## CHIP COIL (CHIP INDUCTORS) LQW15AN□□□□0ZD Murata Standard Reference Specification 【AEC-Q200】

#### 1. Scope

This Reference specification applies to LQW15AN\_0ZD series, Chip coil (Chip Inductors) for automotive Electronics based on AEC-Q200 except for Power train and Safety.

2. Part Numbering

(ex) LQ W 15 A N 1N5 B 0 Z D

Product ID Structure Dimension (L×W) Applications Category Inductance Tolerance Features Application D:Taping

Characteristics

#### 3. Rating

Operating Temperature Range
 Storage Temperature Range.
 -55°C ~ +125°C
 -55°C ~ +125°C

Customer Part Number	MURATA Part Number	(*1) re co	uctance fer to below mment	Q (*1) (min.)	DC Resistance (*1)	Self Resonant Frequency (*1) (GHz min.)	Rated Current (mA)	ESD Rank 6:25k	
		(nH)	Tolerance		(Ω max.)	(OHZ IIIIII.)	(110-1)	0.201	
	LQW15AN1N5B0ZD		B:±0.1nH						
	LQW15AN1N5C0ZD	1.5	C:±0.2nH		0.03	18.0	1000		
	LQW15AN1N5D0ZD		D:±0.5nH						
	LQW15AN1N6C0ZD	1.6			0.07		750		
	LQW15AN1N6D0ZD	1.0		10	0.07	17			
	LQW15AN1N7C0ZD	1.7	C:±0.2nH		0.10		640		
	LQW15AN1N7D0ZD		D:±0.5nH						
	LQW15AN1N8C0ZD	1.8			0.16	16	460		
	LQW15AN1N8D0ZD				****			_	
	LQW15AN2N4B0ZD								
	LQW15AN2N4C0ZD	2.4							
	LQW15AN2N4D0ZD								
	LQW15AN2N5B0ZD								
	LQW15AN2N5C0ZD	2.5							
	LQW15AN2N5D0ZD		0.0		0.05	45.0		6	
	LQW15AN2N6B0ZD								
	LQW15AN2N6C0ZD						850		
	LQW15AN2N6D0ZD								
	LQW15AN2N7B0ZD								
	LQW15AN2N7C0ZD		2.7		15.0		6		
	LQW15AN2N7D0ZD		4		20	20			
	LQW15AN2N8B0ZD	0.0				-			
	LQW15AN2N8C0ZD	2.8	B:±0.1nH						
	LQW15AN2N8D0ZD		C:±0.2nH					-	
	LQW15AN2N9B0ZD	0.0	D:±0.5nH				750		
	LQW15AN2N9C0ZD	2.9							
	LQW15AN2N9D0ZD		4		0.07				
	LQW15AN3N0B0ZD	2.0							
	LQW15AN3N0C0ZD	3.0							
	LQW15AN3N0D0ZD LQW15AN3N1B0ZD							-	
	LQW15AN3N1C0ZD				0.13		570		
	LQW15AN3N1D0ZD				0.13		570		
	LQW15AN3N1D0ZD		1			14.0		+	
	LQW15AN3N2C0ZD	3.2		15	0.17		500		
	LQW15AN3N2D0ZD	5.2		15	0.17		500		
	LQW15AN3N2B0ZD		-					1	
	LQW15AN3N9C0ZD	3.9		25	0.07	10.0	750		
	LGVV 10/11V01V3CUZD	0.0	1	20	0.07	10.0	, 50	1	

