

# Through Hole Fixed Inductors

**Token fixed inductors meet the needs of a variety of manufacturing methods (TCAL)**

## ▶ Preview

Token TCAL series fixed inductor utilizes the latest winding technology with special core material, sturdy construction, outer layer of epoxy resin processing, high Q value and self-resonance frequency, wide inductance range, high reliability, and low price.

The TCAL series is ideal for consumer electronics such as digital set-top boxes (DVB), digital video disc players (DVD), video cassette recorders (VCR), television (TV), computers, audio equipment, mobile communications, telephone, and various general-purpose electronic applications.

Token highly efficient automated production processes offer a full range of high-quality inductors products suitable for automatic plug-in operation. The TCAL provides 0204,0307,0410, and 0510 size varieties of different forming, such as Normal & Short Form, F Forming, U Forming, Pana Forming, and bulk products to meet the needs of a variety of manufacturing methods.

Token TCAL Series fixed inductors are full line conforming with RoHS specifications, Pb-free standards. Provide a complete inductor size and full range inductance, and custom parts are available on request. Token will also produce devices outside these specifications to meet specific customer requirements, please contact our sales for more information.

### Applications :

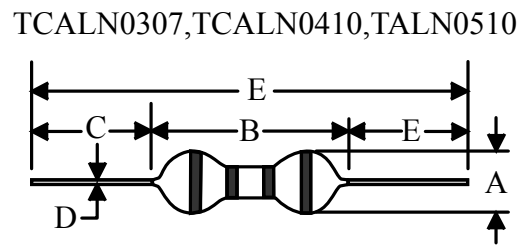
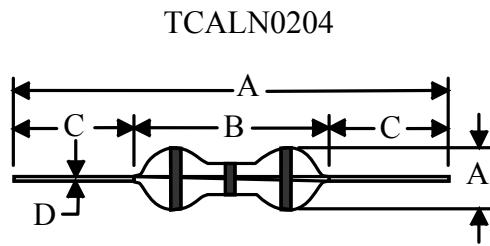
- TV, VCR.
- Computer Devices
- Electronics products.
- Communication equipment.

### Features :

- Low Cost.
- Coating epoxy resin that ensures the humidity resistance to be long life.

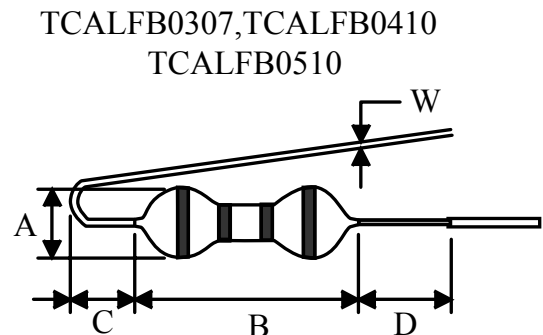
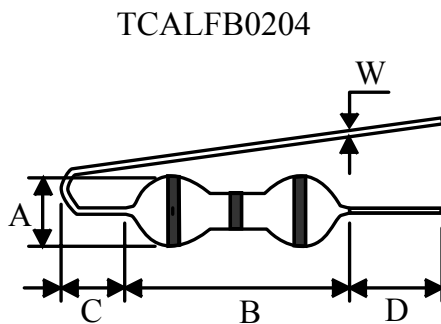


## Normal Form & Short Form



Type	$\Phi A(\text{max})$	B(max)	$C \pm 3.0$	$\Phi D \pm 0.05$	$E \pm 1.5$
TCALN0204	2.8	5.0	29.5	0.50	62.5
TCALS0204	2.8	5.0	16.0	0.50	36.5
TCALN0307	3.0	7.0	28.0	0.50	62.5
TCALS0307	3.0	7.0	15.0	0.50	36.5
TCALN0410	4.0	10.0	26.0	0.65	62.5
TCALS0410	4.0	10.0	14.0	0.65	36.5
TCALN0510	5.0	10.0	26.0	0.65	62.5
TCALS0510	5.0	10.0	14.0	0.65	36.5

