



## Applications-Information 07/08

### Electronic Lighting Ballasts

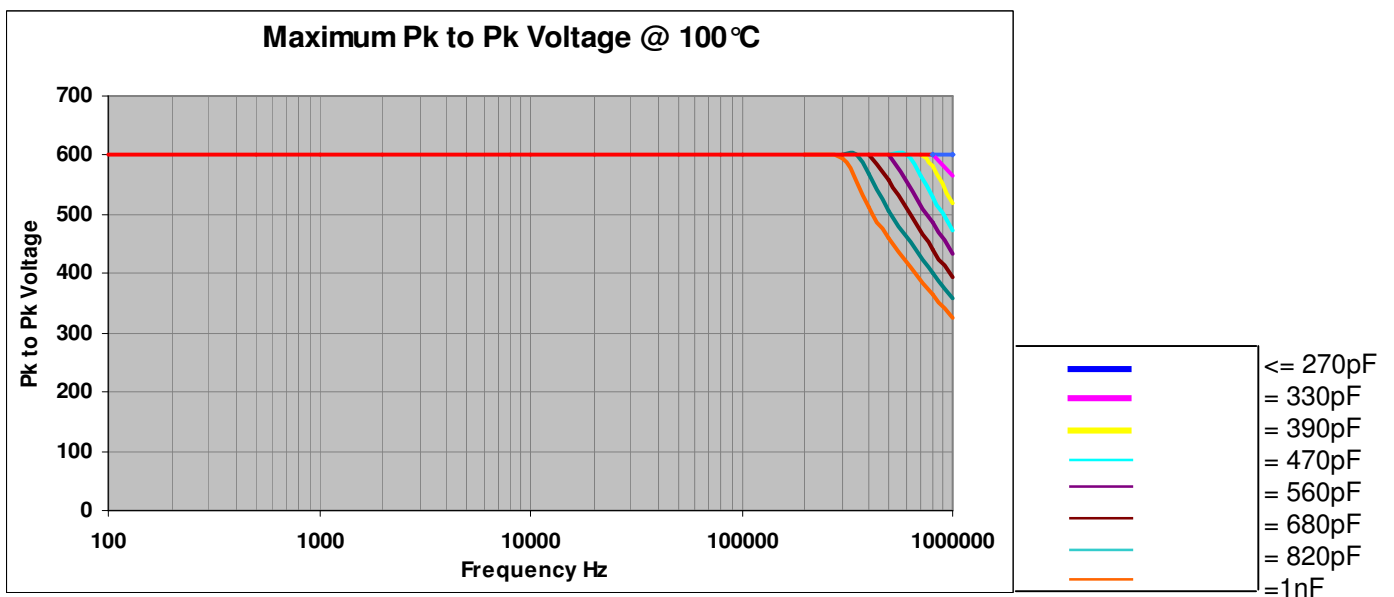


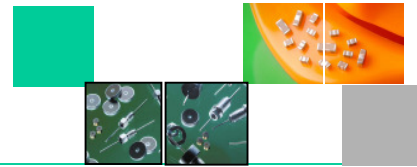
#### Introduction

All fluorescent lamps require a ballast to provide the electrical power to preheat the lamp electrodes, strike the lamp, provide the running power and control the discharge current. This can be achieved by either electromagnetic or high frequency electronic ballasts. With the introduction of new regulations in 2005 covering the European Union, USA and Japan, the use of the older electromagnetic ballasts will no longer be permitted, apart from repairing older systems until 2010. High frequency electronic ballasts provide increased luminous flux from the fluorescent lamp and negate the need for a starter, thus saving energy and costs.

With more manufacturers of high frequency electronic ballasts converting to low cost surface mount capacitors, for use in the snubber circuit of the ballast, Syfer Technology Ltd has introduced a range of capacitors specifically intended for this application. This range is available in the popular 1206 case size and is manufactured from the stable COG/NPO dielectric. This is particularly suitable for the ballast operating frequencies of 20KHz to 100KHz.

The range features capacitance values up to 1nF, with a maximum peak to peak voltage of 600V over a wide operating frequency range (see below).

