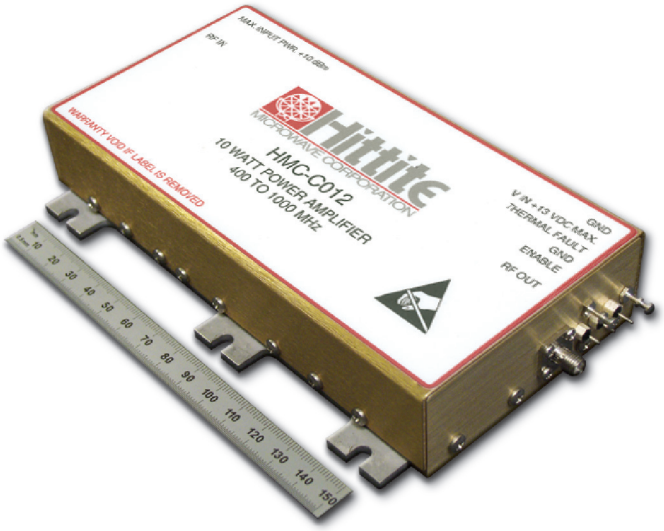
# HMC-C012

v01.1205

## 10 WATT POWER AMPLIFIER MODULE, 400 - 1000 MHz

### Features

P1dB Output Power: 10 Watts
Gain: 40 dB
Output IP3: +54 dBm
Single Positive Supply: +12V
Thermally Compensated and Protected
TTL DC Power Enable
Unconditionally Stable
Heat Sink/Fan Accessories Available




### Typical Applications

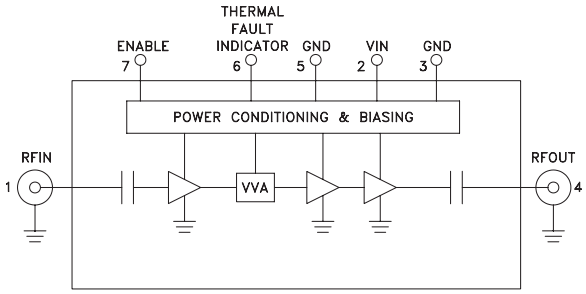
The HMC-C012 is ideal for:

- Cellular/3G Infrastructure
- Automated Test Equipment (ATE)
- Laboratory Use

### General Description

The HMC-C012 is a 10 Watt Power Amplifier Module suitable for Cellular/3G repeaters, wireless data, laboratory use and ATE applications. This extremely robust PA module is DC blocked, internally regulated and over voltage protected. Thermal protection/fault circuitry automatically turns off DC power if base temperature exceeds +75 °C and restores power at < +55 °C.

