

### Ceramic Capacitors (Safety Regulations) For Surface Mounting Types

Discontinued

Type HC (Sub-Class Y1)

Type FC (Sub-Class Y2)

Type BC (Sub-Class Y2)



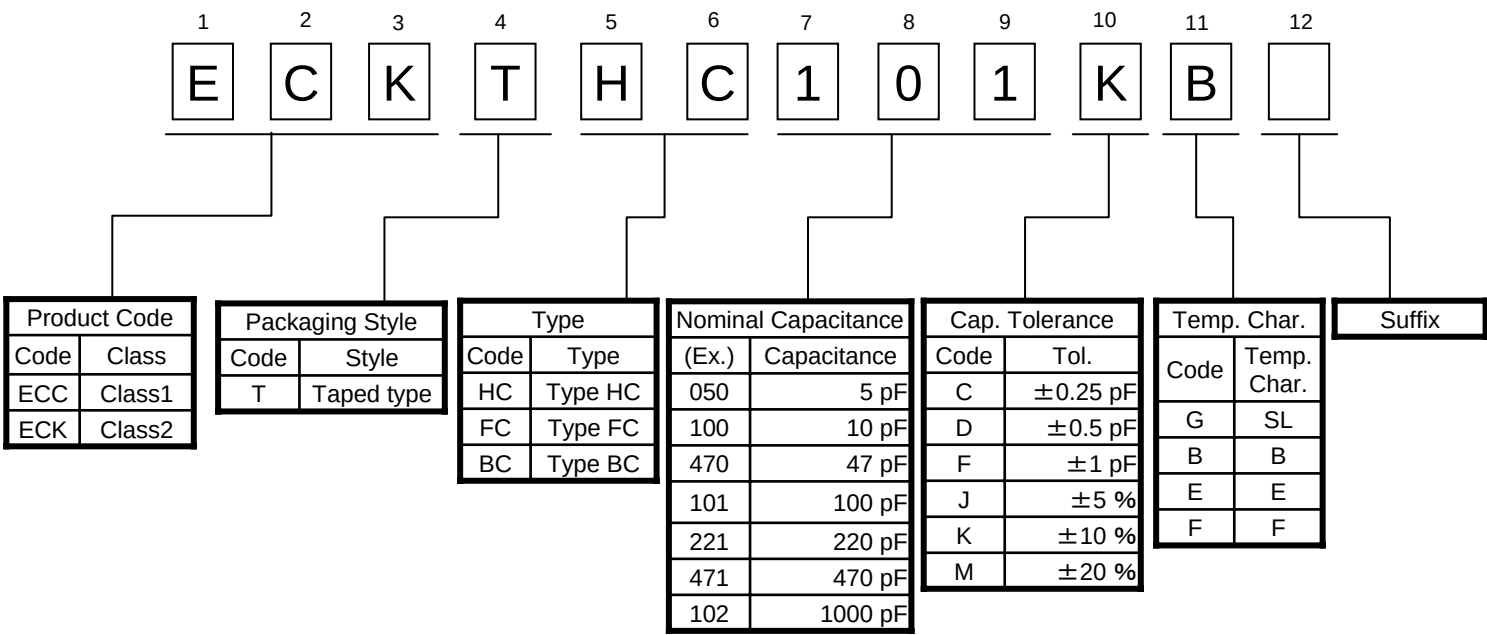
#### ■ Features

- Resin molded SMD type for flow/reflow soldering (HC) and reflow soldering (FC,BC)
- High reliability
- Safety requirement approved by UL, SEMKO, NEMKO, FIMKO, DEMKO and KTL\* \* KTL: only Type FC

#### ■ Recommended Application

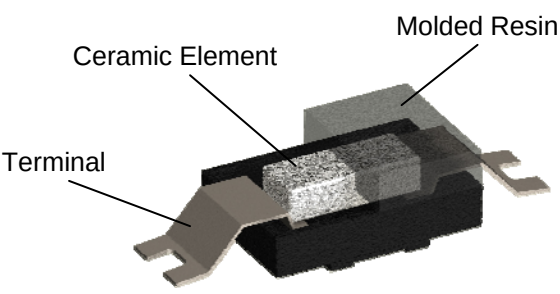
- Interference suppressors circuit and Isolation circuit of IT equipment such as MODEM.
- Interference suppressors circuit of small power supply machinery such as DC-DC converters and power modules.
- Interference suppressors circuit of AC primary side for general electronic equipment.

