

HMC1013* PRODUCT PAGE QUICK LINKS

Last Content Update: 11/29/2017

COMPARABLE PARTS

View a parametric search of comparable parts.

EVALUATION KITS

- HMC1013LP4E Evaluation Board

DOCUMENTATION

Data Sheet

- HMC1013 Data Sheet

TOOLS AND SIMULATIONS

- HMC1013 S-Parameters

REFERENCE MATERIALS

Product Selection Guide

- RF, Microwave, and Millimeter Wave IC Selection Guide 2017

DESIGN RESOURCES

- HMC1013 Material Declaration
- PCN-PDN Information
- Quality And Reliability
- Symbols and Footprints

DISCUSSIONS

View all HMC1013 EngineerZone Discussions.

SAMPLE AND BUY

Visit the product page to see pricing options.

TECHNICAL SUPPORT

Submit a technical question or find your regional support number.

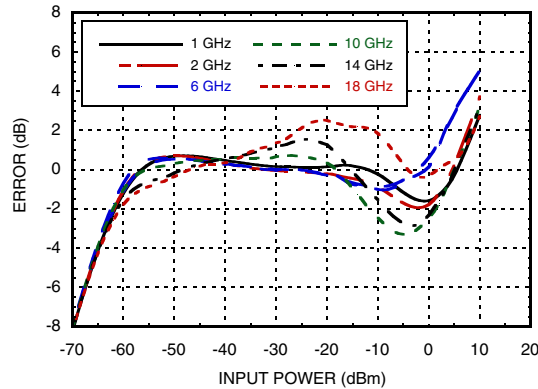
DOCUMENT FEEDBACK

Submit feedback for this data sheet.

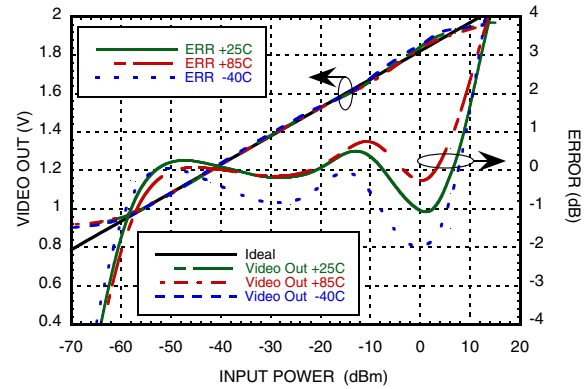


SUCCESSIVE DETECTION LOG VIDEO AMPLIFIER (SDLVA), 0.5 - 18.5 GHz

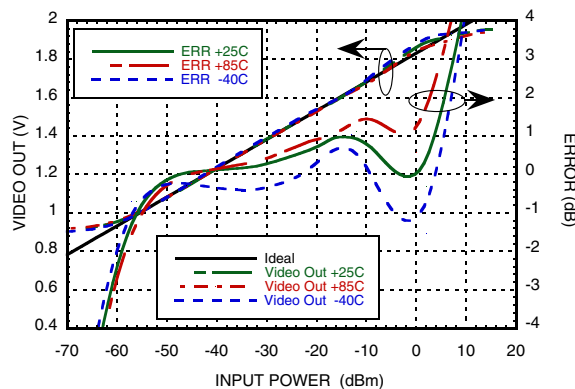
**Error Flatness vs.
Input Power Over Frequency [1] [2]**



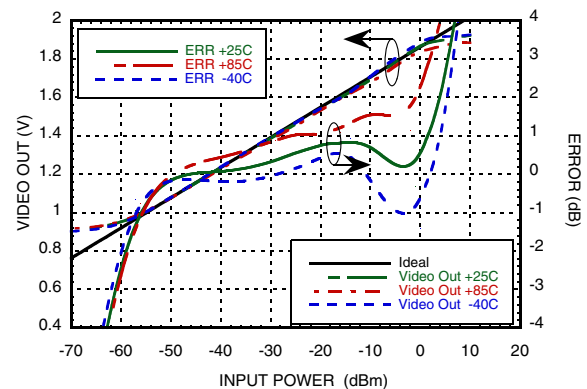
**VIDEO OUT & Error
vs. Input Power, $F_{in} = 500$ MHz**



