

# PRELIMINARY DATASHEET

## CGY2370UH/C1

### 92-96 GHz SPST Switch

#### DESCRIPTION

The CGY2370UH/C1 is a high performance GaAs MMIC Single Pole Single Throw Switch designed to operate in the W band.

The CGY2370UH/C1 has an insertion loss of 3 dB and an isolation of 20 dB over the whole 92 – 96 GHz frequency band. The input and output return losses are 13 dB. The device can be used in Radar, Telecommunication, Instrumentation applications and passive or active imaging systems.

The die is manufactured using OMMIC's Advanced 130 nm gate length medium Indium content MHEMT Technology. The MMIC uses gold bonding pads and backside metallization and is fully protected with Silicon Nitride passivation to obtain the highest level of reliability.

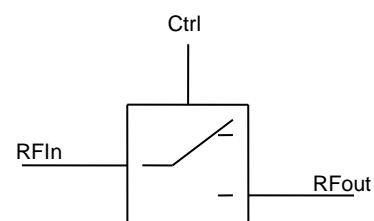
This part is the member of a chipset dedicated to build a transmit and receive radio system in this band.

#### APPLICATIONS

- ▶ Radar
- ▶ Telecommunication
- ▶ Instrumentation
- ▶ Passive and active radar imaging

#### FEATURES

- ▶ Operating Range : 92 GHz to 96 GHz
- ▶ Insertion Loss 2.2 dB
- ▶ Isolation 35 dB
- ▶ Switching Speed 10ns
- ▶ 50 Ohms input and output matched
- ▶ Input Return Loss : > 10 dB
- ▶ Output Return Loss : > 10 dB
- ▶ Maximum Input Power > 15dBm
- ▶ Control voltage 0 / -3V logic signal
- ▶ Die size = 1.57 x 0.94 x 0.1 mm
- ▶ Device Availability (Q1 2014) :
  - Tested, Inspected Known Good Die (KGD)



CGY2370UH/C1 Block Diagram



**MAXIMUM VALUES**

Symbol	Parameter	Conditions	MIN.	MAX.	UNIT
RFin, RFout	RF Port			20	dBm
Ctrl	Control port		-4.5	0	V
T <sub>amb</sub>	Ambient temperature		- 40	+ 85	° C
T <sub>j</sub>	Junction temperature			+ 150	° C
T <sub>stg</sub>	Storage temperature		- 55	+ 150	° C

Operation of this device outside the parameter ranges given above may cause permanent damage

**ELECTRICAL CHARACTERISTICS**

Conditions : T<sub>amb</sub> = + 25 °C, V<sub>CTRL</sub> = 0 / -3V

Symbol	Parameter	Conditions	MIN.	TYP.	MAX.	UNIT
RFin	Input frequency		92		96	GHz
I <sub>LOSS</sub>	Insertion Loss			2.2		dB
I <sub>SOL</sub>	Isolation			35		dB
S <sub>SPEED</sub>	Switching Speed			10		ns
P1dB	1 dB compression point			9		dBm
S <sub>11</sub>	Input reflection coefficient			-13		dB
S <sub>22</sub>	Output reflection coefficient			-13		dB

(\*) Measurement reference planes are the INPUT and OUTPUT plans of the CGY2370UH/C1 MMIC.

**ENVIRONMENTAL CHARACTERISTICS**

Symbol	Parameter	Value	UNIT
C <sub>S<sub>MAX</sub></sub>	Maximum chip size	1.57 x 0.94	mm <sup>2</sup>
C <sub>THICK</sub>	Typical chip thickness	0.1	mm



