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|---|--|-------------------------------|
| SPECIFICATION SHEET NO. | R1010- FM455K0000S114 | |
| ORIGINAL MFG/PART NO | TGS Crystals/CFTC 455KEW TLH/LTWC455KEx | |
| DATE | Oct. 10, 2024 | |
| REVISION | A4 | Updated With Most Recent Data |
| DESCRIPTION AND MAIN PARAMETRICS | <p>KHz SMD Ceramic Filter, GDT Type, 4 Pads, FM Series</p> <p>Case 12065, Dimension L12.0*W6.5*H3.0mm</p> <p>455KHz, Insertion Loss. 4.0dB Max.; 6dB Bandwidth: ±7.5KHz Min.</p> <p>Group Delay Time (GDT) Ripple Deviation: 30µSec. Max. within f0 ±5KHz</p> <p>Input/Output Impedance: 1500 ohm, Operating Temp. Range -20°C ~+85°C</p> <p>Reflow Profile Condition 260 °C Max. Package in Tape/Reel, 1000pcs/Reel</p> <p>REACH/RoHS/RoHS III Compliant, RoHS Annex III lead Exemption (Exempt per RoHS EU 2015/863)</p> | |
| CUSTOMER | | |
| CUSTOMER PART NUMBER | | |
| CROSS REF. PART NUMBER | | |
| MEMO | | |

| | | | |
|-------------------------|---|--|---|
| VENDOR APPROVE | | | |
| Issued/Checked/Approved |  |  |  |
| Date: Oct. 10, 2024 | | | |

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

MAIN FEATURE

- KHz SMD Ceramic Filter, GDT Type, 4 pads, Case 12065
- White case, Dimension L12.0*W6.5*H3.0mm
- Low Cost And Short Shipment
- Group Delay Time (GDT) Ripple Deviation: 30μSec. Max. within f0 ±5KHz
- Reflow Profile Condition 260 °C Max.
- Cross Main Competitors Parts CFWKG series
- 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

HOW TO ORDER

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

PART CODE GUIDE

RFQ
[Request For Quotation](#)

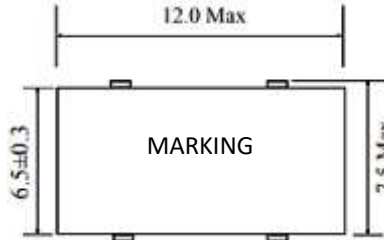
| CODE | NAME | KEY SPECIFICATION OPTION |
|------|--------------------|--|
| FM | Product Series | KHz SMD Ceramic Filter, 4 pads, Case 12065 Dimension L12.0*W6.5*H3.0mm |
| 455K | Frequency Range | 450: 450KHz; 455K: 455KHz |
| 0000 | Internal Control | Letter or Digits (A~Z, a~z or 1~9) |
| S | SMD Type Package | Tape/Reel |
| 114 | Special Parametric | Letter or Digits (A~Z, a~z or 1~9) |
| - XX | Suffix | Blank: N/A XX: Internal Control Code, Letter A~Z, a~z or digits (0~9) for Special/Custom Parameters |

DIMENSION (Unit: mm)

