

## Aluminum Capacitors +105 °C, Miniature, Radial Lead


**FEATURES**

- Original SMPS output capacitors
- Minimal ESR change
- High ripple current capability
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

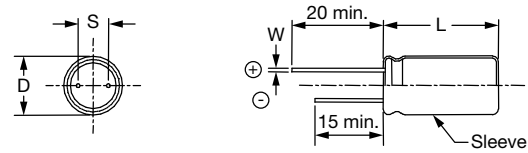
QUICK REFERENCE DATA	
DESCRIPTION	VALUE
Nominal case size Ø D x L in inches [mm]	0.394 x 0.472 [10.0 x 12.0] to 0.709 x 1.575 [18.0 x 40.0]
Operating temperature	-55 °C to +105 °C
Rated capacitance range, C <sub>R</sub>	4.7 µF to 3300 µF
Tolerance on C <sub>R</sub>	-10 %, +50 %
Rated voltage range, U <sub>R</sub>	6.3 WV <sub>DC</sub> to 250 WV <sub>DC</sub>
Termination	2 and 3 radial leads and axial mount.
Life validation test	4000 h at +105 °C (≥ 13.0 mm dia.); 3000 h at +105 °C (10.0 mm dia.); ΔCAP ≤ 20 % from initial measurement. ΔESR ≤ 1.15 x initial specified limit. ΔDCL ≤ initial specified limit.
Shelf life at 105 °C	500 h: ΔCAP ≤ 10 % from initial measurement. ΔESR ≤ 1.15 x initial specified limit. ΔDCL ≤ 2 x initial specified limit, (6.3 WV <sub>DC</sub> to 100 WV <sub>DC</sub> ); ≤ 3 x initial specified limit, (150 WV <sub>DC</sub> to 250 WV <sub>DC</sub> ).
DC leakage current (after 2 min charge)	$I = 0.03 \sqrt{CV}$ (6.3 V <sub>DC</sub> to 100 V <sub>DC</sub> ) $I = 0.01 CV$ (150 V <sub>DC</sub> to 250 V <sub>DC</sub> ) I in µA, C in µF, V in Volts

RIPPLE CURRENT MULTIPLIERS				
TEMPERATURE				
AMBIENT TEMPERATURE		MULTIPLIERS		
+105 °C		0.5		
+85 °C		1.0		
≤ +75 °C		1.25		
FREQUENCY (Hz)				
WV <sub>DC</sub>	50 TO 60	100 TO 120	300 TO 400	1K TO 19K
0 to 75	0.60	0.70	0.75	0.80
76 to 100	0.40	0.55	0.70	0.80
101 to 250	0.25	0.35	0.45	0.65

LOW TEMPERATURE PERFORMANCE				
CAPACITANCE RATIO C <sup>-55 °C</sup> / C <sup>+25 °C</sup> MINIMUM AT 120 Hz				
MAXIMUM CAPACITANCE CHANGE	VOLTAGE	MULTIPLIER		
	6.3 V to 100 V	0.75		
150 V to 250 V	0.70			
MAXIMUM IMPEDANCE CHANGE	VOLTAGE	MULTIPLIER		
	6.3 V to 100 V	2.5		
150 V to 250 V	2.0			
ESL (TYPICAL VALUES AT 1 MHz TO 10 MHz)				
NOMINAL DIAMETER	0.394 [10.0]	0.512 [13.0]	0.630 [16.0]	0.709 [18.0]
TYPICAL ESL (nH)	4.0	7.0	10.0	12.0

**BULK SPECIFICATIONS** in millimeters

**TERMINAL CODE C**

**TERMINAL CODE D**

**TERMINAL CODE J <sup>(1)</sup>**

**TERMINAL CODE O <sup>(2)</sup>**

**Notes**

- ⊕ Positive terminal
- ⊖ Negative terminal
- Ⓝ No charge potential

<sup>(1)</sup> Available for 12.5 mm, 16 mm, and 18 mm diameter units

<sup>(2)</sup> Available for 12.5 mm, 16 mm, and 18 mm diameter units with epoxy end-seal

