






A Product Line of  
Diodes Incorporated



# SPECIFICATION FOR APPROVAL

CUSTOMER	
NOMINAL FREQUENCY	<b>16.000000 MHz</b>
PRODUCT TYPE	<b>TYPE FL 3.2x2.5 SEAM SEALED CRYSTAL</b>
PART NUMBER	<b>FL1600152</b>
CUSTOMER P/N	
ISSUE DATE	<b>January 10, 2018</b>
VERSION	<b>B</b>

APPROVED	PREPARED	QA
		

## Diodes Incorporated

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\*Pb-free

\*RoHS Compliant

\*HF-Halogen Free

\*REACH Compliant

# TYPE FL 3.2x2.5 SEAM SEALED CRYSTAL

**FL1600152**

VER.B 10-JAN-18

## VERSION HISTORY

Version No.	Version Date	Description	Notes
A	Aug. 5, 2016	Initial Release	
B	Jan. 10, 2018	Updated logo	

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## FL1600152

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### ELECTRICAL SPECIFICATIONS

Item	Symbol	Specifications	Units	Notes
Nominal Frequency	Fn	16.000000	MHz	
Mode of Oscillation	MO	AT Cut-Fundamental		
Calibration Load Capacitance	CL	8	pF	
Calibration Tolerance	FL	± 15	ppm	at 25°C±3°C
Operating Temperature Range	TR	-40 to +110	°C	
Frequency Stability(Frequency Deviation over the Operating Temperature Range)	F/T	± 40	ppm	Reference to the Frequency at 25°C
Operating Drive Level		10	μW	
Maximum Drive Level		200	μW	
Equivalent Series Resistance	ESR	120	Ω	Max.
Shunt Capacitance	C0	0.89	pF	±30%
Motional Capacitance	C1	2.86	fF	±30%
Motional Inductance	L1	34.6	mH	±30%
Trim Sensitivity	TS	18.1	ppm/pF	±30%
Aging at 25°C		± 5	ppm	Max, 1st year
Aging at 25°C		± 10	ppm	Max, 5 years
Aging at 25°C		± 20	ppm	Max, 10 years
Storage Temperature		-55 to +125	°C	
Insulation Resistance		500	MΩ	Min

\*\* 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).

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## RELIABILITY SPECIFICATIONS

### MECHANICAL AND ENVIRONMENTAL RATINGS:

- a) FINE LEAK TEST: JESD22-A109 (Condition 1A)
- b) GROSS LEAK TEST: JESD22-A109 (Condition C)
- c) MOISTURE RESISTANCE: JESD22-A113
- d) SHOCK: JESD22-B104 (Condition B)
- e) SOLDERABILITY : (RoHS version): J-STD-002
- f) VIBRATION: JESD22-B103
- g) SOLVENT RESISTANCE: JESD22-B107
- h) RESISTANCE TO SOLDERING HEAT (RoHS version): J-STD-020D Table 5.2 Pb free devices (3 cycles max)

## SUGGESTED IR REFLOW PROFILE

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



Note:

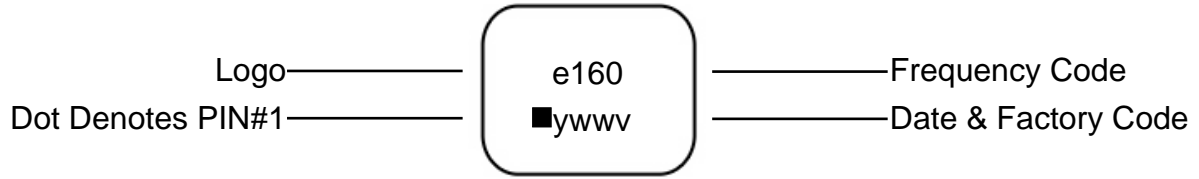
	Stage	Temperature	Time
A	Preheat	150~200°C	60~120 Sec
B	Primary Heat	217°C	60~150 Sec
C	Peak	260°C	10 Sec

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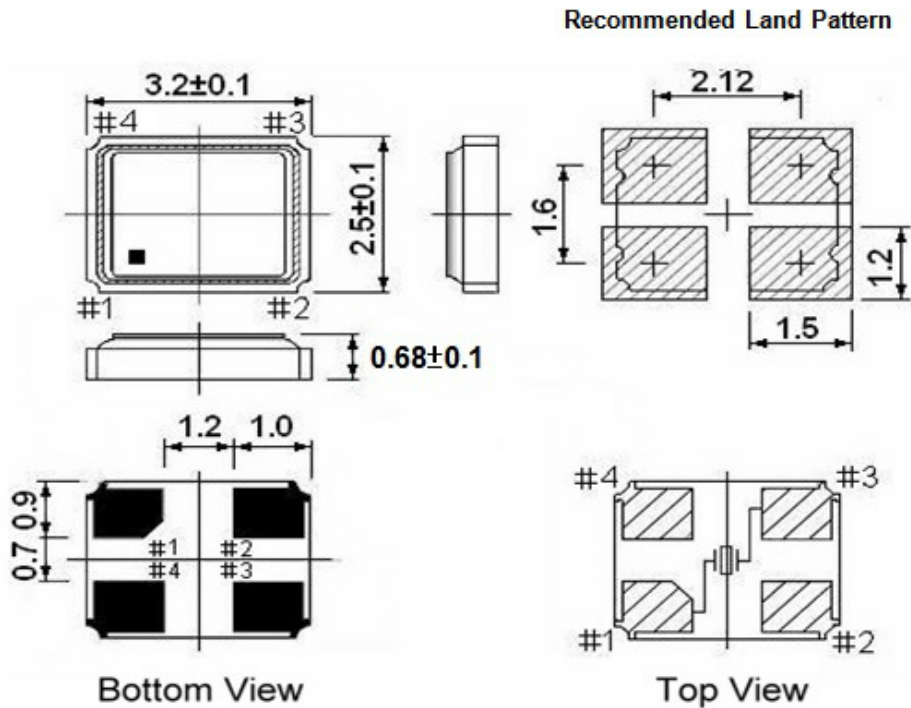
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## MARKING



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



**\*\* Recommended - Pin 1 & 3 : CRYSTAL  
Pin 2 & 4 : GND**

### Notes:

1. Package drawings are for reference only, and the appearances of objects may vary. Actual packages are based on the real product.
2. The marking dot denotes Pin#1.
3. The position and shape of the chamfer pin may vary and are based on the real product.

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## Tape & Reel



1. 230mm minimum leader 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.

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### PACKING

