DATA SHEET

NEC

CMOS INTEGRATED CIRCUIT

# μPD5720K

## CMOS MMIC 4 x 2 IF SWITCH MATRIX

### FEATURES

- 4 independent IF channels, integral switching to channel input to either channel output
- Integrated 4 bit decoder
- With enable external pins for each OUT ports enabled/disabled
- Frequency range : f = 250 to 2 150 MHz
- High isolation : ISL = 42 dB TYP.
- Insertion loss : $L_{INS}$ =7.0 dB TYP. @$Z_O$ = 50 Ω
- Insertion loss flatness : $\Delta L_{INS}$ = 0.6 dB TYP.
- Control voltage : $V_{CONT}$ = 0 V/+5.0 V
- 20-PIN 4 × 4 mm SQUARE MICRO LEAD PACKAGE (20-pin plastic QFN (0.5 mm pitch))

### APPLICATIONS

- DBS IF switching
- Switch box
- 4 × 2 switching application for microwave signal

### ORDERING INFORMATION

| Part Number | Order Number | Package | Marking | Supplying Form |
|---|---|---|---|---|
| μPD5720K-E3 | μPD5720K-E3-A | 20-pin plastic QFN (0.5 mm pitch) (Pb-Free) | D5720 | • Embossed tape 12 mm wide<br>• Pin 1 to 5 face the perforation side of the tape<br>• Qty 3 kpcs/reel |

**Remark** To order evaluation samples, contact your nearby sales office.
Part number for sample order: μPD5720K

**Caution Observe precautions when handling because these devices are sensitive to electrostatic discharge.**



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## ABSOLUTE MAXIMUM RATINGS ($T_A$ = +25°C, unless otherwise specified)

| Parameter | Symbol | Ratings | Unit |
|---|---|---|---|
| Supply Voltage | $V_{DD}$ | −0.5 to +6.0 | V |
| Switch Control Voltage | $V_{CONT}$1, 2, 3, 4 | −0.5 to +6.0 | V |
| Enable Control Voltage | $V_{EA}$1, 2 | −0.5 to +6.0 | V |
| Input Power | $P_{in}$ | +15 | dBm |
| Operating Ambient Temperature | $T_A$ | −40 to +85 | °C |
| Storage Temperature | $T_{stg}$ | −55 to +150 | °C |

## RECOMMENDED OPERATING CONDITIONS ($T_A$ = +25°C, unless otherwise specified)

| Parameter | Symbol | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|
| Supply Voltage Note 1, 2 | $V_{DD}$ | +4.0 | +5.0 | +5.5 | V |
| Control Voltage (H) Note 1 | $V_{CONT (H)}$ | +4.0 | +5.0 | +5.5 | V |
| Control Voltage (L) | $V_{CONT (L)}$ | −0.2 | 0 | +0.4 | V |
| Enable Control Voltage (H) Note 2 | $V_{EA (H)}$ | +4.0 | +5.0 | +5.5 | V |
| Enable Control Voltage (L) | $V_{EA (L)}$ | −0.2 | 0 | +0.4 | V |

**Notes 1.** $V_{DD} - 0.4\ V \le V_{CONT (H)} \le V_{DD} + 0.2\ V$

**2.** $V_{DD} - 0.4\ V \le V_{EA (H)} \le V_{DD} + 0.2\ V$

## ELECTRICAL CHARACTERISTICS ($T_A$ = +25°C, $V_{DD}$ = +5.0 V, $V_{CONT}$ = +5.0 V/0 V, $V_{EA}1$ = $V_{EA}2$ = +5.0 V (both OUTs enabled), $P_{in}$ = 0 dBm, $Z_O$ = 50 Ω for each port, worst mode, unless otherwise specified)

| Parameter | Symbol | Test Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|
| Insertion Loss | $L_{INS}$ | f = 0.25 to 2.15 GHz | – | 7.0 | 9.0 | dB |
| Insertion Loss Flatness | $\Delta L_{INS}$ | $\lvert L_{INS (0.25\ GHz)} - L_{INS (2.15\ GHz)} \rvert$ | – | 0.6 | 3.0 | dB |
| Isolation Note 1 | ISL | f = 0.25 to 2.15 GHz | 37 | 42 | – | dB |
| Output Return Loss | $RL_{out}$ | f = 0.25 to 2.15 GHz | 10 | 16 | – | dB |
| Supply Current | $I_{DD}$ | $V_{DD}$ = +5.0 V, $V_{CONT}$ = +5.0 V/0 V, $V_{EA}$ = +5.0 V/0 V, non-RF | – | 50 | 100 | μA |
| Switch Control Current Note 2 | $I_{CONT}$ | $V_{DD}$ = +5.0 V, $V_{CONT}$ = +5.0 V/0 V, $V_{EA}$ = +5.0 V/0 V, non-RF | – | 50 | 100 | μA |
| Enable Control Current Note 2 | $I_{EA}$ | $V_{DD}$ = +5.0 V, $V_{CONT}$ = +5.0 V/0 V, $V_{EA}$ = +5.0 V/0 V, non-RF | – | 50 | 100 | μA |

**Notes 1.** Isolation = Signal leakage (off-state)

**2.** Per 1 control pin

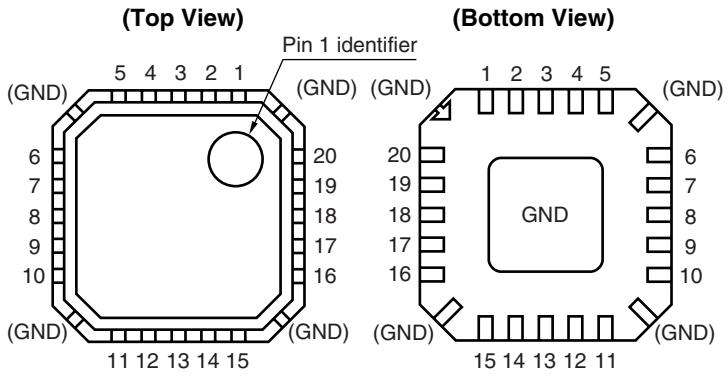
## STANDARD CHARACTERISTICS FOR REFERENCE

**($T_A$ = +25°C, $V_{DD}$ = +5.0 V, $V_{CONT}$ = +5.0 V/0 V, $V_{EA}1$ = $V_{EA}2$ = +5.0 V (both OUTs enabled), $P_{in}$ = 0 dBm, $Z_O$ = 50 Ω for each port, worst mode, unless otherwise specified)**

| Parameter | Symbol | Test Conditions | Reference Value | Unit |
|---|---|---|---|---|
| Isolation D/U-ratio [Note] | $ISL_{D/U}$ | f = 0.25 to 2.15 GHz | 35 | dB |
| Input Return Loss | $RL_{in}$ | f = 0.25 to 2.15 GHz | 21 | dB |
| Isolation of Disable Mode | $ISL_{DA}$ | f = 0.25 to 2.15 GHz<br>$V_{EA}1$ = 0 V and/or $V_{EA}2$ = 0 V | 40 | dB |

**Note** Isolation D/U-ratio = |(Isolation (off-state)) – (Insertion loss (on-state))|

## PIN CONNECTIONS




| Pin No. | Pin Name | Pin No. | Pin Name |
|---|---|---|---|
| 1 | $V_{CONT1}$ | 11 | GND |
| 2 | $V_{CONT2}$ | 12 | IN-C |
| 3 | Enable1 | 13 | Enable2 |
| 4 | IN-A | 14 | $V_{CONT4}$ |
| 5 | GND | 15 | $V_{CONT3}$ |
| 6 | IN-B | 16 | OUT2 |
| 7 | GND | 17 | GND |
| 8 | GND | 18 | $V_{DD}$ |
| 9 | GND | 19 | GND |
| 10 | IN-D | 20 | OUT1 |

**Remark** Heat Sink : GND

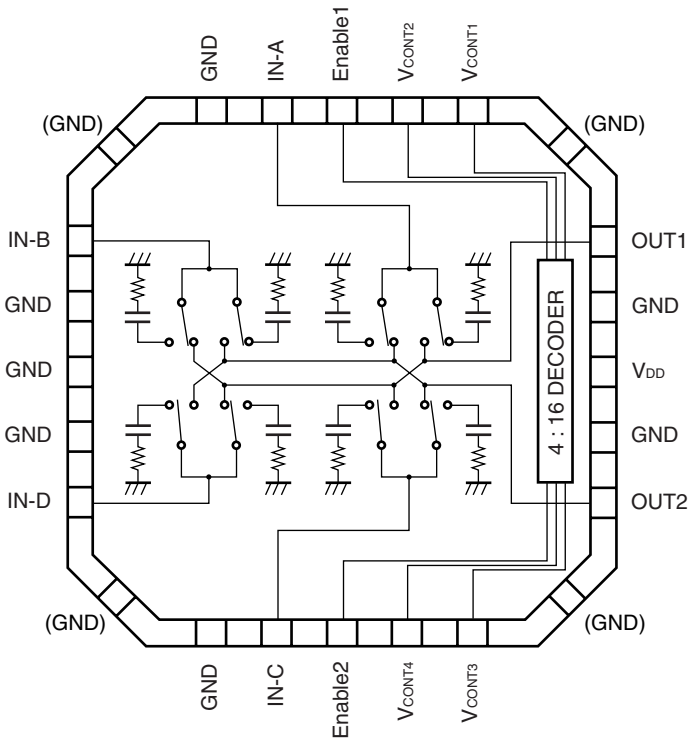
## TRUTH TABLE OF SWITCHING BY CONDITION OF CONTROL VOLTAGE

| State | | | Output Signal | | Control Pins | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| No. | Mode | | OUT1 | OUT2 | $V_{CONT}1$ | $V_{CONT}2$ | $V_{CONT}3$ | $V_{CONT}4$ | Enable1 | Enable2 |
| 1 | Both OUTs Enabled | AA | IN-A | IN-A | Low | Low | Low | Low | High | High |
| 2 | | AB | | IN-B | Low | Low | Low | High | High | High |
| 3 | | AC | | IN-C | Low | Low | High | Low | High | High |
| 4 | | AD | | IN-D | Low | Low | High | High | High | High |
| 5 | | BA | IN-B | IN-A | Low | High | Low | Low | High | High |
| 6 | | BB | | IN-B | Low | High | Low | High | High | High |
| 7 | | BC | | IN-C | Low | High | High | Low | High | High |
| 8 | | BD | | IN-D | Low | High | High | High | High | High |
| 9 | | CA | IN-C | IN-A | High | Low | Low | Low | High | High |
| 10 | | CB | | IN-B | High | Low | Low | High | High | High |
| 11 | | CC | | IN-C | High | Low | High | Low | High | High |
| 12 | | CD | | IN-D | High | Low | High | High | High | High |
| 13 | | DA | IN-D | IN-A | High | High | Low | Low | High | High |
| 14 | | DB | | IN-B | High | High | Low | High | High | High |
| 15 | | DC | | IN-C | High | High | High | Low | High | High |
| 16 | | DD | | IN-D | High | High | High | High | High | High |
| 17 | OUT1 Disabled | NA | None | IN-A | Any [Note] | Any [Note] | Low | Low | Low | High |
| 18 | | NB | | IN-B | Any [Note] | Any [Note] | Low | High | Low | High |
| 19 | | NC | | IN-C | Any [Note] | Any [Note] | High | Low | Low | High |
| 20 | | ND | | IN-D | Any [Note] | Any [Note] | High | High | Low | High |
| 21 | OUT2 Disabled | AN | IN-A | None | Low | Low | Any [Note] | Any [Note] | High | Low |
| 22 | | BN | IN-B | | Low | High | Any [Note] | Any [Note] | High | Low |
| 23 | | CN | IN-C | | High | Low | Any [Note] | Any [Note] | High | Low |
| 24 | | DN | IN-D | | High | High | Any [Note] | Any [Note] | High | Low |
| 25 | Both OUTs Disabled | | None | None | Any [Note] | Any [Note] | Any [Note] | Any [Note] | Low | Low |

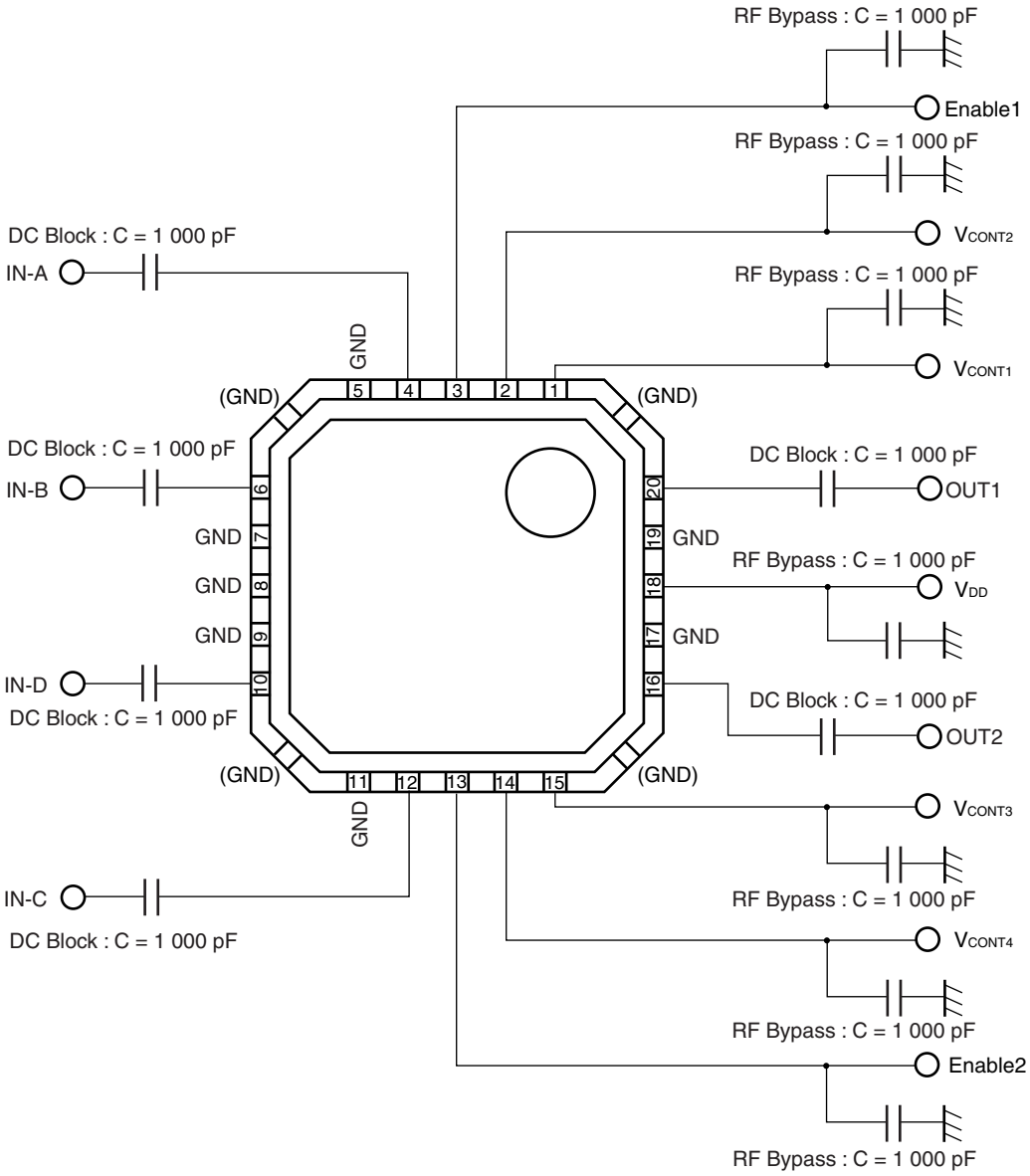
**Note** Any means High or Low.

**Remark** High : +5.0 Vdc, Low : 0 Vdc, $V_{DD}$ = +5 Vdc

**FUNCTIONAL DIAGRAM**



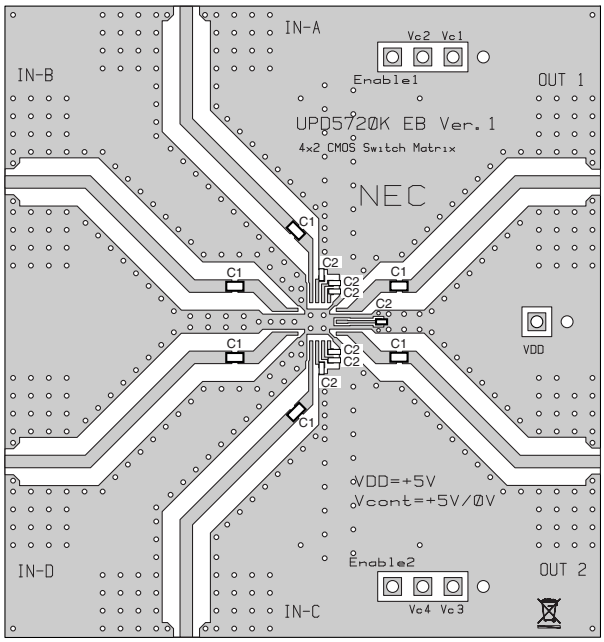
## EVALUATION CIRCUIT

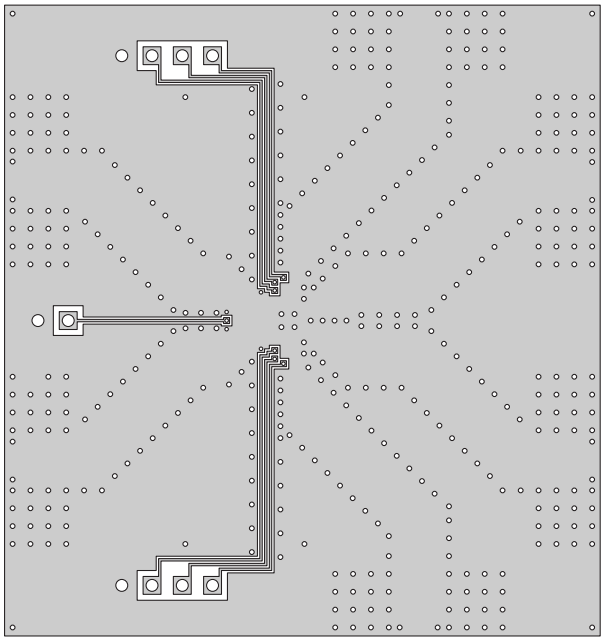



**Caution In order to avoid degradation of system by the standing waves, turn off $V_{CC}$ bias of 2nd IF AMP on occasion of turning off the enable – terminal.**

The application circuits and their parameters are for reference only and are not intended for use in actual design-ins.

