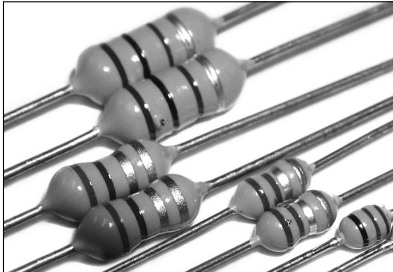


# LEADED INDUCTORS

■ OPERATING TEMP

-25 ~ +85°C (Including self-generated heat)

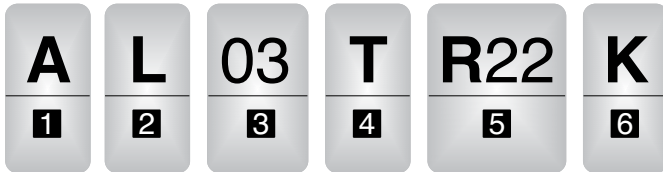


## ■ FEATURES

- ABCO Axial inductor is wire wound on the fewite core.
- Extremely reliable inductors that are ideal for signal and power line applications
- Highly efficient automated production processes can provide high quality inductors in large volumes.

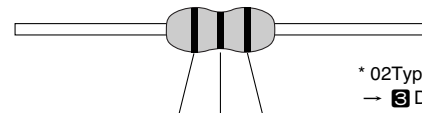
## ■ APPLICATION

- Consumer electronics (such as VCRs, TVs, audio, equipment, general electronic appliances.)

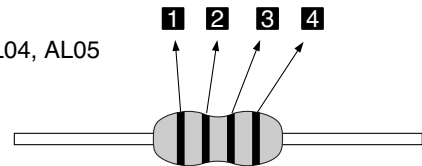


## ■ MARKING

- AL02, ALN02, ALC02



- AL03, AL04, AL05



## ■ ORDERING CODE

1 Part name	
A	Axial Inductor

2 Characteristics	
L	Standard Type
N, C	High Current Type

3 Body Size (D×L)[mm]	
02	2.5×3.4(AL, ALC)
	2.5×3.7(ALN)
03	3.0×7.0
04	4.2×9.8
05	4.5×14.0

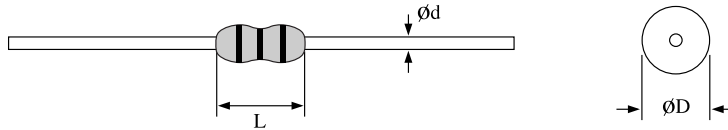
4 Taping Configurations	
TA	Axial lead(26mm lead space) /ammo pack(02/03type)
TB	Axial lead(52mm lead space) /ammo pack(all type)
TR	Axial lead Reel pack (all type)

5 Nominal Inductance[μH]	
R22	0.22
1R5	1.5
120	12

6 Inductance Tolerance[%]	
J	± 5
K	± 10
M	± 20

Color	Inductance[μH]			
	1st Digit	2nd Digit	Multiplier	Tolerance
	1	2	3	4
Black	0	×	1	± 20%
Brown	1	×	10	-
Red	2	×	100	-
Orange	3	×	1000	-
Yellow	4	-	-	-
Green	5	-	-	-
Blue	6	-	-	-
Purple	7	-	-	-
Grey	8	-	-	-
White	9	-	-	-
Gold	-	×	0.1	± 5%
Silver	-	×	0.01	± 10%

## ■ APPERANCE DIMENSIONS



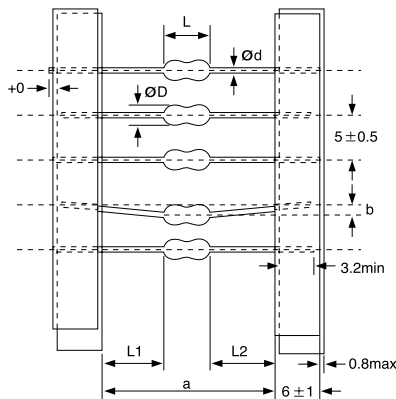
Unit: mm

Type	Dimensions			Taped	
	L	ØD	Ød	Straight	
AL02, ALC02	3.4max.	2.5max.	0.5 ± 0.05	TB	
ALN02	3.7max.	2.5max.			
AL02, ALC02	3.4max.	2.5max.	0.45 ± 0.05	TA	
ALN02	3.7max.	2.5max.			
AL03	7.0max.	3.0max.	0.5 ± 0.05	TA	
AL04	9.8max.	4.2max.	0.65 ± 0.05	TB	
AL05	14.0max.	4.5max.	0.65 ± 0.05	TB	

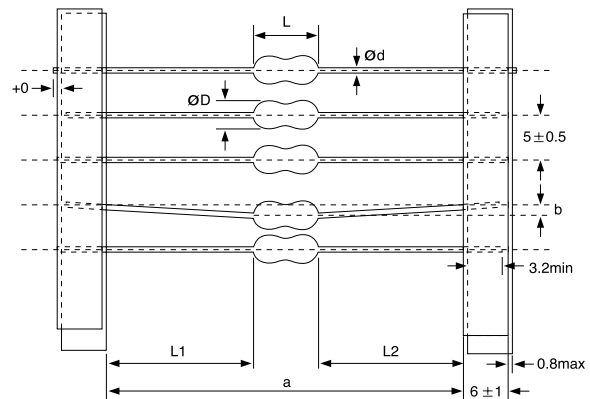
LEADED INDUCTORS

## ■ SHAPE DIMENSIONS

● TA(26mm)



● TB(52mm)



Unit: mm

Type	Dimensions						Pitch Minimum insertion pitch
	ØD	L	a	b	L1-L2	Ød	
AL02 ALC02	2.5max.	3.4max.	26 <sup>+0.5</sup> <sub>-0</sub>	0.8max.	0.5max.	0.45 ± 0.05	5.0
ALN02	2.5max.	3.7max.	26 <sup>+0.5</sup> <sub>-0</sub>	0.8max.	0.5max.	0.45 ± 0.05	5.0
AL03	3.0max.	7.0max.	26 <sup>+1</sup> <sub>-0.5</sub>	0.8max.	1.0max.	0.50 ± 0.05	10.0

