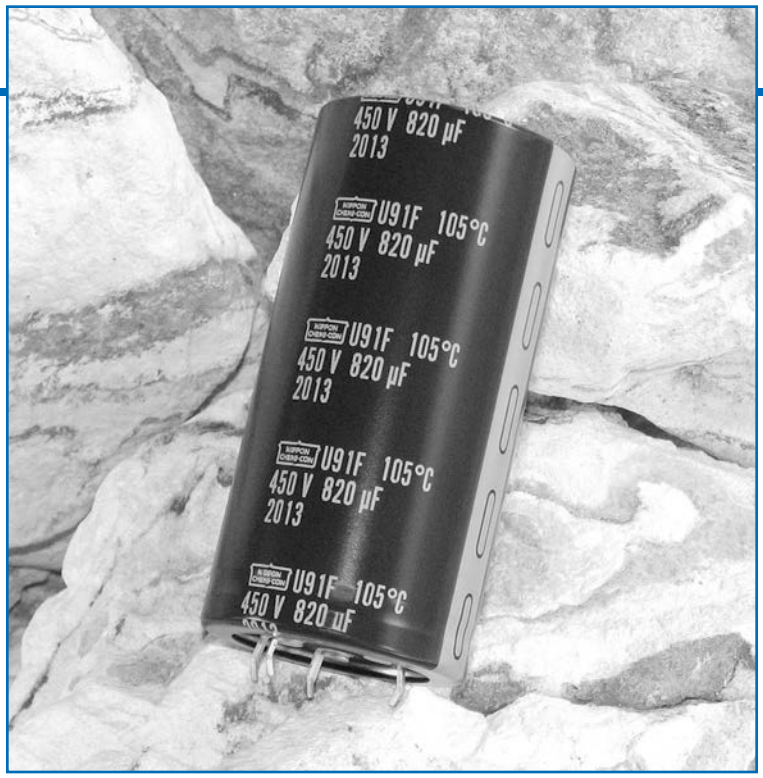
U91F Series NEW

UNITED CHEMI-CON



- **Snap Mount**
- **Specific Design For Higher Ripple Current**
- **350 to 500VDC Voltage Range**
- **RoHS Compliant**
- **+105°C Maximum Temperature**
- **5,000 Hours Lifetime at +105°C**

The U91F series is a high temperature snap-in series specifically designed for higher ripple current capability. The U91F capacitors have an endurance rating of 5,000 hours at +105°C with the rated ripple current applied. All the U91F series capacitors are RoHS compliant and available in a variety of sizes, with or without an end disk, and encased in a standard Pb-free PVC sleeve or an optional PET sleeve. Snap-in terminals (2, 4 or 5-pin configurations) are available as standard or optional styles depending on case size. Straight standoff terminals (5-pin configuration) are an option for the 40, 45 and 50mm can diameters.

Summary of Specifications

- **PC board snap-in or straight standoff terminals available as standard or optional styles depending on pin styles and case size.**
- **Capacitance range: 120 to 2,700µF.**
- **Voltage range: 350 to 500VDC.**
- **Category temperature range: −25°C to +105°C.**
- **Leakage current: $3\sqrt{CV}$ (µA) or 3mA, whichever is smaller, after 5 minutes at +20°C.**
- **Standard capacitance tolerance: ±20%**
- **Nominal case size (D×L): 30×40mm to 50×105mm.**
- **Rated lifetime: 5,000 hours at +105°C with the rated ripple current applied.**

