



A Product Line of
Diodes Incorporated



SPECIFICATION FOR APPROVAL

CUSTOMER _____

NOMINAL FREQUENCY _____ 16.000000 MHz _____

PRODUCT TYPE _____ **TYPE FL 3.2x2.5 SEAM SEALED CRYSTAL** _____

SPEC. NO. (P/N) _____ FL1600011 _____

CUSTOMER P/N _____

ISSUE DATE _____ January 3, 2018 _____

VERSION _____ E _____

APPROVED	PREPARED	QA

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

TYPE FL 3.2x2.5 SEAM SEALED CRYSTAL

FL1600011

VER. E 3-Jan-18

VERSION HISTORY

Version No.	Version Date	Description	Notes
A	Jul.8,2008	Initial Release	
B	Nov.5,2010	Changed ESR from 100Ω to 80Ω & Temp. range from -20~70°C to -40~85°C & Marking from eCERA to SRe.	
C	Nov.14,2012	Updated Suggested IR Reflow Profile & Format	
D	Feb.7,2013	Changed ESR from 80Ω to 60Ω.	
E	Jan.3,2018	Updated logo	



TYPE FL 3.2x2.5 SEAM SEALED CRYSTAL

FL1600011

VER. E 3-Jan-18

ELECTRICAL SPECIFICATIONS

Item	Symbol	Specifications	Units	Notes
Nominal Frequency	Fn	16.000000	MHz	
Mode of Oscillation	MO	AT Cut-Fundamental		
Calibration Load Capacitance	CL	9	pF	
Calibration Tolerance	FL	±20	ppm	at 25°C±3°C
Operating Temperature Range	TR	-40 to +85	°C	
Frequency Stability (Frequency Deviation over the Operating Temperature Range)	F/T	±20	ppm	Reference to the Frequency at 25°C
Operating Drive Level		10	µW	
Maximum Drive Level		100	µW	
Equivalent Series Resistance	ESR	60	Ω	Max
Shunt Capacitance	C0	5	pF	Max
Aging at 25°C		±3	ppm	Max, 1st year
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).

TYPE FL 3.2x2.5 SEAM SEALED CRYSTAL

FL1600011

VER. E 3-Jan-18

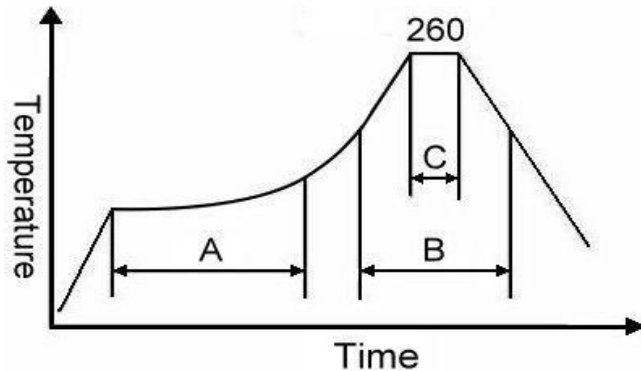
RELIABILITY SPECIFICATIONS

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:

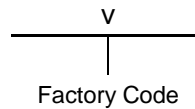
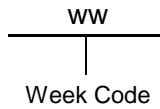
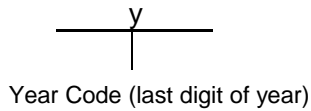
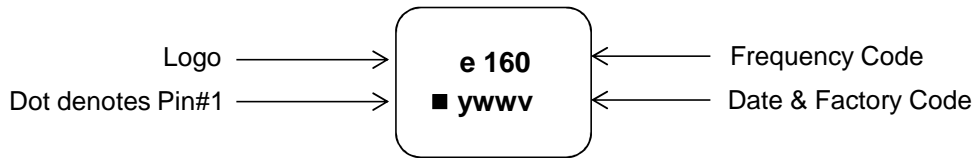
	Stage	Temperature	Time
A	Preheat	150~200°C	60~120 Sec
B	Primary Heat	217°C	60~150 Sec
C	Peak	260°C	10 Sec

TYPE FL 3.2x2.5 SEAM SEALED CRYSTAL

FL1600011

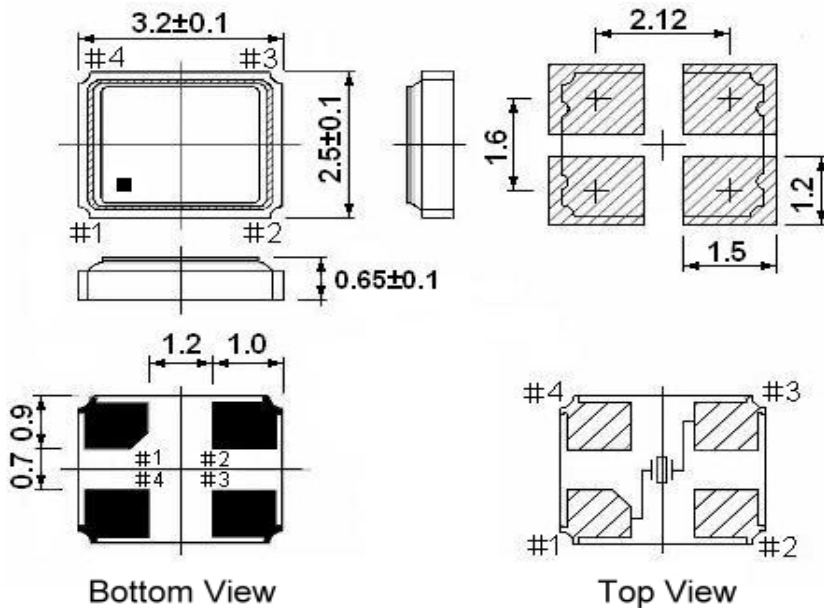
VER. E 3-Jan-18

MARKING



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

Recommended Land Pattern



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

Notes:

