

AV5K SERIES

5000 HOURS LONG LIFE TYPE

ALUMINUM SOLID ELECTROLYTIC CAPACITOR ■ SMD type

Very high ripple current up to 5.4A at 100kHz/105°C

Ultra-low ESR up to 7mΩ at 100kHz/20°C

Low drift and stable electrical characteristics over lifetime

Moisture Sensitivity Level ▲ MSL 1

Ultra-long lifetime with 5000 hours at 105°C



SPECIFICATION

Item		Characteristics
Category Temperature Range		-55°C to +105°C
Rated Voltage Range	V_R	2.5V _{DC} to 25V _{DC}
Rated Capacitance Range	C_R	22μF to 820μF
Capacitance Tolerance ■ At 20°C; 120Hz	ΔC	±20%
Surge Voltage ■ At 105°C	V_S	$V_S = 1.15 \times V_R$
Dissipation Factor ■ At 20°C; 120Hz	$\tan \delta$	0.12 max.
Leakage Current ■ At 20°C; after 2min.	I_{LEAK}	Shall not exceed values in the electrical characteristics
Endurance	Test	105°C ▲ 5000hrs ▲ V_R applied
	Appearance	No significant damage
	$\Delta C/C_R$	≤ ±20% of the initial value
	$\tan \delta$	≤ 150% of the initial specified value
	ESR	≤ 150% of the initial specified value
	I_{LEAK}	≤ The initial specified value
Damp Heat (Steady State)	Test	60°C ▲ 90 to 95% RH ▲ 1000hrs ▲ No voltage applied
	Appearance	No significant damage
	$\Delta C/C_R$	≤ ±20% of the initial value
	$\tan \delta$	≤ 150% of the initial specified value
	ESR	≤ 150% of the initial specified value
	I_{LEAK}	≤ The initial specified value
Surge Voltage	Test	1000 cycles and each one includes charge with V_S specified at 105°C for 0.5min through a protective resistor ($R=1k\Omega$) and discharge for 5.5min.
	Appearance	No significant damage
	$\Delta C/C_R$	≤ ±20% of the initial value
	$\tan \delta$	≤ 150% of the initial specified value
	ESR	≤ 150% of the initial specified value
	I_{LEAK}	≤ The initial specified value

ELECTRICAL CHARACTERISTICS

V_{RDC} (V)	C_R (μF)	Size Code	Dimensions (mm)		I_{LEAK} 20°C 2min (μA)	ESR 20°C 100kHz (m Ω)	I_R 105°C 100kHz (mA)	Part Number ^{Note 1}
			D	L				
2.5	330	0645	6.3	4.3	700	16	3180	2R5AV5K331M0645C
	390	0606	6.3	5.8	489	10	3900	2R5AV5K391M0606C
	560	0606	6.3	5.8	700	10	3900	2R5AV5K561M0606C
	820	0608	6.3	7.5	700	7	5000	2R5AV5K821M0608C
	820	0610	6.3	9.7	700	10	4300	2R5AV5K821M0610C
6.3	220	0645	6.3	4.3	700	17	2300	6R3AV5K221M0645C
	220	0606	6.3	5.8	277	15	3160	6R3AV5K221M0606C
	330	0606	6.3	5.8	416	17	3390	6R3AV5K331M0606C
	560	0608	6.3	7.5	705	8	5000	6R3AV5K561M0608C
	560	0610	6.3	9.7	705	10	4300	6R3AV5K561M0610C
16	100	0506	5.0	5.8	320	26	3000	160AV5K101M0506C
	100	0606	6.3	5.8	320	24	2490	160AV5K101M0606C
	180	0606	6.3	5.8	576	21	3300	160AV5K181M0606C
	270	0610	6.3	9.7	864	16	3500	160AV5K271M0610C
	270	0807	8.0	6.8	864	22	3300	160AV5K271M0807C
	270	0810	8.0	9.7	864	16	4400	160AV5K271M0810C
	470	0810	8.0	9.7	1504	12	4700	160AV5K471M0810C
	560	0812	8.0	12.0	1792	14	4950	160AV5K561M0812C
25	1000	1012	10.0	12.3	3200	12	5400	160AV5K102M1012C
	22	0645	6.3	4.3	275	45	2350	250AV5K220M0645C
	27	0606	6.3	5.8	338	40	2100	250AV5K270M0606C

Notes

1 Part number shows the standard Tape/Reel version

APPLICATIONS

Input/Output Filter in DC/DC Converter	High Frequency Applications	Equipment with High Expected Life	Server & Industrial PC	Voltage Stabilizing in LED Panels
				