#### ■ Explanation of Part Numbers

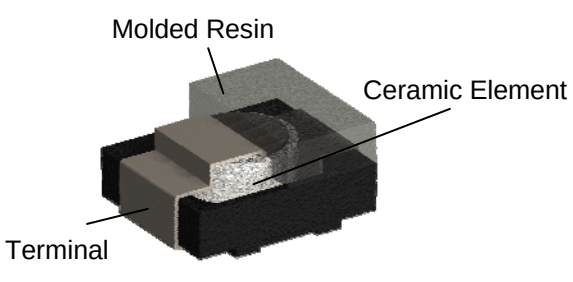


#### ■ Construction

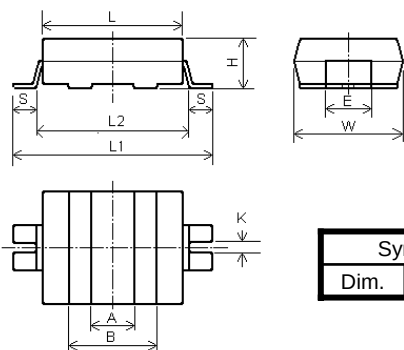
● Type HC



● Type FC,BC



### ■ Dimensions in mm (not to scale) 【Type HC:Y1】

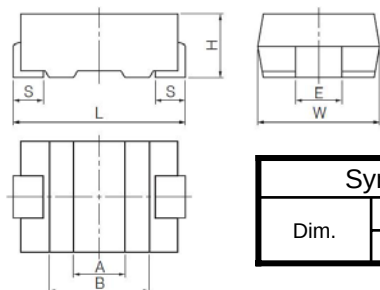


| Symbol       | L       | W       | H       | S        | E       | A     | B     | L1       | L2      |
|--------------|---------|---------|---------|----------|---------|-------|-------|----------|---------|
| Dim. Type HC | 6.8±0.3 | 4.5±0.2 | 2.5 max | 1.0±0.50 | 2.5±0.2 | (1.7) | (3.1) | 12.0±0.5 | 8.0 min |

### ■ Specifications 【Type HC:Y1】

| Characteristics                 | Temp. Char. B/Y5P                                                                 |                  |             |
|---------------------------------|-----------------------------------------------------------------------------------|------------------|-------------|
| Operating Temperature Range     | -25 to 125 °C                                                                     |                  |             |
| Rated Voltage                   | 250 VAC                                                                           |                  |             |
| Dielectric Withstanding Voltage | 4000 VAC for 1 minute                                                             |                  |             |
| Capacitance                     | Within the specified tolerance, when measured at 1kHz±20%, 1 to 5 Vrms. and 20 °C |                  |             |
| Q or Dissipation Factor (tan δ) | tan δ < 0.025at 1 kHz±20 %, 1 to 5 Vrms. and 20 °C                                |                  |             |
| Insulation Resistance           | 10000 MΩ min. at 500 VDC and 1 minute electrification                             |                  |             |
| Temperature Characteristics     | Char.                                                                             | Max. Cap. Change | Temp. Range |
|                                 | B/Y5P                                                                             | ±10%             | -25 ~ 85 °C |

### ■ Dimensions in mm (not to scale) 【Type BC,FC:Y2】



| Symbol | L       | W       | H       | S       | E         | A       | B           |
|--------|---------|---------|---------|---------|-----------|---------|-------------|
| Dim.   | Type FC | 5.7±0.5 | 4.5±0.3 | 2.3 max | 0.85±0.30 | 2.5±0.2 | (1.7) (3.1) |
|        | Type BC | 7.1±0.5 | 6.3±0.3 | 2.5±0.3 | 1.45±0.30 | 2.5±0.2 | (2.0) (3.7) |

