

SMD Aluminum Solid Capacitors with Conductive Polymer



FEATURES

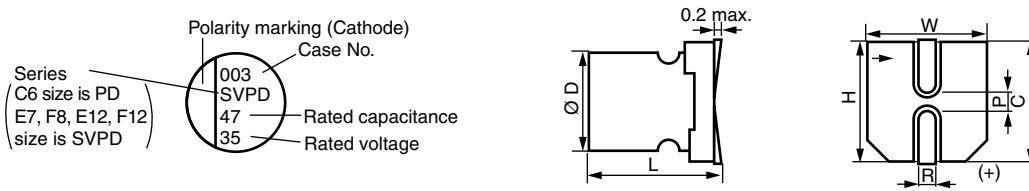
- New OS-CON 94SVPD series provides improved characteristics with up to 125 °C temperature capability and 35 V maximum voltage rating in a SMD package
- Improved damp heat (steady state) 85 °C x 85 % RH performance
- Suitable for use in smoothing circuits of vehicle-mounted equipment, industrial equipment, etc.
- This product can support lead (Pb)-free reflow ⁽²⁾
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

QUICK REFERENCE DATA				
DESCRIPTION	CONDITIONS	VALUE		
Operating temperature range	-	- 55 °C to + 125 °C		
Capacitance tolerance	120 Hz	M: ± 20 %		
Tangent of loss angle (tan δ)	120 Hz	≤ values in Electrical Data and Ordering Information table		
Leakage current (μA/2 min) (or less) ⁽¹⁾	After 2 min	≤ values in Electrical Data and Ordering Information table		
ESR	-	≤ values in Electrical Data and Ordering Information table		
Characteristics of impedance ratio at high and low temperature	100 kHz, + 20 °C	- 55 °C	Z/Z _{20 °C}	0.75 to 1.25
		+ 125 °C	Z/Z _{20 °C}	0.75 to 1.0
		ΔC/C	Within ± 20 %	
		tan δ	2 x or < than an initial standard	
		ESR	2 x or < than an initial standard	
Endurance	+ 125 °C, 2000 h rated voltage applied	Leakage current	Below an initial standard	
		ΔC/C	Within ± 20 %	
		tan δ	2 x or < than an initial standard	
		ESR	2 x or < than an initial standard	
		Leakage current	Below an initial standard	
Damp heat (steady state)	+ 85 °C, 85 % to 90 % RH, 1000 h rated voltage applied	ΔC/C	Within ± 20 %	
		tan δ	2 x or < than an initial standard	
		ESR	2 x or < than an initial standard	
		Leakage current	Below an initial standard	
		Leakage current	Below an initial standard	
Solder heat resistance ⁽²⁾	(VPS) (230 °C x 75 s)	ΔC/C	Within ± 10 %	
		tan δ	1.3 x or < than an initial standard	
		ESR	1.3 x or < than an initial standard	
		Leakage current	Below an initial standard	
		Leakage current	(after voltage processing)	

Notes

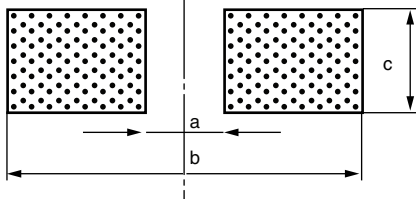
- (1) If any doubt arises, measure the current after applying voltage (voltage treatment). Voltage treatment: The rated voltage is applied (10 V to 35 V) for 120 min at 125 °C.
- (2) Refer to "Recommended Reflow Profile" for maximum temperatures.

DIMENSIONS in millimeters							
							
SIZE CODE	Ø D ± 0.5	L + 0.1/- 0.4	W ± 0.2	H ± 0.2	C ± 0.2	R	P ± 0.2
C6	6.3	5.9	6.6	6.6	7.3	0.6 to 0.8	2.1
E7	8.0	6.9	8.3	8.3	9.0	0.6 to 0.8	3.2
F8	10.0	7.9	10.3	10.3	11.0	0.6 to 0.8	4.6
E12	8.0	11.9	8.3	8.3	9.0	0.8 to 1.1	3.2
F12	10.0	12.6	10.3	10.3	11.0	0.8 to 1.1	4.6

CASE CODE LIST

CAPACITANCE (μ F)	RATED VOLTAGE (SURGE AT 125 °C)			
	10.0 (11.5)	16.0 (18.4)	25.0 (29.0)	35.0 (40.0)
8.2				E7
10			C6	
18				F8
22			E7	E12
39			F8	
47			E12	F12
56	C6			
82		E7	F12	

RECOMMENDED LAND PATTERN DIMENSIONS (in millimeters)

	SIZE CODE	a	b	c
	C6	2.1	9.1	1.6
	E7	2.8	11.1	1.9
	F8	4.3	13.1	1.9
	E12	2.8	11.1	1.9
	F12	4.3	13.1	1.9

FREQUENCY COEFFICIENT FOR RIPPLE CURRENT

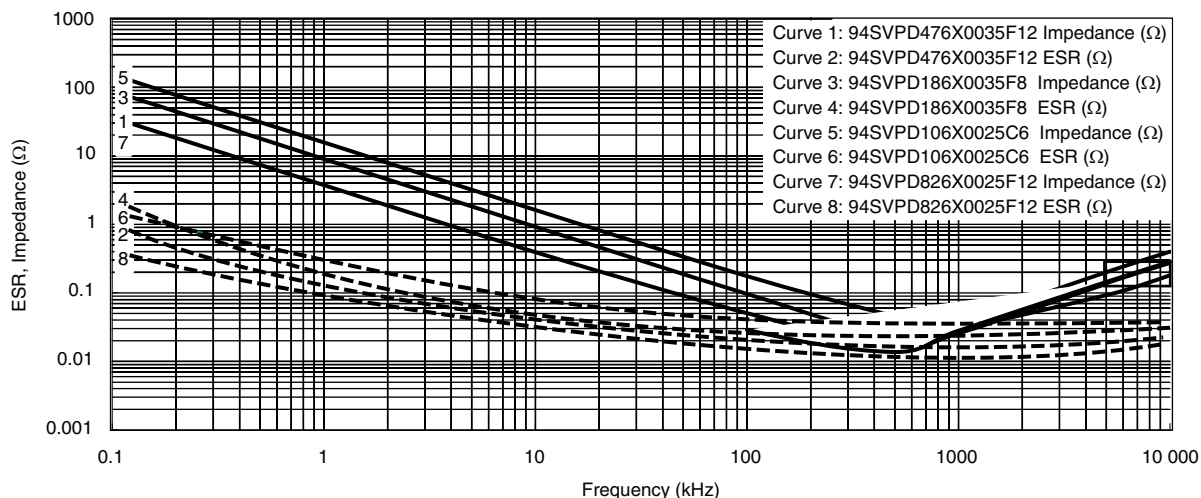
FREQUENCY	120 Hz $\leq$ f < 1 kHz	1 kHz $\leq$ f < 10 kHz	10 kHz $\leq$ f < 100 kHz	100 kHz $\leq$ f < 500 kHz
COEFFICIENT	0.05	0.3	0.7	1

