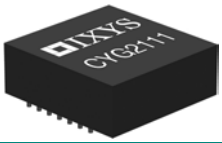


CYG2111
Cybergate™ DAA

Features

- Low Distortion Transformer Signal Coupling
- Complete Ringing Detector Circuit
- Low Power Hook Switch
- Electronic Inductor/Gyrator Circuit
- Surge Protection
- V.32 bis/V.34 Compatible
- PTT and Safety Regulations for CTR-21 Countries
- PC Board Mountable

Applications

- Home Medical Devices
- Plant Monitoring Equipment
- Security/Alarm Systems
- Utility Meters
- Modems
- Voice Mail Systems
- Vending Machines
- Elevator Control Boxes
- Network Routers
- PBX Systems
- PC Mother Boards
- Telephony Applications
- Digital Telephone Answering Machines

Description

IXYS Integrated Circuits Division's CYG2111 Series DAA Module provides a complete telephone line interface circuit 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 CYG2111 is specifically designed to meet PTT and safety regulations for CTR-21 regulated countries.

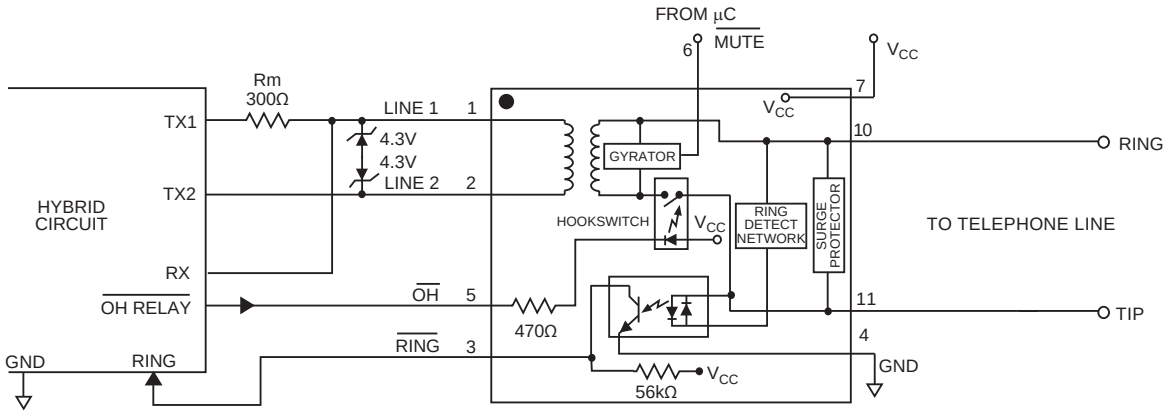
Approvals

- BSI Certified

Ordering Information

Part	Description
CYG2111	CYBERGATE Module (CTR-21 Countries) (18/Tube)

Typical Application



CYG2111

1 Specifications

1.1 Absolute Maximum Ratings @ 25°C

Symbol	Ratings	Units
Isolation Voltage, Input to Output	1500	V_{rms}
Tip/Ring Load Current (Continuous)	60	mA
Hook Switch LED Drive Current	50	mA
Hook Switch LED Reverse Voltage	5	V
Ring Detect Phototransistor Voltage V_{CC}	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	$V_{Tip-Ring} = 100V_{DC}$	10	-	-	MΩ
Off-Hook Line Leakage Current	$V_{Tip-Ring} = 100V_{DC}$	-	-	10	µA
Off-Hook Relay Supply Current	$V_{CC} = +5V_{DC}$	7	8	9	mA
Hook Switch Power Source	-	4.75	5	20	V
DC Loop Current	-	5	-	60	mA
Mute Relay Supply Current	$V_{CC} = +5V_{DC}$	7	8	9	mA

[1] For V_{CC} > +12V, select an external resistor (R) such that ((V_{CC} - 1.4) / R) < 50mA

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

Parameter	Conditions	Minimum	Typical	Maximum	Units
Return Loss	300Hz to 3500Hz (600Ω)	14	25	-	dB
Insertion Loss					
Transmit	Test Circuit 1	-	-	7.5	dB
Receive	Test Circuit 2				
Frequency Response	300Hz to 3500Hz	-0.25	-	+0.25	dB
Longitudinal Balance					
On-Hook	-	60	-	-	dB
Off-Hook	-	40	-	-	
Total Harmonic Distortion	f = 350Hz, P = -10dBm	-	-80	-	dB
Secondary Load Impedance	Line 1 & Line 2	-	300	-	Ω
Primary Source Impedance	Tip & Ring	-	600	-	Ω

