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# **(LREA) AEC-Q200 Metal Alloy High Power Resistors**

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**▶ Product Introduction****Token AEC-Q200 High Power Current Sensing Chips (LREA)  
Compliant for your Automotive & Transportation Solutions.****Features :**

- Wide range package sizes 1206/2512/2725/4527.
- High power rating up to 5 Watts, Low TCR down to  $\pm 50$  ppm/ $^{\circ}$ C.
- Resistance values from 0.25m $\Omega$  to 1 $\Omega$ , Customized resistance available.
- AEC-Q200 Compliance, RoHS compliant and Halogen free.

**Applications :**

- Power Management for NB, MB, Monitor.
- SWPS DC-DC Converter, Charger, Adaptor, Power Supplies, shunts.
- Electric Vehicles, Automatic and Continuously Variable Transmission systems.
- Hard Disk Drives: Solid-state hard drives (SSD), Solid-state hybrid drives (SSHD).

**Construction :**

- The resistive layer is covered with a protective coat, and two external end terminations are added.
- Internal metal electrodes are added at each end and connected by a resistive paste that is applied to the top surface of the metal alloy.
- Wrap-around terminations have an electroplated nickel barrier and pure Tin (lead free) or matte-tin finish, ensuring excellent "leach" resistance properties and solderability.

Token electronics AEC-Q200 current sensing resistor (LREA) offer excellent stability, high power, small size, excellent heat dissipation and high solder-joint reliability which make them excellent for design into Electric Vehicles, Hybrid Electric Vehicles, Automatic and Continuously Variable Transmission systems and other vehicle power applications.

Power metal alloy strip current sense surface-mount resistors (LREA) provide superior performance in high temperature applications with a wide range of package sizes in 1206/2512/2725/4527 and choice of resistance values from 0.25 m $\Omega$  to 1 $\Omega$ . The (LREA) resistors deliver overload capabilities equivalent to wirewound devices with high power handling (Up to 5W) and temperature coefficients as low as  $\pm 50$  ppm/ $^{\circ}$ C.

AEC-Q200 (LREA) current-sensing chip resistors are qualified for automotive systems to provide engineers additional assurance that they are designing in a robust and reliable component. The device is optimized for electronic controls, including chassis, driver information electronics, engine, and climate controls and ideal for all types of pulse and current sensing applications including linear power supplies and switching, instruments, power amplifiers and shunts.

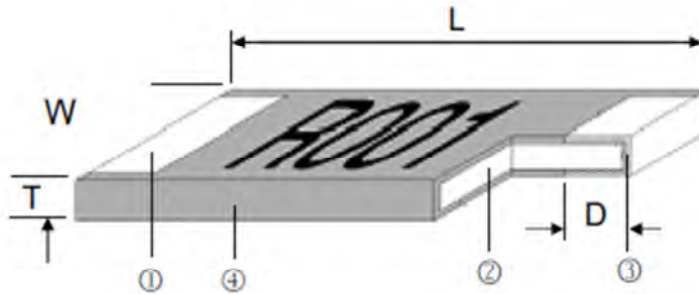
To maximise energy conversion efficiency and reduce power consumption, current sense resistors ought to be from the lowest ohmic value, the highest pulse and surge possible. Token Current-sensing (LREA) resistors allow control circuitry to watch the level of current in a circuit by converting current into a voltage that can be monitored with exceptional efficiency such as typical applications in modern battery-operated equipment.

Token electronics delivers the right chip for your low range, current-sense applications. For standard parts please link to High Power Low Value Current Sensing Chip Resistors (LRE) Metal Strip. For more detailed product information and data sheets or to discuss your specific requirements please contact Token electronics. Or link to Token official website "[Current Sense Resistors](#)". Contact us with your specific needs.



