VISHAY

One of the World's Largest Manufacturers
of Discrete Semiconductors and Passive Components

Production Part Approval Process

The following PPAP documentation is assembled according to the AIAG, 4th Edition PPAP Manual and applicable customer requirements

IHLP2525xxERxxxM5A

Generic PPAP

Generic PPAP

8/31/2017

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Vishay / Dale Electronics
1505 East Hway 50 Yankton, SD 57078, USA Phone (605) 665-9301 Fax (605) 668-4247

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Note: Generic PPAPs do not include all sections shown in the Table of Contents.
Sections 4,5,6,7,8,12,&18 are only available upon request of a full Automotive PPAP.

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Use the control buttons below to navigate through the PPAP sections.

Section 1. Design Records

Vishay / Dale Electronics
1505 East Hway 50 Yankton, SD 57078, USA Phone (605) 665-9301 Fax (605) 668-4247
ONE OF THE WORLD'S LARGEST MANUFACTURERS OF DISCRETE SEMICONDUCTORS AND PASSIVE COMPONENTS

Low Profile, High Current IHLP® Inductors

Manufactured under one or more of the following:
US Patents; 6,198,375/6,204,744/6,449,829/6,460,244.
Several foreign patents, and other patents pending.

FEATURES

- High temperature, up to 155 °C
- Shielded construction
- Excellent DC/DC energy storage up to 1 MHz to 2 Mhz. Filter inductor applications up the SRF (see Standard Electrical Specifications table).
- Handles high transient current spikes without saturation
- Ultra low buzz noise, due to composite construction
- AEC-Q200 qualified
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE

Pb-free

RoHS COMPLIANT

HALOGEN FREE GREEN (5-2008)

APPLICATIONS

- Engine and transmission control units
- Diesel injection drivers
- DC/DC converters for entertainment/navigation systems
- Noise suppression for motors
  - Windshield wipers
  - Power seats
  - Power mirrors
  - Heating and ventilation blowers
  - HID lighting
- LED drivers

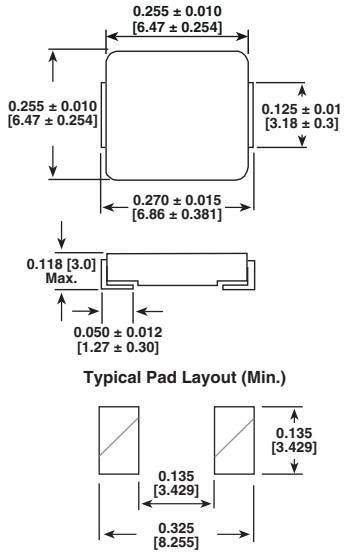
STANDARD ELECTRICAL SPECIFICATIONS

L_0 INDUCTANCE ± 20 % AT 100 kHz, 0.25 V, 0 A (µH)	DCR TYP. 25 °C (mΩ)	DCR MAX. 25 °C (mΩ)	HEAT RATING CURRENT DC TYP. (A) (3)	SATURATION CURRENT DC TYP. (A) (4)	SRF TYP. (MHz)
0.47	3.87	4.14	20.0	14.0	82.4
0.68	5.38	5.76	16.5	17.0	56.1
0.82	6.75	7.22	13.8	16.8	68.6
1.0	7.90	8.45	12.0	13.0	53.2
1.5	12.3	13.2	10.6	11.6	45.9
2.2	17.10	18.30	8.1	10.8	31.2
3.3	26.50	28.40	6.8	8.3	28.6
4.7	35.90	38.40	5.6	5.6	25.5
5.6	42.60	45.60	5.3	4.8	22.8
6.8	53.80	57.60	4.4	4.4	19.6
10	71.90	76.90	4.0	2.9	14.0
15	118.0	127.0	2.9	2.8	10.4
22	163.0	174.0	2.8	2.2	8.3

Notes

(1) All test data is referenced to 25 °C ambient
(2) Operating temperature range -55 °C to +155 °C
(3) DC current (A) that will cause an approximate ΔT of 40 °C
(4) DC current (A) that will cause L_0 to drop approximately 20 %
(5) The part temperature (ambient + temp. rise) should not exceed 155 °C under worst case operating conditions. Circuit design, 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.
(6) Maximum recommended operating voltage (across inductor) = 200 V

DIMENSIONS in inches [millimeters]



DESCRIPTION

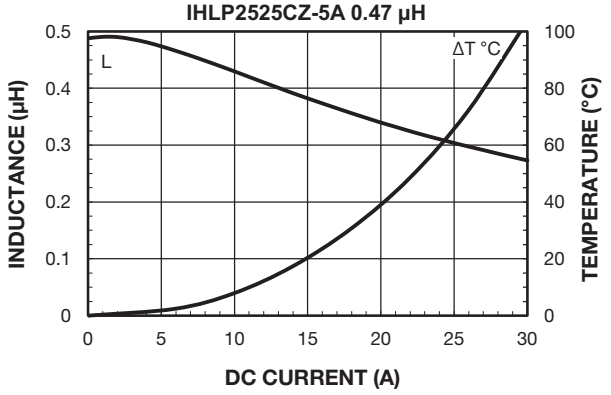
IHLP-2525CZ-5A	22 µH	± 20 %	ER	e3
MODEL	INDUCTANCE VALUE	INDUCTANCE TOLERANCE	PACKAGE CODE	JEDEC® LEAD (Pb)-FREE STANDARD

GLOBAL PART NUMBER

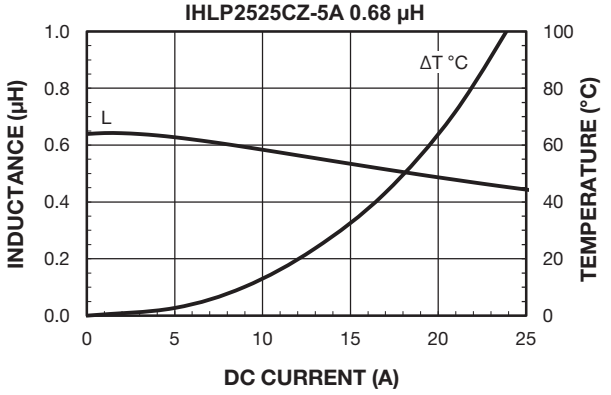
I	H	L	P	2	5	2	5	C	Z	E	R	2	2	0	M	5	A
MODEL				SIZE						PACKAGE CODE		INDUCTANCE VALUE			TOL.	SERIES	

PERFORMANCE GRAPHS

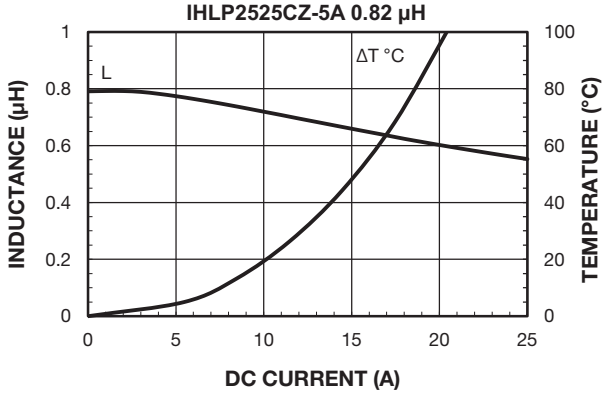
IHLP2525CZ-5A 0.47 µH



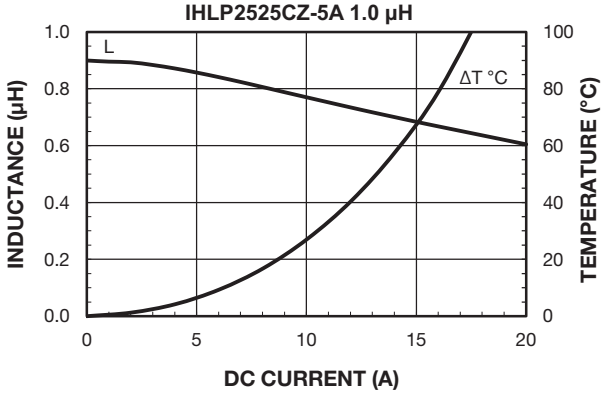
IHLP2525CZ-5A 0.68 µH



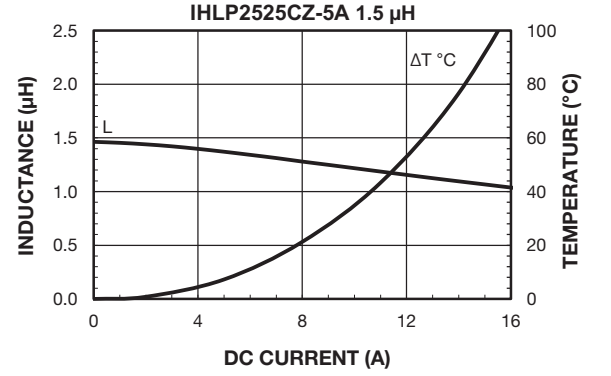
IHLP2525CZ-5A 0.82 µH



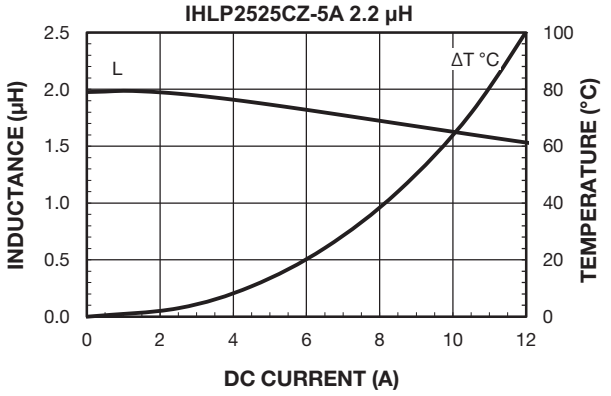
IHLP2525CZ-5A 1.0 µH



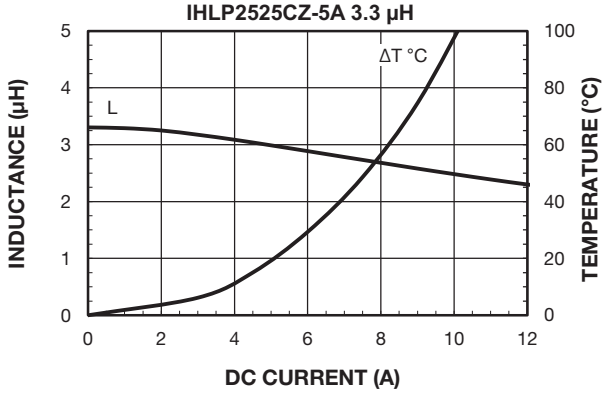
IHLP2525CZ-5A 1.5 µH



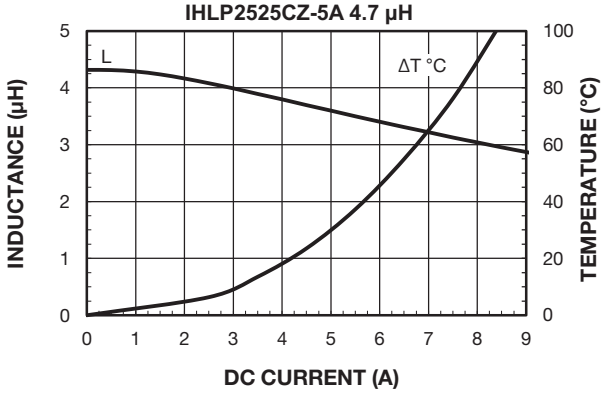
IHLP2525CZ-5A 2.2 µH



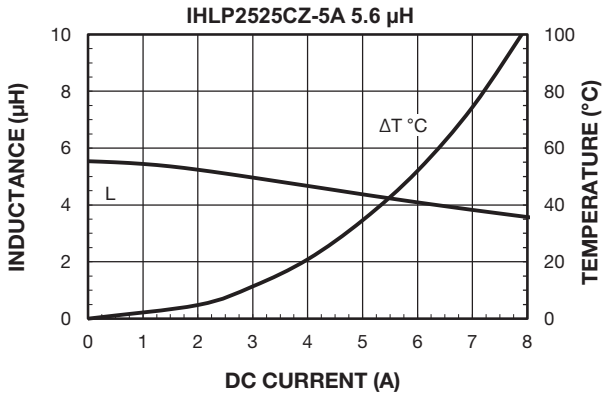
IHLP2525CZ-5A 3.3 µH

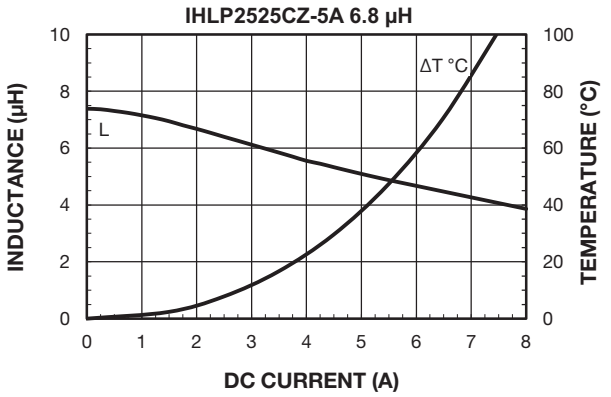


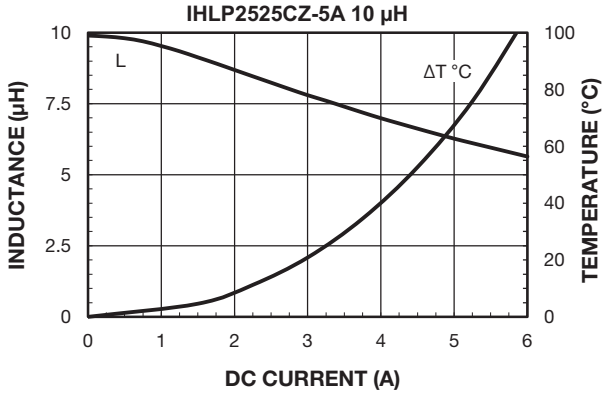
IHLP2525CZ-5A 4.7 µH

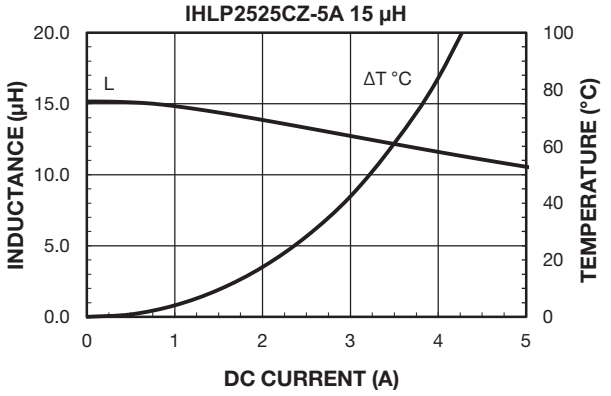


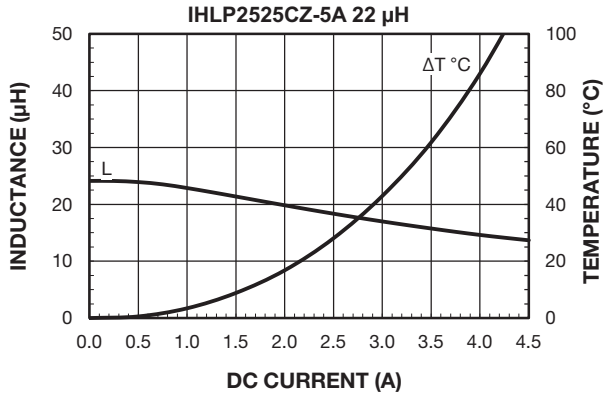
PERFORMANCE GRAPHS





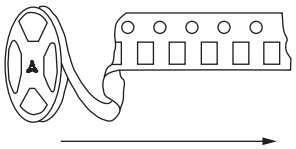




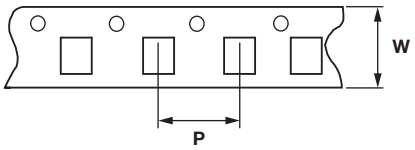


SMD Magnetics Packaging Methods

TAPE AND REEL in inches [millimeters] - Meets EIA RS-481 tape and reel packaging standard



