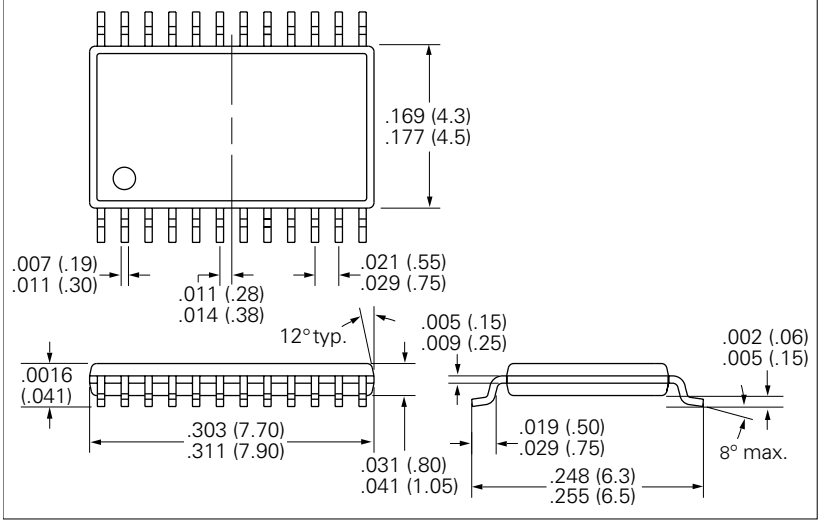
DL207DAA

Line Side IC for Optical DAA 2000
Part of the DAA2000 Kit

Package Dimensions in Inches (mm)

Integrated Circuit



FEATURES

- **V.32, V.34, and V.90 (56 Kb/s) Compatibility**
- **Supports Ring Detect and Wake On Ring**
- **On-hook Monitor Provides for Caller ID and Voice/Fax/Data Steer Functions**
- **On-hook Monitor Draws <1 mA**
- **Over Current and Thermal Limiting**
- **On-hook Line Voltage Measurement**
- **Line Current Sense**
- **Low Gain Drift**
- **Universal Applications**
- **100% Low Profile Surface Mount**
- **Compatible to FCC Part 68**

DESCRIPTION

The DL207DAA is part of the DAA2000 circuit consisting of the DL207DAA Line-Side Integrated Circuit, a DM207DAA Modem-Side Integrated Circuit and two IL388DAA Linear Optocouplers. When configured along with other components, the final circuit provides a full featured Optical DAA.

The DL207DAA is packaged in a standard 24-pin TSSOP package. A complete DAA circuit can be assembled directly onto a mother board using less than 4 square inches of board space, eliminating costly special or hand insert operations.

The DAA2000 is a full featured Optical DAA that takes into consideration the needs of today's portable and multimedia equipment. Added features of the DAA2000 such as line current sense, snooping and line V/F make the circuit ideal for enhanced modems which support speaker phones, answering machines, simultaneous voice and fax, caller ID and voice/fax/data steering.

Maximum Ratings

Supply voltage, V_{DD}–V_{SS} ..... 10 V
Input voltage ..... V_{SS}–0.5 V to V_{DD}+0.5 V
Package dissipation at 25° ambient ..... 1.2 W
Derate linearly from 25°C ..... 0.03 W/°C
Storage temperature ..... –20°C to +85°C
Operating temperature ..... 0°C to +70°C
Derate operating temperature linearly
from 70°C at 50 mA loop current to ..... 50°C at 120 mA

Table 1. Pin Configurations—DL207DAA (Line Side)

