

TDK Ferrite Chip EMI Filters

ACF SERIES

TDK has developed very thin surface mountable Ferrite-chip EMI Filters, ACF series for high density circuits on PCB. The Ferrite chip EMI Filters are composed of T type circuits with micro-beads and a multilayer ceramic chip capacitor.

FEATURES

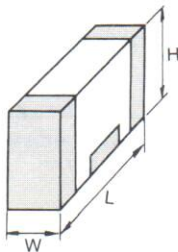
- The external structure is composed entirely of ferrite, so high attenuation can be obtained in spite of its compact size.
- Because it is a leadless type, stray capacitance and residual inductance of leads have been eliminated.
- They can be mounted using commercial automatic mounting machines.
- Because they can be mounted vertically, higher density mounting is possible.
- As the chip width is only 1.8mm [.070 inches], it can be mounted in parallel for a 2.54mm [.100 inches] IC pin pitch.
- The attenuation is 25dB and the guaranteed selectable frequency range is 7 MHz to 700 MHz (ACF321825: 11 to 700 MHz, ACF451832: 7 to 650 MHz) according to applications.

PRODUCT IDENTIFICATION

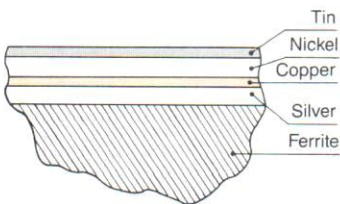
ACF 321825 - 223 - T

(1) (2) (3) (4)

- (1) ACF series
- (2) Dimensions (Length × Width × Height)
- (3) Capacitance (223: 22000pF)
- (4) Packaging style
T: Tapeing (ϕ 178mm reel)
TL: Taping (ϕ 330mm reel)
B: Bulk

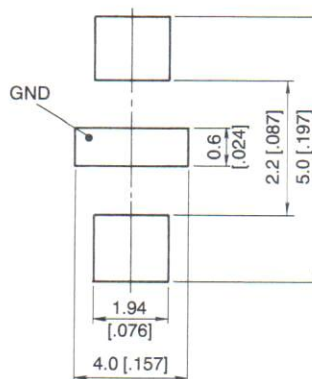


TERMINAL ELECTRODE CONSTRUCTION



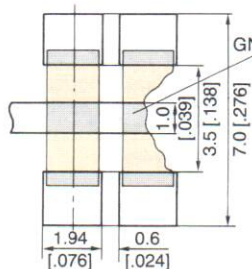
PC BOARD PATTERN

ACF321825 type

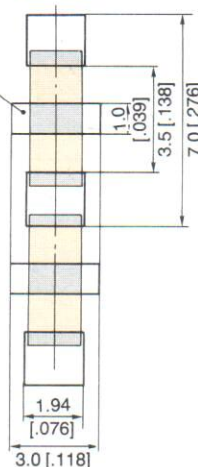


ACF451832 type

Parallel



Series

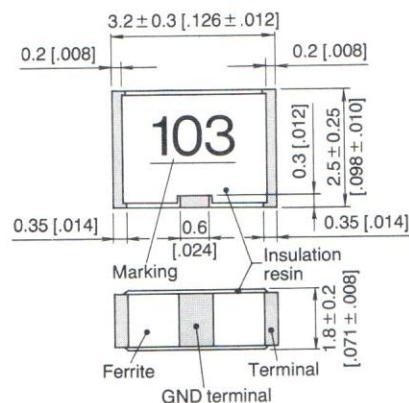


Dimensions in mm [inches]

TDK Ferrite Chip EMI Filters

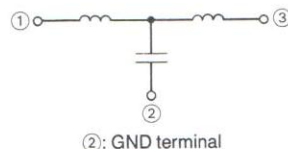
ACF321825 TYPE

SHAPES AND DIMENSIONS



Dimensions in mm [inches]

CIRCUIT



ELECTRICAL CHARACTERISTICS [Rated voltage: 20Vdc, Rated current: 300mA]

