

**Features**

- Zero insertion loss
- Low distortion transformer signal coupling (0.01% max)
- Complete ring detector circuit
- Low power hookswitch
- Electronic inductor/gyrator circuit
- Solid state surge protection
- Transient protection zeners
- Complete hybrid circuit (2-4 wire converter) included
- Compatible with all modem chip sets
- V.32 bis/V.34 compatible

**Description**

Clare'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

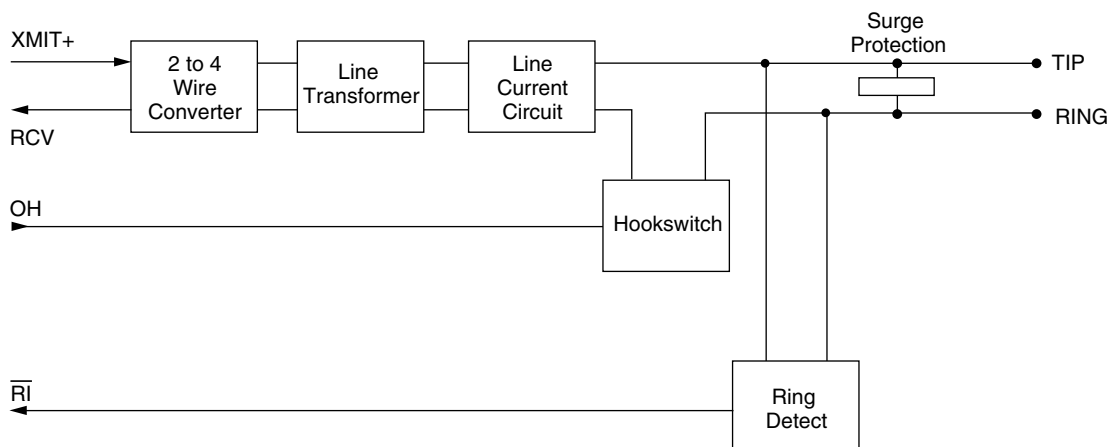
**Applications**

- Modems
- Fax machines
- Remote data acquisition
- Security systems
- Voice mail systems
- PC motherboard
- Computer telephony
- Process control
- Medical
- PBX
- Direct broadcast satellite

**Ordering Information**

Part #	Description
CYG2218	DAA Module (18/Tube)

**Block Diagram**



**Handling and Assembly Recommendations**

The CYG2218 products are not hermetically sealed and should not be exposed to any liquid-based rinsing processes. Clare recommends two (2) approaches. The modem should either use a no clean soldering flux that would mostly evaporate during the normal wave soldering processes, or be soldered by hand after the rest of the card is wave soldered.



## CYG2218

## Absolute Maximum Ratings (@ 25° C)

Parameter	Min	Typ	Max	Units
Isolation Voltage	-	-	1000	$V_{RMS}$
Operational Temperature	0	-	70	°C
Storage Temperature	0	-	100	°C
Relative Humidity (Non-Condensing)	10	-	85	%
Soldering Temperature	-	-	260	°C
Tip/Ring Load Current (continuous)	-	-	120	mA
Hookswitch LED Drive Current	-	-	50	mA
Hookswitch LED Reverse Voltage	-	-	5	V
Ring Detect Phototransistor Voltage $V_{CC}$	-	-	20	V

<sup>1</sup> Derate Linearly 1.33 mw / oC

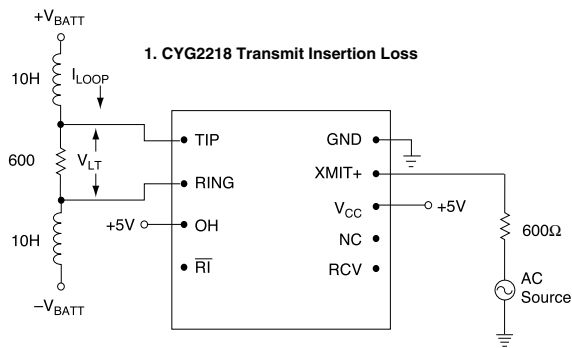
<sup>2</sup> Derate Linearly 3.67 mw / oC

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 these or any other conditions beyond those indicated in the operational sections of this data sheet is not implied. Exposure of the device to the absolute maximum ratings for an extended period may degrade the device and effect its reliability.

