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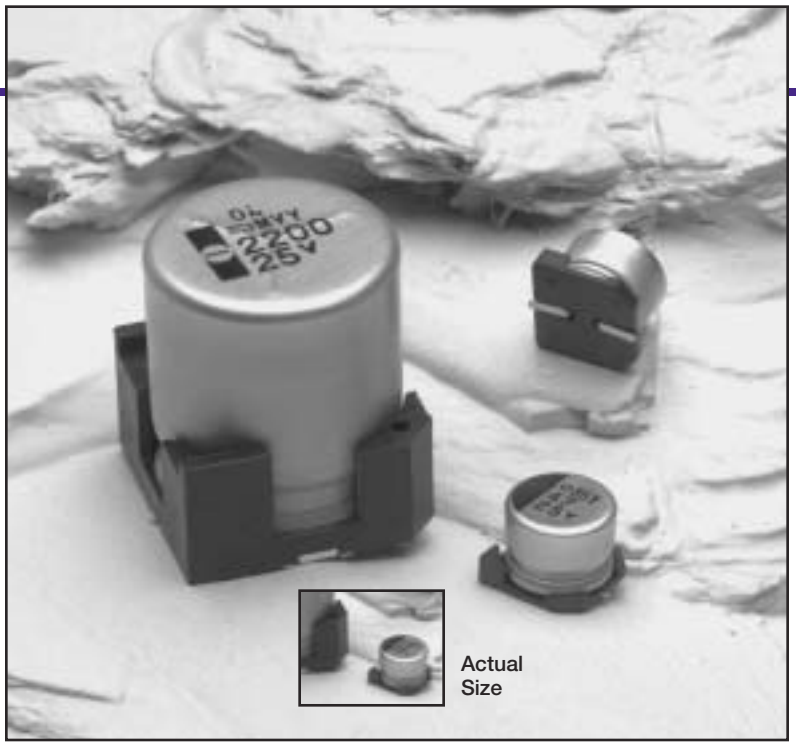
UPGRADE
Engineering Bulletin Dec 02

MVY Series

UNITED CHEMI-CON

- Surface Mount
- Low Impedance
- Vertical Chip
- Solvent Proof (6.3-63V)
- +105°C Maximum Temperature



The MVY series capacitors are low impedance vertical chip capacitors designed for reflow soldering. The voltage and capacitance values of this series have been extended allowing use in a wider variety of applications. The MVY series has lower impedance and an extended range of case sizes compared to the MVK series and is specifically designed to replace larger radial, low impedance capacitors. These MVY capacitors make it possible to design all surface mount PC boards, thereby reducing the production process by eliminating the use of both surface mount and radial capacitors.

The MVY series capacitors *except for those rated at 80 and 100 volts* are solvent proof. Refer to the Mini-Glossary for cleaning guidelines and recommended cleaning agents that are compatible with United Chemi-Con products.

Summary of Specifications

- **Surface mount lead terminals.**
- **Capacitance range: 1.0 to 8,200µF.**
- **Voltage range: 6.3 to 100VDC.**
- **Category temperature range: −55°C to +105°C for 6.3 to 63V; −40°C to +105°C for 80 to 100V.**
- **Leakage current: 0.01CV or 3µA, whichever is greater, after 2 minutes at +20°C.**
- **Standard capacitance tolerance: ±20%**
- **Nominal case size (D×L): 4×5.2mm to 18×21.5mm.**
- **Rated lifetime: 1,000 to 5,000 hours at +105°C depending on case size.**

