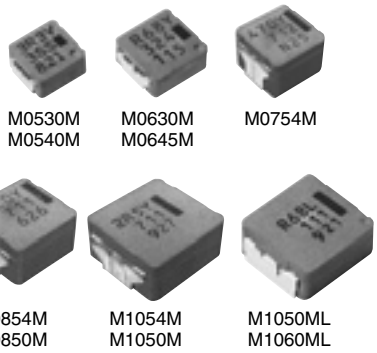
Power Choke Coil for Automotive application

Series: **PCC-M0530M (MC) PCC-M0540M (MC)**
PCC-M0630M (MC) PCC-M0645M (MC)
PCC-M0754M (MC)
PCC-M0854M (MC) PCC-M0850M (MC)
PCC-M1054M (MC) PCC-M1050M (MC)
PCC-M1050ML (MC) PCC-M1060ML (MC)



Realize high heat resistance and high reliability
with metal composite core(MC)

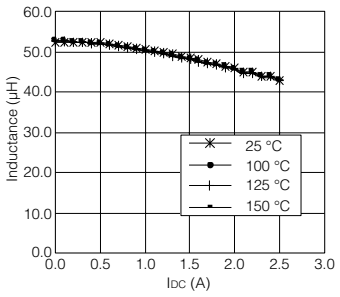
Industrial Property : patents 21 (Registered 2/Pending 19)

■ Features

- High heat resistance : Operation up to 150 °C
- High-reliability : High vibration resistance due to newly developed integral construction and severe reliability condition of automotive application is covered
- High bias current : Excellent inductance stability by using ferrous alloy magnetic material(Fig.1)
- Temp. stability : Excellent inductance stability in wide temp. range (Fig.1)
- Low buzz noise : New metal composite core technology
- High efficiency : Low R_{DC} of winding and low eddy-current loss of the core
- AEC-Q200 qualified
- RoHS compliant

● Fig.1 Inductance v.s. DC current, Temp.

ETQP5M470YFM(reference)



■ Recommended Applications

- Noise filter for various drive circuitry requiring high temp. operation and peak current handling capability
- DC-DC converters

■ Standard Packing Quantity (Minimum Quantity/Packing Unit)

- 1000 pcs./box (2 reel) : PCC-M0645M, M0754M, M0854M, M0850M, M1054M, M1050M, M1050ML, M1060ML
- 2000 pcs./box (2 reel) : PCC-M0530M, M0540M, M0630M

■ Explanation of Part Numbers

1	2	3	4	5	6	7	8	9	10	11	12
E	T	Q	P		M				Y	F	
Product Code			Classification	Height	Winding	Inductance			Core	Suffix	Size

Inductance
4R7→ 4.7 µH
220→ 22 µH
101→ 100 µH

Size	
P	□ 5 mm size
N	□ 6 mm size
M	□ 7 mm size
K	□ 8 mm size
C	□10 mm size

■ Temperature rating

Operating temperature range		Tc : -40 °C to +150 °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/PCC-M0540M (ETQP3M□□□YFP/ETQP4M□□□YFP)

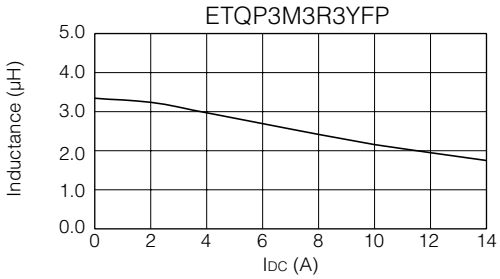
■ Standard Parts

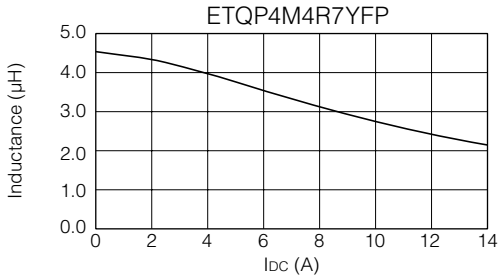
Series	Part No.	Inductance *1		DCR (at 20 °C) (mΩ)		Rated Current (Typ. : A)		
		L0 (μH)	Tolerance (%)	Typ. (max.)	Tolerance (%)	△T=40K (*2)	△T=40K (*3)	△L=–30% (*4)
PCC-M0530M [5.5×5.0×3.0(mm)]	ETQP3M3R3YFP	3.3	±20	31.3 (34.4)	±10	4.1	5.0	8.6
PCC-M0540M [5.5×5.0×4.0(mm)]	ETQP4M4R7YFP	4.7		36.0 (39.6)		4.0	4.8	7.7
	ETQP4M220YFP	22		163 (179)		1.9	2.3	3.1

