## Analog Devices Welcomes Hittite Microwave Corporation



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# GaAs MMIC 5 WATT T/R SWITCH DC - 3 GHz 

## Typical Applications

The HMC574AMS8 / HMC574AMS8E is ideal for:

- Cellular/3G Infrastructure
- Private Mobile Radio Handsets
- WLAN, WiMAX \& WiBro
- Automotive Telematics
- Test Equipment


## Functional Diagram



## Features

Low Insertion Loss: 0.3 dB
High Third Order Intercept: +65 dBm
Isolation: 30 dB
Single Positive Supply: +3 to +8 V
SMT Package: MSOP8
Included in the HMC-DK005 Designer's Kit

## General Description

The HMC574AMS8 \& HMC574AMS8E are lowcost SPDT switches in 8-lead MSOP packages for use in transmit/receive applications which require very low distortion at high incident power levels. The device can control signals from DC to 3 GHz and is especially suited for Cellular/3G infrastructure, WiMAX and WiBro applications with only 0.3 dB typical insertion loss. The design provides 5 watt power handling performance and +65 dBm third order intercept at +8 Volt bias. RF1 and RF2 are refl ective shorts when "Off".

Electrical Specifications,
$T_{A}=+25^{\circ} \mathrm{C}, \mathrm{VctI}=0 /+5 \mathrm{Vdc}, \mathrm{Vdd}=+5 \mathrm{Vdc}$ (Unless Otherwise Stated), 50 Ohm System

| Parameter | Frequency | Min. | Typ. | Max. | Units |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Insertion Loss | $\begin{aligned} & \text { DC }-1.0 \mathrm{GHz} \\ & \mathrm{DC}-2.0 \mathrm{GHz} \\ & \mathrm{DC}-2.5 \mathrm{GHz} \\ & \mathrm{DC}-3.0 \mathrm{GHz} \end{aligned}$ |  | $\begin{gathered} \hline 0.25 \\ 0.3 \\ 0.4 \\ 0.5 \\ \hline \end{gathered}$ | $\begin{aligned} & 0.5 \\ & 0.6 \\ & 0.7 \\ & 0.8 \\ & \hline \end{aligned}$ | $\begin{aligned} & \mathrm{dB} \\ & \mathrm{~dB} \\ & \mathrm{~dB} \\ & \mathrm{~dB} \\ & \hline \end{aligned}$ |
| Isolation | $\begin{aligned} & \text { DC }-1.0 \mathrm{GHz} \\ & \mathrm{DC}-2.0 \mathrm{GHz} \\ & \mathrm{DC}-2.5 \mathrm{GHz} \\ & \mathrm{DC}-3.0 \mathrm{GHz} \end{aligned}$ | $\begin{aligned} & 26 \\ & 24 \\ & 21 \\ & 16 \end{aligned}$ | $\begin{aligned} & 30 \\ & 28 \\ & 25 \\ & 20 \\ & \hline \end{aligned}$ |  | $\begin{aligned} & \hline \mathrm{dB} \\ & \mathrm{~dB} \\ & \mathrm{~dB} \\ & \mathrm{~dB} \end{aligned}$ |
| Return Loss | $\begin{aligned} & \text { DC }-1.0 \mathrm{GHz} \\ & \text { DC }-2.0 \mathrm{GHz} \\ & \mathrm{DC}-2.5 \mathrm{GHz} \\ & \mathrm{DC}-3.0 \mathrm{GHz} \end{aligned}$ |  | $\begin{aligned} & \hline 35 \\ & 25 \\ & 18 \\ & 16 \\ & \hline \end{aligned}$ |  | $\begin{aligned} & \mathrm{dB} \\ & \mathrm{~dB} \\ & \mathrm{~dB} \\ & \mathrm{~dB} \end{aligned}$ |
| $\begin{array}{ll} \\ \text { Input Power for 1dB Compression } & \mathrm{Vctl}=0 /+3 \mathrm{~V} \\ \mathrm{Vctl}=0 /+5 \mathrm{~V} \\ \mathrm{Vctl}=0 /+8 \mathrm{~V}\end{array}$ | 0.5-3.0 GHz | $\begin{aligned} & 33 \\ & 35 \\ & 37 \\ & \hline \end{aligned}$ | $\begin{aligned} & \hline 36 \\ & 38 \\ & 39 \\ & \hline \end{aligned}$ |  | dBm dBm dBm |
| Input Third Order Intercept $\text { (Two-tone Input Power }=+27 \mathrm{dBm} \text { Each Tone) }$ $\begin{aligned} & \mathrm{VctI}=0 /+3 \mathrm{~V} \\ & \mathrm{VctI}=0 /+5 \mathrm{~V} \\ & \mathrm{VctI}=0 /+8 \mathrm{~V} \\ & \hline \end{aligned}$ | 0.5-3.0 GHz |  | $\begin{aligned} & 55 \\ & 63 \\ & 65 \\ & \hline \end{aligned}$ |  | dBm dBm dBm |
| Switching Characteristics <br> tRISE, tFALL (10/90\% RF) tON, tOFF (50\% CTL to 10/90\% RF) | DC - 3.0 GHz |  | $\begin{gathered} 80 \\ 120 \end{gathered}$ |  | $\begin{aligned} & \text { ns } \\ & \text { ns } \end{aligned}$ |