MVY Series

MVY Specifications

<table>
<tr><th>Item</th><th>Characteristics</th></tr>
<tr><td>Category Temperature Range</td><td>−55 to +105°C for 6.3 to 63V; −40 to +105°C for 80 to 100V</td></tr>
<tr><td>Rated Voltage Range</td><td>6.3 to 100VDC</td></tr>
<tr><td>Capacitance Range</td><td>1.0 to 8,200μF</td></tr>
<tr><td>Capacitance Tolerance</td><td>±20% (M) at +20°C, 120Hz</td></tr>
<tr><td>Leakage Current</td><td>I = 0.01CV or 3μA, whichever is greater, after 2 minutes at +20°C.
Where I = Max. leakage current (μA), C = Nominal capacitance (μF) and V = Rated voltage (V)</td></tr>
<tr><td>Dissipation Factor (Tan δ)</td><td>At +20°C, 120Hz
<table>
<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><td>80</td><td>100</td></tr>
<tr><td>Case D55-F80</td><td>0.24</td><td>0.20</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.12</td><td>–</td><td>–</td><td>–</td></tr>
<tr><td>Case H10 & J10</td><td>0.28</td><td>0.24</td><td>0.20</td><td>0.16</td><td>0.14</td><td>0.12</td><td>–</td><td>–</td><td>–</td></tr>
<tr><td>Case K14-M22</td><td>0.26</td><td>0.22</td><td>0.18</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.14</td><td>0.10</td><td>0.10</td></tr>
</table>
When nominal capacitance exceeds 1,000μF, add 0.02 to the values above for each 1,000μF increase.</td></tr>
<tr><td>Impedance at 100kHz</td><td>At +20°C, 100kHz, impedance (Z) shall not exceed the values given in the Ratings Tables.</td></tr>
<tr><td>Low Temperature Characteristics</td><td>At 120Hz, impedance (Z) ratio between the −40°C value and +20°C value shall not exceed the values given below.
<table>
<tr><td colspan="2">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><td>80</td><td>100</td></tr>
<tr><td rowspan="2">Z(−40°C)/Z(+20°C)</td><td>D55-J10</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td><td>–</td><td>–</td><td>–</td></tr>
<tr><td>K14-M22</td><td>10</td><td>8</td><td>6</td><td>4</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td></tr>
</table></td></tr>
<tr><td>Endurance (Load Life)</td><td>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.
<table>
<tr><td>Case Code</td><td>D55-F80</td><td>H10 & J10</td><td>K14-M22</td></tr>
<tr><td>Test Time</td><td>1,000 Hours</td><td>2,000 Hours</td><td>5,000 Hours</td></tr>
</table>
Case Code D55-J10 (6.3V)
Capacitance change:
≤ ±30% of initial measured value
Tan δ (DF):
≤ 300% of initial specified value
Leakage current:
≤ initial specified value

Case Code D55-M22 (10-100V) and K14-M22 (6.3V)
Capacitance change:
≤ ±20% of initial measured value
Tan δ (DF):
≤ 200% of initial specified value
Leakage current:
≤ initial specified value</td></tr>
<tr><td>Shelf Life</td><td>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.
Case Code D55-J10 (6.3V)
Capacitance change:
≤ ±30% of initial measured value
Tan δ (DF):
≤ 300% of initial specified value
Leakage current:
≤ initial specified value

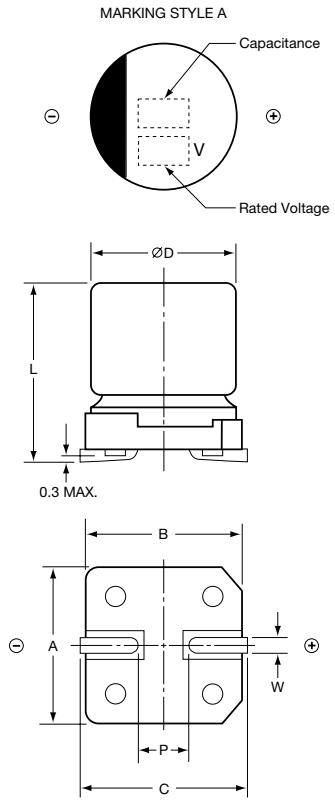
Case Code D55-M22 (10-100V) and K14-M22 (6.3V)
Capacitance change:
≤ ±20% of initial measured value
Tan δ (DF):
≤ 200% of initial specified value
Leakage current:
≤ initial specified value</td></tr>
</table>

