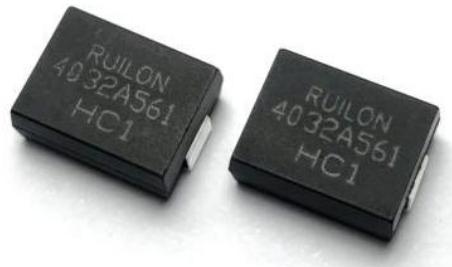


Features

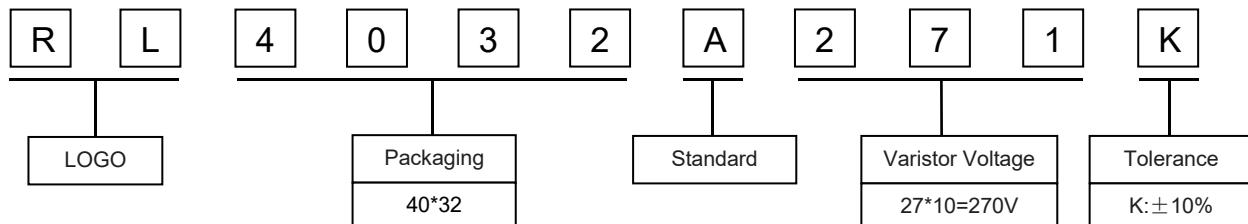
- Electrical equivalents to leaded types
- SMD plastic package.
- RoHS-compatible. AECQ101
- Suitable for lead-free soldering
- Pspice models available
- Cylindrical varistor element, encapsulated.
- Encapsulation: thermoplastic, flame-retardant to UL 94 V-0.
- Termination: tinned copper alloy, suitable for lead-free wave and reflow soldering, and compatible with tin/lead solder.
- Operating Temperature: -40°C to +125°C
- Storage Temperature: -40 °C to +150°C



Applications

- Power supplies for telecommunication systems
- Protection for LED circuits
- Protection for consumer, industrial equipment
- Protection for automotive electronics

Part Number Code



Electrical Characteristics

| Type Number | Varistor Voltage | Max. Allowable Voltage | | Max. Energy (10/1000μs) | Max. Clamping Voltage (8/20μs) | | Withstanding Surge Current (8/20μs) | 8/20μs&1.2/50μs @Ri=2 Ω | | Maximum DC Leakage Current | C _{typ} (1 kHz, 1 V) |
|-------------|----------------------|------------------------|---------------------|-------------------------|--------------------------------|--------------------|-------------------------------------|-------------------------|-------|----------------------------|-------------------------------|
| | V _{1mA} (V) | V _{AC} (V) | V _{DC} (V) | (J) | I _P (A) | V _c (V) | I(A) @1 Time | KV | Times | μA | pF |
| RL4032A201K | 180~220 | 130 | 170 | 25 | 25 | 340 | 2500 | 4 | 40 | 20 | 500 |
| RL4032A221K | 198~242 | 140 | 180 | 27 | 25 | 360 | 2500 | 4 | 40 | 20 | 450 |
| RL4032A241K | 216~264 | 150 | 200 | 30 | 25 | 395 | 2500 | 4 | 40 | 20 | 420 |
| RL4032A271K | 243~297 | 175 | 225 | 35 | 25 | 455 | 2500 | 4 | 40 | 20 | 370 |
| RL4032A301K | 270~330 | 195 | 250 | 40 | 25 | 500 | 2500 | 4 | 40 | 20 | 330 |
| RL4032A331K | 297~363 | 210 | 275 | 42 | 25 | 550 | 2500 | 4 | 40 | 20 | 300 |
| RL4032A361K | 324~396 | 230 | 300 | 45 | 25 | 595 | 2500 | 4 | 40 | 20 | 280 |
| RL4032A391K | 351~429 | 250 | 320 | 50 | 25 | 650 | 2500 | 4 | 40 | 20 | 260 |
| RL4032A431K | 387~473 | 275 | 350 | 55 | 25 | 710 | 2500 | 4 | 40 | 20 | 230 |
| RL4032A471K | 423~517 | 300 | 385 | 60 | 25 | 775 | 2500 | 4 | 40 | 20 | 210 |
| RL4032A511K | 459~561 | 320 | 410 | 67 | 25 | 845 | 2500 | 4 | 40 | 20 | 200 |
| RL4032A561K | 504~616 | 350 | 450 | 69 | 25 | 930 | 2500 | 4 | 40 | 20 | 180 |
| RL4032A621K | 558~682 | 395 | 510 | 70 | 25 | 1020 | 2500 | 4 | 40 | 20 | 160 |
| RL4032A681K | 612~748 | 420 | 560 | 72 | 25 | 1120 | 2500 | 4 | 40 | 20 | 150 |