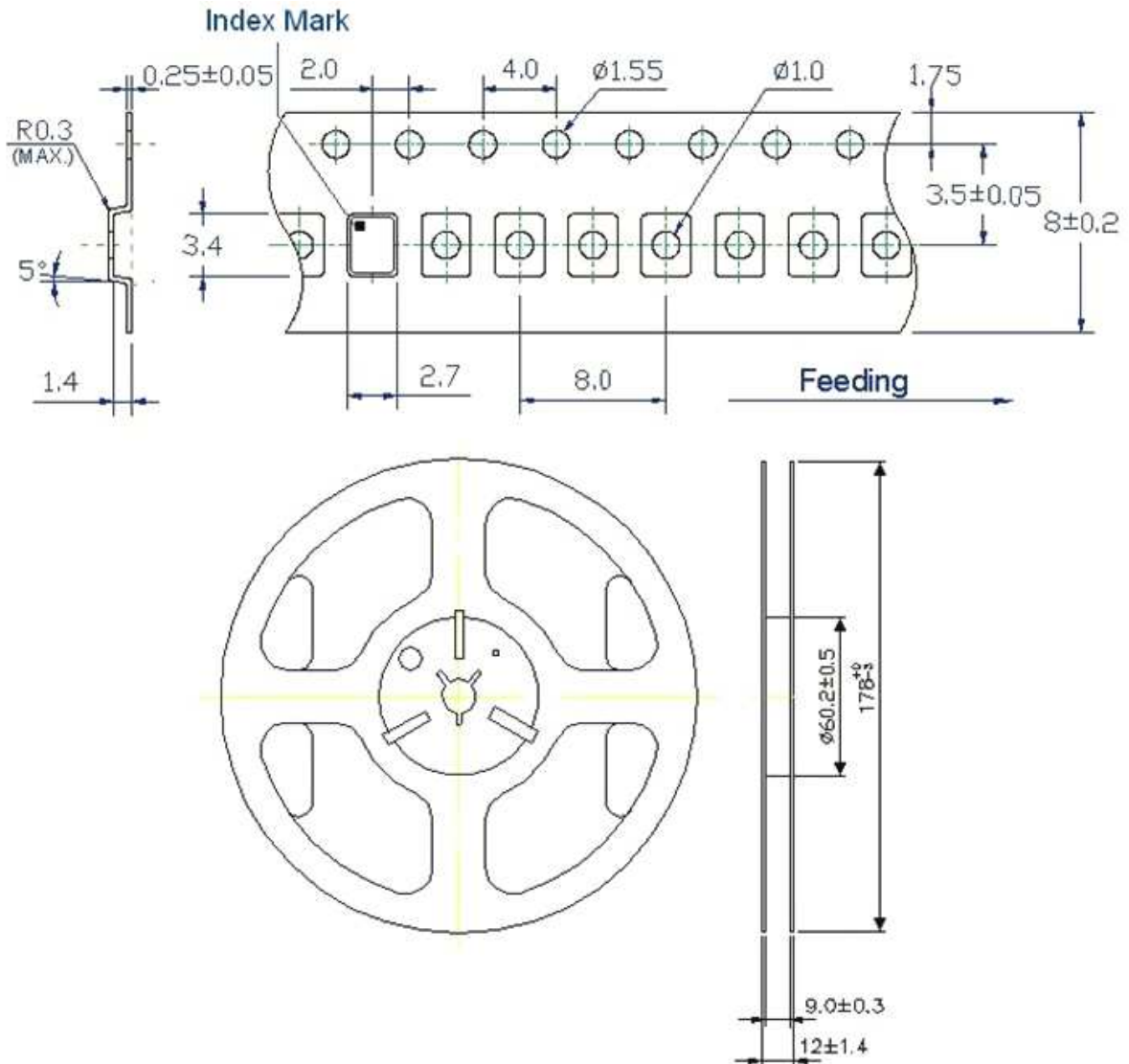
1. Package drawings are for reference only, and the appearances of objects may vary.
Actual packages are based on the real product.
2. The marking dot denotes Pin#1.
3. The position and shape of the chamfer pin may vary and are based on the real product.

TYPE FL 3.2x2.5 SEAM SEALED CRYSTAL

FL1600011

VER. E 3-Jan-18

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.

TYPE FL 3.2x2.5 SEAM SEALED CRYSTAL

FL1600011

VER. E 3-Jan-18

PACKING

