

## Features

- Zero Insertion Loss
- Low Distortion Transformer Signal Coupling (0.01% max)
- Complete Ring Detector Circuit
- Low Power Hook Switch
- Electronic Inductor/Gyrator Circuit
- Solid State Surge Protection
- Transient Protection Zener Diodes
- Complete Hybrid Circuit (2-4 Wire Converter) Included
- Compatible with All Modem Chip Sets
- V.32 bis/V.34 Compatible

## Applications

- Modems
- Fax Machines
- Remote Data Acquisition
- Security Systems
- Voice Mail Systems
- PC Motherboard
- Computer Telephony
- Process Control
- Medical
- PBX
- Direct Broadcast Satellite

## Description

IXYS Integrated Circuits Division's Cybergate™ CYG2218 DAA module provides a complete telephone line interface circuit featuring 0dB insertion loss. It includes a 2-4 wire converter for transmit and receive signal separation in a small 1.07" x 1.07" x 0.4" package. The module provides a fast and cost effective solution for designs that require an interface to the telephone line. The module is designed to meet FCC part 68 requirements, thus providing a low risk design solution.

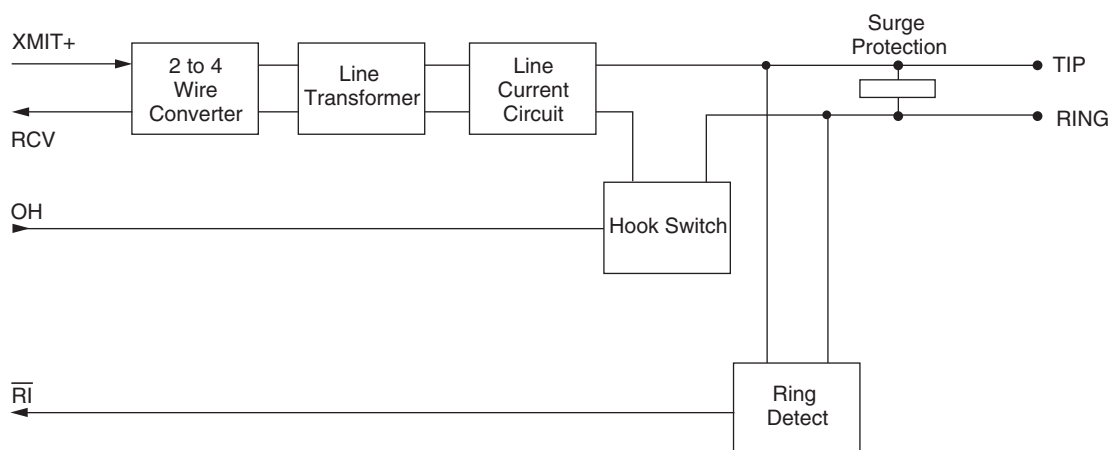
## Approvals

- UL Recognized: File E174201

## Ordering Information

Part	Description
CYG2218	DAA Module (18/Tube)

## Block Diagram



## 1 Specifications

### 1.1 Absolute Maximum Ratings @ 25°C

Symbol	Ratings	Units
Isolation Voltage	1000	V <sub>rms</sub>
Tip/Ring Load Current (Continuous)	120	mA
Hook Switch LED Drive Current	50	mA
Hook Switch LED Reverse Voltage	5	V
Ring Detect Phototransistor Voltage V <sub>CC</sub>	20	V
Relative Humidity (non-condensing)	10-85	%
Operational Temperature	0-70	°C
Storage Temperature	0-100	°C

*Absolute maximum ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at conditions beyond those indicated in the operational sections of this data sheet is not implied.*