<b>DIMENSIONS</b> in inches [millimeters]										
CASE CODE	NOMINAL		STYLES 2 AND 4		STYLES 3 AND 5		LEAD SPACING		LEAD DIAMETER	
	D	L	D (max.)	L (max.)	D (max.)	L (max.)	S ± 0.024 [0.60]	T ± 0.020 [0.50]	NOMINAL	AWG
CC	0.394 [10.0]	0.512 [13.0]	0.413 [10.5]	0.563 [14.3]	0.413 [10.5]	0.630 [16.0]	0.197 [5.0]	n/a	0.025 [0.63]	22
CD	0.394 [10.0]	0.630 [16.0]	0.413 [10.5]	0.669 [17.0]	0.413 [10.5]	0.740 [18.8]	0.197 [5.0]	n/a	0.025 [0.63]	22
CG	0.394 [10.0]	0.787 [20.0]	0.413 [10.5]	0.846 [21.5]	0.413 [10.5]	0.906 [23.0]	0.197 [5.0]	n/a	0.025 [0.63]	22
DG	0.492 [12.5]	0.787 [20.0]	0.512 [13.0]	0.846 [21.5]	0.512 [13.0]	0.906 [23.0]	0.197 [5.0]	0.098 [2.5]	0.032 [0.81]	20
DK	0.492 [12.5]	0.984 [25.0]	0.512 [13.0]	1.043 [26.5]	0.512 [13.0]	1.142 [29.0]	0.197 [5.0]	0.098 [2.5]	0.032 [0.81]	20
DM	0.492 [12.5]	1.043 [26.5]	0.512 [13.0]	1.102 [28.0]	0.512 [13.0]	1.161 [29.5]	0.197 [5.0]	0.098 [2.5]	0.032 [0.81]	20
DT	0.492 [12.5]	1.319 [33.5]	0.512 [13.0]	1.346 [34.2]	0.512 [13.0]	1.417 [36.0]	0.197 [5.0]	0.098 [2.5]	0.032 [0.81]	20
DS	0.492 [12.5]	1.673 [42.5]	0.512 [13.0]	1.720 [43.7]	0.512 [13.0]	1.791 [45.5]	0.197 [5.0]	0.098 [2.5]	0.032 [0.81]	20
EK	0.630 [16.0]	0.984 [25.0]	0.650 [16.5]	1.031 [26.2]	0.650 [16.5]	1.098 [27.9]	0.295 [7.5]	0.150 [3.8]	0.032 [0.81]	20
EN	0.630 [16.0]	1.260 [32.0]	0.650 [16.5]	1.319 [33.5]	0.650 [16.5]	1.417 [36.0]	0.295 [7.5]	0.150 [3.8]	0.032 [0.81]	20
ER	0.630 [16.0]	1.417 [36.0]	0.650 [16.5]	1.476 [37.5]	0.650 [16.5]	1.575 [40.0]	0.295 [7.5]	0.150 [3.8]	0.032 [0.81]	20
ET	0.630 [16.0]	1.319 [33.5]	0.650 [16.5]	1.347 [34.2]	0.650 [16.5]	1.417 [36.0]	0.295 [7.5]	0.150 [3.8]	0.032 [0.81]	20
EU	0.630 [16.0]	1.575 [40.0]	0.650 [16.5]	1.642 [41.7]	0.650 [16.5]	1.669 [42.4]	0.295 [7.5]	0.150 [3.8]	0.032 [0.81]	20
FR	0.709 [18.0]	1.417 [36.0]	0.728 [18.5]	1.476 [37.5]	0.728 [18.5]	1.575 [40.0]	0.295 [7.5]	0.150 [3.8]	0.032 [0.81]	20
FV	0.709 [18.0]	1.575 [40.0]	0.728 [18.5]	1.653 [42.0]	0.728 [18.5]	1.693 [43.0]	0.295 [7.5]	0.150 [3.8]	0.032 [0.81]	20

**TAPE AND REEL, SPECIFICATIONS TO EIA-468D** in inches [millimeters]

**Formed Leads**


<b>DIMENSIONS</b> in inches [millimeters] <b>AND PACKAGING QUANTITIES</b>		
<b>CASE SIZE</b>	<b>F LEAD SPACING</b>	<b>STD. QTY/REEL</b>
0.236 x 0.453 [6.0 x 11.0]	0.197 [5.0]	800
0.315 x 0.472 [8.0 x 12.0]	0.197 [5.0]	700

