

# U33F Series

**U33F SERIES**  
Engineering Bulletin Jun 2013



**NEW!**

- Large Can
- Screw Terminals
- General Purpose U33 Grade
- High Ripple
- 350 to 500VDC Ratings
- RoHS Compliant
- 5,000 Hours Lifetime at +105°C
- Up to 175,000 Hours Useful Life



The U33F series is a general purpose high temperature screw mount series specifically designed to provide the ripple current capability and long life required for high reliability inverter applications. The U33F has an endurance rating of 5,000 hours at +105°C with the rated ripple current applied. The useful life can exceed 175,000 hours at +40°C and 1.5x the ripple current. These capacitors are available in a variety of high current English or Metric thread terminals. Mounting options include a three-footed clamp or bottom threaded stud. Custom designs are also available.

## Summary of Specifications

- Screw terminals: high and low post, English and Metric thread.
- Capacitance range: 1,200 to 15,000µF.
- Voltage range: 350 to 500VDC.
- Category temperature range: -40°C to +105°C.
- Leakage current: 0.02CV(µA) or 5mA, whichever is smaller, after 5 minutes at +25°C.
- Standard capacitance tolerance: ±20%
- Nominal case size (D×L): D = 50mm (2.000") to 89mm (3.500"); L = 92mm (3.625") to 219mm (8.625").
- Rated lifetime: 5,000 hours at +105°C with rated ripple current applied.

