

## GTO MKP Capacitors for Pulse Applications with Internal Series Connection

### Special Features

- Pulse duty construction
- Self-healing
- Cylindrical capacitor body with axial screw and thread connections size M6 or M8
- Internal series connection from 400 VAC
- Very low dissipation factor
- Negative capacitance change versus temperature
- According to RoHS 2002/95/EC

### Typical Applications

For high pulse and high frequency applications requiring extremely reliable contacts e.g.

- Damping of voltage spikes on GTO-Thyristors

### Construction

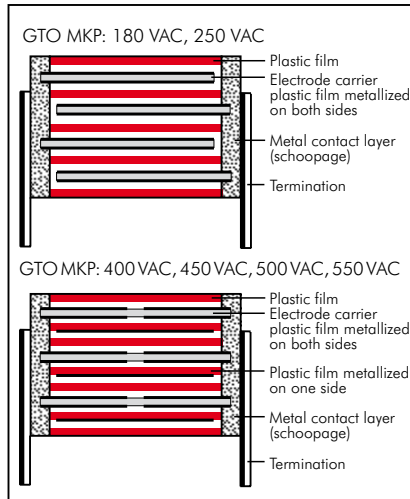
#### Dielectric:

Polypropylene (PP) film

#### Capacitor electrodes:

Double-sided metallized plastic film

#### Internal construction:



#### Encapsulation:

Solvent-resistant, flame-retardant plastic case with PU seal, UL 94 V-0

#### Terminations:

Axial screw connection M6 or M8.

#### Marking:

Colour: Red. Marking: Black on Silver.

### Electrical Data

#### Capacitance range:

1.0  $\mu\text{F}$  to 100  $\mu\text{F}$

#### Rated voltages:

400 VDC, 600 VDC, 850 VDC, 1000 VDC, 1200 VDC, 1500 VDC

#### Capacitance tolerances:

$\pm 20\%$ ,  $\pm 10\%$ ,  $\pm 5\%$

#### Operating temperature range:

$-55^\circ\text{C}$  to  $+85^\circ\text{C}$

#### Climatic test category:

55/085/56 in accordance with IEC

#### Insulation resistance at $+20^\circ\text{C}$ :

$\geq 10000 \text{ sec } (\text{M}\Omega \times \mu\text{F})$

(mean value: 50000 sec)

Measuring voltage: 100 V/1 min.

#### Test voltage: $1.2 U_r$ , 2 sec.

#### Dielectric absorption:

0.05%

#### Dissipation factors at $+20^\circ\text{C}$ : $\tan \delta$

at f	$C \leq 20 \mu\text{F}$	$20 \mu\text{F} < C \leq 50 \mu\text{F}$	$C > 50 \mu\text{F}$
1 kHz	$\leq 3 \times 10^{-4}$	$\leq 5 \times 10^{-4}$	$\leq 8 \times 10^{-4}$

#### Voltage derating:

A voltage derating factor of 1.35 % per K must be applied from  $+65^\circ\text{C}$  for DC voltages and from  $+60^\circ\text{C}$  for AC voltages.

#### Reliability:

Operational life  $> 300000$  hours

Failure rate  $< 1 \text{ fit } (0.5 \times U_r \text{ and } 40^\circ\text{C})$

#### Specific dissipation:

Box size W x L in mm	Specific dissipation in Watts per K above the ambient temperature
60x49	0.186
70x49	0.231
80x49	0.280
90x49	0.333
90x58	0.364
90x97	0.501

### Mounting Recommendation

Excessive mechanical strain, e.g. pressure or shock onto the capacitor body, is to be avoided during mounting and usage of the capacitors. When fixing the capacitor the screw torque is to be limited to max. 5 Nm.

For further details and graphs please refer to Technical Information.

### Packing

Transportation-safe packing in cardboard boxes.