## ► Dimensions

### Metal Alloy Chip (LREA) Construction & Dimensions



1	Solder Plating (Sn)
2	Alloy Plate
3	Barrier Layer (Cu, Ni)
4	Overcoat

Metal Alloy AEC-Q200 Chip (LREA) Construction & Dimensions

Type	Power Rating at 70°C (W)	Resistance Range (mΩ)	Dimensions (Unit: mm)			
			L	W	T	D
LREA1206	1	1.0~2.0	3.200±0.254	1.650±0.254	0.670±0.254	0.508±0.254
		3.0~100.0	3.200±0.254	1.650±0.254	0.490±0.254	0.508±0.254
LREA2512	2	0.5~1.0	6.350±0.254	3.050±0.254	0.670±0.254	2.200±0.254
		1.5			2.000±0.254	
		2.0			0.560±0.254	1.400±0.254
		2.5~100.0			1.100±0.254	
		101.0~450.0			0.610±0.254	0.850±0.254
	3	0.5~1.0			2.200±0.254	
		1.5			0.670±0.254	2.000±0.254
		2.0			1.400±0.254	
		2.5~50.0			1.100±0.254	
		51.0~100.0			0.740±0.254	1.100±0.254
LREA2725	4	0.25	6.800±0.254	6.350±0.254	0.820±0.254	2.300±0.254
		0.5			0.690±0.254	
		1			0.690±0.254	1.800±0.254
		1.5~3.0			0.610±0.254	
LREA4527	3	501.0~680.0	11.300±0.500	6.600±0.500	0.770±0.254	2.000±0.254
		681.0m~1.0R			0.690±0.254	
	5	1.0			0.790±0.254	3.000±0.254
		1.5			0.840±0.254	2.000±0.254
		2.0~500.0			0.840±0.254	

## Electrical Specifications

### AEC-Q200 Chip Resistors (LREA) Electrical Specifications

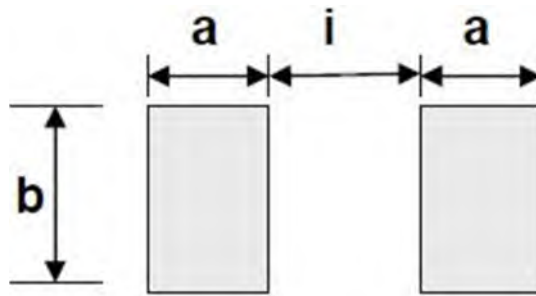
Type	Max. Rating Power (W)	Max. Rating Current (A)*	Max. Overload Current (A)	Resistance Range (mΩ)*		TCR (ppm/°C)	Operating Temperature (°C)
				D (±0.5%)	F (±1%); G (±2%); J (±5%)		
LREA1206	1	31.62	54.77	7.0~100.0	1.0~100.0	±50	-55~+170°C
LREA2512	2	63.25	141.42	7.0~450.0	0.5~450.0		
	3	77.46	134.16	7.0~100.0	0.5~100.0		
LREA2725	4	126.49	252.98	--	0.25~3.0		
LREA4527	3	2.45	4.24	501m~1.0R	501m~1.0R		
	5	70.71	122.47	7.0~500.0	1.0~500.0		

- Note: Rating Current  $I = \sqrt{P/R}$  or Max. Rating Current whichever is lower.  
Special tolerance and range of resistance are under requested.

## Land Pattern

### Recommend Land Pattern (LREA)

Type	Maximum Power Rating (Watts)	Resistance Range (mΩ)	Dimensions (Unit: mm)		
			a	b	i
LREA1206	1.0	1.0 ~ 100.0	1.60	2.18	0.66
LREA2512	2.0 & 3.0	0.5 ~ 1.5	3.05	3.68	1.27
		2.0 ~ 3.5	2.11	3.68	3.18
		3.6 ~ 450.0	1.90	3.68	3.50
LREA2725	4.0	0.25 ~ 0.5	3.18	6.86	1.32
		1.0 ~ 3.0	2.34	6.86	3.00
LREA4527	3.0 & 5.0	1.0 ~ 3.0	4.50	8.74	4.50
		3.5 ~ 100.0	3.40	8.74	6.43
		101.0m ~ 1R	2.93	8.74	7.63

