



AVHE SERIES

1 000 HOURS 125°C TYPE

ALUMINUM SOLID ELECTROLYTIC CAPACITOR ■ SMD type

High ripple current up to 1.8A at 100kHz/125°C

Ultra-low ESR up to 8mΩ at 100kHz/20°C

Low drift and stable electrical characteristics over lifetime

Moisture Sensitivity Level ▲ MSL 1

High temperature approved with 1 000 hours at 125°C

SPECIFICATION

Item		Characteristics
Category Temperature Range		-55°C to +125°C
Rated Voltage Range	V_R	2.5V _{DC} to 50V _{DC}
Rated Capacitance Range	C_R	47μF 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	125°C ▲ 1000hrs ▲ V_R applied
	Appearance	No significant damage
	$\Delta C/C_R$	≤ ±20% of the initial value
	$\tan \delta$	≤ 200% of the initial specified value
	ESR	≤ 200% 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
	$\tan \delta$	≤ 200% of the initial specified value
	ESR	≤ 200% of the initial specified value
	I_{LEAK}	≤ The initial specified value
Surge Voltage	Test	1 000 cycles and each one includes charge with V_S specified at 125°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
	$\tan \delta$	≤ 200% of the initial specified value
	ESR	≤ 200% 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)	I_R 125°C 100kHz (mA)	Part Number ^{Note 1}
			D	L					
2.5	560	0606	6.3	5.8	700	10	3500	1400	2R5AVHE561M0606
	820	0608	6.3	7.5	700	8	4500	1800	2R5AVHE821M0608
6.3	220	0606	6.3	5.8	277	12	3500	1050	6R3AVHE221M0606
	560	0610	6.3	9.7	705	10	4300	1720	6R3AVHE561M0610
16	100	0606	6.3	5.8	320	24	2490	747	160AVHE101M0606
	270	0810	8.0	9.7	864	16	4400	1320	160AVHE271M0810
25	47	0606	6.3	5.8	300	35	2500	750	250AVHE470M0606
	100	0608	6.3	7.5	500	24	2500	1000	250AVHE101M0608
	100	0807	8.0	6.8	500	24	2800	1120	250AVHE101M0807
35	68	0608	6.3	7.5	476	35	1800	720	350AVHE680M0608
	100	0608	6.3	7.5	700	35	1800	720	350AVHE101M0608
	120	0810	8.0	9.7	840	35	2800	840	350AVHE121M0810
	180	0812	8.0	12.0	1260	28	3400	1020	350AVHE181M0812
	220	0812	8.0	12.0	1540	28	3400	1020	350AVHE221M0812
	330	1012	10.0	12.3	2310	18	4400	1760	350AVHE331M1012
50	100	0812	8.0	12.0	1000	30	3100	930	500AVHE101M0812
	120	1012	10.0	12.3	1200	20	3800	1520	500AVHE121M1012

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 ▲ 350AVHE101M0810 ▲ 100 μ F ▲ 35V ▲ 8.0 x 9.7mm

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

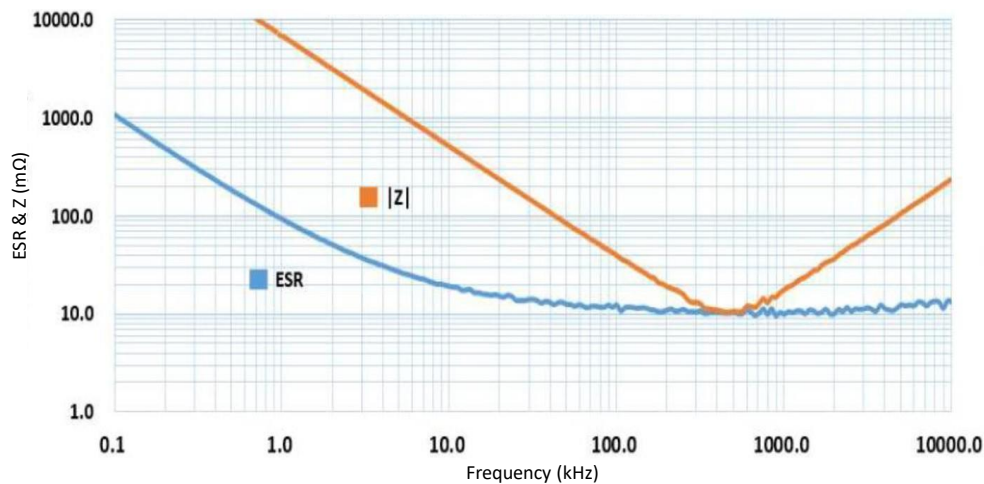


Fig. 2 • Frequency Characteristics of C (μ F)

