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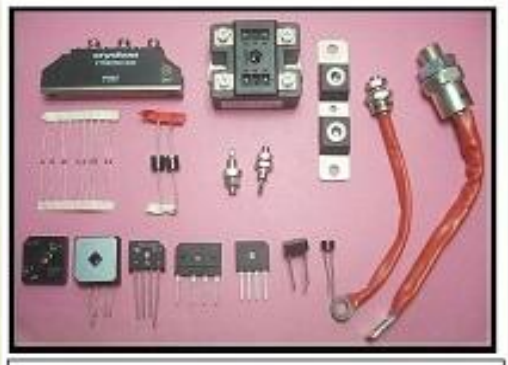
Capacitors



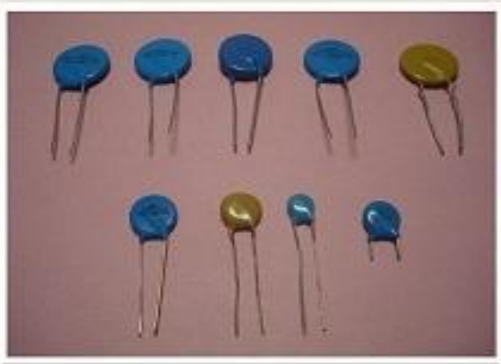
Diodes

Terminal Blocks
PCB Mountable

Transistors

LCD Displays

Instrument Cooling Fan



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MP SERIES

FEATURES : GENERAL PURPOSE SCREW TERMINAL TYPE. RECOMMENDED FOR USE IN TELE-COMMUNICATIONS AND INDUSTRIAL SYSTEMS

REFERENCE STANDARDS : IS4317/ IEC 384-4

ENDURANCE : +85^{0}C, FOR 2000 Hrs

PRODUCT MARKING } **PROVIDED WITH GREEN COLOUR SLEEVE AND BLACK PRINT**

1. SPECIFICATIONS

PARAMETERS.	PERFORMANCE CHARACTERISTICS
Operating Temperature	- 40^{0}C to +85^{0}C for WV ≤ 160 Vdc & -25^{0}C to +85^{0}C for WV > 160 Vdc.
Working Voltage	16 Vdc to 450 Vdc
Capacitance Range	220 µF to 1,00,000µF at +27^0 C, 100 Hz
Capacitance Tolerance	± 20%
Leakage Current (After 5mt charging through 1000 Ω resistor) IL in µA	IL ≤ 3 $\sqrt{}$ (CV) Where IL = Leakage current in µA C= Capacitance (µF), V= Working Voltage in Volt Note: For C ≤ 2500µF, the charging resistor for R= 1000Ω For C> 2500µF, the charging resistor R = 2.5 /C
Dissipation factor (Tan δ) Max (To be measured in four wire Kelvin clip terminal Method) Note: The DF value indicated is the maximum value permitted. But the typical values will be lower than the above table.	Tan δ at +27^{0}C, 100 Hz in percentage

WV in Volts / Diameter in mm	16	25	35	50	63	100	160	200	250	350	400	450
Ø 35	85	70	55	40	35	25	17	15	16	19	23	25
Ø50	105	85	70	50	45	35	25	21	23	26	30	32
Ø63	140	100	90	75	50	45	34	30	32	35	40	42

Life Tests

(i). Endurance Test at High Temperature +85^{0}C at WV.

(ii). Storage Test at High Temperature +85^{0}C at 0V.

Tests	Endurance DC Life Test	Storage Shelf Life Test
Test Condition / Parameters	Capacitor at rated voltage and At +85^{0}C for 2000 Hrs Measurements after recovery to +27^{0}C	Capacitor under no voltage At +85^{0}C for 1000 Hrs Measurements after recovery to +27^{0}C
Δ Capacitance	Within ±25% for WV 16 V to 25V Within ±20% for WV 35 V to 100V Within ±15% for WV 160 V to 450V of initial measured value	Within ±15% of initial measured Value
Tan ∂	Within 200% of initial limit	Within 150% of initial limit
D.C Leakage Current	Within initial limit	Within 150% of initial limit

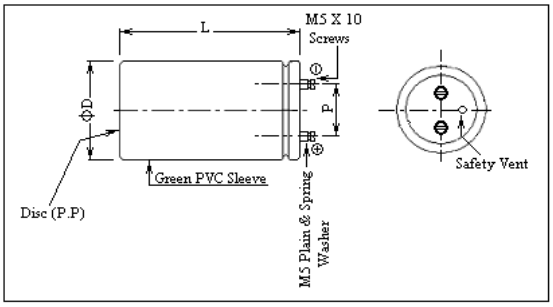
2. OTHER INFORMATION

Type of Packing and Lead Configuration	Bulk Packing – in cardboard cartons with separator. Provided with SCREW TYPE terminals for external connection For details refer section 9.
Capacitor Codification System	Refer page no. 72
Dimensional Specification	Refer section 4 for details
Marking Specification	Refer page no. 73

MP SERIES

3. PHYSICAL OUT LINES – MP SERIES

Dimensions provided without sleeve. For sleeved dimensions add 1.0mm to the diameter and 2mm to the length of the capacitor.