## F Forming



Sym.	TCALFB0204	TCALFB0307	TCALFB0410	TCALFB0510
A (max)	2.80	3.00	4.00	5.00
B (max)	5.00	7.00	10.00	10.00
C (max)	6.00	6.00	6.00	6.00
D (min)	3.60	3.60	4.00	4.00
$W \pm 0.05$	0.50 $\Phi$	0.50 $\Phi$	0.65 $\Phi$	0.65 $\Phi$

## ► U Forming

TCALUB0204

TCALUB0307, TCALUB0410  
TCALUB0510

Sym.	TCALUB0204	TCALUB0307	TCALUB0410	TCALUB0510
A (max)	2.80	3.00	4.00	5.00
B (max)	5.00	7.00	10.00	10.00
C (min)	3.60	3.60	3.60	3.60
F	6 ~ 15	10 ~ 20	12.5 ~ 20	12.5 ~ 20
W ± 0.05	0.50 Φ	0.50 Φ	0.65 Φ	0.65 Φ

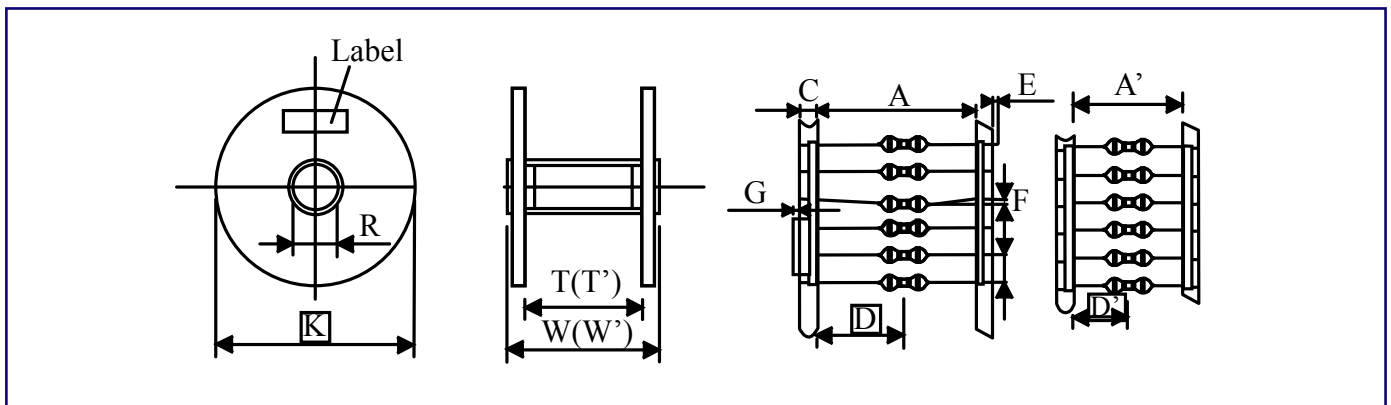
## ► (TCAL 0307 Series) Pana Forming

Coating

Unit in mm

A	B	C	D0	F	H	H0	H1	h	h1
3.00 (max)	7.00 (max)	3.00 +0.00 -1.00	4.00±0.3	5.00 +0.80 -0.20	19.00 +1.00 -0.30	16.00±0.5	28.50 (max)	0.00 ±2.0 (±5°)	0.00 ±2.0 (±5°)
P	P0	P1	P2	T	W	W0	W1	W2	
12.7±1.0	12.7±0.3	3.85±0.7	6.35±1.3	0.7±0.2	18.00 +1.00 -0.50	13.00±1.0	9.00 +0.75 -0.50	4.00 (max)	

