

## GTO MKP Capacitors for Pulse Applications with Internal Series Connection. Capacitances from 1.0 $\mu\text{F}$ to 100 $\mu\text{F}$ . Rated Voltages from 400 VDC to 2000 VDC.

### 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 2011/65/EU

### Typical Applications

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

- Damping of voltage spikes on GTO-Thyristors

### Construction

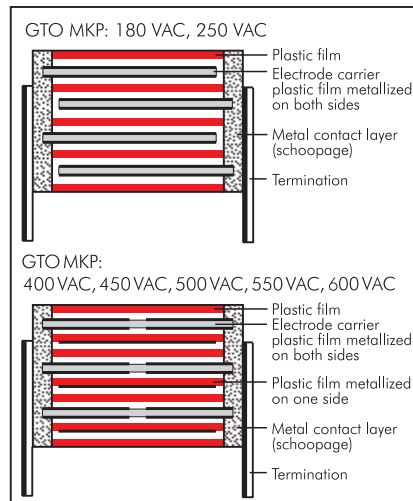
#### Dielectric:

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, 2000 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 $+20^\circ\text{C}$ :

$\geq 10\,000 \text{ sec (M}\Omega \times \mu\text{F)}$

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 > 300 000 hours

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

#### Specific dissipation:

Box size D 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

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

## Continuation

### General Data

Capacitance	400 VDC/180 VAC*				600 VDC/250 VAC*			
	D x L mm	du/dt V/μsec	I <sub>max.</sub> A	Part number	D 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*			
	D x L mm	du/dt V/μsec	I <sub>max.</sub> A	Part number	D 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:  $f \leq 1000 \text{ Hz}$ ;  $1.4 \times U_{\text{rms}} + U_{\text{DC}} \leq U_r$

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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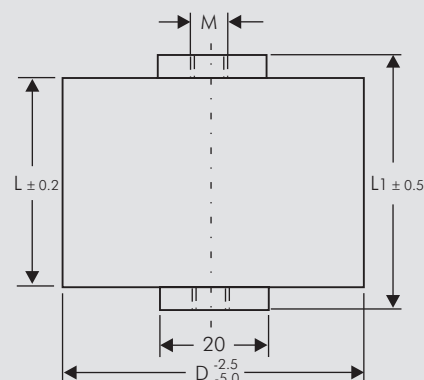
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## Continuation

### General Data

Capacitance	1200 VDC/500 VAC*				1500 VDC/550 VAC*			
	D x L mm	du/dt V/μsec	I <sub>max.</sub> A	Part number	D 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_____				

Capacitance	2000 VDC/600 VAC*			
	D x L mm	du/dt V/μsec	I <sub>max.</sub> A	Part number
1 μF	60 x 49	500	500	GTOMU04100GA00_____
1.5 "	60 x 49	500	750	GTOMU04150GA00_____
2 "	70 x 49	500	1000	GTOMU04200GB00_____
2.5 "	70 x 49	500	1250	GTOMU04250GB00_____
3 "	80 x 49	500	1500	GTOMU04300GC00_____
3.5 "	80 x 49	500	1750	GTOMU04350GC00_____
4 "	90 x 49	500	2000	GTOMU04400GD00_____
4.5 "	90 x 49	500	2250	GTOMU04450GD00_____
5 "	90 x 58	500	2500	GTOMU04500GE00_____
6 "	90 x 58	450	2700	GTOMU04600GE00_____
8 "	90 x 97	400	3200	GTOMU04800GF00_____
10 μF	90 x 97	300	3000	GTOMU05100GF00_____



