NGM Snubber Capacitors

Snubber Capacitors of Metalized Polypropylene Film With Internal Series Connection

RoHS COMPLIANT

Features

- Very High Pulse Strength
- High Current
- Highest possible contact reliability
- RoHS-compatible

Typical Applications

- Snubbering
- IGBT protection circuits
- Filtering

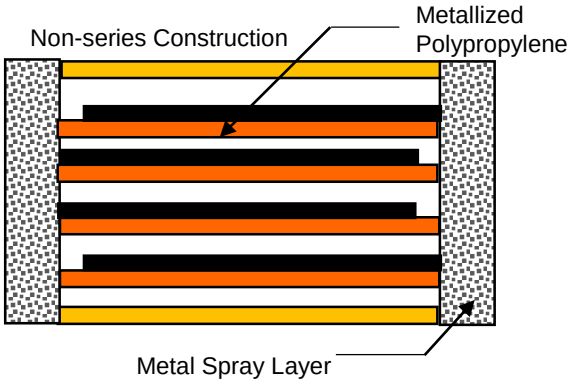
Technical Data			
Rated capacitance range	0.47µF-10µF		
Capacitance Tolerance	±5%		
Dissipation factor tan δ at 20°C, 10 kHz	$1x10^{-3}$ $3x10^{-3}$		
Rated DC Voltage, U_{NDC}	700V, 850V, 1000V, 1250V, 1600V, 2000V, 2500V		
Operating temperature range	Upper category temperature T_{max} +105°C Lower category temperature T_{min} -55°C Rated temperature T_R +85°C		
Climatic testing class	55/105/56		
Rated AC Voltage	420V, 400V to 450V, 425V to 500V, 450V to 550V. 450V to 600V, 700V, 800V		
Reference standards	IEC 60384-17		
Insulation resistance R_{INS} or time constant $T=(C_R)(R_{INS})$ at 20°C	$C_R \leq 0.33\mu F$		$C_R > 0.33\mu F$
	100GΩ		30000 s
DC test voltage	1.6 x V_{RDC} @ 60s (maximum rise time 1000V/s; cut off current 10mA)		
Category voltage V_C (continuous operation with V_{DC} or V_{AC} at f≤1 kHz	T_A (°C)	DC voltage derating	AC voltage derating
	$T_A \leq 85$ $85 \leq T_A \leq 100$	$V_C = V_R$ $V_C = V_R \cdot (165-T_A)/80$	$V_{C,RMS} = V_{RMS}$ $V_{C,RMS} = V_{RMS} \cdot (165-T_A)/80$
Operating voltage V_{op} for short operating periods (V_{DC} or V_{AC} at f≤1 kHz)	T_A (°C)	DC voltage (max. hours)	AC voltage (max. hours)
	$T_A \leq 85$ $85 < T_A \leq 100$	$V_{op} = 1.25xV_C$ (2000 h) $V_{op} = 1.25xV_C$ (1000 h)	$V_{op} = 1.0 \cdot V_{C,RMS}$ (2000 h) $V_{op} = 1.0 \cdot V_{C,RMS}$ (1000 h)
Damp heat test Limit values after damp heat test	56 days/40°C/93% relative humidity Capacitance change IΔC/CI ≤2% Dissipation factor change Δ tan δ ≤$1x10^{-3}$ (at 10kHz) Insulation Resistance R_{INS} ≥50% of minimum or time constant $\tau=(C_R)(R_{INS})$ as delivered values		

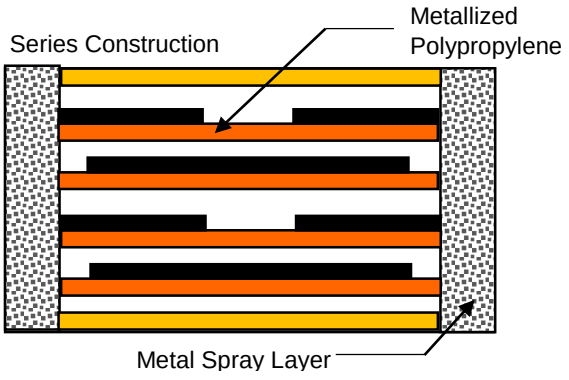
Reliability: **Failure rate λ** **Service life t_{SL}** **Failure criteria:** **Total failure** **Failure due to variation of parameters**	 1 fit(≤1x10^{-9} /h) at 0.5· V_R, 40°C 200 000 h at 1.0· V_R, 85°C Short circuit or open circuit Capacitance change IΔC/CI >10% Dissipation factor change Δ tan δ 4· upper limit value Insulation Resistance R_{INS} <1500MΩ (C_R≤0.33µF) or time constant τ=(C_R)(R_{INS}) <500 s (C_R>0.33µF)
Dielectric	Polypropylene Film
Electrodes	Metallized Film
Construction	Non series and series construction
Encapsulation	UL94-V0 plastic case and polymeric potted material
Terminals	Tinned coated copper
Self-Inductance	<0.7nH per mm of lead spacing
Test voltage between terminals and case	1.4U_{RAC}+2000V_{DC} for 60 s

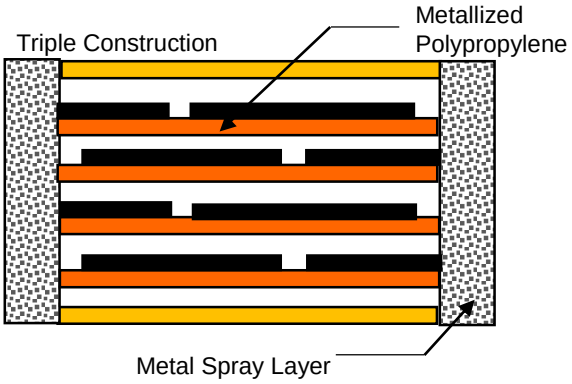
DC Voltage Ratings							
VDC	700	850	1000	1250	1600	2000	2500
VAC	420	450	500	550	600	700	800

Construction

- Dielectric: Polypropylene (PP) film
- Internal Series Connection
- Plastic case, epoxy resin sealing (UL 94-V0)







Terminals

- Strap terminals, tinned copper (max. torque 10 Nm)

COMPOSITION OF CATALOG NUMBER

MULTIPLIER	
1	1
2	10
3	100

TOLERANCE	
J	**±5%**
K	**±10%**

NG	150	2	J	0700	T8

CAPACITANCE (nF)

Voltage
Example 0700=700VDC

SPECIAL CODE FOR TERMINALS				
DRAWING	**L (mm)**	**P_1 (mm)**	**P_2 (mm)**	**DRAWING**
T1	44	28±0.5	23±0.5	
	58	43±0.5	38±0.5	
T2	44	24.5±0.5	19.5±0.5	
	58	39.5±0.5	34.5±0.5	
T3	33.5	47±0.5	-	
	44	57±0.5	-	
	58	72±0.5	-	
T4	44	28±0.5	22±0.5	
	58	43±0.5	37±0.5	
T5	33.5	32.3±1	22.7±1	
	44	42.3±1	32.7±1	
	58	57.3±1	47.7±1	
T6	44	32.3±1	22.7±1	
	58	47.3±1	37.7±1	
T7	33.5	32.3±1	22.7±1	
	44	42.3±1	32.7±1	
	58	57.3±1	47.7±1	
T8	44	32.3±1	22.7±1	
	58	47.3±1	37.7±1	

Working Voltage 700 VDC (420 VAC)

Cap	W*	h*	L*	dV/dt (V/µs)	Ipeak (A)	Irms(1) (A)	ESR (mΩ)	tan δ 1Khz <(10^{-4})	tan δ 10 Khz <(10^{-4})	tan δ 100Khz <(10^{-4})	Ordering Code
0.47	22	30.5	33.5	600	282	7	16	4	8	50	NG4701J0700**
0.68	22	30.5	33.5	600	408	8	11	4	8	50	NG6801J0700**
1	22	30.5	33.5	600	600	9	7.5	4	8	50	NG1002J0700**
1.5	22	30.5	33.5	600	900	10	5.0	4	8	-	NG1502J0700**
2	22	38	44	300	600	10	7.5	5	15	-	NG2002J0700**
2.2	22	38	44	300	660	10	6.5	5	15	-	NG2202J0700**
3	30	46	44	300	900	14	5.5	5	15	-	NG3002J0700**
3.3	30	46	44	300	990	14	5.0	5	15	-	NG3302J0700**
4	30	46	44	300	1200	15	4.5	5	15	-	NG4002J0700**
4.7	30	46	44	300	1410	15	6.0	5	15	-	NG4702J0700**
5.0	30	46	44	300	1500	15	6.0	5	15	-	NG5002J0700**