**U33F**  
LARGE CAN 105°C

## U33F Specifications - Screw Terminals

Item	Characteristics																																															
Category Temperature Range	- 40 to +105°C																																															
Rated Voltage Range	350 to 500VDC																																															
Capacitance Range	1,200 to 15,000µF at +25°C, 120Hz																																															
Capacitance Tolerance	± 20% (M) at +25°C, 120Hz																																															
Leakage Current	I = 0.02CV (µA) or 5mA, whichever is smaller, after 5 minutes at +25°C. Where I = Max. leakage current (µA), C = Nominal capacitance (µF) and V = Rated voltage (V)																																															
Rated Ripple Current Multipliers	Ambient Temperature (°C) <table border="1" style="margin-left: 20px;"> <tr> <td>+65°C</td> <td>+85°C</td> <td>+105°C</td> </tr> <tr> <td>2.20</td> <td>1.73</td> <td>1.00</td> </tr> </table> Frequency (Hz) <table border="1" style="margin-left: 20px;"> <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> To determine maximum ripple current at a specified temperature and frequency, use the appropriate multiplier shown. However, do not use both the temperature and frequency multipliers together.	+65°C	+85°C	+105°C	2.20	1.73	1.00	DC Rated Voltage	50Hz	120Hz	300Hz	1kHz	10kHz	100kHz	350-450V	0.77	1.00	1.16	1.30	1.41	1.43	500V	0.70	1.00	1.16	1.30	1.41	1.43																				
+65°C	+85°C	+105°C																																														
2.20	1.73	1.00																																														
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350-450V	0.77	1.00	1.16	1.30	1.41	1.43																																										
500V	0.70	1.00	1.16	1.30	1.41	1.43																																										
Endurance (Load Life)	The following specifications shall be satisfied when the capacitors are restored to +25°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% from initial measurement ESR change : ≤ 200% of initial specified limit Leakage current : ≤ initial specified limit																																															
Useful Life	With specified standard voltage and ripple current applied, typical life as function of ambient temperature is listed below. <table border="1" style="margin-left: 20px;"> <tr> <td>+105°C</td> <td>6,500 hours max.</td> </tr> <tr> <td>+85°C</td> <td>24,000 hours max.</td> </tr> <tr> <td>+65°C</td> <td>122,000 hours max.</td> </tr> </table> Capacitance change: ≤ 30% from initial measurement ESR change : ≤ 300% of initial specified limit Leakage current : ≤ initial specified limit	+105°C	6,500 hours max.	+85°C	24,000 hours max.	+65°C	122,000 hours max.																																									
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+65°C	122,000 hours max.																																															
