

Power Choke Coil (Automotive Grade)

Series: **PCC-M0530M-LP(MC)**
PCC-M0630M-LP(MC)
PCC-M0840M-LP(MC)
PCC-M1040M-LP(MC)



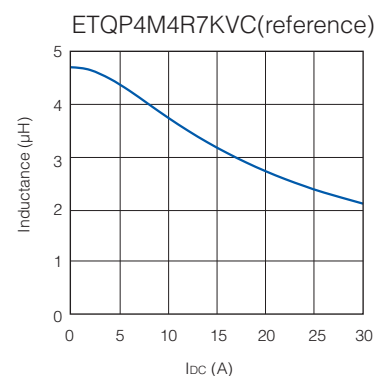
High heat resistance and high reliability
 Using metal composite core (MC)

Industrial Property : patents 3 (Registered 2/Pending 1)

Features

- High heat resistance : Operation up to 155 °C including self-heating
- Low profile : 3 mm max. height (PCC-M0530M-LP, PCC-M0630M-LP)
4 mm max. height (PCC-M0840M-LP, PCC-M1040M-LP)
- SMD type
- High-reliability : High vibration resistance as result of newly developed integral construction; under severe reliability conditions of automotive and other strenuous applications
- High bias current : Excellent inductance stability using ferrous alloy magnetic material (Fig.1)
- Temp. stability : Excellent inductance stability over broad temp. range
- Low audible (buzz) noise : A gapless structure achieved with metal composite core
- High efficiency : Low DC resistance of winding and low eddy-current loss of the core
- Shielded construction
- AEC-Q200 Automotive qualified
- RoHS compliant

● Fig.1 Inductance v.s. DC current



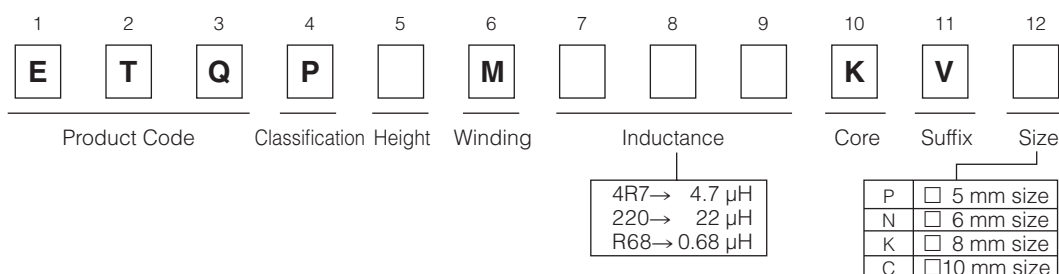
Recommended Applications

- Noise filter for various drive circuitry requiring high temp. operation and peak current handling capability
- Boost-Converter, Buck-Converter DC/DC

Standard Packing Quantity (Minimum Quantity/Packing Unit)

- 4,000 pcs./box (2 reel) : PCC-M0530M-LP, PCC-M0630M-LP
- 1,000 pcs./box (2 reel) : PCC-M0840M-LP, PCC-M1040M-LP

Explanation of Part Numbers



Temperature rating

| | | |
|-----------------------------|---------------------|---|
| Operating temperature range | | Tc : -55 °C to +155 °C(Including self-temperature rise) |
| Storage condition | After PWB mounting | |
| | Before PWB mounting | Ta : -5 °C to +35 °C 85%RH max. |

1. Series PCC-M0530M-LP (ETQP3M□□□KVP)

Standard Parts

| Series | Part No. | Inductance *1 | | DCR (at 20 °C) (mΩ) | | Rated Current (Typ. : A) | | |
|------------------------------------|--------------|---------------|---------------|---------------------|---------------|--------------------------|------|---------|
| | | L0 (μH) | Tolerance (%) | Typ. (max.) | Tolerance (%) | ΔT=40K | | ΔL=-30% |
| | | | | | | (*2) | (*3) | (*4) |
| PCC-M0530M-LP [5.5×5.0×3.0(mm)] | ETQP3M100KVP | 10.00 | ±20 | 96 (105.6) | ±10 | 2.4 | 2.9 | 4.2 |
| | ETQP3M6R8KVP | 6.80 | | 65.7 (72.27) | | 2.9 | 3.5 | 6.1 |
| | ETQP3M4R7KVP | 4.70 | | 45.6 (50.16) | | 3.4 | 4.1 | 6.7 |
| | ETQP3M3R3KVP | 3.30 | | 27.3 (30.03) | | 4.4 | 5.4 | 8.0 |
| | ETQP3M2R2KVP | 2.20 | | 20 (22) | | 5.2 | 6.3 | 10.1 |
| | ETQP3M1R5KVP | 1.50 | | 12 (13.2) | | 6.7 | 8.1 | 12.0 |
| | ETQP3M1R0KVP | 1.00 | | 9.6 (10.56) | | 7.5 | 9.0 | 14.1 |
| | ETQP3MR68KVP | 0.68 | | 7.6 (8.36) | | 8.4 | 10.2 | 15.9 |

(*1) Measured at 100k Hz.

(*2) DC current which causes temperature rise of 40K. Parts are soldered by reflow on four-layer PWB (1.6 mm FR4) and measured at room temperature. See also (*5)

(*3) DC current which causes temperature rise of 40K. Parts are soldered by reflow on multilayer PWB with high heat dissipation performance. Note: Heat radiation constant are approx. 51 K/W measured on 5.5×5.0×3.0 mm case size. See also (*5)

(*4) Saturation rated current : DC current which causes L(0) drop -30 %.