REFERENCE DATA ▲ 6R3AV5K221M0645C ▲ 220μF ▲ 6.3V ▲ 6.3 x 4.3mm

Fig. 1 • Frequency Characteristics of ESR & |Z|

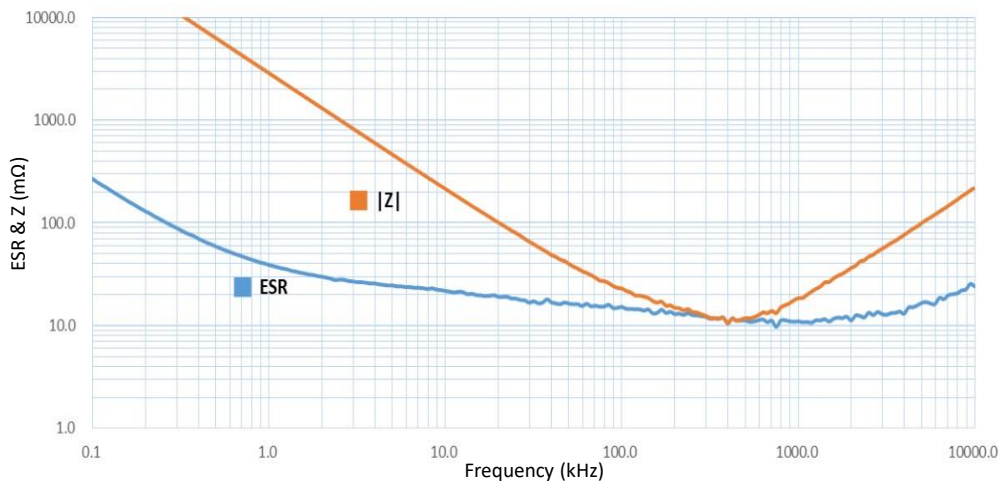


Fig. 2 • Frequency Characteristics of C (μF)

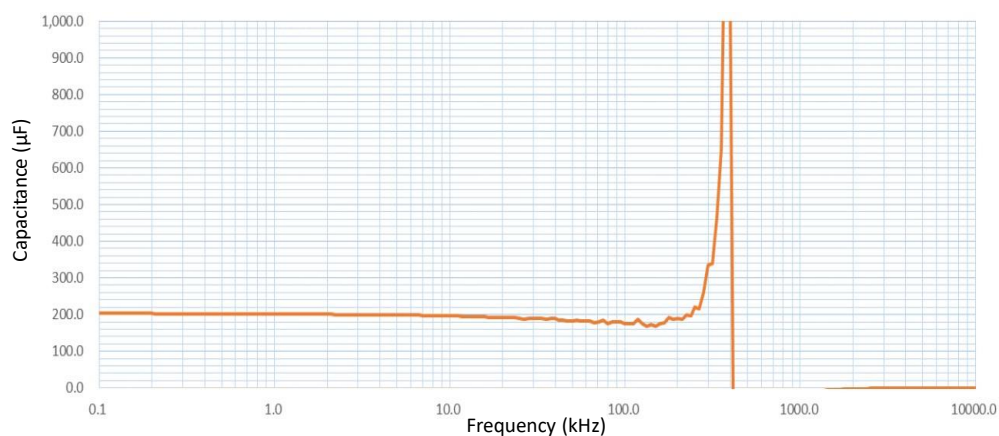
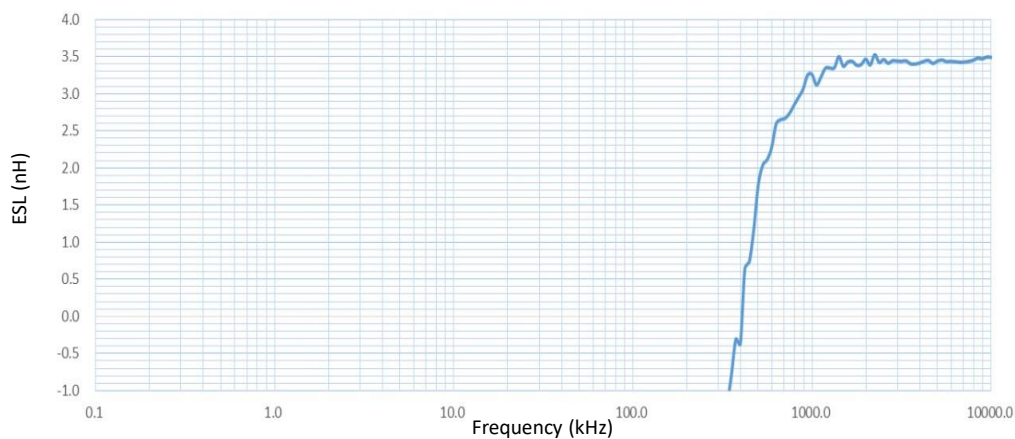


