



**FHS SERIES**

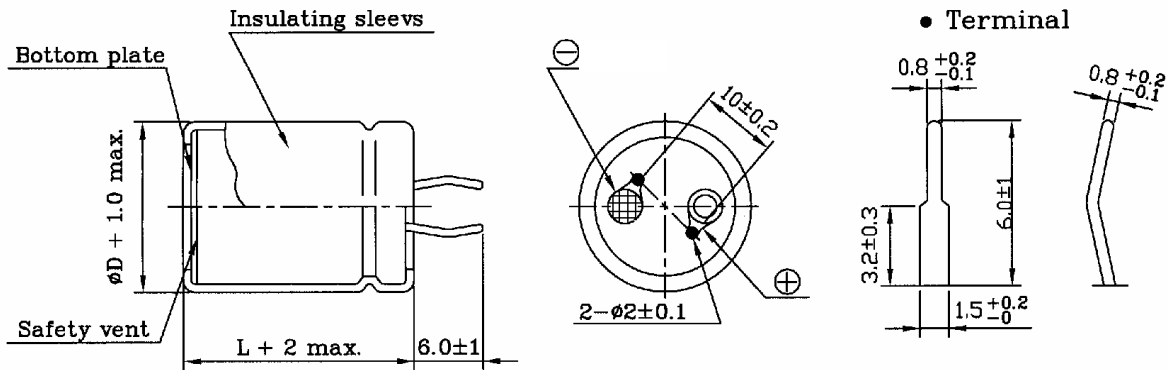
85°C, Standard, PCB Mounting

- Directly mountable on printed circuit board without holders.
- Smaller low profile sizes than ordinary capacitors.
- Terminal spacing fixed at 10mm for PC board plug in.
- Aluminum case designed explosion-proof vent.

**Characteristics**

<b>Voltage Range</b>	16 ~ 100V	160 ~ 450V					
<b>Capacitance Range</b>	47 ~ 47000μF	47 ~ 2200μF					
<b>Temperature Range</b>	-40 ~ +85°C	-25 ~ +85°C					
<b>Capacitance Tolerance</b>	□20% at 120Hz, 20°C (10% Tol. is available upon request)						
<b>Leakage Current</b>	$I=3\sqrt{CV}$ uA max C: Capacitance, V:W.V. (After 5 minutes)						
<b>Dissipation Factor(tan δ)</b>	Less than the value under table (%)						
<b>( at 20°C, 120Hz)</b>	uF \\\ W.V.	10 ~ 16	25 ~ 35	50 ~ 63	80 ~ 100	160 ~ 250	350 ~ 450
	47 ~ 390	-	-	-	-	15	20
	470 ~ 3900	25	20	20	20	15	20
	4700 ~ 8200	35	30	30	25		
	10000 ~ 22000	40	35	30			
	27000 ~ 47000	45	40	35			
<b>Stability at Low Temperature</b>	Impedance ratio at 120Hz between the -25°C or -40°C value and 20°C value shall not exceed :						
	$Z_{-25°C}/Z_{20°C}$				3		
	$Z_{-40°C}/Z_{20°C}$				12		
<b>Load Life</b>	The following specifications shall satisfied when the capacitors are restored to 20°C after rated working voltage applied for 2,000 hours at max. operating temperature with the rated ripple current applied.						
	Capacitance change	$\leq \square 20\%$ of the initial value.					
	Dissipation factor	$\leq \square 200\%$ of the initial specified value					
	Leakage current	$\leq$ The initial specified value.					
<b>Shelf Life</b>	After storage for 1000 hours at 85°C with no voltage applied, the capacitor shall meet the specified limit in load life.						

**Diagram of dimensions**



**Multiplier for R.C. vs Temperature**

Temp.(°C)	45	60	70	85
Multiplier	1.55	1.3	1.2	1.00

**Multiplier for Ripple Current VS Frequency**

Cap.(uF) \\\ (Hz)	60	120	1K	10K	50K - 100K
10 < Cap. ≤ 100	0.8	1	1.36	1.48	1.53
100 < Cap. ≤ 1000	0.8	1	1.25	1.35	1.38
1000 < Cap.	0.8	1	1.17	1.25	1.28