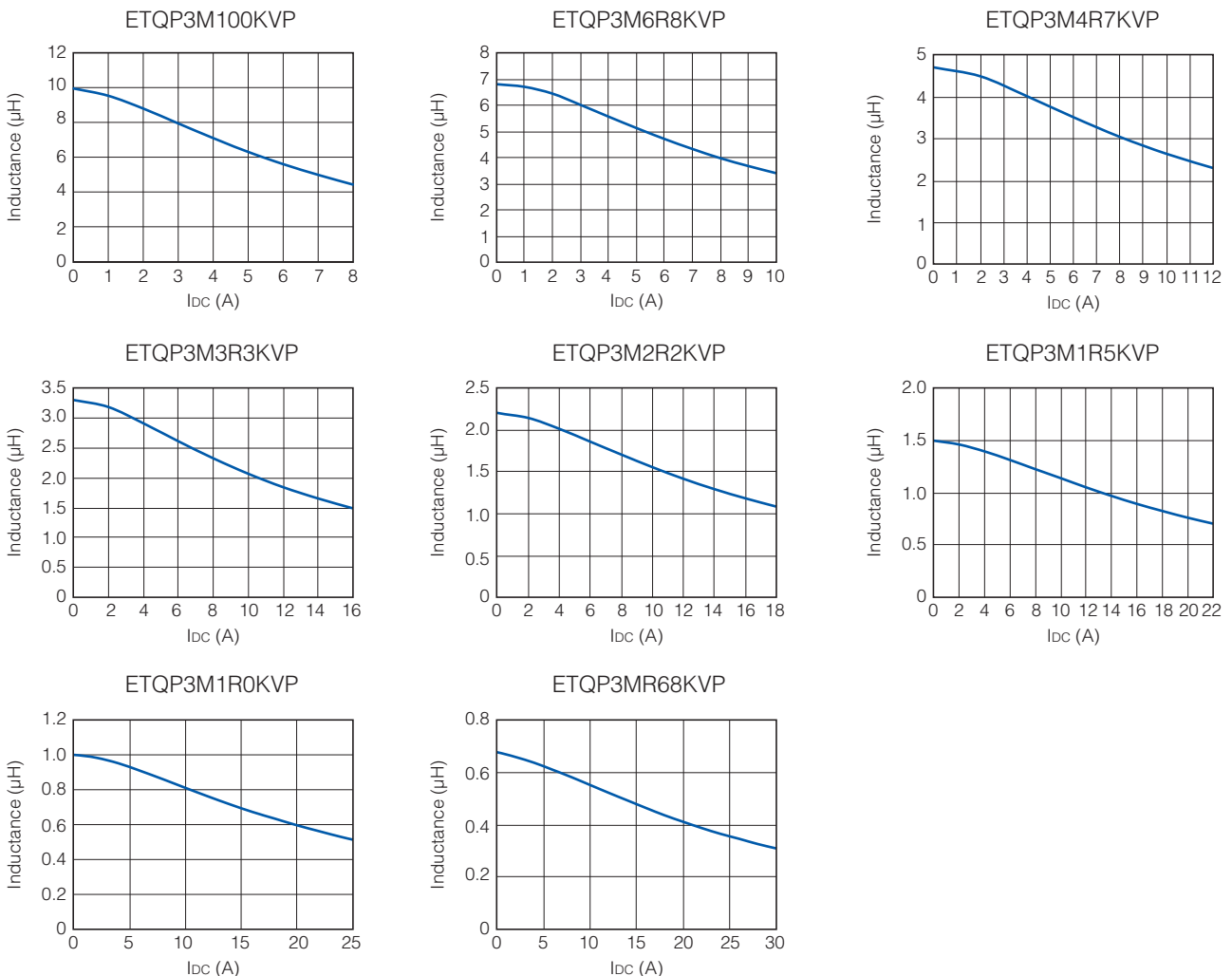
(*5) Within a suitable application, the part's temperature depends on circuit design and certain heat dissipation conditions. This should be double checked in a worst case operation mode.

In normal case, the max.standard operating temperature of +155 °C should not be exceeded.

For higher operating temperature conditions, please contact Panasonic representative in your area.

Performance Characteristics (Reference)

● Inductance vs DC Current

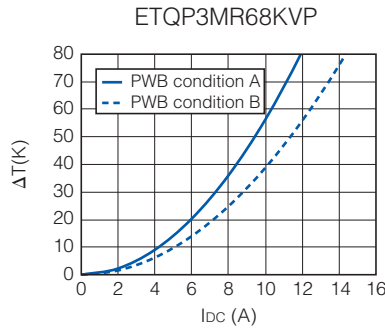
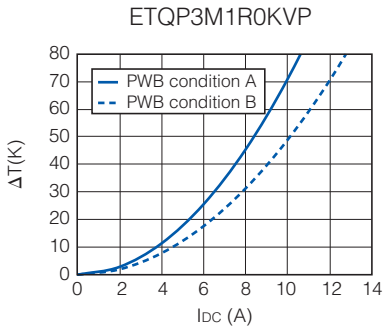
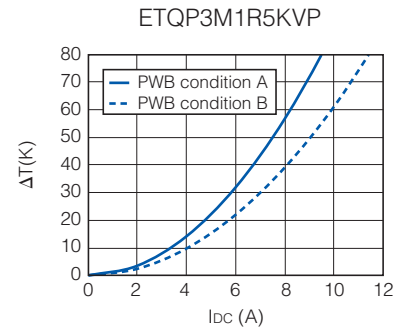
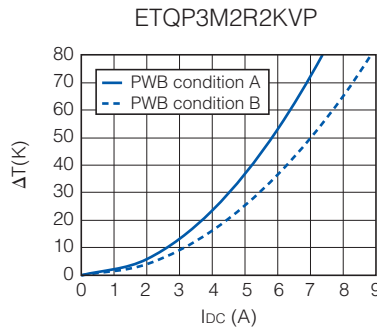
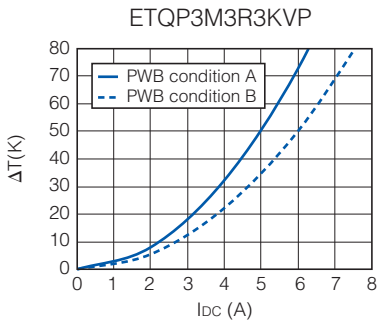
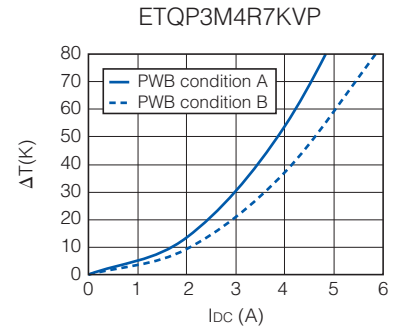
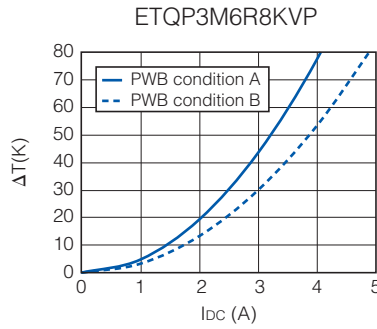
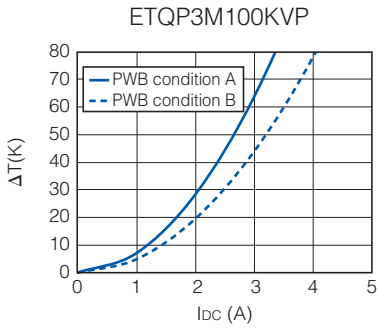


Performance Characteristics (Reference)

● Case Temperature vs DC Current

PWB condition A : Four-layer PWB (1.6 mm FR4), See also (*2)

PWB condition B : Multilayer PWB with high heat dissipation performance. See also (*3)



