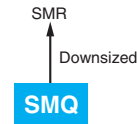


# SMQ Series

- Endurance with ripple current : 2,000 hours at 85°C
- Non solvent resistant type
- RoHS2 Compliant



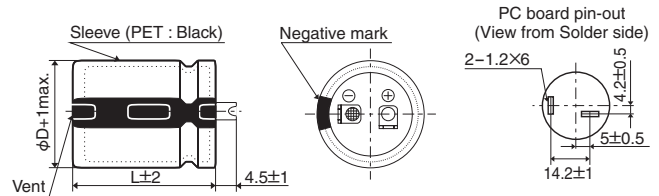
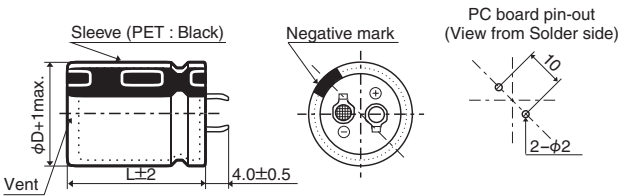
## SPECIFICATIONS

Items	Characteristics			
Category	-25 to +85°C			
Temperature Range	-25 to +85°C			
Rated Voltage Range	160 to 450V <sub>dc</sub>			
Capacitance Tolerance	±20% (M) (at 20°C, 120Hz)			
Leakage Current	I ≤ 3√CV Where, I : Max. leakage current (µA), C : Nominal capacitance (µF), V : Rated voltage (V) (at 20°C after 5 minutes)			
Dissipation Factor (tan δ)	Rated voltage (V <sub>dc</sub> )	160 to 250V	315 to 400V	420 & 450V
	tan δ (Max.)	0.15	0.15	0.20
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (V <sub>dc</sub> )	160 to 250V	315 to 400V	420 & 450V
	Z(-25°C)/Z(+20°C)	4	8	8
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 85°C.			
	Capacitance change	≤ ±20% of the initial value		
	D. F. (tan δ)	≤ 200% of the initial specified value		
	Leakage current	≤ The initial specified value		
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4.			
	Capacitance change	≤ ±15% of the initial value		
	D. F. (tan δ)	≤ 150% of the initial specified value		
	Leakage current	≤ The initial specified value		

## DIMENSIONS [mm]

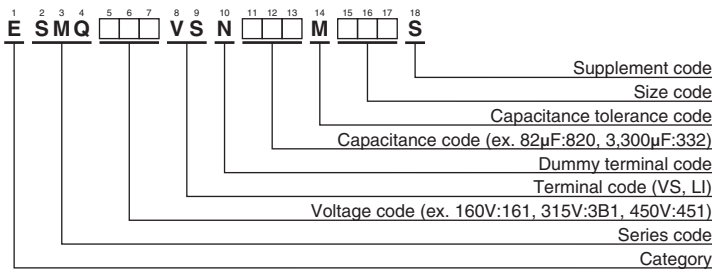
Terminal Code : VS (φ22 to φ35) : Standard

Terminal Code : LI (φ35)



The standard design has no plastic disc.

## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"

