCTAVE BAND ATTENUATOR/MODULATOR, PROGRAMMABLE BY 8 BIT POSITIVE TRUE BINARY LOGIC.

SPECIFICATIONS
- FREQUENCY RANGE: 6 - 12 GHz MINIMUM
- INSERTION LOSS: 2.5 dB MAXIMUM
- FREQUENCY FLATNESS:
  - 0 - 10 db ± 0.7 MAXIMUM
  - 10 - 20 db ± 1.0 MAXIMUM
  - 20 - 40 db ± 1.5 MAXIMUM
  - 40 - 60 db ± 1.6 MAXIMUM
- ATTENUATION ACCURACY:
  - 0 - 30 db ± 0.5 MAXIMUM
  - 30 - 50 db ± 1.0 MAXIMUM
  - 50 - 64 db ± 1.5 MAXIMUM
- SWITCHING TIME: 125nS MAXIMUM
- TEMPERATURE COEFFICIENT: ±0.01 dB/°C
- VSWR (ON/OFF): 1.7:1 MAXIMUM
- POWER RATINGS:
  - OPERATING: +20dBm MAXIMUM
  - SURVIVAL: +30dBm MAXIMUM
- CONTROL: 8 BIT POSITIVE TRUE TTL BINARY LOGIC, 0.25dB MINIMUM ATTENUATION STEPS (SEE PIN FUNCTION TABLE)
- POWER SUPPLY:
  - +12 TO +18VDC @ 100mA MAXIMUM
  - /-12 TO -18VDC @ 15mA MAXIMUM
- CONNECTORS:
  - RF INPUT/OUTPUT: FIELD REPLACEABLE SMA (FEMALE)
  - POWER AND CONTROLS: MINIATURE 14 PIN MALE (MIL-28748), MATING CONNECTOR (FEMALE) FURNISHED
- SIZE: 1.80" x 1.67" x 0.85"

AVAILABLE OPTIONS
- A01: J1 SMA MALE, J2 SMA FEMALE
- A02: TWO SMA MALE CONNECTORS
- A03: MINIATURE 15 PIN, MALE CONNECTOR (MDM15SSP)
- A04: ULTRA HIGH SPEED (70ns ON/OFF TIME)

MECHANICAL OUTLINE

ENVIRONMENTAL RATING
- TEMPERATURE: -55°C TO +85°C (OPERATING)
  - -55°C TO +125°C (STORAGE)
- HUMIDITY: MIL-STD-202F, METHOD 103B COND. B
- SHOCK: MIL-STD-202F, METHOD 213B COND. B
- VIBRATION: MIL-STD-202F, METHOD 204D COND. B
- ALTITUDE: MIL-STD-202F, METHOD 105C COND. B
- TEMPERATURE CYCLE: MIL-STD-202F, METHOD 1070 COND. A

AMERICAN MICROWAVE CORPORATION
7311G GROVE RD., FREDERICK, MD. 21701
TEL: (301) 662-4700 FAX: (301) 662-4938

PRODUCT FEATURE
AGH-0612-60DDSF
ULTRA HIGH SPEED, 6 TO 12 GHz PROGRAMMABLE ATTENUATOR

APPROVALS
DESCRIPTION
AMC MODEL AGH-8018-60DD-SF IS A HIGH SPEED OVER-OCTAVE BAND VARIABLE ATTENUATOR/MODULATOR, CONTROLLED BY 8 BIT BINARY LOGIC OR DRIVEN BY AN ANALOG POSITIVE VOLTAGE; UNIT IS PACKAGED IN A MINIATURE HERMETIC HOUSING FOR HIGH RELIABILITY APPLICATIONS.

SPECIFICATIONS
- FREQUENCY RANGE: 6–18 GHz MINIMUM
- INSERTION LOSS: 3.0 dB MAXIMUM
- FREQUENCY FLATNESS (±dB MAXIMUM)

<table>
<thead>
<tr>
<th>FREQUENCY RANGE</th>
<th>10dB</th>
<th>20dB</th>
<th>40dB</th>
<th>60dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.0–18 GHz</td>
<td>0.7</td>
<td>1.0</td>
<td>1.5</td>
<td>1.6</td>
</tr>
<tr>
<td>6.0–18 GHz</td>
<td>0.9</td>
<td>1.5</td>
<td>3.0</td>
<td>3.5</td>
</tr>
</tbody>
</table>
- ATTENUATION ACCURACY: 0–30dB ± 0.5dB MAXIMUM
- 30–50dB ± 1.0dB MAXIMUM
- 50–60dB ± 1.5dB MAXIMUM
- MONOTONICITY: GUARANTEED
- TEMPERATURE COEFFICIENT: ±0.02 dB/C
- SWITCHING TIME
  - (-SF): 500 nS MAXIMUM
  - (-VF): 200 nS MAXIMUM
  - (-UF): 125 nS MAXIMUM
- VSWR (ALL ATTENUATION LEVELS): 1.8:1 MAXIMUM
- POWER RATINGS
  - (-SF): +20dBm CW OR PEAK
  - (-VF) & (-UF): +10dBm CW OR PEAK
- CONTROL
  - DIGITAL: 8 BIT TRUE BINARY LOGIC, 0.25dB MINIMUM ATTENUATION STEP.
  - ANALOG: 0–6V ANALOG VOLTAGE, 10dB/VOLT TRANSFER FUNCTION
- POWER SUPPLY
  - +12 TO +18VDC @ 100 mA MAXIMUM
  - -12 TO -18VDC @ 15 mA MAXIMUM
- CONNECTORS
  - RF INPUT/OUTPUT
  - POWER & CONTROLS: FIELD REPLACEABLE SMA (FEMALE)
  - MATING CONNECTOR (FEMALE) FURNISHED
- SIZE: 1.34" x 1.34" x 0.50"

AVAILABLE OPTIONS
A01: J1 SMA MALE, J2 SMA FEMALE
A02: TWO SMA MALE CONNECTORS
A03: HERMETIC SEALING (MIL-STD-883)