Unit: mm

Type	Dimensions						Pitch Minimum insertion pitch
	ØD	L	a	b	L1-L2	Ød	
AL02 ALC02	2.5max.	3.4max.	52 <sup>+2</sup> <sub>-1</sub>	1.2max.	1.0max.	0.50 ± 0.05	5.0
ALN02	2.5max.	3.7max.	52 <sup>+2</sup> <sub>-1</sub>	1.2max.	1.0max.	0.50 ± 0.05	7.5
AL03	3.0max.	7.0max.	52 <sup>+2</sup> <sub>-1</sub>	1.2max.	1.0max.	0.50 ± 0.05	10.0
AL04	4.2max.	9.8max.	52 <sup>+2</sup> <sub>-1</sub>	1.2max.	1.0max.	0.65 ± 0.05	12.5
AL05	4.5max.	14.0max.	52 <sup>+2</sup>	1.2max.	1.0max.	0.50 ± 0.05	20.0

# AVAILABLE INDUCTANCE RANGE

Type Range	AL02	ALC02	ALN02	AL03	AL04	AL05
0	I max.[mA] Rdc max.[Ω]	I max.[mA] Rdc max.[Ω]	I max.[mA] Rdc max.[Ω]	I max.[mA] Rdc max.[Ω]	I max.[mA] Rdc max.[Ω]	I max.[mA] Rdc max.[Ω]
1	0.22	0.22	0.12	0.22	0.22	
10						
100	470	100	470			
1000				1000		
2200						
8200						
10000					10000	
						1.0
						1500

## ● Examples

Inductance	I max. [mA]	Rdc max. [Ω]	I max. [mA]	Rdc max. [Ω]	I max. [mA]	Rdc max. [Ω]	I max. [mA]	Rdc max. [Ω]	I max. [mA]	Rdc max. [Ω]	I max. [mA]	Rdc max. [Ω]
1 μH	270	0.8	510	0.4	500	0.32	270	0.8	920	0.19	5600	0.022
10 μH	160	2.3	270	1.4	280	1.0	160	2.3	500	0.58	2100	0.062
100 μH	44	12	105	9.1	120	5.6	90	7.0	275	1.80	700	0.480
1000 μH	-	-	-	-	-	-	40	33.0	100	14.0	240	5.800
2200 μH	-	-	-	-	-	-	-	-	80	40.0	-	-
8200 μH	-	-	-	-	-	-	-	-	45	116.0	-	-
10000 μH	-	-	-	-	-	-	-	-	35	148.0	-	-

# ITEM PART NUMBERS

●AL02

Ordering Code	Inductance [μH]	Inductance Tolerance	Q (min.)	Measuring Frequency [MHz]	Self-Resonant Frequency [MHz] (min.)	DC Resistance [Ω] (max.)	Rate Current [mA] (max.)		
AL02TO R22K	0.22	± 10% (± 5%)	35	25.2	410	0.40	400		
AL02TO R27K	0.27				410	0.43	380		
AL02TO R33K	0.33				360	0.48	370		
AL02TO R39K	0.39				300	0.51	350		
AL02TO R47K	0.47				230	0.56	330		
AL02TO R56K	0.56				210	0.61	320		
AL02TO R68K	0.68				190	0.67	310		
AL02TO R82K	0.82				170	0.74	290		
AL02TO 1R0K	1.0				150	0.80	270		
AL02TO 1R2K	1.2				40	7.96	110	0.90	260
AL02TO 1R5K	1.5		80	1.0			250		
AL02TO 1R8K	1.8		60	1.1			240		
AL02TO 2R2K	2.2		45	1.2			230		
AL02TO 2R7K	2.7		40	1.3			220		
AL02TO 3R3K	3.3		38	1.4			210		
AL02TO 3R9K	3.9		35	1.6			200		
AL02TO 4R7K	4.7		32	1.7			190		
AL02TO 5R6K	5.6		30	1.9			180		
AL02TO 6R8K	6.8		28	2.0			175		
AL02TO 8R2K	8.2		26	2.2			165		
AL02TO 100K	10		24	2.3			160		
AL02TO 120K	12		2.52	25.2			22	2.5	150
AL02TO 150K	15						20	2.8	145
AL02TO 180K	18						18	3.1	140
AL02TO 220K	22						17	3.4	130
AL02TO 270K	27						16	4.3	80
AL02TO 330K	33						14	4.7	76
AL02TO 390K	39						13	5.2	74
AL02TO 470K	47						12	5.8	70
AL02TO 560K	56				11	6.4	68		
AL02TO 680K	68				10	7.2	64		
AL02TO 820K	82		9.5	11	46				
AL02TO 101K	100		9.0	12	44				
AL02TO 121K	120		0.796	7.96	8.0	13	42		
AL02TO 151K	150				6.0	16	39		
AL02TO 181K	180	5.5			18	37			
AL02TO 221K	220	5.0			20	35			
AL02TO 271K	270	4.6			26	28			
AL02TO 331K	330	4.4			27	26			
AL02TO 391K	390	4.1			28	25			
AL02TO 471K	470	3.7			30	24			

\*please specify the taping configuration code.

