



# CMD273P3

## DC-12 GHz DPDT Transfer Switch

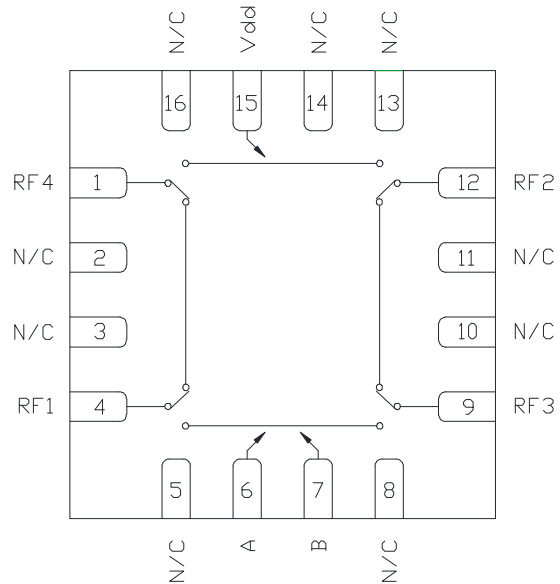
### Features

- ▶ Low loss broadband performance
- ▶ High isolation
- ▶ Non-reflective design
- ▶ Pb-free RoHs compliant 3x3 SMT package

### Description

The CMD273P3 is a low loss broadband positive control MMIC DPDT transfer switch housed in a leadless 3x3 mm surface mount package. The CMD273P3 covers DC to 12 GHz and offers a low insertion loss of 1.7 dB and high isolation of 42 dB at 6 GHz. The CMD273P3 operates using complementary control voltage logic lines of 0/+5 V.

### Functional Block Diagram



### Electrical Performance - $V_{ctl} = 0/+5\text{ V}$ , $V_{dd} = +5\text{ V}$ , $T_A = 25\text{ }^{\circ}\text{C}$ , $F = 6\text{ GHz}$

| Parameter       | Min     | Typ | Max | Units |
|-----------------|---------|-----|-----|-------|
| Frequency Range | DC - 12 |     |     | GHz   |
| Insertion Loss  |         | 1.7 |     | dB    |
| Isolation       |         | 42  |     | dB    |
| Return Loss     |         | 13  |     | dB    |
| Input P0.1dB    |         | 25  |     | dBm   |
| Input IP3       |         | 44  |     | dBm   |
| Switching Speed |         | 12  |     | ns    |

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## DC-12 GHz DPDT Transfer Switch

### Specifications

#### Absolute Maximum Ratings

| Parameter                            | Rating            |
|--------------------------------------|-------------------|
| RF Input Power                       | +27 dBm           |
| Bias Voltage (Vdd)                   | +7.0V             |
| Control Voltage Range (A,B)          | -0.5V to Vdd + 1V |
| Channel Temperature, T <sub>ch</sub> | 150 °C            |
| Thermal Resistance, $\Theta_{jc}$    | 46.6 °C/W         |
| Operating Temperature                | -40 to 85 °C      |
| Storage Temperature                  | -55 to 150 °C     |

Exceeding any one or combination of the maximum ratings may cause permanent damage to the device.

#### Bias Voltage & Current

| Vdd Range = +5.0V $\pm$ 10% |                |                |
|-----------------------------|----------------|----------------|
| Vdd (V)                     | Idd (Typ) (uA) | Idd (Max) (uA) |
| +5                          | 5              | 10             |

#### TTL/CMOS Control Voltages

| State | Bias Condition            |
|-------|---------------------------|
| Low   | 0V to +0.2V @ 1 uA Typ    |
| High  | Vdd $\pm$ 0.2V @ 1 uA Typ |

#### Truth Table

| Control Input |      |            |            |            |            |
|---------------|------|------------|------------|------------|------------|
| A             | B    | RF4 to RF2 | RF1 to RF3 | RF4 to RF1 | RF2 to RF3 |
| Low           | High | On         | On         | Off        | Off        |
| High          | Low  | Off        | Off        | On         | On         |