## ILLUSTRATION OF THE TEST CIRCUIT ASSEMBLED ON EVALUATION BOARD



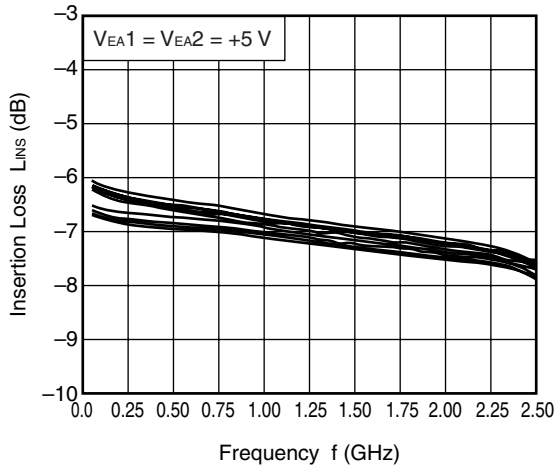



**Notes**

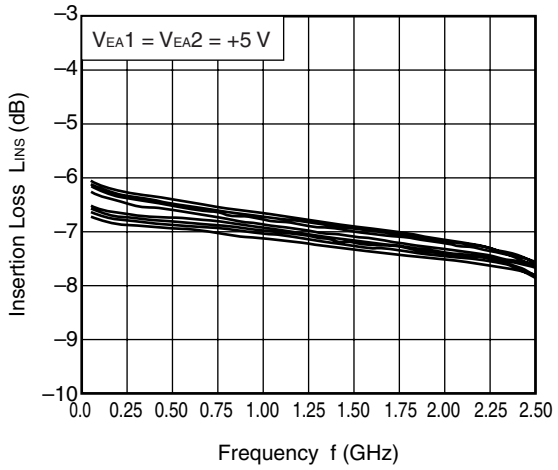
1. 50 × 53 × 0.51 mm double sided copper clad RO4003 (Rogers) board ($\varepsilon r$ = 3.38).
2. Au plated on pattern
3. ○: Through holes
4. C1, C2: 1 000 pF

**TYPICAL CHARACTERISTICS ($T_A$ = +25°C, $V_{DD}$ = +5.0 V, $V_{CONT}$ = +5.0 V/0 V, $V_{EA}1$ = $V_{EA}2$ = +5.0 V (both OUTs enabled), $P_{in}$ = 0 dBm, $Z_O$ = 50 Ω for each port, unless otherwise specified)**

INSERTION LOSS vs. FREQUENCY
(IN-x - OUT1)

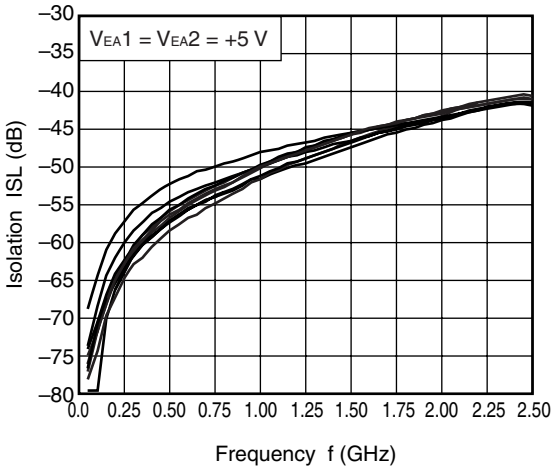



INSERTION LOSS vs. FREQUENCY
(IN-x - OUT2)

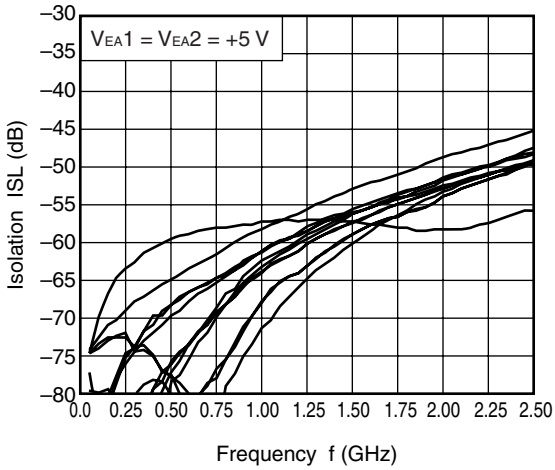



**Remark** The graphs indicate nominal characteristics.

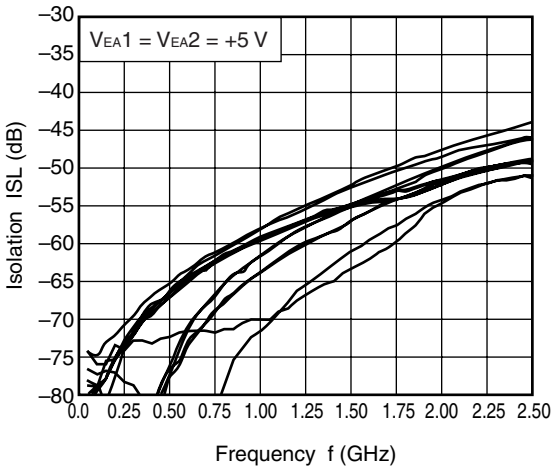
ISOLATION vs. FREQUENCY
(IN-A - OUT1)



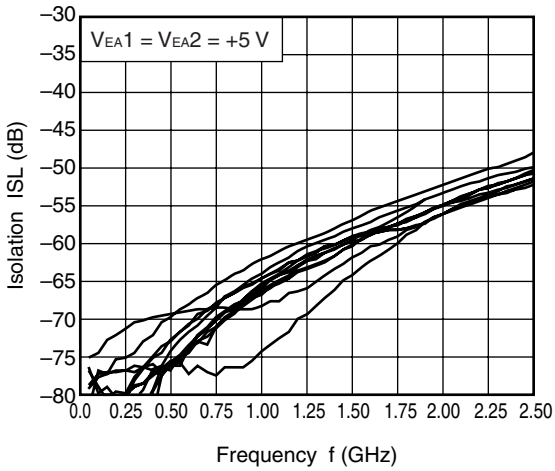

ISOLATION vs. FREQUENCY
(IN-B - OUT1)



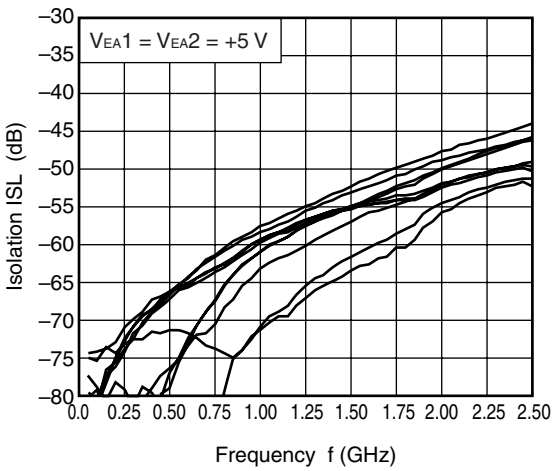

ISOLATION vs. FREQUENCY
(IN-C - OUT1)



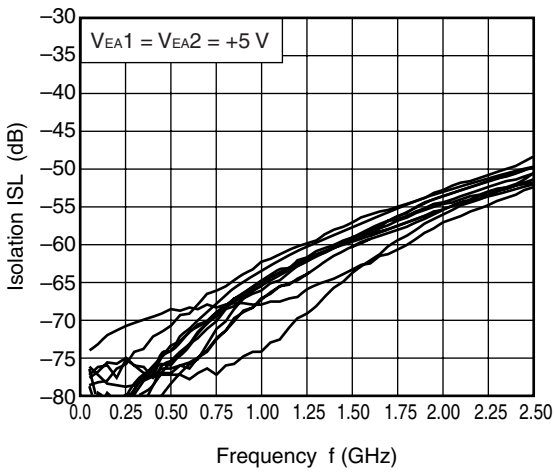

ISOLATION vs. FREQUENCY
(IN-D - OUT1)




ISOLATION vs. FREQUENCY
(IN-A - OUT2)

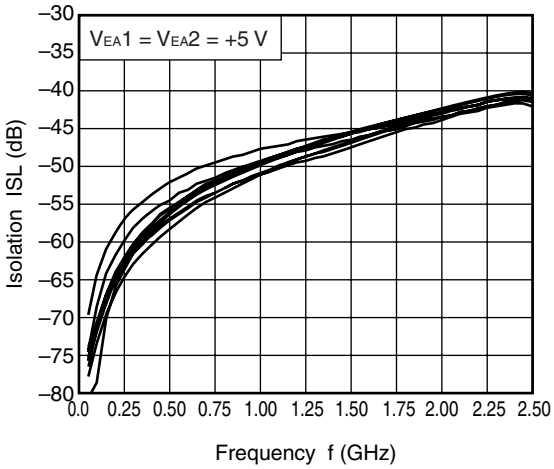



ISOLATION vs. FREQUENCY
(IN-B - OUT2)

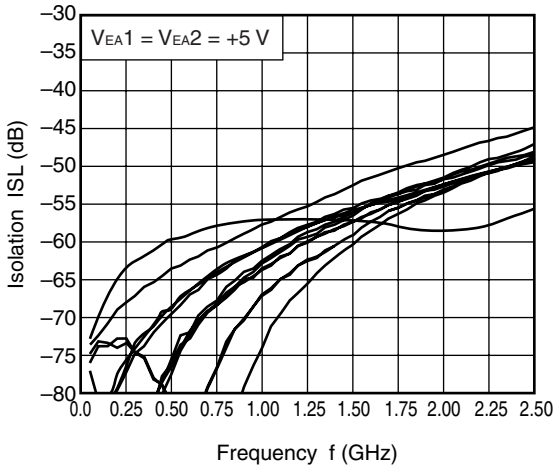



**Remark** The graphs indicate nominal characteristics.

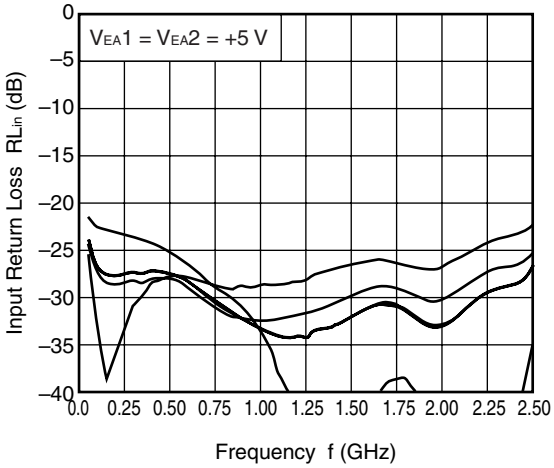
ISOLATION vs. FREQUENCY
(IN-C - OUT2)



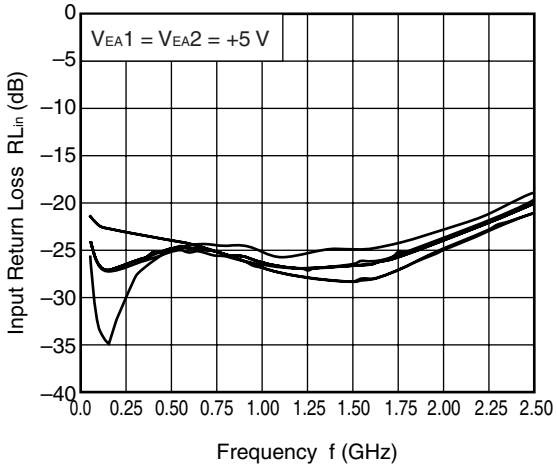

ISOLATION vs. FREQUENCY
(IN-D - OUT2)



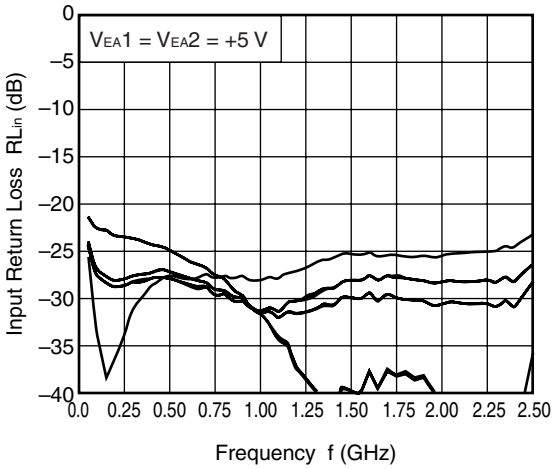

INPUT RETURN LOSS vs. FREQUENCY
(IN-A - OUT1)



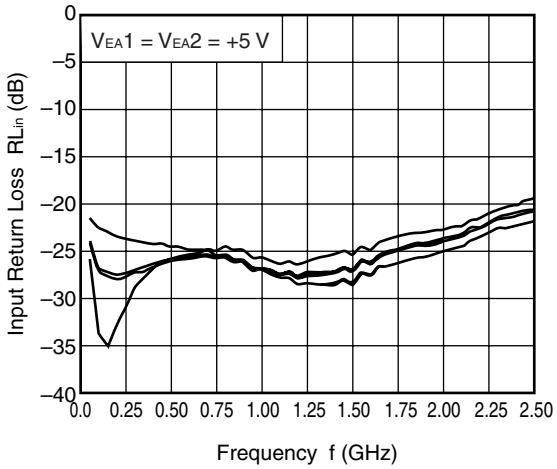

INPUT RETURN LOSS vs. FREQUENCY
(IN-B - OUT1)




INPUT RETURN LOSS vs. FREQUENCY
(IN-C - OUT1)

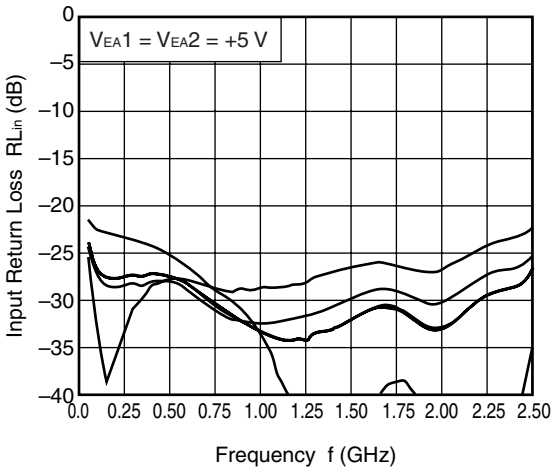



INPUT RETURN LOSS vs. FREQUENCY
(IN-D - OUT1)

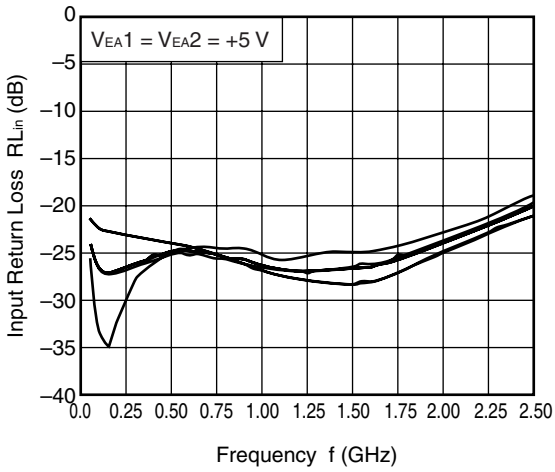



**Remark** The graphs indicate nominal characteristics.

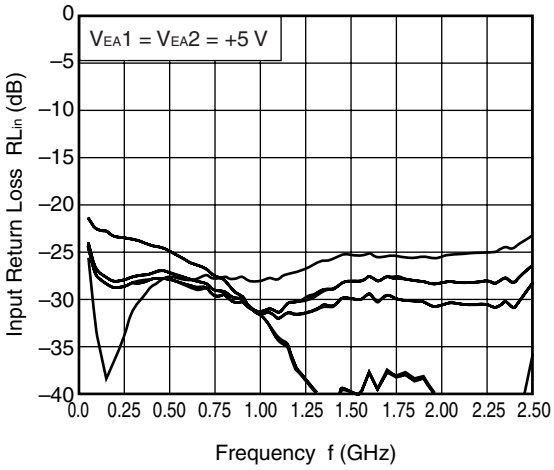
INPUT RETURN LOSS vs. FREQUENCY
(IN-A - OUT2)



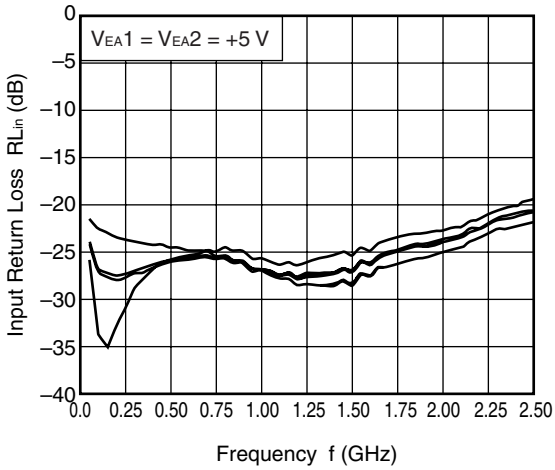

INPUT RETURN LOSS vs. FREQUENCY
(IN-B - OUT2)