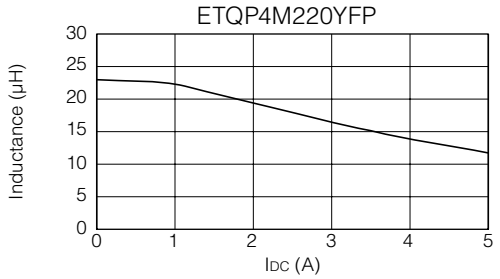
(*1) Measured at 100 kHz.
(*2) DC current which causes temperature rise of 40 K. Parts are soldered by reflow on four-layer PWB (1.6 mm FR4) and measured at room temperature. See also (*5)
(*3) DC current which causes temperature rise of 40 K. Parts are soldered by reflow on multilayer PWB with high heat dissipation performance. Note: Heat radiation constant are approx. 52 K/W measured on 5.5×5.0×3.0 mm case size and approx. 48 K/W measured on 5.5×5.0×4.0 mm case size. See also (*5)
(*4) Suturation 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 +150 °C should not be exceeded.
For higher operating temperature conditions, please contact Panasonic representative in your area.

■ Performance Characteristics (Reference)

● Inductance vs DC Current

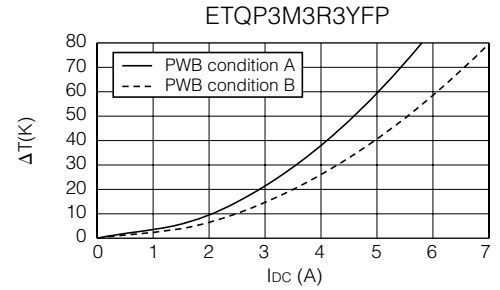


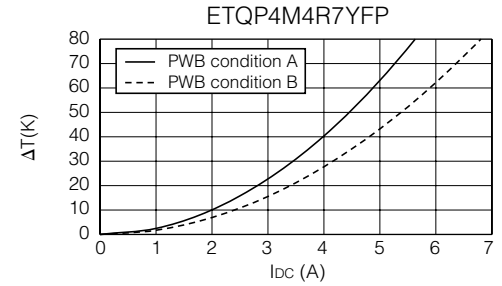


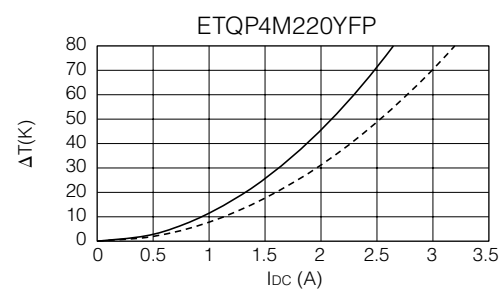


● Case Temperature vs DC Current

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/PCC-M0645M (ETQP3M□□□YFN/ETQP4M□□□YFN)

■ Standard Parts

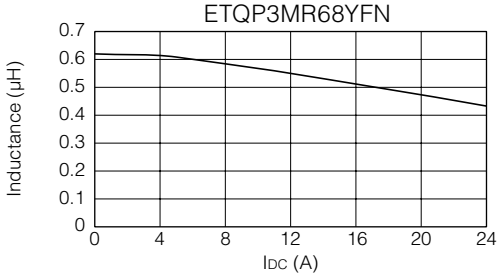
Series	Part No.	Inductance *1		DCR (at 20 °C) (mΩ)		Rated Current (Typ. : A)		
		L0 (μH)	Tolerance (%)	Typ. (max.)	Tolerance (%)	△T=40K (*2)	△T=40K (*3)	△L=−30% (*4)
PCC-M0630M [6.5×6.0×3.0(mm)]	ETQP3MR68YFN	0.68	±20	6.3 (6.9)	±10	9.8	12.0	24.0
	ETQP3M1R0YFN	1.0		7.9 (8.7)		8.8	10.7	20.0
PCC-M0645M [6.5×6.0×4.5(mm)]	ETQP4M100YFN	10		54.2 (59.6)		3.3	4.5	8.3

(*1) Measured at 100 kHz.
(*2) DC current which causes temperature rise of 40 K. 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 40 K. 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 and approx. 37 K/W measured on 6.5×6.0×4.5 mm case size. See also (*5)
(*4) Suturation 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 +150 °C should not be exceeded.
For higher operating temperature conditions, please contact Panasonic representative in your area.