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to +25°C after exposing them for 500 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% from initial measurement ESR change : ≤ 200% of initial specified limit Leakage current : ≤ initial specified limit																																															
Vibration Rating	10-55Hz, 10g sinusoidal in three axes, 2 hours per axis.																																															
Maximum Tightening Torque	<table border="1" style="margin-left: 20px;"> <tr> <td>Terminal Code</td> <td>HP</td> <td>HL</td> <td>CD</td> <td>CP</td> <td>CH</td> <td>CA</td> <td>CS</td> </tr> <tr> <td>Thread Size</td> <td>10-32 NF-2B</td> <td>M5x0.8-6H</td> <td></td> <td>¼-28 NF-2B</td> <td></td> <td>M6x1-6H</td> <td></td> </tr> <tr> <td>3 Threads Engaged</td> <td colspan="3">2.0 N·m (18.0 in·lb)</td> <td colspan="4">4.0 N·m (35.0 in·lb)</td> </tr> <tr> <td>6 Threads Engaged</td> <td colspan="3">2.8 N·m (25.0 in·lb)</td> <td colspan="4">6.2 N·m (55.0 in·lb)</td> </tr> </table>	Terminal Code	HP	HL	CD	CP	CH	CA	CS	Thread Size	10-32 NF-2B	M5x0.8-6H		¼-28 NF-2B		M6x1-6H		3 Threads Engaged	2.0 N·m (18.0 in·lb)			4.0 N·m (35.0 in·lb)				6 Threads Engaged	2.8 N·m (25.0 in·lb)			6.2 N·m (55.0 in·lb)																		
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Typical Inductance (nH) at 1MHz	<table border="1" style="margin-left: 20px;"> <tr> <td rowspan="2">Case Diameter (mm)</td> <td colspan="7">Terminal Code</td> </tr> <tr> <td>HP</td> <td>HL</td> <td>CD</td> <td>CP</td> <td>CH</td> <td>CA</td> <td>CS</td> </tr> <tr> <td>Ø50.8</td> <td>—</td> <td>—</td> <td>NA</td> <td>NA</td> <td>NA</td> <td>NA</td> <td>NA</td> </tr> <tr> <td>Ø63.5</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>Ø76.2</td> <td>30</td> <td>30</td> <td>25</td> <td>20</td> <td>25</td> <td>20</td> <td>25</td> </tr> <tr> <td>Ø89.0</td> <td>30</td> <td>30</td> <td>25</td> <td>20</td> <td>25</td> <td>20</td> <td>25</td> </tr> </table>	Case Diameter (mm)	Terminal Code							HP	HL	CD	CP	CH	CA	CS	Ø50.8	—	—	NA	NA	NA	NA	NA	Ø63.5	—	—	—	—	—	—	—	Ø76.2	30	30	25	20	25	20	25	Ø89.0	30	30	25	20	25	20	25
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Ø76.2	30	30	25	20	25	20	25																																									
Ø89.0	30	30	25	20	25	20	25																																									
Custom Designs	Custom CV values per case size and termination type may be available upon request. Contact appropriate representative with specific requirements.																																															

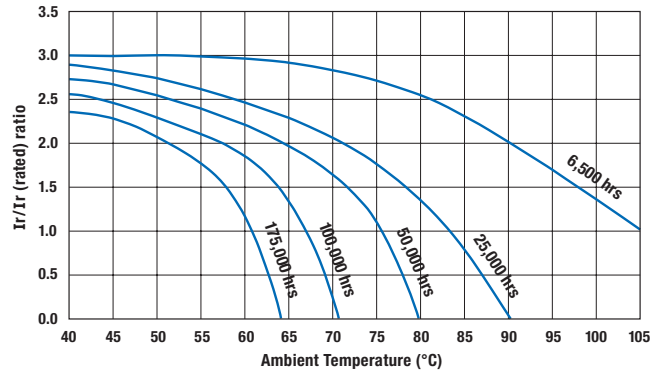
Product specifications are subject to change without notice.

Ask for UCC product bulletins and review specifications before purchase and/or use. Please use our products based on parameters specified in our bulletins.

