Issue 1 / 2018

CHARGE

July 2018

A Technical News Journal from Deki Electronics Ltd

Editor's Desk

Dear Reader,

As you may be aware, Deki is India's largest manufacturer of plastic film capacitors with 25% of the turnover coming from new products.

One of the latest products launched by Deki is a film capacitor that replaces High Voltage Ceramic Disc Capacitors of 630v, 1kv and 2kv ratings. This new capacitor provides some technical advantages and costs more or less the same as ceramic capacitors. The added bonus is that ceramic capacitors do not have to be imported any longer. This issue of Charge covers the new high voltage ceramic capacitor replacement in detail.

At Deki, we organise an Annual Executive Day each year where we meet and discuss the year gone by and look ahead at the new year. This year Annual Executive Day was held on 13 April.

Finally, as usual, we look forward to your suggestions to improve Charge further. Do send in your suggestions.

Anil Bali

Deki at Elecrama

Exhibiting for the first time at this prestigious exhibition that is all about electricity, the Deki theme was: **Charge - The Only Constant.**

As our invitation said, "At Deki, we keep charging ahead. With new ideas and improved products. For us, charge is the only constant."

The Deki stall featured application oriented solutions with capacitors for:
• EV Chargers • Welding Machines • IGBT Snubber • UPS Applications • Energy Meters • Fan Motors and Regulators

The products on display included:
a. IGBT Snubber Capacitors
b. Film Capacitors in Capacitive Power Supply
c. Fan Motor Capacitors
d. Fan Regulator Capacitors
e. DC Link Capacitors
f. Class-X / Class-Y Capacitors

The response from the visitors was encouraging, more so since this was Deki's first foray in the exhibition.

Deki Goes Green

Indoor air pollutants rank as leading environmental risks. However, plants provide an easy and affordable way to combat these pollutants. Adding potted plants to a room has been shown to reduce the amount of air particulates.

At Deki, we have placed the following plants all over the premises for their benefits against common air pollutants:

- Mother-in-Law's Tongue (*Sansevieria trifasciata*): Filters formaldehyde, trichloroethylene, xylene, toluene and benzene.
- Indian Aloe (*Aloe vera*): Helps clear formaldehyde and benzene.
- Bamboo Palm (*Chamaedorea seifrizii*): Filters benzene, trichloroethylene and formaldehyde.
- Money plant (*Epipremnum aureum*): Cleans the air effectively with a particular affinity for volatile organic compounds (known as VOCs).

All the plants have placards in Hindi and English that identify them and the benefits they provide.

Goonj Initiative at Deki

For more than a decade now, the 'Odha Do Zindagi' campaign from Goonj aims to create awareness on the issue of winters as an annual disaster for the poor. Deki Electronics participated in the 'Odha Do Zindagi' campaing from 6th November to 20th November 2017 and Team Deki collected 269 kg of clothes, woollens and footwear.

This was delivered to the Goonj office in Sarita Vihar, New Delhi alongwith a cheque of Rs 5,000 to cover logistics expenses in transporting the material to those in need.

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Film Capacitor Replacement for High Voltage Ceramic Disc Capacitors. Deki introduces its 1kV and 2kV film capacitor range.

Capacitors, as we all know, are devices that store charge and give it up when required.

There are many types of capacitors - ceramic, film, mica, paper, electrolytic and tantalum among others.

We also know that all capacitors are nothing but a dielectric between two conducting plates.

In the case of ceramic capacitors the dielectric is ceramic whereas in film capacitors the dielectric is a plastic film. This could be polyester (PET) or polypropylene (PP) or polycarbonate (PC) or even polystyrene (PS) which is not easy to source now.

Both, ceramic and polyester capacitors, are non-polar capacitors unlike an electrolytic capacitor which is polar. That means it has a negative and a positive terminal.

In general ceramic capacitors have a capacitance range starting from 2.2pf to 100mfd with voltage varying from 16 volts to 15kV.

Film capacitors, normally, have a range between 100pf and 1000uf with voltage varying from 50V to 3kV.

