

Power Inductor

Automotive Grade

AFDI Series



Overview

Power inductors are passive electronic components used in various circuits to store energy in a magnetic field when electrical current flows through them. They are critical in filtering, energy storage, and noise suppression in power electronic systems. They are designed to handle higher currents and are optimized for minimal power loss and thermal efficiency.

Benefits

1. Automotive grade available
2. Large size bottom termination
3. Low DCR
4. Large current

Applications

1. Automotive Systems
2. VRM/VRD
3. Industrial Control

Product Information

Series	L (mm)	W(mm)	T (mm)	Inductance (μH)
AFDI	12.0	12.0	9.0	0.47 ~ 120
	12.0	12.0	10.0	
	13.0	12.0	10.5	
	13.0	12.0	12.0	
	13.0	12.0	11.0	
	13.0	12.0	10.0	
	12.0	13.0	8.0	
	15.5	13.0	11.0	
	15.5	13.0	10.0	
	15.5	13.0	10.4	
	15.5	13.0	12.0	
	19.5	19.0	8.5	
	20.5	20.0	9.5	
	28.0	28.0	10.5	
	30.0	30.0	12.7	

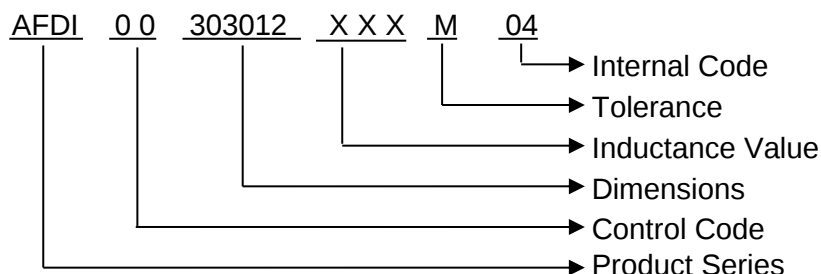


AFDI00303012XXXM04 Series Specification

AEC-Q200

1 Scope: This specification applies to large current and low RDC DIP power inductor.

2 Part Numbering:



3 Rating:

Operating temperature range: $-50^{\circ}\text{C} \sim 150^{\circ}\text{C}$ (Including self - temperature rise)

Storage condition: $-20^{\circ}\text{C} \sim 40^{\circ}\text{C}$; 75%RH Max

4 Marking:



Marking color : Black

Marking : xx uH $\longrightarrow$ Inductance
CEC $\longrightarrow$ Chilisin

5 Material List:

NO	Part	Material
1	Copper Wire	EIAIW (200°C)
2	Core	Carbonyl iron powder
3	coating	silver Paint
4	Solder	Sn96.5-Ag3.0-Cu0.5
5	Ink	M23-089(PR-1075-8T)

6 Standard Testing Condition

	Unless otherwise specified	In case of doubt
Temperature	Ordinary Temperature(15 to 35°C)	20 to 30°C
Humidity	Ordinary Humidity(25 to 85% RH)	50 to 80 %RH

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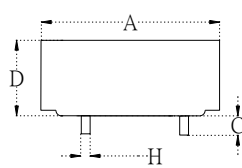
AEC-Q200

