# SPECIFICATION SHEET

## MHZ SMD CERAMIC RESONATOR CASE 4520 CR SERIES

| | | |
|---|---|---|
| **SPECIFICATION SHEET NO.** | R1018- CR4M500000S039 | |
| **ORIGINAL MFG/PART NO** | TGS Crystals/CRTR 4.5MG-39 TLH/ZTTCR 4.5MG-39 | |
| **DATE** | Oct. 18, 2024 | |
| **REVISION** | A2 | Updated With Most Recent Data |
| **DESCRIPTION AND MAIN PARAMETRICS** | MHz SMD Ceramic Resonator, 3 Pads, CR Series<br>Case 4520, Dimension L4.5*W2.0*H1.2mm<br>4.50MHz, Frequency Accuracy ±0.5%; Built-in Capacitance 39pF<br>Operating Temp. Range -25°C ~+85°C<br>Reflow Profile Condition 260 °C Max.<br>Package in Tape/Reel, 3000pcs/Reel<br>REACH/RoHS/RoHS III Compliant, RoHS Annex III lead Exemption<br>(Exempt per RoHS EU 2015/863) | |
| **CUSTOMER** | | |
| **CUSTOMER PART NUMBER** | | |
| **CROSS REF. PART NUMBER** | | |
| **MEMO** | | |

| **VENDOR APPROVE** |
|---|
| Issued/Checked/Approved<br>NextGen Components, Inc. Mandy Xu<br>NextGen Components, Inc. Ruby Zhang<br>NextGen Components, Inc. Jack Zhang |
| Date: Oct. 18, 2024 |

| **CUSTOMER APPROVE** |
|---|
| |
| Date: |

## MAIN FEATURE

- MHz SMD Resonator, 3 pads, Case 4520
- Case Dimension L4.5*W2.0*H1.2mm
- Low Cost And Short Shipment
- Cross More Competitors Part
- Built-in Capacitance
- Reflow Profile Condition 260 °C Max.
- REACH/RoHS/RoHS III compliant, RoHS Annex III lead Exemption (Exempt per RoHS EU 2015/863)



*Image shown is a representation only. Exact specifications should be obtained from the product dimension.*

## APPLICATION

- Communication Electronics
- Bluetooth, wireless communication set

## HOW TO ORDER

- Please follow up part code guide and indicate part code when you order or RFQ.

**RFQ**
Request For Quotation

## PART CODE GUIDE

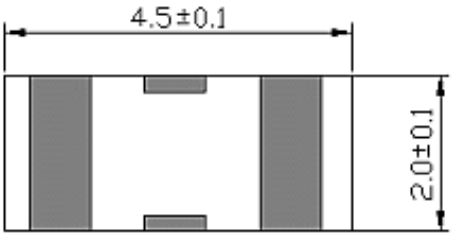
| CODE | NAME | KEY SPECIFICATION OPTION |
|---|---|---|
| CR | Product Series | MHz SMD Resonator, 3 pads, Case 4520<br>Dimension L4.5*W2.0*H1.2mm |
| 4M5 | Frequency Range | 4M5: 4.50MHz |
| 00000 | Internal Control | Letter or Digits (A~Z, a~z or 1~9) |
| S | SMD Type Package | Tape/Reel |
| 039 | Special Parametric | Letter or Digits (A~Z, a~z or 1~9) |
| - XX | Suffix | Blank: N/A<br>XX: Internal Control Code, Letter A~Z, a~z or digits (0~9) for Special/Custom Parameters |