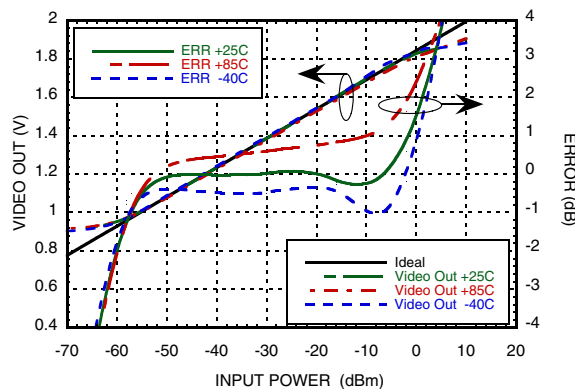
**VIDEO OUT & Error
vs. Input Power, $F_{in} = 1$ GHz**



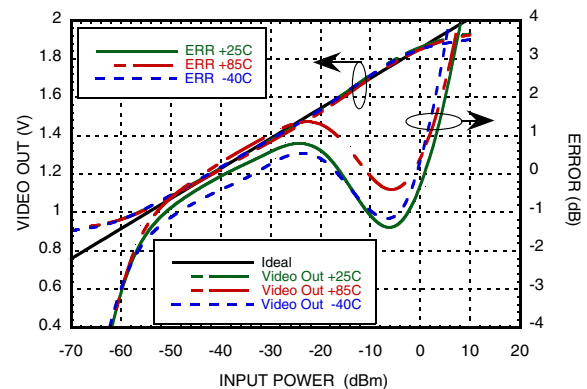
**VIDEO OUT & Error
vs. Input Power, $F_{in} = 2$ GHz**



**VIDEO OUT & Error
vs. Input Power, $F_{in} = 6$ GHz**



**VIDEO OUT & Error
vs. Input Power, $F_{in} = 10$ GHz**



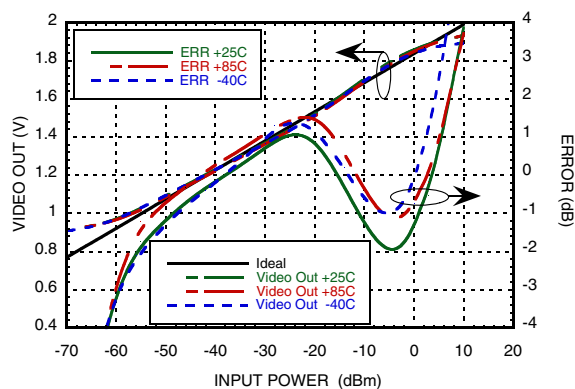
[1] An average ideal line is used to calculate error curves.

[2] At 25°C.

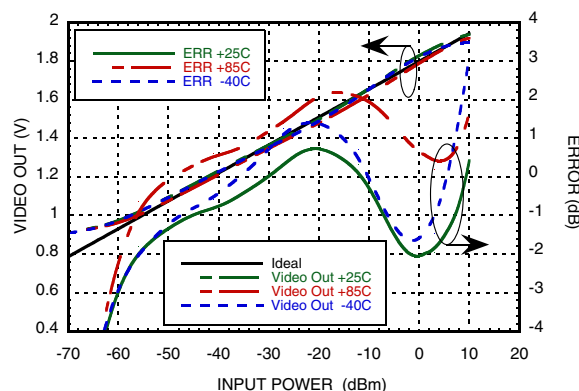


SUCCESSIVE DETECTION LOG VIDEO AMPLIFIER (SDLVA), 0.5 - 18.5 GHz

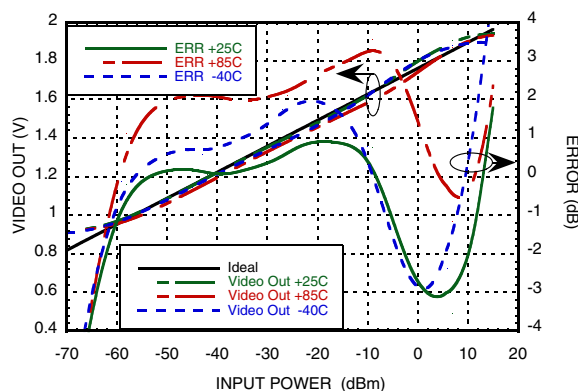
**VIDEO OUT & Error
vs. Input Power, $F_{in} = 14$ GHz**



