

# MQH-2655CSP3

## MMIC 26 - 55 GHz 90° Hybrid Coupler

### DEVICE OVERVIEW

#### General Description

The MQH-2655CSP3 is a MMIC 26 - 55 GHz quadrature hybrid. Passive GaAs MMIC technology allows production of smaller constructions that replace larger form factor circuit board constructions. The MQH-2655CSP3 exhibits excellent amplitude balance with broadband quadrature phasing between output ports. Low variation allows for accurate simulations using the provided S4P file taken from measured production units. Tight fabrication tolerances allow for less unit to unit variation than traditional splitter/combiner technologies.

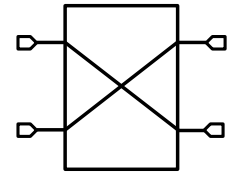
#### Features

- Designed for Ka/Low V-band applications
- Excellent amplitude and phase balance
- High isolation
- Low insertion loss

#### Applications

N/A

#### Functional Block Diagram



#### Part Ordering Options

| Part Number         | Description   | Package | Green Status | Product Lifecycle | Export Classification |
|---------------------|---|---------|--------------|-------------------|-----------------------|
| MQH-2655CSP3        | MMIC 26 - 55 GHz 90° Hybrid Coupler                   | CSP3    | RoHS REACH   | Released          | EAR99                 |
| <u>EVB-MQH-2655</u> | Evaluation Board, 26 - 55 GHz MMIC 90° Hybrid Coupler | EVB     | RoHS REACH   | Released          | EAR99                 |

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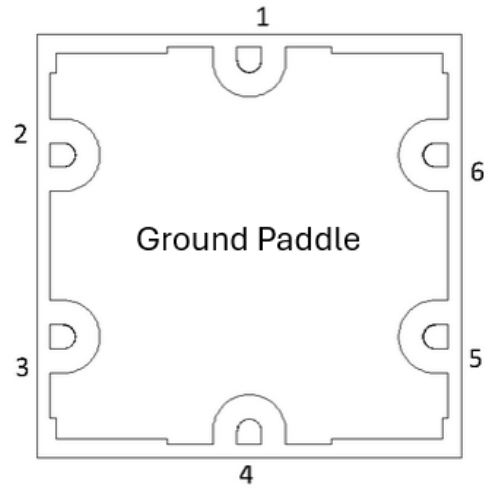
## Revision History

| Revision Code | Revision Date | Comment         |
|---------------|---------------|-----------------|
| -             | 2026-04-16    | Initial Release |

## Port Configuration and Functions

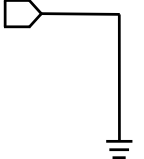
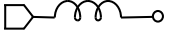
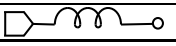

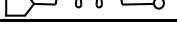
### Port Diagram

X-RAY VIEW CSP PACKAGE

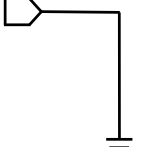
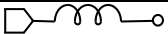
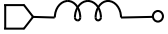
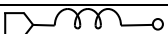
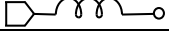


**Port Functions**

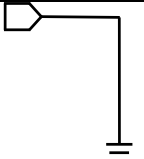

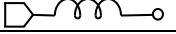
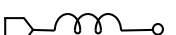
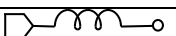
**Configuration A**

| Port          | Function   | Description   | DC Equivalent Circuit  |
|---------------|------------|---|--|
| Ground Paddle | Gnd        | Ground paddle should be connected to RF ground  |   |
| Pin 1         | NC         | Pin 1 is not internally connected. It can be connected to ground for normal operation.  | -  |
| Pin 2         | Isolated   | Pin 2 is isolated from the input. It is DC open to the other pins and open to ground. It should be connected to a 50 Ω load for normal operation. |   |
| Pin 3         | RF Input   | Pin 3 is used as input. It is DC open to the other pins and open to ground.   |   |
| Pin 4         | NC         | Pin 4 is not internally connected. It can be connected to ground for normal operation.  | -  |
| Pin 5         | 90° Output | Pin 5 is 90° output. It is DC open to the other pins and open to ground.  |   |
| Pin 6         | 0° Output  | Pin 6 is 0° output. It is DC open to the other 4 pins and open to ground.   |  |