**DIMENSION** (Unit: mm)

**Case 4520**, 3 Pads

L4.5*W2.0*H1.2mm

Top View

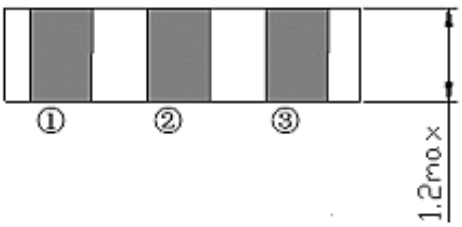



**Marking**

Frequency Range

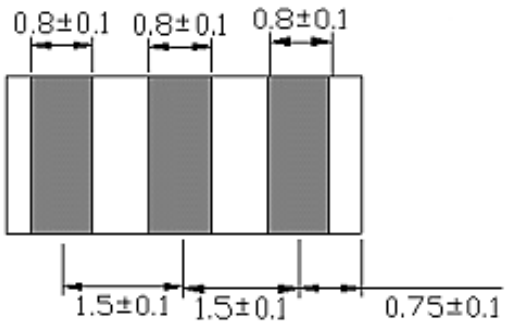
+ QC Code

Side View

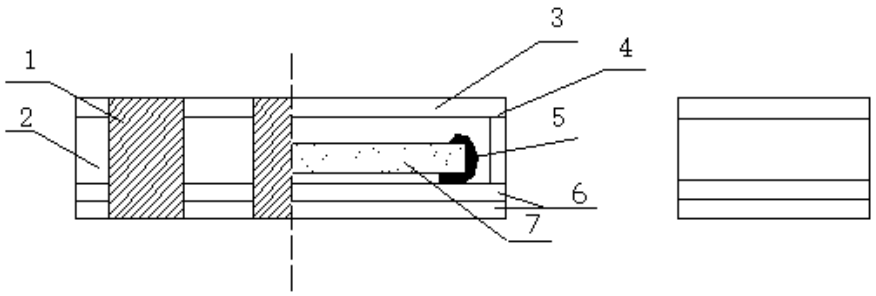



Connection: ① Input ② Ground ③ Output

Side View



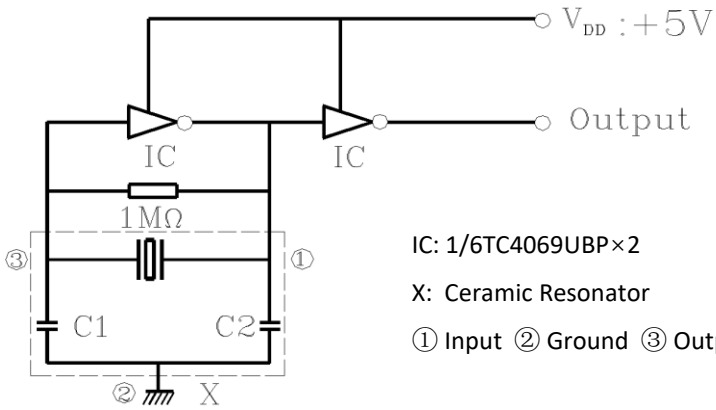
**STRUCTURE**




| NO. | COMPONENTS | MATERIALS |
|---|---|---|
| 1 | Outer Electrodes | Top and Bottom Electrodes<br>Ag + Ni(under plating) + Sn(over plating)<br>Side Electrodes<br>Ni + Cu + Ag( under plating)+Sn(over plating) |
| 2 | Ceramic Box | Insulation Box |
| 3 | Cover | Dielectric Material |
| 4 | Glue | Epoxy Resin |
| 5 | Conductive Adhesive | Ag + Epoxy Resin |
| 6 | Base | Dielectric Material |
| 7 | Ceramic Element | Piezoelectric Ceramics (PZT) |

## MEASUREMENT

- Parts shall be tested under the condition ( Temp.: 20±15℃, Humidity 65±20% R.H.) unless the standard condition (Temp.: 25±3 ℃, Humidity : 65±10% R.H.) is regulated to measure.
- Measuring Circuit




IC: 1/6TC4069UBP×2

X: Ceramic Resonator

① Input ② Ground ③ Output

## GENERAL ELECTRICAL CHARACTERISTICS AND RATING- FOR DIFFERENT PART CODE- Ta = 25℃

| PARAMETER | SYMBOLS | VALUE | UNITS | CONDITION |
|---|---|---|---|---|
| Withstanding Voltage | - | 50 | V | @DC, 1 min. |
| Insulation Resistance | $R_i$ | 500 Min. | mΩ | @10V, 1min. |
| Operating Temperature Range | $T_J$ | -25 to +85 | ℃ | |
| Storage Temperature Range | $T_{STG}$ | -55 to +85 | ℃ | |
| Rating Voltage | $U_R$ | 6 | V DC | |
| | | 15 | $V_{p-p}$ | |
| Temperature Coefficient of Oscillation Frequency | | ±0.3 Max. | % | Oscillation Frequency drift, -25℃ ~ +85℃ |
| Oscillation Frequency Aging Rate (10 Years) * | | ±0.1 Max. | | From initial value |

Note: * : Components shall be left in a chamber of +85±2 ℃ for 1000 hours, then measured after leaving in natural condition for 1 hours.

