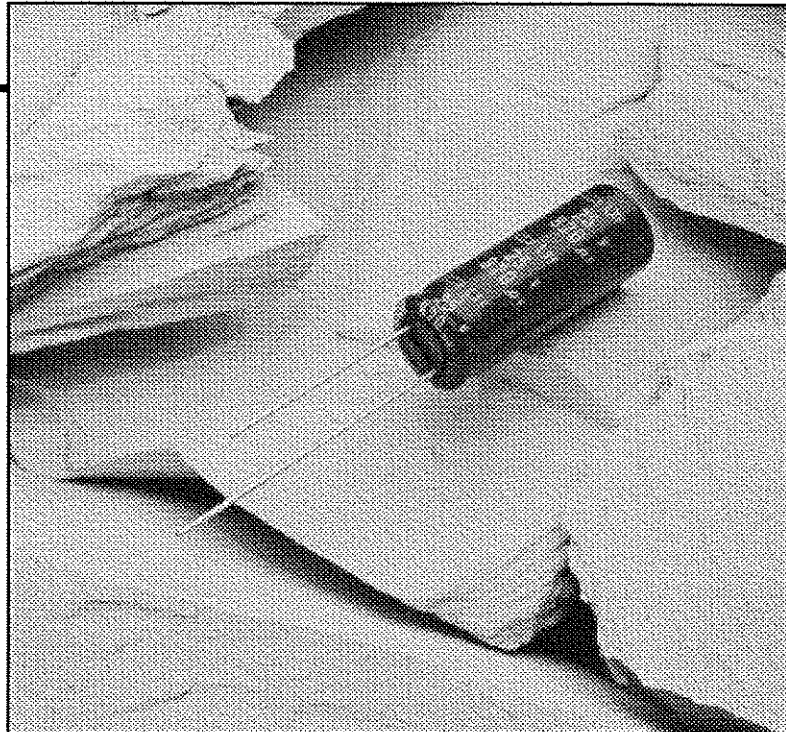


- Miniature
- Solvent Proof
- Low Impedance
- Long Life
- Large Capacitance
- +105°C Maximum Temperature



The LXF series capacitors are designed to keep pace with the progressive miniaturization of electronic devices. LXF capacitors are ideal for use in compact DC-DC converters, switching power supplies and other high frequency applications. Important features include large capacitance, low impedance, a wide operating temperature range of -55°C to $+105^{\circ}\text{C}$, and long life.

The LXF series capacitors were developed to withstand HCFC cleaning agents for five minutes by ultrasonic, vapor or immersion. This solvent proof design allows all circuit board components to be cleaned together, at the same time, without resorting to more expensive epoxy end-sealed capacitors. Refer to the Mini-Glossary for recommended cleaning conditions.

Summary of Specifications

- Radial lead terminals.
- Capacitance range: 10 to 15,000 μF .
- Voltage range: 6.3 to 63VDC.
- Operating temperature range: -55°C to $+105^{\circ}\text{C}$.
- Leakage current: 0.01CV or 3 μA , whichever is greater, after 2 minutes at $+20^{\circ}\text{C}$.
- Standard capacitance tolerance: $\pm 20\%$
- Nominal case size (D \times L): 5 \times 11.5mm to 18 \times 40mm.
- Rated lifetime: 3,000 to 15,000 hours at $+105^{\circ}\text{C}$ with the rated ripple current applied, depending on case size.