\*O: A, B, R

LEADED INDUCTORS

# ITEM PART NUMBERS

● ALC02

Ordering Code	Inductance [ $\mu$ H]	Inductance Tolerance	Q (min.)	Measuring Frequency [MHz]	Self-Resonant Frequency [MHz] (min.)	DC Resistance [ $\Omega$ ] (max.)	Rate Current [mA] (max.)		
ALC02TOR22K	0.22	10%	50	25.2	450	0.2	730		
ALC02TOR27K	0.27				400	0.21	700		
ALC02TOR33K	0.33				350	0.23	670		
ALC02TOR39K	0.39				320	0.25	640		
ALC02TOR47K	0.47				300	0.27	620		
ALC02TOR56K	0.56				280	0.3	590		
ALC02TOR68K	0.68				240	0.33	570		
ALC02TOR82K	0.82				210	0.35	540		
ALC02TO1R0K	1				190	0.4	510		
ALC02TO1R2J	1.2				5%	40	7.96	110	0.43
ALC02TO1R5J	1.5	80	0.48	460					
ALC02TO1R8J	1.8	70	0.53	440					
ALC02TO2R2J	2.2	60	0.6	420					
ALC02TO2R7J	2.7	55	0.68	390					
ALC02TO3R3J	3.3	50	0.75	370					
ALC02TO3R9J	3.9	45	0.83	350					
ALC02TO4R7J	4.7	40	0.91	340					
ALC02TO5R6J	5.6	35	1	320					
ALC02TO6R8J	6.8	30	1.1	300					
ALC02TO8R2J	8.2	26	1.3	290					
ALC02TO100J	10	24	1.4	270					
ALC02TO120J	12	40	2.52	22				1.4	270
ALC02TO150J	15			20				1.6	260
ALC02TO180J	18			18				1.7	250
ALC02TO220J	22			17				1.9	230
ALC02TO270J	27			16				2.5	200
ALC02TO330J	33			14				3.4	180
ALC02TO390J	39			13				3.6	170
ALC02TO470J	47			12				4.6	150
ALC02TO560J	56			11	5.1	140			
ALC02TO680J	68			10	5.6	130			
ALC02TO820J	82	9.5	7.9	115					
ALC02TO101J	100	9	9.1	105					

\*please specify the taping configuration code.

\*O: A, B, R

●ALN02

Ordering Code	Inductance [μH]	Inductance Tolerance	Q (min.)	Measuring Frequency [MHz]	Self-Resonant Frequency [MHz] (min.)	DC Resistance [Ω] (max.)	Rate Current [mA] (max.)
ALN02TOR12K	0.12	± 10% (± 5%)	50	25.2	500	0.12	850
ALN02TOR15K	0.15				500	0.14	800
ALN02TOR18K	0.18				500	0.15	760
ALN02TOR22K	0.22				500	0.16	730
ALN02TOR27K	0.27				500	0.18	690
ALN02TOR33K	0.33				480	0.19	660
ALN02TOR39K	0.39				430	0.21	640
ALN02TOR47K	0.47				380	0.23	610
ALN02TOR56K	0.56				350	0.25	580
ALN02TOR68K	0.68				310	0.27	550
ALN02TOR82K	0.82				270	0.29	520
ALN02TOR1R0K	1.0				240	0.32	500
ALN02TOR1R2K	1.2				210	0.35	480
ALN02TOR1R5K	1.5				190	0.38	450
ALN02TOR1R8K	1.8				140	0.42	430
ALN02TOR2R2K	2.2				90	0.47	410
ALN02TOR2R7K	2.7				70	0.52	390
ALN02TOR3R3K	3.3				50	0.57	370
ALN02TOR3R9K	3.9				35	0.63	360
ALN02TOR4R7K	4.7				32	0.69	340
ALN02TOR5R6K	5.6		30	0.75	320		
ALN02TOR6R8K	6.8		28	0.84	310		
ALN02TOR8R2K	8.2		26	0.92	290		
ALN02TOR100K	10		24	1.0	280		
ALN02TOR120K	12		22	1.0	280		
ALN02TOR150K	15		20	1.2	265		
ALN02TOR180K	18		18	1.3	250		
ALN02TOR220K	22		17	1.5	235		
ALN02TOR270K	27		15	1.7	220		
ALN02TOR330K	33		14	2.2	180		
ALN02TOR390K	39		13	2.4	170		
ALN02TOR470K	47		12	2.8	160		
ALN02TOR560K	56		10	4.1	140		
ALN02TOR680K	68		9.2	4.5	130		
ALN02TOR820K	82		8.8	5.0	125		
ALN02TOR101K	100		8.0	5.6	120		
ALN02TOR121K	120		6.6	9.2	90		
ALN02TOR151K	150		5.8	10.5	85		
ALN02TOR181K	180		5.4	11.5	80		
ALN02TOR221K	220		4.8	13.0	75		
ALN02TOR271K	270	3.6	16.0	70			
ALN02TOR331K	330	3.4	18.0	66			
ALN02TOR391K	390	3.2	20.0	63			
ALN02TOR471K	470	3.0	22.0	60			

\*please specify the taping configuration code.

\*O: A, B, R

LEADED INDUCTORS

# ITEM PART NUMBERS

●AL03

Ordering Code	Inductance [μH]	Inductance Tolerance	Q (min.)	Measuring Frequency [MHz]	Self-Resonant Frequency [MHz] (min.)	DC Resistance [Ω] (max.)	Rate Current [mA] (max.)
AL03T O R22K	0.22	± 10% (± 5%)	35	25.2	450	0.40	400
AL03T O R27K	0.27				410	0.43	380
AL03T O R33K	0.33				360	0.48	370
AL03T O R39K	0.39				300	0.51	350
AL03T O R47K	0.47				230	0.56	330
AL03T O R56K	0.56				210	0.61	320
AL03T O R68K	0.68				190	0.67	310
AL03T O R82K	0.82				170	0.74	290
AL03T O 1R0K	1.0		150	0.80	270		
AL03T O 1R2K	1.2		50	7.96	144	0.90	260
AL03T O 1R5K	1.5				131	1.0	250
AL03T O 1R8K	1.8				121	1.1	240
AL03T O 2R2K	2.2				110	1.2	230
AL03T O 2R7K	2.7				100	1.3	220
AL03T O 3R3K	3.3				94	1.4	210
AL03T O 3R9K	3.9				65	1.6	200
AL03T O 4R7K	4.7				56	1.7	190
AL03T O 5R6K	5.6				48	1.9	180
AL03T O 6R8K	6.8				37	2.0	175
AL03T O 8R2K	8.2				25	2.2	165
AL03T O 100K	10				21	2.3	160
AL03T O 120K	12				19	2.5	150
AL03T O 150K	15				17	2.8	145
AL03T O 180K	18				13	3.1	140
AL03T O 220K	22				9.6	3.4	130
AL03T O 270K	27				7.2	3.8	125
AL03T O 330K	33				6.3	4.1	120
AL03T O 390K	39				6.3	4.5	115
AL03T O 470K	47				6.3	4.9	110
AL03T O 560K	56		6.2	5.3	105		
AL03T O 680K	68		5.7	5.8	100		
AL03T O 820K	82		5.3	6.3	95		
AL03T O 101K	100		4.8	7.0	90		
AL03T O 121K	120		0.796	3.8	13	90	
AL03T O 151K	150			3.5	15	85	
AL03T O 181K	180			3.3	16	80	
AL03T O 221K	220			3.0	17	75	
AL03T O 271K	270			2.8	19	65	
AL03T O 331K	330			2.6	20	60	
AL03T O 391K	390			2.4	22	55	
AL03T O 471K	470	2.25		24	55		
AL03T O 561K	560	2.10		26	50		
AL03T O 681K	680	1.95		28	45		
AL03T O 821K	820	1.85	30	40			
AL03T O 102K	1000	1.40	33	40			

\*please specify the taping configuration code.

