

ASJ

DATA SHEET

Metal Alloy 0mΩ (Jumper) Resistor

CLE Series

5%, <0.30mΩ to 0.50mΩ

SIZE: 0402/0603

RoHS-Compliant

METAL ALLOY 0mΩ (JUMPER) RESISTOR

CLE Series

DS-ENG-049

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1. SCOPE

- 1.1. This specification is applicable to Lead-free and Halogen-free for CLE zero milli-ohm resistor (Jumper) metal alloy product only.
- 1.2. The product is belong to the universal series.

2. PART NUMBERING SYSTEM

Part Numbering is made in accordance with the following system:

CLE	16	G	-	R000	-	J	L
Type	Size (mm/inch)	Power Rating	Nominal Resistance		Resistance Tolerance	Packaging	
Metal Alloy Low Resistance Resistors	10(0402) 16(0603)	H=0.2W G=0.25W	Resistors	Resistance (4 Digits) `0402 R000= Below 0.50 mΩ `0603 R000= Below 0.30 mΩ	J=±5.0%	L=5000 pcs K=10000 pcs	

3. RATING

3.1. Rated Power

3.1.1 Resistor Rated Power

Type	Max. Rating Power	Max. Rating Current
CLE10	0.20 W	20.0A
CLE16	0.25 W	28.8A

- 3.2 Power Derating Curve: Operating Temperature Range: - 55 ~+150 °C
For resistors operated in ambient temperatures 70°C, power rating shall be derated in accordance with the curve below:

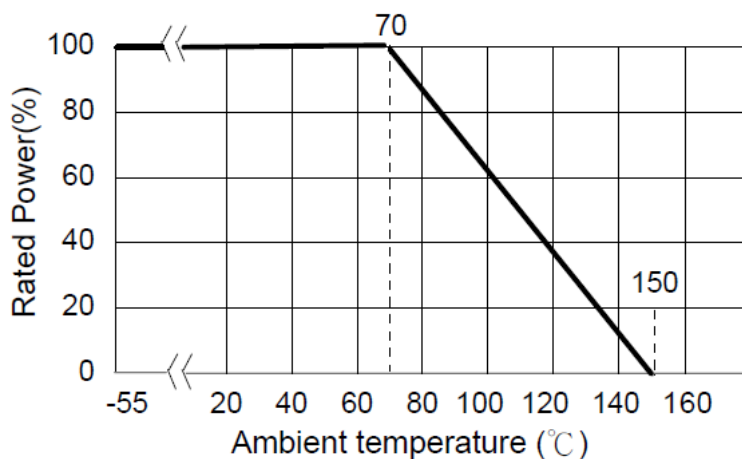


Fig.1 Power Derating Characteristics



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3.3 Standard Atmospheric Condition

Unless otherwise specified, the standard range of atmospheric conditions for making measurements and tests is as follows:

Ambient Temperature = +5°C to +35°C

Relative Humidity = < 85% RH

Air Pressure = 86 to 106kPa

If there may be any doubt about the results, measurement shall be made within the following limits :

Ambient Temperature = 20± 2°C

Relative Humidity = 60 to 70% RH

Air Pressure = 86 to 106kPa

3.4 Operating Temperature Range -55°C to +150°C

3.5 Storage Temperature Range -5°C to +40°C

3.6 Flammability Rating Tested in accordance to UL-94, V-0

3.7 Moisture Sensitivity Level Rating: Level 1

3.8 Product Assurance

ASJ resistor shall warranty 24 months from manufacturing date with control conditions.

3.9 ASJ resistors are RoHS-compliant in accordance to RoHS Directive 2011/65/EU.

3.10 Resistance, Resistance Tolerance and Temperature Coefficient of Resistance

Type	Max. Rating Power	Max. Rating Current	Resistance Range (mΩ)	Operating Temperature Range
			J (±5%)	
CLE10	0.20 W	20.0A	<0.50	-55~+150°C
CLE16	0.25 W	28.8A	<0.30	

3.11 Rated Current

The resistor shall have a DC continuous working current or a RMS(Root Mean Square). AC continuous working current at commercial-line frequency and wave form corresponding to the power rating, as determined from the following:

Remark:

$$I = \sqrt{P/R}$$

I=Rating Current(A)
P= Rating Power(W)
R=Resistance(Ω)

3.11 All product, product specifications and data are subject to change without notice to improve reliability, function or design or otherwise.