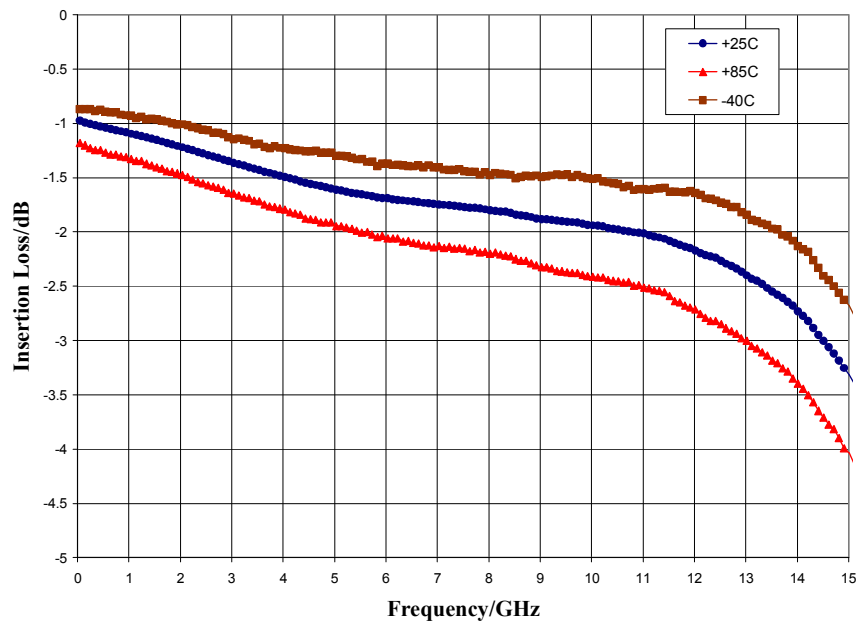
#### Electrical Specifications - V<sub>ctl</sub> = 0/+5 V, Vdd = +5 V T<sub>A</sub> = 25 °C

| Parameter       | Min    | Typ | Max | Min    | Typ | Max | Min     | Typ | Max | Units |
|-----------------|--------|-----|-----|--------|-----|-----|---------|-----|-----|-------|
| Frequency Range | DC - 4 |     |     | DC - 8 |     |     | DC - 12 |     |     | GHz   |
| Insertion Loss  |        | 1.2 | 1.8 |        | 1.7 | 2.1 |         | 1.9 | 2.5 | dB    |
| Isolation       | 36     | 42  |     | 36     | 42  |     | 25      | 35  |     | dB    |
| Return Loss     |        | 15  |     |        | 13  |     |         | 13  |     | dB    |
| Input P0.1dB    |        | 25  |     |        | 25  |     |         | 24  |     | dBm   |
| Input IP3       |        | 46  |     |        | 44  |     |         | 40  |     | dBm   |
| Switching Speed |        | 12  |     |        | 12  |     |         | 12  |     | ns    |

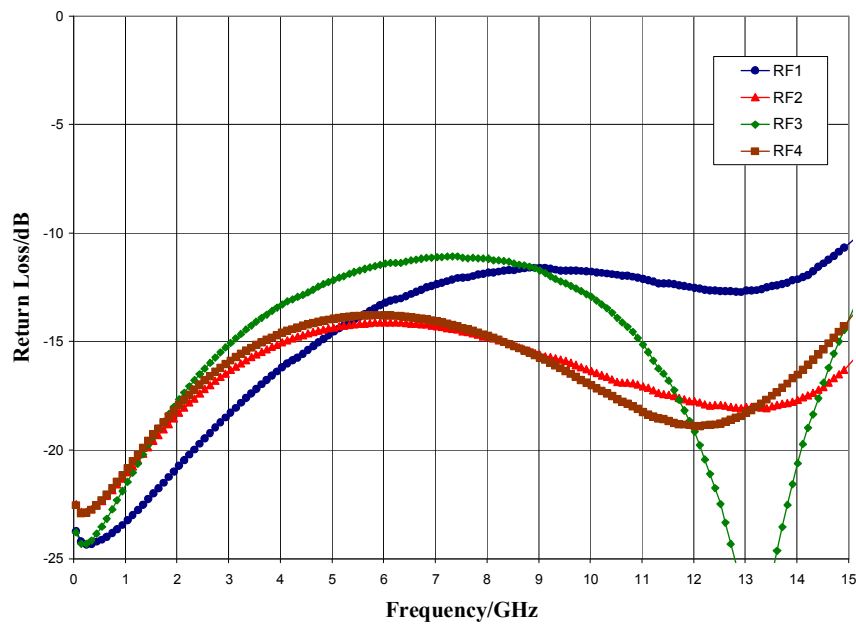
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### Typical Performance