\*O: A, B, R

●AL04

Ordering Code	Inductance [μH]	Inductance Tolerance	Q (min.)	Measuring Frequency [MHz]	Self-Resonant Frequency [MHz] (min.)	DC Resistance [Ω] (max.)	Rated Current [mA] (max.)	
AL04TOR22K	0.22	± 10% (± 5%)	45	25.2	300	0.10	1400	
AL04TOR27K	0.27				270	0.11	1320	
AL04TOR33K	0.33				250	0.12	1280	
AL04TOR39K	0.39				230	0.13	1200	
AL04TOR47K	0.47				220	0.14	1150	
AL04TOR56K	0.56				200	0.15	1100	
AL04TOR68K	0.68				190	0.16	1030	
AL04TOR82K	0.82				172	0.17	980	
AL04TOR1R0K	1.0				157	0.19	920	
AL04TOR1R2K	1.2				50	7.96	144	0.21
AL04TOR1R5K	1.5		131	0.23			830	
AL04TOR1R8K	1.8		121	0.25			790	
AL04TOR2R2K	2.2		110	0.28			750	
AL04TOR2R7K	2.7		100	0.30			720	
AL04TOR3R3K	3.3		65	7.96	94	0.34	670	
AL04TOR3R9K	3.9				65	0.37	640	
AL04TOR4R7K	4.7				56	0.39	620	
AL04TOR5R6K	5.6				48	0.43	590	
AL04TOR6R8K	6.8				37	0.48	550	
AL04TOR8R2K	8.2		80	25	0.52	530		
AL04TOR100K	10		65	21	0.58	500		
AL04TOR120K	12		50	2.52	19	0.63	480	
AL04TOR150K	15				17	0.72	460	
AL04TOR180K	18				13	0.77	430	
AL04TOR220K	22				9.6	0.84	410	
AL04TOR270K	27				7.2	0.94	390	
AL04TOR330K	33				6.3	1.03	370	
AL04TOR390K	39				6.3	1.12	350	
AL04TOR470K	47				45	6.3	1.22	340
AL04TOR560K	56				40	6.2	1.34	320
AL04TOR680K	68				5.7	1.47	305	
AL04TOR820K	82		35	5.3	1.62	290		
AL04TOR101K	100		30	4.8	1.80	275		
AL04TOR121K	120		55	3.8	3.70	185		
AL04TOR151K	150		45	3.5	4.20	175		
AL04TOR181K	180		50	3.3	4.60	165		
AL04TOR221K	220		55	3.0	5.10	155		
AL04TOR271K	270		65	0.796	2.8	5.80	145	
AL04TOR331K	330				2.6	6.40	137	
AL04TOR391K	390				2.4	7.00	133	
AL04TOR471K	470	60			2.25	7.70	126	
AL04TOR561K	560	2.10			8.50	120		
AL04TOR681K	680	55	0.796	1.95	9.40	113		
AL04TOR821K	820			1.85	10.5	105		
AL04TOR102K	1000			50	1.40	14.0	100	
AL04TOR122K	1200	50	0.252	1.20	22.0	110		
AL04TOR152K	1500			1.10	25.0	100		
AL04TOR182K	1800			0.98	28.0	90		
AL04TOR222K	2200			0.90	40.0	80		
AL04TOR272K	2700			0.85	44.0	70		
AL04TOR332K	3300			0.81	50.0	70		
AL04TOR392K	3900			0.72	63.0	60		
AL04TOR472K	4700			0.60	69.0	55		
AL04TOR562K	5600			40	0.55	77.0	50	
AL04TOR682K	6800			0.50	104.0	45		
AL04TOR822K	8200	0.48	116.0	45				
AL04TOR103K	10000	30	0.40	148.0	35			

\*please specify the taping configuration code.