2. Series PCC-M0630M-LP (ETQP3M□□□KVN)

Standard Parts

| Series | Part No. | Inductance *1 | | DCR (at 20 °C) (mΩ) | | Rated Current (Typ. : A) | | |
|------------------------------------|--------------|---------------|---------------|---------------------|---------------|--------------------------|------|---------|
| | | L0 (μH) | Tolerance (%) | Typ. (max.) | Tolerance (%) | ΔT=40K | | ΔL=-30% |
| | | | | | | (*2) | (*3) | (*4) |
| PCC-M0630M-LP [6.4×6.0×3.0(mm)] | ETQP3M330KVN | 33.00 | ±20 | 206 (226.6) | ±10 | 1.7 | 2.1 | 3.0 |
| | ETQP3M220KVN | 22.00 | | 128 (140.8) | | 2.2 | 2.7 | 4.3 |
| | ETQP3M150KVN | 15.00 | | 99.2 (109.12) | | 2.5 | 3.0 | 5.1 |
| | ETQP3M100KVN | 10.00 | | 71 (78.1) | | 2.9 | 3.6 | 5.8 |
| | ETQP3M6R8KVN | 6.80 | | 45.6 (50.16) | | 3.6 | 4.5 | 8.1 |
| | ETQP3M4R7KVN | 4.70 | | 29 (31.9) | | 4.6 | 5.6 | 9.8 |
| | ETQP3M3R3KVN | 3.30 | | 24.1 (26.51) | | 5.0 | 6.1 | 11.5 |
| | ETQP3M2R2KVN | 2.20 | | 14.5 (15.95) | | 6.5 | 7.9 | 12.8 |
| | ETQP3M1R5KVN | 1.50 | | 11 (12.1) | | 7.4 | 9.1 | 14.2 |
| | ETQP3M1R0KVN | 1.00 | | 6.2 (6.82) | | 9.9 | 12.1 | 16.0 |
| ETQP3MR68KVN | 0.68 | 5.2 (5.72) | 10.8 | 13.2 | 20.2 | | | |

(*1) Measured at 100k Hz.

(*2) DC current which causes temperature rise of 40K. Parts are soldered by reflow on four-layer PWB (1.6 mm FR4) and measured at room temperature. See also (*5)

(*3) DC current which causes temperature rise of 40K. Parts are soldered by reflow on multilayer PWB with high heat dissipation performance. Note: Heat radiation constant are approx. 44 K/W measured on 6.5×6.0×3.0 mm case size. See also (*5)

(*4) Saturation rated current : DC current which causes L(0) drop -30 %.

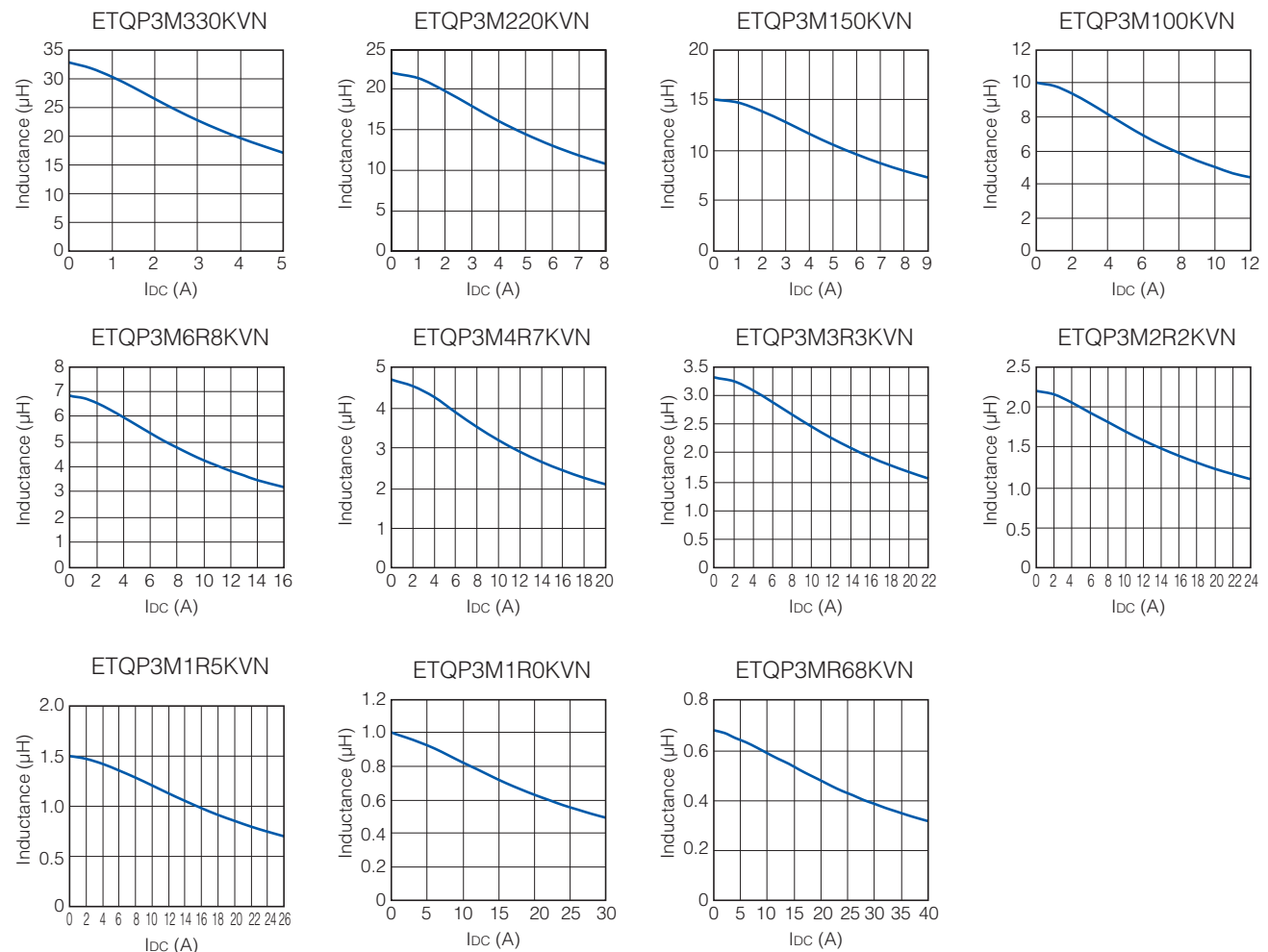
(*5) Within a suitable application, the part's temperature depends on circuit design and certain heat dissipation conditions. This should be double checked in a worst case operation mode.

In normal case, the max.standard operating temperature of +155 °C should not be exceeded.

For higher operating temperature conditions, please contact Panasonic representative in your area.

