



Product Series Code	NL	Brand	MOTTO
File Version	NL-V2	Editor	Jack
Established Date	2000.05.23	Description	Ferrite Core Wound Molding Inductor
Latest Edit Date	2010.11.26	Pages	1

Features & Application:

* Molding Wound Chip Inductor

* Fit for power line & signal line circuit

* To help you go pass the CE/FCC standard.

* Mobile Device / Handheld Device / LowProfile Device / Panel...

Product Structure

SMD	DIP	Shield	Unshield

2005 RoHS Compliant - SGS Certified Result

鉛 Pb	鎘 Cd	汞 Hg	六價鉻 Cr+6	溴化聯苯 PBB	溴化聯苯 醚PBDE
<1000ppm	ND	ND	ND	ND	ND

Part No Example:

NL 2520 - 6R8 J
1 2 3 4

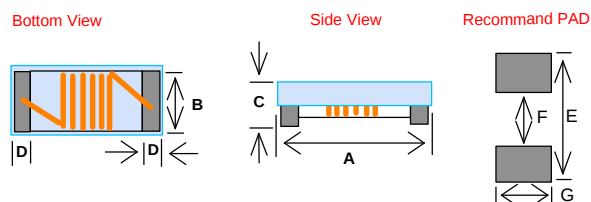
1. MOTTO SERIES : NL

2. Dimension Code: 2520 [2.5 x 2.0 mm]

3. [L] Value : Inductance 6R8=6.8uH

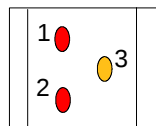
4. Tolerance: J=5%, K=10%,

Dimensions: [mm] 2012/2520 TYPE



Type	A	B	C	D	E	F	G
NL2012	2.1+/-0.2	1.65+/-0.1	1.3+/-0.15	0.45+/-0.15	2.8	0.77	1.8
NL2520	2.7+/-0.3	2.50+/-0.3	2.0+/-0.30	0.50+/-0.15	3.3	1.25	2.6

2520 SIZE - Marking Expression:



0 1 2 3 4 5 6 7 8 9
黑 棕 紅 橙 黃 綠 藍 紫 灰 白

料號色碼依下列算法計之.....

For inductance meaning:

[(1st dot x10)+2 nd dot]x10 3 rd dot=nH

for example:

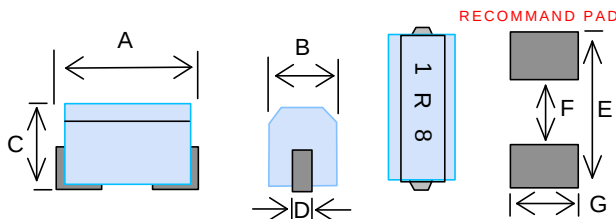
NL 2520S-220J Color Dot=紅 1st 紅 2nd 橙 3rd

Inductance= [(紅 2) x 10 + (紅 2)] x (橙)10x100

=22x1000=22000nH

22000 ÷ 1000 = 22uH

Dimensions: [mm] 3225 / 4532 / 5650 TYPE



Type	A+/-0.3	B+/-0.3	C+/-0.3	D+/-0.3	E	F	G
NL2520	2.5	2.0	1.8	1.2	3.5	1.5	1.5
NL3225	3.2	2.5	2.2	1.2	3.5	1.0	3.0
NL4532	4.5	3.2	3.2	1.4	5.5	2.0	4.0
NL5650	5.6	5.0	5.0	2.1	6.5	2.5	6.0

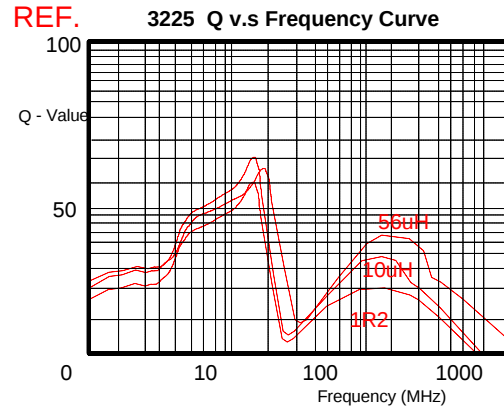
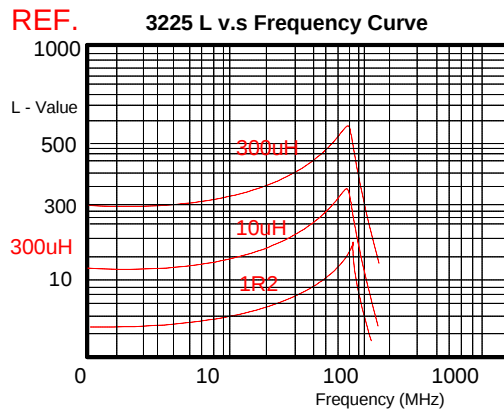


