

零件承认书

SPECIFICATION FOR APPROVAL

客户名称: 0001规格描述: ZECD功率电感系列规格书日期: 2024/08/10

增益签核:

制订	审核	核准
夏琳	陈雨	李万

客户签核:

工程	审核	核准



东莞市增益实业有限公司

地址: 东莞市塘厦镇林村塘厦大道北552号

电话: 0769-87321000

传真: 0769-87891229

物料类型:

功率电感

日期:

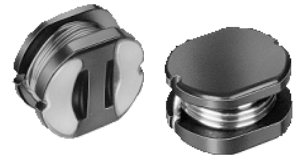
2024/08/10

版本:

A



ZECD Power Inductors 功率电感系列



■ Features

1. Excellent solderability and high heat resistance.
2. Excellent terminal strength construction.
3. Packed in embossed carrier tape and can be used by automatic mounting machine.

● 特征

1. 絕佳的焊錫性及高溫耐熱性。
2. 絕佳的端面強度結構。
3. 捲軸包裝，可用於自動插件機器。

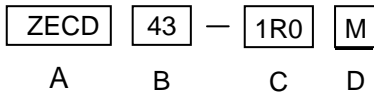
■ Applications

Power supply for VCR, OA equipment, LCD television set, notebook, DC to DC converters, DC to AC inverters etc.

● 用途

VCR、辦公室自動設備、液晶電視機、筆記型電腦、直流-直流整流器、直流-交流換流器等的電源供應器。

■ Feed Free Part Numbering



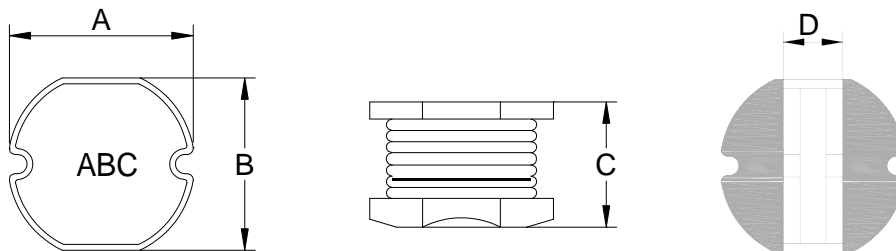
A. Series

B. Dimension A x C

C. Inductance 1R0=1.0uH, 100=10uH, 101=100uH

D. Inductance Tolerance K=±10%, M=±20%

■ Dimensions



Series	A	B	C	D ref
ZECD31	3.5±0.3	3.0±0.3	1.6±0.3	1.0
ZECD32	3.5±0.3	3.0±0.3	2.1±0.3	1.0
ZECD42	4.5±0.3	4.0±0.3	2.0±0.3	1.4
ZECD43	4.5±0.3	4.0±0.3	3.2±0.3	1.4
ZECD52	5.8±0.3	5.2±0.3	2.0±0.3	1.6
ZECD53	5.8±0.3	5.2±0.3	3.0±0.3	1.6
ZECD54	5.8±0.3	5.2±0.3	4.5±0.3	1.6
ZECD73	7.8±0.3	7.0±0.3	3.5±0.3	2.4
ZECD75	7.8±0.3	7.0±0.3	5.0±0.3	2.4
ZECD104	10.0±0.3	9.0±0.3	4.0±0.3	3.1
ZECD105	10.0±0.3	9.0±0.3	5.4±0.3	3.1

