



Aluminum Electrolytic Capacitors

LS

Features

- Snap-in terminal type
- 85°C, 2,000 hours assured
- RoHS Compliance



Sleeve & Marking Color: Black & White

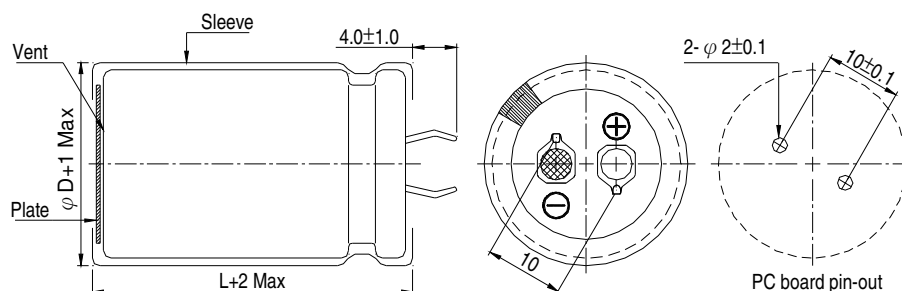
SPECIFICATIONS

Items	Performance																																															
Category Temperature Range	-40°C ~ +85°C																																															
Capacitance Tolerance	±20% (at 120Hz, 20°C)																																															
Leakage Current (at 20°C)	$I = 3\sqrt{CV}$ or 1.5 mA whichever is smaller (after 5 minutes) Where, C = rated capacitance in μF V = rated DC working voltage in V																																															
Dissipation Factor (Tan δ at 120Hz, 20°C)	<table border="1"> <thead> <tr> <th>Rated Voltage</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> <th>160</th> <th>200</th> <th>250</th> <th>350</th> <th>400</th> <th>420</th> <th>450</th> <th>500</th> </tr> </thead> <tbody> <tr> <td>Tan δ (max)</td> <td>0.50</td> <td>0.45</td> <td>0.40</td> <td>0.35</td> <td>0.30</td> <td>0.20</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> <td>0.15</td> </tr> </tbody> </table>	Rated Voltage	16	25	35	50	63	100	160	200	250	350	400	420	450	500	Tan δ (max)	0.50	0.45	0.40	0.35	0.30	0.20	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15																	
Rated Voltage	16	25	35	50	63	100	160	200	250	350	400	420	450	500																																		
Tan δ (max)	0.50	0.45	0.40	0.35	0.30	0.20	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15																																		
Low Temperature Characteristics (at 120Hz)	<p>Impedance ratio shall not exceed the values given in the table below.</p> <table border="1"> <thead> <tr> <th colspan="2">Rated Voltage</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> <th>160</th> <th>200</th> <th>250</th> <th>350</th> <th>400</th> <th>420</th> <th>450</th> <th>500</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Impedance Ratio</td> <td>Z(-25°C)/Z(+20°C)</td> <td>4</td> <td>3</td> <td>3</td> <td>2</td> <td>2</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> <td>8</td> <td>8</td> <td>8</td> <td>8</td> <td>8</td> </tr> <tr> <td>Z(-40°C)/Z(+20°C)</td> <td>15</td> <td>10</td> <td>8</td> <td>6</td> <td>5</td> <td>4</td> <td>8</td> <td>10</td> <td>10</td> <td>16</td> <td>18</td> <td>18</td> <td>20</td> <td>20</td> </tr> </tbody> </table>	Rated Voltage		16	25	35	50	63	100	160	200	250	350	400	420	450	500	Impedance Ratio	Z(-25°C)/Z(+20°C)	4	3	3	2	2	4	4	4	4	8	8	8	8	8	Z(-40°C)/Z(+20°C)	15	10	8	6	5	4	8	10	10	16	18	18	20	20
Rated Voltage		16	25	35	50	63	100	160	200	250	350	400	420	450	500																																	
Impedance Ratio	Z(-25°C)/Z(+20°C)	4	3	3	2	2	4	4	4	4	8	8	8	8	8																																	
	Z(-40°C)/Z(+20°C)	15	10	8	6	5	4	8	10	10	16	18	18	20	20																																	
