



## High Current, Power Inductors

### VCMA-1040-XXX-M-1A Power Choke



#### Description

- AEC-Q200 qualified
- Halogen Free
- 125°C maximum total temperature operation
- 11.5x10.3x4.0mm maximum surface mount package
- Magnetically shielded, low EMI
- High current carrying capacity, Low core losses
- RoHS compliant

#### Applications

- Automotive applications

#### Environmental Data

- Storage temperature range: -55°C to +125 °C
- Operating temperature range: -55°C to +125°C (ambient plus self-temperature rise)
- Solder reflow temperature: J-STD-020 compliant

| Description        |   |   |   |                  |   |   |   |                      |   |           |   |            |
|--------------------|---|---|---|------------------|---|---|---|----------------------|---|-----------|---|------------|
| VCMA-1040-1R0-M-1A |   |   |   | 1.0μH            |   |   |   | ±20 %                |   |           |   |            |
| Model              |   |   |   | Inductance Value |   |   |   | Inductance Tolerance |   |           |   |            |
| Global Part Number |   |   |   |                  |   |   |   |                      |   |           |   |            |
| V                  | C | M | A | 1                | 0 | 4 | 0 | 1                    | R | 0         | M | 1A         |
| Product Series     |   |   |   | Dimensions       |   |   |   | Inductance Value     |   | Tolerance |   | Automotive |

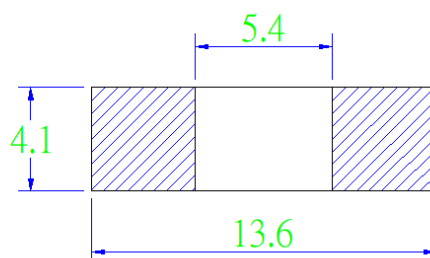
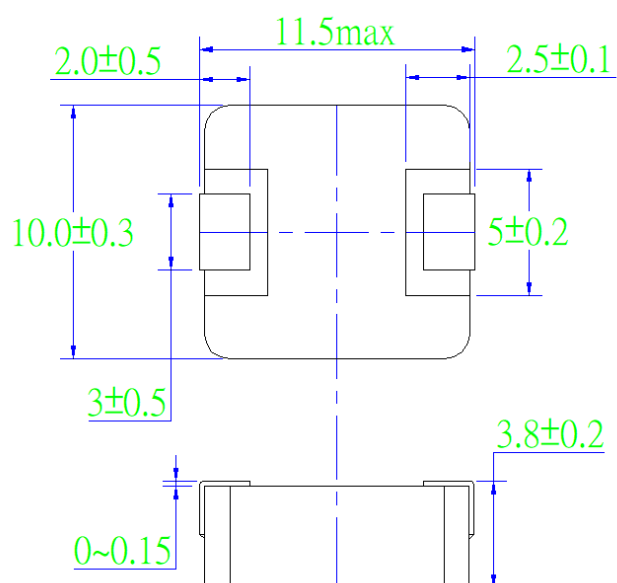


| Part No.           | Inductance      | DC Resistance |      | Heating Rating Current | Saturation Current |
|--------------------|-----------------|---------------|------|------------------------|--------------------|
|                    | L0 (μH)         | DCR (mΩ)      |      | Idc (A)                | Isat (A)           |
|                    | ±20 %, 1MHz, 1V | TYP.          | MAX. | TYP.                   | TYP.               |
| VCMA-1040-R22-M-1A | 0.22            | 0.62          | 0.8  | 37.0                   | 70.0               |
| VCMA-1040-R36-M-1A | 0.36            | 0.95          | 1.2  | 32.0                   | 54.0               |
| VCMA-1040-R47-M-1A | 0.47            | 1.3           | 1.7  | 27.0                   | 45.0               |
| VCMA-1040-R56-M-1A | 0.56            | 1.5           | 1.8  | 26.0                   | 38.0               |
| VCMA-1040-R68-M-1A | 0.68            | 1.95          | 2.4  | 23.0                   | 32.0               |
| VCMA-1040-1R0-M-1A | 1.0             | 2.6           | 3.1  | 19.0                   | 29.0               |
| VCMA-1040-1R5-M-1A | 1.5             | 3.3           | 3.8  | 17.0                   | 27.0               |
| VCMA-1040-2R2-M-1A | 2.2             | 6.0           | 7.0  | 14.0                   | 19.0               |
| VCMA-1040-3R3-M-1A | 3.3             | 10.0          | 11.8 | 11.5                   | 17.0               |
| VCMA-1040-4R7-M-1A | 4.7             | 12.7          | 16.0 | 10.5                   | 15.0               |
| VCMA-1040-6R8-M-1A | 6.8             | 21.2          | 25.0 | 8.0                    | 12.5               |
| VCMA-1040-8R2-M-1A | 8.2             | 23.0          | 27.0 | 7.8                    | 11.0               |
| VCMA-1040-100-M-1A | 10.0            | 25.5          | 30.0 | 7.2                    | 9.0                |
| VCMA-1040-150-M-1A | 15.0            | 39.5          | 45.0 | 5.7                    | 7.5                |
| VCMA-1040-220-M-1A | 22.0            | 58.0          | 66.0 | 5.0                    | 6.5                |