MECHANICAL OUTLINE

ENVIRONMENTAL RATINGS
- TEMPERATURE
  - -55°C TO +110°C (OPERATING)
  - -65°C TO +125°C (STORAGE)
- HUMIDITY
  - MIL-STD-202F, METHOD 103B COND. B
- SHOCK
  - MIL-STD-202F, METHOD 213B COND. B
- VIBRATION
  - MIL-STD-202F, METHOD 204D COND. B
- ALTITUDE
  - MIL-STD-202F, METHOD 105C COND. B
- TEMPERATURE CYCLE
  - MIL-STD-202F, METHOD 107D COND. A

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PRODUCT FEATURE
AGH-8018-60DD-SF SF (STANDARD)
VF (VERY FAST) UF (ULTRA FAST)

SIZE A SHEET 1 OF 2 DWG. 100-2813
DESCRIPTION

AMC MODEL AGH-8018-65DD-205 IS A HIGH SPEED OVER-OCTAVE BAND VARIABLE ATTENUATOR/MODULATOR, CONTROLLED BY 8 BIT POSITIVE TRUE BINARY LOGIC.

SPECIFICATIONS

- **FREQUENCY RANGE** ............ 6.0-18.0 GHz MINIMUM
- **INSERTION LOSS** .............. 3.0 dB MAXIMUM
- **FREQUENCY FLATNESS (±dB MAXIMUM)**

<table>
<thead>
<tr>
<th>FREQUENCY RANGE</th>
<th>10 dB</th>
<th>20 dB</th>
<th>40 dB</th>
<th>60 dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.0-18.0 GHz</td>
<td>0.7</td>
<td>1.0</td>
<td>1.5</td>
<td>1.6</td>
</tr>
<tr>
<td>6.0-8.0 GHz</td>
<td>0.9</td>
<td>1.5</td>
<td>3.0</td>
<td>3.5</td>
</tr>
</tbody>
</table>
- **ATTENUATION ACCURACY** ........ 0-30 dB ±0.5 dB MAXIMUM
  (MONOTONICITY IS GUARANTEED)
  30-50 dB ±1.0 dB MAXIMUM
  50-60 dB ±1.5 dB MAXIMUM
- **TEMPERATURE COEFFICIENT** .... ±0.025 dB/°C MAXIMUM
- **SWITCHING TIME**
  DELAY ON (50% TTL TO 90% RF) 900 ns MAXIMUM
  DELAY OFF (50% TTL TO 10% RF) 900 ns MAXIMUM
- **VSWR (ALL ATTENUATION LEVELS)** 2:1 MAXIMUM
- **RF POWER RATINGS**
  OPERATING POWER +20 dBm CW MAXIMUM
  SURVIVAL POWER +30 dBm CW MAXIMUM
- **CONTROL** 8 BIT TRUE BINARY LOGIC
  0.25 dB MAXIMUM ATTENUATION STEPS
- **POWER SUPPLY** +12 TO +18VDC @ 100 mA MAXIMUM
  -12 TO -18VDC @ 100 mA MAXIMUM
- **CONNECTORS**
  RF INPUT/OUTPUT SMA FEMALE
  POWER AND CONTROLS 15 PIN D TYPE SUBMINIATURE MALE, MATING CONNECTOR FURNISHED
- **SIZE** 2.00" x 3.00" x 0.80"

AVAILABLE OPTIONS

- A01 J1 SMA MALE, J2 SMA FEMALE
- A02 TWO SMA MALE RF CONNECTORS

MECHANICAL OUTLINE

<table>
<thead>
<tr>
<th>PIN#</th>
<th>PIN FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
</tr>
<tr>
<td>2</td>
<td>ANALOG INPUT</td>
</tr>
<tr>
<td>3</td>
<td>N/C</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
</tr>
<tr>
<td>5</td>
<td>0.25 dB (LSB)</td>
</tr>
<tr>
<td>6</td>
<td>0.5 dB</td>
</tr>
<tr>
<td>7</td>
<td>1.0 dB</td>
</tr>
<tr>
<td>8</td>
<td>2.0 dB</td>
</tr>
<tr>
<td>9</td>
<td>4.0 dB</td>
</tr>
<tr>
<td>10</td>
<td>8.0 dB</td>
</tr>
<tr>
<td>11</td>
<td>16.0 dB</td>
</tr>
<tr>
<td>12</td>
<td>32.0 dB (MSB)</td>
</tr>
<tr>
<td>13</td>
<td>4 V</td>
</tr>
<tr>
<td>14</td>
<td>-- V</td>
</tr>
<tr>
<td>15</td>
<td>N/C</td>
</tr>
</tbody>
</table>

NOTES:
1) DIMENSIONS ARE IN INCHES
2) TOLERANCES: XXX ±0.020
3) WEIGHT: APPROX. 7.0 OZ

ENVIRONMENTAL RATINGS

- **TEMPERATURE**
  -55°C TO +85°C (OPERATING)
  -65°C TO +125°C (STORAGE)
- **HUMIDITY** MIL-STD-202F, METHOD 103B COND. B
- **SHOCK** MIL-STD-202F, METHOD 213B COND. B
- **VIBRATION** MIL-STD-202F, METHOD 204D COND. B
- **ALTITUDE** MIL-STD-202F, METHOD 105C COND. B
- **TEMPERATURE CYCLE** MIL-STD-202F, METHOD 107A COND. A

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PRODUCT FEATURE

AGH-8018-65DD-205
8.0-18 GHz, HIGH SPEED PROGRAMMABLE VARIABLE ATTENUATOR

SIZE A SHEET 1 OF 2 DWG. # 100-3120
FUNCTIONAL SCHEMATIC

RP SECTION

DRIVER/CONTROL CIRCUIT
DESCRIPTION

AMC MODEL AGH-2040-65DD IS AN OCTAVE BAND ATTENUATOR/MODULATOR, PROGRAMMABLE BY 8 BIT POSITIVE TRUE BINARY LOGIC WITH READ DATA LATCHING FUNCTION CAPABILITY.

