

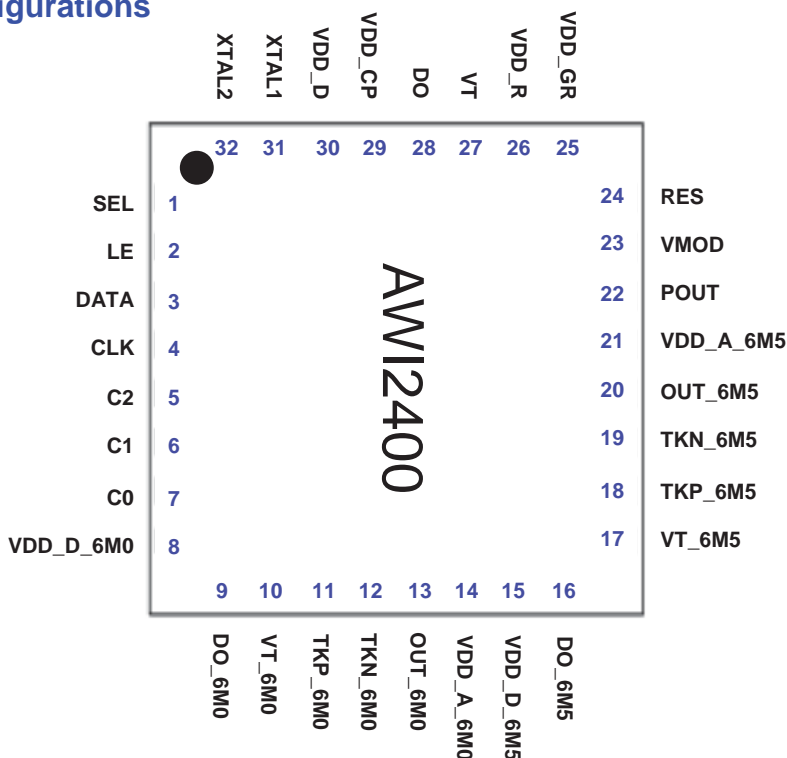
Product Description

The AWI2400 is a single chip and low power consumption transmitter designed for analog A/V sender and wideband digital FSK transmitter operating in the 2.4GHz ISM band. The transmitter IC consists of a fully integrated frequency synthesizer, a power amplifier, a crystal oscillator and a stereo audio modulator. The IC is provided in 32-lead QFN5X5 package and is designed to provide a fully functional FM/FSK transmitter.

Main Features

- 3V power Supply
- 4 channel operation for analog A/V sender and digital FSK transmission applications
- Channel select by use of c0,c1 and c2 pins for a set of pre-defined frequencies
- Programmable user-defined channel frequencies by use of the 3-wire serial interface
- Two audio sub-carriers generated with PLL for high frequency accuracy and stability