**ELECTRICAL CHARACTERISTICS** - FOR DIFFERENT PART CODE

| PART CODE | CENTER FREQUENCY (F0) | FREQUENCY ACCURACY | MAX.RESONANT IMPEDANCE R0 | BUILT-IN CAPACITANCE C1, C2 | IC MODEL NO. |
|---|---|---|---|---|---|
| | MHz | % | Ω | pF | |
| CR4M000000S015 | 4.00 | ±0.5 | 40 | 15 (1±20%) | 1/6TC4069UBPx2 |
| CR4M000000S039 | 4.00 | ±0.5 | 40 | 39 (1±20%) | 1/6TC4069UBPx2 |
| CR4M096000S015 | 4.096 | ±0.5 | 40 | 15 (1±20%) | 1/6TC4069UBPx2 |
| CR4M096000S039 | 4.096 | ±0.5 | 40 | 39 (1±20%) | 1/6TC4069UBPx2 |
| CR4M190000S015 | 4.19 | ±0.5 | 40 | 15 (1±20%) | 1/6TC4069UBPx2 |
| CR4M194000S039 | 4.194 | ±0.5 | 40 | 39 (1±20%) | 1/6TC4069UBPx2 |
| CR4M200000S015 | 4.20 | ±0.5 | 40 | 15 (1±20%) | 1/6TC4069UBPx2 |
| CR4M200000S039 | 4.20 | ±0.5 | 40 | 39 (1±20%) | 1/6TC4069UBPx2 |
| CR4M258000S015 | 4.258 | ±0.5 | 40 | 15 (1±20%) | 1/6TC4069UBPx2 |
| CR4M500000S039 | 4.50 | ±0.5 | 40 | 39 (1±20%) | 1/6TC4069UBPx2 |
| CR4M910000S015 | 4.91 | ±0.5 | 40 | 15 (1±20%) | 1/6TC4069UBPx2 |
| CR4M910000S039 | 4.91 | ±0.5 | 40 | 39 (1±20%) | 1/6TC4069UBPx2 |
| CR5M000000S015 | 5.00 | ±0.5 | 40 | 15 (1±20%) | 1/6TC4069UBPx2 |
| CR5M000000S039 | 5.00 | ±0.5 | 40 | 39 (1±20%) | 1/6TC4069UBPx2 |
| CR6M000000S015 | 6.00 | ±0.5 | 40 | 15 (1±20%) | 1/6TC4069UBPx2 |
| CR6M000000S039 | 6.00 | ±0.5 | 40 | 39 (1±20%) | 1/6TC4069UBPx2 |
| CR6M250000S033 | 6.25 | ±0.5 | 40 | 33 (1±20%) | 1/6TC4069UBPx2 |
| CR6M250000S039 | 6.25 | ±0.5 | 40 | 39 (1±20%) | 1/6TC4069UBPx2 |
| CR6M290000S015 | 6.29 | ±0.5 | 40 | 15 (1±20%) | 1/6TC4069UBPx2 |
| CR6M400000S039 | 6.40 | ±0.5 | 40 | 39 (1±20%) | 1/6TC4069UBPx2 |