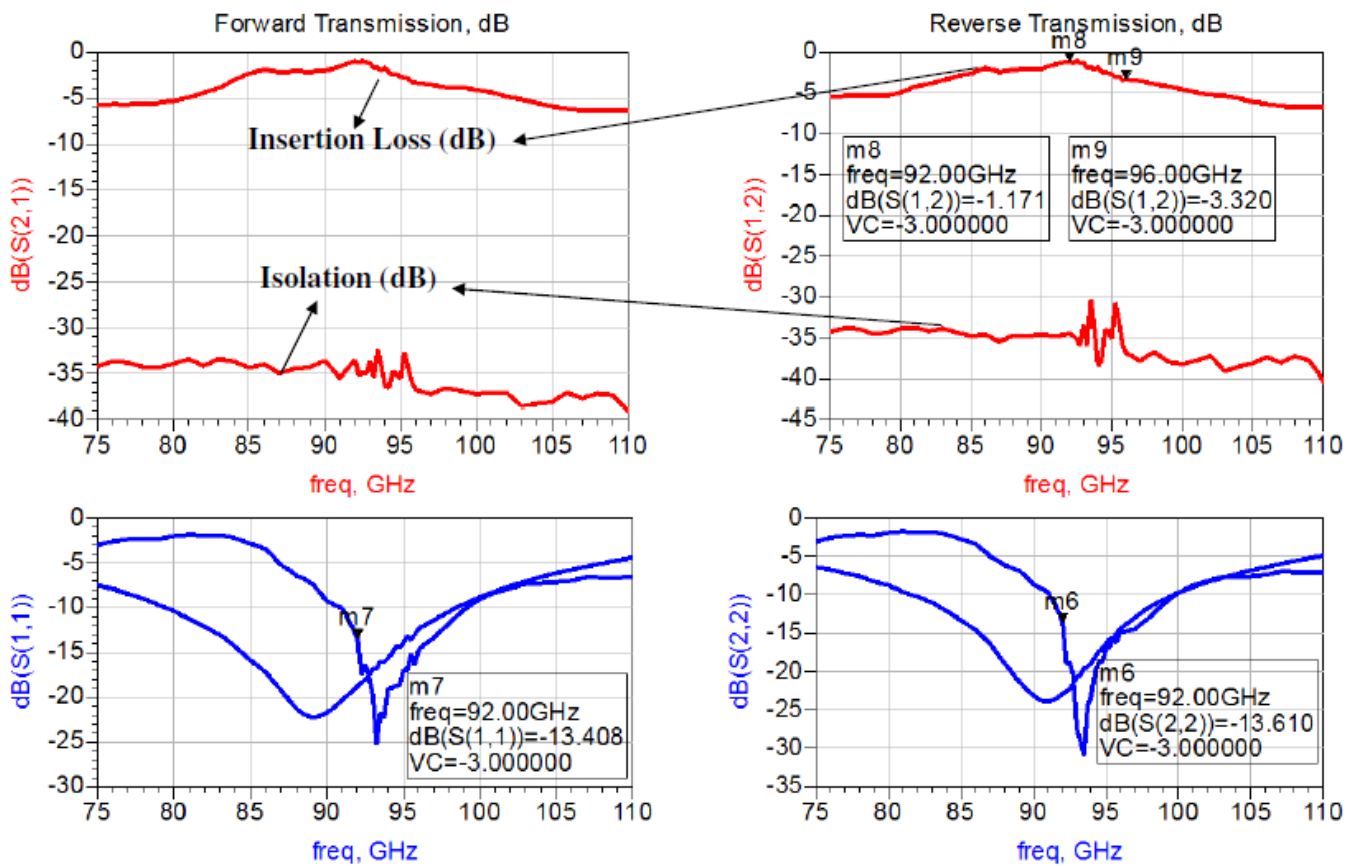
**Caution** : This device is a high performance RF component and can be damaged by inappropriate handling. Standard ESD precautions should be followed. OMMIC document "OM-CI-MV/ 001/ PG" contains more information on the precautions to take.

