Product Brief 2023

CeraLink Capacitors

The revolution for demanding high-efficiency and high-density power applications

Features

- Increasing capacitance with DC bias between 0 V and V_{op} (positive bias behaviour) and best in class capacitance density at operating point (V_{op} & T_{op})
- Capable of handling extremely high ripple currents
- High reliability with qualification based on AEC-Q200
- RoHS compatible
- Cu inner electrode material properties are beneficial for high-frequency switching with low losses and allow fast slew rates with a high I_{max}.
- Generally low self-heating and good thermal self-regulating characteristics. Additionally, the self-heating supports CeraLink to come to temperature for good performance.
- Surface mountable using standard MLCC reflow profiles

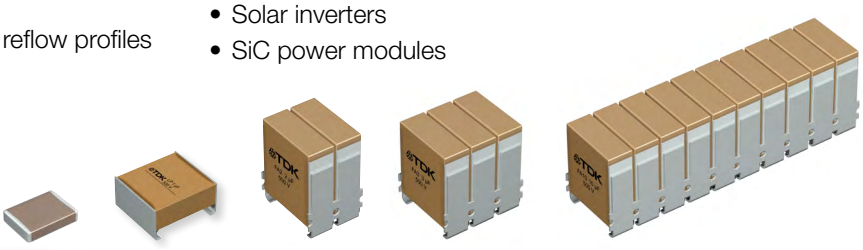
Applications

TDK CeraLink capacitors are a highly compact solution for e. g. snubbers, filters, flying capacitors, and DC links to name a few functions. It can be used in xEV high-voltage applications:

- Auxiliary inverters (HV compressor, HV pump, HV heater)
- OBC, DC/DC converters or even charger converters
- Traction inverters or even eAxles

Industry:

- Drives
- Energy storage systems
- Power converters
- Power supplies like UPS, isolated power supply
- Solar inverters
- SiC power modules



More information

www.tdk-electronics.tdk.com/ceralink

or contact your local sales office

CeraLink Capacitors

Portfolio and technical specification

Series	Ordering Code	$V_{pk, max}$	V_R	V_{op}	$C_{nom, typ}$	$C_{eff, typ}$	I_{op1} @ 100 kHz, 85 °C	I_{op2} @ 100 kHz, 105 °C	ESL	Terminal style
		V	V	V	µF	µF	A_{RMS}	A_{RMS}	nH	
SMD 2220										
	B58043I5254M052	650	500	400	0.25	0.15	5	4.3	3	standard
	B58043E5254M052	650	500	400	0.25	0.15	4.5	3.8	3	soft
LP (Low Profile) – L-style										
	B58031I5105M062	650	500	400	1	0.6	11	10	3	SMD with lead frame
	B58031I7504M062	1000	700	600	0.5	0.25	7	6	3	
	B58031I9254M062	1300	900	800	0.25	0.13	5	5	3	
LP (Low Profile) – J-style										
	B58031U5105M062	650	500	400	1	0.6	11	10	3	SMD with lead frame
	B58031U7504M062	1000	700	600	0.5	0.25	7	6	3	
	B58031U9254M062	1300	900	800	0.25	0.13	5	5	3	
FA (Flex Assembly)										
FA2										
	B58035U5205M*	650	500	400	2	1.2	17	14	3	SMD with lead frame
	B58035U7105M*	1000	700	600	1	0.5	12	11	3	
	B58035U9504M*	1300	900	800	0.5	0.26	8	7	3	
FA3										
	B58035U5305M*	650	500	400	3	1.8	20	17	3	SMD with lead frame
	B58035U7155M*	1000	700	600	1.5	0.75	16	13	3	
	B58035U9754M*	1300	900	800	0.75	0.39	11	9	3	
FA10										
	B58035U5106M001	650	500	400	10	6	47	38	2	SMD with lead frame
	B58035U7505M001	1000	700	600	5	2.5	39	30	2	
	B58035U9255M001	1300	900	800	2.5	1.3	32	23	2	
SP (Solder Pin)										
	B58033I5206M001	650	500	400	20	12	41	32	4	THT
	B58033I7106M001	1000	700	600	10	5	33	27	4	
	B58033I9505M001	1300	900	800	5	3	26	24	4	

* different packaging units available

Symbol	Terms
$C_{eff, typ}$	Typical effective capacitance @ V_{op}, 0.5 $V_{AC, RMS}$, 1 kHz, room temperature
$C_{nom, typ}$	Typical nominal capacitance @ V_{op}, quasistatic, room temperature
ESL	Equivalent series inductance

Symbol	Terms
I_{op}	Operating ripple current, root mean square value of sinusoidal AC current
V_{op}	Operating voltage
$V_{pk, max}$	Maximum peak operating voltage
V_R	Rated voltage