**ELECTRICAL CHARACTERISTICS** - FOR DIFFERENT PART CODE

| PART CODE | CENTER FREQUENCY (F0) | FREQUENCY ACCURACY | MAX.RESONANT IMPEDANCE R0 | BUILT-IN CAPACITANCE C1, C2 | IC MODEL NO. |
|---|---|---|---|---|---|
| | MHz | % | Ω | pF | |
| CR6M600000S039 | 6.60 | ±0.5 | 40 | 39 (1±20%) | 1/6TC4069UBPx2 |
| CR6M750000S015 | 6.75 | ±0.5 | 40 | 15 (1±20%) | 1/6TC4069UBPx2 |
| CR6M750000S039 | 6.75 | ±0.5 | 40 | 39 (1±20%) | 1/6TC4069UBPx2 |
| CR6M875000S015 | 6.875 | ±0.5 | 40 | 15 (1±20%) | 1/6TC4069UBPx2 |
| CR7M000000S015 | 7.00 | ±0.5 | 40 | 15 (1±20%) | 1/6TC4069UBPx2 |
| CR7M000000S033 | 7.00 | ±0.5 | 40 | 33 (1±20%) | 1/6TC4069UBPx2 |
| CR7M000000S039 | 7.00 | ±0.5 | 40 | 39 (1±20%) | 1/6TC4069UBPx2 |
| CR7M200000S015 | 7.20 | ±0.5 | 40 | 15 (1±20%) | 1/6TC4069UBPx2 |
| CR7M280000S033 | 7.28 | ±0.5 | 40 | 33 (1±20%) | 1/6TC4069UBPx2 |
| CR7M370000S015 | 7.37 | ±0.5 | 40 | 15 (1±20%) | 1/6TC4069UBPx2 |
| CR7M370000S039 | 7.37 | ±0.5 | 40 | 39 (1±20%) | 1/6TC4069UBPx2 |
| CR7M500000S039 | 7.50 | ±0.5 | 40 | 39 (1±20%) | 1/6TC4069UBPx2 |
| CR7M680000S015 | 7.68 | ±0.5 | 40 | 15 (1±20%) | 1/6TC4069UBPx2 |
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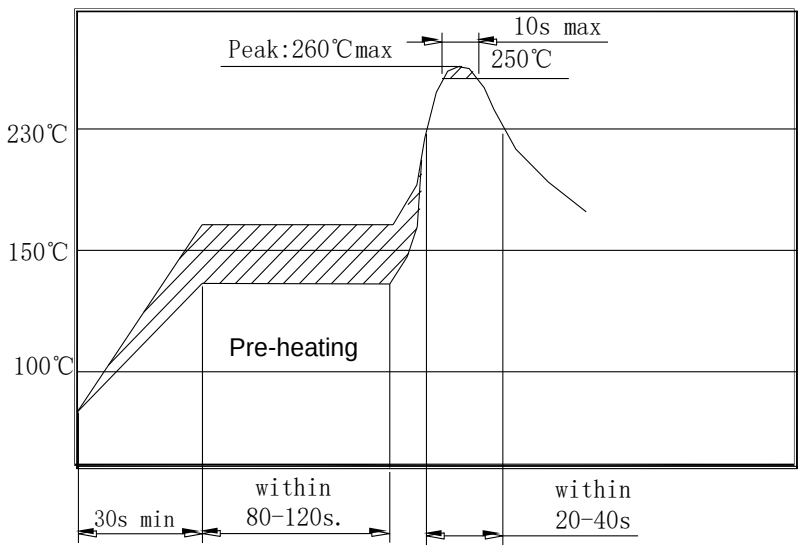
## PHYSICAL AND ENVIRONMENTAL CHARACTERISTICS

| TEST ITEMS | TEST METHOD AND CONDITIONS | REQUIREMENT |
|---|---|---|
| Humidity | Keep the resonator at 40℃±2℃ and 90%-95% RH for 96h. Then Release the resonator into the room Condition for 1h prior to the Measurement. | It shall fulfill the specifications in Table 1 |
| High Temperature | Subject the resonator to 85℃±2℃ for 96h, then release the resonator into the room conditions for 1h prior to the measurement. | It shall fulfill the specifications in Table 1 |
| Low Temperature | Subject the resonator to -55℃±2℃ for 96h, then release the resonator into the room conditions for 1h prior to the measurement. | It shall fulfill the specifications in Table 1 |
| Temperature Cycling | After temperature cycling of blow table was performed 5 times, resonator shall be measured after being placed in natural conditions for 1h.<br>Temp.: –25±3℃, Time: 30±3 min ;<br>Temp.: 85±3℃, Time: 30±3 min. | It shall fulfill the specifications in Table 1 |
| Vibration | Subject the resonator to vibration for 2h each in x、y and z axis With the amplitude of 1.5mm, the frequency shall be varied uniformly between the limits of 10 Hz—55Hz. | It shall fulfill the specifications in Table 1 |
| Mechanical Shock | Drop the resonator randomly onto a wooden floor from the height of 100cm 3 times. | It shall fulfill the specifications in Table 1 |
| Soldering Test | Passed through the re-flow oven under the following condition and left at room temperature for 1h before measurement. | It shall fulfill the specifications in Table 1 |
| Solderability | Dipped in 245℃±5℃ solder bath for 3s±0.5 s with rosin flux (25wt% ethanol solution.). see *Suggested Reflow Profile* | The terminals shall be at least 95% covered by solder. |
| Board Bending | Mount on a glass-epoxy board(width =40mm, thickness=1.6mm),then bend it to 1mm displacement(velocity= 1mm/s) and keep it for 5s. | Mechanical damage such as break shall not occur |