■ZECD31 Series

Part Number	Inductance (uH)	Test Frequency (Hz)	DCR (Ω)max	IDC (A)max
ZECD31-1R0M	1.0±20%	100K/0.25V	0.048	1.60
ZECD31-1R5M	1.5±20%	100K/0.25V	0.078	1.55
ZECD31-2R2M	2.2±20%	100K/0.25V	0.100	1.47
ZECD31-3R3M	3.3±20%	100K/0.25V	0.126	1.34
ZECD31-3R9M	3.9±20%	100K/0.25V	0.140	1.24
ZECD31-4R7M	4.7±20%	100K/0.25V	0.158	1.22
ZECD31-5R6M	5.6±20%	100K/0.25V	0.186	1.09
ZECD31-6R8M	6.8±20%	100K/0.25V	0.213	0.96
ZECD31-8R2M	8.2±20%	100K/0.25V	0.238	0.84
ZECD31-100M	10±20%	1K/0.25V	0.307	0.70
ZECD31-120M	12±20%	1K/0.25V	0.372	0.65
ZECD31-150M	15±20%	1K/0.25V	0.466	0.59
ZECD31-180M	18±20%	1K/0.25V	0.515	0.54
ZECD31-220M	22±20%	1K/0.25V	0.656	0.48
ZECD31-270M	27±20%	1K/0.25V	0.774	0.43
ZECD31-330M	33±20%	1K/0.25V	1.021	0.37
ZECD31-390M	39±20%	1K/0.25V	1.122	0.32
ZECD31-470M	47±20%	1K/0.25V	1.509	0.26
ZECD31-560M	56±20%	1K/0.25V	1.675	0.24
ZECD31-680M	68±20%	1K/0.25V	1.919	0.23
ZECD31-820M	82±20%	1K/0.25V	2.644	0.21
ZECD31-101M	100±20%	1K/0.25V	2.870	0.19
ZECD31-121M	120±20%	1K/0.25V	4.084	0.17
ZECD31-151M	150±20%	1K/0.25V	4.774	0.16
ZECD31-181M	180±20%	1K/0.25V	5.699	0.14

■ZECD32 Series

Part Number	Inductance (uH)	Test Frequency (Hz)	DCR (Ω)max	IDC (A)max
ZECD32-1R0M	1.0±20%	100K/0.25V	0.035	3.34
ZECD32-2R2M	2.2±20%	100K/0.25V	0.059	2.35
ZECD32-3R3M	3.3±20%	100K/0.25V	0.098	1.83
ZECD32-4R7M	4.7±20%	100K/0.25V	0.137	1.50
ZECD32-5R6M	5.6±20%	100K/0.25V	0.157	1.36
ZECD32-6R8M	6.8±20%	100K/0.25V	0.196	1.22
ZECD32-8R2M	8.2±20%	100K/0.25V	0.230	1.09
ZECD32-100K	10±10%	1K/0.25V	0.286	0.95
ZECD32-120K	12±10%	1K/0.25V	0.322	0.88
ZECD32-150K	15±10%	1K/0.25V	0.398	0.82
ZECD32-180K	18±10%	1K/0.25V	0.520	0.76
ZECD32-220K	22±10%	1K/0.25V	0.660	0.63
ZECD32-270K	27±10%	1K/0.25V	0.760	0.62

■ZECD32 Series

Part Number	Inductance (uH)	Test Frequency (Hz)	DCR (Ω)max	IDC (A)max
ZECD32-330K	33±10%	1K/0.25V	0.87	0.56
ZECD32-390K	39±10%	1K/0.25V	1.10	0.51
ZECD32-470K	47±10%	1K/0.25V	1.25	0.47
ZECD32-560K	56±10%	1K/0.25V	1.59	0.42
ZECD32-680K	68±10%	1K/0.25V	1.82	0.38
ZECD32-820K	82±10%	1K/0.25V	2.44	0.34
ZECD32-101K	100±10%	1K/0.25V	2.84	0.31
ZECD32-121K	120±10%	1K/0.25V	3.19	0.28
ZECD32-151K	150±10%	1K/0.25V	4.20	0.175
ZECD32-181K	180±10%	1K/0.25V	5.11	0.17
ZECD32-221K	220±10%	1K/0.25V	7.31	0.16
ZECD32-271K	270±10%	1K/0.25V	8.24	0.14
ZECD32-331K	330±10%	1K/0.25V	10.19	0.13

■ZECD42 Series

Part Number	Inductance (uH)	Test Frequency (Hz)	DCR (Ω)max	IDC (A)max
ZECD42-2R7M	2.7±20%	100K/0.25V	0.065	1.50
ZECD42-4R7M	4.7±20%	100K/0.25V	0.095	1.40
ZECD42-100M	10±20%	1K/0.25V	0.18	0.97
ZECD42-220M	22±20%	1K/0.25V	0.45	0.60
ZECD42-260M	26±20%	1K/0.25V	0.47	0.55
ZECD42-330M	33±20%	1K/0.25V	0.50	0.54
ZECD42-390M	39±20%	1K/0.25V	0.70	0.50
ZECD42-470M	47±20%	1K/0.25V	0.80	0.48
ZECD42-560M	56±20%	1K/0.25V	0.90	0.45
ZECD42-101M	100±20%	1K/0.25V	1.50	0.10
ZECD42-151M	150±20%	1K/0.25V	2.30	0.09

