

Solid Tantalum Surface Mount Chip Capacitors

TANTAMOUNT[®], Molded Case, Hi-Rel COTS, Built-In-Fuse



FEATURES

- Weibull grading and surge current test options per MIL-PRF-55365
- Standard and low ESR options
- Terminations: 100 % matte tin, standard, tin/lead available
- Molded case available in three case sizes
- Compliant terminations
- Compatible with "High Volume" automatic pick and place equipment
- Moisture sensitivity level 1
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912


RoHS*
COMPLIANT

Note

* Lead (Pb)-containing terminations are not RoHS-compliant. Exemptions may apply.

PERFORMANCE/ELECTRICAL CHARACTERISTICS

www.vishay.com/doc?40088

Operating Temperature: - 55 °C to + 125 °C
(Above 85 °C voltage derating is required)

Capacitance Range: 0.47 µF to 470 µF

Capacitance Tolerance: ± 10 %, ± 20 %

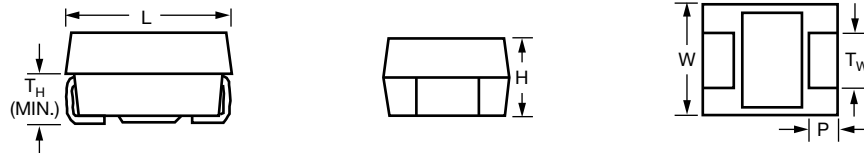
Voltage Rating: 4 V_{DC} to 50 V_{DC}

APPLICATIONS

- Industrial
- Medical
- Military/aerospace
- Telecom

ORDERING INFORMATION								
T86	D	107	K	010	E	A	A	S
TYPE	CASE CODE	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT + 85 °C	TERMINATION/PACKAGING	RELIABILITY LEVEL	SURGE CURRENT	ESR
	See Ratings and Case Codes Table	This is expressed in picofarads. The first two digits are the significant figures. The third is the number of zeros to follow.	K = ± 10 % M = ± 20 % J = ± 5 % (special order)	This is expressed in V. To complete the three-digit block, zeros precede the voltage rating. A decimal point is indicated by an "R" (6R3 = 6.3 V).	See table Termination and Packaging Codes	A = 1.0 % B = 0.1 % C = 0.01 % S = Hi-Rel standard Z = Non-ER	A = 10 cycles at + 25 °C B = 10 cycles at - 55 °C/+ 85 °C S = 3 cycles at + 25 °C	S = Std. L = Low

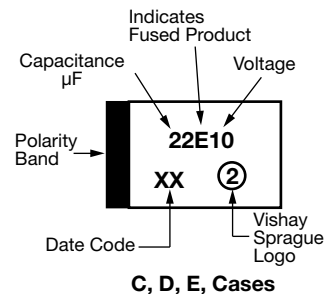
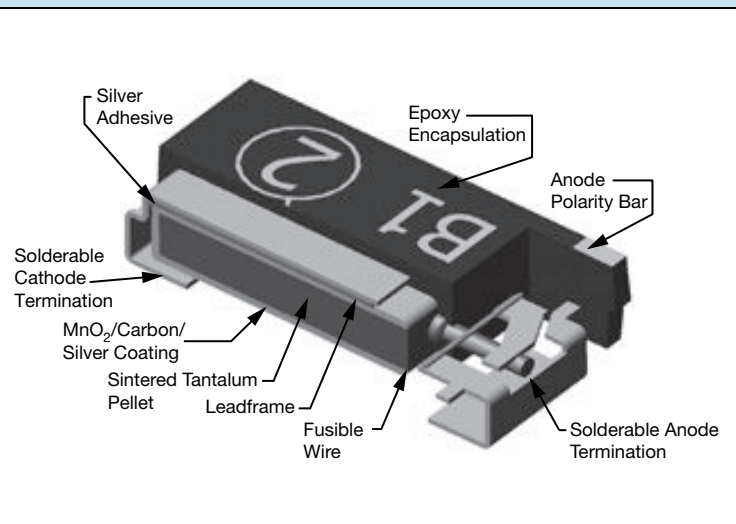
TERMINATION AND PACKAGING CODES		
CODE	TERMINATION	PACKAGING
C	Matte tin	7" (178 mm) reels
H	Matte tin	7" (178 mm) reels, ½ reel
U	Matte tin	7" (178 mm) reels, partial reel
E	Solder plated, tin/lead	7" (178 mm) reels
L	Solder plated, tin/lead	7" (178 mm) reels, ½ reel
R	Solder plated, tin/lead	7" (178 mm) reels, partial reel
K	Solder fused, tin/lead	7" (178 mm) reels
M	Solder fused, tin/lead	7" (178 mm) reels, ½ reel
N	Solder fused, tin/lead	7" (178 mm) reels, partial reel