## (Axial Lead Type) Dimensions of Tape & Reel

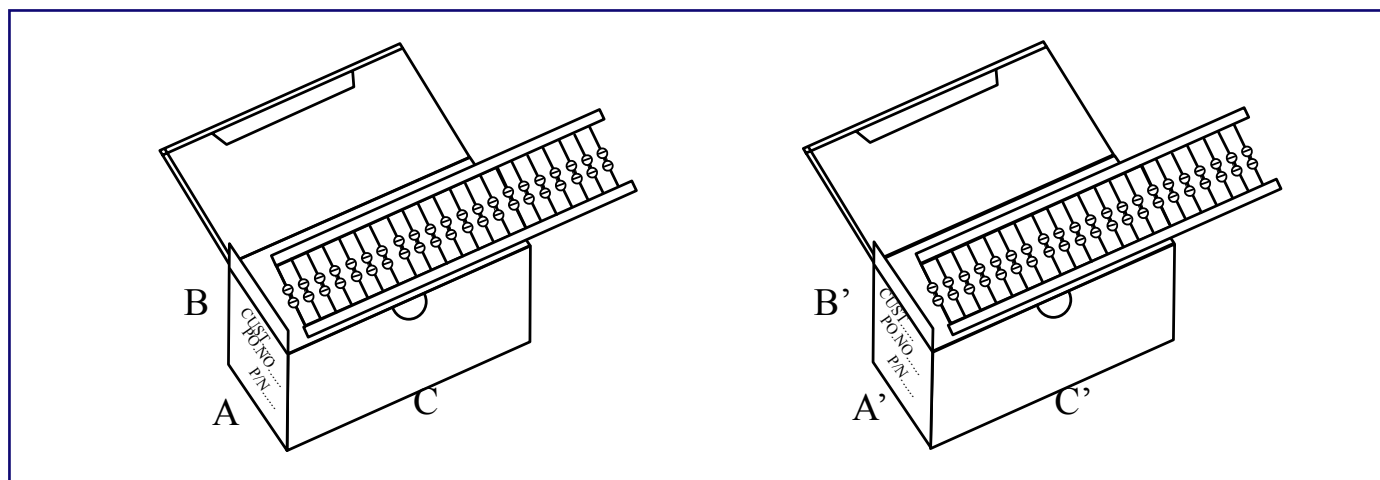


Sym.	Dimensions	Sym.	Dimensions	Sym.	Dimensions
A	52.00 ± 1.50	E	0.00 ± 0.50	T'	45.00 ± 0.50
A'	26.00 ± 1.50	F	1.00 (max)	W	76.00 ± 0.50
B	5.00 ± 0.50	G	1.00 (max)	W'	50.00 ± 0.50
C	6.00 ± 1.00	K	355.00 ± 0.50		
D	26.00 ± 0.50	R	15.00 ± 0.50		
D'	13.00 ± 0.50	T	71.00 ± 0.50		

## (Axial Lead Type) Packing Unit for Reel

Item	TCAL0204	TCAL0307	TCAL0410	TCAL0510
Q' TY/ Reel	5,000 PCS	5,000 PCS	5,000 PCS	3,000 PCS
GW/Reel (Approx.)	1.4 Kgm	1.6 Kgm	2.0 Kgm	2.0 Kgm
Q' TY/CTN.	25,000 PCS	25,000 PCS	25,000 PCS	15,000 PCS
NW/CTN. (Approx.)	7.0 Kgm	8.0 Kgm	10.0 Kgm	10.0 Kgm
GW/CTN. (Approx.)	8.0 Kgm	9.0 Kgm	11.0 Kgm	11.0 Kgm
Carton Size (mm)	397 × 397 × 479	397 × 397 × 479	397 × 397 × 479	397 × 397 × 479

## ▶ (Axial Lead Type) Dimensions of Ammo Box



Sym.	Dimensions	Sym.	Dimensions	Sym.	Dimensions
A	74.00 ± 0.30	B	108.00 ± 0.30	C	260.00 ± 0.30
A'	48.00 ± 0.30	B'	105.00 ± 0.30	C'	255.00 ± 0.30