Pin Configurations

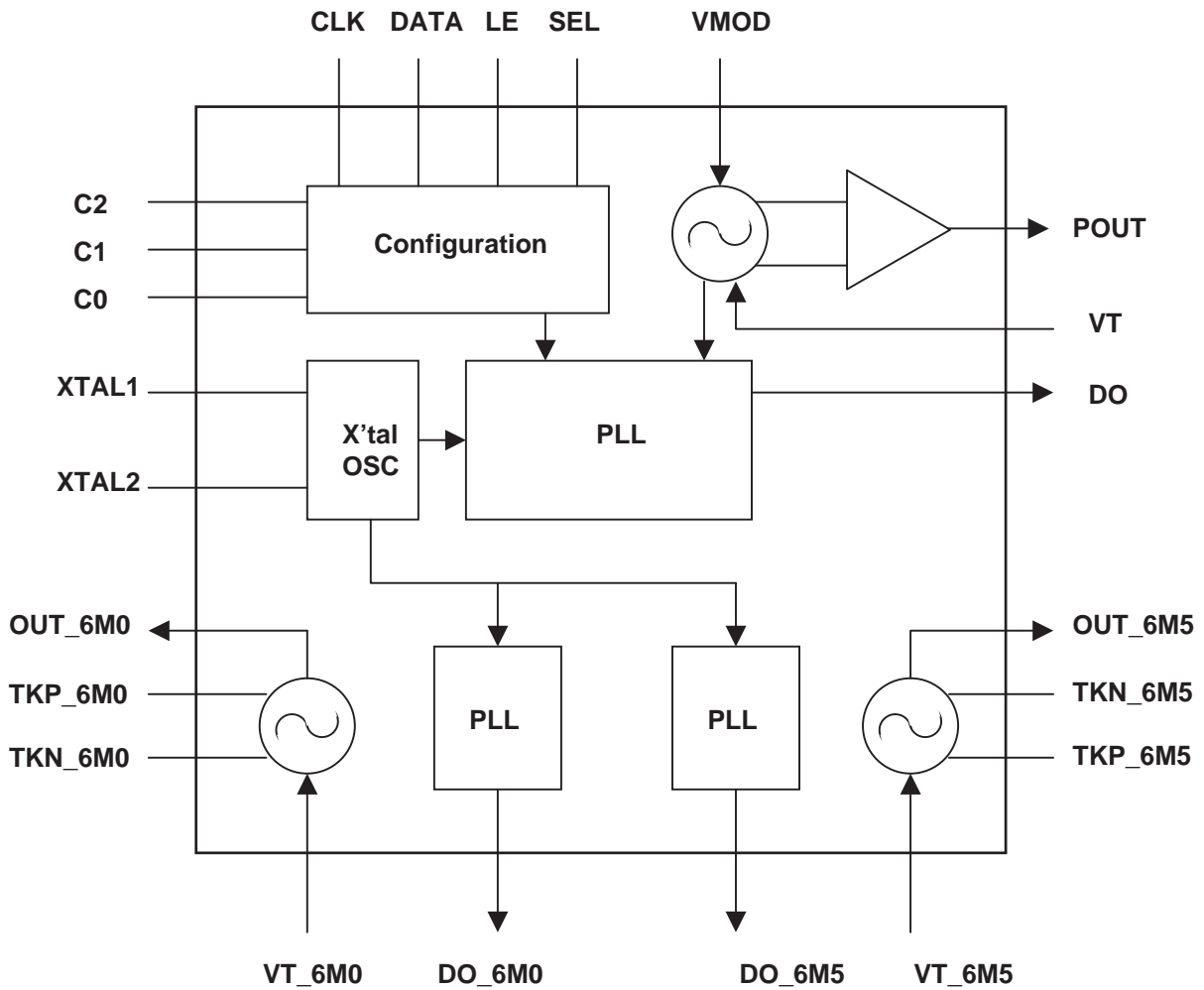




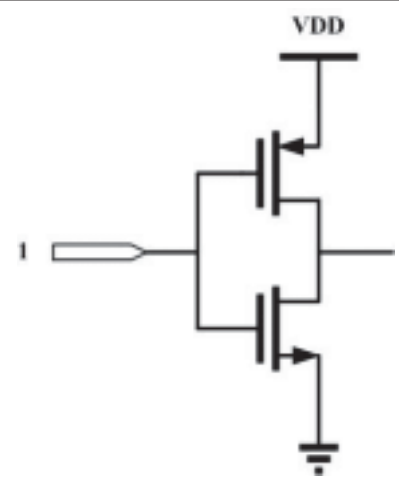
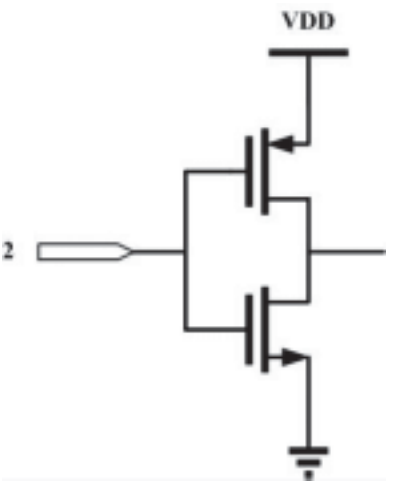
AWI2400