■ZECD43 Series

Part Number	Inductance (uH)	Test Frequency (Hz)	DCR (Ω)max	IDC (A)max
ZECD43-1R0M	1.0±20%	100K/0.25V	0.033	3.80
ZECD43-2R2M	2.2±20%	100K/0.25V	0.047	2.60
ZECD43-3R3M	3.3±20%	100K/0.25V	0.052	2.43
ZECD43-3R9M	3.9±20%	100K/0.25V	0.058	2.15
ZECD43-4R7M	4.7±20%	100K/0.25V	0.094	1.70
ZECD43-6R8M	6.8±20%	100K/0.25V	0.117	1.50
ZECD43-8R2M	8.2±20%	100K/0.25V	0.132	1.26

■ZECD43 Series

Part Number	Inductance (uH)	Test Frequency (Hz)	DCR (Ω)max	IDC (A)max
ZECD43-100M	10±20%	1K/0.25V	0.182	1.20
ZECD43-120M	12±20%	1K/0.25V	0.210	1.10
ZECD43-150M	15±20%	1K/0.25V	0.235	0.95
ZECD43-180M	18±20%	1K/0.25V	0.338	0.84
ZECD43-220M	22±20%	1K/0.25V	0.378	0.76
ZECD43-270M	27±20%	1K/0.25V	0.522	0.71
ZECD43-330M	33±20%	1K/0.25V	0.540	0.64
ZECD43-390M	39±20%	1K/0.25V	0.587	0.59
ZECD43-470M	47±20%	1K/0.25V	0.844	0.54
ZECD43-560M	56±20%	1K/0.25V	0.937	0.50
ZECD43-680M	68±20%	1K/0.25V	1.117	0.46
ZECD43-820M	82±20%	1K/0.25V	1.180	0.45
ZECD43-101K	100±10%	1K/0.25V	1.190	0.44
ZECD43-121M	120±20%	1K/0.25V	1.220	0.38
ZECD43-151K	150±10%	1K/0.25V	1.400	0.35
ZECD43-181M	180±20%	1K/0.25V	1.500	0.31
ZECD43-221K	220±10%	1K/0.25V	1.641	0.29
ZECD43-271M	270±20%	1K/0.25V	2.890	0.28
ZECD43-331K	330±10%	1K/0.25V	3.760	0.28

■ZECD52 Series

Part Number	Inductance (uH)	Test Frequency (Hz)	DCR (Ω)max	IDC (A)max
ZECD52-1R0M	1.0±20%	100K/0.25V	0.05	4.2
ZECD52-2R2M	2.2±20%	100K/0.25V	0.08	3.2
ZECD52-3R3M	3.3±20%	100K/0.25V	0.12	2.4
ZECD52-3R9M	3.9±20%	100K/0.25V	0.14	2.0
ZECD52-4R7M	4.7±20%	100K/0.25V	0.15	1.8
ZECD52-5R6M	5.6±20%	100K/0.25V	0.16	1.5
ZECD52-6R8M	6.8±20%	100K/0.25V	0.17	1.4
ZECD52-8R2M	8.2±20%	100K/0.25V	0.20	1.3
ZECD52-100M	10±20%	1K/0.25V	0.23	1.1
ZECD52-120M	12±20%	1K/0.25V	0.25	1.05
ZECD52-150M	15±20%	1K/0.25V	0.30	1.00
ZECD52-180M	18±20%	1K/0.25V	0.35	0.90
ZECD52-220M	22±20%	1K/0.25V	0.40	0.85
ZECD52-270M	27±20%	1K/0.25V	0.50	0.75
ZECD52-330M	33±20%	1K/0.25V	0.55	0.70
ZECD52-390M	39±20%	1K/0.25V	0.65	0.60
ZECD52-470M	47±20%	1K/0.25V	0.75	0.55
ZECD52-560M	56±20%	1K/0.25V	0.95	0.50

■ZECD52 Series

Part Number	Inductance (uH)	Test Frequency (Hz)	DCR (Ω)max	IDC (A)max
ZECD52-680M	68±20%	1K/0.25V	1.20	0.45
ZECD52-820M	82±20%	1K/0.25V	1.40	0.40
ZECD52-101M	100±20%	1K/0.25V	1.75	0.35
ZECD52-121M	120±20%	1K/0.25V	2.0	0.25
ZECD52-151M	150±20%	1K/0.25V	2.6	0.22
ZECD52-181M	180±20%	1K/0.25V	3.7	0.18
ZECD52-221M	220±20%	1K/0.25V	4.0	0.19
ZECD52-271M	270±20%	1K/0.25V	4.2	0.20