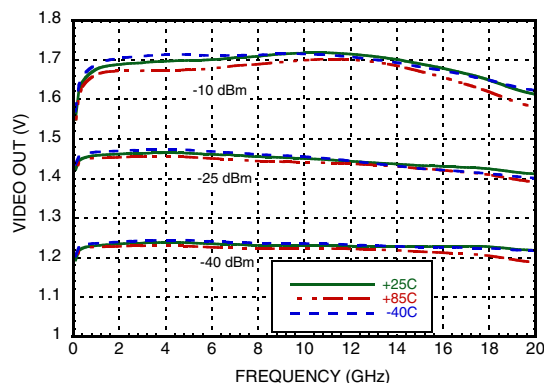
**VIDEO OUT & Error
vs. Input Power, $F_{in} = 18$ GHz**



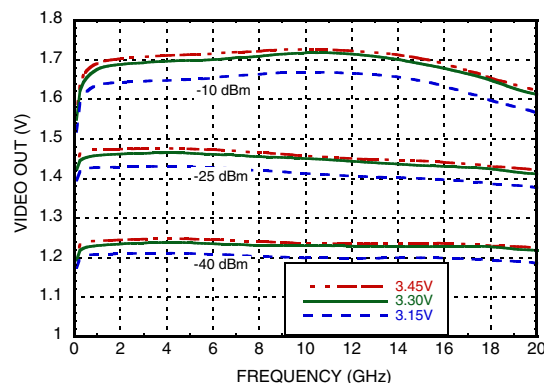
**VIDEO OUT & Error
vs. Input Power, $F_{in} = 20$ GHz**



**VIDEO OUT vs. Frequency
Over Input Power & Temperature**



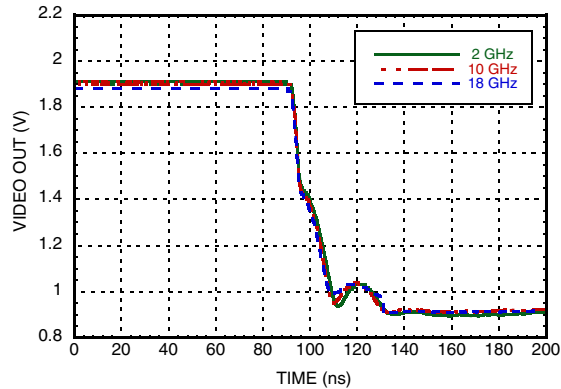
**VIDEO OUT vs. Frequency
Over Input Power & Bias Voltage**



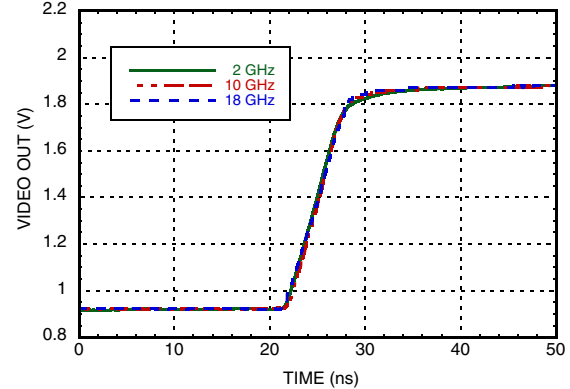


SUCCESSIVE DETECTION LOG VIDEO AMPLIFIER (SDLVA), 0.5 - 18.5 GHz

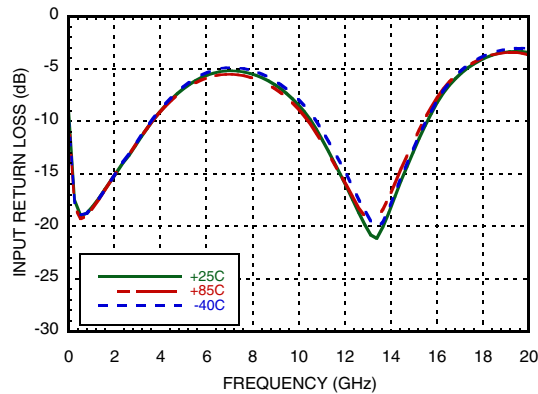
**Fall Time for Various Frequencies
@ 0 dBm**