DIMENSIONS in inches [millimeters]


CASE CODE	EIA SIZE	L	W	H	P	Tw	TH (MIN.)
C	6032-28	0.236 ± 0.012 [6.0 ± 0.30]	0.126 ± 0.012 [3.2 ± 0.30]	0.098 ± 0.012 [2.5 ± 0.30]	0.051 ± 0.012 [1.3 ± 0.30]	0.087 ± 0.004 [2.2 ± 0.10]	0.039 [1.0]
D	7343-31	0.287 ± 0.012 [7.3 ± 0.30]	0.169 ± 0.012 [4.3 ± 0.30]	0.110 ± 0.012 [2.8 ± 0.30]	0.051 ± 0.012 [1.3 ± 0.30]	0.094 ± 0.004 [2.4 ± 0.10]	0.039 [1.0]
E	7343-43	0.287 ± 0.012 [7.3 ± 0.30]	0.169 ± 0.012 [4.3 ± 0.30]	0.157 ± 0.012 [4.0 ± 0.30]	0.051 ± 0.012 [1.3 ± 0.30]	0.094 ± 0.004 [2.4 ± 0.10]	0.039 [1.0]

RATINGS AND CASE CODES

μF	4 V	6.3 V	10 V	16 V	20 V	25 V	35 V	50 V
0.47								C
0.68								C
1.0								C
1.5							C	C
2.2						C	C	C/D
3.3						C	C	C/D
4.7					C	C	C/D	D
6.8				C	C	C	D	D/E
10			C	C	C	C/D	D/E	
15		C	C	C	C/D	D	D/E	
22		C	C	C/D	D	D/E	E	
33		C	C/D	C/D	D/E	E		
47		C/D	C/D	D/E	E			
68	C	C/D	D/E	D	E			
100	C	D/E	D	E				
150	D	D	D/E	E				
220	D	D/E	E					
330	D/E	E						
470	E							

CONSTRUCTION AND MARKING

Marking:

Capacitor marking includes an anode (+) polarity band, capacitance in microfarads and the voltage rating. The Vishay Sprague® trademark is included if space permits. Capacitors rated at 6.3 V are marked 6 V. A manufacturing date code is marked on all capacitors. Capital letter "E" stands for lead (Pb)-free terminations small cap letter "e" stands for SnPb