7 Configuration and Dimensions:

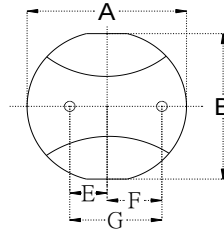
Top side



Side view



Bottom side



Product appearance

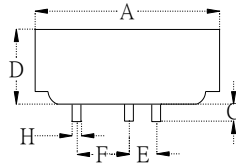


1.0uH~47uH

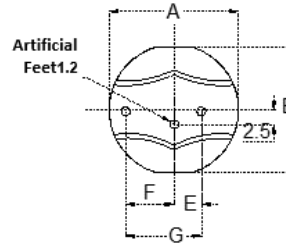
Top side



Side view



Bottom side



Product appearance



68uH~120uH

Part No.	A	B	C	D	E	F	G	H
AFDI003030121R0M04	30±0.4	30±0.4	4.0±0.5	12.7max	6.8±0.5	9.2±0.5	16±0.5	Φ2.5±0.1
AFDI003030122R2M04	30±0.4	30±0.4	4.0±0.5	12.7max	6.8±0.5	9.2±0.5	16±0.5	Φ2.5±0.1
AFDI003030123R3M04	30±0.4	30±0.4	4.0±0.5	12.7max	6.2±0.5	9.8±0.5	16±0.5	Φ2.0±0.1
AFDI003030124R7M04	30±0.4	30±0.4	4.0±0.5	12.7max	6.8±0.5	9.2±0.5	16±0.5	Φ2.3±0.1
AFDI003030126R8M04	30±0.4	30±0.4	4.0±0.5	12.7max	6.8±0.5	9.2±0.5	16±0.5	Φ2.3±0.1
AFDI003030128R2M04	30±0.4	30±0.4	4.0±0.5	12.7max	6.2±0.5	9.8±0.5	16±0.5	Φ2.0±0.1
AFDI00303012100M04	30±0.4	30±0.4	4.0±0.5	12.7max	6.2±0.5	9.8±0.5	16±0.5	Φ1.8±0.1
AFDI00303012150M04	30±0.4	30±0.4	4.0±0.5	12.7max	6.2±0.5	9.8±0.5	16±0.5	Φ1.8±0.1
AFDI00303012220M04	30±0.4	30±0.4	4.0±0.5	12.7max	5.75±0.5	9.25±0.5	15±0.5	Φ1.6±0.1
AFDI00303012330M04	30±0.4	30±0.4	4.0±0.5	12.7max	5.4±0.5	9.6±0.5	15±0.5	Φ1.3±0.1
AFDI00303012470M04	30±0.4	30±0.4	4.0±0.5	12.7max	5.4±0.5	9.6±0.5	15±0.5	Φ1.3±0.1
AFDI00303012680M04	30±0.4	30±0.4	4.0±0.5	12.7max	5.7±0.5	9.3±0.5	15±0.5	Φ1.1±0.1
AFDIJA303012101M04	30±0.4	30±0.4	4.0±0.5	12.7max	5.7±0.5	9.3±0.5	15±0.5	Φ1.1±0.1
AFDIJA303012121M04	30±0.4	30±0.4	4.0±0.5	12.7max	5.7±0.5	9.3±0.5	15±0.5	Φ1.1±0.1

8 Electrical Characteristics:

Part No.	Inductance (uH)	Test Freq.	Tolerance (±%)	Irms (A)Typ.	Isat (A)Typ.	RDC(mΩ) Max(Typ)	Marking
AFDI003030121R0M04	1.0	100kHz, 1.0V	20	90	65	0.48(0.38)	1.0uH
AFDI003030122R2M04	2.2	100kHz, 1.0V	20	72	65	0.77(0.72)	2.2uH
AFDI003030123R3M04	3.3	100kHz, 1.0V	20	60	62	1.48(1.31)	3.3uH
AFDI003030124R7M04	4.7	100kHz, 1.0V	20	54	53	1.40(1.31)	4.7uH
AFDI003030126R8M04	6.8	100kHz, 1.0V	20	45	44	1.90(1.81)	6.8uH
AFDI003030128R2M04	8.2	100kHz, 1.0V	20	37	34	2.9(2.56)	8.2uH
AFDI00303012100M04	10	100kHz, 1.0V	20	34	32	3.60(3.2)	15uH
AFDI00303012150M04	15	100kHz, 1.0V	20	28	28	4.60(4.16)	10uH
AFDI00303012220M04	22	100kHz, 1.0V	20	23	23	6.83(6.43)	22uH
AFDI00303012330M04	33	100kHz, 1.0V	20	18	18	11.3(10.56)	33uH
AFDI00303012470M04	47	100kHz, 1.0V	20	16	16.2	14.6(13.45)	47uH
AFDI00303012680M04	68	100kHz, 1.0V	20	12	11	27.0(25.5)	68uH
AFDIJA303012101M04	100	100kHz, 1.0V	20	11	9	32.0(29.71)	100uH
AFDIJA303012121M04	120	100kHz, 1.0V	20	9	8	36.0(34.21)	120uH