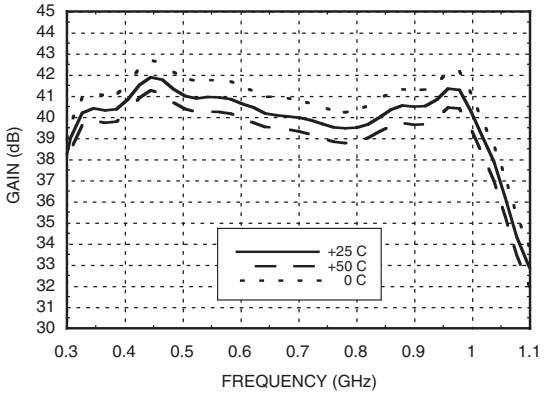
### Functional Diagram



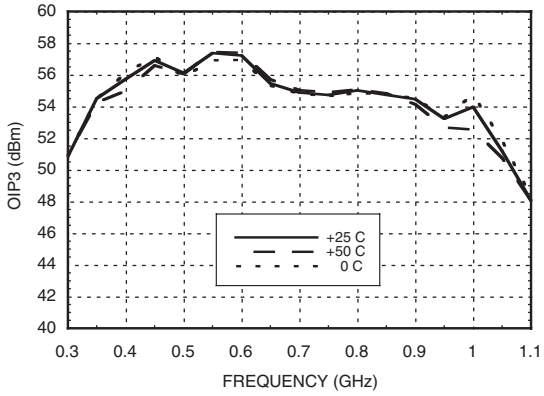

### Electrical Specifications, $T_A$ = +25° C, VIN = +12V

| Parameter | Min. | Typ. | Max. | Units |
|---|---|---|---|---|
| Frequency Range | | 0.4 - 1.0 | | GHz |
| Gain | 38 | 40 | | dB |
| Input Return Loss | 9.5 | 12 | | dB |
| Output Return Loss | 7.5 | 12 | | dB |
| Output Power for 1 dB Compression (P1dB) | 9 | 10 | | W |
| Saturated Output Power (Psat) | | 42 | | dBm |
| Output Third Order Intercept (IP3) (Two-tone Input Power = -28 dBm each tone) | | 54 | | dBm |
| Channel Output Power for -60 dBc ACPR (CDMA-2000, 1.98 MHz offset) | | 36 | | dBm |
| Channel Output Power for -50 dBc ACPR (CDMA-2000, 885 kHz offset) | | 34 | | dBm |
| Second Harmonic at Output P1dB | | -20 | | dBc |
| Third Harmonic at Output P1dB | | -30 | | dBc |
| Spurious at Output P1dB | | -65 | | dBc |
| Supply Current | | 6.5 | 7.0 | A |

