

# F1A2-4646 Series

## Shielded SMD Power Inductors

Signal Transformer is introducing the beginning of a new family of low-profile shielded surface mount power inductors with the release of the third of three series, F1A2-4646. Height profiles of 1.2 mm to 1.5 mm, small footprints of 4.6 mm x 4.6 mm and broad range of inductance and current ratings, make them ideal for a wide range of applications.

Power inductors are an essential component in the voltage regulator topology. Virtually every circuit that regulates power in automobiles, electronics and DC-DC converters requires an inductor.

Magnetically shielded inductors minimize EMI while balancing small size with low DCR and high current ratings. Perfect as power chokes eliminating noise in power supplies for automotive, commercial, industrial, and high-reliability designs.

They are primarily used in electrical power and electronic devices for these major purposes: Choking, blocking, attenuating, or filtering high frequency noise in electrical circuits. Storing energy in power converters (DC-DC or AC-DC) or inverters (DC-AC).



### General Features

- Magnetically shielded construction
- Surface mount
- Copper base with DR core & RI core
- Reduced size (small footprint) & weight
- Low Profile & High current
- Automated process
- New designed terminal for low cost

### Specifications

- Inductance Range: 1.2  $\mu$ H to 100  $\mu$ H
- Saturation Rated Current: 0.28 A to 2.4 A
- Rated Current: 0.35 to 1.9  $A_{RMS}$
- Operating Temperature Range: -40°C to +125°C (Including coil self-temperature rise)
- Storage Temperature Range (component): -40°C to +125°C

### Applications

- DC-DC converters in consumer, industrial & telecom electronics
- Wearable devices
- HDDs, SSDs
- Smartphones
- Digital equipment
- Laptops, digital cameras
- Filtering of supply voltages

## PRODUCT IDENTIFICATION

**F1A2 - 464612 - 220 M**

**Type / Product Series**

F1A2 = Shielded SMD Power Inductors

**Dimensions**

464612 = 4.6 x 4.6 x 1.2 mm

464615 = 4.6 x 4.6 x 1.5 mm

**Inductance \***

220 = 22  $\mu$ H

\* Note: Expressed by three figures. The unit is micro henry ( $\mu$ H). The first and second figures are significant digits, the third figure expresses the number of zeros which follow the two figures.

If there is a decimal point, it is expressed by the capital letter "R" (3R8 = 3.8  $\mu$ H). In that case, all figures are significant digits.

**Inductance Tolerance**

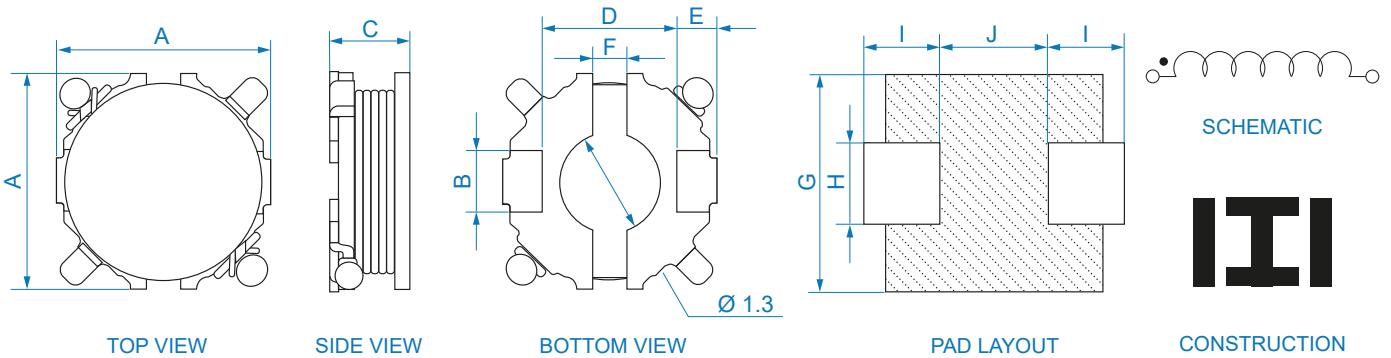
M =  $\pm$ 20%

N =  $\pm$ 30%

## MECHANICAL SPECIFICATIONS

Dimensions are in mm.

