

## Series ATS - ATC - 105°C 8.000h

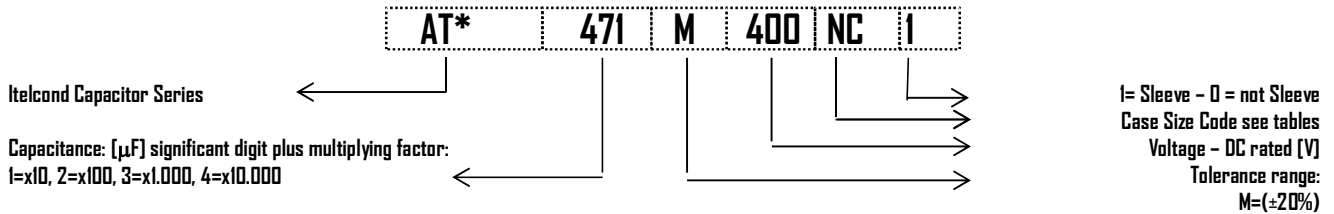
### Capacitors PCB type - Very professional - Extra Long Life

- ATC 2 pins
- ATS 4 pins
- Capacitance Tolerance: -20 + 20% - standard (M)
- Climatic category: 25/105/56
- Case: 30x40 - 45x100
- Temperature - 55°C + 105°C

### Mechanical Outlines

- Case: aluminium made
- Terminals: solder pin
- Sealing: hermetic on Rubber Bakelite cover
- Pressure Release Vent: onto aluminium case
- No insulated bottom
- Sleeve: self-extinguishing thermo shrinkable
- Size: see enclosed drawings
- External Material UL94-V0

### Ordering Code: Example



### Ripple Current

The allowable values of ripple current in Ampères, are related to the temperature and frequency by following equation:

$$I_{\text{Ripple}} = K_t \cdot K_f \cdot I_{\text{Ripple}@105^\circ\text{C}}$$

Where:

- $I_{\text{Ripple}@85^\circ\text{C}}$  is the limit given by tables, @ 105°C/100HZ
- $K_t$  is the Temperature Correlation Factor
- $K_f$  is the Frequency Correlation Factor

Note .Superimposed alternating voltage summed to DC volage must not exceed rated voltage, rated ripple current must not be exceeded and no reverse polarity is allowed

°C	50	65	75	85	95	105
$K_t$	2.40	2.20	2.10	1.80	1.30	1.00

Table 1-Kt Values

$V_n/\text{Hz}$	$K_f$
$V > 160$	
50	0.88
100	1.00
300	1.20
400	1.25
500	1.35
>1000	1.40

Table 2-Kf Valu

### Expected Lifetime End of Life Criteria

During useful life typical electrical parameters of electrolytic capacitor are subject to change.

End of Life criteria, when rated temperature, voltage and ripple are applied, are:

$$\frac{\Delta C}{C_{t0}} \leq 30\% \quad \text{Equation 1}$$

$$ESR \leq 3 \cdot ESR_{t0} \quad \text{Equation 2}$$

$$I_f \leq I_{ft0} \quad \text{Equation 3}$$

where  $t_0$  is the initial value

### Voltage Endurance Test Requirements

On Voltage Endurance Test are based Expected Lifetime Curves.

End of Life criteria, when rated temperature, and voltage are applied for 2'000hrs, are

$$\frac{\Delta C}{C_{t0}} \leq 10\% \quad \text{Equation 4}$$

$$ESR \leq 1,3 \cdot ESR_{t0} \quad \text{Equation 5}$$

$$I_f \leq I_{ft0} \quad \text{Equation 6}$$

where  $t_0$  is the initial value

### Expected Lifetime Vs Temperature and Ripple Current

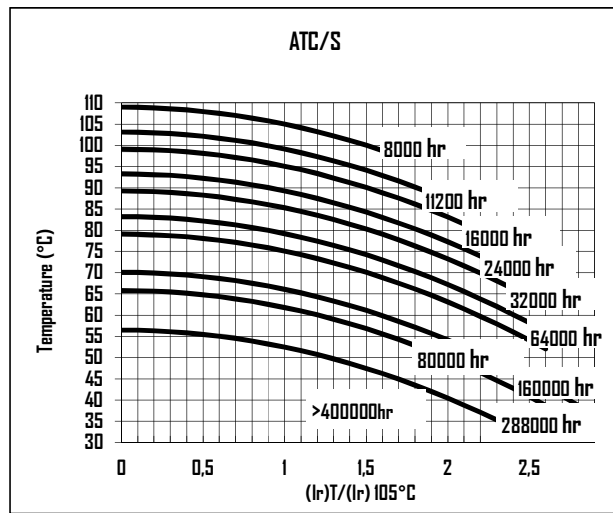


Table 3

### Leakage Current

After the rated voltage has been applied to the capacitor for 5 minutes the leakage current must be within those limits.