LXF Series

LXF Specifications

LXF
MINIATURE -105°C

Item	Characteristics																																																																														
Operating Temperature Range	- 55 to +105°C																																																																														
Rated Voltage Range	6.3 to 63VDC																																																																														
Capacitance Range	10 to 15,000μF																																																																														
Capacitance Tolerance	± 20% (M) at +20°C, 120Hz																																																																														
Leakage Current	I = 0.01CV or 3μA, whichever is greater, after 2 minutes at +20°C. Where I = Leakage current (μA), C = Nominal capacitance (μF) and V = Rated voltage (V)																																																																														
Dissipation Factor (Tan δ)	At +20°C, 120Hz <table border="1" style="margin-left: 20px;"> <tr> <td>Rated Voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> </tr> <tr> <td>Tan δ (DF)</td> <td>0.22</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.10</td> </tr> </table> <p>When nominal capacitance exceeds 1,000μF, add 0.02 to the values above for each 1,000μF increase.</p>	Rated Voltage (V)	6.3	10	16	25	35	50	63	Tan δ (DF)	0.22	0.19	0.16	0.14	0.12	0.10	0.10																																																														
Rated Voltage (V)	6.3	10	16	25	35	50	63																																																																								
Tan δ (DF)	0.22	0.19	0.16	0.14	0.12	0.10	0.10																																																																								
Low Temperature Characteristics	At 120Hz, capacitance change and impedance (Z) ratio between the -55°C value and +20°C value are given in the table below. <table border="1" style="margin-left: 20px;"> <tr> <td>Rated Voltage (V)</td> <td>6.3-63</td> </tr> <tr> <td>Capacitance change: ΔC (-55°C) / C (+20°C)</td> <td>≤ 30%</td> </tr> <tr> <td>Impedance ratio: Z (-55°C) / Z (+20°C)</td> <td>3 max.</td> </tr> </table>	Rated Voltage (V)	6.3-63	Capacitance change: ΔC (-55°C) / C (+20°C)	≤ 30%	Impedance ratio: Z (-55°C) / Z (+20°C)	3 max.																																																																								
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Ripple Current Multipliers	Refer to the following page for Ripple Current Multipliers.																																																																														
Load Life	The following specifications shall be satisfied when the capacitors are restored to +20°C after subjecting them to the DC rated voltage for the specified test time at +105°C with the rated ripple current applied. The sum of DC voltage and peak AC voltage must not exceed the full rated voltage of the capacitors. <table border="1" style="margin-left: 20px; width: 100%;"> <thead> <tr> <th>Case Size D×L (mm)</th> <th>Test Time (Hours)</th> <th>Case Size D×L (mm)</th> <th>Test Time (Hours)</th> <th>Case Size D×L (mm)</th> <th>Test Time (Hours)</th> </tr> </thead> <tbody> <tr> <td>5 × 11.5</td> <td>3,000</td> <td>10 × 12.5 12.5</td> <td>5,000</td> <td>16 × 15</td> <td>6,000</td> </tr> <tr> <td>5 × 15</td> <td>4,000</td> <td>10 × 16 16</td> <td>6,000</td> <td>16 × 20</td> <td>7,000</td> </tr> <tr> <td>6.3 × 11.5</td> <td>3,000</td> <td>10 × 14.5 14.5</td> <td>6,000</td> <td>16 × 25</td> <td>10,000</td> </tr> <tr> <td>6.3 × 15</td> <td>5,000</td> <td>10 × 18 18</td> <td>7,000</td> <td>16 × 30</td> <td>10,000</td> </tr> <tr> <td>8 × 12</td> <td>3,500</td> <td>10 × 25 25</td> <td>7,000</td> <td>16 × 35</td> <td>13,000</td> </tr> <tr> <td>8 × 15</td> <td>5,000</td> <td>10 × 30 30</td> <td>7,000</td> <td>16 × 40</td> <td>15,000</td> </tr> <tr> <td>8 × 20</td> <td>5,000</td> <td>12.5 × 15</td> <td>5,000</td> <td>18 × 15</td> <td>6,000</td> </tr> <tr> <td></td> <td></td> <td>12.5 × 20</td> <td>7,000</td> <td>18 × 20</td> <td>7,000</td> </tr> <tr> <td></td> <td></td> <td>12.5 × 25</td> <td>8,000</td> <td>18 × 25</td> <td>10,000</td> </tr> <tr> <td></td> <td></td> <td>12.5 × 30</td> <td>8,000</td> <td>18 × 30</td> <td>10,000</td> </tr> <tr> <td></td> <td></td> <td>12.5 × 35</td> <td>10,000</td> <td>18 × 35</td> <td>13,000</td> </tr> <tr> <td></td> <td></td> <td>12.5 × 40</td> <td>10,000</td> <td>18 × 40</td> <td>15,000</td> </tr> </tbody> </table> <p>Capacitance change: ≤ ± 30% of the initial value Tan δ (DF) : ≤ 300% of the initial specified value Leakage current : ≤ the initial specified value</p>	Case Size D×L (mm)	Test Time (Hours)	Case Size D×L (mm)	Test Time (Hours)	Case Size D×L (mm)	Test Time (Hours)	5 × 11.5	3,000	10 × 12.5 12.5	5,000	16 × 15	6,000	5 × 15	4,000	10 × 16 16	6,000	16 × 20	7,000	6.3 × 11.5	3,000	10 × 14.5 14.5	6,000	16 × 25	10,000	6.3 × 15	5,000	10 × 18 18	7,000	16 × 30	10,000	8 × 12	3,500	10 × 25 25	7,000	16 × 35	13,000	8 × 15	5,000	10 × 30 30	7,000	16 × 40	15,000	8 × 20	5,000	12.5 × 15	5,000	18 × 15	6,000			12.5 × 20	7,000	18 × 20	7,000			12.5 × 25	8,000	18 × 25	10,000			12.5 × 30	8,000	18 × 30	10,000			12.5 × 35	10,000	18 × 35	13,000			12.5 × 40	10,000	18 × 40	15,000
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		12.5 × 40	10,000	18 × 40	15,000																																																																										
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to +20°C after exposing them for 1,000 hours at +105°C without voltage applied. The rated voltage shall be applied to the capacitors for a minimum of 30 minutes, at least 24 hours and not more than 48 hours before the measurements. Capacitance change: ≤ ± 20% of initial measured value Tan δ (DF) : ≤ 200% of initial specified value Leakage current : ≤ initial specified value																																																																														
Others	Satisfies characteristic W of JIS C5141																																																																														

