

## DC-12GHZ ATTENUATOR

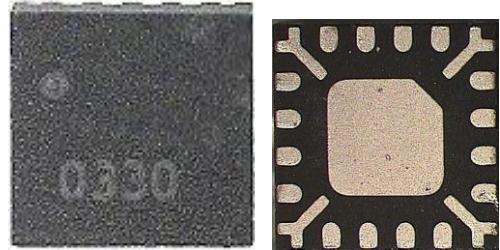
### GaAs Monolithic Microwave IC in SMD leadless package

#### Description

The CHT3091aQAG is a variable DC-12GHz attenuator designed for a wide range of applications, from military to commercial communication systems.

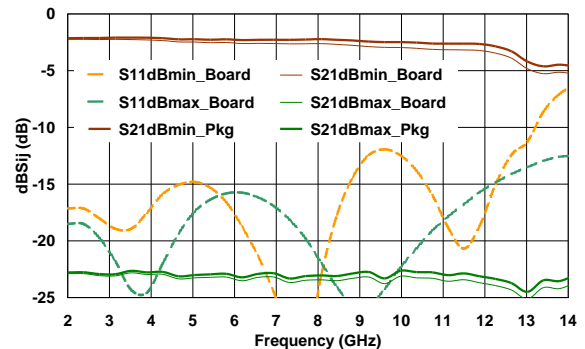
It is supplied in lead-free SMD package. The circuit is manufactured with a MESFET process, 0.7 $\mu$ m gate length, via holes through the substrate, air bridges and electron beam gate lithography.

It is supplied in RoHS compliant SMD package.



#### Main Features

- Broadband performances: DC-12GHz
- 15dBm typical input @1dB compression point (any attenuation, 1-12GHz)
- DC bias:  $-5V < V_S < 0V$  ;  $-5V < V_P < 0V$
- Package type: 16 Leads QFN3x3
- MSL1



PCB Measured performances @ 20°C

#### Main Electrical Characteristics

Tamb.= +25°C

Symbol	Parameter	Min	Typ	Max	Unit
$F_{in}$	Input frequency range	DC		12	GHz
Min Att.	Minimum attenuation  S21  ( $V_S=0V; V_P=-5V$ )		3	4	dB
Max Att.	Maximum attenuation  S21  ( $V_S=-5V; V_P=0V$ )	20	23		dB
$P_{in1dB}$	Input 1dB comp. point (any Att., $F_{in} > 1GHz$ )	14			dBm

ESD Protection: Electrostatic discharge sensitive device. Observe handling precautions!

## Main Characteristics

$T_{amb.} = 25^{\circ}\text{C}$

Symbol	Parameter	Min	Typ	Max	Unit
$F_{in}$	Input frequency range	DC		12	GHz
Min Att.	Minimum attenuation $ S_{21} $ ( $V_S=0V; V_P=-5V$ )		3.0	4.0	dB
Max Att.	Maximum attenuation $ S_{21} $ ( $V_S=-5V; V_P=0V$ )	20	23		dB
$VSWR_{in}$	Input VSWR (any attenuation)		2.:1		
$VSWR_{out}$	Output VSWR (any attenuation)		2.:1		
$P_{in1dB}$	Input 1dB compression point.(any attenuation, 1 – 12GHz)	14	15		dBm

These values are representative of onboard measurements as defined in the application section.

ESD Protection: Electrostatic discharge sensitive device. Observe handling precautions!

## Absolute Maximum Ratings

$T_{amb.} = 25^{\circ}\text{C}$  <sup>(1)</sup>

Symbol	Parameter	Values	Unit
$V_P$	$V_P$ control voltage	-6V to +0.6V	V
$V_S$	$V_S$ control voltage	-6V to +0.6V	V
$P_{in}$	RF input power	20	dBm
$T_a$	Operating temperature range	-40 to +85	$^{\circ}\text{C}$
$T_{stg}$	Storage temperature range	-55 to +155	$^{\circ}\text{C}$

<sup>(1)</sup> Operation of this device above any one of these parameters may cause permanent damage.