Pin	Symbol	I/O	Function
1	HLDR	O	Hold Resistor – Normally a 16.5 Ω resistor is tied between this point and V_{SS}. All of the loop current, less 4.0 mA passes through this resistor. This resistor value sets the 600 Ω AC termination impedance, effects, and transhybrid balance.
2	LEDCT	O	LED Cathode – The receive linear optocoupler (DAA067 U3, pin 1) LED cathode connection. This pin provides sink drive current for the LED. The printed circuit board layout should minimize capacitive coupling between this trace and the SRVAN and TXAN traces.
3	HLDCAP	I	Hold Capacitor – Line holding capacitor is tied between pin # 3 and pin # 23 (V_{SS}). A 68 nF capacitor in the holding circuit behaves like a 2.5 H inductor in the loop.
4	HKP	O	Hook Positive – Positive hook switch driver output. Tied to the emitter of a PNP high voltage bipolar transistor.
5	HKN	O	Hook Negative – Negative hook switch driver output. Tied to the base of a PNP high voltage bipolar transistor.
6	LINPWR		Diagnostic pin – do not connect.
7	HLFWV	I	Halfwave – Connecting this pin to V_{DD} selects halfwave ring detection (1 pulse/ring cycle). Disconnecting this pin from V_{DD} selects full wave ring detection (2 pulses/ring cycle).
8, 9	LR2, LR1	I	Line Resistor – A 10 MΩ resistor is tied between each of these inputs and each side of the line. These inputs provide operating power and sense current for the ring detect circuit during on-hook (idle) mode. During off-hook operation, these inputs provide line voltage sensing for power limiting shutdown.
10	END		A 150 kΩ resistor is tied between this pin and CEN. This is part of the first stage transmit bias control low pass filter when off-hook, and determines ring detect transimpedance gain for LR1 when IDLE.
11	CEN		Another 150 kΩ resistor is tied between this pin and C1A. This is part of the first stage transmit bias control low pass filter when OFF-HOOK and determines ring detect transimpedance gain for LR2 when IDLE.
12, 13	C1A, C1B		A 15 nF capacitor (C1) is tied between these two pins. This sets the RC time constant for the first stage of the low pass filter of the transmit automatic bias control circuits.
14	BIASEN		Diagnostic pin – do not connect.
15	C2		A 150 nF capacitor (C2) is tied between this point and line side V_{SS}. This sets the integrator response for the second stage low pass filter of the transmit automatic bias control circuit.
16	TXCT	I	TX Cathode – The transmit photo diode return is connected to pin # 8 of the IL388DAA (U4).
17	TXAN	I	TX Anode – The transmit photo diode input is connected to pin # 7 of the IL388DAA (U4). This input is sensitive to noise relative to V_{SS} and should be routed to minimize pickup from other signal sources.
18	ONHKMCAP	I	On Hook Monitor Capacitor – A series capacitor and resistor is tied from this pin to the bridge negative output. This connection is optional if Caller ID is not required.
19	VFCAP	I	Voltage to Frequency Converter Capacitor – A 33 nF to 68 nF capacitor is tied between this pin and V_{DD}. A 20 MΩ resistor is tied between this pin and the bridge negative output to implement the line voltage to frequency oscillator. This V/F function is optional and is only enabled while On Hook.
20	HIN		Diagnostic pin – do not connect.
21	SRVAN	I	Servo Anode – The receive servo photo diode is connected to pin # 3 of the IL388DAA (U3). This input is sensitive to noise relative to V_{SS} and should be routed to minimize pickup from other signal sources.
22	SRVCT	I	Servo Cathode – The receive servo photo diode current return is connected to pin # 4 of the IL388DAA (U3). This input is clamped to about 2.7 V.
23	V_{SS}	P	Line side return/negative voltage supply.
24	V_{DD}	P	Line side return/positive voltage supply.

