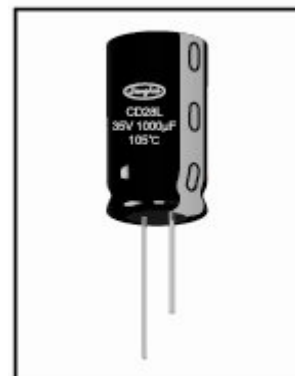
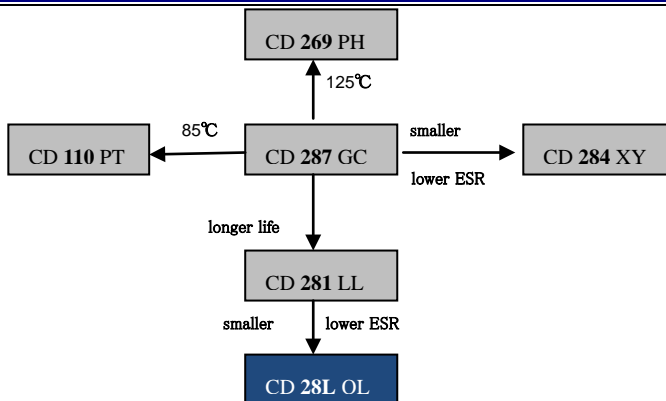


# CD 28L QL Series



2000 ~ 8000h at 105°C

- Miniaturized
- Low Impedance, High Current
- Switching Power Supply

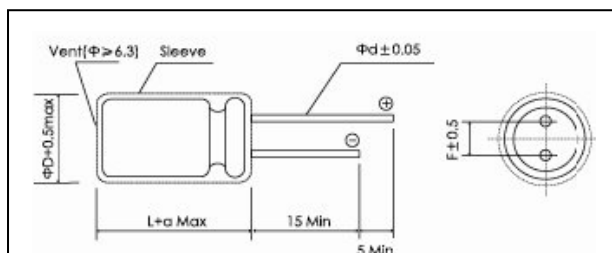


Items	Characteristics																
Operating Temperature Range(°C)	-55~ +105																
Voltage Range (V)	6.3~ 63																
Capacitance Range(μF)	12~ 18000																
Capacitance Tolerance (20°C,120Hz)	±20%																
Leakage Current (μA)	After 2 minutes at 20°C application of rated voltage, leakage current is not more than 0.01CV or 3, whichever is greater C:Nominal Capacitance(μF) V:Rated Voltage(V)																
Dissipation Factor (20°C, 120Hz)	<table border="1"> <thead> <tr> <th>Rated Voltage(V)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> </tr> </thead> <tbody> <tr> <td>Tan δ(max)</td> <td>0.22</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.08</td> </tr> </tbody> </table>	Rated Voltage(V)	6.3	10	16	25	35	50	63	Tan δ(max)	0.22	0.19	0.16	0.14	0.12	0.10	0.08
	Rated Voltage(V)	6.3	10	16	25	35	50	63									
Tan δ(max)	0.22	0.19	0.16	0.14	0.12	0.10	0.08										
For Capacitances>1000μF add 0.02 to every 1000μF																	
Stability at Low Temperature (Impedance Ratio at 120Hz)	Rated Voltage(V)	6.3~ 63															
	Z <sub>-55°C/+20°C</sub>	3															

	Useful Life		Load Life	Endurance Test	Shelf Life
Lifetime	$\phi \leq 6.3$ :4000h $\phi 8$ :6000h $\phi 10$ :10000h $\phi 12.5$ :12000h $\phi \geq 16$ :14000h	$\phi \geq 8$ :>250000h	$\phi \leq 6.3$ :2000h $\phi 8$ :3000h $\phi 10$ :5000h $\phi 12.5$ :7000h $\phi \geq 16$ :8000h	$\phi \leq 6.3$ :3000h $\phi 8$ :5000h $\phi 10$ :7000h $\phi 12.5$ :9000h $\phi \geq 16$ :10000h	1000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacitance Change	Within ±30% of initial value		Within ± 20% of initial value	Within ±20% of initial value	Within ±20% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 200% of specified value	Not more than 200% of specified value
Condition: Applied Voltage Applied Current Applied Temperature	$U_R$ $I_R$ 105°C	$U_R$ 1.4 x $I_R$ 40°C	$U_R$ $I_R$ 105°C	$U_R$ $I_R = 0$ 105°C	After test: $U_R$ to be applied for 30min>24h before measurement