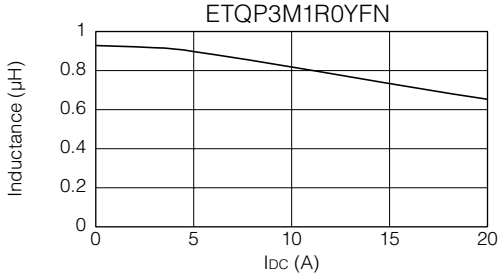
■ Performance Characteristics (Reference)

● Inductance vs DC Current

ETQP3MR68YFN



ETQP3M1R0YFN



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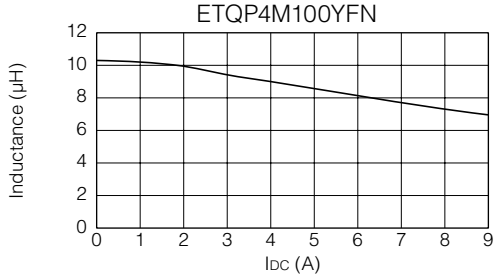
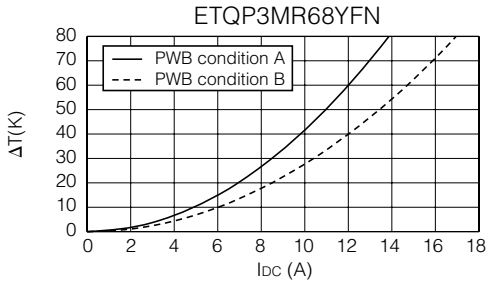


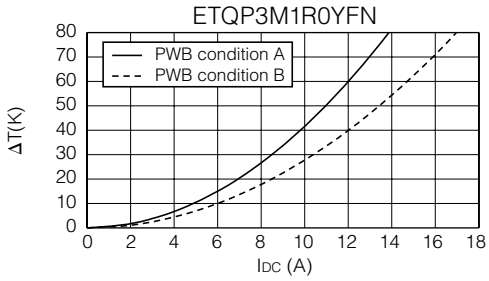
● Case Temperature vs DC Current

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)

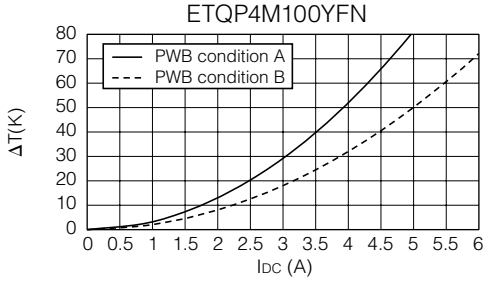
ETQP3MR68YFN



ETQP3M1R0YFN



ETQP4M100YFN



3. Series PCC-M0754M (ETQP5M□□□YFM)

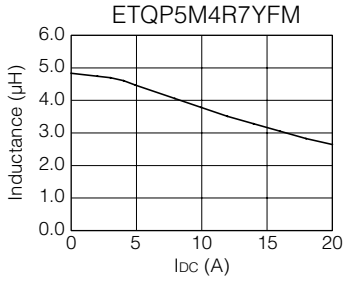
■ Standard Parts

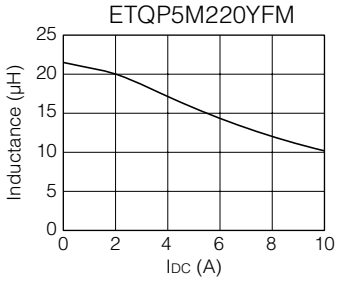
Series	Part No.	Inductance *1		DCR (at 20 °C) (mΩ)		Rated Current (Typ. : A)		
		L0 (μH)	Tolerance (%)	Typ. (max.)	Tolerance (%)	△T=40K		△L=–30%
						(*2)	(*3)	(*4)
PCC-M0754M [7.5×7.0×5.4(mm)]	ETQP5M4R7YFM	4.7	±20	20(23)	±10	6.3	8.0	13.1
	ETQP5M220YFM	22		92(102)		3.0	3.7	5.8
	ETQP5M330YFM	34		120(132)		2.6	3.3	4.8
	ETQP5M470YFM	48		156(172)		2.3	2.9	4.1