Customer Part Number	MURATA Part Number	(*1) re	luctance fer to below omment	Q (*1) (min.)	DC Resistance (*1)	Self Resonant Frequency (*1)	Rated Current	ESD Rank
		(nH)	Tolerance	()	(Ω max.)	(GHz min.)	(mA)	6:25kV
	LQW15AN4N1B0ZD	, ,						
	LQW15AN4N1C0ZD	4.1						
	LQW15AN4N1D0ZD					40.0		
	LQW15AN4N3B0ZD		1			10.0		
	LQW15AN4N3C0ZD	4.3						
	LQW15AN4N3D0ZD							
	LQW15AN4N4B0ZD		1					
	LQW15AN4N4C0ZD	4.4						
	LQW15AN4N4D0ZD							
	LQW15AN4N5B0ZD		†					
	LQW15AN4N5C0ZD	4.5			0.07		750	
	LQW15AN4N5D0ZD	7.0			0.07		7.50	
	LQW15AN4N6B0ZD		+					
	LQW15AN4N6C0ZD	4.6						
		4.0						
	LQW15AN4N6D0ZD		-					
	LQW15AN4N7B0ZD	4 7						
	LQW15AN4N7C0ZD	4.7						
	LQW15AN4N7D0ZD		1					
	LQW15AN4N8B0ZD							
	LQW15AN4N8C0ZD	4.8				8.0		
	LQW15AN4N8D0ZD		1				8.0	_
	LQW15AN4N9B0ZD					0.0		
	LQW15AN4N9C0ZD	4.9						
	LQW15AN4N9D0ZD							
	LQW15AN5N0B0ZD		B:±0.1nH					
	LQW15AN5N0C0ZD	5.0	C:±0.2nH		0.12		600	
	LQW15AN5N0D0ZD		D:±0.5nH	25				6
	LQW15AN5N1B0ZD			25				0
	LQW15AN5N1C0ZD	5.1						
	LQW15AN5N1D0ZD							
	LQW15AN5N8B0ZD							
	LQW15AN5N8C0ZD	5.8						
	LQW15AN5N8D0ZD							
	LQW15AN6N2B0ZD		1					
	LQW15AN6N2C0ZD	6.2						
	LQW15AN6N2D0ZD							
	LQW15AN6N3B0ZD		1					
	LQW15AN6N3C0ZD	6.3						
	LQW15AN6N3D0ZD							
	LQW15AN6N4B0ZD		1					
	LQW15AN6N4C0ZD	6.4						
	LQW15AN6N4D0ZD	0.4						
	LQW15AN6N5B0ZD		1		0.09		700	
	LQW15AN6N5C0ZD	6.5						
		15AN6N5D0ZD						
			-			6.0		
	LQW15AN6N6B0ZD	6.0						
	LQW15AN6N6C0ZD	6.6						
	LQW15AN6N6D0ZD		1					
	LQW15AN6N7B0ZD							
	LQW15AN6N7C0ZD	6.7						
	LQW15AN6N7D0ZD							
	LQW15AN6N8G0ZD	_	G:±2%					
	LQW15AN6N8H0ZD	6.8	H:±3%					
	LQW15AN6N8J0ZD		J:±5%					

Customer Part Number	MURATA Part Number	(*1) re	uctance fer to below omment	Q (*1) (min.)	DC Resistance (*1)	Self Resonant Frequency (*1)	Rated Current	ESD Rank
T dit Hamboi	T dit Hambon	(nH)	Tolerance	(111111.)	(Ω max.)	(GHz min.)	(mA)	6:25kV
	LQW15AN6N9G0ZD	. ,			,			
	LQW15AN6N9H0ZD	6.9						
	LQW15AN6N9J0ZD							
	LQW15AN7N0G0ZD							
	LQW15AN7N0H0ZD	7.0						
	LQW15AN7N0J0ZD							
	LQW15AN7N1G0ZD							
	LQW15AN7N1H0ZD	7.1						
	LQW15AN7N1J0ZD				0.40	0.0	570	
	LQW15AN7N2G0ZD				0.13	6.0	570	
	LQW15AN7N2H0ZD	7.2						
	LQW15AN7N2J0ZD							
	LQW15AN7N3G0ZD							
	LQW15AN7N3H0ZD	7.3						
	LQW15AN7N3J0ZD							
	LQW15AN7N5G0ZD		1					
	LQW15AN7N5H0ZD	7.5						
	LQW15AN7N5J0ZD							
	LQW15AN8N2G0ZD							
	LQW15AN8N2H0ZD	8.2						
***************************************	LQW15AN8N2J0ZD							
	LQW15AN8N6G0ZD							
	LQW15AN8N6H0ZD	8.6						
	LQW15AN8N6J0ZD							
	LQW15AN8N7G0ZD		G:±2%					
	LQW15AN8N7H0ZD	8.7						
	LQW15AN8N7J0ZD	· · · ·						
	LQW15AN8N8G0ZD		H:±3%	25				6
	LQW15AN8N8H0ZD	8.8	J:±5%					
	LQW15AN8N8J0ZD	0.0						
	LQW15AN8N9G0ZD							
	LQW15AN8N9H0ZD	8.9						
	LQW15AN8N9J0ZD							
	LQW15AN9N0G0ZD							
	LQW15AN9N0H0ZD	9.0						
	LQW15AN9N0J0ZD	0.0						
	LQW15AN9N1G0ZD				0.14	5.5	540	
	LQW15AN9N1H0ZD	9.1						
	LQW15AN9N1J0ZD							
	LQW15AN9N2G0ZD							
	LQW15AN9N2H0ZD	9.2						
	LQW15AN9N2J0ZD							
	LQW15AN9N3G0ZD		1					
	LQW15AN9N3H0ZD	9.3						
	LQW15AN9N3J0ZD		5.5					
	LQW15AN9N4G0ZD							
	LQW15AN9N4H0ZD	9.4						
	LQW15AN9N4J0ZD							
	LQW15AN9N5G0ZD							
	LQW15AN9N5H0ZD	9.5						
	LQW15AN9N5J0ZD	3.5						
	LQW15AN9N6G0ZD		1					
	LQW15AN9N6H0ZD	9.6						
	LQW15AN9N6J0ZD	2.5						
<u>l</u>			l	1		l	I	1