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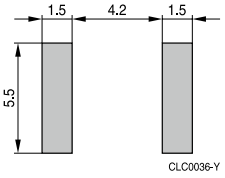
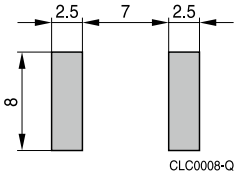
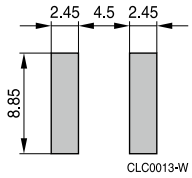
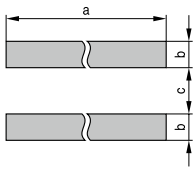
Series	Ordering Code	l	w	h	Approx. weight	Solder pad layout
		mm	mm	mm	g	mm
SMD 2220						
	B58043I5254M052	5.7	5	1.4	0.26	
	B58043E5254M052	5.7	5	1.4	0.26	
LP (Low Profile) – L-style						
	B58031I5105M062	7.85	10.84	4	1.3	
	B58031I7504M062	7.85	10.84	4	1.3	
	B58031I9254M062	7.85	10.84	4	1.3	
LP (Low Profile) – J-style						
	B58031U5105M062	7.85	7.14	4	1.3	
	B58031U7504M062	7.85	7.14	4	1.3	
	B58031U9254M062	7.85	7.14	4	1.3	
FA (Flex Assembly)						
FA2						
	B58035U5205M*	7.4	6	9.1	2.3	
	B58035U7105M*	7.4	6	9.1	2.3	
	B58035U9504M*	7.4	6	9.1	2.3	
FA3						
	B58035U5305M*	7.4	9	9.1	3.5	
	B58035U7155M*	7.4	9	9.1	3.5	
	B58035U9754M*	7.4	9	9.1	3.5	
FA10						
	B58035U5106M001	7.4	30	9.1	11.5	
	B58035U7505M001	7.4	30	9.1	11.5	
	B58035U9255M001	7.4	30	9.1	11.5	
SP (Solder Pin)						
	B58033I5206M001	33	22	11.5	31	
	B58033I7106M001	33	22	11.5	31	
	B58033I9505M001	33	22	11.5	31	

Type	a	b	c
FA2	7	2.85	5
FA3	10	2.85	5
FA10	31	2.85	5

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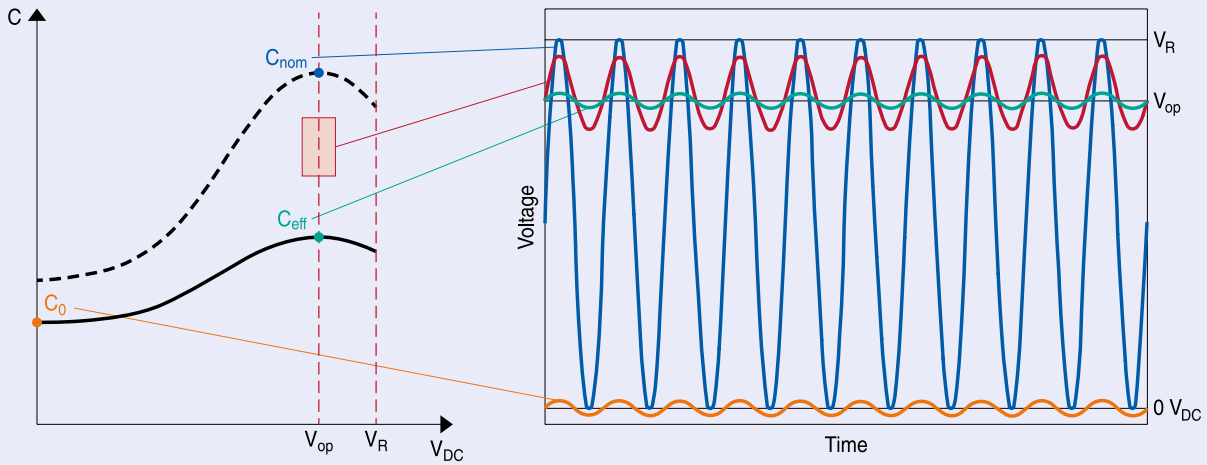
CeraLink's special features

- Positive bias behavior

CeraLink features a non-linear capacitance behavior, i.e. the capacitance strongly depends on external parameters such as the applied DC bias voltage or the temperature. It is important to note that CeraLink is designed to have its capacitance maximum under operating conditions, i. e. under a DC bias (constant operating voltage) and with a superimposed ripple amplitude.



C_0 : 0 V_{DC} plus small superimposed AC signal (0.5 $V_{AC, RMS}$)
C_{eff} : 400 V_{DC} plus small superimposed AC signal (0.5 $V_{AC, RMS}$)
C_{nom} : Value of large signal capacitance (C = dQ/dV) at V_{op} (simplified for the purpose of this picture)
$C_{(red\ area)}$: 400 V_{DC} plus large superimposed AC signal (20 $V_{AC, RMS}$)

Typical snubber application
Typical DC-Link application

CLC0057-L

- Behavior at high temperatures
  - Operating temperature up to +150 °C (also suitable for SiC/GaN)
  - Low losses, ESR decreases drastically with temperature
  - Ultra-low leakage currents due to material selection
  - No thermal runaway
  - Generally low self-heating and self-heating supports CeraLink to come to temperature for good performance

- Behavior at high frequencies
  - Optimal frequency in the range of 100 kHz to 1 MHz
  - Minimal ESR due to low-loss copper electrodes and HF-suited backend
  - Low losses
  - No limitation of dV/dt

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