ELECTRICAL DATA AND ORDERING INFORMATION

U _R (V)	C _R (μF)	CASE CODE	MAX. ESR (100 kHz TO 300 kHz) (mΩ)	RATED RIPPLE CURRENT	ALLOWABLE RIPPLE CURRENT	MAX. TANGENT OF LOSS ANGLE	MAX. LEAKAGE CURRENT (μA) ⁽²⁾	PART NUMBER ⁽¹⁾
				100 kHz (mA) ⁽³⁾				
				105 °C < Tx ≤ 125 °C	Tx ≤ 105 °C			
10	56	C6	45	538	1700	0.12	112	94SVPD566X0010C6
16	82	E7	40	670	2120	0.12	262	94SVPD826X0016E7
25	10	C6	65	474	1500	0.10	50	94SVPD106X0025C6
	22	E7	48	580	1835	0.10	110	94SVPD226X0025E7
	39	F8	45	664	2100	0.10	195	94SVPD396X0025F8
	47	E12	30	943	2980	0.12	235	94SVPD476X0025E12
	82	F12	28	1202	3800	0.12	410	94SVPD826X0025F12
35	8.2	E7	70	400	1300	0.10	57	94SVPD825X0035E7
	18	F8	60	550	1800	0.10	126	94SVPD186X0035F8
	22	E12	50	700	2300	0.12	154	94SVPD226X0035E12
	47	F12	30	1150	3650	0.12	329	94SVPD476X0035F12

Notes

- ⁽¹⁾ Capacitance tolerance: M $\pm$ 20 %
⁽²⁾ After 2 min
⁽³⁾ Tx: Ambient temperature

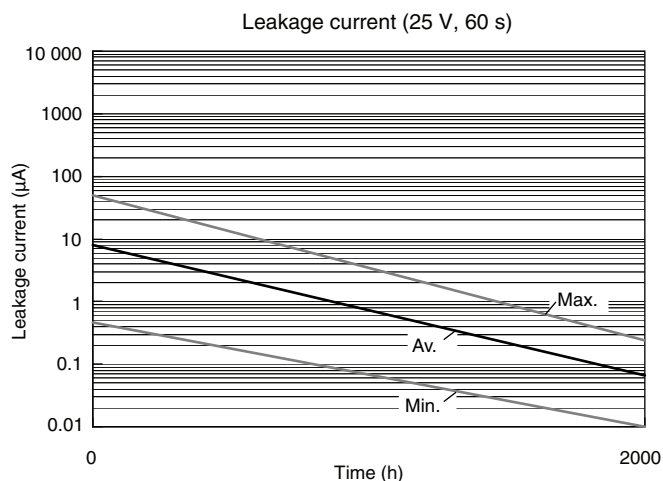
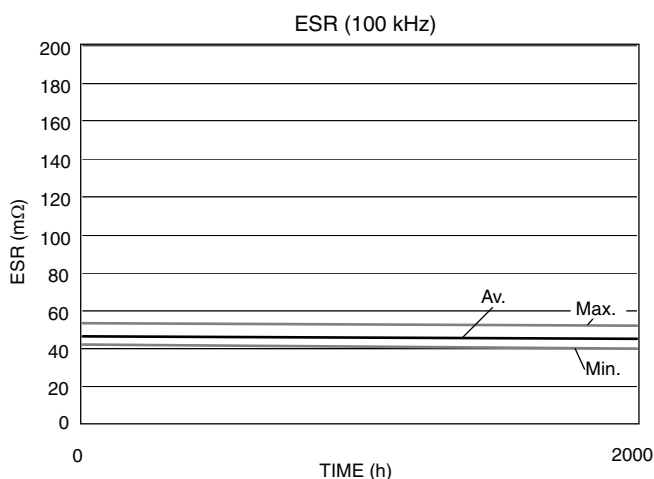
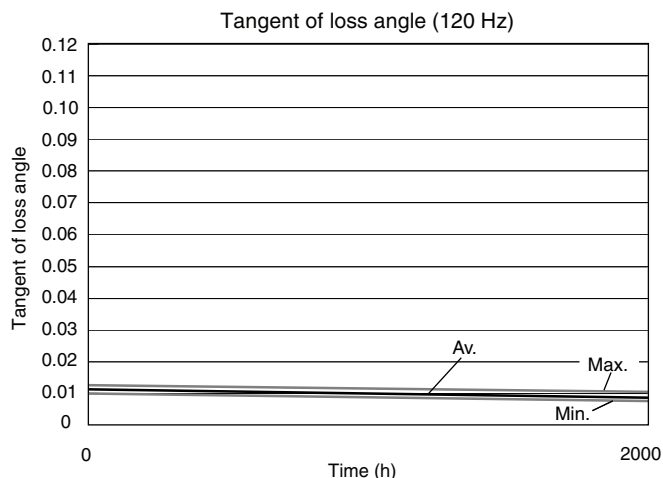
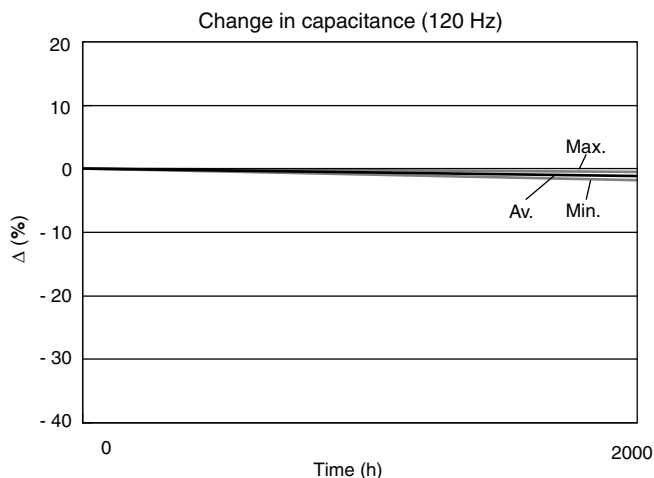
FREQUENCY CHARACTERISTICS