As a result, whenever the circuit demanded a lower capacitance value (in pf) a ceramic capacitor has been the preferred choice. If the circuit demanded a higher value (in nf) then a film capacitor is the obvious choice.

Ceramic capacitors are somewhat non-linear in their frequency and voltage responses when compared to film capacitors. Another issue with ceramic capacitors is that they tend to behave as microphones, thus picking up ambient sound and modulating the voltage across them accordingly. What makes them less than ideal in the audio signal path is, most of all, the varying capacitance with a change in voltage. Here's a diagram for various types of ceramics (and it doesn't even show ceramic dielectrics like Y5V):

With your audio signal changing, your capacitors change, too. This causes non-harmonic distortion.

Think of a high-pitch note superimposed on a bass note. While your bass note is close to zero, your higher note passes through a capacitor with the nominal value. When the momentary voltage of your bass note is higher, a (bad) ceramic capacitor has a lower value, i.e., your high pass filter has a higher cut-off frequency. This may lead to the higher note becoming damped more strongly.

For audio applications, you will often need large capacitor values. Only non-linear types of ceramics tend to have these.

Film capacitors are quite linear and usually better suited for analogue signal processing.

The new, film capacitor range from Deki provides 1kV and 2kV rating with a capacitance value of 100pf to 10nf.

Compared to the LB and LR range of ceramic disc capacitors, Deki's film capacitor replacement offers the following advantages:

1) High insulation resistance – nearly ten times more than ceramic capacitors

2) Very low loss factor – almost 30 times less than ceramic capacitors.

This twin benefit, coupled with the high capacitance stability of film capacitors, makes them an ideal replacement of 1kv and 2kv ceramic disc capacitors

The best part of the film capacitor replacement for high voltage ceramic disc capacitors from Deki is that you get all this at more or less the same price.

The data sheet alongisde has all the relevant technical details.

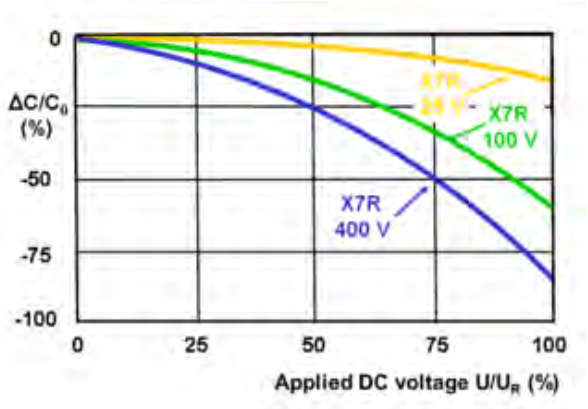


Image Source: Wikipedia

High Voltage Film Capacitors

High Voltage Ceramic Disc Capacitor Replacement

Main Application: Oscillator, timing and LC/RC filter circuits, high frequency coupling of fast digital and analogue ICs.

Construction: Film/foil inductive type construction with aluminum foil as electrode and plastic film as dielectric coated with flame retardant epoxy resin.

Climatic Category: 40/100/56

Applicable Specification: IEC 384-13

Maximum Temperature Rating: 100° C

Capacitance Value, Rated Voltage (DC): Refer dimension chart

Capacitance Tolerance: ±1%, ±2%, ±2.5%, ±5%, ±10%

Voltage Proof: Between terminals: 2 times of rated voltage.

Tan δ: 0.08% (maximum) at 1 kHz.

Life Test Conditions
(Loading at elevated temperature)
Loaded at 1.5 times of rated voltage at 85° C or 1.5 times of category voltage at 100° C for 1000 hours.
Category voltage is 80% of rated voltage.

After the test:
Δc/c: ≤ 5% of initial value.
Increase of Tan δ: ≤ 0.01 or 1.2 times the value measured before the test, whichever is higher.
Insulation resistance: ≥ 50% of the value mentioned in IR chart.