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Test Equipment :

- * HP4284A, HP42841A- L, IDC, Q, RDC
- * HP8753D NETWORK ANALYZER- SRF

Standard Atmospheric Conditions:

Ambient Temp: 20 $\pm$ 15 $^{\circ}$ C

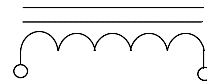
Relative Humidity: 65 $\pm$ 20%

If there may be any doubt on the result, measurement shall be made within the following limits:

Ambient Temp: 25 $\pm$ 5 $^{\circ}$ C

Relative Humidity: 75 $\pm$ 10%

SCHEMATIC:



Operating & Storage Condition:

OPERATING TEMP: -40 $\sim$ +85 $^{\circ}$ C

STORAGE TEMP: -40 $\sim$ +85 $^{\circ}$ C

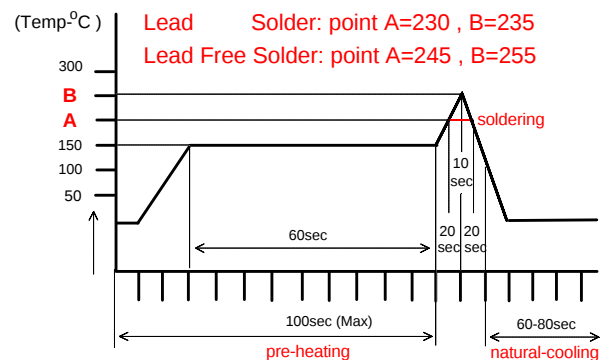
STORAGE LIFE TIME: 12 MONTH @25 $^{\circ}$ C , RH 65%

Attention & Caution:

Please avoid following matters:

- * Splashing water or salt water
- * Toxic Gas (Hydrogen sulfide, Sulfurous acid, Chlorine, Ammonia)
- * Vibrations or shocks which exceed the specified condition
- * Dew condenses
- * Please be careful for the stress to this product by board flexure or something after the mounting.

Recommand Reflow Curve (TIME:Second)