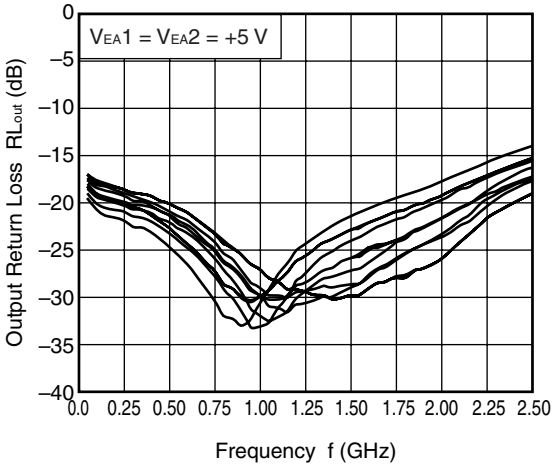

INPUT RETURN LOSS vs. FREQUENCY
(IN-C - OUT2)



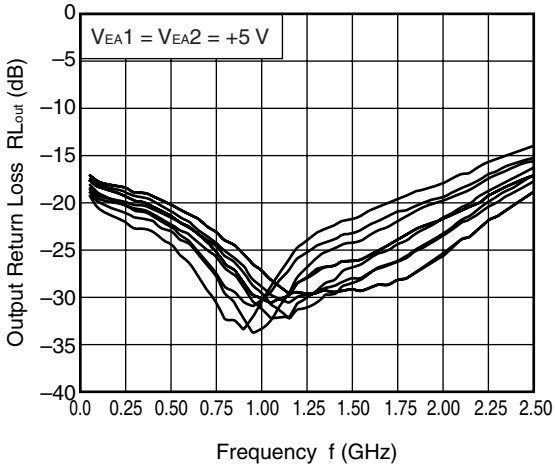

INPUT RETURN LOSS vs. FREQUENCY
(IN-D - OUT2)




OUTPUT RETURN LOSS vs. FREQUENCY
(IN-A - OUT1)

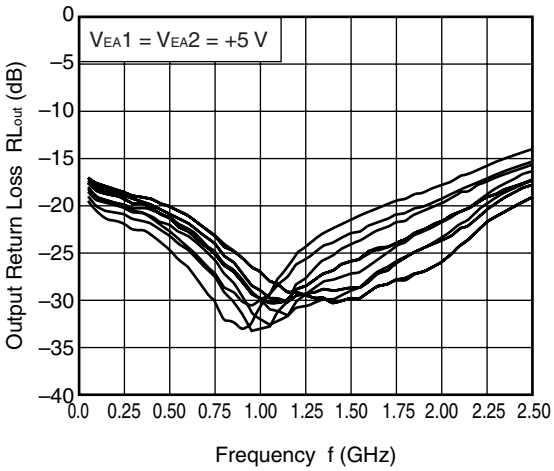



OUTPUT RETURN LOSS vs. FREQUENCY
(IN-B - OUT1)

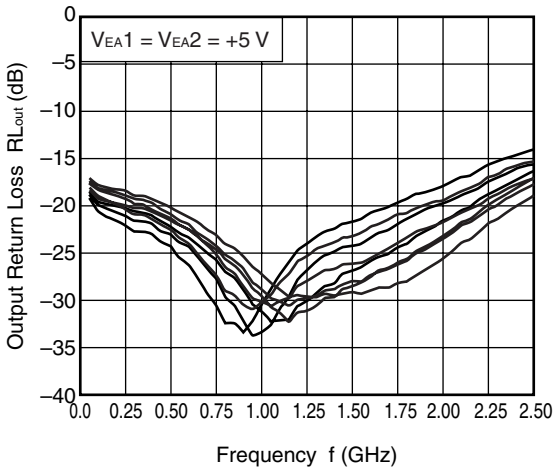



**Remark** The graphs indicate nominal characteristics.

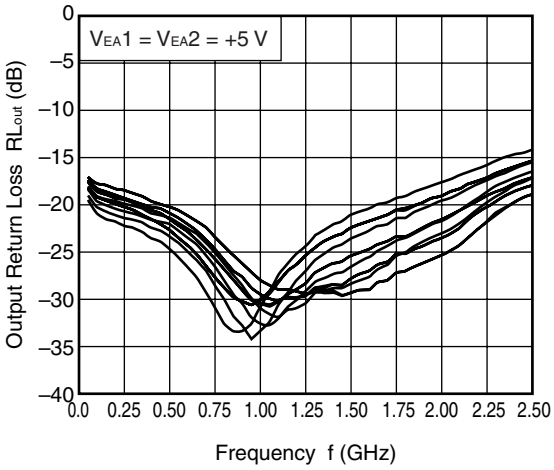
OUTPUT RETURN LOSS vs. FREQUENCY
(IN-C - OUT1)



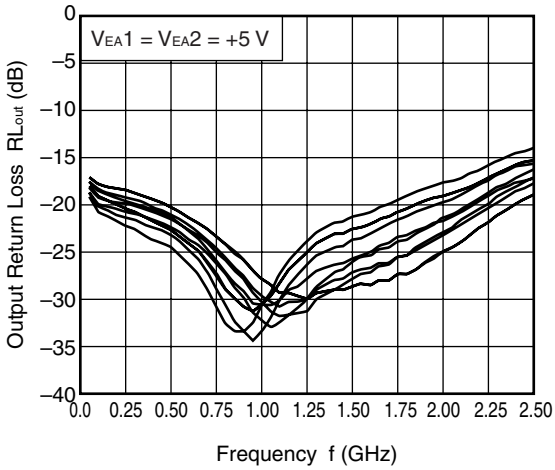

OUTPUT RETURN LOSS vs. FREQUENCY
(IN-D - OUT1)



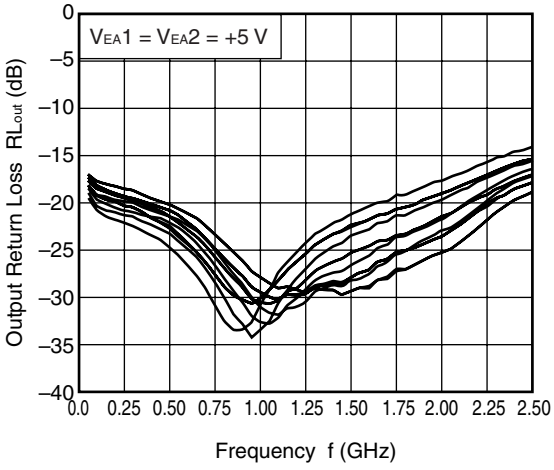

OUTPUT RETURN LOSS vs. FREQUENCY
(IN-A - OUT2)



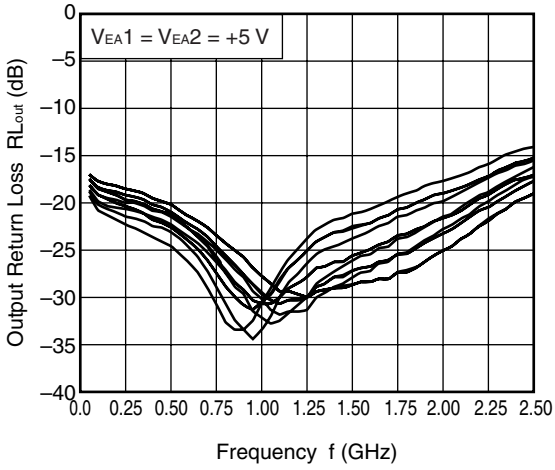

OUTPUT RETURN LOSS vs. FREQUENCY
(IN-B - OUT2)




OUTPUT RETURN LOSS vs. FREQUENCY
(IN-C - OUT2)



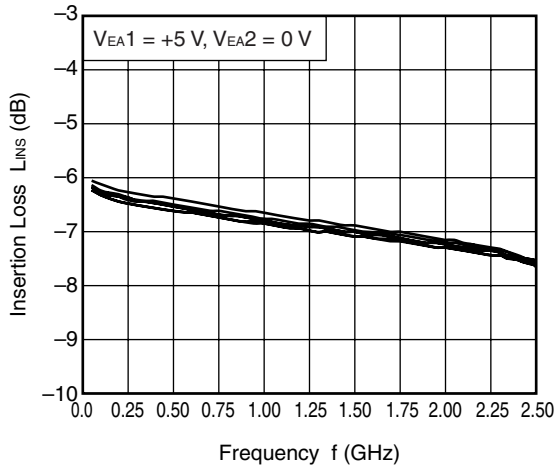

OUTPUT RETURN LOSS vs. FREQUENCY
(IN-D - OUT2)



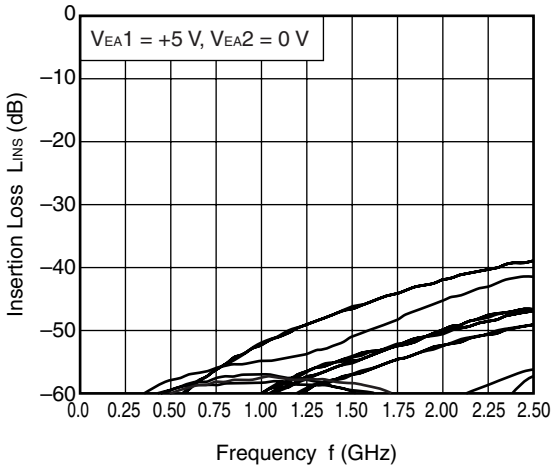

**Remark** The graphs indicate nominal characteristics.

**TYPICAL CHARACTERISTICS ($T_A$ = +25°C, $V_{DD}$ = +5.0 V, $V_{CONT}$ = +5.0 V/0 V, $V_{EA}1$ = +5.0 V, $V_{EA}2$ = 0 V (OUT2 disabled), $P_{in}$ = 0 dBm, $Z_O$ = 50 Ω for each port, unless otherwise specified)**

INSERTION LOSS vs. FREQUENCY
(IN-x - OUT1)

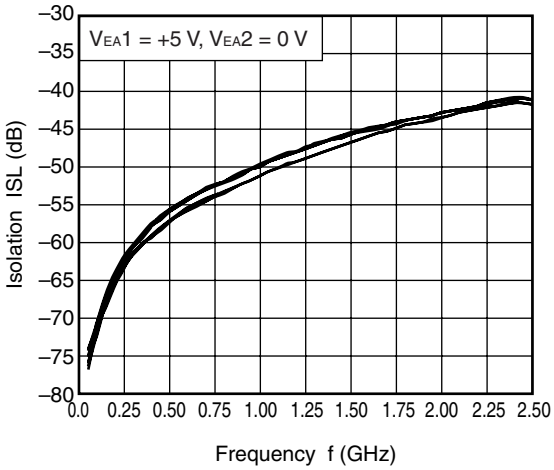



INSERTION LOSS vs. FREQUENCY
(IN-x - OUT2)

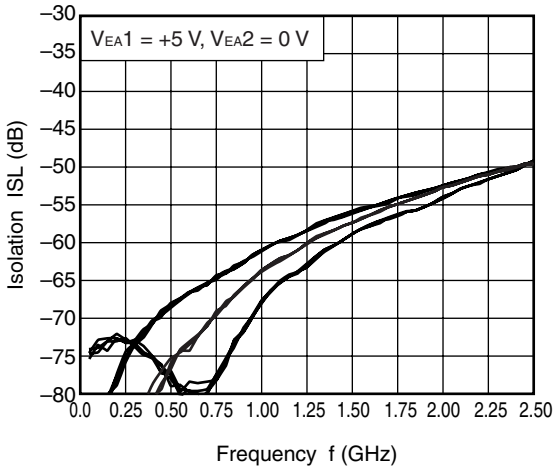



**Remark** The graphs indicate nominal characteristics.

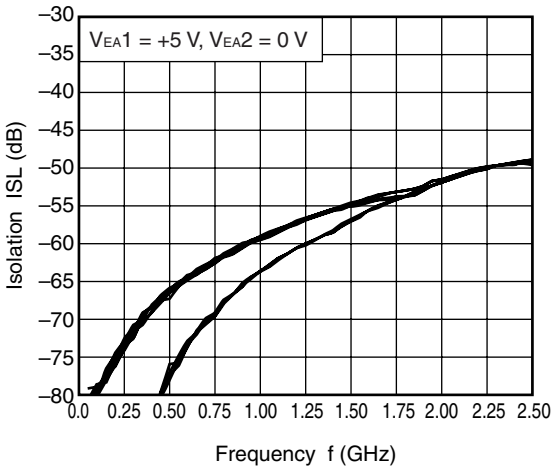
ISOLATION vs. FREQUENCY
(IN-A - OUT1)



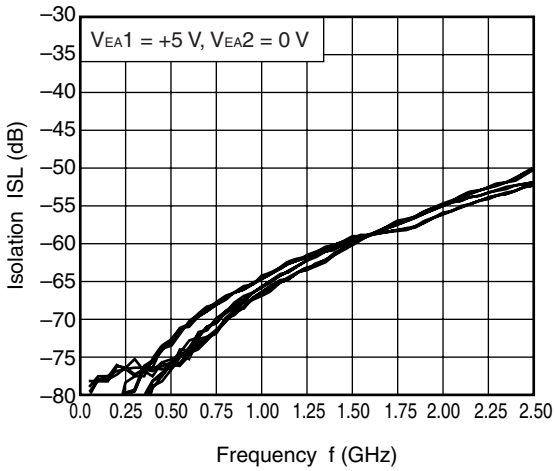

ISOLATION vs. FREQUENCY
(IN-B - OUT1)



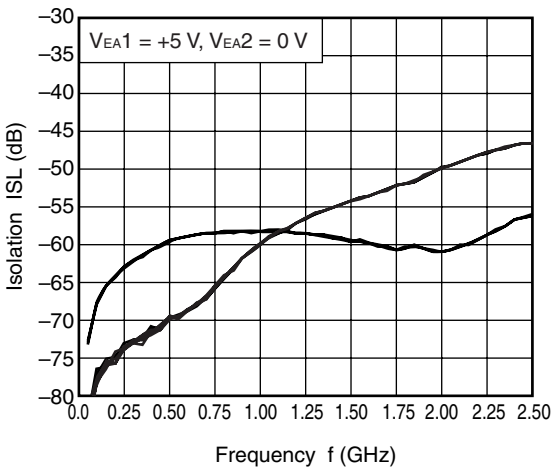

ISOLATION vs. FREQUENCY
(IN-C - OUT1)



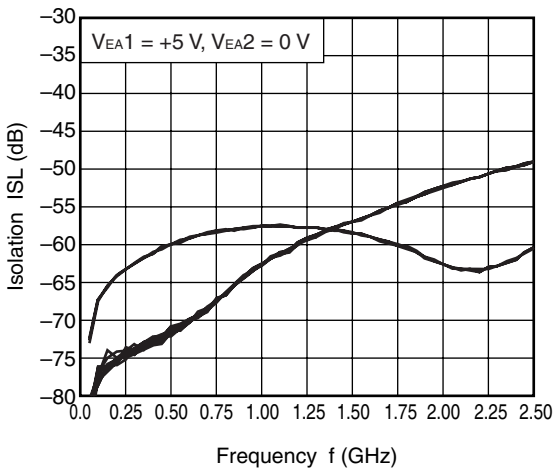

ISOLATION vs. FREQUENCY
(IN-D - OUT1)




ISOLATION vs. FREQUENCY
(IN-A - OUT2)

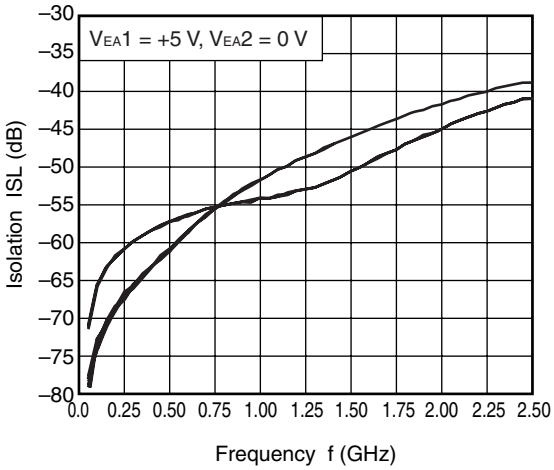



ISOLATION vs. FREQUENCY
(IN-B - OUT2)

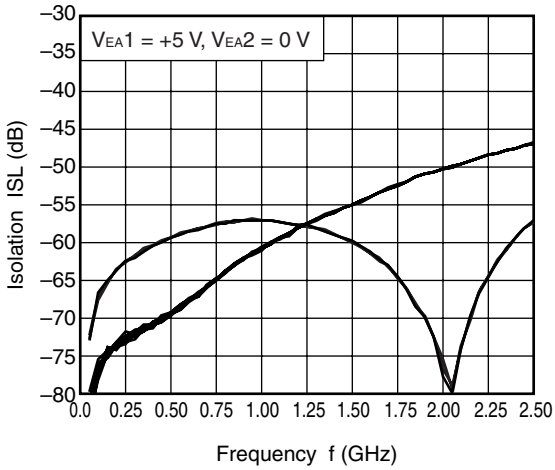



**Remark** The graphs indicate nominal characteristics.

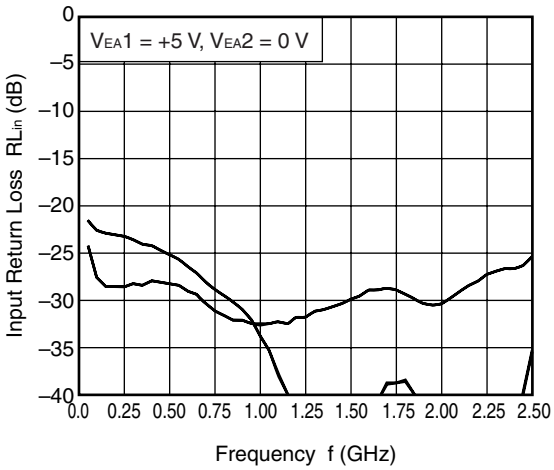
ISOLATION vs. FREQUENCY
(IN-C - OUT2)



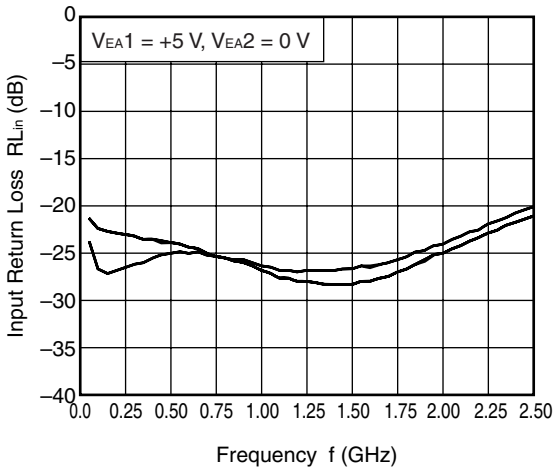

ISOLATION vs. FREQUENCY
(IN-D - OUT2)