## ▶ (Axial Lead Type) Packing Unit for Box

Item	TCAL0204	TCAL0307	TCAL0410	TCAL0510
Q' TY / Ammo Box	3,000 PCS	3,000 PCS	2,000 PCS	1,500 PCS
GW / Box(Approx.)	0.8 KGM	0.9 KGM	1.0 KGM	0.7 KGM
Q' TY / CTN.	30,000 PCS	30,000 PCS	20,000 PCS	10,000 PCS
NW / CTN. (Approx.)	6.0 Kgm	7.0 Kgm	8.0 Kgm	5.0 Kgm
GW / CTN.(Approx.)	8.0 Kgm	9.0 Kgm	10.0 Kgm	7.0 Kgm
Carton Size (mm)	438 × 295 × 270	438 × 295 × 270	438 × 295 × 270s	438 × 295 × 270

## ▶ (Axial Lead Type) Packing Unit for Bulk

Item	TCAL0204	TCAL0307	TCAL0410	TCAL0510
Q' TY / Bag	1,000 PCS	1,000 PCS	1,000 PCS	500 PCS
GW / Bag (Approx.)	0.1 Kgm	0.15 Kgm	0.3 Kgm	0.3 Kgm

## How to Order



① Part Number: TCAL

② Form

Code	Form
N	Normal Form
S	Short Form
F	F Forming
U	U Forming
P	Pana Forming without coating of lead wire
PC	Pana Forming with coating of lead wire

③ Package

Code	Package
P	Bulk
TR	Taping Reel
TB	Taping Box

④ Size

Code	Size
0204	2.8×5.0mm
0307	3.0×7.0mm
0410	4.0×10.0mm
0510	5.0×10.0mm

④ Inductance

Code	Inductance
R10	0.10μH
1R0	1.00μH
100	10.00μH
101	100.00μH
102	1000.00μH

⑤ Tolerance

Code	Tolerance
J	5%
K	10%
M	20%

## ▶ How to Select a fixed inductor

Perfectly, inductors should have zero resistance and capacitance. This is not practically possible, as the conducting copper wires, used for fixed inductors, have small internal resistance.

### Important criteria for the selection are:

- **Inductance Range (H):**

The rated inductance range of the inductor. This is designated by  $\pm 10\%$  of the inductance.

- **Quality Factor (Q):**

The Q value of an inductor is a measure of the relative losses in an inductor. The Q is also known as the “quality factor” and is technically defined as the ratio of inductive reactance to effective resistance.

- **Self-Resonant Frequency (SRF):**

The frequency at which the inductor’s distributed capacitance resonates with the inductance. It is at this frequency that the inductance is equal to the capacitance and they cancel each other. The inductor will act purely resistive with a high impedance at the SRF point.

- **Permissible DC Current:**

Measured in Ohms, it is the maximum DC current that the inductor should be exposed to.