User Direction of Feed



Carrier Dimensions

MODEL	PACKAGE CODE			REEL SIZE	CARRIER TAPE WIDTH (W)	COMPONENT PITCH (P)	UNITS/ REEL	PACKAGE CODE			UNITS/ BULK
	PREVIOUS CODE	GLOBAL CODE LEAD (Pb)-BEARING	GLOBAL CODE LEAD (Pb)-FREE					PREVIOUS CODE	GLOBAL CODE LEAD (Pb)-BEARING	GLOBAL CODE LEAD (Pb)-FREE	
IHLP-1212ABER	-	-	ER	13	0.472 [12.0]	0.315 [8.0]	3000	-	-	-	-
IHLP-1212ABEV	-	-	ER	13	0.472 [12.0]	0.315 [8.0]	4000	-	-	-	-
IHLP-1212AEER	-	-	ER	13	0.472 [12.0]	0.315 [8.0]	3000	-	-	-	-
IHLP-1212BZER	-	-	ER	13	0.472 [12.0]	0.315 [8.0]	3000	-	-	-	-
IHLP-1212BZEV	-	-	ER	13	0.472 [12.0]	0.315 [8.0]	4000	-	-	-	-
IHLP-1616AB	-	-	ER	13	0.472 [12.0]	0.315 [8.0]	4000	-	-	EB	100
IHLP-1616BZ	-	-	ER	13	0.472 [12.0]	0.315 [8.0]	4000	-	-	EB	100
IHLP-2020AB	-	-	ER	13	0.472 [12.0]	0.315 [8.0]	4000	-	-	EB	100
IHLP-2020BZ	-	-	ER	13	0.472 [12.0]	0.315 [8.0]	2000	-	-	EB	100
IHLP-2020CZ	-	-	ER	13	0.472 [12.0]	0.315 [8.0]	2000	-	-	EB	100
IHLP-2525AH	-	-	ER	13	0.630 [16.0]	0.315 [8.0]	2000	-	-	EB	100
IHLP-2525BD	-	-	ER	13	0.630 [16.0]	0.315 [8.0]	2000	-	-	EB	100
IHLP-2525CZ	-	-	ER	13	0.630 [16.0]	0.315 [8.0]	2000	-	-	EB	100
IHLP-2525EZ	-	-	ER	13	0.630 [16.0]	0.472 [12.0]	500	-	-	EB	100
IHLP-3232CZ	-	-	ER	13	0.630 [16.0]	0.472 [12.0]	1000	-	-	EB	100
IHLP-3232DZ	-	-	ER	13	0.630 [16.0]	0.472 [12.0]	500	-	-	EB	100
IHLP-4040DZ	-	-	ER	13	0.945 [24.0]	0.630 [16.0]	500	-	-	EB	100
IHLP-5050CE	-	-	ER	13	0.945 [24.0]	0.630 [16.0]	500	-	-	EB	100
IHLP-5050EZ	-	-	ER	13	0.945 [24.0]	0.630 [16.0]	250	-	-	EB	100
IHLP-5050FD	-	-	ER	13	0.945 [24.0]	0.630 [16.0]	250	-	-	EB	100
IHLP-6767DZ	-	-	ER	13	0.945 [24.0]	0.945 [24.0]	250	-	-	EB	100
IHLP-6767GZ	-	-	ER	13	0.945 [24.0]	0.945 [24.0]	200	-	-	EB	100
IHLP-8787MZ	-	-	ER	13	1.73 [44.0]	1.26 [32.0]	100	-	-	-	-
IHCL-4040DZ	-	-	ER	13	0.945 [24.0]	0.630 [16.0]	500	-	-	EB	100
IHLD-4032KB	-	-	ER	13	0.945 [24.0]	0.630 [16.0]	250	-	-	EB	100
IHLD-3232HB	-	-	ER	13	0.945 [24.0]	0.630 [16.0]	250	-	-	EB	100
IHLE-2525CD	-	-	ER	13	0.630 [16.0]	0.315 [8.0]	2000	-	-	EB	100
IHLE-3232DD	-	-	ER	13	0.630 [16.0]	0.472 [12.0]	500	-	-	EB	100
IHLE-4040DD	-	-	ER	13	0.945 [24.0]	0.630 [16.0]	500	-	-	EB	100
IHLR-4040DZ	-	-	ER	13	0.945 [24.0]	0.630 [16.0]	500	-	-	EB	100
IHLM-2525CZ	-	-	ER	13	0.630 [16.0]	0.315 [8.0]	2000	-	-	EB	100
IHLW-4040CF	-	-	ER	13	0.945 [24.0]	0.630 [16.0]	500	-	-	EB	100
IHLW-5050CE	-	-	ER	13	0.945 [24.0]	0.630 [16.0]	500	-	-	EB	100
IFLP-4040DZ	-	-	ER	13	0.945 [24.0]	0.630 [16.0]	500	-	-	EB	100
IFLR-2727EZ	-	-	ER	13	0.630 [16.0]	0.630 [16.0]	1000	-	-	-	-
IFLR-4027EZ	-	-	ER	13	0.945 [24.0]	0.630 [16.0]	1000	-	-	-	-
IFLR-4031GC	-	-	ER	13	0.945 [24.0]	0.472 [12.0]	500	-	-	EB	100
IFLR-5151HZ	-	-	ER	13	0.945 [24.0]	0.630 [16.0]	450	-	-	EB	100

TAPE AND REEL in inches [millimeters] - Meets EIA RS-481 tape and reel packaging standard											
	PACKAGE CODE							PACKAGE CODE			
MODEL	PREVIOUS CODE	GLOBAL CODE LEAD (Pb)-BEARING	GLOBAL CODE LEAD (Pb)-FREE	REEL SIZE	CARRIER TAPE WIDTH (W)	COMPONENT PITCH (P)	UNITS/ REEL	PREVIOUS CODE	GLOBAL CODE LEAD (Pb)-BEARING	GLOBAL CODE LEAD (Pb)-FREE	UNITS/ BULK
IFSC-0806AZ	-	-	ER	7	0.315 [8.0]	0.157 [4.0]	2000	-	-	-	-
IFSC-1008AB	-	-	ER	7	0.315 [8.0]	0.157 [4.0]	2000	-	-	-	-
IFSC-1111AZ	-	-	ER	7	0.315 [8.0]	0.157 [4.0]	2000	-	-	-	-
IFSC-1111AB	-	-	ER	7	0.315 [8.0]	0.157 [4.0]	2000	-	-	-	-
IFSC-1515AH	-	-	ER	13	0.472 [12.0]	0.315 [8.0]	2000	-	-	-	-
IHHP-0806AZ-01	-	-	ER	7	0.315 [8.0]	0.157 [4.0]	2000	-	-	-	-
IHHP-0806AB-01	-	-	ER	7	0.315 [8.0]	0.157 [4.0]	2000	-	-	-	-
IHHP-1008AZ-01	-	-	ER	7	0.315 [8.0]	0.157 [4.0]	3000	-	-	-	-
IHHP-1008AB-01	-	-	ER	7	0.315 [8.0]	0.157 [4.0]	3000	-	-	-	-
IHHP-1212ZH-01	-	-	ER	7	0.315 [8.0]	0.157 [4.0]	3000	-	-	-	-
IHHP-1212AZ-01	-	-	ER	7	0.315 [8.0]	0.157 [4.0]	3000	-	-	-	-
IHSM-3825	RC2	RE	ER	13	0.945 [24.0]	0.472 [12.0]	750	P09	PJ	EB	100
IHSM-4825	RC2	RE	ER	13	0.945 [24.0]	0.472 [12.0]	750	P09	PJ	EB	100
IHSM-5832	RC3	RF	ER	13	1.26 [32.0]	0.472 [12.0]	500	P09	PJ	EB	100
IHSM-7832	RC4	RG	ER	13	1.73 [44.0]	0.472 [12.0]	500	P09	PJ	EB	100
IDC-2512	-	-	ER	13	0.630 [16.0]	0.315 [8.0]	2000	-	-	-	-
IDC-5020	-	-	ER	13	0.630 [16.0]	0.472 [12.0]	500	-	-	-	-
IDC-7328	-	-	ER	13	0.945 [24.0]	0.945 [24.0]	250	-	-	-	-
IDCS-2512	-	-	ER	13	0.630 [16.0]	0.315 [8.0]	2000	-	-	-	-
IDCS-5020	-	-	ER	13	0.630 [16.0]	0.472 [12.0]	500	-	-	-	-
IDCS-7328	-	-	ER	13	0.945 [24.0]	0.945 [24.0]	250	-	-	-	-
IDCP-1813	-	-	ER	13	0.472 [12.0]	0.315 [8.0]	2000	-	-	-	-
IDCP-2218	-	-	ER	13	0.472 [12.0]	0.315 [8.0]	1500	-	-	-	-
IDCP-3114	-	-	ER	13	0.630 (16.0)	0.472 [12.0]	1000	-	-	-	-
IDCP-3020	-	-	ER	13	0.630 (16.0)	0.472 [12.0]	1000	-	-	-	-
IDCP-3722	-	-	ER	13	0.945 [24.0]	0.472 [12.0]	500	-	-	-	-
IDCP-3916	-	-	ER	13	0.945 [24.0]	0.472 [12.0]	500	-	-	-	-
IFCB-0402	-	-	ER	7	0.315 [8.0]	0.079 [2.0]	10 000	-	-	-	-
ILC-0402	-	-	ER	7	0.315 [8.0]	0.079 [2.0]	10 000	-	-	-	-
ILC-0603	-	-	ER	7	0.315 [8.0]	0.157 [4.0]	4000	-	-	-	-
ILC-0805	-	-	ER	7	0.315 [8.0]	0.157 [4.0]	4000	-	-	-	-
IMC-0402	-	-	ER	7	0.315 [8.0]	0.079 [2.0]	10 000	-	-	-	-
IMC-0402-01	-	-	ER	7	0.315 [8.0]	0.079 [2.0]	10 000	-	-	-	-
IMC-0603	-	-	ER	7	0.315 [8.0]	0.157 [4.0]	4000	-	-	-	-
IMC-0603-01	-	-	ER	7	0.315 [8.0]	0.079 [2.0]	3000	-	-	-	-
IMC-0805-01	-	-	ER	7	0.315 [8.0]	0.157 [4.0]	2000	-	-	-	-
IMC-1008	-	-	ER	7	0.315 [8.0]	0.157 [4.0]	2000	-	-	-	-
IMC-1210	R98/RB3 R99/RB4	SY/AN SZ/R9	ER/ET ES/EU	7 13	0.315 [8.0] 0.315 [8.0]	0.157 [4.0] 0.157 [4.0]	2000 7500	B13	BN	EB	500
IMC-1210-100	R98/RB3 R99/RB4	SY/AN SZ/R9	ER/ET ES/EU	7 13	0.315 [8.0] 0.315 [8.0]	0.157 [4.0] 0.157 [4.0]	2000 7500	B13	BN	EB	500
IMC-1812	R73/R92 R13/R91	RV/RX RQ/RW	ER/ET ES/EU	7 13	0.472 [12.0] 0.472 [12.0]	0.315 [8.0] 0.315 [8.0]	500 2000	B13	BN	EB	500
IMCH-1812	-	-	ER	7	0.472 [12.0]	0.315 [8.0]	500	-	-	-	-
IMC-2220	-	-	ER	13	0.630 [16.0]	0.472 [12.0]	1000	-	-	-	-

IHLP PACKAGING

COMPONENT PHOTO

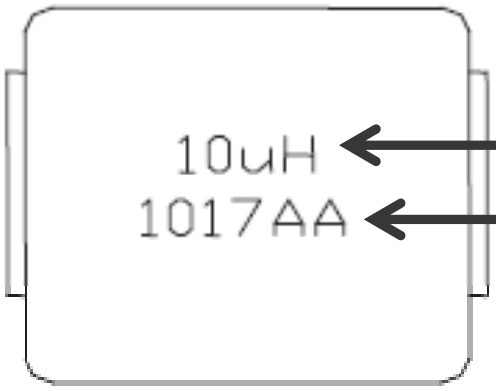
POCKET TAPE PHOTO

REEL PHOTO

CONTAINER PHOTO

UNIT LOAD PHOTO

IHLP COMPONENT PRINT



The Inductance Value

DATE CODE:
1017 = 17th week of 2010
The letters behind the date code are used by Vishay to trace each component back to a specific lot

Production Part Approval Process

The following PPAP documentation is assembled according to AIAG, 4th Edition PPAP Manual and applicable customer requirements

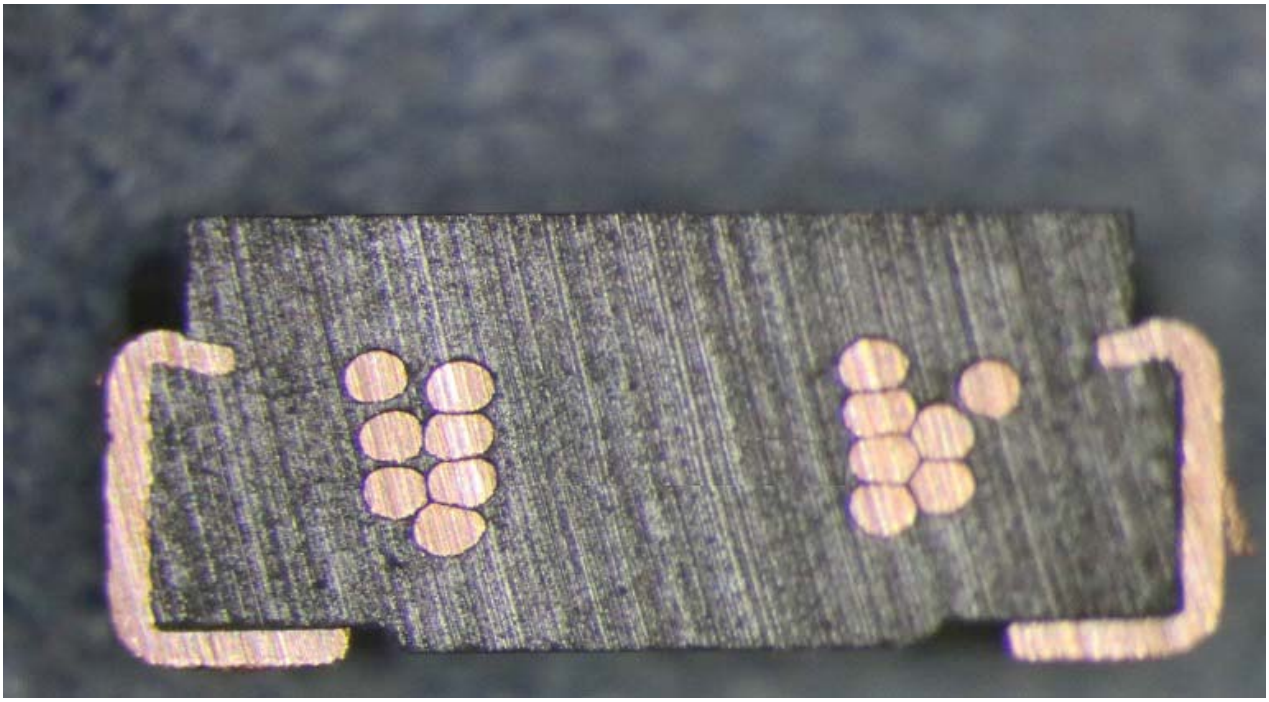
Terminal Plating Info

Part Number (CUSTOMER)	Part Number (Vishay)	Layer structure with base and coating material used:	Layer thickness and tolerances of the coatings (base material, intermediate layer, final finish)	Kind of Coating or technology (e.g. galvanized, chemically hot tin-plated,..)
Generic PPAP	IHLP2525xxERxxxM5A	Cu - Base Material Ni- Intermediate Later Sn- Finish Layer	CU: 0.203 +/- .0254mm Ni: 1.27um to 3.175um Sn: 4.57um to 6.35 um	Electroplated