■ZECD53 Series

Part Number	Inductance (uH)	Test Frequency (Hz)	DCR (Ω)max	IDC (A)max
ZECD53-1R0M	1.0±20%	100K/0.25V	0.038	4.5
ZECD53-2R2M	2.2±20%	100K/0.25V	0.045	3.5
ZECD53-3R3M	3.3±20%	100K/0.25V	0.055	2.8
ZECD53-3R9M	3.9±20%	100K/0.25V	0.064	2.6
ZECD53-4R7M	4.7±20%	100K/0.25V	0.072	2.5
ZECD53-5R6M	5.6±20%	100K/0.25V	0.084	2.4
ZECD53-6R8M	6.8±20%	100K/0.25V	0.09	2.2
ZECD53-8R2M	8.2±20%	100K/0.25V	0.10	2.0
ZECD53-100K	10±10%	1K/0.25V	0.12	1.8
ZECD53-120K	12±10%	1K/0.25V	0.13	1.8
ZECD53-150K	15±10%	1K/0.25V	0.15	1.7
ZECD53-180K	18±10%	1K/0.25V	0.18	1.6
ZECD53-220K	22±10%	1K/0.25V	0.22	1.5
ZECD53-270K	27±10%	1K/0.25V	0.24	1.4
ZECD53-330K	33±10%	1K/0.25V	0.30	1.1
ZECD53-390K	39±10%	1K/0.25V	0.40	1.0
ZECD53-470K	47±10%	1K/0.25V	0.43	1.0
ZECD53-560K	56±10%	1K/0.25V	0.5	0.85
ZECD53-680K	68±10%	1K/0.25V	0.6	0.80
ZECD53-820K	82±10%	1K/0.25V	0.8	0.65
ZECD53-101K	100±10%	1K/0.25V	0.9	0.63
ZECD53-121K	120±10%	1K/0.25V	1.0	0.58
ZECD53-151K	150±10%	1K/0.25V	1.3	0.48
ZECD53-181K	180±10%	1K/0.25V	1.5	0.41
ZECD53-221K	220±10%	1K/0.25V	2.0	0.38
ZECD53-271K	270±10%	1K/0.25V	2.5	0.35
ZECD53-331K	330±10%	1K/0.25V	3.2	0.28

■ZECD54 Series

Part Number	Inductance (uH)	Test Frequency (Hz)	DCR (Ω)max	IDC (A)max
ZECD54-1R0M	1.0±20%	100K/0.25V	0.020	5.9
ZECD54-1R5M	1.5±20%	100K/0.25V	0.025	4.8
ZECD54-2R2M	2.2±20%	100K/0.25V	0.027	4.5
ZECD54-2R7M	2.7±20%	100K/0.25V	0.030	3.5
ZECD54-3R3M	3.3±20%	100K/0.25V	0.034	3.5
ZECD54-4R7M	4.7±20%	100K/0.25V	0.04	2.8
ZECD54-6R8M	6.8±20%	100K/0.25V	0.08	2.5
ZECD54-100M	10±20%	1K/0.25V	0.10	1.45
ZECD54-120M	12±20%	1K/0.25V	0.12	1.40
ZECD54-150M	15±20%	1K/0.25V	0.14	1.40
ZECD54-180M	18±20%	1K/0.25V	0.15	1.23
ZECD54-220M	22±20%	1K/0.25V	0.18	1.20
ZECD54-270M	27±20%	1K/0.25V	0.20	0.98
ZECD54-330M	33±20%	1K/0.25V	0.23	0.90
ZECD54-390M	39±20%	1K/0.25V	0.32	0.80
ZECD54-470M	47±20%	1K/0.25V	0.37	0.75
ZECD54-560M	56±20%	1K/0.25V	0.42	0.68
ZECD54-680K	68±10%	1K/0.25V	0.46	0.65
ZECD54-820K	82±10%	1K/0.25V	0.60	0.58
ZECD54-101K	100±10%	1K/0.25V	0.70	0.52
ZECD54-121K	120±10%	1K/0.25V	0.93	0.50
ZECD54-151K	150±10%	1K/0.25V	1.10	0.45
ZECD54-181K	180±10%	1K/0.25V	1.38	0.40
ZECD54-221K	220±10%	1K/0.25V	1.57	0.37