Diagram of Dimensions

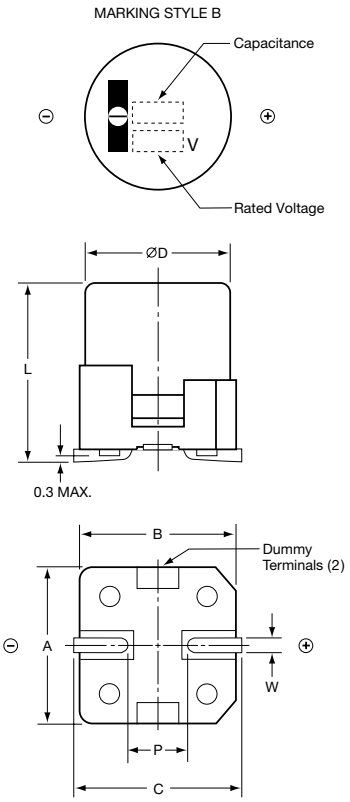
Vertical Chip SMD Lead Terminals

Unit: mm

VC Type ØD = Ø4 - Ø12.5*

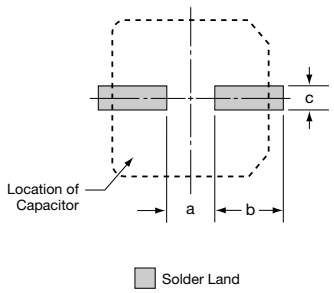


VD Type ØD = Ø16 & Ø18

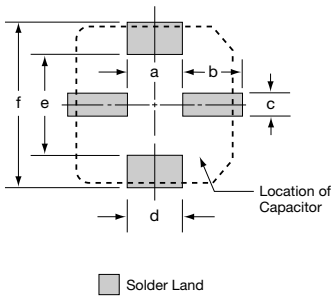


Recommended PCB Land Patterns

VC Type ØD = Ø4 - Ø12.5



VD Type ØD = Ø16 & Ø18



***Marking Style B is used for all Ø12.5 VC Type products.

Refer to Packaging section for Surface Mount taping, reel and tray specifications and Surface Mount Soldering section for reflow soldering conditions.

Case and PCB Land Pattern Dimensions

Case Code	ØD ±0.5	L	A ±0.2	B ±0.2	C ±0.2	W	P	a	b	c	d	e	f
D55	ø4	5.2±0.3	4.3	4.3	5.1	0.5-0.8	1.0	1.0	2.6	1.6	–	–	–
E55	ø5	5.2±0.3	5.3	5.3	5.9	0.5-0.8	1.4	1.4	3.0	1.6	–	–	–
F55	ø6.3	5.2±0.3	6.6	6.6	7.2	0.5-0.8	1.9	1.9	3.5	1.6	–	–	–
F80	ø6.3	7.7±0.3	6.6	6.6	7.2	0.5-0.8	1.9	1.9	3.5	1.6	–	–	–
H10	ø8	10.0±0.5	8.3	8.3	9.0	0.7-1.1	3.1	3.1	4.2	2.2	–	–	–
J10	ø10	10.0±0.5	10.3	10.3	11.0	0.7-1.1	4.5	4.5	4.4	2.2	–	–	–
K14	ø12.5	13.5±0.5	13.0	13.0	13.7	1.0-1.3	4.2	4.0	5.7	2.5	–	–	–
K16	ø12.5	16.0±0.5	13.0	13.0	13.7	1.0-1.3	4.2	4.0	5.7	2.5	–	–	–
L17	ø16	16.5±0.5	17.0	17.0	18.0	1.0-1.3	6.5	6.0	6.9	2.5	6.5	11.0	19.2
L22	ø16	21.5±0.5	17.0	17.0	18.0	1.0-1.3	6.5	6.0	6.9	2.5	6.5	11.0	19.2
M17	ø18	16.5±0.5	19.0	19.0	20.0	1.0-1.3	6.5	6.0	7.9	2.5	6.5	13.0	21.2
M22	ø18	21.5±0.5	19.0	19.0	20.0	1.0-1.3	6.5	6.0	7.9	2.5	6.5	13.0	21.2