Notice: Iron Soldering: 3 Seconds Max. @260 $^{\circ}$ C





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MOTTO Part No.	L - Value (uH)	Tolerance of L.value J=5%,K=10%	Q value (min)	L&Q Test Freq. (MHz)	S.R.F (MHz) (min)	DCR (ohm) (max)	IDC (mA) (max)
NL2520-5N0 □	0.005	K	10	100	3000	0.25	2000
NL2520-10N □	0.010	K	10	100	2500	0.25	1800
NL2520-12N □	0.012	K	15	100	2400	0.26	1700
NL2520-15N □	0.015	K	15	100	2300	0.28	1600
NL2520-18N □	0.018	K	15	100	2200	0.30	1550
NL2520-22N □	0.022	J,K	20	100	2100	0.35	1500
NL2520-27N □	0.027	J,K	20	100	2000	0.40	1450
NL2520-33N □	0.033	J,K	30	100	1600	0.42	1400
NL2520-39N □	0.039	J,K	35	100	1500	0.45	1350
NL2520-47N □	0.047	J,K	35	100	1400	0.50	1300
NL2520-56N □	0.056	J,K	35	100	1300	0.60	1250
NL2520-68N □	0.068	J,K	35	100	1200	0.65	1240
NL2520-82N □	0.082	J,K	35	100	1100	0.75	1230
NL2520-R10 □	0.100	J,K	35	100	800	0.80	1220
NL2520-R12 □	0.120	J,K	30	25.2	700	0.30	900
NL2520-R15 □	0.150	J,K	30	25.2	550	0.35	900
NL2520-R18 □	0.180	J,K	30	25.2	500	0.40	850
NL2520-R22 □	0.220	J,K	30	25.2	450	0.50	840
NL2520-R27 □	0.220	J,K	30	25.2	425	0.55	830
NL2520-R33 □	0.330	J,K	30	25.2	400	0.60	820
NL2520-R39 □	0.390	J,K	30	25.2	375	0.65	810
NL2520-R47 □	0.470	J,K	30	25.2	350	0.68	800
NL2520-R56 □	0.560	J,K	30	25.2	325	0.75	800
NL2520-R68 □	0.680	J,K	30	25.2	300	0.85	800
NL2520-R82 □	0.820	J,K	30	25.2	260	1.00	800
NL2520-1R0 □	1.000	J,K	25	7.96	245	1.10	800
NL2520-1R2 □	1.200	J,K	25	7.96	230	1.20	790
NL2520-1R5 □	1.500	J,K	25	7.96	182	1.30	750
NL2520-1R8 □	1.800	J,K	25	7.96	135	1.45	750
NL2520-2R2 □	2.200	J,K	25	7.96	105	1.55	750
NL2520-2R7 □	2.700	J,K	25	7.96	70	1.70	740
NL2520-3R3 □	3.300	J,K	25	7.96	55	1.90	730
NL2520-3R9 □	3.900	J,K	25	7.96	48	2.10	700
NL2520-4R7 □	4.700	J,K	25	7.96	43	2.30	650
NL2520-5R6 □	5.600	J,K	20	7.96	42	2.50	640
NL2520-6R8 □	6.800	J,K	20	7.96	39	2.70	630
NL2520-8R2 □	8.200	J,K	20	7.96	36	3.05	600
NL2520-100 □	10.000	J,K	15	2.52	33	3.50	680
NL2520-120 □	12.000	J,K	15	2.52	30	3.80	650
NL2520-150 □	15.000	J,K	15	2.52	26	4.40	500
NL2520-180 □	18.000	J,K	15	2.52	24	4.80	450
NL2520-220 □	22.000	J,K	15	2.52	22	5.50	450
NL2520-270 □	27.000	J,K	15	2.52	21	6.30	430
NL2520-330 □	33.000	J,K	15	2.52	20	7.10	380
NL2520-390 □	39.000	J,K	10	2.52	18	9.50	330
NL2520-470 □	47.000	J,K	10	2.52	17	11.10	300
NL2520-560 □	56.000	J,K	10	2.52	16	12.10	270
NL2520-680 □	68.000	J,K	10	2.52	15	16.60	250
NL2520-820 □	82.000	J,K	10	2.52	13	19.00	200
NL2520-101 □	100.000	J,K	8	0.796	12	21.00	120





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NL2520F-R22 □	0.220	J,K	25	25.2	230	0.50	430
NL2520F-R27 □	0.220	J,K	25	25.2	210	0.55	420
NL2520F-R33 □	0.330	J,K	25	25.2	190	0.60	400
NL2520F-R39 □	0.390	J,K	25	25.2	175	0.65	375
NL2520F-R47 □	0.470	J,K	25	25.2	160	0.68	350
NL2520F-R56 □	0.560	J,K	25	25.2	150	0.75	325
NL2520F-R68 □	0.680	J,K	25	25.2	135	0.85	300
NL2520F-R82 □	0.820	J,K	25	25.2	125	1.00	260
NL2520F-1R0 □	1.000	J,K	30	7.96	115	1.10	245
NL2520F-1R2 □	1.200	J,K	30	7.96	100	1.20	230
NL2520F-1R5 □	1.500	J,K	30	7.96	90	1.30	220
NL2520F-1R8 □	1.800	J,K	30	7.96	85	1.45	210
NL2520F-2R2 □	2.200	J,K	30	7.96	75	1.55	200
NL2520F-2R7 □	2.700	J,K	30	7.96	55	1.70	195
NL2520F-3R3 □	3.300	J,K	30	7.96	48	1.90	185
NL2520F-3R9 □	3.900	J,K	30	7.96	43	2.10	180
NL2520F-4R7 □	4.700	J,K	30	7.96	40	2.30	175
NL2520F-5R6 □	5.600	J,K	25	7.96	36	2.50	170
NL2520F-6R8 □	6.800	J,K	25	7.96	33	2.70	165
NL2520F-8R2 □	8.200	J,K	25	7.96	30	3.05	160
NL2520F-100 □	10.000	J,K	25	2.52	27	3.50	155
NL2520F-120 □	12.000	J,K	25	2.52	23	3.80	150
NL2520F-150 □	15.000	J,K	25	2.52	20	4.40	140
NL2520F-180 □	18.000	J,K	25	2.52	18	4.80	130
NL2520F-220 □	22.000	J,K	25	2.52	17	5.50	125
NL2520F-270 □	27.000	J,K	25	2.52	16	6.30	115
NL2520F-330 □	33.000	J,K	25	2.52	15	7.10	110
NL2520F-390 □	39.000	J,K	20	2.52	14	9.50	90
NL2520F-470 □	47.000	J,K	20	2.52	13	11.00	80
NL2520F-560 □	56.000	J,K	20	2.52	12	12.10	75
NL2520F-680 □	68.000	J,K	20	2.52	11	16.60	70
NL2520F-820 □	82.000	J,K	20	2.52	10	19.00	66
NL2520F-101 □	100.000	J,K	15	0.796	9	21.00	60