#### Packing units

W	pcs. per packing unit
60	12
70	8
80	6
90	6

## Continuation

### General Data

Capacitance	400 VDC/180 VAC*				600 VDC/250 VAC*			
	W x L mm	du/dt V/μsec	I <sub>max.</sub> A	Part number	W x L mm	du/dt V/μsec	I <sub>max.</sub> A	Part number
3.5 μF					60 x 49	200	770	GTOMI04350GA00_____
4 "					60 x 49	200	890	GTOMI04400GA00_____
4.5 "					60 x 49	200	990	GTOMI04450GA00_____
5 "					60 x 49	180	1090	GTOMI04500GA00_____
6 "					60 x 49	180	1310	GTOMI04600GA00_____
8 "					60 x 49	80	610	GTOMI04800GA00_____
10 μF					60 x 49	80	780	GTOMI05100GA00_____
15 "	60 x 49	50	790	GTOMG05150GA00_____	60 x 49	80	1150	GTOMI05150GA00_____
20 "	60 x 49	50	1050	GTOMG05200GA00_____	70 x 49	80	1540	GTOMI05200GB00_____
25 "	60 x 49	50	1330	GTOMG05250GA00_____	70 x 49	80	1940	GTOMI05250GB00_____
30 "	60 x 49	50	1610	GTOMG05300GA00_____	80 x 49	80	2340	GTOMI05300GC00_____
40 "	70 x 49	50	2090	GTOMG05400GB00_____	90 x 49	80	3080	GTOMI05400GD00_____
50 "	80 x 49	50	2680	GTOMG05500GC00_____	90 x 58	60	3050	GTOMI05500GE00_____
60 "	80 x 49	50	3240	GTOMG05600GC00_____	90 x 97	35	2140	GTOMI05600GF00_____
70 "	90 x 49	50	3630	GTOMG05700GD00_____	90 x 97	35	2520	GTOMI05700GF00_____
80 "	90 x 49	50	4100	GTOMG05800GD00_____	90 x 97	35	2810	GTOMI05800GF00_____
90 "	90 x 58	40	3800	GTOMG05900GE00_____	90 x 97	35	3200	GTOMI05900GF00_____
100 μF	90 x 58	40	4300	GTOMG06100GE00_____	90 x 97	35	3550	GTOMI06100GF00_____

Capacitance	850 VDC/400 VAC*				1000 VDC/450 VAC*			
	W x L mm	du/dt V/μsec	I <sub>max.</sub> A	Part number	W x L mm	du/dt V/μsec	I <sub>max.</sub> A	Part number
3 μF	60 x 49	200	770	GTOMM04300GA00_____	60 x 49	260	790	GTOMO14300GA00_____
3.5 "	60 x 49	200	770	GTOMM04350GA00_____	60 x 49	260	910	GTOMO14350GA00_____
4 "	60 x 49	200	890	GTOMM04400GA00_____	60 x 49	260	1050	GTOMO14400GA00_____
4.5 "	60 x 49	200	990	GTOMM04450GA00_____	60 x 49	260	1170	GTOMO14450GA00_____
5 "	60 x 49	200	1090	GTOMM04500GA00_____	60 x 49	260	1310	GTOMO14500GA00_____
6 "	60 x 49	200	1310	GTOMM04600GA00_____	60 x 49	260	1550	GTOMO14600GA00_____
8 "	60 x 49	200	1740	GTOMM04800GA00_____	70 x 49	260	2080	GTOMO14800GB00_____
10 μF	70 x 49	200	2190	GTOMM05100GB00_____	70 x 49	260	2600	GTOMO15100GB00_____
15 "	70 x 49	200	3230	GTOMM05150GB00_____	90 x 49	260	3920	GTOMO15150GD00_____
20 "	80 x 49	200	4310	GTOMM05200GC00_____	90 x 58	200	4300	GTOMO15200GE00_____
25 "	90 x 49	200	5390	GTOMM05250GD00_____	90 x 97	120	3050	GTOMO15250GF00_____
30 "	90 x 58	160	4800	GTOMM05300GE00_____	90 x 97	120	3580	GTOMO15300GF00_____
40 "	90 x 97	100	3780	GTOMM05400GF00_____	90 x 97	120	4770	GTOMO15400GF00_____
50 "	90 x 97	100	4790	GTOMM05500GF00_____				
60 "	90 x 97	100	5800	GTOMM05600GF00_____				

\* AC voltage:  $f \leq 1000 \text{ Hz}$ ;  $1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

Ionisation inception level in isolated cases may be lower than admissible rated AC voltage.