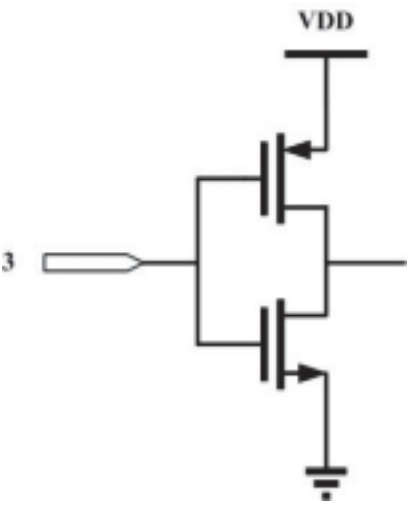
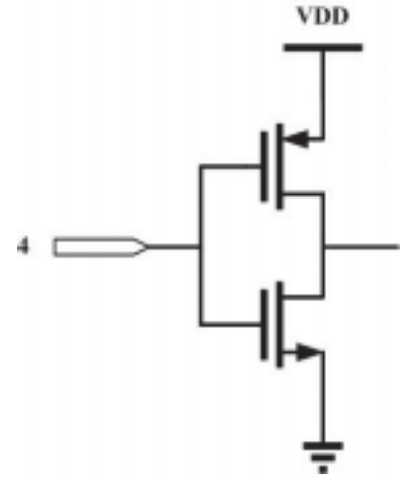
2.4GHz Wireless Transmitter

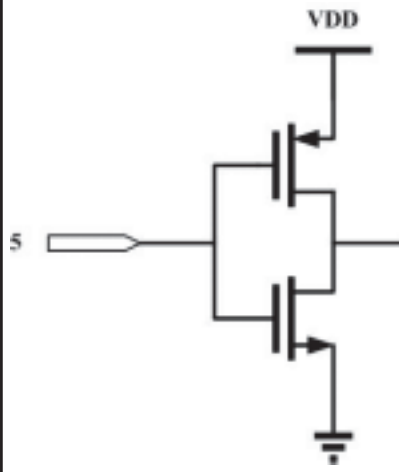
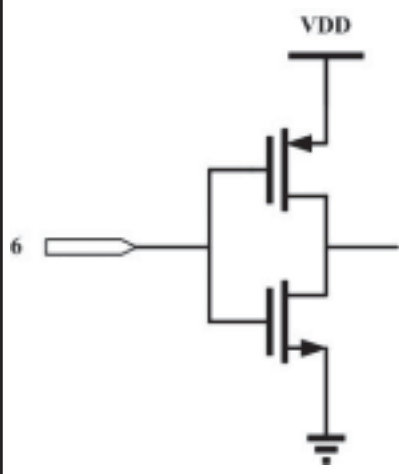
Transmitter Block Diagram

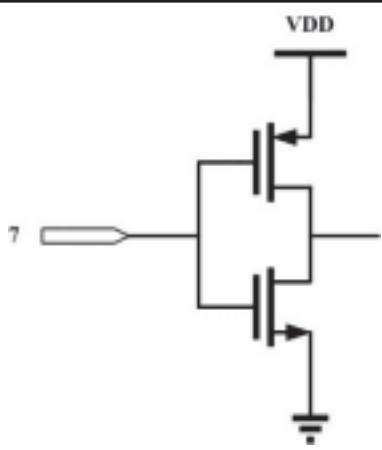
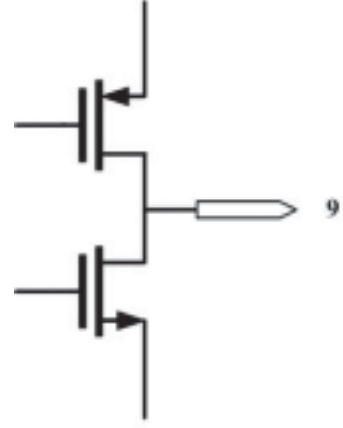