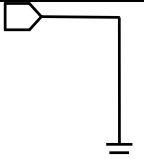
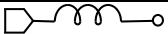
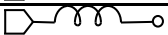
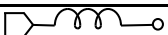
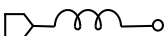
**Configuration B**

| Port          | Function   | Description   | DC Equivalent Circuit   |
|---------------|------------|---|---|
| Ground Paddle | Gnd        | Ground paddle should be connected to RF ground  |  |
| Pin 1         | NC         | Pin 1 is not internally connected. It can be connected to ground for normal operation.  | -   |
| Pin 2         | RF Input   | Pin 2 is used as input. It is DC open to the other pins and open to ground.   |  |
| Pin 3         | Isolated   | Pin 3 is isolated from the input. It is DC open to the other pins and open to ground. It should be connected to a 50 Ω load for normal operation. |  |
| Pin 4         | NC         | Pin 4 is not internally connected. It can be connected to ground for normal operation.  | -   |
| Pin 5         | 0° Output  | Pin 5 is 0° output. It is DC open to the other 4 pins and open to ground.   |  |
| Pin 6         | 90° Output | Pin 6 is 90° output. It is DC open to the other pins and open to ground.  |  |

**Configuration C**

| Port          | Function   | Description   | DC Equivalent Circuit   |
|---------------|------------|---|---|
| Ground Paddle | Gnd        | Ground paddle should be connected to RF ground  |  |
| Pin 1         | NC         | Pin 1 is not internally connected. It can be connected to ground for normal operation.  | -   |
| Pin 2         | 90° Output | Pin 2 is 90° output. It is DC open to the other pins and open to ground.  |  |
| Pin 3         | 0° Output  | Pin 3 is 0° output. It is DC open to the other 4 pins and open to ground.   |  |
| Pin 4         | NC         | Pin 4 is not internally connected. It can be connected to ground for normal operation.  | -   |
| Pin 5         | Isolated   | Pin 5 is isolated from the input. It is DC open to the other pins and open to ground. It should be connected to a 50 Ω load for normal operation. |  |
| Pin 6         | RF Input   | Pin 6 is used as input. It is DC open to the other pins and open to ground  |  |

**Configuration D**

| Port          | Function   | Description   | DC Equivalent Circuit   |
|---------------|------------|---|---|
| Ground Paddle | Gnd        | Ground paddle should be connected to RF ground  |  |
| Pin 1         | NC         | Pin 1 is not internally connected. It can be connected to ground for normal operation.  | -   |
| Pin 2         | 0° Output  | Pin 2 is 0° output. It is DC open to the other 4 pins and open to ground.   |  |
| Pin 3         | 90° Output | Pin 3 is 90° output. It is DC open to the other pins and open to ground.  |  |
| Pin 4         | NC         | Pin 4 is not internally connected. It can be connected to ground for normal operation.  | -   |
| Pin 5         | RF Input   | Pin 5 is used as input. It is DC open to the other pins and open to ground.   |  |
| Pin 6         | Isolated   | Pin 6 is isolated from the input. It is DC open to the other pins and open to ground. It should be connected to a 50 Ω load for normal operation. |  |

**Specifications**

**Absolute Maximum Ratings**

The Absolute Maximum Ratings indicate limits beyond which damage may occur to the device. If these limits are exceeded, the device may be inoperable or have a reduced lifetime.

| Parameter                     | Maximum Rating | Unit |
|-------------------------------|----------------|------|
| Maximum Operating Temperature | 100            | °C   |
| Maximum Storage Temperature   | 125            | °C   |
| Minimum Operating Temperature | -55            | °C   |
| Minimum Storage Temperature   | -65            | °C   |
| RF Power Handling             | 45             | dBm  |

