

VSML1206S1 Series, Current Sensor Resistor (Lead / Halogen Free)

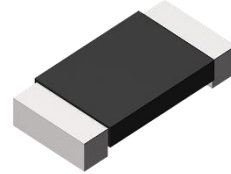
The history of revision change for the specification

Date	Revision	Changes
2021/10/05	A0	New Approval standard (YT)
2021/11/26	A1	Add AEC Q200, modify letter size, Solder Pad designation (POYIN)
2021/12/15	A2	Modify life condition: Terminal temperature 70°C (POYIN)
2022/3/9	A3	Add resistance 2,3,4. Modified solder pad plot and schematic diagram 3D (POYIN)
2022/7/11	A4	(1) Modify P.6 Package schematic diagram (CH) (2) Add two descriptions of care note for storage of Care note (CH)
2023/2/23	A5	Remove ESD test item (CH)

VSML1206S1 Series, Current Sensor Resistor (Lead / Halogen Free)

Features / Applications :

- High power rating is up to 1W
- Welding construction; excellent long-term stability
- Automotive applications & Current Sensor Resistor
- RoHS compliant and AEC Q200 qualified



Electrical Specifications :

Characteristics ¹	Feature
Power Rating ²	1W
Resistance Value	1 to 10 mΩ
Temperature Coefficient of Resistance (25/125°C)	±75 ppm/°C
Operation Temperature Range	-65°C ~ +170°C
Resistance Tolerance	±1 %
Maximum Working Voltage (V)	$(P \cdot R)^{1/2}$

1. For detail information refer to the table on page 3 P/N list
2. For resistors are operated at ambient temperature in excess of 70°C, the maximum load shall be derated in accordance with the following curve.