### ■ Specifications 【TypeBC,FC:Y2】

| Characteristics                 | Temp. Char. SL/GP                                                                               | Temp. Char. B/Y5P, E/Y5U, F/Y5V |                                                                                     |             |
|---------------------------------|-------------------------------------------------------------------------------------------------|---------------------------------|-------------------------------------------------------------------------------------|-------------|
| Operating Temperature Range     | -25 to 100 °C                                                                                   |                                 |                                                                                     |             |
| Rated Voltage                   | 250 VAC                                                                                         |                                 |                                                                                     |             |
| Dielectric Withstanding Voltage | 1500 VAC for 1 minute                                                                           |                                 |                                                                                     |             |
| Capacitance                     | Within the specified tolerance, when measured at 1 MHz±20 %, 1 to 5 Vrms. and 20 °C             |                                 | Within the specified tolerance, when measured at 1 kHz±20 %, 1 to 5 Vrms. and 20 °C |             |
| Q or Dissipation Factor (tan δ) | 30 pF or under Q > 200+10 C (C:Cap.pF) over 30 pF Q > 500 at 1 MHz±20 %, 1 to 5 Vrms. and 20 °C |                                 | tan δ < 0.025 at 1 kHz±20 %, 1 to 5 Vrms. and 20 °C                                 |             |
| Insulation Resistance           | 10000 MΩ min. at 500 VDC and 1 minute electrification                                           |                                 |                                                                                     |             |
| Temperature Characteristics     | Temperature Coefficient:+350 to -1000 ppm/ °C over the temperature range 20 to 85 °C            | Char.                           | Max. Cap. Change                                                                    | Temp. Range |
|                                 |                                                                                                 | B/Y5P                           | ±10%                                                                                | -25 ~ 85 °C |
|                                 |                                                                                                 | E/Y5U                           | +20,-55%                                                                            |             |
|                                 |                                                                                                 | F/Y5V                           | +30,-80%                                                                            |             |

### ■ Related Standards and Certificate Number

| Certification Body | Related Standard   | Certificate Number |                          |                                 | Sub-Class         | Rated Voltage | Dielectric Withstanding Voltage       | Operating Temperature Range               |
|--------------------|--------------------|--------------------|--------------------------|---------------------------------|-------------------|---------------|---------------------------------------|-------------------------------------------|
|                    |                    | Type HC            | Type FC                  | Type BC                         |                   |               |                                       |                                           |
| UL(USA)            | UL60384-14         | E62674             | E62674                   | E62674                          | HC:Y1<br>BC/FC:Y2 | 250 VAC       | HC:<br>4000 VAC<br>BC/FC:<br>1500 VAC | HC:<br>-25 ~ 125℃<br>BC/FC:<br>-25 ~ 100℃ |
|                    | CAN/CSA –E60384-14 | -----              | -----                    | E62674                          | Y2                |               | 1500 VAC                              |                                           |
| SEMKO(Sweden)      | EN60384-14 2005    | 1025027            | 806189                   | 1025267                         | HC:Y1<br>BC/FC:Y2 |               | HC:<br>4000 VAC<br>BC/FC:<br>1500 VAC |                                           |
| FIMKO(Finland)     |                    | FI 26683           | FI 16588A1<br>FI 17348A2 | FI 26770                        |                   |               |                                       |                                           |
| DEMKO(Denmark)     |                    | D-00043            | 310914-01<br>310698-01   | Issuing<br>certification<br>now |                   |               |                                       |                                           |
| NEMKO(Norway)      |                    | P11213874          | P01100665<br>P01101830   | P11214054                       |                   |               |                                       |                                           |
| KTL(Korea)         | K60384-14          | -----              | SU03013-<br>3001         | -----                           |                   |               |                                       |                                           |

### ■ Ratings and Characteristics

| Type Name | Part Number | Capacitance (pF) | Cap. Tolerance | Temp. Char | Dimensions in mm   |
|-----------|-------------|------------------|----------------|------------|--------------------|
| Type HC   | ECKTHC101KB | 100              | ±10 %          | B/Y5P      | 6.8L × 4.5W × 2.5H |
|           | ECKTHC221KB | 220              |                |            |                    |
|           | ECKTHC471KB | 470              |                |            |                    |
|           | ECKTHC101MB | 100              | ±20 %          |            |                    |
|           | ECKTHC221MB | 220              |                |            |                    |
|           | ECKTHC471MB | 470              |                |            |                    |
| Type FC   | ECCTFC100DG | 10               | ±0.5 pF        | SL/GP      | 5.7L × 4.5W × 2.3H |
|           | ECCTFC150JG | 15               | ±5 %           |            |                    |
|           | ECCTFC220JG | 22               |                |            |                    |
|           | ECCTFC330JG | 33               |                | ±10 %      |                    |
|           | ECKTFC470KB | 47               |                |            |                    |
|           | ECKTFC101KB | 100              |                |            |                    |
|           | ECKTFC151KB | 150              |                |            |                    |
|           | ECKTFC221KB | 220              |                |            |                    |
|           | ECKTFC331KB | 330              |                |            |                    |
|           | ECKTFC471KB | 470              |                |            |                    |
|           | ECKTFC102ME | 1000             | ±20 %          | E/Y5U      |                    |
|           | ECKTFC152MF | 1500             |                | F/Y5V      |                    |
|           | ECKTFC222MF | 2200             |                |            |                    |
| Type BC   | ECCTBC100DG | 10               | ±0.5 pF        | SL/GP      | 7.1L × 6.3W × 2.5H |
|           | ECCTBC150JG | 15               | ±5 %           |            |                    |
|           | ECCTBC220JG | 22               |                |            |                    |
|           | ECCTBC330JG | 33               |                |            |                    |
|           | ECCTBC470JG | 47               |                |            |                    |
|           | ECCTBC680JG | 68               |                |            |                    |
|           | ECKTBC101KB | 100              |                | ±10 %      |                    |
|           | ECKTBC151KB | 150              |                |            |                    |
|           | ECKTBC221KB | 220              |                |            |                    |
|           | ECKTBC331KB | 330              |                |            |                    |
|           | ECKTBC471KB | 470              |                |            |                    |
|           | ECKTBC681KB | 680              |                |            |                    |
|           | ECKTBC102ME | 1000             | ±20 %          | E/Y5U      |                    |
|           | ECKTBC152ME | 1500             |                |            |                    |
|           | ECKTBC222ME | 2200             |                |            |                    |