#### Notes

1. All test data is referenced to 25 °C ambient
2. Operating temperature range - 55 °C to + 125 °C
3. Idc(A):DC current (A) that will cause an approximate ΔT of 40 °C(reference ambient temperature is 25 °C)
4. Isat(A):DC current (A) that will cause L0 to drop approximately 30 %
5. The part temperature (ambient + temp rise) should not exceed 125 °C under worst case operating conditions. Circuit design, component placement, PWB trace size and thickness, airflow and other cooling provisions all affect the part temperature. Part temperature should be verified in the end application.

### •Dimensions-mm



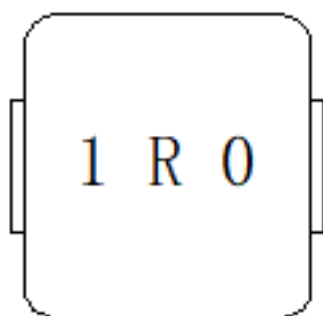
Recommend Land Pattern Dimensions

### •Marking

The inductor is marked with a 3-digit code

Example - -1.0→1R0

Note : Using Ink for marking



## Performance Graphs

## Test Instruments

Wayne kerr 3260B/G LCR Meter

Wayne kerr 3265B Bias Current Source

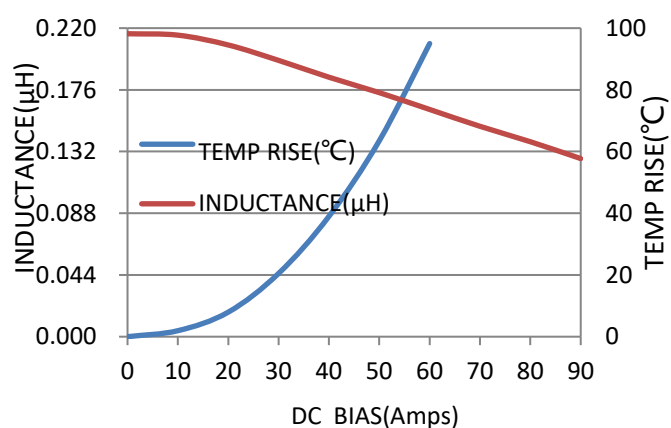
