



### FEATURES:

- Resistance Range: 1mΩ to 15mΩ
- Low TCR as low as 75PPM
- High power rating
- Operating Temperature: -55°C to +170°C



### PART NUMBER STRUCTURE

<b>CSMS</b> Series	<b>0805</b> Size O603 0805 1206 2512	<b>- V</b> Power Rating U = 1/3 W V = 1/2 W X = 1 W Y = 2 W	<b>K</b> TCR H = ±75ppm K = ±100ppm L = ±200ppm	<b>- R010</b> Resistance XXXX R010 = 10mΩ R002 = 2mΩ	<b>F</b> Resistance Tol. F = ±1% J = ±5%	<b>T</b> Packaging T = Tape & Reel
-----------------------	---	--	---	--	---	--

Example P/N: CSMS0805-VK-R010FT

Standard Termination is 100% matte Tin over Nickel.

### DIMENSIONS

Unit: inches(mm)

SIZE	RESISTANCE RANGE (MΩ)	L	W	T	C <sub>1</sub> / C <sub>2</sub>
0603 (1608)	5, 10	0.063±0.004 (1.60±0.10)	0.031±0.004 (0.80±0.10)	see individual item list	see individual item list
0805 (2012)	2 - 10	0.079±0.006 (2.00±0.15)	0.049±0.006 (1.25±0.15)	see individual item list	see individual item list
1206 (3216)	1,2	0.126±0.008 (3.20±0.20)	0.067±0.008 (1.70±0.20)	see individual item list	see individual item list
1206 (3216)	3 - 10,12,15	0.122±0.008 (3.10±0.20)	0.065±0.008 (1.65±0.20)	see individual item list	see individual item list
2512 (6332) 1W	1,2,3	0.252±0.008 (6.40±0.20)	0.128±0.008 (3.25±0.20)	see individual item list	see individual item list
2512 (6332) 1W	4 - 10,12,15	0.244±0.008 (6.20±0.20)	0.128±0.008 (3.25±0.20)	see individual item list	see individual item list
2512 (6332) 2 W	1,2,3	0.252±0.008 (6.40±0.20)	0.128±0.008 (3.25±0.20)	see individual item list	see individual item list
2512 (6332) 2 W	4 - 10	0.244±0.008 (6.20±0.20)	0.128±0.008 (3.25±0.20)	see individual item list	see individual item list