#### Insertion Loss vs. Temperature



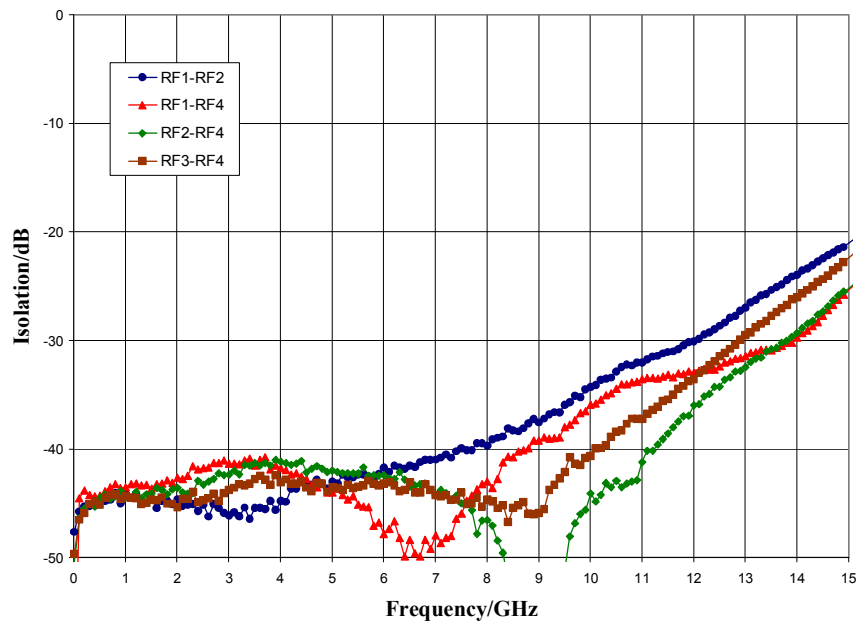
#### Return Loss



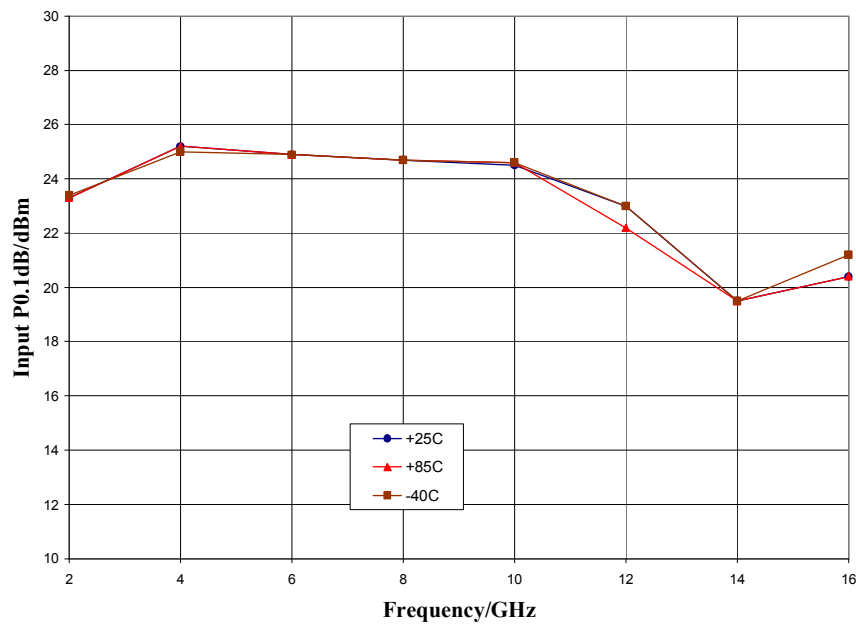
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### Typical Performance

#### Isolation



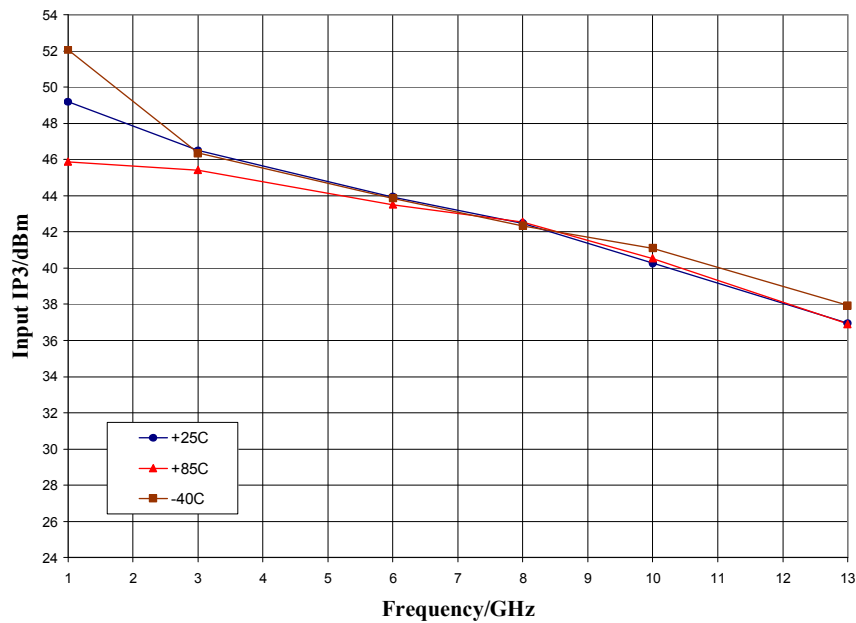
#### Input P0.1dB Compression Point vs. Temperature