Working Voltage 850 VDC (450 VAC)

Cap	W*	h*	L*	dV/dt (V/µs)	Ipeak (A)	Irms(1) (A)	ESR (mΩ)	tan δ 1Khz <(10^{-4})	tan δ 10 Khz <(10^{-4})	tan δ 100Khz <(10^{-4})	Ordering Code
0.47	22	30.5	33.5	600	282	7.5	13	4	8	50	NG4701J0850**
0.68	22	30.5	33.5	600	408	8.5	10	4	8	50	NG6801J0850**
.82	22	30.5	33.5	600	492	9	8.5	4	8	50	NG8201J0850**
1	22	30.5	33.5	600	600	10	7	4	8	50	NG1002J0850**
1.5	22	38	44	600	900	10	9	5	15	-	NG1502J0850**
2	22	38	44	300	600	12	7	5	15	-	NG2002J0850**
2.2	22	38	44	300	660	13	6	5	15	-	NG2202J0850**
3	30	46	44	300	900	16	4.5	5	15	-	NG3002J0850**
3.3	30	46	44	300	990	16	4	5	15	-	NG3302J0850**
4	30	46	44	300	1200	18	3.5	5	15	-	NG4002J0850**

Working Voltage 850 VDC (400 VAC)

Cap	W*	h*	L*	dV/dt (V/µs)	Ipeak (A)	Irms(1) (A)	ESR (mΩ)	tan δ 1Khz <(10^{-4})	tan δ 10 Khz <(10^{-4})	tan δ 100Khz <(10^{-4})	Ordering Code
4.7	25	45	58	170	799	17.5	4	6	25	-	NG4702J0850**
5	25	45	48	170	850	18	3.5	6	25	-	NG5002J0850**
6	30	45	58	170	1020	20.5	3	6	25	-	NG6002J0850**
7	30	45	58	170	1190	22.5	2.5	6	25	-	NG7002J0850**
8	35	50	58	170	1360	26	2	6	25	-	NG8002J0850**
10	35	50	58	170	1700	29	1.5	6	25	-	NG1003J0850**

***** See Dimension´s diagram (page 15, 16)
(1) Maximum RMS current at 100 kHz
** Terminal Type

Working Voltage 1000 VDC (500 VAC)

Cap	W*	h*	L*	dV/dt (V/µs)	Ipeak (A)	Irms(1) (A)	ESR (mΩ)	tan δ 1Khz <(10^{-4})	tan δ 10 Khz <(10^{-4})	tan δ 100Khz <(10^{-4})	Ordering Code
0.47	22	30.5	72.5	400	188	7.5	13	4	8	50	NG4701J1000**
0.56	22	30.5	72.5	400	224	8	11	4	8	50	NG5601J1000**
0.68	22	30.5	72.5	400	272	9	9	4	8	50	NG6801J1000**
0.82	22	30.5	72.5	400	328	9	7.5	4	8	50	NG8201J1000**
1	22	30.5	72.5	400	400	10	6	4	8	50	NG1002J1000**
1.2	22	38	44	300	360	10	10	5	15	-	NG1202J1000**
1.5	22	38	44	300	450	11	11	5	15	-	NG1502J1000**
1.8	22	38	44	300	540	12	12	5	15	-	NG1802J1000**
2	30	46	44	300	600	14	14	5	15	-	NG2002J1000**
2.2	30	46	44	300	660	15	15	5	15	-	NG2202J1000**
2.5	30	46	44	300	750	15	15	5	15	-	NG2502J1000**
2.7	30	46	44	300	810	16	16	5	15	-	NG2702J1000**
3.3	30	46	44	300	990	18	18	5	15	-	NG3302J1000**

Working Voltage 1000 VDC (425 VAC)

Cap	W*	h*	L*	dV/dt (V/µs)	Ipeak (A)	Irms(1) (A)	ESR (mΩ)	tan δ 1Khz <(10^{-4})	tan δ 10 Khz <(10^{-4})	tan δ 100Khz <(10^{-4})	Ordering Code
3.3	25	45	58	200	660	16	4.5	7.5	25	-	NG3302J1000**
4	25	45	58	200	800	17.5	3.5	7.5	25	-	NG4002J1000**
4.7	30	45	58	200	940	20	3	7.5	25	-	NG4702J1000**
5	30	45	58	200	1000	21	3	7.5	25	-	NG5002J1000**
6	35	50	58	200	1200	24.5	2.5	7.5	25	-	NG6002J1000**
7	35	50	58	200	1400	26.5	2	7.5	25	-	NG7002J1000**

Working Voltage 1250 VDC (550 VAC)

Cap	W*	h*	L*	dV/dt (V/µs)	Ipeak (A)	Irms(1) (A)	ESR (mΩ)	tan δ 1Khz <(10^{-4})	tan δ 10 Khz <(10^{-4})	tan δ 100Khz <(10^{-4})	Ordering Code
0.33	22	30	33.5	720	238	7	16	4	8	40	NG3301J1250**
0.39	22	30	33.5	720	281	7	14	4	8	40	NG3901J1250**
0.47	22	30	33.5	720	338	8	11	4	8	40	NG4701J1250**
0.56	22	30	33.5	720	403	8.5	10	4	8	40	NG5601J1250**
0.68	22	30	33.5	720	490	9.5	8	4	8	40	NG6801J1250**
0.82	22	30	33.5	375	375	9	13	5	15	60	NG8201J1250**
1	22	38	44	375	375	10	10	5	15	60	NG1002J1250**
1.2	22	38	44	375	450	11	9	5	15	-	NG1202J1250**
1.5	30	46	44	375	563	14	7	5	15	-	NG1502J1250**
1.8	30	46	44	375	675	15	6	5	15	-	NG1802J1250**
2	30	46	44	375	750	16	5.5	5	15	-	NG2002J1250**
2.2	30	46	44	375	825	18	4.5	5	15	-	NG2202J1250**

***** See Dimension´s diagram (page 15, 16)

(1) Maximum RMS current at 100 kHz

** Terminal Type

Working Voltage 1250 VDC (450 VAC)

Cap	W*	h*	L*	dV/dt (V/µs)	Ipeak (A)	Irms(1) (A)	ESR (mΩ)	tan δ 1Khz <(10^{-4})	tan δ 10 Khz <(10^{-4})	tan δ 100Khz <(10^{-4})	Ordering Code
2.2	25	45	58	225	495	14	6	7.5	20	-	NG2202J1250**
2.5	25	45	58	225	563	15	5	7.5	20	-	NG2502J1250**
3	25	45	58	225	675	16.5	4	7.5	20	-	NG3002J1250**
3.3	30	45	58	225	743	18	4	7.5	20	-	NG3302J1250**
4	30	45	58	225	900	21.5	3	7.5	20	-	NG4002J1250**
4.7	30	45	58	225	1058	23.5	2.5	7.5	20	-	NG4702J1250**
5	30	45	58	225	1125	24.5	2.5	7.5	20	-	NG5002J1250**

Working Voltage 1600 VDC (600 VAC)

Cap	W*	h*	L*	dV/dt (V/µs)	Ipeak (A)	Irms(1) (A)	ESR (mΩ)	tan δ 1Khz <(10^{-4})	tan δ 10 Khz <(10^{-4})	tan δ 100Khz <(10^{-4})	Ordering Code
0.22	22	30	33.5	800	176	7	16	3	5	40	NG2201J1600**
0.27	22	30	33.5	800	216	7	15	3	5	40	NG2701J1600**
0.33	22	30	33.5	800	264	8	12	3	5	40	NG3301J1600**
0.39	22	30	33.5	800	312	8.5	10	3	5	40	NG3901J1600**
0.47	22	30	33.5	800	376	9	8.5	3	5	40	NG4701J1600**
0.56	22	38	44	375	210	9	14	4	10	60	NG5601J1600**
0.68	22	38	44	375	255	9	12	4	10	60	NG6801J1600**
0.82	22	38	44	375	308	10	10	4	10	60	NG8201J1600**
1	22	38	44	375	375	12	8	4	10	60	NG1002J1600**
1.3	30	46	44	375	488	16	6	4	10	-	NG1302J1600**
1.5	30	46	44	375	563	16	5.5	4	10	-	NG1502J1600**
1.8	30	46	44	375	675	18	4.5	4	10	-	NG1802J1600**
2	30	46	44	375	750	19	4	4	10	-	NG2002J1600**