## (TCAL0204) Characteristics

Part Number	Inductance (μH)	Q (min)	Freq. (MHz)	SRF (MHz)(min)	DCR (Ω)(max)	RDC (mA)(max)
TCAL**0204-R22M	0.22±20%	40	25.2	175	0.20	705
TCAL**0204-R27M	0.27±20%	40	25.2	160	0.22	670
TCAL**0204-R33M	0.33±20%	40	25.2	150	0.24	645
TCAL**0204-R39M	0.39±20%	50	25.2	150	0.27	605
TCAL**0204-R47M	0.47±20%	50	25.2	150	0.30	575
TCAL**0204-R56M	0.56±20%	50	25.2	150	0.34	540
TCAL**0204-R68M	0.68±20%	50	25.2	150	0.38	510
TCAL**0204-R82M	0.82±20%	50	25.2	150	0.43	480
TCAL**0204-1R0K	1.0±10%	50	25.2	150	0.46	465
TCAL**0204-1R2K	1.2±10%	50	7.96	110	0.52	435
TCAL**0204-1R5K	1.5±10%	50	7.96	80	0.57	415
TCAL**0204-1R8K	1.8±10%	50	7.96	66	0.60	405
TCAL**0204-2R2K	2.2±10%	50	7.96	60	0.65	390
TCAL**0204-2R7K	2.7±10%	50	7.96	54	0.73	370
TCAL**0204-3R3K	3.3±10%	50	7.96	48	0.82	345
TCAL**0204-3R9K	3.9±10%	50	7.96	44	0.90	330
TCAL**0204-4R7K	4.7±10%	50	7.96	38	1.00	315
TCAL**0204-5R6K	5.6±10%	50	7.96	34	1.10	300
TCAL**0204-6R8K	6.8±10%	50	7.96	30	1.20	285
TCAL**0204-8R2K	8.2±10%	50	7.96	26	1.30	275
TCAL**0204-100K	10±10%	50	7.96	24	1.40	265
TCAL**0204-120K	12±10%	50	2.52	22	1.50	255
TCAL**0204-150K	15±10%	50	2.52	20	1.65	245
TCAL**0204-180K	18±10%	50	2.52	18	1.90	225
TCAL**0204-220K	22±10%	50	2.52	17	2.20	210
TCAL**0204-270K	27±10%	50	2.52	16	2.50	200
TCAL**0204-330K	33±10%	50	2.52	14	3.80	160
TCAL**0204-390K	39±10%	50	2.52	13	4.20	150
TCAL**0204-470K	47±10%	50	2.52	12	4.60	145
TCAL**0204-560K	56±10%	40	2.52	11	5.10	140
TCAL**0204-680K	68±10%	40	2.52	10	5.60	130
TCAL**0204-820K	82±10%	40	2.52	9.5	9.60	100
TCAL**0204-101K	100±10%	40	2.52	8.0	10.8	95
TCAL**0204-121K	120±10%	40	0.796	6.5	12.5	85
TCAL**0204-151K	150±10%	40	0.796	6.0	14.5	80
TCAL**0204-181K	180±10%	40	0.796	5.5	16.3	75
TCAL**0204-221K	220±10%	40	0.796	5.0	20.0	70