Fig. 3 • Frequency Characteristics of ESL (nH)



REFERENCE DATA ▲ 160AV5K271M0810C ▲ 270 μ F ▲ 16V ▲ 8.0 x 9.7mm

Fig. 4 • Frequency Characteristics of ESR & |Z|

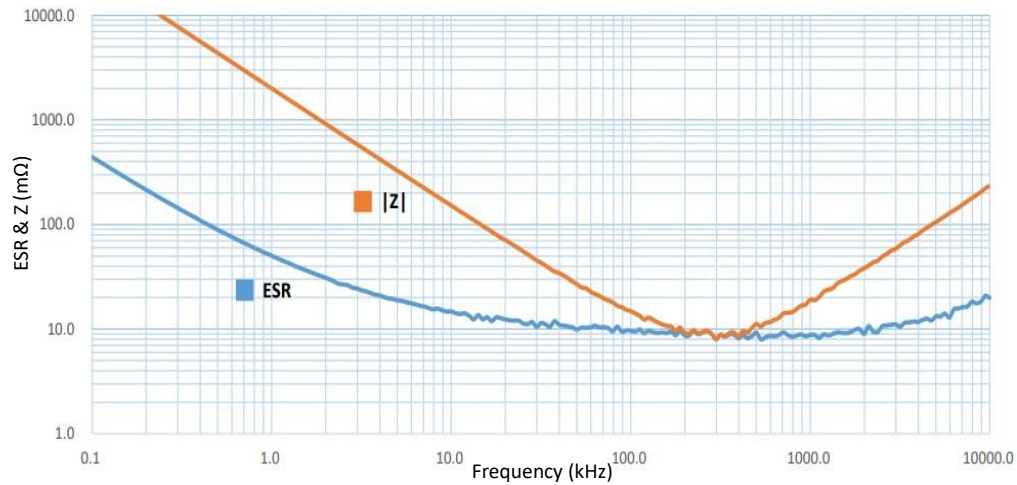


Fig. 5 • Frequency Characteristics of C (μ F)

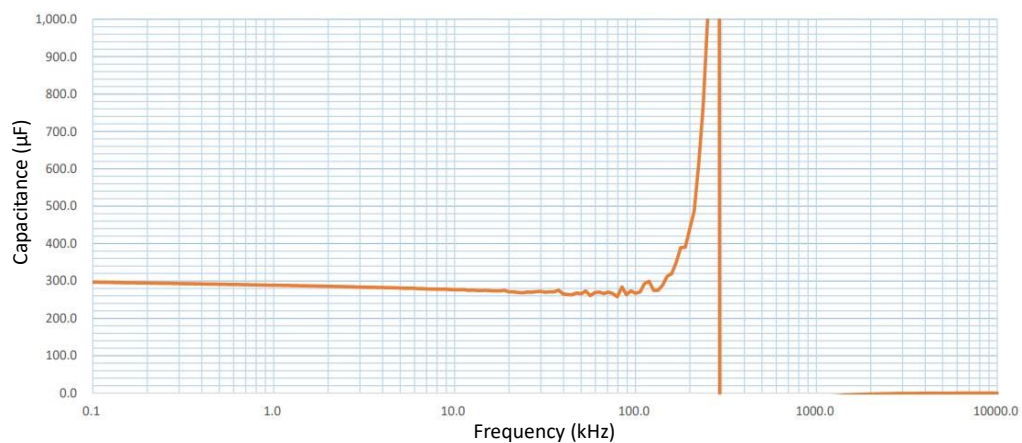
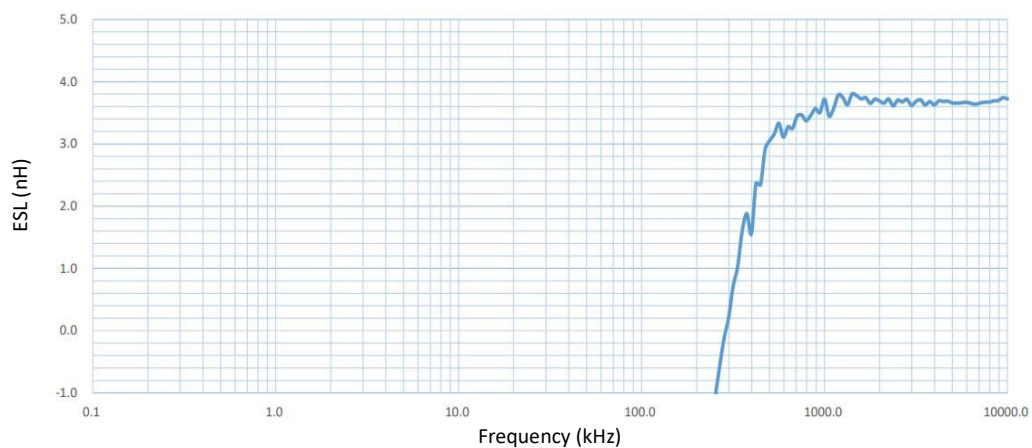