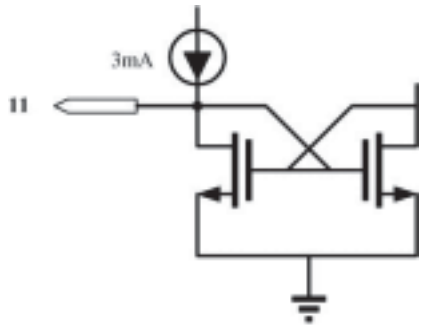
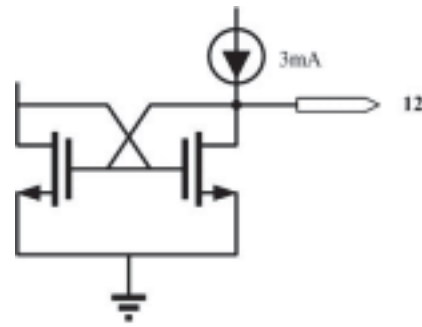
Pin Descriptions

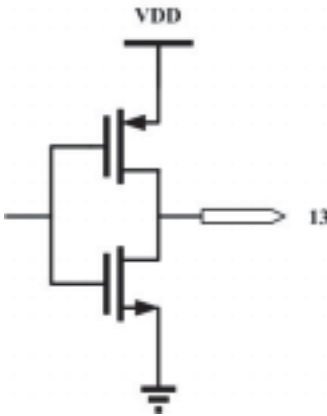
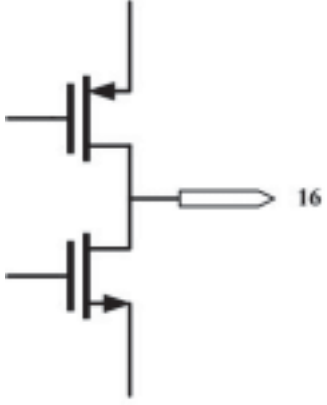
Pin No.	Name	Description	Equivalent Schematic
1	SEL	<p>If PIN1 is unconnected (Internal pull high), the channel can be selected from a set of pre-defined channel frequencies by the settings of C0,C1,C2.</p> <p>If PIN1 is connected to GND, the channel frequencies can be programmed by an external MCU via the 3-wire serial interface, LE, DATA and CLK.</p> <p>See Note1</p>	
2	LE	<p>Load Enable Input of 3-wire Series Interface</p> <p>PIN2 is enabled when SEL (PIN1) is connected to ground</p>	


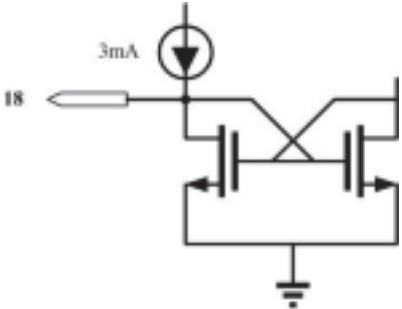
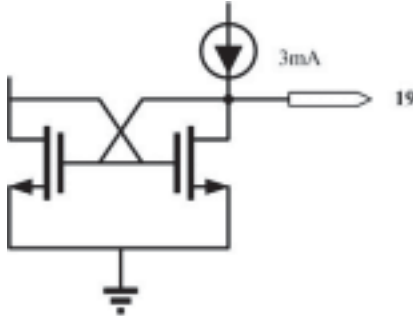
Pin No.	Name	Description	Equivalent Schematic
3	DATA	<p>DATA Input of 3-wire Series Interface</p> <p>PIN3 is enabled when SEL (PIN1) is connected to ground</p>	
4	CLK	<p>CL CK Input of 3-wire Series Interface</p> <p>PIN is active when SEL (PIN1) is connected to ground</p>	

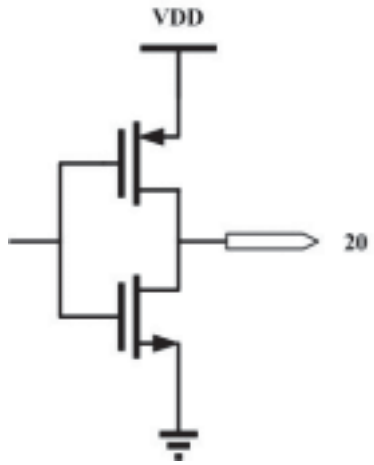
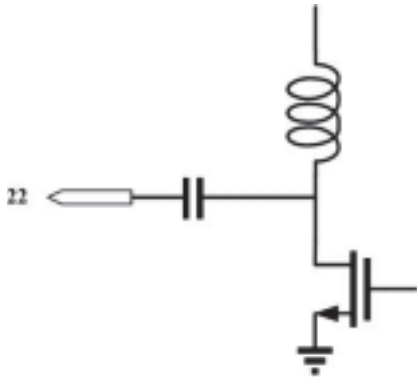
Pin No.	Name	Description	Equivalent Schematic
	C	<p>Internal pull high, set PIN Low to select C 3 (2 0M)</p> <p>PIN is enabled when SEL (PIN1) is open</p> <p>See Note1</p>	
	C	<p>Internal pull high, set PIN Low to select C 2 (2 32M)</p> <p>PIN is enabled when SEL (PIN1) is open</p> <p>See Note1</p>	