U91F Series

U91F Specifications - Snap Mount

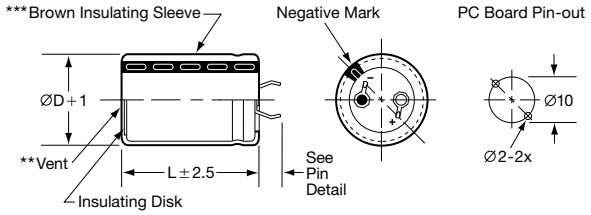
<table>
<tr><th>Item</th><th>Characteristics</th></tr>
<tr><td>Category Temperature Range</td><td>−25 to +105°C</td></tr>
<tr><td>Rated Voltage Range</td><td>350 to 500VDC</td></tr>
<tr><td>Capacitance Range</td><td>120 to 2,700μF</td></tr>
<tr><td>Capacitance Tolerance</td><td>±20% (M) at +20°C, 120Hz</td></tr>
<tr><td>Leakage Current</td><td>$I = 3\sqrt{CV}$ (μA) or 3mA, whichever is smaller, after 5 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>350-400</td><td>420-500</td></tr><tr><td>Tan δ (DF) Max.</td><td>0.15</td><td>0.20</td></tr></table></td></tr>
<tr><td>Low Temperature Characteristics</td><td>At 120Hz, impedance (Z) ratio between the −25°C value and +20°C value shall not exceed the values given below.
<table><tr><td>Rated Voltage (V)</td><td>350-500</td></tr><tr><td>Z(−25°C)/Z(+20°C)</td><td>8</td></tr></table></td></tr>
<tr><td>Rated Ripple Current Multipliers</td><td>Ambient Temperature (°C)
<table><tr><td>+65°C</td><td>+85°C</td><td>+105°C</td></tr><tr><td>2.82</td><td>1.73</td><td>1.00</td></tr></table>Frequency (Hz)
<table><tr><td>DC Rated Voltage</td><td>50Hz</td><td>120Hz</td><td>300Hz</td><td>1kHz</td><td>10kHz</td><td>100kHz</td></tr><tr><td>350-450V</td><td>0.77</td><td>1.00</td><td>1.16</td><td>1.30</td><td>1.41</td><td>1.43</td></tr><tr><td>500V</td><td>0.70</td><td>1.00</td><td>1.16</td><td>1.30</td><td>1.41</td><td>1.43</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 DC voltage for 5,000 hours at +105°C with the rated ripple current applied. The sum of the DC voltage and peak AC voltage must not exceed the full rated voltage of the capacitors.
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.
Capacitance change: ≤ ±20% of initial measured value
Tan δ (DF) : ≤ 150% of initial specified value
Leakage current : ≤ initial specified value</td></tr>
</table>

Diagram of Dimensions - Snap Mount

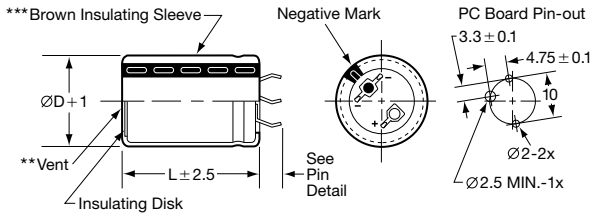
Snap Mount

Unit: mm

VSN Snap-in Ø30 and Ø35 standard
VNN Snap-in Ø30 and Ø35 optional

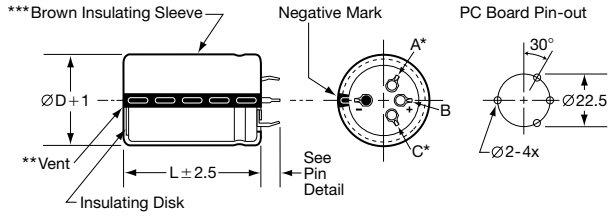


VEN Snap-in Ø30 and Ø35 optional

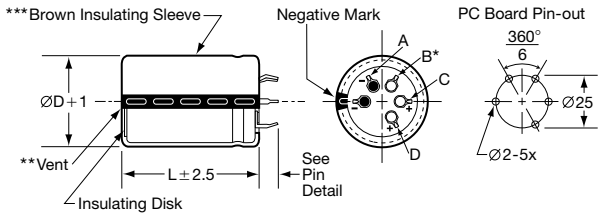


Snap Mount

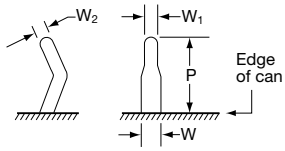
VND Snap-in Ø35 and Ø40 standard; Ø45 optional
VSD Snap-in Ø35 and Ø40 optional



