A Product Line of Diodes Incorporated

SPECIFICATION FOR APPROVAL

CUSTOMER	
NOMINAL FREQUENCY	12.000000 MHz
PRODUCT TYPE	TYPE FN 7.0×5.0 SEAM SEALED CRYSTAL CLOCK OSCILLATOR
SPEC. NO. (P/N)	FN1200054Q
CUSTOMER P/N	
ISSUE DATE	September 1, 2020
VERSION	C

APPROVED	PREPARED	QA
Brenda	Claire	Jenny Yang

Diodes Incorporated

No.2, Ziqiang 5th Rd., Zhongli Industrial Park,
Zhongli Dist., Taoyuan City 32063, Taiwan (R.O.C.)
TEL: 886-3-451-8888
FAX: 886-3-461-3865
https://www.diodes.com

*Pb-free
*RoHS Compliant
*HF-Halogen Free
*REACH Compliant
*AEC-Q200 Compliant

VERSION HISTORY

Version No.	Version Date	Description	Notes
A	Aug.24,2016	Initial Release	
B	Sep.10,2018	Updated logo	
C	Sep.1,2020	1.Modified marking illustrations. 2.Modified Output Enable Delay to 50ns max	

TYPE FN 7.0×5.0 SEAM SEALED CRYSTAL CLOCK OSCILLATOR

FN1200054Q

VER. C 1-Sep-20

ELECTRICAL SPECIFICATIONS

SRe Part Number : FN1200054Q

Item	Symbol	Specifications	Units	Notes
Nominal Frequency	Fo	12.000000	MHz	
Frequency Stability	FT	± 25	ppm	**See note
Operating Temperature Range	TR	-40 to +85	°C	
Supply Voltage	V_{DD}	+3.3 ± 10%	V	
Logic Type	LT	LVCMOS		
Supply Current, Output Enabled	I_{DD}/OE	10	mA	Max.
Supply Current, Output Disabled	I_{DD}/OD	10	µA	Max.
Duty Cycle (Symmetry)	DC/SY	45 / 55	%	Measured 50% of Waveform
Rise / Fall Time	T_R/T_F	4.5	ns	Max. measured 20/80% of Waveform
Output Voltage "0" Level	V_{OL}	10% V_{DD}	V	Max.
Output Voltage "1" Level	V_{OH}	90% V_{DD}	V	Min.
Output Load	CL	15	pF	Max
Jitter, Phase	RMS	1	ps	Max, 12kHz ~ 5MHz Frequency Band
Jitter, Accumulated	RMS(1-σ)	5	ps	Max, 20,000 Consecutive Periods
Jitter, Peak to Peak	Pk-Pk	50	ps	Max, 100,000 Random Periods
Start Up Time		10	ms	Max
Storage Temperature Range		-55 to +125	°C	

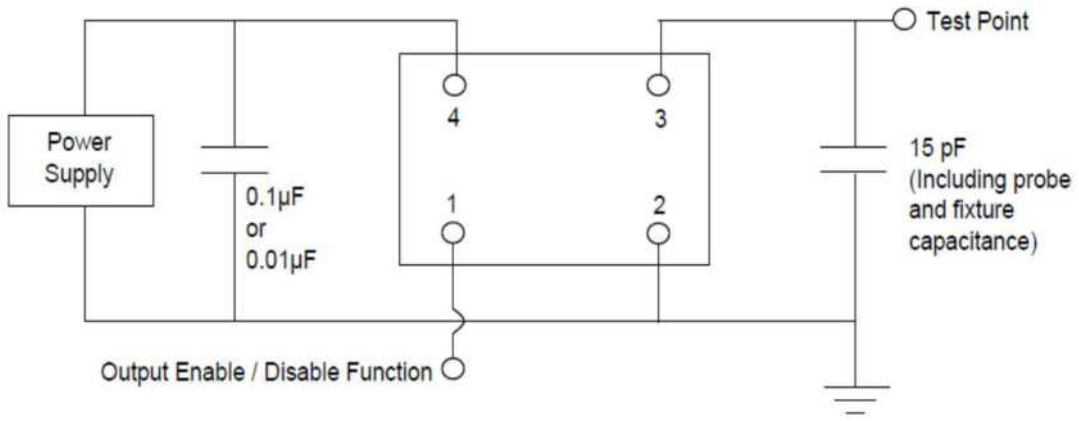
※ This product doesn't include harmful substance that stipulated by SONY SS-00259 Level 1 and S-AT2-001 Level 1 standard. RoHS Compliant (Pb - Free).