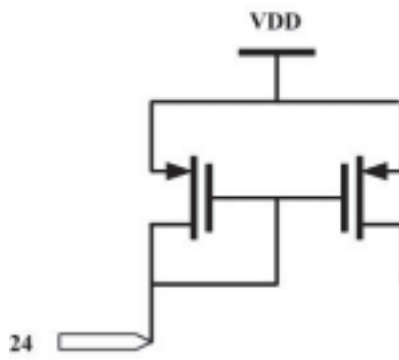

Pin No.	Name	Description	Equivalent Schematic
	C	<p>Internal pull high, set PIN Low to select C₁ (2.1 MΩ)</p> <p>PIN is enabled when SEL (PIN1) is open</p> <p>See Note1</p>	
	DD D	<p>Power supply for digital portion of .0M Audio Modulator</p> <p>Suggestion value of bypass capacitor C21 is 0.1μ.</p>	
	D	<p>Charge Pump output of .0M PLL</p>	

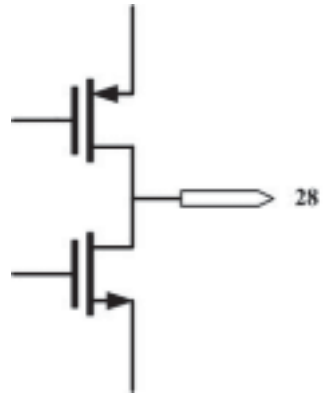
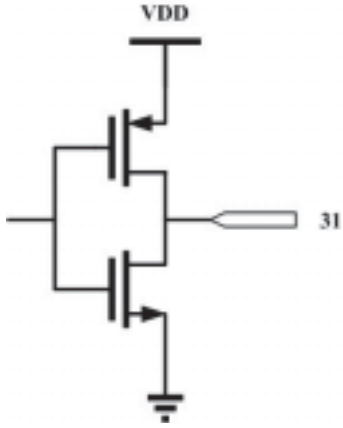
Pin No.	Name	Description	Equivalent Schematic
	T	<p>10MΩ C Tuning Voltage Control Input</p> <p>Typical range of V_{t} is 1.0V to 1.5V.</p>	
	TKP	<p>One of the two connection pins for external Tuning components of 10MΩ C.</p> <p>Shorter traces for the interconnection of L and C are recommended. Suggestion values of L and C2 are 33uH and 10pF.</p>	
	TKN	<p>One of the two connection pins for external Tuning components of 10MΩ C.</p> <p>Shorter traces for the interconnection of L and C are recommended. Suggestion values of L and C2 are 33uH and 10pF.</p>	

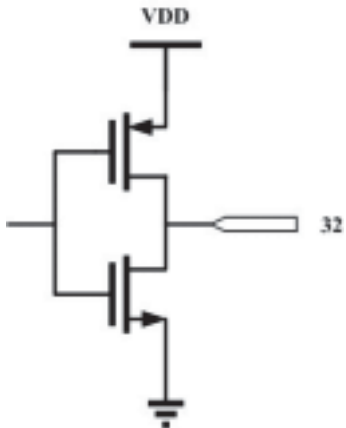
Pin No.	Name	Description	Equivalent Schematic
3	T	.0M Audio Modulator output	
4	DD A	Power supply for analog portion of .0M Audio Modulator. Suggestion values of bypass capacitor C2 is 0.1u .	
	DD D	Power supply for digital portion of . M Audio Modulator. Connect to DD A M0 (PIN1).	
	D	. M PLL Charge Pump output	