## U33F Useful Life

### Useful Life: 6,500 Hours at +105°C

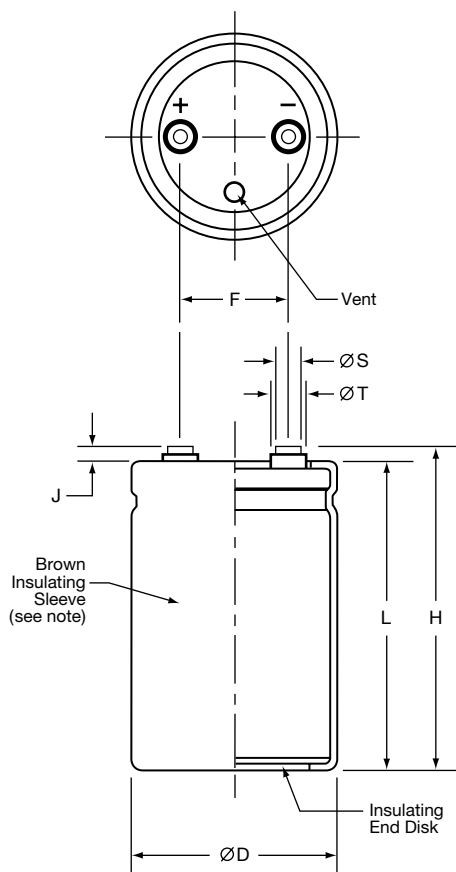
The life expectancy of a capacitor is shown as a function of ambient temperature and ripple current load.



## Diagram of Dimensions - Screw Terminals

### Large Can/Screw Terminals

Unit: mm (inches)



### Case Dimensions and Standard Box Quantities

Case Size Code	$\pm 2.0$ (0.080) $\varnothing D$	$\pm 1.0$ (0.040) L	$\pm 0.25$ (0.010) F	Standard Box Quantity
CB7 CD0	50.8 (2.000)	117 (4.625) 130 (5.125)	22.2 (0.875)	49
D92 DA5 DB7 DD0 DE3	63.5 (2.500)	92 (3.625) 105 (4.125) 117 (4.625) 130 (5.125) 143 (5.625)	28.6 (1.125)	20
E92 EA5 EB7 EE3 EJ1 EM9	76.2 (3.000)	92 (3.625) 105 (4.125) 117 (4.625) 143 (5.625) 181 (7.125) 219 (8.625)	31.8 (1.250)	16 9
F92 FA5 FB7 FE3 FF5 FK0 FM9	89.0 (3.500)	92 (3.625) 105 (4.125) 117 (4.625) 143 (5.625) 155 (6.125) 190 (7.500) 219 (8.625)	31.8 (1.250)	5

#### Note:

In some cases, the color of the sleeve may change slightly due to the operating conditions, however, the discoloration will not impair capacitor function.