Table 2. DAA Circuit Operating Characteristics, T_A=25°C*

Parameter	Min.	Typ.	Max.	Unit
Ring Detection Threshold	—	15	—	V_{RMS}
Ringer Equivalent Load	—	0.65	—	REN
Transmit THD	—	–70	—	dB
Receive THD	—	–70	—	dB
Transmit in band noise	—	–80	—	dBm
Receive in band noise	—	–80	—	dBm
Transmit Frequency Response, –3 dB	100	—	80,000	Hz
Receive Frequency Response, –3 dB	100	—	80,000	Hz
Transmit Signal Level	—	—	+3.0	dBm
Receive Signal Level	—	—	+3.0	dBm
Transhybrid Loss	10	20	—	dB
Return Loss	10	30	—	dB
Off–Hook AC impedance (Fig. 1)	—	600	—	Ω
On–Hook AC impedance (Fig. 1)	150 K	—	—	Ω
On–Hook DC resistance	10 M	—	—	Ω
Leakage to ground	100 M	—	—	Ω
Transmit Gain	–0.5	0	+0.5	dB
Receive Gain	–7.0	–6.0	–5.0	dB
Loop DC current	15	—	120	mA
Current Limit Threshold	130	—	160	mA
Isolation Voltage, T & R to ground	2500	—	—	V
Supply Voltage (modem side)	3.0	—	7.0	V
Supply Current (modem side, active)	—	10	—	mA
Command input level (HIGH)	2.7	—	—	V
Command input level (LOW)	—	—	0.7	V

Note:

* Based on Figure 2. Some parameters can be affected by external components.

Figure 1. DAA2000 Functional Block Diagram

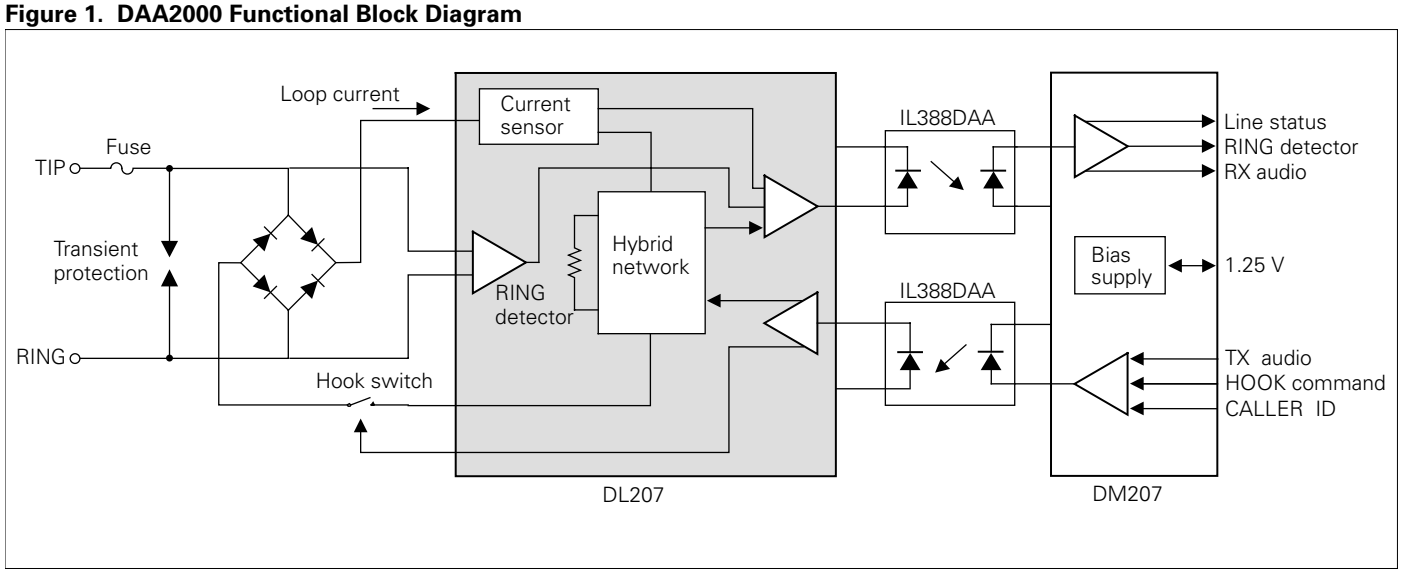


Figure 2. DAA2000 Reference Schematic (North American Version)