LXF Series

Ripple Current Multipliers

When capacitors are operated at a temperature and frequency other than +105°C and 100kHz respectively, the ripple current should not exceed the value multiplied by the factor given in the following tables.

Ambient Temperature (°C)

≤ +45°C	+65°C	+75°C	+85°C	+105°C
2.73	2.23	2.00	1.73	1.00

Frequency (Hz) for 6.3-10V

Case Diameter	120Hz	1kHz	10kHz	100kHz
5-8mm	0.63	0.82	0.95	1.00
10 to 12mm	0.70	0.89	0.95	1.00
16-18mm	0.82	0.94	0.99	1.00

Frequency (Hz) for 35-50V

Case Diameter	120Hz	1kHz	10kHz	100kHz
5-8mm	0.40	0.63	0.82	1.00
10 to 12mm	0.50	0.72	0.88	1.00
16-18mm	0.60	0.80	0.93	1.00

Frequency (Hz) for 16-25V

Case Diameter	120Hz	1kHz	10kHz	100kHz
5-8mm	0.53	0.75	0.90	1.00
10 to 12mm	0.61	0.80	0.92	1.00
16-18mm	0.70	0.87	0.95	1.00

Frequency (Hz) for 63V

Case Diameter	120Hz	1kHz	10kHz	100kHz
5-8mm	0.20	0.55	0.80	1.00
10 to 12mm	0.35	0.66	0.85	1.00
16-18mm	0.50	0.74	0.90	1.00

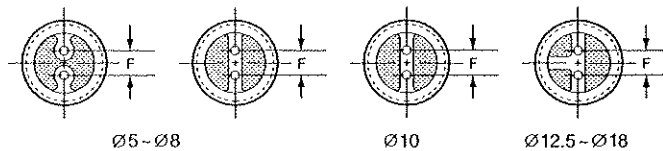
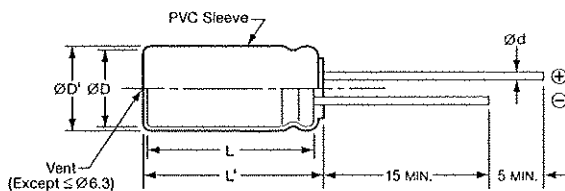
For applications requiring long life, do not apply ripple current higher than the rated ripple current specified at 105°C, even if actual operating temperature is less than the rated maximum operating temperature of 105°C. The temperature multipliers are based on the condition of the same life time as the rated maximum operating temperature.

When the temperature multipliers are used, longer life should not be expected even at lower ambient temperatures.

Diagram of Dimensions

VB/Radial Lead

Unit: mm



Gas escape end seal for all case diameters.

For optional lead configurations and tape and reel packaging, refer to the beginning of the Miniature section.

ØD	ØD' max.	L' max.	Ød	F ±0.5
5	ØD+0.5	L+1.0	0.5	2.0
6.3	ØD+0.5	L+1.0	0.5	2.5
8	ØD+0.5	L+1.0	0.6	3.5
10, 12.5	ØD+0.5	L+1.0	0.6	5.0
16, 18	ØD+0.5	L+1.5	0.8	7.5

Part Numbering System for LXF Series

When ordering, always specify complete catalog number for LXF Series.