FREQUENCY (kHz)	0.12	0.5	1	10	100	500	1000	5000	10 000
94SVPD106X0025C6 IMPEDANCE (Ω)	127.769	31.001	15.608	1.612	0.176	0.046	0.032	0.093	0.179
94SVPD106X0025C6 ESR (Ω)	1.303	0.482	0.306	0.081	0.044	0.035	0.032	0.033	0.040
94SVPD186X0035F8 IMPEDANCE (Ω)	72.87	17.781	8.955	0.918	0.096	0.023	0.037	0.200	0.397
94SVPD186X0035F8 ESR (Ω)	1.681	0.333	0.179	0.043	0.027	0.023	0.023	0.026	0.034
94SVPD476X0035F12 IMPEDANCE (Ω)	30.178	7.389	3.725	0.392	0.05	0.016	0.025	0.134	0.266
94SVPD476X0035F12 ESR (Ω)	0.852	0.206	0.121	0.045	0.023	0.016	0.014	0.017	0.023
94SVPD826X0025F12 IMPEDANCE (Ω)	16.736	4.096	2.074	0.229	0.029	0.014	0.028	0.144	0.285
94SVPD826X0025F12 ESR (Ω)	0.339	0.135	0.094	0.033	0.015	0.011	0.011	0.014	0.019



TYPICAL PARAMETERS

MODEL	TEST ITEM	TEST TEMPERATURE	APPLIED VOLTAGE	LOT. NUMBER
94SVPD106X0025C6	Endurance (after V.P.S. test)	125 °C	25 V	7130A2714



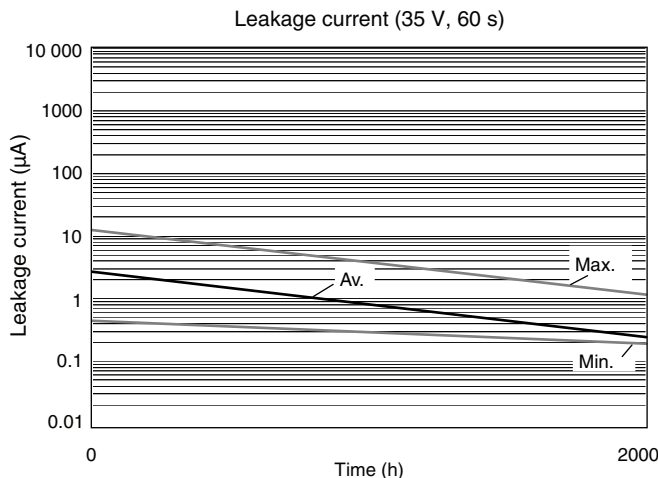
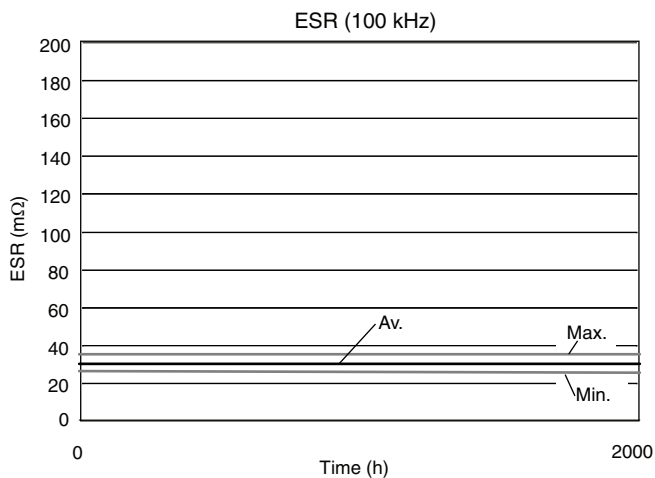
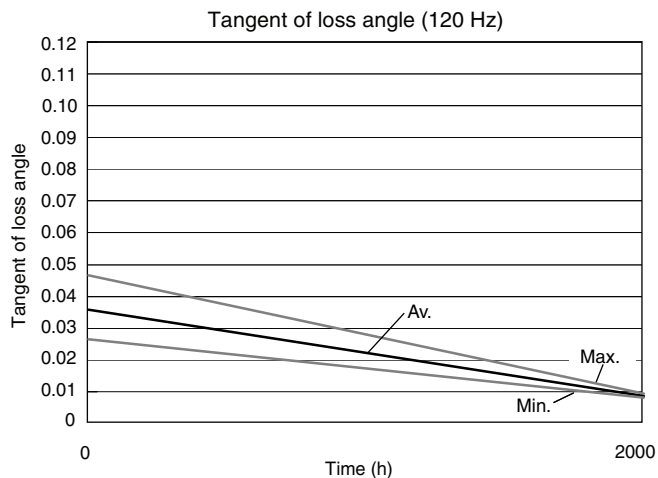
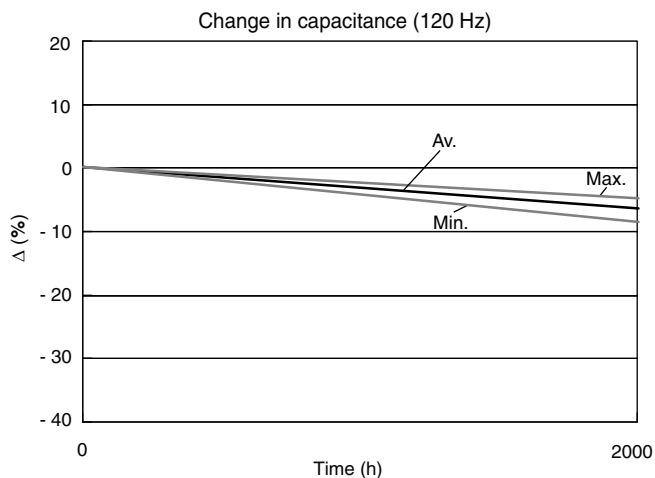
Notes

- n = 30 pieces
- V.P.S. test conditions: 230 °C x 75 s x 2 (V.P.S. = Vapor Phase Soldering method)