COW15ANSNTGOZD   COW15ANSNTGOZD   COW15ANSNTHOZD   S.7   COW15ANSNTHOZD   S.7   COW15ANSNTHOZD   S.7   COW15ANSNTHOZD   S.7   COW15ANSNSHOZD   S.8   COW15ANSNSHOZD   S.9   COW15ANSNSHOZD   CO	Customer Part Number	MURATA Part Number	(*1) re	uctance fer to below mment	Q (*1) (min.)	DC Resistance (*1)	Self Resonant Frequency (*1)	Rated Current	ESD Rank						
LGW15AN9NT40ZD   9.7	1 art rumber	1 art ramber			(111111.)		(GHz min.)	(mA)	6:25kV						
LOW15AN9N8GOZD   LOW15AN9N8HOZD   9.8   LOW15AN9N8HOZD   9.8   LOW15AN9N8HOZD   0.9   LOW15AN9N9NBHOZD   0.9   LOW15AN9N9NBHOZD   0.17   0.1		LQW15AN9N7G0ZD	. ,			,									
LOW15AN9N8HOZD   9.8		LQW15AN9N7H0ZD	9.7												
LGW15AN9N8H0ZD   9.8		LQW15AN9N7J0ZD													
LQW15AN9NBJ0ZD															
LQW15AN9NBJ0ZD			9.8			0.14		540							
LQW15AN9N9GOZD   9.9   LQW15AN9N9GOZD   LQW15AN9N9JOZD   10   LQW15AN10NIOZD   10   LQW15AN11NIOZD   11   LQW15AN11NIOZD   11   LQW15AN11NIOZD   12   LQW15AN11NIOZD   12   LQW15AN11NIOZD   12   LQW15AN13NIOZD   13   LQW15AN13NIOZD   14   LQW15AN13NIOZD   15   LQW15AN15NIOZD   15   LQW15AN15NIOZD   15   LQW15AN15NIOZD   LQW15AN15NIOZD   LQW15AN16NIOZD   LQW15AN16NIOZD   LQW15AN16NIOZD   LQW15AN18NIOZD   LQW15AN18NIOZD   LQW15AN18NIOZD   LQW15AN18NIOZD   16   LQW15AN18NIOZD   LQW15AN18NIOZD   LQW15AN18NIOZD   LQW15AN18NIOZD   LQW15AN18NIOZD   LQW15AN18NIOZD   LQW15AN19NIOZD   LQW15AN19NIOZD   LQW15AN19NIOZD   LQW15AN19NIOZD   LQW15AN19NIOZD   LQW15AN19NIOZD   LQW15AN19NIOZD   LQW15AN2NIOZD   LQW15AN3NIOZD   L															
LQW15AN9N9J0ZD		· ·		1	25										
LQW15AN10NG0ZD		• • • • • • • • • • • • • • • • • • • •	9.9												
LQW15AN10NG0ZD															
LQW15AN10NH0ZD							5.5		1						
LQW15AN11NO3ZD			10			0.17									
LQW15AN11NH0ZD						0.17									
LQW15AN11NH0ZD		· ·		1											
LQW15AN11NJ0ZD			11					500							
LQW15AN12NG0ZD   LQW15AN12NH0ZD   LQW15AN12NH0ZD   LQW15AN13NH0ZD   LQW15AN13NJ0ZD   LQW15AN13NJ0ZD   LQW15AN15NJ0ZD   LQW15AN15NJ0ZD   LQW15AN15NJ0ZD   LQW15AN16NJ0ZD   LQW15AN16NJ0ZD   LQW15AN16NJ0ZD   LQW15AN16NJ0ZD   LQW15AN16NJ0ZD   LQW15AN16NJ0ZD   LQW15AN18NJ0ZD   LQW15AN18NJ0ZD   LQW15AN18NJ0ZD   LQW15AN19NJ0ZD   LQW15AN19NJ0ZD   LQW15AN19NJ0ZD   LQW15AN2NJ0ZD   LQW15AN3NJ0ZD   LQW15AN			'''					300							
LQW15AN12NJOZD					30	0.14									
LQW15AN12NJOZD   LQW15AN13NIOZD   LQW15AN13NIOZD   LQW15AN15NIOZD   LQW15AN15NIOZD   LQW15AN15NIOZD   LQW15AN15NIOZD   LQW15AN16NIOZD   LQW15AN16NIOZD   LQW15AN16NIOZD   LQW15AN16NIOZD   LQW15AN18NIOZD   LQW15AN18NIOZD   LQW15AN18NIOZD   LQW15AN18NIOZD   LQW15AN18NIOZD   LQW15AN18NIOZD   LQW15AN18NIOZD   LQW15AN19NIOZD   LQW15AN19NIOZD   LQW15AN2NIOZD   LQW15AN3NIOZD   LQW15AN3			12												
LQW15AN13NG0ZD   LQW15AN13NH0ZD   LQW15AN13NH0ZD   LQW15AN15NH0ZD   LQW15AN15NH0ZD   LQW15AN16NH0ZD   LQW15AN16NH0ZD   LQW15AN16NH0ZD   LQW15AN16NH0ZD   LQW15AN16NH0ZD   LQW15AN16NH0ZD   LQW15AN18NH0ZD   LQW15AN18NH0ZD   LQW15AN18NH0ZD   LQW15AN18NH0ZD   LQW15AN19NH0ZD   LQW15AN19NH0ZD   LQW15AN19NH0ZD   LQW15AN2NH0ZD   LQW15AN3NNH0ZD   LQW15AN3NNH0ZD   SO			12												
LQW15AN13NH0ZD															
LQW15AN13NJOZD			13			0.21	25 0.21		430						
LQW15AN15NGOZD		•	13			0.21	25   0.21	20 0.21		430					
LQW15AN15NH0ZD		· · · · · · · · · · · · · · · · · · ·									5.0		-		
LQW15AN15NJ0ZD		•	15		20	0.46	16	460	460						
LQW15AN16NG0ZD			15		30	0.16									
LQW15AN16NH0ZD				<b>⊣</b>				4							
LQW15AN16NJOZD			40			0.04									
LQW15AN18NG0ZD			16	G:+2%		0.24									
LQW15AN18NHOZD   18									6						
LQW15AN18NJ0ZD			40	J:±5%											
LQW15AN19NG0ZD		•	18		0.27			4.5	4.0						
LQW15AN19NHOZD   19									370						
LQW15AN19NJ0ZD		•				0.	0.27	0.27	0.27	0.27	0.27				
LQW15AN20NG0ZD			19					0.27							
LQW15AN20NH0ZD   20						_									
LQW15AN20NJ0ZD															
LQW15AN22NGOZD   LQW15AN22NJOZD   22   LQW15AN23NGOZD   LQW15AN23NJOZD   23   LQW15AN23NJOZD   LQW15AN24NJOZD   LQW15AN24NJOZD   LQW15AN24NJOZD   LQW15AN24NJOZD   LQW15AN27NGOZD   LQW15AN27NHOZD   27   LQW15AN27NJOZD   LQW15AN27NJOZD   LQW15AN27NJOZD   LQW15AN30NGOZD   LQW15AN30NGOZD   LQW15AN30NHOZD   30   0.58   3.3   270			20												
LQW15AN22NG0ZD							4.0		4						
LQW15AN22NJ0ZD															
LQW15AN23NG0ZD			22				3.8								
LQW15AN23NG0ZD					25	0.30		310							
LQW15AN23NJ0ZD						5.00		5.0							
LQW15AN24NG0ZD LQW15AN24NH0ZD 24 LQW15AN24NJ0ZD LQW15AN27NG0ZD LQW15AN27NH0ZD 27 LQW15AN27NJ0ZD LQW15AN30NG0ZD LQW15AN30NG0ZD LQW15AN30NH0ZD 30 0.52 3.5 280		•	23												
LQW15AN24NH0ZD     24       LQW15AN24NJ0ZD     0.52       LQW15AN27NG0ZD     27       LQW15AN27NH0ZD     27       LQW15AN27NJ0ZD     0.58       LQW15AN30NH0ZD     30       LQW15AN30NH0ZD     30									1						
LQW15AN24NJ0ZD       LQW15AN27NG0ZD       LQW15AN27NH0ZD       LQW15AN27NJ0ZD       LQW15AN30NG0ZD       LQW15AN30NH0ZD       30       0.52       3.5       280       0.52       3.5       280       0.52       3.5       280       0.52       3.5       280       0.52       3.5       280       0.52       3.5       280       0.52       3.5       280       0.52       3.5       280       0.52       3.5       280       0.52       3.5       280       0.52       3.5       280       0.52       3.5       280       0.52       3.5       280       0.52       3.5       280       0.52       3.5       280       0.52       3.5       280       0.52       3.5       280       0.52       3.5       280		LQW15AN24NG0ZD													
LQW15AN27NG0ZD		LQW15AN24NH0ZD	24												
LQW15AN27NG0ZD LQW15AN27NH0ZD 27 LQW15AN27NJ0ZD LQW15AN30NG0ZD LQW15AN30NH0ZD 30 0.58 3.3 270		LQW15AN24NJ0ZD				0.52	3.5	280							
LQW15AN27NJ0ZD         LQW15AN30NG0ZD           LQW15AN30NH0ZD         30           0.58         3.3           270		LQW15AN27NG0ZD				0.02	3.5	200							
LQW15AN30NG0ZD         0.58         3.3         270		LQW15AN27NH0ZD	27												
LQW15AN30NH0ZD 30 0.58 3.3 270		LQW15AN27NJ0ZD													
		LQW15AN30NG0ZD													
LQW15AN30NJ0ZD		LQW15AN30NH0ZD	30			0.58	3.3	270							
		LQW15AN30NJ0ZD													
LQW15AN33NG0ZD		LQW15AN33NG0ZD		1					1						
LQW15AN33NH0ZD 33 0.63 3.2 260		LQW15AN33NH0ZD	33			0.63	3.2	260							
LQW15AN33NJ0ZD		LQW15AN33NJ0ZD													