## Dimensions

mm



φD	5	6.3	8	10	12.5	16	18
F	2.0	2.5	3.5	5.0		7.5	
φd	0.5		0.6			0.8	
a	1.5			2.0			

## Frequency Coefficient

Frequency Cap(μF)	Frequency			
	120Hz	1kHz	10kHz	100kHz
12~180	0.40	0.75	0.90	1.00
220~560	0.50	0.83	0.93	1.00
680~1800	0.60	0.86	0.95	1.00
2200~3900	0.75	0.90	0.97	1.00
4700~18000	0.85	0.95	0.98	1.00

## Temperature Coefficient

Temperature(°C)	+70	+85	+105
Coefficient	1.96	1.68	1.0

## Ratings for CD 28L QL Series

U <sub>R</sub> (Surge Voltage) Code	Rated Capacitance	Max ESR 20°C, 120Hz	Max Imp 20°C, 100kHz	Max Imp -10°C, 100kHz	Rated Ripple Current 105°C, 100kHz	Size ΦD×L	P/N
(v)	(μF)	(Ω)	(Ω)	(Ω)	(mArms)	(mm)	-
<b>6.3 (7.2) 0J</b>	150	1.946	0.50	1.0	175	5×11.5	ECR0JQL151M□□050011
	330	0.885	0.25	0.50	290	6.3×11.5	ECR0JQL331M□□063011
	470	0.621	0.18	0.36	400	6.3×15	ECR0JQL471M□□063015
	680	0.429	0.12	0.24	555	8×11.5	ECR0JQL681M□□080011
	820	0.356	0.090	0.18	760	10×12.5	ECR0JQL821M□□10012
	1000	0.292	0.090	0.18	730	8×16	ECR0JQL102M□□080016
	1200	0.243	0.080	0.16	810	8×20	ECR0JQL122M□□080020
		0.243	0.068	0.136	1050	10×16	ECR0JQL122M□□100016
	1500	0.195	0.052	0.104	1220	10×20	ECR0JQL152M□□100020
	2200	0.145	0.045	0.090	1440	10×25	ECR0JQL222M□□100025
	2700	0.118	0.037	0.074	1690	10×30	ECR0JQL272M□□100030
	3300	0.105	0.038	0.076	1660	12.5×20	ECR0JQL332M□□125020
	3900	0.088	0.030	0.060	1950	12.5×25	ECR0JQL392M□□125025
	4700	0.079	0.025	0.050	2310	12.5×30	ECR0JQL472M□□125030
	5600	0.071	0.022	0.044	2510	12.5×35	ECR0JQL562M□□125035
		0.071	0.029	0.058	2210	16×20	ECR0JQL562M□□160020
	6800	0.062	0.017	0.034	2870	12.5×40	ECR0JQL682M□□125040
		0.062	0.022	0.044	2560	16×25	ECR0JQL682M□□160025
		0.062	0.028	0.056	2490	18×20	ECR0JQL682M□□180020
	8200	0.058	0.019	0.038	3010	16×31.5	ECR0JQL822M□□160031