Fig. 6 • Frequency Characteristics of ESL (nH)



REFERENCE DATA ▲ 250AV5K220M0645C ▲ 22 μ F ▲ 25V ▲ 6.3 x 4.3mm

Fig. 7 • Frequency Characteristics of ESR & |Z|

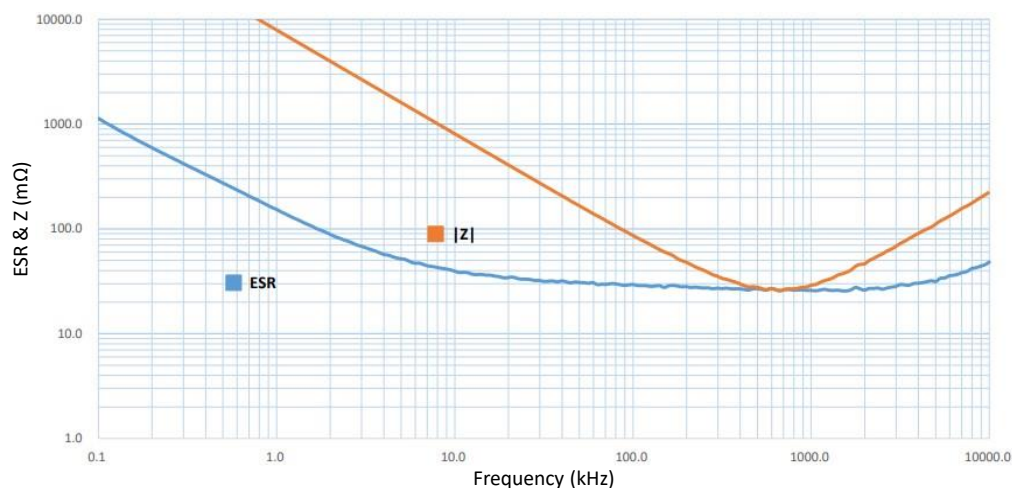


Fig. 8 • Frequency Characteristics of C (μ F)

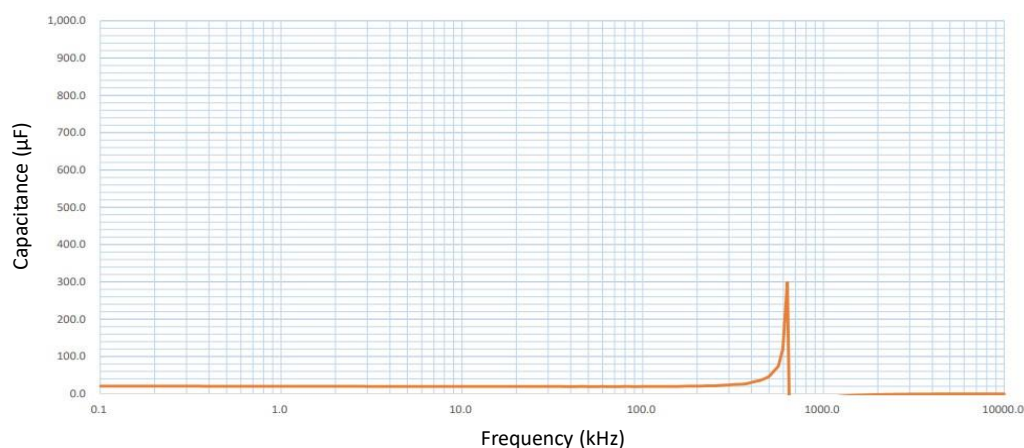
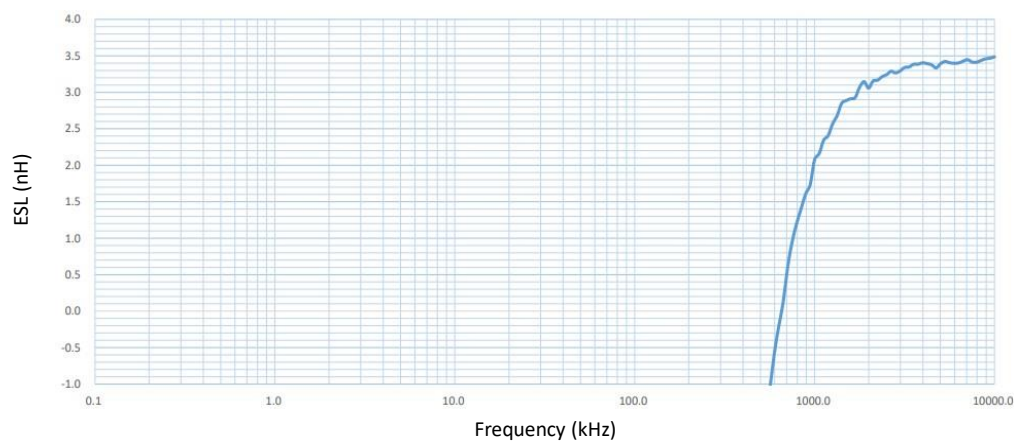