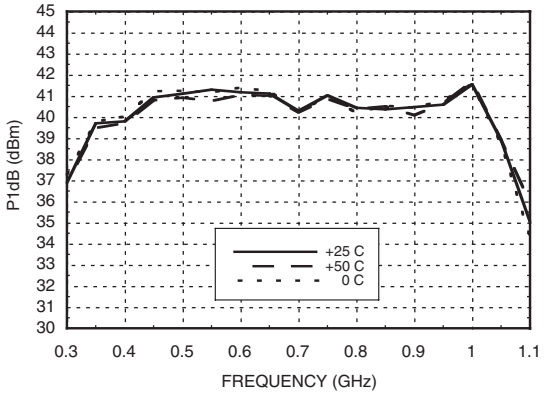
### Gain vs. Temperature



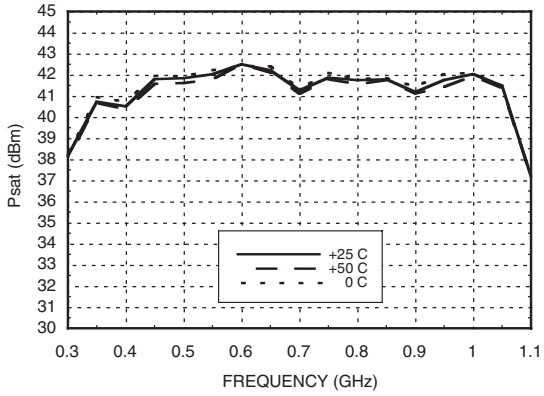

### Output IP3 vs. Temperature



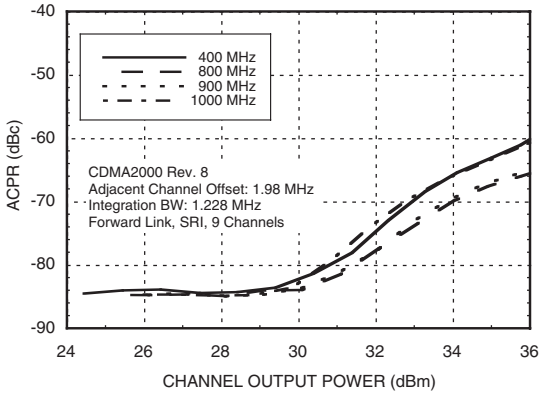

### P1dB vs. Temperature



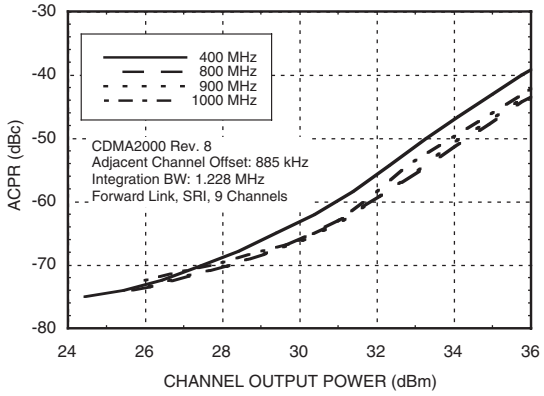

### Psat vs. Temperature



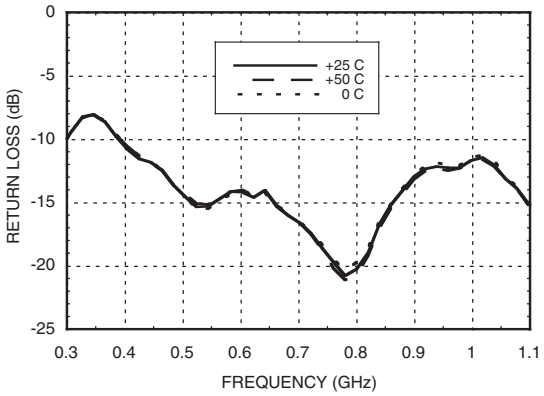

### ACPR, CDMA-2000, 1.98 MHz Offset



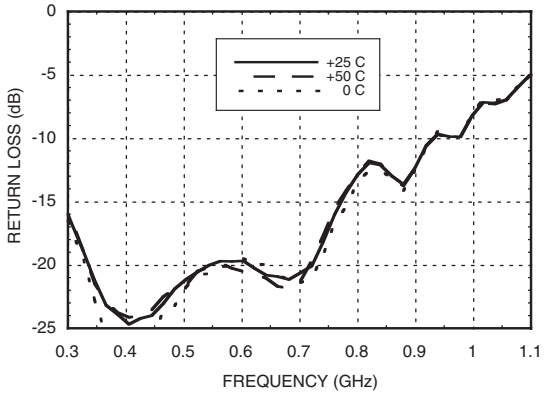

### ACPR, CDMA-2000, 885 kHz Offset



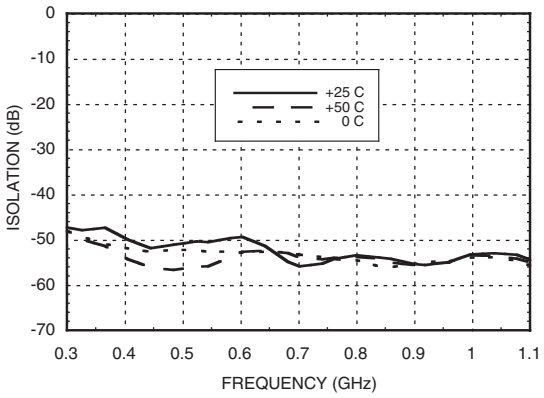
### Input Return Loss vs. Temperature



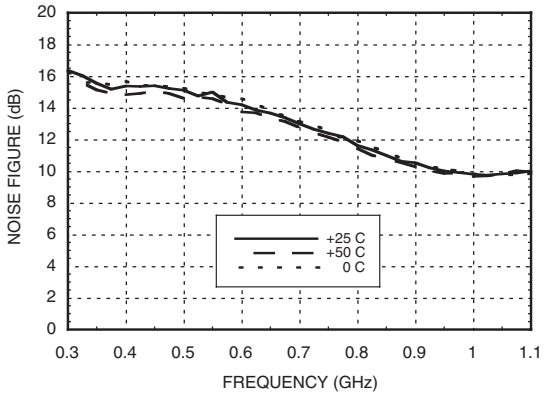

### Output Return Loss vs. Temperature




### Reverse Isolation vs. Temperature




### Noise Figure vs. Temperature




### Absolute Maximum Ratings

| | |
|---|---|
| Supply Voltage (VIN) | +13 Vdc |
| RF Input Power (RFIN) | +10 dBm |
| Storage Temperature | -40 to +85 °C |
| Operating Temperature | 0 to +50 °C |
| Thermal Fault Indicator Max Pdiss (derate 1.8 mW/°C above 50 °C) | 180 mW |
| Enable | -0.5 to +6.0 Vdc |