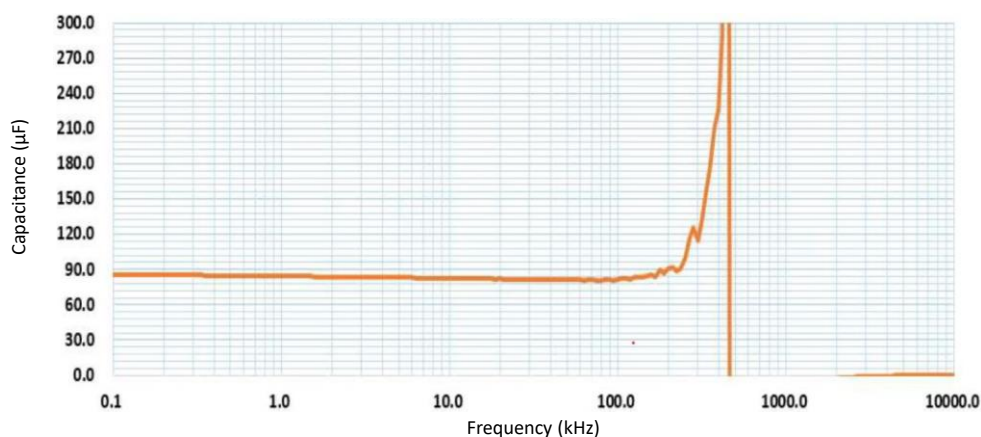
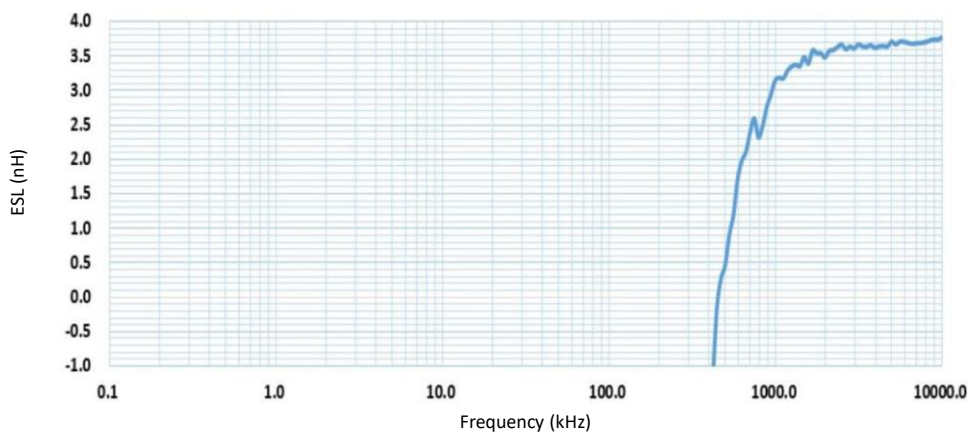


Fig. 3 • Frequency Characteristics of ESL (nH)



REFERENCE DATA ▲ 630AVHE470M0810 ▲ 47 μ F ▲ 63V ▲ 8.0 x 9.7mm

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

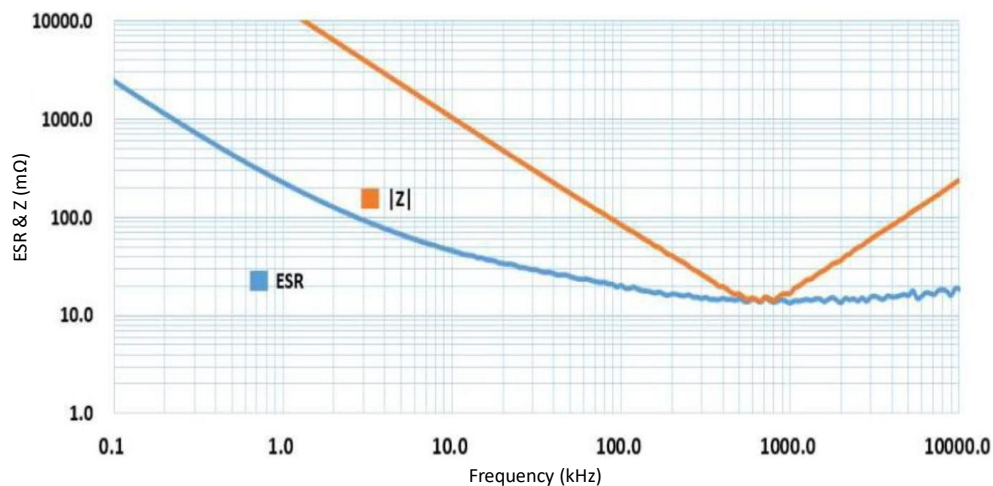


Fig. 5 • Frequency Characteristics of C (μ F)