Insulation Resistance

Minimum Insulation Resistance R_{IS} (or) time constant $= C_R \times R_{IS}$	V_R	$C_R \leq 0.1\mu F$	$C_R > 0.1\mu F$
at 25° C, relative humidity ≤70%	≥630 V DC	100 GΩ	10000 second RC

Ordering codes and packaging units

Rated Voltage	Rated Cap. (µfd)	Dimensions (mm) W ±0.5	S ±0.5	H ±0.5	L ±0.05	d ±0.5	F 0.8/-0.2	DV/DT V/µs	Wt. g	Ordering code	Packing units Ammo	Bulk
630V DC	0.00010	5.5	14	9.0	0.5	5.0	5	10000	0.12	134 101 +2J*^	4500	2000
	0.00033	6.5	14	9.5	0.5	5.0	5	10000	0.13	134 331 +2J*^	4500	2000
	0.00047	4.5	12	6.5	0.5	4.0	5	10000	0.16	134 471 +2J*^	4500	2000
	0.00068	4.5	13	6.5	0.5	5.0	5	10000	0.20	134 681 +2J*^	4500	2000
	0.00082	5.0	13	7.5	0.5	4.0	5	10000	0.22	134 681 +2J*^	4500	2000
	0.00100	5.5	13	7.5	0.5	4.0	5	10000	0.24	134 102 +2J*^	4500	2000
	0.00150	5.0	13	7.5	0.5	4.0	5	10000	0.36	134 152 +2J*^	4500	2000
	0.00220	5.5	14	8.5	0.5	5.0	5	10000	0.38	134 222 +2J*^	4500	2000
	0.00330	5.0	14	9.5	0.5	5.0	5	10000	0.41	134 332 +2J*^	4000	2000
	0.00470	6.0	13	9.5	0.5	5.0	5	10000	0.45	134 472 +2J*^	2500	2000
	0.00680	6.5	14	10.5	0.5	5.5	5	10000	0.60	134 682 +2J*^	1500	2000
	0.01000	8.0	15	12.5	0.5	7.5	5	10000	0.75	134 103 +2J*^	1500	2000
	0.02200	10.0	20	14.0	0.5	8.5	5	10000	1.12	134 223 +2J*^	1500	1000
1000V DC	0.00010	5.5	14	9.0	0.5	5.0	5	10000	0.12	134 101 +3A*^	4500	2000
	0.00033	6.5	14	9.5	0.5	5.0	5	10000	0.13	134 331 +3A*^	4500	2000
	0.00047	4.5	12	6.5	0.5	4.0	5	10000	0.16	134 471 +3A*^	4500	2000
	0.00068	4.5	13	6.5	0.5	5.0	5	10000	0.20	134 681 +3A*^	4500	2000
	0.00082	5.0	13	7.5	0.5	4.0	5	10000	0.22	134 681 +3A*^	4500	2000
	0.00100	6.0	14	8.5	0.5	4.5	5	10000	0.28	134 102 +3A*^	4500	2000
	0.00220	6.5	15	9.5	0.5	5.0	5	10000	0.28	134 222 +3A*^	4500	2000
	0.00330	6.5	14	10.0	0.5	5.0	5	10000	0.35	134 332 +3A*^	4000	2000
	0.00470	8.0	15	11.0	0.5	5.0	5	10000	0.36	134 472 +3A*^	2500	2000
	0.00680	8.0	15	11.5	0.5	5.0	5	10000	0.55	134 682 +3A*^	2500	2000
2000V DC	0.00010	5.5	14	9.0	0.5	5.0	5	10000	0.12	134 101 +3D*^	4500	2000
	0.00033	6.5	14	9.5	0.5	5.0	5	10000	0.13	134 331 +3D*^	4500	2000
	0.00100	5.5	14	9.0	0.5	5.0	5	10000	0.28	134 102 +3D*^	4500	2000
	0.00220	6.5	14	10.5	0.5	5.0	5	10000	0.31	134 222 +3D*^	4500	2000
	0.00470	9.0	15	13.0	0.5	5.5	5	10000	0.38	134 472 +3D*^	2500	2000
	0.01000	12.0	16	16.5	0.5	7.5	5	10000	0.81	134 103 +3D*^	2000	1000

Deki Annual Executive Day

Deki's Annual Executive Meet was held on 13 April 2018 at NITS (National Institute for Training & Standardization) in Sector 62, NOIDA. All executives, including the Chairman, Mr Jai Kumar, attended the meet.