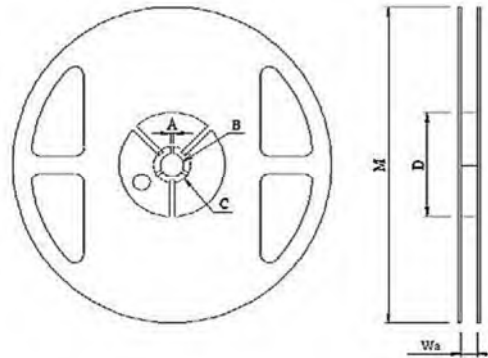


AEC-Q200 Recommend Land Pattern (LREA) Dimensions

## ▶ Reel & Type

### Reel Specifications (LREA)

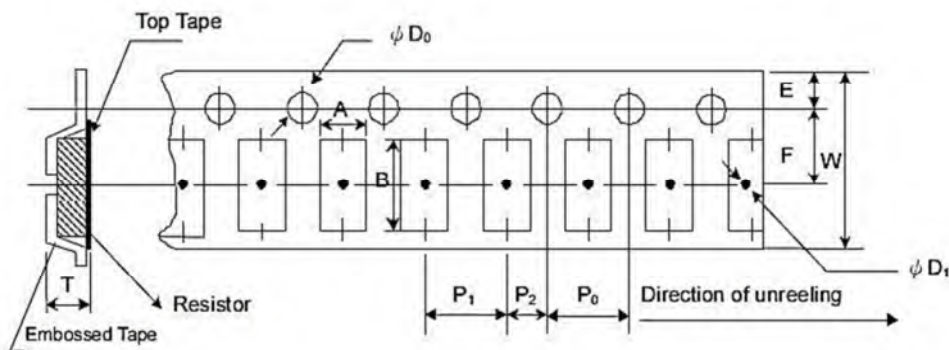
Reel Type / Tape	W	M	A	B	C	D
7" reel for 8 mm embossed (LREA0805 & 1206 series only)	12.00± 0.5	178 ± 1.0	2.0 ± 0.5	13.2 ± 0.5	17.7 ± 0.5	60.0 ± 0.5
7" reel for 12 mm embossed	16.2 ± 0.5	178 ± 1.0	2.5 ± 0.5	13.5 ± 0.5	17.7 ± 0.5	60.0 ± 0.5
7" reel for 24 mm embossed (LREA4527 series only)	24.4 +2/-0	178 ± 1.0	2.0 ± 0.5	13.2 ± 0.5	17.7 ± 0.5	60.0 ± 0.5



Reel Specifications Dimensions

### Emboss Plastic Tape Specifications (LREA)

Type	A±0.1	B±0.1	W±0.3	E±0.1	F±0.1	P0±0.1	P1±0.3	P2±0.1	ΦD0±0.05	ΦD1±0.1	T±0.1
LREA1206	2.03	3.55	8.0	1.75	3.5	4.0	4.0	2.0	1.55	1.00	0.70
LREA2512	3.50	6.75	12.0	1.75	5.5	4.0	4.0	2.0	1.55	1.55	0.90
LREA2725	6.81	7.16	12.0	1.75	5.5	4.0	8.0	2.0	1.55	1.55	1.05
LREA4527	7.38	12.0	24.0	1.75	11.5	4.0	12.0	2.0	1.55	1.55	1.05