VNT Snap-in Ø45 and Ø50 standard



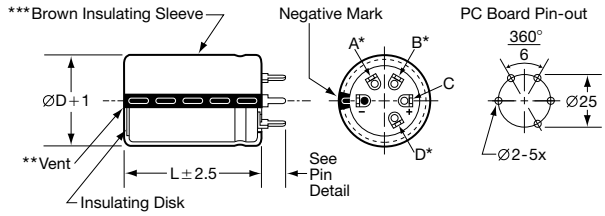
VS, VE & VN Snap-in Pin Dimensions



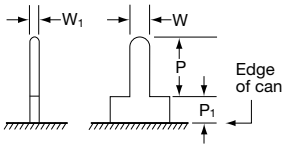
Type	P	W	W1	W2
VSN Ø30	4.0±0.5	1.5±0.2	0.8±0.1	0.8±0.1
VSN Ø35	3.5±0.5			
VNN Ø30-Ø35	5.8±1.0			
VEN Ø30-Ø35	4.0±0.5			
VSD Ø35-Ø40	3.5±1.0			
VND Ø35-Ø45	5.8±1.0			
VNT Ø45-Ø50	5.8±1.0			

Straight Pin Mount

VQT Straight Standoff Ø40, Ø45 and Ø50 optional



VQ Straight Standoff Pin Dimensions



Type	P	P1	W	W1
Standoff Pin (VQ)	3.75±1.0	2.0 max.	1.5±0.1	0.7±0.2

CAUTION:

*Use the blank terminals for mechanical support only. The blank terminals must not be connected to a solder trace on the PC board but be electrically isolated from the negative and positive terminals.

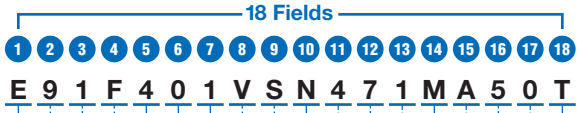
**The vent may be located either on the bottom or side of the can.

***The brown sleeve with gray stripe negative pin indicator is standard. Also note in some cases, the sleeve color may change slightly due to the operating conditions, however, the discoloration will not impair capacitor function.

U91F Series

Part Numbering System for U91F Series

When ordering, always specify complete 18-field global part number.



9 Supplement Code. Field 18.
All construction options listed have Sn100% terminal plating.
- T = Pb-free PVC sleeve with end disk.
- M = Pb-free PVC sleeve without end disk.
- W = PET sleeve with end disk.
- S = PET sleeve without end disk.

8 Case Size. Fields 15, 16 and 17.
The single letter diameter code is inserted in field 15.
- R = Ø30mm
- A = Ø35mm
- B = Ø40mm
- U = Ø45mm
- C = Ø50mm

The double digit length code is inserted in fields 16 and 17.
- 40 = 40mm
- 50 = 50mm
- 65 = 65mm
- 80 = 80mm
- A0 = 100mm
- A5 = 105mm

7 Capacitance Tolerance. Field 14.
- M = ±20%

6 Capacitance. Fields 11, 12 and 13.
Expressed in Microfarads. The first two digits are significant figures inserted in fields 11 and 12, and the third digit inserted in field 13 indicates the number of zeros for capacitance of 10μF or more. R indicates the decimal point for capacitance less than 10μF (e.g. 4R7 = 4.7μF; 470 = 47μF; 471 = 470μF; 472 = 4,700μF; 473 = 47,000μF).

5 Dummy Terminals. Field 10.
- N = No dummy terminals.
- D = 2 dummy terminals.
- T = 3 dummy terminals.

4 Terminal Type. Fields 8 and 9.
- VS = Snap-in pins, 4.0mm in length (Ø30 VSN); 3.5mm in length (Ø35 VSN, Ø35 or Ø40 VSD).
- VN = Snap-in pins, 5.8mm in length.
- VE = Snap-in pins, polarized, Ø30 or Ø35 option.
- VQ = Straight standoff pins.

3 DC Rated Voltage. Fields 5, 6 and 7.
Expressed in Volts. The first two digits are significant figures inserted in fields 5 and 6, and the third digit inserted in field 7 indicates the number of zeros for rated voltage of 10VDC or more. R indicates the decimal point for rated voltage less than 10VDC (e.g. 4R0 = 4.0VDC; 400 = 40VDC; 401 = 400VDC).