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

### Thermal Fault Indicator Characteristics

| Parameter | Min. | Typ. | Max. | Units |
|---|---|---|---|---|
| $I_{OUT}$ ($V_{OUT}$ > 2V) | | 350 | | mA |
| $R_{ON}$ ($I_{OUT}$ = 50 mA) | | | 7.5 | Ohms |
| $R_{OFF}$ ($V_{OUT}$ = 30 V) | | 1 | | MOhm |

### Enable Input Characteristics

| Parameter | Min. | Typ. | Max. | Units |
|---|---|---|---|---|
| $V_{IH}$ | 3.5 | | | V |
| $V_{IL}$ | | | 1.6 | V |
| $I_{IL}$ @ VIN = 0V | | -0.5 | | mA |
| $I_{IH}$ @ 5V | | < ± 50 | | µA |

## Recommended Biasing Procedure

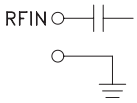
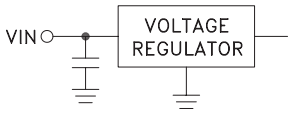
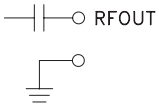
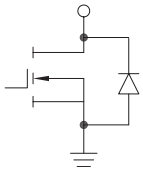
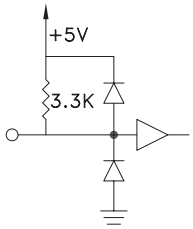
TURN-ON