SPECIFICATIONS

- FREQUENCY RANGE: 2-4 GHz MINIMUM
- INSERTION LOSS: 2.5 dB MAXIMUM
- FREQUENCY FLATNESS: 0-10 dB ±0.3 dB MAXIMUM
- 10-20 dB ±0.8 dB MAXIMUM
- 20-40 dB ±1.5 dB MAXIMUM
- 40-63.75 dB ±1.6 dB MAXIMUM
- ATTENUATION ACCURACY: 0-30 dB ±0.5 dB MAXIMUM
- (MONOTONICITY IS GUARANTEED)
  30-50 dB ±1.0 dB MAXIMUM
  50-63.75 dB ±1.5 dB MAXIMUM
- SWITCHING TIME: 2 μS MAXIMUM
- TEMPERATURE COEFFICIENT: ±0.025 dB/°C MAXIMUM
- VSWR (ALL ATTENUATION LEVELS): 1.8:1 MAXIMUM
- RF POWER RATINGS: +30 dBm CW MAXIMUM
- CONTROL: 8 BIT POSITIVE TRUE TTL BINARY LOGIC, 300ns DATA TRANSFER STROBE TIME (ACTIVE LOW). 0.25dB MINIMUM ATTENUATION STEPS (SEE PIN FUNCTION TABLE)
- POWER SUPPLY: +15VDC ±5%@100 mA MAXIMUM
- -15VDC ±5%@100 mA MAXIMUM
- CONNECTORS
  RF INPUT/OUTPUT: SMA FEMALE
  POWER AND CONTROLS: 15 PIN D-SUBMINIATURE (MALE) WITH JACK POST (MATING CONNECTOR FURNISHED)
- SIZE: 2.00" x 2.50" x 1.00"

AVAILABLE OPTIONS

A01 - J1 SMA MALE, J2 SMA FEMALE
A02 - TWO SMA MALE RF CONNECTORS

MECHANICAL OUTLINE

ENVIRONMENTAL RATINGS

- TEMPERATURE: -55°C TO +85°C (OPERATING)
- -65°C TO +125°C (STORAGE)
- HUMIDITY: MIL-STD-202F, METHOD 103B COND. B
- SHOCK: MIL-STD-202F, METHOD 213B COND. B
- VIBRATION: MIL-STD-202F, METHOD 204D COND. B
- ALTITUDE: MIL-STD-202F, METHOD 105C COND. B
- TEMPERATURE CYCLE: MIL-STD-202F, METHOD 107D COND. A

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PRODUCT FEATURE
AGH-2040-65DD
2-4 GHz PROGRAMMABLE ATTENUATOR

SIZE A SHEET 1 OF 2 DWG. # 100-3118
DESCRIPTION
AMC MODEL AGH-4080-65DD IS AN OCTAVE BAND ATTENUATOR/MODULATOR, PROGRAMMABLE BY 8 BIT POSITIVE TRUE BINARY LOGIC WITH READ DATA LATCHING FUNCTION CAPABILITY.

SPECIFICATIONS

- FREQUENCY RANGE ............... 4-8 GHz MINIMUM
- INSERTION LOSS ................. 3.0 dB MAXIMUM
- FREQUENCY FLATNESS ............ 0-10 dB ±0.3 dB MAXIMUM
- 10-20 dB ±0.8 dB MAXIMUM
- 20-40 dB ±1.5 dB MAXIMUM
- 40-63.75 dB ±1.6 dB MAXIMUM
- ATTENUATION ACCURACY .......... 0-30 dB ±0.5 dB MAXIMUM
- (MONOTONICITY IS GUARANTEED)
- 30-50 dB ±1.0 dB MAXIMUM
- 50-63.75 dB ±1.5 dB MAXIMUM
- SWITCHING TIME ................. 2 μS MAXIMUM
- TEMPERATURE COEFFICIENT ...... ±0.025 dB/°C MAXIMUM
- VSWR (ALL ATTENUATION LEVELS) 1.8:1 MAXIMUM
- RF POWER RATINGS ............... +30 dBm CW MAXIMUM
- CONTROL .................. 8 BIT POSITIVE TRUE TTL BINARY LOGIC, 300ns DATA TRANSFER STROBE TIME (ACTIVE LOW), 0.25dB MINIMUM ATTENUATION STEPS (SEE PIN FUNCTION TABLE)
- POWER SUPPLY ................. +15VDC ±5%@100 mA MAXIMUM
- -15VDC ±5%@100 mA MAXIMUM
- CONNECTORS
- RF INPUT/OUTPUT ............. SMA FEMALE
- POWER AND CONTROLS ........... 15 PIN D-SUBMINIATURE (MALE)
- WITH JACK POST (MATING CONNECTOR FURNISHED)
- SIZE .................... 2.00" x 2.50" x 1.00"

AVAILABLE OPTIONS

A01 .................. J1 SMA MALE, J2 SMA FEMALE
A02 ............... TWO SMA MALE RF CONNECTORS

MECHANICAL OUTLINE

ENVIRONMENTAL RATINGS

- TEMPERATURE ................. -55°C TO +85°C (OPERATING)
- -65°C TO +125°C (STORAGE)
- HUMIDITY .................. MIL-STD-202F, METHOD 103B COND. B
- SHOCK ..................... MIL-STD-202F, METHOD 213B COND. B
- VIBRATION ................. MIL-STD-202F, METHOD 2040 COND. B
- ALTITUDE .................. MIL-STD-202F, METHOD 105C COND. B
- TEMPERATURE CYCLE .......... MIL-STD-202F, METHOD 107D COND. A

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PRODUCT FEATURE
AGH-4080-65DD
4-8 GHz PROGRAMMABLE ATTENUATOR

APPROVALS DATE

DRAFTS 9/25/93
CHECKED 4/27/93

SIZE A SHEET 1 OF 2 Dwg. # 100-3119
DESCRIPTION

AMC Model AGH-0812-65DD is an octave band attenuator/modulator, programmable by 8 bit positive true binary logic with read data latching function capability.