Customer Part Number	MURATA Part Number	(*1) re	uctance fer to below mment	Q (*1) (min.)	DC Resistance (*1)	Self Resonant Frequency (*1)	Rated Current	ESD Rank									
		(nH)	Tolerance	(111111.)	(Ω max.)	(GHz min.)	(mA)	6:25kV									
	LQW15AN36NG0ZD LQW15AN36NH0ZD	36			0.63	3.1	260										
	LQW15AN36NJ0ZD LQW15AN39NG0ZD LQW15AN39NH0ZD	39															
	LQW15AN39NJ0ZD LQW15AN40NG0ZD																
	LQW15AN40NH0ZD LQW15AN40NJ0ZD	40			0.70	3.0	250										
	LQW15AN43NG0ZD LQW15AN43NH0ZD LQW15AN43NJ0ZD	43	G:±2%	25													
	LQW15AN47NG0ZD LQW15AN47NH0ZD LQW15AN47NJ0ZD	47	6		1.08	2.9	210										
	LQW15AN51NG0ZD LQW15AN51NH0ZD LQW15AN51NJ0ZD	51				2.85		6									
	LQW15AN56NG0ZD LQW15AN56NH0ZD LQW15AN56NJ0ZD	56									1.17	2.8	200	0			
	LQW15AN62NG0ZD LQW15AN62NH0ZD LQW15AN62NJ0ZD	62			1.82	2.6	145										
	LQW15AN68NG0ZD LQW15AN68NJ0ZD	68			1.96	2.5	140										
	LQW15AN72NG0ZD LQW15AN72NJ0ZD	72			2.10	2.0	135										
	LQW15AN75NG0ZD LQW15AN75NJ0ZD	75	G:±2% J:±5%	20		2.4											
	LQW15AN82NG0ZD LQW15AN82NJ0ZD	82			2.24	2.3	130										
	LQW15AN91NG0ZD LQW15AN91NJ0ZD	91												2.38	2.1	125	
	LQW15ANR10J0ZD LQW15ANR12J0ZD	100 120	J:±5%		2.52 2.66	1.5 1.0	120 110										