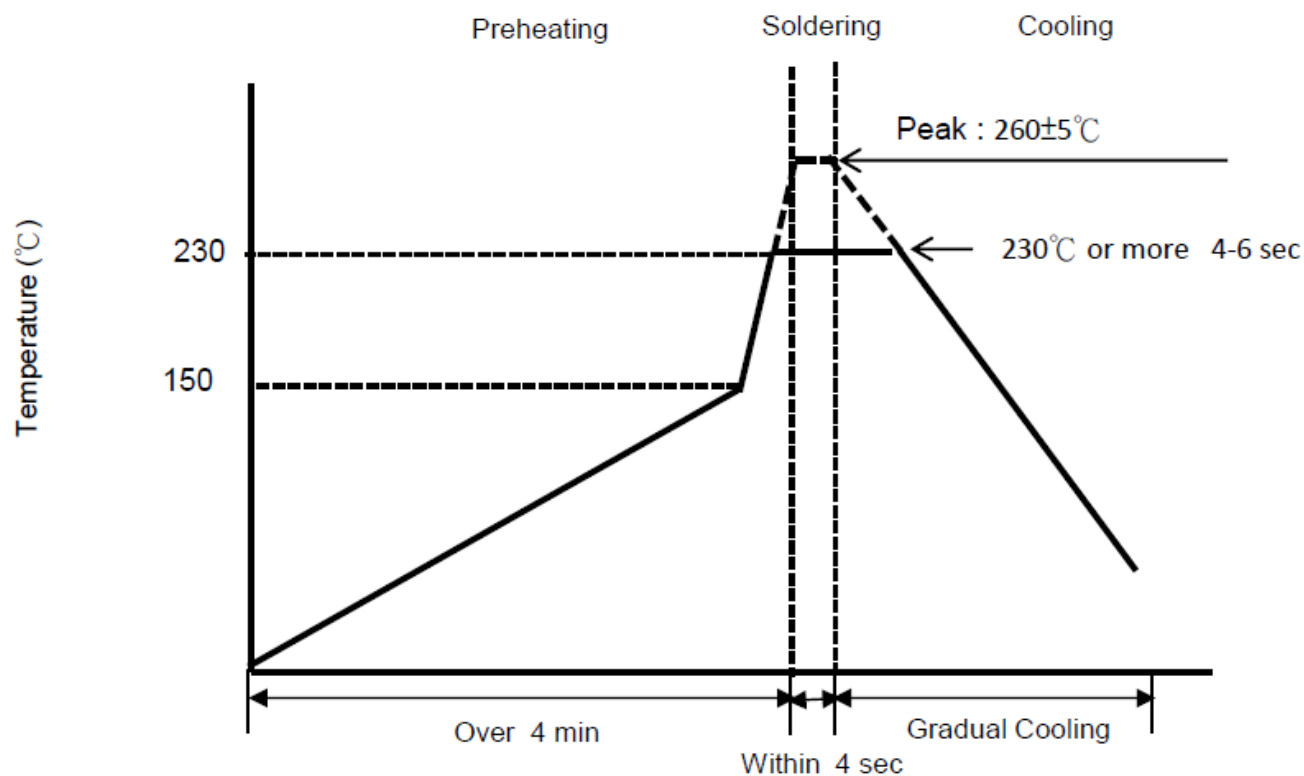
Note:

- Ambient + temperature rise range — 50°C~150°C(Including self - temperature rise)
- Isat for Inductance drop 20% from its value without current.
- Irms for a 40°C temperature rise from 25°C ambient.
- The part temperature (ambient + temp rise) should not exceed 150°C under worst case operating conditions.
Circuit design 150°C under worst case operating conditions. Component placement, PWB trace size and thickness, airflow and other cooling provisions all affect the part temperature. Part temperature should be verified in the end application.