Endurance	<table border="1"> <thead> <tr> <th>Test Time</th> <th>2,000 Hrs</th> </tr> </thead> <tbody> <tr> <td>Capacitance Change</td> <td>Within ±20% of initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>Less than 200% of specified value</td> </tr> <tr> <td>Leakage Current</td> <td>Within specified value</td> </tr> </tbody> </table> <p>* The above specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage applied with rated ripple current for 2,000 hours at 85°C.</p>	Test Time	2,000 Hrs	Capacitance Change	Within ±20% of initial value	Dissipation Factor	Less than 200% of specified value	Leakage Current	Within specified value																																							
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Shelf Life Test	<table border="1"> <thead> <tr> <th>Test Time</th> <th>1,000 Hrs</th> </tr> </thead> <tbody> <tr> <td>Capacitance Change</td> <td>Within ±20% of initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>Less than 150% of specified value</td> </tr> <tr> <td>Leakage Current</td> <td>Within specified value</td> </tr> </tbody> </table> <p>* The above specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 85°C without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (Refer to JIS C 5101-4 4.1).</p>	Test Time	1,000 Hrs	Capacitance Change	Within ±20% of initial value	Dissipation Factor	Less than 150% of specified value	Leakage Current	Within specified value																																							
Test Time	1,000 Hrs																																															
Capacitance Change	Within ±20% of initial value																																															
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Ripple Current & Frequency Multipliers	<table border="1"> <thead> <tr> <th rowspan="2">Case size</th> <th colspan="2">Freq.(Hz)</th> <th rowspan="2">50 / 60</th> <th rowspan="2">100 / 120</th> <th rowspan="2">500</th> <th rowspan="2">1k</th> <th rowspan="2">10k up</th> </tr> <tr> <th colspan="2">W. V.(V)</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Length \leq 55L</td> <td colspan="2">Under 100</td> <td>0.92</td> <td>1.00</td> <td>1.13</td> <td>1.19</td> <td>1.20</td> </tr> <tr> <td colspan="2">160 ~ 250</td> <td>0.81</td> <td>1.00</td> <td>1.32</td> <td>1.45</td> <td>1.50</td> </tr> <tr> <td colspan="2">350 to up</td> <td>0.77</td> <td>1.00</td> <td>1.30</td> <td>1.41</td> <td>1.43</td> </tr> <tr> <td>Length \geq 60L</td> <td colspan="2">160 ~ 450</td> <td>0.88</td> <td>1.00</td> <td>1.20</td> <td>1.25</td> <td>1.40</td> </tr> </tbody> </table>	Case size	Freq.(Hz)		50 / 60	100 / 120	500	1k	10k up	W. V.(V)		Length \leq 55L	Under 100		0.92	1.00	1.13	1.19	1.20	160 ~ 250		0.81	1.00	1.32	1.45	1.50	350 to up		0.77	1.00	1.30	1.41	1.43	Length \geq 60L	160 ~ 450		0.88	1.00	1.20	1.25	1.40							
Case size	Freq.(Hz)		50 / 60	100 / 120						500	1k		10k up																																			
	W. V.(V)																																															
Length \leq 55L	Under 100		0.92	1.00	1.13	1.19	1.20																																									
	160 ~ 250		0.81	1.00	1.32	1.45	1.50																																									
	350 to up		0.77	1.00	1.30	1.41	1.43																																									
Length \geq 60L	160 ~ 450		0.88	1.00	1.20	1.25	1.40																																									

• 3,000 Hrs specifications are available upon request

DIAGRAM OF DIMENSIONS

Unit: mm





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Dimension: $\phi D \times L(\text{mm})$