Heads of Departments presented their department's performance report for 2017-18 and the expected trends for 2018-19 including highlights about their plans for the year and ahead.

Mr Anil Bali, Vice President, shared the business plan to achieve a minimum 25% turnover growth over the previous year and the single page strategy for 2018-19 for achieving the company's objectives.

Mr P Shanker Raj, Vice President (Technical) spoke about improving process capabilities and product cost optimisation. He also updated the executives about the automation and productivity projects, improvement plan for box type capacitors, new product development, diversification and team work.

Mr Vinod Sharma, Managing Director, shared his thoughts and views to inspire the executives to achieve the company's goals. He spoke about improving teamwork, personal efficiency and effectiveness and reiterated the core values and culture of the company.

Mr Jai Kumar, Chairman, while addressing the gathering, talked about business risks and rewards.

In the last session, all executives were divided into eight groups for a brainstorming session of 45 minutes on a unique topic like achieving 100% of the business plan, improving employee happiness, adopting new manufacturing process – Industry 4.0, etc. At the end of the group exercise, each group leader presented the group's strategy for achieving the objective set for their group's topic.

The meet ended over a delicious lunch and a group photo session.

Employee Suggestion Scheme

The employee suggestion scheme at Deki has seen consistent growth since inception in 1999 with 36,069 suggestions implemented till May 2018.

The scheme is very simple with an employee filling a suggestion form mentioning the present process, the new or revised process proposed and the accruing savings /benefits from it. The suggestion reaches the suggestion committee with the remarks of the section-in-charge. The committee deliberates during a weekly meeting and selects suggestions that can be implemented. Accepted suggestion are rewarded every week.

Average employee suggestions per month

In 2016-17 we had 446 implemented suggestions per month which worked out to 10.4 suggestions per employee per annum. In the first five months of 2018-19 we have averaged 288 implemented suggestion per month which is about 7 suggestions per employee per month. We hope to achieve more than 387 implemented suggestions per month in the year. Coupled with results of the Employee Satisfaction Survey, this confirms the high motivation of Team Deki.

International Yoga Day at Deki

International Yoga Day was celebrated with the usual gusto at Deki on 21st June from 8am to 9am.

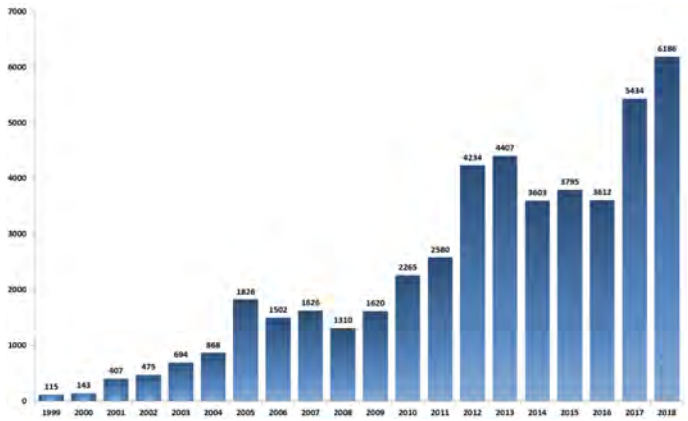
Around 195 employees, including executives, attended the yoga session organised in the park facing the Deki plant and office in NOIDA. Two CII officials also attended the session and appreciated the spirit and efforts put in by all.

Yoga instructors, Mr Pradeep Sharma and Mr K B Sharma led the gathering through various asanas including sukhasana, vajrasana, mandukasana, balasana, titli asana, among others. They also guided the participants through pranayama like bhramari, anulom vilom, etc. Their advice to those present was simple: doing these asanas daily would keep mind and body healthy.

The session ended with distribution of fruits for healthy eating.

Training in Deki

At Deki, training receives the utmost importance and has grown consistently with close to 3% of time spend on it. Detailed stage-wise training imparts knowledge of the process and the machines. This is followed by a written test in which a minimum of 80% at critical stages is required to qualify to run the machine. Deki's training modules have been well recognised and serve as a benchmark for component manufacturers.



Training hours per month