Rule Exception: Coding for rated voltage 385VDC = 3J1.

2 Series Name. Fields 2, 3 and 4.
Enter the 3-letter/digit series name in fields 2, 3 and 4. If the series name is only 2 letters/digits, place a dash in field 4. For a series name with more than 3 letters/digits, refer to the individual series for the appropriate 3-field series name.

1 Capacitor Type. Field 1.
Aluminum Electrolytic Capacitor (Polar).

U91F Series

Standard Voltage Ratings - Snap Mount

Rated Voltage (WVDC)	Capacitance (µF)	Global Part Number†	Nominal Case Size* D×L (mm)	Case Size Code	Maximum ESR (Ω) at +20°C, 120Hz	Rated Ripple Current (A rms) at +105°C, 120Hz
350 Volts 400 Volts Surge	270	E91F351VSN271MR40T	30 × 40	R40	0.324	1.5
	390	E91F351VSN391MR50T	30 × 50	R50	0.225	2.0
	560	E91F351VSN561MR65T	30 × 65	R65	0.156	2.6
	390	E91F351VSN391MA40T	35 × 40	A40	0.235	2.0
	560	E91F351VSN561MA50T	35 × 50	A50	0.164	2.7
	820	E91F351VND821MA65T	35 × 65	A65	0.112	3.5
	1,000	E91F351VND102MA80T	35 × 80	A80	0.092	4.1
	1,200	E91F351VND122MAA0T	35 × 100	AA0	0.076	5.0
	820	E91F351VND821MB50T	40 × 50	B50	0.121	3.3
	1,200	E91F351VND122MB65T	40 × 65	B65	0.083	4.3
	1,500	E91F351VND152MB80T	40 × 80	B80	0.066	5.1
	1,800	E91F351VND182MBA0T	40 × 100	BA0	0.055	6.1
	820	E91F351VNT821MU50T	45 × 50	U50	0.131	3.3
	1,200	E91F351VNT122MU65T	45 × 65	U65	0.090	4.4
	1,800	E91F351VNT182MU80T	45 × 80	U80	0.060	5.8
	2,200	E91F351VNT222MUA5T	45 × 105	UA5	0.049	7.1
	1,200	E91F351VNT122MC50T	50 × 50	C50	0.092	4.1
	1,800	E91F351VNT182MC65T	50 × 65	C65	0.066	5.2
	2,200	E91F351VNT222MC80T	50 × 80	C80	0.054	6.3
	2,700	E91F351VNT272MCA5T	50 × 105	CA5	0.044	7.9
385 Volts 435 Volts Surge	220	E91F3J1VSN221MR40T	30 × 40	R40	0.336	1.5
	330	E91F3J1VSN331MR50T	30 × 50	R50	0.245	1.9
	470	E91F3J1VSN471MR65T	30 × 65	R65	0.174	2.5
	330	E91F3J1VSN331MA40T	35 × 40	A40	0.237	2.0
	470	E91F3J1VSN471MA50T	35 × 50	A50	0.173	2.6
	680	E91F3J1VND681MA65T	35 × 65	A65	0.123	3.3
	1,000	E91F3J1VND102MA80T	35 × 80	A80	0.095	4.0
	1,200	E91F3J1VND122MAA0T	35 × 100	AA0	0.073	5.1
	680	E91F3J1VND681MB50T	40 × 50	B50	0.135	3.1
	1,000	E91F3J1VND102MB65T	40 × 65	B65	0.096	4.0
	1,200	E91F3J1VND122MB80T	40 × 80	B80	0.075	4.8
	1,500	E91F3J1VND152MBA0T	40 × 100	BA0	0.058	6.0
	820	E91F3J1VNT821MU50T	45 × 50	U50	0.118	3.5
	1,200	E91F3J1VNT122MU65T	45 × 65	U65	0.084	4.5
	1,500	E91F3J1VNT152MU80T	45 × 80	U80	0.065	5.5
	1,800	E91F3J1VNT182MUA5T	45 × 105	UA5	0.047	7.2
	1,000	E91F3J1VNT102MC50T	50 × 50	C50	0.094	4.1
	1,500	E91F3J1VNT152MC65T	50 × 65	C65	0.073	5.0
	1,800	E91F3J1VNT182MC80T	50 × 80	C80	0.056	6.2
	2,700	E91F3J1VNT272MCA5T	50 × 105	CA5	0.041	8.2
400 Volts 450 Volts Surge	220	E91F401VSN221MR40T	30 × 40	R40	0.380	1.4
	330	E91F401VSN331MR50T	30 × 50	R50	0.253	1.8
	390	E91F401VSN391MR65T	30 × 65	R65	0.214	2.2
	330	E91F401VSN331MA40T	35 × 40	A40	0.265	1.9
	470	E91F401VSN471MA50T	35 × 50	A50	0.186	2.5
	680	E91F401VND681MA65T	35 × 65	A65	0.129	3.2
	820	E91F401VND821MA80T	35 × 80	A80	0.107	3.8
	1,000	E91F401VND102MAA0T	35 × 100	AA0	0.088	4.7
	560	E91F401VND561MB50T	40 × 50	B50	0.164	2.8
	820	E91F401VND821MB65T	40 × 65	B65	0.112	3.7
	1,200	E91F401VND122MB80T	40 × 80	B80	0.076	4.8
	1,500	E91F401VND152MBA0T	40 × 100	BA0	0.061	5.8
	680	E91F401VNT681MU50T	45 × 50	U50	0.146	3.1
	1,000	E91F401VNT102MU65T	45 × 65	U65	0.100	4.1