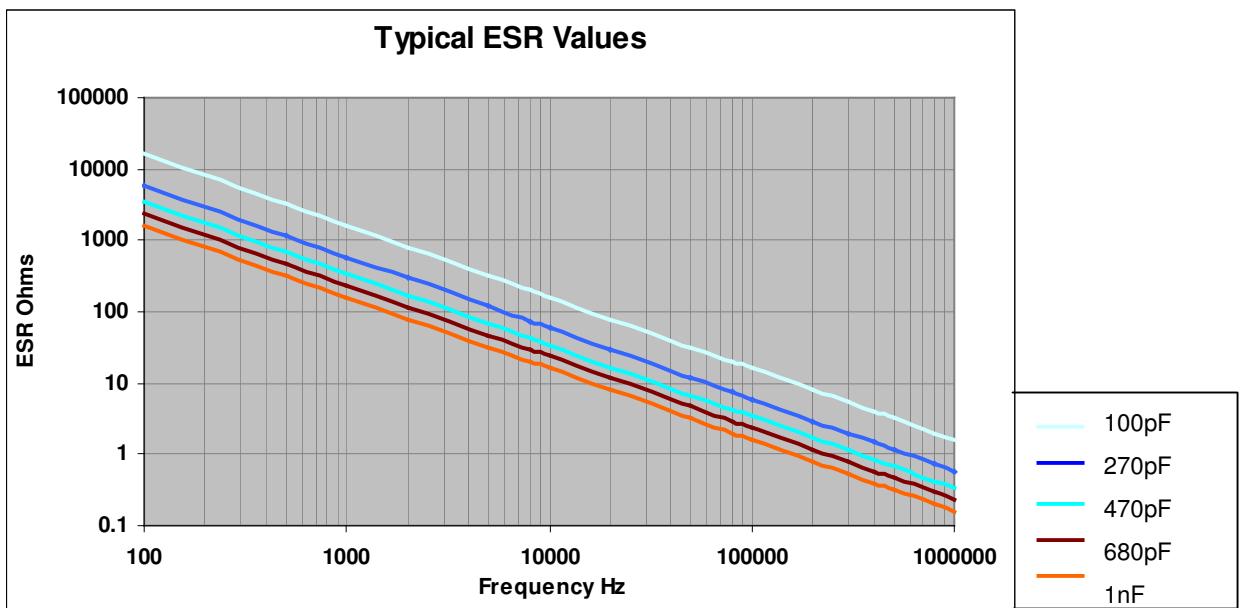




## Electronic Lighting Ballasts - Applications-Information 07/08

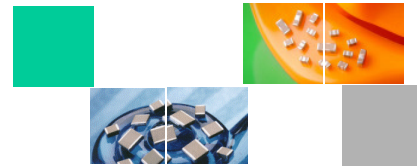
### Effective Series Resistance (ESR)

The low, stable ESR (see below) of this range, particularly at the ballast operating frequency 20 to 100KHz, results in a wide operating ambient temperature range of  $-55^{\circ}\text{C}$  to  $+100^{\circ}\text{C}$ .



### Pk to Pk Voltage

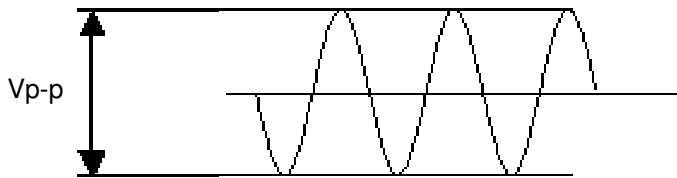
Voltage waveforms produced in ballasts result in very high  $dv/dt$  figures, this range is capable of withstanding a  $dv/dt$  in excess of  $5000\text{V}/\mu\text{Sec}$ . The voltage waveforms used may be of several varying types, depending on application. The maximum peak to peak voltage should be defined as below.



