

FEATURES

- Wide temperature range (-40°C ~ +105°C).
- Long life (2000~5000 hours @ 105°C)
- RoHs COMPLIANT

PART NUMBERING

Part Number Example: TRE-050/102M16X25F							
TRE	-	050	/	102	M	16X25	F
Type		Rated DC Voltage		Capacitance Code (μF)*	Tolerance Code	Size	RoHs Compliant

* Capacitance Code: First two digits represent significant figures, third digit represents multiplier (number of zeros).

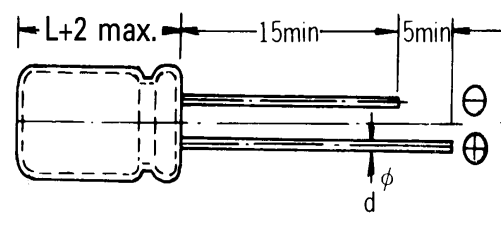
SPECIFICATIONS

Voltage range	6.3~100vdc										160~450vdc					
Operating Temperature Range	-40°C ~ 105°C.										-25°C, +105°C.					
Capacitance Range	0.47~15,000 μF										0.47~470 μF					
Capacitance Tolerance @ 20°C, 120Hz	±20%.															
Maximum Leakage Current (20°C) (after 2 minute @ rated voltage)	0.01CV or 3μA, whichever is greater										0.03CV					
DF @ 120Hz 20° C For Cap>1,000 add 2% for each 1,000 μF	Working volts	6.3	10	16	25	35	50	63	100	160	200	250	350	400	420	450
	DF % max	18	16	14	12	10	9	8	8	12	12	12	15	15	17	17
Low Temperature Characteristics (120Hz)	Working volts	6.3	10	16	25	35	50	63	100	160	200	250	350	400	420	450
	Z -25°C~20°C	4	3	3	3	3	3	2	2	2	2	3	5	5	5	6
	Z -40°C~20°C	8	6	4	3	3	3	3	3	3	6	6	6	6	-	-
Load Life (@ 105°C)5-6.3 D= 2,000 hrs, 8 D = 3000 hrs, =>10 D = 5000 hrs	Capacitance Change	Within ±20% of initial value														
	Dissipation Factor	≤200% of initial specified value.														
	Leakage Current	Initial specified value.														
Shelf Life (105°C) After 1,000 hrs with no voltage applie	Capacitance Change	Within ±20% of initial value.														
	Dissipation Factor	≤200% of initial specified value.														
	Leakage Current	Initial specified value.														

MULTIPLIER FOR RIPPLE CURRENT VS FREQ.

CAP(μF)\FREQ. (Hz)	50(60)	120	400	1K	10K	50K~100K
CAP ≤ 10 μF	0.47	.59	.76	.85	.97	1
CAP 10~100 μF	0.52	.62	.80	.89	.97	1
CAP 100~999 μF	.58	.72	.84	.90	.98	1
CAP > 1000 μF	.63	.78	.87	.91	.98	1

DIMENSIONS



DIMENSIONS (UNIT: mm)

D	5	6.3	8	10	13	16	18	22
P	2.0	2.5	3.5	5.0	7.5	10		
d∅	0.5		L<20 0.5 L=>20 0.6		0.6		0.8	

