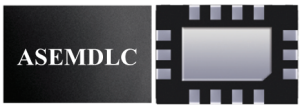
LOW JITTER PIN CONFIGURABLE LVDS-CMOS DUAL OUTPUT ULTRA MINIATURE PURE SILICON™ CLOCK OSCILLATOR



Life Size
3.2 x 2.5 x 0.85 mm

ASEMDLC

RoHS/RoHS II compliant

Moisture Sensitivity Level – MSL 1

FEATURES:

- Ultra Miniature Pure Silicon™ Clock Oscillator
- Pin Configurable LVDS-CMOS Dual output
- Low Jitter (Period Jitter RMS 2.5ps typical)
- Low Integrated Phase Jitter 2ps max
- Excellent Shock & Vibration Immunity

APPLICATIONS:

- Consumer Electronics
- Storage Area Networks
- SATA, SAS, Fibre Channel
- Passive Optical Networks
- EPON, 10G-EPON, GPON, 10G-PON
- Ethernet
- 1G, 10GBASE-T/KR/LR/SR, and FCoE
- PCI Express

Low Jitter
Pin Configurable
LVDS-CMOS Dual Output
3G MEMS

STANDARD SPECIFICATIONS:

Pre-programmed Output Frequency Configuration

Ordering Info	Freq (MHz)	Freq Select Bits [FS2, FS1, FS0] – **Default is [111]**							
		000	001	010	011	100	101	110	**111**
Frequency Configuration 1	f_{OUT1} (LVDS)	148.5	74.25	156.25	150	125	125	100	**100**
	f_{OUT2} (CMOS)	74.25	74.25	125	125	25	50	50	**75**
Custom Configuration	f_{OUT1}	Contact Abracon for customized configurations							
	f_{OUT2}								

Frequency select bits [FS2, FS1, FS0] are weakly tied high so if left floated, the default setting will be [111] and the device will output the associated frequency highlighted in Bold. If other frequency combinations are required, please contact Abracon for customized configuration. Please see the configurable frequency range in the section 2.0

Key Electrical Specifications

Parameters		Minimum	Typical	Maximum	Units	Notes
Configurable frequency range	LVDS	2.3		460	MHz	Commercial, Industrial temp range
	CMOS	2.3		170		
Operating Temperature		-20		+70	°C	See options
Storage Temperature		-55		+150	°C	
Overall Frequency Stability[*1]		-50		+50	ppm	See options
Supply Voltage (Vdd)		+2.25		+3.6	V	
Startup Time				5	ms	
Enable Time				20	ns	
Disable Time				5	ns	
Disable Current			21	23	mA	
Tri-state Function (Standby/Disable)		"1" (VIH≥0.75*Vdd) or Open: Oscillation "0" (VIL<0.25*Vdd) : Hi Z			V	40kΩ pull-up resistor embedded
Aging		-5.0		+5.0	ppm	First year
Supply Current (I_{dd})			49		mA	LVDS output: RL=100Ω, F01=125MHz CMOS output: CL=15pF, F02=75MHz

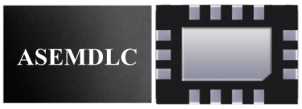
*1. Frequency stability includes frequency variations due to initial tolerance, temp. and power supply voltage

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Life Size

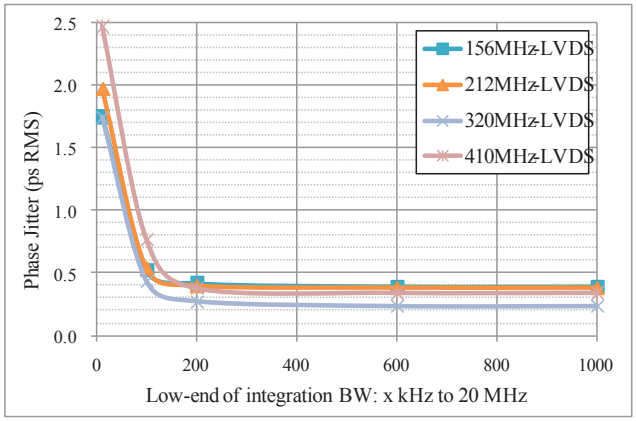
3.2 x 2.5 x 0.85 mm

Key Electrical Specifications (continued)