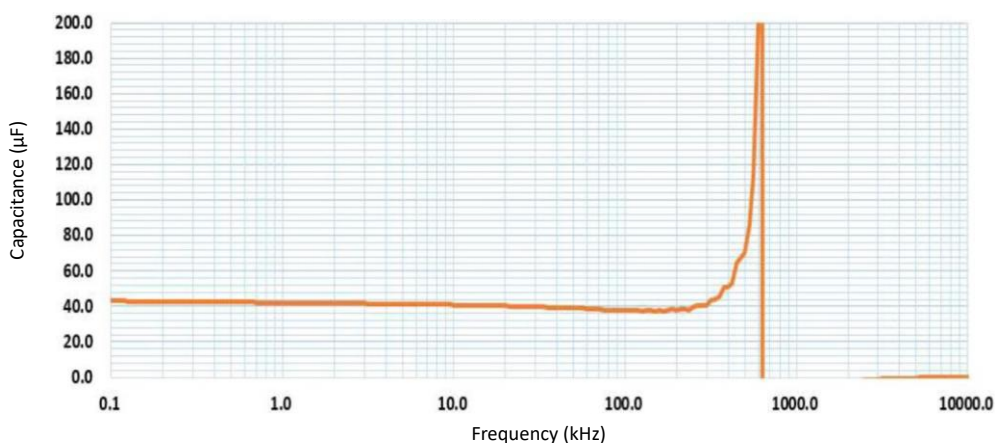
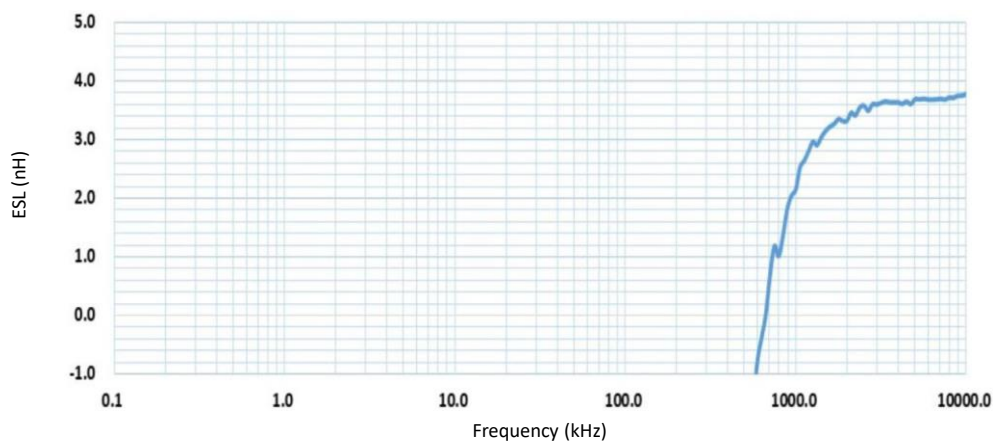


Fig. 6 • Frequency Characteristics of ESL (nH)



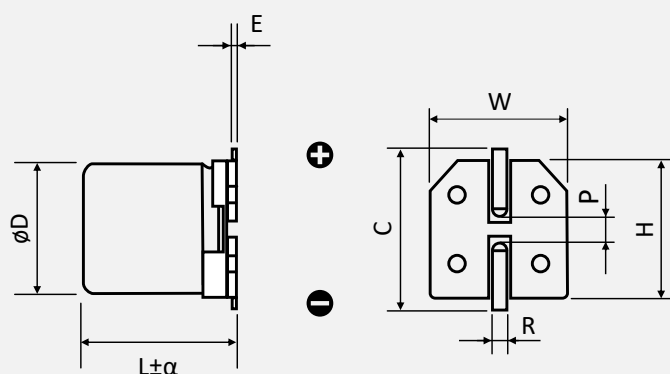
FREQUENCY CORRECTION FACTOR

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
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	0.6 to 0.9	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

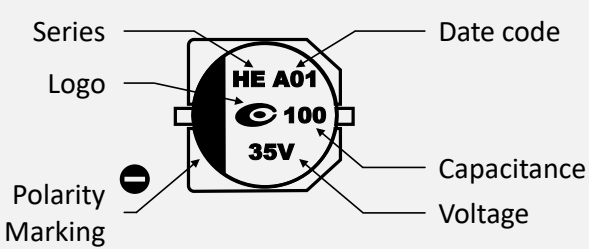
Example: AVHE series ▲ 100μF ▲ 35V_{DC} ▲ ±20% ▲ D=6.3mm ▲ L=7.5mm ▲ Tape/Reel