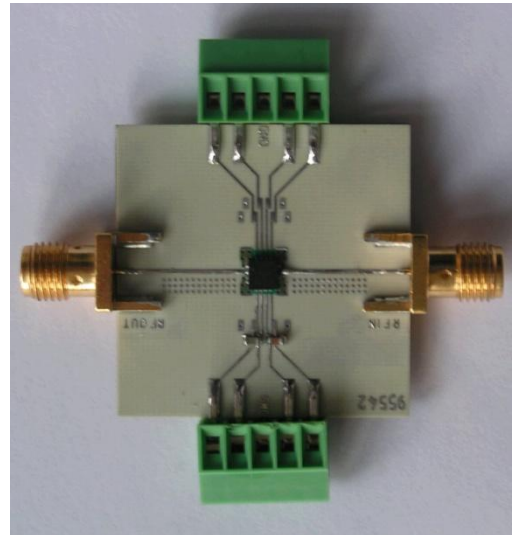
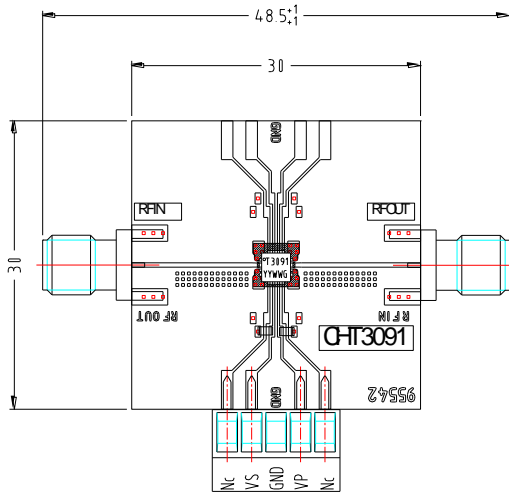
## Typical Bias Conditions

For an ambient Temperature of  $+25^{\circ}\text{C}$

Symbol	Pin No.	Parameter	Values	Unit
$V_s$	6	$V_S$ control voltage	-5 to 0	V
$V_p$	7	$V_P$ control voltage	0 to -5	V

All other pins are not used for this device (but  $RF_{in}$ : pin 2 and  $RF_{out}$ : pin 11).

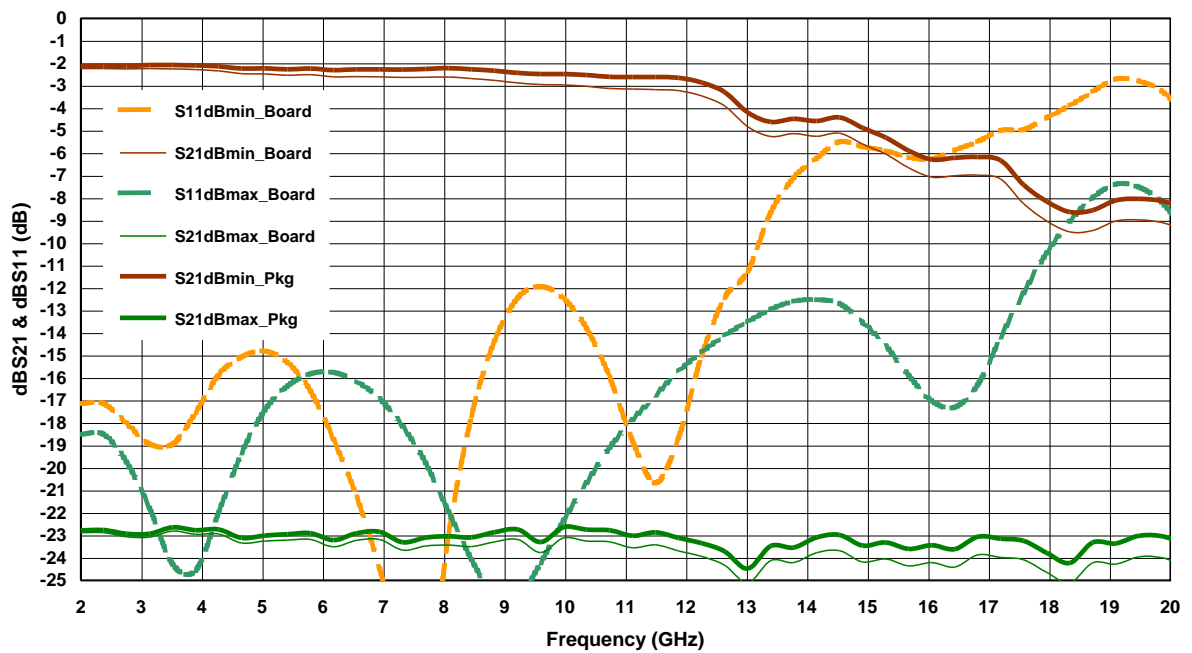
Demonstration Board (PCB)