**Unformed (Straight) Leads**


<b>DIMENSIONS</b> in inches [millimeters] <b>AND PACKAGING QUANTITIES</b>		
<b>CASE SIZE</b>	<b>F LEAD SPACING</b>	<b>STD. QTY/REEL</b>
0.236 x 0.453 [6.0 x 11.0]	0.098 [2.5]	800
0.315 x 0.472 [8.0 x 12.0]	0.140 [3.5] <sup>(1)</sup>	700
0.394 x 0.512 [10.0 x 13.0]	0.197 [5.0]	500
0.394 x 0.630 [10.0 x 16.0]	0.197 [5.0]	500
0.394 x 0.787 [10.0 x 20.0]	0.197 [5.0]	500

**Note**
<sup>(1)</sup> Available as special order.



DIMENSIONS in inches [millimeters]					
ITEM	CASE SIZE (DIAMETER x LENGTH)				
	0.236 x 0.433 [6.0 x 11.0]	0.315 x 0.472 [8.0 x 12.0]	0.394 x 0.512 [10.0 x 13.0]	0.394 x 0.630 [10.0 x 16.0]	0.394 x 0.787 [10.0 x 20.0]
d - Lead-wire diameter	0.025 [0.63]	0.025 [0.63]	0.025 [0.63]	0.025 [0.63]	0.025 [0.63]
P - Pitch of component	0.500 [12.7]	0.500 [12.7]	0.500 [12.7]	0.500 [12.7]	0.500 [12.7]
P <sub>0</sub> - Feed hole pitch	0.500 [12.7]	0.500 [12.7]	0.500 [12.7]	0.500 [12.7]	0.500 [12.7]
F - Lead-to-lead distance	0.197 [5.0]	0.197 [5.0]	0.197 [5.0]	0.197 [5.0]	0.197 [5.0]
K - Clinch height	0.098 [2.5]	0.157 [4.0]	n/a	n/a	n/a
H - Height of component from tape center	0.728 [18.5]	0.787 [20.0]	0.906 [23.0]	0.906 [23.0]	0.906 [23.0]
H <sub>0</sub> - Lead-wire clinch height	0.630 [16.0]	0.630 [16.0]	n/a	n/a	n/a
W - Tape width	0.709 [18.0]	0.709 [18.0]	0.709 [18.0]	0.709 [18.0]	0.709 [18.0]
W <sub>0</sub> - Hold down tape width	0.591 [15.0]	0.591 [15.0]	0.591 [15.0]	0.591 [15.0]	0.591 [15.0]
D <sub>0</sub> - Feed hole diameter	0.157 [4.0]	0.157 [4.0]	0.157 [4.0]	0.157 [4.0]	0.157 [4.0]
f - Total tape thickness	0.028 [0.7]	0.028 [0.7]	0.028 [0.7]	0.028 [0.7]	0.028 [0.7]
L <sub>1</sub> - Maximum lead protrusion	0.118 [3.0]	0.118 [3.0]	0.118 [3.0]	0.118 [3.0]	0.118 [3.0]

**Note**

- Positive leader is standard. Negative leader is available by special order.

**ORDERING EXAMPLE**

Electrolytic capacitor 672D series: 672D 336 F 100 DM 5 D

DESCRIPTION	
CODE	EXPLANATION
672D	Product type
336	Capacitance value (33 μF)
F	Tolerance (F = -10 % / +50 %)
100	Voltage rating at 105 °C (100 = 100 V)
DM	Can size (see Dimensions table)
5	Sleeve and sealing (5 = polyester sleeve w/epoxy end seal)
D	Terminal code / packaging (D = bulk; straight leads)

**Note**

- For lead (Pb)-free / RoHS compliant products add suffix "E3" to part number.  
Example: 672D336F100DM5DE3