Working Voltage 1600 VDC (450 VAC)

Cap	W*	h*	L*	dV/dt (V/µs)	Ipeak (A)	Irms(1) (A)	ESR (mΩ)	tan δ 1Khz <(10^{-4})	tan δ 10 Khz <(10^{-4})	tan δ 100Khz <(10^{-4})	Ordering Code
1.5	22	30	33.5	320	480	18	3.5	5	15	-	NG1502J1600**
2	22	30	33.5	320	640	22	2.5	5	15	-	NG2002J1600**
2.2	22	30	33.5	320	704	25	2.5	5	15	-	NG2202J1600**
2.5	22	30	33.5	320	800	26.5	2	5	15	-	NG2502J1600**

***** See Dimension´s diagram (page 15, 16)
(1) Maximum RMS current at 100 kHz
** Terminal Type

Working Voltage 2000 VDC (700 VAC)

Cap	W*	h*	L*	dV/dt (V/µs)	Ipeak (A)	Irms(1) (A)	ESR (mΩ)	tan δ 1Khz <(10^{-4})	tan δ 10 Khz <(10^{-4})	tan δ 100Khz <(10^{-4})	Ordering Code
0.047	22	30.5	33.5	2000	94	6	20	3	5	30	NG4701J2000**
0.068	22	30.5	33.5	2000	136	6.5	17	3	5	30	NG6801J2000**
0.1	22	30.5	33.5	2000	200	8	11	3	5	30	NG1001J2000**
0.12	22	30.5	33.5	2000	240	9	9	3	5	30	NG1201J2000**
0.15	22	30.5	33.5	2000	300	9.5	8	3	5	30	NG1501J2000**
0.22	22	38	44	850	187	10	10	3	10	50	NG2201J2000**
0.27	22	38	44	850	230	11	8.5	4	10	50	NG2701J2000**
0.33	22	38	44	850	281	12	7	4	10	50	NG3301J2000**
0.39	22	38	44	850	332	12	6	4	10	50	NG3902J2000**
0.47	30	46	44	850	400	16	5	4	10	50	NG4702J2000**
0.56	30	46	44	850	476	18	4	4	10	50	NG5602J2000**
0.68	30	46	44	850	578	20	3.5	4	10	50	NG6802J2000**
0.68	25	45	58	525	357	14	6	4	10	75	NG6802J2000**
0.82	25	45	58	525	431	15.5	5	4	10	75	NG6802J2000**
1	30	45	58	525	525	18	4	4	10	-	NG1002J2000**
1.5	30	45	58	525	788	24	2.5	4	10	-	NG1502J2000**

Working Voltage 2500 VDC (800 VAC)

Cap	W*	h*	L*	dV/dt (V/µs)	Ipeak (A)	Irms(1) (A)	ESR (mΩ)	tan δ 1Khz <(10^{-4})	tan δ 10 Khz <(10^{-4})	tan δ 100Khz <(10^{-4})	Ordering Code
0.047	22	30.5	33.5	2500	118	6	20	3	5	30	NG4701J2500**
0.068	22	30.5	33.5	2500	170	7	14	3	5	30	NG6801J2500**
0.1	22	30.5	33.5	2500	250	8.5	10	3	5	30	NG1001J2500**
0.12	22	30.5	33.5	2500	300	9.5	8	3	5	30	NG1201J2500**
0.15	22	38	44	1000	150	9.5	12.5	4	10	50	NG1501J2500**
0.18	22	38	44	1000	180	10	11	4	10	50	NG2201J2500**
0.22	22	38	44	1000	220	11	8.5	4	10	50	NG2701J2500**
0.33	30	46	44	1000	330	15	6	4	10	50	NG3301J2500**
0.39	30	46	44	1000	390	16	5	4	10	50	NG3902J2500**
0.47	30	46	44	1000	470	18	4	4	10	50	NG4702J2500**
0.47	25	45	58	795	374	15	5.5	5	15	75	NG5602J2500**
0.56	30	45	58	795	445	17	4.5	5	15	75	NG6802J2500**
0.68	35	50	58	795	541	20.5	4	5	15	75	NG6802J2500**
0.82	35	50	58	795	652	22.5	3	5	15	75	NG6802J2500**

***** See Dimension´s diagram (page 15, 16)
(1) Maximum RMS current at 100 kHz
** Terminal Type

AVAILABLE TERMINALS										
VDC	**Cap**	**Ordering Code**	**T1**	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**	**T8**
700	0.47	NG4701J0700			✓		✓		✓	
	0.68	NG6801J0700			✓		✓		✓	
	1	NG1002J0700			✓		✓		✓	
	1.5	NG1502J0700			✓		✓		✓	
	2	NG2002J0700	✓	✓	✓	✓	✓	✓	✓	✓
	2.2	NG2202J0700	✓	✓	✓	✓	✓	✓	✓	✓
	3	NG3002J0700	✓	✓	✓	✓	✓	✓	✓	✓
	3.3	NG3302J0700	✓	✓	✓	✓	✓	✓	✓	✓
	4	NG4002J0700	✓	✓	✓	✓	✓	✓	✓	✓
	4.7	NG4702J0700	✓	✓	✓	✓	✓	✓	✓	✓
	5.0	NG5002J0700	✓	✓	✓	✓	✓	✓	✓	✓
850	0.47	NG4701J0850			✓		✓		✓	
	0.68	NG6801J0850			✓		✓		✓	
	.82	NG8201J0850			✓		✓		✓	
	1	NG1002J0850			✓		✓		✓	
	1.5	NG1502J0850	✓	✓	✓	✓	✓	✓	✓	✓
	2	NG2002J0850	✓	✓	✓	✓	✓	✓	✓	✓
	2.2	NG2202J0850	✓	✓	✓	✓	✓	✓	✓	✓
	3	NG3002J0850	✓	✓	✓	✓	✓	✓	✓	✓
	3.3	NG3302J0850	✓	✓	✓	✓	✓	✓	✓	✓
	4	NG4002J0850	✓	✓	✓	✓	✓	✓	✓	✓

AVAILABLE TERMINALS										
VDC	Cap	Ordering Code	T1	T2	T3	T4	T5	T6	T7	T8
1000	0.47	NG4701J1000			✓		✓		✓	
	0.56	NG5601J1000			✓		✓		✓	
	0.68	NG6801J1000			✓		✓		✓	
	0.82	NG8201J1000			✓		✓		✓	
	1	NG1002J1000			✓		✓		✓	
	1.2	NG1202J1000			✓		✓		✓	
	1.5	NG1502J1000	✓	✓	✓	✓	✓	✓	✓	✓
	1.8	NG1802J1000	✓	✓	✓	✓	✓	✓	✓	✓
	2	NG2002J1000	✓	✓	✓	✓	✓	✓	✓	✓
	2.2	NG2202J1000	✓	✓	✓	✓	✓	✓	✓	✓
	2.5	NG2502J1000	✓	✓	✓	✓	✓	✓	✓	✓
	2.7	NG2702J1000	✓	✓	✓	✓	✓	✓	✓	✓
	3.3	NG3302J1000	✓	✓	✓	✓	✓	✓	✓	✓
	3.3	NG3302J1000	✓	✓	✓	✓	✓	✓	✓	✓
	4	NG4002J1000	✓	✓	✓	✓	✓	✓	✓	✓
	4.7	NG4702J1000	✓	✓	✓	✓	✓	✓	✓	✓
	5	NG5002J1000	✓	✓	✓	✓	✓	✓	✓	✓
	6	NG6002J1000	✓	✓	✓	✓	✓	✓	✓	✓
	7	NG7002J1000	✓	✓	✓	✓	✓	✓	✓	✓
1250	0.33	NG3301J1250			✓		✓		✓	
	0.39	NG3901J1250			✓		✓		✓	
	0.47	NG4701J1250			✓		✓		✓	
	0.56	NG5601J1250			✓		✓		✓	
	0.68	NG6801J1250			✓		✓		✓	
	0.82	NG8201J1250	✓	✓	✓	✓	✓	✓	✓	✓
	1	NG1002J1250	✓	✓	✓	✓	✓	✓	✓	✓
	1.2	NG1202J1250	✓	✓	✓	✓	✓	✓	✓	✓
	1.5	NG1502J1250	✓	✓	✓	✓	✓	✓	✓	✓
	1.8	NG1802J1250	✓	✓	✓	✓	✓	✓	✓	✓
	2	NG2002J1250	✓	✓	✓	✓	✓	✓	✓	✓
	2.2	NG2202J1250	✓	✓	✓	✓	✓	✓	✓	✓
	2.2	NG2202J1250	✓	✓	✓	✓	✓	✓	✓	✓
	2.5	NG2502J1250	✓	✓	✓	✓	✓	✓	✓	✓
	3	NG3002J1250	✓	✓	✓	✓	✓	✓	✓	✓
	3.3	NG3302J1250	✓	✓	✓	✓	✓	✓	✓	✓
	4	NG4002J1250	✓	✓	✓	✓	✓	✓	✓	✓
	4.7	NG4702J1250	✓	✓	✓	✓	✓	✓	✓	✓