STANDARD RATINGS							
CAPACITANCE (μ F)	CASE CODE	PART NUMBER	MAX. DC LEAKAGE AT + 25 °C (μ A)	MAX. DF AT + 25 °C 120 Hz (%)	STANDARD (S) MAX. ESR AT + 25 °C 100 kHz (Ω)	LOW (L) MAX. ESR AT + 25 °C 100 kHz (Ω)	AVAILABLE RELIABILITY LEVEL
4 V_{DC} AT + 85 °C; 2.7 V_{DC} AT + 125 °C							
68	C	T86C686(1)004(2)(6)(4)(5)	2.7	8	1.40	0.40	A, B, C, S, Z
100	C	T86C107(1)004(2)(3)(4)(5)	4.0	8	0.80	0.40	A, B, S, Z
150	D	T86D157(1)004(2)(6)(4)(5)	6.0	8	0.60	0.30	A, B, C, S, Z
220	D	T86D227(1)004(2)(3)(4)(5)	8.8	8	0.60	0.40	A, B, S, Z
330	D	T86D337(1)004(2)(3)(4)(5)	13.2	15	0.60	0.30	A, B, S, Z
330	E	T86E337(1)004(2)(3)(4)(5)	13.2	8	0.50	0.30	A, B, S, Z
470	E	T86E477(1)004(2)(3)(4)(5)	18.8	16	0.50	0.25	A, B, S, Z
6.3 V_{DC} AT + 85 °C; 4 V_{DC} AT + 125 °C							
15	C	T86C156(1)6R3(2)(6)(4)(5)	0.9	6	1.80	0.60	A, B, C, S, Z
22	C	T86C226(1)6R3(2)(6)(4)(5)	1.1	6	1.80	0.60	A, B, C, S, Z
33	C	T86C336(1)6R3(2)(6)(4)(5)	1.6	6	1.40	0.60	A, B, C, S, Z
47	C	T86C476(1)6R3(2)(6)(4)(5)	2.3	6	1.30	0.60	A, B, C, S, Z
47	D	T86D476(1)6R3(2)(6)(4)(5)	2.3	6	0.90	0.45	A, B, C, S, Z
68	C	T86C686(1)6R3(2)(3)(4)S	3.3	6	0.80	n/a	A, B, S, Z
68	D	T86D686(1)6R3(2)(6)(4)(5)	3.3	6	0.70	0.35	A, B, C, S, Z
100	D	T86D107(1)6R3(2)(6)(4)(5)	6.0	8	0.70	0.35	A, B, C, S, Z
100	E	T86E107(1)6R3(2)(6)(4)(5)	6.0	8	0.70	0.30	A, B, C, S, Z
150	D	T86D157(1)6R3(2)(3)(4)(5)	9.0	8	0.60	0.30	A, B, S, Z
220	D	T86D227(1)6R3(2)(3)(4)(5)	13.2	8	0.60	0.30	A, B, S, Z
220	E	T86E227(1)6R3(2)(3)(4)(5)	13.2	8	0.50	0.30	A, B, S, Z
330	E	T86E337(1)6R3(2)(3)(4)(5)	19.8	8	0.50	0.30	A, B, S, Z
10 V_{DC} AT + 85 °C; 7 V_{DC} AT + 125 °C							
10	C	T86C106(1)010(2)(6)(4)S	1.0	6	1.80	n/a	A, B, C, S, Z
15	C	T86C156(1)010(2)(6)(4)(5)	1.5	6	1.80	0.60	A, B, C, S, Z
22	C	T86C226(1)010(2)(6)(4)(5)	2.2	6	1.40	0.50	A, B, C, S, Z
33	C	T86C336(1)010(2)(6)(4)(5)	3.3	6	1.30	0.40	A, B, C, S, Z
33	D	T86D336(1)010(2)(6)(4)(5)	3.3	6	0.90	0.40	A, B, C, S, Z
47	C	T86C476(1)010(2)(3)(4)S	4.7	6	1.00	n/a	A, B, S, Z
47	D	T86D476(1)010(2)(6)(4)(5)	4.7	6	0.70	0.40	A, B, C, S, Z
68	D	T86D686(1)010(2)(6)(4)(5)	6.8	6	0.70	0.35	A, B, C, S, Z
68	E	T86E686(1)010(2)(6)(4)(5)	6.8	6	0.70	0.35	A, B, C, S, Z
100	D	T86D107(1)010(2)(3)(4)(5)	10.0	8	0.60	0.30	A, B, S, Z
150	D	T86D157(1)010(2)(3)(4)(5)	15.0	8	0.60	0.30	A, B, S, Z
150	E	T86E157(1)010(2)(3)(4)(5)	15.0	8	0.50	0.40	A, B, S, Z
220	E	T86E227(1)010(2)(3)(4)(5)	22.0	8	0.50	0.30	A, B, S, Z
16 V_{DC} AT + 85 °C; 10 V_{DC} AT + 125 °C							
6.8	C	T86C685(1)016(2)(6)(4)(5)	1.1	6	2.00	0.60	A, B, C, S, Z
10	C	T86C106(1)016(2)(6)(4)(5)	1.6	6	1.80	0.70	A, B, C, S, Z
15	C	T86C156(1)016(2)(6)(4)S	2.4	6	1.40	n/a	A, B, C, S, Z
22	C	T86C226(1)016(2)(6)(4)(5)	3.5	6	1.30	0.70	A, B, C, S, Z

