



# Types CGS, CGH, CGO, CGR, CG, HES Part Number Information



DuraCap Catalog Number **CGS** **184** **U** **010** **X3L** **(3** **P** **H)** **[-S]**

**TYPE:** \_\_\_\_\_  
Identifies the basic type  
CGS, CGH, CGO, CGR, CG, HES

**CAPACITANCE:** \_\_\_\_\_  
Expressed in microfarads  
The first two digits are significant figures  
The third digit is the number of zeros

**CAPACITANCE TOLERANCE:** \_\_\_\_\_  
**F** = -0 / +30%    **R** = -15 / +15%    **U** = -10 / +75%  
**G** = -0 / +50%    **S** = -10 / +30%    **X** = -10 / +20%  
**M** = -20 / +20%    **T** = -10 / +50%    **Z** = -10 / +10%

**DC VOLTAGE RATING:** \_\_\_\_\_  
Zeros are used to precede the voltage rating where necessary to complete the three digit block  
The letter 'R' indicates a decimal point

**CASE CODE:** \_\_\_\_\_  
See chart on next page

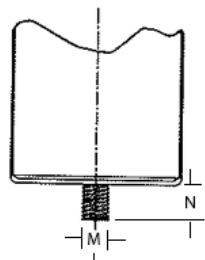
**INSULATING SLEEVE:** \_\_\_\_\_  
 0 = No sleeve  
 1 = Mylar (Polyester)  
 3 = Single Layer PVC - .008" thickness  
 7 = Double Layer .008" PVC (.016" total thickness)  
 8 = Blue PVC - .012" thickness

**POLARITY:** \_\_\_\_\_  
**P** = Polar    **S** = Semi-Polar    **N** = Non-Polar

**TERMINAL:** \_\_\_\_\_

- H = High Post
- L = Low Post
- V = Printed Circuit Mount
- D = Low Post, Low Resistance Screw Mount (1/4 - 28 Thread)
- F = High Post Metric Thread
- G = Low Post Metric Thread
- N = High Post, Low Resistance Screw Mount (1/4 - 28 Thread)
- S = Stud Mount (see chart below)

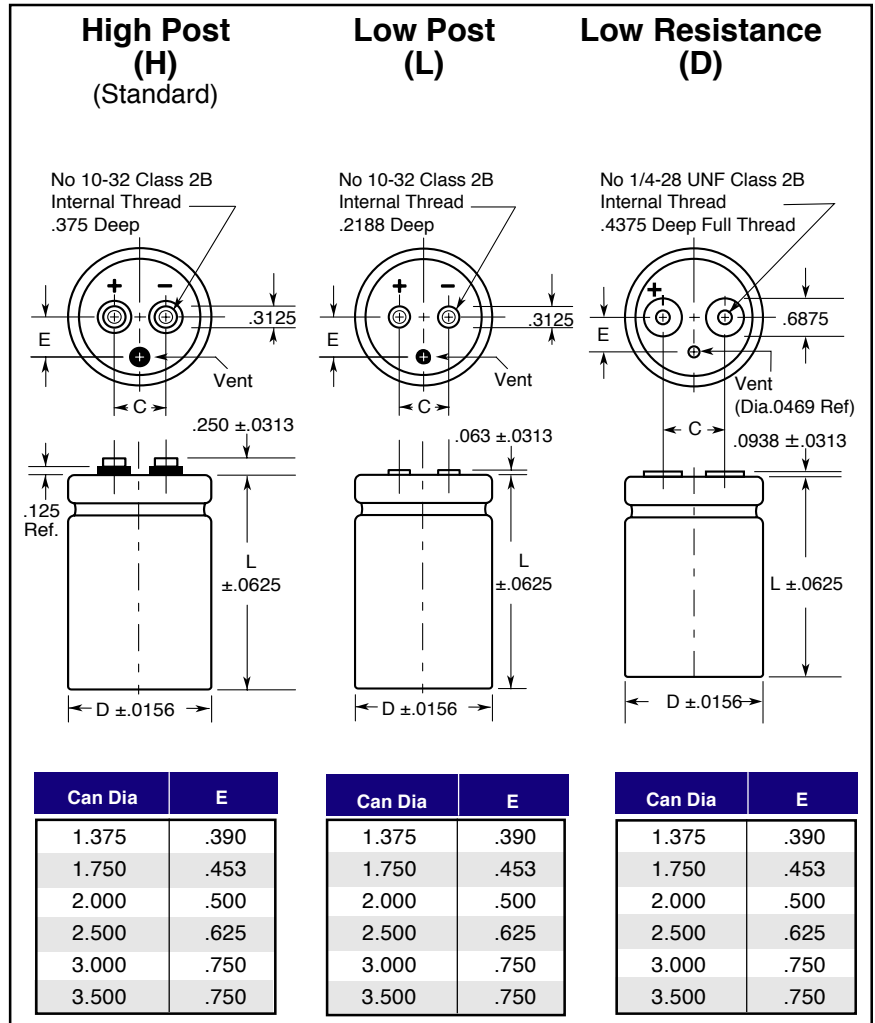
CAN DIAMETER	M THREAD	N INCH	N MM
1.375	M8	.472	12
1.750	M8	.472	12
2.000	M12	.630	16
2.500	M12	.630	16
3.000	M12	.630	16
3.500	M12	.630	16