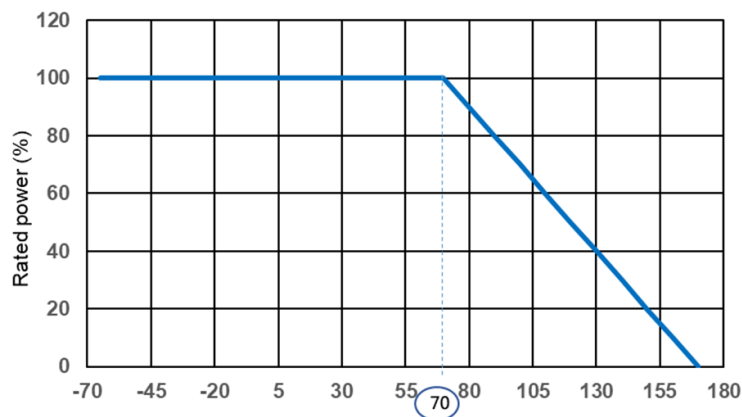
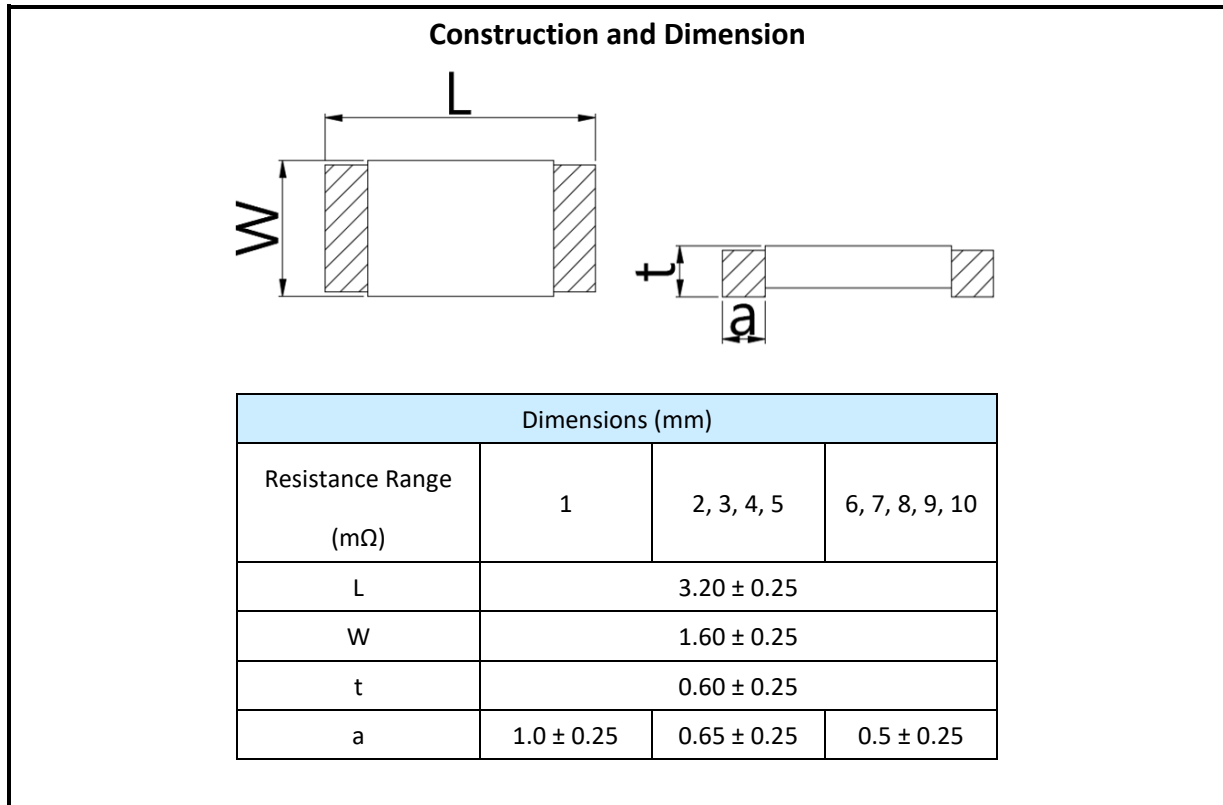
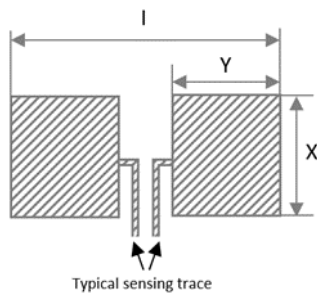


Figure 1. : Power derating curve at ambient temperature

Outline Drawing :



Recommended Solder Pad Dimensions



Resistance Range	Dimensions		
mΩ	X (mm)	Y (mm)	I (mm)
1 to 10	1.8	1.6	4.0

Type Designation :

V S M L 1206 S □ — □ □ □ □ □
 (1) (2) (3) (4) (5) (6)

Note :

- (1) Series No.
- (2) Size
- (3) Terminal Type : S = Short terminal
- (4) Power Rating : 1 = 1W
- (5) Resistance Value : R001 = 0.001Ω
- (6) Tolerance : F = ±1%, G = ±2%, J = ±5%

P/N list :

P/N	R value	TCR	Power Rating	Tolerance		
	(mΩ)	(ppm/K)	(W)	1%	2%	5%
VSML1206S1-R001*	1.0	±75	1	✓		
VSML1206S1-R002*	2.0	±75	1	✓		
VSML1206S1-R003*	3.0	±75	1	✓		
VSML1206S1-R004*	4.0	±75	1	✓		
VSML1206S1-R005*	5.0	±75	1	✓		
VSML1206S1-R006*	6.0	±75	1	✓		
VSML1206S1-R007*	7.0	±75	1	✓		
VSML1206S1-R008*	8.0	±75	1	✓		
VSML1206S1-R009*	9.0	±75	1	✓		
VSML1206S1-R010*	10.0	±75	1	✓		

* Note : Other values and tolerance would be available, please contact Cyntec.