SERIES	A	B	C Max	D	E	F	G	H	I	J
F1A2-464612	4.6 $\pm$ 0.3	1.3	1.2	3.2	0.7	0.6	5.0	1.6	1.4	2.8
F1A2-464615	4.6 $\pm$ 0.3	1.3	1.5	3.2	0.7	0.6	5.0	1.6	1.4	2.8



- Co-planarity: 0.15 Max
- Undeclared tolerance:  
 X.X  $\pm$  0.25 unless stated otherwise  
 X.XX  $\pm$  0.15 unless stated otherwise

Custom versions available upon request.



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## ELECTRICAL SPECIFICATIONS

Electrical specifications for all part numbers measured at 25°C unless stated otherwise.

### F1A2-464612 SERIES

Part Number	Inductance L ( $\mu$ H)	Tolerance ( $\pm$ %)	Test Freq. (0.1 V) (kHz)	DCR Max. (Typ.) (m $\Omega$ )	I <sub>SAT</sub> MAX. <sup>1</sup> (A)	I <sub>RMS</sub> MAX. <sup>2</sup> (A)
F1A2-464612-1R2N	1.2	30	100	65 (55)	2.10	1.90
F1A2-464612-1R8N	1.8	30	100	80 (65)	1.70	1.80
F1A2-464612-2R2N	2.2	30	100	90 (75)	1.50	1.65
F1A2-464612-3R3N	2.7	30	100	110 (90)	1.40	1.55
F1A2-464612-3R9N	3.3	30	100	120 (100)	1.30	1.40
F1A2-464612-4R7N	4.7	30	100	145 (120)	1.20	1.35
F1A2-464612-5R6N	5.6	30	100	155 (130)	1.10	1.25
F1A2-464612-6R8N	6.8	30	100	175 (145)	0.90	1.20
F1A2-464612-8R2N	8.2	30	100	215 (180)	0.80	1.15
F1A2-464612-100M	10.0	20	100	240 (200)	0.70	1.10
F1A2-464612-120M	12.0	20	100	295 (245)	0.65	1.00
F1A2-464612-150M	15.0	20	100	335 (280)	0.60	0.92
F1A2-464612-180M	18.0	20	100	415 (345)	0.55	0.84
F1A2-464612-220M	22.0	20	100	445 (370)	0.45	0.75
F1A2-464612-270M	27.0	20	100	590 (490)	0.38	0.65
F1A2-464612-330M	33.0	20	100	660 (550)	0.35	0.60
F1A2-464612-390M	39.0	20	100	755 (630)	0.32	0.55
F1A2-464612-470M	47.0	20	100	990 (825)	0.28	0.50

<sup>1</sup> I<sub>SAT</sub> (Saturation Rated Current): The current when the inductance becomes 30% lower than its initial value (T<sub>a</sub> = 25°C and T<sub>a</sub> = 100°C).

<sup>2</sup> I<sub>RMS</sub> (Temperature Rise Current): The current when the temperature of coil increases up to max.  $\Delta T = 40^\circ\text{C}$  (T<sub>a</sub> = 25°C).

- **Test equipment**

**L:** measured on Agilent 4284A LCR meter or equivalent

**DCR:** measured on Chroma 16502 micro-ohm meter or equivalent

**I<sub>SAT</sub> & I<sub>RMS</sub>:** measured on Agilent 4284A LCR meter with 42841A Current source or equivalent

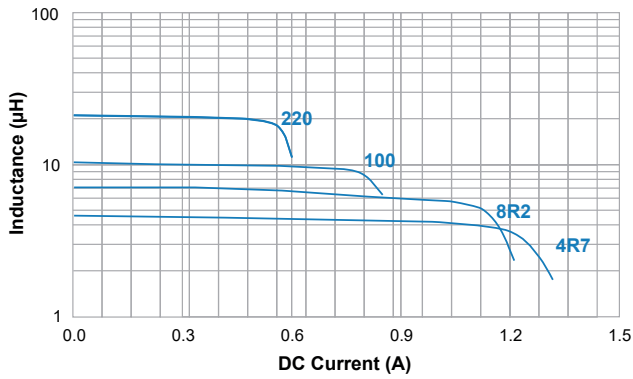
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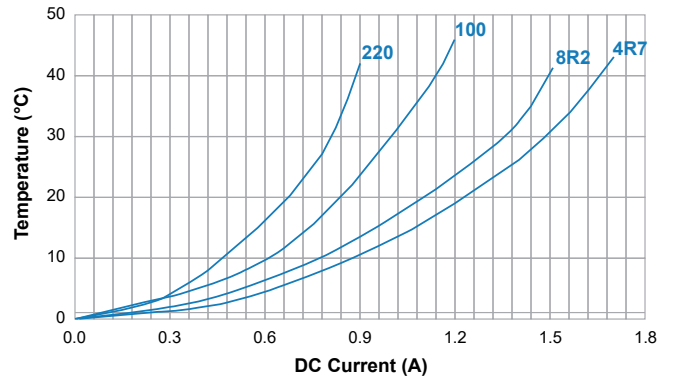
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## TYPICAL PERFORMANCE CURVES