Ripple Current: A/rms at 120 Hz, 85°C

DIMENSION & PERMISSIBLE RIPPLE CURRENT

μF	V. DC ϕD	16V (1C)								25V (1E)							
		22 ϕ		25 ϕ		30 ϕ		35 ϕ		22 ϕ		25 ϕ		30 ϕ		35 ϕ	
5,600										22x25	2.31						
6,800										22x25	2.38	25x25	2.78				
										22x30	2.56						
8,200	22x25	2.56								22x25	2.43	25x25	2.85				
										22x35	2.81						
10,000	22x25	2.60	25x25	2.81						22x30	2.97	25x25	2.93	30x25	3.21		
										22x35	3.18	25x30	3.16				
12,000	22x25	2.88	25x25	2.96						22x35	3.33	25x30	3.26	30x25	3.59	35x25	3.58
										22x40	3.53	25x35	3.48	30x30	3.86		
15,000	22x30	3.45	25x25	3.38	30x25	3.73				22x40	3.68	25x35	3.77	30x25	3.60	35x25	3.96
										22x50	4.08	25x40	4.00	30x35	4.12		
18,000	22x30	3.47	25x25	3.47						22x50	4.54	25x40	4.42	30x30	4.40	35x25	4.34
												25x45	4.68	30x35	4.66	35x30	4.68
22,000	22x35	3.84	25x30	3.93	30x25	4.08	35x25	4.15			25x45	4.71	30x35	4.70	35x25	4.60	
														30x45	5.26	35x35	5.20
27,000	22x50	4.84															
33,000	22x50	5.20															

μF	V. DC ϕD	35V (1V)								50V (1H)							
		22 ϕ		25 ϕ		30 ϕ		35 ϕ		22 ϕ		25 ϕ		30 ϕ		35 ϕ	
2,200										22x25	1.93						
2,700										22x25	2.05						
										22x30	2.21						
3,300										22x30	2.41	25x25	2.38				
3,900										22x30	2.51	25x25	2.46				
										22x35	2.72	25x30	2.68				
4,700	22x25	2.21	25x25	2.42						22x35	2.83	25x30	3.03	30x25	3.01		
										22x40	3.01						
5,600	22x30	2.69	25x25	2.69						22x40	3.21	25x35	3.37	30x25	3.17	35x25	3.47
										22x45	3.43			30x30	3.43		
6,800	22x35	2.70	25x25	2.67	30x25	2.99				22x45	3.73	25x35	3.59	30x30	3.56	35x25	3.64
										22x50	3.94	25x40	3.87	30x35	3.87		
8,200	22x35	3.09	25x30	3.12	30x25	3.04						25x40	4.10	30x30	4.12	35x25	4.07
												25x45	4.37	30x35	4.42	35x30	4.41
10,000	22x40	3.22	25x35	3.37	30x25	3.36	35x25	3.32			25x50	4.91	30x35	4.68	35x30	4.59	
														30x40	5.02	35x35	4.92
12,000	22x45	3.71	25x40	3.79	30x30	3.74	35x25	3.75					30x40	5.10	35x35	5.30	
														30x50	5.60	35x40	5.60
15,000			25x45	4.55	30x35	4.54	35x25	4.37							35x40	6.03	
																35x45	6.44
18,000			25x50	4.84	30x40	4.87	35x30	5.03									
22,000					30x45	5.79	35x35	5.71									



Aluminum Electrolytic Capacitors

LS

Dimension: $\phi D \times L(\text{mm})$

Ripple Current: A/rms at 120 Hz, 85°C

DIMENSION & PERMISSIBLE RIPPLE CURRENT

μF	V. DC ϕD	63V (1J)								100V (2A)							
		22 ϕ		25 ϕ		30 ϕ		35 ϕ		22 ϕ		25 ϕ		30 ϕ		35 ϕ	
1,200										22x30	2.12	25x25	2.10				
1,500										22x35	2.45	25x30	2.43	30x25	2.46		
1,800		22x25	1.90							22x40	2.77	25x35	2.77	30x25	2.65		
2,200		22x30	2.35	25x25	2.30					22x45	3.12	25x40	3.20	30x30	3.10	35x25	3.14
2,700		22x35	2.50	25x25	2.34							25x45	3.61	30x35	3.60	35x30	3.71
				25x30	2.52												
3,300		22x35	2.62	25x30	2.69	30x25	2.78					25x50	4.06	30x40	4.05	35x35	4.07
3,900		22x40	2.90	25x35	3.09	30x30	3.09							30x45	4.60	35x35	4.50
		22x45	3.10														
4,700		22x50	3.49	25x40	3.37	30x30	3.37	35x25	3.36					30x50	5.13	35x40	5.12
5,600				25x45	3.77	30x35	3.75	35x30	3.88							35x45	5.75
6,800				25x50	4.41	30x40	4.41	35x30	4.04							35x50	6.01
								35x35	4.33								
8,200						30x45	4.90	35x35	4.80								
10,000						30x50	5.49	35x40	5.47								
12,000								35x45	5.97								
								35x50	6.30								