	5	NG5002J1250	✓	✓	✓	✓	✓	✓	✓	✓
1600	0.22	NG2201J1600			✓		✓		✓	
	0.27	NG2701J1600			✓		✓		✓	
	0.33	NG3301J1600			✓		✓		✓	
	0.39	NG3901J1600			✓		✓		✓	
	0.47	NG4701J1600			✓		✓		✓	
	0.56	NG5601J1600	✓	✓	✓	✓	✓	✓	✓	✓
	0.68	NG6801J1600	✓	✓	✓	✓	✓	✓	✓	✓
	0.82	NG8201J1600	✓	✓	✓	✓	✓	✓	✓	✓
	1	NG1002J1600	✓	✓	✓	✓	✓	✓	✓	✓
	1.3	NG1302J1600	✓	✓	✓	✓	✓	✓	✓	✓
	1.5	NG1502J1600	✓	✓	✓	✓	✓	✓	✓	✓
	1.8	NG1802J1600	✓	✓	✓	✓	✓	✓	✓	✓
	2	NG2002J1600	✓	✓	✓	✓	✓	✓	✓	✓
	1.5	NG1502J1600	✓	✓	✓	✓	✓	✓	✓	✓
	2	NG2002J1600	✓	✓	✓	✓	✓	✓	✓	✓
	2.2	NG2202J1600	✓	✓	✓	✓	✓	✓	✓	✓
	2.5	NG2502J1600	✓	✓	✓	✓	✓	✓	✓	✓
2000	0.047	NG4701J2000			✓		✓		✓	
	0.068	NG6801J2000			✓		✓		✓	
	0.1	NG1001J2000			✓		✓		✓	
	0.12	NG1201J2000			✓		✓		✓	
	0.15	NG1501J2000			✓		✓		✓	
	0.22	NG2201J2000	✓	✓	✓	✓	✓	✓	✓	✓
	0.27	NG2701J2000	✓	✓	✓	✓	✓	✓	✓	✓
	0.33	NG3301J2000	✓	✓	✓	✓	✓	✓	✓	✓
	0.39	NG3902J2000	✓	✓	✓	✓	✓	✓	✓	✓
	0.47	NG4702J2000	✓	✓	✓	✓	✓	✓	✓	✓
	0.56	NG5602J2000	✓	✓	✓	✓	✓	✓	✓	✓
	0.68	NG6802J2000	✓	✓	✓	✓	✓	✓	✓	✓
	0.68	NG6802J2000	✓	✓	✓	✓	✓	✓	✓	✓
	0.82	NG6802J2000	✓	✓	✓	✓	✓	✓	✓	✓
	1	NG1002J2000	✓	✓	✓	✓	✓	✓	✓	✓
	1.5	NG1502J2000	✓	✓	✓	✓	✓	✓	✓	✓
2500	0.047	NG4701J2500			✓		✓		✓	
	0.068	NG6801J2500			✓		✓		✓	
	0.1	NG1001J2500			✓		✓		✓	
	0.12	NG1201J2500			✓		✓		✓	
	0.15	NG1501J2500	✓	✓	✓	✓	✓	✓	✓	✓
	0.18	NG2201J2500	✓	✓	✓	✓	✓	✓	✓	✓
	0.22	NG2701J2500	✓	✓	✓	✓	✓	✓	✓	✓
	0.33	NG3301J2500	✓	✓	✓	✓	✓	✓	✓	✓

	0.39	NG3902J2500	✓	✓	✓	✓	✓	✓	✓	✓
	0.47	NG4702J2500	✓	✓	✓	✓	✓	✓	✓	✓
	0.47	NG5602J2500	✓	✓	✓	✓	✓	✓	✓	✓
	0.56	NG6802J2500	✓	✓	✓	✓	✓	✓	✓	✓
	0.68	NG6802J2500	✓	✓	✓	✓	✓	✓	✓	✓
	0.82	NG6802J2500	✓	✓	✓	✓	✓	✓	✓	✓

MOUNTING

Normal Use

The capacitors are designed for mounting on IGBT or GTO modules.

Specific Method of Mounting to Withstand Vibration and Shock

In order to withstand vibration and shock tests, the capacitors shall be mechanically fixed by tabs it must be ensured that they are screwed tightly on the best board.

When the weight of the capacitor is bigger than 50 g it needs a clamp in the body of capacitors.

Storage Temperature

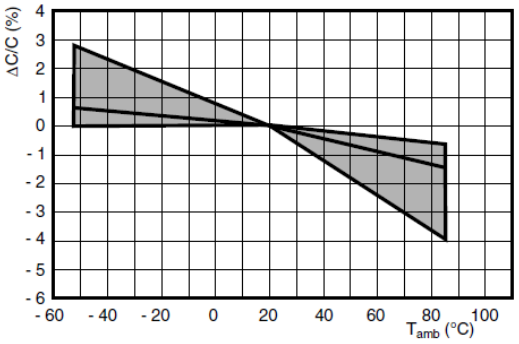
T_{stg}= -25°C to +35°C with RH maximum 75% without condensation.

Ratings and Characteristics Reference Conditions

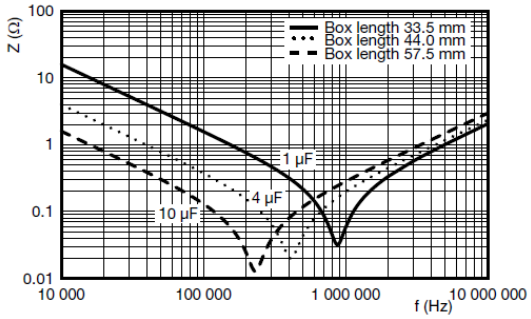
Unless otherwise specified, all electrical values apply to an ambient temperature of 23°C ± 1°C, an atmospheric pressure of 78 kPa to 106 kPa and a relative humidity of 50% ± 2%.

For reference testing, a conditioning period shall be applied over 96h ± 4h by heating the products in a circulating air oven at the rated temperature and a relative humidity not exceeding 20%.