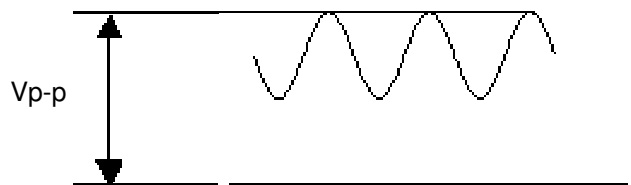
## Electronic Lighting Ballasts - Applications-Information 07/08

### Definition of maximum Pk to Pk Voltage

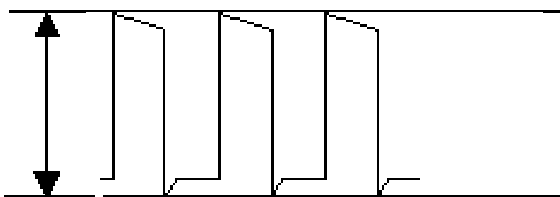
**AC Voltage**



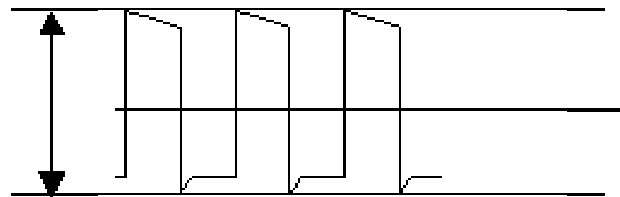
**DC + AC Voltage**



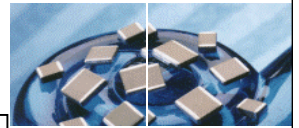
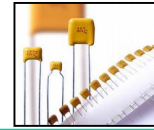
**Pulsed Voltage**



**Pulsed Voltage**

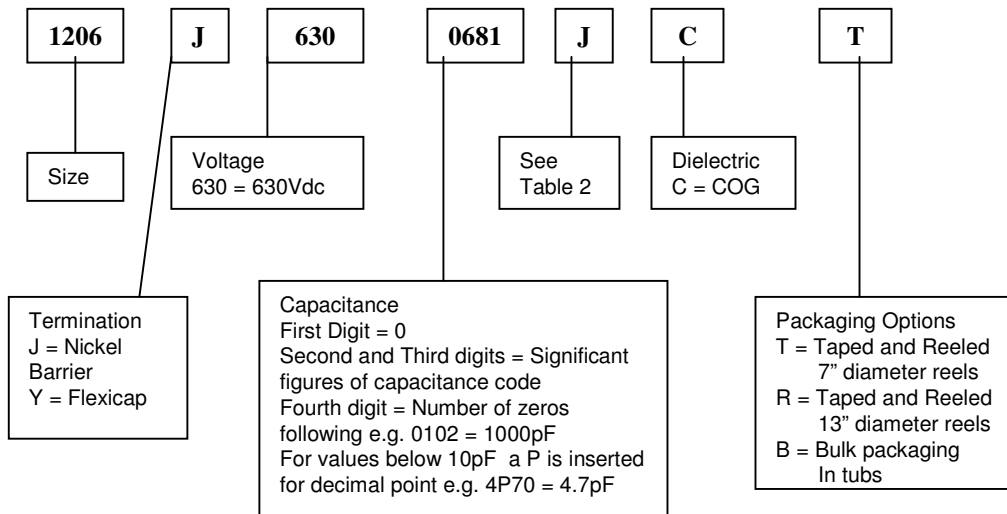


The rated peak to peak voltage of 600 volts should not be exceeded in each of the above options.



## Electronic Lighting Ballasts - Applications-Information 07/08

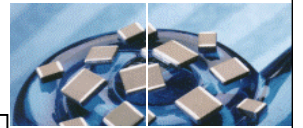
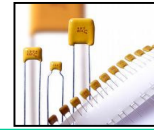
### Ordering Information



**Table 2**  
**Capacitance Tolerance**

Nominal Cap value 4.7pF – 8.2pF  
 C= ± 0.25pF  
 D= ± 0.50pF  
 F= ± 1.0pF

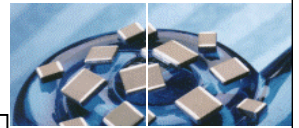
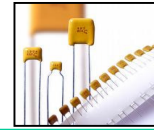
Nominal Cap value 10pF – 1000pF  
 F= ± 1%  
 G= ± 2%  
 J= ± 5%  
 K= ± 10%