## ▶ (TCAL0307) Characteristics

Part Number	Inductance( $\mu$ H)	Q(min)	Freq.(MHz)	SRF(MHz)(min)	DCR( $\Omega$ )(max)	RDC(mA)(max)
TCAL**0307-R22M	0.22 $\pm$ 20%	30	25.2	380	0.075	1150
TCAL**0307-R27M	0.27 $\pm$ 20%	30	25.2	360	0.08	1110
TCAL**0307-R33M	0.33 $\pm$ 20%	30	25.2	350	0.08	1110
TCAL**0307-R39M	0.39 $\pm$ 20%	30	25.2	320	0.09	1000
TCAL**0307-R47M	0.47 $\pm$ 20%	30	25.2	300	0.10	1000
TCAL**0307-R56M	0.56 $\pm$ 20%	30	25.2	280	0.11	950
TCAL**0307-R68M	0.68 $\pm$ 20%	30	25.2	250	0.12	900
TCAL**0307-R82M	0.82 $\pm$ 20%	30	25.2	200	0.12	900
TCAL**0307-1R0K	1.0 $\pm$ 10%	40	25.2	180	0.15	815
TCAL**0307-1R2K	1.2 $\pm$ 10%	40	7.96	165	0.18	740
TCAL**0307-1R5K	1.5 $\pm$ 10%	40	7.96	150	0.20	700
TCAL**0307-1R8K	1.8 $\pm$ 10%	50	7.96	125	0.23	655
TCAL**0307-2R2K	2.2 $\pm$ 10%	50	7.96	110	0.25	630
TCAL**0307-2R7K	2.7 $\pm$ 10%	50	7.96	95	0.28	595
TCAL**0307-3R3K	3.3 $\pm$ 10%	50	7.96	70	0.30	575
TCAL**0307-3R9K	3.9 $\pm$ 10%	45	7.96	65	0.32	555
TCAL**0307-4R7K	4.7 $\pm$ 10%	45	7.96	50	0.35	530
TCAL**0307-5R6K	5.6 $\pm$ 10%	45	7.96	40	0.40	500
TCAL**0307-6R8K	6.8 $\pm$ 10%	40	7.96	30	0.45	470
TCAL**0307-8R2K	8.2 $\pm$ 10%	40	7.96	28	0.55	425
TCAL**0307-100K	10 $\pm$ 10%	40	7.96	22	0.72	370
TCAL**0307-120K	12 $\pm$ 10%	40	2.52	20	0.80	350
TCAL**0307-150K	15 $\pm$ 10%	50	2.52	16	0.88	335
TCAL**0307-180K	18 $\pm$ 10%	50	2.52	15	1.00	315
TCAL**0307-220K	22 $\pm$ 10%	50	2.52	13	1.20	285
TCAL**0307-270K	27 $\pm$ 10%	50	2.52	11	1.35	270
TCAL**0307-330K	33 $\pm$ 10%	50	2.52	10	1.50	255
TCAL**0307-390K	39 $\pm$ 10%	50	2.52	9.5	1.70	240
TCAL**0307-470K	47 $\pm$ 10%	60	2.52	8.5	2.30	205
TCAL**0307-560K	56 $\pm$ 10%	60	2.52	7.5	2.60	195
TCAL**0307-680K	68 $\pm$ 10%	60	2.52	6.5	2.90	185
TCAL**0307-820K	82 $\pm$ 10%	60	2.52	6.0	3.20	175
TCAL**0307-101K	100 $\pm$ 10%	60	2.52	5.5	3.50	165
TCAL**0307-121K	120 $\pm$ 10%	60	0.796	5.4	3.80	160
TCAL**0307-151K	150 $\pm$ 10%	60	0.796	4.75	4.40	150
TCAL**0307-181K	180 $\pm$ 10%	60	0.796	4.35	5.00	140
TCAL**0307-221K	220 $\pm$ 10%	60	0.796	4.0	5.70	130
TCAL**0307-271K	270 $\pm$ 10%	60	0.796	3.7	6.50	120
TCAL**0307-331K	330 $\pm$ 10%	60	0.796	3.4	9.50	100
TCAL**0307-391K	390 $\pm$ 10%	60	0.796	2.8	10.5	95
TCAL**0307-471K	470 $\pm$ 10%	60	0.796	2.55	11.6	90
TCAL**0307-561K	560 $\pm$ 10%	60	0.796	2.35	13.0	85
TCAL**0307-681K	680 $\pm$ 10%	60	0.796	2.0	18.0	75
TCAL**0307-821K	820 $\pm$ 10%	60	0.796	1.5	23.0	65
TCAL**0307-102K	1000 $\pm$ 10%	60	0.796	1.2	26.0	60