ELECTRICAL DATA AND ORDERING INFORMATION						
CAPACITANCE (μF)	PART NUMBER	NOMINAL CASE SIZE D x L	MAX. ESR AT +25 °C (Ω)		MAX. RIPPLE AT +85 °C (A) 20 kHz TO 100 kHz	MAX. IMPEDANCE AT +25 °C (Ω) 100 kHz
			120 Hz	20 kHz		
<b>6.3 WV<sub>DC</sub> AT 105 °C, SURGE = 9 V</b>						
150.0	672D157F6RCD5D	0.394 x 0.630 [10.0 x 16.0]	1.10	0.70	0.50	0.60
220.0	672D227F6RCG5D	0.394 x 0.787 [10.0 x 20.0]	0.75	0.40	0.70	0.33
1000.0	672D108F6REK5D	0.630 x 0.984 [16.0 x 25.0]	0.16	0.09	2.05	0.085
1500.0	672D158F6RET5D	0.630 x 1.319 [16.0 x 33.5]	0.105	0.06	2.90	0.055
3300.0	672D338F6RFV5D	0.709 x 1.575 [18.0 x 40.0]	0.075	0.045	3.40	0.045
<b>12 WV<sub>DC</sub> AT 105 °C, SURGE = 16 V</b>						
100.0	672D107F012CC5D	0.394 x 0.512 [10.0 x 13.0]	1.60	0.90	0.40	0.70
470.0	672D477F012DM5D	0.492 x 1.043 [12.5 x 26.5]	0.31	0.16	1.35	0.12
1000.0	672D108F012DS5D	0.492 x 1.673 [12.5 x 42.5]	0.15	0.08	2.35	0.06
2200.0	672D228F012FV5D	0.709 x 1.575 [18.0 x 40.0]	0.08	0.05	3.30	0.05
<b>15 WV<sub>DC</sub> AT 105 °C, SURGE = 20 V</b>						
100.0	672D107F015CD5D	0.394 x 0.630 [10.0 x 16.0]	1.35	0.70	0.50	0.50
470.0	672D477F015DT5D	0.492 x 1.319 [12.5 x 35.5]	0.25	0.12	1.75	0.11
1000.0	672D108F015ET5D	0.630 x 1.319 [16.0 x 33.5]	0.12	0.06	2.90	0.055
<b>20 WV<sub>DC</sub> AT 105 °C, SURGE = 30 V</b>						
100.0	672D107F020CG5D	0.394 x 0.787 [10.0 x 20.0]	1.25	0.40	0.70	0.35
470.0	672D477F020EK5D	0.630 x 0.984 [16.0 x 25.0]	0.24	0.09	2.00	0.085
1000.0	672D158F020FV5D	0.709 x 1.575 [18.0 x 40.0]	0.09	0.05	3.25	0.05



ELECTRICAL DATA AND ORDERING INFORMATION						
CAPACITANCE (µF)	PART NUMBER	NOMINAL CASE SIZE D x L	MAX. ESR AT +25 °C (Ω)		MAX. RIPPLE AT +85 °C (A) 20 kHz TO 100 kHz	MAX. IMPEDANCE AT +25 °C (Ω) 100 kHz
			120 Hz	20 kHz		
<b>25 WV<sub>DC</sub> AT 105 °C, SURGE = 35 V</b>						
47.0	672D476F025CC5D	0.394 x 0.512 [10.0 x 13.0]	2.35	0.90	0.40	0.85
330.0	672D337F025DT5D	0.492 x 1.319 [12.5 x 33.5]	0.29	0.12	1.75	0.10