μF	V. DC ϕD	160V (2C)								200V (2D)							
		20 ϕ ~ 22 ϕ		25 ϕ		30 ϕ		35 ϕ ~ 40 ϕ		22 ϕ		25 ϕ		30 ϕ		35 ϕ ~ 40 ϕ	
150		22x25	0.95							22x25	0.95						
180		22x25	1.04							22x25	1.04						
220		22x25	1.15							22x25	1.15						
270		20x25	1.12							22x25	1.30						
		22x25	1.27														
330		20x30	1.28							22x30	1.44	25x25	1.43				
		22x25	1.40														
390		22x30	1.62							22x30	1.65	25x25	1.63				
										22x35	1.76	25x30	1.74				
470		22x30	1.77	25x25	1.77					22x35	1.88	25x30	1.86	30x25	1.85		
										22x40	1.97						
560		22x30	1.92	25x25	1.92	30x25	2.02			22x40	2.08	25x30	2.05	30x25	2.05		
		22x35	2.05	25x30	2.05					22x45	2.18	25x35	2.16	30x30	2.15		
680		22x35	2.12	25x30	2.22	30x25	2.22			22x45	2.36	25x35	2.36	30x30	2.36	35x25	2.10
		22x40	2.24	25x35	2.31					22x50	2.47	25x40	2.43	30x35	2.43		
820		22x40	2.32	25x30	2.32	30x25	2.31	35x25	2.50	22x50	2.68	25x40	2.66	30x30	2.62	35x30	2.72
		22x45	2.55	25x35	2.52	30x30	2.51					25x45	2.79	30x35	2.77	35x25	2.39
1,000		22x50	2.88	25x40	2.86	30x30	2.82	35x25	2.79			25x45	2.96	30x35	3.00	35x30	2.96
				25x45	2.98	30x35	2.94	35x30	2.92			25x50	3.12	30x40	3.10	35x35	3.09
1,200				30x35	3.25	35x30	3.24					25x50	3.44	30x40	3.44	35x35	3.40
				25x50	3.43	30x40	3.42	35x35	3.40					30x45	3.53	35x40	3.50
1,500						30x40	3.77	35x35	3.75							35x40	3.87
						30x45	3.92	35x40	3.90					30x50	3.93	35x45	3.95
1,800						30x45	4.10	35x35	4.08							35x45	4.37
						30x50	4.32	35x40	4.30							35x50	4.45
2,200								35x45	4.72							35x50	5.00
								35x50	4.88							40x40	4.92
2,700																35x70	5.40
																40x50	5.00
3,300								35x70	5.00							35x80	5.90
								40x60	5.00							40x60	5.90
3,900								35x80	5.40							35x80	6.30
								40x70	5.60							40x80	6.40
4,700																35x90	7.10
								40x80	6.60							40x80	7.38
5,600																35x100	8.90
																40x90	8.00
6,800																40x100	8.65



Aluminum Electrolytic Capacitors

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Dimension: $\phi D \times L(\text{mm})$