CAP. (μ F)	6.3 VDC SURGE 8V			10 VDC SURGE 13V			16 VDC SURGE 20V			25 VDC SURGE 32V		
	SIZE	RIPPLE	IMPED	SIZE	RIPPLE	IMPED	SIZE	RIPPLE	IMPED	SIZE	RIPPLE	IMPED
4.7										5X11	68	3.95
5.6										5X11	75	3.25
6.8										5X11	80	2.98
10							5X11	74	4.7	5X11	85	2.56
22				5X11	98	2.7	5X11	100	2.6	5X11	125	1.95
33				5X11	100	2.6	5X11	114	2	5X11	155	1.42
47				5X11	150	1.34	5X11	155	1.1	5X11	190	1.1
										6.3X11	220	1.0
56				5X11	160	1.23	5X11	180	0.82	6.3X11	250	0.79
68				5X11	170	1.05	5X11	195	0.69	6.3X11	280	0.65
100	5X11	170	1.00	5X11	210	0.8	6.3X11	265	0.5	6.3X11	370	0.35
120	5X11	175	0.92	6.3X11	250	0.75	6.3X11	270	0.47	6.3X11	380	0.33
150	6.3X11	220	0.81	6.3X11	290	0.61	6.3X11	290	0.41	8X11.5	410	0.31
	5X11	185	0.90									
180	6.3X11	240	0.76	6.3X11	320	0.46	8X11.5	370	0.34	8X11.5	455	0.25
							6.3X11	315	0.38			
220	6.3X11	310	0.65	6.3X11	340	0.35	8X11.5	480	0.25	8X11.5	550	0.15
270	6.3X11	340	0.54	8X11.5	400	0.3	8X11.5	520	0.21	10X12.5	720	0.125
330	8X11.5	390	0.42	8X11.5	460	0.27	8X11.5	590	0.156	10X12.5	820	0.114
470	8X11.5	450	0.25	8X11.5	580	0.25	10X12.5	750	0.124	10X16	1200	0.076
560	8X11.5	490	0.23	10X12.5	635	0.16	10X12.5	785	0.105	10X16	1250	0.072
				8X11.5	550	0.17						
680	8X11.5	550	0.21	10X12.5	765	0.11	10X16	1100	0.092	10X20	1320	0.065
820	8X16	620	0.20	10X16	890	0.1	10X16	1180	0.078	10X20	1400	0.052
										10X25	1530	0.052
1,000	10X12.5	770	0.17	10X16	1040	0.076	10X20	1350	0.065	13X20	1650	0.045
	8X16	750	0.15									
1200	10X16	860	0.16	10X16	1200	0.067	10X25	1500	0.061	13X25	1980	0.041
1500	10X16	1100	0.14	10X20	1400	0.062	10X30	1600	0.056	13X25	2210	0.038
							13X20	1380	0.06			
1800	10X20	1250	0.11	10X25	1550	0.058	13X20	1800	0.047	16X25	2510	0.036
							10X25	1730	0.05			
2200	10X20	1380	0.09	13X20	1750	0.041	13X25	2000	0.038	16X25	2650	0.035
	10X25	1470	0.095	10X25	1650	0.052	13X20	1880	0.04			
2700	10X25	1490	0.075	13X20	1900	0.035	13X25	2450	0.033	16X25	2820	0.031
	13X20	1550	0.075									
3,300	13X20	1650	0.036	13X25	2000	0.031	16X25	2790	0.03	16X31.5	3240	0.026
							13X30	2640	0.03			
4,700	13X30	2100	0.036	16X25	2100	0.03	16X31.5	2880	0.026	16X35.5	3650	0.024
	13X25	1900	0.04									
5600	13X30	2160	0.034	16X25	2290	0.028	16X35.5	2990	0.025	18X35.5	3720	0.024
6800	16X25	2350	0.032	16X31.5	2650	0.026	18X35.5	3200	0.024	18X41	3850	0.024
8200	16X31.5	2550	0.027	16X35.5	2770	0.026	18X35.5	3320	0.024			
10000	16X35.5	2700	0.024	18X35.5	2850	0.024	18X41	3550	0.024			
15000	18X35.5	2950	0.023									

