DuraCap International Incorporated

CG - Computer Grade Electrolytic Capacitors

- High Reliability 85°C
- Screw Terminals
- Long Life
- Custom Designs Available Upon Request

GENERAL SPECIFICATIONS

Operating Temperature:
-40°C to +85°C

Voltage Range:
10 WVDC to 450 WVDC

Capacitance Range:
40 μF to 160,000 μF

Capacitance Tolerance:
-10% +75% (10 - 150 WVDC)
-10% +50% (151 - 450 WVDC)

DC Leakage Current:

$I = 6 \times 10^{-6}$ CV after 5 minutes
Not to exceed 4.0mA
C = Capacitance in μF
V = Rated Voltage
I = Leakage Current in mA

QA Stability Test:
Apply WVDC for 2,000 hrs at 85°C

- Capacitance change ≤15% from initial limits
- DC leakage current meets initial limits
- ESR ≤ 175% of initial measured value

The maximum ripple current at 85°C and 120 Hz for CG capacitors is shown in the Standard Rating Table. Maximum ripple current may be adjusted by the multipliers in the following tables:

Rated WVDC	Ripple Multipliers				
	120 Hz	400 Hz	1000 Hz	2500Hz	10KHz
10 to 75	1.0	1.050	1.085	1.135	1.150
76 to 250	1.0	1.075	1.125	1.155	1.210
251 to 450	1.0	1.080	1.130	1.175	1.230

Ambient Temperature	Ripple Multiplier
+85°C	1.00
+65°C	1.42
+55°C	1.58
+45°C	1.72
+35°C	1.88
+25°C	2.00

DuraCap International, Inc
P.O. Box 1579 Woodstock, Ontario
N4S 0A7 Canada

Phone: (519) 539-4891
Fax: (519) 539-6684
http://www.duracap.com/

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

DuraCap International Incorporated

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

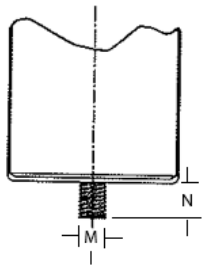
CASE CODE:
See chart on next page

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



STUDDED CAN
CROSS SECTION DETAIL

DuraCap International, Inc
P.O. Box 1579 Woodstock, Ontario
N4S 0A7 Canada

Phone: (519) 539-4891
Fax: (519) 539-6684
http://www.duracap.com/

Type CG Dimensions and Size Charts

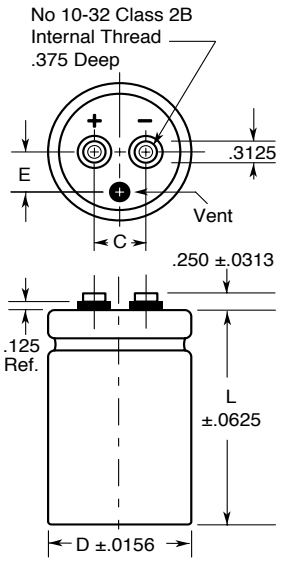
DuraCap International Incorporated

Case Code Chart

Uninsulated Can

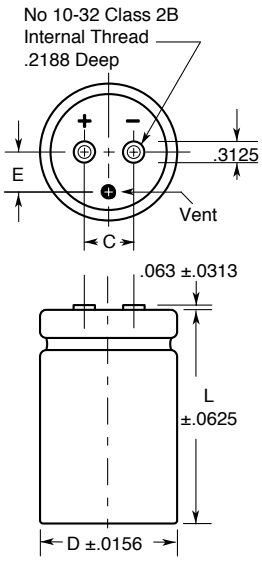
Case Code	Inches D	Inches L	mm D	mm L	Inches C	mm C	Mounting Bracket
R2C	1.375	2.125	35	54	.500	12.7	VR3
R2L	1.375	2.625	35	67	.500	12.7	VR3
R3C	1.375	3.125	35	79.4	.500	12.7	VR3
R3L	1.375	3.625	35	92	.500	12.7	VR3
R4C	1.375	4.125	35	105	.500	12.7	VR3
R4L	1.375	4.625	35	117.5	.500	12.7	VR3
R5C	1.375	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