All dimensions in mm

4. DIMENSIONS (All units in mm)

Case code	DG	DH	DM	DQ	GM	GQ	HQ
Diameter Ø D ± 1 (mm)	35	35	35	35	50	50	63
Length L ± 2 (mm)	55	60	80	105	80	105	105
Pitch P ± 0.5 (mm)	12.5	12.5	12.5	12.5	22	22	28.5

5. STANDARD RATING TABLE

Provides detailed information regarding applicable case size, and the appropriate ripple current handling capability of the defined case size and the maximum ESR value at +270C, +100Hz.

WV / SV / Cap (µF)	16 / 19			25 / 30			35 / 41			50 / 58			63 / 73			100 / 115		
	CC	RC	ESR	CC	RC	ESR	CC	RC	ESR	CC	RC	ESR	CC	RC	ESR	CC	RC	ESR
1000																DH	1.3	0.498
1500																DH	1.6	0.332
2200																DH	2.0	0.226
3300																DM	2.6	0.151
4700										DG	2.1	0.170	DG	2.3	0.148	DQ	3.4	0.106
6800										DH	2.6	0.117	DH	2.8	0.102	GM	3.5	0.102
10000										DM	3.6	0.080	DM	3.9	0.070	GM	4.2	0.070
15000							DH	3.4	0.073	DQ	4.8	0.053	DQ	5.2	0.046	GQ	5.6	0.046
22000				DH	3.6	0.063	DM	4.6	0.050	DQ	5.9	0.036	GM	5.4	0.040			
33000	DH	4.0	0.051	DM	4.9	0.042	DQ	6.1	0.033	GM	6.3	0.030	GQ	7.3	0.027			
47000	DM	5.4	0.036	DQ	6.5	0.030	GM	6.4	0.030	GQ	8.2	0.021						
68000	DQ	7.0	0.025	DQ GM	7.8 6.3	0.020 0.031	GQ	8.4	0.020									
100000	GM	7.6	0.021	GQ	8.3	0.021												

Abbreviations used:

WV : Working voltage of the capacitor in Volts.

SV : Surge voltage in volts.

Cap : Capacitance in microfarad.

CC : Case code.

RC : Maximum Ripple current allowed in ampere at 100Hz/ +85^{0}C

ESR : Max ESR at 100Hz/ +27^{0}C in Ohms.

STANDARD RATING TABLE (Contd)

WV / SV / Cap (µF)	160 / 184			200 / 230			250 / 285			350 / 385			400 / 440			450 / 500		
	CC	RC	ESR	CC	RC	ESR	CC	RC	ESR	CC	RC	ESR	CC	RC	ESR	CC	RC	ESR
220																DH	0.9	2.262
330													DM	1.3	1.387	DM	1.2	1.508
470							DM	1.9	0.678	DM	1.7	0.805	DM DQ	1.5 1.7	0.974 0.974	DM DQ	1.5 1.6	1.058 1.059
680							DM	2.2	0.470	DQ	2.2	0.556	GM	1.8	0.878	GM	1.7	0.937
1000	DM	1.8	0.338	DQ	2.0	0.30	GM	2.4	0.458	GM	2.3	0.518	GQ	2.3	0.597	GQ	2.3	0.637
1500	DQ	2.3	0.225	GM	2.1	0.279	GM	3.0	0.305	GQ HQ	3.1 2.8	0.345 0.464	GQ HQ	2.9 2.6	0.398 0.531	HQ	2.5	0.557
2200	GM	2.3	0.226	GQ	2.8	0.19	GQ	4.0	0.208	HQ	3.4	0.316	HQ	3.2	0.362	HQ	3.1	0.380
3300	GQ	3.1	0.151	GQ	3.4	0.130	HQ	4.3	0.193									

Abbreviations used:

WV : Working voltage of the capacitor in Volts.

SV : Surge voltage in volts.

Cap : Capacitance in microfarad.

CC : Case code.

RC : Maximum Ripple current allowed in ampere at 100Hz/ +85^{o}C

ESR : Max ESR at 100Hz/ +27^{0}C in Ohms.

Frequency Multiplier For Ripple Current

Freq (Hz) / Cap (µF)	50	100	300	1K	10K
16 ~ 100	0.90	1	1.07	1.15	1.15
160~ 250	0.88	1	1.07	1.15	1.20
350 ~ 450	0.90	1	1.03	1.10	1.15

6. CAPACITOR ORDERING INFORMATION

Capacitors are identified with the help of 12-digit code. For details refer Page No. 72

7. MARKING ON THE CAPACITOR

MP Series capacitors are provided with green colour sleeve. Details are marked on the capacitor with black print. For marking details refer Page No. 73

8. DATE CODE

Date code in Year-Month format is provided in the capacitor. For details refer Page No. 73

9. PACKING QUANTITY

MP Series capacitors are generally packed in PRIMARY cardboard cartons by employing suitable separators to avoid damage during transit. The primary cartons are then inserted into MOTHER cardboard cartons before shipment. Packing quantity in numbers per primary carton are detailed below.

Case Code	DG	DH	DM	DQ	GM	GQ	HQ
Numbers per Primary Carton	81	81	81	81	36	36	25