SPECIFICATIONS

- **FREQUENCY RANGE**: 8-12 GHz minimum
- **INSERTION LOSS**: 3.0 dB maximum
- **FREQUENCY FLATNESS**: 0-10 dB ± 0.3 dB maximum
  10-20 dB ± 0.8 dB maximum
  20-40 dB ± 1.5 dB maximum
  40-63.75 dB ± 1.6 dB maximum
- **ATTENUATION ACCURACY** (Monotonicity is guaranteed)
  0-30 dB ± 0.5 dB maximum
  30-50 dB ± 1.0 dB maximum
  50-53.75 dB ± 1.5 dB maximum
- **SWITCHING TIME**: 2 μs maximum
- **TEMPERATURE COEFFICIENT**: ± 0.025 dB/°C maximum
- **VSWR (ALL ATTENUATION LEVELS)**: 2:1 maximum
- **RF POWER RATINGS**: +30 dBm CW maximum
- **CONTROL**: 8 bit positive true TTL binary logic, 300ns data transfer strobe time (active low), 0.25dB minimum attenuation steps (see pin function table)
- **POWER SUPPLY**: ±15VDC ±5%@100 mA maximum
- **CONNECTORS**: SMA female power and controls
- **SIZE**: 2.00” x 2.50” x 1.00”

AVAILABLe OPTIONS

AO1: J1 SMA male, J2 SMA female
AO2: Two SMA male RF connectors

MECHANICAL OUTLINE

ENVIRONMENTAL RATINGS

- **TEMPERATURE**: -55°C to +85°C (operating)
  -65°C to +125°C (storage)
- **HUMIDITY**: MIL-STD-202F, METHOD 103B cond. B
- **SHOCK**: MIL-STD-202F, METHOD 213B cond. B
- **VIBRATION**: MIL-STD-202F, METHOD 204D cond. B
- **ALTITUDE**: MIL-STD-202F, METHOD 105C cond. B
- **TEMPERATURE CYCLE**: MIL-STD-202F, METHOD 107D cond. A

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PRODUCT FEATURE

AGH-0812-65DD
8-12 GHz programmable attenuator

SIZE A SHEET 1 OF 2

REV. DESCRIPTION DATE APPROVED
A ORIGINAL RELEASE, JOB # 20373E 04/24/93
DESCRIPTION

AMC MODEL AGH-2550-60DD-410 IS AN OVER-OCTAVE BAND VARIABLE ATTENUATOR/MODULATOR, CONTROLLED BY 10 BIT POSITIVE TRUE BINARY LOGIC.

SPECIFICATIONS

- **FREQUENCY RANGE** ........................................... 1.9–5.6 GHz MINIMUM
- **INSERTION LOSS** ........................................... 2.0 dB MAXIMUM 2.5–5.0 GHz
  2.1 dB MAXIMUM 1.9–5.5 GHz
- **FREQUENCY FLATNESS (± dB MAXIMUM)**
<table>
<thead>
<tr>
<th>FREQUENCY RANGE</th>
<th>10 dB</th>
<th>20 dB</th>
<th>40 dB</th>
<th>60 dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5–5.0 GHz</td>
<td>0.3</td>
<td>0.8</td>
<td>1.5</td>
<td>1.6</td>
</tr>
<tr>
<td>1.9–5.5 GHz</td>
<td>0.5</td>
<td>1.4</td>
<td>3.0</td>
<td>3.5</td>
</tr>
</tbody>
</table>
- **ATTENUATION ACCURACY** ................................... 0–30 dB ± 0.5 dB MAXIMUM
  30–50 dB ± 1.0 dB MAXIMUM
  50–60 dB ± 1.5 dB MAXIMUM
- **TEMPERATURE COEFFICIENT** ................................ ±0.025 dB/C MAXIMUM
- **SWITCHING TIME**
  DELAY ON (50% TTL TO 90% RF) ......................... 2.0 µs MAXIMUM
  DELAY OFF (50% TTL TO 10% RF) ......................... 2.0 µs MAXIMUM
- **VSWR (ALL ATTENUATION LEVELS)** ...................... 2:1 MAXIMUM
- **RF POWER RATINGS**
  OPERATING POWER ........................................... +20 dBm CW MAXIMUM
  SURVIVAL POWER ........................................... +30 dBm CW MAXIMUM
- **CONTROL** .................................................... 10 BIT TRUE BINARY LOGIC
  0.1 dB MAXIMUM ATTENUATION STEPS
- **POWER SUPPLY** ........................................... +12 TO +18VDC @ 100 mA MAXIMUM
  −12 TO −18VDC @ 100 mA MAXIMUM
- **CONNECTORS**
  RF INPUT/OUTPUT ........................................... SMA FEMALE
  POWER AND CONTROLS ...................................... 15 PIN D TYPE SUBMINIATURE MALE, MATING CONNECTOR FURNISHED
- **SIZE** .......................................................... 2.00” x 3.00” x 0.80”

AVAILABLE OPTIONS

- A01 .................. J1 SMA MALE, J2 SMA FEMALE
- A02 .................. TWO SMA MALE RF CONNECTORS
- A03 .................. 8 BIT BINARY LOGIC
- A04 .................. 11 BIT BINARY LOGIC
- A05 .................. 12 BIT BINARY LOGIC

MECHANICAL OUTLINE

<table>
<thead>
<tr>
<th>J3 PIN FUNCTION</th>
<th>PIN</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>ANALOG INPUT</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.1 dB (LSB)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.2 dB</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>0.4 dB</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>0.8 dB</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>1.6 dB</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>3.2 dB</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>6.4 dB</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>12.8 dB</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>25.6 dB</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>51.2 dB (MSB)</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>+V</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>−V</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>N/C</td>
<td></td>
</tr>
</tbody>
</table>

NOTES:
1) DIMENSIONS ARE IN INCHES
2) TOLERANCES: X.XX ±0.020
   X.XXX ±0.010
3) WEIGHT: APPROX. 6.0 OZ

ENVIRONMENTAL RATINGS

- **TEMPERATURE** ........................................... −55°C TO +85°C (OPERATING)
  −65°C TO +125°C (STORAGE)
- **HUMIDITY** .............................................. MIL-STD-202F, METHOD 103B COND. B
- **SHOCK** .................................................. MIL-STD-202F, METHOD 213B COND. B
- **VIBRATION** .............................................. MIL-STD-202F, METHOD 204D COND. B
- **ALTITUDE** ............................................... MIL-STD-202F, METHOD 105C COND. B
- **TEMPERATURE CYCLE** .................................. MIL-STD-202F, METHOD 107D COND. A

AMERICAN MICROWAVE CORPORATION
7311GROVE RD., FREDERICK, MD. 21701
TEL: (301) 662-4700 FAX: (301) 662-4938

PRODUCT FEATURE

AGH-2550-60DD-410
1.9–5.6 GHz, PROGRAMMABLE VARIABLE ATTENUATOR

SIZE A SHEET 1 OF 2 DWG #: 150-3128
DESCRIPTION
AMC Model AGT-2018-60DD-100 is a multioctave attenuator/modulator, programmable by 8 bit positive true binary logic, packaged in a low profile housing.