## Test Condition

Temperature:  $26 \pm 3^{\circ}\text{C}$ 

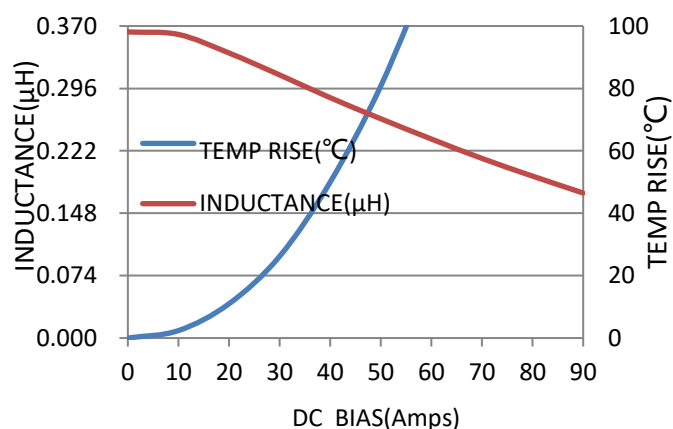
Humidity: &lt; 70% RH

Frequency: 1MHz, 1.0V

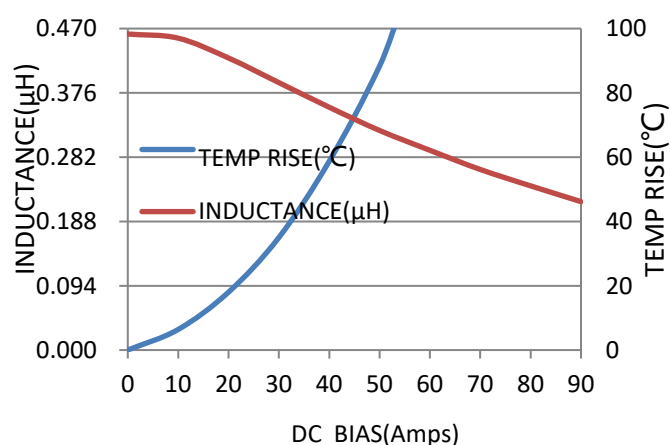
VCMA-1040-R22-M-1A



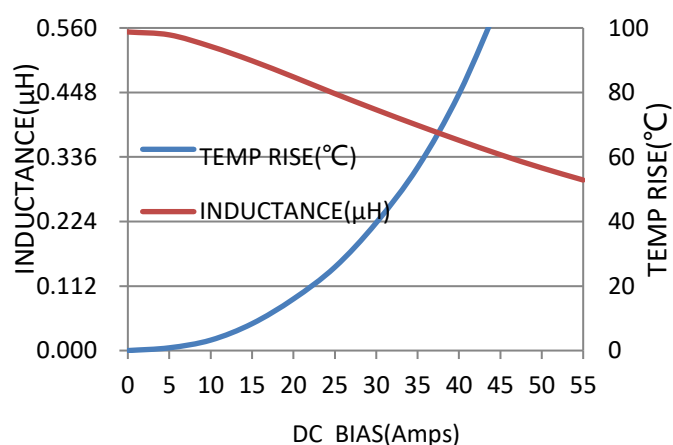
VCMA-1040-R36-M-1A



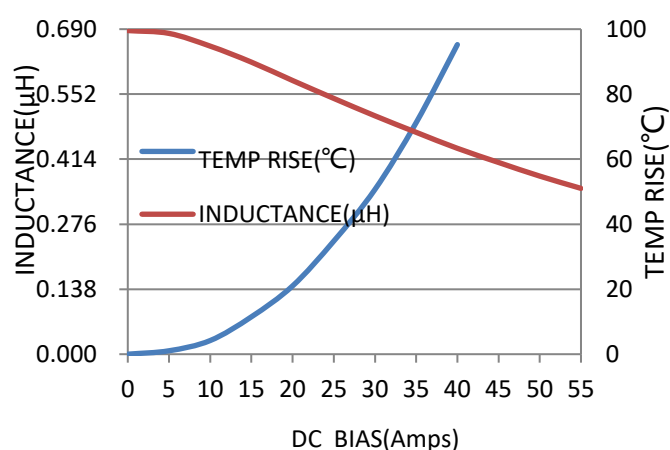
VCMA-1040-R47-M-1A



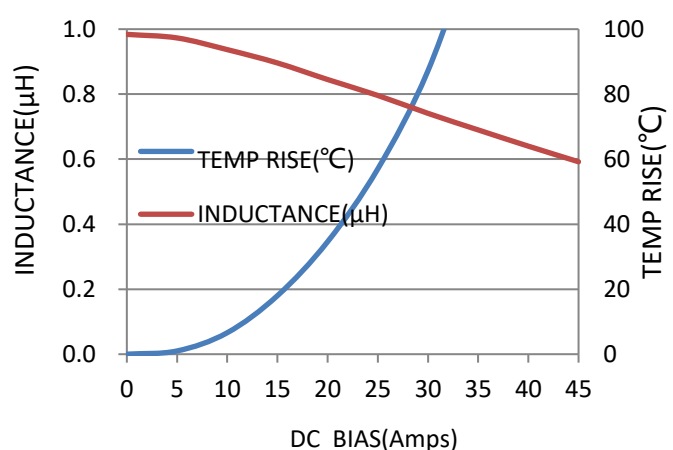
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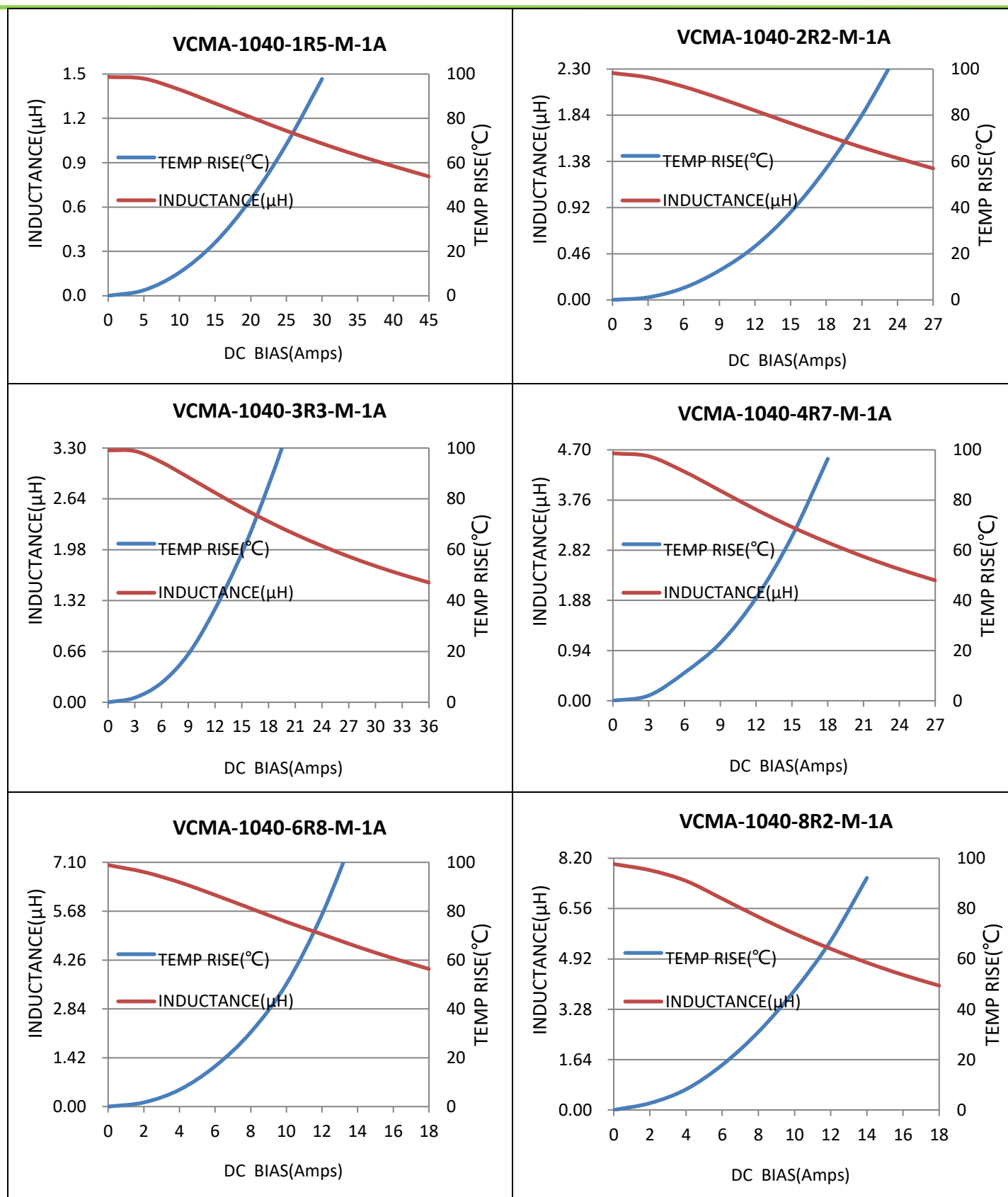