## S-PARAMETERS

### Measurements conditions

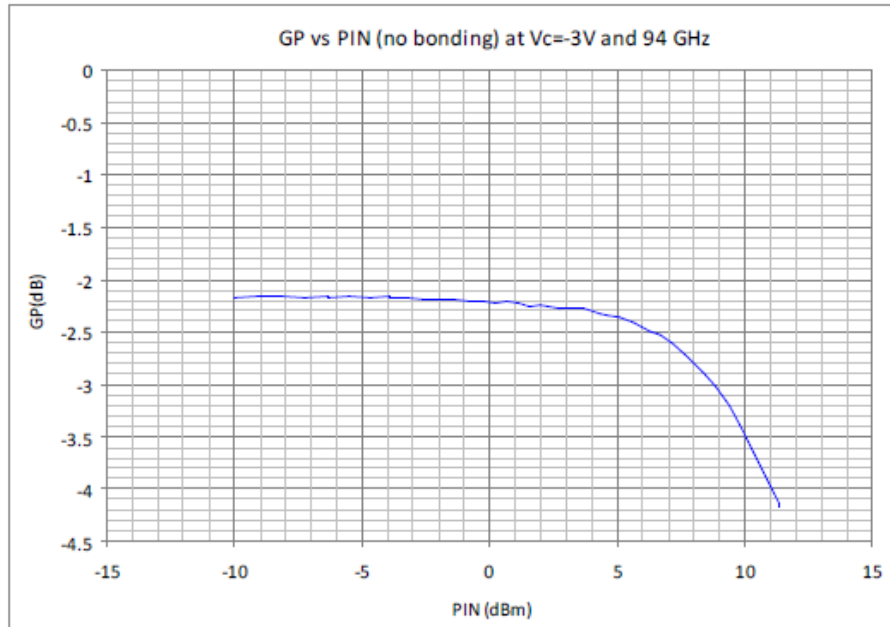
The dies have been measured on-wafer and S parameter files have been captured. The SPST is not 50 Ohms matched in the connector plan, it have been designed to be connected to 50 lines using 0.1nH equivalent bondings. Used ADS software simulator, a 0.1 nH have been added at each RF port. Results are presented below.

S-Parameters vs. Frequency



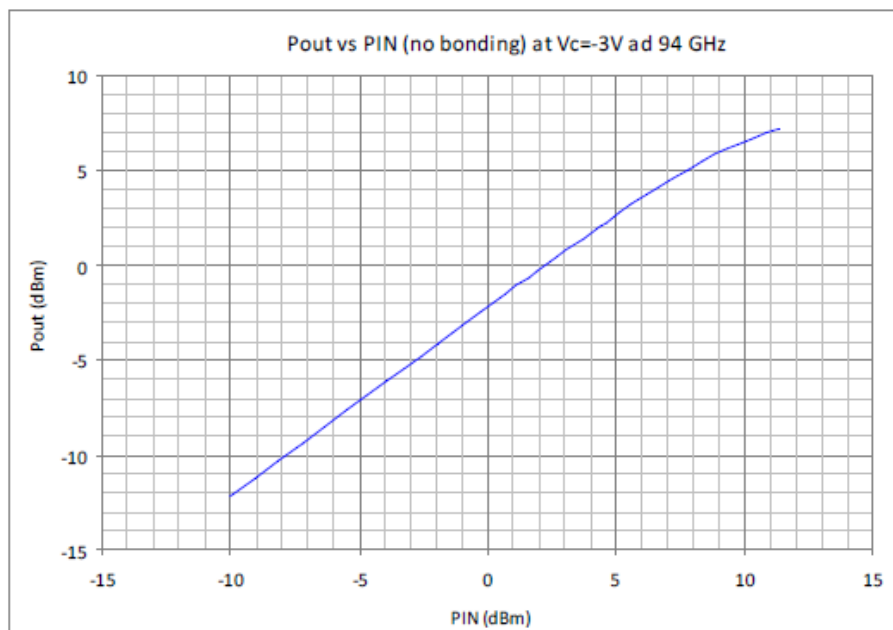
### Gain versus Pin characteristics

The dies have been measured on-wafer and S parameter files have been captured in the connector plan. The SPST is not 50 Ohms matched in the connector plan, it have been designed to be connected to 50 lines using 0.1nH equivalent bondings.



### Pout versus Pin characteristics

The dies have been measured on-wafer and S parameter files have been captured in the connector plan. The SPST is not 50 Ohms matched in the connector plan, it have been designed to be connected to 50 lines using 0.1nH equivalent bondings.