LXF 25 VB 821 M 10X30 LL

- Lead Length: LL is Standard.
- Case Code: See Case Sizes in Tables.
- Capacitance Tolerance: M = ±20%
- Capacitance Value: Expressed in microfarads. The first two digits are significant figures, and the third digit indicates the number of zeros for capacitance of 100µF or more. R indicates the decimal point for capacitance less than 100µF (e.g. R82 = .82µF; 8R2 = 8.2µF; 82R = 82µF; 821 = 820µF; 822 = 8,200µF; 823 = 82,000µF).
- Lead Configuration: VB = Radial Lead Terminals.
- DC Rated Voltage: Expressed in Volts (e.g. 25 = 25WVDC).
- Series Name: Indicates Basic Capacitor Design.

LXF Series

Standard Voltage Ratings - VB/Radial Lead

Rated Voltage (WVDC)	Capacitance (µF)	Catalog Part Number	Nominal Case Size* D x L (mm)	Maximum Impedance (Ω) at		Maximum Ripple Current (mA rms) at +105°C, 100kHz
				+20°C, 100kHz	-10°C, 100kHz	
6.3 Volts 8 Volts Surge	100	LXF6.3VB101M5X11LL	5 x 11.5	0.75	1.5	163
	150	LXF6.3VB151M5X15LL	5 x 15	0.5	1.0	225
	220	LXF6.3VB221M6X11LL	6.3 x 11.5	0.35	0.7	273
	330	LXF6.3VB331M6X15LL	6.3 x 15	0.25	0.5	390
	470	LXF6.3VB471M8X12LL	8 x 12	0.17	0.34	445
	680	LXF6.3VB681M8X15LL	8 x 15	0.13	0.26	555
	680	LXF6.3VB681M10X12LL	10 x 12.5	0.12	0.24	625
	820	LXF6.3VB821M10X16LL	10 x 16	0.084	0.17	825
	1,000	LXF6.3VB102M8X20LL	8 x 20	0.095	0.19	740
	1,200	LXF6.3VB122M10X20LL	10 x 20	0.062	0.13	1,040
	1,200	LXF6.3VB122M12X15LL	12.5 x 15	0.076	0.16	935
	1,500	LXF6.3VB152M10X25LL	10 x 25	0.052	0.11	1,260
	2,200	LXF6.3VB222M10X30LL	10 x 30	0.044	0.088	1,440
	2,200	LXF6.3VB222M12X20LL	12.5 x 20	0.046	0.092	1,340
	2,700	LXF6.3VB272M12X25LL	12.5 x 25	0.034	0.068	1,690
	2,700	LXF6.3VB272M16X15LL	16 x 15	0.054	0.11	1,260
	3,300	LXF6.3VB332M18X15LL	18 x 15	0.054	0.11	1,350
	3,900	LXF6.3VB392M12X30LL	12.5 x 30	0.03	0.06	1,950
	4,700	LXF6.3VB472M12X35LL	12.5 x 35	0.024	0.048	2,220
	4,700	LXF6.3VB472M16X20LL	16 x 20	0.038	0.076	1,630
	5,600	LXF6.3VB562M12X40LL	12.5 x 40	0.021	0.042	2,390
	5,600	LXF6.3VB562M16X25LL	16 x 25	0.028	0.056	2,070