TYPICAL PARAMETERS

MODEL	TEST ITEM	TEST TEMPERATURE	APPLIED VOLTAGE	LOT. NUMBER
94SVPD186X0035F8	Endurance (after V.P.S. test)	125 °C	35 V	6517A3254

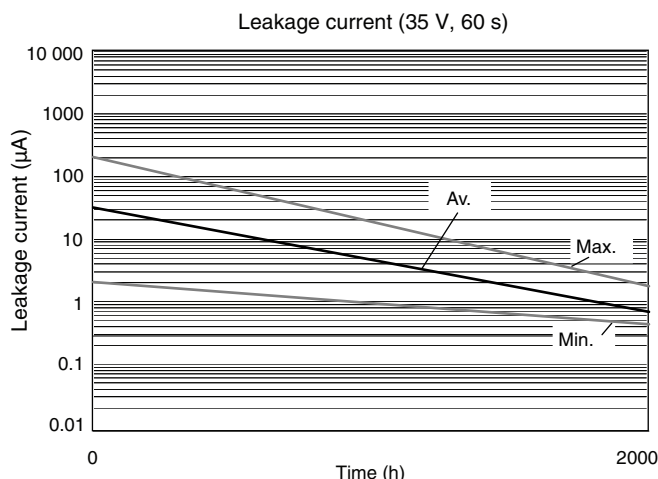
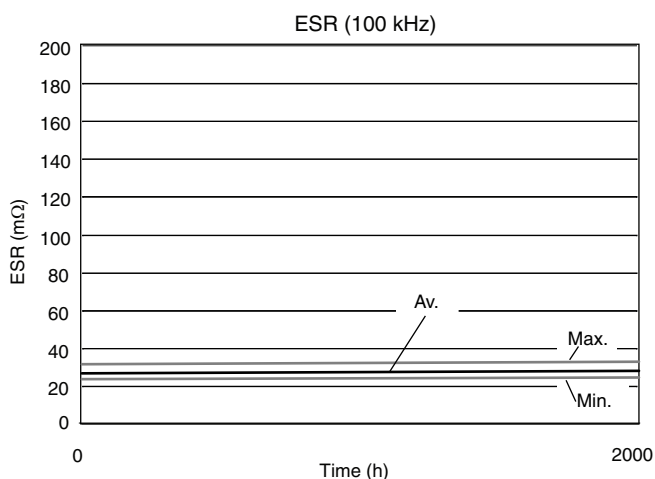
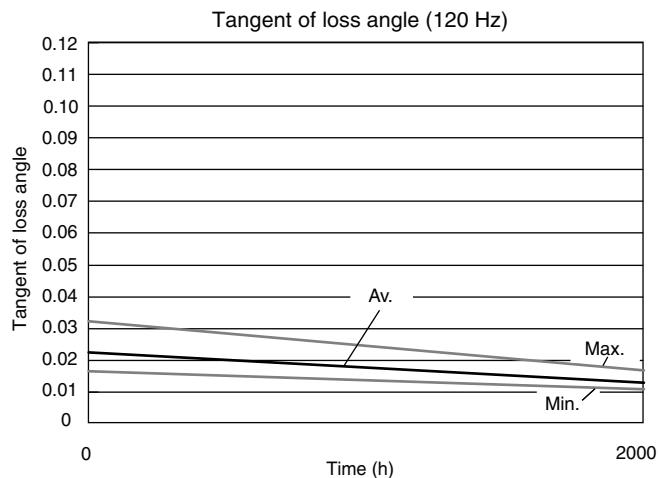
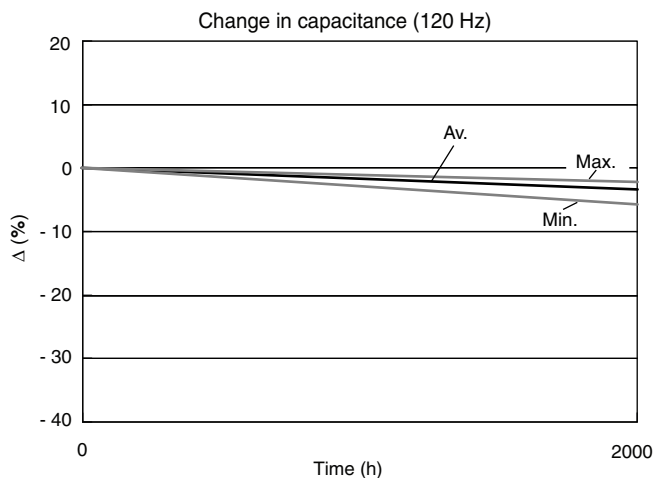


Notes

- n = 30 pieces
- V.P.S. test conditions: 230 °C x 75 s x 2 (V.P.S. = Vapor Phase Soldering method)

TYPICAL PARAMETERS

MODEL	TEST ITEM	TEST TEMPERATURE	APPLIED VOLTAGE	LOT. NUMBER
94SVPD476X0035F12	Endurance (after V.P.S. test)	125 °C	35 V	7209A6544