◆ STANDARD RATINGS

WV (V <sub>dc</sub> )	Cap (μF)	Case size φD×L(mm)	tan δ	Rated ripple current (Arms/85°C, 120Hz)	Part No.	WV (V <sub>dc</sub> )	Cap (μF)	Case size φD×L(mm)	tan δ	Rated ripple current (Arms/85°C, 120Hz)	Part No.
160	560	22 × 25	0.15	2.25	ESMQ161VSN561MP25S	250	270	22 × 25	0.15	1.31	ESMQ251VSN271MP25S
	680	22 × 30	0.15	2.50	ESMQ161VSN681MP30S		330	22 × 30	0.15	1.75	ESMQ251VSN331MP30S
	820	22 × 35	0.15	2.75	ESMQ161VSN821MP35S		390	22 × 30	0.15	1.91	ESMQ251VSN391MP30S
	1,000	22 × 40	0.15	3.00	ESMQ161VSN102MP40S		390	25.4 × 25	0.15	1.91	ESMQ251VSN391MQ25S
	1,000	25.4 × 30	0.15	3.00	ESMQ161VSN102MQ30S		470	22 × 35	0.15	2.11	ESMQ251VSN471MP35S
	1,200	22 × 45	0.15	3.25	ESMQ161VSN122MP45S		470	25.4 × 30	0.15	2.11	ESMQ251VSN471MQ30S
	1,200	25.4 × 35	0.15	3.25	ESMQ161VSN122MQ35S		560	22 × 40	0.15	2.25	ESMQ251VSN561MP40S
	1,200	30 × 25	0.15	3.25	ESMQ161VSN122MR25S		560	25.4 × 30	0.15	2.25	ESMQ251VSN561MQ30S
	1,500	22 × 50	0.15	3.73	ESMQ161VSN152MP50S		560	30 × 25	0.15	2.25	ESMQ251VSN561MR25S
	1,500	25.4 × 40	0.15	3.73	ESMQ161VSN152MQ40S		680	22 × 45	0.15	2.50	ESMQ251VSN681MP45S
	1,500	30 × 30	0.15	3.73	ESMQ161VSN152MR30S		680	25.4 × 35	0.15	2.50	ESMQ251VSN681MQ35S
	1,500	35 × 25	0.15	3.73	ESMQ161VSN152MA25S		680	30 × 30	0.15	2.50	ESMQ251VSN681MR30S
	1,800	25.4 × 45	0.15	4.20	ESMQ161VSN182MQ45S		820	22 × 50	0.15	2.77	ESMQ251VSN821MP50S
	1,800	30 × 35	0.15	4.20	ESMQ161VSN182MR35S		820	25.4 × 40	0.15	2.77	ESMQ251VSN821MQ40S
	1,800	35 × 30	0.15	4.20	ESMQ161VSN182MA30S		820	30 × 30	0.15	2.77	ESMQ251VSN821MR30S
	2,200	30 × 40	0.15	4.78	ESMQ161VSN222MR40S		820	35 × 25	0.15	2.77	ESMQ251VSN821MA25S
	2,200	35 × 35	0.15	4.78	ESMQ161VSN222MA35S		1,000	25.4 × 45	0.15	3.32	ESMQ251VSN102MQ45S
	2,700	35 × 40	0.15	5.45	ESMQ161VSN272MA40S		1,000	30 × 35	0.15	3.32	ESMQ251VSN102MR35S
	3,300	35 × 45	0.15	5.75	ESMQ161VSN332MA45S		1,000	35 × 30	0.15	3.32	ESMQ251VSN102MA30S
	3,900	35 × 50	0.15	6.00	ESMQ161VSN392MA50S		1,200	30 × 40	0.15	3.53	ESMQ251VSN122MR40S