\*O: A, B, R

LEADED INDUCTORS



# ITEM PART NUMBERS

●AL05

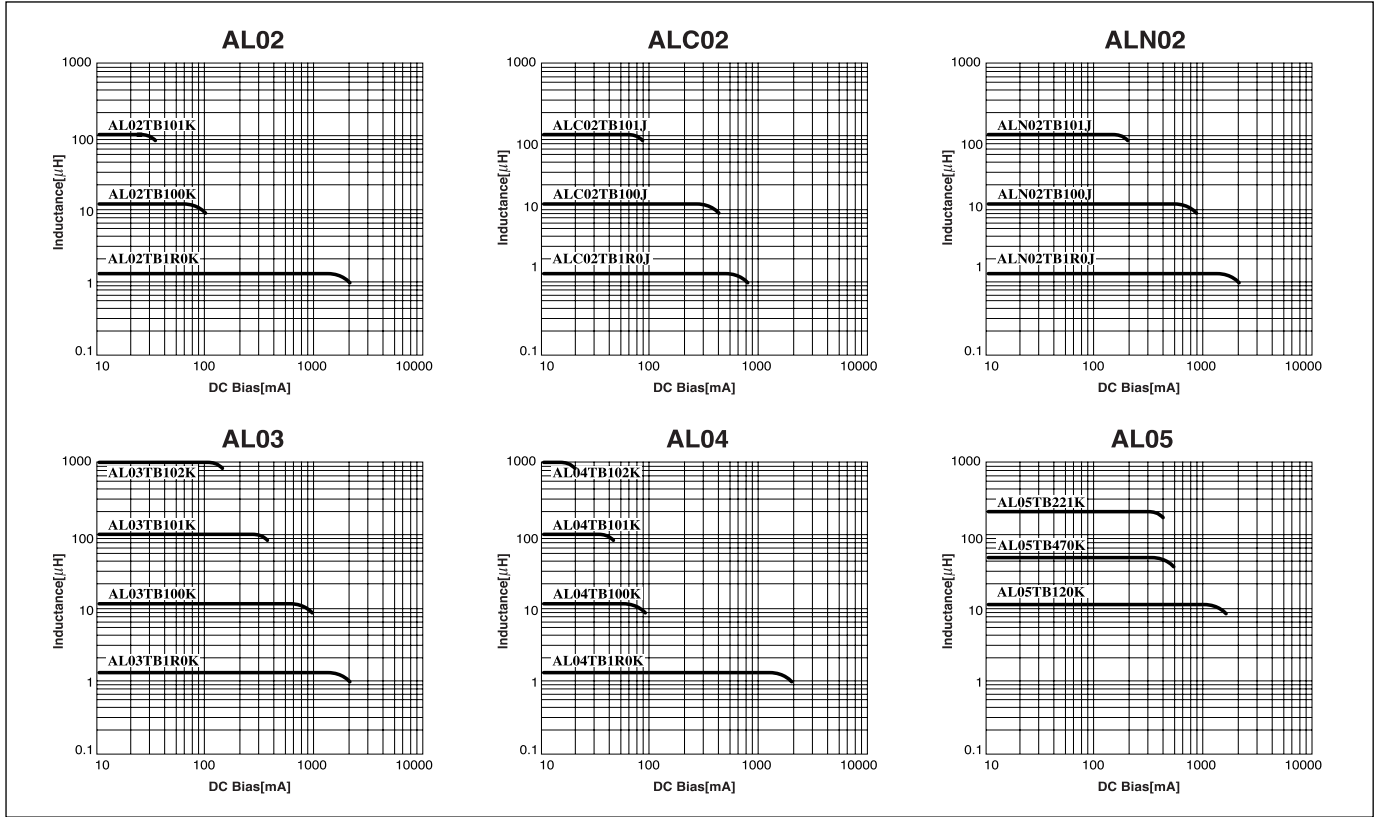
Ordering Code	Inductance [μH]	Inductance Tolerance	Q (min.)	Measuring Frequency [MHz]	Self-Resonant Frequency [MHz] (min.)	DC Resistance [Ω] (max.)	Rate Current [mA] (max.)			
AL05T O 1R0K	1.0	± 10%	10	7.96	300	0.022	5600			
AL05T O 1R2K	1.2				260	0.024	5500			
AL05T O 1R5K	1.5				250	0.026	5000			
AL05T O 1R8K	1.8				240	0.029	4700			
AL05T O 2R2K	2.2				220	0.031	4500			
AL05T O 2R7K	2.7				195	0.034	4000			
AL05T O 3R3K	3.3				155	0.038	3400			
AL05T O 3R9K	3.9				115	0.040	3100			
AL05T O 4R7K	4.7				85	0.044	2800			
AL05T O 5R6K	5.6				55	0.048	2600			
AL05T O 6R8K	6.8				50	0.051	2400			
AL05T O 8R2K	8.2				38	0.056	2200			
AL05T O 100K	10				24	0.062	2100			
AL05T O 120K	12				2.52	15	0.796	18	0.076	1800
AL05T O 150K	15							16	0.088	1700
AL05T O 180K	18							15	0.110	1600
AL05T O 220K	22							14	0.130	1400
AL05T O 270K	27							13	0.140	1300
AL05T O 330K	33		11	0.200				1200		
AL05T O 390K	39		10	0.220				1100		
AL05T O 430K	43		9.5	0.280				1000		
AL05T O 470K	47		9.5	0.280				1000		
AL05T O 560K	56		8.0	0.300				900		
AL05T O 680K	68		7.5	0.340				800		
AL05T O 820K	82		7.0	0.385				700		
AL05T O 101K	100		6.5	0.480				700		
AL05T O 121K	120		5.0	0.595				600		
AL05T O 151K	150		4.5	0.900				550		
AL05T O 181K	180		4.0	1.10				500		
AL05T O 221K	220		3.8	1.25				440		
AL05T O 271K	270		3.5	1.85				420		
AL05T O 331K	330		3.0	2.10	380					
AL05T O 391K	390		2.8	2.28	340					
AL05T O 471K	470		2.5	3.22	320					
AL05T O 561K	560		2.2	3.85	290					
AL05T O 681K	680		2.1	4.00	260					
AL05T O 821K	820	2.0	5.00	250						
AL05T O 102K	1000	1.8	5.80	240						
AL05T O 122K	1200	1.6	7.10	200						
AL05T O 152K	1500	1.5	7.80	190						

\*please specify the taping configuration code.