****Stability includes all combinations of Operating Temperature, Load changes, rated Input (Supply) Voltage changes, Initial Calibration Tolerance (25°C), Aging (1 year at 25°C Average Effective Ambient Temperature), Shock and Vibration.**

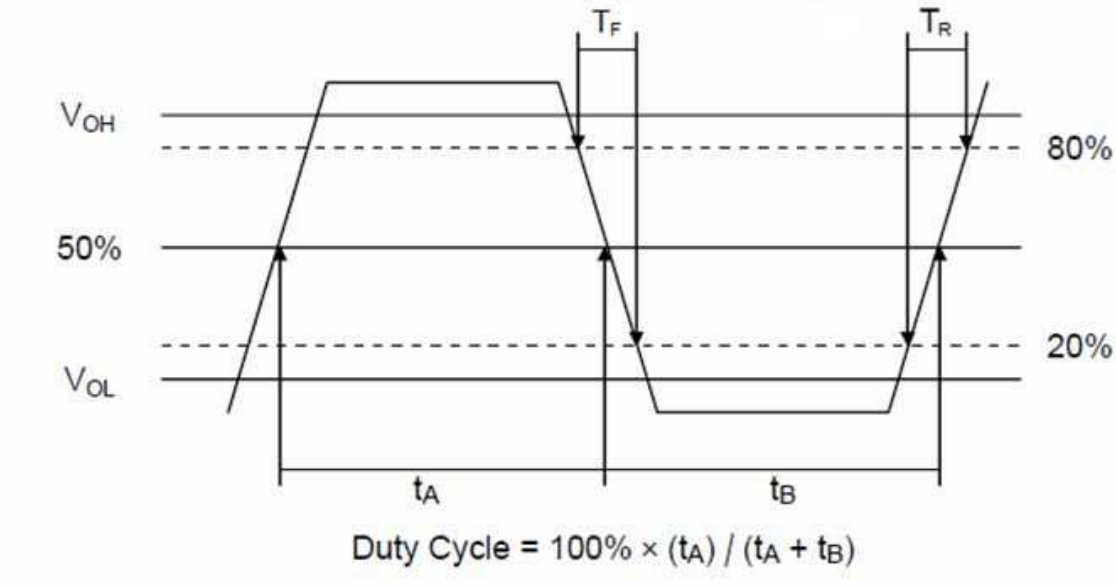
Output Enable / Disable Function

Parameter	Min.	Typ.	Max.	Units	Notes
Input Voltage (Pin1), Output Enable	$0.7V_{DD}$			V	Or Open
Input Voltage (Pin1), Output Disable (low power standby)			$0.3V_{DD}$	V	Output is Hi-Z
Internal Pullup Resistance	30			KΩ	
Output Enable Delay			50	ns	

TEST CIRCUIT



OUTPUT WAVEFORM



AEC-Q200 RELIABILITY TEST SPECIFICATIONS:

1. Initial

1.1 Physical Dimensions: JESD22, Method JB1-100

1.2 External Visual: MIL-STD-883, Method 2009

1.3 Freq. Vs. Temperature: Per Specification/Datasheet

2. Mechanical

2.1 Mechanical Shock: MIL-STD-202 Method 213

2.2 Vibration: MIL-STD-202 Method 204

2.3 Solderability: J-STD-002

2.4 Board Flex: AEC Q200-005

2.5 Terminal Strength (SMD): AEC Q200-006

3.Environmental

3.1 Temp Cycle: JESD22, Method JA-104

3.2 Resistance to Solder Heat: MIL-STD-202 Method 210

3.3 High Temperature Operating Life: MIL-STD-202, Method 108

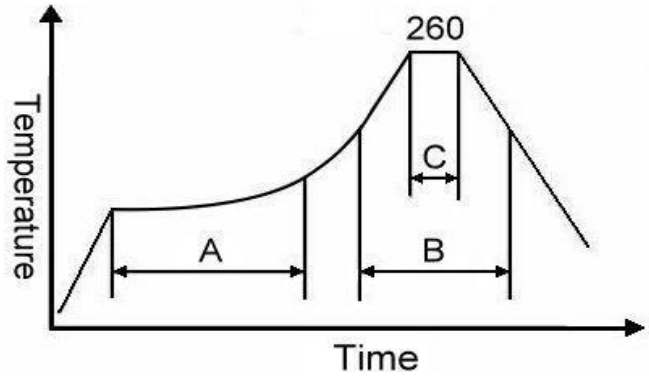
3.4 High Temp Exposure: MIL-STD-202, Method 108