### Terminal Specifications

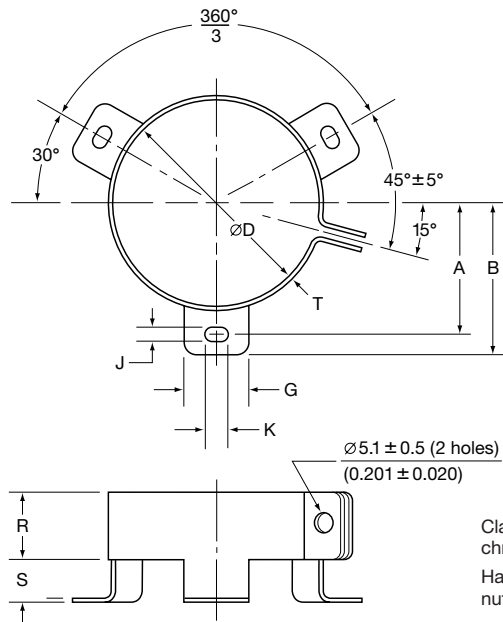
Terminal Code	Available Case Diameter		Thread Size	Minimum Thread Depth	J $\pm 0.5$ (0.020)	H $\pm 2.0$ (0.080)	$\varnothing S$ $\pm 0.25$ (0.010)	$\varnothing T$ $\pm 0.25$ (0.010)
	$\varnothing D$ Code	$\varnothing D$ mm (inches)						
HP	C	50.8 (2.000)	10-32 NF-2B	9.5 (0.375)	6.4 (0.250)	L+J	8.0 (0.313)	11.1 (0.438)
HL	C	50.8 (2.000)	M5x0.8-6H	9.5 (0.375)	6.4 (0.250)	L+J	8.0 (0.313)	11.1 (0.438)
CD	D-E	63.5 - 76.2 (2.500 - 3.000)	M5x0.8-6H	8.5 (0.335)	5.0 (0.200)	L+J	13.0 (0.512)	18.8 (0.740)
CP	D-F	63.5 - 89.0 (2.500 - 3.500)	1/4 - 28 NF-2B	8.7 (0.344)	2.4 (0.093)	L+J	17.5 (0.689)	—
CH	D-F	63.5 - 89.0 (2.500 - 3.500)	1/4 - 28 NF-2B	11.9 (0.468)	6.4 (0.250)	L+J	17.5 (0.689)	—
CA	D-F	63.5 - 89.0 (2.500 - 3.500)	M6x1-6H	8.7 (0.344)	2.4 (0.093)	L+J	17.5 (0.689)	—
CS	D-F	63.5 - 89.0 (2.500 - 3.500)	M6x1-6H	11.9 (0.468)	6.4 (0.250)	L+J	17.5 (0.689)	—

Mounting Hardware is optional. Refer to hardware specifications on the following page.

## Mounting Hardware - Screw Terminals

### Type C: Three-Footed Clamp

Unit: mm (inches)



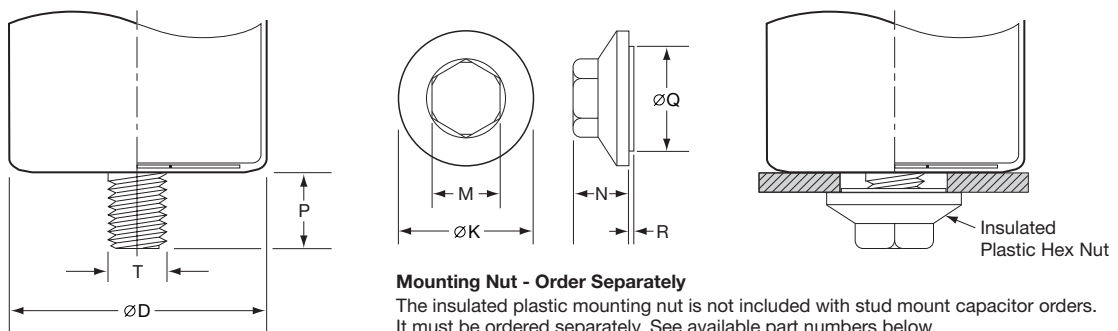
Clamp: Zinc with silver trivalent chromate post treatment.

Hardware: Screw, washer and hexagon nut included with each clamp.

### Type C: Clamp Dimensions

Mounting Code	Case $\varnothing D$	A $\pm 1.0 (0.040)$	B $\pm 1.0 (0.040)$	G $\pm 1.0 (0.040)$	J $\pm 0.5 (0.020)$	K $\pm 0.5 (0.020)$	R $\pm 1.0 (0.040)$	S $\pm 1.0 (0.040)$	T $\pm 0.5 (0.020)$
C	50.8 (2.000)	31.8 (1.250)	36.5 (1.437)	13.3 (0.524)	4.5 (0.177)	7.1 (0.280)	19.1 (0.751)	9.5 (0.374)	0.8 (0.032)
C	63.5 (2.500)	38.1 (1.500)	42.9 (1.689)	13.3 (0.524)	4.5 (0.177)	7.1 (0.280)	19.1 (0.751)	9.5 (0.374)	0.8 (0.032)
C	76.2 (3.000)	44.5 (1.750)	49.2 (1.937)	13.3 (0.524)	4.5 (0.177)	7.1 (0.280)	19.1 (0.751)	9.5 (0.374)	1.0 (0.040)
C	89.0 (3.500)	50.8 (2.000)	56.5 (2.224)	16.0 (0.630)	4.5 (0.177)	8.0 (0.313)	21.0 (0.827)	9.0 (0.354)	1.0 (0.040)

### Type S: Stud Mounting



#### Mounting Nut - Order Separately

The insulated plastic mounting nut is not included with stud mount capacitor orders. It must be ordered separately. See available part numbers below.