Case 12065, 4 Pads

L12.0*W6.5*H3.0mm

Top View



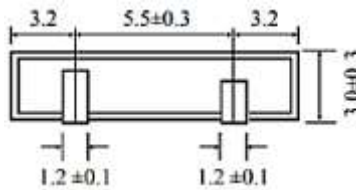
Marking

Line 1: CFTC or LTWC

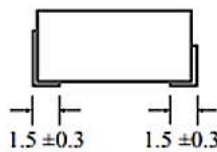
Line 2: Frequency Range

+ Internal Control Code

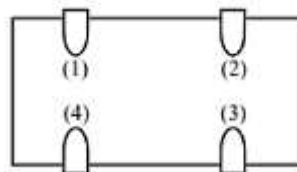
Side View



Side View



Bottom View



Connection

(1): Pin 1: Input/Output

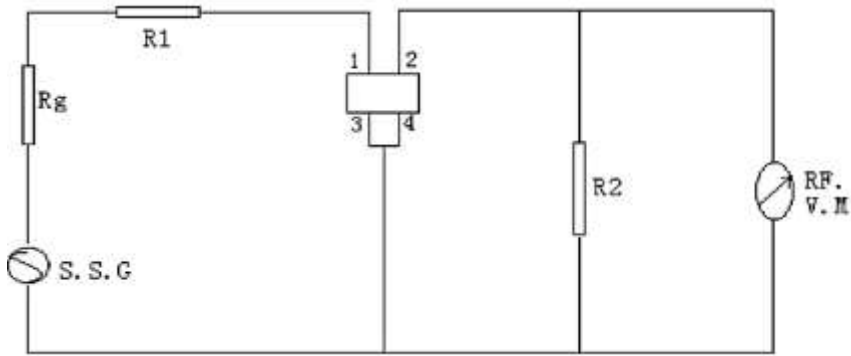
(2): Pin 2: Output/Input

(3): Pin 3: Ground

(4): Pin 4: Ground

MEASUREMENT

- Measurement shall be carried out at the standard temperature of $25\pm 2^{\circ}\text{C}$. If no specific requirements, Test can be carried out under $5-35^{\circ}\text{C}$.
- Measuring Circuit



$R_g + R_1 = R_2 = \text{Output/input Impedance}$

GENERAL ELECTRICAL PARAMETERS

| PARAMETER | UNITS | VALUE | | | CONDITION |
|-----------------------|-------|-------|---------|------|------------------|
| | | MIN. | TYPICAL | MAX. | |
| Operating Temperature | °C | -20 | | +85 | |
| Storage Temperature | °C | -40 | | +85 | |
| Temperature Stability | % | | | ±0.5 | @ -20°C ~+85°C |
| Insulation Resistance | MΩ | 100 | | | @DC 25V 1 minute |

ELECTRONICAL RIPPLE PARAMETERS I – FOR DIFFERENT PART CODE

| Part Code | Center Freq.(f0) (Center of 6dB Bandwidth) | 3dB Bandwidth | 6dB Bandwidth | 50dB Bandwidth | Stop Band Attenuation |
|-----------------------|--|------------------|------------------|-------------------|--------------------------------|
| | KHz | KHz | KHz | KHz | dB |
| FM450K0000S111 | 450±1.0 | ±11.5 Min. | ±13.0 Min. | ±30.0 Min. | 45 Min. (within f0± 100KHz) |
| FM450K0000S112 | 450±1.0 | ±10.0 Min. | ±12.0 Min. | ±30.0 Min. | 45 Min. (within f0± 100KHz) |
| FM450K0000S113 | 450±1.0 | ±7.0 Min. | ±10.0 Min. | ±25.0 Min. | 45 Min. (within f0± 100KHz) |
| FM450K0000S114 | 450±1.0 | ±5.0 Min. | ±7.5 Min. | ±20.0 Min. | 45 Min. (within f0± 100KHz) |
| FM450K0000S115 | 450±1.0 | ±4.0 Min. | ±6.0 Min. | ±17.5 Min. | 45 Min. (within f0± 100KHz) |
| FM450K0000S116 | 450±1.0 | ±3.0 Min. | ±4.5 Min. | ±15.0 Min. | 45 Min. (within f0± 100KHz) |
| FM455K0000S111 | 455±1.0 | ±11.5 Min. | ±15.0 Min. | ±35.0 Min. | 45 Min. (within f0± 100KHz) |
| FM455K0000S112 | 455±1.0 | ±10.0 Min. | ±12.0 Min. | ±30.0 Min. | 45 Min. (within f0± 100KHz) |
| FM455K0000S113 | 455±1.0 | ±7.0 Min. | ±10.0 Min. | ±25.0 Min. | 45 Min. (within f0± 100KHz) |
| FM455K0000S114 | 455±1.0 | ±5.0 Min. | ±7.5 Min. | ±20.0 Min. | 45 Min. (within f0± 100KHz) |
| FM455K0000S115 | 455±1.0 | ±4.0 Min. | ±6.0 Min. | ±17.5 Min. | 45 Min. (within f0± 100KHz) |
| FM455K0000S116 | 455±1.0 | ±3.0 Min. | ±4.5 Min. | ±15.0 Min. | 45 Min. (within f0± 100KHz) |