Pin No.	Name	Description	Equivalent Schematic
	T	<p>1. M C Tuning Voltage Control Input</p> <p>Typical range of t is 1.0 1. .</p>	
	TKP	<p>One of the two connection pins for external Tan components of 1. M C .</p> <p>Shorter traces for the interconnection of L and C are recommended. Suggestion values of L and C2 are 33u and . p .</p>	
	TKN	<p>One of the two connection pins for external Tan components of 1. M C .</p> <p>Shorter traces for the interconnection of L and C are recommended. Suggestion values of L and C2 are 33u and . p .</p>	

Pin No.	Name	Description	Equivalent Schematic
	T	. M Audio Modulator output	
	DD A	Power supply for analog portion of . M Audio Modulator. Suggestion value of bypass capacitor C1 is 0.1u .	
	P T	2. G Amplifier output. Typical output power range is 2d m 1d m.	

Pin No.	Name	Description	Equivalent Schematic
3	D	MSK modulation signal input of 2.4GHz	
4	ES	External bias resistor for setting 2.4GHz bias current For optimal phase noise performance, a suggestion value of R1 is 12KΩ	
	DD	Power supply for Guarding. Suggestion values of bypass capacitors C1 and C2 are 0.1uF and 100pF.	
	DD	Power Supply for 2.4GHz Connect to VDDG (PIN2).	
	T	2.4GHz Tuning Voltage Control Input, Connect to LP output	

Pin No.	Name	Description	Equivalent Schematic
	D	2. G PLL Charge Pump output	
	DD CP	Power supply for Charge Pump. Suggestion value of bypass capacitor C is 0.1u .	
3	DD P	Prescaler Power Supply Connect to DD CP (PIN2)	
3	TAL	ne of the two connection pins of external crystal See Note2	

Pin No.	Name	Description	Equivalent Schematic
3	TAL	<p>ne of the two connection pins of external crystal</p> <p>See Note2</p>	

Maximum Rating

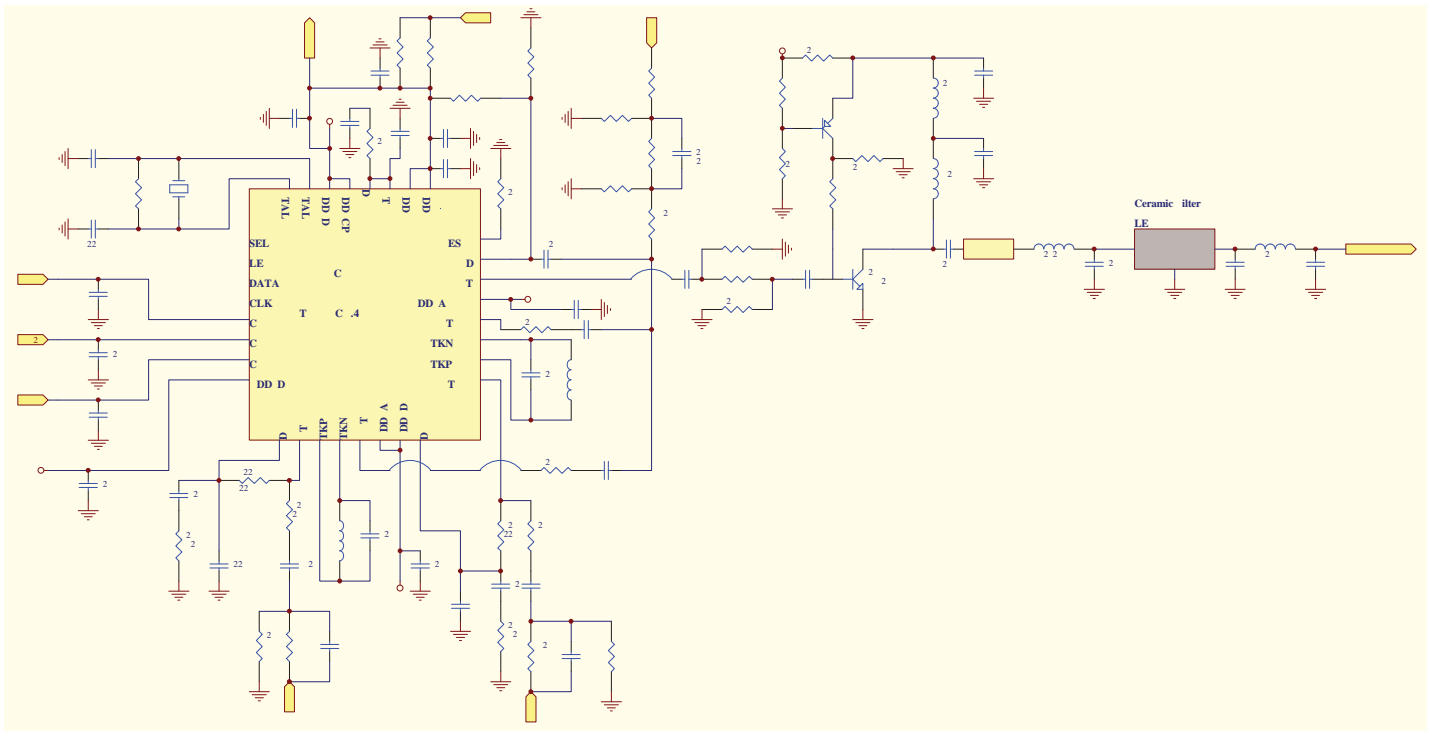
Parameter	Maximum Rating	Units
Supply Voltage (V _{DD})		
Storage Temperature	-20 ~ 0	°C