180	470	22 × 25	0.15	2.08	ESMQ181VSN471MP25S	1,200	35 × 35	0.15	3.53	ESMQ251VSN122MA35S	
	560	22 × 30	0.15	2.25	ESMQ181VSN561MP30S	1,500	30 × 50	0.15	4.04	ESMQ251VSN152MR50S	
	680	22 × 30	0.15	2.50	ESMQ181VSN681MP30S	1,500	35 × 40	0.15	4.04	ESMQ251VSN152MA40S	
	680	25.4 × 25	0.15	2.50	ESMQ181VSN681MQ25S	1,800	35 × 45	0.15	4.55	ESMQ251VSN182MA45S	
	820	22 × 35	0.15	2.75	ESMQ181VSN821MP35S	315	180	22 × 25	0.15	1.21	ESMQ31VSN181MP25S
	820	25.4 × 30	0.15	2.75	ESMQ181VSN821MQ30S		220	22 × 30	0.15	1.41	ESMQ31VSN221MP30S
	1,000	22 × 45	0.15	3.00	ESMQ181VSN102MP45S		270	22 × 30	0.15	1.60	ESMQ31VSN271MP30S
	1,000	25.4 × 35	0.15	3.00	ESMQ181VSN102MQ35S		330	22 × 40	0.15	1.82	ESMQ31VSN331MP40S
	1,000	30 × 25	0.15	3.00	ESMQ181VSN102MR25S		330	25.4 × 30	0.15	1.82	ESMQ31VSN331MQ30S
	1,200	22 × 50	0.15	3.31	ESMQ181VSN122MP50S		330	30 × 25	0.15	1.82	ESMQ31VSN331MR25S
	1,200	25.4 × 40	0.15	3.31	ESMQ181VSN122MQ40S		390	22 × 45	0.15	2.01	ESMQ31VSN391MP45S
	1,200	30 × 30	0.15	3.31	ESMQ181VSN122MR30S		390	25.4 × 35	0.15	2.01	ESMQ31VSN391MQ35S
	1,200	35 × 25	0.15	3.31	ESMQ181VSN122MA25S		390	30 × 30	0.15	2.01	ESMQ31VSN391MR30S
	1,500	25.4 × 45	0.15	3.83	ESMQ181VSN152MQ45S		470	22 × 50	0.15	2.27	ESMQ31VSN471MP50S
	1,500	30 × 35	0.15	3.83	ESMQ181VSN152MR35S		470	25.4 × 40	0.15	2.27	ESMQ31VSN471MQ40S
	1,500	35 × 30	0.15	3.83	ESMQ181VSN152MA30S		470	30 × 30	0.15	2.27	ESMQ31VSN471MR30S
	1,800	25.4 × 50	0.15	4.32	ESMQ181VSN182MQ50S		470	35 × 25	0.15	2.27	ESMQ31VSN471MA25S
	1,800	30 × 40	0.15	4.32	ESMQ181VSN182MR40S		560	25.4 × 45	0.15	2.56	ESMQ31VSN561MQ45S
	1,800	35 × 30	0.15	4.32	ESMQ181VSN182MA30S		560	30 × 35	0.15	2.56	ESMQ31VSN561MR35S
	2,200	30 × 45	0.15	4.92	ESMQ181VSN222MR45S		560	35 × 30	0.15	2.56	ESMQ31VSN561MA30S
2,200	35 × 40	0.15	4.92	ESMQ181VSN222MA40S	680		30 × 40	0.15	2.87	ESMQ31VSN681MR40S	
2,700	35 × 45	0.15	5.52	ESMQ181VSN272MA45S	680		35 × 35	0.15	2.87	ESMQ31VSN681MA35S	
3,300	35 × 50	0.15	5.75	ESMQ181VSN332MA50S	820		30 × 45	0.15	3.25	ESMQ31VSN821MR45S	
200	390	22 × 25	0.15	1.68	ESMQ201VSN391MP25S		820	35 × 40	0.15	3.25	ESMQ31VSN821MA40S