RIPPLE CURRENT (mA) @ 105°C 100KHZ
IMPEDANCE (ohm) @ 20°C 100KHZ

CAP. (μ F)	35 VDC SURGE 44V			50 VDC SURGE 63V			63 VDC SURGE 79V		
	SIZE	RIPPLE	IMPED	SIZE	RIPPLE	IMPED	SIZE	RIPPLE	IMPED
.047				5X11	25	5.4	5X11	25	5.4
1.0				5X11	40	4	5X11	33	4
2.2				5X11	55	2.8	5X11	45	2.8
3.3				5X11	60	2.2	5X11	58	2.2
4.7	5X11	85	3.65	5X11	90	2	5X11	65	2
5.6	5X11	92	3.09	5X11	105	1.93	5X11	95	1.9
6.8	5X11	97	2.82	5X11	110	1.89	5X11	100	1.82
10	5X11	105	2.37	5X11	120	1.82	5X11	110	1.75
22	5X11	150	1.5	6.3X11	150	1.25	6.3X11	180	0.8
33	5X11	180	1.21	6.3X11	250	0.8	8X11.5	270	0.61
47	6.3X11	280	0.8	6.3X11	290	0.65	8X11.5	300	0.56
56	6.3X11	310	0.64	8X11.5	310	0.49	8X11.5	330	0.38
68	8X11.5	350	0.52	8X11.5	375	0.33	10X12.5	480	0.21
100	8X11.5	450	0.25	10X12.5	480	0.17	10X16	610	0.14
120	8X11.5	510	0.22	10X12.5	530	0.156	10X16	620	0.13
150	8X11.5	540	0.191	10X12.5	590	0.132	10X16	700	0.11
180	10X12.5	650	0.172	10X16	860	0.114	10X20	800	0.10
220	10X12.5	750	0.114	10X16	930	0.096	10X20	920	0.08
270	10X16	910	0.095	10X20	1060	0.078	13X20	1150	0.065
330	10X16	1050	0.079	10X25	1150	0.065	13X20	1250	0.055
470	10X20	1200	0.065	13X20	1590	0.055	13X25	1620	0.053
560	10X25	1500	0.061	13X20	1740	0.05	13X25	1680	0.049
680	13X20	1570	0.056	13X25	1930	0.044	13X30	1950	0.043
820	13X20	1700	0.048	13X30	2100	0.039	16X25	2150	0.038
1000	13X25	1900	0.042	16X25	2300	0.036	16X31.5	2350	0.034
1200	13X30	2130	0.039	16X31.5	2650	0.036	16X35.5	2550	0.032
1500	16X25	2270	0.036	16X35.5	2750	0.034	18X35.5	2710	0.031
1800	16X31.5	2700	0.035	16X35.5	2850	0.034	18X41	3000	0.027
2200	16X31.5	2780	0.034	18X35.5	3040	0.032			
2700	16X35.5	2850	0.029	18X41	3070	0.027			
3300	18X35.5	3100	0.026	18X41	3100	0.025			
4700	18X41	3500	0.024						

RIPPLE CURRENT (mA) @ 105°C 100KHZ
 IMPEDANCE (ohm) @ 20°C 100KHZ

CAP. (μ F)	100 VDC SURGE 125V			160 VDC SURGE 200V			200 VDC SURGE 250V			250 VDC SURGE 300V		
	SIZE	RIPPLE	IMPED	SIZE	RIPPLE	IMPED	SIZE	RIPPLE	IMPED	SIZE	RIPPLE	IMPED
.047	5X11	20	5.9	5X11	36	9.44	5X11	36	9.38	5X11	40	8.85
1.0	5X11	30	4.4	6.3X11	45	7.85	6.3X11	45	7.76	6.3X11	50	6.54
2.2	5X11	42	3.3	6.3X11	55	5.21	6.3X11	55	5.18	8X11.5	72	4.12
3.3	5X11	55	2.8	8X11.5	70	4.31	8X11.5	71	4.25	8X11.5	75	3.85
4.7	5X11	72	2.6	8X11.5	80	4.16	8X11.5	78	5	8X11.5	85	3.5
5.6	5X11	100	2.33	10X12.5	91	3.61	10X12.5	85	4.12	10X12.5	100	2.95
							8X11.5	90	4.5	8X11.5	95	2.93
6.8	6.3X11	115	1.95	10X16	100	3.12	10X12.5	95	3.55	10X12.5	105	2.72
							8X16	115	3.25	8X11.5	124	2.5
							10X16	140	2.71	10X12.5	126	2.2
10	6.3X11	130	1.77	10X16	140	2.69	10X16	150	2.02	10X16	140	1.86
										8X16	141	1.8
										10X12.5	144	1.75
22	8X11.5	220	0.85	10X16	205	1.3	10X16	150	2.02	10X16	160	1.4
										10X20	186	1.8
										10X20	205	1.4
33	10X12.5	320	0.69	10X20	260	1.1	10X20	280	1	10X25	248	1.25
										13X20	330	0.8
47	10X12.5	370	0.58	13X20	320	0.91	13X20	360	0.65	13X20	375	0.6
										13X25	400	0.62
56	10X12.5	400	0.43	13X20	340	0.67	13X20	430	0.45	13X25	420	0.42
	10X16	440	0.42	13X25	370	0.66						
68	10X16	470	0.35	13X25	450	0.56	13X25	480	0.42			
							16X25	540	0.35	16X25	490	0.38
100	10X25	560	0.3	16X25	540	0.47	16X25	780	0.3	16X31.5	675	0.27
							16X31.5	820	0.28			
120	10X25	660	0.22	16X25	560	0.35	16X25	740	0.28	16X31.5	692	0.26
							16X31.5	830	0.26	16X35.5	730	0.25
150	13X20	780	0.174	16X31.5	710	0.26	16X31.5	840	0.25	16X35.5	750	0.24
							16X35.5	860	0.23	18X31.5	750	0.23
180	13X20	820	0.142	16X35.5	760	0.22	18X31.5	920	0.2	18X35.5	830	0.21
220	13X25	950	0.13	16X35.5	820	0.19	18X35.5	1050	0.19	18X31.5	850	0.2
							18X41	1090	0.16	18X41	910	0.19
270	13X30	1120	0.11	18X35.5	990	0.18						
330	16X25	1440	0.1	18X41	1180	0.16						
470	16X31.5	1650	0.09									
560	16X35.5	1720	0.085									
680	18X35.5	1790	0.08									
820	18X35.5	1840	0.071									
1,000	18X41	1930	0.066									