SPECIFICATIONS
- Frequency Range: 2–18 GHz minimum
- Insertion Loss: 4.5 dB maximum
- Frequency Flatness: 0–30 dB ±1.0 dB maximum
- Attenuation Accuracy: 0–20 dB ±1.0 dB maximum
- Rise/Fall Time: 3 µS maximum
- VSWR: 2:1 maximum
- Power Ratings:
  - Operating: +20 dBm maximum
  - Survival: +30 dBm maximum
- Control: 8 bit positive true TTL binary logic (see pin functions table)
- Power Supply: +12VDC ±5%@210 mA maximum
- -12VDC ±5%@30 mA maximum
- Connectors:
  - RF Input/Output: Field replaceable SMA (female)
  - Power and Controls: Miniature 15 pin (male) mating connector (female) furnished
- Size: 2.0” x 1.81” x 0.50”

AVAILABLE OPTIONS
- A01: Blindmate “GPO” RF connectors
- A02: ±15 Volts power supply
- A03: Extended frequency band 0.3–18 GHz (+10 dBm operating +27 dBm survival, 0.3 – 2 GHz)

MECHANICAL OUTLINE

J3 PIN FUNCTIONS

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>FUNCTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
</tr>
<tr>
<td>2</td>
<td>Analog Input</td>
</tr>
<tr>
<td>3</td>
<td>N/C</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
</tr>
<tr>
<td>5</td>
<td>0.25 dB (LSB)</td>
</tr>
<tr>
<td>6</td>
<td>0.5 dB</td>
</tr>
<tr>
<td>7</td>
<td>1.0 dB</td>
</tr>
<tr>
<td>8</td>
<td>2.0 dB</td>
</tr>
<tr>
<td>9</td>
<td>4.0 dB</td>
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<tr>
<td>10</td>
<td>8.0 dB</td>
</tr>
<tr>
<td>11</td>
<td>16.0 dB</td>
</tr>
<tr>
<td>12</td>
<td>32.0 dB</td>
</tr>
<tr>
<td>13</td>
<td>+V</td>
</tr>
<tr>
<td>14</td>
<td>-V</td>
</tr>
<tr>
<td>15</td>
<td>N/C</td>
</tr>
</tbody>
</table>

NOTES:
1) Dimensions are in inches
2) Tolerances: ±0.020
3) Weight: Approx. 2.0 oz

ENVIRONMENTAL RATINGS
- Temperature: -55°C to +125°C (operating)
- -65°C to +125°C (storage)

AMERICAN MICROWAVE CORPORATION
7311G GROVE RD., FREDERICK, MD. 21701
TEL: (301) 662-4700  FAX: (301) 662-4938

PRODUCT FEATURE
AGT-2018-60DD-100
Miniature 10 to 18 GHz programmable attenuator
**DESCRIPTION**

AMC MODEL AGT-2000-70DD IS A BROAD BAND VARIABLE ATTENUATOR/ MODULATOR, CONTROLLED BY 10 BIT POSITIVE TRUE BINARY LOGIC.

**SPECIFICATIONS**

- **FREQUENCY RANGE** .... 0.01-2.0 GHz MINIMUM
- **INSERTION LOSS** .... 2.0 dB MAXIMUM
- **FREQUENCY FLATNESS** (± dB MAXIMUM)  
  - 0-30 dB ± 0.5 dB MAXIMUM
  - 30-50 dB ± 1.5 dB MAXIMUM
  - 50-70 dB ± 2.5 dB MAXIMUM
- **ATTENUATION ACCURACY**  
  - 0-20 dB ± 1.0 dB MAXIMUM
  - 20-50 dB ± 1.5 dB MAXIMUM
  - 50-70 dB ± 2.0 dB MAXIMUM
- **SWITCHING TIME** .... 3 μS MAXIMUM
- **VSWR** .... 1.8:1 MAXIMUM
- **RF POWER RATINGS**  
  - OPERATING .... +20 dBm CW MAXIMUM
  - SURVIVAL .... +30 dBm CW MAXIMUM
- **CONTROL** .... 10 BIT TRUE BINARY LOGIC
  - 0.1 dB MAXIMUM ATTENUATION STEPS.
- **POWER SUPPLY** .... +12 TO +18VDC @ 210 mA MAXIMUM
  - -12 TO -18VDC @ 30 mA MAXIMUM
- **CONNECTORS**  
  - RF INPUT/OUTPUT .... SMA FEMALE
  - POWER AND CONTROLS .... 15 PIN D-SUBMINIATURE (MALE)
  - MATING CONNECTOR FURNISHED
- **SIZE** .... 2.00" x 1.81" x 0.88"

**AVAILABLE OPTIONS**

- A01 .... J1 SMA MALE, J2 SMA FEMALE
- A02 .... TWO SMA MALE RF CONNECTORS
- A03 .... 8 BIT BINARY LOGIC
- A04 .... 11 BIT BINARY LOGIC
- A05 .... 12 BIT BINARY LOGIC

**ENVIRONMENTAL RATINGS**

- **TEMPERATURE** .... -55°C TO +125°C (OPERATING)
  - -65°C TO +125°C (STORAGE)
- **HUMIDITY** .... MIL-STD-202F, METHOD 103B, CONDITION B
- **SHOCK** .... MIL-STD-202F, METHOD 213B, CONDITION B
- **VIBRATION** .... MIL-STD-202F, METHOD 204D, CONDITION B
- **ALTITUDE** .... MIL-STD-202F, METHOD 105C, CONDITION B
- **TEMPERATURE CYCLE** .... MIL-STD-202F, METHOD 107D, CONDITION A