Production Part Approval Process

The following PPAP documentation is assembled according to AIAG, 4th Edition PPAP Manual and applicable customer requirements

Cross Sectional Picture IHLP2525CZ-5A



Production Part Approval Process

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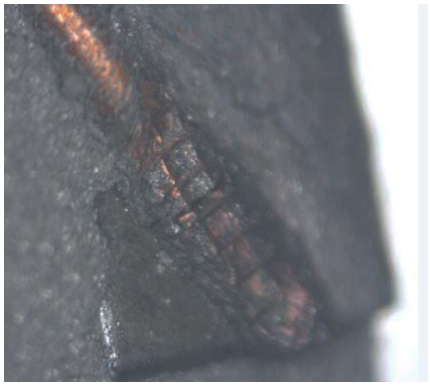
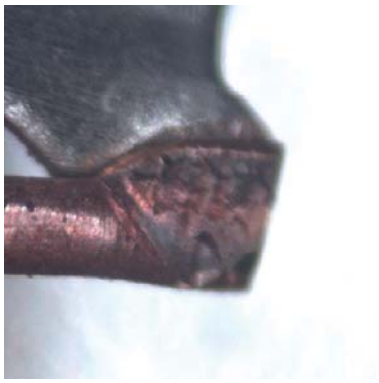
Example Photos of IHLP Welds





Production Part Approval Process

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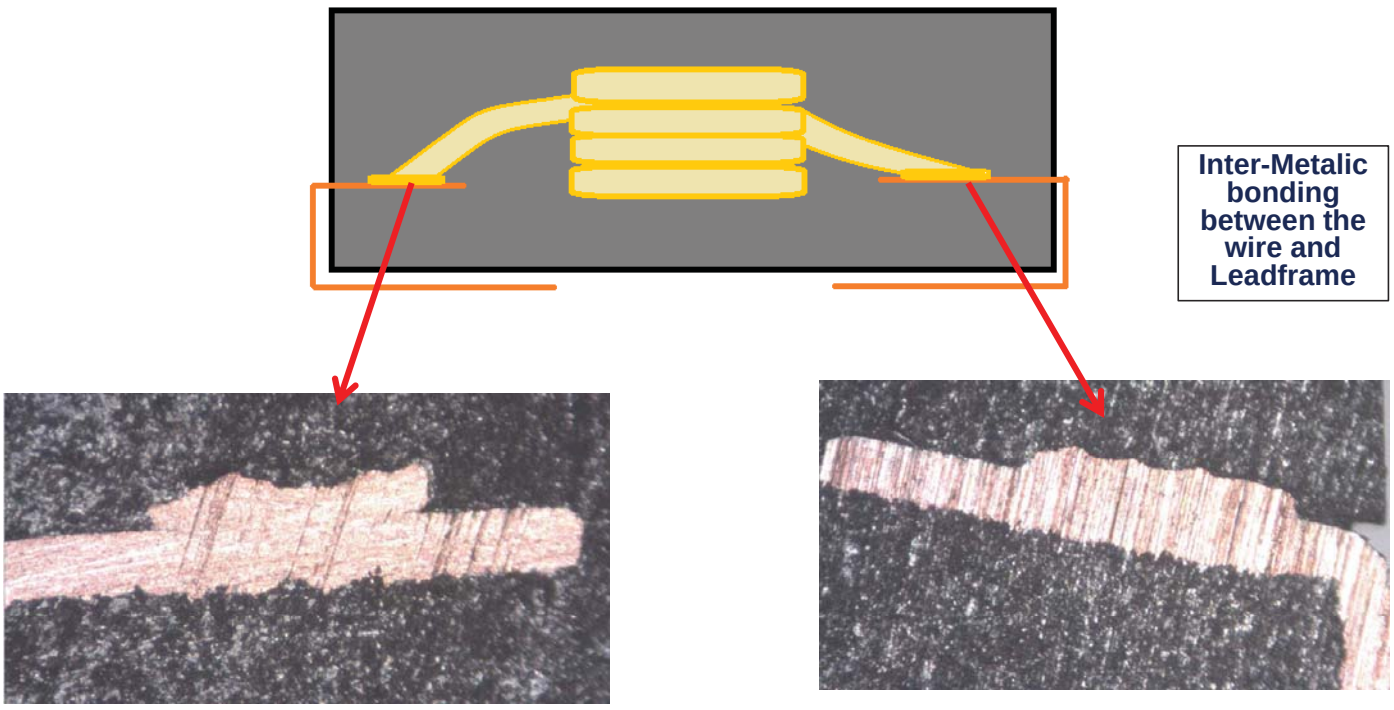
Cross sectional Photos of IHLP Welds



Production Part Approval Process

The following PPAP documentation is assembled according to AIAG, 4th Edition PPAP Manual and applicable customer requirements

Use the control buttons below to navigate through the PPAP sections.

Section 2: Engineering Change Documents

There are no applicable Engineering Change Documents for this part number.

Vishay / Dale Electronics
1505 East Hway 50 Yankton, SD 57078, USA Phone (605) 665-9301 Fax (605) 668-4247

Production Part Approval Process

The following PPAP documentation is assembled according to AIAG, 4th Edition PPAP Manual and applicable customer requirements

Use the control buttons below to navigate through the PPAP sections.

Section 3: Customer Engineering Approval

Customer Engineering Approval does not apply for this part number

PRODUCTION PART APPROVAL PROCESS
THE FOLLOWING PPAP DOCUMENTATION IS ASSEMBLED ACCORDING TO
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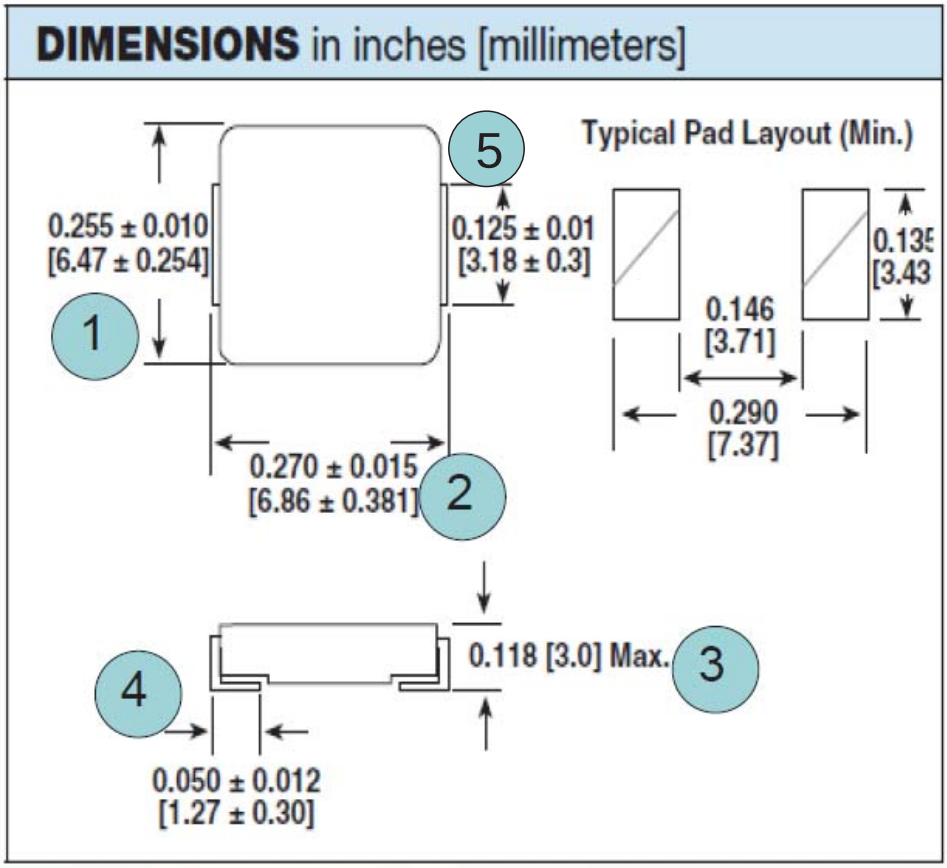

PRODUCTION PART APPROVAL PROCESS
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No.	1	2	3	4	5
1	0.262	0.28	0.114	0.048	0.125
2	0.262	0.28	0.114	0.049	0.125
3	0.263	0.282	0.114	0.05	0.125
4	0.262	0.28	0.114	0.049	0.125
5	0.262	0.28	0.115	0.05	0.125
6	0.262	0.28	0.115	0.05	0.125
7	0.262	0.28	0.114	0.05	0.125
8	0.262	0.28	0.114	0.05	0.125
9	0.262	0.281	0.114	0.05	0.125
10	0.262	0.281	0.114	0.051	0.1245
11	0.263	0.281	0.114	0.049	0.125
12	0.262	0.281	0.115	0.047	0.125
13	0.262	0.281	0.115	0.049	0.125
14	0.262	0.281	0.115	0.049	0.125
15	0.262	0.28	0.115	0.05	0.125
16	0.262	0.28	0.114	0.051	0.1245
17	0.263	0.28	0.114	0.05	0.125
18	0.262	0.28	0.114	0.052	0.125
19	0.262	0.281	0.114	0.048	0.125
20	0.262	0.28	0.114	0.049	0.125
21	0.263	0.28	0.114	0.049	0.125
22	0.262	0.28	0.114	0.05	0.125
23	0.262	0.28	0.114	0.049	0.125
24	0.262	0.281	0.114	0.048	0.125
25	0.262	0.281	0.114	0.051	0.125
26	0.262	0.281	0.114	0.049	0.125
27	0.263	0.28	0.115	0.047	0.125
28	0.262	0.28	0.114	0.049	0.125
29	0.262	0.28	0.114	0.048	0.1245
30	0.262	0.28	0.115	0.049	0.125

PRODUCTION PART APPROVAL PROCESS
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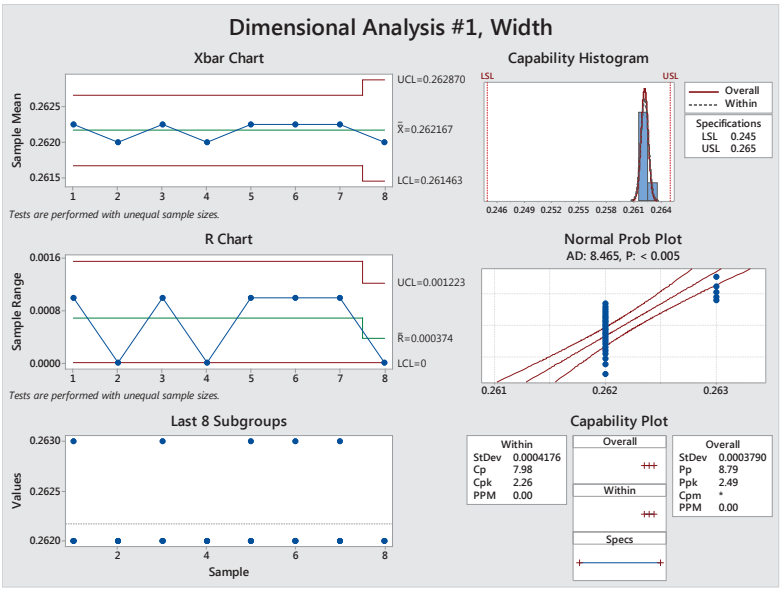

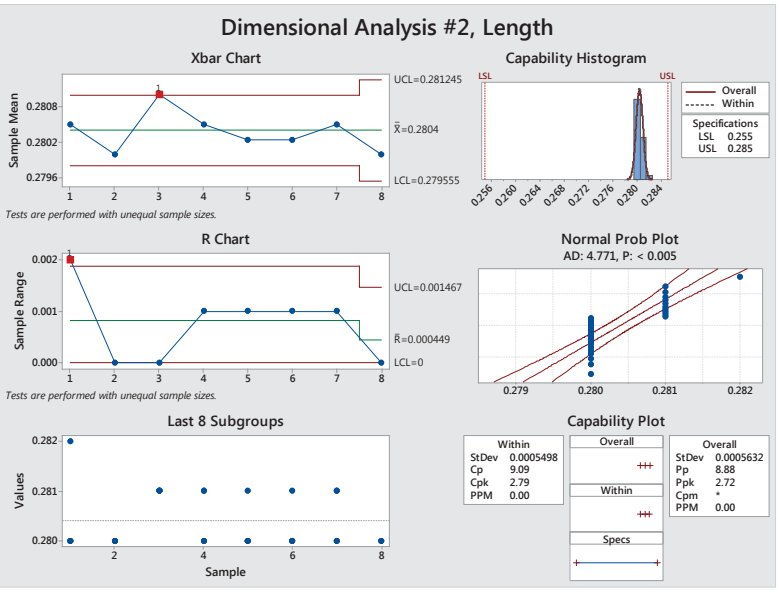

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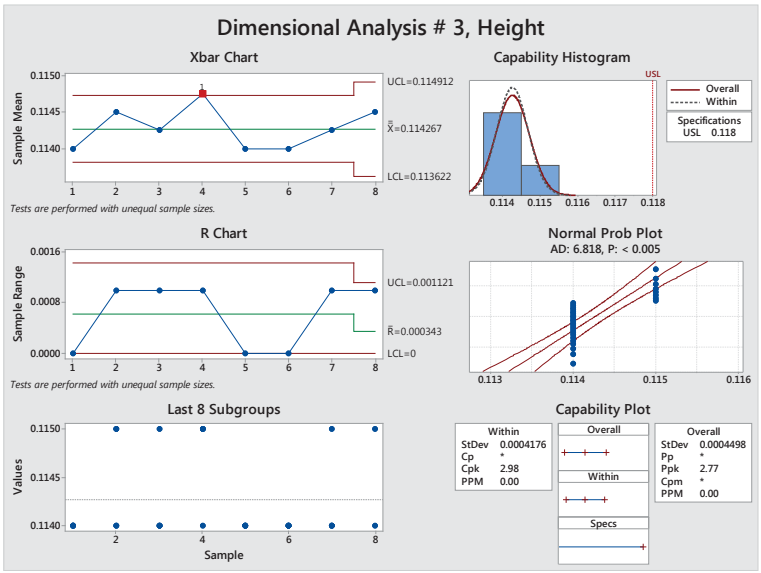