Note: This device is ESD sensitive. Handling and assembly of this device should only be done at proper ESD protection environment.

Electrical Characteristics

Parameter	Description	Min.	Typ.	Max.	Unit
Operation Temperature		-10		0	°C
Supply Voltage		3.0		3.3	V
Current Consumption			32		mA
Output Power		-2	1	2	dBm
Reference Frequency					M
Crystal Accuracy			30		ppm
Operation Frequency (SEL _{High})		2.410, 2.432, 2.450, 2.470			M
-30dBm Audio Modulator Output Level		2		3	pp
-10dBm Audio Modulator Output Level		2		3	pp

Application Circuit 6 OTX Block Diagram



Note

1. Channel Selection

If SEL(PIN1) is unconnected (internal pull high) then connect **C2, C1, C0** to a 3 pins DIP switch to select the channel according to Table1.

Note **C2, C1, C0** are internal pull high and are enabled when connected to ground. When more than one pins are low, the lowest channel is the selected one (e.g. C 1 is selected when both C0 and C1 are low). If no pins are connected to ground, C is the default channel.

C	frequency	C	C	C
	44			
	43			
3	4			
4	4			

Table1

2. Crystal Oscillator

Figure.1 shows the recommended crystal oscillator circuit diagram. The resistor R is connected in parallel with the crystal and between the input and output of the inverter to provide a negative DC feedback. Usually, the range of its resistance value is 100KΩ ~ 200KΩ.

The capacitors C1 and C2 provide the necessary load capacitance for resonating the crystal. Their values can be determined by the following equation

$$C_L = \frac{C_1 + C_2}{2} + C_s$$

where CL is the load capacitance of the crystal whose value can be obtained from the data sheet provided by the crystal manufacturer and Cs is the stray capacitance on the printed circuit board. A typical value of Cs is 0.3 pF. Larger values of C1 and C2 increase frequency stability but decrease loop gain. Suggested values of C1, C2 and R are 22pF, 30pF and 1MΩ respectively.