9 Reliability verification conditions

No.	Stress	Reference	Test Conditions	Sample Size	Specification	Result
1	High Temperature Exposure (Storage)	MIL-STD-202 Method 108	1000 hrs. at rated operating temperature, part can be stored for 1000 hrs. @ 150°C. Unpowered. Measurement at 24±4 hours after test conclusion.	77	1. Electrical characterization-Inductance change range 2. Appearance-No damage	Pass
2	Temperature Cycling	JESD22 Method JA-104	1000 cycles (-50°C to +150°C). Measurement at 24±4 hours after test conclusion. 30 min maximum dwell time at each temperature extreme. 1 min.	77	1. Electrical characterization-Inductance change range 2. Appearance-No damage	Pass
3	Biased Humidity	MIL-STD-202 Method 103	1000 hours 85°C/85%RH. Unpowered. Measurement at 24±4 hours after test conclusion.	77	1. Electrical characterization-Inductance change range 2. Appearance-No damage	Pass
4	Operational Life	MIL-PRF-27	1000 hrs. @ 150 °C.Measurement 24±4 hours after test conclusion.	77	1. Electrical characterization-Inductance change range 2. Appearance-No damage	Pass
5	Physical Dimension	JESD22 Method JB-100	Verify physical dimensions to the applicable device detail specification.	15	Product spec	Pass
6	Resistance to Solvents	MIL-STD-202 Method 215	Immersion 3+0.5/-0 minutes in Terpene defluxer. Brush 10 strokes (wet bristle) 2 to 3 oz. Rinse in water. Air blow dry.	5	1. Marking resistance to solvent-No constitute failure (≤3X magnification) 2. Component protective coating, encapsulation material and sleeve material resistance- No damage or degradation that has occurred due to solvent (10X magnification)	Pass
7	Mechanical Shock	MIL-STD-202 Method 213	Units are non-operating. Pulse shape : Half-sine waveform Impact acceleration : 100 g's Pulse duration : 6 ms Number of shocks : 18 shocks (3 shocks 5 g's for 20 minutes, 12 cycles each of 3 orientations. Note: Use 8"X5" PCB, .031" thick, 7 secure points on the long side and 2 secure points at corners of opposite sides. Parts mounted within 2" from any secure point. Test from 10-2000Hz.	30	1. Electrical characterization-Inductance change range 2. Appearance-No damage (OM)	Pass
8	Vibration	MIL-STD-202 Method 204	5 g's for 20 minutes, 12 cycles each of 3 orientations. Note: Use 8"X5" PCB, .031" thick, 7 secure points on the long side and 2 secure points at corners of opposite sides. Parts mounted within 2" from any secure point. Test from 10-2000Hz.	30	1. Electrical characterization-Inductance change range 2. Appearance-No damage (OM)	Pass
9	Resistance to Soldering Heat	MIL-STD-202 Method 210	Test condition B: Solder dip-260±5°C (solder temp.), time 10±1 sec, immersion rate 25mm/s ±6 mm/s, 1 heat cycle.	30	1. Electrical characterization-Inductance change range 2. Appearance-No damage	Pass
10	Solderability	J-STD-002	Pre-condition: Steam 8hr±15min @93° C.For both Leaded & SMD. Electrical test not required. Magnification 50X. Test Method B @ 245±5°C, dwell for 5+0/-0.5 seconds	15	All terminations shall exhibit a continuous solder coating free from defects for a minimum of 95% of the critical area of any individual termination. (10X magnification)	Pass
11	Board Flex	AEC-Q200-005	Bend the board (D) X =2mm, 60sec minimum holding time.	30	No cracks	Pass
12	Terminal Strength	AEC-Q200-008	Apply a 1.8Kg force to the side of a device bending tested. The force shall be applied for 60+1 seconds.	30	No cracking or no part being sheared off from its pad	Pass