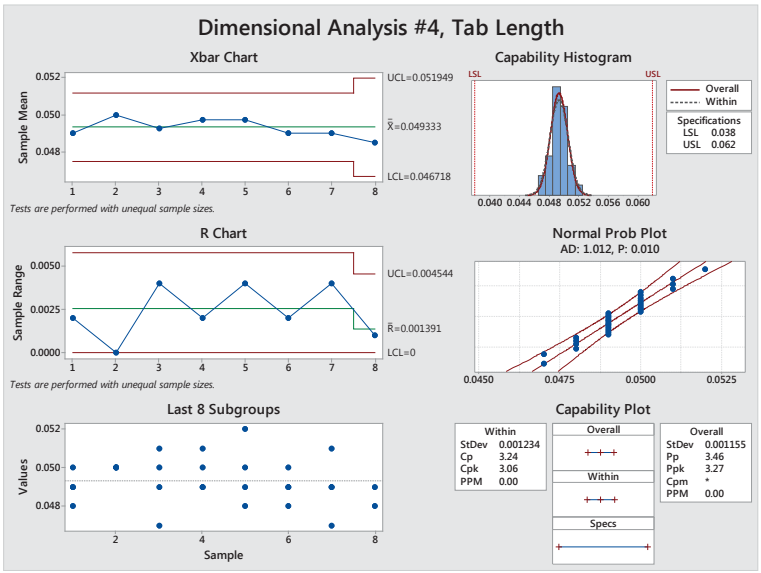

PRODUCTION PART APPROVAL PROCESS
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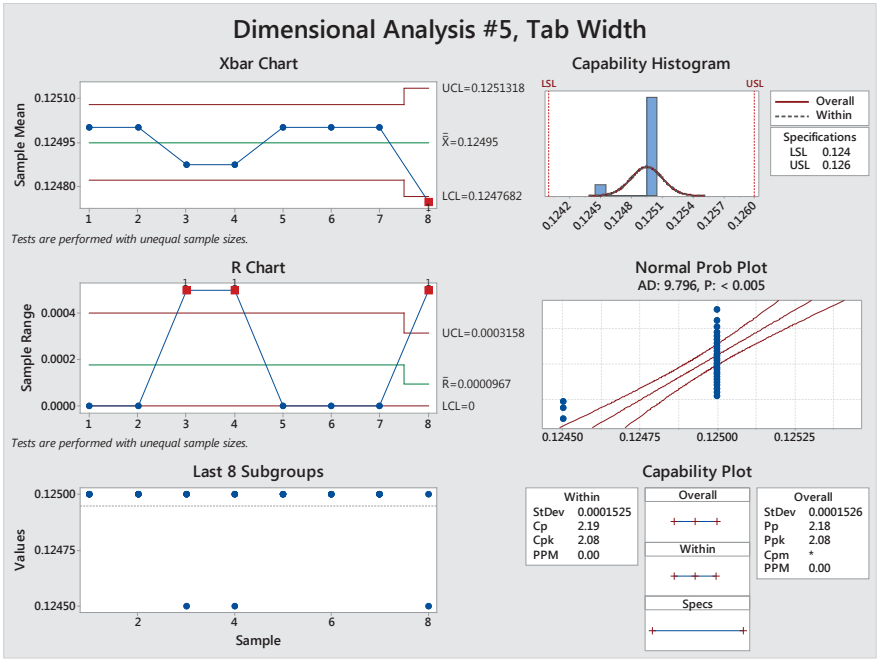

SECTION 10

IHLP2525CZ-5A

PERFORMANCE TEST RESULTS

IHLP2525CZER220M5A

Test #	Description	Ref. Spec. Meth / Cond	Test Conditions	End Point Δ requirements	Sample Size	Meas Temp							
0	Preconditioning for lead-free products	AEC-Q200 Rev C - Pb Free Specific Tests Table 4.2	As specified in sections 4.3.1 thru 4.3.3 except Visual per DPS-11,865 10X magnification										
1	Pre- and Post-Stress Electrical Test	IHLP Data Sheet	L (uH) – 100KHz and 250mV DCR – 25°C Ambient	L=±15% of initial, DCR =±15% of initial	All tests requiring electrical data								
3	High Temp Exposure	IEC-60068 Part 2-2 test group BA	155C for 2000 hours, unpowered readings at 0, 250, 500, 1000 and 2000 hour intervals. Initial (0 hr.) and final (2000 hr.) readings at LT/RT/HT LT=Low Temperature=-55°C, RT=Room Temperature=+25°C,HT=High Temperature=+125°C for –A1/1A models. HT=High Temperature =+155° C for -5A models.	L=±20% of initial, DCR =±20% of initial	77			Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
						-55 deg. C	Maximum	20.480	21.927	13.320	114.690	114.210	9.559
							Mimimum	16.051	18.189	0.829	101.270	108.750	-2.903
							Mean	18.707	20.422	9.248	111.240	110.930	-0.263
							Std Dev	0.886	0.694	1.992	1.449	0.993	1.539
						+25 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	20.427	22.044	13.064	162.090	162.650	5.501
							Mimimum	15.968	16.066	0.611	151.430	157.940	-1.158
							Mean	18.637	20.491	9.993	158.283	160.278	1.286
							Std Dev	0.860	0.820	1.964	2.613	0.873	1.649
						+155 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	20.561	22.397	13.030	245.600	244.500	0.456
							Mimimum	16.278	16.537	1.587	239.900	237.300	-3.143
							Mean	18.851	20.776	10.226	243.426	241.906	-0.623
							Std Dev	0.777	0.817	1.492	1.382	1.429	0.498

IHLP2525CZER220M5A

								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
	Low Temperature Storage	EC-60068 Part 2-1 test group Aa	-55°C for 2000 hours unpowered readings at 0, 250, 500, 1000 and 2000 hour intervals. Initial (0 hr.) and final (2000 hr.) readings at LT/RT/H	L=±20% of initial, DCR =±20% of initial	77	-55 deg. C	Maximum	21.292	20.491	14.404	114.050	117.030	4.919
							Mimimum	16.116	16.518	-12.498	109.540	104.260	-5.639
							Mean	18.615	18.968	1.971	111.154	112.514	1.225
							Std Dev	0.814	0.688	3.058	0.990	1.896	1.543
						+25 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	20.112	20.535	3.322	161.080	162.410	2.527
							Mimimum	17.264	17.724	0.968	157.880	151.150	-5.259
							Mean	18.588	19.036	2.421	159.651	160.974	0.830
							Std Dev	0.654	0.633	0.379	0.730	1.262	0.831
						+155 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	20.337	20.385	2.186	244.600	244.200	0.375
							Mimimum	17.584	17.636	-7.408	237.800	234.500	-3.406
							Mean	18.839	18.881	0.225	241.717	239.788	-0.796
							Std Dev	0.620	0.626	0.935	1.714	2.489	0.945

IHLP2525CZER220M5A

								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
4	Temperature Cycling	IEC-60068, Part 2.14 test group Na	-55°C to +125°C (+155° C for -5A models) dwell time = 30 min. transfer time ≤10 sec. no. of cycles = 1000 unpowered initial (0 cycles) and final 1000 cycles). Readings at LT/RT/HT	L=±20% of initial, DCR =±20% of initial	77	-55 deg. C	Maximum	20.115	20.924	12.917	115.420	113.290	1.145
							Mimimum	17.231	18.615	3.417	109.210	106.050	-5.304
							Mean	18.763	19.852	5.840	112.048	110.452	-1.422
							Std Dev	0.682	0.576	1.320	0.740	0.964	0.922
						+25 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	20.175	21.047	8.881	163.890	161.980	0.376
							Mimimum	17.137	18.659	4.209	159.740	143.490	-11.278
							Mean	18.732	19.911	6.325	161.684	159.799	-1.165
							Std Dev	0.689	0.587	1.076	0.739	2.040	1.279
						+155 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	20.310	21.256	13.137	245.800	245.600	1.460
							Mimimum	17.413	19.006	4.051	238.000	237.800	-0.613
							Mean	18.865	20.142	6.803	243.264	242.881	-0.156
							Std Dev	0.669	0.573	1.625	1.802	1.416	0.394

								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
7	Biased Humidity	IEC-60068 Part 2-67	emperature = 85°C ±20°C Humidity = 85% ±5% RH Duration = 1000 hours Power = No Power Initial (0hr.) and final (1000hr.) readings at LT/RT/HT	L=±20% of initial, DCR =±20% of initial	77	-55 deg. C	Maximum	20.3956	21.0547	13.611	113.5000	115.4900	5.939
							Mimimum	17.3495	15.3802	-13.315	107.2500	100.3400	-9.013
							Mean	18.7120	17.7191	-5.392	111.0558	112.0204	0.872
							Std Dev	0.6751	1.2304	3.935	1.0395	1.8053	1.605
						+25 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	20.3200	20.5228	0.998	161.8400	164.4000	9.592
							Mimimum	17.2885	15.4260	-11.693	147.6300	157.2300	-1.750
							Mean	18.6699	17.7655	-4.925	159.9945	161.0064	0.643
							Std Dev	0.6738	1.1383	3.169	1.6706	1.2156	1.286
						+155 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	20.4315	20.5810	0.732	245.7000	245.6000	0.334
							Mimimum	17.6610	15.6236	-13.501	237.6000	238.3000	-1.157
							Mean	18.9154	17.8709	-5.601	243.0143	242.8286	-0.075
							Std Dev	0.6333	1.1324	3.297	1.6948	1.4920	0.319

IHLP2525CZER220M5A

								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
8	Operational Life	MIL-STD-202, Method 108A	Temperature = 85°C for -1A/A1 models. Temperature =115° C for -5A models. Duration = 2000hrs. Pow er = As noted on the test request. Readings a 0, 250, 500, 1000 and 2000 hour intervals. Initial (0 hr.) and final (2000 hr.) readings at LT/RT/HT	L=±20% of initial, DCR =±20% of initial	77	-55 deg. C	Maximum	21.237	21.647	6.418	115.310	113.940	0.063
							Mimimum	17.983	19.067	0.183	110.220	105.190	-5.634
							Mean	19.749	20.570	4.178	112.026	111.292	-0.653
							Std Dev	0.535	0.464	1.031	0.975	1.098	0.755
						+25 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	21.294	21.880	7.091	162.840	162.470	0.702
							Mimimum	18.077	19.204	0.379	159.250	156.210	-3.077
							Mean	19.772	20.759	5.008	161.170	160.870	-0.186
							Std Dev	0.535	0.472	1.080	0.830	1.120	0.454
						+155 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	21.375	22.127	8.755	245.600	244.600	1.302
							Mimimum	18.177	19.317	-3.844	236.000	236.500	-0.574
							Mean	19.870	20.929	5.347	242.691	242.200	-0.201
							Std Dev	0.518	0.498	1.668	1.930	1.611	0.270

9	External Visual	MIL-STD-883G Method 2009.9	Inspect construction and workmanship.	Pass all criteria as defined in DPS-11,865 VA1	All	na	Pass
10	Physical Dimensions	JESD22 Method JB-100	Verify physical dimensions per part specification	All parts within dimensional tolerance per data sheet	30	na	Pass
12	Resistance to Solvents	MIL-STD-202G Method 215K	Add Aqueous wash chemical. OKEM Clean or equivalent. Do not use banned solvents.	Pass all criteria as defined in DPS-11,865 VA1 L=±20% of initial, DCR =±20% of initial	5	na	Pass

IHLP2525CZER220M5A

								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
13	Mechanical Shock	IEC-60068 part 2.27 test group Ea with precondition per 0 above	Pulse Shape-Half Sine Normal Pulse Length 6ms Peak acceleration-100g No. shocks-6 each in both directions of each axis (total of 36) Initial and final readings at LT/RT/HT	L=±20% of initial, DCR =±20% of initial	30	-55 deg. C	Maximum	19.504	19.820	2.663	111.770	113.420	1.729
							Mimimum	17.777	16.342	-8.660	109.600	108.120	-3.002
							Mean	18.545	18.875	1.767	110.809	110.463	-0.312
							Std Dev	0.446	0.639	1.986	0.586	1.505	1.235
						+25 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	21.279	20.622	14.259	162.170	162.270	2.646
							Mimimum	17.722	16.905	-10.690	156.070	157.630	-1.739
							Mean	18.587	18.957	2.057	160.020	160.334	0.202
							Std Dev	0.689	0.658	3.661	1.367	0.951	0.858
						+155 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	19.753	19.761	7.499	245.500	245.600	0.041
							Mimimum	17.429	16.850	-7.085	242.900	240.700	-1.835
							Mean	18.719	18.808	0.487	244.443	243.930	-0.210
							Std Dev	0.527	0.575	2.034	0.692	1.125	0.411
								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
14	Vibration	IEC-60068 PART 2-6 TEST GROUP Fc. With precondition per 0 above	Pulse Shape-sine wave range of frequency 1 10-55Hz. Amplitude ±0.75mm Range of frequency 2 55-2000Hz Amplitude; 10G Frequency Sweep: 1 oct./min. Duration: 24 h each of 3 axis. Initial and final readings at LT/RT/HT	L=±20% of initial, DCR =±20% of initial	30	-55 deg. C	Maximum	20.703	20.944	3.065	113.140	111.930	0.370
							Mimimum	17.538	17.927	0.998	110.380	107.720	-2.867
							Mean	19.187	19.505	1.682	111.199	110.734	-0.417
							Std Dev	0.993	0.906	0.646	0.562	0.887	0.719
						+25 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	20.720	21.018	3.472	161.210	160.830	2.732
							Mimimum	17.477	17.915	1.369	154.850	157.180	-2.001
							Mean	19.151	19.545	2.083	159.654	159.422	-0.142
							Std Dev	0.990	0.906	0.651	1.146	0.841	0.671
						+155 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	20.816	20.860	0.342	245.700	245.700	0.083
							Mimimum	17.759	17.793	0.123	239.400	239.400	-0.042
							Mean	19.353	19.397	0.231	242.643	242.647	0.001
							Std Dev	0.905	0.899	0.063	1.789	1.788	0.032