**Package Information**

| Parameter                  | Details     | Rating         |
|----------------------------|-------------|----------------|
| ESD                        | < 250 Volts | HBM Class 0    |
| Dimensions                 | -           | 3.50 x 3.50 mm |
| Moisture Sensitivity Level | -           | MSL 1          |

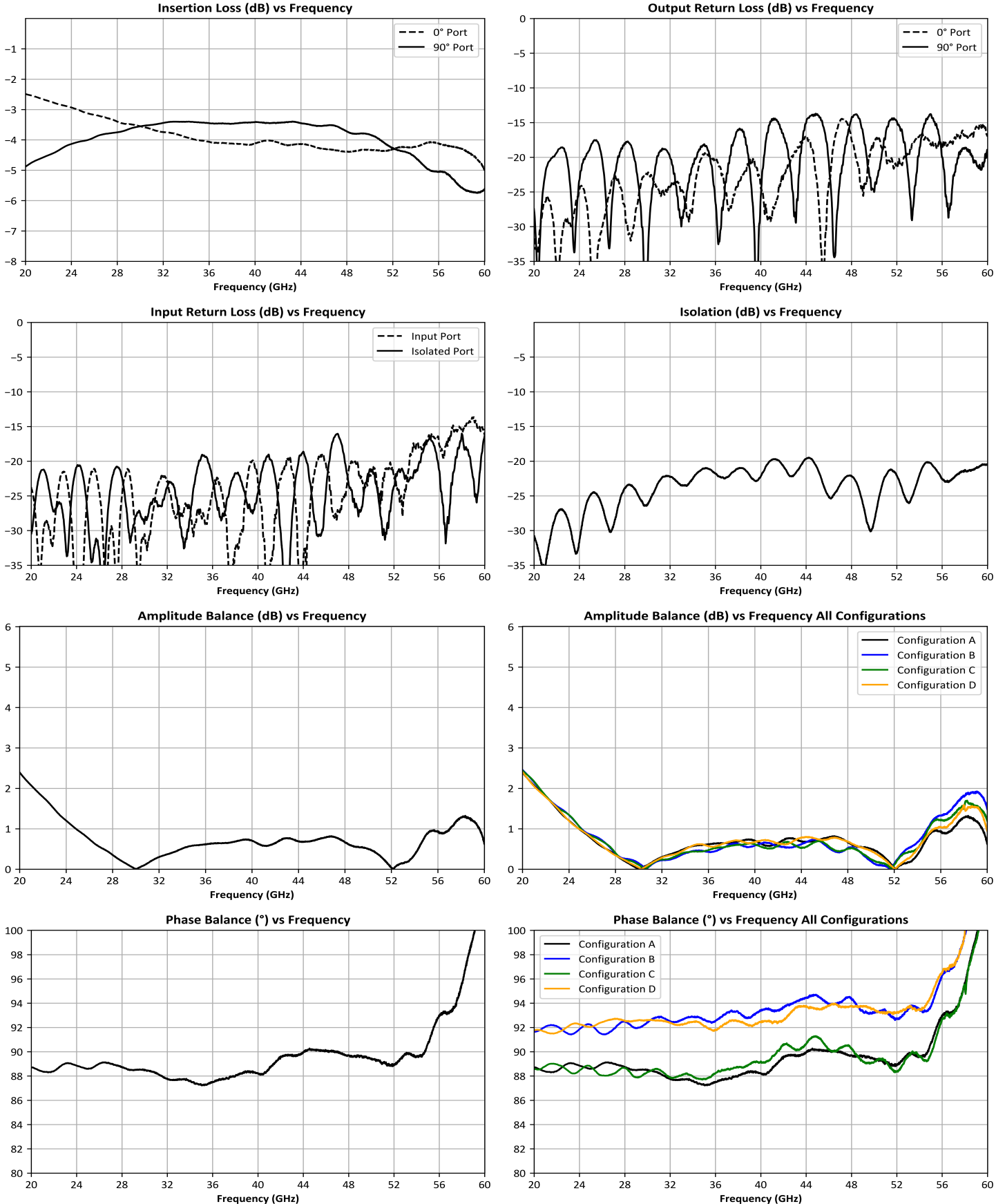
**Electrical Specifications**

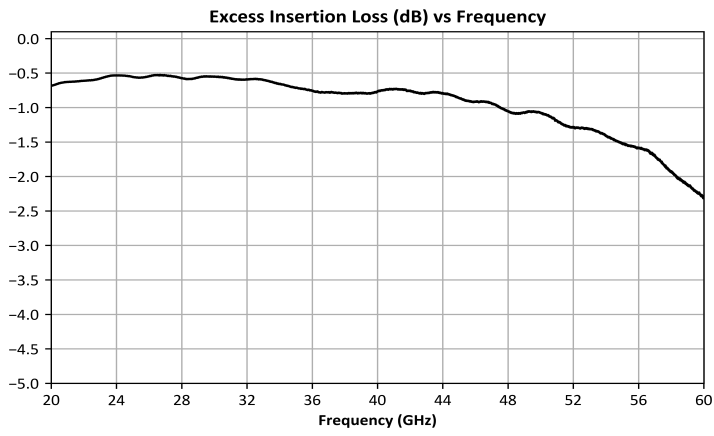
| Parameter             | Port Configuration | Test Conditions | Minimum Frequency (GHz) | Maximum Frequency (GHz) | Min | Typ | Max | Unit |
|-----------------------|--------------------|-----------------|-------------------------|-------------------------|-----|-----|-----|------|
| Amplitude Balance     | A                  | Configuration A | 26                      | 55                      | -   | 0.5 | -   | dB   |
| Impedance             | -                  | All Ports       | 26                      | 55                      | -   | 50  | -   | Ω    |
| Isolation             | A                  | Configuration A | 26                      | 55                      | -   | 23  | -   | dB   |