Low Ohm Metal Strip (LREA) Emboss Plastic Tape Specifications

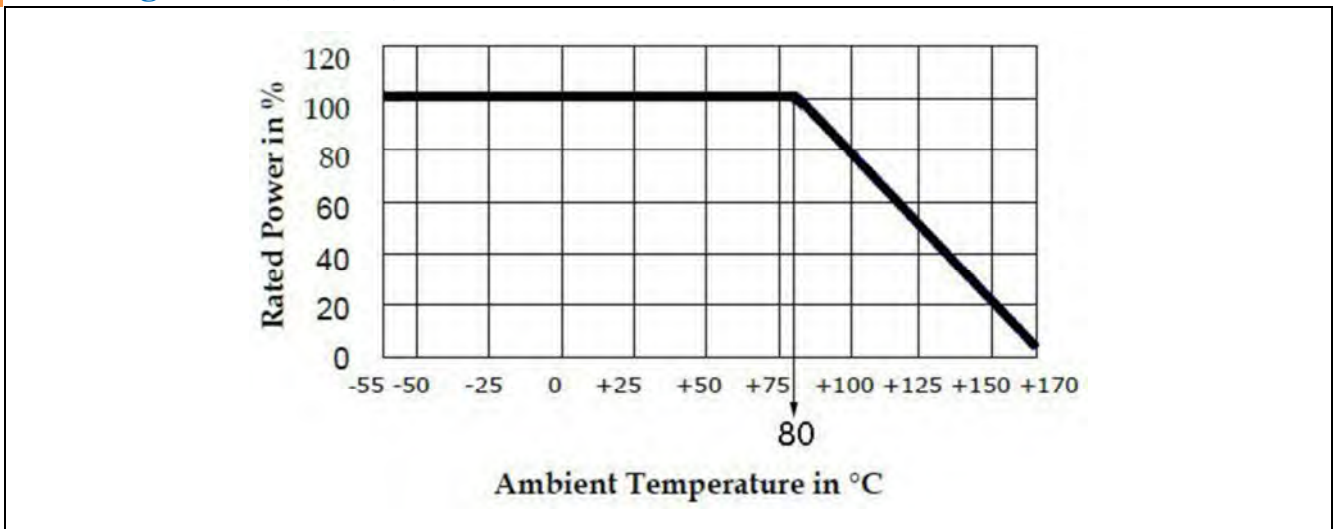
- The cumulative tolerance of 10 sprockets hole pitch is ± 0.2mm.
- Carrier camber shall be not more than 1mm per 100mm through a length of 250mm.
- A & B measured 0.3mm from the bottom of the packet
- T measured at a point on the inside bottom of the packet to the top surface of the carrier.
- Pocket position relative to sprocket hole is measured as the true position of the pocket and not the pocket hole.

## Packaging Quantity (LREA)

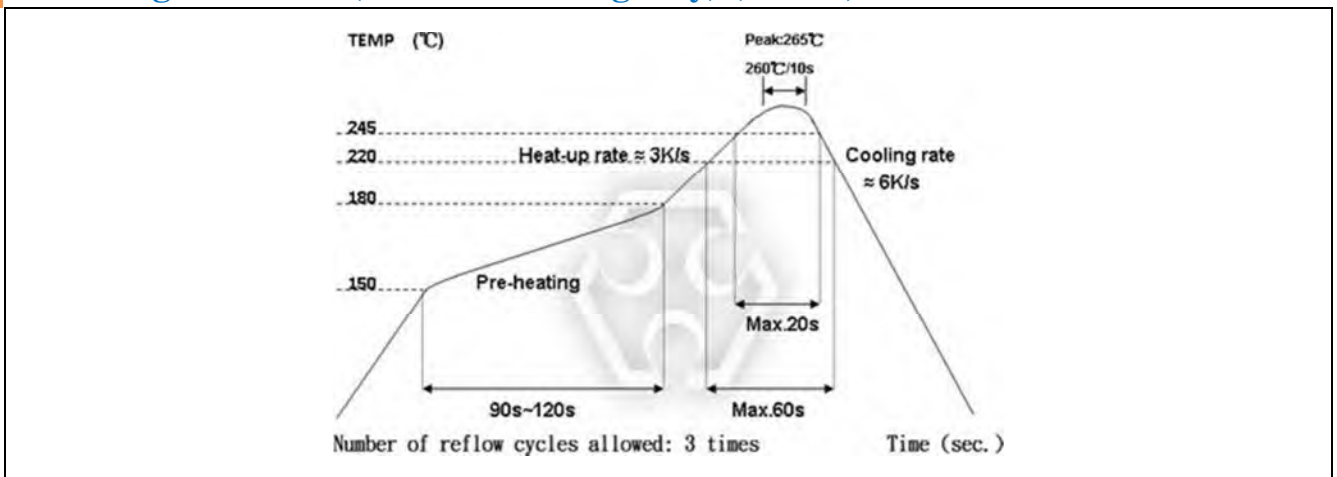
Type	Tape Width	Diameter	Piece/Reel
LREA1206	8 mm/embossed plastic	178 mm/7"	5,000
LREA2512	12 mm/embossed plastic	178 mm/7"	4,000
LREA2725	12 mm/embossed plastic	178 mm/7"	2,000
LREA4527	24 mm/embossed plastic	178 mm/7"	1,000