Fig. 9 • Frequency Characteristics of ESL (nH)



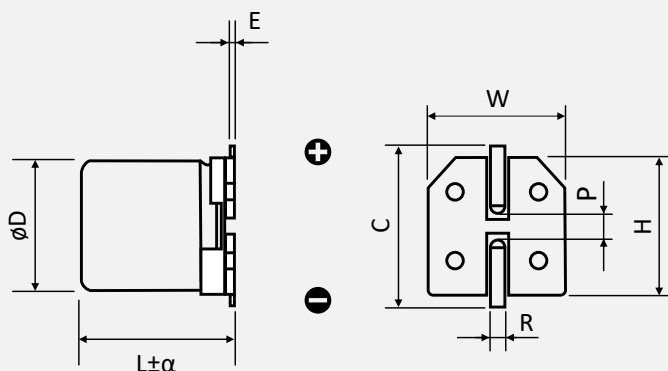
FREQUENCY CORRECTION FACTOR

Frequency Correction Factor of Permissible Ripple Current

Frequency	$120\text{Hz} \leq f < 1\text{kHz}$	$1\text{kHz} \leq f < 10\text{kHz}$	$10\text{kHz} \leq f < 50\text{kHz}$	$50\text{kHz} \leq f < 100\text{kHz}$	$100\text{kHz} \leq f < 500\text{kHz}$
Coefficient	0.05	0.3	0.7	0.85	1

PACKAGE OUTLINE ▲ All dimensions in mm

Dimensions



Size Code	$\varnothing D$	L	α	E	W	H	C	R	P
Tolerance	$\pm 0.5 \text{ max.}$	-	-	-	± 0.2	± 0.2	± 0.2	-	± 0.3
0506	5.0	5.8	± 0.2	0.00 to 0.20	5.3	5.3	6.0	0.5 to 0.8	1.4
0645	6.3	4.3	± 0.2	0.00 to 0.20	6.6	6.6	7.3	0.5 to 0.8	2.1
0606	6.3	5.8	± 0.2	0.00 to 0.20	6.6	6.6	7.3	0.5 to 0.8	2.1
0608	6.3	7.5	± 0.5	0.00 to 0.20	6.6	6.6	7.3	0.5 to 0.8	2.1
0610	6.3	9.7	± 0.3	0.00 to 0.20	6.6	6.6	7.3	0.5 to 0.8	2.1
0807	8.0	6.8	± 0.2	0.00 to 0.20	8.3	8.3	9.0	0.8 to 1.1	2.9
0810	8.0	9.7	± 0.3	0.00 to 0.20	8.3	8.3	9.0	0.8 to 1.1	2.9
0812	8.0	12.0	± 0.5	0.00 to 0.20	8.3	8.3	9.0	0.8 to 1.1	3.2
1012	10.0	12.3	± 0.2	0.00 to 0.20	10.3	10.3	11.0	0.8 to 1.1	4.6

PRODUCT CODE

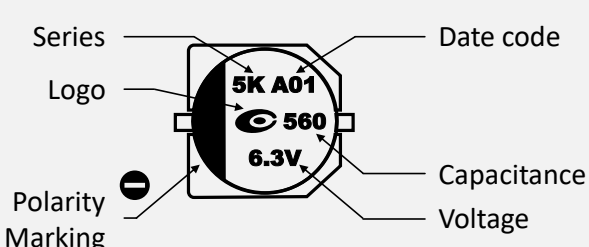
Example: AV5K series ▲ 560μF ▲ 6.3V_{DC} ▲ ±20% ▲ D=6.3mm ▲ L=7.5mm ▲ Tape/Reel

6R3		AV5K		561		M		0608		C	
Rated Voltage (V _{DC})		Series		Capacitance Code ^{Note 1} (μF)		Capacitance Tolerance (%)		Package Code		Marking	
Code	VDC	Code	Series	Code	μF	Code	Tol.	Code	D x L	Code	Type
2R5	2.5	AV5K	AV5K	220	22	M	±20	0506	5.0 x 5.8	C	Grey Marking
6R3	6.3			101	100			0645	6.3 x 4.3		
160	16			331	330			0606	6.3 x 5.8		
250	25			471	470			0608	6.3 x 7.5		
				102	1000			0610	6.3 x 9.7		
		0807	8.0 x 6.8								
								0810	8.0 x 9.7		
								0812	8.0 x 12.0		
								1012	10.0 x 12.3		

Note:

- 1 Capacitance code expressed in μF. The first two digits represent significant figures. The last digit specifies the total number of zeros to be added.