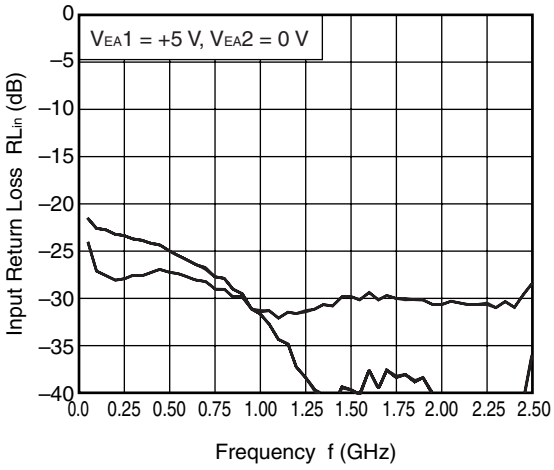

INPUT RETURN LOSS vs. FREQUENCY
(IN-A - OUT1)



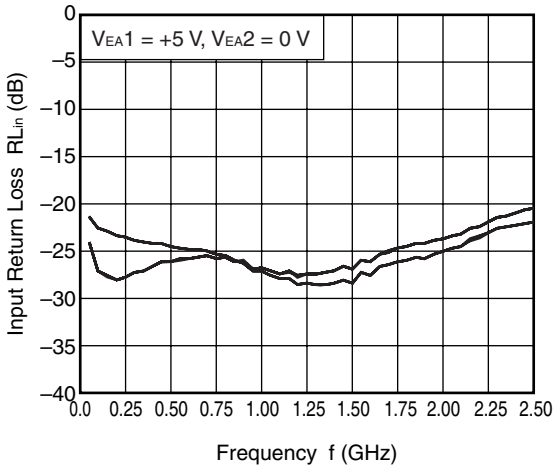

INPUT RETURN LOSS vs. FREQUENCY
(IN-B - OUT1)




INPUT RETURN LOSS vs. FREQUENCY
(IN-C - OUT1)

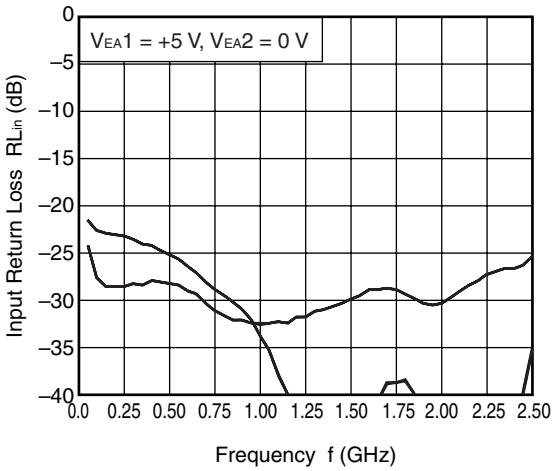



INPUT RETURN LOSS vs. FREQUENCY
(IN-D - OUT1)

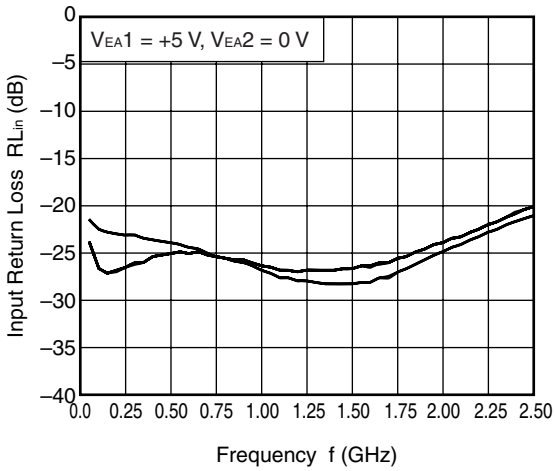



**Remark** The graphs indicate nominal characteristics.

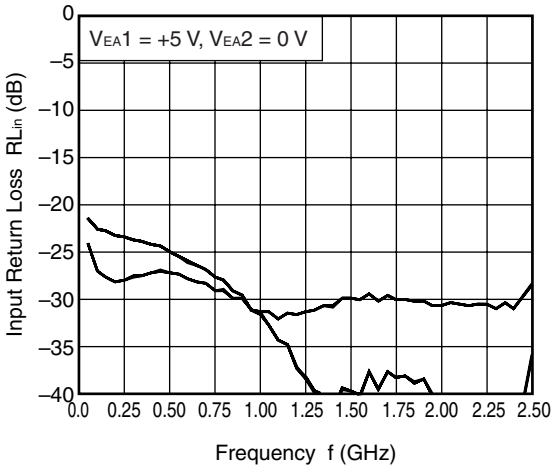
INPUT RETURN LOSS vs. FREQUENCY
(IN-A - OUT2)



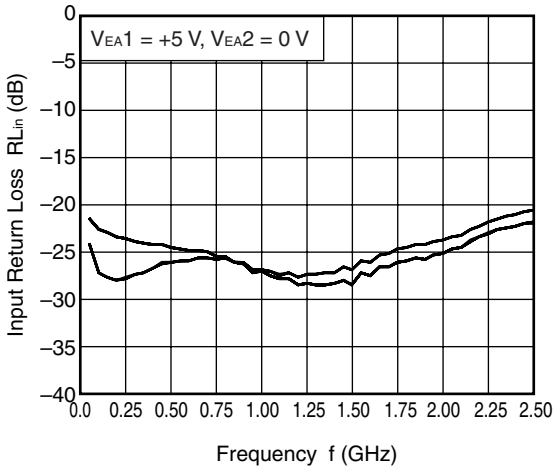

INPUT RETURN LOSS vs. FREQUENCY
(IN-B - OUT2)



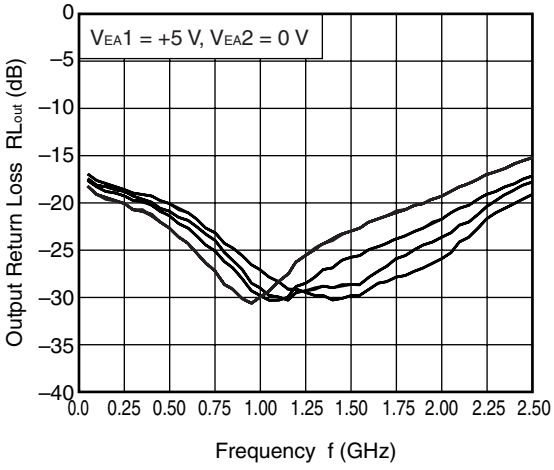

INPUT RETURN LOSS vs. FREQUENCY
(IN-C - OUT2)



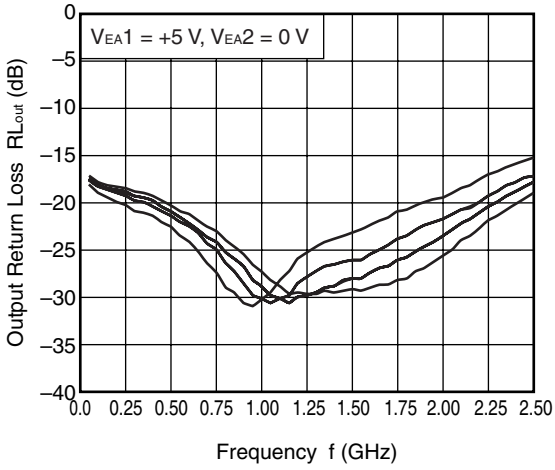

INPUT RETURN LOSS vs. FREQUENCY
(IN-D - OUT2)




OUTPUT RETURN LOSS vs. FREQUENCY
(IN-A - OUT1)

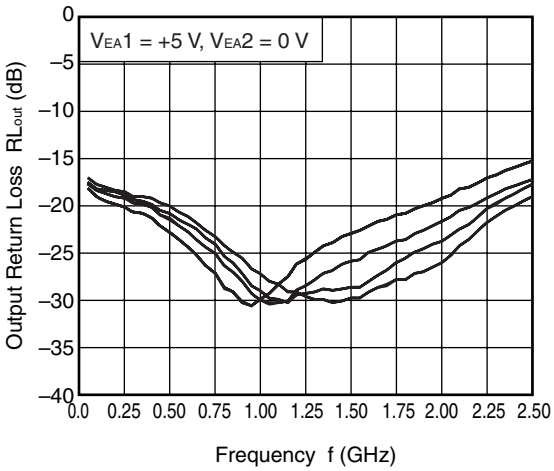



OUTPUT RETURN LOSS vs. FREQUENCY
(IN-B - OUT1)

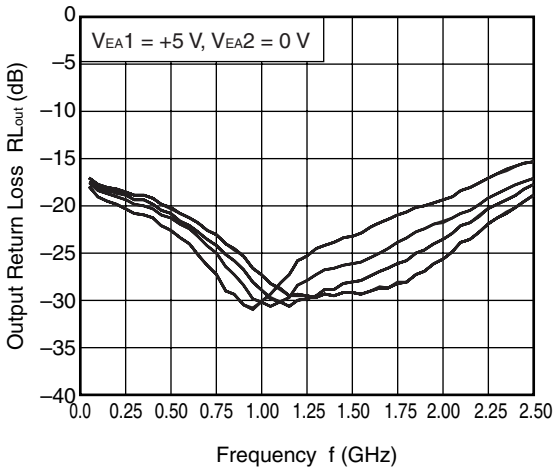



**Remark** The graphs indicate nominal characteristics.

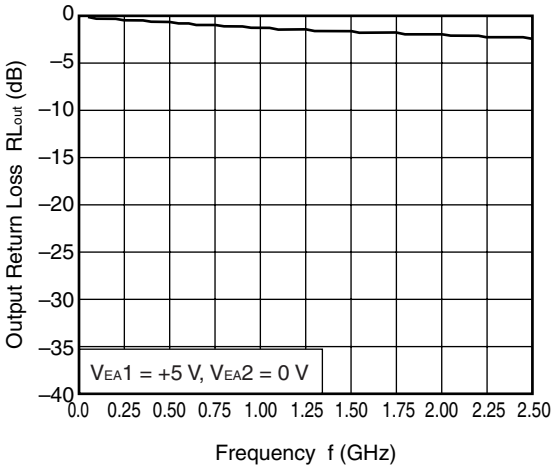
OUTPUT RETURN LOSS vs. FREQUENCY
(IN-C - OUT1)



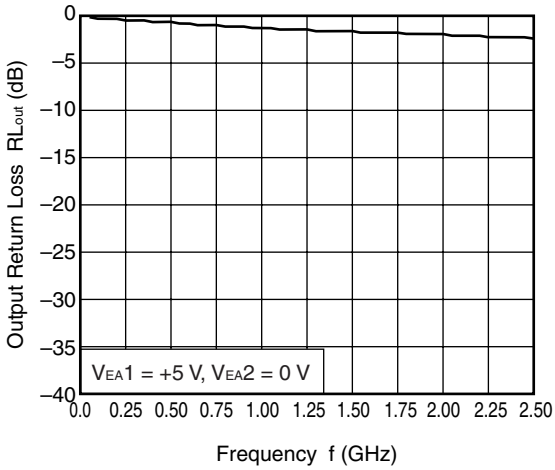

OUTPUT RETURN LOSS vs. FREQUENCY
(IN-D - OUT1)



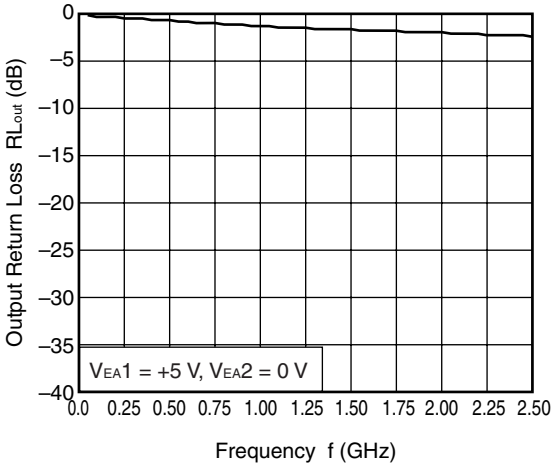

OUTPUT RETURN LOSS vs. FREQUENCY
(IN-A - OUT2)



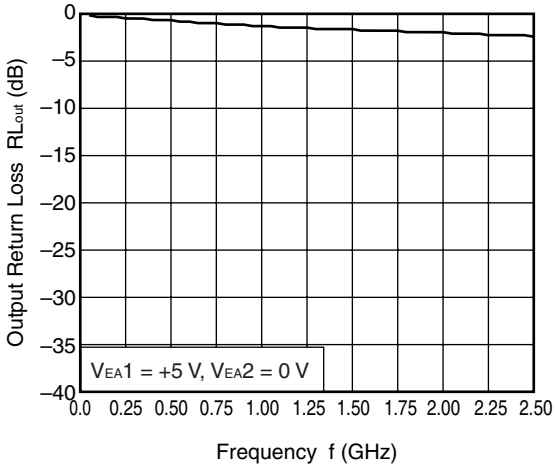

OUTPUT RETURN LOSS vs. FREQUENCY
(IN-B - OUT2)




OUTPUT RETURN LOSS vs. FREQUENCY
(IN-C - OUT2)



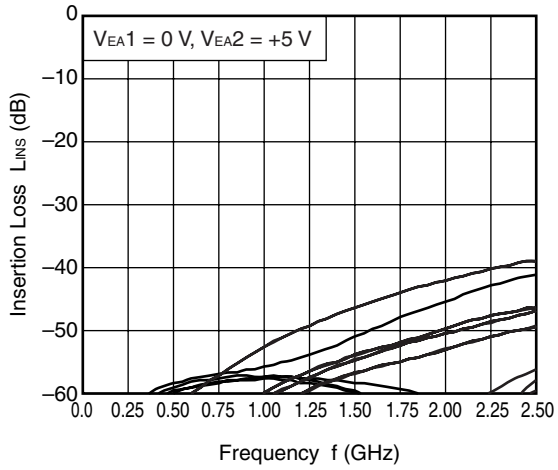

OUTPUT RETURN LOSS vs. FREQUENCY
(IN-D - OUT2)



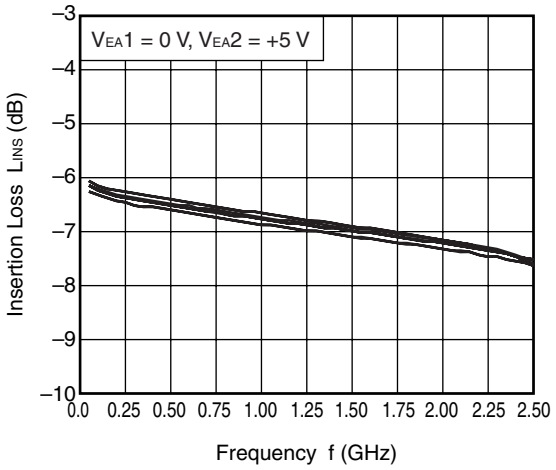

**Remark** The graphs indicate nominal characteristics.

**TYPICAL CHARACTERISTICS ($T_A$ = +25°C, $V_{DD}$ = +5.0 V, $V_{CONT}$ = +5.0 V/0 V, $V_{EA}1$ = 0 V (OUT1 disabled), $V_{EA}2$ = +5.0 V, $P_{in}$ = 0 dBm, $Z_O$ = 50 Ω for each port, unless otherwise specified)**

INSERTION LOSS vs. FREQUENCY
(IN-x - OUT1)

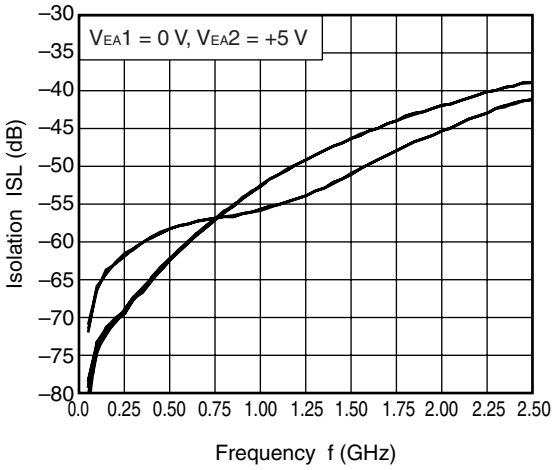



INSERTION LOSS vs. FREQUENCY
(IN-x - OUT2)

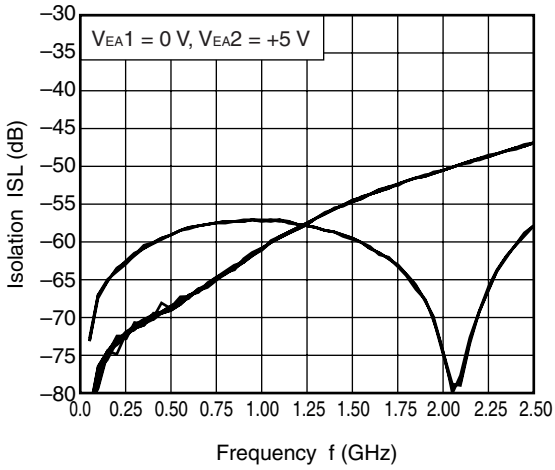



**Remark** The graphs indicate nominal characteristics.

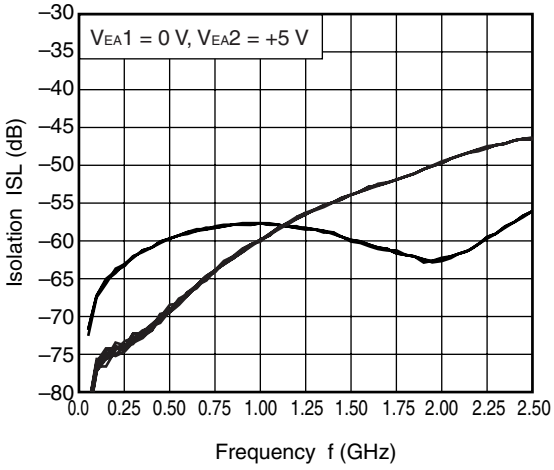
ISOLATION vs. FREQUENCY
(IN-A - OUT1)