(\*1)

### 4. Testing Conditions

《Unless otherwise specified》

Temperature : Ordinary Temperature / 15°C to 35°C

Humidity : Ordinary Humidity / 25%(RH) to 85%(RH)

《In case of doubt》

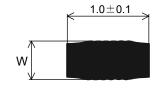
Temperature : 20°C±2°C

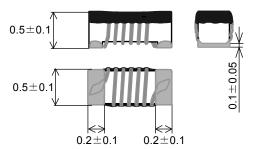
Humidity : 60%(RH) to 70%(RH) Atmospheric Pressure : 86kPa to 106 kPa

#### SpecNo.JELF243A-9114F-01

## Reference Only

### 5. Appearance and Dimensions





#### \*Dimension of W

Inductance	W (in mm)
1N5~23N	0.6±0.1
24N~R12	0.5±0.1

■Unit mass (Typical value) 0.0008g

(in mm)

#### **6.Electrical Performance**

	icai i eriorillance		
No.	Item	Specification	Test Method
6.1	Inductance	Inductance shall meet item 3.	Measuring Equipment: KEYSIGHT E4991A or equivalent Measuring Frequency: <inductance> 100MHz</inductance>
6.2	Q	Q shall meet item 3.	Measuring Method : See the endnote. <electrical :="" inductance="" measuring="" method="" of="" performance="" q=""></electrical>
6.3	DC Resistance	DC Resistance shall meet item 3.	Measuring Equipment : Digital multi meter
6.4	Self Resonant Frequency(S.R.F)	S.R.F shall meet item 3.	Measuring Equipment : KEYSIGHT N5230A or equivalent
6.5	Rated Current	Self temperature rise shall be limited to 20°C max.	The rated current is applied.



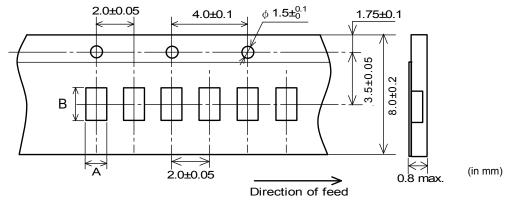
# 7. Q200 Requirement 7.1.Performance (based on Table 5 for Magnetics(Inductors / Transformer) AEC-Q200 Rev.D issued June 1. 2010