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**Standard Products Table**

W.V(DC)	CAP. (μF)	Ripple Current A max. 85°C, 120Hz	Dimensions A		Dimensions B		Dimensions C	
			D φ	L	D φ	L	D φ	L
<b>16 (1C)</b>	4700	2.4	22	25	-		-	
	6800	2.84	22	25	-		-	
	10000	3.06	22	30	25	25	-	
	15000	3.94	22	35	25	30	-	
	22000	4.80	22	45	25	35	30	30
	33000	8.2	25	50	30	40	-	
	47000	8.96	30	50	35	40	-	
<b>25 (1E)</b>	3300	2.46	22	25	-		-	
	4700	2.64	22	25	25	25	-	
	6800	2.93	22	30	25	25	-	
	10000	3.43	22	40	25	35	-	
	15000	4.39	22	50	25	40	30	35
	22000	5.40	25	50	30	40	-	
<b>35 (1V)</b>	2200	2.18	22	25	-		-	
	3300	2.46	22	25	-		-	
	4700	2.68	22	30	25	25	-	
	6800	3.06	22	35	25	30	-	
	10000	3.60	25	45	30	35	30	30
	15000	3.92	25	50	30	40	-	
	22000	5.45	30	45	35	40	-	
<b>50 (1H)</b>	2200	2.04	22	25	-		-	
	3300	2.64	22	30	25	25	-	
	4700	2.88	22	40	25	35	30	30
	6800	3.24	22	50	25	40	-	
	10000	3.96	25	50	35	40	-	
<b>63 (1J)</b>	1000	1.58	22	25	-		-	
	2200	2.52	22	25	25	25	-	
	3300	3.12	22	40	25	30	-	
	4700	3.28	25	45	30	35	-	
	6800	4.32	25	50	30	40	-	
	10000	4.77	35	50	-		-	
<b>80 (1K)</b>	1000	1.62	22	25	-		-	
	2200	2.52	22	40	25	30	-	
	3300	3.24	22	50	25	40	30	30
	4700	3.60	25	50	30	40	-	
	6800	4.60	30	50	35	40	-	
	10000	5.04	35	55	-		-	
<b>100 (2A)</b>	470	1.34	22	25	-		-	
	680	1.53	22	25	-		-	
	1000	1.62	22	30	25	25	-	
	1500	1.85	22	40	25	35	30	30
	2200	2.64	22	50	25	40	30	30
	3300	3.42	25	50	30	40	-	
	4700	3.72	30	50	35	40	-	
	6800	4.10	35	50	-		-	



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**Standard Products Table**

W.V(DC)	CAP. (μF)	Ripple Current A max. 85°C, 120Hz	Dimensions A		Dimensions B		Dimensions C	
			D φ	L	D φ	L	D φ	L
160 (2C)	220	1.20	22	25	-		-	
	330	1.44	22	25	-		-	
	470	1.76	22	30	25	25	-	
	680	2.36	22	40	25	30	-	
	1000	3.13	25	45	30	35	-	
	1500	3.96	25	45	35	35	-	
	2200	4.65	35	45	-		-	
200 (2D)	150	0.96	22	25	-		-	
	220	1.36	22	25	-		-	
	330	1.89	22	30	25	25	-	
	470	2.23	22	35	25	30	-	
	680	2.98	22	45	25	40	30	30
	1000	3.26	25	50	30	40	-	
	1500	4.99	30	50	35	40	-	
250 (2E)	2200	6.07	35	50	-		-	
	150	0.98	22	25	-		-	
	220	1.36	22	30	25	25	-	
	330	1.87	22	35	25	30	-	
	470	2.38	22	45	25	40	30	30
	680	3.11	25	50	30	40	-	
	1000	4.00	30	50	35	40	-	
350 (2V)	1500	5.34	35	50	-		-	
	100	0.90	22	30	-		-	
	150	1.00	22	35	25	30	-	
	220	1.40	22	45	25	35	30	30
	330	1.90	25	50	30	40	-	
	470	2.41	30	45	35	35	-	
400 (2G)	680	3.20	35	50	-		-	
	47	0.42	22	25	-		-	
	68	0.51	22	25	-		-	
	100	1.03	22	30	25	25	-	
	150	1.26	22	40	25	30	-	
	220	1.75	22	45	25	40	30	30
	330	2.26	30	40	35	35	25	50
	470	2.80	30	50	35	40	-	
450 (2W)	680	3.69	40	50	-		-	
	47	0.36	22	25	-		-	
	68	0.50	22	25	22	30	-	
	100	1.03	22	35	25	30	-	
	150	1.39	22	45	25	35	30	30
	220	1.76	25	50	30	40	30	30
	330	2.29	30	45	35	40	-	
470	2.89	35	45	40	40	-		

# ORDERING INFORMATION (CEL)

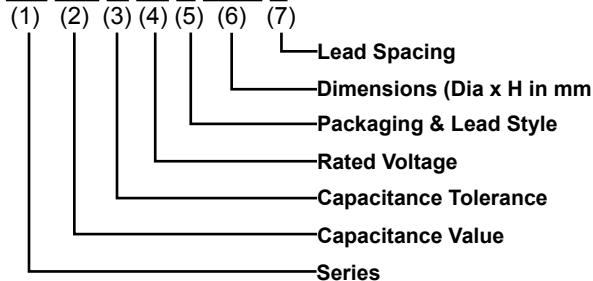


Daewoo Components Corp.