General Technical Data

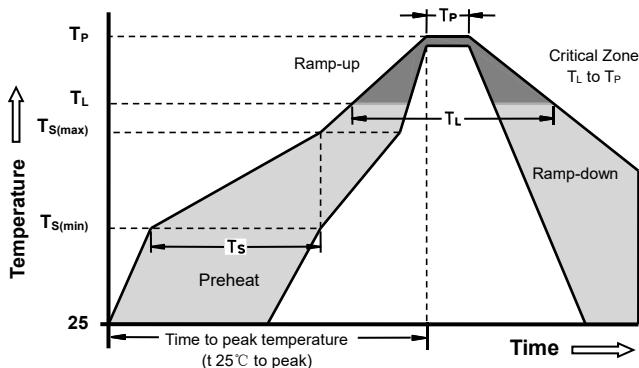
| | | |
|----------------------------------|---------------------|---------------|
| Taping Package Storage Condition | Storage Temperature | -10~40°C |
| | Relative Humidity | ≤ 75% |
| | Storage Time | 12 Months max |

(Do not use this product in corrosive gases or direct sunlight environment preservation)

Reliability Test (Note: For CU varistors mounted on PCB by reflow soldering.)

| Items | Test Condition/Description | Specification |
|---|--|--|
| Varistor voltage | The voltage between two terminals with the specified measuring current applied is called V_v (1 mA _{DC} @ 0.2 ... 2 s). | To meet the specified value |
| Clamping voltage | The maximum voltage between two terminals with the specified standard impulse current (8/20 μ s) applied. | To meet the specified value |
| Endurance at upper Category temperature | 1000 h at UCT After having continuously applied the maximum allowable AC voltage at UCT ± 2 °C for 1000 h, the specimen shall be stored at room temperature and normal humidity for 1 to 2 h. Thereafter, the change of V_v shall be measured. | $ \Delta V / V(1mA) \leq 10\%$ |
| Surge current derating, 8/20 μ s | 10 surge currents (8/20 μ s), unipolar, interval 30 s, amplitude corresponding to derating curve for 10 impulses at 20 μ s | $ \Delta V / V(1mA) \leq 10\%$ (measured in direction of surge current) No visible damage |
| Surge current derating, 2 ms | 10 surge currents (2 ms), unipolar, interval 120 s, amplitude corresponding to derating curve for 10 impulses at 2 ms | $ \Delta V / V(1mA) \leq 10\%$ (measured in direction of surge current) No visible damage |
| Climatic sequence | The specimen shall be subjected to: a) dry heat at UCT, 16 h, IEC 60068-2-2, test Ba b) damp heat, 1st cycle: 55 °C, 93% r. H., 24 h, IEC 60068-2-30, test Db. c) cold, LCT, 2 h, IEC 60068-2-1, test Aa. d) damp heat, additional 5 cycles: 55 °C/ 25°C, 93% r. H., 24 h/cycle, IEC 60068-2-30, test Db. Then the specimen shall be stored at room temperature and normal humidity for 1 to 2h. Thereafter, the change of V_v shall be measured. Thereafter, insulation resistance R_{ins} shall be measured at $V = 500V$. | $ \Delta V / V(1mA) \leq 10\%$ $R_{ins} \geq 100 \text{ M}\Omega$ |
| Rapid change of temperature | IEC 60068-2-14, test Na, LCT/UCT, dwell time 30 min, 5 cycles | $ \Delta V / V(1mA) \leq 5\%$ No visible damage |
| Damp heat, steady state | IEC 60068-2-78, test Ca The specimen shall be subjected to 40 ± 2 °C, 90 to 95% r. H. for 56 days without load / with 10% of the maximum continuous DC operating voltage V_{DC} . Then stored at room temperature and normal humidity for 1 to 2 h. Thereafter, the change of V_v shall be measured. Thereafter, insulation resistance R_{ins} shall be measured at $V = 500 V$ (insulated varistors only). | $ \Delta V / V(1mA) \leq 10\%$ $R_{ins} \geq 100 \text{ M}\Omega$ |
| Solderability | IEC 60068-2-58, test Td1, method 1 - solder bath, Sn96, 5Ag3Cu0.5 $T = 245 \pm 3$ °C , $t = 2$ s | The terminations shall be uniformly tinned for soldering test. |
| Resistance to soldering heat | IEC 60068-2-58, test Td2, method 1 - solder bath, Sn96, 5Ag3Cu0.5 $T = 260 \pm 5$ °C , $d = 10 \pm 1$ s | $ \Delta V / V(1mA) \leq 5\%$ No visible damage |
| Robustness of termination | Substrate bending test : IEC 60068-2-21, test Ue1 Deflection = 2 mm , $t = 60$ s | $ \Delta V / V(1mA) \leq 10\%$ No visible damage |
| | Shear test: IEC 60068-2-21, test Ue3 Force = 5 N , $t = 10 \pm 1$ s | $ \Delta V / V(1mA) \leq 10\%$ No visible damage |
| Vibration | IEC 60068-2-6, test Fc, method B4: Frequency range: 10 ... 55 Hz , Amplitude: 0.75 mm or 98 m/s ² , Duration: 6 h (3 · 2 h) Pulse: sine wave After repeatedly applying a single harmonic vibration according to the table above. The change of V_v shall be measured and the specimen shall be visually examined. | $ \Delta V / V(1mA) \leq 5\%$ No visible damage |
| Bump | IEC 60068-2-27, test Ea: Pulse duration: 6 ms , Max. acceleration: 400 m/s ² Number: 6 x 5000 shocks , Pulse shape: half sine | $ \Delta V / V(1mA) \leq 5\%$ No visible damage |
| Fire hazard | IEC 60695-11-5 (needle flame test) Severity: vertical 10 s | 5 s max. |

Soldering Parameters - Reflow Soldering (Surface Mount Devices)



Precaution for soldering

Note that this product will be easily damaged by rapid heating, rapid cooling or local heating.