IHLP2525CZER220M5A

								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
	Bump	IEC-60068 part 2-29 test group Eb with precondition per 0 above.	Pulse shape: half sine Nominal pulse length: 6 ms Peak Acceleration: 40g No. of shocks: 4000 each mechanical axis.Initial and final readings at LT/RT/HT	L=±20% of initial, DCR =±20% of initial	30	-55 deg. C	Maximum	20.332	20.440	2.636	113.310	112.050	-0.645
							Mimimum	17.156	17.547	-0.051	110.140	104.640	-5.303
							Mean	18.657	18.977	1.734	111.691	109.470	-1.988
							Std Dev	0.844	0.775	0.736	0.965	1.457	1.034
						+25 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	20.438	20.527	2.907	161.070	161.010	-0.037
							Mimimum	17.102	17.531	0.409	158.850	152.800	-4.999
							Mean	18.642	19.010	1.998	160.043	157.941	-1.314
							Std Dev	0.880	0.788	0.762	0.666	1.703	0.961
						+155 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	20.511	20.527	0.316	244.500	244.400	0.000
							Mimimum	17.411	17.457	0.079	238.600	238.200	-0.168
							Mean	18.871	18.913	0.222	241.763	241.587	-0.073
							Std Dev	0.832	0.824	0.066	1.557	1.642	0.049
								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
15	Resistance to Solder Heat	MIL-STD-202G Method 210F Condition K	IR/convection reflow. 250 ± 5°C for 30 ± 5sec. Ramp rate 1°C/s to 4°C/; Above 183°C for 90s-120s	L=±20% of initial, DCR =±20% of initial	30	+25 deg. C	Maximum	19.794	20.440	5.297	164.510	163.570	-0.062
							Mimimum	18.016	18.872	1.714	162.320	161.600	-0.731
							Mean	19.095	19.834	3.884	163.384	162.602	-0.478
							Std Dev	0.459	0.385	0.769	0.611	0.515	0.133
								Inductance (µH)			DC Resistance (mΩ)		
								Initial	25KV	%Δ	Initial	25KV	%Δ
17	ESD	AEC-Q200-002	Determine the Classification of the part.	L=±20% of initial, DCR =±20% of initial	15	+25 deg. C	Maximum	20.757	20.531	0.624	164.930	164.760	-0.103
							Mimimum	19.304	19.263	-1.088	162.180	161.140	-0.827
							Mean	20.004	19.948	-0.278	163.563	162.996	-0.347
							Std Dev	0.439	0.423	0.421	0.657	0.911	0.207
18	Solderability	J-STD-002C Method B1	4 hours @ 155°C dry heat @ 255°C. 90° dipping angle.	95% or greater coverage on "A" (seating plane) per J-STD-002C	15	NA	Pass						

IHLP2525CZER220M5A

								Inductance (µH)			DC Resistance (mΩ)		
19	Electrical Characterization	User Specification	Min, Max, Mean, and Standard Deviation @ Min (-55C), Room, and Max (+125C) operating temperatures. After mounted, allow +/-5% shift DCR at room temp. -55C/+125C DCR Max calculated using temp conversion for copper: $R_2 = [(T_2 + 234.5) / (234.5 + T_A)] * 1.05R_A$ (A = Ambient, 2 = new con)	Final Test: L=±20% of initial, DCR per calculated limits described in test conditions. L test for -55C & +125C = ±20% initial	30			Initial	[redacted]		Initial	[redacted]	
					-55 deg. C	Maximum	21.237			115.310		
						Mimimum	17.983			110.220		
						Mean	19.749			112.026		
						Std Dev	0.535			0.975		
					+25 deg. C		Initial			Initial		
						Maximum	21.294			162.840		
						Mimimum	18.077			159.250		
						Mean	19.772			161.170		
						Std Dev	0.535			0.830		
					+155 deg. C		Initial			Initial		
						Maximum	21.375			245.600		
						Mimimum	18.177			236.000		
						Mean	19.870			242.691		
						Std Dev	0.518			1.930		
							Inductance (µH)			DC Resistance (mΩ)		
							Initial	Final	%Δ	Initial	Final	%Δ
21	Board Flex	AEC-Q200-005 Appendix 2	2mm minimum flex for 60 (+5) sec	Pass all criteria as defined in DPS-11,865 VA1 L=±20% of initial, DCR =±20% of initial	30	+25 deg. C	Maximum	20.879	21.062	0.874	167.160	165.940	0.766
							Mimimum	17.558	17.548	-0.057	163.710	163.670	-1.298
							Mean	19.289	19.414	0.644	164.759	165.011	0.154
							Std Dev	0.777	0.801	0.162	0.711	0.606	0.411
								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
22	Terminal Strength	AEC-Q200-006 Appendix 1	Force of 1.8kg (17.7 N) for 60 seconds	Pass all criteria as defined in DPS-11,865 VA1 L=±20% of initial, DCR =±20% of initial	30	+25 deg. C	Maximum	21.662	21.695	0.370	165.880	166.400	1.042
							Mimimum	18.295	18.363	-0.024	162.540	162.400	-0.418
							Mean	19.662	19.694	0.160	164.355	164.674	0.194
							Std Dev	0.748	0.748	0.095	0.866	0.949	0.342

IHLP2525CZER1R0M5A

Test #	Description	Ref. Spec. Meth / Cond	Test Conditions	End Point Δ requirements	Sample Size	Meas Temp							
0	Preconditioning for lead-free products	AEC-Q200 Rev C - Pb Free Specific Tests Table 4.2	As specified in sections 4.3.1 thru 4.3.3 except Visual per DPS-11,865 10X magnification										
1	Pre- and Post-Stress Electrical Test	IHLP Data Sheet	L (uH) – 100KHz and 250mV DCR – 25°C Ambient	L=±15% of initial, DCR =±15% of initial	All tests requiring electrical data								
3	High Temp Exposure	IEC-60068 Part 2-2 test group BA	+125°C for 2000 hours, unpowered readings at 0, 250, 500, 1000 and 2000 hour intervals. Initial (0 hr.) and final (2000 hr.) readings at LT/RT/HT LT=Low Temperature=-55°C, RT=Room Temperature=+25°C,HT=High Temperature=+125°C for –A1/1A models. HT=High Temperature =+155° C for -5A models.	L=±20% of initial, DCR =±20% of initial	77			Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
						-55 deg. C	Maximum	0.994266	1.0914	17.943	5.091	5.105	1.31
							Mimimum	0.833022	0.9561	50607	4.858	4.728	-4.749
							Mean	0.896514	1.0132	13.0297	4.94743	4.826	-2.452
							Std Dev	0.027897	0.027	1.3977	0.04228	0.071	1.109
						+25 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	1.00931	1.1036	18.582	7.392	7.377	0.461
							Mimimum	0.836269	0.996	7.299	7.065	9.885	-3.273
							Mean	0.900372	1.0224	13.571	7.16178	7.12	-0.585
							Std Dev	0.028156	0.0283	1.346	0.06075	0.0762	0.519
						+155 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.994142	1.1289	20.248	11	10.542	-3.552
							Mimimum	0.848901	0.0971	7.432	10.379	9.298	-13.07
							Mean	0.909642	1.0446	14.856	10.6071	10.003	-5.695
							Std Dev	0.026788	0.03021	1.7062	0.11529	0.199	1.601

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								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
	Low Temperature Storage	EC-60068 Part 2-1 test group Aa	-55°C for 2000 hours unpowered readings at 0, 250, 500, 1000 and 2000 hour intervals. Initial (0 hr.) and final (2000 hr.) readings at LT/RT/H	L=±20% of initial, DCR =±20% of initial	77	-55 deg. C	Maximum	0.9511	0.9603	2.011	5.5180	4.985	-0.781
							Mimimum	0.8481	0.8521	0.272	4.9060	4.708	-14.679
							Mean	0.9036	0.9128	1.0179	4.9955	4.853	-2.841
							Std Dev	0.0208	0.021	0.3618	0.0742	0.0609	1.783
						+25 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.9525	0.9360	2.562	7.3070	7.0710	-1.422
							Mimimum	0.8505	0.8559	0.252	7.0610	6.6480	-7.293
							Mean	0.9051	0.9160	1.210	7.1532	6.8600	-4.094
							Std Dev	0.0206	0.2121	0.432	0.0487	0.0954	1.302
						+155 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.9557	0.9608	0.925	10.8310	10.619	-0.618
							Mimimum	0.8577	0.8592	-0.134	10.3860	9.799	-7.332
							Mean	0.9101	0.9136	0.377	10.5714	10.139	-4.09
							Std Dev	0.0198	0.0202	0.228	0.0836	0.1457	1.241

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								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
4	Temperature Cycling	IEC-60068, Part 2.14 test group Na	-55°C to +125°C (+155° C for -5A models) dwell time = 30 min. transfer time ≤10 sec. no. of cycles = 1000 unpowered initial (0 cycles) and final 1000 cycles). Readings at LT/RT/HT	L=±20% of initial, DCR =±20% of initial	77	-55 deg. C	Maximum	0.9428	1.0216	14.116	5.1450	5.0850	0.242
							Mimimum	0.8057	0.9065	6.092	4.9110	4.8390	-3.385
							Mean	0.8899	0.9676	8.764	5.0067	4.9635	-0.858
							Std Dev	0.0279	0.0244	1.293	0.0536	0.0434	0.725
						+25 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.9436	1.0280	15.053	7.3570	7.4410	2.193
							Mimimum	0.8059	0.9148	6.523	7.0600	7.1200	0.289
							Mean	0.8921	0.9742	9.235	7.1652	7.2396	1.038
							Std Dev	0.0276	0.0239	1.365	0.0561	0.0593	0.408
						+155 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.9521	1.0444	14.712	10.8970	10.8530	2.485
							Mimimum	0.8222	0.9304	7.306	10.3800	10.3850	-1.638
							Mean	0.9015	0.9898	9.822	10.6105	10.6347	0.232
							Std Dev	0.0257	0.0238	1.232	0.0984	0.0997	0.947

								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
7	Biased Humidity	IEC-60068 Part 2-67	emperature = 85°C ±20°C Humidity = 85% ±5% RH Duration = 1000 hours Power = No Power Initial (0hr.) and final (1000hr.) readings at LT/RT/HT	L=±20% of initial, DCR =±20% of initial	77	-55 deg. C	Maximum	0.9678	0.9206	0.602	5.2440	5.1710	0.081
							Mimimum	0.7598	0.7196	-10.205	4.9230	4.7780	-3.103
							Mean	0.8649	0.8262	-4.506	5.0143	4.9588	-1.106
							Std Dev	0.0363	0.0472	2.659	0.0595	0.0589	0.514
						+25 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.9969	0.9226	0.531	7.3290	7.3560	1.391
							Mimimum	0.7605	0.7244	-12.187	7.0300	6.8570	-3.281
							Mean	0.8686	0.8290	-4.577	7.1454	7.1320	-0.187
							Std Dev	0.0375	0.0469	2.704	0.0627	0.0733	0.679
						+155 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.9557	0.9220	0.214	10.8750	10.8880	1.294
							Mimimum	0.7649	0.7277	-10.632	10.3540	10.0790	-2.656
							Mean	0.8736	0.8327	-4.707	10.6081	10.6165	0.079
							Std Dev	0.0357	0.0449	2.461	0.0975	0.1178	0.616

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								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
8	Operational Life	MIL-STD-202, Method 108A	Temperature = 85°C for -1A/A1 models. Temperature =115° C for -5A models. Duration = 2000hrs. Pow er = As noted on the test request. Readings a 0, 250, 500, 1000 and 2000 hour intervals. Initial (0 hr.) and final (2000 hr.) readings at LT/RT/HT	L=±20% of initial, DCR =±20% of initial	77	-55 deg. C	Maximum	0.9539	1.1192	18.095	7.4280	5.201	9.027
							Mimimum	0.8232	0.09202	10.252	7.0770	4.875	-2.348
							Mean	0.8876	1.00908	13.679	7.2381	4.995	-0.4939
							Std Dev	0.0269	0.03523	1.8581	0.0833	0.063	1.248
						+25 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.9538	1.1311	19.254	7.4280	7.4240	1.104
							Mimimum	0.8260	0.9344	10.877	7.0770	7.0310	-2.766
							Mean	0.8898	1.0205	14.682	7.2381	7.1920	-0.635
							Std Dev	0.0265	0.0355	1.961	0.0833	0.0812	0.639
						+155 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.9506	1.1535	21.801	11.0880	10.9870	7.3920
							Mimimum	0.8288	0.095	12.189	10.1320	10.3970	-2.6380
							Mean	0.8911	1.039	16.603	10.7549	10.6690	0.7916
							Std Dev	0.0253	0.0361	2.23	0.1534	0.1326	1.0658

9	External Visual	MIL-STD-883G Method 2009.9	Inspect construction and workmanship.	Pass all criteria as defined in DPS-11,865 VA1	All	na	Pass
10	Physical Dimensions	JESD22 Method JB-100	Verify physical dimensions per part specification	All parts within dimensional tolerance per data sheet	30	na	Pass
12	Resistance to Solvents	MIL-STD-202G Method 215K	Add Aqueous wash chemical. OKEM Clean or equivalent. Do not use banned solvents.	Pass all criteria as defined in DPS-11,865 VA1 L=±20% of initial, DCR =±20% of initial	5	na	Pass

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								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
13	Mechanical Shock	IEC-60068 part 2.27 test group Ea with precondition per 0 above	Pulse Shape-Half Sine Normal Pulse Length 6ms Peak acceleration-100g No. shocks-6 each in both directions of each axis (total of 36) Initial and final readings at LT/RT/HT	L=±20% of initial, DCR =±20% of initial	30	-55 deg. C	Maximum	0.9270	0.9412	1.931	5.1830	5.1240	0.603
							Mimimum	0.8390	0.8521	0.648	4.9280	4.8450	-4.888
							Mean	0.8918	0.9033	1.302	5.0276	4.9951	-0.638
							Std Dev	0.0222	0.0216	0.317	0.0629	0.0656	1.291
						+25 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.9350	0.9444	1.927	7.4630	7.3690	0.310
							Mimimum	0.8365	0.8526	0.366	7.0910	7.0510	-1.883
							Mean	0.8967	0.9059	1.027	7.2365	7.1543	-1.133
							Std Dev	0.0234	0.0221	0.367	0.0886	0.0744	0.584
						+155 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.9389	0.9451	1.236	10.9840	10.9250	0.208
							Mimimum	0.8416	0.8484	0.092	10.5370	10.4220	-1.771
							Mean	0.8989	0.9040	0.571	10.6793	10.6296	-0.464
							Std Dev	0.0229	0.0224	0.218	0.1101	0.1084	0.395
								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
14	Vibration	IEC-60068 PART 2-6 TEST GROUP Fc. With precondition per 0 above	Pulse Shape-sine wave range of frequency 1 10-55Hz. Amplitude ±0.75mm Range of frequency 2 55-2000Hz Amplitude; 10G Frequency Sweep: 1 oct./min. Duration: 24 h each of 3 axis. Initial and final readings at LT/RT/HT	L=±20% of initial, DCR =±20% of initial	30	-55 deg. C	Maximum	0.9304	0.9298	0.578	5.0400	5.0480	1.739
							Mimimum	0.8345	0.8333	-0.749	4.9180	4.9360	-0.421
							Mean	0.8957	0.8958	0.018	4.9735	4.9905	0.343
							Std Dev	0.0214	0.0208	0.293	0.0321	0.0324	0.412
						+25 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.9315	0.9359	0.893	7.2910	7.2660	0.167
							Mimimum	0.8342	0.8393	-0.172	7.1190	7.0700	-1.465
							Mean	0.8964	0.9010	0.505	7.2100	7.1548	-0.765
							Std Dev	0.0219	0.0215	0.230	0.0485	0.0470	0.422
						+155 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.9385	0.9299	-0.318	10.8890	10.7340	0.009
							Mimimum	0.8421	0.8335	-1.039	10.5950	10.3510	-2.478
							Mean	0.9023	0.8957	-0.733	10.7126	10.5967	-1.083
							Std Dev	0.0226	0.0220	0.214	0.0637	0.0784	0.374