Note

- Part number definitions:
 - Capacitance tolerance codes: K, M
 - Terminations and packaging codes: C, E, K, H, L, M, U, R, N
 - Reliability level: A, B, S, Z
 - Surge current: A, B, S
 - ESR: L, S
 - Reliability level: A, B, C, S, Z



STANDARD RATINGS							
CAPACITANCE (μF)	CASE CODE	PART NUMBER	MAX. DC LEAKAGE AT + 25 °C (μA)	MAX. DF AT + 25 °C 120 Hz (%)	STANDARD (S) MAX. ESR AT + 25 °C 100 kHz (Ω)	LOW (L) MAX. ESR AT + 25 °C 100 kHz (Ω)	AVAILABLE RELIABILITY LEVEL
16 V_{DC} AT + 85 °C; 10 V_{DC} AT + 125 °C							
22	D	T86D226(1)016(2)(6)(4)(5)	3.5	6	0.90	0.45	A, B, C, S, Z
33	C	T86C336(1)016(2)(3)(4)(5)	5.3	6	1.00	0.50	A, B, C, S, Z
33	D	T86D336(1)016(2)(6)(4)(5)	5.3	6	0.70	0.35	A, B, C, S, Z
47	D	T86D476(1)016(2)(6)(4)(5)	7.5	6	0.70	0.35	A, B, C, S, Z
47	E	T86E476(1)016(2)(6)(4)(5)	7.5	6	0.70	0.35	A, B, C, S, Z
68	D	T86D686(1)016(2)(3)(4)(5)	10.9	6	0.60	0.30	A, B, S, Z
100	E	T86E107(1)016(2)(3)(4)(5)	16.0	8	0.60	0.30	A, B, S, Z
150	E	T86E157(1)016(2)(3)(4)S	24.0	10	0.40	n/a	A, B, S, Z
20 V_{DC} AT + 85 °C; 13 V_{DC} AT + 125 °C							
4.7	C	T86C475(1)020(2)(6)(4)(5)	0.9	6	2.00	1.00	A, B, C, S, Z
6.8	C	T86C685(1)020(2)(6)(4)(5)	1.4	6	1.90	0.6	A, B, C, S, Z
10	C	T86C106(1)020(2)(6)(4)(5)	2.0	6	1.60	0.8	A, B, C, S, Z
15	C	T86C156(1)020(2)(6)(4)S	3.0	6	1.40	n/a	A, B, C, S, Z
15	D	T86D156(1)020(2)(6)(4)(5)	3.0	6	0.90	0.45	A, B, C, S, Z
22	D	T86D226(1)020(2)(6)(4)(5)	4.4	6	0.70	0.35	A, B, C, S, Z
33	D	T86D336(1)020(2)(6)(4)(5)	6.6	6	0.70	0.40	A, B, C, S, Z
33	E	T86E336(1)020(2)(6)(4)(5)	6.6	6	0.70	0.40	A, B, C, S, Z
47	E	T86E476(1)020(2)(3)(4)(5)	9.4	6	0.60	0.30	A, B, S, Z
68	E	T86E686(1)020(2)(3)(4)(5)	13.6	6	0.60	0.30	A, B, S, Z
25 V_{DC} AT + 85 °C; 17 V_{DC} AT + 125 °C							
2.2	C	T86C225(1)025(2)(6)(4)S	0.6	6	2.80	n/a	A, B, C, S, Z
3.3	C	T86C335(1)025(2)(6)(4)(5)	0.8	6	2.30	2.10	A, B, C, S, Z
4.7	C	T86C475(1)025(2)(6)(4)(5)	1.2	6	1.90	1.00	A, B, C, S, Z
6.8	C	T86C685(1)025(2)(6)(4)(5)	1.7	6	1.60	0.60	A, B, C, S, Z
10	C	T86C106(1)025(2)(6)(4)(5)	2.5	6	1.40	0.60	A, B, C, S, Z
10	D	T86D106(1)025(2)(6)(4)(5)	2.5	6	1.00	0.50	A, B, C, S, Z
15	D	T86D156(1)025(2)(6)(4)(5)	3.8	6	0.80	0.40	A, B, C, S, Z
22	D	T86D226(1)025(2)(6)(4)(5)	5.5	6	0.70	0.35	A, B, C, S, Z
22	E	T86E226(1)025(2)(6)(4)(5)	5.5	6	0.70	0.35	A, B, C, S, Z
33	E	T86E336(1)025(2)(3)(4)(5)	8.3	6	0.60	0.30	A, B, C, S, Z
35 V_{DC} AT + 85 °C; 23 V_{DC} AT + 125 °C							
1.5	C	T86C155(1)035(2)(6)(4)(5)	0.5	6	3.80	2.60	A, B, C, S, Z
2.2	C	T86C225(1)035(2)(6)(4)S	0.8	6	2.90	n/a	A, B, C, S, Z
3.3	C	T86C335(1)035(2)(6)(4)S	1.2	6	2.00	n/a	A, B, C, S, Z
4.7	C	T86C475(1)035(2)(6)(4)S	1.6	6	1.80	n/a	A, B, C, S, Z
4.7	D	T86D475(1)035(2)(6)(4)(5)	1.6	6	1.20	0.60	A, B, C, S, Z
6.8	D	T86D685(1)035(2)(6)(4)(5)	2.4	6	1.00	0.50	A, B, C, S, Z
10	D	T86D106(1)035(2)(6)(4)(5)	3.5	6	0.80	0.50	A, B, C, S, Z
10	E	T86E106(1)035(2)(6)(4)(5)	3.5	6	0.80	0.50	A, B, C, S, Z
15	D	T86D156(1)035(2)(3)(4)(5)	5.3	6	0.70	0.50	A, B, S, Z
15	E	T86E156(1)035(2)(3)(4)(5)	5.3	6	0.70	0.50	A, B, S, Z
22	E	T86E226(1)035(2)(3)(4)(5)	7.7	6	0.60	0.40	A, B, S, Z