**Rise Time for Various Frequencies
@ 0 dBm**



Input Return Loss vs. Frequency



Absolute Maximum Ratings

| | |
|--|----------------|
| Vcc | +3.6V |
| Enable | +3.6V |
| RF Input Power | +13 dBm |
| Junction Temperature | 125 °C |
| Continuous P _{diss} (T=85 °C) Derate 35.22 mW/°C above 85 °C | 1.41 W |
| Thermal Resistance (R _{thj}) (junction to package bottom) | 28.4 °C/W |
| Storage Temperature | -65 to +150 °C |
| Operating Temperature | -40 to +85 °C |
| ESD Sensitivity (HBM) | Class 1A |



**ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS**



1. PACKAGE BODY MATERIAL: LOW STRESS INJECTION MOLDED PLASTIC SILICA AND SILICON IMPREGNATED.
2. LEAD AND GROUND PADDLE MATERIAL: COPPER ALLOY.
3. LEAD AND GROUND PADDLE PLATING: 100% MATTE TIN
4. DIMENSIONS ARE IN INCHES [MILLIMETERS].
5. LEAD SPACING TOLERANCE IS NON-CUMULATIVE.
6. CHARACTERS TO BE HELVETICA MEDIUM, .025 HIGH, WHITE INK, OR LASER MARK LOCATED APPROX. AS SHOWN.
7. PAD BURR LENGTH SHALL BE 0.15mm MAX. PAD BURR HEIGHT SHALL BE 0.05mm MAX.
8. PACKAGE WARP SHALL NOT EXCEED 0.05mm
9. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.
10. REFER TO HITTITE APPLICATION NOTE FOR SUGGESTED PCB LAND PATTERN


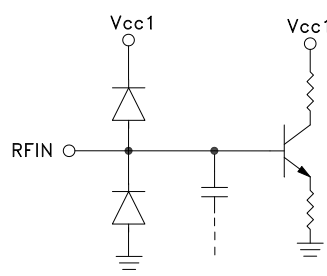
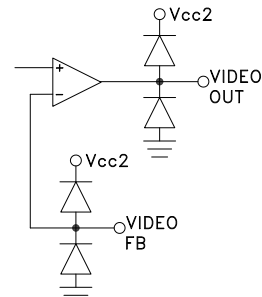
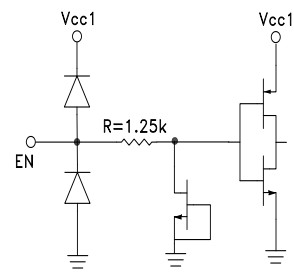
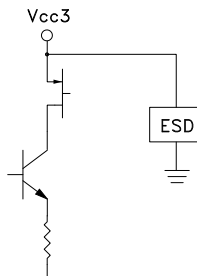
| Part Number | Package Body Material | Lead Finish | MSL Rating | Package Marking ^[1] |
|-------------|--|---------------|---------------------|--------------------------------|
| HMC1013LP4E | RoHS-compliant Low Stress Injection Molded Plastic | 100% matte Sn | MSL1 ^[2] | <u>H1013</u> XXXX |

[2] Max peak reflow temperature of 260 °C



SUCCESSIVE DETECTION LOG VIDEO AMPLIFIER (SDLVA), 0.5 - 18.5 GHz

Pin Descriptions

| Pin Number | Function | Description | Interface Schematic |
|--|-----------------------|--|---|
| 1-2, 7, 9-10, 12-13, 16, 18-19, 21, 23 | N/C | The pins are not connected internally; however, all data shown herein was measured with these pins connected to RF/DC ground externally. | |
| 3, 5-6, 8, 11 | GND | These pins and the exposed package bottom must be connected to a high quality RF/DC ground. |  |
| 4 | RFIN | RF Input pin |  |
| 14, 15 | VIDEO_FB VIDEO_OUT | Video out and feedback. These pins should be shorted to each other (see application circuit). Video out load should be at least 1K Ohm or higher. |  |
| 17 | EN | Enable pin, connect to 3.3V supply for normal operation. Total supply current reduced to less than 11mA when EN is set to 0V. |  |
| 20 | VCC3 | Bias Supply. Connect supply voltage to these pins with appropriate filtering. See application circuit To ensure proper start-up supply rise time should be faster than 100uSec. |  |