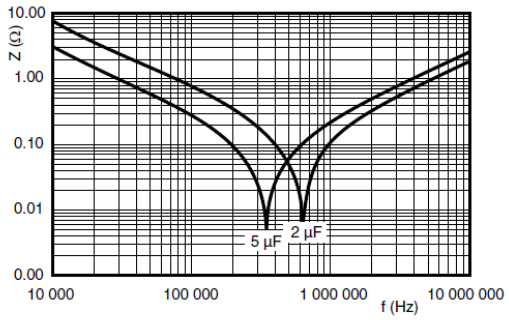
CHARACTERISTICS



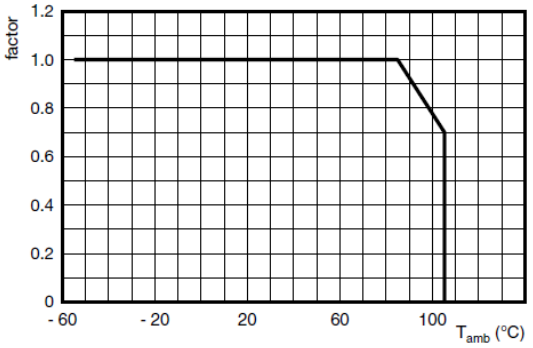
Capacitance as a function of ambient temperature
(typical curve)



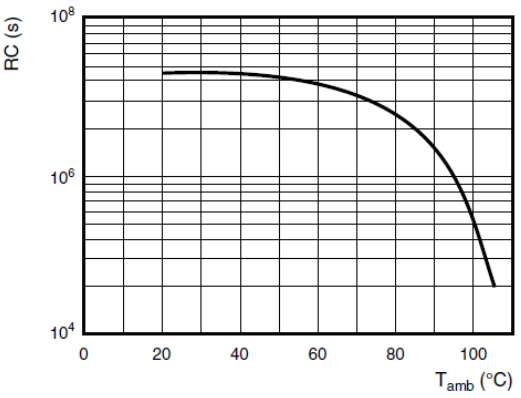
Impedance as a function of frequency
(typical curve)



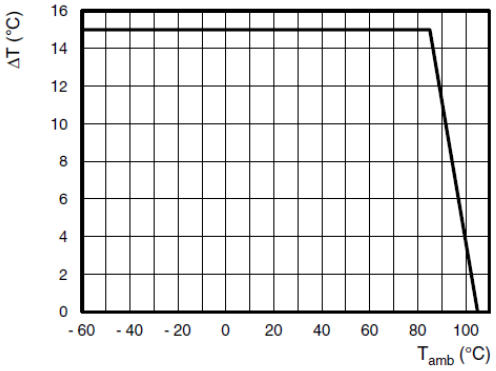
Impedance as function of frequency for box length 44.0 mm
(typical curve)



Max. DC and AC voltage as a function of temperature

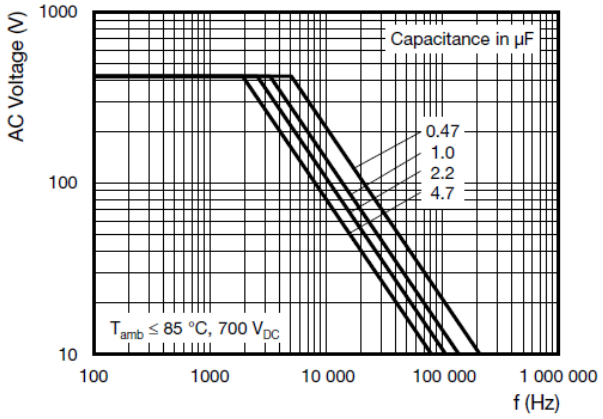


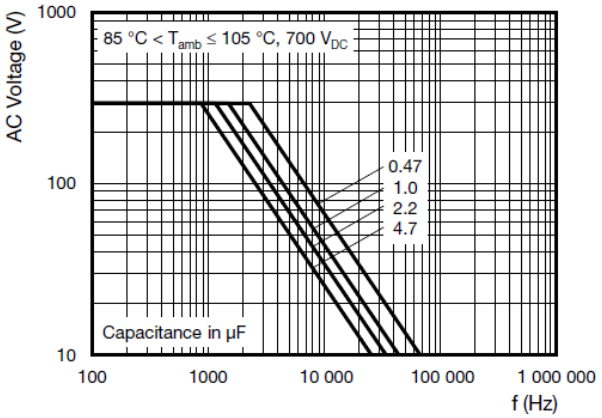
Insulation resistance as a function of ambient temperature
(typical curve)

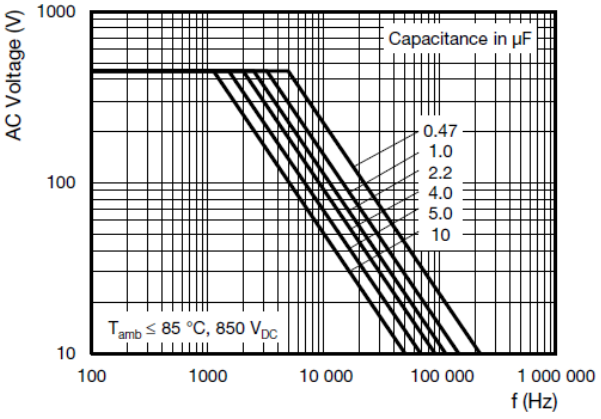


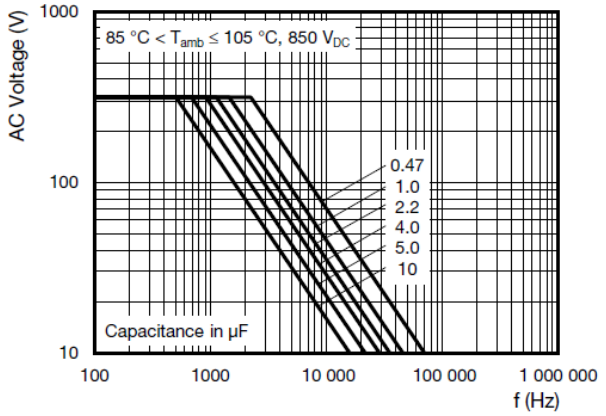
Maximum allowed component temperature rise (ΔT)
as function of the ambient temperature (T_{amb})