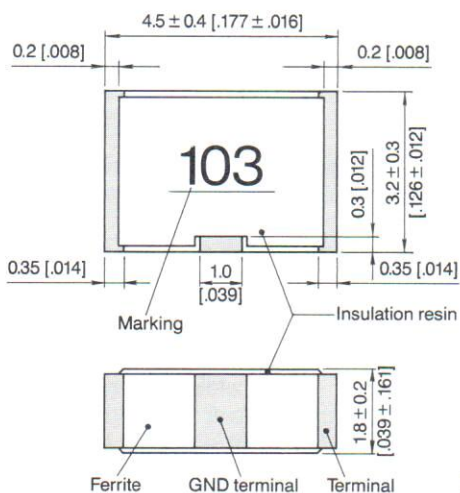
Part No.	Marking	Capacitance (pF)	Max. attenuation frequency (MHz)	25dB attenuation frequency range (MHz)	Insulation resistance ① to ② (MΩ) min.	DC resistance ① to ③ (Ω) max.
ACF321825-223-□*	223	22000	17	11 to 55	1000	0.15
ACF321825-103-□	103	10000	27	17 to 60	1000	0.15
ACF321825-682-□	682	6800	37	22 to 75	1000	0.15
ACF321825-472-□	472	4700	45	30 to 85	1000	0.15
ACF321825-332-□	332	3300	55	37 to 90	1000	0.15
ACF321825-222-□	222	2200	65	45 to 105	1000	0.15
ACF321825-152-□	152	1500	80	60 to 115	1000	0.15
ACF321825-102-□	102	1000	100	80 to 140	1000	0.15
ACF321825-681-□	681	680	120	95 to 150	1000	0.15
ACF321825-471-□	471	470	145	120 to 180	1000	0.15
ACF321825-331-□	331	330	165	130 to 210	1000	0.15
ACF321825-221-□	221	220	200	170 to 250	1000	0.15
ACF321825-151-□	151	150	240	205 to 280	1000	0.15
ACF321825-101-□	101	100	300	265 to 340	1000	0.15
ACF321825-680-□	680	68	370	340 to 420	1000	0.15
ACF321825-470-□	470	47	450	420 to 500	1000	0.15
ACF321825-330-□	330	33	530	500 to 600	1000	0.15
ACF321825-220-□	220	22	650	600 to 700	1000	0.15

* □: Packaging style, T: $\phi 178$ mm [7.008 inches] Reel taping, TL: $\phi 330$ mm [12.992 inches] Reel taping or B: Bulk

TDK Ferrite Chip EMI Filters

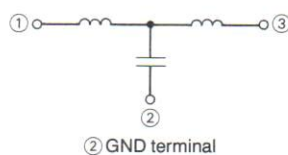
ACF451832 TYPE

SHAPES AND DIMENSIONS



Dimensions in mm [inches]

CIRCUIT



ELECTRICAL CHARACTERISTICS [Rated voltage: 50Vdc, Rated current: 300mA]

Part No.	Marking	Max. attenuation frequency (MHz)	25dB attenuation frequency range (MHz)	Insulation resistance (MΩ) min.	DC resistance ① to ③ (Ω) max.
ACF451832-333-□ *	333	12	7 to 60	1000	0.15
ACF451832-223-□	223	15	9 to 65	1000	0.15
ACF451832-153-□	153	18	11 to 70	1000	0.15
ACF451832-103-□	103 ✓	23	15 to 75	1000	0.15
ACF451832-682-□	682	35	20 to 85	1000	0.15
ACF451832-472-□	472	40	25 to 90	1000	0.15
ACF451832-332-□	332	50	35 to 100	1000	0.15
ACF451832-222-□	222	60	40 to 110	1000	0.15
ACF451832-152-□	152	75	50 to 130	1000	0.15
ACF451832-102-□	102 ✓	90	65 to 150	1000	0.15
ACF451832-681-□	681	105	75 to 160	1000	0.15
ACF451832-471-□	471	125	95 to 180	1000	0.15
ACF451832-331-□	331	150	115 to 205	1000	0.15
ACF451832-221-□	221	190	150 to 250	1000	0.15
ACF451832-151-□	151	230	190 to 290	1000	0.15
ACF451832-101-□	101	280	235 to 335	1000	0.15
ACF451832-680-□	680	340	295 to 395	1000	0.15
ACF451832-470-□	470	410	360 to 460	1000	0.15
ACF451832-330-□	330	500	450 to 550	1000	0.15
ACF451832-220-□	220	600	550 to 650	1000	0.15

* □: Packaging style, T: $\phi 178\text{mm}$ [7.008 inches] Reel taping, TL: $\phi 330\text{mm}$ [12.992 inches] Reel taping or B: Bulk

TDK Ferrite Chip EMI Filters

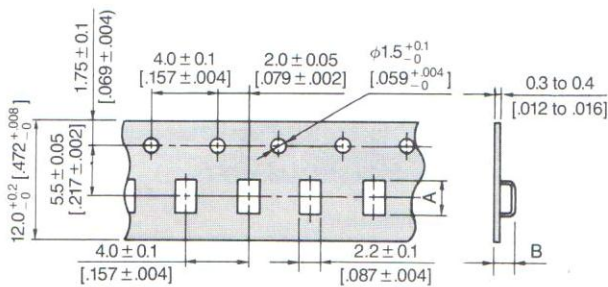
PACKAGING

Packaging style and quantity

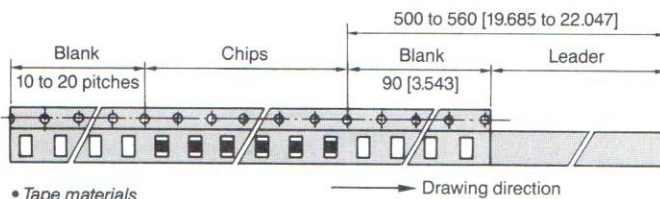
Taping: 1000, 5000 pcs./reel

Bulk: 2000 pcs./box

Tape dimensions



Type	ACF321825	ACF451832
A	3.7 ± 0.05 [.146 ± .002]	5.2 ± 0.05 [.205 ± .002]
B	3.1 ± 0.05 [.122 ± .002]	3.6 ± 0.05 [.142 ± .002]