	A	AEC-Q200	Murata Specification / Doviation			
No	Stress	Test Method	Murata Specification / Deviation			
3	High Temperature	1000hours at 125 deg C Set for 24hours at room	Meet Table A after testing. <u>Table A</u>			
	Exposure	temperature, then measured.	Appearance No damage			
			Inductance change (at 100MHz) Within ±5%			
4	Temperature Cycling	1000cycles -40 deg C to +125 deg C Set for 24hours at room temperature,then measured.	Meet Table A after testing.			
7	Biased Humidity	1000hours at 85 deg C, 85%RH unpowered.	Meet Table A after testing.			
8	Operational Life	Apply 125 deg C 1000hours Set for 24hours at room temperature, then measured	Meet Table A after testing.			
9	External Visual	Visual inspection	No abnormalities			
10	Physical Dimension	Meet ITEM 5 (Style and Dimensions)	No defects			
12	Resistance to Solvents	Per MIL-STD-202 Method 215	Not Applicable			
13	Mechanical Shock	Per MIL-STD-202 Method 213 Condition C: 100g's(0.98N), 6ms, Half sine, 12.3ft / s	Meet Table A after testing.			
14	Vibration	5g's (0.049N) for 20 minutes, 12cycles each of 3 orientations Test from 10-2000Hz.	Meet Table A after testing.			
15	Resistance to Soldering Heat	No-heating Solder temperature 260C+/-5 deg C Immersion time 10s	Pre-heating: 150C + / -10 deg C, 60s to 90s Meet Table A after testing.			
17	ESD	Per AEC-Q200-002	ESD Rank : Refer to Item 3. Rating. Meet Table A after testing			
18	Solderbility	Per J-STD-002	Method b : Not Applicable 95% of the terminations is to be soldered. (Except exposed wire)			
19	Electrical Characterization	Measured : Inductance	No defects			
20	Flammability	Per UL-94	Not Applicable			

	A	AEC-Q200	Murata Specification / Deviation		
No	Stress	Test Method	- Widiata Specification / Deviation		
21	Board Flex	Epoxy-PCB(1.6mm) Deflection 2mm(min) Holding time 60s	Meet Table B after testing.  Table B  Appearance  No damage  DC resistance change  Within ±10%		
22	Terminal Strength	Per AEC-Q200-006 A force of 17.7N for 60s	No defects Murata Deviation Request : 5N / 60s		

#### 8. Specification of Packaging

8.1 Appearance and Dimensions of paper tape (8mm-wide)



Inductance	A* (mm) (Tolerance ±0.03)	B* (mm) (Tolerance ±0.03)
1N5, 2N4~2N8, 3N9~4N8, 5N8~6N8, 8N2~9N9, 11N, 12N, 15N	0.69	1.18
1N6~1N8, 2N9, 3N0, 3N1, 3N2, 4N9~5N1, 6N9-7N5, 10N, 13N, 16N~23N, R10, R12	0.66	1.18
24N~91N	0.64	1.18

\*Typical value

#### 8.2 Specification of Taping

- (1) Packing quantity (standard quantity)
  - 10,000 pcs. / reel
- (2) Packing Method

Products shall be packed in the cavity of the base tape and sealed by Cover tape.

(3) Sprocket hole

The sprocket holes are to the right as the tape is pulled toward the user.

(4) Spliced point

Base tape and Cover tape has no spliced point.

(5) Missing components number

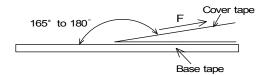
Missing components number within 0.1% of the number per reel or 1 pc., whichever is greater, and are not continuous. The Specified quantity per reel is kept.

#### 8.3 Pull Strength

Cover tape	5N min.
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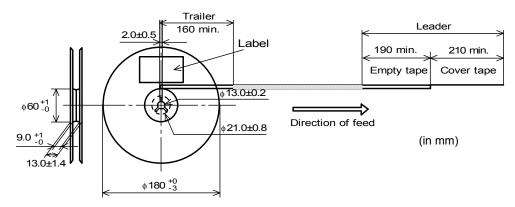
#### 8.4 Peeling off force of cover tape

Speed of Peeling off	300mm/min
Peeling off force	0.1N to 0.6N (minimum value is typical)



#### 8.5 Dimensions of Leader-tape, Trailer and Reel

There shall be leader-tape (cover tape and empty tape) and trailer-tape (empty tape) as follows.



#### 8.6 Marking for reel

Customer part number, MURATA part number, Inspection number (\*1), RoHS marking (\*2), Quantity etc · · ·

\*1) <Expression of Inspection No.>

 $\frac{\square \square}{(1)} \frac{0000}{(2)} \frac{\times \times \times}{(3)}$ 

(1) Factory Code

(2) Date First digit : Year / Last digit of year

Second digit : Month / Jan. to Sep.  $\rightarrow$  1 to 9, Oct. to Dec.  $\rightarrow$  O, N, D

Third, Fourth digit : Day

(3) Serial No.

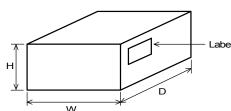
\*2) <Expression of RoHS marking> ROHS  $-\underline{Y}$  ( $\underline{\triangle}$ ) (1) (2)

- (1) RoHS regulation conformity
- (2) MURATA classification number

#### 8.7 Marking for Outside package (corrugated paper box)

Customer name, Purchasing order number, Customer part number, MURATA part number, RoHS Marking (\*2), Quantity, etc  $\cdots$ 

#### 8.8. Specification of Outer Case



Outer Cas	se Dimensi	ons (mm)	Standard Reel Quantity
W	D	Н	in Outer Case (Reel)
186	186	93	5

\* Above Outer Case size is typical. It depends on a quantity of an order.