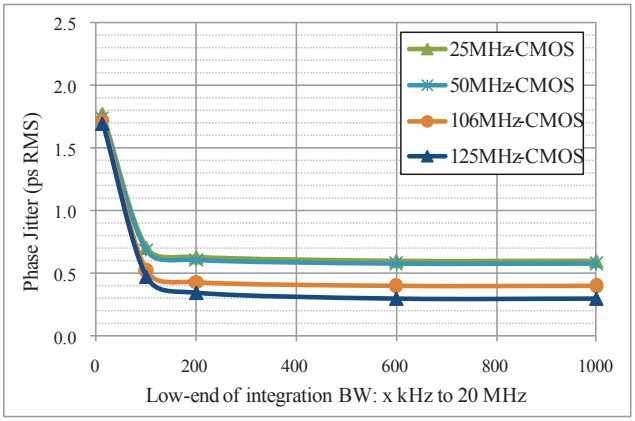
LVDS Output (Fout1)						
Parameters		**Minimum**	**Typical**	**Maximum**	**Units**	**Notes**
Output Offset Voltage		1.125		1.40	V	RL=100 Ω, Differential
Delta Offset Voltage				50	mV	
Peak to Peak Output Swing			350		mV	Single-Ended
Rise Time	Tr		200	350	ps	RL=50 Ω, CL=2pF
Fall Time	Tf		200	350	ps	20% to 80%
Duty Cycle		48		52	%	Differential
Period Jitter RMS (J_{PER})			2.5		ps	F01= 125MHz
Integrated Phase Jitter (J_{PH})			0.28	2	ps	200kHz ~ 20MHz, @156.25MHz
			0.40	2		100kHz ~ 20MHz, @156.25MHz
			1.70	2		12kHz ~ 20MHz, @156.25MHz

CMOS Output (Fout2)						
Parameter		**Minimum**	**Typical**	**Maximum**	**Units**	**Notes**
Output Logic Level	V_{OH}	0.9*V_{dd}			V	I=±6mA
	V_{OL}			0.1*V_{dd}		
Rise Time	Tr		1.1	2.0	ns	CL=15pF
Fall Time	Tf		1.3	2.0	ns	20% to 80%
Duty Cycle		45		55	%	
Period Jitter RMS (J_{PER})			3.0		ps	F01= 125MHz
Integrated Phase Jitter (J_{PH})			0.30	2	ps	200kHz ~ 20MHz, @125MHz
			0.38	2		100kHz ~ 20MHz, @125MHz
			1.70	2		12kiHz ~ 20MHz, @125MHz

PHASE JITTER



LVDS

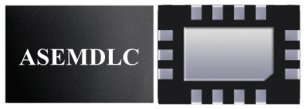


CMOS

LOW JITTER PIN CONFIGURABLE LVDS-CMOS DUAL OUTPUT ULTRA MINIATURE PURE SILICON™ CLOCK OSCILLATOR

ASEMDLC

RoHS/RoHS II compliant



Life Size

3.2 x 2.5 x 0.85 mm

ABSOLUTE MAXIMUM RATINGS

Item	Minimum	Maximum	Unit	Condition
Supply Voltage	-0.3	+4.0	V	
Input Voltage	-0.3	V_{dd}+0.3	V	
Junction Temp.		+150	°C	
Storage Temp.	-55	+150	°C	
Soldering Temp.		+260	°C	40sec max
ESD HBM MM CDM		 4,000 400 1,500	V	

OPTIONS AND PART IDENTIFICATION:

ASEMDLC - ☐ - ☐ - ☐

Operating Temp.
Blank: -20°C ~ +70°C
L: -40°C ~ +85°C

Overall Freq. Stability
Blank: ±50ppm
R: ±25 ppm

Packaging
Blank*: Tube (110pcs / Tube)
T: Tape & Reel (1kpcs / reel)
T3: Tape & Reel (3kpcs / reel)
T5: Tape & Reel (5kpcs / reel)

* Due to the immediate availability of stock and the qty of the order, the parts may be delivered as BULK: Cut Tape, Loose parts in Antistatic Bag or in Tube(s). The MOQ per the series will still apply for Tube packaging.