Note

- Part number definitions:
 - Capacitance tolerance codes: K, M
 - Terminations and packaging codes: C, E, K, H, L, M, U, R, N
 - Reliability level: A, B, S, Z
 - Surge current: A, B, S
 - ESR: L, S
 - Reliability level: A, B, C, S, Z



STANDARD RATINGS							
CAPACITANCE (μ F)	CASE CODE	PART NUMBER	MAX. DC LEAKAGE AT + 25 °C (μ A)	MAX. DF AT + 25 °C 120 Hz (%)	STANDARD (S) MAX. ESR AT + 25 °C 100 kHz (Ω)	LOW (L) MAX. ESR AT + 25 °C 100 kHz (Ω)	AVAILABLE RELIABILITY LEVEL
50 V _{DC} AT + 85 °C; 33 V _{DC} AT + 125 °C							
0.47	C	T86C474(1)050(2)(6)(4)S	0.5	4	6.70	n/a	A, B, C, S, Z
0.68	C	T86C684(1)050(2)(6)(4)S	0.5	4	5.90	n/a	A, B, C, S, Z
1.0	C	T86C105(1)050(2)(6)(4)(5)	0.5	4	4.40	2.70	A, B, C, S, Z
1.5	C	T86C155(1)050(2)(6)(4)(5)	0.8	6	5.00	3.20	A, B, C, S, Z
2.2	C	T86C225(1)050(2)(6)(4)S	1.1	6	2.80	n/a	A, B, C, S, Z
2.2	D	T86D225(1)050(2)(6)(4)(5)	1.1	6	2.10	0.90	A, B, C, S, Z
3.3	C	T86C335(1)050(2)(6)(4)(5)	1.7	6	2.40	1.60	A, B, C, S, Z
3.3	D	T86D335(1)050(2)(6)(4)S	1.7	6	2.00	n/a	A, B, C, S, Z
4.7	D	T86D475(1)050(2)(6)(4)S	2.4	6	1.10	n/a	A, B, C, S, Z
6.8	D	T86D685(1)050(2)(6)(4)S	3.4	6	0.90	n/a	A, B, C, S, Z
6.8	E	T86E685(1)050(2)(6)(4)S	3.4	6	0.90	n/a	A, B, C, S, Z