### Type S: Stud Dimensions

Mounting Code	P $\pm 1.0 (0.040)$	T Thread Size
S	16.0 (0.630)	M12

### Mounting Nut Dimensions

Part Number	$\varnothing K$ $\pm 2.0 (0.080)$	M $\pm 1.0 (0.040)$	N $\pm 1.0 (0.040)$	$\varnothing Q$ $\pm 1.0 (0.040)$	R $\pm 1.0 (0.040)$
50-8D	30.0 (1.181)	19.0 (0.748)	18.0 (0.709)	22.0 (0.866)	1.40 (0.055)
50-8E	38.0 (1.496)	19.0 (0.748)	18.0 (0.709)	30.0 (1.181)	1.40 (0.055)

## Part Numbering System for U33F Series

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

**18 Fields**

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

**E 3 3 F 4 0 1 C P N 1 0 3 M E M 9 M**

- Capacitor Type.** Field 1.  
Aluminum Electrolytic Capacitor (Polar).
- 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.
- 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).
- Terminal Type.** Fields 8 and 9.  
HP = High post 10-32 NF-2B screw thread.  
HL = High post M5x0.8 screw thread.  
CD = UTE M5x0.8 screw thread.  
CP = Low post 1/4-28 NF-2B screw thread.  
CH = High post 1/4-28 NF-2B screw thread.  
CA = Low post M6x1 screw thread.  
CS = High post M6x1 screw thread.
- Mounting Hardware.** Field 10.  
N = None.  
C = Three-footed clamp.  
S = Stud mount. *The mounting nut is not included with stud mount orders. It must be ordered separately.*
- 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 10 $\mu$ F or more. R indicates the decimal point for capacitance less than 10 $\mu$ F (e.g. 1R0 = 1.0 $\mu$ F; 100 = 10 $\mu$ F; 101 = 100 $\mu$ F; 102 = 1,000 $\mu$ F; 103 = 10,000 $\mu$ F).
- Capacitance Tolerance.** Field 14.  
M =  $\pm$ 20%
- Case Size.** Fields 15, 16 and 17.  
The single letter diameter code is inserted in field 15.  
C =  $\varnothing$ 50.8mm ( $\varnothing$ 2.000")  
D =  $\varnothing$ 63.5mm ( $\varnothing$ 2.500")  
E =  $\varnothing$ 76.2mm ( $\varnothing$ 3.000")  
F =  $\varnothing$ 89.0mm ( $\varnothing$ 3.500")  
  
The double character length code is inserted in fields 16 and 17. For lengths  $\leq$ 99mm, insert the actual length rounded to nearest millimeter. For lengths of 100mm or more, insert the appropriate alpha numeric code as indicated below.  
92 = 92mm (3.625")  
A5 = 105mm (4.125")  
B7 = 117mm (4.625")  
D0 = 130mm (5.125")  
E3 = 143mm (5.625")  
F5 = 155mm (6.125")  
J1 = 181mm (7.125")  
K0 = 190mm (7.500")  
M9 = 219mm (8.625")
- Supplement Code.** Field 18.  
C = PET insulation with end disk ( $\varnothing$ 50.8mm only).  
M = Pb-free PVC insulation with end disk.  
S = Polyolefin insulation with end disk.