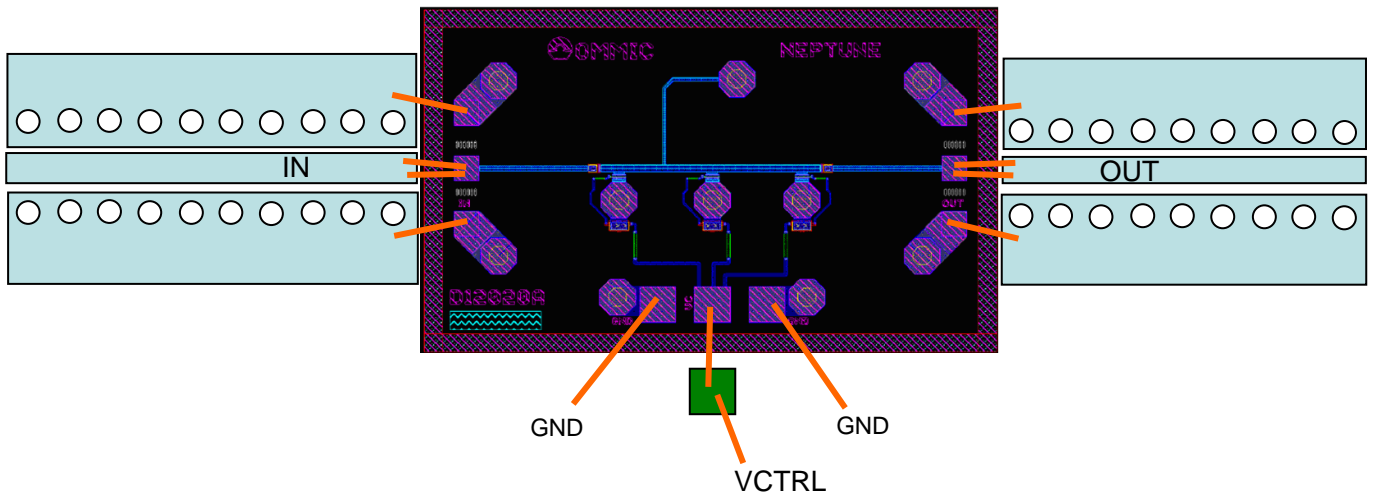
## APPLICATION INFORMATIONS

### Measurements conditions

The dies have been measured on-wafer and S parameter files have been captured. The SPST is not 50 Ohms matched in the connector plan, it have been designed to be connected to 50 lines using 0.1nH equivalent bondings.

The alumina are coplanar wave-guide, it is recommended to connect central connector and ground to improve guidance. A microstrip 50 Ohms line can also be used. Bondings should be kept as short as possible.

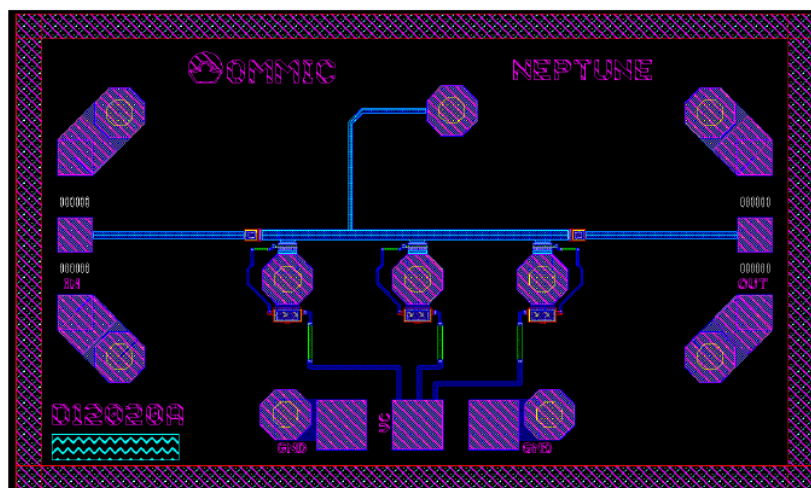
The die has vias to access the backside metallization made of TiAu layers. The die can be soldered using AuSn solder or glued using a conductive epoxy material.



## MECANICAL INFORMATIONS

### Die outline

The CGY2370UH/C1 SPST is not 50 Ohms matched in the connector plan, it have been designed to be connected to 50 lines using 0.1nH equivalent wire or ribbon bondings.



**ORDERING INFORMATION**

Generic type	Package type	Version	Description
CGY2370UH	Bare Die	C1	MHEMT Semi-conductor die. External dimensions : 1570 x 940 $\mu\text{m}$ (Tolerance : $\pm 15 \mu\text{m}$ due to dicing). Die thickness: 0.1 mm. Backside material: TiAu

## **DEFINITIONS**

### **Limiting values definition**

Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

### **Application information**

Applications that are described herein for any of these products are for illustrative purposes only. OMMIC makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

## **DISCLAIMERS**

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