Performance Characteristics (Reference)

● Inductance vs DC Current

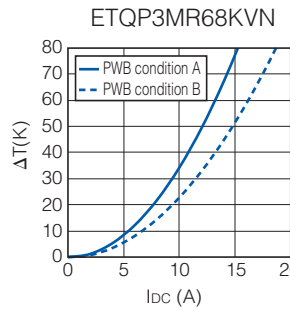
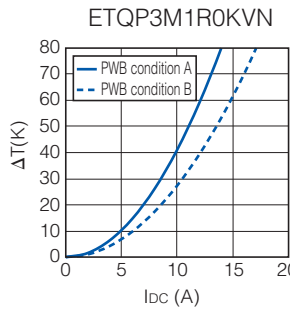
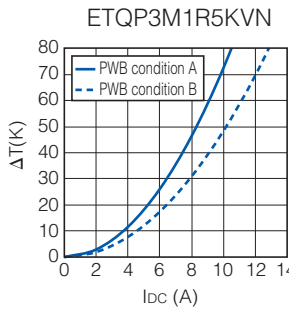
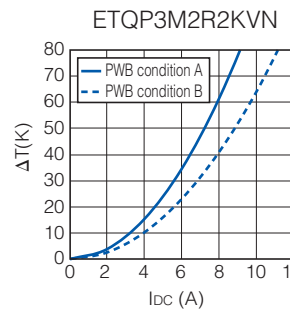
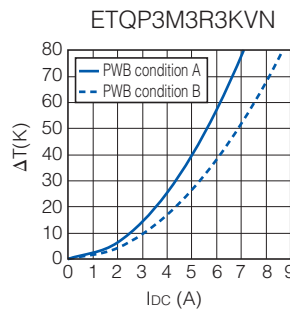
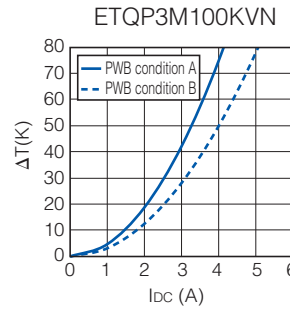
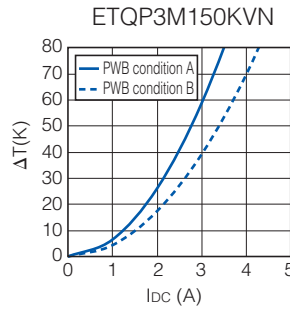


Performance Characteristics (Reference)

● Case Temperature vs DC Current

PWB condition A : Four-layer PWB (1.6 mm FR4), See also (*2)

PWB condition B : Multilayer PWB with high heat dissipation performance. See also (*3)



3. Series PCC-M0840M-LP (ETQP4M□□□KVK)

Standard Parts

| Series | Part No. | Inductance *1 | | DCR (at 20 °C) (mΩ) | | Rated Current (Typ. : A) | | |
|------------------------------------|--------------|---------------|---------------|---------------------|---------------|--------------------------|------|---------|
| | | L0 (μH) | Tolerance (%) | Typ. (max.) | Tolerance (%) | ΔT=40K | | ΔL=-30% |
| | | | | | | (*2) | (*3) | (*4) |
| PCC-M0840M-LP [8.5×8.0×4.0(mm)] | ETQP4M330KVK | 33.00 | ±20 | 118 (129.8) | ±10 | 2.6 | 3.1 | 5.3 |
| | ETQP4M220KVK | 22.00 | | 78.4 (86.24) | | 3.2 | 3.8 | 6.7 |
| | ETQP4M150KVK | 15.00 | | 55 (60.5) | | 3.8 | 4.5 | 7.7 |
| | ETQP4M100KVK | 10.00 | | 41.6 (45.76) | | 4.4 | 5.2 | 9.1 |
| | ETQP4M6R8KVK | 6.80 | | 23.5 (25.85) | | 5.9 | 6.9 | 11.0 |
| | ETQP4M4R7KVK | 4.70 | | 16.1 (17.71) | | 7.1 | 8.3 | 15.1 |
| | ETQP4M3R3KVK | 3.30 | | 14.1 (15.51) | | 7.6 | 8.9 | 17.4 |
| | ETQP4M2R2KVK | 2.20 | | 8.5 (9.35) | | 9.8 | 11.4 | 20.4 |
| | ETQP4M1R5KVK | 1.50 | | 4.9 (5.39) | | 12.8 | 15.1 | 22.5 |
| | ETQP4M1R0KVK | 1.00 | | 3.7 (4.07) | | 14.8 | 17.3 | 24.4 |
| ETQP4MR68KVK | 0.68 | 2.92 (3.21) | 16.6 | 19.5 | 29.0 | | | |

(*1) Measured at 100k Hz.

(*2) DC current which causes temperature rise of 40K. Parts are soldered by reflow on four-layer PWB (1.6 mm FR4) and measured at room temperature. See also (*5)

(*3) DC current which causes temperature rise of 40K. Parts are soldered by reflow on multilayer PWB with high heat dissipation performance. Note: Heat radiation constant are approx. 36 K/W measured on 8.5×8.0×4.0 mm case size. See also (*5)

(*4) Saturation rated current : DC current which causes L(0) drop -30 %.

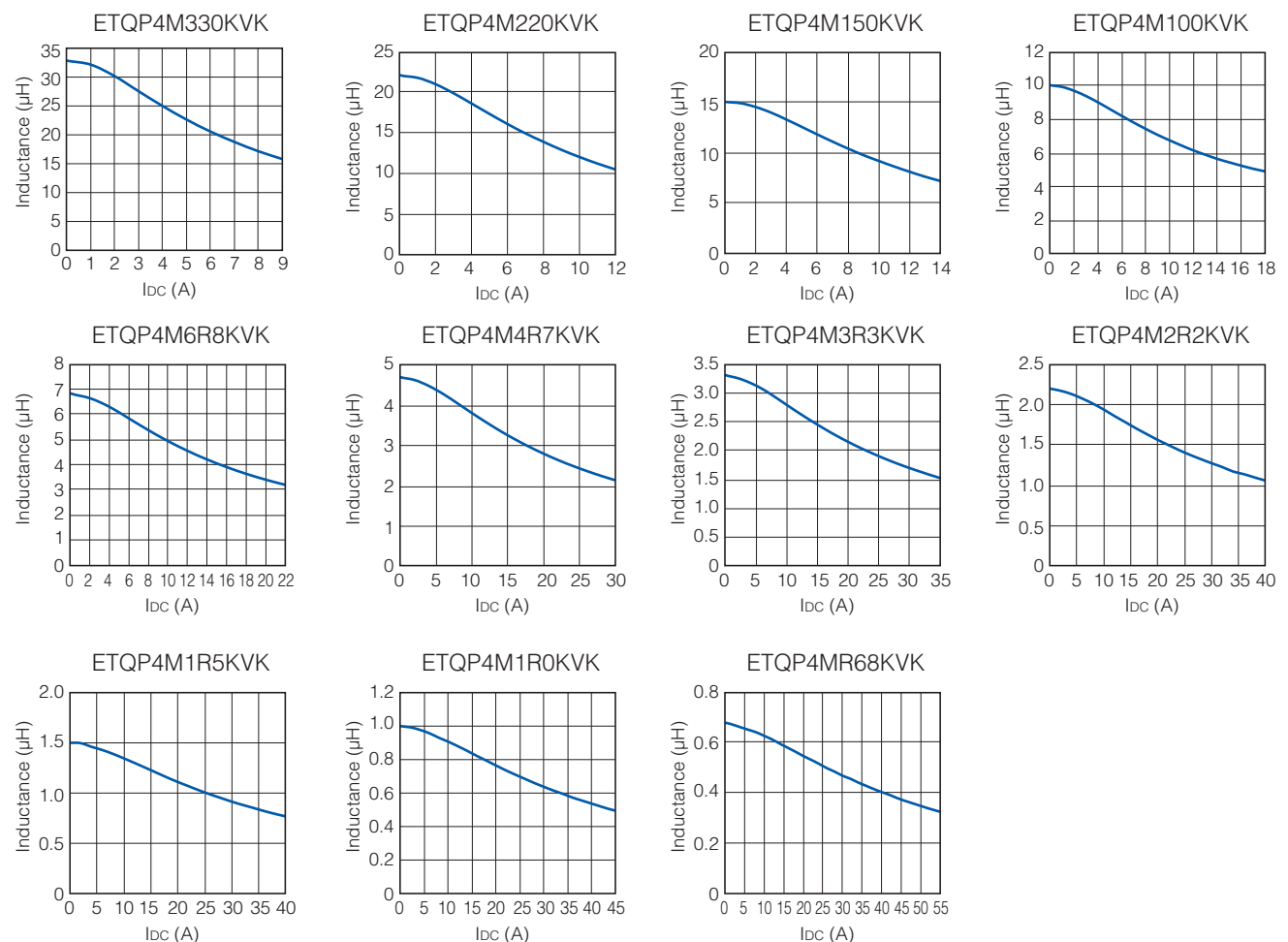
(*5) Within a suitable application, the part's temperature depends on circuit design and certain heat dissipation conditions. This should be double checked in a worst case operation mode.