1. Connect RF input and output
2. Apply Supply Voltage VIN (+12 Vdc)
3. Set Enable low
4. Apply RF input signal

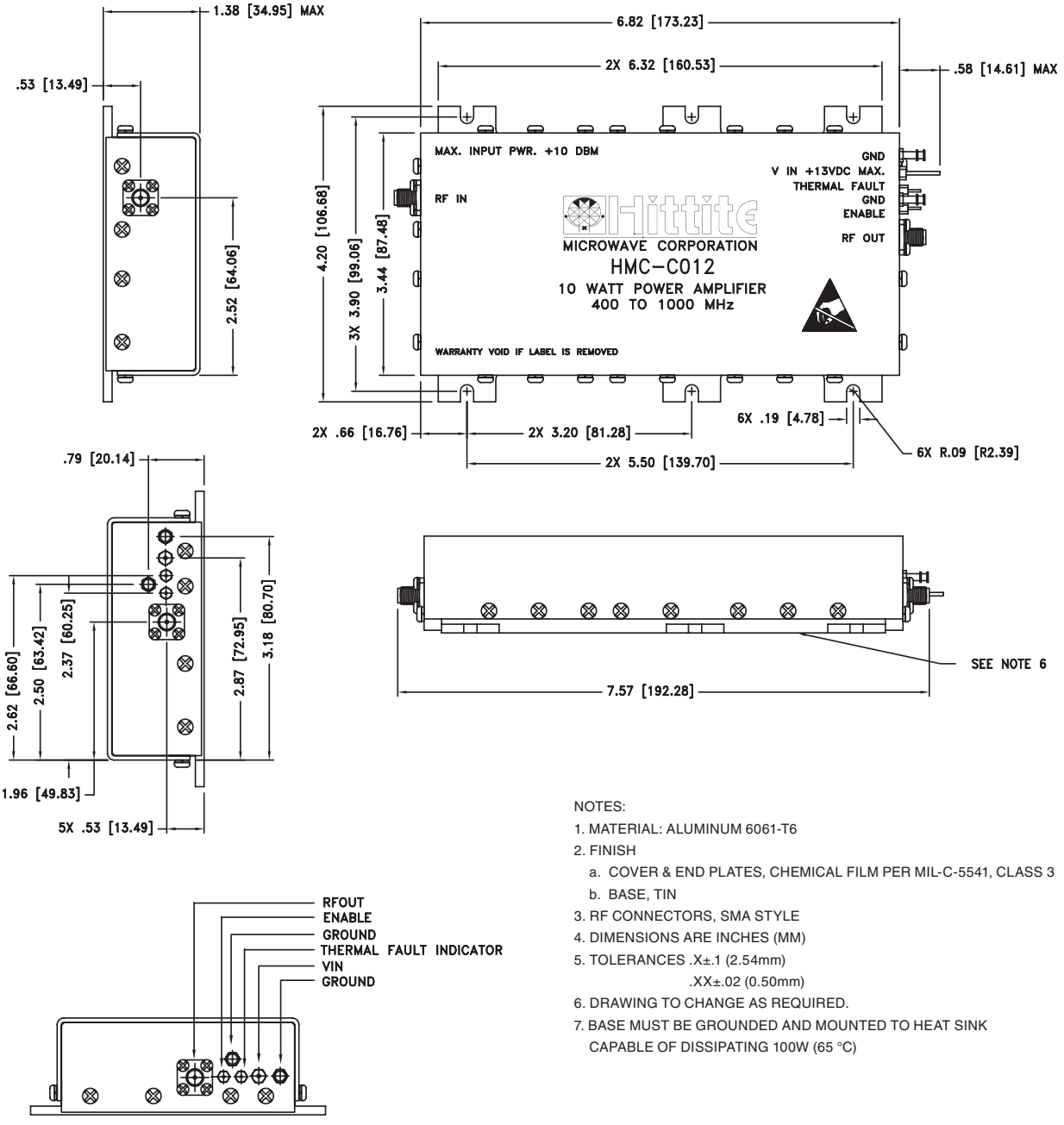
TURN-OFF

1. Remove RF input signal
2. Remove Supply Voltage VIN

## Pin Descriptions

| Pin Number | Function | Description | Interface Schematic |
|---|---|---|---|
| 1 | RFIN & RF Ground | RF input connector, SMA female. This pin is AC coupled and matched to 50 Ohms from 400 - 1000 MHz. |   |
| 2 | VIN | Power supply voltage for the amplifier. |   |
| 3 | GND | Power supply ground. |   |
| 4 | RFOUT & RF Ground | RF output connector, SMA female. This pin is AC coupled and matched to 50 Ohms from 400 - 1000 MHz. |   |
| 5 | GND | Ground for thermal fault indicator and enable circuit. |   |
| 6 | Thermal Fault Indicator | Open drain output. High impedance for base plate temperatures less than 55 °C. Low impedance for base plate temperatures exceeding 75 °C. |  |
| 7 | Enable | TTL compatible supply voltage (VIN) shutdown. If enable feature is not required, short this pin to DC ground.<br><br>TTL “High” Disable<br>TTL “Low” Enable |   |