†For construction and terminal options, refer to the part numbering system for descriptions and codes.
*** Refer to diagram of dimensions for detailed case size specifications.**

U91F Series

Standard Voltage Ratings - Snap Mount

Rated Voltage (WVDC)	Capacitance (µF)	Global Part Number†	Nominal Case Size* D×L (mm)	Case Size Code	Maximum ESR (Ω) at +20°C, 120Hz	Rated Ripple Current (A rms) at +105°C, 120Hz
400 Volts 450 Volts Surge	1,200	E91F401VNT122MU80T	45 × 80	U80	0.083	4.9
	1,800	E91F401VNT182MUA5T	45 × 105	UA5	0.055	6.7
	1,000	E91F401VNT102MC50T	50 × 50	C50	0.101	3.9
	1,200	E91F401VNT122MC65T	50 × 65	C65	0.093	4.4
	1,800	E91F401VNT182MC80T	50 × 80	C80	0.062	5.9
	2,200	E91F401VNT222MCA5T	50 × 105	CA5	0.051	7.4
420 Volts 470 Volts Surge	180	E91F421VSN181MR40T	30 × 40	R40	0.442	1.3
	270	E91F421VSN271MR50T	30 × 50	R50	0.295	1.7
	390	E91F421VSN391MR65T	30 × 65	R65	0.204	2.3
	270	E91F421VSN271MA40T	35 × 40	A40	0.310	1.8
	390	E91F421VSN391MA50T	35 × 50	A50	0.214	2.3
	560	E91F421VND561MA65T	35 × 65	A65	0.149	3.0
	680	E91F421VND681MA80T	35 × 80	A80	0.123	3.5
	820	E91F421VND821MAA0T	35 × 100	AA0	0.102	4.3
	560	E91F421VND561MB50T	40 × 50	B50	0.156	2.9
	820	E91F421VND821MB65T	40 × 65	B65	0.107	3.8
	1,000	E91F421VND102MB80T	40 × 80	B80	0.088	4.5
	1,200	E91F421VND122MBA0T	40 × 100	BA0	0.073	5.3
	680	E91F421VNT681MU50T	45 × 50	U50	0.141	3.2
	1,000	E91F421VNT102MU65T	45 × 65	U65	0.096	4.2
	1,200	E91F421VNT122MU80T	45 × 80	U80	0.080	5.0
	1,700	E91F421VNT172MUA5T	45 × 105	UA5	0.056	6.6
	820	E91F421VNT821MC50T	50 × 50	C50	0.126	3.5
	1,200	E91F421VNT122MC65T	50 × 65	C65	0.086	4.6
	1,500	E91F421VNT152MC80T	50 × 80	C80	0.069	5.6
	2,200	E91F421VNT222MCA5T	50 × 105	CA5	0.047	7.7
450 Volts 500 Volts Surge	180	E91F451VSN181MR40T	30 × 40	R40	0.442	1.3
	220	E91F451VSN221MR50T	30 × 50	R50	0.362	1.5
	330	E91F451VSN331MR65T	30 × 65	R65	0.241	2.1
	270	E91F451VSN271MA40T	35 × 40	A40	0.310	1.8
	390	E91F451VSN391MA50T	35 × 50	A50	0.214	2.3
	470	E91F451VND471MA65T	35 × 65	A65	0.178	2.8
	680	E91F451VND681MA80T	35 × 80	A80	0.123	3.5
	820	E91F451VND821MAA0T	35 × 100	AA0	0.102	4.3
	470	E91F451VND471MB50T	40 × 50	B50	0.178	2.7
	680	E91F451VND681MB65T	40 × 65	B65	0.123	3.5
	820	E91F451VND821MB80T	40 × 80	B80	0.102	4.1
	1,200	E91F451VND122MBA0T	40 × 100	BA0	0.070	5.5
	680	E91F451VNT681MU50T	45 × 50	U50	0.135	3.3
	820	E91F451VNT821MU65T	45 × 65	U65	0.112	3.9
	1,000	E91F451VNT102MU80T	45 × 80	U80	0.092	4.7
	1,500	E91F451VNT152MUA5T	45 × 105	UA5	0.061	6.4
	820	E91F451VNT821MC50T	50 × 50	C50	0.121	3.6
	1,000	E91F451VNT102MC65T	50 × 65	C65	0.100	4.3
	1,500	E91F451VNT152MC80T	50 × 80	C80	0.066	5.7
	1,800	E91F451VNT182MCA5T	50 × 105	CA5	0.055	7.1
500 Volts 550 Volts Surge	120	E91F501VSN121MR40T	30 × 40	R40	0.663	1.0
	180	E91F501VSN181MR50T	30 × 50	R50	0.442	1.4
	270	E91F501VSN271MR65T	30 × 65	R65	0.295	1.9
	180	E91F501VSN181MA40T	35 × 40	A40	0.442	1.5
	270	E91F501VSN271MA50T	35 × 50	A50	0.295	2.0
	390	E91F501VND391MA65T	35 × 65	A65	0.204	2.6