### STRUCTURE

1	Alloy Plate	4	Solder Plating (Sn)
2	Internal Electrode (Cu)	5	Overcoat (molding)
3	Barrier Layer (Ni)	6	Marking

### ELECTRICAL SPECIFICATION & RANGE

SIZE	POWER RATING AT 70°C	RESISTANCE (MΩ)	RATED CURRENT (A)	MAX WORKING VOLTAGE	TOLERANCE (□)	TCR PPM (◇)	T in/(mm)	C <sub>1</sub> in/(mm)	C <sub>2</sub> in/(mm)	VENKEL PART NUMBER
0603	0.330W (1/3W)	5	8.1	√P*R	±1%, ±5%	±75, ±100	0.014±0.004 (0.35±0.10)	0.008±0.004 (0.20±0.10)	0.024±0.004 (0.60±0.10)	CSMS0603-U◇-R005□T
0603	0.330W (1/3W)	10	5.7	√P*R	±1%, ±5%	±75, ±100	0.012±0.004 (0.30±0.10)	0.008±0.004 (0.20±0.10)	0.012±0.004 (0.30±0.10)	CSMS0603-U◇-R010□T
0805	0.500W (1/2W)	2	15.8	√P*R	±1%, ±5%	±75, ±100	0.009±0.004 (0.22±0.10)	0.014±0.004 (0.35±0.10)	0.022±0.008 (0.55±0.20)	CSMS0805-V◇-R002□T
0805	0.500W (1/2W)	3	12.9	√P*R	±1%, ±5%	±75, ±100	0.018±0.004 (0.45±0.10)	0.014±0.004 (0.35±0.10)	0.030±0.008 (0.75±0.20)	CSMS0805-V◇-R003□T
0805	0.500W (1/2W)	4	11.1	√P*R	±1%, ±5%	±75, ±100	0.014±0.004 (0.35±0.10)	0.014±0.004 (0.35±0.10)	0.030±0.008 (0.75±0.20)	CSMS0805-V◇-R004□T
0805	0.500W (1/2W)	5	10	√P*R	±1%, ±5%	±75, ±100	0.014±0.004 (0.35±0.10)	0.014±0.004 (0.35±0.10)	0.024±0.008 (0.60±0.20)	CSMS0805-V◇-R005□T
0805	0.500W (1/2W)	6	9.1	√P*R	±1%, ±5%	±75, ±100	0.014±0.004 (0.35±0.10)	0.014±0.004 (0.35±0.10)	0.019±0.008 (0.47±0.20)	CSMS0805-V◇-R006□T
0805	0.500W (1/2W)	7	8.4	√P*R	±1%, ±5%	±75, ±100	0.009±0.004 (0.22±0.10)	0.014±0.004 (0.35±0.10)	0.030±0.008 (0.75±0.20)	CSMS0805-V◇-R007□T
0805	0.500W (1/2W)	8	7.9	√P*R	±1%, ±5%	±75, ±100	0.009±0.004 (0.22±0.10)	0.014±0.004 (0.35±0.10)	0.024±0.008 (0.60±0.20)	CSMS0805-V◇-R008□T
0805	0.500W (1/2W)	9	7.4	√P*R	±1%, ±5%	±75, ±100	0.009±0.004 (0.22±0.10)	0.014±0.004 (0.35±0.10)	0.020±0.008 (0.52±0.20)	CSMS0805-V◇-R009□T
0805	0.500W (1/2W)	10	7	√P*R	±1%, ±5%	±75, ±100	0.009±0.004 (0.22±0.10)	0.014±0.004 (0.35±0.10)	0.019±0.008 (0.47±0.20)	CSMS0805-V◇-R010□T
1206	1W	1	31.6	√P*R	±1%, ±5%	±75, ±100	0.028±0.008 (0.70±0.20)	0.043±0.010 (1.10±0.25)	0.043±0.010 (1.10±0.25)	CSMS1206-X◇-R001□T
1206	1W	2	22.4	√P*R	±1%, ±5%	±75, ±100	0.028±0.008 (0.70±0.20)	0.043±0.010 (1.10±0.25)	0.043±0.010 (1.10±0.25)	CSMS1206-X◇-R002□T
1206	1W	3	18.3	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	0.024±0.008 (0.60±0.20)	0.024±0.008 (0.60±0.20)	CSMS1206-X◇-R003□T
1206	1W	4	15.8	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	0.024±0.008 (0.60±0.20)	0.024±0.008 (0.60±0.20)	CSMS1206-X◇-R004□T
1206	1W	5	14.1	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	0.024±0.008 (0.60±0.20)	0.024±0.008 (0.60±0.20)	CSMS1206-X◇-R005□T
1206	1W	6	12.9	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	0.024±0.008 (0.60±0.20)	0.024±0.008 (0.60±0.20)	CSMS1206-X◇-R006□T
1206	1W	7	12.0	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	0.024±0.008 (0.60±0.20)	0.024±0.008 (0.60±0.20)	CSMS1206-X◇-R007□T
1206	1W	8	11.2	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	0.024±0.008 (0.60±0.20)	0.024±0.008 (0.60±0.20)	CSMS1206-X◇-R008□T
1206	1W	9	10.5	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	0.024±0.008 (0.60±0.20)	0.024±0.008 (0.60±0.20)	CSMS1206-X◇-R009□T
1206	1W	10	10	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	0.024±0.008 (0.60±0.20)	0.024±0.008 (0.60±0.20)	CSMS1206-X◇-R010□T
1206	1W	12	9.1	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	0.024±0.008 (0.60±0.20)	0.024±0.008 (0.60±0.20)	CSMS1206-X◇-R012□T
1206	1W	15	8.2	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	0.024±0.008 (0.60±0.20)	0.024±0.008 (0.60±0.20)	CSMS1206-X◇-R015□T
2512	1W	1	31.6	√P*R	±1%, ±5%	±75, ±100	0.030±0.008 (0.75±0.20)	(0.079±0.008) (2.00±0.20)	(0.079±0.008) (2.00±0.20)	CSMS2512-X◇-R001□T
2512	1W	2	22.4	√P*R	±1%, ±5%	±75, ±100	0.030±0.008 (0.75±0.20)	(0.079±0.008) (2.00±0.20)	(0.079±0.008) (2.00±0.20)	CSMS2512-X◇-R002□T
2512	1W	3	18.3	√P*R	±1%, ±5%	±75, ±100	0.030±0.008 (0.75±0.20)	(0.079±0.008) (2.00±0.20)	(0.079±0.008) (2.00±0.20)	CSMS2512-X◇-R003□T
2512	1W	4	15.8	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	(0.031±0.008) (0.80±0.20)	(0.031±0.008) (0.80±0.20)	CSMS2512-X◇-R004□T
2512	1W	5	14.1	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	(0.031±0.008) (0.80±0.20)	(0.031±0.008) (0.80±0.20)	CSMS2512-X◇-R005□T
2512	1W	6	12.9	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	(0.031±0.008) (0.80±0.20)	(0.031±0.008) (0.80±0.20)	CSMS2512-X◇-R006□T
2512	1W	7	12.0	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	(0.031±0.008) (0.80±0.20)	(0.031±0.008) (0.80±0.20)	CSMS2512-X◇-R007□T