Part number completion:

Tolerance: 20 % = M  
 10 % = K  
 5 % = J  
 Packing: bulk = S  
 Pin length: none = 00

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## Continuation

### General Data

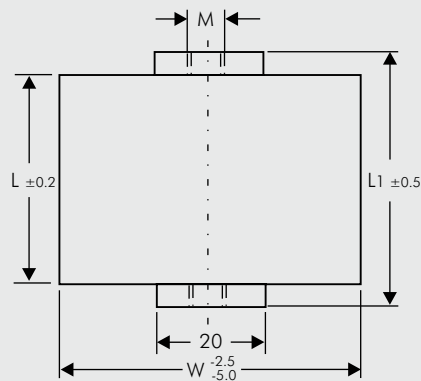
Capacitance	1200 VDC/500 VAC*				1500 VDC/550 VAC*			
	W x L mm	du/dt V/μsec	I <sub>max.</sub> A	Part number	W x L mm	du/dt V/μsec	I <sub>max.</sub> A	Part number
1 μF					60 x 49	400	420	GTOMS04100GA00_
1.5 "					60 x 49	400	590	GTOMS04150GA00_
2 "					60 x 49	400	820	GTOMS04200GA00_
2.5 "	60 x 49	300	770	GTOMQ04250GA00_	60 x 49	400	1010	GTOMS04250GA00_
3 "	60 x 49	300	950	GTOMQ04300GA00_	60 x 49	400	1220	GTOMS04300GA00_
3.5 "	60 x 49	300	1070	GTOMQ04350GA00_	60 x 49	400	1400	GTOMS04350GA00_
4 "	60 x 49	300	1230	GTOMQ04400GA00_	70 x 49	400	1630	GTOMS04400GB00_
4.5 "	60 x 49	300	1380	GTOMQ04450GA00_	70 x 49	400	1800	GTOMS04450GB00_
5 "	60 x 49	300	1570	GTOMQ04500GA00_	70 x 49	400	2010	GTOMS04500GB00_
6 "	70 x 49	300	1840	GTOMQ04600GB00_	80 x 49	400	2390	GTOMS04600GC00_
8 "	70 x 49	300	2470	GTOMQ04800GB00_	90 x 49	400	3210	GTOMS04800GD00_
10 μF	80 x 49	300	3080	GTOMQ05100GC00_	90 x 58	320	3210	GTOMS05100GE00_
15 "	90 x 58	230	3550	GTOMQ05150GE00_	90 x 97	180	2690	GTOMS05150GF00_
20 "	90 x 97	130	2690	GTOMQ05200GF00_	90 x 97	180	3600	GTOMS05200GF00_
25 "	90 x 97	130	3370	GTOMQ05250GF00_				
30 "	90 x 97	130	4110	GTOMQ05300GF00_				

\* AC voltage:  $f \leq 1000 \text{ Hz}$ ;  $1.4 \times U_{\text{rms}} + \text{UDC} \leq U_r$

Ionisation inception level in isolated cases may be lower than admissible rated AC voltage.

