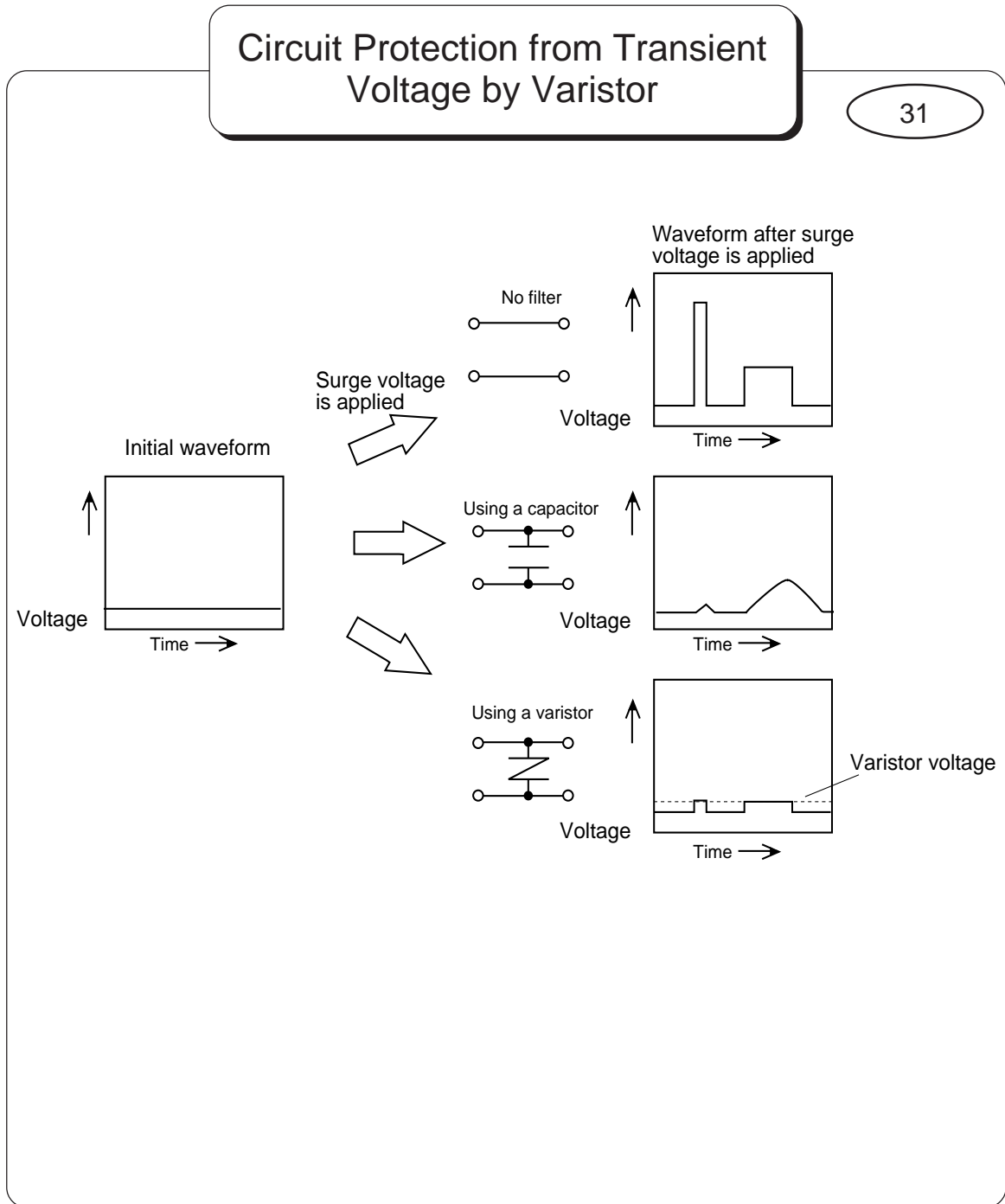


4. Other Filters

4.4. Varistors



Varistors are used to protect a circuit from high voltage surges.

[Notes]

When a high voltage surge is applied to a circuit, the outcome is usually catastrophic to the circuit. A capacitor may be installed across the signal lines. However, this capacitor cannot suppress voltage surges.

Therefore, when circuit protection from voltage surges is required, a varistor is used as a voltage protection device. When a voltage surge exceeding a specified voltage (varistor voltage) is applied, the varistor suppresses the voltage to protect the circuit.

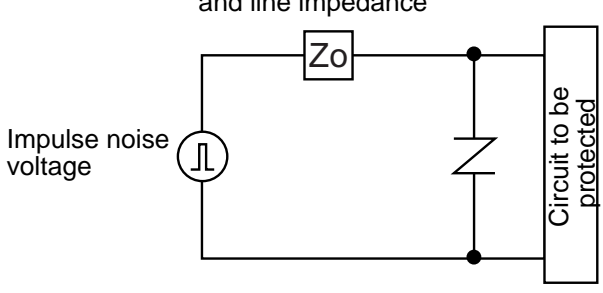
4. Other Filters

4.4. Varistors

Characteristic of Varistor

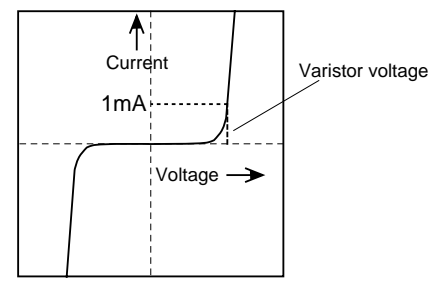
32

Internal resistance of noise source and line impedance



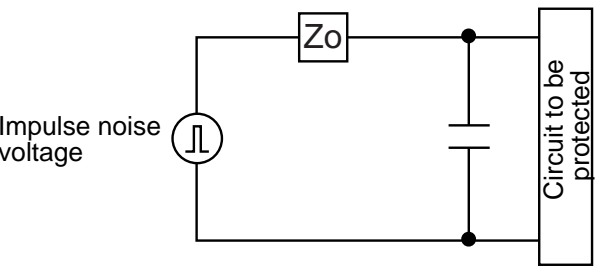
Impulse noise voltage

Characteristic of varistor



Current
1mA
Voltage →
Varistor voltage

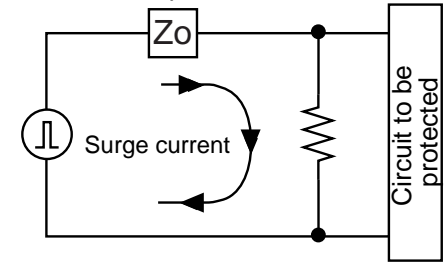
When the surge voltage is equal to or below varistor voltage



Internal resistance of noise source and line impedance

Impulse noise voltage

When the surge voltage is equal to or exceeds varistor voltage



Internal resistance of noise source and line impedance

Surge current

Varistor voltage
The Voltage applied across the terminals when a current of 1 mA flow through varistor .

Peak pulse current
Impulse current which the varistor can withstand.

When the voltage surge does not exceed the varistor voltage, the varistor works as a capacitor. However, when the surge voltage exceeds the varistor voltage, the impedance across the varistor terminals decreases sharply. Since input voltage to the circuit depends on the varistor internal resistance and line impedance, the decrease in the impedance across the varistor terminals allows surge voltage suppression.

width of 20 μs). If the peak pulse current rating is insufficient, then the varistor may be damaged.

An essential point of varistor selection is that the varistor can handle the peak pulse current. The peak pulse current is the maximum current at which the varistor voltage does not change by more than 10% even if a peak current is applied twice at intervals of 5 minutes (pulse to have a rising pulse width of 8 μs and a half