D	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

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

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

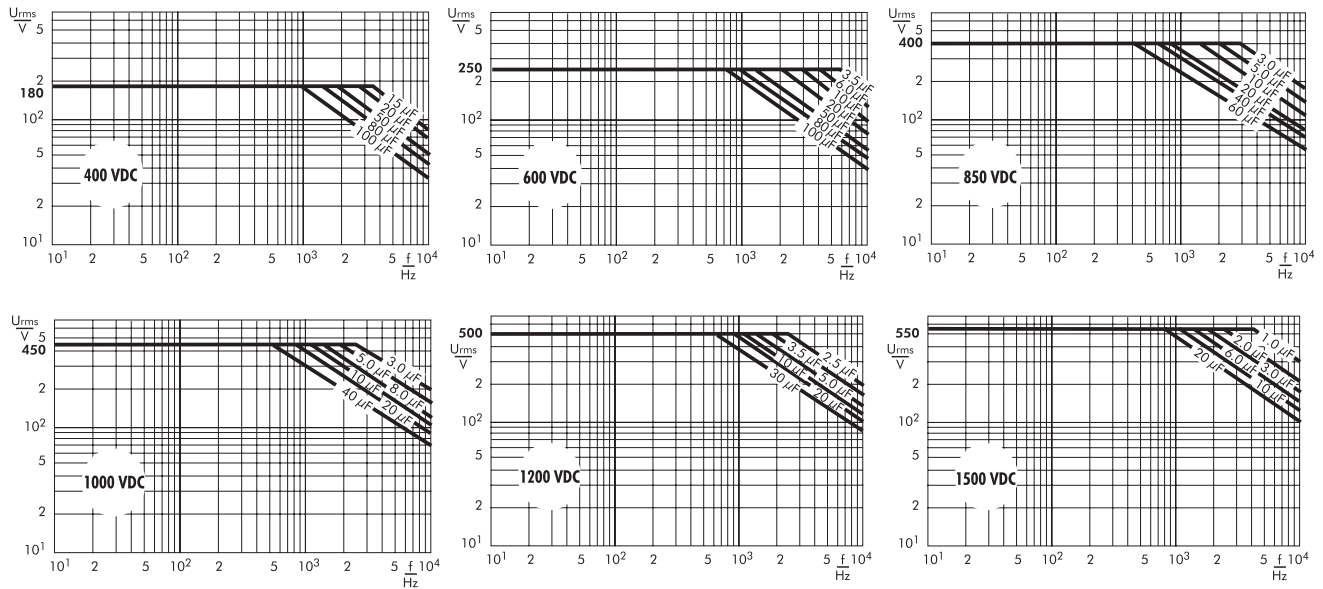
Part number completion:	
Tolerance:	20 % = M
	10 % = K
	5 % = J
Packing:	bulk = S
Pin length:	none = 00

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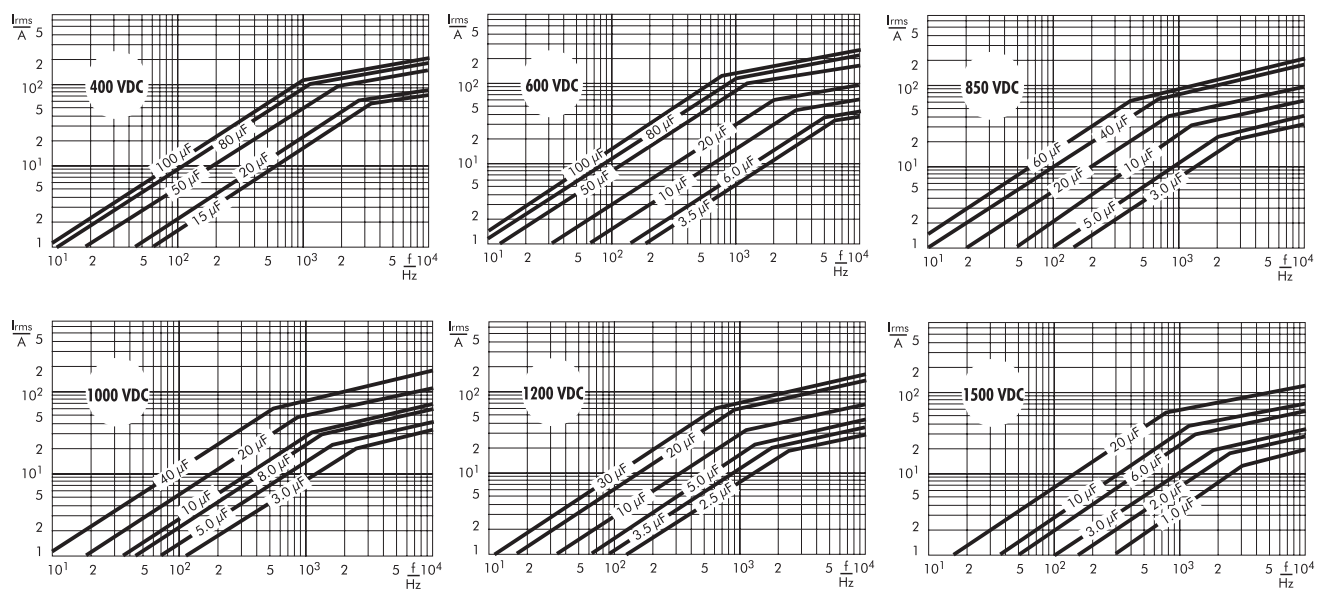
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## Continuation

