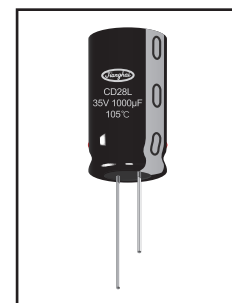
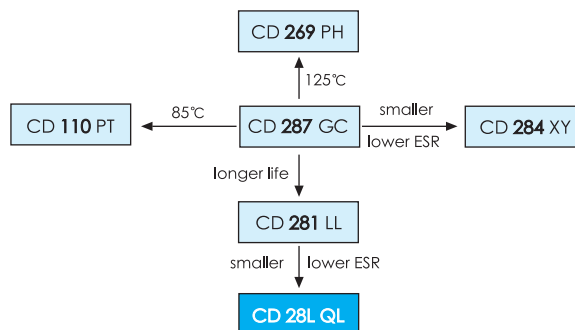


CD 28L QL SERIES



2000 - 8000h at 105°C

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

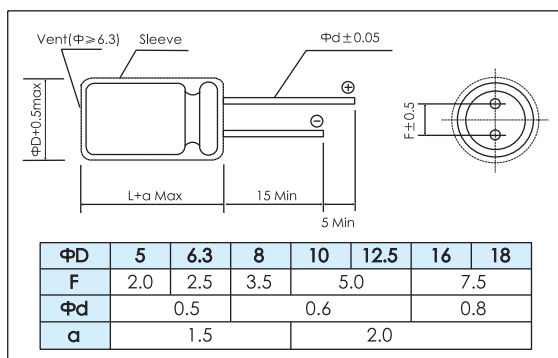


Items	Characteristics																
Operating Temperature Range (°C)	-55 ~ +105																
Voltage Range (V)	6.3 ~ 63																
Capacitance Range (µF)	12 ~ 18000																
Capacitance Tolerance (20°C, 120Hz)	± 20%																
Leakage Current (µA)	After 2 minutes at 20°C application 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 _{-55°C} / Z _{+20°C}	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	U _R = 0 I _R = 0 105°C After test: U _R to be applied for 30min >24h before measurement

Dimensions

mm



Frequency Coefficient

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	1.00

Ratings for CD 28L QL Series

U _r (Surge Voltage) Code	Rated Capa- cance	Max ESR 20°C, 120Hz	Max Imp 20°C, 100kHz	Max Imp -10°C, 100kHz	Rated Ripple Current 105°C, 100kHz	Size ΦD x L	P/N
(V)	(μF)	(Ω)	(Ω)	(Ω)	(mA _{rms})	(mm)	-
6.3 (7.2) 0J	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□□100012
	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	
10 (13) 1A	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	ECR1AQL822M□□160035	
	0.053	0.018	0.036	3330	18×31.5	ECR1AQL822M□□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	

U _r (Surge Voltage) Code	Rated Capa- cance	Max ESR 20°C, 120Hz	Max Imp 20°C, 100kHz	Max Imp -10°C, 100kHz	Rated Ripple Current 105°C, 100kHz	Size ΦD x L	P/N
(V)	(μF)	(Ω)	(Ω)	(Ω)	(mA _{rms})	(mm)	-
16 (20) 1C	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	
25 (32) 1E	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	