Maximum limit	@25°C	$I_f \leq 1.3 \cdot \sqrt{C \cdot V}$
Operating limit	@25°C	$I_f \leq 1.0 \cdot \sqrt{C \cdot V}$

Where:  $I_f$ =leakage current [ $\mu$ A],  $C$ =capacitance [ $\mu$ F],  
 $V$ =rated voltage [V]

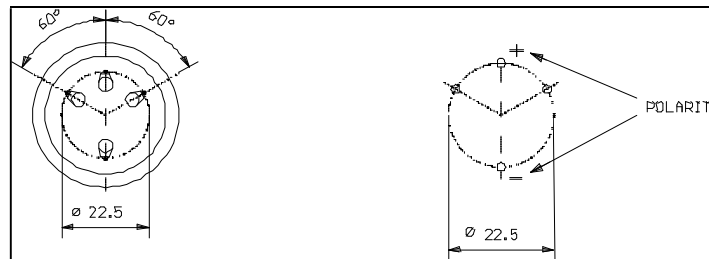
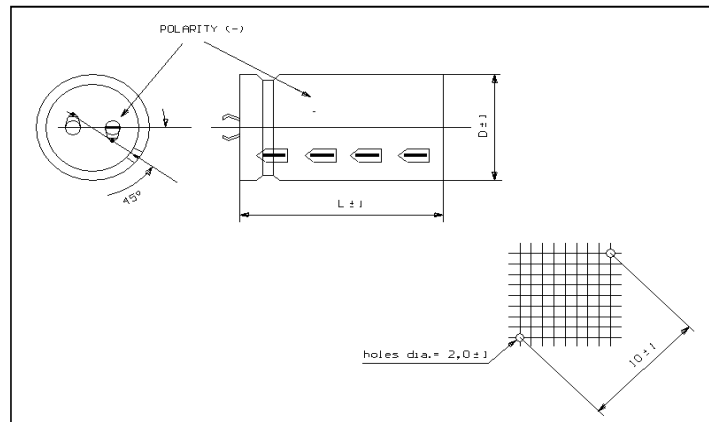
### Surge Voltage

Working Voltage	200	250	400	450
Surge Voltage	230	290	440	495

	Capacitance	Case	Diam	Height	Tanδ	ESRmax   typ		Zmax	Iripple @100Hz		Ordering Code
	[μF]@100Hz		[mm]	[mm]	[%]@100Hz	[mΩ]@100Hz	[mΩ]@10KHz	[mΩ]@10KHz	[A]@85°C	[A]@105°C	*= C, 2 Pins   S, 4 Pins
200	220	MB	30	40	0,08	463	371	347	2,2	1,2	AT*22IM200MBI
	330	NB	35	40	0,08	309	247	232	3,0	1,7	AT*33IM200NBI
	470	NC	35	50	0,08	217	173	163	3,9	2,2	AT*47IM200NCI
	680	MC	30	50	0,08	150	120	112	4,3	2,4	AT*68IM200MCI
		PC	40	50	0,08	150	120	112	5,1	2,8	AT*68IM200PCI
	1000	NC	35	50	0,08	102	82	76	5,7	3,2	AT*102M200NCI
		PE	40	75	0,08	102	82	76	7,3	4,1	AT*102M200PEI
	1500	PC	40	50	0,08	68	54	51	7,5	4,2	AT*152M200PCI
		PG	40	100	0,08	68	54	51	10,2	5,7	AT*152M200PGI
	1800	PE	40	75	0,08	57	45	42	9,8	5,4	AT*182M200PEI
QC		45	50	0,08	57	45	42	8,8	4,9	AT*182M200QCI	
2200	PG	40	100	0,08	46	37	35	12,3	6,9	AT*222M200PGI	
	QE	45	75	0,08	46	37	35	11,6	6,4	AT*222M200QEI	
3300	QG	45	100	0,08	31	25	23	16,1	8,9	AT*332M200QGI	
250	220	MB	30	40	0,08	463	371	347	2,2	1,2	AT*22IM250MBI
		NB	35	40	0,08	463	371	347	2,4	1,3	AT*22IM250NBI
	330	NC	35	50	0,08	309	247	232	3,3	1,8	AT*33IM250NCI
	470	MC	30	50	0,08	217	173	163	3,6	2,0	AT*47IM250MCI
	680	NC	35	50	0,08	150	120	112	4,7	2,6	AT*68IM250NCI
	1000	NC	35	50	0,08	102	82	76	5,7	3,2	AT*102M250NCI
	1200	PC	40	50	0,08	85	68	64	6,7	3,7	AT*122M250PCI
		PE	40	75	0,08	68	54	51	8,9	5,0	AT*152M250PEI
	1500	QC	45	50	0,08	68	54	51	8,1	4,5	AT*152M250QCI
		PG	40	100	0,08	46	37	35	12,3	6,9	AT*222M250PGI
2200	QE	45	75	0,08	46	37	35	11,6	6,4	AT*222M250QEI	
	2700	QG	45	100	0,08	38	30	28	14,6	8,1	AT*272M250QGI
400	220	MB	30	40	0,08	463	371	347	2,2	1,2	AT*22IM400MBI
	330	MC	30	50	0,08	309	247	232	3,0	1,7	AT*33IM400MCI
		NC	35	50	0,08	309	247	232	3,3	1,8	AT*33IM400NCI
	470	NC	35	50	0,08	217	173	163	3,9	2,2	AT*47IM400NCI
	680	NN	35	60	0,08	150	120	112	5,1	2,8	AT*68IM400NNI
		NE	35	75	0,08	150	120	112	5,6	3,1	AT*68IM400NEI
		PC	40	50	0,08	150	120	112	5,1	2,8	AT*68IM400PCI
	820	PC	40	50	0,08	124	99	93	5,6	3,1	AT*82IM400PCI
	1000	PN	40	60	0,08	102	82	76	6,6	3,7	AT*102M400PNI
		PE	40	75	0,08	102	82	76	7,3	4,1	AT*102M400PEI
PG		40	100	0,08	102	82	76	8,3	4,6	AT*102M400PGI	
QC		45	50	0,08	102	82	76	6,6	3,7	AT*102M400QCI	
1200	PE	40	75	0,08	85	68	64	8,0	4,4	AT*122M400PEI	
	QN	45	60	0,08	85	68	64	7,8	4,3	AT*122M400QNI	