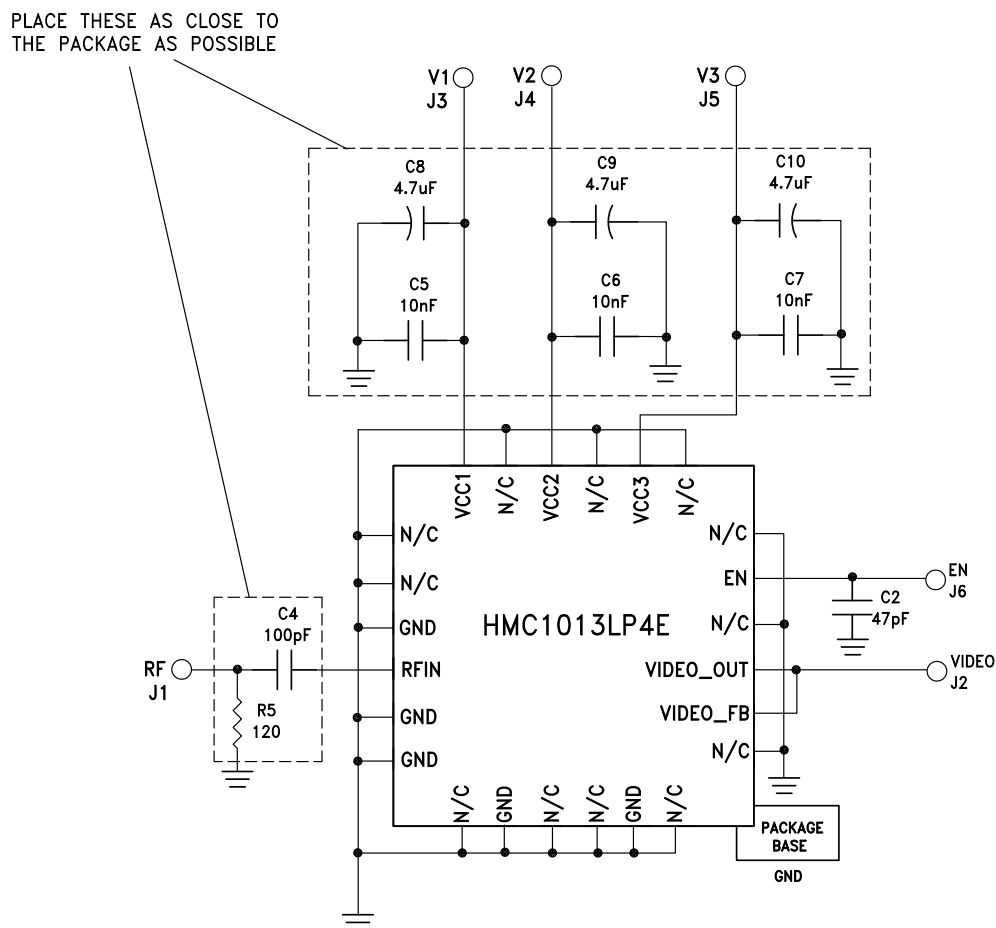


**SUCCESSIVE DETECTION LOG VIDEO
AMPLIFIER (SDLVA), 0.5 - 18.5 GHz**

Pin Descriptions (continued)

| Pin Number | Function | Description | Interface Schematic |
|------------|---------------|---|---------------------|
| 22, 24 | VCC2, VCC1 | Bias Supply. Connect Supply Voltage to these pins with appropriate filtering. Connect Vcc2 with Vcc1. See application circuit. To ensure proper start-up supply rise time should be faster than 100usec. | |