	470	22 × 30	0.15	1.85	ESMQ201VSN471MP30S	1,000	30 × 50	0.15	3.63	ESMQ31VSN102MR50S	
	560	22 × 30	0.15	2.43	ESMQ201VSN561MP30S	1,000	35 × 45	0.15	3.63	ESMQ31VSN102MA45S	
	560	25.4 × 25	0.15	2.43	ESMQ201VSN561MQ25S	350	150	22 × 25	0.15	1.12	ESMQ351VSN151MP25S
	680	22 × 35	0.15	2.68	ESMQ201VSN681MP35S		180	22 × 30	0.15	1.22	ESMQ351VSN181MP30S
	680	25.4 × 30	0.15	2.68	ESMQ201VSN681MQ30S		220	22 × 35	0.15	1.44	ESMQ351VSN221MP35S
	820	22 × 40	0.15	2.93	ESMQ201VSN821MP40S		270	22 × 40	0.15	1.66	ESMQ351VSN271MP40S
	820	25.4 × 30	0.15	2.93	ESMQ201VSN821MQ30S		270	25.4 × 30	0.15	1.66	ESMQ351VSN271MQ30S
	820	30 × 25	0.15	2.93	ESMQ201VSN821MR25S		330	22 × 45	0.15	1.88	ESMQ351VSN331MP45S
	1,000	22 × 45	0.15	3.25	ESMQ201VSN102MP45S		330	25.4 × 35	0.15	1.88	ESMQ351VSN331MQ35S
	1,000	25.4 × 35	0.15	3.25	ESMQ201VSN102MQ35S		390	22 × 50	0.15	2.06	ESMQ351VSN391MP50S
	1,000	30 × 30	0.15	3.25	ESMQ201VSN102MR30S		390	25.4 × 40	0.15	2.06	ESMQ351VSN391MQ40S
	1,000	35 × 25	0.15	3.25	ESMQ201VSN102MA25S		390	30 × 30	0.15	2.06	ESMQ351VSN391MR30S
	1,200	25.4 × 40	0.15	3.50	ESMQ201VSN122MQ40S		390	35 × 25	0.15	2.06	ESMQ351VSN391MA25S
	1,200	30 × 30	0.15	3.50	ESMQ201VSN122MR30S		470	25.4 × 45	0.15	2.40	ESMQ351VSN471MQ45S
	1,200	35 × 30	0.15	3.50	ESMQ201VSN122MA30S		470	30 × 35	0.15	2.40	ESMQ351VSN471MR35S
	1,500	25.4 × 50	0.15	3.87	ESMQ201VSN152MQ50S		470	35 × 30	0.15	2.40	ESMQ351VSN471MA30S
	1,500	30 × 35	0.15	3.87	ESMQ201VSN152MR35S		560	25.4 × 50	0.15	2.60	ESMQ351VSN561MQ50S
	1,500	35 × 30	0.15	3.87	ESMQ201VSN152MA30S		560	30 × 40	0.15	2.60	ESMQ351VSN561MR40S
	1,800	30 × 45	0.15	4.32	ESMQ201VSN182MR45S		560	35 × 30	0.15	2.60	ESMQ351VSN561MA30S
1,800	35 × 35	0.15	4.32	ESMQ201VSN182MA35S	680		30 × 45	0.15	2.96	ESMQ351VSN681MR45S	
2,200	30 × 50	0.15	4.92	ESMQ201VSN222MR50S	680		35 × 35	0.15	2.96	ESMQ351VSN681MA35S	
2,200	35 × 40	0.15	4.92	ESMQ201VSN222MA40S	820		30 × 50	0.15	3.25	ESMQ351VSN821MR50S	
2,700	35 × 50	0.15	5.45	ESMQ201VSN272MA50S	820	35 × 45	0.15	3.25	ESMQ351VSN821MA45S		