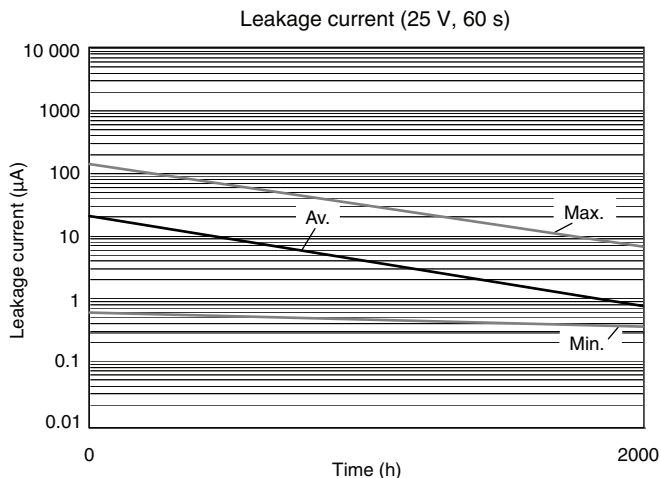
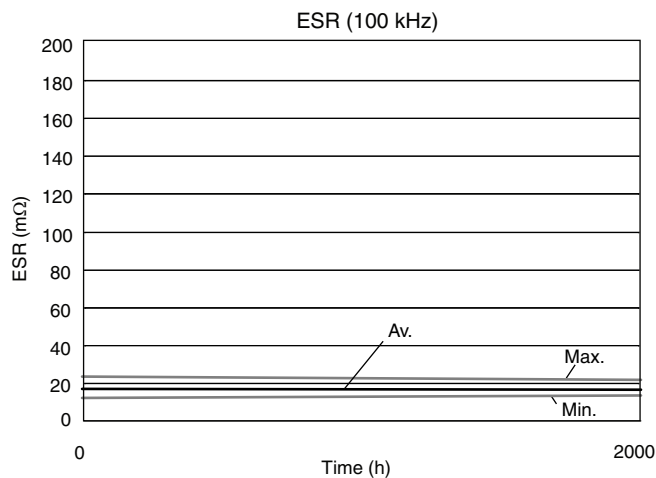
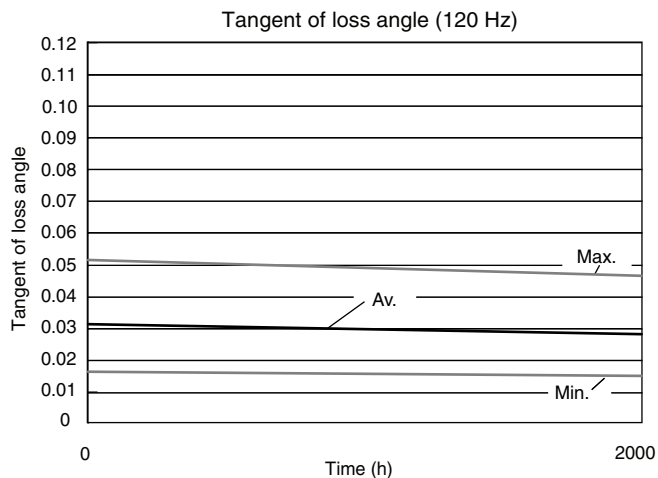
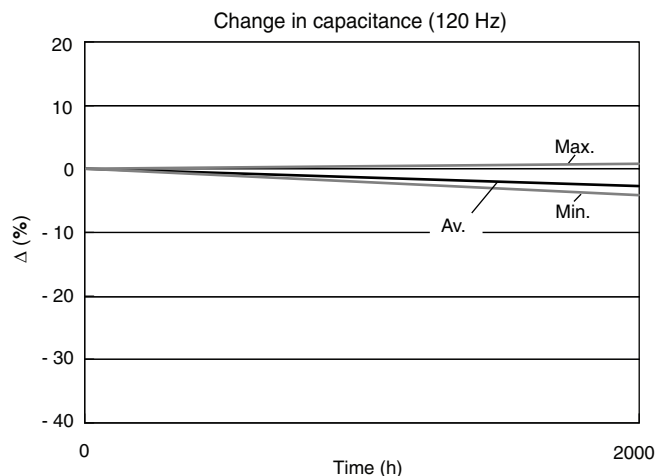

Notes

- n = 30 pieces
- V.P.S. test conditions: 230 °C x 75 s x 2 (V.P.S. = Vapor Phase Soldering method)



TYPICAL PARAMETERS

MODEL	TEST ITEM	TEST TEMPERATURE	APPLIED VOLTAGE	LOT. NUMBER
94SVPD826X0025F12	Endurance (after V.P.S. test)	125 °C	25 V	7527A6544



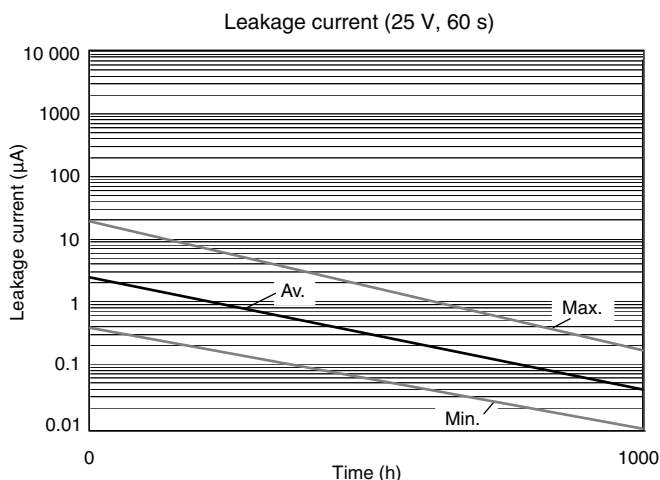
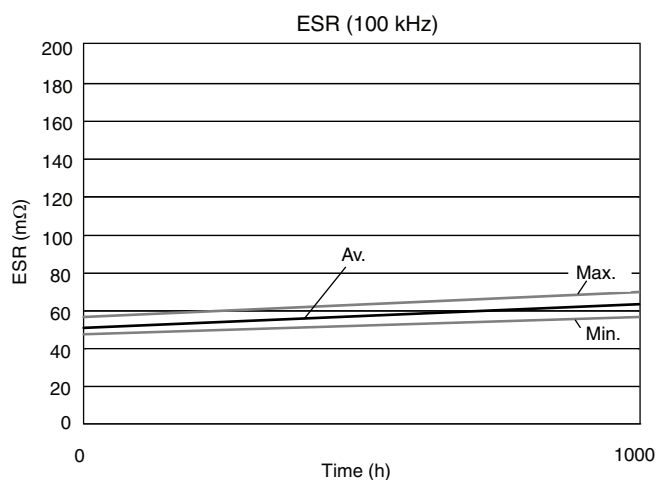
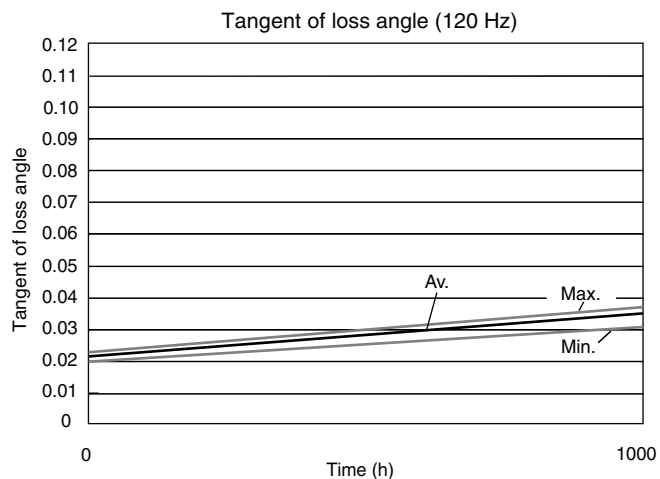
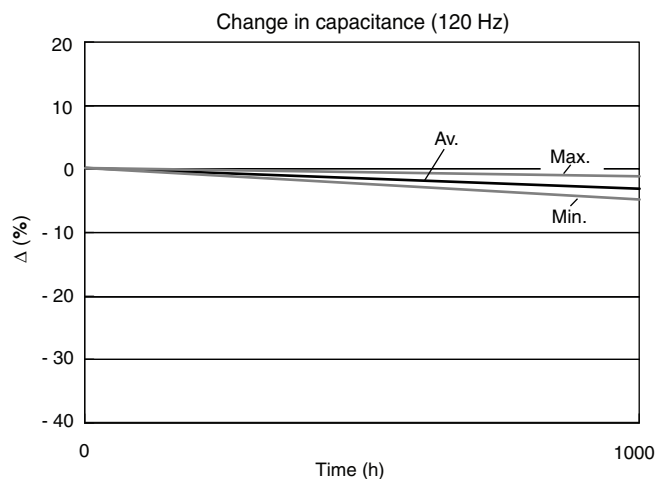
Notes