ELECTRONICAL RIPPLE PARAMETERS II – FOR DIFFERENT PART CODE

| Part Code | Ripple | Insertion Loss @ Min. Loss Point | Spurious Response (0.1 ~ 1MHz) | GDT Ripple Deviation | Input/ Output Impedance |
|-----------------------|----------------------------|----------------------------------|--------------------------------|---------------------------|-------------------------|
| | dB | dB | dB | µsec. | Ω |
| FM450K0000S111 | 1.0 Max. (within f0±10KHz) | 4.0 Max. | 20 Min. | 30 Max. (within fo±10KHz) | 1000 |
| FM450K0000S112 | 1.0 Max. (within f0±8KHz) | 4.0 Max. | 20 Min. | 30 Max. (within fo±8KHz) | 1000 |
| FM450K0000S113 | 1.0 Max. (within f0±7KHz) | 4.0 Max. | 20 Min. | 30 Max. (within fo±7KHz) | 1500 |
| FM450K0000S114 | 1.0 Max. (within f0±5KHz) | 4.0 Max. | 20 Min. | 30 Max. (within fo±5KHz) | 1500 |
| FM450K0000S115 | 1.0 Max. (within f0±4KHz) | 4.0 Max. | 20 Min. | 40 Max. (within fo±4KHz) | 1500 |
| FM450K0000S116 | 1.0 Max. (within f0±3KHz) | 4.0 Max. | 20 Min. | 40 Max. (within fo±3KHz) | 1500 |
| FM455K0000S111 | 1.0 Max. (within f0±10KHz) | 4.0 Max. | 20 Min. | 30 Max. (within fo±10KHz) | 1000 |
| FM455K0000S112 | 1.0 Max. (within f0±8KHz) | 4.0 Max. | 20 Min. | 30 Max. (within fo±8KHz) | 1000 |
| FM455K0000S113 | 1.0 Max. (within f0±7KHz) | 4.0 Max. | 20 Min. | 30 Max. (within fo±7KHz) | 1500 |
| FM455K0000S114 | 1.0 Max. (within f0±5KHz) | 4.0 Max. | 20 Min. | 30 Max. (within fo±5KHz) | 1500 |
| FM455K0000S115 | 1.0 Max. (within f0±4KHz) | 4.0 Max. | 20 Min. | 40 Max. (within fo±4KHz) | 1500 |
| FM455K0000S116 | 1.0 Max. (within f0±3KHz) | 4.0 Max. | 20 Min. | 40 Max. (within fo±3KHz) | 1500 |