## ◆STANDARD RATINGS

WV (V <sub>dc</sub> )	Cap (μF)	Case size φD×L(mm)	tan δ	Rated ripple current (Arms/85°C, 120Hz)	Part No.	WV (V <sub>dc</sub> )	Cap (μF)	Case size φD×L(mm)	tan δ	Rated ripple current (Arms/85°C, 120Hz)	Part No.	
350	1,000	35 × 50	0.15	3.54	ESMQ351VSN102MA50S	420	270	30 × 30	0.20	1.94	ESMQ421VSN271MR30S	
	120	22 × 25	0.15	1.02	ESMQ401VSN121MP25S		330	25.4 × 45	0.20	2.17	ESMQ421VSN331MQ45S	
	150	22 × 30	0.15	1.16	ESMQ401VSN151MP30S		330	30 × 35	0.20	2.17	ESMQ421VSN331MR35S	
	180	22 × 35	0.15	1.44	ESMQ401VSN181MP35S		330	35 × 30	0.20	2.17	ESMQ421VSN331MA30S	
	220	22 × 40	0.15	1.49	ESMQ401VSN221MP40S		390	25.4 × 50	0.20	2.27	ESMQ421VSN391MQ50S	
	220	25.4 × 30	0.15	1.49	ESMQ401VSN221MQ30S		390	30 × 35	0.20	2.27	ESMQ421VSN391MR35S	
	270	22 × 45	0.15	1.67	ESMQ401VSN271MP45S		390	35 × 30	0.20	2.27	ESMQ421VSN391MA30S	
	270	25.4 × 35	0.15	1.67	ESMQ401VSN271MQ35S		470	30 × 40	0.20	2.61	ESMQ421VSN471MR40S	
	270	30 × 25	0.15	1.67	ESMQ401VSN271MR25S		470	35 × 35	0.20	2.61	ESMQ421VSN471MA35S	
	330	22 × 50	0.15	1.90	ESMQ401VSN331MP50S		560	30 × 50	0.20	2.82	ESMQ421VSN561MR50S	
	330	25.4 × 40	0.15	1.90	ESMQ401VSN331MP40S		560	35 × 40	0.20	2.82	ESMQ421VSN561MA40S	
	330	30 × 30	0.15	1.90	ESMQ401VSN331MR30S		680	35 × 45	0.20	3.11	ESMQ421VSN681MA45S	
	330	35 × 25	0.15	1.90	ESMQ401VSN331MA25S		450	82	22 × 25	0.20	0.83	ESMQ451VSN820MP25S
	390	25.4 × 45	0.15	2.13	ESMQ401VSN391MQ45S			100	22 × 25	0.20	0.93	ESMQ451VSN101MP25S
	390	30 × 35	0.15	2.13	ESMQ401VSN391MP35S			120	22 × 30	0.20	1.04	ESMQ451VSN121MP30S
390	35 × 30	0.15	2.13	ESMQ401VSN391MA30S	150	22 × 35		0.20	1.19	ESMQ451VSN151MP35S		
470	25.4 × 50	0.15	2.39	ESMQ401VSN471MQ50S	150	25.4 × 25		0.20	1.19	ESMQ451VSN151MQ25S		
470	30 × 40	0.15	2.39	ESMQ401VSN471MR40S	180	22 × 40		0.20	1.35	ESMQ451VSN181MP40S		
470	35 × 30	0.15	2.39	ESMQ401VSN471MA30S	180	25.4 × 30		0.20	1.35	ESMQ451VSN181MQ30S		
560	30 × 45	0.15	2.69	ESMQ401VSN561MR45S	220	22 × 45		0.20	1.55	ESMQ451VSN221MP45S		
560	35 × 35	0.15	2.69	ESMQ401VSN561MA35S	220	25.4 × 40		0.20	1.55	ESMQ451VSN221MQ40S		
680	30 × 50	0.15	2.96	ESMQ401VSN681MR50S	220	30 × 30		0.20	1.55	ESMQ451VSN221MR30S		
680	35 × 40	0.15	2.96	ESMQ401VSN681MA40S	220	35 × 25		0.20	1.55	ESMQ451VSN221MA25S		
820	35 × 45	0.15	3.25	ESMQ401VSN821MA45S	270	22 × 50		0.20	1.78	ESMQ451VSN271MP50S		
400	100	22 × 25	0.20	0.97	ESMQ421VSN101MP25S	270		25.4 × 40	0.20	1.78	ESMQ451VSN271MQ40S	
	120	22 × 25	0.20	1.08	ESMQ421VSN121MP25S	270		30 × 30	0.20	1.78	ESMQ451VSN271MR30S	
	150	22 × 30	0.20	1.30	ESMQ421VSN151MP30S	330		25.4 × 50	0.20	2.01	ESMQ451VSN331MQ50S	
	150	25.4 × 25	0.20	1.30	ESMQ421VSN151MQ25S	330	30 × 40	0.20	2.01	ESMQ451VSN331MR40S		
	180	22 × 35	0.20	1.48	ESMQ421VSN181MP35S	330	35 × 30	0.20	2.01	ESMQ451VSN331MA30S		
	180	25.4 × 30	0.20	1.48	ESMQ421VSN181MQ30S	390	30 × 40	0.20	2.24	ESMQ451VSN391MR40S		
	220	22 × 40	0.20	1.65	ESMQ421VSN221MP40S	390	35 × 35	0.20	2.24	ESMQ451VSN391MA35S		
	220	25.4 × 35	0.20	1.65	ESMQ421VSN221MQ35S	470	30 × 45	0.20	2.53	ESMQ451VSN471MR45S		
	220	30 × 25	0.20	1.65	ESMQ421VSN221MR25S	470	35 × 40	0.20	2.53	ESMQ451VSN471MA40S		
	270	22 × 50	0.20	1.94	ESMQ421VSN271MP50S	560	30 × 50	0.20	2.82	ESMQ451VSN561MR50S		
	270	25.4 × 35	0.20	1.94	ESMQ421VSN271MQ35S	560	35 × 45	0.20	2.82	ESMQ451VSN561MA45S		