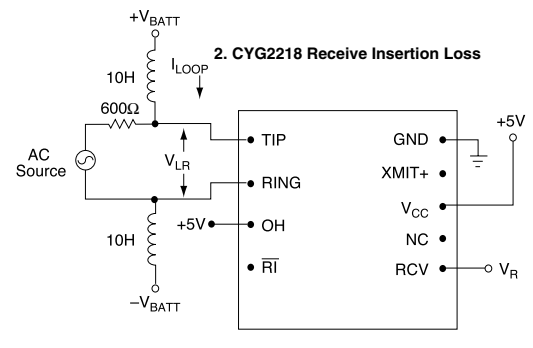
## Electrical Characteristics

Parameter	Conditions	Min	Typ	Max	Units
<b>DC Electrical Characteristics</b>					
On-Hook Impedance 2,1 (R,T) per FCC 68.312	@100V $V_{DC}$ across pins 1,2	10	-	-	MΩ
Off-Hook Line Leakage Current 2,1 (R,T) per FCC 68.312	@100V $V_{DC}$ across pins 1,2	-	-	10	μA
Power Supply Current @ $V_{CC}$	$V_{CC}=5V$	4	5	6	mA
Hookswitch Control Current @ (OH)	@ $V_{OH}=2.4V$	3.5	4.1	5.0	mA
	@ $V_{OH}=5.0V$	11.8	12.4	13	mA
Hookswitch Control Voltage	Off-Hook	2.0	3.0	20	V
	On-Hook	-	0.2	0.5	V
<b>AC Signal Path Electrical Characteristics</b>					
Return Loss	600Ω, 1800Hz	39	40	-	dB
Insertion Loss	600Ω, 1800Hz				
	Transmit Test Circuit 1	-1.0	0	+1.0	dB
Receive Test Circuit 2	-1.0	0	+1.0	dB	
Frequency Response	300-3500Hz	-0.25	-	+0.25	dB
Longitudinal Balance	On-Hook	60	-	-	dB
	Off-Hook	40	-	-	dB
Transhybrid Loss	600Ω, 1800Hz	-	-32	-10	dB
Total Harmonic Distortion	600Ω, 1800Hz	-	-80	-	dB
DC Loop Current	-	20	-	120	mA
<b>Ring Detection Circuit Characteristics</b>					
Ring Voltage Detection Range	-	20	-	150	$V_{RMS}$
Ring Frequency Detection Range	-	15	-	70	Hz
Ringer Equivalence Number	-	-	0.8B	-	-
RING (Pin 5) Output Voltage (Pulsed) Logic '0', Ring present Logic '1', Ring not present	$V_{CC}=+5V$				
		-	-	0.8	V
		-	-	$V_{CC}$	V
<b>Surge and Isolation Characteristics</b>					
Surge Protection Voltage Tip and Ring (Pins 1,2)	-	-	-	300	V
Isolation Voltage (Pins 18,17,16,15,14,5,4,to1,2)	Per FCC 68.302	1000	-	-	$V_{RMS}$

### Test Circuits



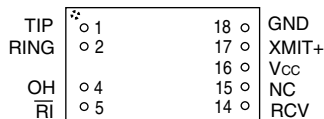
$$\text{Transmit Insertion Loss} = G_{TR} = 20 \text{Log} \frac{V_{LT}}{V_T}$$



$$\text{Receive Insertion Loss} = G_{RC} = 20 \text{Log} \frac{V_R}{V_{LR}}$$

### Package Pinout

#### CYG2218



Top View

#### CYG2218 Pinouts & Definitions

PIN#	Name	Function
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 hookswitch 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 which 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 which uses a ground reference.
18	GND	Connection to host system ground.



# CLARE

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