PRODUCT MARKING

Marking	Details														
	<table> <tr> <th>Marking</th><th>Description</th></tr> <tr> <td>Logo</td><td>Manufacturer Logo</td></tr> <tr> <td>Series</td><td>5K = AV5K</td></tr> <tr> <td>Date code</td><td>See date code table</td></tr> <tr> <td>Capacitance</td><td>560 = 560μF</td></tr> <tr> <td>Voltage</td><td>6.3V = 6.3V</td></tr> <tr> <td></td><td>Polarity (-) marking</td></tr> </table>	Marking	Description	Logo	Manufacturer Logo	Series	5K = AV5K	Date code	See date code table	Capacitance	560 = 560μF	Voltage	6.3V = 6.3V		Polarity (-) marking
Marking	Description														
Logo	Manufacturer Logo														
Series	5K = AV5K														
Date code	See date code table														
Capacitance	560 = 560μF														
Voltage	6.3V = 6.3V														
	Polarity (-) marking														

DATE CODE

Example:

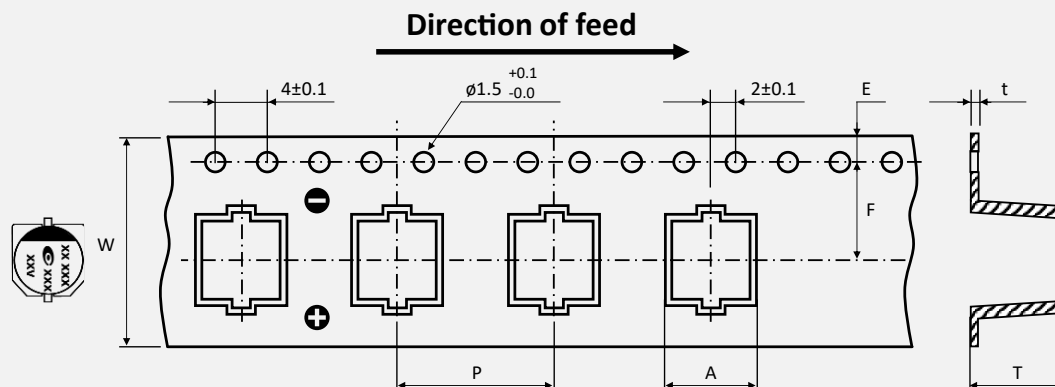
Date code

A01: A01 = 1st week of 2020

A		01	
Year		Week	
A	2019	01	1 st
B	2020	02	2 nd
...	...	...	...
Z	2030	53	53 rd

TAPING SPECIFICATION ▲ SMD TYPE

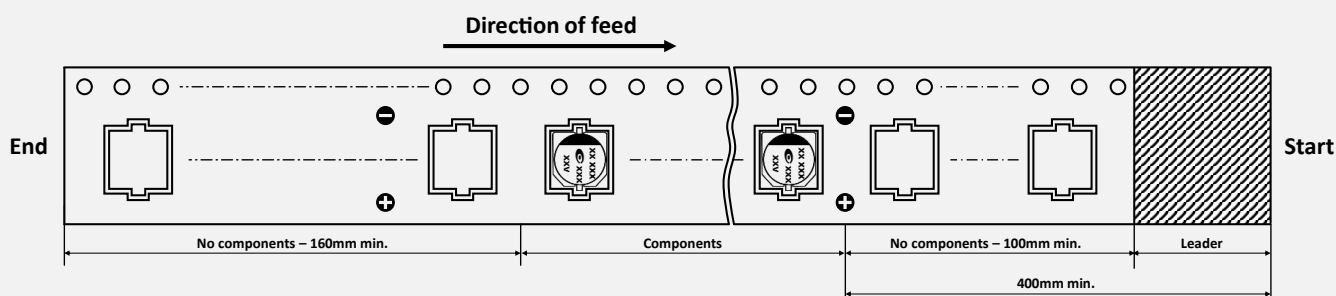
Dimensions in mm



Size Code	W (mm)	A (mm)	B (mm)	F (mm)	E (mm)	P (mm)	T (mm)	t (mm)
Tolerance	± 0.3	± 0.2	± 0.2	± 0.1	± 0.1	± 0.1	± 0.2	± 0.05
0506	12	5.7	5.7	5.5	1.75	12	6.2	0.4
0645	16	6.8	6.8	7.5	1.75	12	4.8	0.4
0606	16	6.8	6.8	7.5	1.75	12	6.3	0.4
0608	16	7	7	7.5	1.75	12	8.2	0.5
0610	16	7	7	7.5	1.75	12	10	0.5
0807	24	8.7	8.7	11.5	1.75	12	7.2	0.5
0810	24	8.7	8.7	11.5	1.75	16	10	0.5
0812	24	8.7	8.7	11.5	1.75	16	12	0.5
1012	24	10.7	10.7	11.5	1.75	16	13	0.5