Characteristics :

Electrical

Item	Specification and Requirement	Test Method
Temperature Coefficient (TCR)	As follow specification	JIS-C-5201 +25°C / +125°C
Short Time Overload	$\Delta R: \pm 0.5\%$ Without damage by flashover, spark, arcing, burning or breakdown	JIS-C-5201-1 4.13 2.5 x rated power for 5 seconds
Insulation Resistance	Over 100 M Ω on overcoat layer face up	JIS-C-5201-1 4.6 100V _{DC} for 60 +10/-0 seconds
Voltage Proof	$\Delta R: \pm 1.0\%$ Without damage by flashover, spark, arcing, burning or breakdown	JIS-C-5201-1 4.7 400V _{AC(rms.)} for 60 +10/-0 seconds

Mechanical

Item	Specification and Requirement	Test Method
Solderability	The surface of terminal immersed shall be minimum of 95% covered with a new coating of solder	J-STD-002 Method B category 3 245 \pm 5°C for 5 \pm 0.5 seconds
Resistance to Solder Heat	$\Delta R: \pm 0.5\%$ Without distinct damage in appearance	MIL-STD-202 Method 210 260 \pm 5°C for 10 \pm 1 seconds
Board Flex	$\Delta R: \pm 1.0\%$ Without mechanical damage such as break	AEC-Q200-005 Bending value: 2 mm for 60 \pm 1 seconds
Vibration	$\Delta R: \pm 0.5\%$ Without distinct damage in appearance	MIL-STD-202 Method 204 5G's for 20 minutes, 12 cycles each of 3 orientations Test from 10-2000Hz

Mechanical Shock	$\Delta R: \pm 0.5\%$ Without distinct damage in appearance	MIL-STD-202 Method 213 100G's peak value, 6ms, half-sine waveform, 12.3 ft/sec
Terminal Strength (SMD)	$\Delta R: \pm 1.0\%$ Without mechanical damage such as break	AEC-Q200-006 Force of 1.8Kg for 60 seconds

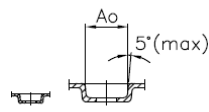
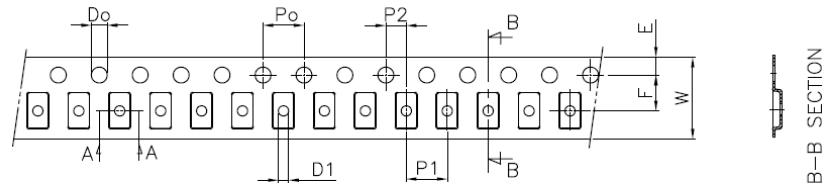
Endurance

Item	Specification and Requirement	Test Method
Temperature Cycling	$\Delta R: \pm 0.5\%$ Without distinct damage in appearance	JESD22 Method JA-104 -55°C to 150°C /1000cycle 30 minutes maximum dwell time at each temperature
Biased Humidity	$\Delta R: \pm 0.5\%$ Without distinct damage in appearance	MIL-STD-202 Method 103 1000 hours, 85°C /85% RH, applied for 10% rated power
Operational Life	$\Delta R: \pm 1.0\%$ Without distinct damage in appearance	MIL-STD-202 Method 108 70°C, 100% rated power 1.5 hours ON, 0.5 hours Off For total 1000 hours
High Temperature Storage	$\Delta R: \pm 1.0\%$ Without distinct damage in appearance	MIL-STD-202 Method 108 170°C for 1000 hours
Moisture Resistance	$\Delta R: \pm 0.5\%$ Without distinct damage in appearance	MIL-STD-202 Method 106 65°C /90-100% RH, unpowered, 7b not required

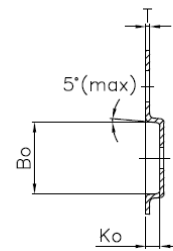
Note : Measurement at 24 ± 4 hours after test conclusion for all reliability tests-parts.