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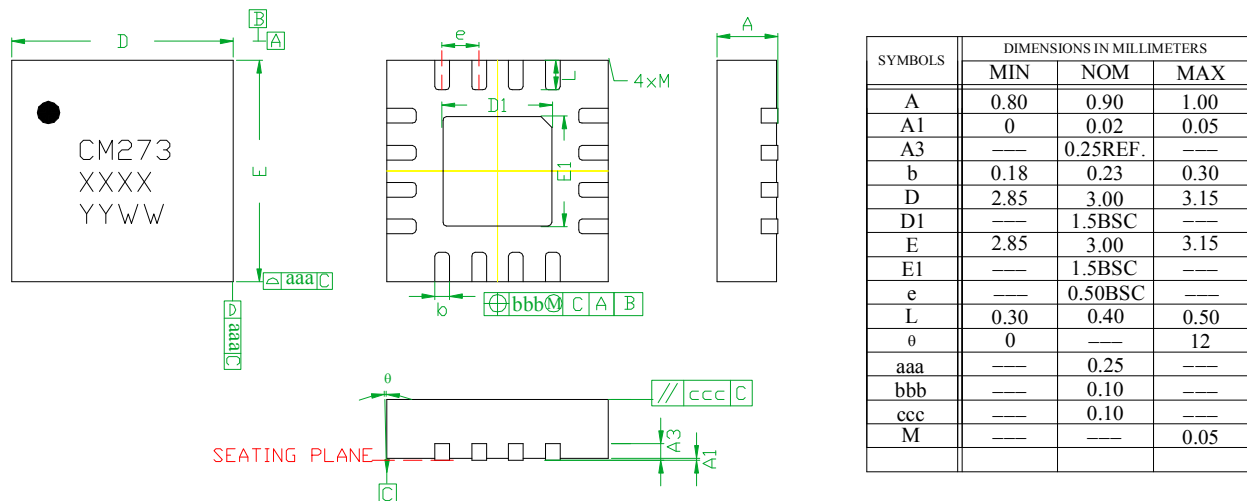
### Typical Performance

#### Input Third Order Intercept Point vs. Temperature



### Mechanical Information

#### Package Information and Dimensions



#### NOTES:

1. DIMENSIONS ARE IN MILLIMETERS
2. RoHS COMPLIANT MOLD COMPOUND
3. LEADFRAME MATERIAL: COPPER ALLOY
4. LEAD FINISH: 100% MATTE Sn
5. INDICATED DIMENSION/TOLERANCE APPLIES TO LEADS AND EXPOSED PAD

#### Recommended PCB Land Pattern

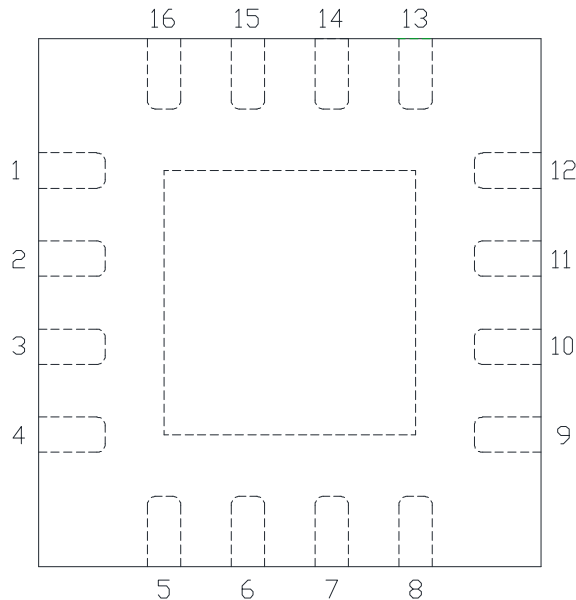
Custom MMIC recommends that the user develop the land pattern that will provide the best design for proper solder reflow and device attach for their specific application. Please review Custom MMIC Application Note AN 105 for a recommended land pattern approach.