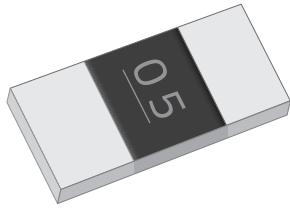
### ELECTRICAL SPECIFICATION & RANGE

SIZE	POWER RATING AT 70°C	RESISTANCE (MΩ)	RATED CURRENT (A)	MAX WORKING VOLTAGE	TOLERANCE (%)	TCR PPM (°)	T in/(mm)	C <sub>1</sub> in/(mm)	C <sub>2</sub> in/(mm)	VENKEL PART NUMBER
2512	1W	8	11.2	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	(0.031±0.008) (0.80±0.20)	(0.031±0.008) (0.80±0.20)	CSMS2512-X∅-R008□T
2512	1W	9	10.5	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	(0.031±0.008) (0.80±0.20)	(0.031±0.008) (0.80±0.20)	CSMS2512-X∅-R009□T
2512	1W	10	10	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	(0.031±0.008) (0.80±0.20)	(0.031±0.008) (0.80±0.20)	CSMS2512-X∅-R010□T
2512	1W	12	9.1	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	(0.031±0.008) (0.80±0.20)	(0.031±0.008) (0.80±0.20)	CSMS2512-X∅-R012□T
2512	1W	15	8.2	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	(0.031±0.008) (0.80±0.20)	(0.031±0.008) (0.80±0.20)	CSMS2512-X∅-R015□T
2512	2W	1	44.7	√P*R	±1%, ±5%	±75, ±100	0.030±0.008 (0.75±0.20)	(0.079±0.008) (2.00±0.20)	(0.079±0.008) (2.00±0.20)	CSMS2512-Y∅-R001□T
2512	2W	2	31.6	√P*R	±1%, ±5%	±75, ±100	0.030±0.008 (0.75±0.20)	(0.079±0.008) (2.00±0.20)	(0.079±0.008) (2.00±0.20)	CSMS2512-Y∅-R002□T
2512	2W	3	25.8	√P*R	±1%, ±5%	±75, ±100	0.030±0.008 (0.75±0.20)	(0.079±0.008) (2.00±0.20)	(0.079±0.008) (2.00±0.20)	CSMS2512-Y∅-R003□T
2512	2W	4	22.4	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	(0.031±0.008) (0.80±0.20)	(0.031±0.008) (0.80±0.20)	CSMS2512-Y∅-R004□T
2512	2W	5	20	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	(0.031±0.008) (0.80±0.20)	(0.031±0.008) (0.80±0.20)	CSMS2512-Y∅-R005□T
2512	2W	6	18.3	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	(0.031±0.008) (0.80±0.20)	(0.031±0.008) (0.80±0.20)	CSMS2512-Y∅-R006□T
2512	2W	7	16.9	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	(0.031±0.008) (0.80±0.20)	(0.031±0.008) (0.80±0.20)	CSMS2512-Y∅-R007□T
2512	2W	8	15.8	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	(0.031±0.008) (0.80±0.20)	(0.031±0.008) (0.80±0.20)	CSMS2512-Y∅-R008□T
2512	2W	9	14.9	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	(0.031±0.008) (0.80±0.20)	(0.031±0.008) (0.80±0.20)	CSMS2512-Y∅-R009□T
2512	2W	10	14.1	√P*R	±1%, ±5%	±75, ±100	0.024±0.008 (0.60±0.20)	(0.031±0.008) (0.80±0.20)	(0.031±0.008) (0.80±0.20)	CSMS2512-Y∅-R010□T