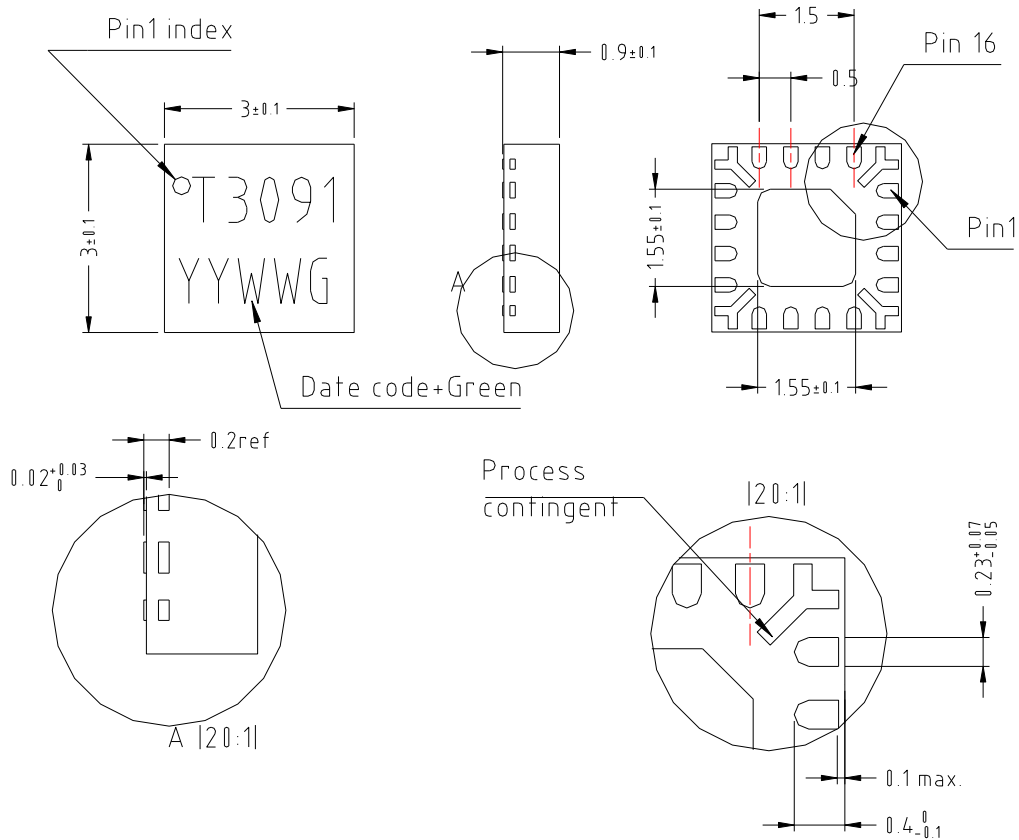
Typical Results

$T_{amb} = +25^{\circ}\text{C}$   
 $V_P = 0\text{V to } -5\text{V} \ \& \ V_S = -5\text{V to } 0\text{V}$

PCB Measured Performance  
 (T amb. 25°C)