| Mean Coupling         | A                  | Configuration A | 26                      | 55                      | -   | 3   | -   | dB   |
| Nominal Phase Shift   | A                  | Configuration A | 26                      | 55                      | -   | 90  | -   | °    |
| Phase Balance         | A                  | Configuration A | 26                      | 55                      | -   | 1.1 | -   | °    |
| Return Loss           | -                  | All Ports       | 26                      | 55                      | -   | 24  | -   | dB   |
| Excess Insertion Loss | A                  | Configuration A | 26                      | 55                      | -   | 0.8 | -   | dB   |

Excess Insertion Loss = Input to Output Insertion Loss - 3dB

Typical performance plots shown for port configuration A. Performance may vary in alternate configurations.

**Typical Performance Plots**





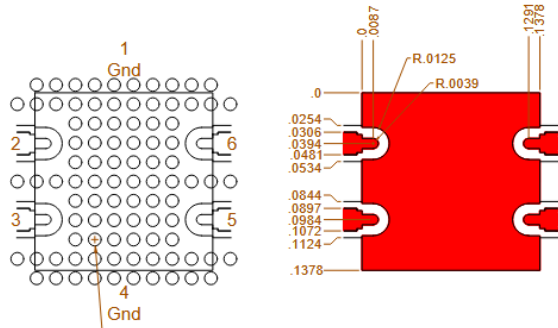
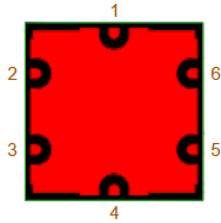


### Footprint Image

Download : [Footprint Drawing](#)

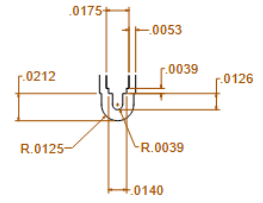
CSP3 Package Sample Drawing X-Ray view

| Pin# | Function |
|------|----------|
| 1    | NC       |
| 2    | iso      |
| 3    | Input    |
| 4    | NC       |
| 5    | 50       |
| 6    | 0        |