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								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
	Bump	IEC-60068 part 2-29 test group Eb with precondition per 0 above.	Pulse shape: half sine Nominal pulse length: 6 ms Peak Acceleration: 40g No. of shocks: 4000 each mechanical axis.Initial and final readings at LT/RT/HT	L=±20% of initial, DCR =±20% of initial	30	-55 deg. C	Maximum	0.9389	0.9372	0.977	5.1520	5.0510	-0.321
							Mimimum	0.7927	0.7972	-0.183	4.9300	4.5570	-9.959
							Mean	0.8616	0.8651	0.406	5.0210	4.9515	-1.378
							Std Dev	0.0284	0.0270	0.291	0.0585	0.0889	1.781
						+25 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.9413	0.9432	1.354	7.3450	7.3220	0.071
							Mimimum	0.7976	0.8015	-0.101	7.0570	7.0410	-1.042
							Mean	0.8639	0.8697	0.670	7.1531	7.1264	-0.373
							Std Dev	0.0279	0.0272	0.327	0.0614	0.0610	0.199
						+155 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.9477	0.9406	0.022	10.6860	10.6910	0.212
							Mimimum	0.8084	0.8054	-0.752	10.2940	10.3000	-2.196
							Mean	0.8736	0.8694	-0.470	10.5353	10.4826	-0.499
							Std Dev	0.0268	0.0261	0.145	0.0928	0.0867	0.483
								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
15	Resistance to Solder Heat	MIL-STD-202G Method 210F Condition K	IR/convection reflow. 250 ± 5°C for 30 ± 5sec. Ramp rate 1°C/s to 4°C/; Above 183°C for 90s-120s	L=±20% of initial, DCR =±20% of initial	30	+25 deg. C	Maximum	0.9706	0.9992	5.143	7.3710	7.3460	-0.097
							Mimimum	0.8041	0.8425	1.958	7.1460	7.1250	-0.435
							Mean	0.8688	0.9020	3.835	7.2537	7.2344	-0.266
							Std Dev	0.0333	0.0295	0.783	0.0474	0.0459	0.076
								Inductance (µH)			DC Resistance (mΩ)		
								Initial	25KV	%Δ	Initial	25KV	%Δ
17	ESD	AEC-Q200-002	Determine the Classification of the part.	L=±20% of initial, DCR =±20% of initial	15	+25 deg. C	Maximum	0.9048	0.0964	0.730	7.386	7.399	0.455
							Mimimum	0.7704	0.7714	-0.299	7.177	7.183	-0.014
							Mean	0.8131	0.8156	0.300	7.263	7.271	0.105
							Std Dev	0.0337	0.0338	0.300	0.0562	0.058	0.114
18	Solderability	J-STD-002C Method B1	4 hours @ 155°C dry heat @ 255°C. 90° dipping angle.	95% or greater coverage on "A" (seating plane) per J-STD-002C	15	NA	Pass						

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								Inductance (µH)			DC Resistance (mΩ)		
19	Electrical Characterization	User Specification	Min, Max, Mean, and Standard Deviation @ Min (-55C), Room, and Max (+125C) operating temperatures. After mounted, allow +/-5% shift DCR at room temp. -55C/+125C DCR Max calculated using temp conversion for copper: $R_2 = [(T_2 + 234.5) / (234.5 + T_A)] * 1.05R_A$ (A = Ambient, 2 = new con)	Final Test: L=±20% of initial, DCR per calculated limits described in test conditions. L test for -55C & +125C = ±20% initial	30			Initial	[redacted]		Initial	[redacted]	
					-55 deg. C	Maximum	0.927033			5.1830		
						Mimimum	0.83899			4.9280		
						Mean	0.891753			5.0276		
						Std Dev	0.022178			0.0629		
					+25 deg. C		Initial			Initial		
						Maximum	0.93504			7.4630		
						Mimimum	0.836488			7.0910		
						Mean	0.896732			7.2365		
						Std Dev	0.023429			0.0886		
					+155 deg. C		Initial			Initial		
						Maximum	0.938899			10.9840		
						Mimimum	0.841644			10.5370		
						Mean	0.898866			10.6793		
						Std Dev	0.02286			0.1101		

							Inductance (µH)			DC Resistance (mΩ)		
21	Board Flex	AEC-Q200-005 Appendix 2	2mm minimum flex for 60 (+5) sec	Pass all criteria as defined in DPS-11,865 VA1 L=±20% of initial, DCR =±20% of initial	30		Initial	Final	%Δ	Initial	Final	%Δ
						Maximum	0.9372	0.9391	1.558	7.307	7.378	1.712
					+25 deg. C	Mimimum	0.7496	0.7597	-1.254	7.069	7.142	-0.179
						Mean	0.8005	0.805	0.5687	7.159	7.235	1.06
						Std Dev	0.0393	0.0391	0.5824	0.053	0.043	0.389

							Inductance (µH)			DC Resistance (mΩ)		
22	Terminal Strength	AEC-Q200-006 Appendix 1	Force of 1.8kg (17.7 N) for 60 seconds	Pass all criteria as defined in DPS-11,865 VA1 L=±20% of initial, DCR =±20% of initial	30		Initial	Final	%Δ	Initial	Final	%Δ
						Maximum	0.9035	0.9029	0.028	7.372	7.39	0.417
					+25 deg. C	Mimimum	0.7534	0.7521	-0.293	7.133	7.155	-0.535
						Mean	0.8382	0.837	-0.139	7.226	7.241	0.216
						Std Dev	0.0415	0.042	0.096	0.056	0.055	0.175

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Test #	Description	Ref. Spec. Meth / Cond	Test Conditions	End Point Δ requirements	Sample Size	Meas Temp							
0	Preconditioning for lead-free products	AEC-Q200 Rev C - Pb Free Specific Tests Table 4.2	As specified in sections 4.3.1 thru 4.3.3 except Visual per DPS-11,865 10X magnification										
1	Pre- and Post-Stress Electrical Test	IHLP Data Sheet	L (uH) – 100KHz and 250mV DCR – 25°C Ambient	L=±15% of initial, DCR =±15% of initial	All tests requiring electrical data								
3	High Temp Exposure	IEC-60068 Part 2-2 test group BA	155C for 2000 hours, unpowered readings at 0, 250, 500, 1000 and 2000 hour intervals. Initial (0 hr.) and final (2000 hr.) readings at LT/RT/HT LT=Low Temperature=-55°C, RT=Room Temperature=+25°C,HT=High Temperature=+125°C for –A1/1A models. HT=High Temperature =+155° C for -5A models.	L=±20% of initial, DCR =±20% of initial	77			Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
						-55 deg. C	Maximum	0.471	0.527	14.588	2.446	2.427	1.696
							Mimimum	0.406	0.454	7.508	2.280	2.315	-1.444
							Mean	0.441	0.492	11.563	2.363	2.365	0.094
							Std Dev	0.014	0.016	1.724	0.032	0.029	0.779
						+25 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.472	0.523	14.646	3.485	3.506	5.481
							Mimimum	0.407	0.452	6.279	3.233	3.343	-0.737
							Mean	0.442	0.495	11.853	3.380	3.413	1.001
							Std Dev	0.014	0.016	1.784	0.050	0.035	1.291
						+155 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.489	0.542	14.872	5.149	5.220	4.773
							Mimimum	0.414	0.472	5.570	4.852	4.954	-0.736
							Mean	0.454	0.509	11.972	5.011	5.080	1.387
							Std Dev	0.015	0.016	1.897	0.068	0.056	1.231

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								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
	Low Temperature Storage	EC-60068 Part 2-1 test group Aa	-55°C for 2000 hours unpowered readings at 0, 250, 500, 1000 and 2000 hour intervals. Initial (0 hr.) and final (2000 hr.) readings at LT/RT/H	L=±20% of initial, DCR =±20% of initial	77	-55 deg. C	Maximum	0.471	0.468	3.908	2.466	2.475	5.698
							Mimimum	0.352	0.347	-6.678	2.299	2.331	-2.125
							Mean	0.423	0.421	-0.586	2.360	2.383	0.982
							Std Dev	0.029	0.029	2.213	0.034	0.035	1.053
						+25 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.473	0.472	11.765	3.490	3.508	3.894
							Mimimum	0.353	0.352	-2.540	3.262	3.350	0.030
							Mean	0.424	0.425	0.270	3.383	3.412	0.875
							Std Dev	0.030	0.028	1.965	0.042	0.037	0.742
						+155 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.488	0.477	5.612	5.166	5.218	5.989
							Mimimum	0.371	0.365	-4.581	4.715	4.915	-1.578
							Mean	0.437	0.431	-1.490	4.952	5.044	1.865
							Std Dev	0.027	0.027	1.648	0.082	0.061	1.316

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								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
4	Temperature Cycling	IEC-60068, Part 2.14 test group Na	-55°C to +125°C (+155° C for -5A models) dwell time = 30 min. transfer time ≤10 sec. no. of cycles = 1000 unpowered initial (0 cycles) and final 1000 cycles). Readings at LT/RT/HT	L=±20% of initial, DCR =±20% of initial	77	-55 deg. C	Maximum	0.470	0.531	14.739	2.438	2.732	12.059
							Mimimum	0.400	0.434	2.084	2.323	2.305	-1.797
							Mean	0.433	0.474	9.477	2.374	2.367	-0.302
							Std Dev	0.017	0.021	2.591	0.025	0.051	1.634
						+25 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.472	0.495	12.199	3.481	3.463	0.293
							Mimimum	0.401	0.436	2.896	3.317	3.286	-1.800
							Mean	0.435	0.464	6.768	3.403	3.378	-0.726
							Std Dev	0.017	0.017	2.075	0.031	0.034	0.380
						+155 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.474	0.539	14.952	5.163	5.160	4.706
							Mimimum	0.400	0.445	2.284	4.781	4.882	-1.385
							Mean	0.435	0.480	10.353	5.037	5.025	-0.233
							Std Dev	0.018	0.018	2.648	0.061	0.050	0.709

								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
7	Biased Humidity	IEC-60068 Part 2-67	emperature = 85°C ±20°C Humidity = 85% ±5% RH Duration = 1000 hours Power = No Power Initial (0hr.) and final (1000hr.) readings at LT/RT/HT	L=±20% of initial, DCR =±20% of initial	77	-55 deg. C	Maximum	0.444	0.487	12.151	2.517	2.483	11.379
							Mimimum	0.359	0.351	-3.789	2.153	2.342	-2.913
							Mean	0.405	0.424	4.490	2.410	2.404	-0.205
							Std Dev	0.017	0.028	4.112	0.047	0.032	1.572
						+25 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.463	0.493	12.416	3.529	3.547	5.778
							Mimimum	0.362	0.355	-3.997	3.340	3.367	-0.847
							Mean	0.415	0.427	3.060	3.427	3.453	0.765
							Std Dev	0.021	0.029	3.872	0.045	0.047	0.729
						+155 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.449	0.491	11.583	5.242	5.262	4.592
							Mimimum	0.369	0.362	-4.554	4.911	4.941	-0.576
							Mean	0.412	0.429	4.184	5.084	5.105	0.424
							Std Dev	0.016	0.028	3.945	0.076	0.076	0.672

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								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
8	Operational Life	MIL-STD-202, Method 108A	Temperature = 85°C for -1A/A1 models. Temperature =115° C for -5A models. Duration = 2000hrs. Pow er = As noted on the test request. Readings a 0, 250, 500, 1000 and 2000 hour intervals. Initial (0 hr.) and final (2000 hr.) readings at LT/RT/HT	L=±20% of initial, DCR =±20% of initial	77	-55 deg. C	Maximum	0.464	0.516	13.868	3.873	3.593	4.324
							Mimimum	0.399	0.436	4.553	2.334	2.347	-14.097
							Mean	0.435	0.472	8.466	2.432	2.443	0.553
							Std Dev	0.015	0.018	1.784	0.177	0.140	2.131
						+25 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.471	0.519	14.223	3.942	3.873	3.866
							Mimimum	0.404	0.440	2.819	3.355	2.970	-12.493
							Mean	0.442	0.478	8.106	3.467	3.490	0.652
							Std Dev	0.016	0.018	2.008	0.083	0.099	1.880
						+155 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.475	0.533	12.405	5.798	5.569	3.688
							Mimimum	0.404	0.428	5.779	4.942	5.017	-8.244
							Mean	0.444	0.486	9.448	5.137	5.179	0.833
							Std Dev	0.015	0.020	1.543	0.116	0.097	1.402

9	External Visual	MIL-STD-883G Method 2009.9	Inspect construction and workmanship.	Pass all criteria as defined in DPS-11,865 VA1	All	na	Pass
10	Physical Dimensions	JESD22 Method JB-100	Verify physical dimensions per part specification	All parts within dimensional tolerance per data sheet	30	na	Pass
12	Resistance to Solvents	MIL-STD-202G Method 215K	Add Aqueous wash chemical. OKEM Clean or equivalent. Do not use banned solvents.	Pass all criteria as defined in DPS-11,865 VA1 L=±20% of initial, DCR =±20% of initial	5	na	Pass

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								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
13	Mechanical Shock	IEC-60068 part 2.27 test group Ea with precondition per 0 above	Pulse Shape-Half Sine Normal Pulse Length 6ms Peak acceleration-100g No. shocks-6 each in both directions of each axis (total of 36) Initial and final readings at LT/RT/HT	L=±20% of initial, DCR =±20% of initial	30	-55 deg. C	Maximum	0.442	0.446	2.308	2.561	2.421	7.213
							Mimimum	0.361	0.364	-2.647	2.232	2.318	-6.091
							Mean	0.405	0.407	0.399	2.358	2.368	0.470
							Std Dev	0.024	0.025	0.945	0.056	0.026	2.118
						+25 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.442	0.450	3.249	3.471	3.497	6.827
							Mimimum	0.364	0.368	-1.219	3.193	3.352	-2.155
							Mean	0.406	0.411	1.423	3.358	3.415	1.714
							Std Dev	0.024	0.025	0.988	0.069	0.038	1.862
						+155 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.447	0.447	1.308	5.176	5.221	3.608
							Mimimum	0.373	0.370	-1.409	4.860	4.999	-0.213
							Mean	0.412	0.411	-0.321	5.033	5.093	1.217
							Std Dev	0.024	0.024	0.547	0.084	0.056	1.107
								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
14	Vibration	IEC-60068 PART 2-6 TEST GROUP Fc. With precondition per 0 above	Pulse Shape-sine wave range of frequency 1 10-55Hz. Amplitude ±0.75mm Range of frequency 2 55-2000Hz Amplitude; 10G Frequency Sweep: 1 oct./min. Duration: 24 h each of 3 axis. Initial and final readings at LT/RT/HT	L=±20% of initial, DCR =±20% of initial	30	-55 deg. C	Maximum	0.448	0.464	4.542	2.424	2.435	2.949
							Mimimum	0.359	0.373	1.829	2.306	2.329	-0.256
							Mean	0.408	0.420	2.902	2.361	2.377	0.706
							Std Dev	0.022	0.024	0.970	0.031	0.029	0.717
						+25 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.450	0.468	8.403	3.487	3.524	3.476
							Mimimum	0.358	0.378	1.995	3.308	3.348	-1.577
							Mean	0.407	0.422	3.584	3.392	3.429	1.089
							Std Dev	0.023	0.024	1.421	0.049	0.044	0.835
						+155 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.452	0.467	4.028	5.162	5.233	4.357
							Mimimum	0.368	0.381	1.149	4.826	4.989	1.342
							Mean	0.413	0.422	2.164	4.999	5.119	2.418
							Std Dev	0.020	0.022	1.097	0.081	0.062	0.832