CD 28L QL SERIES



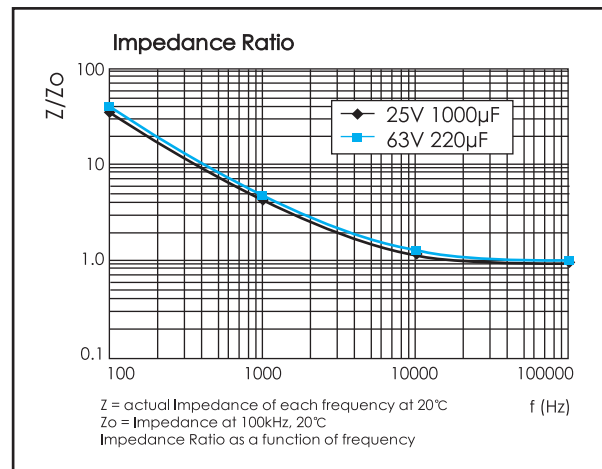
Ratings for CD 28L QL Series

U_r (Surge Voltage) Code	Rated Capa- cance	Max ESR 20°C, 120Hz	Max Imp 20°C, 100kHz	Max Imp -10°C, 100kHz	Rated Ripple Current 105°C, 100kHz	Size ΦD x L	P/N
(V)	(μF)	(Ω)	(Ω)	(Ω)	(mA _{rms})	(mm)	-
35 (44) 1V	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
		0.724	0.090	0.18	760	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
		0.234	0.038	0.076	1660	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
		0.133	0.029	0.058	2210	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
		0.088	0.022	0.044	2560	16×25	ECR1VQL182M□□160025
	2200	0.088	0.028	0.056	2490	18×20	ECR1VQL182M□□180020
		0.084	0.019	0.038	3010	16×31.5	ECR1VQL222M□□160031
2700	0.084	0.020	0.040	2740	18×25	ECR1VQL222M□□180025	
	0.069	0.017	0.034	3150	16×35.5	ECR1VQL272M□□160035	
3300	0.069	0.018	0.036	3330	18×31.5	ECR1VQL272M□□180031	
	0.064	0.015	0.030	3710	16×40	ECR1VQL332M□□160040	
3900	0.064	0.016	0.032	3680	18×35.5	ECR1VQL332M□□180035	
	0.054	0.015	0.030	3800	18×40	ECR1VQL392M□□180040	
50 (63) 1H	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
		1.106	0.16	0.32	620	10×12.5	ECR1HQL121M□□100012
	180	0.737	0.12	0.24	730	8×20	ECR1HQL181M□□080020
		0.737	0.13	0.26	850	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
		0.340	0.070	0.14	1480	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
		0.195	0.048	0.096	1840	16×20	ECR1HQL681M□□160020
	820	0.162	0.033	0.066	2290	12.5×35	ECR1HQL821M□□125035
		0.162	0.042	0.084	1980	18×20	ECR1HQL821M□□180020
	1000	0.133	0.029	0.058	2500	12.5×40	ECR1HQL102M□□125040
		0.133	0.034	0.068	2240	16×25	ECR1HQL102M□□160025
	1200	0.111	0.028	0.056	2700	16×31.5	ECR1HQL122M□□160031
0.111		0.029	0.058	2610	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	
	0.074	0.025	0.050	3000	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	

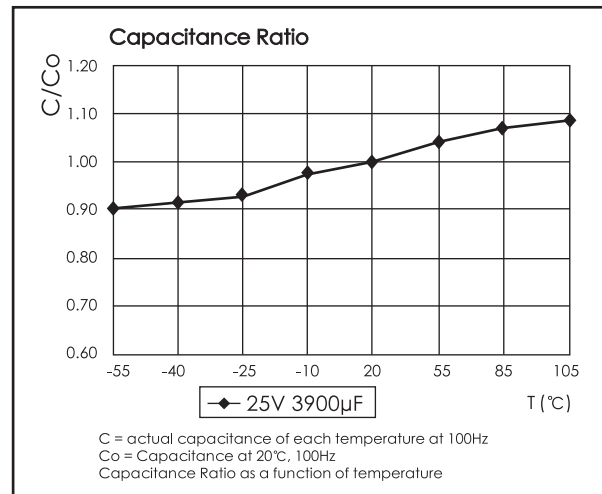
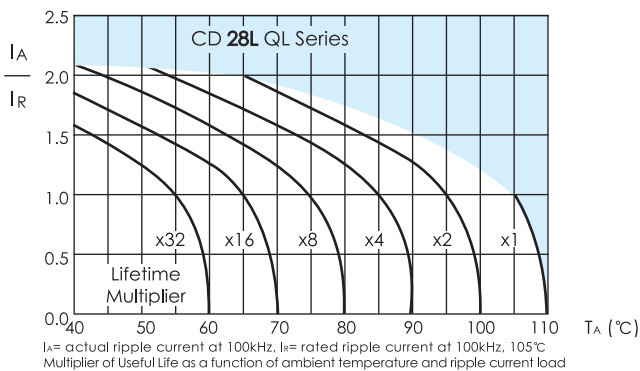
U_r (Surge Voltage) Code	Rated Capa- cance	Max ESR 20°C, 120Hz	Max Imp 20°C, 100kHz	Max Imp -10°C, 100kHz	Rated Ripple Current 105°C, 100kHz	Size ΦD x L	P/N
(V)	(μF)	(Ω)	(Ω)	(Ω)	(mA _{rms})	(mm)	-
63 (79) 1J	12	8.846	1.9	4.0	145	5×11.5	ECR1JQL120M□□050011
	22	4.825	1.0	2.0	240	6.3×11.5	ECR1JQL220M□□063011
	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
	820	0.156	0.055	0.110	2290	18×20	ECR1JQL681M□□180020
		0.129	0.042	0.084	2560	12.5×40	ECR1JQL821M□□125040
	1000	0.129	0.043	0.086	2670	16×31.5	ECR1JQL821M□□160031
0.129		0.043	0.086	2590	18×25	ECR1JQL821M□□180025	
1200	0.106	0.036	0.072	2770	16×35.5	ECR1JQL102M□□160035	
	0.088	0.030	0.060	2850	16×40	ECR1JQL122M□□160040	
1500	0.088	0.032	0.064	2950	18×31.5	ECR1JQL122M□□180031	
	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.

Typical Curves



Lifetime Diagram



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