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

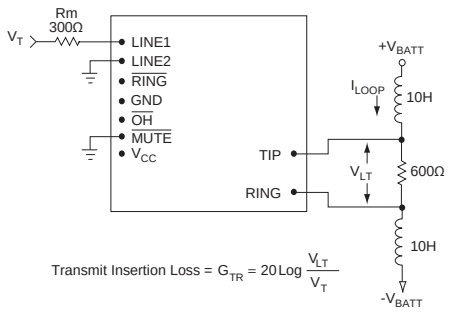
Parameter	Conditions	Minimum	Typical	Maximum	Units
Ringing Voltage Detection Range	-	29	-	-	V_{rms}
Ringing Frequency Detection Range	-	15	-	70	Hz
Ringing Impedance	f = 25Hz	-	18	-	kΩ
RING (Pin 9) Output Voltage (Pulsed)					
Logic “0”, Ring Present		-	-	0.8	V
Logic “1”, Ring Not Present		-	-	V_{CC}	

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

Parameter	Conditions	Minimum	Typical	Maximum	Units
Surge Protection Voltage Tip & Ring (Pins 11, 10)	-	-	-	300	V
Isolation Voltage, Pins (1, 2, 3, 4, 5, 6, 7) to (10, 11)	60 Seconds	-	-	1500	V_{rms}

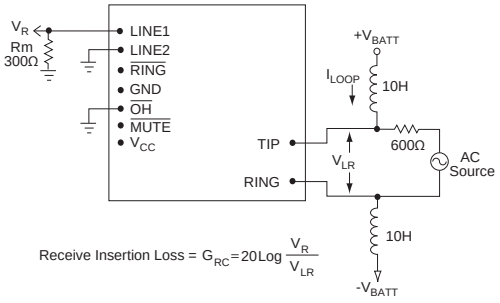
1.6 Test Circuits

Test Circuit 1: CYG2111 Transmit Insertion Loss



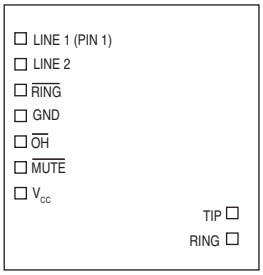
$$\text{Transmit Insertion Loss} = G_{TR} = 20\,\text{Log}\,\frac{V_{LT}}{V_T}$$

Test Circuit 2: CYG2111 Receive Insertion Loss



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

1.7 CYG2111 Pinouts and Definitions



Top View

Pin#	I/O	Name	Function
1	I/O	LINE 1	Transformer isolated audio signal coupling path for the telephone line.
2	I/O	LINE 2	Transformer isolated audio signal coupling path for the telephone line.
3	O	$\overline{\text{RING}}$	Active low indicates incoming ring signal. This is pulsed low by the AC ring signal at the ring frequency.
4	I	GND	Connected to host system ground.
5	I	$\overline{\text{OH}}$	Driving this pin low asserts the off-hook condition. The hook switch LED is current limited by an internal 470Ω resistor.
6	I	$\overline{\text{MUTE}}$	Driving this pin low activates the mute relay for pulse dialing. See Figure 1. The mute relay LED is current limited by an internal 470Ω resistor.
7	I	V_{CC}	Provides power to the hook switch LED. Voltage is usually +5V (for 8mA LED current). LED is current limited by an internal 470Ω resistor. V_{CC} should not exceed 20V.
10	I/O	RING	Connection to telephone line Ring conductor.
11	I/O	TIP	Connection to telephone line Tip conductor.

2 Off-Hook Transient Requirement

In order to meet Section 4.6.1 of the CTR-21 requirement, it is necessary to assert the $\overline{\text{MUTE}}$ pin of the CYG2111 for a duration of 80ms after the $\overline{\text{OH}}$ pin is driven low as shown in Figure 1. This can be accomplished via the host firmware or external hardware as shown in Figure 2 and Figure 3 respectively.

Figure 1. MUTE and OH Timing

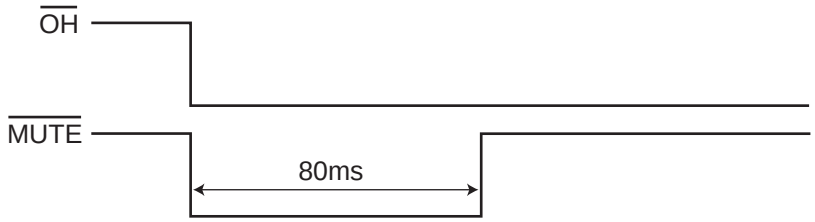


Figure 2.