*Inductance vs DC current*



*Temperature rise vs DC current*

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## F1A2-464615 SERIES

Part Number	Inductance L ( $\mu$ H)	Tolerance ( $\pm$ %)	Test Freq. (0.1 V) (kHz)	DCR Max. (Typ.) (m $\Omega$ )	I <sub>SAT</sub> MAX. <sup>1</sup> (A)	I <sub>RMS</sub> MAX. <sup>2</sup> (A)
F1A2-464615-2R2N	2.2	30	100	90 (75)	2.40	1.70
F1A2-464615-2R7N	2.7	30	100	105 (90)	2.20	1.60
F1A2-464615-3R3N	3.3	30	100	120 (100)	2.00	1.50
F1A2-464615-3R9N	3.9	30	100	140 (115)	1.80	1.40
F1A2-464615-4R7N	4.7	30	100	150 (125)	1.70	1.30
F1A2-464615-5R6N	5.6	30	100	170 (140)	1.50	1.25
F1A2-464615-6R8N	6.8	30	100	180 (150)	1.40	1.20
F1A2-464615-8R2N	8.2	30	100	205 (170)	1.30	1.10
F1A2-464615-100M	10.0	20	100	240 (200)	1.20	1.00
F1A2-464615-120M	12.0	20	100	290 (240)	1.10	0.90
F1A2-464615-150M	15.0	20	100	325 (270)	1.00	0.85
F1A2-464615-180M	18.0	20	100	420 (350)	0.80	0.75
F1A2-464615-220M	22.0	20	100	445 (370)	0.70	0.72
F1A2-464615-270M	27.0	20	100	490 (410)	0.65	0.70
F1A2-464615-330M	33.0	20	100	630 (525)	0.55	0.62
F1A2-464615-390M	39.0	20	100	720 (600)	0.50	0.58
F1A2-464615-470M	47.0	20	100	900 (750)	0.45	0.52
F1A2-464615-560M	56.0	20	100	1190 (990)	0.42	0.45
F1A2-464615-680M	68.0	20	100	1345 (1120)	0.40	0.42
F1A2-464615-101M	100.0	20	100	2065 (1720)	0.32	0.35

<sup>1</sup> I<sub>SAT</sub> (Saturation Rated Current): The current when the inductance becomes 30% lower than its initial value (T<sub>a</sub> = 25°C and T<sub>a</sub> = 100°C).

<sup>2</sup> I<sub>RMS</sub> (Temperature Rise Current): The current when the temperature of coil increases up to max.  $\Delta T = 40^\circ\text{C}$  (T<sub>a</sub> = 25°C).

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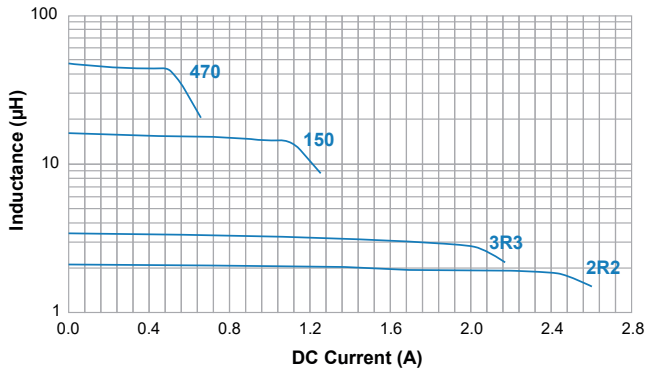
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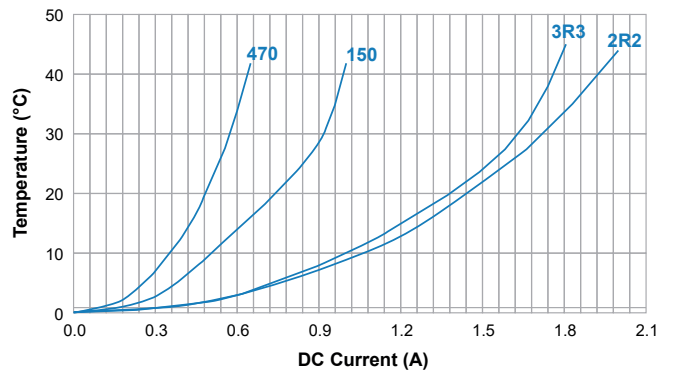
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## TYPICAL PERFORMANCE CURVES