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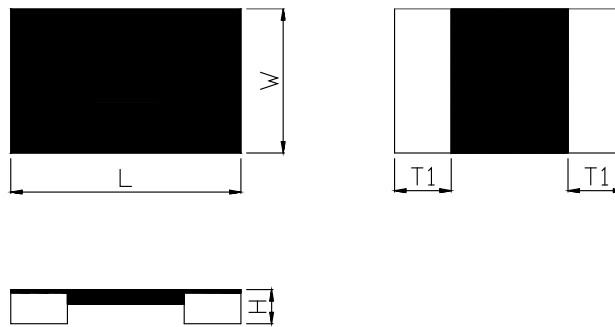
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4. DIMENSION



Type	Resistance Range (mΩ)	Dimensions - in inches (millimeters)			
		L	W	H	T1
CLE10	<0.50	0.039±0.004 (1.00±0.100)	0.020±0.004 (0.50±0.100)	0.014±0.006 (0.35±0.150)	0.010±0.004 (0.25±0.100)
CLE16	<0.30	0.064±0.004 (1.60±0.100)	0.032±0.004 (0.80±0.100)	0.014±0.006 (0.35±0.150)	0.012±0.006 (0.30±0.150)

4.1 Plating Thickness:

4.1.1 Ni : $\geq 2 \mu\text{m}$

4.1.2 Sn (Tin) : $\geq 3 \mu\text{m}$

4.1.3 Sn (Tin) : Matte Sn

5. MARKING FORMAT:

CLE10, CLE16 No Marking

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6. RELIABILITY PERFORMANCE

6.1 Electrical Performance Test

Test Item	Conditions of Test	Test Limits									
Short Time Overload	<p>Refer to JIS C 5201-1 4.13 Applied Overload for 5 seconds and release the load for about 30 minutes, then measure its resistance variance rate. (Overload condition refer to below):</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Power (W)</th> <th># of rated power</th> </tr> </thead> <tbody> <tr> <td>CLE10</td> <td>0.20</td> <td>4 times</td> </tr> <tr> <td>CLE16</td> <td>0.25</td> <td>4 times</td> </tr> </tbody> </table>	Type	Power (W)	# of rated power	CLE10	0.20	4 times	CLE16	0.25	4 times	<p>CLE10\leq0.5 mΩ CLE16\leq0.3 mΩ</p>
		Type	Power (W)	# of rated power							
CLE10	0.20	4 times									
CLE16	0.25	4 times									
		No evidence of mechanical damage									
Insulation Resistance	<p>Refer to JIS-C5201-1 4.6 Put the resistor in the fixture, add 100 VDC in +, - terminal for 60secs then measured the insulation resistance between electrodes and insulating enclosure or between electrodes and base material.</p>	$\geq 10^8 \Omega$									
Dielectric Withstanding Voltage	<p>Refer to JIS-C5201-1 4.7 Applied 300VAC for 1 minute, and Limit surge current 50 mA (max.)</p>	No short or burned on the appearance.									

6.2 Mechanical Performance Test

Test Item	Conditions of Test	Test Limits
Resistance to Solder Heat	<p>Refer to JIS-C5201-1 4.18 The tested resistor be immersed 25 mm/sec into molten solder of 260\pm5°C for 10\pm1secs. Then the resistor is left in the room for 1 hour, and measured its resistance variance rate.</p>	<p>CLE10\leq0.5 mΩ CLE16\leq0.3 mΩ</p>
		No evidence of mechanical damage
Solderability	<p>Refer to JIS-C5201-1 4.17 Add flux into tested resistors, immersion into solder bath in temperature 245\pm5°C for 3\pm0.5secs.</p>	Solder coverage over 95%
Vibration	<p>Refer to JIS-C5201-1 4.22 The resistor shall be mounted by its terminal leads to the supporting terminals on the solid table. The entire frequency range :from 10 Hz to 55 Hz and return to 10 Hz, shall be transferred in 1 min. Amplitude : 1.5mm This motion shall be applied for a period of 4 hours in each 3 mutually perpendicular directions (a total of 12hrs)</p>	<p>CLE10\leq0.5 mΩ CLE16\leq0.3 mΩ</p>
		No evidence of mechanical damage
Resistance to solvent	<p>Refer to JIS-C5201-1 4.29 The tested resistor be immersed into isopropyl alcohol of 20~25°C for 60secs, then the resistor is left in the room for 48 hrs.</p>	<p>CLE10\leq0.5 mΩ CLE16\leq0.3 mΩ</p>
		No evidence of mechanical damage

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6.3 Environmental Performance