■ZECD73 Series

Part Number	Inductance (uH)	Test Frequency (Hz)	DCR (Ω)max	IDC (A)max
ZECD73-1R0M	1.0±20%	100K/0.25V	0.018	7.0
ZECD73-1R5M	1.5±20%	100K/0.25V	0.020	6.0
ZECD73-2R2M	2.2±20%	100K/0.25V	0.023	5.0
ZECD73-3R3M	3.3±20%	100K/0.25V	0.025	4.0
ZECD73-4R7M	4.7±20%	100K/0.25V	0.039	3.5
ZECD73-6R8M	6.8±20%	100K/0.25V	0.04	2.8
ZECD73-100M	10±20%	1K/0.25V	0.08	1.50
ZECD73-120M	12±20%	1K/0.25V	0.09	1.39
ZECD73-150M	15±20%	1K/0.25V	0.10	1.24
ZECD73-180M	18±20%	1K/0.25V	0.11	1.12
ZECD73-220M	22±20%	1K/0.25V	0.13	1.07
ZECD73-270M	27±20%	1K/0.25V	0.15	0.94
ZECD73-330M	33±20%	1K/0.25V	0.17	0.85
ZECD73-390M	39±20%	1K/0.25V	0.22	0.74

■ZECD73 Series

Part Number	Inductance (uH)	Test Frequency (Hz)	DCR (Ω)max	IDC (A)max
ZECD73-470M	47±20%	1K/0.25V	0.25	0.68
ZECD73-560M	56±20%	1K/0.25V	0.28	0.64
ZECD73-680M	68±20%	1K/0.25V	0.33	0.59
ZECD73-820M	82±20%	1K/0.25V	0.41	0.54
ZECD73-101M	100±20%	1K/0.25V	0.48	0.51
ZECD73-121M	120±20%	1K/0.25V	0.54	0.49

■ZECD75 Series

Part Number	Inductance (uH)	Test Frequency (Hz)	DCR (Ω)max	IDC (A)max
ZECD75-1R0M	1.0±20%	100K/0.25V	0.013	7.5
ZECD75-1R5M	1.5±20%	100K/0.25V	0.023	5.3
ZECD75-2R2M	2.2±20%	100K/0.25V	0.028	4.5
ZECD75-3R3M	3.3±20%	100K/0.25V	0.045	4.4
ZECD75-4R7M	4.7±20%	100K/0.25V	0.058	4.2
ZECD75-6R8M	6.8±20%	100K/0.25V	0.07	3.0
ZECD75-100M	10±20%	1K/0.25V	0.07	2.5
ZECD75-120M	12±20%	1K/0.25V	0.08	2.0
ZECD75-150M	15±20%	1K/0.25V	0.09	1.9
ZECD75-180M	18±20%	1K/0.25V	0.10	1.6
ZECD75-220M	22±20%	1K/0.25V	0.11	1.6
ZECD75-270M	27±20%	1K/0.25V	0.12	1.4
ZECD75-330M	33±20%	1K/0.25V	0.13	1.3
ZECD75-390M	39±20%	1K/0.25V	0.16	1.2
ZECD75-470M	47±20%	1K/0.25V	0.18	1.2
ZECD75-560K	56±10%	1K/0.25V	0.24	0.95
ZECD75-680K	68±10%	1K/0.25V	0.28	0.88
ZECD75-820K	82±10%	1K/0.25V	0.37	0.80
ZECD75-101K	100±10%	1K/0.25V	0.43	0.75
ZECD75-121K	120±10%	1K/0.25V	0.47	0.66
ZECD75-151K	150±10%	1K/0.25V	0.64	0.60
ZECD75-181K	180±10%	1K/0.25V	0.71	0.53
ZECD75-221K	220±10%	1K/0.25V	0.96	0.50
ZECD75-271K	270±10%	1K/0.25V	1.11	0.42
ZECD75-331K	330±10%	1K/0.25V	1.26	0.41
ZECD75-391K	390±10%	1K/0.25V	1.77	0.38
ZECD75-471K	470±10%	1K/0.25V	1.96	0.36
ZECD75-561K	560±10%	1K/0.25V	2.9	0.33