In normal case, the max.standard operating temperature of +155 °C should not be exceeded.

For higher operating temperature conditions, please contact Panasonic representative in your area.

Performance Characteristics (Reference)

● Inductance vs DC Current

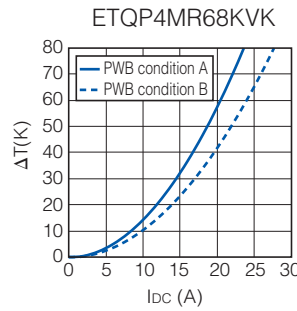
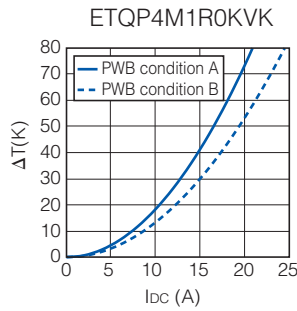
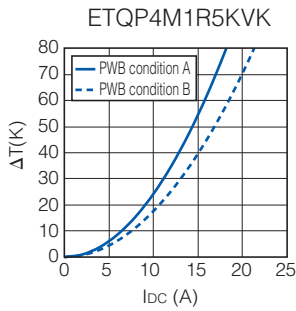
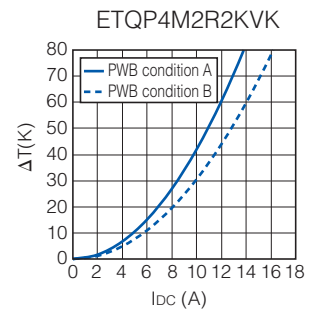
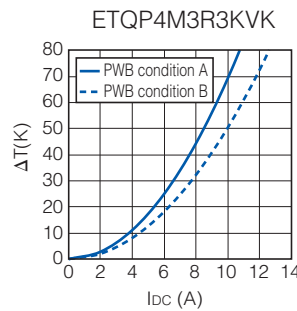
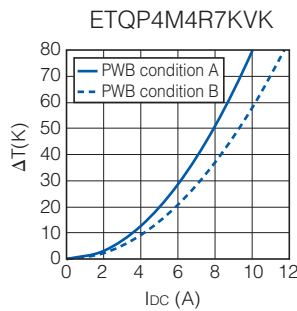
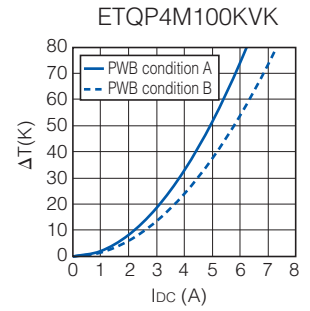
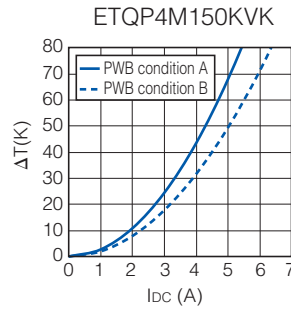
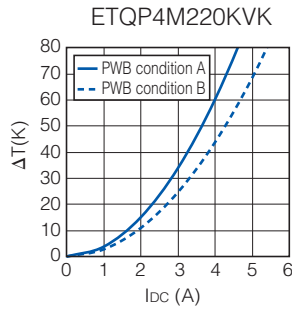


Performance Characteristics (Reference)

● Case Temperature vs DC Current

PWB condition A : Four-layer PWB (1.6 mm FR4), See also (*2)

PWB condition B : Multilayer PWB with high heat dissipation performance. See also (*3)



4. Series PCC-M1040M-LP (ETQP4M□□□KVC)

Standard Parts

| Series | Part No. | Inductance *1 | | DCR (at 20 °C) (mΩ) | | Rated Current (Typ. : A) | | |
|--------------------------------------|---------------|---------------|---------------|---------------------|---------------|--------------------------|------|---------|
| | | L0 (μH) | Tolerance (%) | Typ. (max.) | Tolerance (%) | ΔT=40K | | ΔL=-30% |
| | | | | | | (*2) | (*3) | (*4) |
| PCC-M1040M-LP [10.7×10.0×4.0(mm)] | ETQP4M470KVC | 47.00 | ±20 | 132 (145.2) | ±10 | 2.8 | 3.4 | 4.7 |
| | ETQP4M330KVC | 33.00 | | 84.6 (93.06) | | 3.4 | 4.2 | 5.6 |
| | ETQP4M220KVC | 22.00 | | 60 (66) | | 4.1 | 5.0 | 7.4 |
| | ETQP4M150KVC | 15.00 | | 37 (40.7) | | 5.2 | 6.3 | 9.2 |
| | ETQP4M100KVC | 10.00 | | 25.4 (27.94) | | 6.3 | 7.6 | 10.8 |
| | ETQP4M6R8KVC | 6.80 | | 18.5 (20.35) | | 7.4 | 8.9 | 12.1 |
| | ▲ETQP4M4R7KVC | 4.70 | | 11.8 (12.98) | | 9.2 | 11.2 | 13.9 |
| | ETQP4M3R3KVC | 3.30 | | 9.4 (10.34) | | 10.3 | 12.6 | 17.1 |
| | ETQP4M2R2KVC | 2.20 | | 6.8 (7.48) | | 12.1 | 14.8 | 21.0 |
| | ETQP4M1R5KVC | 1.50 | | 4.9 (5.39) | | 14.3 | 17.4 | 25.0 |
| ETQP4M1R0KVC | 1.00 | 2.6 (2.86) | 19.6 | 23.9 | 34.6 | | | |

(*1) Measured at 100k Hz.