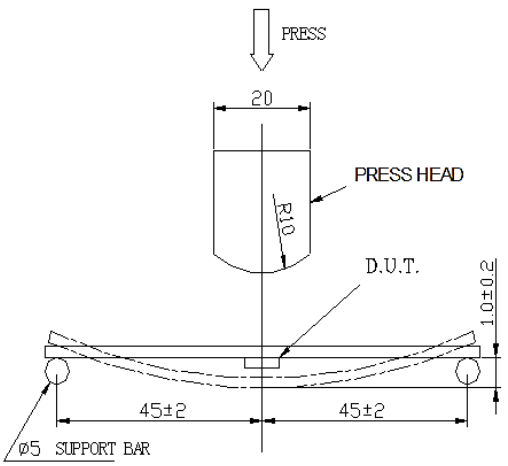
Table 1

| TEST ITEMS | CHARACTERISTICS AFTER TEST | |
|---|---|---|
| | VALUE | UNITS |
| Oscillation Frequency Change △Fosc/Fosc | ±0.3 Max | % |
| Resonant Impedance △Ro | 40 Max. | Ω |
| Note: The limits in the above table are referenced to the initial measurements. | | |

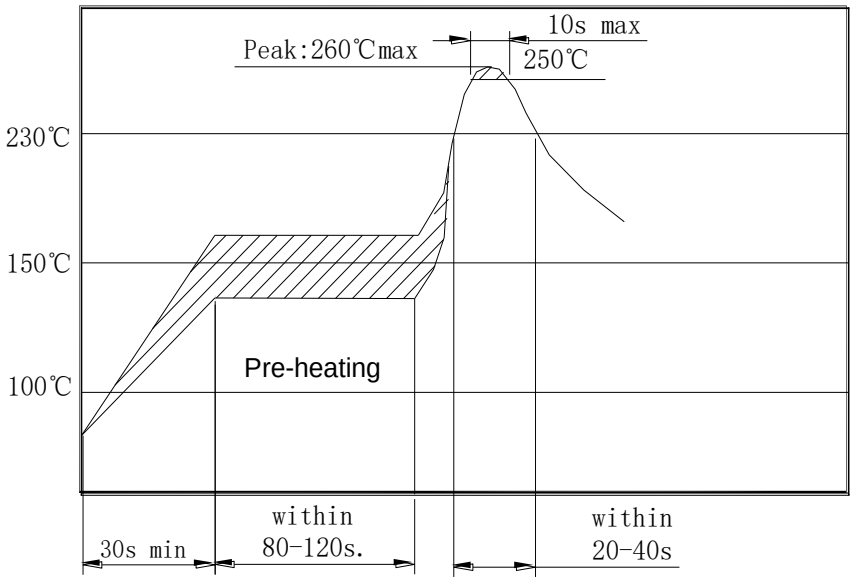
Soldering Test



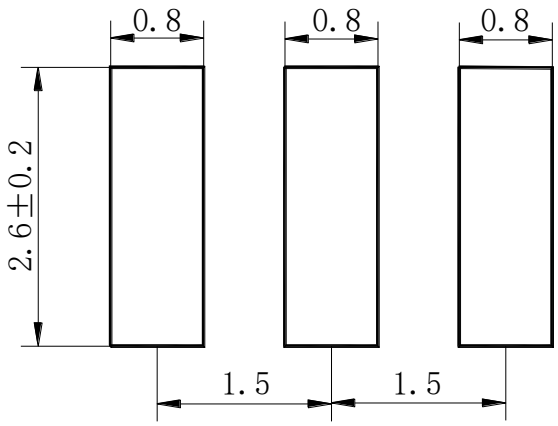

Board Bending



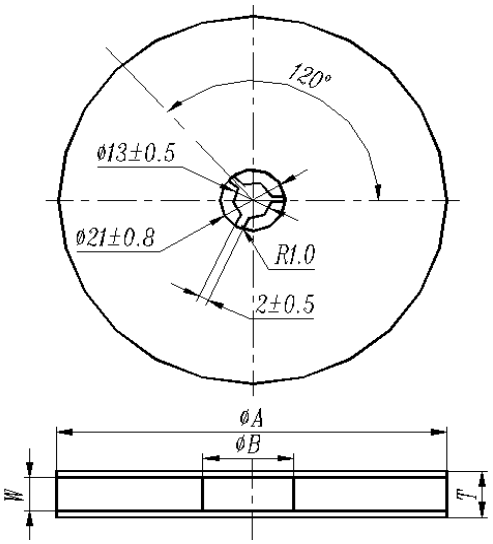
**SUGGESTED REFLOW PROFILE** (For Reference Only)