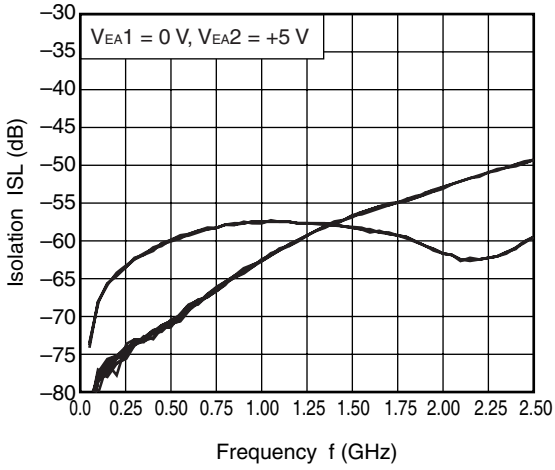

ISOLATION vs. FREQUENCY
(IN-B - OUT1)



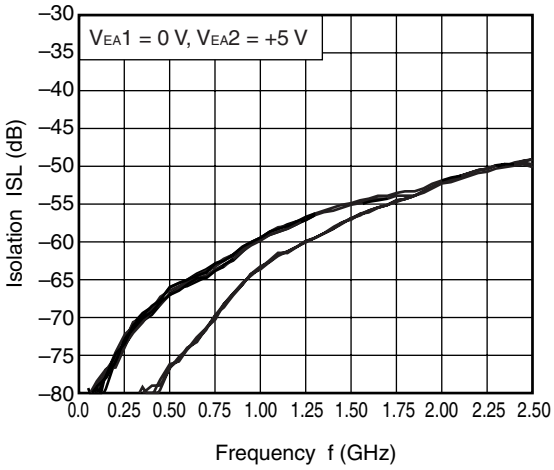

ISOLATION vs. FREQUENCY
(IN-C - OUT1)



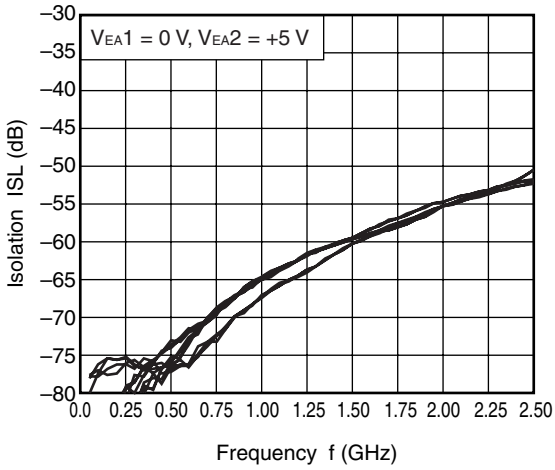

ISOLATION vs. FREQUENCY
(IN-D - OUT1)




ISOLATION vs. FREQUENCY
(IN-A - OUT2)

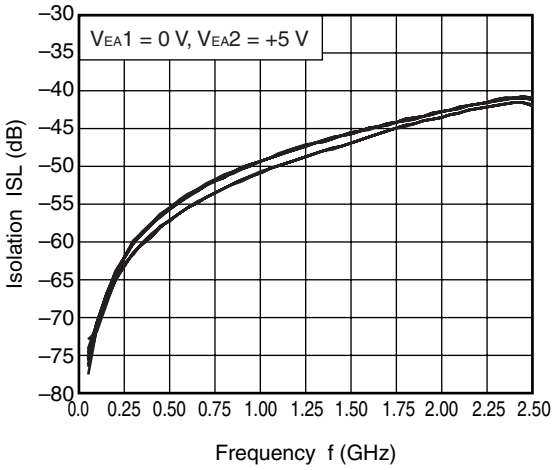



ISOLATION vs. FREQUENCY
(IN-B - OUT2)

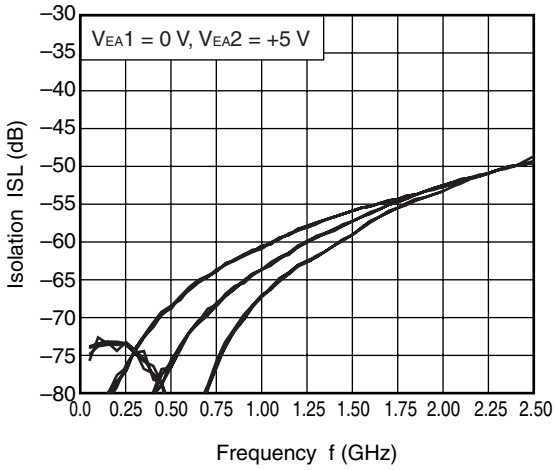



**Remark** The graphs indicate nominal characteristics.

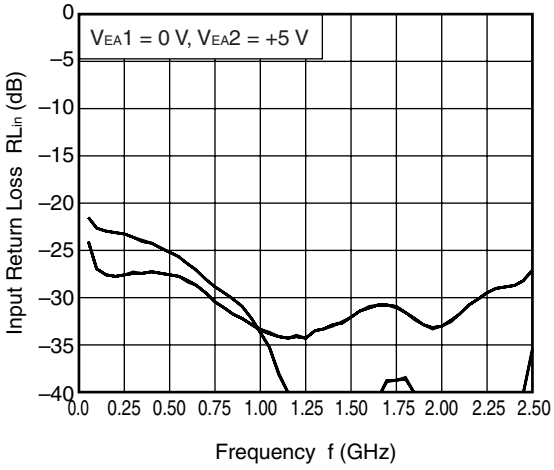
ISOLATION vs. FREQUENCY
(IN-C - OUT2)



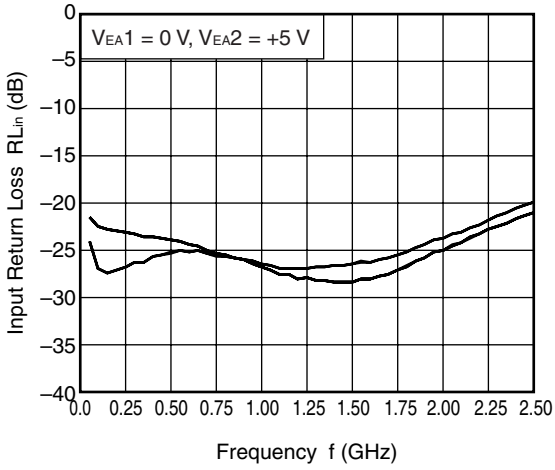

ISOLATION vs. FREQUENCY
(IN-D - OUT2)



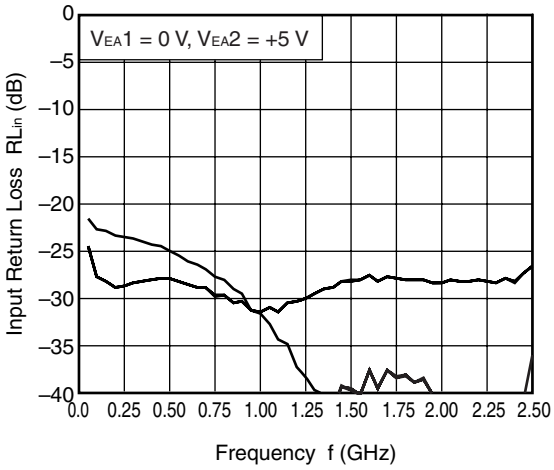

INPUT RETURN LOSS vs. FREQUENCY
(IN-A - OUT1)



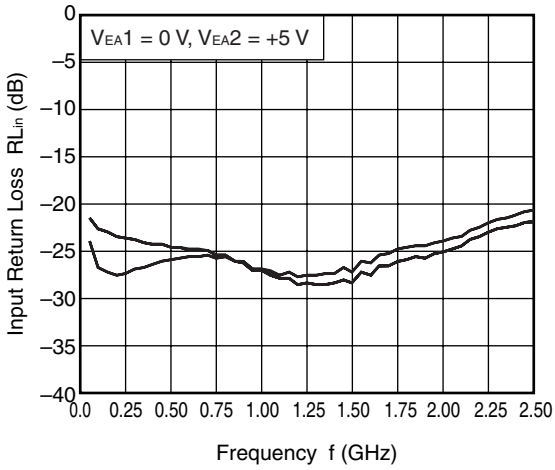

INPUT RETURN LOSS vs. FREQUENCY
(IN-B - OUT1)




INPUT RETURN LOSS vs. FREQUENCY
(IN-C - OUT1)

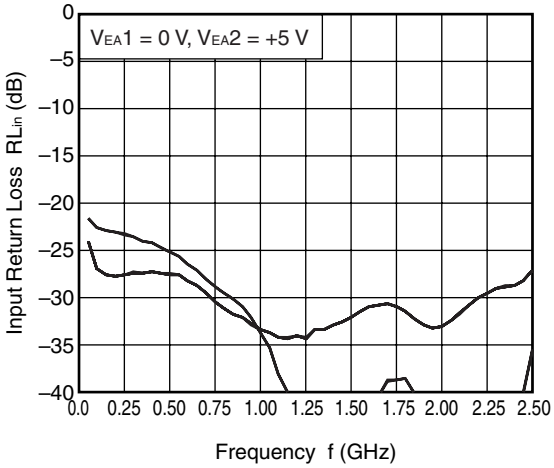



INPUT RETURN LOSS vs. FREQUENCY
(IN-D - OUT1)

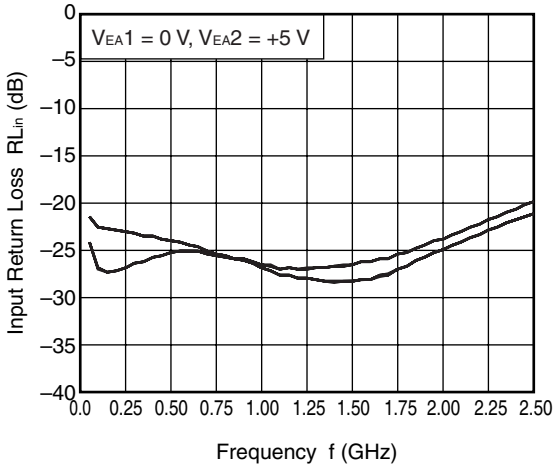



**Remark** The graphs indicate nominal characteristics.

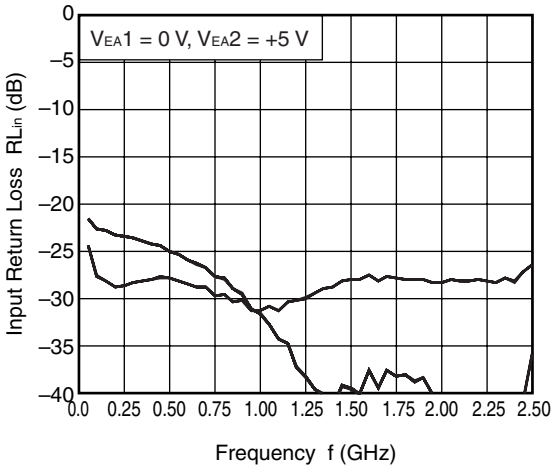
INPUT RETURN LOSS vs. FREQUENCY
(IN-A - OUT2)



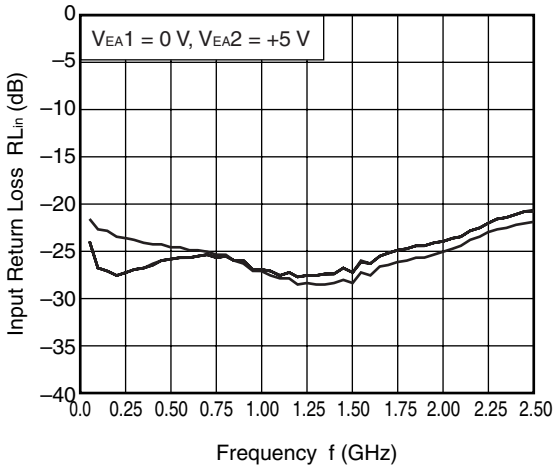

INPUT RETURN LOSS vs. FREQUENCY
(IN-B - OUT2)



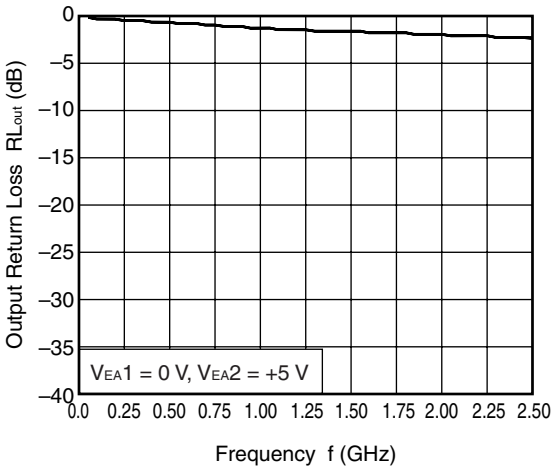

INPUT RETURN LOSS vs. FREQUENCY
(IN-C - OUT2)



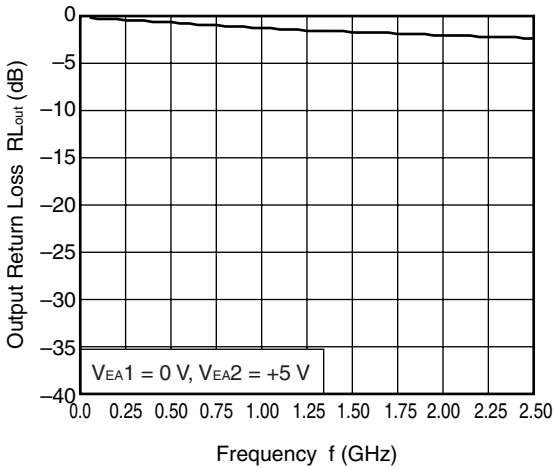

INPUT RETURN LOSS vs. FREQUENCY
(IN-D - OUT2)




OUTPUT RETURN LOSS vs. FREQUENCY
(IN-A - OUT1)

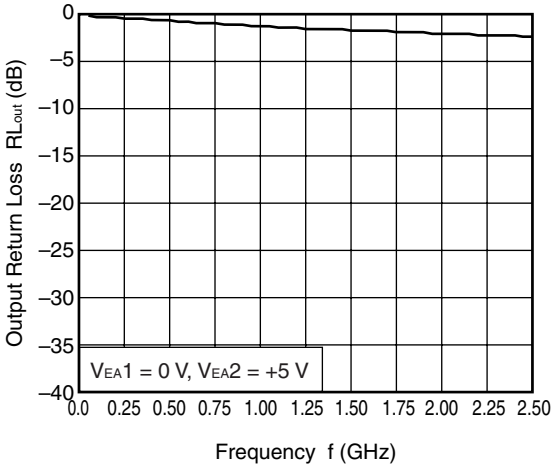



OUTPUT RETURN LOSS vs. FREQUENCY
(IN-B - OUT1)

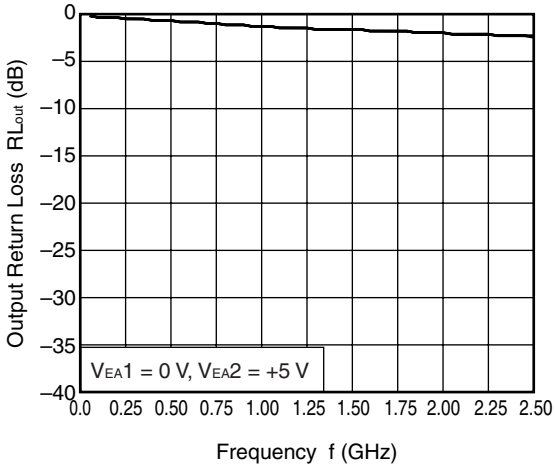



**Remark** The graphs indicate nominal characteristics.

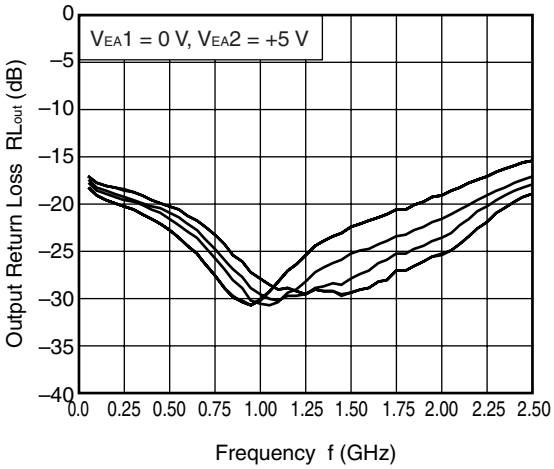
OUTPUT RETURN LOSS vs. FREQUENCY
(IN-C - OUT1)



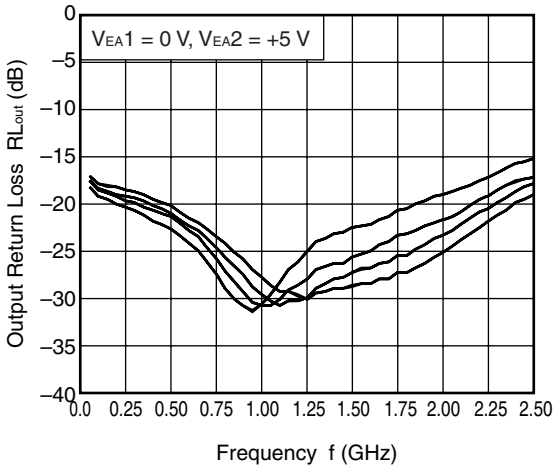

OUTPUT RETURN LOSS vs. FREQUENCY
(IN-D - OUT1)