Frequency Combination	Freq (MHz)	Freq Select Bits [FS2, FS1, FS0] – **Default is [111]**							
		000	001	010	011	100	101	110	**111**
Standard Configuration	f_{OUT1} (LVDS)	148.5	74.25	156.25	150	125	125	100	**100**
	f_{OUT2} (CMOS)	74.25	74.25	125	125	25	50	50	**75**
Custom Configuration	f_{OUT1}	Contact Abracon for customized configurations							
	f_{OUT2}								

Default condition: Frequency select bits [FS2, FS1, FS0] are all left floated. FS2, FS1, FS0 are pulled high [111] Frequency combination and default frequency is customized upon request. Please contact Abracon for the frequency combinations.

CONFIGURABLE CMOS OUTPUT STRENGTH (TR/TF)

CMOS Output (Tr/Tf) are configurable by the control pins OS2, OS1 and OS0. The combinations are described in the table below.

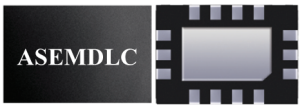
	Output Drive Strength Bits [OS2, OS1, OS0] - **Default [111]**							
	000	001	010	011	100	101	110	**111**
Tr (ns)	2.1	1.7	1.6	1.4	1.3	1.3	1.2	**1.1**
Tf (ns)	2.5	2.4	2.4	2	1.8	1.6	1.3	**1.3**

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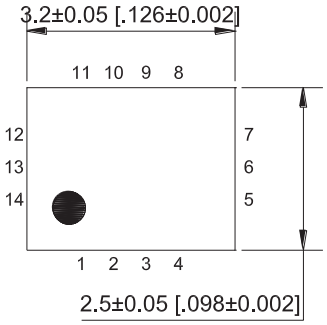
RoHS/RoHS II compliant

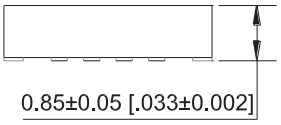


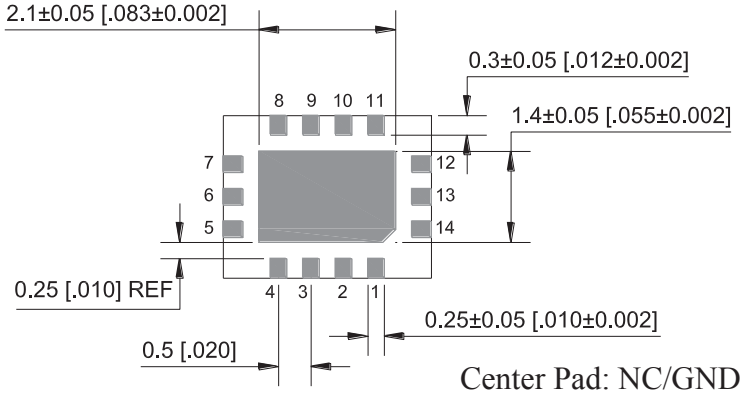
Life Size

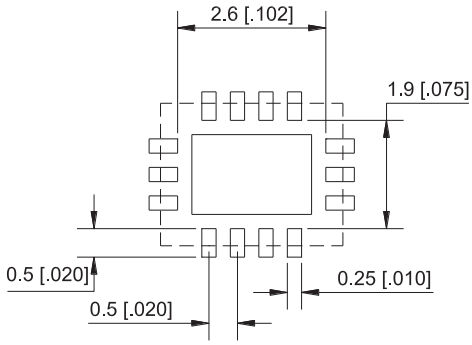
3.2 x 2.5 x 0.85 mm

MECHANICAL DIMENSIONS









Recommended Land Pattern

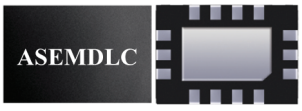
Pin No.	Pin Name	Pin Type	Description
1	Enable	I	Enables outputs when high and disables (tri-state) them when low
2	NC	NA	Leave unconnected or grounded
3	OS0	I	Least significant bit for output drive strength selection for CMOS
4	GND	Power	Ground
5	FS0	I	Least significant bit for frequency selection
6	FS1	I	Middle bit for frequency selection
7	FS2	I	Most significant bit for frequency selection
8	Output1+	O	Positive LVDS Output 1
9	Output1-	O	Negative LVDS Output 1
10	OS1	I	Middle bit for output drive strength selection for CMOS
11	Output 2	O	CMOS output
12	VDD2	Power	Power Supply 2 for CMOS Output
13	VDD	Power	Power Supply
14	OS2	I	Most significant bit for output drive strength selection for CMOS