STUDED CAN  
CROSS SECTION DETAIL

## Case Code Chart

Case Code	Uninsulated Can						Mounting Bracket
	Inches		mm		Inches	mm	
	D	L	D	L	C	C	
R2C	1.375	2.125	35	54	.500	12.7	VR3
R2L	1.375	2.625	35	67	.500	12.7	VR3
R3C	1.375	3.125	35	79.4	.500	12.7	VR3
R3L	1.375	3.625	35	92	.500	12.7	VR3
R4C	1.375	4.125	35	105	.500	12.7	VR3
R4L	1.375	4.625	35	117.5	.500	12.7	VR3
R5C	1.375	5.125	35	130	.500	12.7	VR3
R5L	1.375	5.625	35	143	.500	12.7	VR3
U2C	1.750	2.125	44.5	54	.750	19	VR6
U2L	1.750	2.625	44.5	67	.750	19	VR6
U3C	1.750	3.125	44.5	79.4	.750	19	VR6
U3L	1.750	3.625	44.5	92	.750	19	VR6
U4C	1.750	4.125	44.5	105	.750	19	VR6
U4L	1.750	4.625	44.5	117.5	.750	19	VR6
U5C	1.750	5.125	44.5	130	.750	19	VR6
U5L	1.750	5.625	44.5	143	.750	19	VR6
V2C	2.000	2.125	50.8	54	.875	22.2	VR8
V2L	2.000	2.625	50.8	67	.875	22.2	VR8
V3C	2.000	3.125	50.8	79.4	.875	22.2	VR8
V3L	2.000	3.625	50.8	92	.875	22.2	VR8
V4C	2.000	4.125	50.8	105	.875	22.2	VR8
V4L	2.000	4.625	50.8	117.5	.875	22.2	VR8
V5C	2.000	5.125	50.8	130	.875	22.2	VR8
V5L	2.000	5.625	50.8	143	.875	22.2	VR8
W3C	2.500	3.125	63.5	79.4	1.125	28.6	VR10
W3L	2.500	3.625	63.5	92	1.125	28.6	VR10
W4C	2.500	4.125	63.5	105	1.125	28.6	VR10
W4L	2.500	4.625	63.5	117.5	1.125	28.6	VR10
W5C	2.500	5.125	63.5	130	1.125	28.6	VR10
W5L	2.500	5.625	63.5	143	1.125	28.6	VR10
X3L	3.000	3.625	76.2	92	1.250	31.7	VR12
X4C	3.000	4.125	76.2	105	1.250	31.7	VR12
X4L	3.000	4.625	76.2	117.5	1.250	31.7	VR12
X5C	3.000	5.125	76.2	130	1.250	31.7	VR12
X5L	3.000	5.625	76.2	143	1.250	31.7	VR12
X5R	3.000	5.875	76.2	149	1.250	31.7	VR12
X6L	3.000	6.625	76.2	168	1.250	31.7	VR12
X7L	3.000	7.625	76.2	194	1.250	31.7	VR12
X8L	3.000	8.625	76.2	219	1.250	31.7	VR12
Y3L	3.500	3.625	88.9	92	1.25	31.7	N/A
Y4C	3.500	4.125	88.9	105	1.25	31.7	N/A
Y4L	3.500	4.625	88.9	117.5	1.25	31.7	N/A
Y5C	3.500	5.125	88.9	130	1.25	31.7	N/A
Y5L	3.500	5.625	88.9	143	1.25	31.7	N/A
Y5R	3.500	5.875	88.9	149	1.25	31.7	N/A
Y6L	3.500	6.625	88.9	168	1.25	31.7	N/A
Y7L	3.500	7.625	88.9	194	1.25	31.7	N/A
Y8L	3.500	8.625	88.9	219	1.25	31.7	N/A