350		AVHE		101		M		0608	
Rated Voltage (V _{DC})		Series		Capacitance Code ^{Note 1} (μF)		Capacitance Tolerance (%)		Package Code	
Code	VDC	Code	Series	Code	μF	Code	Tol.	Code	D x L
2R5	2.5	AVHE	AVHE	680	68	M	±20	0606	6.3 x 5.8
6R3	6.3			101	100			0608	6.3 x 7.5
160	16			561	560			0610	6.3 x 9.7
250	25			821	820			0807	8.0 x 6.8
350	35							0810	8.0 x 9.7
500	50							0812	8.0 x 12.0
								1012	10.0 x 12.3

Note:

- 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	
	Marking	Description
	Logo	Manufacturer Logo
	Series	HE = AVHE
	Date code	See date code table
	Capacitance	100 = 100μF
	Voltage	35V = 35V
		Polarity (-) marking

DATE CODE

Example:

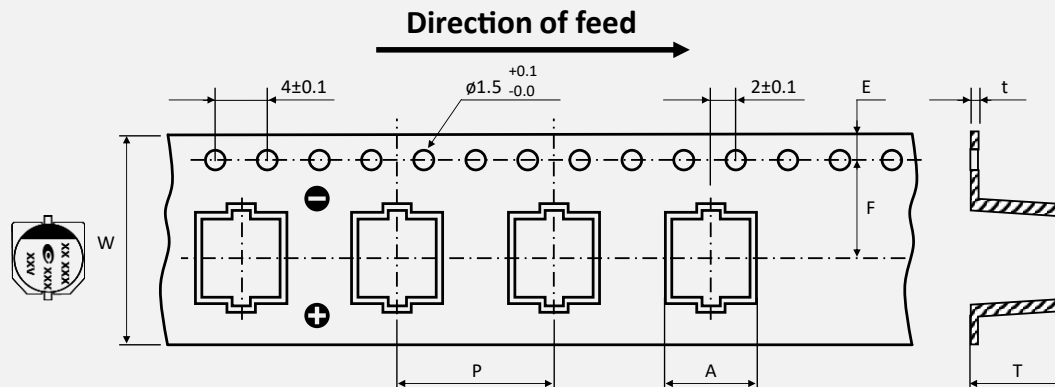
Date code

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

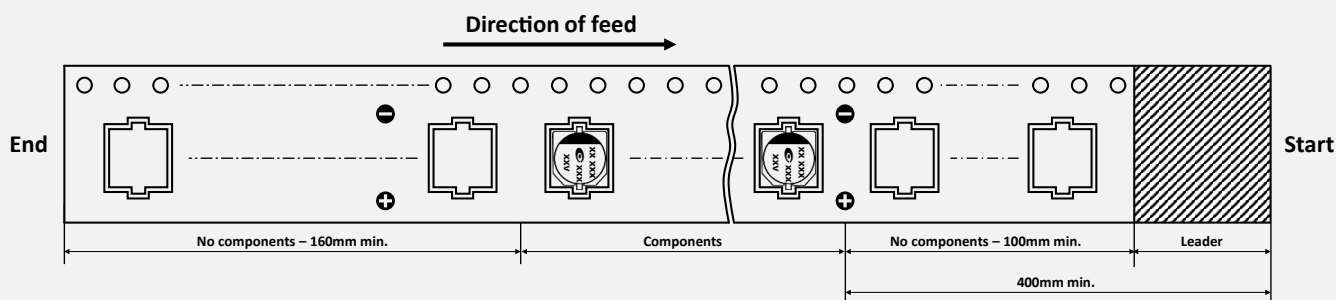
Dimensions in mm



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
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