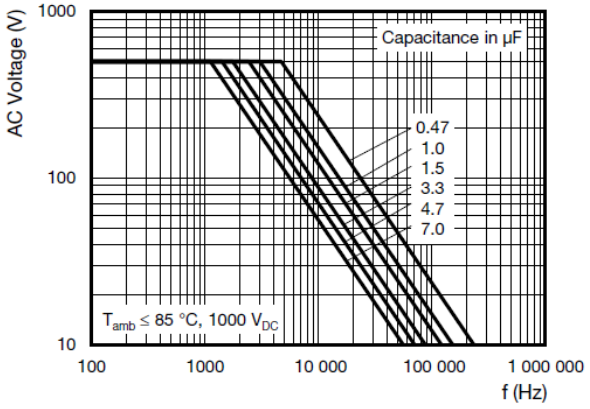
MAXIUM RMS VOLTAGE (SINEWAVE) AS A FUNCTION OF FREQUENCY

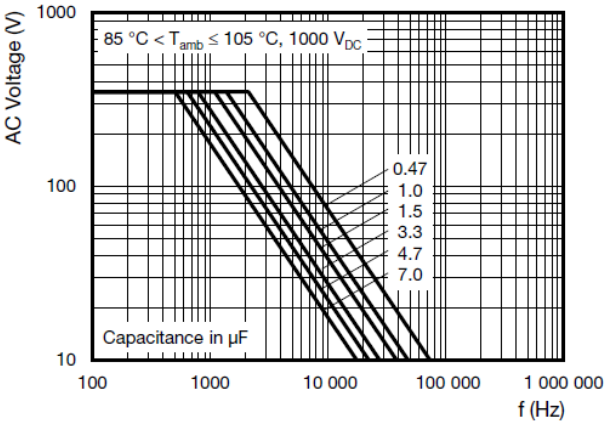


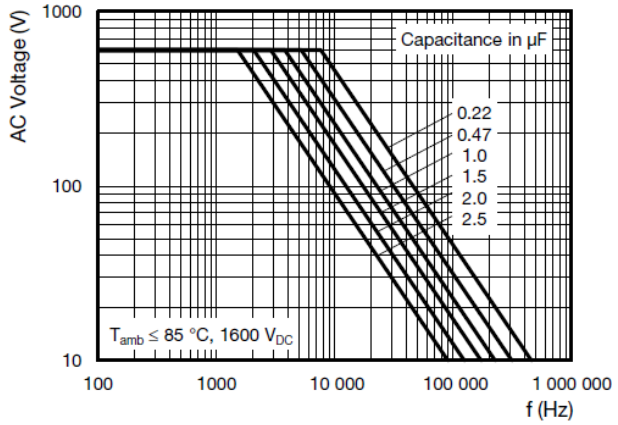


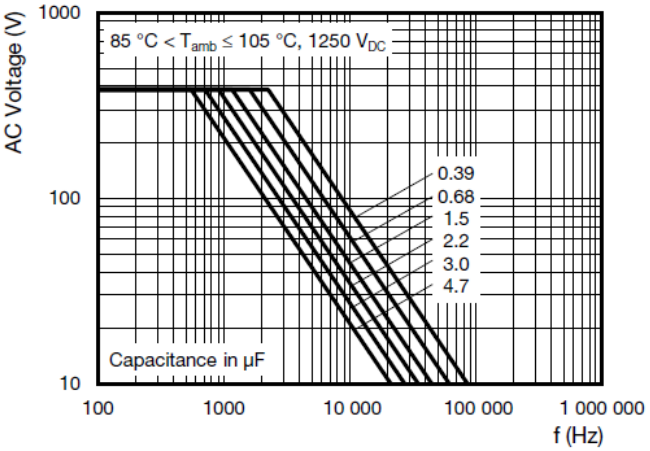


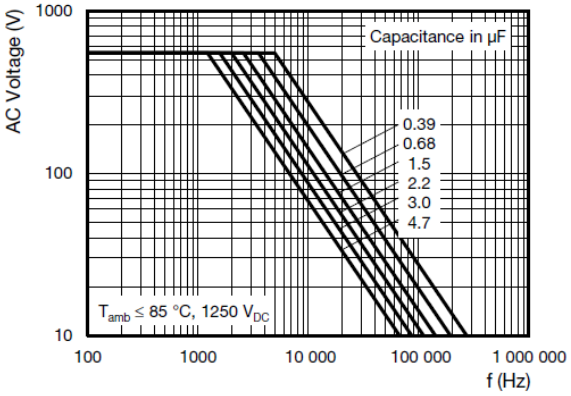


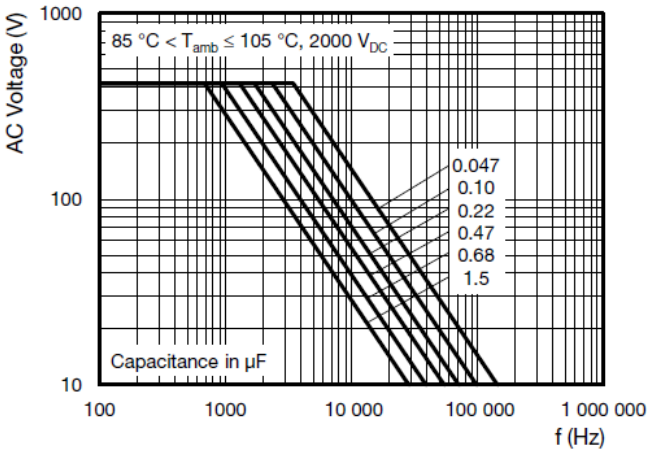


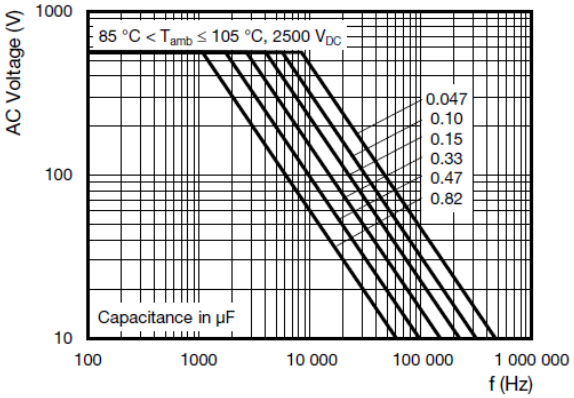


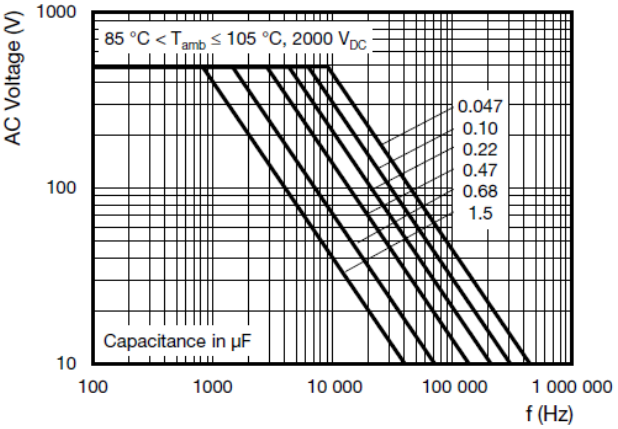

AC Voltage (V)
1000
100
10
Capacitance in µF
0.22
0.47
1.0
1.5
2.0
2.5
$T_{amb} \leq 85$ °C, 1600 V_{DC}
100
1000
10 000
100 000
1 000 000
f (Hz)

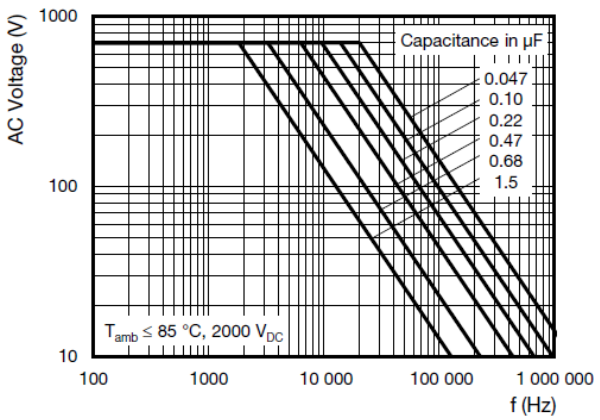

AC Voltage (V)
1000
100
10
85 °C < $T_{amb} \leq$ 105 °C, 1250 V_{DC}
0.39
0.68
1.5
2.2
3.0
4.7
Capacitance in µF
100
1000
10 000
100 000
1 000 000
f (Hz)

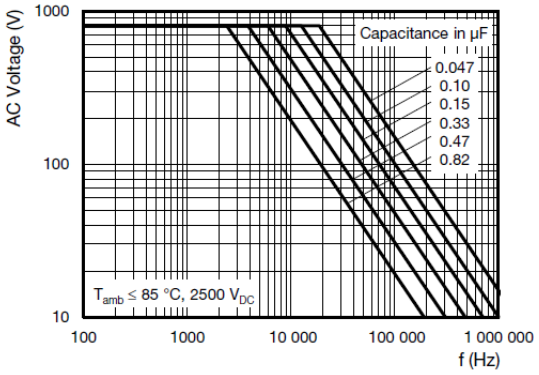

AC Voltage (V)
1000
100
10
Capacitance in µF
0.39
0.68
1.5
2.2
3.0
4.7
$T_{amb} \leq 85$ °C, 1250 V_{DC}
100
1000
10 000
100 000
1 000 000
f (Hz)

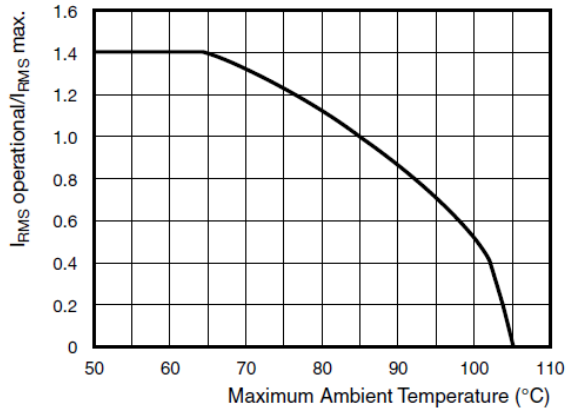

AC Voltage (V)
1000
100
10
85 °C < $T_{amb} \leq$ 105 °C, 2000 V_{DC}
0.047
0.10
0.22
0.47
0.68
1.5
Capacitance in µF
100
1000
10 000
100 000
1 000 000
f (Hz)


AC Voltage (V)
1000
100
10
85 °C < $T_{amb} \leq$ 105 °C, 2500 V_{DC}
0.047
0.10
0.15
0.33
0.47
0.82
Capacitance in µF
100
1000
10 000
100 000
1 000 000
f (Hz)

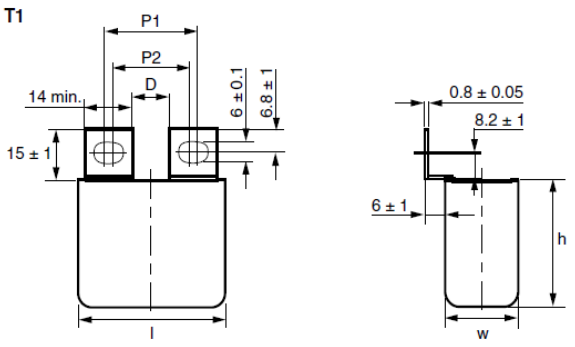

AC Voltage (V)
1000
100
10
85 °C < $T_{amb} \leq$ 105 °C, 2000 V_{DC}
0.047
0.10
0.22
0.47
0.68
1.5
Capacitance in µF
100
1000
10 000
100 000
1 000 000
f (Hz)



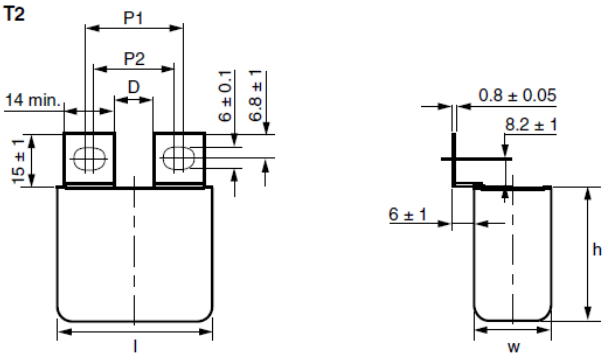




CASE DIMENSIONS (mm.)