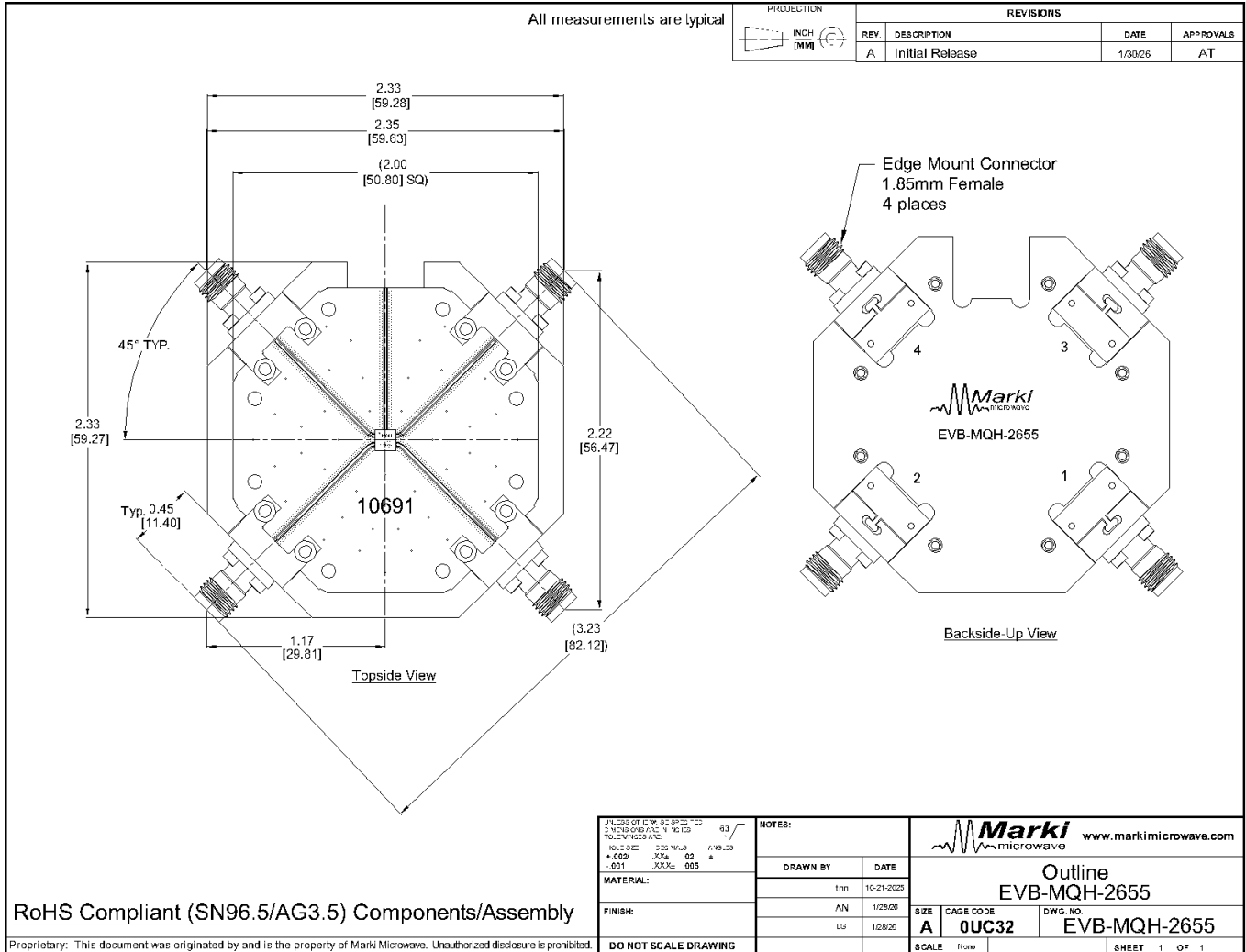


Ø.0100  
Plated thru via, 92 PL. Recommended conductive or non-conductive fill. Vias can be added or reduced at PCB designer's discretion.

Launch pattern sample below. Grounded Coplanar wave guide with 5.3mil slot. All Places.



**Evaluation Board - Outline Drawing**



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