VCMA-1040-R68-M-1A



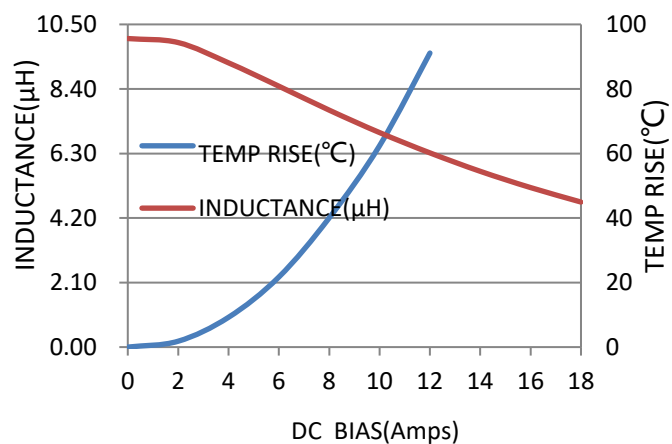
VCMA-1040-1R0-M-1A



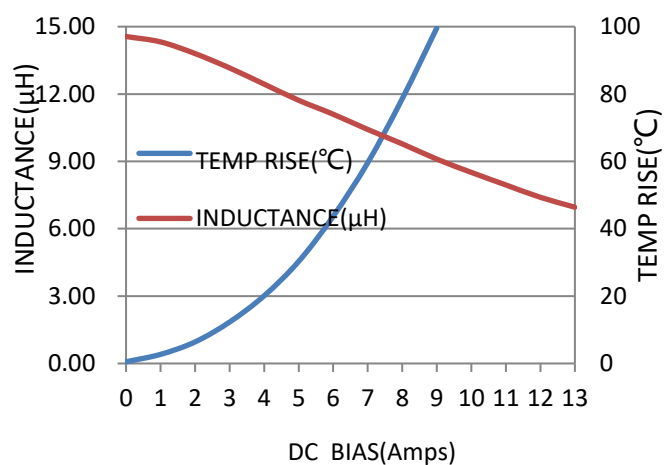




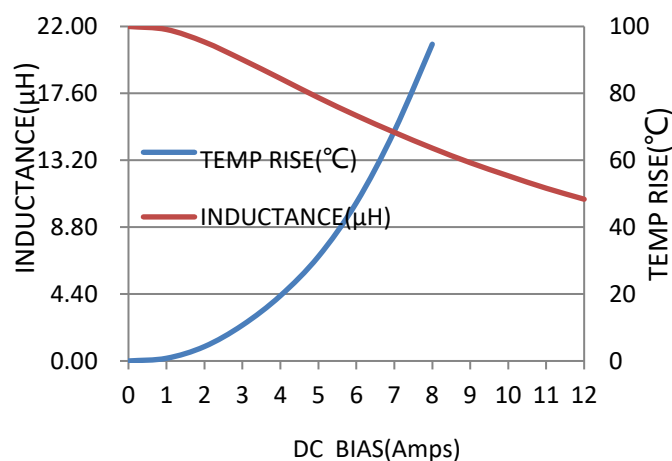
VCMA-1040-100-M-1A



VCMA-1040-150-M-1A



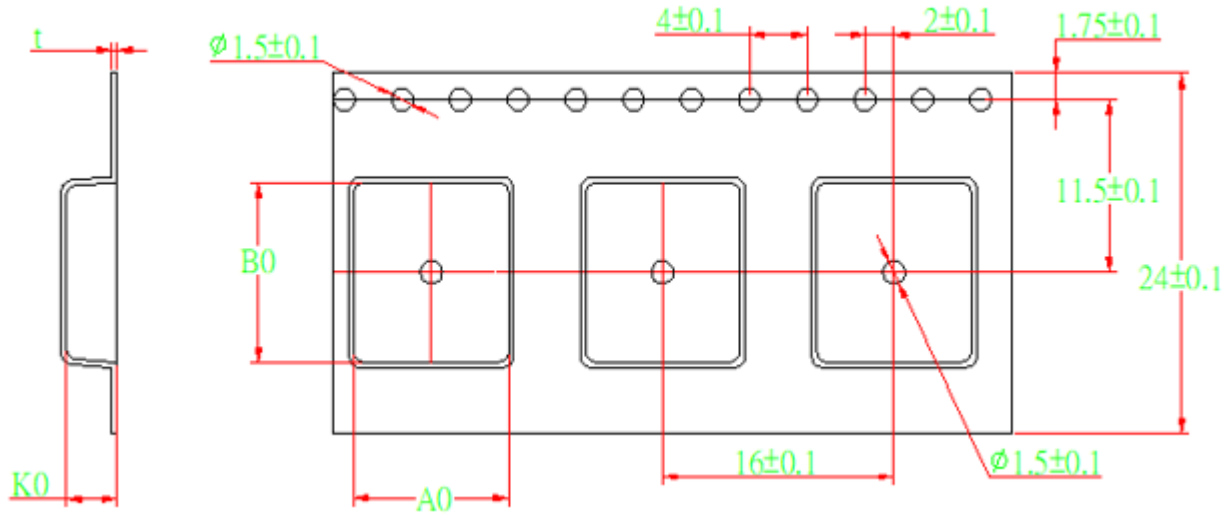
VCMA-1040-220-M-1A





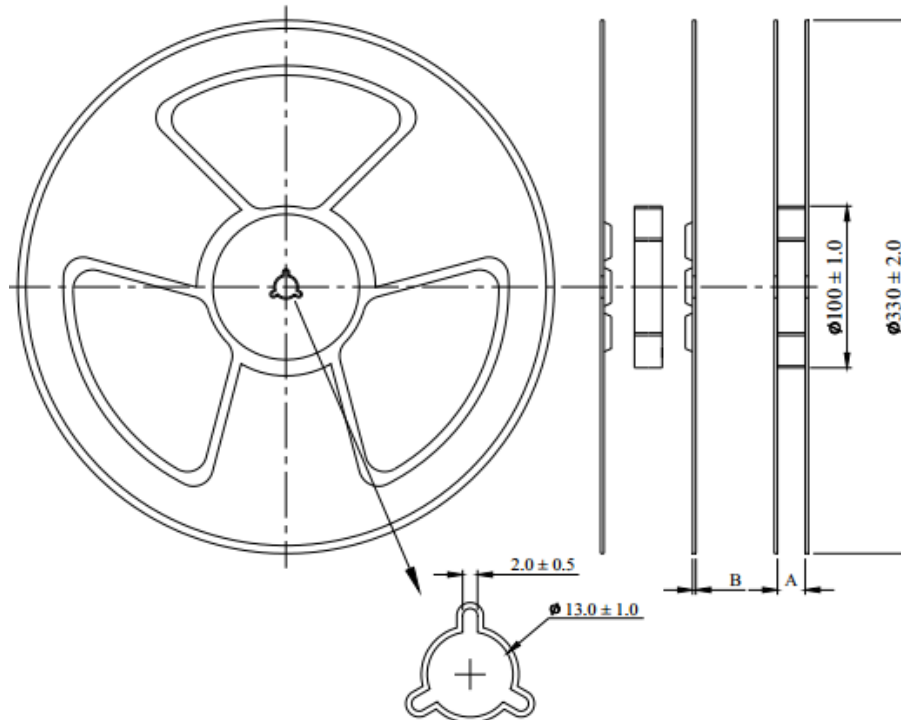
| Mechanical Reliability |                              |                                                                                               |                                                                                                                                                                                                             |
|------------------------|------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No.                    | Item                         | Specification and Requirement                                                                 | Test Method                                                                                                                                                                                                 |
| 1                      | Solderability                | The surface of terminal immersed shall be minimum of 95% covered with a new coating of solder | Retention time: $245 \pm 5$ °C for 5+0/-0.5seconds;                                                                                                                                                         |
| 2                      | Resistance to Soldering Heat | Change from an initial value<br>Inductance: within $\pm 10\%$                                 | Retention time: within 30 seconds $255 \pm 5$ °C ,<br>Three Times;                                                                                                                                          |
| 3                      | Terminal Strength            | No electrode detachment                                                                       | No electrode detachment should be found when the device is pushed is two directions of X and Y with the force of 17.7N for 60 seconds after soldering between copper plate and the electrodes;              |
| 4                      | Vibration                    | Inductance change: Within $\pm 10\%$<br>Without mechanical damage such as break               | 1. Vibration frequency: (10 Hz to 2000 Hz to 10Hz) in 20 minutes as a period;<br>2. Vibration time: Period cycled for four hours in each of 3 mutual perpendicular directions.<br>3. Amplitude: 1.5 mm max. |