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**PRODUCT FEATURE**

AGT-2000-70DD
0.01-2 GHz, PROGRAMMABLE VARIABLE ATTENUATOR

**SIZE** A

**SHEET 1 OF 2**

**DWG. # 100-3127**
FUNCTIONAL SCHEMATIC

RP SECTION

DRIVER CIRCUIT
DESCRIPTION
AMC MODEL AGH-1020-60D-SF IS A VOLTAGE CONTROLLED, HIGH SPEED VARIABLE ATTENUATOR/MODULATOR WITH BUILT IN LINEARIZER/DRIVER CIRCUIT DESIGNED FOR HIGH DYNAMIC RANGE AND HIGH ACCURACY APPLICATIONS.

SPECIFICATIONS
- FREQUENCY RANGE: 1-2 GHz
- INSERTION LOSS: 2.0 dB MAXIMUM
- FREQUENCY FLATNESS:
  - 0-10 dB ±0.3 dB MAXIMUM
  - 10-20 dB ±0.8 dB MAXIMUM
  - 20-40 dB ±1.5 dB MAXIMUM
  - 40-60 dB ±1.6 dB MAXIMUM
- ATTENUATION DYNAMIC RANGE: 60 dB
- ATTENUATION ACCURACY:
  - 0-30 dB ±0.5 dB MAXIMUM
  - (DEVIATION FROM
    NOMINAL ATTENUATION)
  - 30-50 dB ±1.0 dB MAXIMUM
  - 50-60 dB ±1.5 dB MAXIMUM
- MONOTONICITY: GUARANTEED
- TEMPERATURE COEFFICIENT: ±0.025 dB/°C MAXIMUM
- SWITCHING TIME:
  - (-SF): 500 ns MAXIMUM
  - (-VF): 200 ns MAXIMUM
  - (-UF): 125 ns MAXIMUM
- VSWR (ALL ATTENUATION LEVELS): 1.5:1 MAXIMUM (1-2 GHz)
- POWER HANDLING:
  - (+SF): +20 dBm CW OR PEAK
  - (+VF) & (-UF): +10 dBm CW OR PEAK
- CONTROL: VOLTAGE CONTROLLED
  - 10 dB/VOLT TRANSFER FUNCTION SLOPE
- POWER SUPPLY:
  - +12VDC ±5%@100 mA MAXIMUM
- CONNECTORS:
  - RF INPUT/OUTPUT: SMA FEMALE
  - POWER: SOLDER PIN
  - CONTROL: SOLDER PIN
- SIZE: 2.6" x 2.0" x 0.50"

AVAILABLE OPTIONS
A01: J1 SMA MALE, J2 SMA FEMALE
A02: J1 SMA FEMALE, J2 SMA MALE
A03: J1 SMA MALE, J2 SMA MALE
A04: SMA FEMALE CONTROL CONNECTOR
A05: SMC MALE CONTROL CONNECTOR
A06: MINIATURE 14 PIN MALE (MIL-C-28748) CONNECTOR
A07: REMOVABLE SMA FEMALE RF CONNECTOR
A08: ±15VDC SUPPLIES
A09: ±18 VOLT POWER SUPPLY
A10: 0-30 dB RANGE
A11: 5 dB/VOLT TRANSFER FUNCTION SLOPE
A12: 0.75-2.25 GHz WITH INSERTION LOSS OF 2.1 dB MAXIMUM
VSWR OF 2.0:1 MAXIMUM AND FREQUENCY FLATNESS OF
- 0.5 dB @ 10 dB, ±1.4 dB @ 20 dB, ±3.0 dB @ 40 dB
AND ±3.5 dB @ 60 dB
A13: 8 BIT DIGITAL CONTROLLED AND LINEARIZED
A14: OPTION 20, OPTIMIZED FOR 1365-1435 MHz

MECHANICAL OUTLINE

ENVIRONMENTAL RATINGS
- TEMPERATURE: -20°C TO +70°C (OPERATING)
  - -65°C TO +125°C (STORAGE)
- HUMIDITY: MIL-STD-202F, METHOD 103B COND. B
- SHOCK: MIL-STD-202F, METHOD 213B COND. B
- VIBRATION: MIL-STD-202F, METHOD 204D COND. B
- ALTITUDE: MIL-STD-202F, METHOD 105C COND. B
- TEMPERATURE CYCLE: MIL-STD-202F, METHOD 107D COND. A

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PRODUCT FEATURE
AGH-1020-60D-SF
1-2 GHz, VOLTAGE CONTROLLED, HIGH SPEED, VARIABLE ATTENUATOR/MODULATOR

APPROVALS Dwg. # 100-3170

SIZE SHEET 1 OF 2
DESCRIPTION

AMC MODEL AGH-0510-60D IS AN OCTAVE BAND VOLTAGE CONTROLLED VARIABLE ATTENUATOR MODULE WITH BUILT IN DRIVER/LINEARIZER CIRCUITRY, DESIGNED FOR HIGH DYNAMIC RANGE AND HIGH ACCURACY APPLICATIONS.