High Post (H) (Standard)



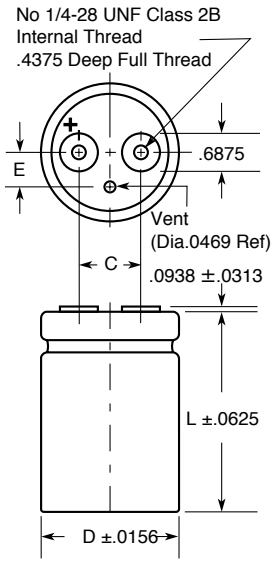
Can Dia	E
1.375	.390
1.750	.453
2.000	.500
2.500	.625
3.000	.750
3.500	.750

Low Post (L)



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

Low Resistance (D)



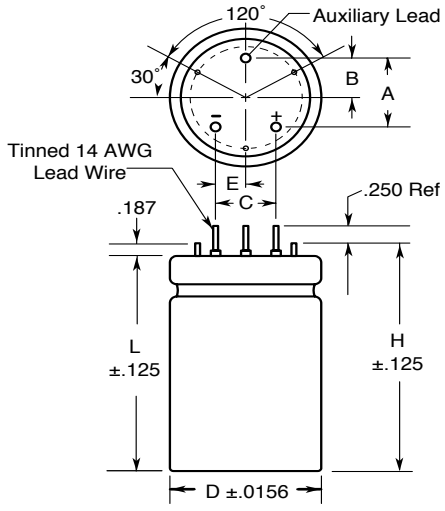
Can Dia	E
1.375	.390
1.750	.453
2.000	.500
2.500	.625
3.000	.750
3.500	.750

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

PC Mounting Board Dimensions

Uninsulated Can

Case Code	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



DuraCap International Inc.
P.O. Box 1579 Woodstock, Ontario
N4S 0A7 Canada

Phone: (519) 539-4891
Fax: (519) 539-6684
http://www.duracap.com/

Selector Guide & Performance Specifications
Computer Grade Capacitors

DuraCap International Incorporated

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 - 2500μF R = 1000Ω
C = 2500 - 25kμF R = 500Ω
C = ≥25,001μF R = 100Ω
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. Seperate capacitors to maintain temperature -0°C +3°C. Apply rated VDC for rated life ±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 ±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:
A. 85°C for 30 minutes
B. 25°C for 30 minutes
C. -40°C for 30 minutes
D. 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 1000Ω 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.

DuraCap International Inc.
P.O. Box 1579 Woodstock, Ontario
N4S 0A7 Canada

Phone: (519) 539-4891
Fax: (519) 539-6684
http://www.duracap.com/

DuraCap International Incorporated

Capacitance (µF)	Max ESR (Ohms) @120Hz	Max Ripple Amps RMS @120Hz +85°C	Diameter	Length	Part Description
10 WVDC; 15 VDC Surge					
160,000	0.006	27.10	3.000	5.625	CG164U010X5L
16 WVDC; 20 VDC Surge					
2,500	0.047	3.9	1.375	2.125	CG252U016R2C
6,500	0.039	4.3	1.375	2.125	CG652U016R2C
10,500	0.027	7.6	2.000	3.125	CG1052U016V3C
12,000	0.024	6.4	1.375	3.125	CG123U016R3C
18,000	0.018	8.3	1.375	4.125	CG183U016R4C
21,000	0.012	10.5	1.750	3.125	CG213U016U3C
27,000	0.012	11.4	2.000	3.125	CG273U016V3C
40,000	0.009	14.7	2.000	4.125	CG403U016V4C
25 WVDC; 40 VDC Surge					
1,500	0.058	3.5	1.375	2.125	CG152U025R2C
2,800	0.036	5.2	1.375	3.125	CG282U025R3C
3,300	0.043	4.1	1.375	2.125	CG332U025R2C
4,500	0.006	14.8	1.750	3.125	CG452U025U3C
6,000	0.029	7.3	2.000	3.125	CG602U025V3C
6,300	0.028	5.9	1.375	3.125	CG632U025R3C
8,500	0.022	9.4	2.000	4.125	CG852U025V4C
9,200	0.022	7.5	1.375	4.125	CG922U025R4C
10,000	0.026	7.1	1.750	3.125	CG103U025U3C
13,000	0.024	8.0	2.000	3.125	CG133U025V3C
20,000	0.019	10.1	2.000	4.125	CG203U025V4C
20,000	0.019	12.9	3.000	4.125	CG203U025X4C
32,000	0.010	15.9	2.500	4.125	CG323U025W4C
48,000	0.005	25.2	3.000	4.125	CG483U025X4C
35 WVDC; 50 VDC Surge					
1,100	0.063	3.4	1.375	2.125	CG112U035R2C
2,100	0.039	5.0	1.375	3.125	CG212U035R3C
2,300	0.051	3.8	1.375	2.125	CG232U035R2C
4,300	0.030	5.7	1.375	3.125	CG432U035R3C
9,500	0.025	7.9	2.000	3.125	CG952U035V3C
11,000	0.021	11.0	2.500	4.125	CG113U035W4C
11,000	0.020	9.1	1.750	4.125	CG113U035U4C