MVY Series

Part Numbering System for MVY Series

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

MVY 25 VC 47R M F55 TP

- TP: Packaging: TP = Standard Taping for D55 - K16. TR = Plastic Tray for L17 - M22; Optional for K14 - K16.
- F55: Case Code: See Case Sizes in Tables.
- M: Capacitance Tolerance: M = ±20%
- 47R: 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. R47 = .47µF; 4R7 = 4.7µF; 47R = 47µF; 471 = 470µF; 472 = 4,700µF; 473 = 47,000µF).
- VC: Lead Configuration: VC = Vertical Chip, 2 SMD Terminals. VD = Vertical Chip, 4 SMD Terminals (2 dummy).
- 25: DC Rated Voltage: Expressed in Volts (e.g. 25 = 25WVDC).
- MVY: Series Name: Indicates Basic Capacitor Design.

Standard Voltage Ratings - Surface Mount

Rated Voltage (WVDC)	Capacitance (µF)	Catalog Part Number	Nominal Case Size* D×L (mm)	Case Code	Maximum Impedance (Ω) at +20°C, 100kHz	Rated Ripple Current (mA rms) at +105°C, 100kHz
6.3 Volts 8 Volts Surge	22	MVY6.3VC22RMD55TP	4 × 5.2	D55	3.0	60
	33	MVY6.3VC33RME55TP	5 × 5.2	E55	1.8	95
	47	MVY6.3VC47RME55TP	5 × 5.2	E55	1.8	95
	100	MVY6.3VC101MF55TP	6.3 × 5.2	F55	1.0	140
	220	MVY6.3VC221MF55TP	6.3 × 5.2	F55	1.0	140
	330	MVY6.3VC331MF80TP	6.3 × 7.7	F80	0.34	280
	470	MVY6.3VC471MH10TP	8 × 10	H10	0.3	450
	680	MVY6.3VC681MH10TP	8 × 10	H10	0.3	450
	1,000	MVY6.3VC102MH10TP	8 × 10	H10	0.3	450
	1,500	MVY6.3VC152MJ10TP	10 × 10	J10	0.15	670
	2,200	MVY6.3VC222MK14TP	12.5 × 13.5	K14	0.07	820
	2,200	MVY6.3VD222ML17TR	16 × 16.5	L17	0.054	1,260
	3,300	MVY6.3VC332MK16TP	12.5 × 16	K16	0.06	950
	3,300	MVY6.3VD332MM17TR	18 × 16.5	M17	0.054	1,350
	4,700	MVY6.3VD472ML22TR	16 × 21.5	L22	0.038	1,630
	4,700	MVY6.3VD472MM17TR	18 × 16.5	M17	0.054	1,350
	6,800	MVY6.3VD682ML22TR	16 × 21.5	L22	0.038	1,630
	6,800	MVY6.3VD682MM22TR	18 × 21.5	M22	0.038	1,750
	8,200	MVY6.3VD822MM22TR	18 × 21.5	M22	0.038	1,750
10 Volts 13 Volts Surge	22	MVY10VC22RME55TP	5 × 5.2	E55	1.8	95
	33	MVY10VC33RME55TP	5 × 5.2	E55	1.8	95
	47	MVY10VC47RMF55TP	6.3 × 5.2	F55	1.0	140
	100	MVY10VC101MF55TP	6.3 × 5.2	F55	1.0	140
	220	MVY10VC221MF80TP	6.3 × 7.7	F80	0.34	280
	330	MVY10VC331MH10TP	8 × 10	H10	0.3	450
	470	MVY10VC471MH10TP	8 × 10	H10	0.3	450
	680	MVY10VC681MJ10TP	10 × 10	J10	0.15	670
	1,000	MVY10VC102MJ10TP	10 × 10	J10	0.15	670
	2,200	MVY10VC222MK16TP	12.5 × 16	K16	0.06	950
	2,200	MVY10VD222ML17TR	16 × 16.5	L17	0.054	1,260
	3,300	MVY10VD332ML17TR	16 × 16.5	L17	0.054	1,260
	3,300	MVY10VD332MM17TR	18 × 16.5	M17	0.054	1,350
	4,700	MVY10VD472ML22TR	16 × 21.5	L22	0.038	1,630
	4,700	MVY10VD472MM22TR	18 × 21.5	M22	0.038	1,750
	6,800	MVY10VD682MM22TR	18 × 21.5	M22	0.038	1,750
16 Volts 20 Volts Surge	10	MVY16VC10RMD55TP	4 × 5.2	D55	3.0	60
	22	MVY16VC22RME55TP	5 × 5.2	E55	1.8	95
	33	MVY16VC33RMF55TP	6.3 × 5.2	F55	1.0	140