- n = 30 pieces
- V.P.S. test conditions: 230 °C x 75 s x 2 (V.P.S. = Vapor Phase Soldering method)



TYPICAL PARAMETERS

MODEL	TEST ITEM	TEST TEMPERATURE	APPLIED VOLTAGE	TEST HUMIDITY	LOT. NUMBER
94SVPD106X0025C6	Damp heat (steady state) (after V.P.S. test)	85 °C	25 V	85 %	7530A2714



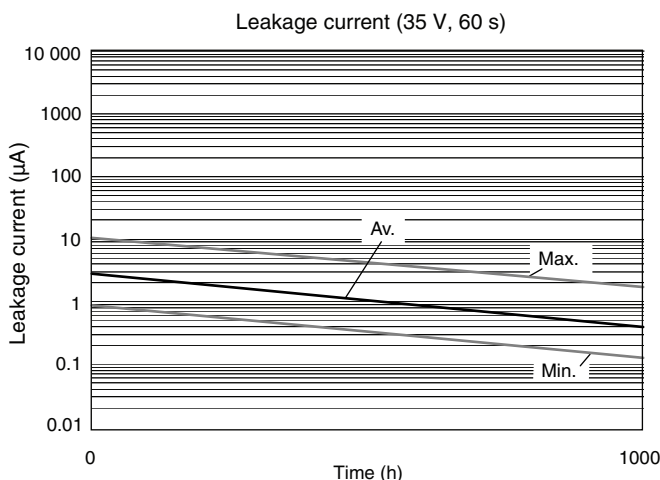
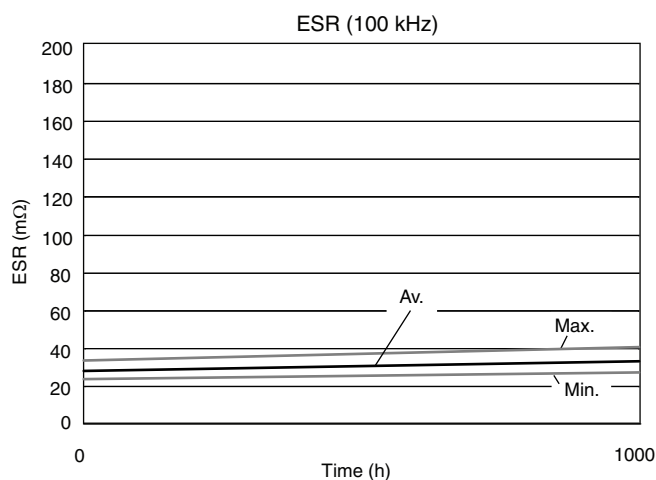
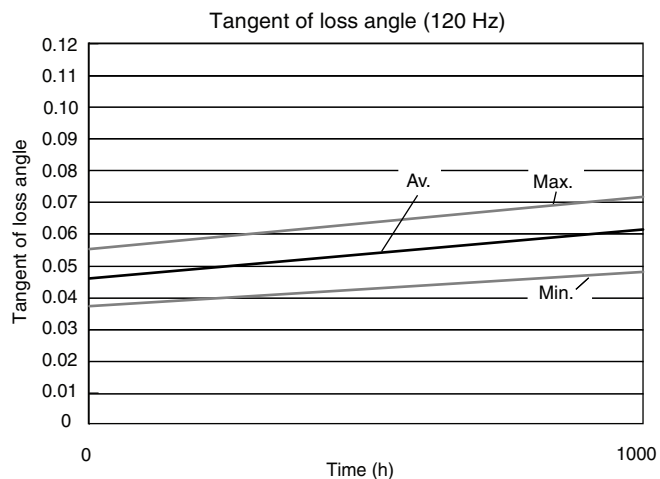
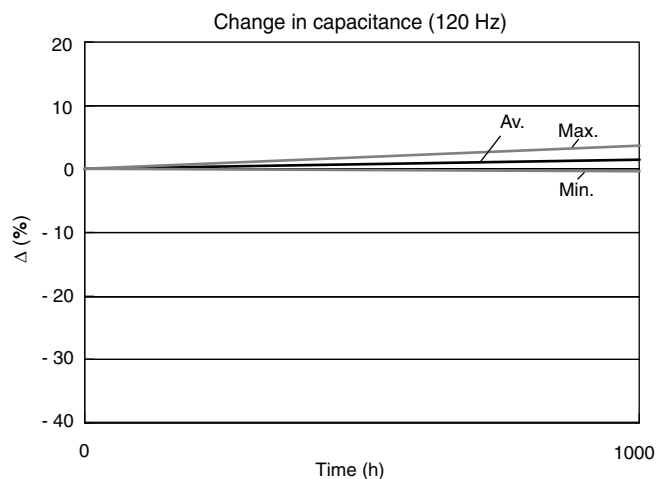
Notes

- n = 30 pieces
- V.P.S. test conditions: 230 °C x 75 s x 2 (V.P.S. = Vapor Phase Soldering method)