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								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
	Bump	IEC-60068 part 2-29 test group Eb with precondition per 0 above.	Pulse shape: half sine Nominal pulse length: 6 ms Peak Acceleration: 40g No. of shocks: 4000 each mechanical axis.Initial and final readings at LT/RT/HT	L=±20% of initial, DCR =±20% of initial	30	-55 deg. C	Maximum	0.456	0.454	14.267	2.470	2.553	7.224
							Mimimum	0.365	0.368	-8.202	2.305	2.326	-5.709
							Mean	0.400	0.404	0.887	2.351	2.378	1.151
							Std Dev	0.024	0.025	4.111	0.035	0.052	2.004
						+25 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.455	0.456	2.163	3.409	3.420	1.075
							Mimimum	0.366	0.369	0.153	3.333	3.344	-0.323
							Mean	0.400	0.404	0.984	3.370	3.382	0.356
							Std Dev	0.024	0.023	0.501	0.022	0.020	0.290
						+155 deg. C		Initial	Final	%Δ	Initial	Final	%Δ
							Maximum	0.461	0.457	0.042	5.029	5.072	2.698
							Mimimum	0.375	0.373	-1.499	4.844	4.938	-0.121
							Mean	0.409	0.407	-0.481	4.941	4.999	1.180
							Std Dev	0.023	0.023	0.332	0.043	0.036	0.792
								Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
15	Resistance to Solder Heat	MIL-STD-202G Method 210F Condition K	IR/convection reflow. 250 ± 5°C for 30 ± 5sec. Ramp rate 1°C/s to 4°C/; Above 183°C for 90s-120s	L=±20% of initial, DCR =±20% of initial	30	+25 deg. C	Maximum	0.441	0.456	6.297	3.434	3.448	0.760
							Mimimum	0.373	0.394	2.723	3.339	3.342	-0.117
							Mean	0.401	0.419	4.415	3.393	3.404	0.337
							Std Dev	0.020	0.019	0.913	0.025	0.029	0.248
								Inductance (µH)			DC Resistance (mΩ)		
								Initial	25KV	%Δ	Initial	25KV	%Δ
17	ESD	AEC-Q200-002	Determine the Classification of the part.	L=±20% of initial, DCR =±20% of initial	15	+25 deg. C	Maximum	0.444	0.450	1.481	3.553	3.560	0.259
							Mimimum	0.371	0.376	0.915	3.425	3.422	-0.348
							Mean	0.411	0.416	1.213	3.481	3.481	-0.006
							Std Dev	0.022	0.022	0.179	0.035	0.036	0.181
18	Solderability	J-STD-002C Method B1	4 hours @ 155°C dry heat @ 255°C. 90° dipping angle.	95% or greater coverage on "A" (seating plane) per J-STD-002C	15	NA	Pass						

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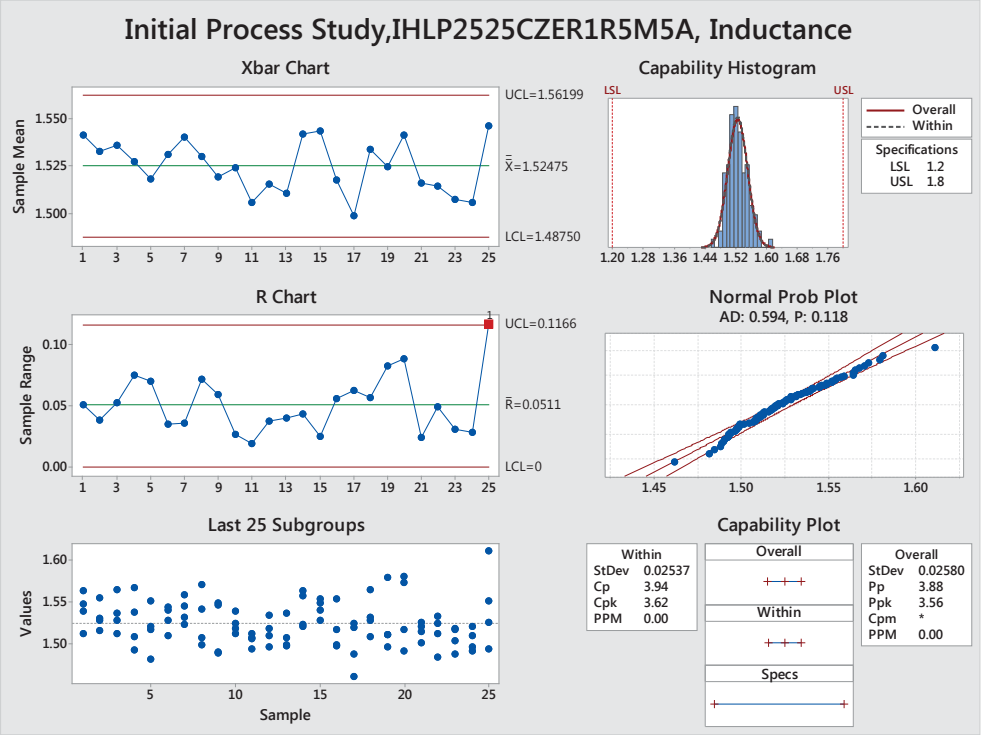
								Inductance (µH)			DC Resistance (mΩ)		
19	Electrical Characterization	User Specification	Min, Max, Mean, and Standard Deviation @ Min (-55C), Room, and Max (+125C) operating temperatures. After mounted, allow +/-5% shift DCR at room temp. -55C/+125C DCR Max calculated using temp conversion for copper: $R_2 = [(T_2 + 234.5) / (234.5 + T_A)] * 1.05R_A$ (A = Ambient, 2 = new con)	Final Test: L=±20% of initial, DCR per calculated limits described in test conditions. L test for -55C & +125C = ±20% initial	30			Initial			Initial		
						-55 deg. C	Maximum	0.470			2.438		
							Mimimum	0.400			2.323		
							Mean	0.433			2.374		
							Std Dev	0.017			0.025		
						+25 deg. C		Initial			Initial		
							Maximum	0.472			3.481		
							Mimimum	0.401			3.317		
							Mean	0.435			3.403		
							Std Dev	0.017			0.031		
						+155 deg. C		Initial			Initial		
							Maximum	0.474			5.163		
							Mimimum	0.400			4.781		
							Mean	0.435			5.037		
							Std Dev	0.018			0.061		
21	Board Flex	AEC-Q200-005 Appendix 2	2mm minimum flex for 60 (+5) sec	Pass all criteria as defined in DPS-11,865 VA1 L=±20% of initial, DCR =±20% of initial	30			Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
						+25 deg. C	Maximum	0.451	0.447	1.058	3.537	3.535	0.522
							Mimimum	0.356	0.357	-1.435	3.394	3.409	-0.399
							Mean	0.407	0.406	-0.227	3.461	3.463	0.082
							Std Dev	0.022	0.021	0.511	0.039	0.034	0.229
22	Terminal Strength	AEC-Q200-006 Appendix 1	Force of 1.8kg (17.7 N) for 60 seconds	Pass all criteria as defined in DPS-11,865 VA1 L=±20% of initial, DCR =±20% of initial	30			Inductance (µH)			DC Resistance (mΩ)		
								Initial	Final	%Δ	Initial	Final	%Δ
						+25 deg. C	Maximum	0.465	0.469	1.484	3.519	3.530	0.672
							Mimimum	0.378	0.376	-0.861	3.375	3.381	0.029
							Mean	0.413	0.416	0.638	3.455	3.464	0.279
							Std Dev	0.023	0.024	0.631	0.037	0.037	0.180

Production Part Approval Process

The following PPAP documentation is assembled according to AIAG, 4th Edition PPAP Manual and applicable customer requirements

Initial Process Study
IHLP2525CZER1R5M5A, Inductance

Inductance (uH)							
1	1.513	26	1.524	51	1.499	76	1.580
2	1.539	27	1.559	52	1.537	77	1.492
3	1.548	28	1.532	53	1.557	78	1.518
4	1.564	29	1.499	54	1.524	79	1.581
5	1.531	30	1.571	55	1.521	80	1.573
6	1.528	31	1.507	56	1.564	81	1.516
7	1.517	32	1.542	57	1.541	82	1.521
8	1.555	33	1.490	58	1.528	83	1.526
9	1.529	34	1.549	59	1.549	84	1.502
10	1.537	35	1.546	60	1.554	85	1.485
11	1.513	36	1.490	61	1.498	86	1.525
12	1.565	37	1.525	62	1.499	87	1.534
13	1.509	38	1.519	63	1.554	88	1.513
14	1.493	39	1.513	64	1.517	89	1.504
15	1.538	40	1.540	65	1.488	90	1.518
16	1.568	41	1.494	66	1.462	91	1.519
17	1.552	42	1.513	67	1.520	92	1.489
18	1.522	43	1.508	68	1.525	93	1.493
19	1.517	44	1.507	69	1.509	94	1.521
20	1.482	45	1.497	70	1.528	95	1.511
21	1.528	46	1.510	71	1.532	96	1.497
22	1.545	47	1.535	72	1.566	97	1.552
23	1.540	48	1.519	73	1.511	98	1.526
24	1.510	49	1.498	74	1.511	99	1.611
25	1.545	50	1.508	75	1.497	100	1.494

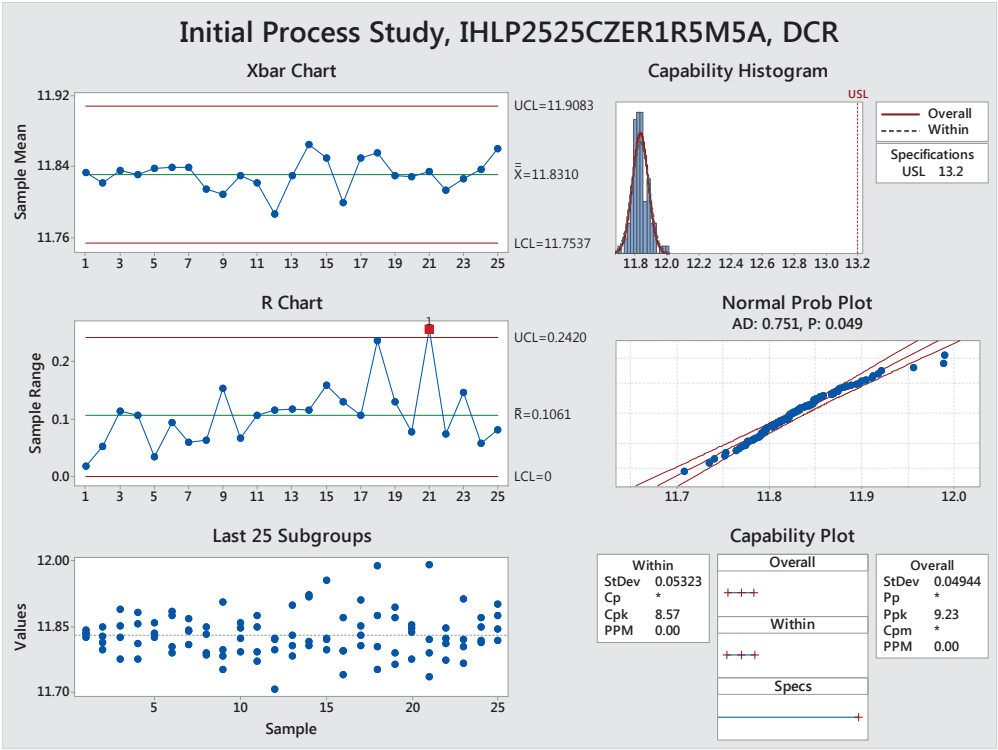


Production Part Approval Process

The following PPAP documentation is assembled according to AIAG, 4th Edition PPAP Manual and applicable customer requirements

Initial Process Study
IHLP2525CZER1R5M5A, DC Resistance

DCR (mOhm)							
1	11.834	26	11.867	51	11.831	76	11.87
2	11.825	27	11.84	52	11.898	77	11.847
3	11.833	28	11.808	53	11.815	78	11.777
4	11.843	29	11.833	54	11.918	79	11.838
5	11.828	30	11.789	55	11.807	80	11.854
6	11.813	31	11.848	56	11.921	81	11.99
7	11.796	32	11.786	57	11.821	82	11.791
8	11.848	33	11.752	58	11.822	83	11.821
9	11.851	34	11.783	59	11.956	84	11.735
10	11.889	35	11.905	60	11.798	85	11.811
11	11.826	36	11.797	61	11.794	86	11.774
12	11.776	37	11.847	62	11.794	87	11.847
13	11.775	38	11.858	63	11.87	88	11.822
14	11.811	39	11.792	64	11.74	89	11.804
15	11.881	40	11.823	65	11.851	90	11.912
16	11.855	41	11.848	66	11.911	91	11.82
17	11.859	42	11.876	67	11.83	92	11.767
18	11.833	43	11.771	68	11.806	93	11.87
19	11.826	44	11.792	69	11.753	94	11.818
20	11.834	45	11.82	70	11.989	95	11.813
21	11.791	46	11.797	71	11.804	96	11.848
22	11.874	47	11.708	72	11.875	97	11.9
23	11.884	48	11.823	73	11.79	98	11.845
24	11.805	49	11.806	74	11.764	99	11.819
25	11.843	50	11.782	75	11.894	100	11.874

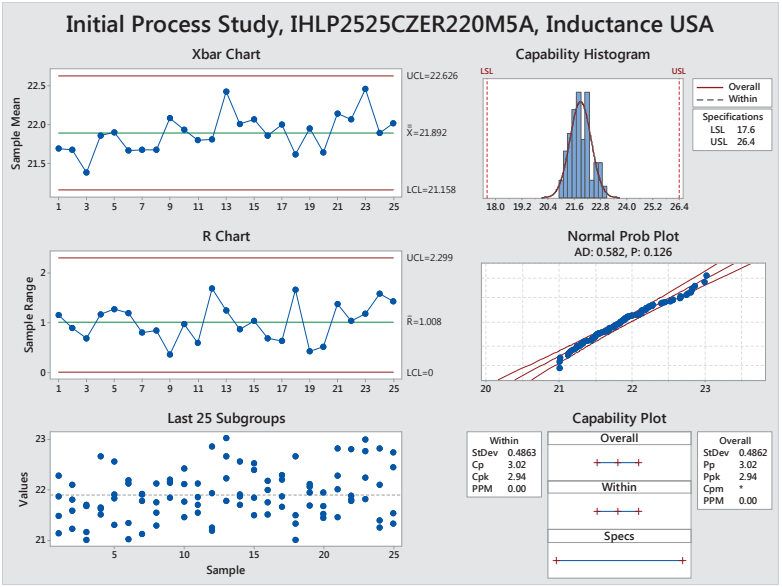


Production Part Approval Process

The following PPAP documentation is assembled according to AIAG, 4th Edition PPAP Manual and applicable customer requirements