***Refer to diagrams for detailed case size dimensions.**

Standard Voltage Ratings - Surface Mount

Rated Voltage (WVDC)	Capacitance (µF)	Catalog Part Number	Nominal Case Size* D×L (mm)	Case Code	Maximum Impedance (Ω) at +20°C, 100kHz	Rated Ripple Current (mA rms) at +105°C, 100kHz
16 Volts 20 Volts Surge	47	MVY16VC47RMF55TP	6.3 × 5.2	F55	1.0	140
	100	MVY16VC101MF55TP	6.3 × 5.2	F55	1.0	140
	220	MVY16VC221MF80TP	6.3 × 7.7	F80	0.34	280
	330	MVY16VC331MH10TP	8 × 10	H10	0.3	450
	470	MVY16VC471MH10TP	8 × 10	H10	0.3	450
	680	MVY16VC681MJ10TP	10 × 10	J10	0.15	670
	1,000	MVY16VC102MK14TP	12.5 × 13.5	K14	0.07	820
	1,000	MVY16VD102ML17TR	16 × 16.5	L17	0.054	1,260
	2,200	MVY16VD222ML17TR	16 × 16.5	L17	0.054	1,260
	2,200	MVY16VD222MM17TR	18 × 16.5	M17	0.054	1,350
	3,300	MVY16VD332ML22TR	16 × 21.5	L22	0.038	1,630
	3,300	MVY16VD332MM17TR	18 × 16.5	M17	0.054	1,350
	4,700	MVY16VD472MM22TR	18 × 21.5	M22	0.038	1,750
25 Volts 32 Volts Surge	10	MVY25VC10RME55TP	5 × 5.2	E55	1.8	95
	22	MVY25VC22RMF55TP	6.3 × 5.2	F55	1.0	140
	33	MVY25VC33RMF55TP	6.3 × 5.2	F55	1.0	140
	47	MVY25VC47RMF55TP	6.3 × 5.2	F55	1.0	140
	100	MVY25VC101MF80TP	6.3 × 7.7	F80	0.34	280
	220	MVY25VC221MH10TP	8 × 10	H10	0.3	450
	330	MVY25VC331MH10TP	8 × 10	H10	0.3	450
	470	MVY25VC471MJ10TP	10 × 10	J10	0.15	670
	1,000	MVY25VD102ML17TR	16 × 16.5	L17	0.054	1,260
	1,000	MVY25VD102MM17TR	18 × 16.5	M17	0.054	1,350
	2,200	MVY25VD222ML22TR	16 × 21.5	L22	0.038	1,630
	2,200	MVY25VD222MM22TR	18 × 21.5	M22	0.038	1,750
	3,300	MVY25VD332MM22TR	18 × 21.5	M22	0.038	1,750
35 Volts 44 Volts Surge	4.7	MVY35VC4R7MD55TP	4 × 5.2	D55	3.0	60
	10	MVY35VC10RME55TP	5 × 5.2	E55	1.8	95
	22	MVY35VC22RMF55TP	6.3 × 5.2	F55	1.0	140
	33	MVY35VC33RMF55TP	6.3 × 5.2	F55	1.0	140
	47	MVY35VC47RMF55TP	6.3 × 5.2	F55	1.0	140
	68	MVY35VC68RMF80TP	6.3 × 7.7	F80	0.34	280
	100	MVY35VC101MH10TP	8 × 10	H10	0.3	450
	220	MVY35VC221MH10TP	8 × 10	H10	0.3	450
	330	MVY35VC331MJ10TP	10 × 10	J10	0.15	670
	470	MVY35VC471MK14TP	12.5 × 13.5	K14	0.07	820
	470	MVY35VD471ML17TR	16 × 16.5	L17	0.054	1,260
	1,000	MVY35VD102ML17TR	16 × 16.5	L17	0.054	1,260
	1,000	MVY35VD102MM17TR	18 × 16.5	M17	0.054	1,350
	2,200	MVY35VD222MM22TR	18 × 21.5	M22	0.038	1,750
50 Volts 63 Volts Surge	1.0	MVY50VC1R0MD55TP	4 × 5.2	D55	5.0	30
	2.2	MVY50VC2R2MD55TP	4 × 5.2	D55	5.0	30
	3.3	MVY50VC3R3MD55TP	4 × 5.2	D55	5.0	30
	4.7	MVY50VC4R7ME55TP	5 × 5.2	E55	3.0	50
	10	MVY50VC10RMF55TP	6.3 × 5.2	F55	2.0	70
	22	MVY50VC22RMF55TP	6.3 × 5.2	F55	2.0	70
	33	MVY50VC33RMF80TP	6.3 × 7.7	F80	0.6	170
	47	MVY50VC47RMF80TP	6.3 × 7.7	F80	0.6	170
	68	MVY50VC68RMH10TP	8 × 10	H10	0.6	300
	100	MVY50VC101MH10TP	8 × 10	H10	0.6	300
	220	MVY50VC221MJ10TP	10 × 10	J10	0.3	500
	330	MVY50VC331MK14TP	12.5 × 13.5	K14	0.11	650
	330	MVY50VD331ML17TR	16 × 16.5	L17	0.087	900
	470	MVY50VD471ML17TR	16 × 16.5	L17	0.087	900
	470	MVY50VD471MM17TR	18 × 16.5	M17	0.087	1,060
	1,000	MVY50VD102MM22TR	18 × 21.5	M22	0.05	1,520