#### Recommended Solder Reflow Profile

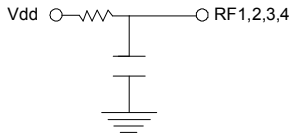
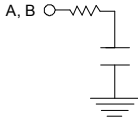
Custom MMIC recommends screen printing with belt furnace reflow to ensure proper solder reflow and device attach. Please review Custom MMIC Application Note AN 102 for a recommended solder reflow profile.

### Pin Description

#### Pin Diagram



#### Functional Description

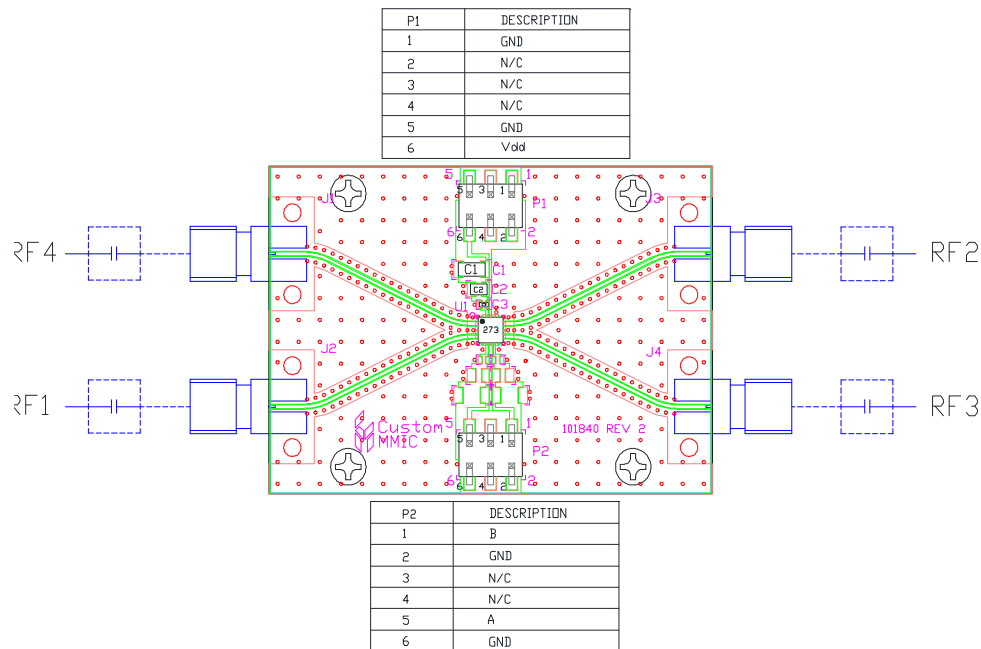
| Pin                        | Function               | Description                                                                       | Schematic                                                                             |
|----------------------------|------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1,4, 9,12                  | RF4, RF1,<br>RF3, RF2, | These pins are DC coupled and matched to 50 Ohm. Blocking capacitors are required |  |
| 15                         | Vdd                    | Power supply voltage                                                              |                                                                                       |
| 6                          | CTLA                   | See truth table and control voltage table                                         |  |
| 7                          | CTLB                   | See truth table and control voltage table                                         |                                                                                       |
| 2,3,5,8,10,11,<br>13,14,16 | N/C                    | No connection required. These pins may be connected to RF/DC ground               |                                                                                       |
| Die paddle                 | Ground                 | Connect to RF / DC ground                                                         |  |

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### Applications Information

#### Evaluation Board

The circuit board shown has been developed for optimized assembly at Custom MMIC. A sufficient number of via holes should be used to connect the top and bottom ground planes. As surface mount processes vary, careful process development is recommended.



#### Bill of Material

| Designator | Value        | Description                   |
|------------|--------------|-------------------------------|
| J1 - J4    |              | SMA End Launch Connector      |
| P1, P2     |              | 6 Pin Header                  |
| C1         | 0.33 $\mu$ F | Capacitor, Tantalum           |
| C2         | 1000 pF      | Capacitor, 0603               |
| C3         | 100 pF       | Capacitor, 0402               |
| U1         |              | CMD273P3 DPDT Transfer Switch |
| PCB        |              | 101840 Evaluation PCB         |

**GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.**

Please note, all information contained in this data sheet is subject to change without notice.

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