†For construction and terminal options, refer to the part numbering system for descriptions and codes.
*** Refer to diagram of dimensions for detailed case size specifications.**

U91F Series

Standard Voltage Ratings - Snap Mount

Rated Voltage (WVDC)	Capacitance (µF)	Global Part Number†	Nominal Case Size* D×L (mm)	Case Size Code	Maximum ESR (Ω) at +20°C, 120Hz	Rated Ripple Current (A rms) at +105°C, 120Hz
500 Volts **550 Volts Surge**	470	E91F501VND471MA80T	35 × 80	A80	0.169	3.0
	560	E91F501VND561MAA0T	35 × 100	AA0	0.142	3.7
	330	E91F501VND331MB50T	40 × 50	B50	0.253	2.3
	470	E91F501VND471MB65T	40 × 65	B65	0.178	2.9
	680	E91F501VND681MB80T	40 × 80	B80	0.123	3.8
	820	E91F501VND821MBA0T	40 × 100	BA0	0.102	4.5
	390	E91F501VNT391MU50T	45 × 50	U50	0.225	2.5
	560	E91F501VNT561MU65T	45 × 65	U65	0.156	3.3
	820	E91F501VNT821MU80T	45 × 80	U80	0.107	4.3
	1,000	E91F501VNT102MUA5T	45 × 105	UA5	0.088	5.3
	560	E91F501VNT561MC50T	50 × 50	C50	0.164	3.1
	820	E91F501VNT821MC65T	50 × 65	C65	0.112	4.0
	1,000	E91F501VNT102MC80T	50 × 80	C80	0.092	4.9
	1,200	E91F501VNT122MCA5T	50 × 105	CA5	0.076	6.0

†For construction and terminal options, refer to the part numbering system for descriptions and codes.
*** Refer to diagram of dimensions for detailed case size specifications.**