***Refer to diagrams for detailed case size dimensions.**

MVY Series

Standard Voltage Ratings - Surface Mount

Rated Voltage (WVDC)	Capacitance (µF)	Catalog Part Number	Nominal Case Size* D×L (mm)	Case Code	Maximum Impedance (Ω) at +20°C, 100kHz	Rated Ripple Current (mA rms) at +105°C, 100kHz
63 Volts **79 Volts Surge**	68	MVY63VC68RMK14TP	12.5 × 13.5	K14	0.19	500
	100	MVY63VC101MK14TP	12.5 × 13.5	K14	0.19	500
	220	MVY63VC221MK14TP	12.5 × 13.5	K14	0.19	500
	220	MVY63VD221ML17TR	16 × 16.5	L17	0.12	845
	330	MVY63VD331ML17TR	16 × 16.5	L17	0.12	845
	330	MVY63VD331MM17TR	18 × 16.5	M17	0.12	905
	470	MVY63VD471ML22TR	16 × 21.5	L22	0.085	1,100
	470	MVY63VD471MM17TR	18 × 16.5	M17	0.12	905
80 Volts **100 Volts Surge** **Not Solvent Proof**	100	MVY80VC101MK14TP	12.5 × 13.5	K14	0.33	450
	220	MVY80VC221MK16TP	12.5 × 16	K16	0.26	550
	330	MVY80VD331ML22TR	16 × 21.5	L22	0.16	900
	330	MVY80VD331MM17TR	18 × 16.5	M17	0.24	700
	470	MVY80VD471MM22TR	18 × 21.5	M22	0.16	950
100 Volts **125 Volts Surge** **Not Solvent Proof**	47	MVY100VC47RMK14TP	12.5 × 13.5	K14	0.33	450
	68	MVY100VC68RMK14TP	12.5 × 13.5	K14	0.33	450
	100	MVY100VC101MK14TP	12.5 × 13.5	K14	0.33	450
	100	MVY100VD101ML17TR	16 × 16.5	L17	0.24	650
	220	MVY100VD221ML22TR	16 × 21.5	L22	0.16	900
	220	MVY100VD221MM17TR	18 × 16.5	M17	0.24	700
	330	MVY100VD331MM22TR	18 × 21.5	M22	0.16	950

***Refer to diagrams for detailed case size dimensions.**