**Electronic Lighting Ballasts - Applications-Information 07/08**

**Mechanical Specification**

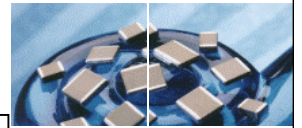
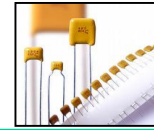
Syfer Size	1206
Length (L1) mm	3.20 ± 0.30
Width (W) mm	1.60 ± 0.20
Thickness (H) mm	1.60 Max.
Termination Bands mm (L2, L3)	0.25 – 0.75
Creepage Distance (L4)	1.40 Min.
Termination Material	Nickel Barrier
Solderability	IEC 68-2-20



## Electronic Lighting Ballasts - *Applications-Information 07/08*

### Electrical Specification

Dielectric	: COG $0 \pm 30$ ppm/°C
Operating Temperature range	: -55°C to + 100°C
Dissipation Factor	: Cr > 50pF $\leq 0.0015$ : Cr $\leq 50$ pF = 0.0015 (15+0.7)Cr
Rated Voltage	: 630Vdc/600V Peak to peak
Insulation Resistance	: >100Gohms
Voltage Proof	: 1.5 x Rated Voltage for 5 seconds
dv/dt Rating	: >5000V/uSec
Climatic Category	: 55/125/56
Ageing Rate	: Zero



*Application tip:*



**X2Y-series**

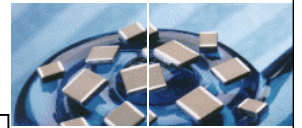
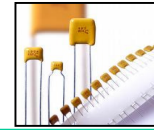
The Syfer X2Y Integrated Passive Component is a 3 terminal EMI chip device. The revolutionary design provides simultaneous line-to-line and line-to-ground filtering, using a single ceramic chip. In this way, differential and common mode filtering are provided in one device. Capable of replacing 2 or more conventional devices, it is ideal for balanced lines, twisted pairs and dc motors, in automotive, audio, sensor and other applications.

These filters can prove invaluable in meeting stringent EMC demands, particularly in automotive applications.

**Ordering Information**

1206	J	100	0222	M	X	T	E03
<b>Chip Size Reference</b> 0603 0805 1206 1410 1812 2220	<b>Termination</b> J = Nickel Barrier Y = FlexiCap™ A = Nickel Barrier (Tin/Lead) H = FlexiCap™ (Tin/Lead)	<b>Voltage</b> 016 = 16 volts 025 = 25 volts 050 = 50 volts 100 = 100 volts	<b>Capacitance</b> Expressed in picofarads (pF). First digit is 0. Second and third digits are significant figures of capacitance code. The fourth digit is number of zeros following. Example: 0222=2200pF.	<b>Tolerance</b> M= ±20%	<b>Dielectric</b> C = C0G X = X7R	<b>Packaging</b> T = 178mm (7") reel R = 330mm (13") reel B = Bulk	Balanced Line EMI Chip





*Application tip:*



**X2Y Panel Mount Feedthroughs (SFJEB Range)**

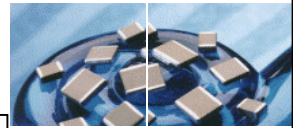
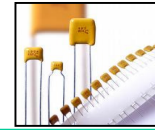
The Syfer balanced line filter is a 2-pin panel mounting device suitable for balanced lines and twisted pairs. It is ideal for passing lines through a bulkhead, and the feedthrough construction offers insertion loss performance up to 1GHz and above.

The filter also incorporates capacitance line-to-line as well as line-to-ground, and therefore both differential and common mode filtering are offered in the same package. In this way one single device can replace three separate components.