## ▶ (TCAL0410) Characteristics

Part Number	Inductance( $\mu$ H)	Q(min)	Freq.(MHz)	SRF(MHz)(min)	DCR( $\Omega$ )(max)	RDC(mA)(max)
TCAL**0410-R22M	0.22 $\pm$ 20%	25	25.2	380	0.21	880
TCAL**0410-R27M	0.27 $\pm$ 20%	25	25.2	340	0.24	800
TCAL**0410-R33M	0.33 $\pm$ 20%	25	25.2	300	0.28	750
TCAL**0410-R39M	0.39 $\pm$ 20%	25	25.2	280	0.32	680
TCAL**0410-R47M	0.47 $\pm$ 20%	25	25.2	250	0.36	650
TCAL**0410-R56M	0.56 $\pm$ 20%	25	25.2	230	0.41	600
TCAL**0410-R68M	0.68 $\pm$ 20%	25	25.2	210	0.47	550
TCAL**0410-R82M	0.82 $\pm$ 20%	45	25.2	172	0.17	980
TCAL**0410-1R0K	1.0 $\pm$ 10%	45	25.2	157	0.19	920
TCAL**0410-1R2K	1.2 $\pm$ 10%	50	7.96	144	0.21	880
TCAL**0410-1R5K	1.5 $\pm$ 10%	50	7.96	131	0.23	830
TCAL**0410-1R8K	1.8 $\pm$ 10%	55	7.96	121	0.25	790
TCAL**0410-2R2K	2.2 $\pm$ 10%	55	7.96	110	0.28	750
TCAL**0410-2R7K	2.7 $\pm$ 10%	60	7.96	100	0.30	720
TCAL**0410-3R3K	3.3 $\pm$ 10%	60	7.96	94	0.34	670
TCAL**0410-3R9K	3.9 $\pm$ 10%	60	7.96	86	0.37	640
TCAL**0410-4R7K	4.7 $\pm$ 10%	60	7.96	80	0.39	620
TCAL**0410-5R6K	5.6 $\pm$ 10%	60	7.96	74	0.43	590
TCAL**0410-6R8K	6.8 $\pm$ 10%	60	7.96	68	0.48	550
TCAL**0410-8R2K	8.2 $\pm$ 10%	60	7.96	53	0.52	530
TCAL**0410-100K	10 $\pm$ 10%	60	7.96	45	0.58	500
TCAL**0410-120K	12 $\pm$ 10%	60	2.52	34	0.63	480
TCAL**0410-150K	15 $\pm$ 10%	60	2.52	20	0.72	460
TCAL**0410-180K	18 $\pm$ 10%	60	2.52	14	0.77	430
TCAL**0410-220K	22 $\pm$ 10%	60	2.52	9.9	0.84	410
TCAL**0410-270K	27 $\pm$ 10%	50	2.52	7.6	0.94	390
TCAL**0410-330K	33 $\pm$ 10%	50	2.52	6.3	1.03	370
TCAL**0410-390K	39 $\pm$ 10%	50	2.52	6.3	1.12	350
TCAL**0410-470K	47 $\pm$ 10%	50	2.52	6.3	1.22	340
TCAL**0410-560K	56 $\pm$ 10%	40	2.52	6.2	1.34	320
TCAL**0410-680K	68 $\pm$ 10%	40	2.52	5.7	1.47	305
TCAL**0410-820K	82 $\pm$ 10%	35	2.52	5.3	1.62	290
TCAL**0410-101K	100 $\pm$ 10%	35	2.52	4.8	1.80	275
TCAL**0410-121K	120 $\pm$ 10%	60	0.796	3.8	3.70	185
TCAL**0410-151K	150 $\pm$ 10%	60	0.796	3.5	4.20	175
TCAL**0410-181K	180 $\pm$ 10%	60	0.796	3.3	4.60	165
TCAL**0410-221K	220 $\pm$ 10%	60	0.796	3.0	5.10	155
TCAL**0410-271K	270 $\pm$ 10%	60	0.796	2.8	5.80	145
TCAL**0410-331K	330 $\pm$ 10%	60	0.796	2.6	6.40	137
TCAL**0410-391K	390 $\pm$ 10%	60	0.796	2.4	7.00	133
TCAL**0410-471K	470 $\pm$ 10%	60	0.796	2.25	7.70	126
TCAL**0410-561K	560 $\pm$ 10%	60	0.796	2.1	8.50	120
TCAL**0410-681K	680 $\pm$ 10%	55	0.796	1.95	9.40	113
TCAL**0410-821K	820 $\pm$ 10%	55	0.796	1.85	10.5	100
TCAL**0410-102K	1000 $\pm$ 10%	50	0.796	1.4	14.0	100