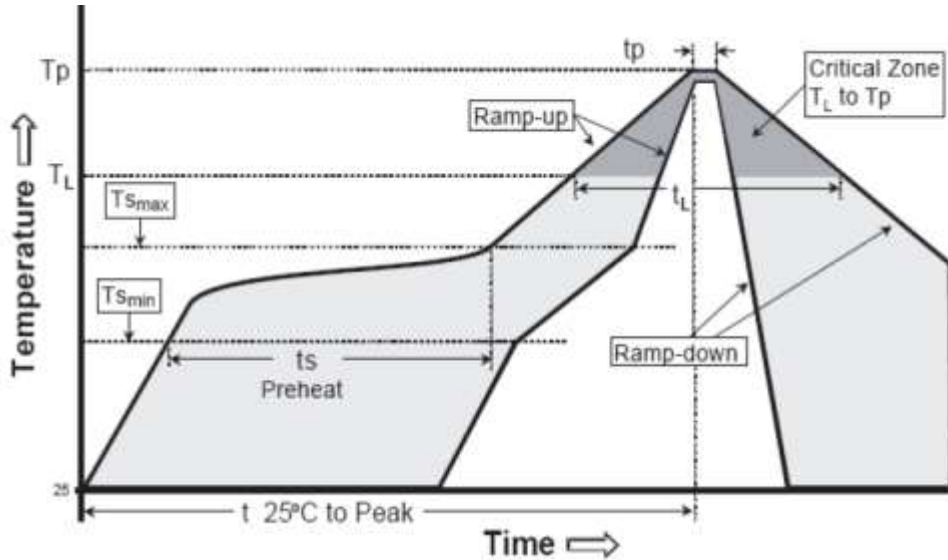
PHYSICAL CHARACTERISTICS

| TEST ITEMS | MEASUREMENT CONDITION | REQUIREMENT |
|------------------------|---|---|
| Random Drop | Filter shall be measured after 3 times random drops from the height of 30cm on concrete floor | No visible damage and it meet Table at Page 4~6 |
| Vibration | Filter shall be measured after being applied vibration of amplitude of 1.5mm with 10-55Hz band of vibration frequency to each of 3 perpendicular directions for 2 hours | No damage and it meet Table at Page 4~6 |
| Solderability | Lead terminals are immersed in aide solder for 5 sec and then immersed in soldering bath of 230±5°C, for 3±0.5 sec. | At least 95% lead terminals shall be covered with solder. |
| Substrate Bending Test | Apply pressure in the direction of arrow at a rate of about 0.5mm per second until it reaches a bend of 3mm and hold for 30s. | No damage, no cut-off and it meet Table at Page 4~6 |
| Adhesion | A static load of 20N to the direction of the arrow shall be applied on the core of the component and hold for 10 seconds. Filter shall be soldered correctly and tightly to PCB. | No damage, no cut-off and it meet Table at Page 4~6 |
| Reflow Soldering | Put on the solder paste on the printed wiring board the samples shall be mounted and soldered under the condition, then it shall be subjected to the room atmosphere for 24 hours prior to the measurement. | No damage, no cut-off and it meet Table at Page 4~6 |

ENVIRONMENTAL CHARACTERISTICS

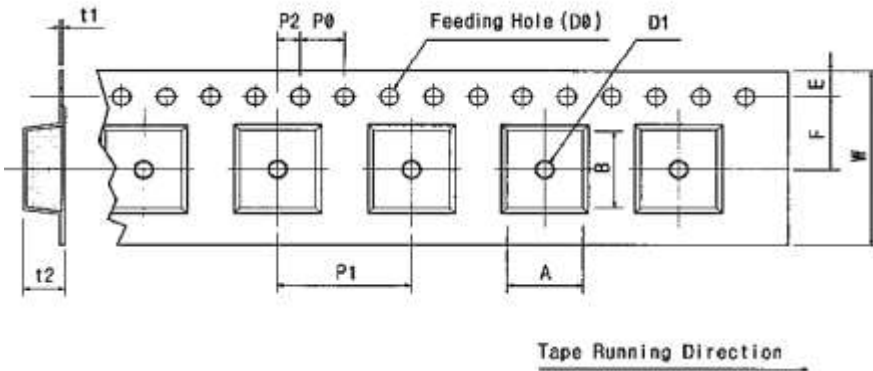
| TEST ITEMS | MEASUREMENT CONDITION | REQUIREMENT |
|---------------------------|---|---------------------------------|
| Humidity | After being placed in a chamber with 90-95% R.H. at 40±2°C for 100 hours and then being placed in room temperature for 1 hour, filter shall be measured. | It shall meet Table at Page 4~6 |
| Resistance to Solder Heat | After being placed in a chamber with 80±2°C, for 100 hours and then being placed in room temperature for 1 hour, filter shall be measured. | It shall meet Table at Page 4~6 |
| High Temperature | After being placed in a chamber with 80±2°C, for 100 hours and then being placed in room temperature for 1 hour, filter shall be measured. | It shall meet Table at Page 4~6 |
| Low Temperature | After being placed in a chamber with -20±2°C, for 100 hours and then being placed in room temperature for 1 hour, filter shall be measured. | It shall meet Table at Page 4~6 |
| Heat Shock | After being kept at room temperature, filter shall be placed at temperature of -55 °C, for 30 minutes, then be placed at temperature. 85°C, for 30 minutes. After that returned to -55°C again. Repeated above cycle for 5 times. After being kept in room temp. for 1 hour, filter shall be measured | It shall meet Table at Page 4~6 |