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## Absolute Maximum Ratings

| Max. Input Power $V_{d d}=0 /+8 \mathrm{~V}$ | 0.5-2.5 GHz | 39 dBm |
| :---: | :---: | :---: |
| Bias Voltage Range (Vdd) |  | -0.2 to +10 Vdc |
| Control Voltage Range (A \& B) |  | -0.2 to +Vdd Vdc |
| Hot Switching Power Level$V_{d d}=+8 \mathrm{~V}$ |  | 39 dBm |
| Channel Temperature |  | $150{ }^{\circ} \mathrm{C}$ |
| Continuous Pdiss ( $\mathrm{T}=+85^{\circ} \mathrm{C}$ ) <br> (derate $10 \mathrm{~mW} /{ }^{\circ} \mathrm{C}$ above $85^{\circ} \mathrm{C}$ ) |  | 0.65W |
| Thermal Resistance |  | $100^{\circ} \mathrm{C} / \mathrm{W}$ |
| Storage Temperature |  | -65 to $+150{ }^{\circ} \mathrm{C}$ |
| Operating Temperature |  | -40 to $+85^{\circ} \mathrm{C}$ |
| ESD Sensitivity (HBM) |  | Class 1A |

DC Blocks are required at ports RFC, RF1 and RF2


ELECTROSTATIC SENSITIVE DEVICE OBSERVE HANDLING PRECAUTIONS

## Bias Voltage \& Current

| Vdd (Vdc) | Typical Idd $(\mu \mathrm{A})$ |
| :---: | :---: |
| +3 | 2 |
| +5 | 10 |
| +8 | 40 |

Control Voltages

| State | Bias Condition |
| :--- | :--- |
| Low | 0 to +0.2 Vdc @ $10 \mu \mathrm{~A}$ Typical |
| High | Vdd $\pm 0.2 \mathrm{Vdc} @ 10 \mu \mathrm{~A}$ Typical |

## Truth Table

| Control Input (Vctl) |  | Signal Path State |  |
| :---: | :---: | :---: | :---: |
| A | B | RFC to RF1 | RFC to RF2 |
| High | Low | Off | On |
| Low | High | On | Off |




NOTES:

1. LEADFRAME MATERIAL: COPPER ALLOY
2. DIMENSIONS ARE IN INCHES [MILLIMETERS]
3. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15 mm PER SIDE. 4. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25 mm PER SIDE. 5. ALL GROUND LEADS MUST BE SOLDERED TO PCB RF GROUND.

[^0]:    For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106 Phone: 781-329-4700 • Order online at www. analog.com Application Support: Phone: 1-800-ANALOG-D