DuraCap International Inc.
P.O. Box 1579 Woodstock, Ontario
N4S 0A7 Canada

Phone: (519) 539-4891
Fax: (519) 539-6684
http://www.duracap.com/

Capacitance (µF)	Max ESR (Ohms) @120Hz	Max Ripple Amps RMS @120Hz +85°C	Diameter	Length	Part Description
14,000	0.018	10.4	2.000	4.125	CG143U035V4C
22,000	0.011	15.2	2.500	4.125	CG223U035W4C
33,000	0.006	23.0	3.000	4.125	CG333U035X4C
50 WVDC; 75 VDC Surge					
800	0.072	3.2	1.375	2.125	CG801U050R2C
1,500	0.058	3.5	1.375	2.125	CG152U050R2C
1,500	0.044	4.7	1.375	3.125	CG152U050R3C
2,000	0.033	6.1	1.375	4.125	CG202U050R4C
2,500	0.037	6.0	1.750	3.125	CG252U050U3C
2,900	0.036	5.2	1.375	3.125	CG292U050R3C
3,300	0.035	6.7	2.000	3.125	CG332U050V3C
4,300	0.026	6.9	1.375	4.125	CG432U050R4C
4,500	0.026	8.6	2.000	4.125	CG452U050V4C
5,000	0.029	6.7	1.750	3.125	CG502U050U3C
6,500	0.017	9.6	2.000	3.125	CG652U050V3C
7,300	0.023	10.5	2.500	4.125	CG732U050W4C
7,400	0.022	8.7	1.750	4.125	CG742U050U4C
9,500	0.013	12.2	2.000	4.125	CG952U050V4C
10,000	0.013	15.6	3.000	4.125	CG103U050X4C
15,000	0.009	16.8	2.500	4.125	CG153U050W4C
16,500	0.010	20.5	3.000	5.625	CG1652U050X5L
22,000	0.006	22.5	3.000	4.125	CG223U050X4C
33,000	0.005	29.0	3.000	5.625	CG333U050X5L
75 WVDC; 100 VDC Surge					
600	0.085	2.9	1.375	2.125	CG601U075R2C
800	0.072	3.2	1.375	2.125	CG801U075R2C
1,000	0.053	4.3	1.375	3.125	CG102U075R3C
1,500	0.037	5.8	1.375	4.125	CG152U075R4C
1,500	0.045	4.7	1.375	3.125	CG152U075R3C
2,000	0.039	5.8	1.750	3.125	CG202U075U3C
2,500	0.036	6.6	2.000	3.125	CG252U075V3C
2,600	0.035	6.1	1.750	3.125	CG262U075U3C
3,300	0.022	8.4	2.000	3.125	CG332U075V3C