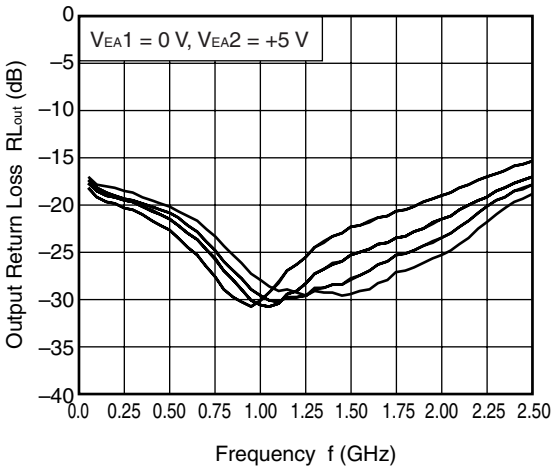

OUTPUT RETURN LOSS vs. FREQUENCY
(IN-A - OUT2)



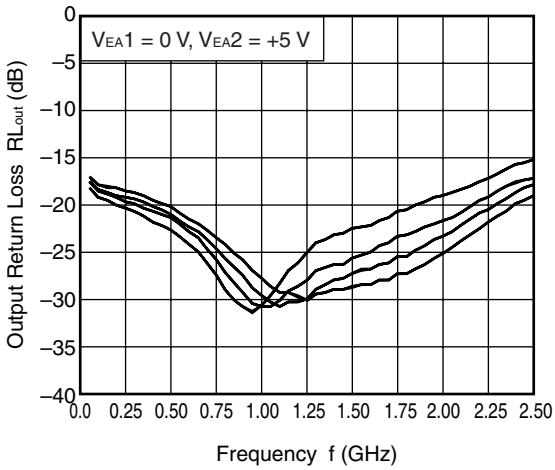

OUTPUT RETURN LOSS vs. FREQUENCY
(IN-B - OUT2)




OUTPUT RETURN LOSS vs. FREQUENCY
(IN-C - OUT2)



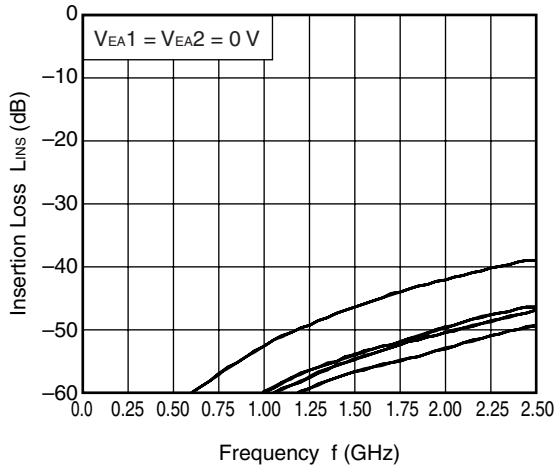

OUTPUT RETURN LOSS vs. FREQUENCY
(IN-D - OUT2)



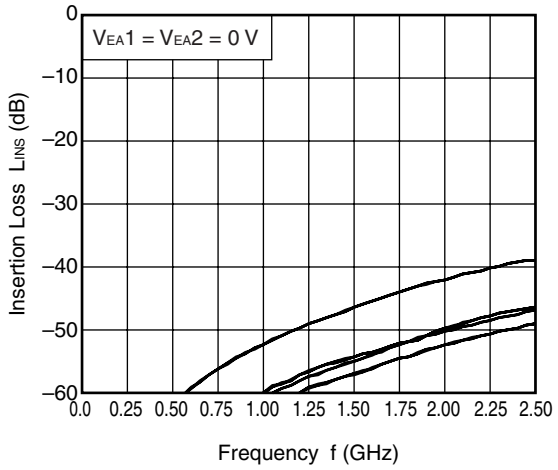

**Remark** The graphs indicate nominal characteristics.

**TYPICAL CHARACTERISTICS ($T_A$ = +25°C, $V_{DD}$ = +5.0 V, $V_{CONT}$ = +5.0 V/0 V, $V_{EA}1$ = $V_{EA}2$ = 0 V (both OUTs enabled), $P_{in}$ = 0 dBm, $Z_O$ = 50 Ω for each port, unless otherwise specified)**

INSERTION LOSS vs. FREQUENCY
(IN-x - OUT1)

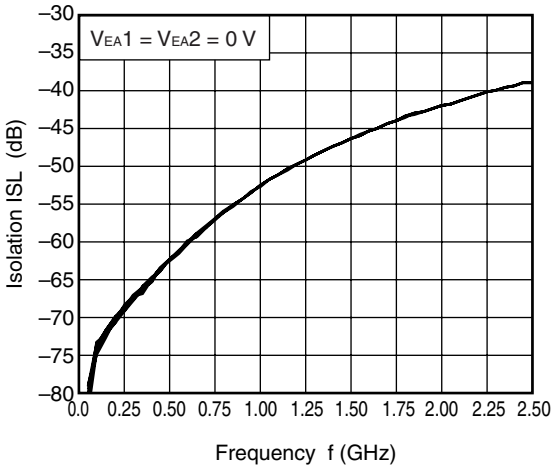



INSERTION LOSS vs. FREQUENCY
(IN-x - OUT2)

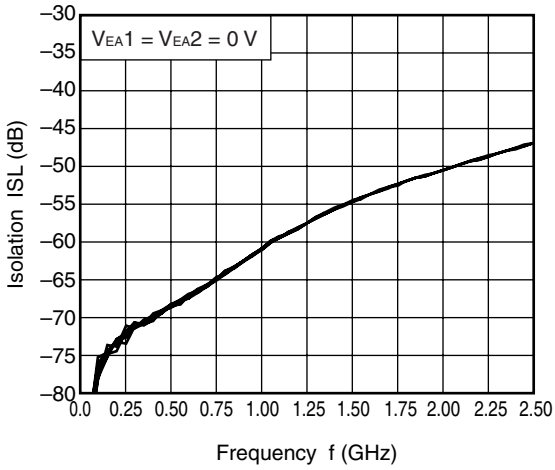



**Remark** The graphs indicate nominal characteristics.

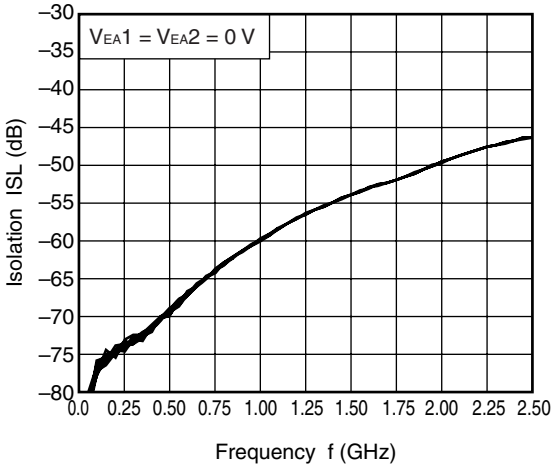
ISOLATION vs. FREQUENCY
(IN-A - OUT1)



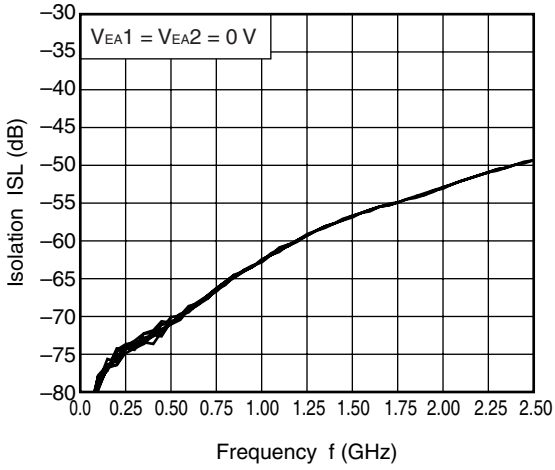

ISOLATION vs. FREQUENCY
(IN-B - OUT1)



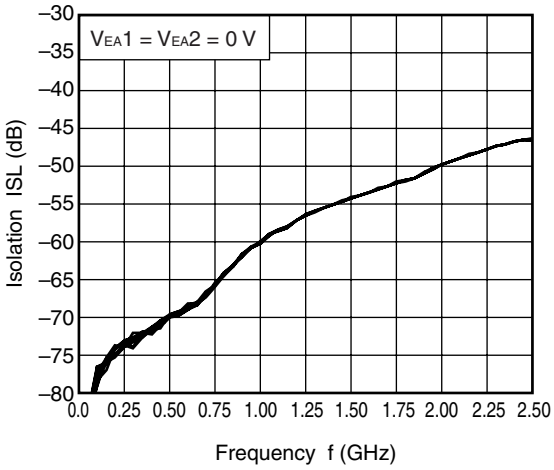

ISOLATION vs. FREQUENCY
(IN-C - OUT1)



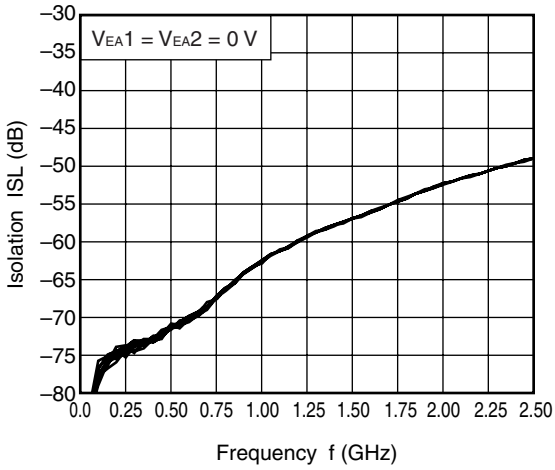

ISOLATION vs. FREQUENCY
(IN-D - OUT1)




ISOLATION vs. FREQUENCY
(IN-A - OUT2)

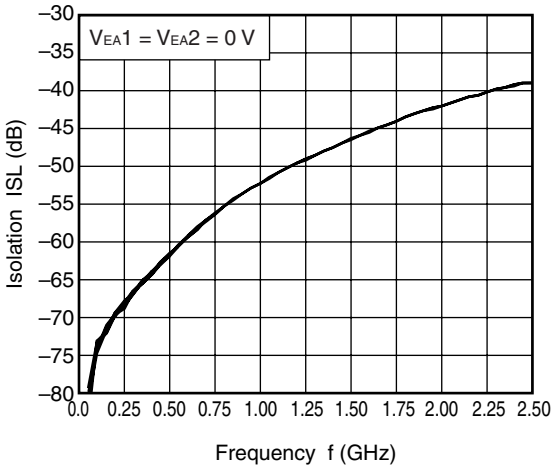



ISOLATION vs. FREQUENCY
(IN-B - OUT2)

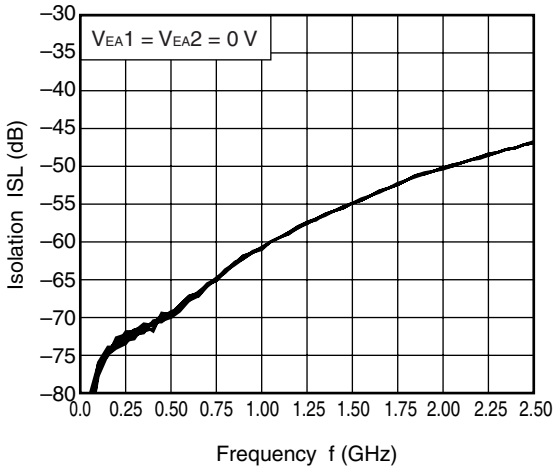



**Remark** The graphs indicate nominal characteristics.

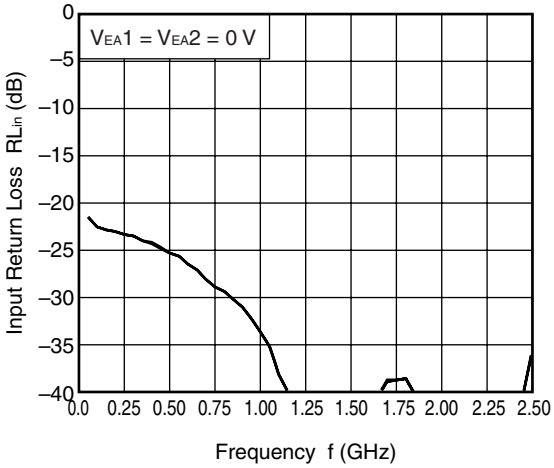
ISOLATION vs. FREQUENCY
(IN-C - OUT2)



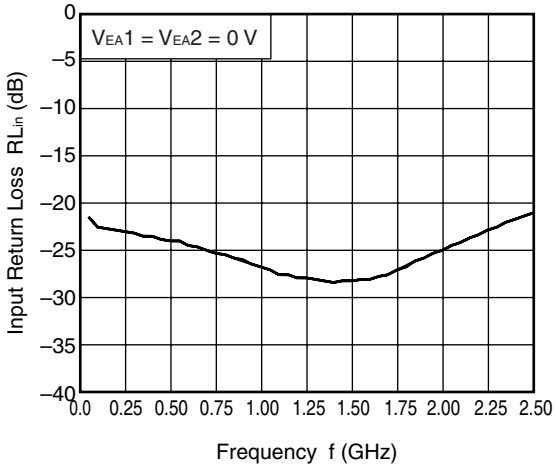

ISOLATION vs. FREQUENCY
(IN-D - OUT2)



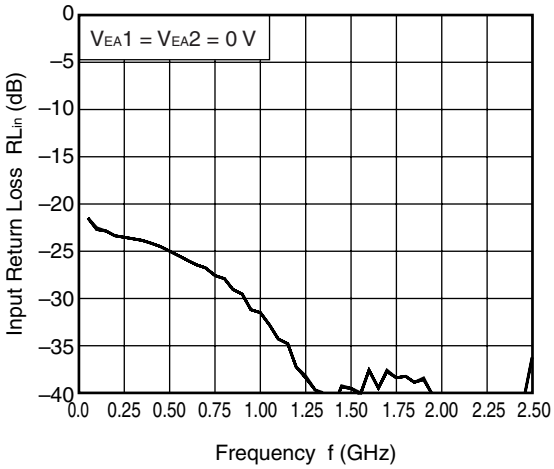

INPUT RETURN LOSS vs. FREQUENCY
(IN-A - OUT1)



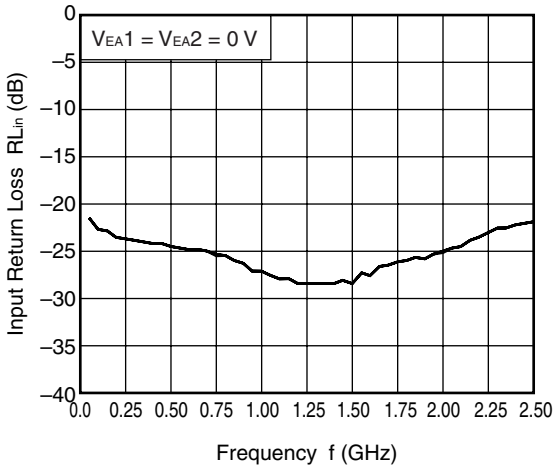

INPUT RETURN LOSS vs. FREQUENCY
(IN-B - OUT1)




INPUT RETURN LOSS vs. FREQUENCY
(IN-C - OUT1)

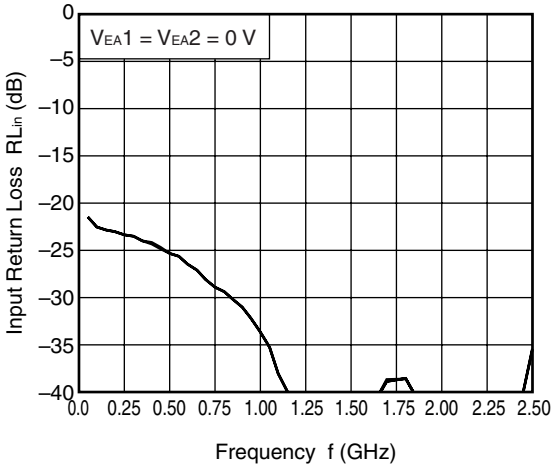



INPUT RETURN LOSS vs. FREQUENCY
(IN-D - OUT1)

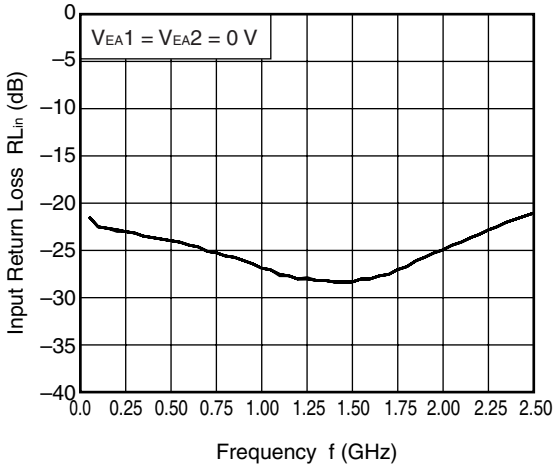



**Remark** The graphs indicate nominal characteristics.

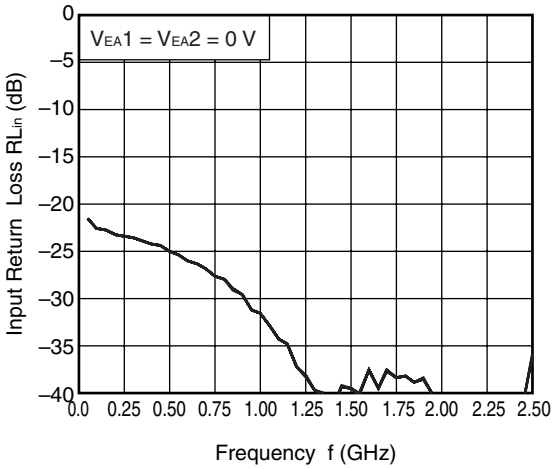
INPUT RETURN LOSS vs. FREQUENCY
(IN-A - OUT2)