## Standard Voltage Ratings - Screw Terminals

Rated Voltage (VWDC)	Capacitance (µF)	Global Part Number†	Nominal Case Size* D × L (mm)	Case Size Code	Maximum ESR (mΩ) at +25°C, 120Hz	Rated Ripple Current (A rms) at +105°C		
						120Hz	300Hz	>3kHz
<b>350 Volts</b> 400 Volts Surge	1,800	E33F351HPN182MCB7M	50 × 117	CB7	58	7.5	9.0	10.5
	2,200	E33F351HPN222MCD0M	50 × 130	CD0	51	8.3	9.9	11.6
	2,200	E33F351CPN222MD92M	63.5 × 92	D92	48	8.5	10.2	11.9
	2,700	E33F351CPN272MDA5M	63.5 × 105	DA5	40	9.7	11.7	13.6
	3,300	E33F351CPN332MDB7M	63.5 × 117	DB7	34	10.9	13.1	15.3
	3,900	E33F351CPN392MDD0M	63.5 × 130	DD0	30	12.1	14.6	17.0
	3,900	E33F351CPN392MDE3M	63.5 × 143	DE3	29	12.8	15.4	17.9
	3,300	E33F351CPN332ME92M	76.2 × 92	E92	34	11.2	13.4	15.6
	3,900	E33F351CPN392MEA5M	76.2 × 105	EA5	28	12.8	15.3	17.9
	5,600	E33F351CPN562MEB7M	76.2 × 117	EB7	21	15.3	18.4	21.4
	6,800	E33F351CPN682MEE3M	76.2 × 143	EE3	19	17.4	20.9	24.4
	8,200	E33F351CPN822MEJ1M	76.2 × 181	EJ1	14	22.0	26.4	30.8
	10,000	E33F351CPN103MEM9M	76.2 × 219	EM9	11	26.5	31.8	37.1
	4,700	E33F351CPN472MF92M	89 × 92	F92	25	14.3	17.1	20.0
	5,600	E33F351CPN562MFA5M	89 × 105	FA5	21	16.3	19.5	22.8
	6,800	E33F351CPN682MFB7M	89 × 117	FB7	18	18.3	21.9	25.6
	8,200	E33F351CPN822MFE3M	89 × 143	FE3	14	22.2	26.6	31.0
	10,000	E33F351CPN103MFF5M	89 × 155	FF5	13	24.1	28.9	33.7
12,000	E33F351CPN123MFK0M	89 × 190	FK0	10	29.3	35.2	41.1	
15,000	E33F351CPN153MFM9M	89 × 219	FM9	8	33.6	40.4	47.1	
<b>400 Volts</b> 450 Volts Surge	1,800	E33F401HPN182MCB7M	50 × 117	CB7	58	7.5	9.0	10.5
	2,200	E33F401HPN222MCD0M	50 × 130	CD0	50	8.3	10.0	11.6
	2,200	E33F401CPN222MD92M	63.5 × 92	D92	47	8.5	10.2	12.0
	2,700	E33F401CPN272MDA5M	63.5 × 105	DA5	40	9.8	11.7	13.7
	3,300	E33F401CPN332MDB7M	63.5 × 117	DB7	34	11.0	13.2	15.4
	3,900	E33F401CPN392MDD0M	63.5 × 130	DD0	30	12.2	14.6	17.0
	3,900	E33F401CPN392MDE3M	63.5 × 143	DE3	26	13.4	16.0	18.7
	3,300	E33F401CPN332ME92M	76.2 × 92	E92	34	11.2	13.4	15.7
	3,900	E33F401CPN392MEA5M	76.2 × 105	EA5	28	12.8	15.4	17.9
	4,700	E33F401CPN472MEB7M	76.2 × 117	EB7	24	14.4	17.3	20.1
	5,600	E33F401CPN562MEE3M	76.2 × 143	EE3	19	17.5	21.0	24.5
	8,200	E33F401CPN822MEJ1M	76.2 × 181	EJ1	14	22.1	26.5	30.9
	10,000	E33F401CPN103MEM9M	76.2 × 219	EM9	11	26.6	31.9	37.2
	4,700	E33F401CPN472MF92M	89 × 92	F92	25	14.3	17.2	20.0
	5,600	E33F401CPN562MFA5M	89 × 105	FA5	21	16.3	19.6	22.9
	6,800	E33F401CPN682MFB7M	89 × 117	FB7	18	18.3	22.0	25.6
	8,200	E33F401CPN822MFE3M	89 × 143	FE3	14	22.2	26.7	31.1
	10,000	E33F401CPN103MFF5M	89 × 155	FF5	12	24.1	29.0	33.8
12,000	E33F401CPN123MFK0M	89 × 190	FK0	10	29.4	35.3	41.2	
15,000	E33F401CPN153MFM9M	89 × 219	FM9	8	33.7	40.5	47.2	
<b>420 Volts</b> 470 Volts Surge	1,500	E33F421HPN152MCB7M	50 × 117	CB7	69	6.9	8.2	9.6
	1,800	E33F421HPN182MCD0M	50 × 130	CD0	60	7.6	9.1	10.7
	1,800	E33F421CPN182MD92M	63.5 × 92	D92	57	7.8	9.4	10.9
	2,200	E33F421CPN222MDA5M	63.5 × 105	DA5	47	8.9	10.7	12.5
	2,700	E33F421CPN272MDB7M	63.5 × 117	DB7	40	10.1	12.1	14.1
	3,300	E33F421CPN332MDD0M	63.5 × 130	DD0	35	11.1	13.4	15.6
	3,300	E33F421CPN332MDE3M	63.5 × 143	DE3	34	11.8	14.1	16.5
	2,700	E33F421CPN272ME92M	76.2 × 92	E92	40	10.3	12.3	14.4
	3,300	E33F421CPN332MEA5M	76.2 × 105	EA5	34	11.7	14.1	16.4
	3,900	E33F421CPN392MEB7M	76.2 × 117	EB7	29	13.2	15.8	18.4
	5,600	E33F421CPN562MEE3M	76.2 × 143	EE3	22	16.0	19.2	22.4
	6,800	E33F421CPN682MEJ1M	76.2 × 181	EJ1	17	19.8	23.8	27.8
	8,200	E33F421CPN822MEM9M	76.2 × 219	EM9	14	23.9	28.7	33.5
	3,900	E33F421CPN392MF92M	89 × 92	F92	30	13.1	15.7	18.3
	4,700	E33F421CPN472MFA5M	89 × 105	FA5	25	15.0	17.9	20.9