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NL3225-R12 □	0.12	J,K	30	25.200	500	0.22	450
NL3225-R22 □	0.22	J,K	30	25.200	350	0.32	450
NL3225-R33 □	0.33	J,K	30	25.200	300	0.40	450
NL3225-R39 □	0.39	J,K	30	25.200	250	0.45	450
NL3225-R47 □	0.47	J,K	30	25.200	250	0.50	450
NL3225-R56 □	0.56	J,K	30	25.200	180	0.55	450
NL3225-R68 □	0.68	J,K	30	25.200	160	0.60	450
NL3225-R82 □	0.82	J,K	30	25.200	140	0.65	450
NL3225-1R0 □	1.00	J,K	30	7.960	120	0.70	400
NL3225-1R2 □	1.20	J,K	30	7.960	100	0.75	390
NL3225-1R5 □	1.50	J,K	30	7.960	85	0.85	370
NL3225-1R8 □	1.80	J,K	30	7.960	80	0.90	350
NL3225-2R2 □	2.20	J,K	30	7.960	75	1.00	320
NL3225-2R7 □	2.70	J,K	30	7.960	70	1.10	290
NL3225-3R3 □	3.30	J,K	30	7.960	60	1.20	260
NL3225-3R9 □	3.90	J,K	30	7.960	55	1.30	250
NL3225-4R7 □	4.70	J,K	30	7.960	50	1.50	220
NL3225-5R6 □	5.60	J,K	30	7.960	45	1.60	200
NL3225-6R8 □	6.80	J,K	30	7.960	40	1.80	180
NL3225-8R2 □	8.20	J,K	30	7.960	35	2.00	170
NL3225-100 □	10.00	J,K	30	2.520	30	2.10	150
NL3225-120 □	12.00	J,K	30	2.520	20	2.50	140
NL3225-150 □	15.00	J,K	30	2.520	20	2.80	130
NL3225-180 □	18.00	J,K	30	2.520	20	3.30	120
NL3225-220 □	22.00	J,K	30	2.520	20	3.70	110
NL3225-270 □	27.00	J,K	30	2.520	20	5.00	80
NL3225-330 □	33.00	J,K	30	2.520	17	5.60	70
NL3225-390 □	39.00	J,K	30	2.520	16	6.40	65
NL3225-470 □	47.00	J,K	30	2.520	15	7.00	60
NL3225-560 □	56.00	J,K	30	2.520	13	8.00	55
NL3225-680 □	68.00	J,K	30	2.520	12	9.00	50
NL3225-820 □	82.00	J,K	30	2.520	11	10.00	45
NL3225-101 □	100.00	J,K	20	0.796	10	11.00	40
NL3225-121 □	120.00	J,K	20	0.796	10	11.00	70
NL3225-151 □	150.00	J,K	20	0.796	8	15.00	65
NL3225-181 □	180.00	J,K	20	0.796	7	17.00	60
NL3225-221 □	220.00	J,K	20	0.796	7	21.00	50