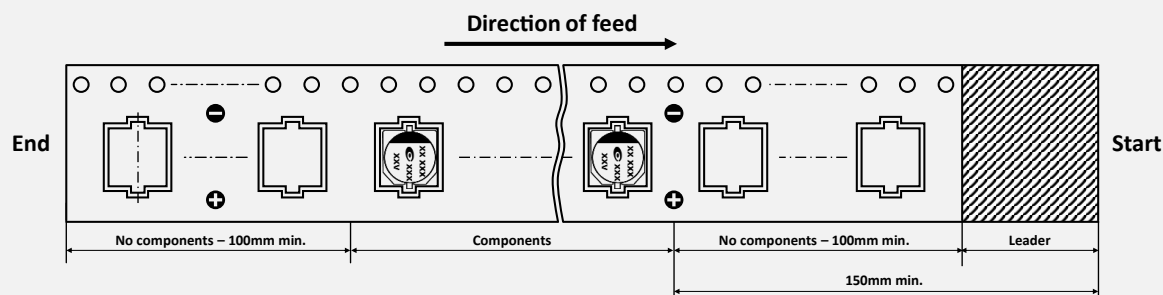
START AND END OF TAPE ▲ SMD TYPE

Diameter 5mm / 6mm and 8mm



START AND END OF TAPE ▲ SMD TYPE

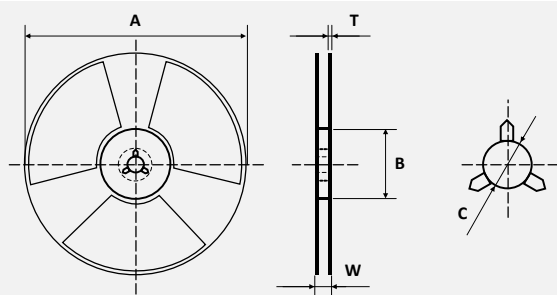
Diameter 10mm



REEL DIMENSION AND PACKAGING QUANTITY ▲ SMD TYPE

Code	Capacitor Dimensions		A ± 2	B ± 0.5	C ± 0.5	W ± 0.8	T ± 0.3	1 Reel	1 Box	
	ØD (mm)	L (mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(pcs)	(pcs)	(reel)
0506	5.0	5.8	381	100	13	13.5	2.5	1 200	7 200	6
0645	6.3	4.3	381	100	13	16.5	2.5	1 500	9 000	6
0606	6.3	5.8	381	100	13	16.5	2.5	1 200	7 200	6
0608	6.3	7.5	381	100	13	16.5	2.5	900	5 400	6
0610	6.3	9.7	381	100	13	16.5	2.5	750	4 500	6
0807	8.0	6.8	381	100	13	25.9	2.5	1 000	5 000	5
0810	8.0	9.7	381	100	13	25.9	2.5	500	2 500	5
0812	8.0	12.0	381	100	13	25.9	2.5	400	2 000	5
1012	10.0	12.3	381	100	13	25.9	2.5	450	2 250	5

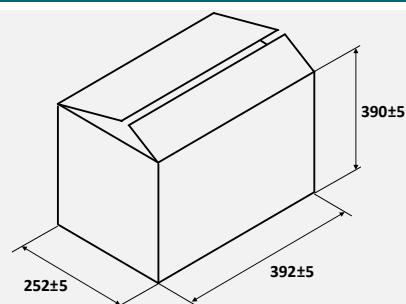
Reel



Label on the reel
Size L x W = 70mm x 35mm

1. **P/N:** Customer part number
2. **DESC:** Customer specification
3. **SPEC:** Manufacturer part number
4. **COO:** Country of origin
5. **QTY:** Quantity (pcs)
6. **MAKER:** Manufacturer
7. **VENDOR:** Manufacturer
8. **DC:** Date code
9. **LOT/NO:** Production lot