### ELECTRICAL SPECIFICATION & RANGE-ZERO OHM JUMPERS

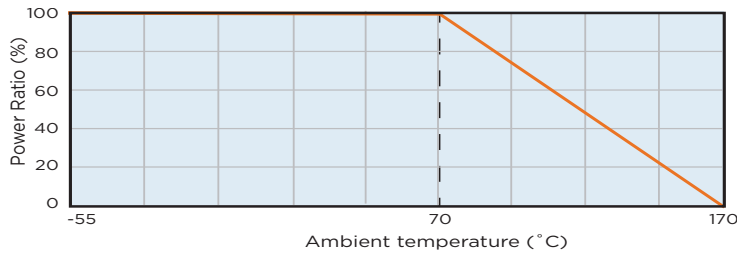
SIZE	RATED CURRENT (A)	MAX WORKING VOLTAGE	RESISTANCE RANGE (mΩ)	L in/(mm)	W in/(mm)	T in/(mm)	C <sub>1</sub> in/(mm)	C <sub>2</sub> in/(mm)	VENKEL PART NUMBER
0402	20.0	√P*R	0.5mΩ	0.004±0.002 (0.10±0.005)	0.020±0.002 (0.50±0.05)	0.010±0.004 (0.25±0.10)	(0.012±0.004) (0.30±0.10)	(0.012±0.004) (0.30±0.10)	CSMS0402-000T
0603	22.4	√P*R	0.5mΩ	0.059±0.006 (1.50±0.15)	0.031±0.006 (0.80±0.15)	0.017±0.004 (0.42±0.10)	(0.016±0.004) (0.40±0.10)	(0.016±0.004) (0.40±0.10)	CSMS0603-000T
0805	31.6	√P*R	0.5mΩ	0.077±0.006 (1.95±0.15)	0.047±0.006 (1.20±0.15)	0.023±0.004 (0.58±0.10)	(0.022±0.004) (0.55±0.10)	(0.022±0.004) (0.55±0.10)	CSMS0805-000T
1206	50.0	√P*R	0.2mΩ	0.122±0.008 (3.10±0.20)	0.057±0.008 (1.45±0.20)	0.018±0.008 (0.45±0.20)	(0.022±0.008) (0.55±0.20)	(0.022±0.008) (0.55±0.20)	CSMS1206-000T
2512	100	√P*R	0.2mΩ	0.244±0.008 (6.20±0.20)	0.126±0.008 (3.20±0.20)	0.024±0.008 (0.60±0.20)	(0.035±0.008) (0.90±0.20)	(0.035±0.008) (0.90±0.20)	CSMS2512-000T

### PART NUMBER & MARKING CODE

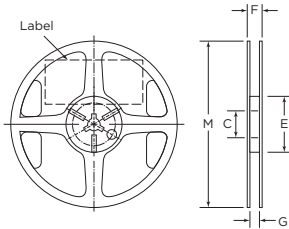


- 0603 is not marked.
- 0805 and 1206: Ohmic value will be marked with a combination of two figures and underlined digits as follows:
  - "05" → 0.005Ω = 5mΩ
  - "10" → 0.01Ω = 10mΩ
- 2512; 1W and 2W: Ohmic value will be marked with a 4-digit marking code as follows:
  - "R005" = 5mΩ
  - "R015" = 15mΩ

### DERATING CURVE

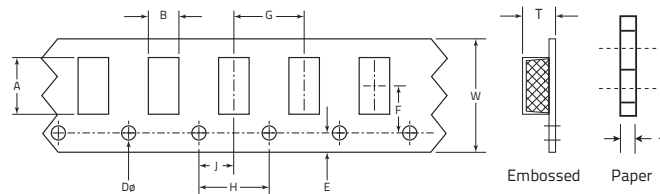


### REEL SPECIFICATIONS



SIZE	M	E	C	G	F	QUANTITY PER REEL
0603	180±1.5	60.0+1, -0	13.0±0.5	9.0±1.0	11.4±1.0	5,000
0805	180±1.5	60.0+1, -0	13.0±0.5	9.0±1.0	11.4±1.0	5,000
1206	180±1.5	60.0+1, -0	13.0±0.5	9.0±1.0	11.4±1.0	5,000
2512	180±1.5	60.0 +1, -0	13.0±0.5	13.0±1.0	11.4±1.0	4,000