3.5 High Temp & High Humidity: MIL-STD-202, Method 103

3.6 Thermal Shock: MIL-STD-202, Method 107

SUGGESTED IR REFLOW PROFILE

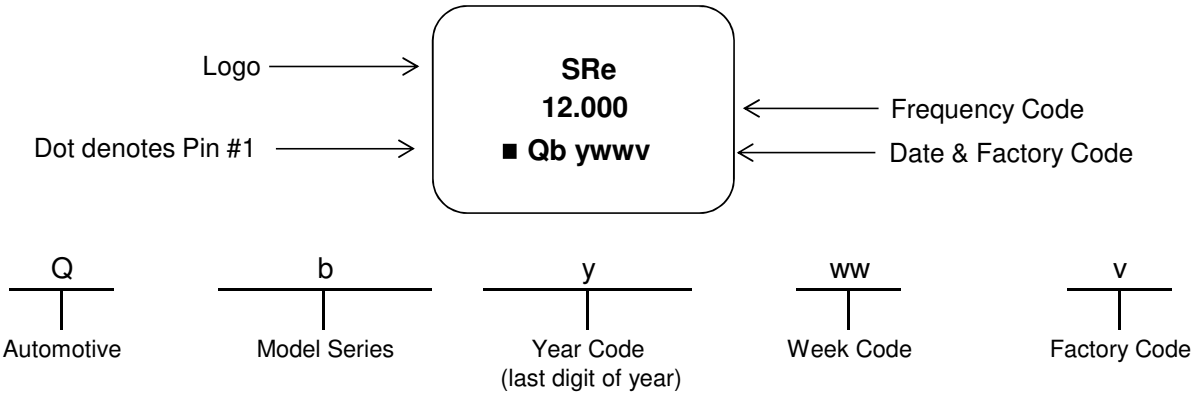
*As per IPC-JEDEC J-STD-020D



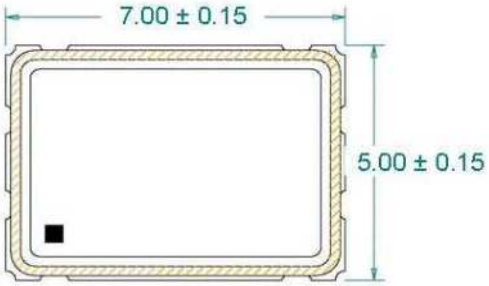
Note:

	Stage	Temperature	Time
A	Preheat	150~200°C	60~120 Sec
B	Primary Heat	217°C	60~150 Sec
C	Peak	260°C	10 Sec

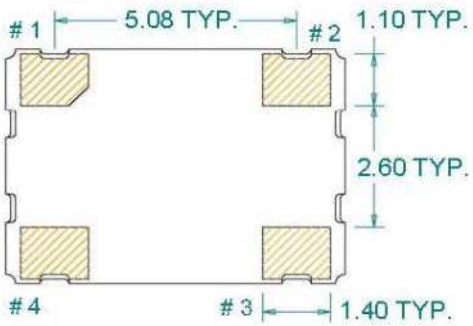
MARKING



MECHANICAL DRAWINGS (Scale:None. Dimensions are in mm.)

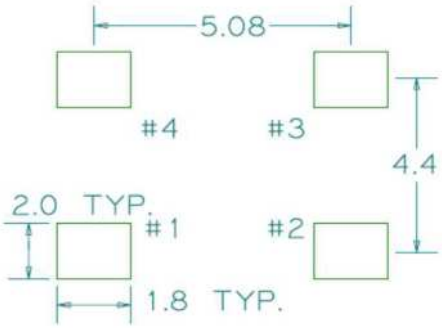






(Bottom View)