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: Version code (e.g. Snubber versions)  
 Field 15: Capacitance tolerance  
 Field 16: Packing  
 Field 17 - 18: Pin length (untaped)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
M	K	S	2	C	0	2	1	0	0	1	A	0	0	M	S	S	D
MKS 2				63 VDC		0.01 μF			2.5x6.5x7.2			-		20%	bulk	6 -2	
<b>Type description:</b>				<b>Rated voltage:</b>		<b>Capacitance:</b>			<b>Size:</b>			<b>Tolerance:</b>		<b>Packing:</b>			
SMD-PET = SMDT				50 VDC = B0		22 pF = 0022			4.8x3.3x3 Size 1812 = KA			±20% = M		AMMO H16.5 340x340 = A			
SMD-PEN = SMDN				63 VDC = C0		47 pF = 0047			4.8x3.3x4 Size 1812 = KB			±10% = K		AMMO H16.5 490x370 = B			
SMD-PPS = SMDI				100 VDC = D0		100 pF = 0100			5.7x5.1x3.5 Size 2220 = QA			±5% = J		AMMO H18.5 340x340 = C			
FKP 02 = FKPO				250 VDC = F0		150 pF = 0150			5.7x5.1x4.5 Size 2220 = QB			±2.5% = H		AMMO H18.5 490x370 = D			
MKS 02 = MKS0				400 VDC = G0		220 pF = 0220			7.2x6.1x3 Size 2824 = TA			±1% = E		REEL H16.5 360 = F			
FKS 2 = FKS2				450 VDC = H0		330 pF = 0330			7.2x6.1x5 Size 2824 = TB			...		REEL H16.5 500 = H			
FKP 2 = FKP2				520 VDC = H2		470 pF = 0470			10.2x7.6x5 Size 4030 = VA					REEL H18.5 360 = I			
FKS 3 = FKS3				600 VDC = I0		680 pF = 0680			12.7x10.2x6 Size 5040 = XA					REEL H18.5 500 = J			
FKP 3 = FKP 3				630 VDC = J0		1000 pF = 1100			15.3x13.7x7 Size 6054 = YA					ROLL H16.5 = N			
MKS 2 = MKS2				700 VDC = K0		1500 pF = 1150			2.5x7x4.6 PCM 2.5 = 0B					ROLL H18.5 = O			
MKP 2 = MKP2				800 VDC = L0		2200 pF = 1220			3x7.5x4.6 PCM 2.5 = 0C					BLISTER W12 180 = P			
MKS 4 = MKS4				850 VDC = M0		3300 pF = 1330			2.5x6.5x7.2 PCM 5 = 1A					BLISTER W12 330 = Q			
MKP 4C = MKPC				900 VDC = N0		4700 pF = 1470			3x7.5x7.2 PCM 5 = 1B					BLISTER W16 330 = R			
MKP 4 = MKP4				1000 VDC = O1		6800 pF = 1680			2.5x7x10 PCM 7.5 = 2A					BLISTER W24 330 = T			
MKP 10 = MKP1				1100 VDC = P0		0.01 μF = 2100			3x8.5x10 PCM 7.5 = 2B					Bulk/TPS Standard = S			
FKP 1 = FKP1				1200 VDC = Q0		0.022 μF = 2220			3x9x13 PCM 10 = 3A					...			
MKP-X2 = MKX2				1250 VDC = R0		0.047 μF = 2470			4x9x13 PCM 10 = 3C								
MKP-X1 R = MKX1				1500 VDC = S0		0.1 μF = 3100			5x11x18 PCM 15 = 4B								
MKP-Y2 = MKY2				1600 VDC = T0		0.22 μF = 3220			6x12.5x18 PCM 15 = 4C								
MP 3-X2 = MPX2				2000 VDC = U0		0.47 μF = 3470			5x14x26.5 PCM 22.5 = 5A								
MP 3-X1 = MPX1				2500 VDC = V0		1 μF = 4100			6x15x26.5 PCM 22.5 = 5B								
MP 3-Y2 = MPY2				3000 VDC = W0		2.2 μF = 4220			9x19x31.5 PCM 27.5 = 6A								
MP 3R-Y2 = MPRY				4000 VDC = X0		4.7 μF = 4470			11x21x31.5 PCM 27.5 = 6B								
MKP 4F = MKPF				6000 VDC = Y0		10 μF = 5100			9x19x41.5 PCM 37.5 = 7A								
Snubber MKP = SNMP				250 VAC = 0V		22 μF = 5220			11x22x41.5 PCM 37.5 = 7B								
Snubber FKP = SNFP				275 VAC = 1W		47 μF = 5470			19x31x56 PCM 48.5 = 8D								
GTO MKP = GTOM				300 VAC = 2W		100 μF = 6100			25x45x57 PCM 52.5 = 9D								
DC-LINK MKP 3 = DCP3				305 VAC = AV		220 μF = 6220			...								
DC-LINK MKP 4 = DCP4				350 VAC = BV		1000 μF = 7100											
DC-LINK MKP 4S = DCP5				440 VAC = 4W		1500 μF = 7150											
DC-LINK MKP 5 = DCP5				500 VAC = 5W		...											
DC-LINK MKP 6 = DCP6				...													
DC-LINK HC = DCHC																	
DC-LINK HY = DCHY																	
				</													