10000	0.053	0.017	0.034	3150	16×35.5	ECR0JQL103M□□160035	
	0.053	0.020	0.040	2740	18×25	ECR0JQL103M□□180025	
12000	0.049	0.015	0.030	3710	16×40	ECR0JQL123M□□160040	
	0.049	0.018	0.036	3330	18×31.5	ECR0JQL123M□□180031	
15000	0.044	0.016	0.032	3680	18×35.5	ECR0JQL153M□□180035	
18000	0.041	0.015	0.030	3800	18×40	ECR0JQL183M□□180040	
<b>10 (13) 1A</b>	100	2.521	0.50	1.0	175	5×11.5	ECR1AQL101M□□050011
	220	1.146	0.25	0.50	290	6.3×11.5	ECR1AQL221M□□063011
	330	0.764	0.18	0.36	400	6.3×15	ECR1AQL331M□□063015
	470	0.536	0.12	0.24	555	8×11.5	ECR1AQL471M□□080011
	680	0.371	0.090	0.18	730	8×16	ECR1AQL681M□□080016
		0.371	0.090	0.18	760	10×12.5	ECR1AQL681M□□100012
	1000	0.252	0.080	0.16	810	8×20	ECR1AQL102M□□080020
		0.252	0.068	0.136	1050	10×16	ECR1AQL102M□□100016
	1200	0.210	0.052	0.104	1220	10×20	ECR1AQL122M□□100020
	1500	0.168	0.045	0.090	1440	10×25	ECR1AQL152M□□100025
	1800	0.140	0.037	0.074	1690	10×30	ECR1AQL182M□□100030
	2200	0.127	0.038	0.076	1660	12.5×20	ECR1AQL222M□□125020
	3300	0.092	0.030	0.060	1950	12.5×25	ECR1AQL332M□□125025
	3900	0.078	0.025	0.050	2310	12.5×30	ECR1AQL392M□□125030
		0.078	0.029	0.058	2210	16×20	ECR1AQL392M□□160020
	4700	0.071	0.022	0.044	2510	12.5×35	ECR1AQL472M□□125035
	5600	0.064	0.017	0.034	2870	12.5×40	ECR1AQL562M□□125040
		0.064	0.022	0.044	2560	16×25	ECR1AQL562M□□160025
		0.064	0.028	0.056	2490	18×20	ECR1AQL562M□□180020
	6800	0.057	0.019	0.038	3010	16×31.5	ECR1AQL682M□□160031
0.057		0.020	0.040	2740	18×25	ECR1AQL682M□□180025	
8200	0.053	0.017	0.034	3150	16×35.5	ECR1AQL882M□□160035	
	0.053	0.018	0.036	3330	18×31.5	ECR1AQL882M□□180031	
10000	0.049	0.015	0.030	3710	16×40	ECR1AQL103M□□160040	
	0.049	0.016	0.032	3680	18×35.5	ECR1AQL103M□□180035	
12000	0.045	0.015	0.030	3800	18×40	ECR1AQL123M□□180040	