Test Item	Conditions of Test	Test Limits						
Low Temperature Exposure (Storage)	<p>Refer to JIS-C5201-1 4.23.4 Put the tested resistor in chamber under temperature -55±2°C for 1,000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate.</p>	CLE10 ≤ 0.5 mΩ CLE16 ≤ 0.3 mΩ						
		No evidence of mechanical damage						
High Temperature Exposure (Storage)	<p>Refer to JIS-C5201-1 4.23.2 Put tested resistor in chamber under temperature 150±5°C for 1,000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate.</p>	CLE10 ≤ 0.5 mΩ CLE16 ≤ 0.3 mΩ						
		No evidence of mechanical damage						
Temperature Cycling (Rapid Temperature Change)	<p>Refer to JIS-C5201-1 4.19 Put the tested resistor in the chamber under the temperature cycling which shown in the following table shall be repeated 1,000 times consecutively. Then leaving the tested resistor in the room temperature for 60 minutes, and measure its resistance variance rate.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">Testing Condition</th> </tr> </thead> <tbody> <tr> <td>Lowest Temperature</td> <td>-55 +0/-10°C</td> </tr> <tr> <td>Highest Temperature</td> <td>150 +10/-0°C</td> </tr> </tbody> </table>	Testing Condition		Lowest Temperature	-55 +0/-10°C	Highest Temperature	150 +10/-0°C	CLE10 ≤ 0.5 mΩ CLE16 ≤ 0.3 mΩ
		Testing Condition						
		Lowest Temperature	-55 +0/-10°C					
		Highest Temperature	150 +10/-0°C					
No evidence of mechanical damage								
Moisture Resistance (Climatic Sequence)	<p>Refer to MIL-STD 202 Method 106 Put the tested resistor in chamber and subject to 10 cycles of damp heat and without power. Each one of which consists of the steps 1 to 7 (Figure 1). Then leaving the tested resistor in room temperature for 24 hr, and measure its resistance variance rate.</p>	CLE10 ≤ 0.5 mΩ CLE16 ≤ 0.3 mΩ						
		No evidence of mechanical damage						
Bias Humidity	<p>Refer to JIS-C5201-1 4.24 Put the tested resistor in chamber under 85± 5°C and 85± 5%RH with 10% bias and load the rated voltage for 90 minutes on, 30 minutes off, total 1,000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate.</p>	CLE10 ≤ 0.5 mΩ CLE16 ≤ 0.3 mΩ						
		No evidence of mechanical damage						

6.4 Operational Life Endurance

Test Item	Conditions of Test	Test Limits
Load Life	<p>Refer to JIS-C5201-1 4.25 Put the tested resistor in chamber under temperature 70± 2°C and load the rated voltage for 90 minutes on 30 minutes off, total 1000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate.</p>	CLE10 ≤ 0.5 mΩ CLE16 ≤ 0.3 mΩ
		No evidence of mechanical damage