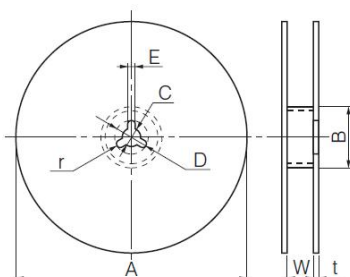
Notes \* Other capacitance values are available by special order.

### ■ Packaging Methods (Taping)

#### ● Minimum Quantity/Packing Unit

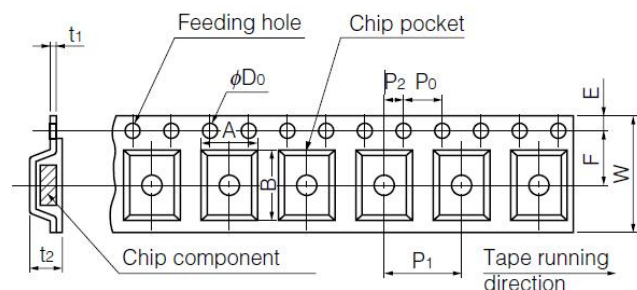
| Type    | Packaging style         | Part Number  |              | Minimum Packing Quantity | Packing Quantity in Carton | Carton Dimensions in mm (LWH) |
|---------|-------------------------|--------------|--------------|--------------------------|----------------------------|-------------------------------|
| Type HC | Embossed Carrier Taping | EC□□THC□□□□□ | 100~470pF    | 3000 pcs./reel           | 6000 pcs                   | 350 × 350 × 62                |
| Type FC | Embossed Carrier Taping | EC□□TFC□□□□□ | 10 to 2200pF | 3000 pcs./reel           | 9000 pcs.                  | 350 × 350 × 62                |
| Type BC | Embossed Carrier Taping | EC□□TBC□□□□□ | 10 to 2200pF | 2000 pcs./reel           | 6000 pcs.                  | 350 × 350 × 62                |

#### ● Reel



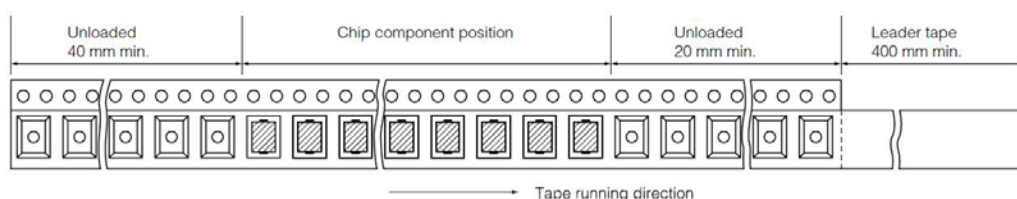
| Symbol    |         | A      | B      | C         | D         | E        | W         | t        | r    |
|-----------|---------|--------|--------|-----------|-----------|----------|-----------|----------|------|
| Dim. (mm) | Type HC | 330 ±5 | 60 min | 13.0 ±0.5 | 21.0 ±1.0 | 2.0 ±0.5 | 25.5 ±1.5 | 2.0 ±0.5 | R1.0 |
|           | Type FC |        |        |           |           |          | 13.5 ±1.5 |          |      |
|           | Type BC |        |        |           |           |          | 13.5 ±1.5 |          |      |