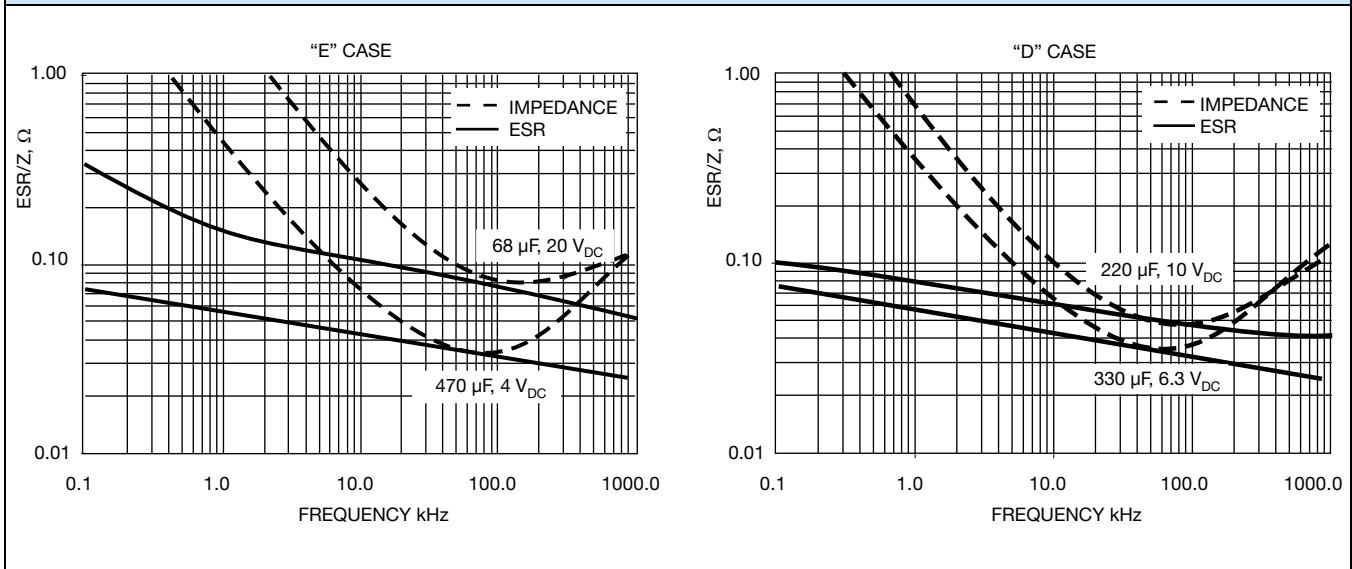
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- Part number definitions:
 - Capacitance tolerance codes: K, M
 - Terminations and packaging codes: C, E, K, H, L, M, U, R, N
 - Reliability level: A, B, S, Z
 - Surge current: A, B, S
 - ESR: L, S
 - Reliability level: A, B, C, S, Z

RECOMMENDED VOLTAGE DERATING GUIDELINES (for temperatures below + 85 °C)	
STANDARD CONDITIONS. FOR EXAMPLE: OUTPUT FILTERS	
Capacitor Voltage Rating	Operating Voltage
4.0	2.5
6.3	3.6
10	6.0
16	10
20	12
25	15
35	24
50	28
SEVERE CONDITIONS. FOR EXAMPLE: INPUT FILTERS	
Capacitor Voltage Rating	Operating Voltage
4.0	2.5
6.3	3.3
10	5.0
16	8.0
20	10
25	12
35	15
50	24



TYPICAL CURVES AT + 25 °C, IMPEDANCE AND ESR VS. FREQUENCY



POWER DISSIPATION

CASE CODE	MAXIMUM PERMISSIBLE POWER DISSIPATION AT + 25 °C (W) IN FREE AIR
C	0.110
D	0.150
E	0.165

STANDARD PACKAGING QUANTITY

CASE CODE	UNITS PER REEL		
	7" REEL	½ 7" REEL	7" PARTIAL REEL
C	500	250	100
D	500	250	100
E	400	200	100

PRODUCT INFORMATION

Molded Guide	
• Pad Dimensions	www.vishay.com/doc?40074
• Package Dimensions	
Moisture Sensitivity	www.vishay.com/doc?40135
SELECTOR GUIDES	
Solid Tantalum Selector Guide	www.vishay.com/doc?49053
Solid Tantalum Chip Capacitors	www.vishay.com/doc?40091
FAQ	
Frequently Asked Questions	www.vishay.com/doc?40110



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Material Category Policy

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.