RIPPLE CURRENT (mA) @ 105°C 100KHZ

IMPEDANCE (ohm) @ 20°C 100KHZ

CAP. (μ F)	350 VDC SURGE 400V			400 VDC SURGE 450V			420 VDC SURGE 470V			450 VDC SURGE 500V		
	SIZE	RIPPLE	IMPED	SIZE	RIPPLE	IMPED	SIZE	RIPPLE	IMPED	SIZE	RIPPLE	IMPED
.047	6.3X11	40	8.82	6.3X11	26	33	6.3X11	28	34	8X11.5	30	34
1	6.3X11.5	50	7.90	8X11.5	36	16.5	8X11.5	38	17	8X11.5	45	17.35
	8X11.5	58	6.35									
2.2	8X11.5	75	5.3	10X12.5	76	13	10X12.5	58	12.1	10X16	65	10.25
	10X12.5	86	4.02	8X11.5	65	13						
3.3	10X12.5	90	3.8	8X11.5	86	12	10X12.5	87	11	10X16	89	10
	10X16	100	3.52									
4.7	10X16	118	3.13	10X12.5	105	10	10X16	102	8.5	10X20	105	5
	10X20	130	2.77									
5.6	10X16	120	2.76	8X16	105	8	10X16	109	6.8	10X20	110	4.75
	10X20	132	2.58	10X12.5	120	9						
6.8	10X16	148	2.43	10X16	160	7.5	10X16	160	6	10X20	135	4.05
	10X25	180	1.65									
10	10X16	165	1.64	10X20	235	3.6	10X20	180	3.7	10X25	180	3.75
	10X25	200	1.35									
22	13X20	220	1.22	13X20	295	2.65	13X25	330	2.7	13X25	320	2.8
33	13X20	263	1.02	13X25	440	1.6	16X25	480	1.8	16X25	460	2.2
	13X25	290	0.86									
47	16X25	389	0.76	16X25	580	1.4	16X31.5	620	1.1	16X35.5	650	1.05
	16X31.5	430	0.62									
56	16X35.5	460	0.60	16X31.5	650	0.85	16X35.5	670	0.90	18X31.5	730	0.95
68	16X31.5	475	0.57	16X31.5	800	0.80	18X31.5	750	0.80	18X35.5	760	0.75
100	16X35.5	481	0.56	18X35.5	900	0.61	18X35.5	820	0.70	18X41	880	0.74
	18X31.5	487	0.56									
	18X35.5	513	0.55									
120	18X35.5	525	0.54									
	18X41	560	0.52									
150	18X41	590	0.50									

RIPPLE CURRENT (mA) @ 105°C 100KHZ

IMPEDANCE (ohm) @ 20°C 100KHZ