	5,600	LXF6.3VB562M18X20LL	18 x 20	0.038	0.076	1,750
	6,800	LXF6.3VB682M16X30LL	16 x 30	0.025	0.05	2,350
	6,800	LXF6.3VB682M18X25LL	18 x 25	0.028	0.056	2,130
	8,200	LXF6.3VB822M16X35LL	16 x 35	0.022	0.044	2,550
	10,000	LXF6.3VB103M18X30LL	18 x 30	0.025	0.05	2,410
	12,000	LXF6.3VB123M16X40LL	16 x 40	0.018	0.036	2,900
12,000	LXF6.3VB123M18X35LL	18 x 35	0.022	0.044	2,660	
15,000	LXF6.3VB153M18X40LL	18 x 40	0.018	0.036	3,010	
10 Volts 13 Volts Surge	82	LXF10VB82RM5X11LL	5 x 11.5	0.75	1.5	163
	100	LXF10VB101M5X15LL	5 x 15	0.50	1.0	225
	180	LXF10VB181M6X11LL	6.3 x 11.5	0.35	0.7	273
	220	LXF10VB221M6X15LL	6.3 x 15	0.25	0.5	390
	330	LXF10VB331M8X12LL	8 x 12	0.17	0.34	445
	390	LXF10VB391M10X12LL	10 x 12.5	0.12	0.24	625
	470	LXF10VB471M8X15LL	8 x 15	0.13	0.26	555
	680	LXF10VB681M8X20LL	8 x 20	0.095	0.19	740
	680	LXF10VB681M10X16LL	10 x 16	0.084	0.17	825
	1,000	LXF10VB102M10X20LL	10 x 20	0.062	0.13	1,040
	1,000	LXF10VB102M12X15LL	12.5 x 15	0.076	0.16	935
	1,200	LXF10VB122M10X25LL	10 x 25	0.052	0.11	1,260
	1,500	LXF10VB152M10X30LL	10 x 30	0.044	0.088	1,440
	1,500	LXF10VB152M16X15LL	16 x 15	0.054	0.11	1,260
	1,800	LXF10VB182M12X20LL	12.5 x 20	0.046	0.092	1,340
	2,200	LXF10VB222M12X25LL	12.5 x 25	0.034	0.068	1,690
	2,200	LXF10VB222M18X15LL	18 x 15	0.054	0.11	1,350
	2,700	LXF10VB272M12X30LL	12.5 x 30	0.03	0.06	1,950
	3,300	LXF10VB332M12X35LL	12.5 x 35	0.024	0.048	2,220
	3,300	LXF10VB332M16X20LL	16 x 20	0.038	0.076	1,630
	3,900	LXF10VB392M12X40LL	12.5 x 40	0.021	0.042	2,390
	3,900	LXF10VB392M16X25LL	16 x 25	0.028	0.056	2,070
	3,900	LXF10VB392M18X20LL	18 x 20	0.038	0.076	1,750
	4,700	LXF10VB472M18X25LL	18 x 25	0.028	0.056	2,130
	5,600	LXF10VB562M16X30LL	16 x 30	0.025	0.05	2,350
	6,800	LXF10VB682M16X35LL	16 x 35	0.022	0.044	2,550
	6,800	LXF10VB682M18X30LL	18 x 30	0.025	0.05	2,410
	8,200	LXF10VB822M16X40LL	16 x 40	0.018	0.036	2,900
8,200	LXF10VB822M18X35LL	18 x 35	0.022	0.044	2,660	
10,000	LXF10VB103M18X40LL	18 x 40	0.018	0.036	3,010	