Do not give heat shock over 100°C in the process of soldering. We recommend to take preheating and gradual cooling

Soldering gun procedure

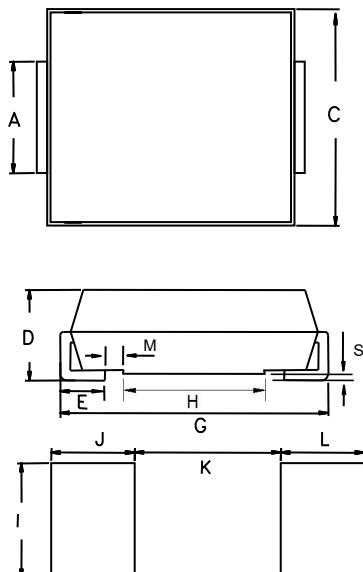
Note the follows, in case of using solder gun for replacement.

- 1) The tip temperature must be less than 280 for the period within 3 seconds by using soldering gun under 30W
- 2) The soldering gun tip shall not touch this product directly.

Soldering volume

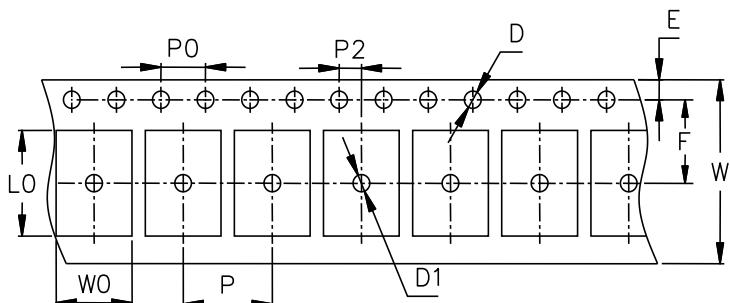
Note that excess of soldering volume will easily get crack the body of this product.

Dimensions And Recommended Pad Layout



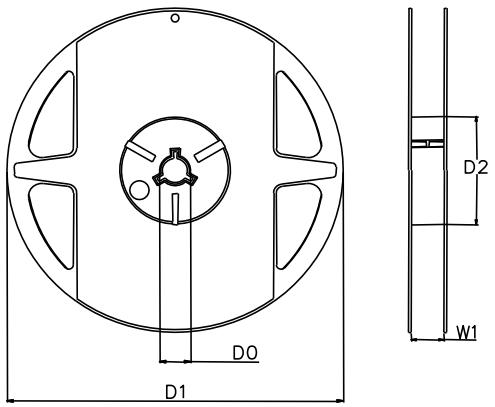
| Reflow Condition | | Pb - Free assembly |
|--|-----------------------------------|--------------------|
| Pre He at | -Temperature Min ($T_{s(min)}$) | 150°C |
| | -Temperature Max ($T_{s(max)}$) | 200°C |
| | - Time (min to max) (t_s) | 60 -180 Seconds |
| Average ramp up rate (Liquids Temp T_L) to peak | | 3°C/second max |
| $T_{s(max)}$ to T_L - Ramp-up Rate | | 3°C/second max |
| Ref low | - Temperature (T_L) (Liquids) | 217°C |
| | - Time (min to max) (t_s) | 60 -150 Seconds |
| Peak Temperature (T_p) | | 260 +0/-5°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 (T_p) | | 8 minutes Max |
| Do not exceed | | 260°C |

Taping and Reel Specifications



| Symbol | Millimeters | Inches |
|--------|-------------|--------------|
| W | 24.00±0.30 | 0.945±0.012 |
| E | 1.75±0.10 | 0.069±0.004 |
| F | 11.5±0.10 | 0.453±0.004 |
| D | Φ1.50±0.10 | Φ0.059±0.004 |
| D1 | Φ1.50±0.10 | Φ0.059±0.004 |
| P | 12.00±0.10 | 0.472±0.004 |
| P0 | 4.00±0.10 | 0.157±0.004 |
| P2 | 2.00±0.10 | 0.079±0.004 |

Packing Specifications



| Symbol | Millimeters | Inches |
|--------|-------------|-----------------|
| D1 | 380+0/-2.0 | 14.961+0/-0.079 |
| D2 | Φ100.0±3.0 | Φ3.937±0.118 |
| W1 | 16.4±0.2 | 0.646±0.008 |

Taping Specifications

There Shall be the portion having no product in both the head and the end of taping, and there shall be the cover tape in the heat of taping.

Quantity of products in the taping package

| | |
|--------------------------------------|------|
| SIZE EIA (EIAJ) | 4032 |
| Standard Packing Quantity (PCS/reel) | 1500 |