Ripple Current: A/rms at 120 Hz, 85°C

DIMENSION & PERMISSIBLE RIPPLE CURRENT

V. DC μF	ϕD	250V (2E)						350V (2V)										
		22 ϕ		25 ϕ		30 ϕ		35 ~ 40 ϕ		20 ϕ ~ 22 ϕ		25 ϕ		30 ϕ		35 ϕ		
82										22x25	0.81							
100										22x25	0.90							
120										20x30 22x25 22x30	0.95 0.99 1.05	25x25	1.04					
150	22x25	0.91								20x35 22x30 22x35	1.05 1.14 1.24	25x25 25x30	1.16 1.24	30x25	1.24			
180	22x25	1.01								20x40 22x35 22x40	1.23 1.28 1.38	25x30 25x35	1.30 1.37	30x25	1.37			
220	22x25 22x30	1.18 1.27	25x25	1.24						20x45 22x40 22x45	1.36 1.40 1.49	25x35 25x40	1.46 1.51	30x25 30x30	1.47 1.52			
270	22x30 22x35	1.43 1.52	25x25	1.49						22x45 22x50	1.62 1.69	25x35 25x40	1.65 1.73	30x30 30x35	1.71 1.76	35x25	1.72	
330	22x30 22x35	1.58 1.67	25x25 25x30	1.53 1.62	30x25	1.59				22x50	1.94	25x40 25x45	1.88 1.96	30x35 30x40	1.93 1.98	35x25 35x30	1.77 1.96	
390	22x35 22x40	1.79 1.89	25x30 25x35	1.79 1.87	30x25 30x30	1.77 1.85						25x45	2.04	30x35 30x40	2.12 2.18	35x30 35x35	2.19 2.24	
470	22x40 22x45	2.05 2.14	25x35	2.05	30x25 30x30	1.80 2.03								30x40 30x45	2.41 2.48	35x35 35x40	2.43 2.50	
560	22x50	2.43	25x40 25x45	2.32 2.41	30x30 30x35	2.24 2.32	35x25 35x30	2.21 2.30							30x45	2.60	35x35 35x40	2.62 2.69
680			25x45 25x50	2.62 2.70	30x35 30x40	2.58 2.65	35x30 35x35	2.54 2.62									35x40 35x45	2.80 3.08
820					30x40 30x45	2.92 3.00	35x35 35x40	2.90 2.98										
1,000					30x45 30x50	3.11 3.47	35x35 35x40 35x45	3.06 3.39 3.45										
1,200							35x40 35x45 35x50	3.39 3.74 3.81										
1,500							40x40	4.04										
1,800							35x70 40x50	4.60 4.50										
2,200							35x80 40x60	4.90 4.90										
2,700							35x90 40x80	5.40 6.30										
3,300							35x90 40x80	6.10 7.00										
3,900							35x100 40x90	7.47 8.00										
4,700							40x100	8.88										

V. DC μF	ϕD	400V (2G)						450V (2W)									
		20 ϕ ~ 22 ϕ		25 ϕ		30 ϕ		35 ϕ		20 ϕ ~ 22 ϕ		25 ϕ		30 ϕ		35 ϕ	
56										20x25 22x25	0.57 0.68						
68	20x25 22x25	0.66 0.72								20x25 22x25 22x30	0.62 0.72 0.80						
82	20x25 22x25	0.72 0.80								20x30 22x30	0.74 0.87	25x25	0.85				
100	22x25 22x30	0.81 0.94	25x25	0.97						20x35 22x30 22x35	0.87 0.87 1.00	25x25	0.98				
120	22x30 22x35	1.04 1.12	25x25 25x30	1.08 1.16						20x40 22x35 22x40	0.96 1.05 1.15	25x30 25x35	1.09 1.12	30x25	1.10		
150	20x35 22x35 22x40	1.00 1.18 1.25	25x30	1.21	30x25	1.24				20x45 22x35 22x40	1.13 1.20 1.25	25x30 25x35 25x40	1.16 1.27 1.35	30x25 30x30	1.16 1.32		
180	20x40 22x40 22x45	1.17 1.34 1.40	25x30 25x35	1.23 1.37	30x25 30x30	1.45 1.52	35x25	1.54		20x50 22x45 22x50	1.29 1.36 1.51	25x35 25x40 25x45	1.31 1.45 1.50	30x30 30x35	1.43 1.49	35x25 35x30	1.35 1.49
220	20x50 22x50 22x50	1.43 1.56 1.56	25x35 25x40	1.56 1.62	30x30 30x35	1.58 1.64	35x25	1.60				25x40 25x45 25x50	1.47 1.65 1.73	30x30 30x35 30x40	1.45 1.63 1.72	35x25 35x30	1.43 1.61
270	22x50	1.74	25x40 25x45	1.70 1.76	30x30 30x35 30x40	1.56 1.73 1.79	35x25 35x30	1.53 1.75				25x45 25x50	1.59 1.72	30x35 30x40 30x45	1.65 1.83 1.95	35x30 35x35	1.71 1.86