#### 9. A Caution

#### 9.1 Limitation of Applications

Please contact us before using our products for the applications listed below which require especially high reliability for the prevention of defects which might directly cause damage to the third party's life, body or property.

- (1) Aircraft equipment
- (6) Transportation equipment (trains, ships, etc.)
- (2) Aerospace equipment
- (7) Traffic signal equipment
- (3) Undersea equipment
- (8) Disaster prevention / crime prevention equipment
- (4) Power plant control equipment
- (9) Data-processing equipment
- (5) Medical equipment
- (10) Applications of similar complexity and /or reliability requirements to the applications listed in the above

#### 9.2 Caution (Rating)

Do not exceed maximum rated current of the product. Thermal stress may be transmitted to the product and short / open circuit of the product or falling off the product may be occurred.

#### 9.3 Fail-safe

Be sure to provide an appropriate fail-safe function on your product to prevent a second damage that may be caused by the abnormal function or the failure of our product.

#### 10. Notice

Products can only be soldered with reflow.

This product is designed for solder mounting.

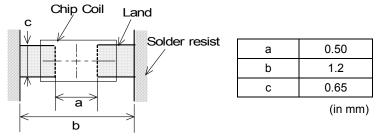
Please consult us in advance for applying other mounting method such as conductive adhesive.

#### 10.1 Land pattern designing

Recommended land patterns for reflow soldering are as follows:

These have been designed for Electric characteristics and solderability.

Please follow the recommended patterns. Otherwise, their performance which includes electrical performance or solderability may be affected, or result to "position shift" in soldering process.



#### 10.2 Flux, Solder

· Use rosin-based flux.

Includes middle activator equivalent to 0.06(wt)% to 0.1(wt) % Chlorine.

Don't use highly acidic flux with halide content exceeding 0.2(wt) % (chlorine conversion value).

Don't use water-soluble flux.

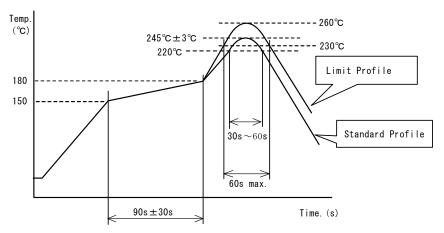
- · Use Sn-3.0Ag-0.5Cu solder.
- Standard thickness of solder paste :  $100 \,\mu$  m to  $150 \,\mu$  m.

#### 10.3 Reflow soldering conditions

 Pre-heating should be in such a way that the temperature difference between solder and product surface is limited to 150°C max. Cooling into solvent after soldering also should be in such a way that the temperature difference is limited to 100°C max.

Insufficient pre-heating may cause cracks on the product, resulting in the deterioration of products quality.

- Standard soldering profile and the limit soldering profile is as follows.
   The excessive limit soldering conditions may cause leaching of the electrode and / or resulting in the deterioration of product quality.
- · Reflow soldering profile



	Standard Profile	Limit Profile	
Pre-heating	150°C~180°C	C 、90s±30s	
Heating	above 220°C, 30s~60s	above 230°C, 60s max.	
Peak temperature	245°C±3°C	260°C,10s	
Cycle of reflow	2 times	2 times	

#### 10.4 Reworking with soldering iron

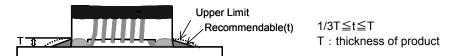
The following conditions must be strictly followed when using a soldering iron.

Pre-heating	150°C,1 min
Tip temperature	350°C max.
Soldering iron output	80W max.
Tip diameter	φ3mm max.
Soldering time	3 (+1,-0)s
Time	2 times

Note: Do not directly touch the products with the tip of the soldering iron in order to prevent the crack on the products due to the thermal shock.

#### 10.5 Solder Volume

- Solder shall be used not to be exceeded the upper limits as shown below.
- Accordingly increasing the solder volume, the mechanical stress to Chip is also increased.
   Exceeding solder volume may cause the failure of mechanical or electrical performance.

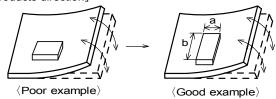


#### 10.6 Product's location

The following shall be considered when designing and laying out P.C.B.'s.

(1) P.C.B. shall be designed so that products are not subject to the mechanical stress due to warping the board.

#### [Products direction]

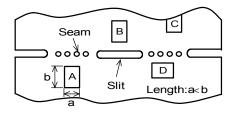


Products shall be located in the sideways direction (Length:a < b) to the mechanical stress.

(2) Components location on P.C.B. separation.

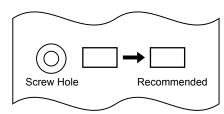
It is effective to implement the following measures, to reduce stress in separating the board. It is best to implement all of the following three measures; however, implement as many measures as possible to reduce stress.