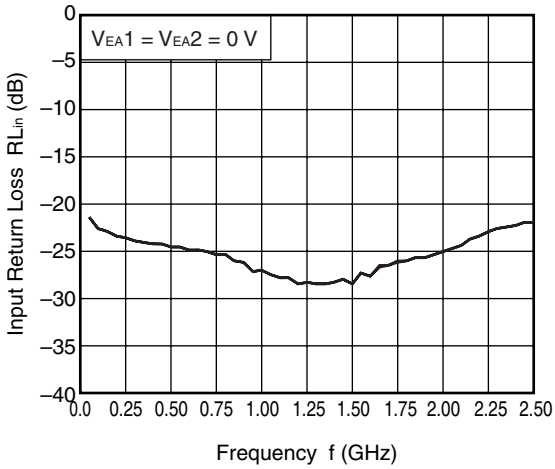

INPUT RETURN LOSS vs. FREQUENCY
(IN-B - OUT2)



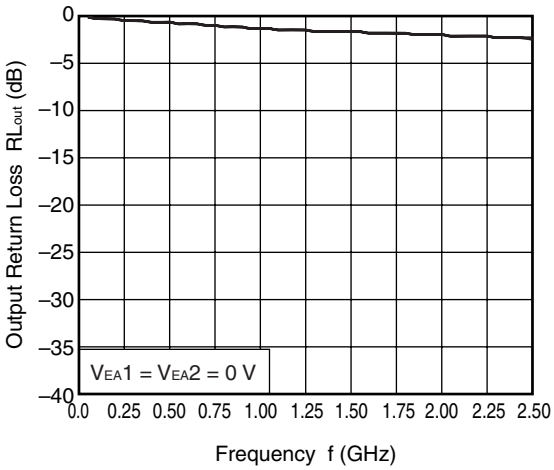

INPUT RETURN LOSS vs. FREQUENCY
(IN-C - OUT2)



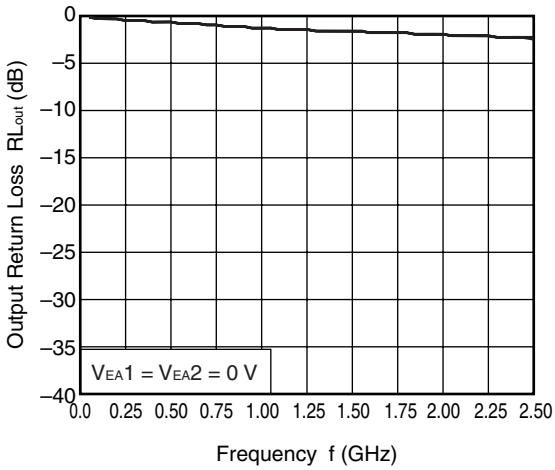

INPUT RETURN LOSS vs. FREQUENCY
(IN-D - OUT2)




OUTPUT RETURN LOSS vs. FREQUENCY
(IN-A - OUT1)

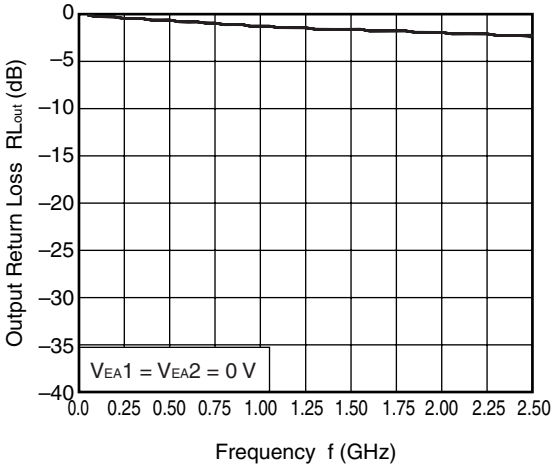



OUTPUT RETURN LOSS vs. FREQUENCY
(IN-B - OUT1)

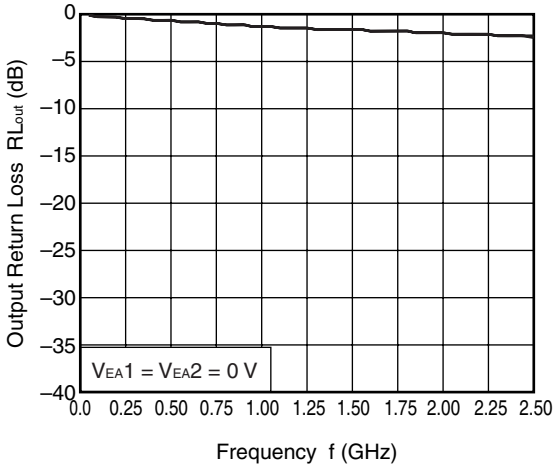



**Remark** The graphs indicate nominal characteristics.

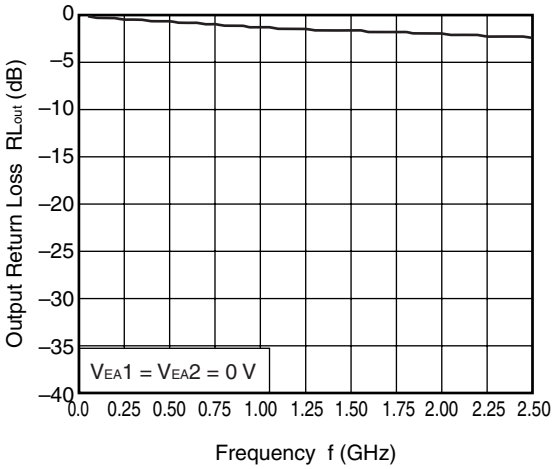
OUTPUT RETURN LOSS vs. FREQUENCY
(IN-C - OUT1)



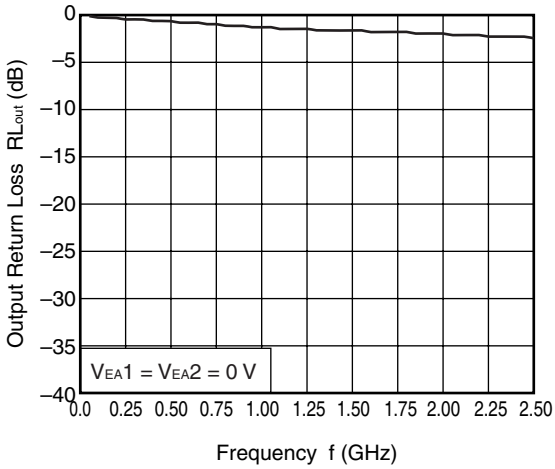

OUTPUT RETURN LOSS vs. FREQUENCY
(IN-D - OUT1)



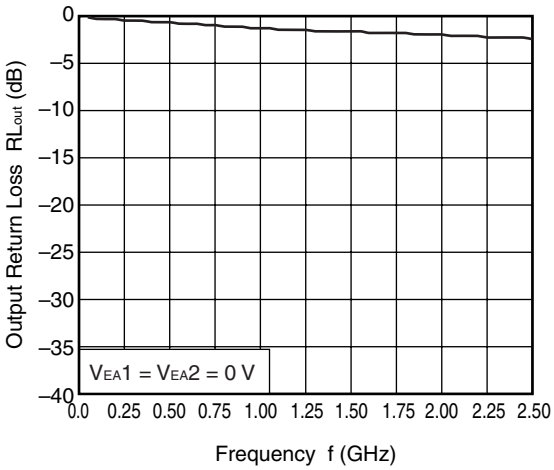

OUTPUT RETURN LOSS vs. FREQUENCY
(IN-A - OUT2)



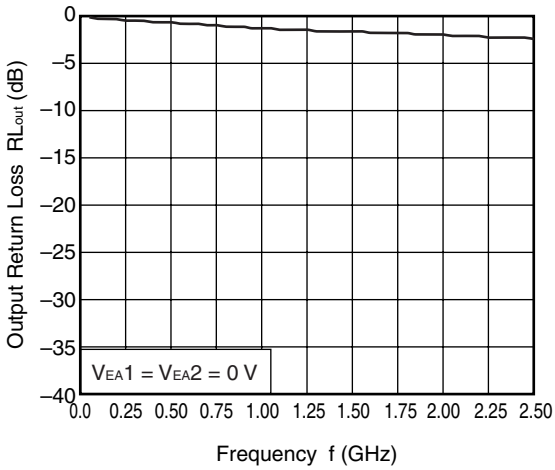

OUTPUT RETURN LOSS vs. FREQUENCY
(IN-B - OUT2)




OUTPUT RETURN LOSS vs. FREQUENCY
(IN-C - OUT2)



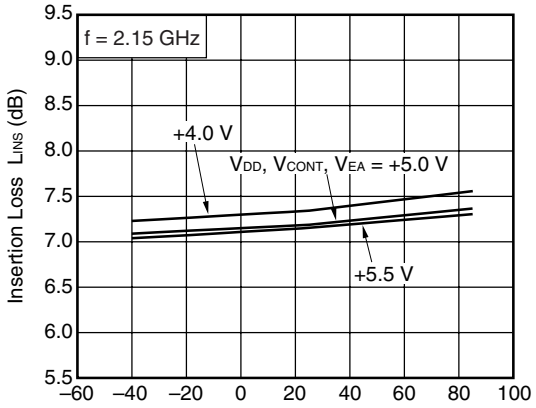

OUTPUT RETURN LOSS vs. FREQUENCY
(IN-D - OUT2)



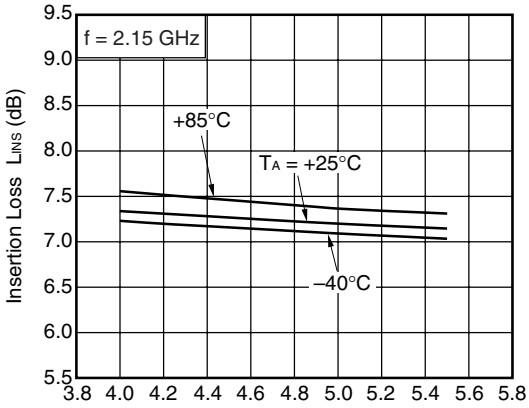

**Remark** The graphs indicate nominal characteristics.

**TYPICAL CHARACTERISTICS ($T_A$ = +25°C, $V_{DD}$ = +5.0 V, $V_{CONT}$ = +5.0 V/0 V, $V_{EA}1$ = $V_{EA}2$ = +5.0 V (both OUTs enabled), $P_{in}$ = 0 dBm, $Z_O$ = 50 Ω for each port, unless otherwise specified)**

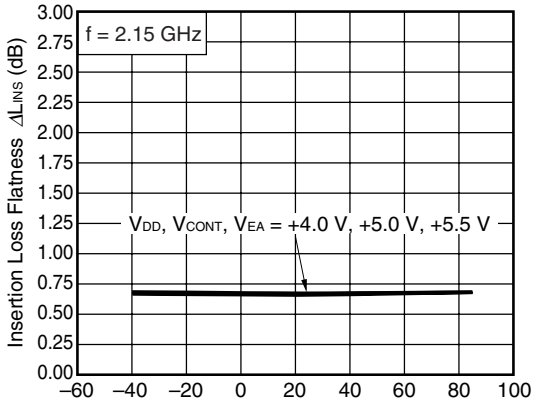
INSERTION LOSS vs. OPERATING AMBIENT TEMPERATURE



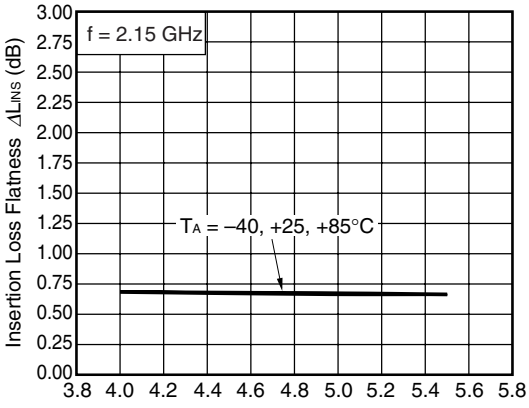

INSERTION LOSS vs. $V_{DD}$, $V_{CONT}$, $V_{EA}$



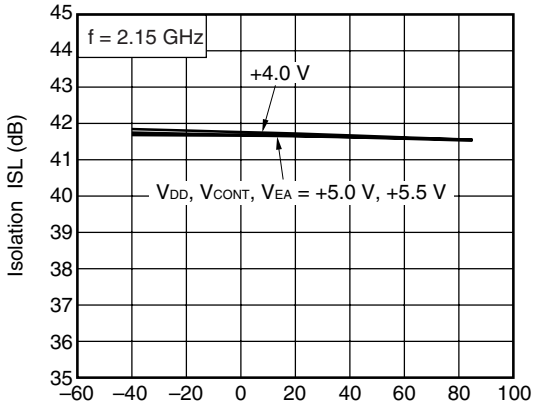

INSERTION LOSS FLATNESS vs. OPERATING AMBIENT TEMPERATURE



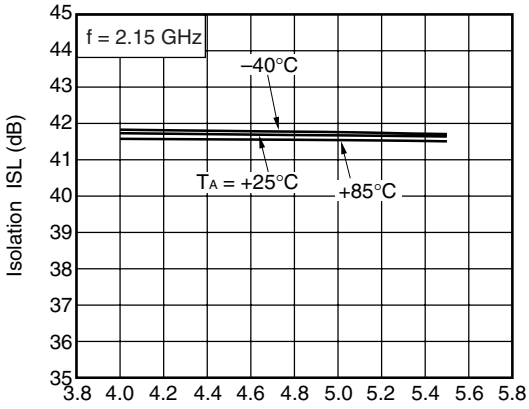

INSERTION LOSS FLATNESS vs. $V_{DD}$, $V_{CONT}$, $V_{EA}$




ISOLATION vs. OPERATING AMBIENT TEMPERATURE

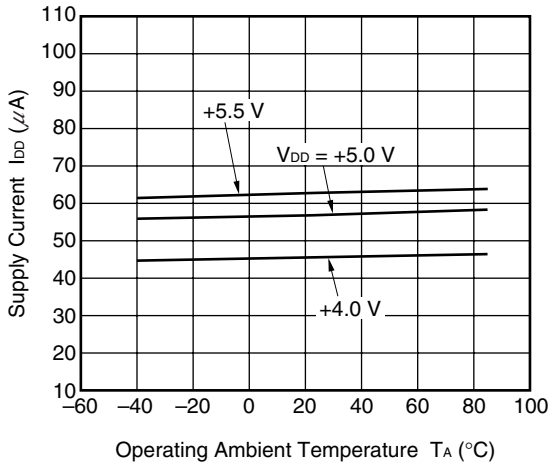



ISOLATION vs. $V_{DD}$, $V_{CONT}$, $V_{EA}$

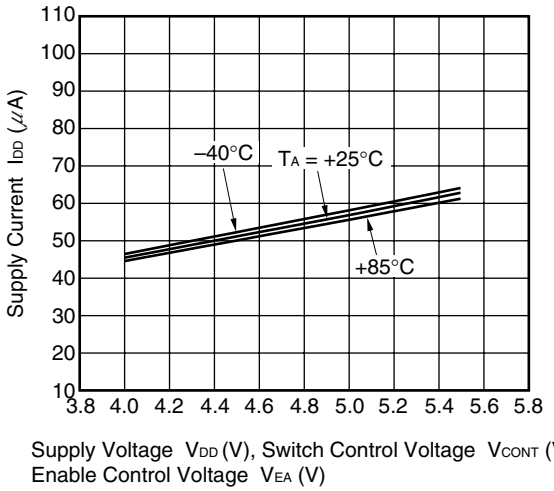



**Remark** The graphs indicate nominal characteristics.

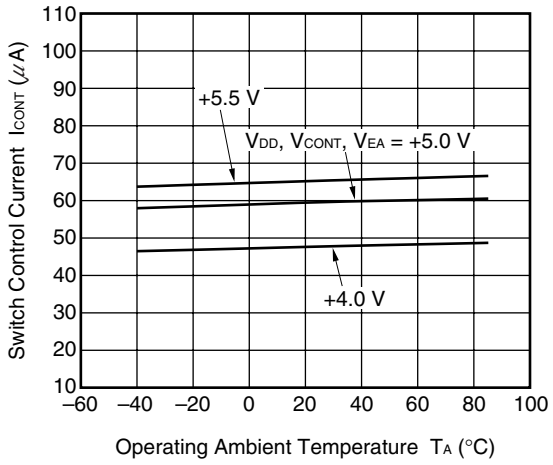
SUPPLY CURRENT vs.
OPERATING AMBIENT TEMPERATURE



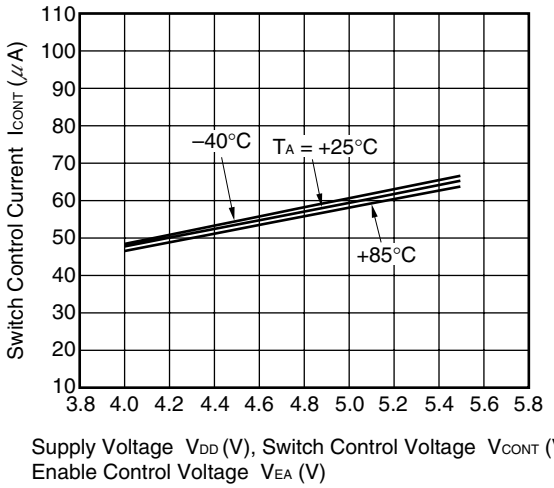

SUPPLY CURRENT vs. VDD, VCONT, VEA




SWITCH CONTROL CURRENT vs.
OPERATING AMBIENT TEMPERATURE



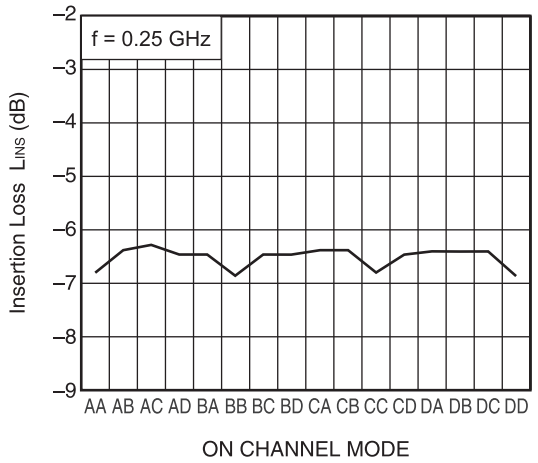

SWITCH CONTROL CURRENT vs.
VDD, VCONT, VEA



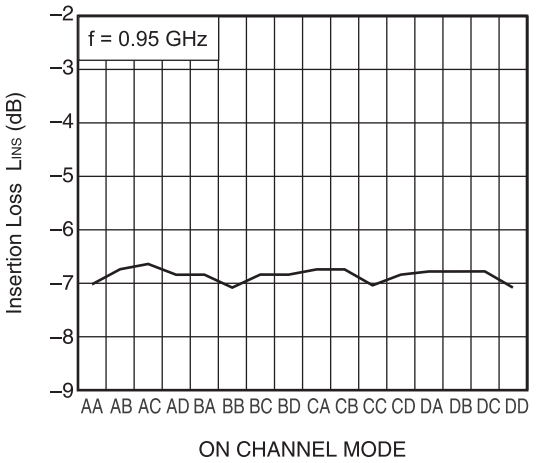

**Remark** The graphs indicate nominal characteristics.

**TYPICAL CHARACTERISTICS ($T_A$ = +25°C, $V_{DD}$ = +5.0 V, $V_{CONT}$ = +5.0 V/0 V, $V_{EA}1$ = $V_{EA}2$ = +5.0 V (both OUTs enabled), $P_{in}$ = 0 dBm, $Z_O$ = 50 Ω for each port, unless otherwise specified)**