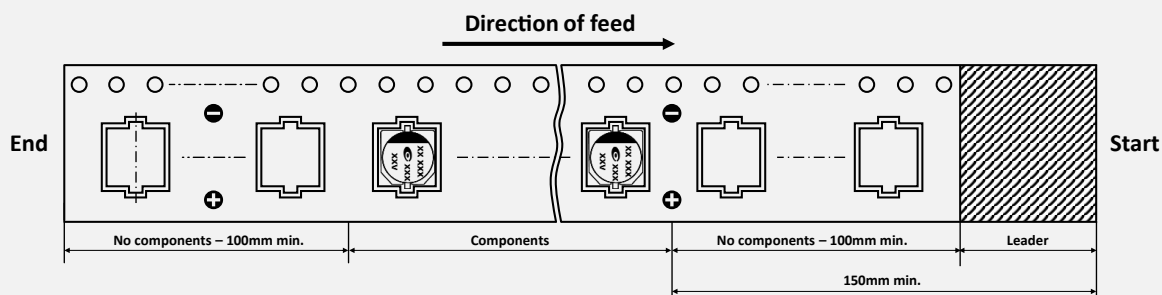
START AND END OF TAPE ▲ SMD TYPE

Diameter 5mm / 6mm and 8mm



START AND END OF TAPE ▲ SMD TYPE

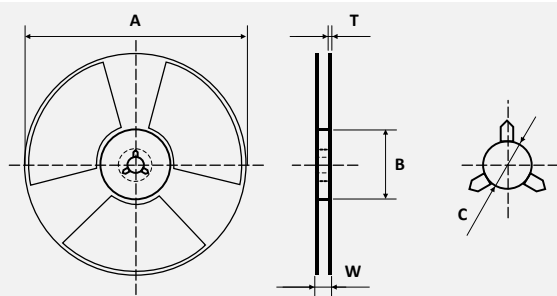
Diameter 10mm



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)
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

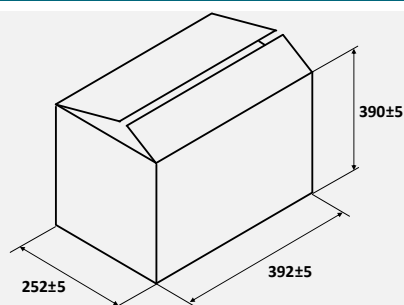
Reel



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

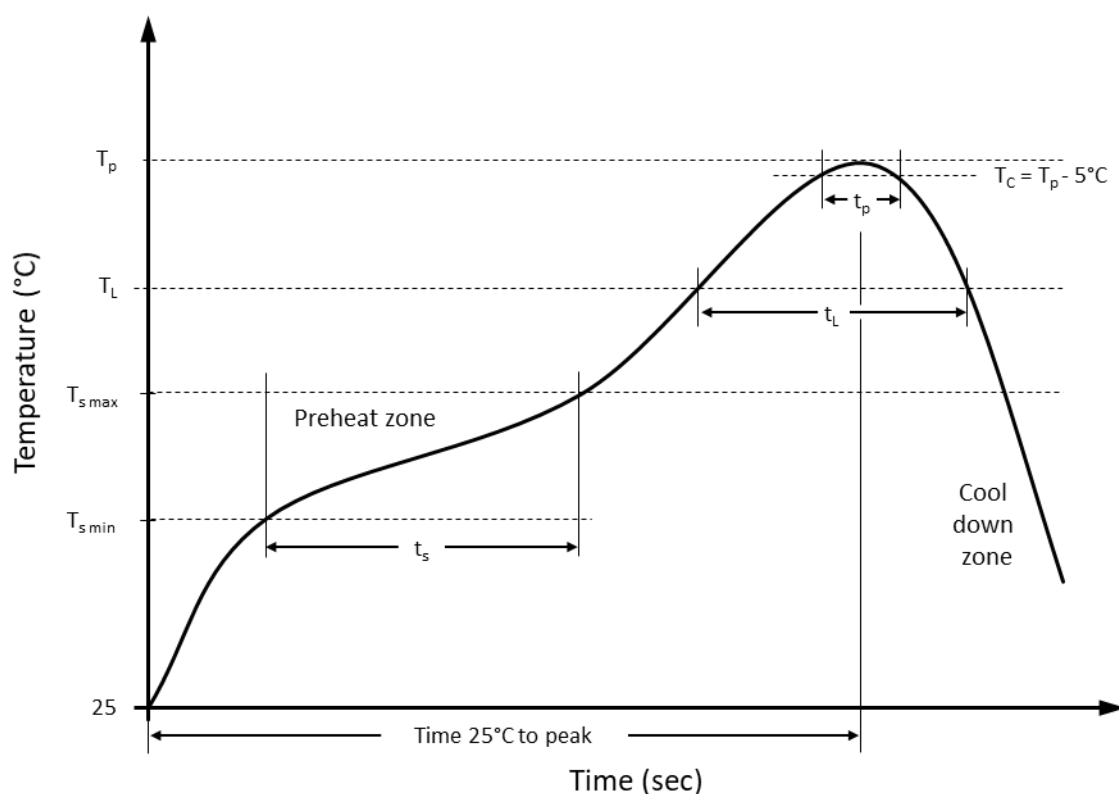
Carton (Dimensions in mm)



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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