## Through-Hole Part Numbering System Example:

**CEL** = Leaded Type, **RM** = Leaded Radial 85°C Miniature Series, **102** = 1000µF, **M** =20% Tolerance, **1E** 25 Volts, **B** = Bulk,  
**1020** = Case size (Dia x H) = 10.0 x 20.0mm, **E** = 5.0mm

### RM 102 M 1E B 1020 E



#### (1) Series

See Quick Guide on page 2  
Example: RSS, RM, RMU,...

#### (2) Capacitance Value Code

Capacitance expressed in micro Farads (µF)  
First two digits are significant figures  
Third digit denotes the number of zeros  
Use R for decimal point for values less than 10µF

##### Examples:

CODE	Capacitance
R10	0.1 µF
R68	0.68 µF
1R0	1.0 µF
100	10 µF
680	68 µF
471	470 µF
102	1000 µF
103	10000 µF

#### (3) Capacitance Tolerance Code

CODE	Cap. Tol.	CODE	Cap. Tol.
J	±5%	V	-10% ~ +20%
K	±10%	Q	-10% ~ +30%
M	±20%	T	-10% ~ +50%
R	+20%, -0%		

#### (4) Rated Voltage Code

CODE	Voltage	CODE	Voltage
0G	4.0V	2C	160V
0J	6.3V	2S	180V
1A	10V	2D	200V
1C	16V	2E	250V
1E	25V	2F	315V
1V	35V	2V	350V
1H	50V	2G	400V
1J	63V	2W	450V
1K	80V	3Z	1000V
2A	100V		

#### (5) Packaging Form & Lead Style Code ( see page 7, 8, 9 for details)

	Code	Packaging Form & Lead Style
<b>Bulk</b>	<b>B</b>	Bulk: Standard Package
	<b>L</b>	"FL" Bulk: 4 -8ø Long Leads Formed to 5 mm Pitch
<b>Snap-In</b>	<b>1</b>	"SA/S1A": 10-13ø Snap-in Cut 5.0mm
	<b>2</b>	"SB/SB1": 16-13ø Snap-in Cut 5.0mm
	<b>3</b>	"SC/S2A": 10-13ø Snap-in Cut 4.5mm
	<b>4</b>	"SE/S2B": 16-18ø Snap-in Cut 4.5mm
	<b>5</b>	"SG/S3A": 4-8ø Snap-in Cut 7.5mm
<b>Form</b>	<b>F</b>	"FF/FCF": 4-8ø Forming Cut 6.5mm
<b>Straight Cut</b>	<b>C</b>	"CJ": 4-18ø Straight Cut 4.0mm
	<b>6</b>	"CR": 4-18ø Straight Cut 3.5mm
	<b>7</b>	"CS": 4-18ø Straight Cut 5.0mm
	<b>8</b>	"CE": 4-18ø Straight Cut 6.35mm
<b>Ammo Tape (+) Leading</b>	<b>A</b>	"TS"/"TSSA": 4-8ø Straight Ammo Detail Ranges: 4-6.3ø; F=2.5mm 8ø; F=3.5mm
		"T5/TAA": 4-8ø Form Tape & Ammo 5mm Pitch
		"T7/TSAA": 10ø Straight Ammo Tape 5mm Pitch
		"T9/TSAA": 13ø Straight Ammo Tape 5mm Pitch
		"TB/TSAA": 16-18ø Straight Ammo Tape 5mm Pitch
<b>Tape &amp; Reel (+) Leading</b>	<b>T</b>	"TQ/TSSRA": 4-8ø Straight Ammo Detail Ranges: 4-6.3ø; F=2.5mm 8ø; F=3.5mm
		"T1/TRA": 4-13ø Form Tape & Reel 5mm Pitch
		"T3/TSRA": 10-13ø Straight Reel Tape 5mm Pitch

NOTE: Standard Pack Anode(+) Lead Leading FEEDS OFF FIRST  
Special Option Cathode(-) Lead Leading available upon request  
Standard Packages: B = Bulk, A = Ammo, T = Tape & Reel

#### (6) Dimension Code (Diameter x Height in mm)

Size Code	Diameter	Height	Size Code	Diameter	Height
0407	4	7	1835	18	35.5
0507	5	7	2240	22	40
0607	6.3	7	2545	25	45
0511	5	11	3035	30	35
0611	6.3	11	3500	35	100
0811	8	11	3501	35	110
1012	10	12.5	5102	51	120
1220	12.5	20	6303	63.5	130
1320	13	20	7604	76	140
1631	16	31.5	8904	89	140

#### (7) Lead Spacing Code (LS)

Code	X	A	B	C	D	E	J	F
LS	1.0	1.5	2.0	2.5	3.5	5.0	7.0	7.5
Code	K	M	G	P	H	Q	R	S
LS	8.0	10.0	10.5	12.0	12.5	12.8	15.0	16.0
Code	T	U	V	W	Y	Z		
LS	20.0	21.7	28.3	30.0	31.6	32		