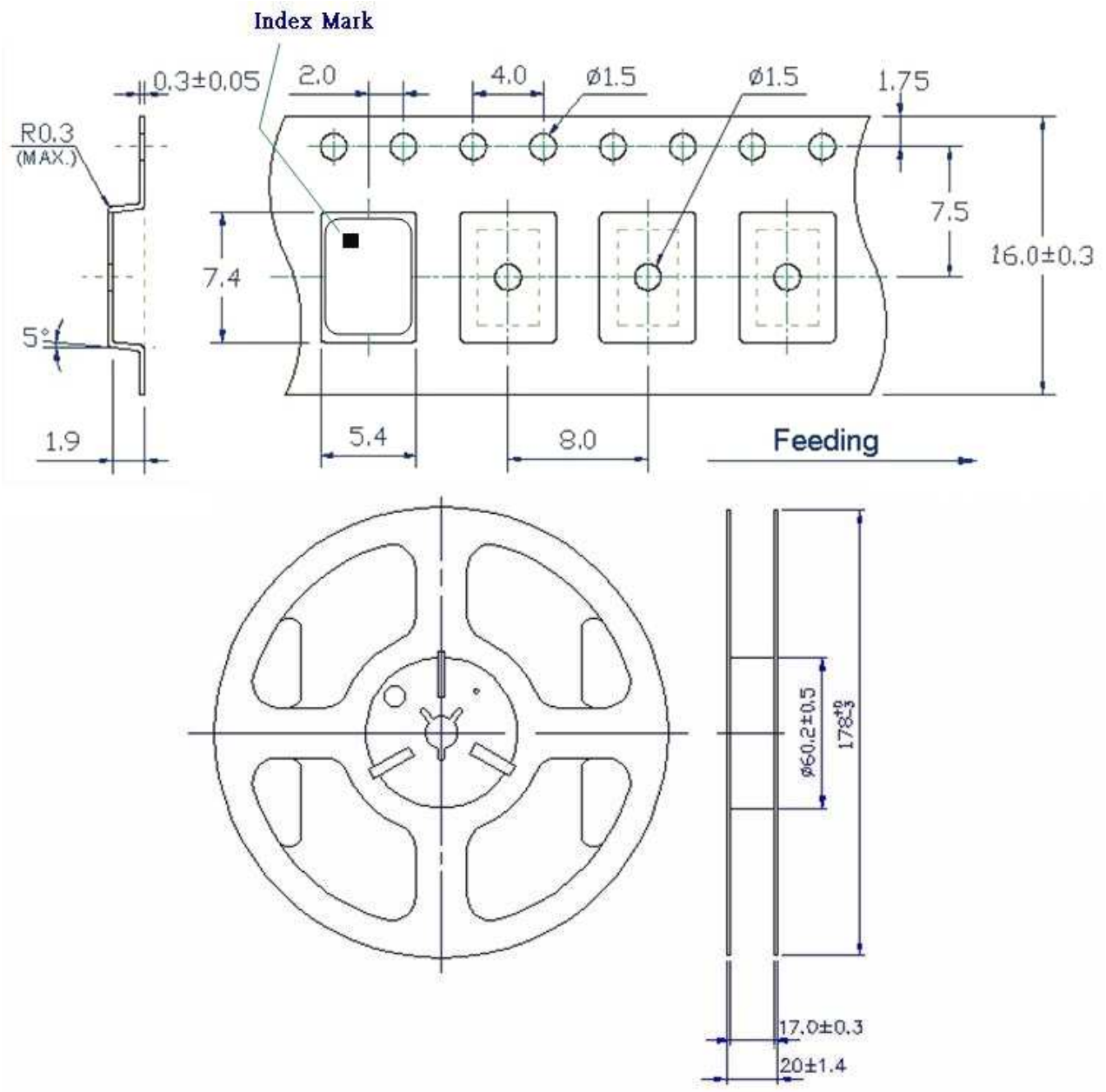
Recommended Land Pattern*



*External high-frequency power decoupling is recommended.(see test circuit for minimum recommendation). To ensure optimal performance, do not route traces beneath the package.

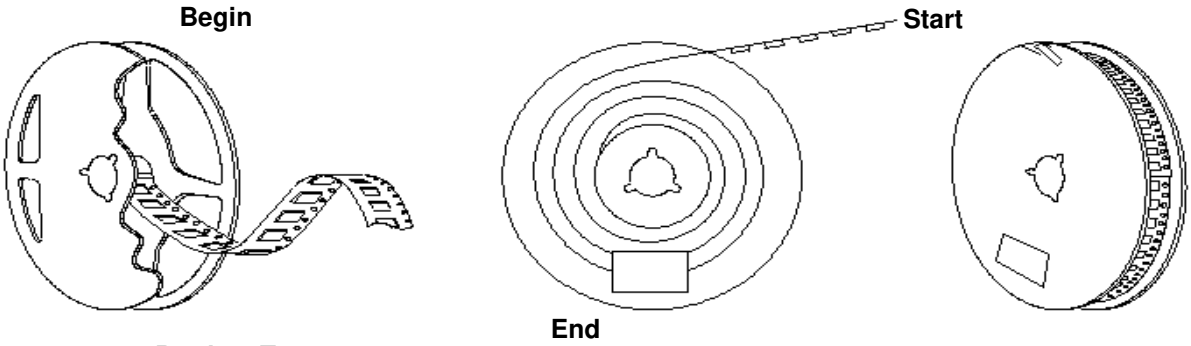
Pin	Function
1	OE
2	Ground
3	Clock Output
4	V_{DD}