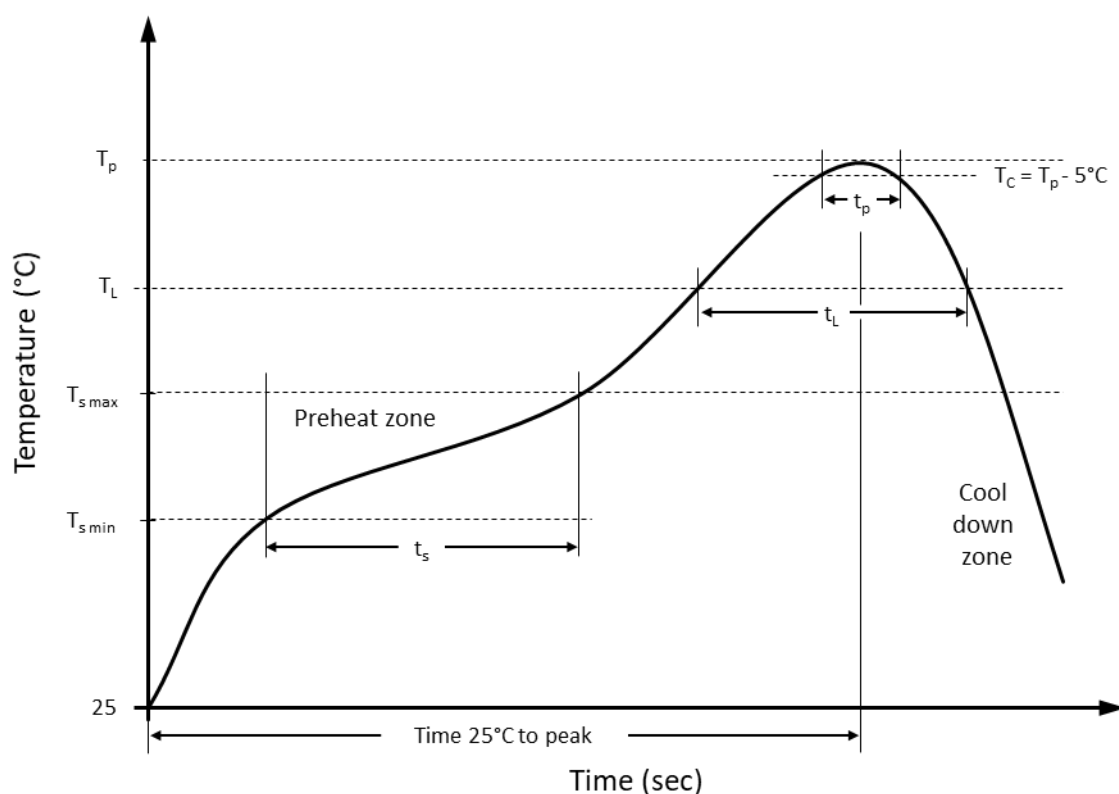
Carton (Dimensions in mm)



Label on the outer carton
Size L x W = 100mm x 90mm

1. **CUSTOMER:** Customer name
2. **P/O:** Customer order number
3. **P/N:** Customer part number
4. **DESCRIPTION:** Manufacturer part number
5. **QTY:** Quantity (pcs) and shipping date
6. **COO:** Country of origin

RECOMMENDED REFLOW SOLDERING PROFILE ▲ SMD PACKAGE



Recommended reflow soldering conditions ▲ Refer to JEDEC J-STD-020E

Profile Features		Pb-Free Assembly
Preheat temperature min.	$T_{s \min}$	150 °C
Preheat temperature max.	$T_{s \max}$	200 °C
Preheat time t_s from $T_{s \min}$ to $T_{s \max}$	t_s	120 seconds
Ramp-up rate (T_L to T_p)		max. 3 °C/second
Liquidous temperature	T_L	217 °C
Time t_L maintained above T_L	t_L	See table below
Peak package body temperature	T_p	See table below
Timeframe of within 5°C below and up to max actual peak body temperature	t_p	See table below
Ramp-down rate (T_L to T_p)		max. 6 °C/second
Time 25°C to peak temperature		max. 8 minutes

Size Code	Time > 200°C	t_L Time > 217°C	Time > 230°C	T_p Peak Temperature	t_p Timeframe	Allowed Reflow Runs
≤ 6.3 mm	70 sec. max.	70 sec. max.	70 sec. max.	260 °C	5 sec	Max. twice
≥ 8mm	70 sec. max.	70 sec. max.	70 sec. max.	245 °C	10 sec	Max. twice
				260 °C	5 sec	Only once

REVISION TABLE

Revision	Date	Status	Notes
001	01/10/2021	Initial release	Initial publication

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It is subject to the user's duty of care to design and validate his products in such a way that appropriate measures are taken, such as protective circuits or redundant systems to ensure the safety standards required in the application.

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