Dimensions: mm (inches)

LOW JITTER PIN CONFIGURABLE LVDS-CMOS DUAL OUTPUT ULTRA MINIATURE PURE SILICON™ CLOCK OSCILLATOR

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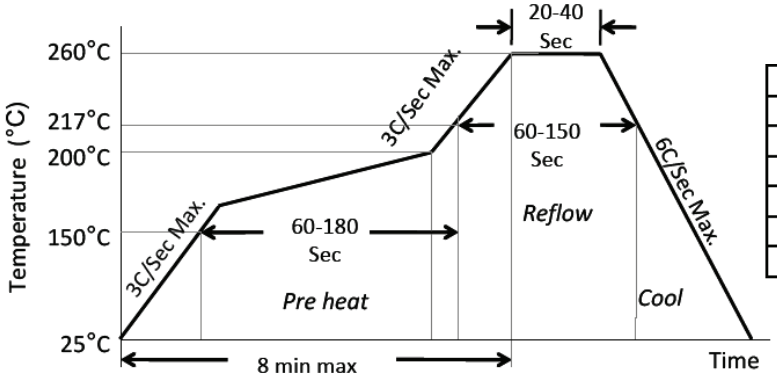
RoHS/RoHS II compliant



Life Size

3.2 x 2.5 x 0.85 mm

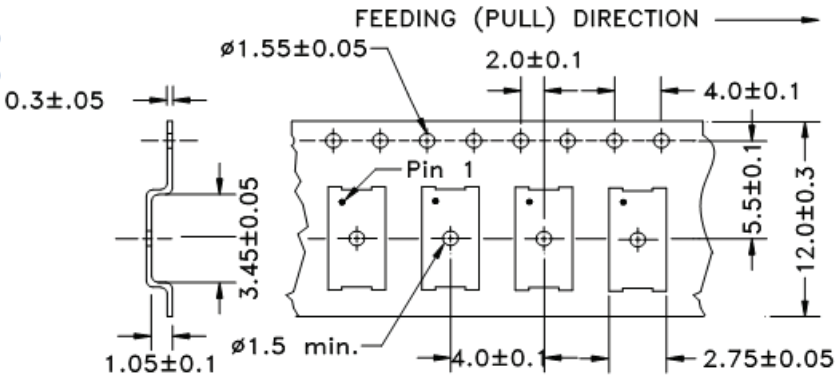
REFLOW PROFILE

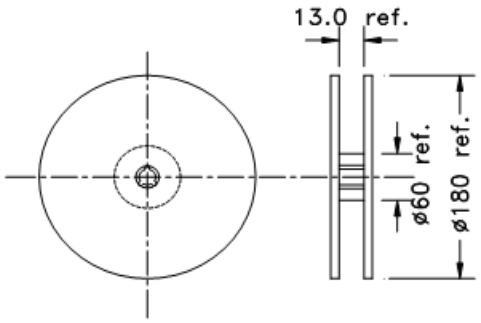


Ramp-Up Rate (200°C to Peak Temp)	3°C/Sec Max.
Preheat Time 150°C to 200°C	60-180 Sec
Time maintained above 217°C	60-150 Sec
Peak Temperature	255-260°C
Time within 5°C of actual Peak	20-40 Sec
Ramp-Down Rate	6°C/Sec Max.
Time 25°C to Peak Temperature	8 min Max.

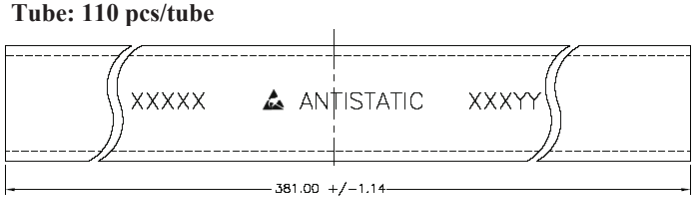
REFLOW PROFILE

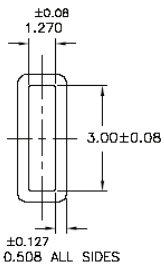
T= 1,000pcs/reel (D=180mm)
T3= 3,000pcs/reel (D=180mm)
T5= 5,000pcs/reel (D=330mm)





Tube: 110 pcs/tube





Unit orientation in tube:



Dimensions: mm

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