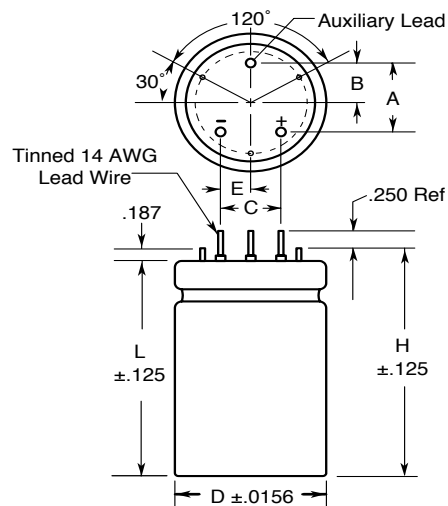


Can Dia	E	Can Dia	E	Can Dia	E
1.375	.390	1.375	.390	1.375	.390
1.750	.453	1.750	.453	1.750	.453
2.000	.500	2.000	.500	2.000	.500
2.500	.625	2.500	.625	2.500	.625
3.000	.750	3.000	.750	3.000	.750
3.500	.750	3.500	.750	3.500	.750

Add .015 inches to diameter and .045 inches to length for PVC insulating sleeve.

## PC Mounting Board Dimensions

Case Code	Uninsulated Can						
	Inches						
	D	L	H	A	B	C	E
R1N	1.375	1.750	1.937	.550	.375	.500	.250
R2C	1.375	2.125	2.312	.550	.375	.500	.250
R2L	1.375	2.625	2.812	.550	.375	.500	.250
R3C	1.375	3.125	3.312	.550	.375	.500	.250
R3L	1.375	3.625	3.812	.550	.375	.500	.250
R4C	1.375	4.125	4.312	.550	.375	.500	.250
R4L	1.375	4.625	4.812	.550	.375	.500	.250
R5C	1.375	5.125	5.312	.550	.375	.500	.250
R5L	1.375	5.625	5.812	.550	.375	.500	.250
V2C	2.000	2.125	2.312	1.000	.575	.800	.400
V2L	2.000	2.625	2.812	1.000	.575	.800	.400
V3C	2.000	3.125	3.312	1.000	.575	.800	.400
V3L	2.000	3.625	3.812	1.000	.575	.800	.400
V4C	2.000	4.125	4.312	1.000	.575	.800	.400
V4L	2.000	4.625	4.812	1.000	.575	.800	.400
V5C	2.000	5.125	5.312	1.000	.575	.800	.400
V5L	2.000	5.625	5.812	1.000	.575	.800	.400



# Selector Guide & Performance Specifications Computer Grade Capacitors



Type	Temperature Range	VDC Range	Life Test Hours @°C	High Cap	Low ESR	Low Hi-Freq. Imped.	High Ripple	Long Life	Low Cost	Comment
CGS / CGH	-40°C to +85°C	10 to 500	1000 +85	Good	Good	Good	Good		Best	Max Cap, Best Value Standard Life & Ripple
CG	-40°C to +85°C	10 to 450	2000 +85	Best		Good	Good		Good	Max Cap, Long Life Max Ripple, Low ESR
HES	-40°C to +105°C	350 to 400	1000 +105	Good	Good	Good	Good	Good	Good	Motor Control, Ultra High Ripple High Voltage
CGR	-40°C to +105°C	7.5 to 200	2000 +105	Good	Good	Good	Good	Good	Good	Wide Temperature Range, MIL-C-39018/04, 06, 10 equivalent
CGO	-40°C to +85°C	5 to 55	1000 +85		Best				Good	Lowest ESR

**Storage:** From -55°C to maximum operating temperature up to 200,000 feet above sea level.

## Test Conditions

**Surge Test:** Connect capacitor in series with resistor as follows:

C = 0 - 2500 $\mu$ F R = 1000 $\Omega$

C = 2500 - 25k $\mu$ F R = 500 $\Omega$

C =  $\geq$ 25,001 $\mu$ F R = 100 $\Omega$

Subject the series combination to rated surge voltage. For capacitors rated at +85°C, apply surge voltage for 30 seconds. Allow capacitor to discharge through resistor. Apply voltage again after 9.5 minutes.

Repeat 10 minute cycle for 24 hours. For capacitors rated at +105°C, apply voltage for 30 seconds and off for 5.5 minutes for 1,000 cycles. Following surge test, allow capacitors to cool to room temperature and measure DCL. DCL is not to increase from initial requirement and no electrolyte shall have leaked.