### 1.2 DC Electrical Characteristics @ 25°C (Unless Otherwise Noted)

Parameter	Conditions	Minimum	Typical	Maximum	Units
On-Hook Impedance 2, 1 (R, T) per FCC 68.312	@ 100V <sub>DC</sub> Across Pins 1, 2	10	-	-	MΩ
Off-Hook Line Leakage Current 2, 1 (R, T) per FCC 68.312	@ 100V <sub>DC</sub> Across Pins 1, 2	-	-	10	μA
Power Supply Current @ V <sub>CC</sub>	V <sub>CC</sub> = 5V	4	5	6	mA
Hook Switch Control Current @ OH	V <sub>OH</sub> = 2.4V	3.5	4.1	5	mA
	V <sub>OH</sub> = 5V	11.8	12.4	13	
Hook Switch Control Voltage Off-Hook On-Hook	-	2	3	20	V
	-	-	0.2	0.5	

### 1.3 AC Signal Path Electrical Characteristics @ 25°C (Unless Otherwise Noted)

Parameter	Conditions	Minimum	Typical	Maximum	Units
Return Loss	600Ω, 1800Hz	39	40	-	dB
Insertion Loss Transmit Receive	600Ω, 1800Hz, Test Circuit 1	-1	0	+1	dB
	600Ω, 1800Hz, Test Circuit 2				
Frequency Response	300Hz - 3500Hz	-0.25	-	+0.25	dB
Longitudinal Balance On-Hook Off-Hook	Per FCC 68.310	60	-	-	dB
		40	-	-	
Transhybrid Loss	600Ω, 1800Hz	-	-32	-10	dB
Total Harmonic Distortion	600Ω, 1800Hz	-	-80	-	dB
DC Loop Current	-	20	-	120	mA

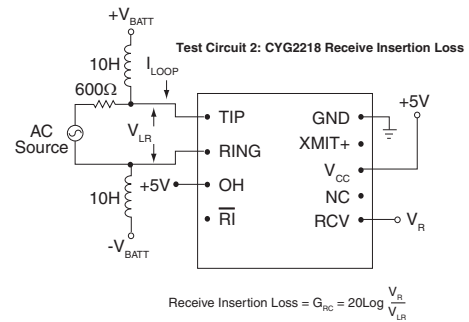
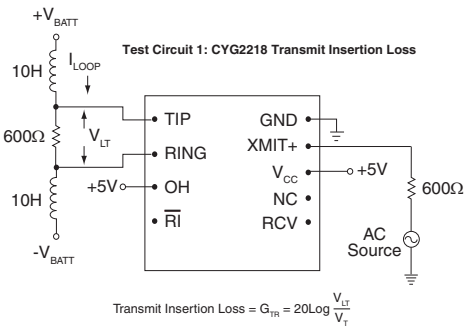
#### 1.4 Ring Detection Circuit Electrical Characteristics @ 25°C (Unless Otherwise Noted)

Parameter	Conditions	Minimum	Typical	Maximum	Units
Ringing Voltage Detection Range	-	20	-	150	V <sub>rms</sub>
Ringing Frequency Detection Range	-	15	-	70	Hz
Ringer Equivalence Number	-	-	0.8B	-	-
RING (Pin 5) Output Voltage (Pulsed)	@ V <sub>CC</sub> = +5V				
Logic "0", Ring Present		-	-	0.8	V
Logic "1", Ring Not Present		-	-	V <sub>CC</sub>	

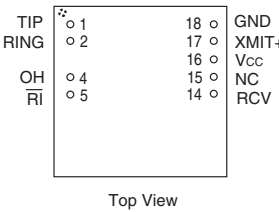
#### 1.5 Surge and Isolation Electrical Characteristics @ 25°C (Unless Otherwise Noted)

Parameter	Conditions	Minimum	Typical	Maximum	Units
Surge Protection Voltage Tip & Ring (Pins 1, 2)	-	-	-	300	V
Isolation Voltage, Pins (18, 17, 16, 15, 14, 5, 4) to (1, 2)	Per FCC 68.302	1000	-	-	V <sub>rms</sub>