PACKAGING DESCRIPTIONS :

Dimensions :



A-A SECTION

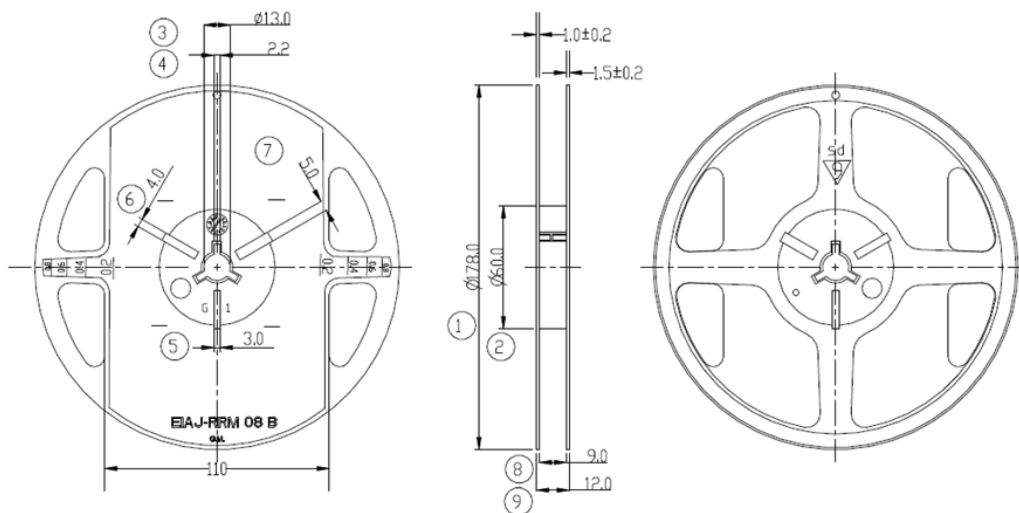


B-B SECTION

Unit:mm

A0	2.00 ± 0.10	P2	2.00 ± 0.05	D1	1.05 ± 0.05
B0	3.50 ± 0.10	T	0.20 ± 0.10	W	8.00 ± 0.30
K0	0.75 ± 0.10	E	1.75 ± 0.10	P0	40.00 ± 0.20
P0	4.00 ± 0.10	F	3.50 ± 0.05	K1	1.50(MAX)
P1	4.00 ± 0.10	D0	1.55 ± 0.05		

Reel Dimensions :

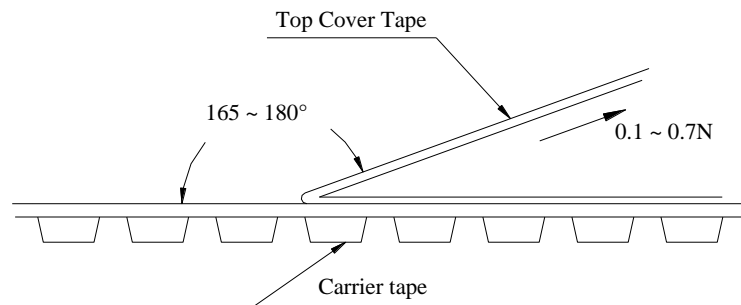


Unit:mm

Symbol	1	2	3	4	5	6	7	8	9
Size	178.0 ±1	60.0 +0.5/-0	13.0 ±0.2	2.2 ±0.5	3.0 +0.5/-0	4.0 +0.5/-0	5.0 +0.5/-0	9.0 ±0.5	12.0 ±0.15

Peel Strength of Top Cover Tape :

The peel speed shall be about 300 mm/min and the peel force of top cover tape shall between 0.1 to 0.7N



Number of Taping :

4,000 pieces / reel

Label Marking :

The following items shall be marked on tray

- (1) Description
- (2) Quantity
- (3) Part No.
- (4) Tapping No.