#### Part number completion:

Tolerance: 20 % = M  
 10 % = K  
 5 % = J  
 Packing: bulk = S  
 Pin length: none = 00



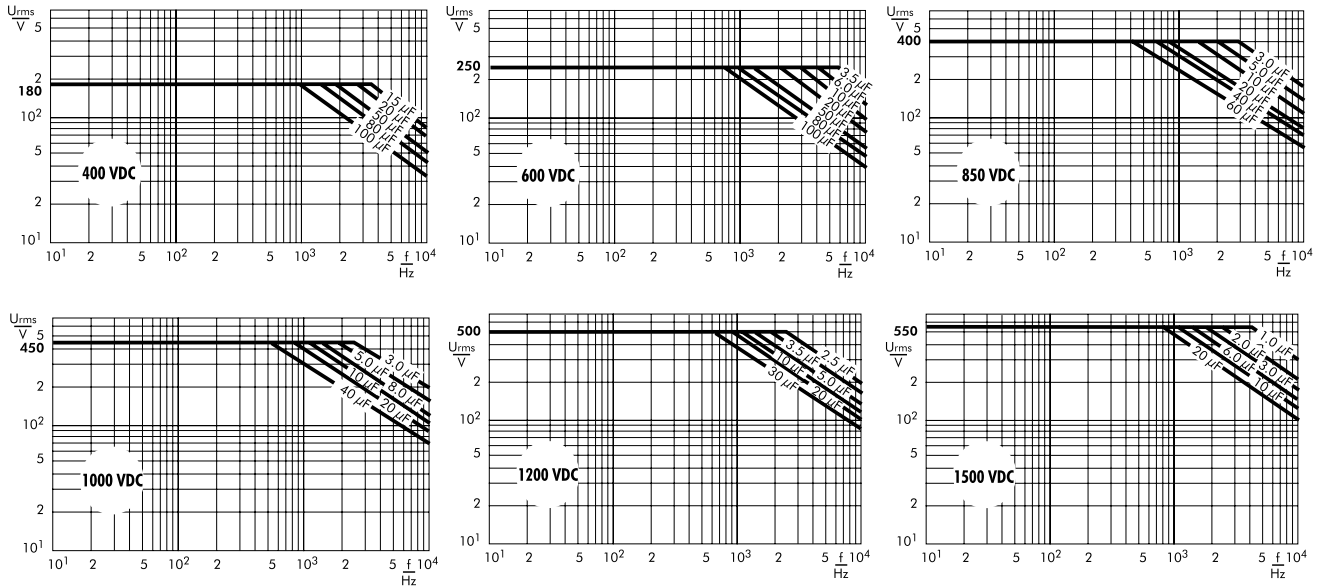
W	L	L1	M
60	49	55	M6
70	49	55	M6
80	49	55	M8
90	49	55	M8
90	58	64	M8
90	97	103	M8

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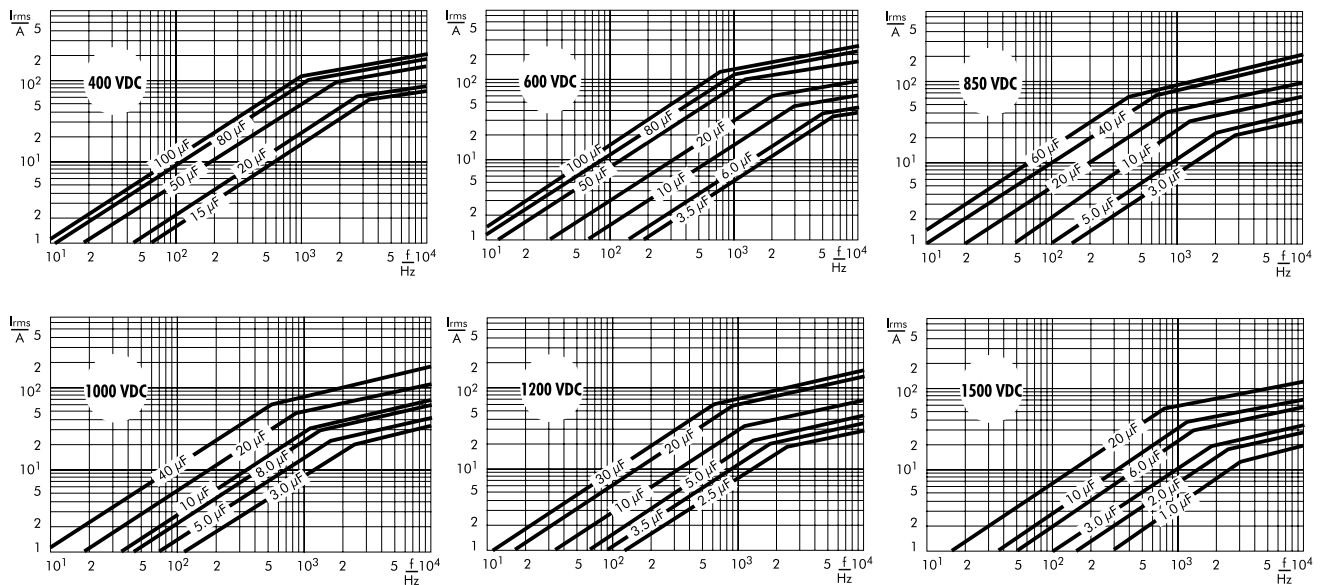
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## Continuation