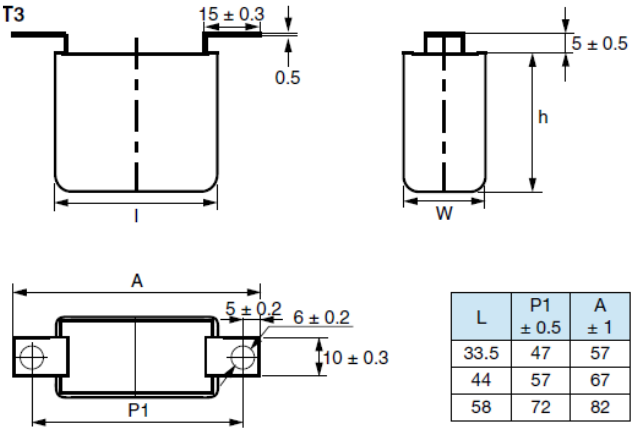


L	P1 ± 0.5	P2 ± 0.5	D min.
44	28	23	10.2
58	43	38	25.2



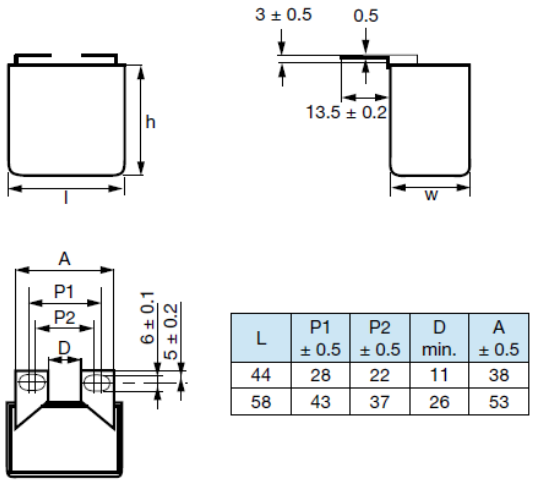
L	P1 ± 0.5	P2 ± 0.5	D min.
44	24.5	19.5	6.2
58	39.5	34.5	21.2

T3



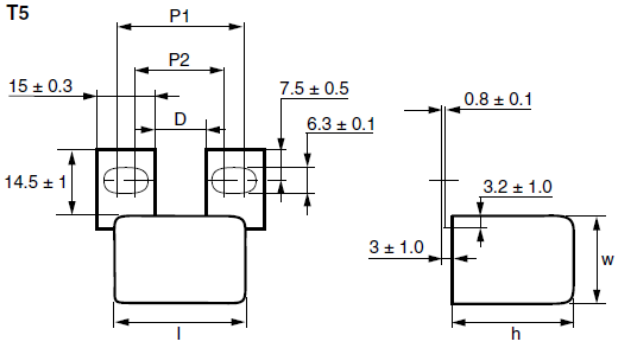
L	P1 ± 0.5	A ± 1
33.5	47	57
44	57	67
58	72	82

T4



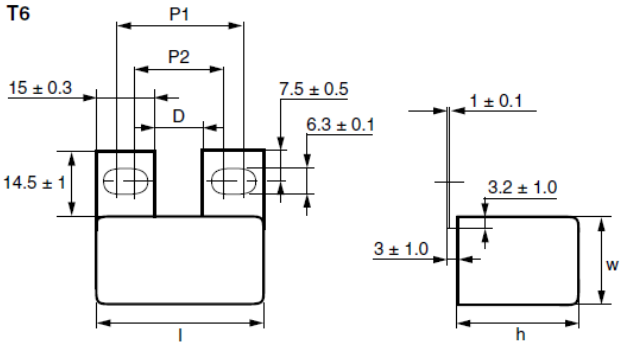
L	P1 ± 0.5	P2 ± 0.5	D min.	A ± 0.5
44	28	22	11	38
58	43	37	26	53

T5



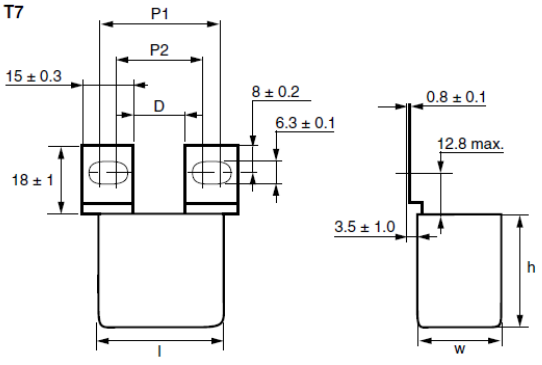
L	P1 ± 1	P2 ± 1	D min.
33.5	32.3	22.7	11
44	42.3	32.7	21
58	57.3	47.7	36

T6



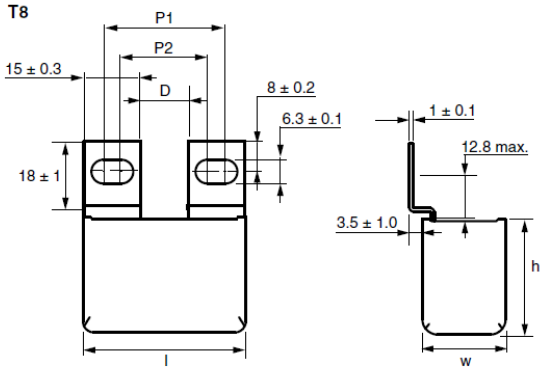
L	P1 ± 1	P2 ± 1	D min.
44	32.3	22.7	11
58	47.3	37.7	26

T7



L	P1 ± 1	P2 ± 1	D min.
33.5	32.3	22.7	11
44	42.3	32.7	21
58	57.3	47.7	36

T8



L	P1 ± 1	P2 ± 1	D min.
44	32.3	22.7	11
58	47.3	37.7	26

MARKING

Product Marking and Identification

The capacitor is marked by stamp, with following information:

1. - Manufacturer´s logo
2. - Single Metallized (e.g. M)
3. - Rated capacitance value (e.g. 5µF)
4. - Tolerance on rated capacitance (e.g. J= ± 5%)
5. - Rated DC voltage (e.g. 700 V)
6. - Year and week of manufacture (e.g. 2315)

NGM

M

5µF J 700V

2315

POWER DISSIPATION AND MAXIUM COMPONENT TEMPERATURE RISE

HEAT CONDUCTIVITY (G) AS A FUNCTION OF ORIGINAL PITCH AND CAPACITOR BODY THICKNESS IN mW/°C			
$W_{max.}$ (mm)	HEAT CONDUCTIVITY (mW/°C)		
	BOX LENGTH 33.5 mm	BOX LENGTH 44 mm	BOX LENGTH 58 mm
22	75	100	-
25	-	-	155
30	-	140	170
35	-	-	200

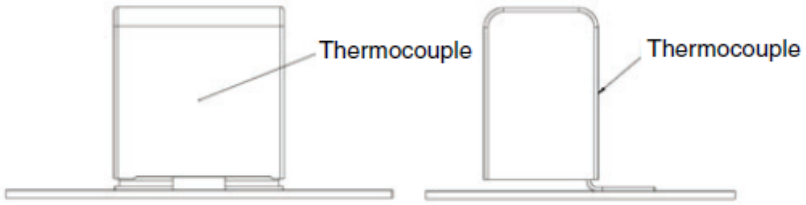
The power dissipation must be limited in order not to exceed the maximum allowed component temperature rise as function of the free air ambient temperature.