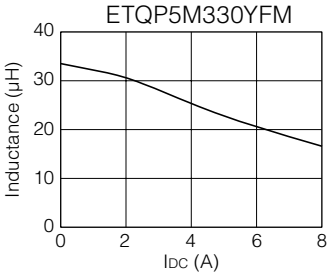
(*1) Measured at 100 kHz.
(*2) DC current which causes temperature rise of 40 K. Parts are soldered by reflow on four-layer PWB (1.6 mm FR4) and measured at room temperature. See also (*5)
(*3) DC current which causes temperature rise of 40 K. Parts are soldered by reflow on multilayer PWB with high heat dissipation performance. Note: Heat radiation constant is approx. 31 K/W measured on 7.5×7.0×5.4 mm case size. See also (*5)
(*4) Suturation 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 +150 °C should not be exceeded.
For higher operating temperature conditions, please contact Panasonic representative in your area.

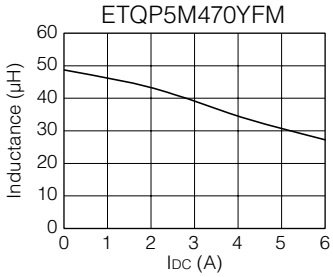
■ Performance Characteristics (Reference)

● Inductance vs DC Current



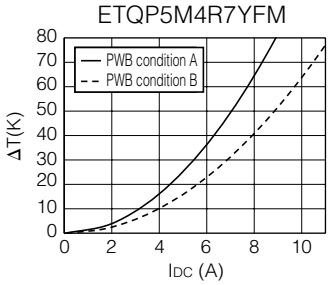


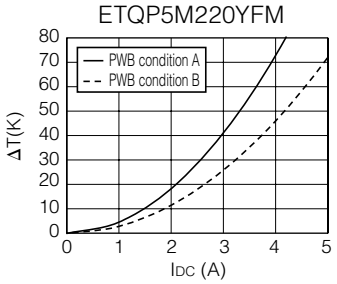


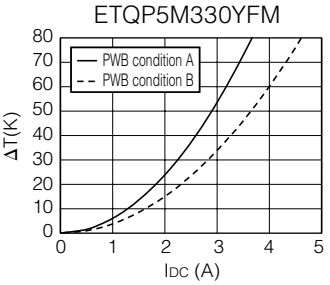


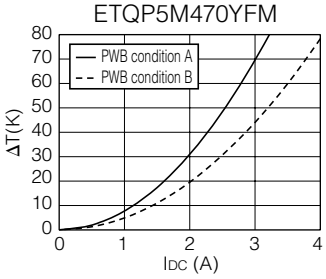
● Case Temperature vs DC Current

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-M0854M/PCC-M0850M (ETQP5M□□□YFK/ETQP5M□□□YGK)