| 5                      | Mechanical Shock             | Inductance change: Within $\pm 10\%$<br>Without mechanical damage such as break               | 1. Peak value: 100 G, Duration of pulse: 6ms<br>2. 3 times in each positive and negative direction of 3 mutual perpendicular directions;                                                                    |
| 6                      | Substrate Bending            | Inductance change: Within $\pm 10\%$<br>Without distinct damage in appearance                 | 1. Bending speed is 0.5mm/sec,<br>2. While the bending width reaches 2mm, keep it for 60 sec                                                                                                                |
| Endurance Reliability  |                              |                                                                                               |                                                                                                                                                                                                             |
| No.                    | Item                         | Specification and Requirement                                                                 | Test Method                                                                                                                                                                                                 |
| 7                      | Thermal Shock                | Inductance change: Within $\pm 10\%$<br>Without distinct damage in appearance                 | Repeat 1000 cycles as follow: ( $-55 \pm 2$ °C; $30 \pm 3$ min) → ( $+125 \pm 2$ °C , $30 \pm 3$ min)                                                                                                       |
| 8                      | Operational Life             | Inductance change: Within $\pm 10\%$<br>Without distinct damage in appearance                 | Rated current (Idc) Environment condition: 85°C<br>Duration: 1000 + 4 / -0 hours                                                                                                                            |
| 9                      | High Temperature Storage     | Inductance change: Within $\pm 10\%$<br>Without distinct damage in appearance                 | Store temperature: $+125 \pm 2$ °C, 1000 + 4 / -0 hours;                                                                                                                                                    |
| 10                     | High Temperature & Humidity  | Inductance change: Within $\pm 10\%$<br>Without distinct damage in appearance                 | 85°C 85%RH , 1000+4/-0 hours;                                                                                                                                                                               |