\*O: A, B, R

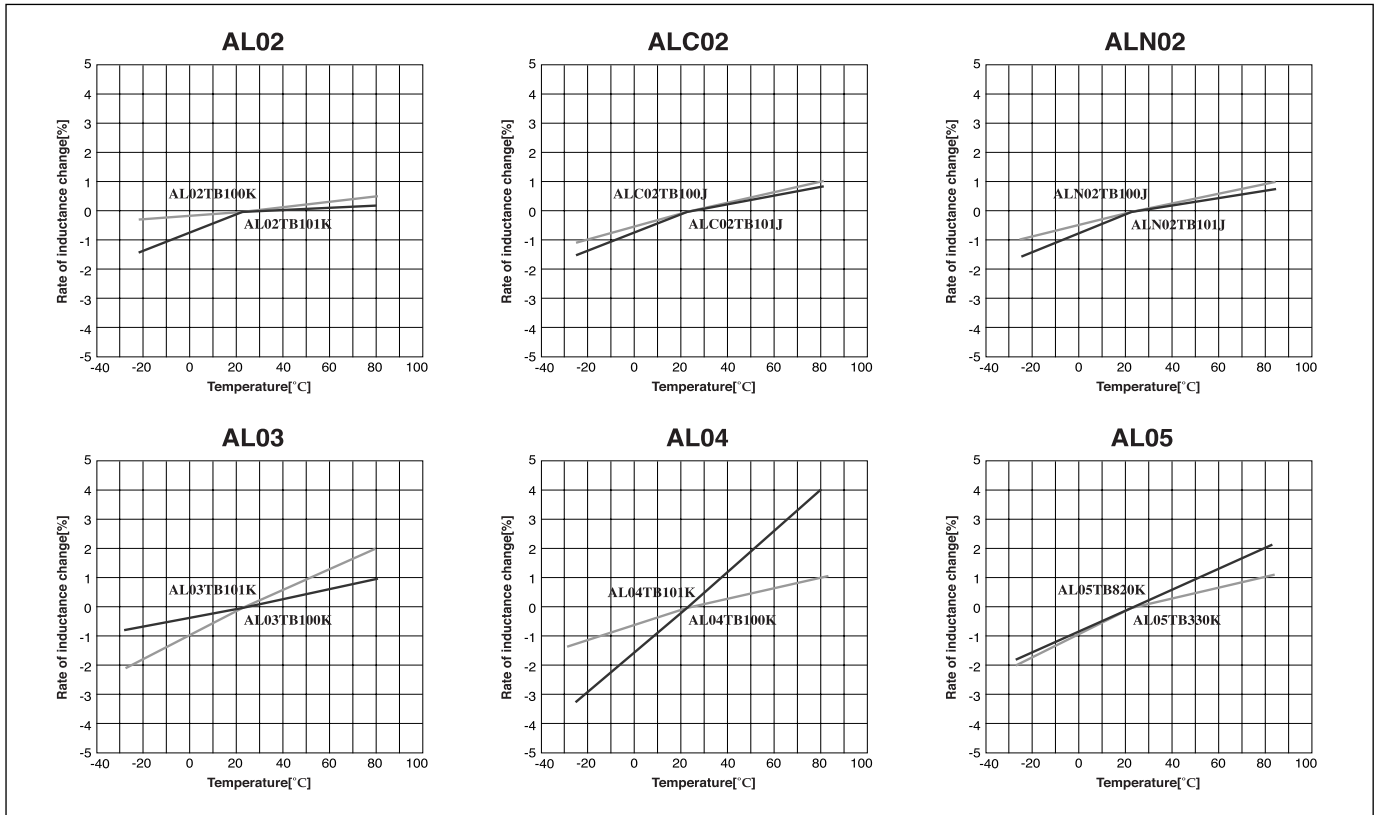
# ELECTRICAL CHARACTERISTICS

## ● DC Bias Characteristics (Measured by HP4284A + HP42841A)



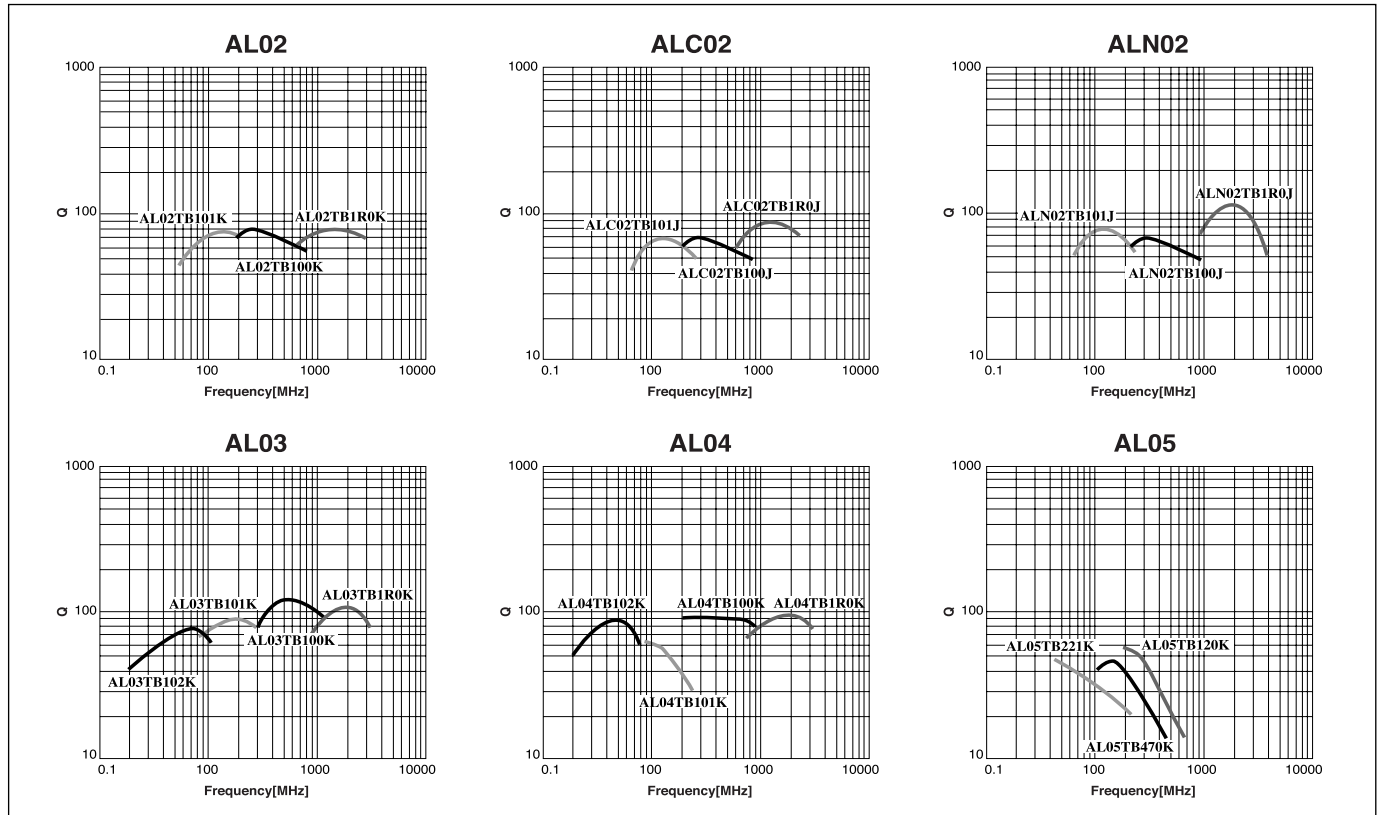
LEADED INDUCTORS

## ● Temperature Characteristics (Measured by HP4284A + HP42841A)



# ELECTRICAL CHARACTERISTICS

● Q-Characteristics(Measured by HP 4285A + HP 42851A)