**RECOMMENDED LAND PATTERN** (Unit: mm)

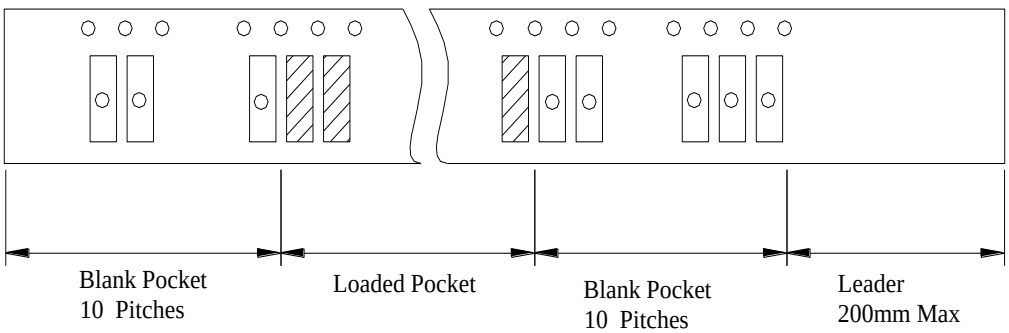


**TPAE/REEL DIMENSIONS** (Unit: mm)

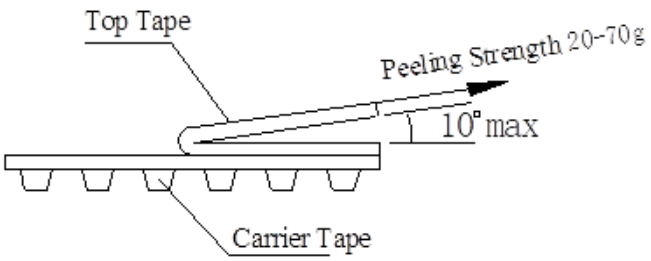



| Code | Dimension |
|---|---|
| ϕA | 180±3.0 |
| ϕB | 60 Min. |
| W | 12.4 Min. |
| T | 19.4 Max. |
| Qty. Per Reel | 3000pcs |
| Carrier Tape Size | 12 |

**PACKING METHOD SKETCH MAP**




**TEST CONDITION OF PEELING STRENGTH**



## CAUTION

- Don't apply excess mechanical stress to the component and terminals at soldering. Do not use this product with bend.
- Do not clean or wash the component for it is not hermetically sealed.
- Do not use strong acidity flux, more than 0.2wt% chlorine content, in flow soldering.
- Don't be close to fire.
- This specification mentions the quality of the component as a single unit. Please insure the component is thoroughly evaluated in your application circuit
- Expire date (Shelf life) of the products is 12 months after delivery under the conditions of a sealed and an unopened package. Please use the products within 12 months after delivery. If you store the products for a long time (more than 12 months), use carefully because the products may be degraded in the solder-ability or rusty. Please confirm solder-ability and characteristics for the products regularly.
- Exposure components under soldering condition that is exceeding our recommendation will increase the failure dangerous.
- Please contact us before using the product as automobile electronic component.
- Please return one of these specifications after your signature of acceptance.
- When something gets doubtful with this specifications, we shall jointly work to get an agreement.
- For questions on technology, prices and delivery, please contact our sales offices or e-mail: sales@NextGenComponent.com .

## IMPORTANT NOTES AND DISCLAIMER

1. ROHS COMPLIANCE: The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU RoHS Directive (EU) 2015/863 EC (RoHS3). RoHS Test Report for this product can be obtained at Download Center.

2. REACH COMPLIANCE: REACH substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, REACH Test Report for this product can be obtained at Download Center.

3. All Product parametric performance is indicated in the Electrical Characteristics for the listed herein test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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