### Tape Packaging Dimensions



| A0              | B0            | K0            | t                |
|-----------------|---------------|---------------|------------------|
| $10.7 \pm 0.10$ | $12 \pm 0.10$ | $4.5 \pm 0.1$ | $0.35 \pm 0.025$ |

### Reel Dimensions

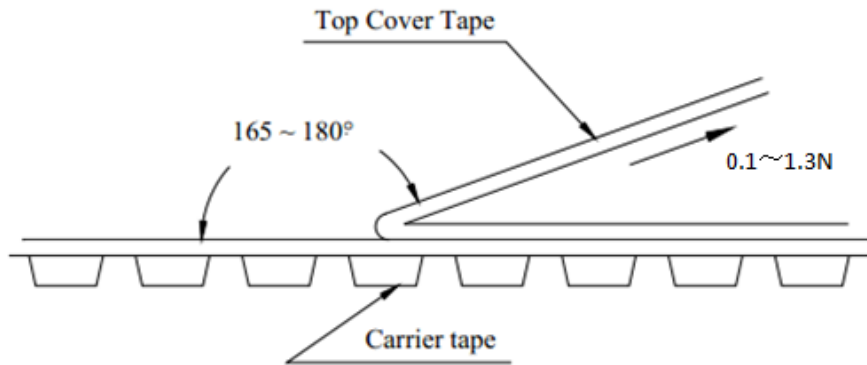


|    | A              | B             |
|----|----------------|---------------|
| mm | $24.5 \pm 0.2$ | $2.0 \pm 0.2$ |

- Peel force of top cover tape

The peel speed shall be about 300mm/minute

The peel force of top cover tape shall be between 0.1 to 1.3 N



- Numbers of taping

500pieces/reel