(*2) DC current which causes temperature rise of 40K. Parts are soldered by reflow on four-layer PWB (1.6 mm FR4) and measured at room temperature. See also (*5)

(*3) DC current which causes temperature rise of 40K. Parts are soldered by reflow on multilayer PWB with high heat dissipation performance. Note: Heat radiation constant are approx. 27 K/W measured on 10.7×10.0×4.0 mm case size. See also (*5)

(*4) Saturation rated current : DC current which causes L(0) drop -30 %.

(*5) Within a suitable application, the part's temperature depends on circuit design and certain heat dissipation conditions. This should be double checked in a worst case operation mode.

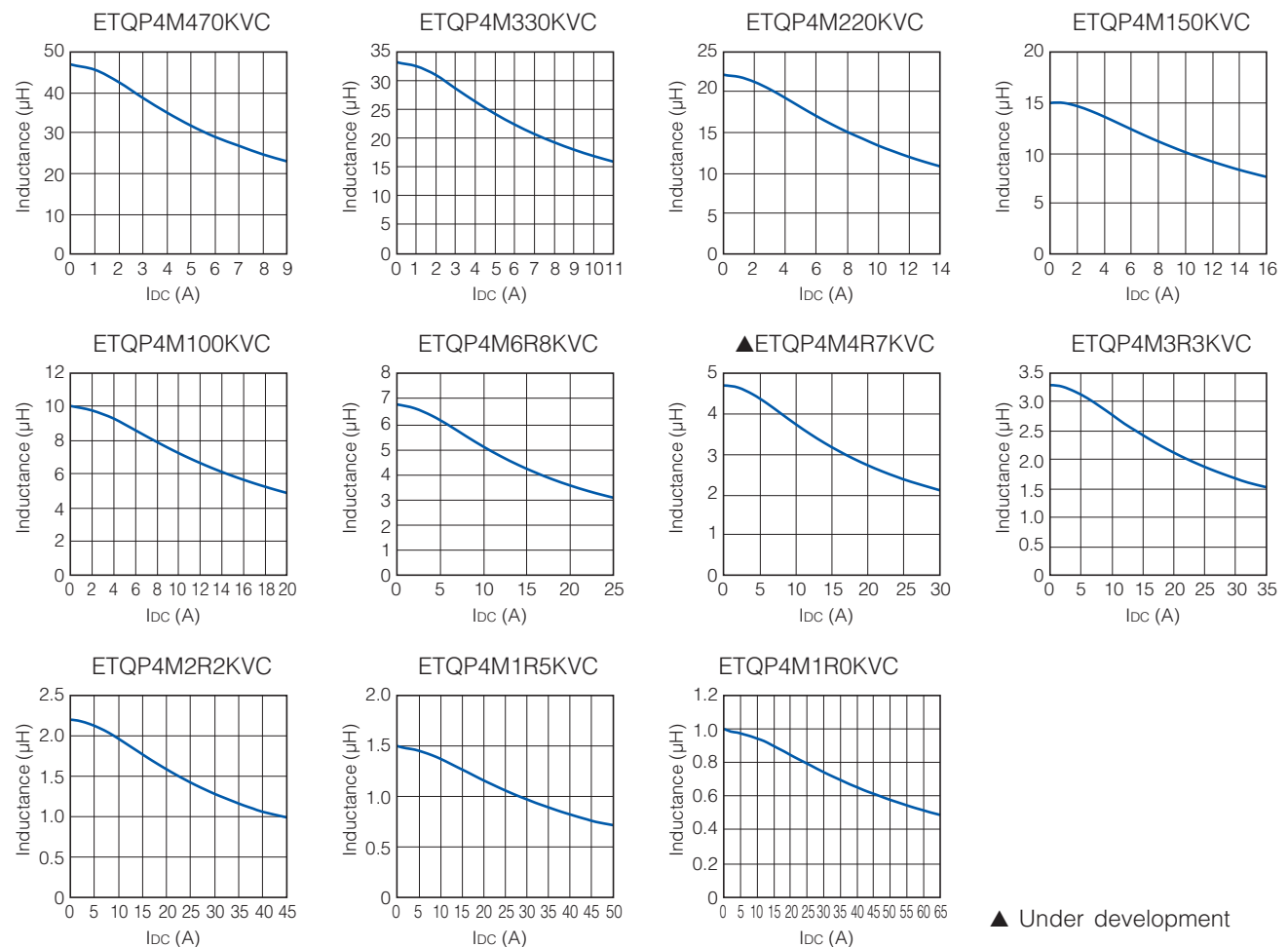
In normal case, the max.standard operating temperature of +155 °C should not be exceeded.

For higher operating temperature conditions, please contact Panasonic representative in your area.

▲ Under development (Start of mass production: the 2nd half of 2018) Please contact us for customized part no.

Performance Characteristics (Reference)

● Inductance vs DC Current

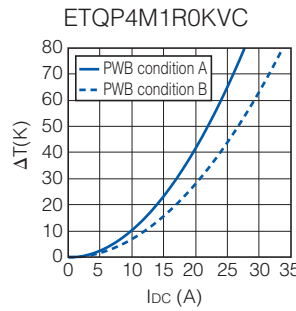
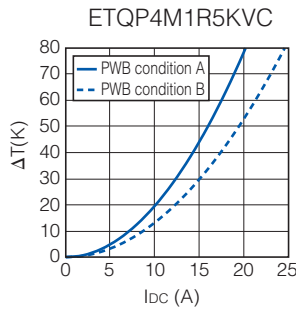
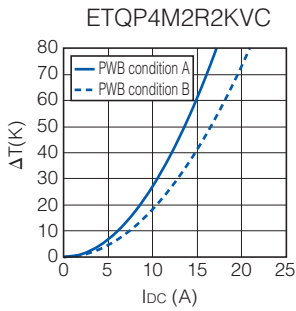
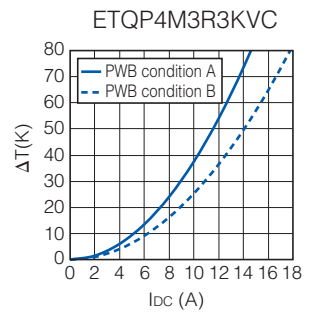
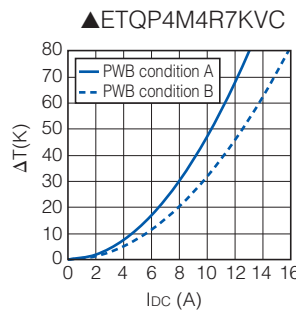
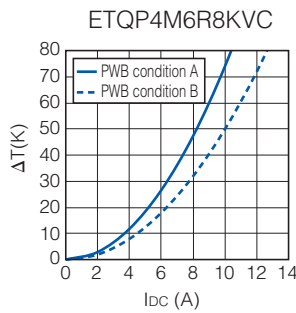
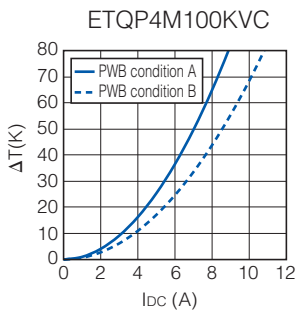
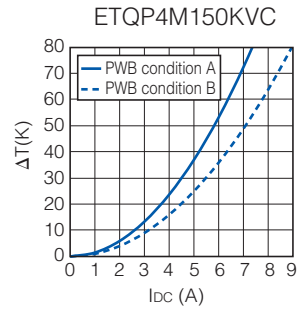
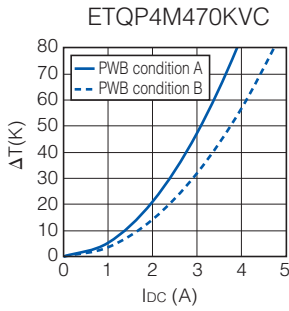


