

SMD WATCH CRYSTAL 32.768 kHz

SERIES „M3215RR“ (50 kΩ VERSION WITH REDUCED RESISTANCE)

FEATURES

- + Cheapest available SMD-MINI-Watch-Crystal
- + Excellent use for low power and battery driven designs
- + Ultra low profile
- + Standard operating temperature range of -40/+85°C
- + LRT-TECHNOLOGY Inside (LRT is Low ESR Resonator-Technology)
- + Excellent clock generator for CPU's, Wireless, Mobile Comm., RTC, IoT, etc.
- + Our top quality promise / depth of production:
 - Only use of crystal blanks from our in-house production
 - Excellent product features guaranteed by multiple 100% tests
 - 100% quality monitoring from crystal raw material to the end product
 - Excellent quality, performance and reliability is guaranteed.



GENERAL DATA

| PARAMETERS | PRODUCT FEATURES AND CONDITIONS | |
|-------------------------------------|--|------------------|
| SMD-CRYSTAL SERIES | M3215RR | (3.2x1.5x0.90mm) |
| NUMBER OF SOLDER PADS | 2 | |
| FREQUENCY RANGE | 32.768 kHz | |
| FREQUENCY TOLERANCES AT 25°C | ±20 ppm (standard) / ±10 ppm (option) | |
| LOAD CAPACITANCE (C _L) | 12.5 pF (standard) 4, 6, 7, 9 or 18 pF are available on request | |
| WORKING TEMPERATURE RANGE | -40/+85°C | |
| RESONANCE RESISTANCE | 50 kΩ max. for low power designs | |
| SHUNT CAPACITANCE (C ₀) | 1.5 pF max. | |
| TURNOVER TEMPERATURE | +25°C ±5°C | |
| PARABOLIC COEFFICIENT | -0.03 ppm ±0.01 ppm /°C ² | |
| DRIVE LEVEL | 0.1 μW typical (0.5 μW max.) | |
| AGING | ±3 ppm max. per year | |
| INSULATION RESISTANCE | >500 MΩ DC/100V ±10% | |
| STORAGE TEMPERATURE | -55°/+125°C | |
| PRODUCT WEIGHT | 0.012 g | |
| MSL LEVEL | 1 | |
| DELIVERY FORM | Tape and Reel (3.000 pcs per reel) | |
| RoHS | Lead free and RoHS compliant | |
| POP (EU)2019/1021 | No POP substances | |
| PFAS | No PFAS present | |
| PROP 65 | Compliant to PROP 65 | |
| TSCA | Compliant to TSCA | |

[SELECT YOUR REQUIRED CRYSTAL \(PRODUCT CONFIGURATOR\)](#)

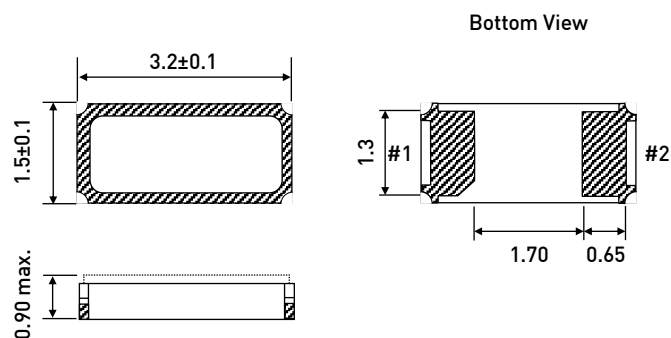
[REQUEST CRYSTAL SAMPLES \(SAMPLE CONFIGURATOR\)](#)

Notes

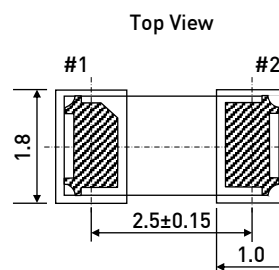
1. The reference temperature for all specified values and tests is +25°C.
2. No Ultrasonic Handling: Do not subject the M3215RR to an ultrasonic cleaning environment or to ultrasonic welding process. Permanent damage or long term reliability issues to the structure may occur.
3. Do not design any ground line under the M3215RR.
4. Do not solder with hot air gun.

DIMENSIONS AND PATTERNS

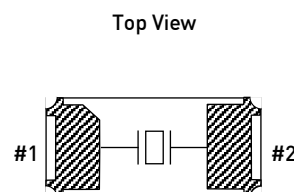
PACKAGE SIZE – DIMENSIONS (UNIT:MM)
3.2 X 1.5 X 0.9 MM