## Ratings for CD 28L QL Series

U <sub>R</sub> (Surge Voltage) Code	Rated Capacitance	Max ESR 20°C, 120Hz	Max Imp 20°C, 100kHz	Max Imp -10°C, 100kHz	Rated Ripple Current 105°C, 100kHz	Size ΦD×L	P/N
(v)	(μF)	(Ω)	(Ω)	(Ω)	(mArms)	(mm)	-
<b>16 (20) 1C</b>	47	4.517	0.50	1.0	175	5×11.5	ECR1CQL470M□□050011
	100	2.123	0.25	0.50	290	6.3×11.5	ECR1CQL101M□□063011
	220	0.965	0.18	0.36	400	6.3×15	ECR1CQL221M□□063015
	330	0.643	0.12	0.24	555	8×11.5	ECR1CQL331M□□080011
	470	0.452	0.090	0.18	730	8×16	ECR1CQL471M□□080016
		0.452	0.090	0.18	760	10×12.5	ECR1CQL471M□□100012
	560	0.379	0.080	0.16	810	8×20	ECR1CQL561M□□080020
	680	0.312	0.068	0.136	1050	10×16	ECR1CQL681M□□100016
	1000	0.212	0.052	0.104	1220	10×20	ECR1CQL102M□□100020
	1200	0.177	0.045	0.090	1440	10×25	ECR1CQL122M□□100025
	1500	0.142	0.037	0.074	1690	10×30	ECR1CQL152M□□100030
		0.142	0.038	0.076	1660	12.5×20	ECR1CQL152M□□125020
	2200	0.109	0.030	0.060	1950	12.5×25	ECR1CQL222M□□125025
	2700	0.088	0.025	0.050	2310	12.5×30	ECR1CQL272M□□125030
		0.088	0.029	0.058	2210	16×20	ECR1CQL272M□□160020
	3300	0.080	0.022	0.044	2510	12.5×35	ECR1CQL332M□□125035
	3900	0.068	0.017	0.034	2870	12.5×40	ECR1CQL392M□□125040
		0.068	0.022	0.044	2560	16×25	ECR1CQL392M□□160025
		0.068	0.028	0.056	2490	18×20	ECR1CQL392M□□180020
	4700	0.062	0.019	0.038	3010	16×31.5	ECR1CQL472M□□160031
0.062		0.020	0.040	2740	18×25	ECR1CQL472M□□180025	
5600	0.057	0.017	0.034	3150	16×35.5	ECR1CQL562M□□160035	
	0.057	0.018	0.036	3330	18×31.5	ECR1CQL562M□□180031	
6800	0.051	0.015	0.030	3710	16×40	ECR1CQL682M□□160040	
8200	0.049	0.016	0.032	3680	18×35.5	ECR1CQL822M□□180035	
10000	0.045	0.015	0.030	3800	18×40	ECR1CQL103M□□180040	
<b>25 (32) 1E</b>	47	3.953	0.50	1.0	175	5×11.5	ECR1EQL470M□□050011
	100	1.858	0.25	0.50	290	6.3×11.5	ECR1EQL101M□□063011
	150	1.238	0.18	0.36	400	6.3×15	ECR1EQL151M□□063015
	220	0.844	0.12	0.24	555	8×11.5	ECR1EQL221M□□080011
	330	0.563	0.090	0.18	730	8×16	ECR1EQL331M□□080016
		0.563	0.090	0.18	760	10×12.5	ECR1EQL331M□□100012
	390	0.476	0.080	0.16	810	8×20	ECR1EQL391M□□080020
	470	0.395	0.068	0.136	1050	10×16	ECR1EQL471M□□100016
	680	0.273	0.052	0.104	1220	10×20	ECR1EQL681M□□100020
	820	0.227	0.045	0.090	1440	10×25	ECR1EQL821M□□100025
	1000	0.186	0.037	0.074	1690	10×30	ECR1EQL102M□□100030
		0.186	0.038	0.076	1660	12.5×20	ECR1EQL102M□□125020
	1500	0.124	0.030	0.060	1950	12.5×25	ECR1EQL152M□□125025
	1800	0.103	0.025	0.050	2310	12.5×30	ECR1EQL182M□□125030
		0.103	0.029	0.058	2210	16×20	ECR1EQL182M□□160020
	2200	0.097	0.022	0.044	2510	12.5×35	ECR1EQL222M□□125035
		0.097	0.028	0.056	2490	18×20	ECR1EQL222M□□180020
	2700	0.079	0.017	0.034	2870	12.5×40	ECR1EQL272M□□125040
		0.079	0.022	0.044	2560	16×25	ECR1EQL272M□□160025
	3300	0.072	0.019	0.038	3010	16×31.5	ECR1EQL332M□□160031
0.072		0.020	0.040	2740	18×25	ECR1EQL332M□□180025	
3900	0.061	0.017	0.034	3150	16×35.5	ECR1EQL392M□□160035	
	0.061	0.018	0.036	3330	18×31.5	ECR1EQL392M□□180031	
4700	0.056	0.015	0.030	3710	16×40	ECR1EQL472M□□160040	
	0.056	0.016	0.032	3680	18×35.5	ECR1EQL472M□□180035	
5600	0.052	0.015	0.030	3800	18×40	ECR1EQL562M□□180040	