Contents of Measures	Stress Level	
(1) Turn the mounting direction of the component parallel to the board separation surface.	A > D*1	
(2) Add slits in the board separation part.	A > B	
(3) Keep the mounting position of the component away from the board separation surface.	A > C	



\*1 A > D is valid when stress is added vertically to the perforation as with Hand Separation. If a Cutting Disc is used, stress will be diagonal to the PCB, therefore A > D is invalid.

(3) Mounting Components Near Screw Holes When a component is mounted near a screw hole, it may be affected by the board deflection that occurs during the tightening of the screw. Mount the component in a position as far away from the screw holes as possible.





#### 10.7 Cleaning Conditions

Products shall be cleaned on the following conditions.

- (1) Cleaning temperature shall be limited to 60°C max. (40°C max for IPA)
- (2) Ultrasonic cleaning shall comply with the following conditions with avoiding the resonance phenomenon at the mounted products and P.C.B.

Power: 20 W / I max. Frequency: 28kHz to 40kHz Time: 5 min max.

- (3) Cleaner
  - 1. Alcohol type cleaner

Isopropyl alcohol (IPA)

2. Aqueous agent

PINE ALPHA ST-100S

(4) There shall be no residual flux and residual cleaner after cleaning.

In the case of using aqueous agent, products shall be dried completely after rinse with de-ionized water in order to remove the cleaner.

(5) Other cleaning Please contact us.

#### 10.8 Resin coating

The inductance value may change due to high cure-stress of resin to be used for coating/molding products.

An open circuit issue may occur by mechanical stress caused by the resin, amount/cured shape of resin, or operating condition etc. Some resin contains some impurities or chloride possible to generate chlorine by hydrolysis under some operating condition may cause corrosion of wire of coil, leading to open circuit. So, please pay your careful attention when you select resin in case of coating/molding the products with the resin.

Prior to use the coating resin, please make sure no reliability issue is observed by evaluating products mounted on your board.

#### 10.9 Caution for use

- Sharp material such as a pair of tweezers or other material such as bristles of cleaning brush , shall not be touched to the winding portion to prevent the breaking of wire.
- · Mechanical shock should not be applied to the products mounted on the board to prevent the breaking of the core.

#### 10.10 Notice of product handling at mounting

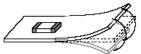
In some mounting machines, when picking up components support pin pushes up the components from the bottom of base tape. In this case, please remove the support pin. The support pin may damage the components and break wire. In rare case, the laser recognition can not recognize this component. Please contact us when you use laser recognition. (There is no problem with the permeation and reflection type.)

#### 10.11 Handling of a substrate

After mounting products on a substrate, do not apply any stress to the product caused by bending or twisting to the substrate when cropping the substrate, inserting and removing a connector from the substrate or tightening screw to the substrate.

Excessive mechanical stress may cause cracking in the product.

Bending



Twisting



#### 10.12 Storage and Handing Requirements

(1) Storage period

Use the products within 12 months after delivered.

Solderability should be checked if this period is exceeded.

- (2) Storage conditions
  - Products should be stored in the warehouse on the following conditions.

Temperature : -10°C to 40°C

Humidity : 15% to 85% relative humidity No rapid change on temperature and humidity

- Don't keep products in corrosive gases such as sulfur, chlorine gas or acid, or it may cause oxidization of electrode, resulting in poor solderability.
- Products should not be stored on bulk packaging condition to prevent the chipping of the core and the breaking
  of winding wire caused by the collision between the products.
- Products should be stored on the palette for the prevention of the influence from humidity, dust and so on.
- Products should be stored in the warehouse without heat shock, vibration, direct sunlight and so on.
- (3) Handling Condition

Care should be taken when transporting or handling product to avoid excessive vibration or mechanical shock.

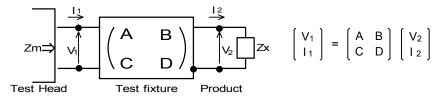
#### 11. **A** Note

- (1) Please make sure that your product has been evaluated in view of your specifications with our product being mounted to your product.
- (2) You are requested not to use our product deviating from the reference specifications.
- (3) The contents of this reference specification are subject to change without advance notice.

  Please approve our product specifications or transact the approval sheet for product specifications before ordering.

#### -< Electrical Performance : Measuring Method of Inductance / Q > -

(1) Residual elements and stray elements of test fixture can be described by F-parameter shown in following.



(2) The impedance of chip coil Zx and measured value Zm can be described by input/output current/voltage.

$$Zm = \frac{V_1}{I_1} , \qquad Zx = \frac{V_2}{I_2}$$

(3) Thus, the relation between Zx and Zm is following;

Zsm: measured impedance of short chip
Zss: residual impedance of short chip (0.556nH)
Yom: measured admittance when opening the fixture

(4) Lx and Qx shall be calculated with the following equation.

$$Lx = \begin{array}{c} \frac{Im(Zx)}{2\pi f}, \quad Qx = \frac{Im(Zx)}{Re(Zx)} \\ \end{array} \begin{array}{c} Lx: \text{ Inductance of chip coil} \\ Qx: Q \text{ of chip coil} \\ f: \text{ Measuring frequency} \end{array}$$