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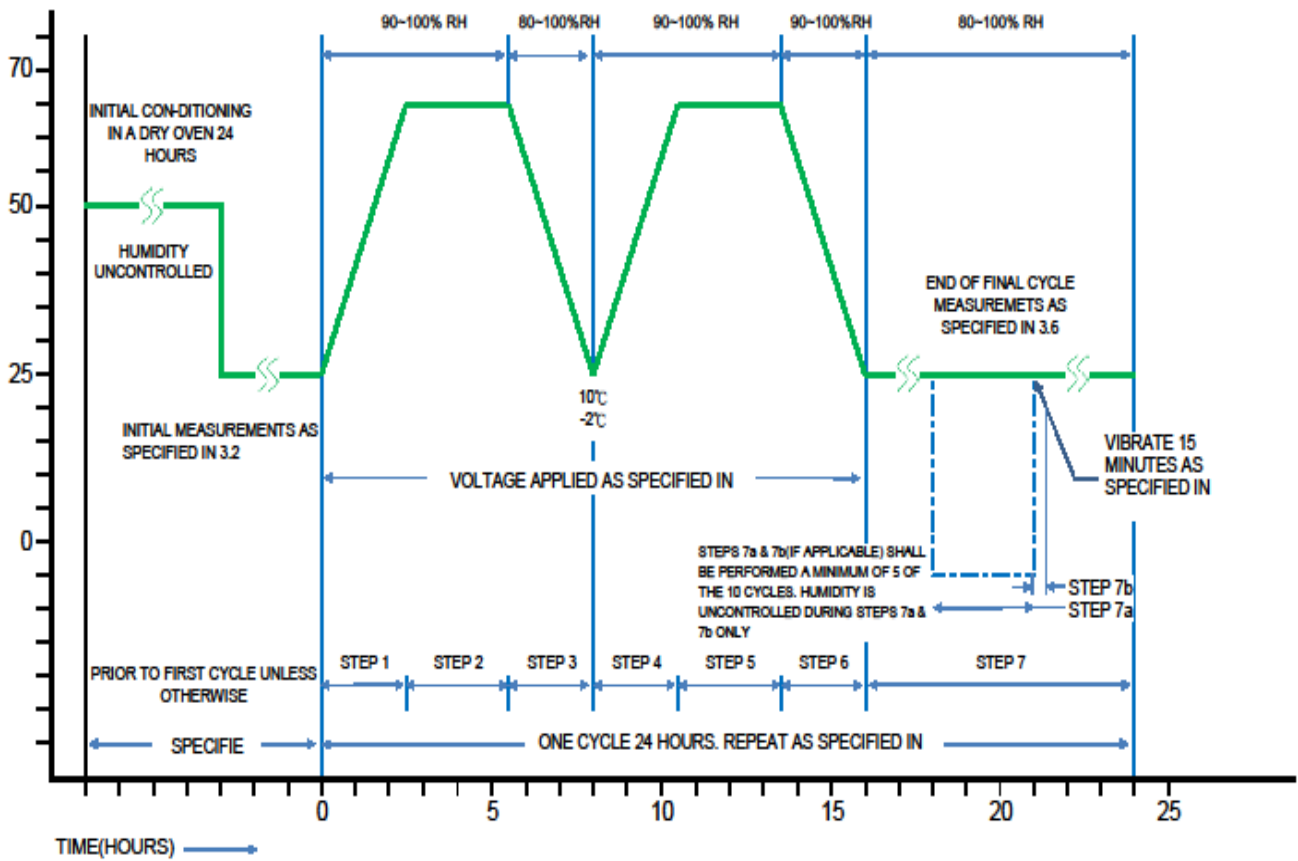


Figure 1

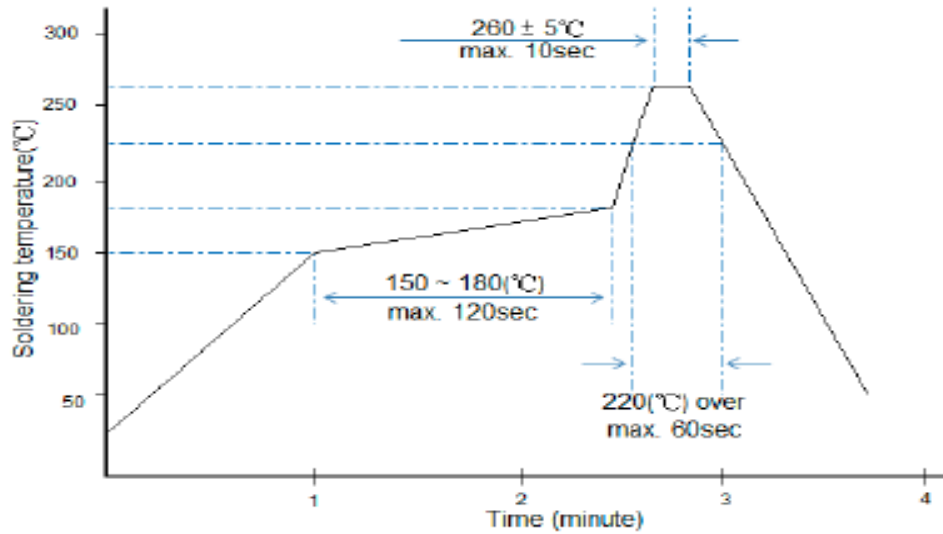
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6.5 Surface-mount components are tested for solderability at a temperature of 245 °C for 3 seconds. Typical examples of soldering processes that provide reliable joints without any damage are given in below:

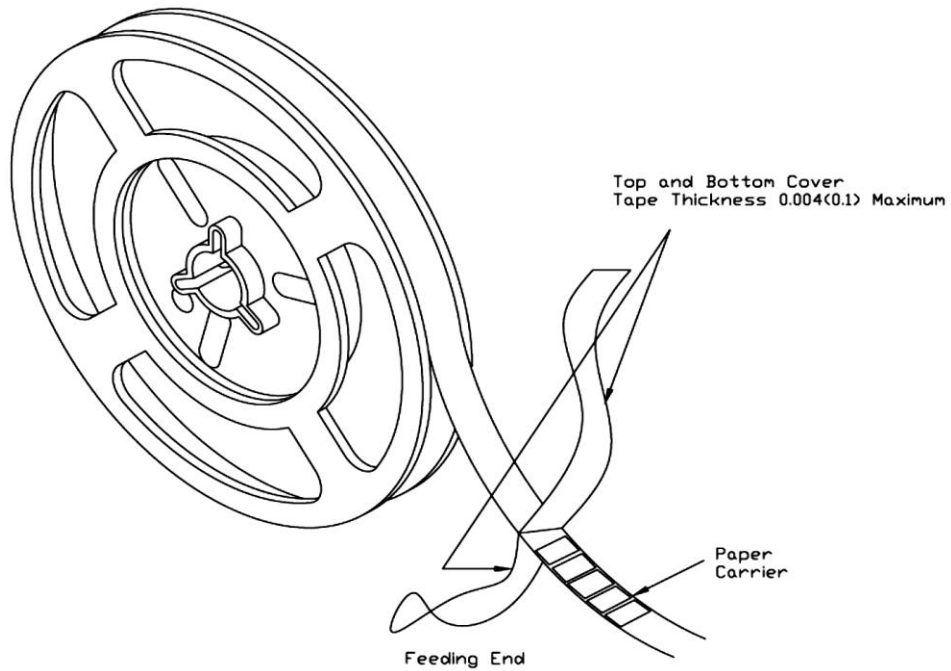


Recommended IR Reflow Soldering profile

7. TAPING

7.1 Structure of Taping

Paper Carrier



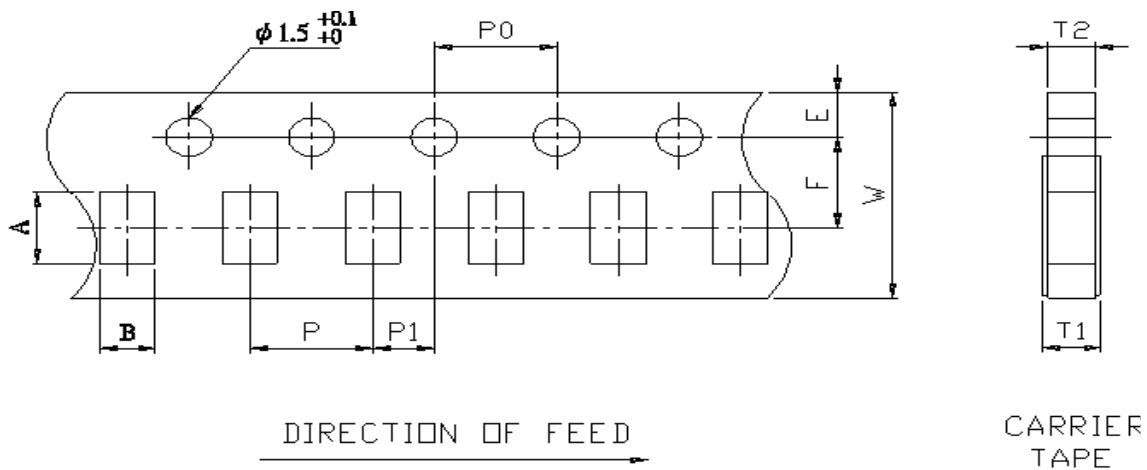
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7.2 Tape Dimension



Unit: mm

DIM Item	A	B	W	E	F	T1	T2	P	P0	10*P0	P1
CLE10	1.15±0.05	0.65±0.05	8.00±0.20	1.75±0.10	3.50±0.05	0.40 $^{+0.2}_{-0}$	0.40±0.05	2.00±0.10	4.00±0.05	40.0±0.20	2.00±0.05
CLE16	1.80±0.10	1.00±0.10	8.00±0.20	1.75±0.10	3.50±0.05	0.40 $^{+0.2}_{-0}$	0.40±0.05	4.00±0.10	4.00±0.10	40.0±0.20	2.00±0.05