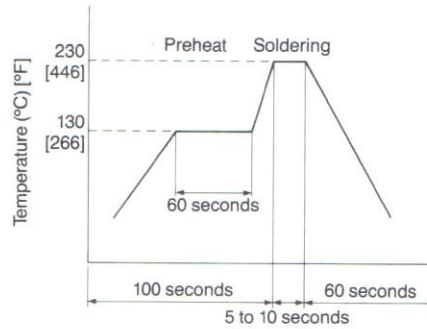


• Tape materials
Base tape: Polystyrene
Cover tape: Polyethylene

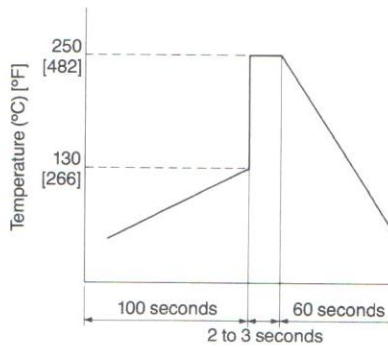
Dimensions in mm [inches]

RECOMMENDED SOLDERING CONDITIONS

Reflow soldering



Flow soldering



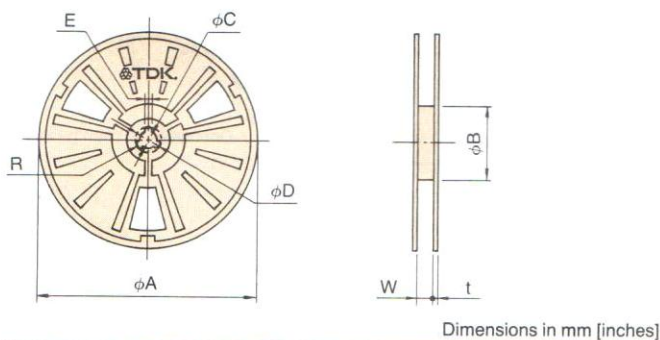
Iron soldering

2 seconds max. at 320°C [608°F], 30W max.

CLEANING

Rosin-based flux is recommended. It is also recommended that cleaning will be done with two minutes using a chlorine-based solvent (example; 1-1-1 tri-chloro-ethane). Do not use acid or alkali solvents.

Reel dimensions



Dimensions in mm [inches]

Taping code	T	TL
A	178 ± 2 [7.008 ± .079]	330 ± 2 [12.992 ± .079]
B	60 ± 1 [2.362 ± .039]	100 ± 2 [3.937 ± .079]
C	13 ± 0.5 [.512 ± .020]	13 ± 0.8 [.512 ± .031]
D	21 ± 0.8 [.827 ± .031]	21 ± 0.8 [.827 ± .031]
E	2 [.079]	2 [.079]
W	14 ± 1.5 [.551 ± .059]	14 ± 1.5 [.551 ± .059]
t	2 ± 0.5 [.079 ± .020]	2 ± 0.5 [.079 ± .020]
R	1 [.039]	1 [.039]
Quantity reel	1000 pcs.	5000 pcs.

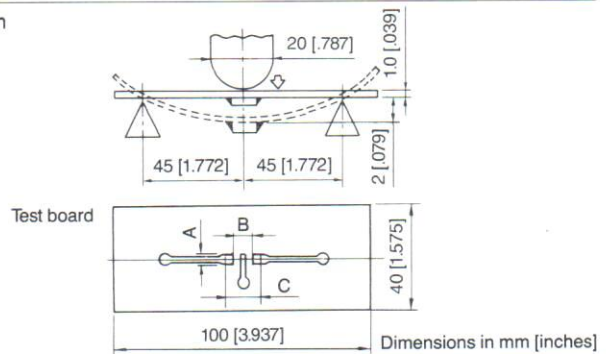
• Reel material: Plastics

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RELIABILITY AND TEST CONDITIONS