Application Circuit

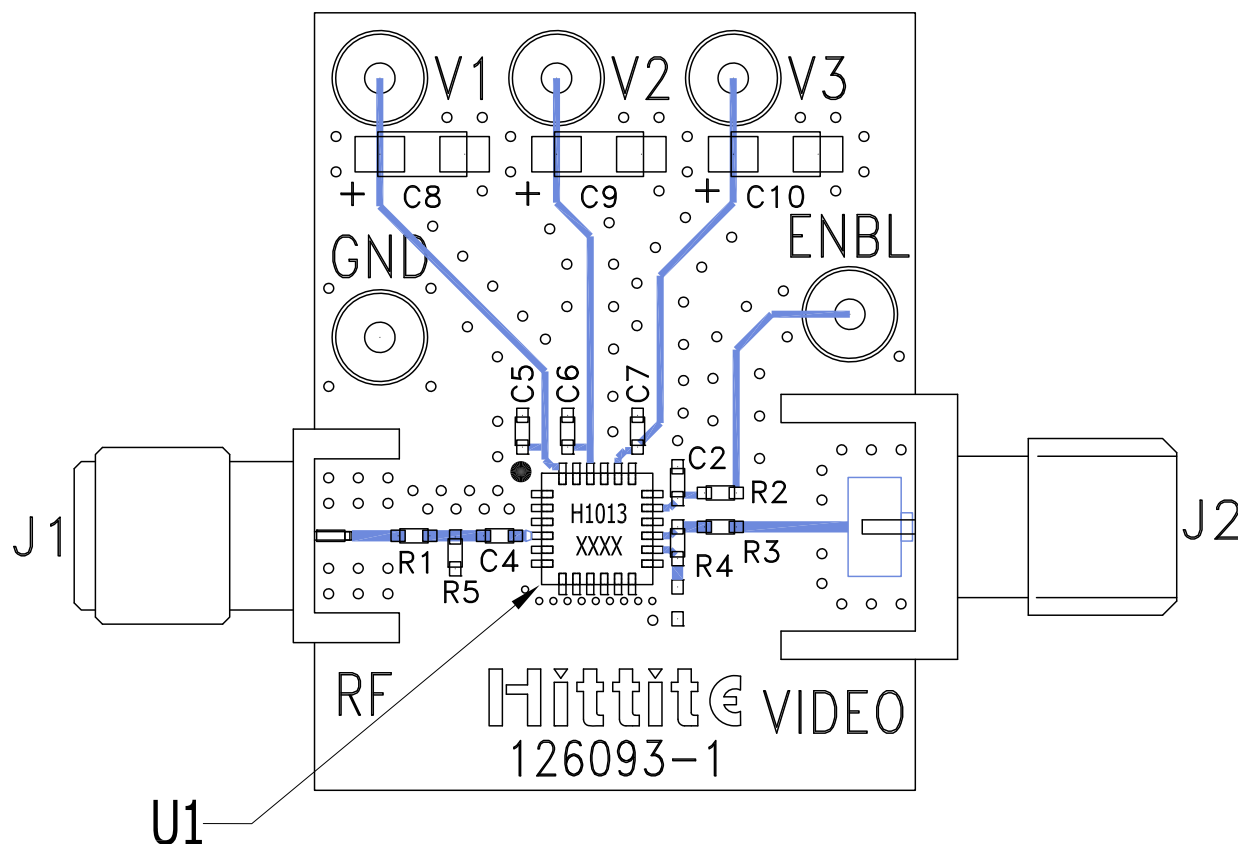


Note: Video output load should be 1K Ohm or higher.



SUCCESSIVE DETECTION LOG VIDEO AMPLIFIER (SDLVA), 0.5 - 18.5 GHz

Evaluation PCB



List of Materials for Evaluation PCB EVAL01-HMC1013LP4E^[1]

| Item | Description |
|--------------------|----------------------------------|
| J1 | K-Type Connector |
| J2 | SMA Connector |
| J3 - J6 | DC Pins |
| C2 | 47 pF Capacitor, 0402 Pkg. |
| C4 | 100 pF Capacitor, 0402 Pkg. |
| C5-C7 | 10 nF Capacitor, 0402 Pkg. |
| C8-C10 | 4.7 μ F Capacitor, Tantalum. |
| R1-R4 | 0 Ohm Resistor, 0402 Pkg. |
| R5 | 120 Ohm Resistor, 0402 Pkg. |
| U1 | HMC1013LP4E SDLVA |
| PCB ^[2] | 126093 Evaluation PCB |

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Rogers 4350 or Arlon 25 FR

The circuit board used in the application should use RF circuit design techniques. Signal lines should have 50 ohm impedance while the package ground leads and exposed paddle should be connected directly to the ground plane similar to that shown. A sufficient number of via holes should be used to connect the top and bottom ground planes. N/C pins should also be connected to ground. The evaluation circuit board shown is available from Hittite upon request.