

## 2 Terminals Current Sense Surface Mount Metal Strip Power Resistors

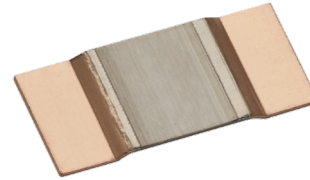
### FEATURES

- Temperature coefficient of resistance to  $\pm 50$  ppm/ $^{\circ}\text{C}$  max. (+20 $^{\circ}\text{C}$  to +120 $^{\circ}\text{C}$ )
- Power rating: to 12 W
- Resistance tolerance: to  $\pm 1\%$
- Resistance range: 0.2m $\Omega$  to 5 m $\Omega$
- Short time overload:  $\pm 0.5\%$
- Maximum current: up to 244 A
- Low Inductance <3nH
- **AEC-Q200 qualified**
- Proprietary processing techniques produce low resistance values and improved TCR
- Working Temperature -65 $^{\circ}\text{C}$  to +170 $^{\circ}\text{C}$
- Solderable terminations
- Quick prototype quantities available, please contact: [foil@vpgsensors.com](mailto:foil@vpgsensors.com)

### KEY APPLICATIONS

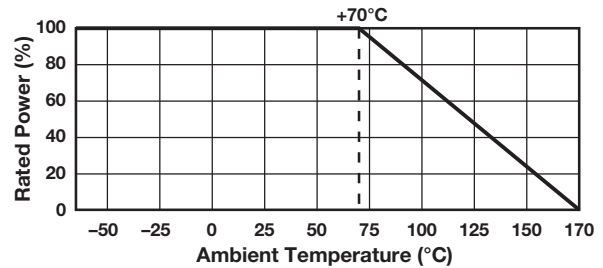
Applications requiring accuracy and repeatability under stress conditions such as the following:

- Switching and linear power supplies
- Precision current-sensing
- Power management systems
- Feedback circuits
- Power amplifiers
- Measurement instrumentation
- Precision instrumentation amplifiers
- Medical and automatic test equipment
- Frequency converters
- Communication systems
- High current applications for the automotive market



**RoHS\***  
COMPLIANT

**Figure 1 – Power Derating Curve**



**Table 1 – Specifications**

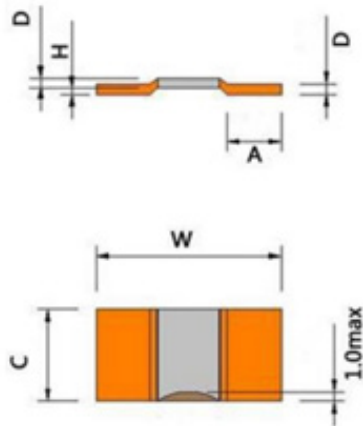
PARAMETER	CSM3920A
Resistance Range	0.2 m $\Omega$ to 5 m $\Omega$
Power Rating at 70 $^{\circ}\text{C}$	12 W (0.2 m $\Omega$ ) 10 W (0.3 m $\Omega$ ) 9 W (0.5 m $\Omega$ ) 8 W (1 m $\Omega$ ) 6 W (2 m $\Omega$ ) 5 W (3 - 4 m $\Omega$ ) 4 W (5 m $\Omega$ )
Maximum Current <sup>(1)</sup>	244 A
Tolerance	to $\pm 1\%$
Temperature Coefficient Max. (+20 $^{\circ}\text{C}$ to +125 $^{\circ}\text{C}$ )	$\pm 200$ ppm/ $^{\circ}\text{C}$ , (0.2 m $\Omega$ ) $\pm 150$ ppm/ $^{\circ}\text{C}$ , (0.3 m $\Omega$ ) $\pm 70$ ppm/ $^{\circ}\text{C}$ , (0.5 m $\Omega$ ) $\pm 50$ ppm/ $^{\circ}\text{C}$ , (1 - 5 m $\Omega$ )
Operating Temperature Range	-65 $^{\circ}\text{C}$ to +170 $^{\circ}\text{C}$
Maximum Working Voltage	$(P \times R)^{1/2}$

#### Notes

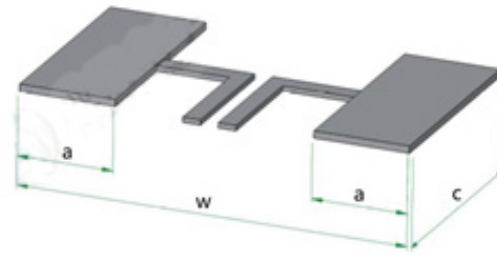
- <sup>(1)</sup> Maximum current for a given resistance value is calculated using  $I = \sqrt{P/R}$

