

## WIDEBAND FIXED ATTENUATOR FAMILY, DC - 25 GHz HMC652LP2E / HMC653LP2E / HMC654LP2E / HMC655LP2E

### Typical Applications

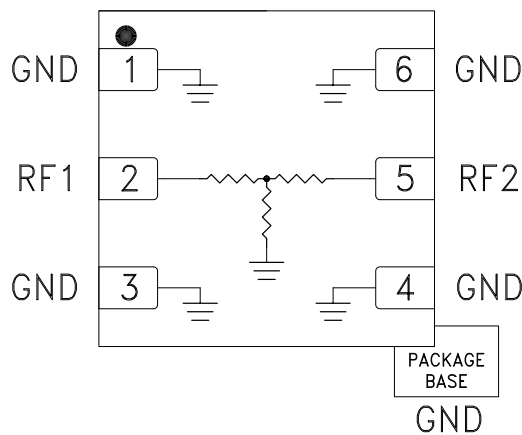
The HMC652LP2E - HMC655LP2E are ideal for:

- Fiber Optics
- Microwave Radio
- Military & Space
- Test & Measurement
- Scientific Instruments
- RF / Microwave Circuit Prototyping

### Features

- 4 Attenuator Products:
- 2, 3, 4 & 6 dB Fixed Attenuation Levels
- Wide Bandwidth: DC - 25 GHz
- Excellent Attenuation Accuracy
- Power Handling: +25 dBm
- 6 Lead 2x2 mm SMT Package: 4 mm<sup>2</sup>

### Functional Diagram



### General Description

The HMC652LP2E / 653LP2E / 654LP2E / 655LP2E are a line of wideband fixed value SMT 50 Ohm matched attenuators which offer attenuation levels of 2, 3, 4 and 6 dB respectively. These passive attenuators are ideal for military, test equipment, and other wideband applications where extremely flat attenuation, and excellent VSWR vs. frequency are required.

These wideband attenuators handle up to +25 dBm of input power, and are compatible with high volume surface mount manufacturing techniques.

### Electrical Specifications, $T_A = +25^\circ\text{C}$ , 50 Ohm system

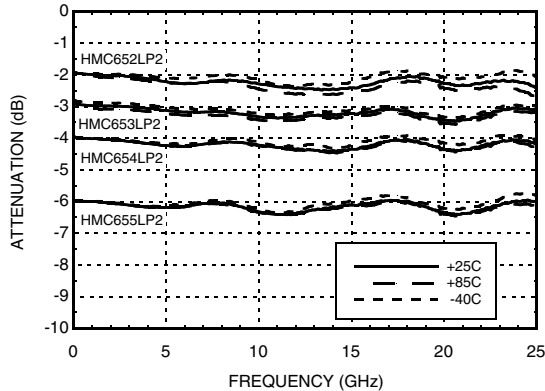
| Part Number | Attenuator Value | Return Loss (Min.) | Return Loss (Typ.) | Attenuation Tolerance [1] | Temperature Coefficient (Typical) [2] | Units   |
|-------------|------------------|--------------------|--------------------|---------------------------|---------------------------------------|---------|
|             |                  |                    |                    |                           |                                       | DC - 25 |
| HMC652LP2E  | 2 dB             | 7.0                | 22.0               | ± 0.5                     | 0.0004                                | dB      |
| HMC653LP2E  | 3 dB             | 7.0                | 23.0               | ± 0.5                     | 0.0006                                | dB      |
| HMC654LP2E  | 4 dB             | 7.0                | 20.5               | ± 0.5                     | 0.0006                                | dB      |
| HMC655LP2E  | 6 dB             | 7.0                | 16.5               | ± 0.5                     | 0.0004                                | dB      |

[1] Attenuation Tolerance is valid over temperature.

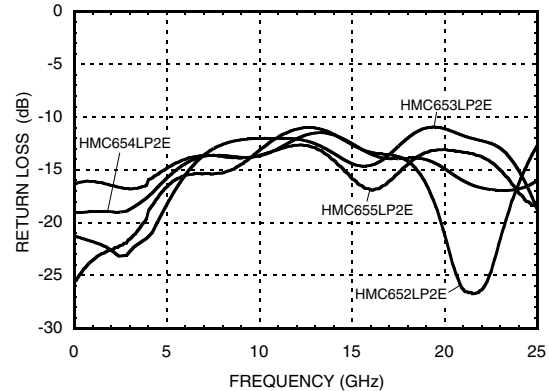
[2] Temperature Coefficient Units are dB/°C.