7.3 Packaging

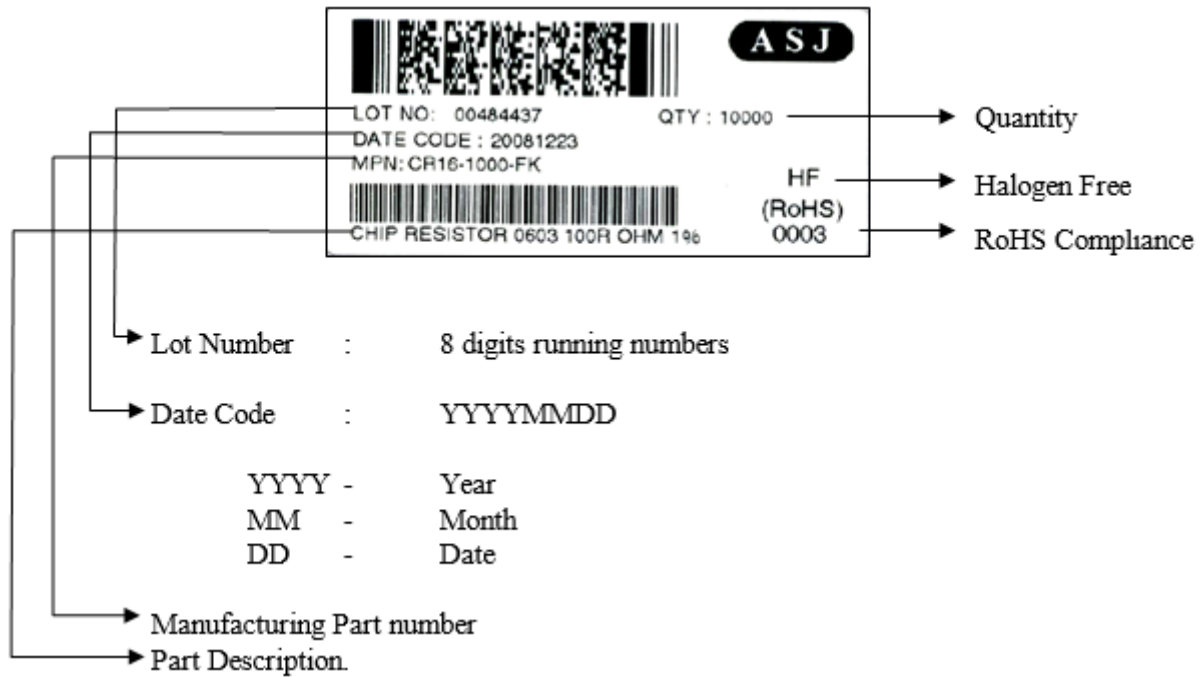
7.3.1 Taping

7.3.1.1 Quantity – Tape and Reels

Type	Tape width	Max. Packaging Quantity (pcs/reel)	
		2 mm pitch	4 mm pitch
CLE10	8 mm	10,000pcs	---
CLE16	8 mm	---	5,000pcs

7.3.2 Identification

Production label that indicates the 8 digits lot number, product type, resistance value and tolerance shall be pasted on the surface of each reel.

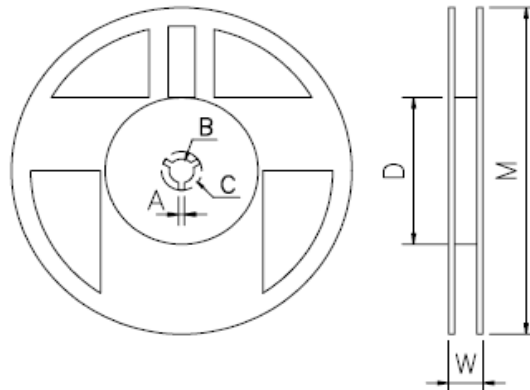


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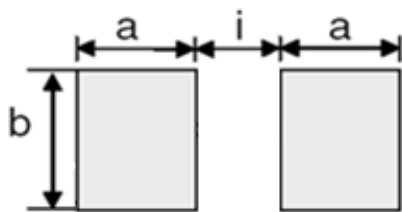
7.3.3 Reel Dimensions



(Unit: mm)

Reel Type/ Tape	W	M	A	B	C	D
7" reel for 8 mm tape	12.0 ± 0.5	178 ± 1.0	2.0 ± 0.5	13.2 ± 0.5	17.7 ± 0.5	60.0 ± 1.0

8. RECOMMENDED LAND PATTERN



Type	Maximum Power Rating (Watts)	Dimensions - millimeters		
		a	b	i
CLE10	0.20	0.65	0.50	0.50
CLE16	0.25	1.00	1.27	0.50

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9. REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version.1	14.01.2019		Initial Release
Version 2	15.06.2023		Revise clause 3.8 Product Assurance



Product Specification

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