470.0	672D477F025DS5D	0.492 x 1.673 [12.5 x 42.5]	0.22	0.08	2.35	0.07
1200.0	672D128F025FV5D	0.709 x 1.575 [18.0 x 40.0]	0.10	0.05	3.20	0.055
<b>40 WV<sub>DC</sub> AT 105 °C, SURGE = 55 V</b>						
220.0	672D227F040EK5D	0.630 x 0.984 [16.0 x 25.0]	0.48	0.14	1.65	0.12
330.0	672D337F040ET5D	0.630 x 1.319 [16.0 x 33.5]	0.32	0.12	2.25	0.08
<b>50 WV<sub>DC</sub> AT 105 °C, SURGE = 75 V</b>						
100.0	672D107F050DT5D	0.492 x 1.319 [12.5 x 33.5]	0.80	0.26	1.15	0.22
150.0	672D157F050EK5D	0.630 x 0.984 [16.0 x 25.0]	0.55	0.22	1.30	0.18
220.0	672D227F050ET5D	0.630 x 1.319 [16.0 x 33.5]	0.40	0.15	1.85	0.12
470.0	672D477F050FV5D	0.709 x 1.575 [18.0 x 40.0]	0.25	0.09	2.40	0.095
<b>60 WV<sub>DC</sub> AT 105 °C, SURGE = 85 V</b>						
15.0	672D156F060CD5D	0.394 x 0.512 [10.0 x 13.0]	7.00	2.00	0.28	1.70
22.0	672D226F060CG5D	0.394 x 0.787 [10.0 x 20.0]	4.60	1.20	0.40	1.00
100.0	672D107F060EK5D	0.630 x 0.984 [16.0 x 25.0]	0.90	0.28	1.20	0.24
150.0	672D157F060ET5D	0.630 x 1.319 [16.0 x 33.5]	0.60	0.18	1.65	0.15
<b>75 WV<sub>DC</sub> AT 105 °C, SURGE = 100 V</b>						
12.0	672D126F075CD5D	0.394 x 0.512 [10.0 x 13.0]	8.50	2.20	0.26	1.75
120.0	672D127F075ET5D	0.630 x 1.319 [16.0 x 33.5]	0.68	0.18	1.50	0.16
<b>100 WV<sub>DC</sub> AT 105 °C, SURGE = 125 V</b>						
10.0	672D106F100CD5D	0.394 x 0.630 [10.0 x 16.0]	10.00	2.30	0.26	1.80
33.0	672D336F100DM5D	0.492 x 1.043 [12.5 x 26.5]	2.55	0.55	0.72	0.39
120.0	672D127F100ET5D	0.630 x 1.319 [16.0 x 33.5]	0.68	0.19	1.50	0.17
<b>200 WV<sub>DC</sub> AT 105 °C, SURGE = 250 V</b>						
4.7	672D475F200CG5D	0.394 x 0.787 [10.0 x 20.0]	22.50	1.95	0.31	1.75
15.0	672D156F200DT5D	0.492 x 1.319 [12.5 x 33.5]	7.00	0.58	0.76	0.55
47.0	672D476F200FV5D	0.709 x 1.575 [18.0 x 40.0]	2.30	0.18	1.90	0.165
<b>250 WV<sub>DC</sub> AT 105 °C, SURGE = 300 V</b>						
10.0	672D106F250DT5D	0.492 x 1.319 [12.5 x 33.5]	12.00	1.50	0.48	1.60