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*Temperature rise vs DC current*

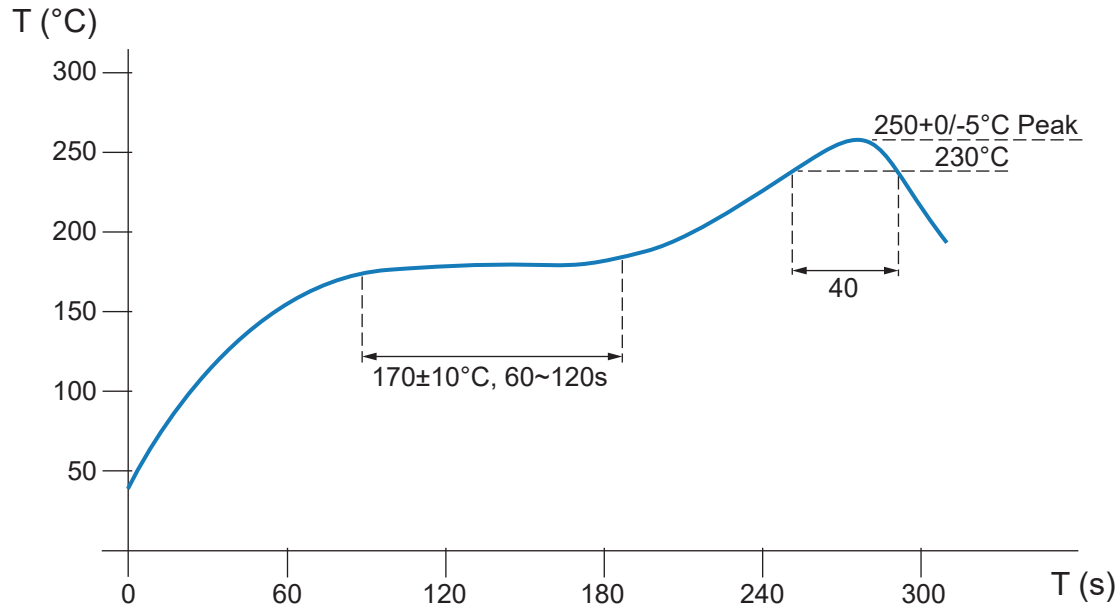
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## RECOMMENDED REFLOW SOLDERING CONDITIONS



- **ADD**

The recommended reflow conditions as above graph, is set according to our soldering equipment. Since various manufactures may have different reflow soldering equipment, products, process conditions, set methods, etc., when setting the reflow conditions, please adjust and confirm according to users' environment/equipment.

- **Notice**

- Solder reflow temperature:  $+250^\circ\text{C}$  max. for maximum 10 seconds
- It is not recommended to solder inductors by soldering iron
- Please contact us for details

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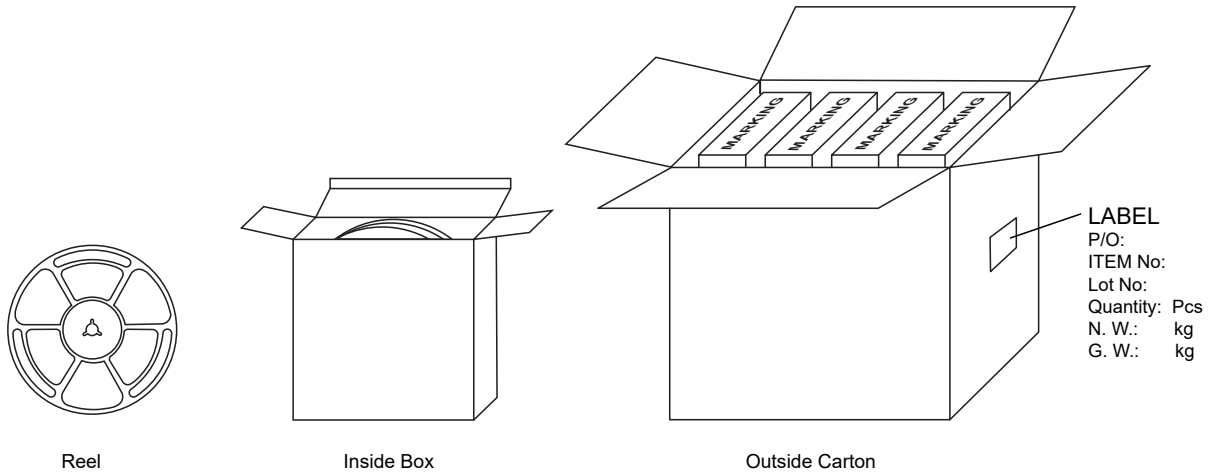
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## PACKAGING SPECIFICATIONS