**Load Life Test:** Use a circulating air oven set to capacitor(s) maximum operating temperature. Separate capacitors to maintain temperature -0°C +3°C. Apply rated VDC for rated life  $\pm$ 12 hours using regulated power supply free from turn-on / turn-off voltage transients. At end of test, return capacitors to room temperature for 24 hours (minimum).

DCL is not to exceed initial requirement.

Capacitance must not be less than 85% of initial measured value.

ESR must not be greater than:

Type	% of Initial Requirement
CGS / CGH	175
CG / HES	175
CGR	100
CGO	175

**Full Ripple Life Test:** Use a circulating air oven as in Load Life Test. Apply DC voltage with rated ripple current from AC source and reduce DC voltage unit sum of DC voltage and peak AC voltage equals capacitor's rated voltage. At end of life test return capacitors to room temperature for 24 hours (minimum). Capacitance, ESR and DCL must meet Load Life Test requirements.

**Shelf Life Test:** Use a circulating air oven as above for rated shelf life  $\pm$ 6 hours. Allow capacitors to cool to room temperature and stabilize for a minimum of 16 hours. Capacitance, ESR and DCL will meet initial requirements.

**Vibration:** Clamp capacitor to a vibrating platform and subject it to a simple harmonic motion with a maximum peak-to-peak amplitude of 0.06" and maximum acceleration of 10g. Vary the frequency linearly between 10 and 55Hz. Entire range of 10-55Hz must be traversed in one minute. Vibrate capacitor for 1-1/2 hours with the direction of motion being parallel to the axis of the capacitor. Then move the capacitor so the direction of motion is perpendicular to the axis of the capacitor and continue the vibration for an additional 1-1/2 hours. During the last 30 minutes of the test connect the capacitor to a bridge and observe for 3 minutes. There will be no evidence of loosening of the capacitor element within the case when shaken by hand following the test. No indication of intermittent contact, open or shorting is allowed during the 3 minute observation period.

**Container Seal:** Following the vibration test, each capacitor for seal tightness as follows:

Subject the capacitors to two successive temperature cycles in circulating air. One temperature cycle is:

- 85°C for 30 minutes
- 25°C for 30 minutes
- 40°C for 30 minutes
- 25°C for 30 minutes

Following the second cycle, immerse the capacitor in 90-95°C water for five minutes. A failure is a continuous chain of bubbles when immersed.

**Vent Test:** Apply reverse DC voltage to a capacitor at 15-25 Amperes. If the capacitor is open or shorts and the vent has not operated, test additional capacitors. The vent must operate and there must be no explosion.

**Shelf Life:** Capacitors stored more than 5 years should be checked for DCL to see if they meet requirements. Apply rated VDC for 30 minutes through a 1000 $\Omega$  resistor to bring DCL within limits.

**Voltage Reversal:** Capacitors will withstand a maximum 1.5 VDC reverse bias.

**Mounting:** The preferred mounting for large computer grade capacitors is in the vertical position with the pressure relief vent up or horizontal with the pressure relief valve up. Be sure to allow 1/2 inch (minimum) clearance to permit the vent to operate.

Capacitance (µF)	Max ESR (mOHMS)		Max Ripple Amps RMS		Diameter	Length	Part Description
	120 Hz	20 kHz	120 Hz	20 kHz			
	<b>250 WVDC; 300 VDC Surge</b>						
1,700	65.8	42.1	4.0	5.0	2.000	2.625	CGH172T250V2L
2,900	53.1	34.0	5.7	7.1	2.000	3.625	CGH292T250V3L
4,100	25.7	16.4	9.1	11.4	2.000	4.625	CGH412T250V4L
5,000	26.9	17.2	9.2	11.5	2.500	3.625	CGH502T250W3L
5,300	20.6	13.2	11.0	13.8	2.000	5.625	CGH532T250V5L
7,000	20.1	12.9	11.7	14.6	2.500	4.625	CGH702T250W4L
7,400	27.1	17.3	10.3	12.9	3.000	3.625	CGH742T250X3L
9,000	16.3	10.4	14.1	17.6	2.500	5.625	CGH902T250W5L
10,000	20.4	13.1	13.0	16.3	3.000	4.625	CGH103T250X4L
13,000	16.8	10.8	15.6	19.5	3.000	5.625	CGH133T250X5L
22,000	11.5	7.4	22.3	27.9	3.000	8.625	CGH223T250X8L