The component temperature rise (ΔT) can be measured or calculated by ΔT =P/G

- ΔT= Component temperature rise (°C) with maximum of 10°C rise (°C)
- P= Power dissipation of the component (mW)
- G= Heat conductivity of the component (mW/°C)

MEASURING THE COMPONENT TEMPERATURE

A thermocouple must be attached to the capacitor body as in:



The temperature is measured in unloaded (T_{amb}) and maximum loaded condition (T_C)

The temperature rise is given by $\Delta T = T_C - T_{amb}$

The avoid radiation or convection, the capacitor should be tested in a wind-free box

APPLICATION NOTE AND LIMITING CONDITIONS

These capacitors are not suitable for mains applications as across-the-line capacitors without additional protection, as described hereunder. These mains application are strictly regulated in safety standards and therefore electromagnetic interference suppression capacitors conforming the standards must be used.

To select the capacitor for a certain application, the following conditions must be checked:

1. The peak voltage (Up) shall not be greater than the rated DC voltage (U_{RDC})
2. The peak-to-peak voltage (Upp) shall not be greater than the maximum (Upp) to avoid electric arc
3. The maximum component surface temperature rise must be lower than the limits
4. Since in circuits used at voltage over 280 V peak-to-peak the risk for an intrinsically active flammability after the capacitor breakdown (short circuit) increases, it is recommended that the power to the component is limited to 100 times the values mentioned in the table “Heat-conductivity”
5. When using these capacitors as across-the-line capacitor in the input filter for mains applications or as series connected with an impedance to the mains the applicant must guarantee that the following conditions are fulfilled in any cases spike and surge voltages from the main included

VOLTAGE CONDITIONS FOR 5 ABOVE		
ALLOWED VOLTAGES	**$T_{amb} \leq 85°C$**	**$85°C \leq T_{amb} \leq 105°C$**
Maximum continuous RMS voltage	U_{RAC}	0.7 x U_{RAC}
Maximum temporary RMS overvoltage (<24 h)	1.25 x U_{RAC}	0.875 x U_{RAC}
Maximum peak voltage (V_{o-p})(<2 s)	1.6 x U_{RDC}	1.1 x U_{RDC}

INSPECTION REQUIREMENTS

General Notes

Sub-clause numbers of tests and performance requirements are refer to the “Sectional Specification, Publication IEC-60384-17”

GROUP C INSPECTIONS REQUIREMENTS		
SUB- CLAUSE NUMBER AND TEST	**CONDITIONS**	**PERFORMANCE REQUIREMENTS**
SUB-GROUP C1A OF SAMPLE OF SUB-GROUP C1		
4.1 Dimensions (details)		Are specified in chapters “General Data” of this specification
4.3.1 Initial measurements	Capacitance Tangent of loss angle: For C>1 µF at 1 Khz For C≤1 µF at 1 Khz	
4.3 Robustness of terminations	Tensile: Load 30 N; 10 s	No visible damage
4.4.2 Final measurements	Visual examination	No visible damage Legible marking
	Capacitance	ΔC/C ≤2 % of the value measured initially
	Tangent of loss angle	Increase of tan $\delta \leq$ 0.002 Compared to values measured initially
	Insulation resistance	≤ 50 % values specified in section “Insulation Resistance” of this specification
SUB-GROUP C1B PART OF SAMPLE OF SUB-GROUP C1		
4.6.1 Initial measurements	Capacitance Tangent of loss angle: For C>1 µF at 1 Khz For C≤1 µF at 1 Khz	
4.6 Rapid change of temperature	θA= -55°C θB=+105°C 5 cylces Duration t=30 min Visual examination	No visible damage
4.7 Vibration	Mounting: See section “Mounting” of this specification. Procedure B4: Frequency range: 10 Hz to 55 Hz Amplitude: 0.75 mm or Acceleration: 98 m/s^2 (whichever is less severe) Total duration 6h	
4.7.2 Final Inspection	Visual examination	No visible damage

4.9 Shock	Mounting: See section “Mounting” for more information Pulse shape: Half sine Acceleration: 490 m/s^2 Duration of pulse: 11 ms Visual examination	No visible damage
4.9.3 Final measurements	Capacitance	ΔC/C ≤2 % of the value measured initially
	Tangent of loss angle	Increase of tan δ≤ 0.002 Compared to values measured initially
	Insulation resistance	≥50 % values specified in section “Insulation Resistance” of this specification
4.15 Solvent resistance of the marking	Isopropyl alcohol at room temperature Method:1 Rubbing material: cotton wool Immersion time: 5 min ± 0.5 min	No visible damage Legible marking

GROUP C INSPECTIONS REQUIREMENTS		
SUB- CLAUSE NUMBER AND TEST	**CONDITIONS**	**PERFORMANCE REQUIREMENTS**
SUB-GROUP C1 COMBINED SAMPLE OF SPECIMENS OF SUB-GROUP C1A AND C1B		
4.10 Climatic sequence		
4.10.2 Dry heat	Temperature: +105°C Duration: 16h	
4.10.4 Cold	Temperature: -55°C Duration: 2h	
4.10.6.2 Final measurements	Voltage proof= U_{RDC} for 1 min within 15 min after removal from test chamber	No visible damage Legible marking No breakdown or flash-over
	Visual examination	No visible damage Legible marking
	Capacitance	ΔC/C ≤3 % of the value measured initially
	Tangent of loss angle	Increase of tan δ≤ 0.002 Compared to values measured in 4.11.1
	Insulation resistance	≥ 50 % values specified in section “Insulation Resistance” of this specification

GROUP C INSPECTIONS REQUIREMENTS		
SUB- CLAUSE NUMBER AND TEST	**CONDITIONS**	**PERFORMANCE REQUIREMENTS**
SUB-GROUP C3A		
4.12.1 Endurance test at 60 Hz alternative voltage	Duration: 2000 h 1.25 x U_{RAC} at 85°C 0.875 x U_{RAC} at 105°C	
4.12.1.1 Initial measurements	Capacitance Tangent of loss angle: For C>1 µF at 1 Khz For C≤1 µF at 1 Khz	
4.12.13 Final measurements	Visual examination	No visible damage Legible marking
	Capacitance	ΔC/C ≤5 % compared to values measured 4.12.11
	Tangent of loss angle	Increase of tan δ: ≤0.0015 for C≤ 1 µF ≤0.0015 for C> 1 µF Compared to values measured in 4.12.1.1
	Insulation resistance	≥ 50 % values specified in section "Insulation Resistance" of this specification
SUB-GROUP C4		
4.2.6 Temperature characteristics Initial measurements Intermediate measurements	Capacitance Capacitance at -55°C Capacitance at 20°C Capacitance at +105°C	For -55°C to 20°C 0 % ≤ΔC/C ≤2.75 % or For 20°C to 105°C -5.5 % ≤ΔC/C ≤0 % As specified in section "Capacitance" of this specification
4.13 Charge and discharge	10 000 cycles Cycle time: 1 c/s Charge: U_{RDC} trough a resistor with value $R = \frac{220\ x\ 10^{-6}}{C_R}$ Charge time: 5ms Discharge: Trough a resistor with value $R = \frac{U}{C\ (dU/dt)}$	
4.13.1 Initial measurements	Capacitance Tangent of loss angle: For C>1 µF at 1 Khz For C≤1 µF at 1 Khz	
4.13.3 Final measurements	Capacitance	ΔC/C ≤3 % of the value measured in 4.13.1
	Tangent of loss angle	Increase of tan δ: ≤0.0015 for C≤ 1 µF ≤0.0015 for C> 1 µF Compared to values measured in 4.13.1
	Insulation resistance	≥ 50 % values specified in section "Insulation Resistance" of this specification

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECTS TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

NG its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively. NG), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

NG makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, NG disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on NG knowledge of typical requirements that are often placed on NG products. Such statements are not binding statements about the suitability of products for a particular application. It is the customer´s responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specification may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer´s technical experts. Products specifications do not expand otherwise modify NG´s terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, NG products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Ng product could result in personal injury or death. Customers using or selling Ng products not expressly indicated for use in such applications do so at their own risk. Please contact authorized personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct NG. Product names and markings noted herein may be trademarks of their respective owners.