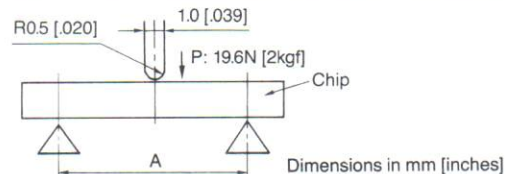
Item	Test conditions	
Operating temperature range	- 25 to +85°C [- 13 to +185°F]	
Storage temperature range	- 40 to +85°C [- 40 to +185°F] 0 to 60°C [32 to 140°F] (in tape and reel packaging)	
Soldering heat resistance	The chip shall not crack. More than 75% of the terminal electrode shall be covered with solder.	Preheat: 120 to 150°C [248 to 302°F] for 60 seconds Solder: H63A (eutectic solder) Solder temperature: 270 ± 5°C [518 ± 9°F] Flux: Rosin Dip time: 3 ± 0.5 seconds
Solderability	More than 90% of the terminal electrode shall be covered with new solder.	Preheat: 120 to 150°C [248 to 302°F] for 60 seconds Solder: H63A (eutectic solder) Solder temperature: 230 ± 5°C [446 ± 9°F] Flux: Rosin Dip time: 4 ± 1 seconds

Flexure strength No mechanical damage shall be noticed even when the board is bent 2 mm [.079 inches].



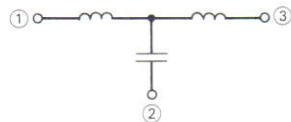
Type	A	B	C
ACF321825	1.94 [.076]	2.2 [.087]	5 [.197]
ACF451832	3 [.118]	3.5 [.138]	7 [.106]

Bending strength The ferrite shall not be damaged by forces applied on the right:



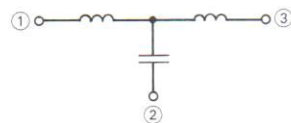
Type	A
ACF321825	2 [.079]
ACF451832	2.7 [.106]

High temperature resistance Insulation resistance 100MΩ min.
DC resistance 0.15Ω max.



Humidity resistance

Thermal shock (Temperature cycle) Insulation resistance 500MΩ min.
DC resistance 0.15Ω max.



Low temperature resistance

Drop

Vibration

Applied 50Vdc for ACF451832 type, or 20Vdc for ACF321825 type, 300mAdc and placed at 85 ± 2°C [185 ± 3.6°F] for 1000 ± 12 hours.
Then measured at room ambient temperature after placing for 24 hours.

Applied 50Vdc for ACF451832 type, or 20Vdc for ACF321825 type, 300mAdc and placed at 90 to 95%RH for 500 hours.
Then measured at room ambient temperature after placing for 24 hours.

Temperature: - 40 to + 85°C [- 40 to + 185°F] for 30 minutes each, 100 cycles.
Then measured at room ambient temperature after placing for 24 hours.

Placed at - 40 ± 2°C [- 40 ± 3.6°F] for 1000 ± 12 hours and measured at room ambient temperature after placing for 24 hours.

Drop 10 times on a concrete floor from a height of 1 m [39.370 inches].

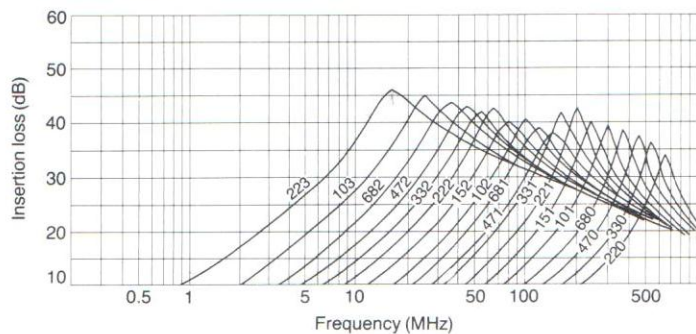
Frequency: 10 to 55 Hz
Amplitude: 1.52 mm [.060 inches]
Direction and time: X, Y and Z directions for 2 hours each.

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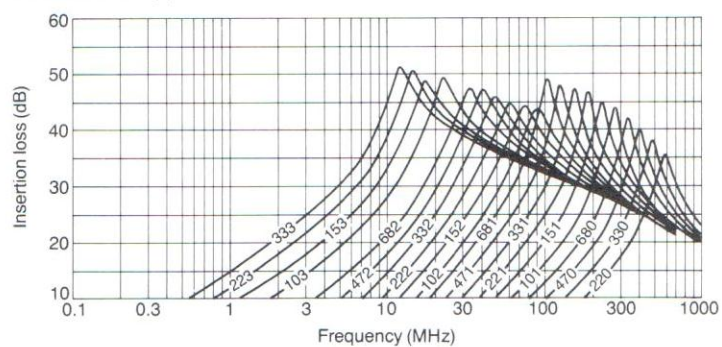
TYPICAL ELECTRICAL CHARACTERISTICS

Insertion loss vs. frequency characteristics

ACF321825 type



ACF451832 type



Measuring