## ◆RATED RIPPLE CURRENT MULTIPLIERS

### ●Frequency Multipliers

Frequency(Hz)	50	120	300	1k	10k	50k
160 to 250V <sub>dc</sub>	0.81	1.00	1.17	1.32	1.45	1.50
315 to 450V <sub>dc</sub>	0.77	1.00	1.16	1.30	1.41	1.43

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



- Always read "Notes on Use" before using the product in order to enable you to use the product correctly and prevent any faults and accidents from occurring.
- Request the Product Specification on the product of NIPPON CHEMI-CON CORPORATION to refer to it as well as this brochure prior to the order of the products. Some specific notes on use of the ordered product may be described in the specifications.
- The products listed in this catalog are designed and manufactured for general electronics equipment use and are not intended for use in applications that can adversely affect human life; where the malfunction of equipment may cause damage to life or property. In addition, our products are not intended to be used in specific applications that may cause a major social impact. Please consult with us in advance of usage of our products in the following listed applications. ① Aerospace equipment ② Power generation equipment such as thermal power, nuclear power etc. ③ Medical equipment ④ Transport equipment (automobiles, trains, ships, etc.) ⑤ Transportation control equipment ⑥ Disaster prevention / crime prevention equipment ⑦ Highly publicized information processing equipment ⑧ Submarine equipment ⑨ Other applications that are not considered general-purpose applications.
- The circuits described as examples in this catalog and the "delivery specifications" are featured in order to show the operations and usage of our products, however, this fact does not guarantee that the circuits are available to function in your equipment systems. We are not in any case responsible for any failures or damage caused by the use of information contained herein. You should examine our products, of which the characteristics are described in the "delivery specifications" and other documents, and determine whether or not our products suit your requirements according to the specifications of your equipment systems. Therefore, you bear final responsibility regarding the use of our products.  
Please make sure that you take appropriate safety measures such as use of redundant design and malfunction prevention measures in order to prevent fatal accidents and/or fires in the event any of our products malfunction.
- We strongly recommend our customers to purchase Nippon Chemi-Con products only through our official sales channels. We assume no responsibility for any defects or damages caused by using products purchased from outside our official sales channel or of counterfeit goods. In addition, we will ask the customer to pay the investigation cost for products purchased outside our official sales channel.
- We reserve the right to discontinue production and delivery of products. We do not guarantee that all the products included in this catalog will be available in the future.  
The aforementioned does not apply in the case of individual agreements deviating from the foregoing for customer-specific products
- We continually strive to improve the quality and reliability of our products, but in any case that our product does not meet our published specifications, please stop using it promptly and contact us immediately. As for compensation for non-conforming goods delivered by Chemi-Con, we will limit it only to goods found in non-compliance of our published specifications. This may be accomplished by a no cost replacement of non-conforming individual products, a credit of the piece price paid per each individual non-conforming product, or in other ways deemed necessary.  
In addition, we have an established system with enhanced traceability, therefore we will limit the applicable lot items for any potential compensation.

[Part Numbering System](#)

[Part Numbering System \(Appendix\)](#)

[Standardization](#)

[Available Items by Manufacturing Locations](#)

[Environmental Measures](#)

[Technical Note](#)

[Precautions and Guidelines](#)

[Recommended Soldering Conditions](#)

[Taping, Lead-preforming and Packaging](#)

[Available Terminals for Snap-in and Screw Mount Type](#)