*The case sizes in table are with no sleeve, refer to diagram for case sizes with sleeve.

LXF Series

Standard Voltage Ratings - VB/Radial Lead

Rated Voltage (WVDC)	Capacitance (µF)	Catalog Part Number	Nominal Case Size* D x L (mm)	Maximum Impedance (Ω) at		Maximum Ripple Current (mA rms) at +105°C, 100kHz
				+20°C, 100kHz	-10°C, 100kHz	
16 Volts 20 Volts Surge	56	LXF16VB56RM5X11LL	5 x 11.5	0.75	1.5	163
	82	LXF16VB82RM5X15LL	5 x 15	0.50	1.0	225
	120	LXF16VB121M6X11LL	6.3 x 11.5	0.35	0.70	273
	180	LXF16VB181M6X15LL	6.3 x 15	0.25	0.50	390
	270	LXF16VB271M8X12LL	8 x 12	0.17	0.34	445
	270	LXF16VB271M10X12LL	10 x 12.5	0.12	0.24	625
	330	LXF16VB331M8X15LL	8 x 15	0.13	0.26	555
	470	LXF16VB471M8X20LL	8 x 20	0.095	0.19	740
	470	LXF16VB471M10X16LL	10 x 16	0.084	0.17	825
	680	LXF16VB681M10X20LL	10 x 20	0.062	0.13	1,040
	680	LXF16VB681M12X15LL	12.5 x 15	0.076	0.16	935
	820	LXF16VB821M10X25LL	10 x 25	0.052	0.11	1,260
	1,200	LXF16VB122M10X30LL	10 x 30	0.044	0.088	1,440
	1,200	LXF16VB122M12X20LL	12.5 x 20	0.046	0.092	1,340
	1,200	LXF16VB122M16X15LL	16 x 15	0.054	0.11	1,260
	1,500	LXF16VB152M12X25LL	12.5 x 25	0.034	0.068	1,690
	1,500	LXF16VB152M18X15LL	18 x 15	0.054	0.11	1,350
	2,200	LXF16VB222M12X30LL	12.5 x 30	0.03	0.06	1,950
	2,200	LXF16VB222M16X20LL	16 x 20	0.038	0.076	1,630
	2,700	LXF16VB272M12X35LL	12.5 x 35	0.024	0.048	2,220
	2,700	LXF16VB272M16X25LL	16 x 25	0.028	0.056	2,070
	3,300	LXF16VB332M12X40LL	12.5 x 40	0.021	0.042	2,390
	3,300	LXF16VB332M18X20LL	18 x 20	0.038	0.076	1,750
	3,900	LXF16VB392M16X30LL	16 x 30	0.025	0.05	2,350
3,900	LXF16VB392M18X25LL	18 x 25	0.028	0.056	2,130	
4,700	LXF16VB472M16X35LL	16 x 35	0.022	0.044	2,550	
4,700	LXF16VB472M18X30LL	18 x 30	0.025	0.05	2,410	
5,600	LXF16VB562M16X40LL	16 x 40	0.018	0.036	2,900	
6,800	LXF16VB682M18X35LL	18 x 35	0.022	0.044	2,660	
8,200	LXF16VB822M18X40LL	18 x 40	0.018	0.036	3,010	
25 Volts 32 Volts Surge	39	LXF25VB39RM5X11LL	5 x 11.5	0.75	1.5	163
	56	LXF25VB56RM5X15LL	5 x 15	0.50	1.0	225
	82	LXF25VB82RM6X11LL	6.3 x 11.5	0.35	0.70	273
	120	LXF25VB121M6X15LL	6.3 x 15	0.25	0.50	390
	150	LXF25VB151M8X12LL	8 x 12	0.17	0.34	445
	180	LXF25VB181M10X12LL	10 x 12.5	0.12	0.24	625
	220	LXF25VB221M8X15LL	8 x 15	0.13	0.26	555
	330	LXF25VB331M8X20LL	8 x 20	0.095	0.19	740
	330	LXF25VB331M10X16LL	10 x 16	0.084	0.17	825
	470	LXF25VB471M10X20LL	10 x 20	0.062	0.13	1,040
	470	LXF25VB471M12X15LL	12.5 x 15	0.076	0.16	935
	560	LXF25VB561M10X25LL	10 x 25	0.052	0.11	1,260
	820	LXF25VB821M10X30LL	10 x 30	0.044	0.088	1,440
	820	LXF25VB821M12X20LL	12.5 x 20	0.046	0.092	1,340
	820	LXF25VB821M16X15LL	16 x 15	0.054	0.11	1,260
	1,000	LXF25VB102M12X25LL	12.5 x 25	0.034	0.068	1,690
	1,200	LXF25VB122M18X15LL	18 x 15	0.054	0.11	1,350
	1,500	LXF25VB152M12X30LL	12.5 x 30	0.03	0.06	1,950
	1,500	LXF25VB152M16X20LL	16 x 20	0.038	0.076	1,630
	1,800	LXF25VB182M12X35LL	12.5 x 35	0.024	0.048	2,220
	1,800	LXF25VB182M16X25LL	16 x 25	0.028	0.056	2,070
	2,200	LXF25VB222M12X40LL	12.5 x 40	0.021	0.042	2,390
	2,200	LXF25VB222M18X20LL	18 x 20	0.038	0.076	1,750
	2,700	LXF25VB272M16X30LL	16 x 30	0.025	0.05	2,350
	2,700	LXF25VB272M18X25LL	18 x 25	0.028	0.056	2,130
	3,300	LXF25VB332M16X35LL	16 x 35	0.022	0.044	2,550
	3,300	LXF25VB332M18X30LL	18 x 30	0.025	0.05	2,410
	3,900	LXF25VB392M16X40LL	16 x 40	0.018	0.036	2,900
3,900	LXF25VB392M18X35LL	18 x 35	0.022	0.044	2,660	
4,700	LXF25VB472M18X40LL	18 x 40	0.018	0.036	3,010	

*The case sizes in table are with no sleeve, refer to diagram for case sizes with sleeve.

LXF
MINIATURE -105°C