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NL4532-R10 □	0.10	J,K	35	25.200	300	0.18	800
NL4532-R12 □	0.12	J,K	35	25.200	280	0.20	770
NL4532-R15 □	0.15	J,K	35	25.200	250	0.22	730
NL4532-R18 □	0.18	J,K	35	25.200	220	0.24	700
NL4532-R22 □	0.22	J,K	40	25.200	200	0.25	665
NL4532-R27 □	0.27	J,K	40	25.200	180	0.26	635
NL4532-R33 □	0.33	J,K	40	25.200	165	0.28	605
NL4532-R39 □	0.39	J,K	40	25.200	150	0.30	575
NL4532-R47 □	0.47	J,K	40	25.200	145	0.32	545
NL4532-R56 □	0.56	J,K	40	25.200	140	0.36	520
NL4532-R68 □	0.68	J,K	40	25.200	135	0.40	50
NL4532-R82 □	0.82	J,K	40	25.200	130	0.45	475
NL4532-1R0 □	1.00	J,K	50	7.960	100	0.50	450
NL4532-1R2 □	1.20	J,K	50	7.960	80	0.55	430
NL4532-1R5 □	1.50	J,K	50	7.960	70	0.60	410
NL4532-1R8 □	1.80	J,K	50	7.960	60	0.65	390
NL4532-2R2 □	2.20	J,K	50	7.960	55	0.70	380
NL4532-2R7 □	2.70	J,K	50	7.960	50	0.75	370
NL4532-3R3 □	3.30	J,K	50	7.960	45	0.80	355
NL4532-3R9 □	3.90	J,K	50	7.960	40	0.90	330
NL4532-4R7 □	4.70	J,K	50	7.960	35	1.00	315
NL4532-5R6 □	5.60	J,K	50	7.960	33	1.10	300
NL4532-6R8 □	6.80	J,K	50	7.960	27	1.20	285
NL4532-8R2 □	8.20	J,K	50	7.960	25	1.40	270
NL4532-100 □	10.00	J,K	50	2.520	20	1.60	250
NL4532-120 □	12.00	J,K	50	2.520	18	2.00	225
NL4532-150 □	15.00	J,K	50	2.520	17	2.50	200
NL4532-180 □	18.00	J,K	50	2.520	15	2.80	190
NL4532-220 □	22.00	J,K	50	2.520	13	3.20	180
NL4532-270 □	27.00	J,K	50	2.520	12	3.60	170
NL4532-330 □	33.00	J,K	50	2.520	11	4.00	160
NL4532-390 □	39.00	J,K	50	2.520	10	4.50	150
NL4532-470 □	47.00	J,K	50	2.520	10	5.00	140
NL4532-560 □	56.00	J,K	50	2.520	9	5.50	135
NL4532-680 □	68.00	J,K	50	2.520	9	6.00	130
NL4532-820 □	82.00	J,K	50	2.520	8	7.00	120
NL4532-101 □	100.00	J,K	40	0.796	8	8.00	110
NL4532-121 □	120.00	J,K	40	0.796	6	8.00	110
NL4532-151 □	150.00	J,K	40	0.796	5	9.00	105
NL4532-181 □	180.00	J,K	40	0.796	5	9.50	102
NL4532-221 □	220.00	J,K	40	0.796	4	10.00	100
NL4532-271 □	270.00	J,K	40	0.796	4	12.00	92
NL4532-331 □	330.00	J,K	40	0.796	3.5	14.00	85
NL4532-391 □	390.00	J,K	40	0.796	3	18.00	80
NL4532-471 □	470.00	J,K	40	0.796	3	26.00	62
NL4532-561 □	560.00	J,K	30	0.796	3	30.00	50
NL4532-681 □	680.00	J,K	30	0.796	3	30.00	50
NL4532-821 □	820.00	J,K	30	0.796	2.5	35.00	30
NL4532-102 □	1000.00	J,K	30	0.252	2.5	40.00	30