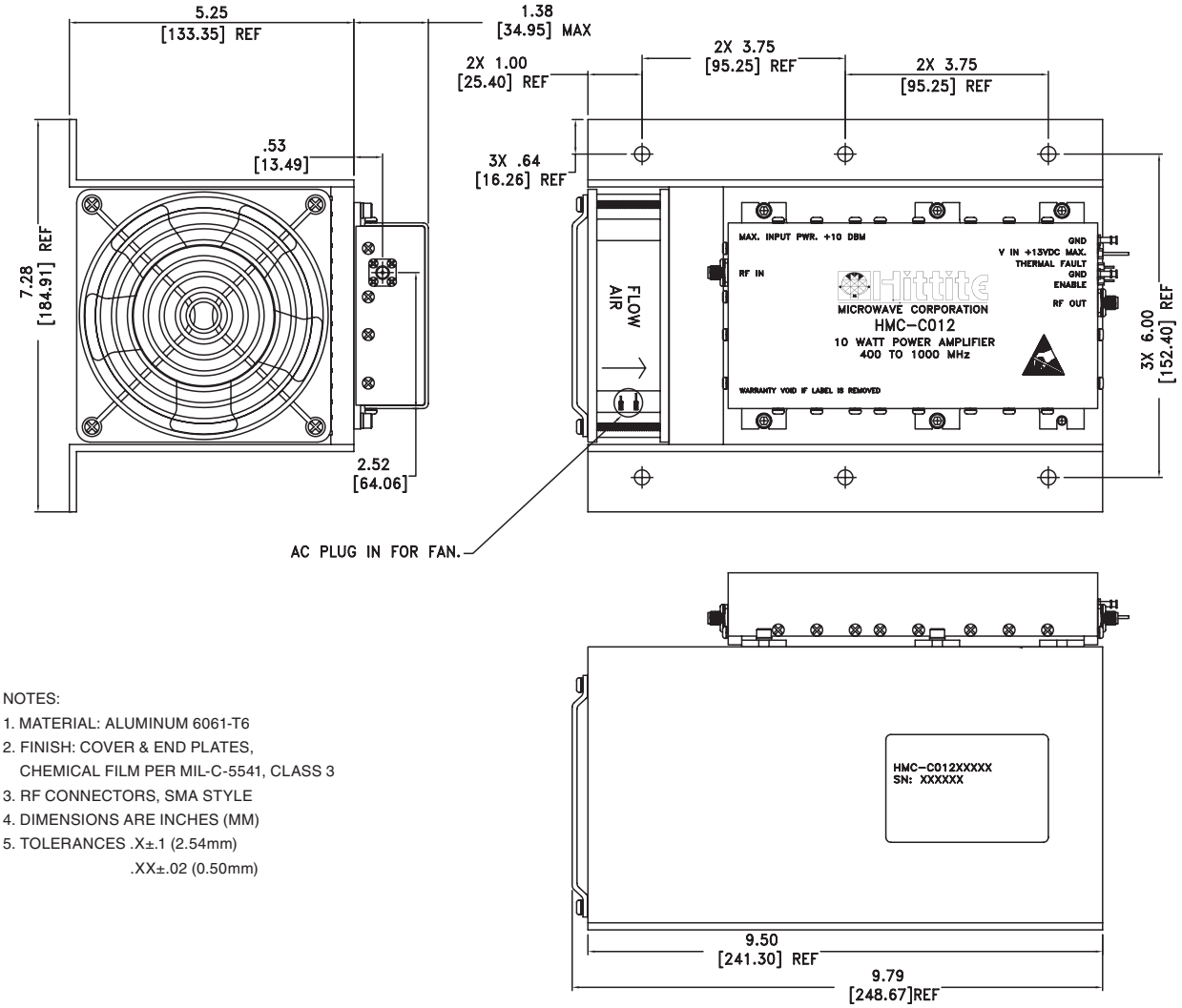
## Outline Drawing




NOTES:

1. MATERIAL: ALUMINUM 6061-T6
2. FINISH
   a. COVER & END PLATES, CHEMICAL FILM PER MIL-C-5541, CLASS 3
   b. BASE, TIN
3. RF CONNECTORS, SMA STYLE
4. DIMENSIONS ARE INCHES (MM)
5. TOLERANCES .X±.1 (2.54mm)
   .XX±.02 (0.50mm)
6. DRAWING TO CHANGE AS REQUIRED.
7. BASE MUST BE GROUNDED AND MOUNTED TO HEAT SINK CAPABLE OF DISSIPATING 100W (65 °C)

## HMC-C012 Heatsink/Fan Outline Drawing




NOTES:

1. MATERIAL: ALUMINUM 6061-T6
2. FINISH: COVER & END PLATES, CHEMICAL FILM PER MIL-C-5541, CLASS 3
3. RF CONNECTORS, SMA STYLE
4. DIMENSIONS ARE INCHES (MM)
5. TOLERANCES .X±.1 (2.54mm)
   .XX±.02 (0.50mm)

## HMC-C008 Ordering Information

| Part Number | Description |
|---|---|
| HMC-C012 | 10 Watt Power Amplifier Module, 400 - 1000 MHz |
| HMC-C012HV115 | 10 Watt Power Amplifier Module with heat sink, 115 Vac fan and power cord. |
| HMC-C012HV230 | 10 Watt Power Amplifier Module with heat sink, 230 Vac fan and power cord. |