# RELIABILITY

Item	Specified Value			Test Methods and Remarks												
	AL02, AL03 Type	AL04 Type	AL05 Type													
1. Operating Temperature Range	-25 ~ +85°C			Including self-generated heat.												
2. Storage Temperature Range	-40 ~ +85°C															
3. Q	Within the specified tolerance			Measuring equipment: LCR meter(HP4285A+42851A or its equivalent) Measuring frequency: Specified frequency												
4. Self Resonant Frequency	Within the specified tolerance			Measuring equipment: (Dip meter or its equivalent)												
5. DC Resistance	Within the specified tolerance			Measuring equipment: m+J80Ω Hi Tester(3226 or its equivalent)												
6. DC Bias Characteristics	ΔL/L → Within -10%			Measure inductance with application of rated current using LCR meter to compare it with the initial value.												
7. Temperature Characteristics	ΔL/L → Within ±5%			Change of maximum inductance deviation in step 1 to 5 <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Step</th> <th>Temperature(°C)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>20</td> </tr> <tr> <td>2</td> <td>-25 (Minimum operating temperature)</td> </tr> <tr> <td>3</td> <td>20 (Reference temperature)</td> </tr> <tr> <td>4</td> <td>+85 (Maximum operating temperature)</td> </tr> <tr> <td>5</td> <td>20</td> </tr> </tbody> </table>	Step	Temperature(°C)	1	20	2	-25 (Minimum operating temperature)	3	20 (Reference temperature)	4	+85 (Maximum operating temperature)	5	20
Step	Temperature(°C)															
1	20															
2	-25 (Minimum operating temperature)															
3	20 (Reference temperature)															
4	+85 (Maximum operating temperature)															
5	20															
8. Inductance	Within the Specified tolerance			Measuring equipment: LCR meter (HP4285A+42851A or its equivalent) Measuring frequency: Specified frequency												
9. Rated Current	Within the specified tolerance			The maximum DC value having inductance decrease within 10% and temperature increase within 20°C by the application of DC bias												
10. Terminal Strength	Tensile	No abnormality such as cutoff or looseness of lead		Apply the stated tensile force progressively in the direction to draw terminal <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Nominal wire diameter(mm)</th> <th>Tensile force(N)</th> <th>Duration(S)</th> </tr> </thead> <tbody> <tr> <td>0.43 &lt; Ød ≤ 0.65</td> <td>25</td> <td>5</td> </tr> </tbody> </table>	Nominal wire diameter(mm)	Tensile force(N)	Duration(S)	0.43 < Ød ≤ 0.65	25	5						
	Nominal wire diameter(mm)	Tensile force(N)	Duration(S)													
0.43 < Ød ≤ 0.65	25	5														
Bending	No abnormality such as cutoff or looseness of lead		Suspend a mass at the terminal, incline the body through angle of 90° and return it to initial position. This operation is done over a period of 2~3 sec. Then a second bend in the opposite direction shall be made. Number of bends: Two times <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Nominal wire diameter(mm)</th> <th>Bending force(N)</th> <th>Mass weight(kg)</th> </tr> </thead> <tbody> <tr> <td>0.3 &lt; Ød ≤ 0.5</td> <td>2.5</td> <td>0.25</td> </tr> <tr> <td>0.5 &lt; Ød ≤ 0.8</td> <td>5</td> <td>0.5</td> </tr> </tbody> </table>	Nominal wire diameter(mm)	Bending force(N)	Mass weight(kg)	0.3 < Ød ≤ 0.5	2.5	0.25	0.5 < Ød ≤ 0.8	5	0.5				
Nominal wire diameter(mm)	Bending force(N)	Mass weight(kg)														
0.3 < Ød ≤ 0.5	2.5	0.25														
0.5 < Ød ≤ 0.8	5	0.5														
11. Body Strength	No abnormality such as damage			AL02 Applied force: 30N Duration: 10 sec. Speed: Shall attain to specified force in 2 sec. AL03, 04, 05 Applied force: 50N Duration: 10 sec. Speed: Shall attain to specified force in 2 sec.												
12. Resistance to vibration	ΔL/L → Within ±5% Q → 30 min.	ΔL/L → Within ±5% Q/Q → Within ±10%	ΔL/L → Within ±5% Q → 15 min.	According to JIS C 5102 clause 8.2 Vibration type: A Duration: 2 hrs each in X, Y and Z directions Total: 6 hrs Frequency range: 10 to 55 to 10 Hz(1min.) Amplitude: 1.5 mm Mounting method: Soldering onto printed board Recovery: At least 1 hr of recovery under the standard condition after the test, followed by the measurement within 2 hrs.												
13. Resistance to Shock	No significant abnormality in appearance	No significant abnormality in appearance	No significant abnormality in appearance	Drop test impact material: Concrete of vinyl tile Height: 1m Total number of drops: 10 times												
14. Solderability	At least 75% of terminal electrode is covered by new solder			Solder temperature: 230 ± 5°C Duration: 3 ± 0.5 sec.												
15. Resistance to Soldering Heat	No significant abnormality in appearance	No significant abnormality in appearance	ΔL/L → Within ±5% Q → 15 min.	Solder temperature: 270 ± 5°C Duration: 5 ± 0.5 sec. Immersed conditions: inserted into substrate with t = 1.6 mm Recovery: At least 1 hr of recovery under the standard condition after the test, followed by the measurement within 2 hrs.												