**Figure 2 – Mechanical Dimensions** in millimeters

**CSM3920A DIMENSIONS**



**CSM3920A LAND PATTERN**



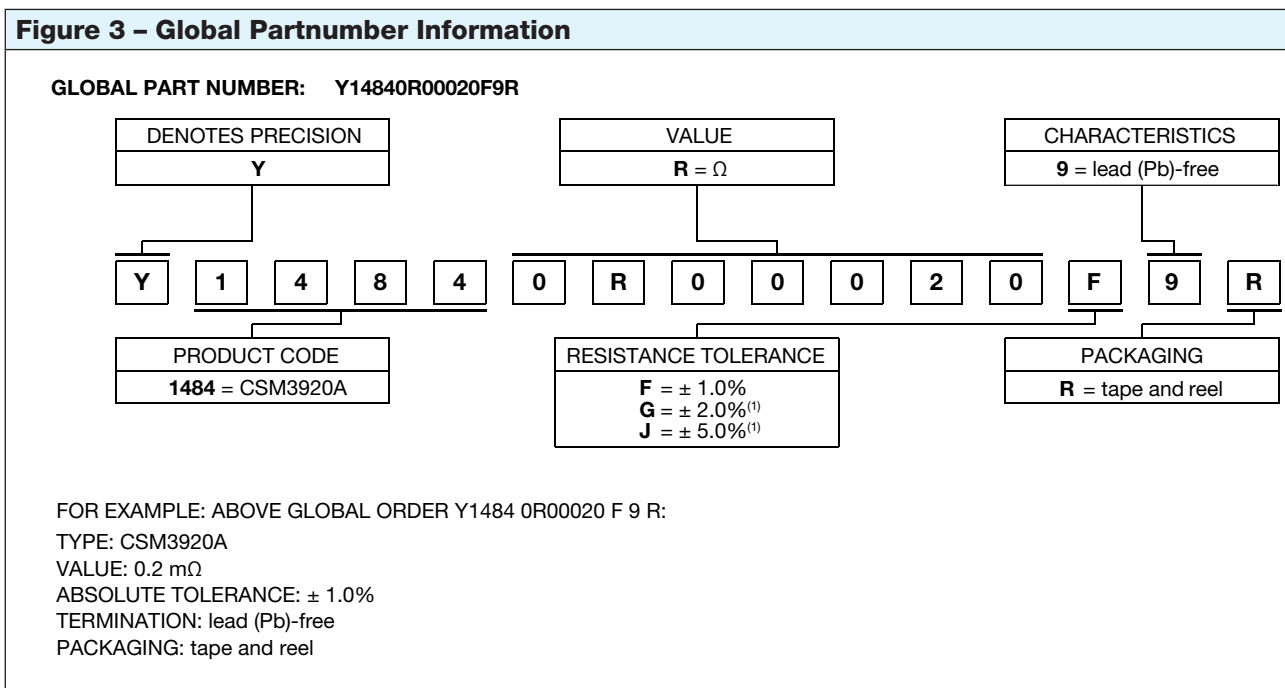
**Dimensions** in millimeters

MODEL	RESISTANCE RANGE (mΩ)	W	A	C	H	D
CSM3920A	0.2	10 ± 0.2	2.2 ± 0.2	5.1 ± 0.4	0.5 ± 0.1	1.64 ± 0.1
	0.3	10 ± 0.2	2.2 ± 0.2	5.1 ± 0.4	0.5 ± 0.1	1.37 ± 0.1
	0.5	10 ± 0.2	2.2 ± 0.2	5.1 ± 0.4	0.5 ± 0.1	0.83 ± 0.1
	1 (Mng)	10 ± 0.2	2.2 ± 0.2	5.1 ± 0.4	0.5 ± 0.1	0.40 ± 0.1
	1 (NiCr)	10 ± 0.2	2.2 ± 0.2	5.1 ± 0.4	0.5 ± 0.1	1.16 ± 0.1
	2	10 ± 0.2	2.2 ± 0.2	5.1 ± 0.4	0.5 ± 0.1	0.56 ± 0.1
	3	10 ± 0.2	2.2 ± 0.2	5.1 ± 0.4	0.5 ± 0.1	0.37 ± 0.1
	4 to 5	10 ± 0.2	2.2 ± 0.2	5.1 ± 0.4	0.5 ± 0.1	0.28 ± 0.1

**Land Pattern Dimensions** in millimeters

MODEL	RESISTANCE RANGE (mΩ)	a	c	w
CSM3920A	0.2 to 5	2.7	6.2	11

Table 2 – CSM3920Y Performance Specifications			
TEST	CONDITIONS	MIL Reference	ΔR LIMITS
Temperature Cycling	1000 Cycles(-55°C to +125°C)	JESD22 Method JA-104	±0.5%
High Temperature Exposure	100hrs.@T=170°C.Unpowered.	MIL-STD-202 Method 108	±0.5%
Moisture Resistance	t=24hrs/cycle.Note:Steps 7a & 7b not required. Unpowered.	MIL-STD-202 Method 106	±0.5%
Biased Humidity	1000hrs 85°C/85%RH. Note:Specified conditions:10% of operating power.	MIL-STD-202 Method 103	±0.5%
Operational Life	Condition D Steady State TA=125°C at rated power.	MIL-STD-202 Method 108	±0.5%
Solderability	245°C±5°C,5s+0.5s/-0	J-STD-002C	95% Coverage Minimum
Vibration	5 g's for 20 min, 12 cycles each of 3 orientations. Note: Use 8"X5" PCB .031" thick 7 secure points on one long side and 2 secure points at corners of opposite sides. Parts mounted within 2" from any secure point. Test from 10-2000 Hz.	MIL-STD-202 Method 204	±0.5%
Resistance to Soldering Heat	260°C±5°C, 10s±1s	MIL-STD-202 Method 210	±0.5%
Short Time Overload	5×Rated power for 5 s	MIL-STD-202 Method 301	±0.5%



**Note**

<sup>(1)</sup> Please contact foil@vpgsensors.com



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