Note

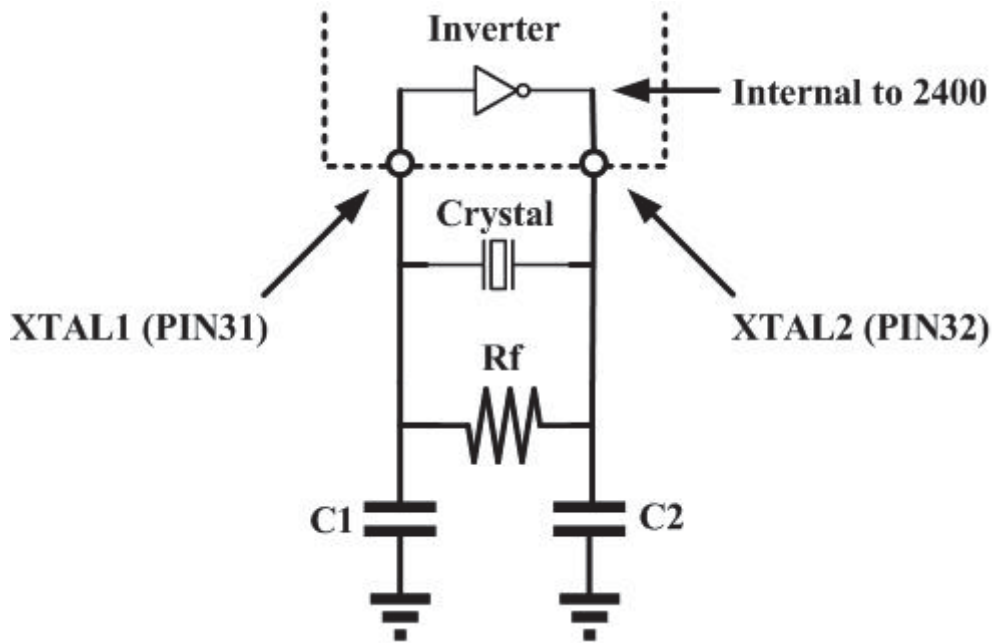
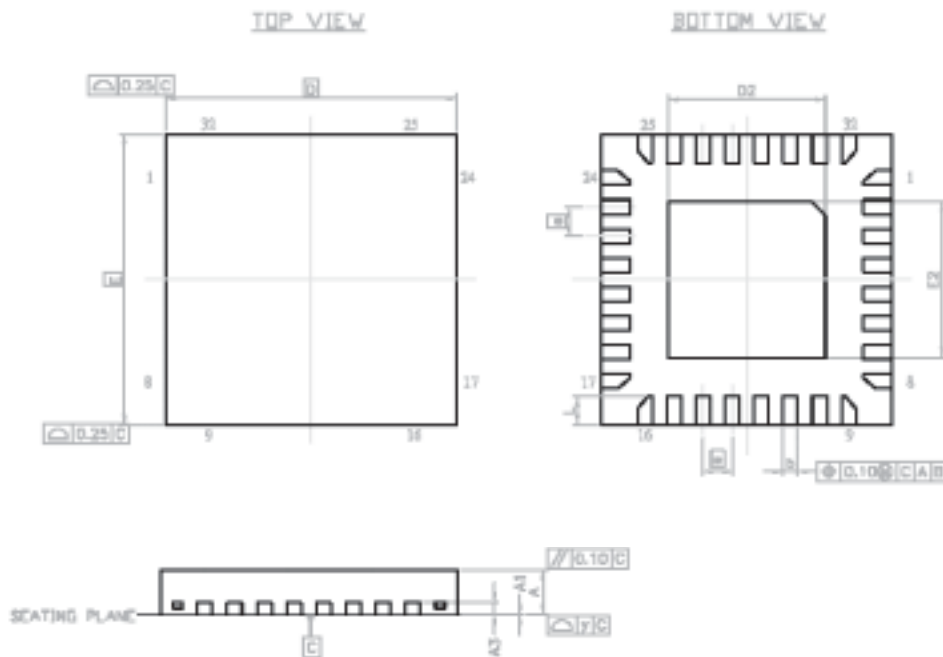



figure1

Package Information

N 2 Outline Dimensions



SYMBOL	DIMENSION (MM)			DIMENSION (MIL)		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.70	0.75	0.80	27.6	29.5	31.5
A1	0	0.02	0.05	0	0.8	2.0
A3	0.20 REF			9.8 REF		
b	0.18	0.25	0.30	7.1	9.8	11.8
D	5.00 BSC			196.9 BSC		
D2	2.60	2.70	2.80	102.4	106.3	110.2
E	5.00 BSC			196.9 BSC		
E2	2.60	2.70	2.80	102.4	106.3	110.2
	0.50 BSC			19.7 BSC		
L	0.30	0.40	0.50	11.8	15.7	19.7
y	0.10			3.9		