Performance Characteristics (Reference)

● Case Temperature vs DC Current

PWB condition A : Four-layer PWB (1.6 mm FR4), See also (*2)

PWB condition B : Multilayer PWB with high heat dissipation performance. See also (*3)

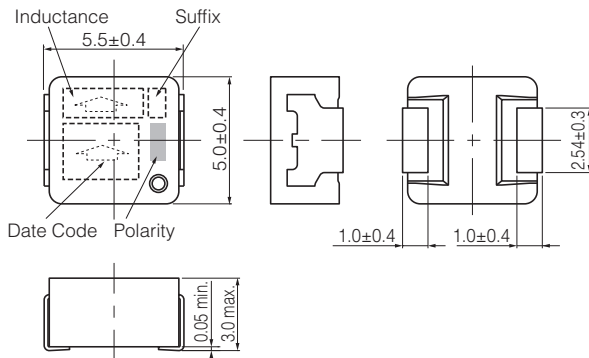


▲ Under development

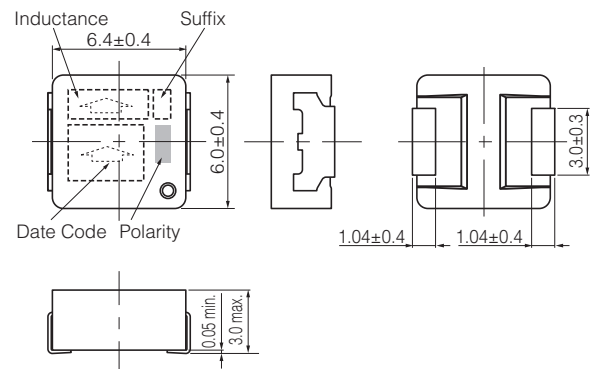
Dimensions in mm (not to scale)

Dimensional tolerance unless noted : ± 0.5

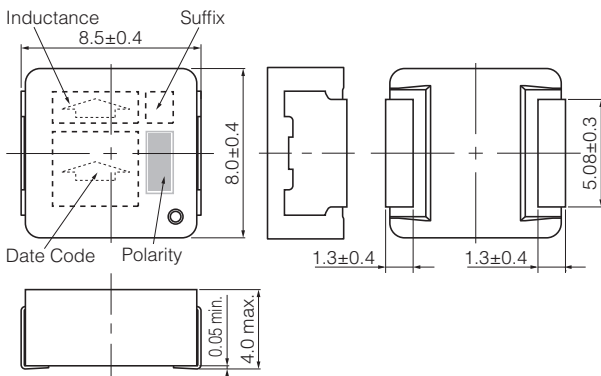
Series PCC-M0530M-LP
(ETQP3M□□□KVP)



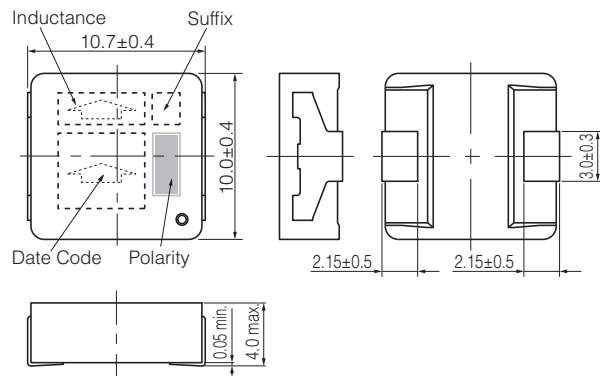
Series PCC-M0630M-LP
(ETQP3M□□□KVN)



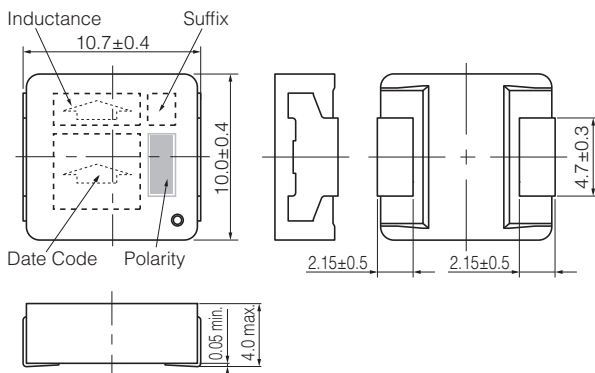
Series PCC-M0840M-LP
(ETQP4M□□□KVK)



Series PCC-M1040M-LP
(ETQP4M□□□*KVC)
* Exemption "1R0"



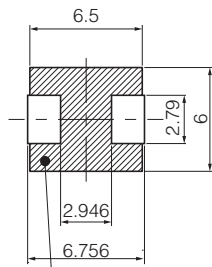
Series PCC-M1040M-LP
(ETQP4M1R0KVC)



Recommended Land Pattern in mm (not to scale)

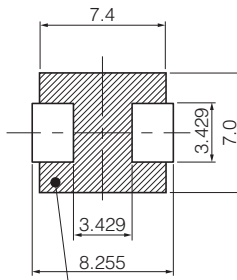
Dimensional tolerance unless noted : ± 0.5

Series PCC-M0530M-LP
(ETQP3M□□□KVP)



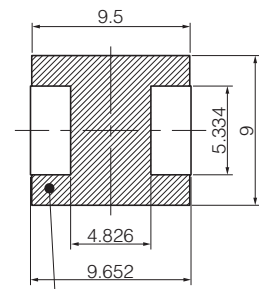
Don't wire on the pattern on shaded portion the PWB.