	Capacitance	Case	Diam	Height	Tanδ	ESRmax   typ		Zmax	Iripple @100Hz		Ordering Code
	[μF]@100Hz		[mm]	[mm]	[%]@100Hz	[mΩ]@100Hz	[mΩ]@10KHz	[mΩ]@10KHz	[A]@85°C	[A]@105°C	*= C, 2 Pins   S, 4 Pins
	1500	PG	40	100	0,08	68	54	51	10,2	5,7	AT*152M400PGI
	1500	QE	45	75	0,08	68	54	51	9,6	5,3	AT*152M400QEI
<b>400</b>	1800	QG	45	100	0,08	57	45	42	11,9	6,6	AT*182M400QGI
<b>450</b>	220	MB	30	40	0,09	521	417	391	2,1	1,2	AT*221M450MBI
	330	MC	30	50	0,09	347	278	261	2,8	1,6	AT*331M450MCI
		NB	35	40	0,09	347	278	261	2,8	1,6	AT*331M450NBI
	470	NC	35	50	0,09	244	195	183	3,7	2,0	AT*471M450NCI
		PB	40	40	0,09	244	195	183	3,6	2,0	AT*471M450PBI
	560	PC	40	50	0,09	205	164	154	4,3	2,4	AT*561M450PCI
	680	NE	35	75	0,09	169	135	126	5,3	2,9	AT*681M450NEI
	820	PE	40	75	0,09	140	112	105	6,2	3,5	AT*821M450PEI
		QC	45	50	0,09	140	112	105	5,6	3,1	AT*821M450QCI
	1000	PG	40	100	0,09	115	92	86	7,8	4,4	AT*102M450PGI
		QE	45	75	0,09	115	92	86	7,4	4,1	AT*102M450QEI
1200	PG	40	100	0,09	96	76	72	8,6	4,8	AT*122M450PGI	
1500	QG	45	100	0,09	76	61	57	10,2	5,7	AT*152M450QGI	

**Dimension, Quantity and Weight for box**



Case		Connections			Packaging	
Code	DxL	PIN			Pcs/Box	Weight/box
		Number		Length		
MB	30x40	2		6.3	100	4-6
MC	30x50	2		6.3	100	4-6
NB	35x40	2	4	6.3	100	6-8
NC	35x50	2	4	6.3	100	6-8
NN	35x60	2	4	6.3	100	5-7
NE	35x75	2	4	6.3	50	6-8
PB	40x40	2	4	6.3	126	9-11
PC	40x50	2	4	6.3	126	9-11
PN	40x60	2	4	6.3	126	9-11
PE	40x75	2	4	6.3	63	10-12
PG	40x100	2	4	6.3	63	7-9
QC	45x50		4	6.3	30	6-8
QN	45x60		4	6.3	30	6-8
QE	45x75		4	6.3	30	7-9
QG	45x100		4	6.3	30	8-10

*All dimensions in mm, torque in Nm, weight in kg*