ELECTRICAL DATA AND ORDERING INFORMATION - Original ratings		
CAPACITANCE (µF)	CASE CODE	PART NUMBER
<b>6.3 WV<sub>DC</sub> AT 105 °C, SURGE = 9 V</b>		
150.0	CD	672D157H6R3CD5C
220.0	CG	672D227H6R3CG5C
680.0	DM	672D687H6R3DM5C
1000.0	EK	672D108H6R3EK5C
1200.0	DS	672D158H6R3ET5C
3300.0	FV	672D338H6R3FV5C
<b>7.5 WV<sub>DC</sub> AT 105 °C, SURGE = 10 V</b>		
100.0	CC	672D107H7R5CC5C
150.0	CD	672D157H7R5CD5C
680.0	DT	672D687H7R5DT5C
1000.0	ET	672D108H7R5ET5C
2700.0	FV	672D278H7R5FV5C

**Note**

- Capacitance tolerance code H, -10 %, +100 %; lead code C, cut leads. C lead = negative lead: 0.281" [7.1 mm], ± 0.062" [1.6 mm]; positive lead: 0.375" [9.5 mm], ± 0.062" [1.6 mm]. D lead = 1.0" [25.4 mm] minimum.



<b>ELECTRICAL DATA AND ORDERING INFORMATION - Original ratings</b>		
<b>CAPACITANCE (µF)</b>	<b>CASE CODE</b>	<b>PART NUMBER</b>
<b>12 WV<sub>DC</sub> AT 105 °C, SURGE = 16 V</b>		
100.0	CC	672D107H012CC5C
150.0	CG	672D157H012CG5C
470.0	DM	672D477H012DM5C
680.0	DT	672D687H012DT5C
1000.0	DS	672D108H012DS5C
2200.0	FV	672D228H012FV5C
<b>15 WV<sub>DC</sub> AT 105 °C, SURGE = 20 V</b>		
100.0	CD	672D107H015CD5C
150.0	CG	672D157H015CG5C
470.0	DT	672D477H015DT5C
680.0	EK	672D687H015EK5C
820.0	DS	672D827H015DS5C
1000.0	ET	672D108H015ET5C
1800.0	FV	672D188H015FV5C
<b>20 WV<sub>DC</sub> AT 105 °C, SURGE = 30 V</b>		
68.0	CD	672D868H020CD5C
100.0	CG	672D107H020CG5C
330.0	DM	672D337H020DM5C
470.0	EK	672D477H020EK5C
560.0	DS	672D567H020DS5C
680.0	ET	672D687H020ET5C
1500.0	FV	672D158H020FV5C
<b>25 WV<sub>DC</sub> AT 105 °C, SURGE = 35 V</b>		
47.0	CC	672D476H025CC5C
68.0	CD	672D686H025CD5C
330.0	DT	672D337H025DT5C
470.0	DS	672D477H025DS5C
680.0	EU	672D687H025EU5C
1200.0	FV	672D128H025FV5C
<b>40 WV<sub>DC</sub> AT 105 °C, SURGE = 55 V</b>		
47.0	CD	672D476H040CD5C
220.0	EK	672D227H040EK5C
330.0	ET	672D337H040ET5C
390.0	DS	672D397H040DS5C
820.0	FV	672D827H040FV5C
<b>50 WV<sub>DC</sub> AT 105 °C, SURGE = 75 V</b>		
22.0	CD	672D226H050CD5C
100.0	DT	672D107H050DT5C
150.0	EK	672D157H050EK5C
180.0	DS	672D187H050DS5C
220.0	ET	672D227H050ET5C
470.0	FV	672D477H050FV5C
<b>60 WV<sub>DC</sub> AT 105 °C, SURGE = 85 V</b>		
15.0	CD	672D156H060CD5C
22.0	CG	672D226H060CG5C
68.0	DM	672D686H060DM5C
100.0	EK	672D107H060EK5C
120.0	DS	672D127H060DS5C
150.0	ET	672D157H060ET5C
390.0	FV	672D397H060FV5C

**Note**

- Capacitance tolerance code H, -10 %, +100 %; lead code C, cut leads. C lead = negative lead: 0.281" [7.1 mm], ± 0.062" [1.6 mm]; positive lead: 0.375" [9.5 mm], ± 0.062" [1.6 mm]. D lead = 1.0" [25.4 mm] minimum.



<b>ELECTRICAL DATA AND ORDERING INFORMATION - Original ratings</b>		
<b>CAPACITANCE (µF)</b>	<b>CASE CODE</b>	<b>PART NUMBER</b>
<b>75 WV<sub>DC</sub> AT 105 °C, SURGE = 100 V</b>		
12.0	CD	672D126H075CD5C
18.0	CG	672D186H075CG5C
82.0	EK	672D826H075EK5C
120.0	ET	672D127H075ET5C
270.0	FV	672D277H075FV5C
<b>100 WV<sub>DC</sub> AT 105 °C, SURGE = 125 V</b>		
8.2	CC	672D825H100CC5C
10.0	CD	672D106H100CD5C
33.0	DM	672D336H100DM5C
68.0	EK	672D686H100EK5C
120.0	ET	672D127H100ET5C
180.0	FV	672D187H100FV5C
<b>150 WV<sub>DC</sub> AT 105 °C, SURGE = 200 V</b>		
6.8	CG	672D685H150CG5C
22.0	DT	672D226H150DT5C
39.0	ET	672D396H150ET5C
68.0	FV	672D686H150FV5C
<b>200 WV<sub>DC</sub> AT 105 °C, SURGE = 250 V</b>		
4.7	CG	672D475H200CG5C
15.0	DT	672D156H200DT5C
27.0	ET	672D276H200ET5C
47.0	FV	672D476H200FV5C
<b>250 WV<sub>DC</sub> AT 105 °C, SURGE = 300 V</b>		
8.2	DM	672D825H250DM5C
10.0	DT	672D106H250DT5C
22.0	ET	672D226H250ET5C
39.0	FV	672D396H250FV5C

**Note**

- Capacitance tolerance code H, -10 %, +100 %; lead code C, cut leads. C lead = negative lead: 0.281" [7.1 mm], ± 0.062" [1.6 mm]; positive lead: 0.375" [9.5 mm], ± 0.062" [1.6 mm]. D lead = 1.0" [25.4 mm] minimum.

Statements about product lifetime are based on calculations and internal testing. They should only be interpreted as estimations. Also due to external factors, the lifetime in the field application may deviate from the calculated lifetime. In general, nothing stated herein shall be construed as a guarantee of durability.



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