#### ● Embossed carrier taping



| Symbol    |         | A        | B         | W         | F         | E          | P <sub>1</sub> | P <sub>2</sub> | P <sub>0</sub> | φD <sub>0</sub> | t <sub>1</sub> | t <sub>2</sub> |
|-----------|---------|----------|-----------|-----------|-----------|------------|----------------|----------------|----------------|-----------------|----------------|----------------|
| Dim. (mm) | Type HC | 4.8      | 12.3 ±0.2 | 24.0 ±0.3 | 11.5 ±0.1 | 1.75 ±0.10 | 8.0 ±0.1       | 2.00 ±0.05     | 4.1 ±0.1       | 1.5 +0.1 -0     | 0.3 ±0.1       | 2.8 ±0.3       |
|           | Type FC | ±0.2     | 6.0 ±0.2  | 12.0 ±0.3 | 5.5 ±0.1  |            |                |                |                |                 |                | ±0.3           |
|           | Type BC | 6.5 ±0.2 | 7.5 ±0.2  | ±0.3      | ±0.1      |            |                |                |                |                 |                | 3.2 ±0.3       |

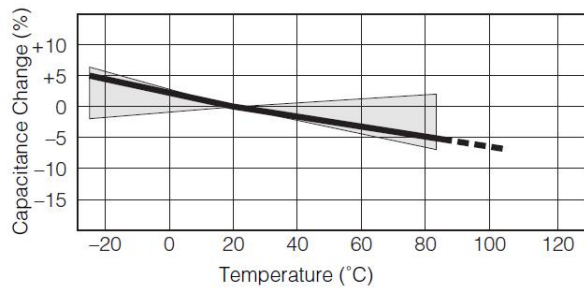
#### ● Leader Part and Taped End



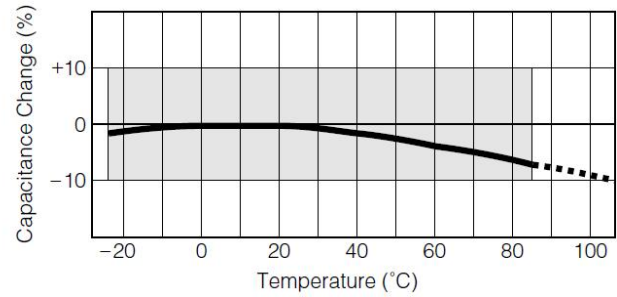
Typical Characteristics

Temperature Characteristics

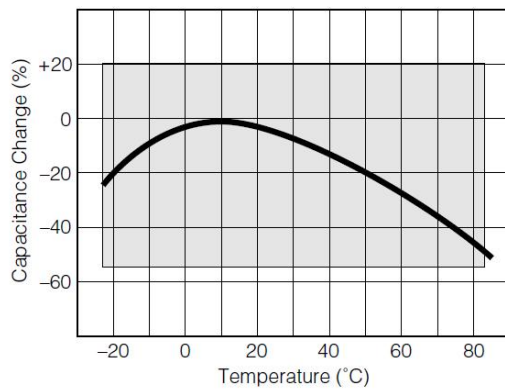
Char. SL/GP  
(Temp.Coeff.:+350 to -1000 ppm/°C)



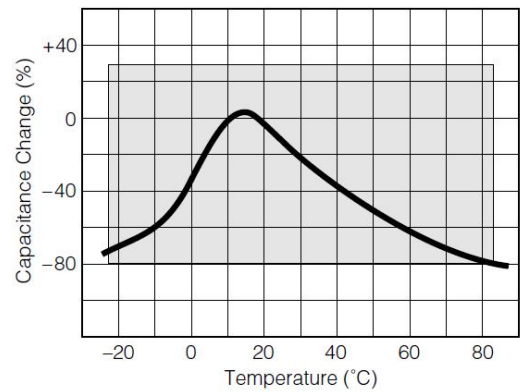
Char. B/Y5P  
Temp.Range:-25 to 85 °C  
Max.Cap.Change:± 10 %



Char. E/Y5U ( Temp.Range:-25 to 85 °C  
max.Cap.Change:+20, -55 % )

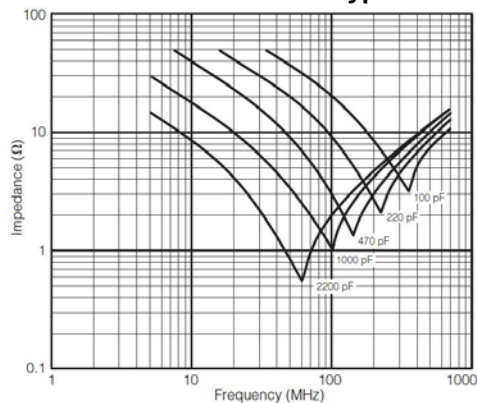


Char. F/Y5V ( Temp. Range :-25 to 85 °C  
max.Cap.Change:+30, -80 % )