SPECIFICATIONS

- FREQUENCY RANGE: 0.5–1.0 GHz MINIMUM
- INSERTION LOSS: 4.0 dB MAXIMUM
- FREQUENCY FLATNESS: 0–40 dB ±2.0 dB MAXIMUM
- ATTENUATION DYNAMIC RANGE: 70 dBc MINIMUM
- ATTENUATION ACCURACY: 0–40 dB ±1.5 dB MAXIMUM
- MONOTONICITY: GUARANTEED
- TEMPERATURE COEFFICIENT: ±0.025 dB/°C MAXIMUM
- SWITCHING TIME: 1.5 μS MAXIMUM
- VSWR (ALL ATTENUATION LEVELS): 1.7:1 MAXIMUM
- POWER RATINGS: +20 dBm MAXIMUM
- CONTROL: VOLTAGE CONTROLLED (0–6VOLTS)
- POWER SUPPLY: +12VDC ±5%@100 mA MAXIMUM
- -12VDC ±5%@20 mA MAXIMUM
- CONNECTORS:
  - RF INPUT/OUTPUT: SMA FEMALE
  - POWER: SOLDER PIN
  - CONTROL: SOLDER PIN
- SIZE: 5.10" x 2.0" x 0.71"

AVAILABLE OPTIONS

- A01: J1 SMA MALE, J2 SMA FEMALE
- A02: TWO SMA MALE CONNECTORS
- A03: ±15VDC SUPPLIES
- A04: SMC MALE CONTROL CONNECTOR
- A05: SMA FEMALE CONTROL CONNECTOR
- A06: 5 dB/VOLT TRANSFER FUNCTION SLOPE (CONSULT FACTORY FOR OTHER AVAILABLE TRANSFER FUNCTION SLOPES)

MECHANICAL OUTLINE

NOTES:
1) DIMENSIONS ARE IN INCHES
2) TOLERANCES: X.XXX ±0.020
   Y.XXX ±0.010
3) WEIGHT: APPROX. 4.0 OZ

ENVIRONMENTAL RATINGS

- TEMPERATURE: -55°C TO +125°C (OPERATING)
- -65°C TO +125°C (STORAGE)
- HUMIDITY: MIL-STD-202F, METHOD 103B COND. B
- SHOCK: MIL-STD-202F, METHOD 213B COND. B
- VIBRATION: MIL-STD-202F, METHOD 204D COND. B
- ALTITUDE: MIL-STD-202F, METHOD 105C COND. B
- TEMPERATURE CYCLE: MIL-STD-202F, METHOD 107D COND. A

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PRODUCT FEATURE
AGH-0510-60D
0.5–1.0 GHz, VOLTAGE CONTROLLED VARIABLE ATTENUATOR MODULE

SIZE A SHEET 1 OF 2 DWG. # 100-2934
DESCRIPTION

AMC MODEL AGH-2856-70D IS A VOLTAGE CONTROLLED VARIABLE ATTENUATOR MODULE WITH BUILT IN LINEARIZER/DRIVER CIRCUITRY DESIGNED FOR HIGH DYNAMIC RANGE AND HIGH ACCURACY APPLICATIONS.

SPECIFICATIONS

- **FREQUENCY RANGE**
  
  4.2–4.4 GHz MINIMUM
  (CONSULT FACTORY FOR OTHER FREQUENCY RANGES)

- **INSERTION LOSS**
  2.0 dB MAXIMUM

- **FREQUENCY FLATNESS**
  
  0–30 dB ±0.3 dB MAXIMUM
  30–50 dB ±0.4 dB MAXIMUM
  50–70 dB ±0.5 dB MAXIMUM

- **ATTENUATION DYNAMIC RANGE**
  70 dBc MINIMUM

- **ATTENUATION ACCURACY**
  0–30 dB ±0.5 dB MAXIMUM
  (DEVIATION FROM NOMINAL ATTENUATION)
  30–50 dB ±1.0 dB MAXIMUM
  50–70 dB ±1.5 dB MAXIMUM

- **MONOTONICITY**
  GUARANTEED

- **TEMPERATURE COEFFICIENT**
  ±0.025 dB/°C MAXIMUM

- **SWITCHING TIME**
  1.5 μS MAXIMUM

- **VSWR (ALL ATTENUATION LEVELS)**
  2 : 1 MAXIMUM

- **POWER RATINGS**
  +20 dBm MAXIMUM

- **CONTROL**
  VOLTAGE CONTROLLED (0–4V)
  17.5 dB/VOLT TRANSFER FUNCTION SLOPE

- **POWER SUPPLY**
  +12VDC ±5%@100 mA MAXIMUM
  -12VDC ±5%@20 mA MAXIMUM

- **CONNECTORS**
  
  RF INPUT/OUTPUT: SMA FEMALE
  POWER: SOLDER PIN
  CONTROL: SOLDER PIN

- **SIZE**
  1.8” x 1.67” x 0.50”

AVAILABLE OPTIONS

- A01: J1 SMA MALE, J2 SMA FEMALE
- A02: TWO SMA MALE CONNECTORS
- A03: ±15VDC SUPPLIES
- A04: SMC MALE CONTROL CONNECTOR
- A05: SMA FEMALE CONTROL CONNECTOR
- A06: 10 dB/VOLT TRANSFER FUNCTION SLOPE
  (OTHER TRANSFER FUNCTION SLOPES AVAILABLE)

MECHANICAL OUTLINE

NOTES:
1) DIMENSIONS ARE IN INCHES
2) TOLERANCES: X.XX ±0.020
   X.XXX ±0.010
3) WEIGHT: APPROX. 2.0 OZ

ENVIRONMENTAL RATINGS

- **TEMPERATURE**
  -55°C TO +125°C (OPERATING)
  -65°C TO +125°C (STORAGE)

- **HUMIDITY**
  MIL-STD-202F, METHOD 103B COND. B

- **SHOCK**
  MIL-STD-202F, METHOD 213B COND. B

- **VIBRATION**
  MIL-STD-202F, METHOD 204D COND. B

- **ALTITUDE**
  MIL-STD-202F, METHOD 105C COND. B

- **TEMPERATURE CYCLE**
  MIL-STD-202F, METHOD 107D COND. A

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PRODUCT FEATURE

agh-2856-70d
4.2–4.4 GHz, VOLTAGE CONTROLLED VARIABLE ATTENUATOR MODULE
DESCRIPTION
AMC MODEL AGC-0510 IS AN ABSORPTIVE CURRENT CONTROLLED ATTENUATOR MODULE. CAPABLE OF HANDLING 1W OF CW RF POWER OVER 0.5–1.0 GHz FREQUENCY BAND.