Initial Process Study
IHLP2525CZER220M5A, Inductance measurement

Inductance (uH)							
1	22.278	26	21.772	51	22.235	76	21.942
2	21.873	27	21.901	52	22.661	77	21.675
3	21.133	28	21.124	53	21.702	78	21.438
4	21.486	29	21.546	54	21.902	79	21.514
5	22.104	30	22.131	55	21.872	80	21.947
6	21.216	31	21.744	56	22.564	81	22.280
7	21.802	32	21.289	57	22.529	82	21.456
8	21.580	33	22.135	58	22.397	83	22.006
9	21.157	34	21.838	59	21.838	84	22.826
10	21.678	35	22.199	60	21.491	85	21.772
11	21.694	36	22.160	61	21.752	86	21.883
12	21.007	37	21.766	62	22.183	87	21.805
13	22.669	38	21.448	63	21.504	88	22.809
14	21.505	39	22.116	64	21.997	89	22.236
15	21.617	40	22.417	65	22.199	90	21.820
16	21.648	41	21.546	66	21.866	91	23.001
17	21.830	42	22.131	67	22.289	92	22.764
18	21.301	43	21.848	68	21.656	93	22.819
19	21.903	44	21.693	69	22.664	94	21.246
20	22.563	45	21.250	70	21.008	95	22.105
21	22.194	46	22.865	71	21.325	96	21.385
22	21.012	47	21.932	72	21.488	97	21.526
23	21.341	48	21.180	73	22.063	98	22.453
24	22.122	49	21.781	74	21.685	99	21.323
25	21.917	50	23.024	75	22.109	100	22.748

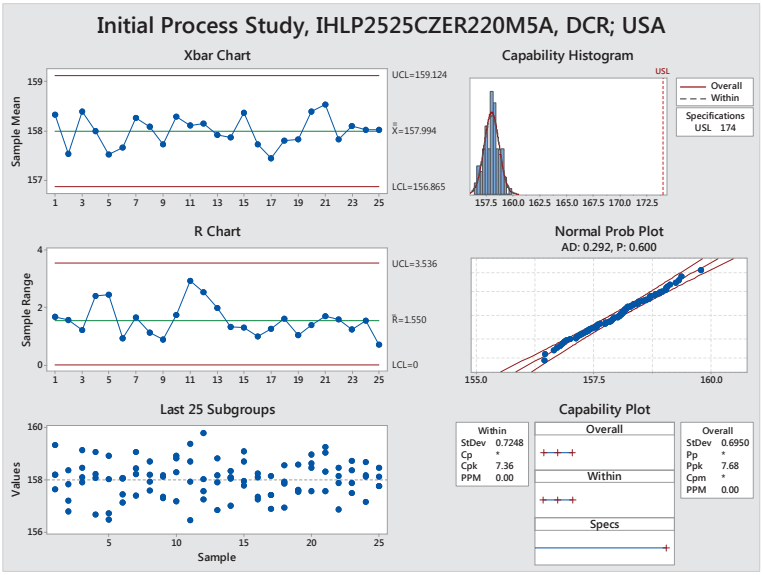


Production Part Approval Process

The following PPAP documentation is assembled according to AIAG, 4th Edition PPAP Manual and applicable customer requirements

Initial Process Study
IHLP2525CZER220M5A, DC Resistance

DC Resistance (mOhm)							
1	158.192	26	157.387	51	157.888	76	157.584
2	158.172	27	158.416	52	158.814	77	158.446
3	159.309	28	159.039	53	158.092	78	157.564
4	157.628	29	158.691	54	158.321	79	158.621
5	157.197	30	157.570	55	157.001	80	158.956
6	156.780	31	157.923	56	158.040	81	157.557
7	158.341	32	158.171	57	158.701	82	158.292
8	157.825	33	158.152	58	159.071	83	159.246
9	158.087	34	158.113	59	157.760	84	159.017
10	159.123	35	157.277	60	157.934	85	156.858
11	158.458	36	157.342	61	157.342	86	157.858
12	157.899	37	158.803	62	157.232	87	158.449
13	156.649	38	157.166	63	158.220	88	158.141
14	159.044	39	158.283	64	158.095	89	158.350
15	158.051	40	158.901	65	157.399	90	157.869
16	158.208	41	156.451	66	158.127	91	158.704
17	156.460	42	157.917	67	156.876	92	157.472
18	158.906	43	159.369	68	157.397	93	158.113
19	158.003	44	158.678	69	157.853	94	158.154
20	156.715	45	158.010	70	158.533	95	158.672
21	158.062	46	157.243	71	157.905	96	157.132
22	158.044	47	159.779	72	156.914	97	158.110
23	157.434	48	157.541	73	157.538	98	157.743
24	157.121	49	156.822	74	158.573	99	158.453
25	158.199	50	158.154	75	157.597	100	157.750



Production Part Approval Process

The following PPAP documentation is assembled according to AIAG, 4th Edition PPAP Manual and applicable customer requirements

Use the control buttons below to navigate through the PPAP sections.

Section 12: Qualified Laboratories

Vishay / Dale Electronics
1505 East Hway 50 Yankton, SD 57078, USA Phone (605) 665-9301 Fax (605) 668-4247
ONE OF THE WORLD'S LARGEST MANUFACTURERS OF DISCRETE SEMICONDUCTORS AND PASSIVE COMPONENTS

Production Part Approval Process

The following PPAP documentation is assembled according to AIAG, 4th Edition PPAP Manual and applicable customer requirements

Use the control buttons below to navigate through the PPAP sections.

Section 13: Appearance Approval Report

Inductors, like many other electronic components are specified for their electrical properties. There are no specific requirements stated for the physical appearance of inductors, e.g. color of inductors. Therefore, the Appearance Approval Report does not apply in this case.

Production Part Approval Process

The following PPAP documentation is assembled according to AIAG, 4th Edition PPAP Manual and applicable customer requirements

Use the control buttons below to navigate through the PPAP sections.

Section 14: Sample Product

Sample product from the Vishay Manufacturing Facility is available upon request

Production Part Approval Process

The following PPAP documentation is assembled according to AIAG, 4th Edition PPAP Manual and applicable customer requirements

Use the control buttons below to navigate through the PPAP sections.

Section 15: Master Sample

Master Sample(s) will be retained at the Vishay Manufacturing Facility with a copy of the PPAP

Production Part Approval Process

The following PPAP documentation is assembled according to AIAG, 4th Edition PPAP Manual and applicable customer requirements

Use the control buttons below to navigate through the PPAP sections.

Section 16: Checking Aids

Checking Aids are not required for this electronic component

Vishay / Dale Electronics
1505 East Hway 50 Yankton, SD 57078, USA Phone (605) 665-9301 Fax (605) 668-4247

Production Part Approval Process

The following PPAP documentation is assembled according to AIAG, 4th Edition PPAP Manual and applicable customer requirements

Use the control buttons below to navigate through the PPAP sections.

Section 19: Bulk Material Requirements

Bulk Material Requirements do not apply to this Electronic Component.

IHLP Standards of Manufacture

IHLP INTRODUCTION SURFACE IRREGULARITIES CRITERIA FOR REJECTION SUMMARY

INTRODUCTION

Scope

This document was written for the purpose of helping customers better understand the product they are purchasing. It will give the customer an idea as to the type of cosmetic irregularities that may occur from time to time during the manufacture of the component itself or during customer use of the component.

This document also discusses the criteria that have been developed for rejection of irregularities that are determined to be excessive.

While it would be desirable to have cosmetically perfect IHLP inductors, the powdered iron manufacturing technique has cosmetic limitations.

Certified test labs have performed extensive environmental testing on IHLP's with and without cosmetic imperfections according to AEC-Q200 standards for such tests as thermal shock, mechanical shock, vibration, humidity and others. This testing has shown that the cosmetic imperfections listed in this document do not affect the performance or reliability of the IHLP inductor. Test results are available upon request.

Product

The IHLP inductor is unique from most inductors. The inductor body is a soft magnetic composite (SMC), not a ferrite. It is made from an iron powder mixture and cemented together using a resin binder. This powder mixture, when pressed around the inductor coil, greatly enhances the electrical properties of the inductor and gives protection from environmental forces. After pressing, the component is cured in an oven to increase the bonding strength of the resin binders with the iron powder, yielding excellent electrical and physical properties.

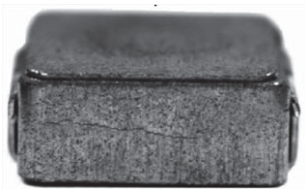
The IHLP inductor provides the best combination of:

- Inductance
- Low Core Loss
- Saturation
- Temperature Stability
- Smallest Footprint
- Lowest Profile

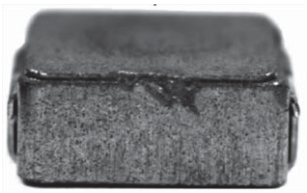
Surface irregularities

The following pages include descriptions of the most common irregularities seen on IHLP inductors. Common causes are described along with variations in their magnitude. Customers may at some time see one or all of these irregularities.

Those that are determined to adversely affect the customer's use of the component are rejected, but minor (acceptable) irregularities will occasionally be present. With the use of this guide, a customer will better understand the effect of each irregularity.



Cracks



Chips

Oxidation

APPLICATION NOTE

IHLP Standards of Manufacture

CRACKS

Cracks within the inductor body are unavoidable during the manufacturing process. Small cracks are caused by die wall friction when the parts are ejected during the pressing process and by expansion of the coil during the process of curing the resin binder in the powdered iron body. Unlike ferrite material, cracks on the IHLP body do not affect the electrical performance of the component.

Reliability testing has shown that even cracks in excess of 0.005" will not cause the component to fail electrically or physically in field application. Acceptance widths are adopted based on the ability to detect cracks both at the component and circuit level.

Terminal area crack, acceptable

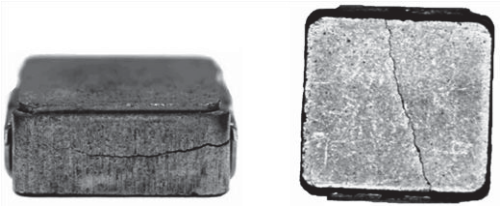
Cracks coming from the top corner of the terminal are a normal occurrence and are caused by terminal expansion during curing operations.

Negligible crack, acceptable

Negligible cracks are those that are nearly invisible without magnification.

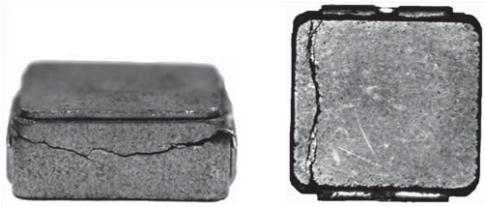
Minor crack, acceptable

Minor cracks are those that are visible without magnification but are not apparent without close inspection.



Moderate crack, rejectable

Moderate cracks are those that are obvious upon examination and continue across most of the component.



Major crack, rejectable

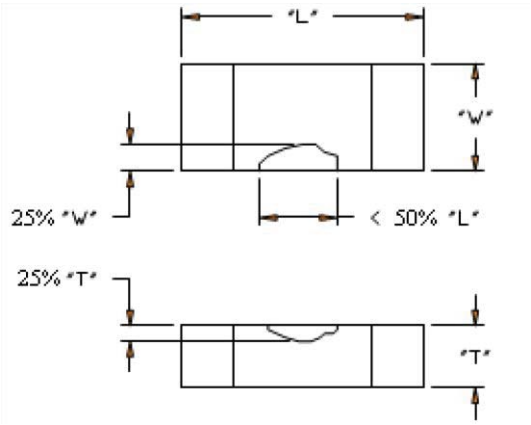
Major cracks are those that are obvious to a customer and would possibly result in large chip-outs that would expose the coil and lead frame.

APPLICATION NOTE

IHLP Standards of Manufacture

CHIPS

Chipping of the inductor body can occur during normal processing and testing of the inductor. The acceptance criteria for chipping vary with the size of the component, but current acceptance standards are based on IPCA-610. The effect of chipping is negligible as long as the inductor coil is not showing. See IPC standard for class 1 and 2 components below.



T	25 % of the thickness
W	25 % of the width
L	50 % of the length

Chips typically occur on the edges and corners of the inductor body. They are slightly darker in color and rougher in appearance than the surrounding material.

Minor chipping, acceptable

Minor chips in the inductor body are those that are typically shallow imperfections that occur on the corners and edge of components. No coil wire or lead frame is showing and the chip does not affect the performance or reliability of the component.

Major chipping, rejectable

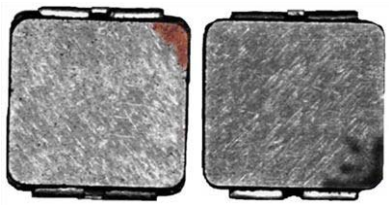
Major chips in the inductor body are those that are very obvious to the customer and may expose the wire coil or lead frame.

OXIDATION

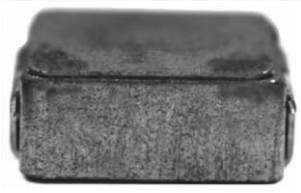
The IHLP inductor is predominately iron and oxidation may occur in a small percentage of the inductors. Resin binders give moderate protection, but some slight oxidation may occur. All components should be stored away from heat, humidity and ionized atmospheres as much as possible before mounting.

Basic steps should be taken in order to limit surface oxidation, including keeping the IHLP inductors sealed in their packaging until PCB mounting.

In the case that oxidation does occur, the effects are contained to the surface of the component and do not penetrate into the core material. No electrical effects have ever been documented due to oxidation of the IHLP product. Oxidation should never be considered a reliability risk.



Top view



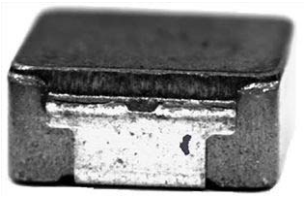
Side view

IHLP Standards of Manufacture

OTHER

A very small number of other irregularities have been reported. These occur at an exceedingly low rate and typically do not affect the components electrically. These include:

Foreign material may be seen pressed into the upper terminals. This material is of the same material as the inductor body and should not be a reason for rejection unless solderability is affected.



Foreign material: Acceptable

Scratches may be seen on the surface of the inductor body. Scratches are an acceptable surface irregularity.

Scratch: Acceptable

SUMMARY

The IHLP inductor is comprised of an iron powder body compressed around a coil. Due to the fact that this iron powder body is not solid like ferrite material, irregularities such as cracks and chips do not affect the electrical properties, or the reliability of the component. Criteria have been determined for the acceptability of the components that allow for a robust manufacturing process as well as an acceptable degree of cosmetic irregularity.

Reliability testing has been done on the effects of cracking of the iron powder body and on the oxidation of the iron particles that are present on the surface. Testing has shown no reliability issues from either of these cosmetic differences.