RECOMMENDED
LAND PATTERN

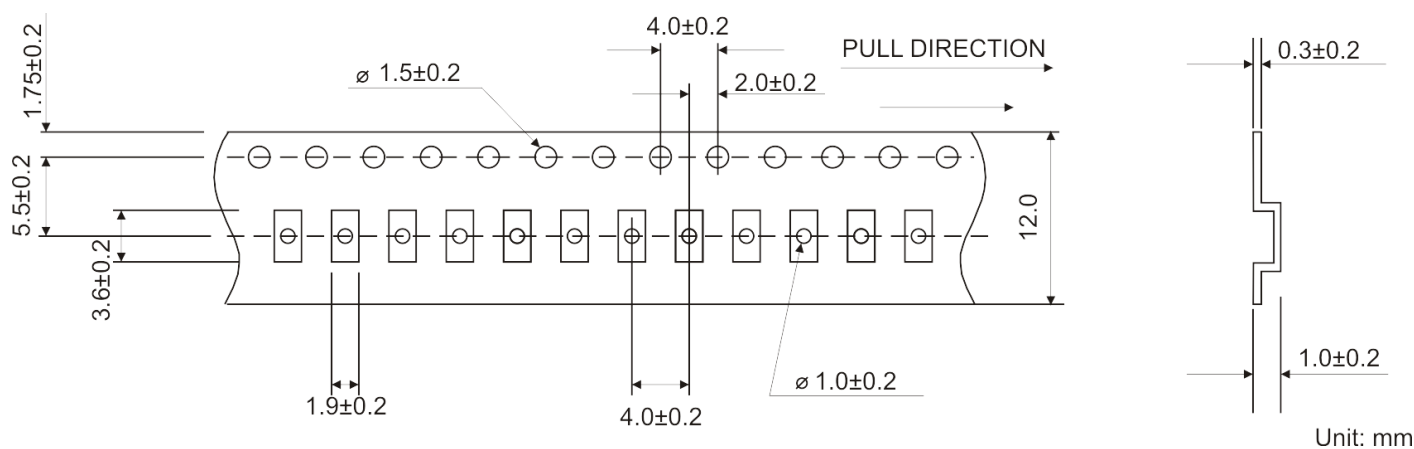


INTERNAL
CONNECTIONS

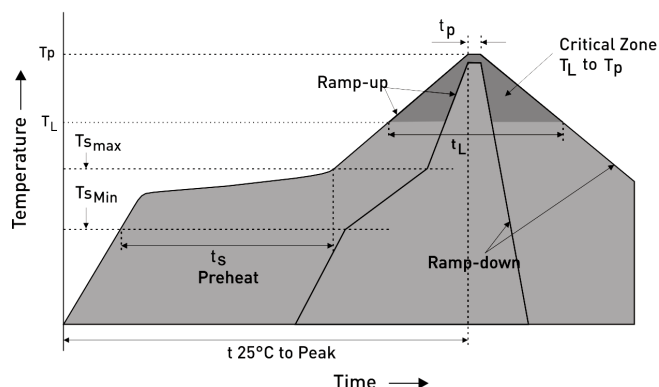


All dimensions in mm typical

REEL SPECIFICATION



REFLOW SOLDER PROFILE



| IPC/JEDEC Standard | IPC/JEDEC J-STD-020 |
|-------------------------------------|---------------------|
| Moisture Sensitivity Level | Level 1 |
| TS MAX to TL (Ramp-up Rate) | 3°C/second Maximum |
| Preheat | |
| - Temperature Minimum (TS MIN) | 150°C |
| - Temperature Typical (TS TYP) | 175°C |
| - Temperature Maximum (TS MAX) | 200°C |
| - Time (tS) | 60 - 180 Seconds |
| Ramp-up Rate (TL to TP) | 3°C/second Maximum |
| Time Maintained Above: | |
| - Temperature (TL) | 217°C |
| - Time (TL) | 60 - 150 Seconds |
| Peak Temperature (TP) | 260°C Maximum |
| Target Peak Temperature (TP Target) | 255°C |
| Time within 5°C of actual peak (tP) | 20 - 40 seconds |
| Max. Number of Reflow Cycles | 2 |
| Ramp-down Rate | 6°C/second Maximum |
| Time 25°C to Peak Temperature (t) | 8 minutes Maximum |

ORDERING INFORMATION

SERIES

FREQUENCY STABILITY AT 25°C
±20 ppm - STANDARD
±10 ppm - OPTIONAL

M3215RR 32.768 kHz ±20 ppm 12.5pF (-40/+85°C)

FREQUENCY

LOAD CAPACITANCE
12.5 pF
9 pF
7 pF
6 pF
4 pF
18 pF

TEMPERATURE RANGE:
(-40/+85°C) - STANDARD

EXAMPLE: M3215RR 32.768 kHz ±20 ppm 12.5pF (-40/+85°C)

PLEASE INDICATE YOUR REQUIRED PARAMETERS

REVISION HISTORY^[1]

| REVISION | RELEASE DATE | AMENDMENTS SUMMARY |
|----------|----------------|---|
| 01 | September 2017 | + 8pF load capacitances (C _L) are deleted due to non-availability |
| 02 | February 2018 | + Added two temperature ranges: 40/+105°C and -40/+125°C |
| 03 | July 2023 | + Removed temperature ranges: 40/+105°C and -40/+125°C + Revised PARABOLIC COEFFICIENT + Revised DIMENSIONS AND PATTERN |
| 04 | January 2026 | + Data Sheet Design updated in our new style |

Note:

1. Based on Datasheet version from September 2017/SPEC 01/REV.01



PREMIUM QUALITY BY PETERMANN-TECHNIK



OUR COMPANY IS CERTIFIED ACCORDING TO ISO 9001:2015 AND 14001:2015

THIS IS FOR YOU TO ENSURE THAT THE PRINCIPLES OF QUALITY MANAGEMENT ARE FULLY IMPLEMENTED IN OUR QM-SYSTEM AND CONTROL METHODS.

CLOCKING YOUR WORLD
RELIABLE · COST-EFFECTIVE · COMPETENT
DESIGN SMARTER – WE MAKE GREAT IDEAS REALITY

FOR ALMOST 30 YEARS, WE HAVE BEEN YOUR SPECIALIST FOR CRYSTALS AND OSCILLATORS –
FROM PROVEN STANDARDS TO CUSTOM-TAILORED SOLUTIONS.

YOU DEVELOP WITH THE HIGHEST STANDARDS – WE DELIVER THE COMPONENTS TO MATCH:
INNOVATIVE, RELIABLE, AND COST-EFFICIENT.

CHOOSE OUR PRODUCTS AND BENEFIT FROM TOP-TIER QUALITY, INNOVATION, STABLE AND
INDEPENDENT SUPPLY CHAINS AND PARTNERSHIP ON HIGHEST LEVEL.

SUSTAINABLE SUCCESS FOR YOU AND YOUR PRODUCTS!