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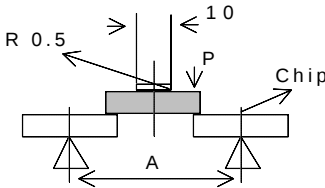
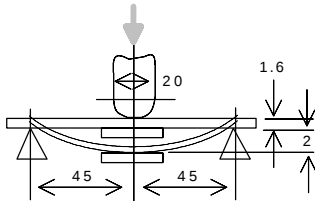
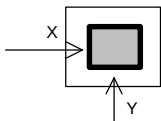
MOTTO Part NO.	L - Value (mH)	Tolerance of L.value J=5%,K=10%	Q value (min)	L&Q Test Freq. (MHz)	S.R.F (MHz) (min)	DCR (ohm) (max)	IDC (mA) (max)
NL5650-122 □	1.2	J,K	30	0.252	1.5	17	75
NL5650-152 □	1.5	J,K	30	0.252	1.4	20	70
NL5650-182 □	1.8	J,K	30	0.252	1.3	30	60
NL5650-222 □	2.2	J,K	30	0.252	1.2	35	55
NL5650-272 □	2.7	J,K	30	0.252	1.1	55	45
NL5650-332 □	3.3	J,K	30	0.252	1.0	60	40
NL5650-392 □	3.9	J,K	30	0.252	1.0	70	38
NL5650-472 □	4.7	J,K	30	0.252	0.9	78	36
NL5650-562 □	5.6	J,K	30	0.252	0.8	85	33
NL5650-682 □	6.8	J,K	30	0.252	0.7	110	30
NL5650-822 □	8.2	J,K	30	0.252	0.6	125	28
NL5650-103 □	10.0	J,K	20	0.0796	0.5	150	25





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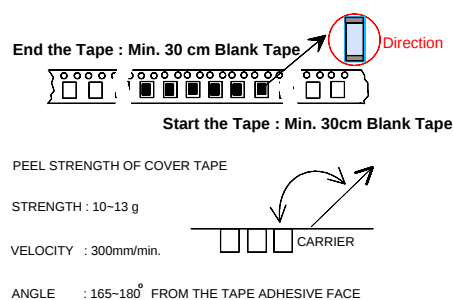
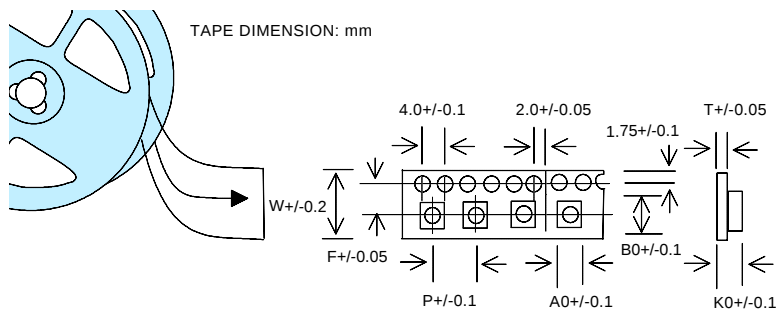
Reliability Test Result :