## Fixed Inductors (TCAL0510) Characteristics

Part Number	Inductance( $\mu$ H)	Q(min)	Freq.(MHz)	SRF(MHz)(min)	DCR( $\Omega$ )(max)	RDC(mA)(max)
TCAL**0510-R56M	0.56 $\pm$ 10%	50	25.2	280	0.14	1150
TCAL**0510-R68K	0.68 $\pm$ 10%	50	25.2	250	0.15	1100
TCAL**0510-R82M	0.82 $\pm$ 10%	50	25.2	220	0.22	900
TCAL**0510-1R0K	1.0 $\pm$ 10%	50	25.2	200	0.29	785
TCAL**0510-1R2K	1.2 $\pm$ 10%	33	7.96	180	0.42	650
TCAL**0510-1R5K	1.5 $\pm$ 10%	33	7.96	160	0.50	600
TCAL**0510-1R8K	1.8 $\pm$ 10%	33	7.96	150	0.65	525
TCAL**0510-2R2K	2.2 $\pm$ 10%	33	7.96	135	0.95	435
TCAL**0510-2R7K	2.7 $\pm$ 10%	33	7.96	120	1.5	385
TCAL**0510-3R3K	3.3 $\pm$ 10%	33	7.96	110	2.0	300
TCAL**0510-3R9K	3.9 $\pm$ 10%	33	7.96	100	2.3	280
TCAL**0510-4R7K	4.7 $\pm$ 10%	33	7.96	90	2.8	260
TCAL**0510-5R6K	5.6 $\pm$ 10%	45	7.96	60	0.32	495
TCAL**0510-6R8K	6.8 $\pm$ 10%	45	7.96	55	0.5	395
TCAL**0510-8R2K	8.2 $\pm$ 10%	45	7.96	50	0.6	360
TCAL**0510-100K	10 $\pm$ 10%	45	7.96	45	0.9	290
TCAL**0510-120K	12 $\pm$ 10%	60	2.52	42	1.2	265
TCAL**0510-150K	15 $\pm$ 10%	65	2.52	40	1.7	240
TCAL**0510-180K	18 $\pm$ 10%	65	2.52	34	2.3	185
TCAL**0510-220K	22 $\pm$ 10%	65	2.52	30	2.6	175
TCAL**0510-270K	27 $\pm$ 10%	45	2.52	25	2.0	170
TCAL**0510-330K	33 $\pm$ 10%	45	2.52	19	2.3	165
TCAL**0510-390K	39 $\pm$ 10%	45	2.52	15	2.5	165
TCAL**0510-470K	47 $\pm$ 10%	45	2.52	14	2.6	165
TCAL**0510-560K	56 $\pm$ 10%	50	2.52	12	3.0	164
TCAL**0510-680K	68 $\pm$ 10%	50	2.52	11	3.3	156
TCAL**0510-820K	82 $\pm$ 10%	50	2.52	10	3.9	143
TCAL**0510-101K	100 $\pm$ 10%	50	2.52	9	4.5	133
TCAL**0510-121K	120 $\pm$ 10%	60	0.796	8.5	5.2	124
TCAL**0510-151K	150 $\pm$ 10%	40	0.796	7.8	6.18	114
TCAL**0510-181K	180 $\pm$ 10%	60	0.796	7.0	6.8	108
TCAL**0510-221K	220 $\pm$ 10%	60	0.796	6.2	7.5	103
TCAL**0510-271K	270 $\pm$ 10%	60	0.796	5.6	8.2	103
TCAL**0510-331K	330 $\pm$ 10%	60	0.796	5.0	9.1	102
TCAL**0510-391K	390 $\pm$ 10%	60	0.796	4.5	10	102
TCAL**0510-471K	470 $\pm$ 10%	60	0.796	4.0	11	100
TCAL**0510-561K	560 $\pm$ 10%	60	0.796	3.6	12.3	85
TCAL**0510-681K	680 $\pm$ 10%	60	0.796	3.6	13.7	81
TCAL**0510-821K	820 $\pm$ 10%	60	0.796	1.32	3.1	180
TCAL**0510-102K	1000 $\pm$ 10%	60	0.796	1.25	4.1	156

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