## Derating & Soldering Condition

### Derating Curve (LREA)



### Soldering Condition (Reflow soldering only) (LREA)



## ► Environmental Characteristics

### Environmental Characteristics (LREA)

Item	Requirement	Test Method		
Temperature Coefficient of Resistance (T.C.R.)	As Spec.	JIS C 5201-1 4.8 +25/+150°C		
Short Time Overload	LREA4527: $\Delta R/R_0 \leq \pm 2.0\%$ The others: $\Delta R/R_0 \leq \pm 0.5\%$	JIS C 5201-1 4.13 Rating power duration: 5secs.		
		Type	Power	Multiple
		LREA1206	1.0W	3 times
		LREA2512	2.0W	5 times
		LREA2512	3.0W	3 times
		LREA2725	4.0W	4 times
LREA4527	3.0W, 5.0W	3 times		
Solderability	95% Min. coverage	JIS-C5201-1 4.17 245±5°C for 3 seconds		
Resistance to Soldering Heat	$\Delta R/R_0 \leq \pm 0.5\%$	JIS-C5201-1 4.18 260±5°C for 10 seconds		
Temperature Cycling	$\Delta R/R_0 \leq \pm 0.5\%$	JIS-C5201-1 4.19 -55°C ~ 150°C, 1000 cycles		
High Temperature Exposure (Storage)	LREA4527: $\Delta R/R_0 \leq \pm 2.0\%$ The others: $\Delta R/R_0 \leq \pm 1.0\%$	JIS-C5201-1 4.23.2 +170°C for 1000 Hrs.		
Bias Humidity	$\Delta R/R_0 \leq \pm 0.5\%$	JIS-C5201-1 4.24 +85°C/85%RH for 1,000Hrs. with 1.5Hrs "ON", 0.5Hr "OFF".		
Load Life	LREA4527: $\Delta R/R_0 \leq \pm 2.0\%$ The others: $\Delta R/R_0 \leq \pm 1.0\%$	JIS-C5201-1 4.25 80±2°C, RCWV for 1000 Hrs. with 1.5 Hrs. "ON" and 0.5 Hr. "OFF"		

## ► Order Codes

### Order Codes (LREA)

LREA	2725	F	TR	D	4	R010
Part Number	Dimensions (L×W)(mm)	Resistance Tolerance (%)	Package	TCR (PPM/°C)	Power Rating (W)	Resistance (Ω) Ex:
LREA	1206 3.20*1.65	J ±5 G ±2 F ±1 D ±0.5	TR Taping Reel	D ±50 W ±75 E ±100 K ±150 F ±200	T 1 S 5 R 3 4 4 5 5	0m50 0.00050 0m75 0.00075 1m50 0.00150 R002 0.00200 R010 0.01000 R100 0.10000

## ► General Information

### Your Current Options - Token Current Sense

As the world becomes more and more technology-driven, the uses for current sensing components will continue to increase. The need for even lower resistance value ranges is already becoming evident, as is the need for these resistors to handle more power. The industry-wide trend is the emergence of smaller and smaller products.

Token Electronics offers a wide variety of current sensing products from the industry to military standards, such as current sense in Thin-Film / Thick-Film Technology, Bare Element Resistors, and Open Air Shunts. This enables Token to present an astounding number of possible solutions for any circuit design needs.

### Applications of Current Detecting Components

Token's TCS and CS Series unique form factor provides automotive designers with several advantages. Both TCS and CS Series are ideal for applications involving window lift motors, fuel pump systems, seat belt pretensioners, and pulse width modulator feedback.

The wider resistive element and lower resistance enables higher current to pass through the device. Token's LRC ultra low Ohmic metal strip chip series provides the inherent ability to flex slightly and offers stress relief during extreme temperature cycling on typical or metal substrates. This LRC series is suitable for switch power supply applications (DC-DC Converter, Charger, and Adaptor) and power management of monitor.

The open air design of bare element resistor LRA and LRB Series provide a far cooler operation by allowing more air flow under the resistive element to keep excess heat from being transmitted to the PC board. They are suitable for high power AC/DC detection of power supply circuit.

Token axial moulded BWL series provides power rating up to 10 watts and lower resistance  $0.005\Omega$ , is ideal for all types of current sensing applications including switching and linear power supplies, instruments and power amplifiers.

Token standard current sensing components can be replacement for Vishay, IRC, Ohmite, KOA, Yageo devices with fast delivery and more competitive price. Contact us with your specific needs.