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Dimension: $\phi D \times L(\text{mm})$

Ripple Current: A/rms at 120 Hz, 85°C

DIMENSION & PERMISSIBLE RIPPLE CURRENT

μF	V. DC ϕD	400V (2G)								450V (2W)									
		20 ϕ ~ 22 ϕ		25 ϕ		30 ϕ		35 ~ 40 ϕ		20 ϕ ~ 22 ϕ		25 ϕ		30 ϕ		35 ~ 40 ϕ			
330				25x45 25x50	1.76 1.90	30x35 30x40 30x45	1.76 1.97 2.02	35x30 35x35	1.95 2.02					25x50	1.76	30x40 30x45 30x50	1.93 2.10 2.19	35x30 35x35 35x40	1.88 2.06 2.13
390				25x50	1.95	30x40 30x45	2.15 2.22	35x30 35x35 35x40	1.97 2.17 2.24							30x45 30x50	2.03 2.24	35x35 35x40 35x45	2.00 2.11 2.34
470						30x45 30x50	2.23 2.40	35x35 35x40 35x45	2.20 2.42 2.48							30x50	2.33	35x45 35x50	2.43 2.63
560						30x50	2.44	35x40 35x45 35x50	2.49 2.71 2.78									35x45	2.60
680								35x45 35x50 35x60 40x50	2.88 2.95 3.70 3.70									35x50 35x70 40x50	2.91 4.00 3.70
820								35x60 40x50	4.10 4.00									35x80 40x60	4.60 4.30
1,000								35x70 40x60	4.80 4.80									35x100 40x70	5.60 5.10
1,200								35x100 40x70	6.10 5.50									40x80	5.80
1,500								35x100 40x80	6.80 6.50									40x100	7.20
1,800								40x100	7.80										

μF	V. DC ϕD	420V (2P)				500V (2H)							
		35 ϕ		40 ϕ		22 ϕ		25 ϕ		30 ϕ		35 ϕ	
56						22x25	0.70						
68						22x30	0.82						
82						22x35	0.96	25x30	0.97				
100						22x40	1.14	25x35	1.15	30x30	1.16		
120						22x45	1.30	25x35	1.25	30x30	1.26	35x25	1.20
150						22x50	1.52	25x40	1.48	30x35	1.50	35x30	1.34
180								25x50	1.65	30x40	1.60	35x30	1.55
220										30x45	1.90	35x30	1.85
270												35x40	1.95
330												35x45	2.00
680		35x60	3.70	40x50	3.70								
820		35x70	4.40	40x60	4.30								
1,000		35x80	5.10	40x60	4.80								
1,200				40x70	5.50								
1,500				40x100	7.20								
1,800				40x100	7.80								

↑ ↑
Ripple current: A/rms
Case size: $\phi D \times L(\text{mm})$

Part numbering system

LS series 100 μF $\pm 20\%$ 400V 4.0 \pm 0.5mm 22 ϕ x 30L Pb-free Terminal + PVC Sleeve

LS- **101** **M** **2G** **=** **A** **2230**

Series name Capacitance Capacitance tolerance Rated voltage Terminal type Terminal length Case size Terminal and Sleeve Type

Example:

Cap.	Symbol
56	560
220	221
470	471

M = $\pm 20\%$
K = $\pm 10\%$

Example:

WV	Symbol
400	2G
450	2W

Example:

Type	Symbol
2 pins	--
5 pins	L5

Example:
"---"
6.3 \pm 1.0 mm

Example:

$\phi D \times L$	Code
22x30	2230
25x25	2525
30x40	3040

Note: For more details, please refer to "Product Code Guide- Snap-in Type" on page 15.