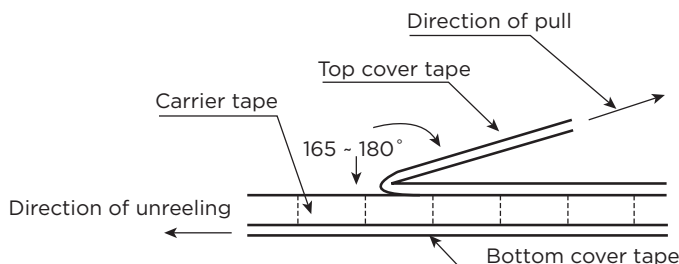
### TAPE SPECIFICATIONS



Units: mm.

SIZE	A	B	W	E	F	H	G	J	D0	T <sub>1</sub>	T <sub>2</sub>
0603	1.15±0.15	1.9±0.2	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	4.0±0.1	2.0±0.05	1.5±0.1	0.6±0.1	6.8 max
0805	1.65±0.15	2.5±0.2	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	4.0±0.1	2.0±0.05	1.5±0.1	0.6±0.1	6.8 max
1206	2.0±0.2	3.6±0.2	8.0±0.3	1.75±0.1	3.5±0.05	4.0±0.1	4.0±0.1	2.0±0.05	1.5±0.1	0.6±0.1	6.8 max
2512	3.5±0.2	6.75±0.2	12.0±0.3	1.75±0.1	5.5±0.05	4.0±0.1	4.0±0.1	2.0±0.05	1.5±0.1	0.9±0.1	1.1±0.15

### PEEL BACK FORCE AND DIRECTION DIAGRAM



Peel back force and direction of peel back angle should follow EIA481-1-A. Peel back force should be between 0.1N - 1.3N and peel back angle of 165° - 180°.

### ENVIRONMENTAL CHARACTERISTICS

TEST ITEM	REQUIREMENT	TEST METHOD (IEC 60115/JIS C 5201-1)
DC Resistance	J : $\pm 5\%$ F : $\pm 1\%$	Sub-clause 4.5 Measure the resistance value.
Short Time Overload	J : $\Delta R \leq \pm 2\%$ F : $\Delta R \leq \pm 1\%$	Sub-clause 4.13 5 x Rated power for 5 seconds. Measure resistance after 30 minutes.
Solderability	Over 95% of termination must be covered with Solder	Sub-clause 4.17 After immersing flux, dip in the $235 \pm 2^\circ\text{C}$ molten solder bath for $3 \pm 0.5\text{sec}$ .
Resistance to Solder Heat	$\Delta R \leq \pm (1\% + 0.1\text{m}\Omega)$ No mechanical damage.	Sub-clause 4.18 With $260 \pm 5^\circ\text{C}$ for $10 \pm 1\text{sec}$ .
Temperature Cycle	J : $\Delta R \leq \pm 1\%$ F : $\Delta R \leq \pm 0.5\%$	Sub-clause 4.19 Repeat 5 cycles as follows $-55^\circ\text{C}(30\text{min.}) \rightarrow 25^\circ\text{C}(2-3\text{min.}) \rightarrow 155^\circ\text{C}(30\text{min.}) \rightarrow 25^\circ\text{C}(2-3\text{min.})$
Load Life Humidity	J : $\Delta R \leq \pm 3\%$ F : $\Delta R \leq \pm 0.5\%$ No mechanical damage.	Sub-clause 4.24 $40 \pm 2^\circ\text{C}$ with relative humidity 90%-95%, DC rated voltage for 1.5 hours On 30 minutes Off. Cycle, repeated 1000hours
Load Life	J : $\Delta R \leq \pm 3\%$ F : $\Delta R \leq \pm 1\%$	IEC 60115-1, Clause 4.25 Rated voltage 1.5 hours then a pause 0.5 hours at $T = 70 \pm 2^\circ\text{C}$ . Cycle repeated 1000 hours.
Insulation Resistance	Between termination and coating must be over $1000\text{M}\Omega$	IEC 60115-1, Clause 4.6 Test voltage: $100 \pm 15\text{V}$
Bending Strength	J : $\Delta R \leq \pm 1\%$ F : $\Delta R \leq \pm 0.5\%$ No mechanical damage.	Sub-clause 4.33 Resistance change after bended on the 90mm PCB. Bending: 2mm