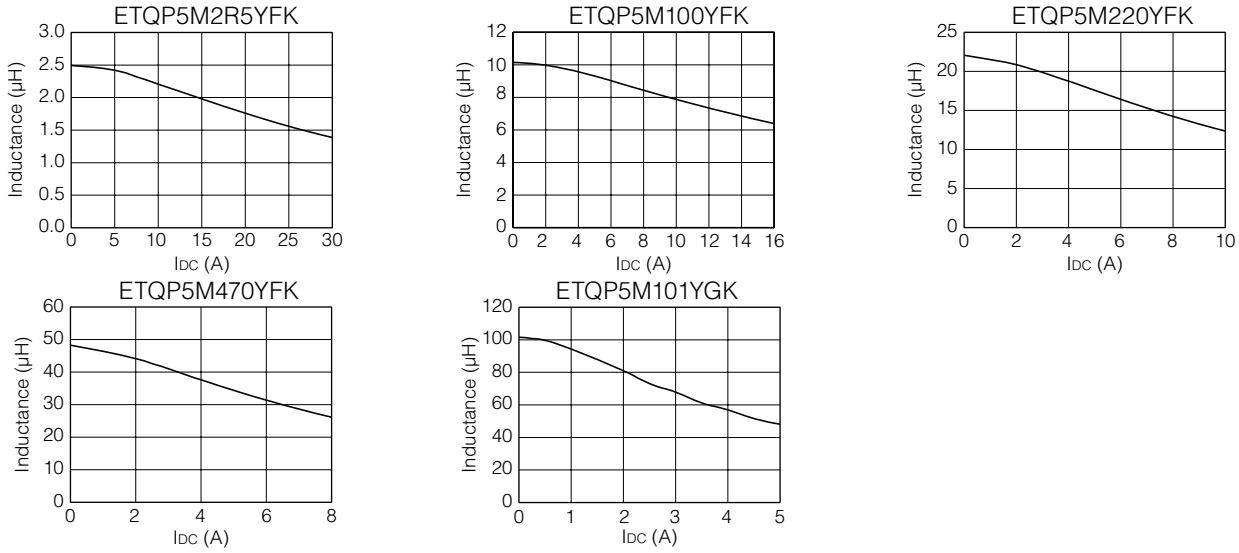
■ Standard Parts

Series	Part No.	Inductance *1		DCR (at 20 °C) (mΩ)		Rated Current (Typ. : A)		
		L0 (μH)	Tolerance (%)	Typ. (max.)	Tolerance (%)	△T=40K		△L=–30%
						(*2)	(*3)	(*4)
PCC-M0854M [8.5×8.0×5.4(mm)]	ETQP5M2R5YFK	2.5	±20	7.6(8.4)	±10	11.9	14.0	20.1
	ETQP5M100YFK	10		33(37)		5.7	6.7	13.0
	ETQP5M220YFK	22		63(70)		4.1	4.8	6.9
	ETQP5M470YFK	48		125(138)		2.9	3.4	5.4
PCC-M0850M [8.5×8.0×5.0(mm)]	ETQP5M101YGK	100	±20	302(333)	±10	1.7	2.1	3.0

(*1) Measured at 100 kHz.
(*2) DC current which causes temperature rise of 40 K. 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 40 K. Parts are soldered by reflow on multilayer PWB with high heat dissipation performance. Note: Heat radiation constant are approx. 27 K/W measured on 8.5×8.0×5.4 mm case size and approx. 29 K/W measured on 8.5×8.0×5.0 mm case size. See also (*5)
(*4) Suturation 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 + 150 °C should not be exceeded.
For higher operating temperature conditions, please contact Panasonic representative in your area.

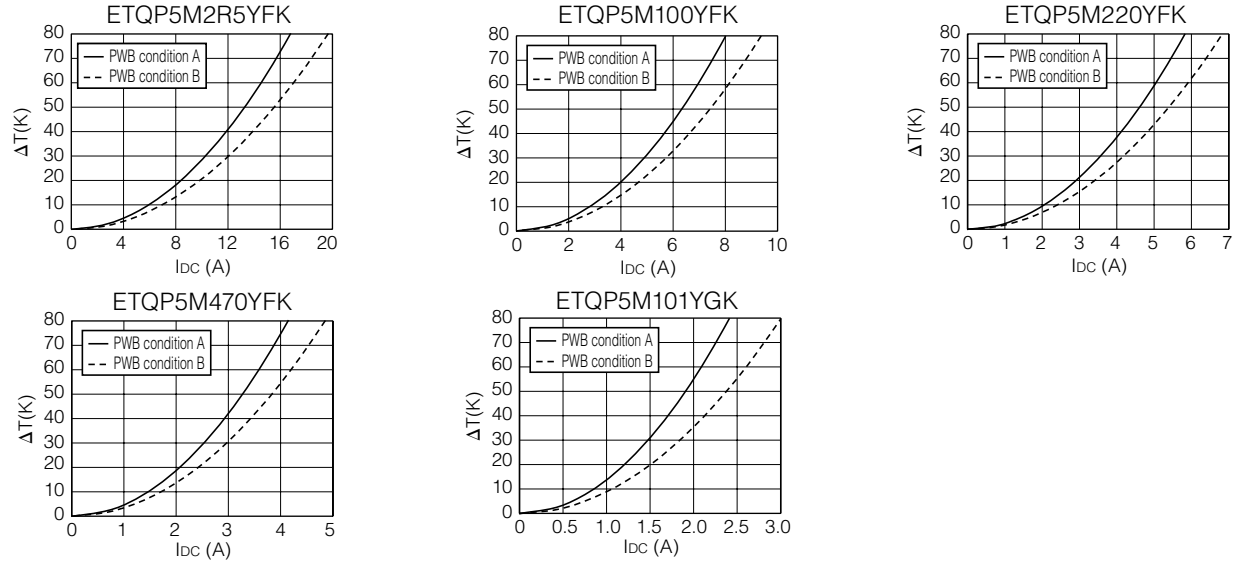
■ Performance Characteristics (Reference)