Permissible AC voltage in relation to frequency at 20° C internal temperature rise (general guide).



Permissible AC current in relation to frequency at 20° C internal temperature rise (general guide).





A WIMA part number consists of 18 digits and is composed as follows:

- Field 1 - 4: Type description
- Field 5 - 6: Rated voltage
- Field 7 - 10: Capacitance
- Field 11 - 12: Size and PCM
- Field 13 - 14: Special features (e.g. Snubber versions)
- Field 15: Capacitance tolerance
- Field 16: Packing
- Field 17 - 18: Lead length (untaped)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
<b>M</b>	<b>K</b>	<b>S</b>	<b>2</b>	<b>C</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>A</b>	<b>0</b>	<b>0</b>	<b>M</b>	<b>S</b>	<b>S</b>	<b>D</b>
MKS 2				63 VDC		0.01 µF			2.5x6.5x7.2		-		20%	bulk	6 -2		

<p><b>Type description:</b></p> <p>SMD-PET = SMDT                  SMD-PPS = SMDI                  FKP 02 = FKP0                  MKS 02 = MKS0                  FKS 2 = FKS2                  FKP 2 = FKP2                  MKS 2 = MKS2                  MKP 2 = MKP2                  FKS 3 = FKS3                  FKP 3 = FKP3                  MKS 4 = MKS4                  MKP 4 = MKP4                  MKP 10 = MKP1                  FKP 4 = FKP4                  FKP 1 = FKP1                  MKP-X2 = MKX2                  MKP-X2 R = MKXR                  MKP-Y2 = MKY2                  MP 3-X2 = MPX2                  MP 3-X1 = MPX1                  MP 3-Y2 = MPY2                  MP 3R-Y2 = MPRY                  Snubber MKP = SNMP                  Snubber FKP = SNFP                  GTO MKP = GTOM                  DC-LINK MKP 4 = DCP4                  DC-LINK MKP 5 = DCP5                  DC-LINK MKP 6 = DCP6                  DC-LINK HC = DCH_                  SuperCap C = SCSC                  SuperCap MC = SCMC                  SuperCap R = SCSR                  SuperCap MR = SCMR</p>	<p><b>Rated voltage:</b></p> <p>2.5 VDC = A1                  4 VDC = A2                  14 VDC = A3                  28 VDC = A4                  40 VDC = A5                  5 VDC = A6                  50 VDC = B0                  63 VDC = C0                  100 VDC = D0                  160 VDC = E0                  250 VDC = F0                  400 VDC = G0                  450 VDC = H0                  600 VDC = I0                  630 VDC = J0                  700 VDC = K0                  800 VDC = L0                  850 VDC = M0                  900 VDC = N0                  1000 VDC = O1                  1100 VDC = P0                  1200 VDC = Q0                  1250 VDC = R0                  1500 VDC = S0                  1600 VDC = T0                  2000 VDC = U0                  2500 VDC = V0                  3000 VDC = W0                  4000 VDC = X0                  6000 VDC = Y0                  250 VAC = 0W                  275 VAC = 1W                  300 VAC = 2W                  400 VAC = 3W                  440 VAC = 4W                  500 VAC = 5W</p>	<p><b>Capacitance:</b></p> <p>22 pF = 0022                  47 pF = 0047                  100 pF = 0100                  150 pF = 0150                  220 pF = 0220                  330 pF = 0330                  470 pF = 0470                  680 pF = 0680                  1000 pF = 1100                  1500 