Series PCC-M0630M-LP
(ETQP3M□□□KVN)



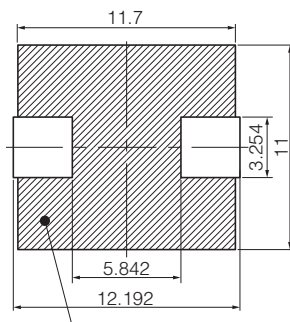
The same as the left.

Series PCC-M0840M-LP
(ETQP4M□□□KVK)



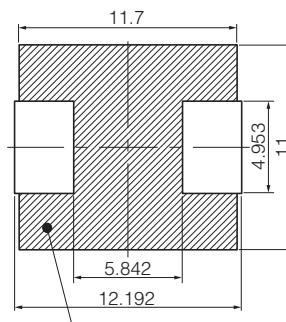
The same as the left.

Series PCC-M1040M-LP
(ETQP4M□□□*KVC)
* Exemption "1R0"



Don't wire on the pattern on shaded portion the PWB.

Series PCC-M1040M-LP
(ETQP4M1R0KVC)



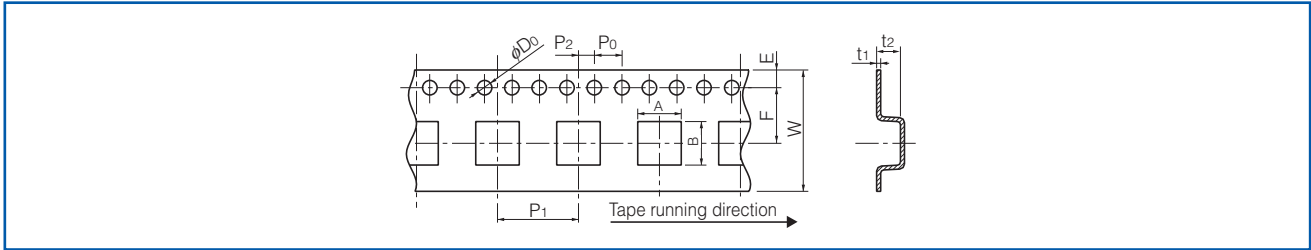
The same as the left.

■ As for Soldering Conditions and Safety Precautions (Power Choke Coils (Automotive Grade)),

Please see Data Files

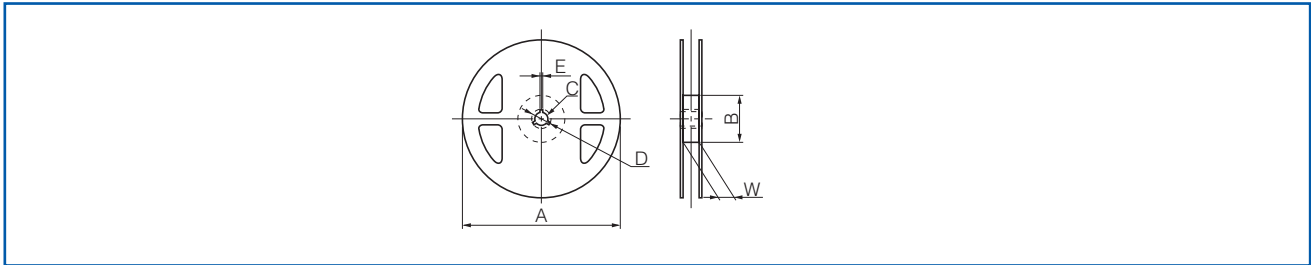
Packaging Methods (Taping)

- Embossed Carrier Tape Dimensions in mm (not to scale)



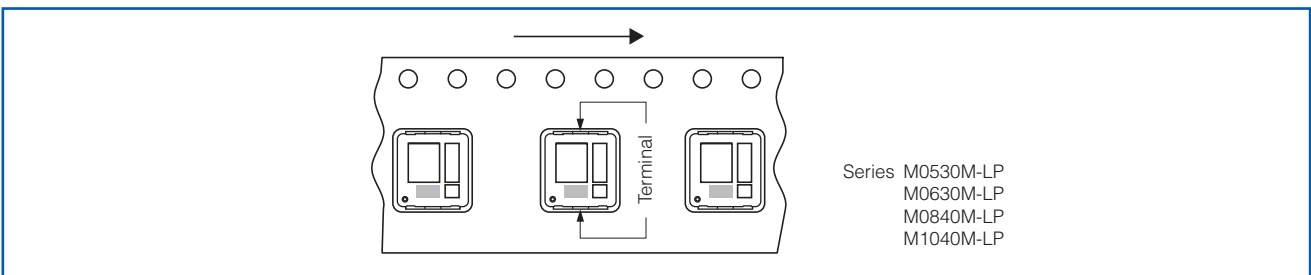
| Series | A | B | W | E | F | P ₁ | P ₂ | P ₀ | φD ₀ | t ₁ | t ₂ |
|---------------|-------|-------|----|------|------|----------------|----------------|----------------|-----------------|----------------|----------------|
| PCC-M0530M-LP | 5.6 | 6.1 | 16 | 1.75 | 7.5 | 8 | 2 | 4 | 1.5 | 0.3 | 3.3 |
| PCC-M0630M-LP | 6.5 | 7.1 | 16 | 1.75 | 7.5 | 8 | 2 | 4 | 1.5 | 0.3 | 3.3 |
| PCC-M0840M-LP | 8.63 | 9.1 | 16 | 1.75 | 7.5 | 12 | 2 | 4 | 1.5 | 0.4 | 6.0 |
| PCC-M1040M-LP | 10.65 | 11.75 | 24 | 1.75 | 11.5 | 16 | 2 | 4 | 1.5 | 0.5 | 6.35 |

- Taping Reel Dimensions in mm (not to scale)



| Series | A | B | C | D | E | W |
|---|-----|-------|----|----|---|------|
| PCC-M0530M-LP PCC-M0630M-LP PCC-M0840M-LP | 330 | (100) | 13 | 21 | 2 | 17.5 |
| PCC-M1040M-LP | | | | | | 25.5 |

Component Placement (Taping)



Standard Packing Quantity/Reel

| Series | Part No. | Minimum Quantity / Packing Unit | Quantity per reel |
|---------------|--------------|---------------------------------|-------------------|
| PCC-M0530M-LP | ETQP3M□□□KVP | 4,000 pcs. / box (2 reel) | 2,000 pcs. |
| PCC-M0630M-LP | ETQP3M□□□KVN | 4,000 pcs. / box (2 reel) | 2,000 pcs. |
| PCC-M0840M-LP | ETQP4M□□□KVK | 1,000 pcs. / box (2 reel) | 500 pcs. |
| PCC-M1040M-LP | ETQP4M□□□KVC | 1,000 pcs. / box (2 reel) | 500 pcs. |