**Ordering Information**

<b>SF</b>	<b>J</b>	<b>E</b>	<b>B</b>	<b>200</b>	<b>0104</b>	<b>M</b>	<b>X</b>	<b>1</b>
<b>Syfer Filter</b>	<b>Case size</b> 9.8 O.D.	<b>Thread</b> ¼-28 UNF	<b>Electrical Configuration</b> Balanced Line Filter	<b>Voltage</b> 200=200Vd.c.	<b>Capacitance</b> Expressed in picofarads (pF). First digit is 0. Second and third digits are significant figures of capacitance code. The fourth digit is number of zeros following. Example: 0104=100,000pF.	<b>Capacitance Tolerance</b> M=±20%	<b>Dielectric</b> X=X7R	<b>Nuts &amp; Washers</b> 1=With





*Application tip:*

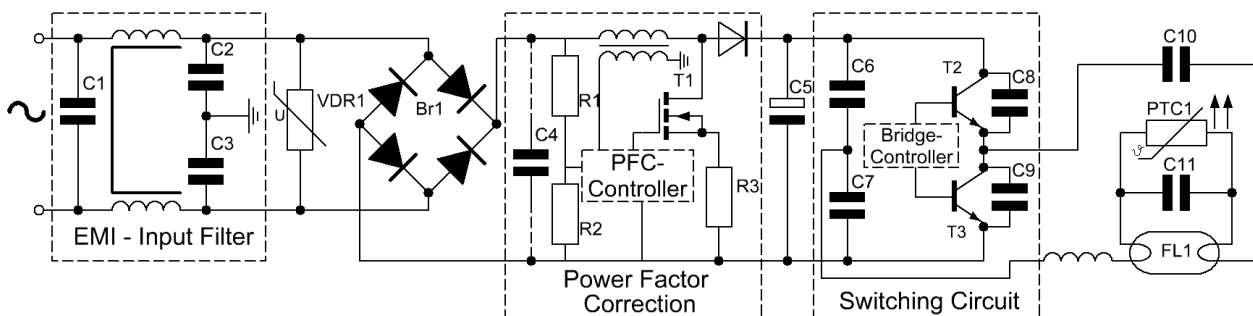


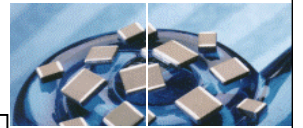
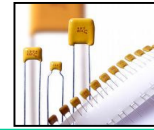
Lighting ballasts control the starting and operating voltages of electrical gas discharge lamps, also known as compact fluorescent lamps (CFL). Because they do not have an intrinsic feedback mechanism that limits operating current like the positive temperature coefficient of resistance of the filaments of incandescent light bulbs, gas discharge lamps need a ballast to limit electric current. Modern electronic lighting ballasts use solid-state circuitry to transform the voltage and alter the frequency of the supplied power. This eliminates any flickering of the CFL and regulates power more efficiently than is possible with standard magnetic lighting ballasts.

VISHAY components used for Lighting Ballast functions, European

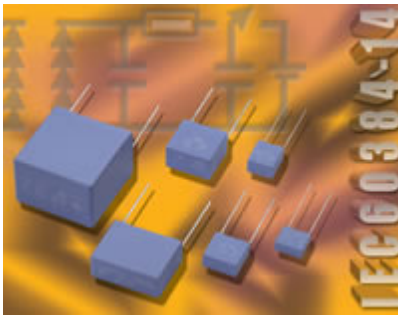
Standard, include:

- Film Capacitors
- Ceramic Capacitors, Single Layer
- Ceramic Capacitors, Multi-Layer
- Aluminum Electrolytic Capacitors
- Thick Film Chip





*Application tip:*



Please contact us for more information, samples and catalogs:  
[info@wts-electronic.de](mailto:info@wts-electronic.de), 05130 / 58 45 – 0

**We find solutions!**

**Permanently updated: <http://www.wts-electronic.de>**

---

***Impressum***

Herausgeber: wts // electronic components GmbH  
Langer Acker 28, 30900 Wedemark  
Telefon +49 (0)5130 / 58 45 0  
Telefax +49 (0)5130 / 37 50 55  
[www.wts-electronic.de](http://www.wts-electronic.de) [info@wts-electronic.de](mailto:info@wts-electronic.de)