## Package outline <sup>(1)</sup>

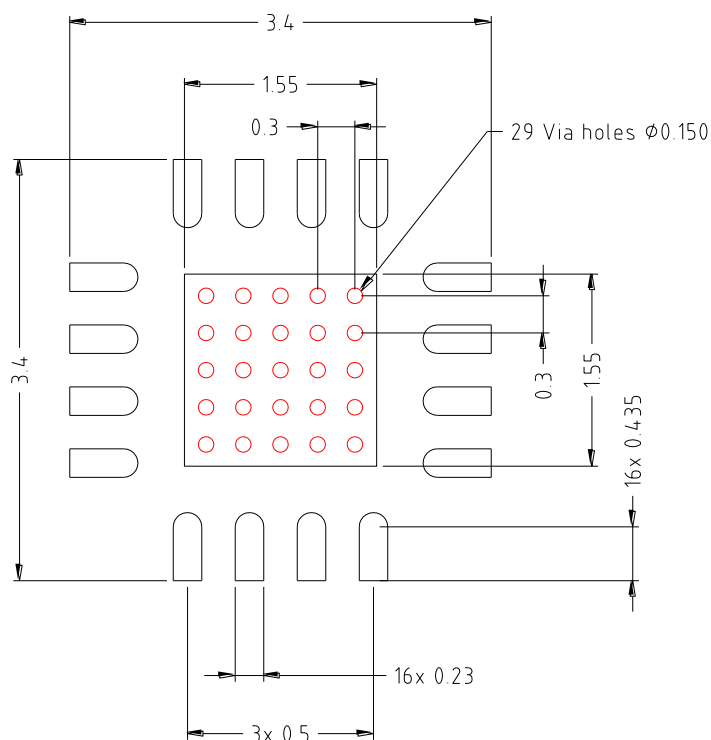


Matte tin, Lead Free (Green)	1- Gnd <sup>(2)</sup>	7- V <sub>P</sub>	13- Nc
Units : mm	2- RF in	8- Nc	14- Nc
From the standard : JEDEC MO-220	3- Gnd <sup>(2)</sup>	9- Nc	15- Nc
(V <sub>xxD</sub> )	4- Nc	10- Gnd <sup>(2)</sup>	16- Nc
17 (exposed pad)- Gnd <sup>(2)</sup>	5- Nc	11- RF out	
	6- V <sub>S</sub>	12- Gnd <sup>(2)</sup>	

<sup>(1)</sup> The package outline drawing included to this data-sheet is given for indication. Refer to the application note AN0017 (<http://www.ums-gaas.com>) for exact package dimensions.

<sup>(2)</sup> It is strongly recommended to ground all pins marked "Gnd" through the PCB board. Ensure that the PCB board is designed to provide the best possible ground to the package.

**Recommended footprint for 16L-QFN3x3**



*This land pattern is used for UMS prototyping assembly.  
For production, design must be adapted with regard to  
PCB tolerances and assembly process.*

**Note:** The RF ports are not DC blocked. There are no DC capacitors in the package.

**Package Information**

Parameter	Value
Package body material	RoHS-compliant
	Low stress Injection Molded Plastic
Lead finish	100% matte tin (Sn)
MSL Rating	MSL1

## Recommended package footprint

Refer to the application note AN0017 available at <http://www.ums-gaas.com> for package footprint recommendations.

## SMD mounting procedure

For the mounting process standard techniques involving solder paste and a suitable reflow process can be used. For further details, see application note AN0017.

## Recommended environmental management

UMS products are compliant with the regulation in particular with the directives RoHS N°2011/65 and REACH N°1907/2006. More environmental data are available in the application note AN0019 also available at <http://www.ums-gaas.com>.

## Recommended ESD management

Refer to the application note AN0020 available at <http://www.ums-gaas.com> for ESD sensitivity and handling recommendations for the UMS package products.

## Ordering Information

QFN 3x3 package:

CHT3091aQAG/XY

Stick: XY = 20

Tape & reel: XY = 21

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