Care Note :

Care note for storage

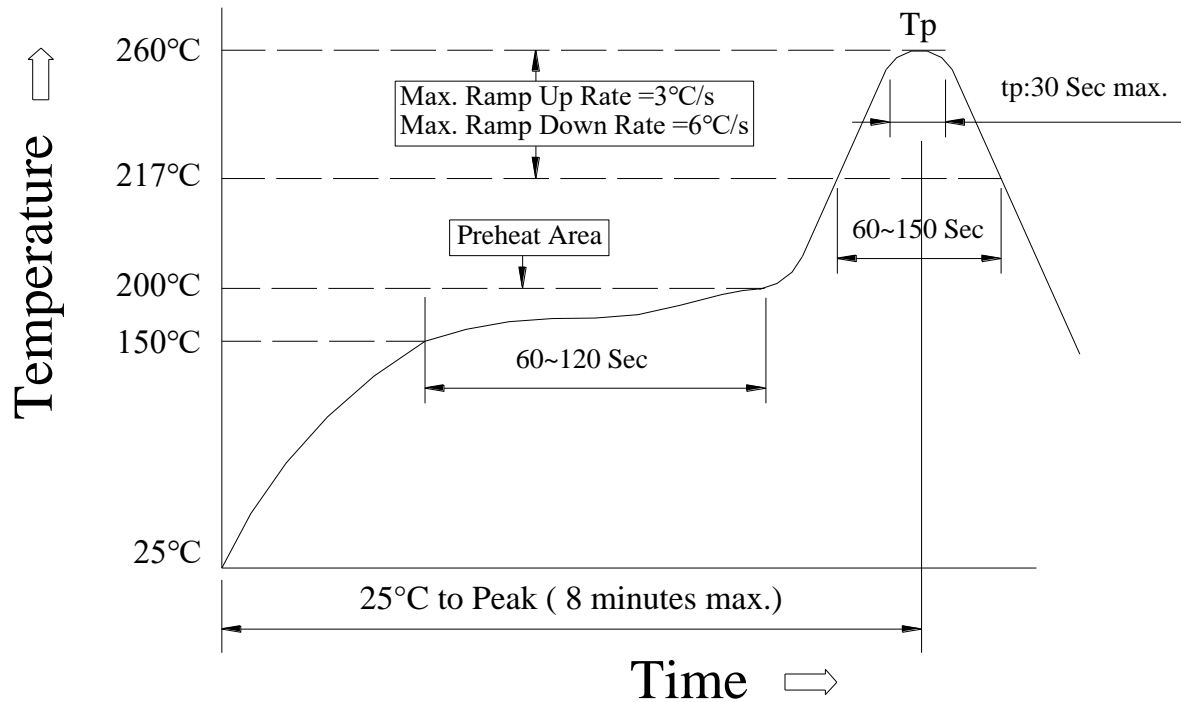
- (1) Chip resistor shall be stored in a room where temperature and humidity must be controlled.
(temperature 5 to 35°C, humidity < 60% RH) However, a humidity keep it low, as it is possible.
- (2) Chip resistor shall be stored as direct sunshine doesn't hit on it.
- (3) Chip resistor shall be stored with no moisture, dust, a material that will make solderability inferior, and a harmful gas (chloridation hydrogen, sulfurous acid gas, and sulfuration hydrogen).
- (4) Expiration date: One year after shipping date (product is required to return after expiration date)
- (5) Solderability should be confirmed in case of exceeding 12 months.

Care note for operating and handling

- (1) Protect the edge and coating of the sensors from mechanical stress.
- (2) Avoid bending of printing circuit board (PCB) when cutting and fixing it on support body to reduce mechanical stress on sensors.
- (3) Sensor should be used within the condition of specification.
Note: When a voltage higher than specified value is loaded to the sensor, this may damage the sensor material due to temperature rise.
- (4) The loaded voltage should consult terminal temperature of the sensor according to the derating curve.
- (5) When applying a high current exceeding suggested specification (pulse current, shock current) to the sensor, it is necessary to re-evaluate the operating condition before using it in the system.

Reflow profile :

Recommended Reflow Profile



(1) Reflow Soldering Method :

Reflow Soldering	Tp:255~260°C	Max.30 seconds (tp)
	217°C	60~150 seconds
Pre-Heat	150 ~ 200°C	60~120 seconds
Time 25°C to peak temperature	8 minutes max.	

Reference : JEDEC J-STD-020E