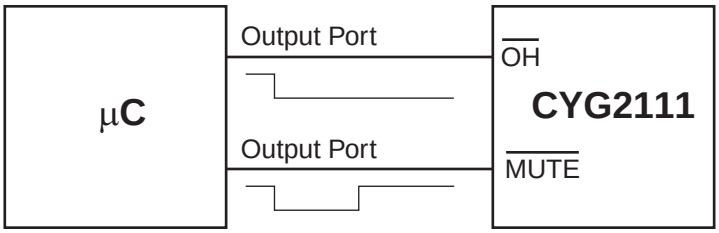
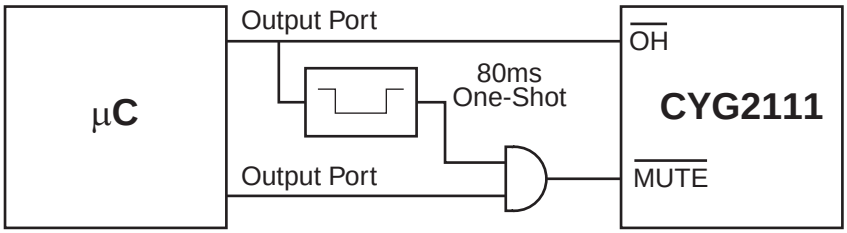


Figure 3.



Asserting the $\overline{\text{MUTE}}$ pin causes the internal gyrator circuit in the CYG2111 to be bypassed, allowing low impedance pulse dialing to be performed by pulsing the $\overline{\text{OH}}$ pin. In Figure 2, the micro-controller output port going to the $\overline{\text{MUTE}}$ pin is used as a shunt for low impedance dialing, and is asserted for 80ms when the $\overline{\text{OH}}$ signal is asserted. This method is preferred when the user has control of the host firmware, and can easily write a subroutine to accomplish this function.

For users who do not have easy access to the modem firmware, some external hardware can be added to accomplish the same function. Figure 3 shows a monostable multivibrator (one-shot) such as an NE555 timer that is designed to generate an 80ms low-going pulse upon the assertion of the $\overline{\text{OH}}$ signal. This 80ms pulse is ANDed with the low impedance pulse dial shunt signal which overrides the 80ms signal when pulse dialing is enabled. The pulse dial shunt signal is included as a standard output pin in most modem chip sets. This pin is activated when an ATDP command is issued to the modem.

3 Manufacturing Information

3.1 Handling and Assembly Recommendations

The CYG2111 products are 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.

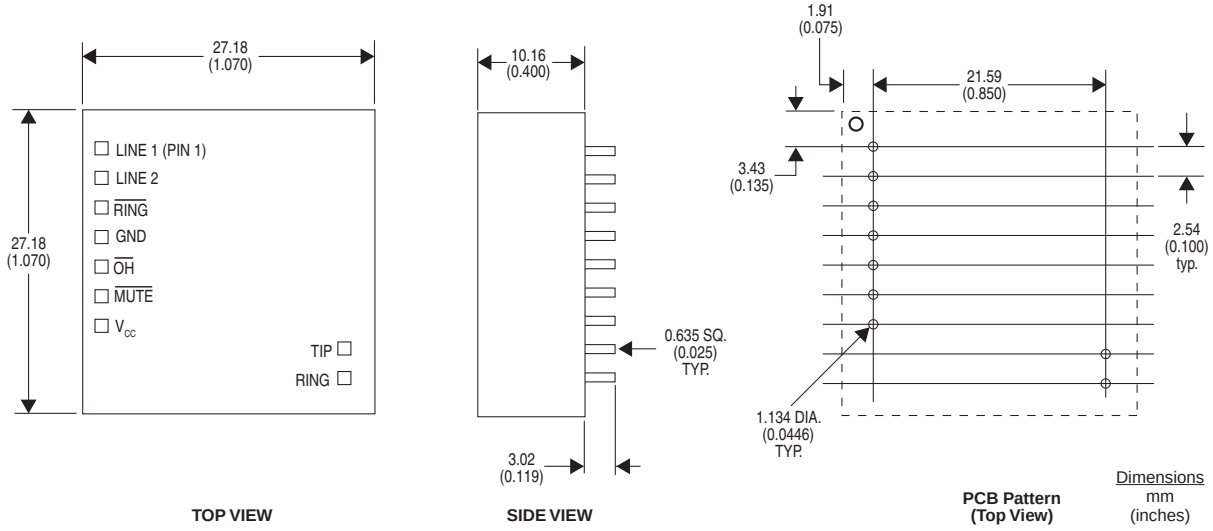
3.2 Reflow Profile

This product has a maximum solder temperature as shown below.

Device	Maximum Temperature
CYG2111	260°C

3.3 Mechanical Dimensions

3.3.1 CYG2111



For additional information please visit our website at: www.ixysic.com

Specification: DS-CYG2111-R03

1/31/2019