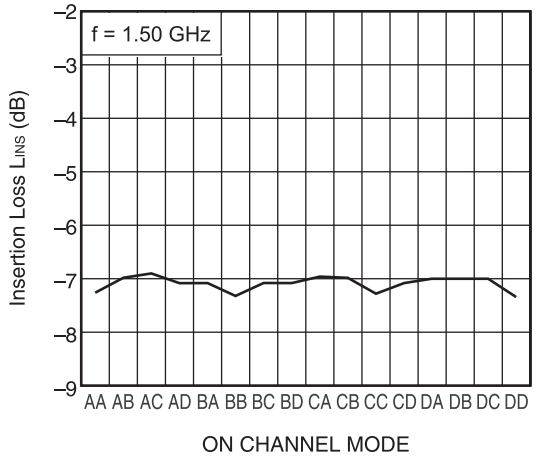
INSERTION LOSS vs. ON CHANNEL MODE



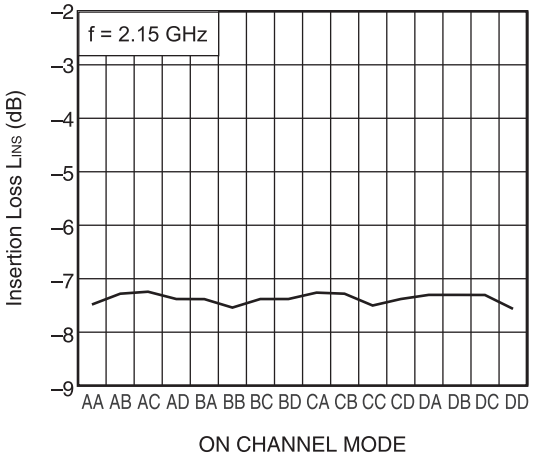

INSERTION LOSS vs. ON CHANNEL MODE



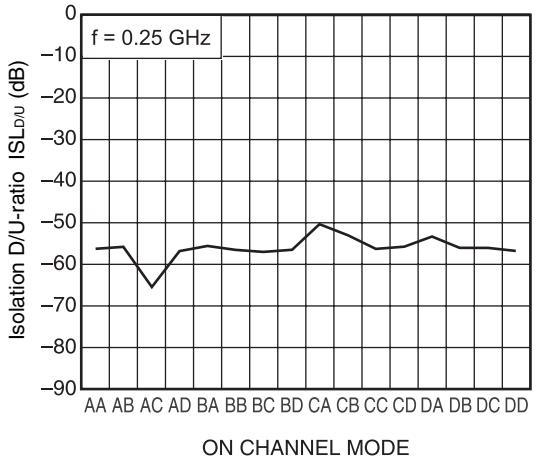

INSERTION LOSS vs. ON CHANNEL MODE



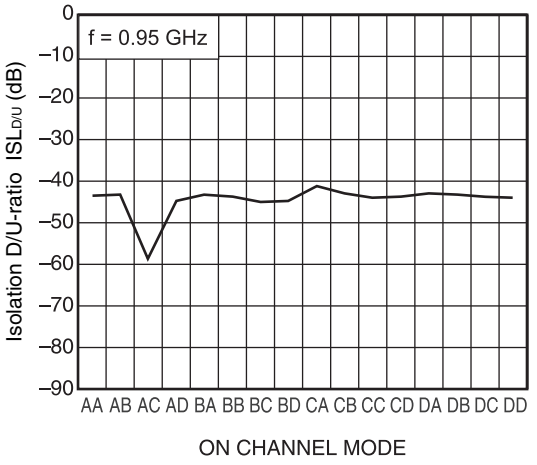

INSERTION LOSS vs. ON CHANNEL MODE




ISOLATION D/U-RATIO vs. ON CHANNEL MODE

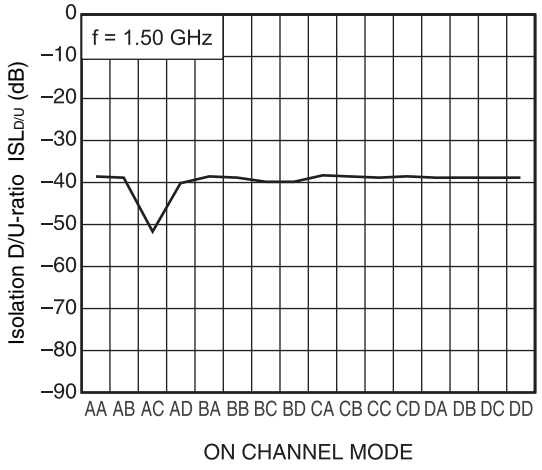



ISOLATION D/U-RATIO vs. ON CHANNEL MODE

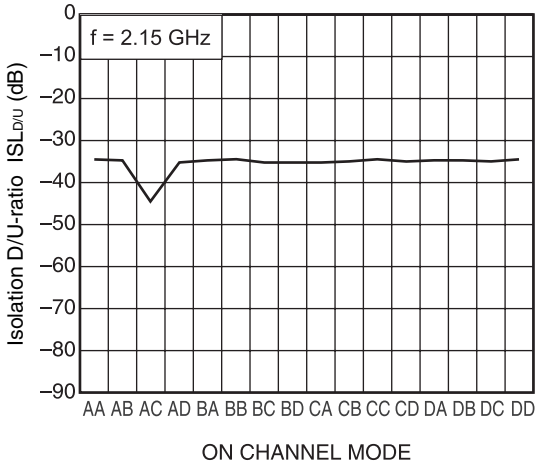



**Remark** The graphs indicate nominal characteristics.

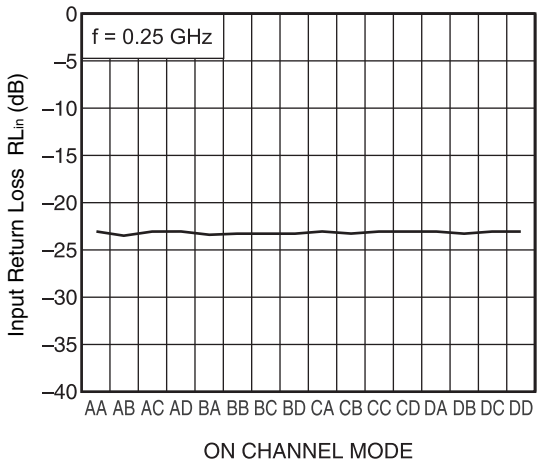
ISOLATION D/U-RATIO vs.
ON CHANNEL MODE



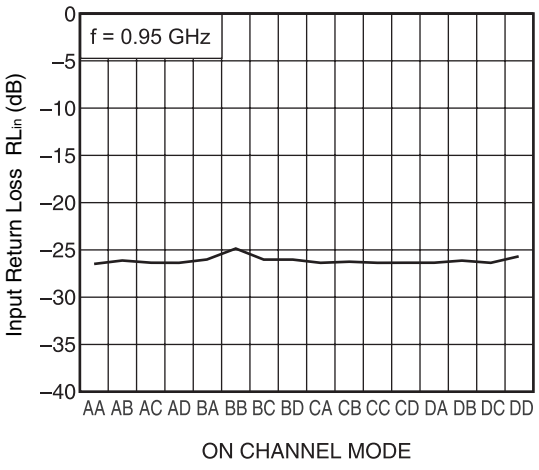

ISOLATION D/U-RATIO vs.
ON CHANNEL MODE



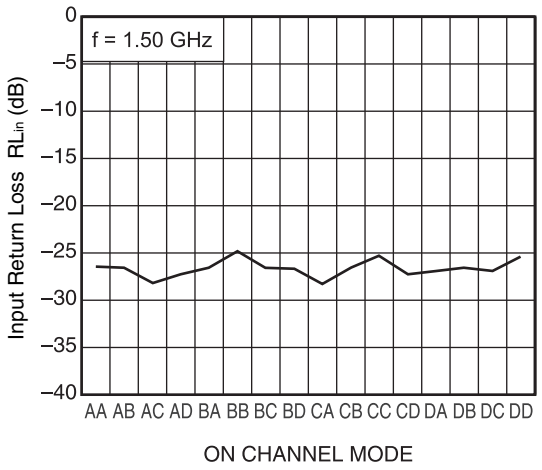

INPUT RETURN LOSS vs.
ON CHANNEL MODE



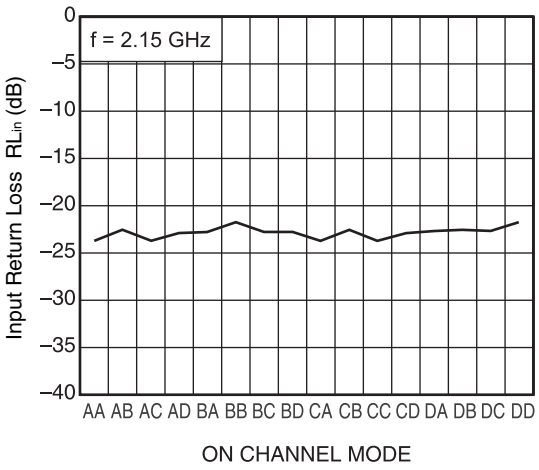

INPUT RETURN LOSS vs.
ON CHANNEL MODE




INPUT RETURN LOSS vs.
ON CHANNEL MODE

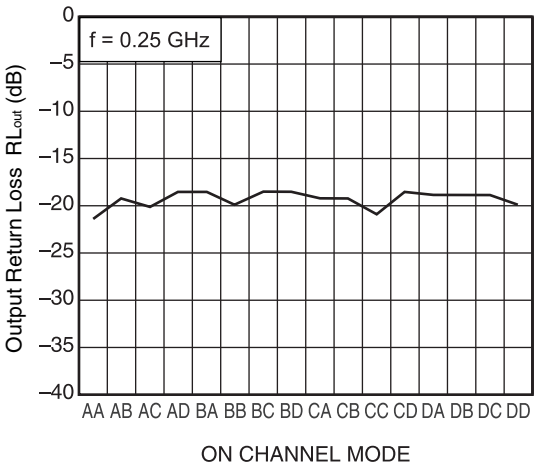



INPUT RETURN LOSS vs.
ON CHANNEL MODE

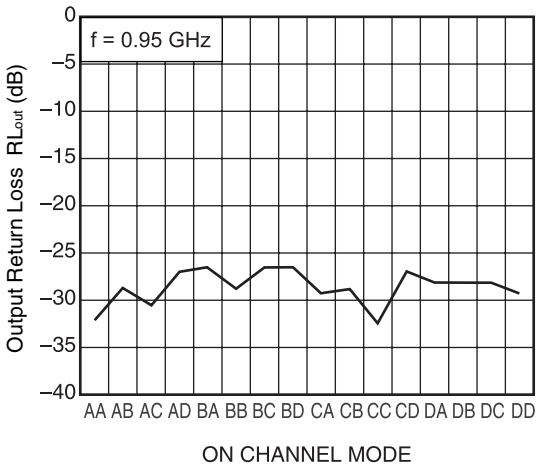



**Remark** The graphs indicate nominal characteristics.

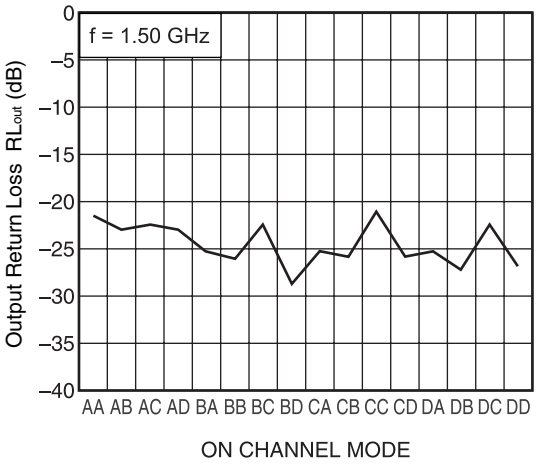
OUTPUT RETURN LOSS vs.
ON CHANNEL MODE



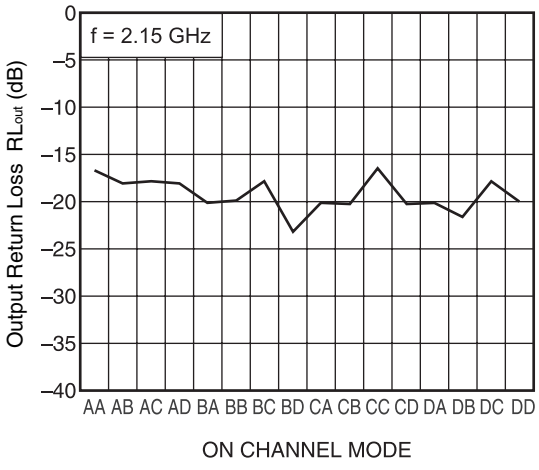

OUTPUT RETURN LOSS vs.
ON CHANNEL MODE




OUTPUT RETURN LOSS vs.
ON CHANNEL MODE




OUTPUT RETURN LOSS vs.
ON CHANNEL MODE

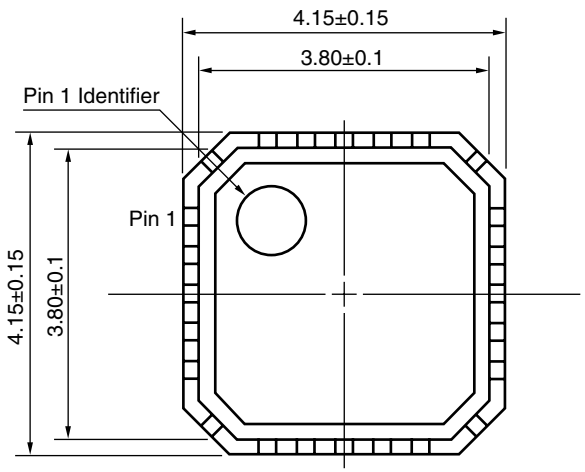



**Remark** The graphs indicate nominal characteristics.

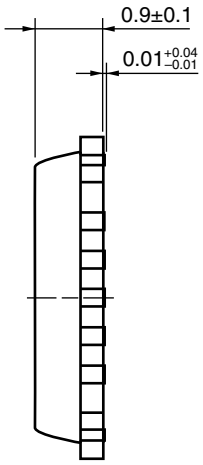
**PACKAGE DIMENSIONS**

**20-PIN 4 × 4 mm SQUARE MICRO LEAD PACKAGE (20-pin plastic QFN (0.5 mm pitch)) (UNIT: mm)**

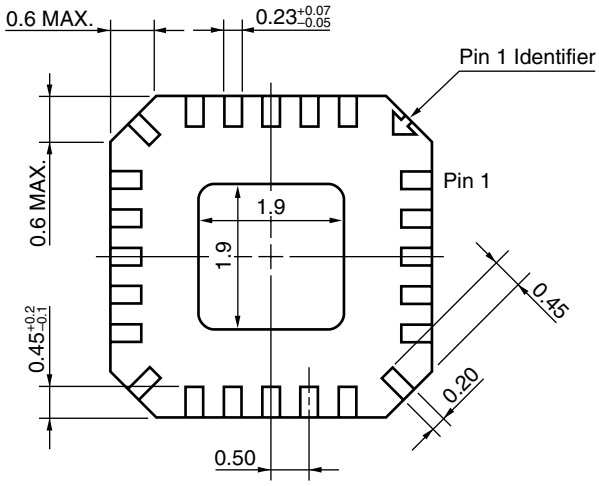
**(Top View)**




**(Side View)**




**(Bottom View)**



## RECOMMENDED SOLDERING CONDITIONS

This product should be soldered and mounted under the following recommended conditions. For soldering methods and conditions other than those recommended below, contact your nearby sales office.

| Soldering Method | Soldering Conditions | | Condition Symbol |
|---|---|---|---|
| Infrared Reflow | Peak temperature (package surface temperature)<br>Time at peak temperature<br>Time at temperature of 220°C or higher<br>Preheating time at 120 to 180°C<br>Maximum number of reflow processes<br>Maximum chlorine content of rosin flux (% mass) | : 260°C or below<br>: 10 seconds or less<br>: 60 seconds or less<br>: 120±30 seconds<br>: 3 times<br>: 0.2%(Wt.) or below | IR260 |
| Partial Heating | Peak temperature (terminal temperature)<br>Soldering time (per side of device)<br>Maximum chlorine content of rosin flux (% mass) | : 350°C or below<br>: 3 seconds or less<br>: 0.2%(Wt.) or below | HS350 |

**Caution Do not use different soldering methods together (except for partial heating).**

- **The information in this document is current as of September, 2009. The information is subject to change without notice. For actual design-in, refer to the latest publications of NEC Electronics data sheets, etc., for the most up-to-date specifications of NEC Electronics products. Not all products and/or types are available in every country. Please check with an NEC Electronics sales representative for availability and additional information.**
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