TYPICAL PARAMETERS

MODEL	TEST ITEM	TEST TEMPERATURE	APPLIED VOLTAGE	TEST HUMIDITY	LOT. NUMBER
94SVPD186X0035F8	Damp heat (steady state) (after V.P.S. test)	85 °C	35 V	85 %	6517A3254



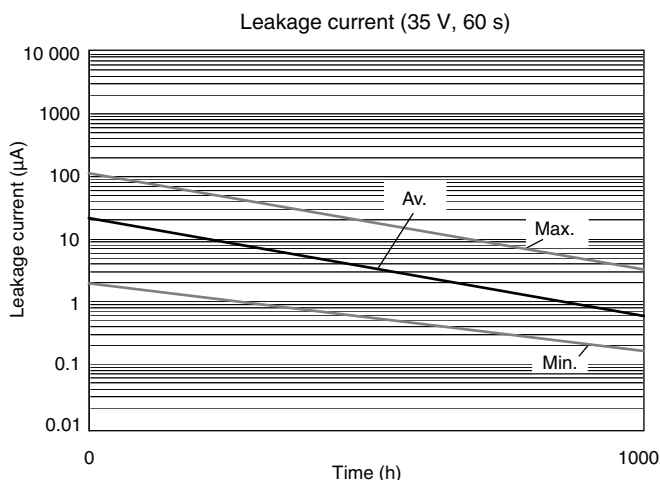
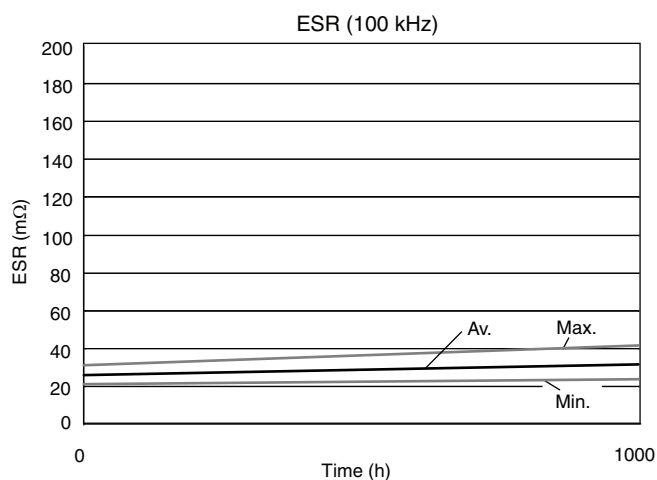
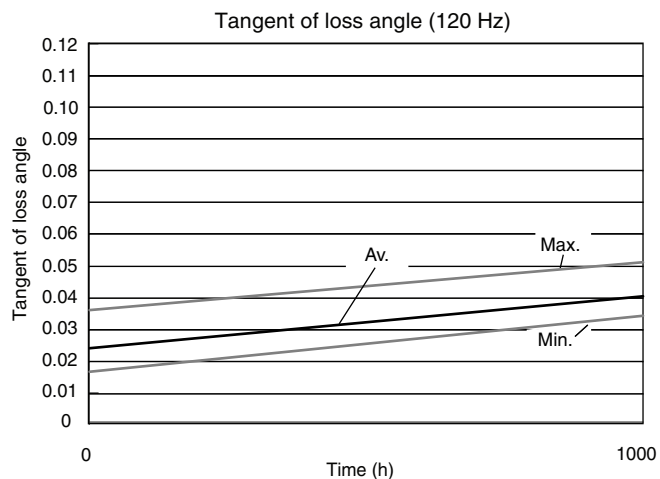
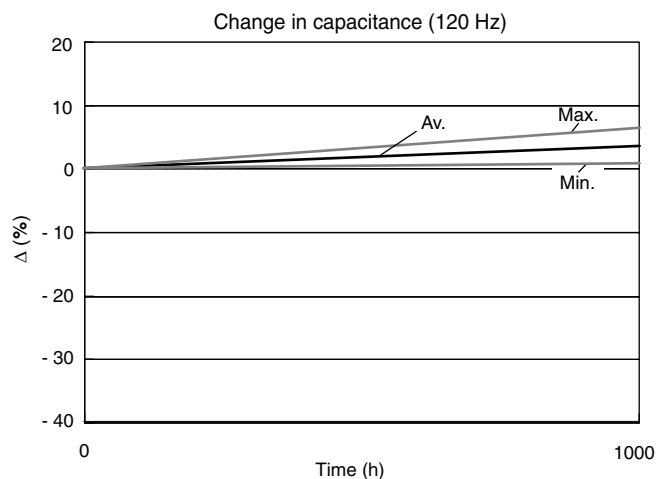
Notes

- n = 30 pieces
- V.P.S. test conditions: 230 °C x 75 s x 2 (V.P.S. = Vapor Phase Soldering method)



TYPICAL PARAMETERS

MODEL	TEST ITEM	TEST TEMPERATURE	APPLIED VOLTAGE	TEST HUMIDITY	LOT. NUMBER
94SVPD476X0035F12	Damp heat (steady state) (after V.P.S. test)	85 °C	35 V	85 %	7209A6544