SUGGESTED REFLOW PROFILE (For Reference Only)

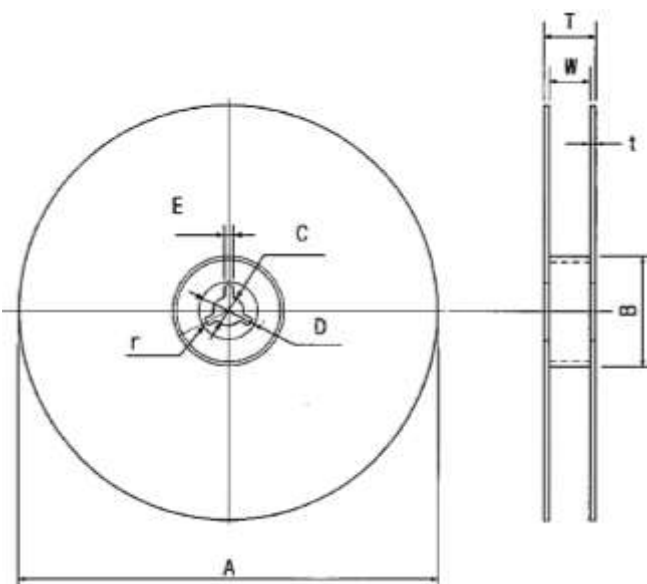


| PROFILE FEATURE | | PB-FREE ASSEMBLY |
|--|-------------------------------|-------------------|
| Average Ramp-up Rate (Ts Max to Tp) | | 3°C/second Max |
| Preheat | Temperature Min (Ts Min.) | 125°C |
| | Temperature Max (Ts Max.) | 200°C |
| | Time (ts Min. to ts Max.) | 60 ~ 180 seconds |
| Time maintained above | Temperature (T _L) | 217°C |
| | Time (t _L) | 60 ~ 150 seconds |
| Peak/Classification Temperature (T _p) | | 260 °C |
| Time within 5°C of actual Peak Temperature (t _p) | | 20 ~ 40 seconds |
| Ramp-down rate | | 6 °C /Second Max. |
| Time 25 °C to Peak Temperature | | 8 minutes Max. |
| Suggest reflow times | | 3 Times Max. |

TAPE AND REEL (Unit: mm, 1000pcs/Reel)



| Code | Dimension |
|------|-------------|
| W | 24.0+/-0.30 |
| F | 11.5+/-0.05 |
| E | 1.75+/-0.10 |
| P 0 | 4.00+/-0.10 |
| P 1 | 12.0+/-0.10 |
| P 2 | 2.00+/-0.05 |
| D 0 | Ø1.5+/-0.10 |
| D 1 | Ø1.0+/-0.25 |
| t 1 | 0.35+/-0.10 |
| t 2 | 3.20+/-0.10 |
| A | 7.70+/-0.10 |
| B | 12.0+/-0.10 |



| Code | Dimension |
|------|-------------|
| A | Ø180+/-1.0 |
| B | Ø60+/-0.5 |
| C | Ø13.0+/-0.5 |
| E | 2.00+/-0.5 |
| W | 17.0+/-1.0 |
| T | 19.4+/-0.3 |

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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