DuraCap International Inc.
P.O. Box 1579 Woodstock, Ontario
N4S 0A7 Canada

Phone: (519) 539-4891
Fax: (519) 539-6684
http://www.duracap.com/

Capacitance (µF)	Max ESR (Ohms) @120Hz	Max Ripple Amps RMS @120Hz +85°C	Diameter	Length	Part Description
3,450	0.027	8.5	2.000	4.125	CG3451U075V4C
4,900	0.015	11.3	2.000	4.125	CG492U075V4C
7,900	0.012	14.5	2.500	4.125	CG792U075W4C
8,200	0.012	16.3	3.000	4.125	CG822U075X4C
11,000	0.009	18.8	3.000	4.125	CG113U075X4C
12,500	0.009	21.8	3.000	5.625	CG1252U075X5L
100 WVDC; 135 VDC Surge					
400	0.180	2.0	1.375	2.125	CG401U100R2C
1,000	0.068	4.3	1.375	4.125	CG102U100R4C
1,300	0.066	4.5	1.750	3.125	CG132U100U3C
1,700	0.050	5.7	1.750	4.125	CG172U100W4C
2,250	0.036	7.3	2.000	4.125	CG2251U100V4C
2,500	0.030	8.0	2.000	4.125	CG252U100V4C
3,600	0.020	11.3	2.500	4.125	CG362U100W4C
4,000	0.019	11.5	2.500	4.125	CG402U100W4C
150 WVDC; 185 VDC Surge					
275	0.170	2.1	1.375	2.125	CG2750U150R2C
500	0.103	3.1	1.375	3.125	CG501U150R3C
1,550	0.052	6.1	2.000	4.125	CG1551U150V4C
2,500	0.030	9.2	2.500	4.125	CG252U150W4C
3,600	0.022	9.4	3.000	4.125	CG362U150X4C
5,600	0.014	17.0	3.000	3.625	CG562U150X3L
200 WVDC; 250 VDC Surge					
180	0.280	1.6	1.375	2.125	CG181T200R2C
450	0.120	3.2	1.375	4.125	CG451T200R4C
550	0.150	3.0	1.750	3.125	CG551T200U3C
750	0.102	3.9	2.000	3.125	CG751T200V3C
1,000	0.085	4.8	2.000	4.125	CG102T200V4C
1,650	0.050	7.8	2.500	4.125	CG1651T200W4C
2,450	0.034	9.7	3.000	4.125	CG2451T200X4C
3,800	0.023	13.2	3.000	5.625	CG382T200X5L

DuraCap International Inc.
P.O. Box 1579 Woodstock, Ontario
N4S 0A7 Canada

Phone: (519) 539-4891
Fax: (519) 539-6684
http://www.duracap.com/

DuraCap International Incorporated

Capacitance (µF)	Max ESR (Ohms) @120Hz	Max Ripple Amps RMS @120Hz +85°C	Diameter	Length	Part Description
250 WVDC; 300 VDC Surge					
140	0.310	1.5	1.375	2.125	CG141T250R2C
375	0.130	3.1	1.375	4.125	CG3750T250R4C
600	0.091	4.1	2.000	3.125	CG601T250V3C
800	0.072	4.6	2.000	4.125	CG801T250V4C
3,000	0.020	14.2	3.000	5.625	CG302T250X5L
300 WVDC; 350 VDC Surge					
525	0.095	4.0	2.000	3.125	CG5250T300V3C
350 WVDC; 400 VDC Surge					
100	0.720	1.0	1.375	2.125	CG101T350R2C
180	0.500	1.4	1.375	3.125	CG181T350R3C
250	0.290	2.1	1.375	4.125	CG251T350R4C
400	0.260	2.4	2.000	3.125	CG401T350V3C
550	0.180	3.3	2.000	4.125	CG551T350V4C
2,000	0.061	8.1	3.000	5.625	CG202T350X5L
400 WVDC; 475 VDC Surge					
325	0.220	3.0	2.000	4.125	CG3250T400V4C
450 WVDC; 525 VDC Surge					
40	3.240	0.50	1.375	2.125	CG400T450R2C
110	1.220	1.00	1.375	4.125	CG111T450R4C
240	0.330	2.4	2.000	4.125	CG241T450V4C

DuraCap International Inc.
P.O. Box 1579 Woodstock, Ontario
N4S 0A7 Canada

Phone: (519) 539-4891
Fax: (519) 539-6684
http://www.duracap.com/