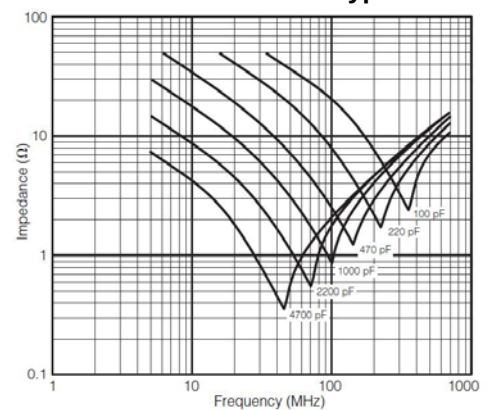


Impedance vs. Frequency Characteristics

Type FC

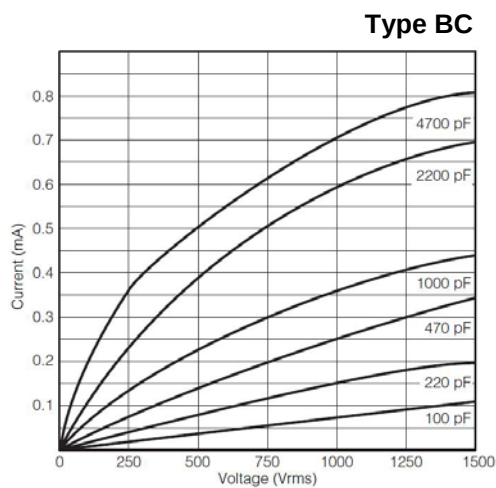
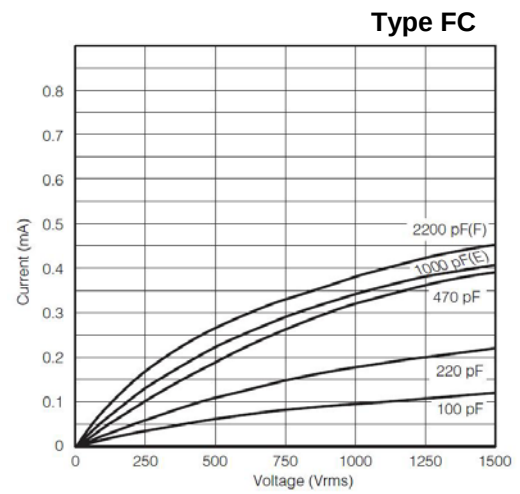
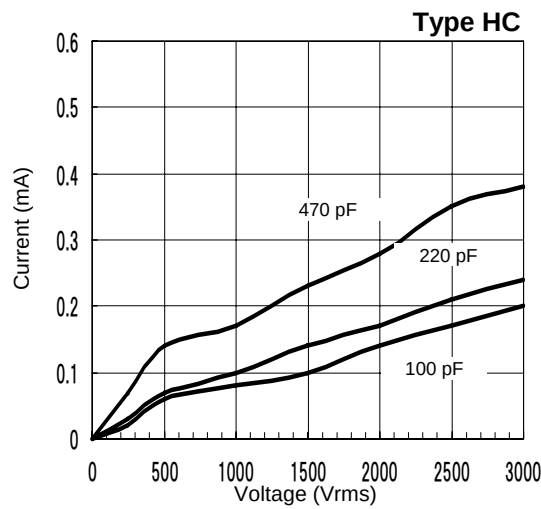


Type BC



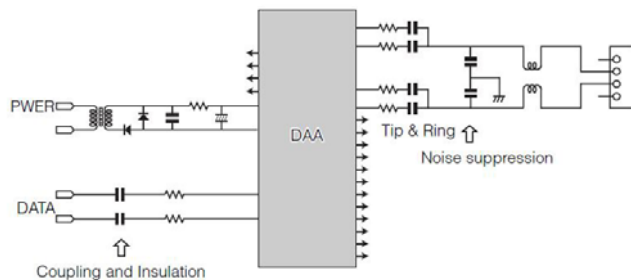
Typical Characteristics

Current vs. Voltage (Leakage Current Characteristics)



Application Examples

MODEM



Primary circuit of Switching Power Supply