## Ratings for CD 28L QL Series

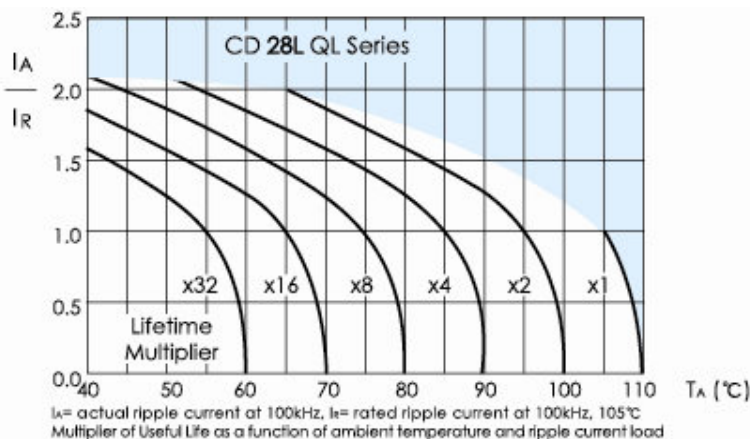
U <sub>R</sub> (Surge Voltage) Code	Rated Capacitance	Max ESR 20°C, 120Hz	Max Imp 20°C, 100kHz	Max Imp -10°C, 100kHz	Rated Ripple Current 105°C, 100kHz	Size ΦD×L	P/N	
(v)	(μF)	(Ω)	(Ω)	(Ω)	(mA rms)	(mm)	-	
<b>35 (44) 1V</b>	33	4.825	0.50	1.0	175	5×11.5	ECR1VQL330M□□050011	
	56	2.843	0.25	0.50	290	6.3×11.5	ECR1VQL560M□□063011	
	100	1.592	0.18	0.36	400	6.3×15	ECR1VQL101M□□063015	
	150	1.062	0.12	0.24	555	8×11.5	ECR1VQL151M□□080011	
	220	0.724	0.090	0.18	730	8×16	ECR1VQL221M□□080016	
							10×12.5	ECR1VQL221M□□100012
	270	0.590	0.080	0.16	810	8×20	ECR1VQL271M□□080020	
	330	0.483	0.068	0.136	1050	10×16	ECR1VQL331M□□100016	
	470	0.339	0.052	0.104	1220	10×20	ECR1VQL471M□□100020	
	560	0.284	0.045	0.090	1440	10×25	ECR1VQL561M□□100025	
	680	0.234	0.037	0.074	1690	10×30	ECR1VQL681M□□100030	
							12.5×20	ECR1VQL681M□□125020
	1000	0.159	0.030	0.060	1950	12.5×25	ECR1VQL102M□□125025	
	1200	0.133	0.025	0.050	2310	12.5×30	ECR1VQL122M□□125030	
							16×20	ECR1VQL122M□□160020
	1500	0.106	0.022	0.044	2510	12.5×35.5	ECR1VQL152M□□125035	
	1800	0.088	0.017	0.034	2870	12.5×40	ECR1VQL182M□□125040	
							16×25	ECR1VQL182M□□160025
							18×20	ECR1VQL182M□□180020
	2200	0.084	0.019	0.038	3010	16×31.5	ECR1VQL222M□□160031	
18×25							ECR1VQL222M□□180025	
2700	0.069	0.017	0.034	3150	16×35.5	ECR1VQL272M□□160035		
						18×31.5	ECR1VQL272M□□180031	
3300	0.064	0.015	0.030	3710	16×40	ECR1VQL332M□□160040		
						18×35.5	ECR1VQL332M□□180035	
3900	0.054	0.015	0.030	3800	18×40	ECR1VQL392M□□180040		
<b>50 (63) 1H</b>	22	6.032	0.90	1.8	155	5×11.5	ECR1HQL220M□□050011	
	47	2.823	0.45	0.90	260	6.3×11.5	ECR1HQL470M□□063011	
	68	1.951	0.31	0.62	360	6.3×15	ECR1HQL680M□□063015	
	100	1.327	0.22	0.44	485	8×11.5	ECR1HQL101M□□080011	
	120	1.106	0.16	0.32	635	8×16	ECR1HQL121M□□080016	
							10×12.5	ECR1HQL121M□□100012
	180	0.737	0.12	0.24	730	8×20	ECR1HQL181M□□080020	
							10×16	ECR1HQL181M□□100016
	220	0.603	0.088	0.18	1050	10×20	ECR1HQL221M□□100020	
	330	0.402	0.080	0.16	1250	10×25	ECR1HQL331M□□100025	
	390	0.340	0.065	0.13	1500	10×30	ECR1HQL391M□□100030	
							12.5×20	ECR1HQL391M□□125020
	560	0.237	0.054	0.108	1840	12.5×25	ECR1HQL561M□□125025	
	680	0.195	0.044	0.088	2220	12.5×30	ECR1HQL681M□□125030	
							16×20	ECR1HQL681M□□160020
	820	0.162	0.033	0.066	2290	12.5×35	ECR1HQL821M□□125035	
							18×20	ECR1HQL821M□□180020
	1000	0.133	0.029	0.058	2500	12.5×40	ECR1HQL102M□□125040	
							16×25	ECR1HQL102M□□160025
	1200	0.111	0.028	0.056	2700	16×31.5	ECR1HQL122M□□160031	
							18×25	ECR1HQL122M□□180025
	1500	0.088	0.025	0.050	2800	16×35.5	ECR1HQL152M□□160035	
	1800	0.074	0.021	0.042	3200	16×40	ECR1HQL182M□□160040	
							18×31.5	ECR1HQL182M□□180031
	2200	0.072	0.023	0.046	3100	18×35.5	ECR1HQL222M□□180035	
	2700	0.059	0.022	0.044	3400	18×40	ECR1HQL272M□□180040	