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**Attenuation vs. Temperature**



**Return Loss**



**Absolute Maximum Ratings**

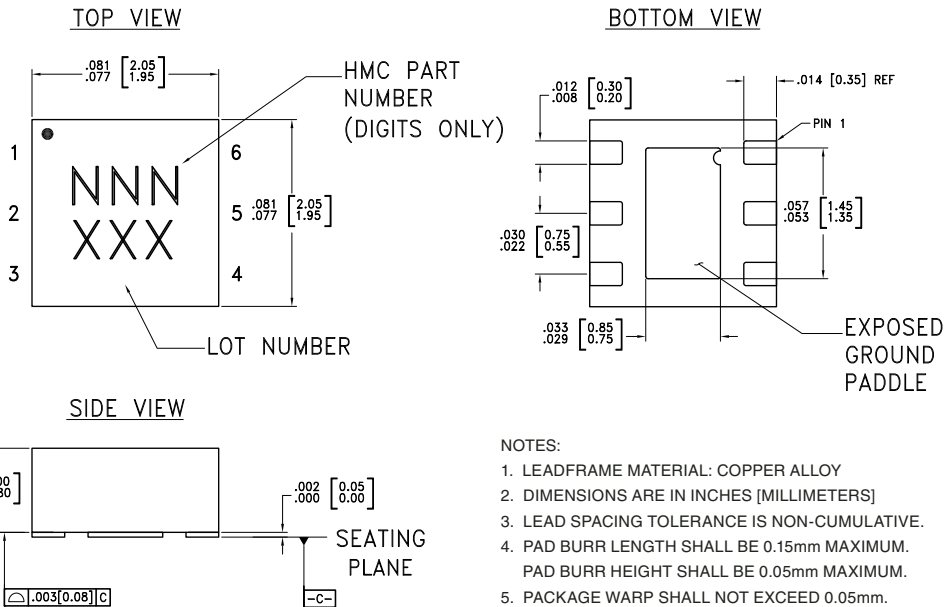
| Part Number           | HMC652LP2E  | HMC653LP2E | HMC654LP2E | HMC655LP2E | Units |
|-----------------------|-------------|------------|------------|------------|-------|
| RF Input Power (CW)   | 27          | 26         | 25         | 26         | dBm   |
| DC Voltage Terminated | 5.6         | 5.2        | 4.9        | 5.2        | V     |
| DC Voltage Open       | 5.6         | 5.1        | 4.6        | 6.0        | V     |
| Storage Temperature   | -65 to +150 |            |            |            | °C    |
| Operating Temperature | -40 to +85  |            |            |            | °C    |
| ESD Sensitivity (HBM) | Class 1A    | Class 1A   | Class 1A   | Class 1A   |       |



ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS

**WIDEBAND FIXED ATTENUATOR FAMILY, DC - 25 GHz**  
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**Outline Drawing**



- NOTES:
1. LEADFRAME MATERIAL: COPPER ALLOY
  2. DIMENSIONS ARE IN INCHES [MILLIMETERS]
  3. LEAD SPACING TOLERANCE IS NON-CUMULATIVE.
  4. PAD BURR LENGTH SHALL BE 0.15mm MAXIMUM. PAD BURR HEIGHT SHALL BE 0.05mm MAXIMUM.
  5. PACKAGE WARP SHALL NOT EXCEED 0.05mm.
  6. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.
  7. REFER TO HITTITE APPLICATION NOTE FOR SUGGESTED LAND PATTERN.

**Package Information**

| Part Number                   | Package Body Material                              | Lead Finish   | MSL Rating          | Package Marking <sup>[1]</sup> |
|-------------------------------|--|---------------|---------------------|--------------------------------|
| HMC652LP2E through HMC655LP2E | RoHS-compliant Low Stress Injection Molded Plastic | 100% matte Sn | MSL1 <sup>[2]</sup> | NNN<br>XXX                     |

[1] 3-Digit lot number XXX

[2] Max peak reflow temperature of 260 °C

**Pin Descriptions**

| Pin Number | Function | Description  | Interface Schematic |
|------------|----------|--|---------------------|
| 1, 3, 4, 6 | GND      | Package bottom must be connected to RF/DC ground.  |                     |
| 2, 5       | RF1, RF2 | This pin is DC coupled and matched to 50 Ohms. Use DC Blocking capacitors if the input / output signals have non-zero DC potential |                     |

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