pF = 1150                  2200 pF = 1220                  3300 pF = 1330                  4700 pF = 1470                  6800 pF = 1680                  0.01 µF = 2100                  0.022 µF = 2220                  0.047 µF = 2470                  0.1 µF = 3100                  0.22 µF = 3220                  0.47 µF = 3470                  1 µF = 4100                  2.2 µF = 4220                  4.7 µF = 4470                  10 µF = 5100                  22 µF = 5220                  47 µF = 5470                  100 µF = 6100                  220 µF = 6220                  1 F = A010                  2.5 F = A025                  50 F = A500                  100 F = B100                  110 F = B110                  600 F = B600                  1200 F = C120                  ...</p>	<p><b>Size:</b></p> <p>4.8x3.3x3 Size 1812 = X1                  4.8x3.3x4 Size 1812 = X2                  5.7x5.1x3.5 Size 2220 = Y1                  5.7x5.1x4.5 Size 2220 = Y2                  7.2x6.1x3 Size 2824 = T1                  7.2x6.1x5 Size 2824 = T2                  10.2x7.6x5 Size 4030 = K1                  12.7x10.2x6 Size 5040 = V1                  15.3x13.7x7 Size 6054 = Q1                  2.5x7x4.6 PCM 2.5 = 0B                  3x7.5x4.6 PCM 2.5 = 0C                  2.5x6.5x7.2 PCM 5 = 1A                  3x7.5x7.2 PCM 5 = 1B                  2.5x7x10 PCM 7.5 = 2A                  3x8.5x10 PCM 7.5 = 2B                  3x9x13 PCM 10 = 3A                  4x9x13 PCM 10 = 3C                  5x11x18 PCM 15 = 4B                  6x12.5x18 PCM 15 = 4C                  5x14x26.5 PCM 22.5 = 5A                  6x15x26.5 PCM 22.5 = 5B                  9x19x31.5 PCM 27.5 = 6A                  11x21x31.5 PCM 27.5 = 6B                  9x19x41.5 PCM 37.5 = 7A                  11x22x41.5 PCM 37.5 = 7B                  94x49x182 DCH_ = H0                  94x77x182 DCH_ = H1                  ...</p> <p><b>Special features:</b></p> <p>Standard = 00                  Version A1 = 1A                  Version A1.1.1 = 1B                  Version A1.2 = 1C                  ...</p>	<p><b>Tolerance:</b></p> <p>20% = M                  10% = K                  5% = J                  2.5% = H                  1% = E                  ...</p> <p><b>Packing:</b></p> <p>AMMO H16.5 340x340 = A                  AMMO H16.5 490x370 = B                  AMMO H18.5 340x340 = C                  AMMO H18.5 490x370 = D                  REEL H16.5 360 = F                  REEL H16.5 500 = H                  REEL H18.5 360 = I                  REEL H18.5 500 = J                  ROLL H16.5 = N                  ROLL H18.5 = O                  BLISTER W12 180 = P                  BLISTER W12 330 = Q                  BLISTER W16 330 = R                  BLISTER W24 330 = T                  Bulk Mini = M                  Bulk Standard = S                  Bulk Maxi = G                  TPS Mini = X                  TPS Standard = Y                  ...</p> <p><b>Lead length (untaped)</b></p> <p>3.5 ±0.5 = C9                  6 -2 = SD                  16 ±1 = P1                  ...</p>
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The data on this page is not complete and serves only to explain the part number system. Part number information is listed on the pages of the respective WIMA range.