10 Wave Soldering:

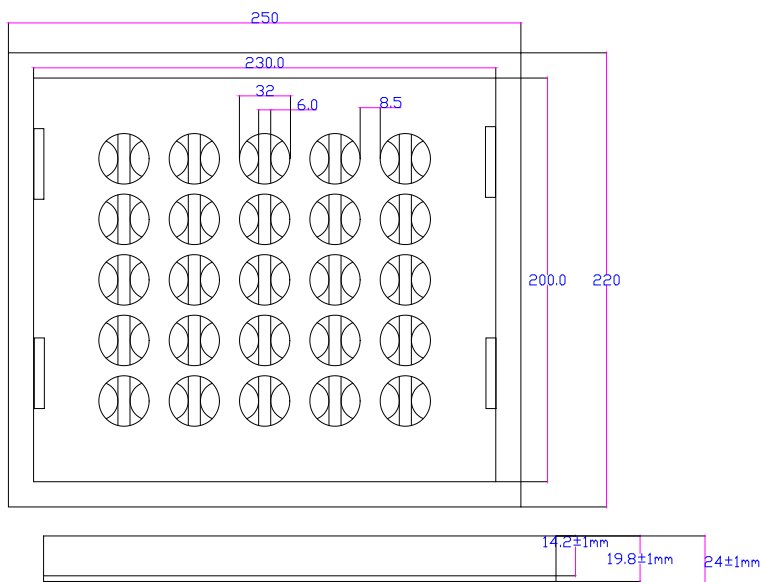


AFDI00303012XXM04 Series Specification

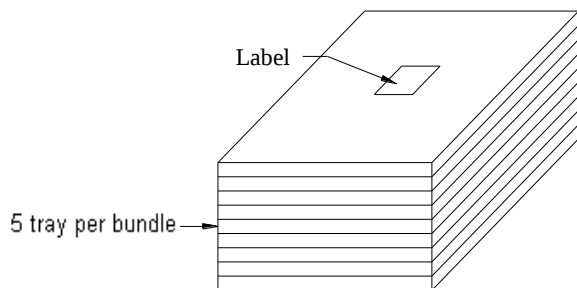
AEC-Q200

12 Packaging:

12.1 Small Pack: 25pcs per tray

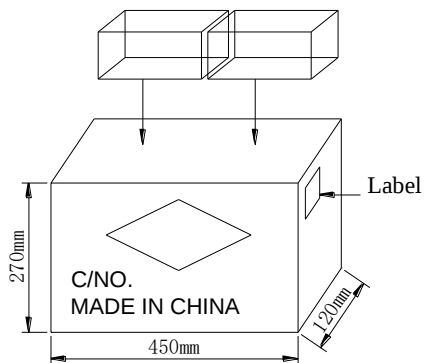


12.2 Medium pack: 5 tray per bundle (125pcs)



Inner carton number	
Partition	M08.137
Desiccant	M66.002
Plastic tray	M47.127
Label size	50*75mm
Label type	Self-adhesion
Label location	Top left corner

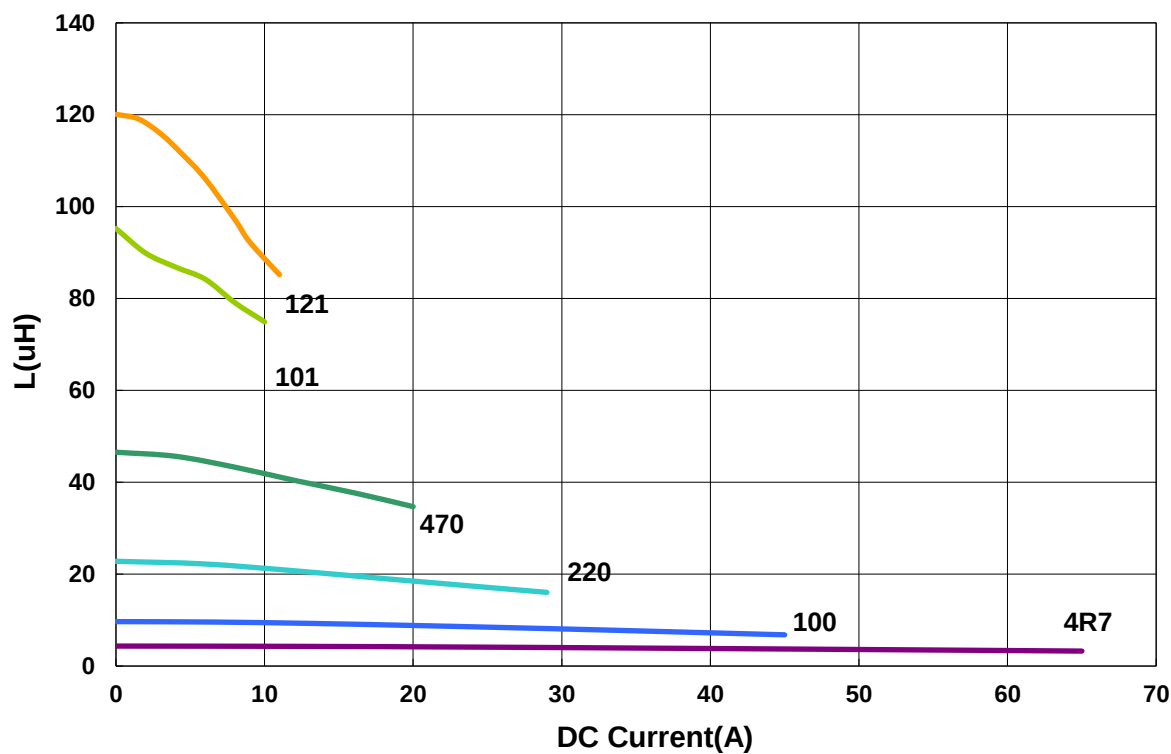
12.3 Large pack: 2 bundle per carton (250pcs)



Carton number	M08.138
Label location	Top left corner on side surface
Label size	75*100mm
Label type	Self-adhesion

13 Graph :

Inductance vs. DC Current



Temperature Change vs. DC Current