NO	ITEM	TEST CONDITIONS	REMARKS															
1	Thermal Shock (Temperature Cycle) 溫度循環試驗	Temperature:-40 ° C/ +85 ° C kept stabilized for 30 minutes each Cycle: 100 Cycles	Inductance value shall be within ± 10% of the initial value. Q-factor shall be within ± 30% of the initial value. Impedance shall be within ± 20% of the initial value. DCR value shall be within ± 20% of the initial value. ■ NO.1~4 Measurement:After placing for 24 hours (min.) ■ NO.2~3 Applied current(spec): Rated current(maximum value) ■ NO.5 Cycle: 5 cycles															
2	Humidity Resistance 耐濕試驗	Humidity: 90%~ 95% RH Temperature: 40 ± 2 ° C Test Time: 1000 ± 12 Hours																
3	HighTemperature 耐熱試驗	Temperature: 85 ± 2 ° C Humidity: 20% Testing Time: 1000 ± 12 Hours																
4	Low Temperature 耐寒試驗	Temperature: -40 ± 2 ° C Time: 1000 ± 12 Hours																
5	Temperature and Humidity Cycle 溫/濕度循環試驗	<table><tr><td>Step</td><td>Temp</td><td>Humidity</td><td>Time</td></tr><tr><td>1</td><td>25 ± 2 ° C</td><td>95~100%RH</td><td>3.0Hr</td></tr><tr><td>2</td><td>55 ± 2 ° C</td><td>95~96%RH</td><td>9.5Hr</td></tr><tr><td>3</td><td>25 ± 2 ° C</td><td>95~100%RH</td><td>9.5Hr</td></tr></table>		Step	Temp	Humidity	Time	1	25 ± 2 ° C	95~100%RH	3.0Hr	2	55 ± 2 ° C	95~96%RH	9.5Hr	3	25 ± 2 ° C	95~100%RH
Step	Temp	Humidity	Time															
1	25 ± 2 ° C	95~100%RH	3.0Hr															
2	55 ± 2 ° C	95~96%RH	9.5Hr															
3	25 ± 2 ° C	95~100%RH	9.5Hr															
6	Vibration 振動性試驗	Frequency: 10Hz~55Hz Amplitude: 1.5mm Direction: X,Y,Z Time: 2 Hours each																
7	IR Reflow Soldering 焊錫性試驗	Solder: H63A(eutectic solder) Solder Temp.: 230 ± 5 ° C Time: 6 minutes Cycles: x 1	Impedance(inductance) shall be within ± 20% of the initial value. DCR value shall be within ± 20% of the initial value.															
8	Soldering Heat Resistance 耐熱 焊性試驗	Preheat:120 ~ 150 ° C (60 sec) Solder:H63A(eutectic solder) Solder Temp.: 260 ± 5 ° C Flux: Rosin Dip time: 10 ± 1 seconds	The chip must have no cracks.More than 75% of the terminal electrode must be covered with solder.															
9	Bending Strength 折斷力試驗		The terminal electrode and the ferrite must not be damaged by the forces applied on the test conditions. 2520: 3.0 kg 3225: 4.0 kg 4532: 5.0 kg 5650: 6.0 kg															
10	Flexure Strength 彎曲試驗		No mechanical damage shall be noticed even when the board is bent 2 mm															
11	Terminal Strength 拉力試驗		After solder between copper plate and terminals of coil, push in two directions of X,Y with 2.0kg must no crack !															



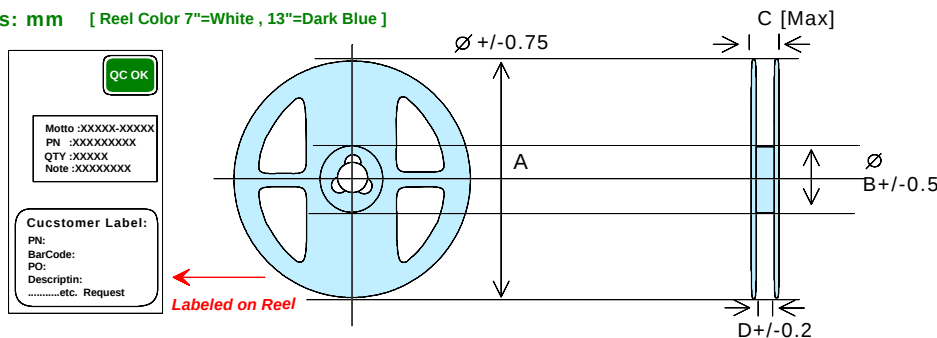


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SIZE/mm	W	P	A ₀	B ₀	K ₀	T	F
2012	8.00	4.00	1.85	2.30	1.50	0.22	3.50
2520	8.00	4.00	2.80	2.95	2.20	0.23	3.50
2520F	8.00	4.00	2.40	2.90	2.00	0.23	3.50
3225	8.00	4.00	2.96	3.60	2.40	0.23	3.50
4532	12.00	8.00	3.30	5.00	3.50	0.30	5.50
5650	16.00	12.00	5.35	6.10	5.50	0.35	7.50

Reel Dimensions: mm [Reel Color 7"=White , 13"=Dark Blue]



SIZE / mm	A	B	C	D	REEL SIZE	QTY/REEL
2012	178	60	12	9	7"	2.0K
2520	178	60	12	9	7"	2.0K
2520F	178	60	12	9	7"	2.0K
3225	178	60	12	9	7"	2.0K
4532	178	60	16	13.2	7"	0.5K
5650	330	100	22	17.4	13"	1.0K

BOX Package: cm