† For terminal, mounting and construction options, refer to the part numbering system for descriptions and codes.

\* Refer to diagram of dimensions for detailed case size specifications.

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## Standard Voltage Ratings - Screw Terminals

Rated Voltage (WVDC)	Capacitance (µF)	Global Part Number†	Nominal Case Size* D × L (mm)	Case Size Code	Maximum ESR (mΩ) at +25°C, 120Hz	Rated Ripple Current (A rms) at +105°C		
						120Hz	300Hz	>3kHz
<b>420 Volts</b> 470 Volts Surge	5,600	E33F421CPN562MFB7M	89 × 117	FB7	21	16.8	20.1	23.5
	8,200	E33F421CPN822MFE3M	89 × 143	FE3	17	20.4	24.4	28.5
	8,200	E33F421CPN822MFF5M	89 × 155	FF5	15	22.1	26.5	31.0
	10,000	E33F421CPN103MFK0M	89 × 190	FK0	12	26.9	32.3	37.7
	12,000	E33F421CPN123MFM9M	89 × 219	FM9	10	30.9	37.1	43.3
<b>450 Volts</b> 500 Volts Surge	1,500	E33F451HPN152MCB7M	50 × 117	CB7	69	6.9	8.2	9.6
	1,800	E33F451HPN182MCD0M	50 × 130	CD0	60	7.6	9.1	10.6
	1,800	E33F451CPN182MD92M	63.5 × 92	D92	57	7.8	9.4	10.9
	2,200	E33F451CPN222MDA5M	63.5 × 105	DA5	47	8.9	10.7	12.5
	2,700	E33F451CPN272MDB7M	63.5 × 117	DB7	40	10.0	12.0	14.1
	3,300	E33F451CPN332MDD0M	63.5 × 130	DD0	35	11.1	13.4	15.6
	3,300	E33F451CPN332MDE3M	63.5 × 143	DE3	34	11.8	14.1	16.5
	2,700	E33F451CPN272ME92M	76.2 × 92	E92	40	10.3	12.3	14.4
	3,300	E33F451CPN332MEA5M	76.2 × 105	EA5	34	11.7	14.1	16.4
	3,900	E33F451CPN392MEB7M	76.2 × 117	EB7	29	13.2	15.8	18.4
	4,700	E33F451CPN472MEE3M	76.2 × 143	EE3	22	16.0	19.2	22.4
	6,800	E33F451CPN682MEJ1M	76.2 × 181	EJ1	17	20.2	24.2	28.3
	8,200	E33F451CPN822MEM9M	76.2 × 219	EM9	13	24.3	29.2	34.1
	3,900	E33F451CPN392MF92M	89 × 92	F92	30	13.1	15.7	18.3
	4,700	E33F451CPN472MFA5M	89 × 105	FA5	25	14.9	17.9	20.9
	5,600	E33F451CPN562MFB7M	89 × 117	FB7	21	16.8	20.1	23.5
	6,800	E33F451CPN682MFE3M	89 × 143	FE3	17	20.3	24.4	28.5
8,200	E33F451CPN822MFF5M	89 × 155	FF5	15	22.1	26.5	30.9	
10,000	E33F451CPN103MFK0M	89 × 190	FK0	12	26.9	32.3	37.7	
12,000	E33F451CPN123MFM9M	89 × 219	FM9	10	30.9	37.0	43.2	
<b>500 Volts</b> 550 Volts Surge	1,200	E33F501HPN122MCB7M	50 × 117	CB7	82	6.3	7.5	8.8
	1,500	E33F501HPN152MCD0M	50 × 130	CD0	72	6.9	8.3	9.7
	1,500	E33F501CPN152MD92M	63.5 × 92	D92	71	7.0	8.4	9.8
	1,800	E33F501CPN182MDA5M	63.5 × 105	DA5	59	8.0	9.6	11.2
	2,200	E33F501CPN222MDB7M	63.5 × 117	DB7	51	9.0	10.8	12.6
	2,200	E33F501CPN222MDD0M	63.5 × 130	DD0	44	10.0	12.0	13.9
	2,700	E33F501CPN272MDE3M	63.5 × 143	DE3	39	10.9	13.1	15.3
	2,200	E33F501CPN222ME92M	76.2 × 92	E92	51	9.2	11.0	12.8
	2,700	E33F501CPN272MEA5M	76.2 × 105	EA5	42	10.5	12.6	14.7
	3,300	E33F501CPN332MEB7M	76.2 × 117	EB7	36	11.8	14.1	16.5
	3,900	E33F501CPN392MEE3M	76.2 × 143	EE3	28	14.3	17.2	20.0
	5,600	E33F501CPN562MEJ1M	76.2 × 181	EJ1	21	18.1	21.7	25.3
	6,800	E33F501CPN682MEM9M	76.2 × 219	EM9	17	21.8	26.1	30.5
	3,300	E33F501CPN332MF92M	89 × 92	F92	37	11.7	14.0	16.4
	3,900	E33F501CPN392MFA5M	89 × 105	FA5	31	13.4	16.0	18.7
	4,700	E33F501CPN472MFB7M	89 × 117	FB7	27	15.0	18.0	21.0
	5,600	E33F501CPN562MFE3M	89 × 143	FE3	21	18.2	21.8	25.5
6,800	E33F501CPN682MFF5M	89 × 155	FF5	19	19.8	23.7	27.7	
8,200	E33F501CPN822MFK0M	89 × 190	FK0	15	24.1	28.9	33.7	
10,000	E33F501CPN103MFM9M	89 × 219	FM9	12	27.6	33.1	38.7	

†For terminal, mounting and construction options, refer to the part numbering system for descriptions and codes.

\*Refer to diagram of dimensions for detailed case size specifications.

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