# RELIABILITY

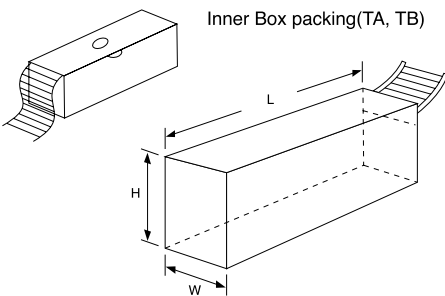
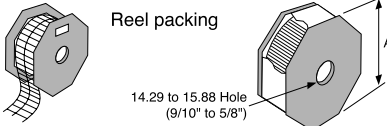
Item	Specified Value			Test Methods and Remarks															
	AL02, AL03 Type	AL04 Type	AL05 Type																
16. Resistance to Solvent	Please avoid the ultrasonic cleaning of this product.																		
17. Thermal shock	$\Delta L/L \rightarrow$ Within $\pm 10\%$ Q $\rightarrow$ 30min.	$\Delta L/L \rightarrow$ Within $\pm 10\%$ Q/Q $\rightarrow$ Within $\pm 30\%$	$\Delta L/L \rightarrow$ Within $\pm 5\%$ Q $\rightarrow$ 15min.	Conditions for 1 cycle <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Step</th> <th>Temperature(°C)</th> <th>Duration(min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td><math>-25^{+0}_{-3}</math></td> <td>30 <math>\pm</math> 3</td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>within 3</td> </tr> <tr> <td>3</td> <td><math>+85^{+2}_{-0}</math></td> <td>30 <math>\pm</math> 3</td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>within 3</td> </tr> </tbody> </table> Number of cycles: 5 cycles Recovery: At least 1 hr of recovery under the standard condition after the removal from test chamber, followed by the measurement within 2 hrs.	Step	Temperature(°C)	Duration(min)	1	$-25^{+0}_{-3}$	30 $\pm$ 3	2	Room temperature	within 3	3	$+85^{+2}_{-0}$	30 $\pm$ 3	4	Room temperature	within 3
Step	Temperature(°C)	Duration(min)																	
1	$-25^{+0}_{-3}$	30 $\pm$ 3																	
2	Room temperature	within 3																	
3	$+85^{+2}_{-0}$	30 $\pm$ 3																	
4	Room temperature	within 3																	
18. Damp Heat	$\Delta L/L \rightarrow$ Within $\pm 10\%$ Q $\rightarrow$ 30min.	$\Delta L/L \rightarrow$ Within $\pm 10\%$ Q/Q $\rightarrow$ Within $\pm 30\%$	$\Delta L/L \rightarrow$ Within $\pm 5\%$ Q $\rightarrow$ 15min.	- Temperature: 40 $\pm$ 2°C - Humidity: 90 to 95% RH - Duration: 1000hrs - Recovery: At least 1 hr of recovery under the standard condition after the removal from test chamber, followed by the measurement within 2 hrs.															
19. Loading under Tensile Damp Heat	$\Delta L/L \rightarrow$ Within $\pm 10\%$ Q $\rightarrow$ 30min.	$\Delta L/L \rightarrow$ Within $\pm 10\%$ Q/Q $\rightarrow$ Within $\pm 30\%$	$\Delta L/L \rightarrow$ Within $\pm 5\%$ Q $\rightarrow$ 15min.	- Temperature: 40 $\pm$ 2°C - Humidity: 90 to 95% RH - Duration: 1000hrs - Applied current: Rated current - Recovery: At least 1 hr of recovery under the standard condition after the removal from test chamber, followed by the measurement within 2 hrs.															
20. Loading at High Temperature	$\Delta L/L \rightarrow$ Within $\pm 10\%$ Q $\rightarrow$ 30min.	$\Delta L/L \rightarrow$ Within $\pm 10\%$ Q/Q $\rightarrow$ Within $\pm 30\%$	$\Delta L/L \rightarrow$ Within $\pm 5\%$ Q $\rightarrow$ 15min.	- Temperature: 85 $\pm$ 2°C - Duration: 1000hrs - Applied current: Rated current - Recovery: At least 1 hr of recovery under the standard condition after the removal from test chamber, followed by the measurement within 2 hrs.															
21. Low Temperature Life Test	$\Delta L/L \rightarrow$ Within $\pm 10\%$ Q $\rightarrow$ 30min.	$\Delta L/L \rightarrow$ Within $\pm 10\%$ Q/Q $\rightarrow$ Within $\pm 30\%$	$\Delta L/L \rightarrow$ Within $\pm 5\%$ Q $\rightarrow$ 15min.	- Temperature: -25 $\pm$ 2°C - Duration: 1000hrs - Applied current: Rated current - Recovery: At least 1 hr of recovery under the standard condition after the removal from test chamber, followed by the measurement within 2 hrs.															

Note on standard condition: "standard condition" referred to herein is defined as follows.

5 to 35°C of temperature, 45 to 85% relative humidity and 86 to 106kPa of air pressure.

When there are questions concerning measurement results: In order to provide correlation data, the test shall be conducted under condition of 20 $\pm$ 2°C of temperature, 45 to 85% relative humidity and 86 to 106kPa of air pressure Unless otherwise specified, all the tests are conducted under the "standard condition"

## ■ PACKING

Type	Taping Lead Style	Inner Box		Out Box			Item		
		Size(m/m) (W × H × L)	Quantity	Size(m/m) (W × H × L)	Quantity	Weight (100 $\mu$ H)			
 Inner Box packing(TA, TB)	TA	26m/m	50 × 65 × 252	2,000	285 × 260 × 455	54,000	8.5kg	AL02	
								9.5kg	ALC02
								11kg	ALN02
	TB	52m/m	70 × 65 × 265	2,500	285 × 250 × 455	45,000	6kg	AL02	
			70 × 85 × 265	2,500			7kg	ALC02, ALN02	
70 × 110 × 355			2,500	30,000			6kg	AL04	
70 × 110 × 355			2,000	24,000			10kg	AL05	
 Reel packing 14.29 to 15.88 Hole (9/16" to 5/8")	TR	52m/m	280 × 280 (A × A)	5,000	460 × 320 × 600	50,000	14kg	AL02	
				4,000			14kg	ALC02	
				2,500			25,000	16kg	AL04