SPECIFICATIONS
- FREQUENCY RANGE: 0.5–1.0 GHz MINIMUM
- INSERTION LOSS: 1.0 dB MAXIMUM
- VSWR: 1.7:1 MAXIMUM
- FREQUENCY FLATNESS: 0–10 dB ± 0.5 dB MAXIMUM
- 10–20 dB ± 1.0 dB MAXIMUM
- 20–40 dB ± 1.5 dB MAXIMUM
- 40–50 dB ± 2.5 dB MAXIMUM
- ATTENUATION VS CURRENT TRANSFER FUNCTION: INSERTION LOSS AT 0 MA
  - 10 dB: -0.28 mA (TYP)
  - 20 dB: -0.77 mA (TYP)
  - 30 dB: -1.68 mA (TYP)
  - 40 dB: -3.48 mA (TYP)
  - 50 dB: -7.94 mA (TYP)
- SWITCHING TIME
  - RISE (10% RF TO 90% RF): 150 nS MAXIMUM
  - FALL (90% RF TO 10% RF): 150 nS MAXIMUM
- RF POWER RATING: 1W CW, MAXIMUM
- CONNECTORS
  - RF INPUT/OUTPUT: SMA (FEMALE)
  - CONTROL: SMA (FEMALE)
- SIZE: 2.0" x 1.5" x 0.4"

AVAILABLE OPTIONS
- A01: ONE SMA MALE, ONE SMA FEMALE RF CONNECTORS
- A02: 2 SMA MALE RF CONNECTORS
- A03: SOLDER PIN CONTROL CONNECTOR
- A04: SMC CONTROL CONNECTOR
- A05: REVERSE CONTROL CURRENT (POSITIVE)

MECHANICAL OUTLINE

NOTES:
1) DIMENSIONS ARE IN INCHES
2) TOLERANCES: X.XX ± 0.020
3) WEIGHT: APPROX. 4 OZ

ENVIRONMENTAL RATINGS
- TEMPERATURE
  - -55°C TO +95°C (OPERATING)
  - -65°C TO +125°C (STORAGE)
- HUMIDITY
  - MIL-STD-202F, METHOD 103B COND. B
- SHOCK
  - MIL-STD-202F, METHOD 213B COND. B
- VIBRATION
  - MIL-STD-202F, METHOD 204D COND. B
- ALTITUDE
  - MIL-STD-202F, METHOD 105C COND. B
- TEMPERATURE CYCLE
  - MIL-STD-202F, METHOD 107D COND. C

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TEL: (301) 662-4700 FAX: (301) 662-4938

PRODUCT FEATURE
AGC-0510
0.50–1.0 GHz CURRENT CONTROLLED PIN DIODE ATTENUATOR

SIZE A
SHEET 1 OF 2
DWG. # 100-2430
DESCRIPTION

AMC MODEL AGH-4080-N IS A CURRENT CONTROLLED, ABSORPTIVE/ NON-REFLECTIVE VARIABLE ATTENUATOR MODULATOR.

SPECIFICATIONS

- **FREQUENCY RANGE** ................. 4–8 GHz MINIMUM
- **INSERTION LOSS** .................. 2.0 dB MAXIMUM
- **FREQUENCY FLATNESS** .............
  - 0–10 dB ± 0.5 dB MAXIMUM
  - 10–20 dB ± 1.0 dB MAXIMUM
  - 20–40 dB ± 1.5 dB MAXIMUM
  - 40–60 dB ± 1.6 dB MAXIMUM
- **MONOTONICITY** .................... GUARANTEED
- **TEMPERATURE COEFFICIENT** ........ ±0.025 dB/C MAXIMUM
- **SWITCHING TIME** .................
  - RISE TIME (90% TO 10% RF) ........ 1.5 μs MAXIMUM
  - FALL TIME (10% TO 90% RF) ........ 50 ns MAXIMUM
- **VSWR (ALL ATTENUATION LEVELS)** 2.0:1 MAXIMUM
- **POWER HANDLING** ................. +20 dBm MAXIMUM CW OR PEAK
- **CONTROL** ............................ NEGATIVE BIAS VOLTAGE, CURRENT CONTROLLED 50 mA MAXIMUM FOR MINIMUM ATTENUATION
- **CONNECTORS** ......................
  - RF INPUT/OUTPUT .................... SMA FEMALE
  - CONTROL ............................ SOLDER PIN
- **SIZE** ............................... 1.3" x 1.4" x 0.50"

AVAILABLE OPTIONS

- A01 .................................. ONE SMA MALE, ONE SMA FEMALE RF CONNECTOR
- A02 .................................. TWO SMA MALE CONNECTORS RF CONNECTORS
- A03 .................................. SMA FEMALE CONTROL CONNECTOR
- A04 .................................. REMOVABLE SMA FEMALE RF CONNECTOR
- A05 .................................. 3.0–9.0 GHz WITH INSERTION LOSS OF 2.1 dB, VSWR OF 2.2:1 AND FREQUENCY FLATNESS OF ±0.5 dB @ 10 dB, ±1.4 dB @ 20 dB, ±3.0 dB @ 40 dB, AND ±3.5 dB @ 60 dB.

MECHANICAL OUTLINE

![Mechanical Outline Diagram]

NOTES:
1. DIMENSIONS ARE IN INCHES
2. TOLERANCES: X.XX ± 0.020
   - X.XXX ± 0.010
3. WEIGHT: APPROX. 1.0 OZ

ENVIRONMENTAL RATINGs

- **TEMPERATURE** ......................
  - –55°C TO +125°C (OPERATING)
  - –65°C TO +125°C (STORAGE)
- **HUMIDITY** ........................ MIL-STD-202F, METHOD 103B COND. B
- **SHOCK** ................................ MIL-STD-202F, METHOD 213B COND. B
- **VIBRATION** ......................... MIL-STD-202F, METHOD 204D COND. B
- **ALTITUDE** .......................... MIL-STD-202F, METHOD 105C COND. B
- **TEMPERATURE CYCLE** .............. MIL-STD-202F, METHOD 107D COND. A

AMERICAN MICROWAVE CORPORATION
7311G GROVE RD., FREDERICK, MD. 21701
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PRODUCT FEATURE

AGH-4080-N

4–8 GHz, CURRENT CONTROLLED NON-REFLECTIVE VARIABLE ATTENUATOR MODULATOR

SIZE: A SHEET 1 OF 2 DWG. #: 100-3171