#### 1.6 Test Circuits



#### 1.7 CYG2218 Pinouts and Definitions

Pinouts	Pin	Name	Function
 <p>Top View</p>	1	TIP	Connection to telephone line Tip connected through an external fuse.
	2	RING	Connection to telephone line Ring conductor.
	4	OH	Driving this pin high asserts the off-hook condition. The hook switch LED is current limited by an internal 300Ω resistor
	5	RI	Active LOW indicates an incoming ring signal. This is pulsed LOW by the AC ring signal, and is not a steady state LOW during ringing.
	14	RCV	Provides the analog output signal from the 2-4 wire converter of the CYG2218. RCV uses a 2.5 volt reference signal, and therefore must be capacitively coupled to host equipment that uses a ground reference.
	15	NC	No Connection
	16	V <sub>CC</sub>	Provides power to the CYG2218. Typically +5V, V <sub>CC</sub> should not exceed 20V.
	17	XMIT+	Provides the analog input signal from the 2-4 wire converter of the CYG2218. XMIT+ uses a 2.5 volt reference signal, and therefore must be capacitively coupled to host equipment that uses a ground reference.
	18	GND	Connection to host system ground.

## 2 Manufacturing Information

### 2.1 Handling and Assembly Recommendations

The CYG2218 is not hermetically sealed, and should not be exposed to any liquid-based rinsing processes. IXYS Integrated Circuits Division recommends two (2) approaches: (1) the modem should be installed in a wave-soldering process that uses a no-clean soldering flux that will mostly evaporate during the normal wave-soldering processes, (2) the modem should be soldered in by hand after the rest of the card is wave-soldered.

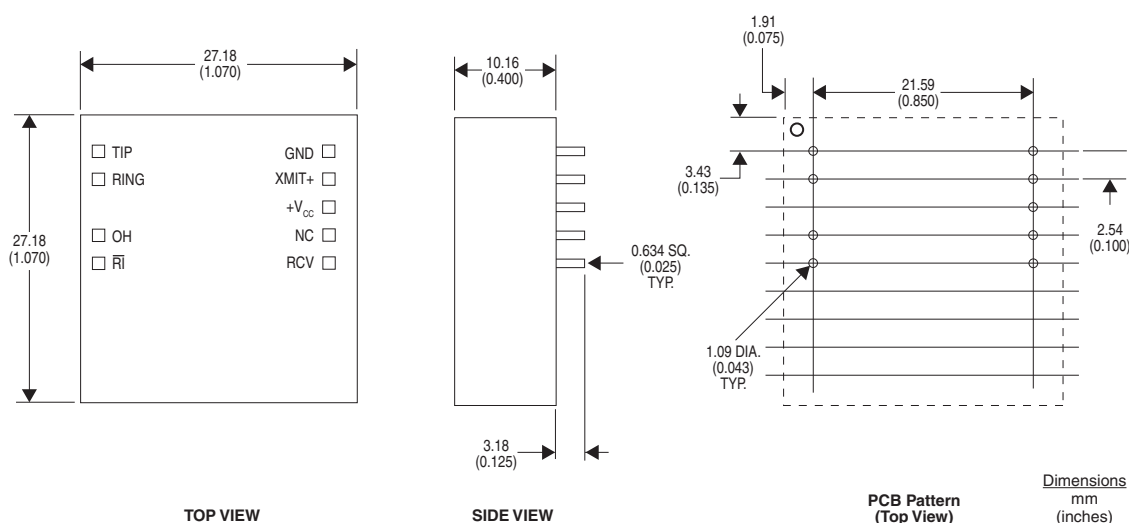
### 2.2 Reflow Profile

This product has a maximum solder temperature as shown below.

Device	Maximum Temperature
CYG2218	260°C

### 2.3 Mechanical Dimensions

#### 2.3.1 CYG2218



For additional information please visit our website at: [www.ixysic.com](http://www.ixysic.com)

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