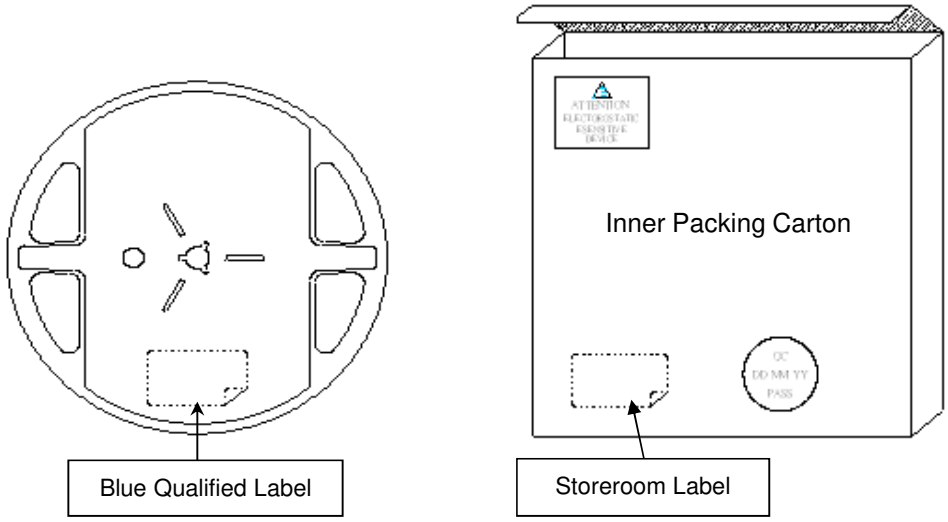
TAPE&REEL

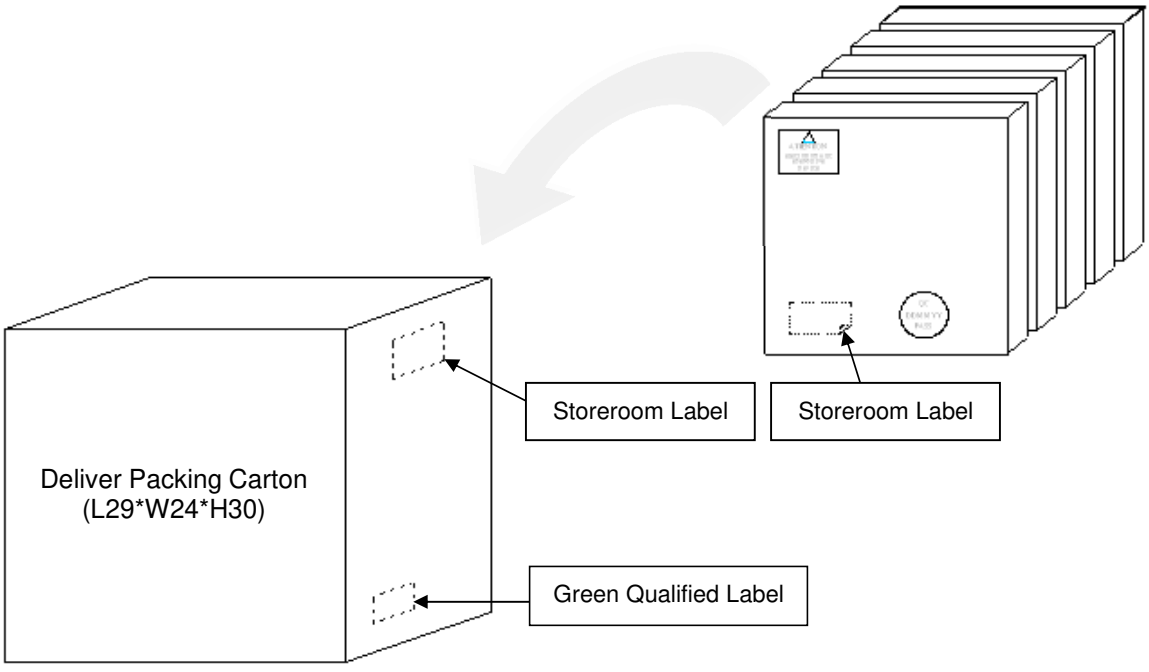


1. 230mm minimum leafer which consist of carrier and/or tape followed by a minimum of 160mm of empty carrier tape sealed with cover tape.
2. 160mm minimum trailer of empty carrier tape sealed with cover tape.

PACKING


Begin
Start
End
1000pcs-Product Tape


Inner Packing Carton
Blue Qualified Label
Storeroom Label


Storeroom Label
Storeroom Label
Deliver Packing Carton
(L29*W24*H30)
Green Qualified Label