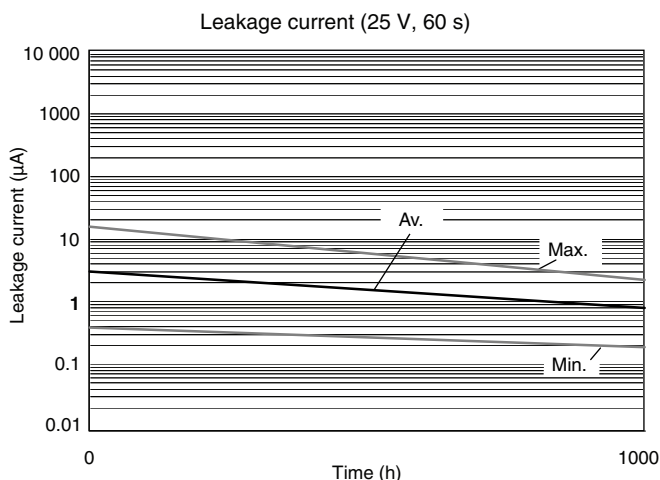
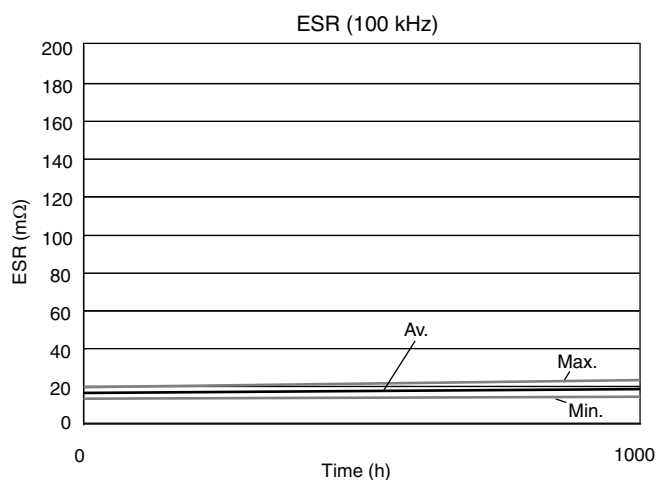
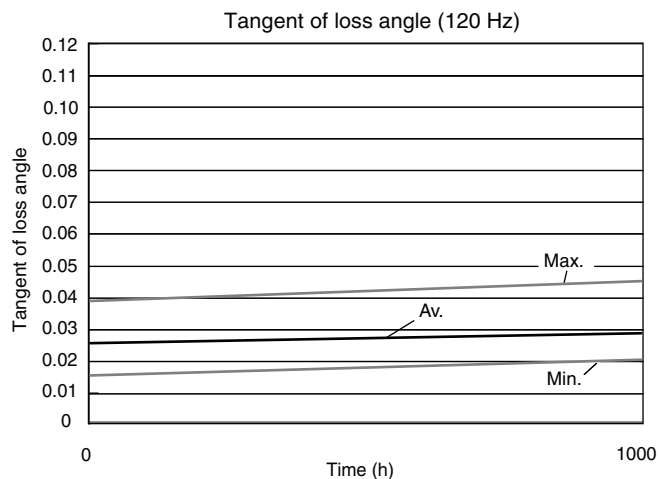
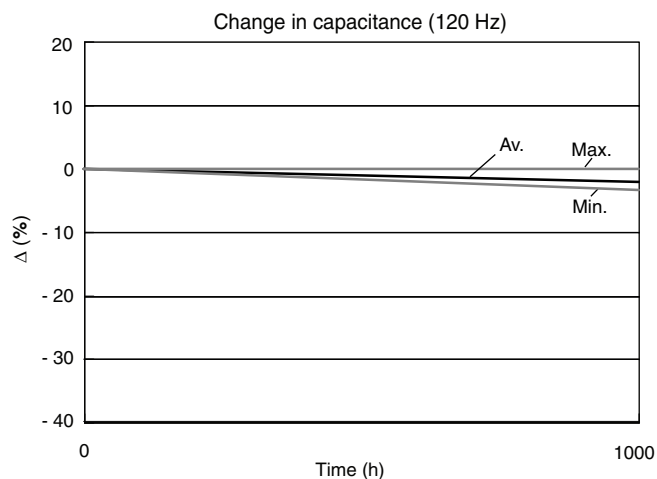
Notes

- n = 30 pieces
- V.P.S. test conditions: 230 °C x 75 s x 2 (V.P.S. = Vapor Phase Soldering method)



TYPICAL PARAMETERS

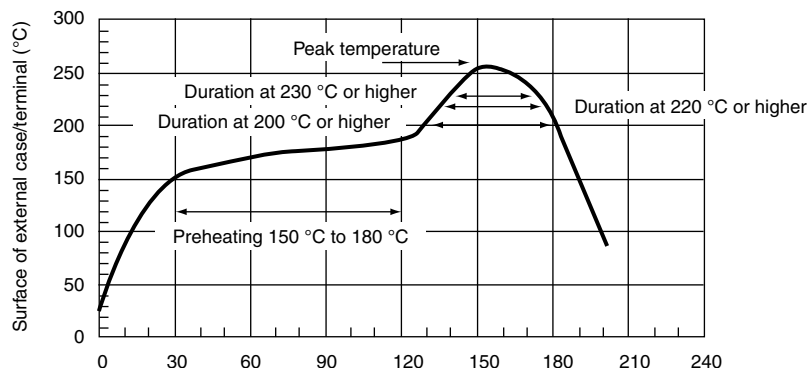
MODEL	TEST ITEM	TEST TEMPERATURE	APPLIED VOLTAGE	TEST HUMIDITY	LOT. NUMBER
94SVDP826X0025F12	Damp heat (steady state) (after V.P.S. test)	85 °C	25 V	85 %	6806A6724



Notes

- n = 30 pieces
- V.P.S. test conditions: 230 °C x 75 s x 2 (V.P.S. = Vapor Phase Soldering method)

RECOMMENDED REFLOW PROFILE



Vishay OS-CON has different characteristics against soldering heat from conventional aluminum electrolytic capacitors or tantalum capacitors because of its unique materials and structure.

Please note the following points on soldering of Vishay OS-CON 94SVPD series to draw out the best performance.

ITEM	94SVPD SERIES	
Peak temperature (max.)	250 °C	260 °C
Preheat	150 °C to 180 °C 90 ± 30 s	
200 °C over time (max.)	60 s	60 s
220 °C over time (max.)	50 s	50 s
230 °C over time (max.)	40 s	40 s
Reflow number	Twice or less	Only 1 time

Note

- All temperatures are measured on the topside of the Al-can and terminal surface.

Attention:

Reflow soldering may reduce the capacitance of products before or after soldering even if soldering conditions stipulated in Recommended Reflow Condition are met. Though the actual reflow conditions are subject to change depending on the kind of reflow soldering method, please be aware that the peak temperature at the top of Al-case and electrode terminals should not exceed peak temperature. Particular notice should be given to the time that Vishay OS-CON is heated at 200 °C or higher during reflow. Be aware that soldering considerably deviating from these conditions will cause problems such as a 50 % reduction in capacitance, and a considerable increase in leakage current.

The leakage current value may increase (from a few μ A to a few mA) even within the above conditions. When the Vishay OS-CON is used in a DC circuit, the leakage current will decrease gradually through self-recovery after voltage is applied. If your reflow profile (reflow temperature, number of reflows, etc.) deviates from the above conditions for mounting the 94SVPD series, please consult with Vishay OS-CON.



Disclaimer

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

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

Vishay 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, Vishay 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 Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. 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 specifications 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. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay 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 Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay 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 of Vishay. Product names and markings noted herein may be trademarks of their respective owners.