## Ratings for CD 28L QL Series

$U_R$ (Surge Voltage) Code	Rated Capacitance	Max ESR 20°C, 120Hz	Max Imp 20°C, 100kHz	Max Imp -10°C, 100kHz	Rated Ripple Current 105°C, 100kHz	Size $\Phi D \times L$	P/N
(v)	( $\mu F$ )	( $\Omega$ )	( $\Omega$ )	( $\Omega$ )	(mA <sub>rms</sub> )	(mm)	-
63 (79) 1J	12	8.846	1.9	4.0	145	5×11.5	ECR1JQL120M□□050011
	22	4.825	1.0	2.0	240	6.3×11.5	ECR1JQL220M□□063011
	39	2.722	0.61	1.4	330	6.3×15	ECR1JQL390M□□063015
	68	1.561	0.34	0.75	405	8×11.5	ECR1JQL680M□□080011
	100	1.062	0.27	0.65	535	8×16	ECR1JQL101M□□080016
		1.062	0.255	0.510	540	10×12.5	ECR1JQL101M□□100012
	120	0.885	0.190	0.380	600	10×16	ECR1JQL121M□□100016
	150	0.708	0.21	0.52	690	8×20	ECR1JQL151M□□080020
	180	0.590	0.145	0.290	890	10×20	ECR1JQL181M□□100020
	220	0.483	0.130	0.260	1050	10×25	ECR1JQL221M□□100025
	330	0.322	0.090	0.180	1300	10×30	ECR1JQL331M□□100030
		0.322	0.085	0.170	1290	12.5×20	ECR1JQL331M□□125020
	390	0.272	0.070	0.140	1720	12.5×25	ECR1JQL391M□□125025
	470	0.226	0.055	0.110	2090	12.5×30	ECR1JQL471M□□125030
		0.226	0.059	0.120	1770	16×20	ECR1JQL471M□□160020
	680	0.156	0.047	0.094	2270	12.5×35	ECR1JQL681M□□125035
		0.156	0.050	0.100	2160	16×25	ECR1JQL681M□□160025
		0.156	0.055	0.110	2290	18×20	ECR1JQL681M□□180020
	820	0.129	0.042	0.084	2560	12.5×40	ECR1JQL821M□□125040
		0.129	0.043	0.086	2670	16×31.5	ECR1JQL821M□□160031
		0.129	0.043	0.086	2590	18×25	ECR1JQL821M□□180025
	1000	0.106	0.036	0.072	2770	16×35.5	ECR1JQL102M□□160035
	1200	0.088	0.030	0.060	2850	16×40	ECR1JQL122M□□160040
		0.088	0.032	0.064	2950	18×31.5	ECR1JQL122M□□180031
1500	0.071	0.030	0.060	3100	18×35.5	ECR1JQL152M□□180035	
1800	0.059	0.025	0.050	3210	18×40	ECR1JQL182M□□180040	

Customer products are available on request.

## Lifetime Diagram



## Typical Curves