Series	Packaging Quantity (pcs)		
	Reel	Inside box	Outside carton
F1A2-464612	4000	20000	80000
F1A2-464615	4000	20000	80000

### Storage Conditions

- a) Temperature and humidity conditions < 35°C and < 35 - 65 %
- b) Moisture Sensitivity Level (MSL): Level 1
- c) Recommendations: Inductors should be used within 6 months from the time of delivery
- d) Packaging material should be kept away from where chlorine and sulfur exist

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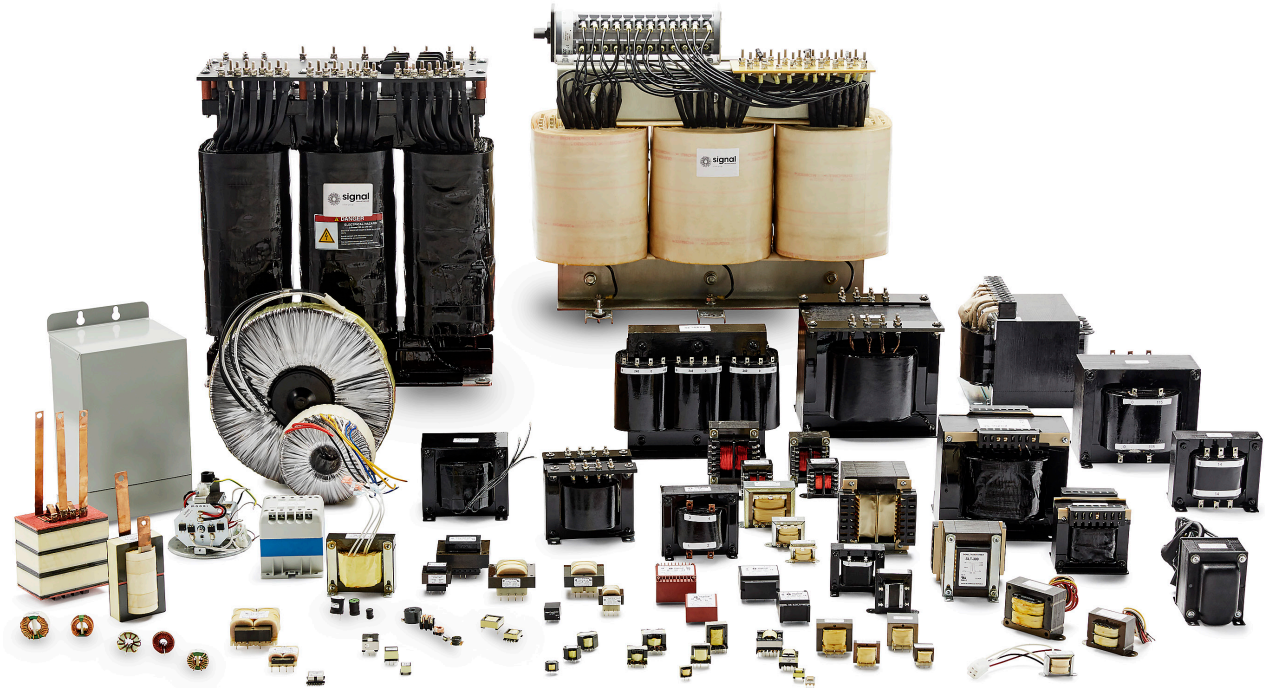
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## About Signal Transformer

Signal Transformer is known as the world's leader of wire wound magnetic solutions since 1959. With over 50 years of experience manufacturing transformers, chokes, inductors and custom or modified standard products. Signal offers not only the most comprehensive line of certified standard power conversion products, with our vast engineering, manufacturing and regulatory resources; Signal Transformer excels in the design and manufacturer of cost effective, specialized platforms.



**For more information,  
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