<b>350 WVDC; 400 VDC Surge</b>							
1,000	162.6	104.1	2.9	3.6	2.000	2.625	CGH102T350V2L
1,700	81.9	52.4	4.6	5.8	2.000	3.625	CGH172T350V3L
2,400	58.8	37.6	6.0	7.5	2.000	4.625	CGH242T350V4L
2,700	54.3	34.8	6.5	8.1	2.500	3.625	CGH272T350W3L
2,900	53.1	34.0	6.8	8.5	2.500	3.625	CGH292T350W3L
3,100	46.2	29.6	7.4	9.3	2.000	5.625	CGH312T350V5L
3,800	39.3	25.2	8.4	10.5	2.500	4.625	CGH382T350W4L
4,000	44.3	28.4	8.1	10.1	3.000	3.625	CGH402T350X3L
4,100	38.6	24.7	8.6	10.8	2.500	4.625	CGH412T350W4L
4,300	43.5	27.8	8.4	10.5	3.000	3.625	CGH432T350X3L
4,900	31.5	20.2	10.1	12.6	2.500	5.625	CGH492T350W5L
5,200	31.1	19.9	10.3	12.9	2.500	5.625	CGH522T350W5L
5,700	32.5	20.8	10.3	12.9	3.000	4.625	CGH572T350X4L
6,000	32.3	20.7	10.6	13.3	3.000	4.625	CGH602T350X4L
7,300	25.9	16.6	12.5	15.6	3.000	5.625	CGH732T350X5L
7,800	25.6	16.4	12.8	16.0	3.000	5.625	CGH782T350X5L
10,000	20.7	13.2	16.6	20.8	3.000	8.625	CGH103T350X8L

Capacitance (µF)	Max ESR (mOHMS)		Max Ripple Amps RMS		Diameter	Length	Part Description
	120 Hz	20 kHz	120 Hz	20 kHz			
	<b>450 WVDC; 525 VDC Surge</b>						
620	159.6	102.1	2.9	3.6	2.000	2.625	CGH621T450V2L
1,000	83.4	53.4	4.8	6.0	2.000	3.625	CGH102T450V3L
1,400	60.3	38.6	5.9	7.4	2.000	4.625	CGH142T450V4L
1,700	55.3	35.4	6.4	8.0	2.500	3.625	CGH172T450W3L
1,800	47.6	30.5	7.2	9.0	2.000	5.625	CGH182T450V5L
2,400	40.1	25.7	8.3	10.4	2.500	4.625	CGH242T450W4L
2,500	44.9	28.7	8.0	10.0	3.000	3.625	CGH252T450X3L
3,100	31.7	20.3	10.1	12.6	2.500	5.625	CGH312T450W5L
3,600	32.6	20.9	10.3	12.9	3.000	4.625	CGH362T450X4L
4,600	26.2	16.8	12.4	15.5	3.000	5.625	CGH462T450X5L
7,700	17.3	11.1	18.2	22.8	3.000	8.625	CGH772T450X8L

<b>500 WVDC; 535 VDC Surge</b>							
350	692.0	612.0	1.3	1.5	2.000	2.125	CGH351T500V2 C
520	470.0	416.0	1.7	1.9	2.000	2.625	CGH521T500V2L
710	345.0	305.0	2.1	2.4	2.000	3.125	CGH711T500V3 C
900	272.0	241.0	2.5	2.8	2.000	3.625	CGH901T500V3L
1100	225.0	199.0	3.1	3.3	2.000	4.125	CGH112T500V4 C
1200	218.0	196.0	3.1	3.4	2.500	3.125	CGH122T500W3 C
1300	192.0	170.0	3.3	3.7	2.000	4.625	CGH132T500V4L
1500	168.0	148.0	3.7	4.1	2.000	5.125	CGH152T500V5 C
1500	172.0	153.0	3.6	4.1	2.500	3.625	CGH152T500W3L
1700	149.0	132.0	4.0	4.5	2.000	5.625	CGH172T500V5L
1800	142.0	126.0	4.2	4.7	2.500	4.125	CGH182T500W4 C
2100	121.0	108.0	4.8	5.3	2.500	4.625	CGH212T500W4L
2200	124.0	111.0	4.8	5.4	3.000	3.625	CGH222T500X3L
2400	106.0	99.1	5.3	6.0	2.500	5.125	CGH242T500W5 C
2700	93.9	83.5	5.9	6.6	2.500	5.625	CGH272T500W5L
2700	103.0	91.8	5.6	6.3	3.000	4.125	CGH272T500X4 C
3100	87.4	78.4	6.3	7.0	3.000	4.625	CGH312T500X4L
3600	76.3	68.4	7.0	7.8	3.000	5.125	CGH362T500X5 C
4100	67.8	60.8	7.7	8.6	3.000	5.625	CGH412T500X5L
6900	41.0	36.9	11.9	13.2	3.000	8.625	CGH692T500X8L