■ZECD104 Series

Part Number	Inductance (uH)	Test Frequency (Hz)	DCR (Ω)max	IDC (A)max
ZECD104-1R0M	1.0±20%	100K/0.25V	0.012	8.70
ZECD104-1R5M	1.5±20%	100K/0.25V	0.020	5.40
ZECD104-2R2M	2.2±20%	100K/0.25V	0.028	2.85
ZECD104-3R3M	3.3±20%	100K/0.25V	0.038	2.75
ZECD104-4R7M	4.7±20%	100K/0.25V	0.040	2.70
ZECD104-6R8M	6.8±20%	100K/0.25V	0.042	2.65
ZECD104-100M	10±20%	1K/0.25V	0.048	2.60
ZECD104-120M	12±20%	1K/0.25V	0.05	2.38
ZECD104-150M	15±20%	1K/0.25V	0.07	1.87
ZECD104-180M	18±20%	1K/0.25V	0.08	1.73
ZECD104-220M	22±20%	1K/0.25V	0.09	1.60
ZECD104-270M	27±20%	1K/0.25V	0.10	1.44
ZECD104-330M	33±20%	1K/0.25V	0.12	1.26
ZECD104-390M	39±20%	1K/0.25V	0.15	1.20
ZECD104-470M	47±20%	1K/0.25V	0.17	1.10
ZECD104-560M	56±20%	1K/0.25V	0.20	1.01
ZECD104-680M	68±20%	1K/0.25V	0.22	0.91
ZECD104-820M	82±20%	1K/0.25V	0.25	0.85
ZECD104-101M	100±20%	1K/0.25V	0.34	0.74
ZECD104-121M	120±20%	1K/0.25V	0.40	0.69
ZECD104-151M	150±20%	1K/0.25V	0.54	0.61
ZECD104-181M	180±20%	1K/0.25V	0.62	0.56
ZECD104-221M	220±20%	1K/0.25V	0.72	0.53
ZECD104-271M	270±20%	1K/0.25V	0.95	0.45
ZECD104-331M	330±20%	1K/0.25V	1.10	0.42
ZECD104-391M	390±20%	1K/0.25V	1.24	0.38
ZECD104-471M	470±20%	1K/0.25V	1.53	0.35
ZECD104-561M	560±20%	1K/0.25V	1.90	0.32

■ZECD105 Series

Part Number	Inductance (uH)	Test Frequency (Hz)	DCR (Ω)max	IDC (A)max
ZECD105-1R0M	1.0±20%	100K/0.25V	0.009	8.63
ZECD105-2R2M	2.2±20%	100K/0.25V	0.016	7.20
ZECD105-3R3M	3.3±20%	100K/0.25V	0.018	6.50
ZECD105-4R7M	4.7±20%	100K/0.25V	0.02	5.50
ZECD105-6R8M	6.8±20%	100K/0.25V	0.04	4.50
ZECD105-100M	10±20%	1K/0.25V	0.06	2.60
ZECD105-150M	15±20%	1K/0.25V	0.07	2.30
ZECD105-180M	18±20%	1K/0.25V	0.08	2.20
ZECD105-220M	22±20%	1K/0.25V	0.09	2.00

■ZECD105 Series

Part Number	Inductance (uH)	Test Frequency (Hz)	DCR (Ω)max	IDC (A)max
ZECD105-270M	27±20%	1K/0.25V	0.10	1.80
ZECD105-330M	33±20%	1K/0.25V	0.11	1.50
ZECD105-390M	39±20%	1K/0.25V	0.12	1.40
ZECD105-470M	47±20%	1K/0.25V	0.14	1.30
ZECD105-560K	56±10%	1K/0.25V	0.19	1.20
ZECD105-680K	68±10%	1K/0.25V	0.21	1.20
ZECD105-820K	82±10%	1K/0.25V	0.28	1.00
ZECD105-101K	100±10%	1K/0.25V	0.34	1.00
ZECD105-121K	120±10%	1K/0.25V	0.37	0.90
ZECD105-151K	150±10%	1K/0.25V	0.51	0.80
ZECD105-181K	180±10%	1K/0.25V	0.57	0.50
ZECD105-221K	220±10%	1K/0.25V	0.78	0.66
ZECD105-271K	270±10%	1K/0.25V	0.87	0.41
ZECD105-331K	330±10%	1K/0.25V	1.20	0.55
ZECD105-471K	470±10%	1K/0.25V	1.50	0.45
ZECD105-561K	560±10%	1K/0.25V	1.90	0.30
ZECD105-681K	680±10%	1K/0.25V	2.25	0.28
ZECD105-821K	820±10%	1K/0.25V	2.55	0.24

- * The maximum rated current is a DC current which causes initial inductance to decrease by 25% or temperature to rise by 40°C, whichever is smaller(at ambient reference temperature:20 °C).
- * Operating Temperature:-40°C to +125°C.