● Inductance vs DC Current



● 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)



5. Series PCC-M1054M/PCC-M1050M (ETQP5M□□□YFC/ETQP5M□□□YGC)

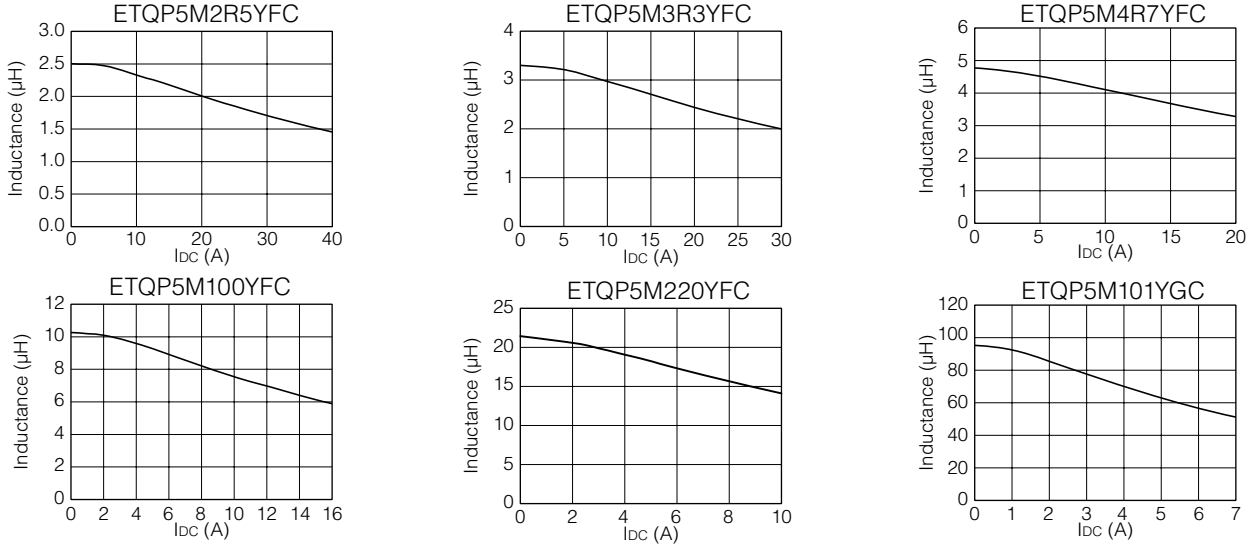
■ Standard Parts

Series	Part No.	Inductance *1		DCR (at 20 °C) (mΩ)		Rated Current (Typ. : A)		
		L0 (μH)	Tolerance (%)	Typ. (max.)	Tolerance (%)	△T=40K (*2)	△T=40K (*3)	△L=–30% (*4)
PCC-M1054M [10.7×10.0×5.4(mm)]	ETQP5M2R5YFC	2.5	±20	5.3(5.9)	±10	15.1	18.1	27.2
	ETQP5M3R3YFC	3.3		7.1(7.9)		13.1	15.7	22.7
	ETQP5M4R7YFC	4.7		10.2(11.3)		10.9	13.1	20.0
	ETQP5M100YFC	10		23.8(26.2)		7.1	8.5	10.7
	ETQP5M220YFC	22		45(50)		5.2	6.2	6.7
PCC-M1050M [10.7×10.0×5.0(mm)]	ETQP5M101YGC	97	±20	208(229)	±10	2.2	2.7	3.0

(*1) Measured at 100 kHz.
(*2) DC current which causes temperature rise of 40 K. 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 40 K. Parts are soldered by reflow on multilayer PWB with high heat dissipation performance. Note: Heat radiation constant are approx. 23 K/W measured on 10.7×10.0×5.4 mm case size and approx. 26 K/W measured on 10.7×10.0×5.0 mm case size. See also (*5)
(*4) Suturation 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 +150 °C should not be exceeded.
For higher operating temperature conditions, please contact Panasonic representative in your area.

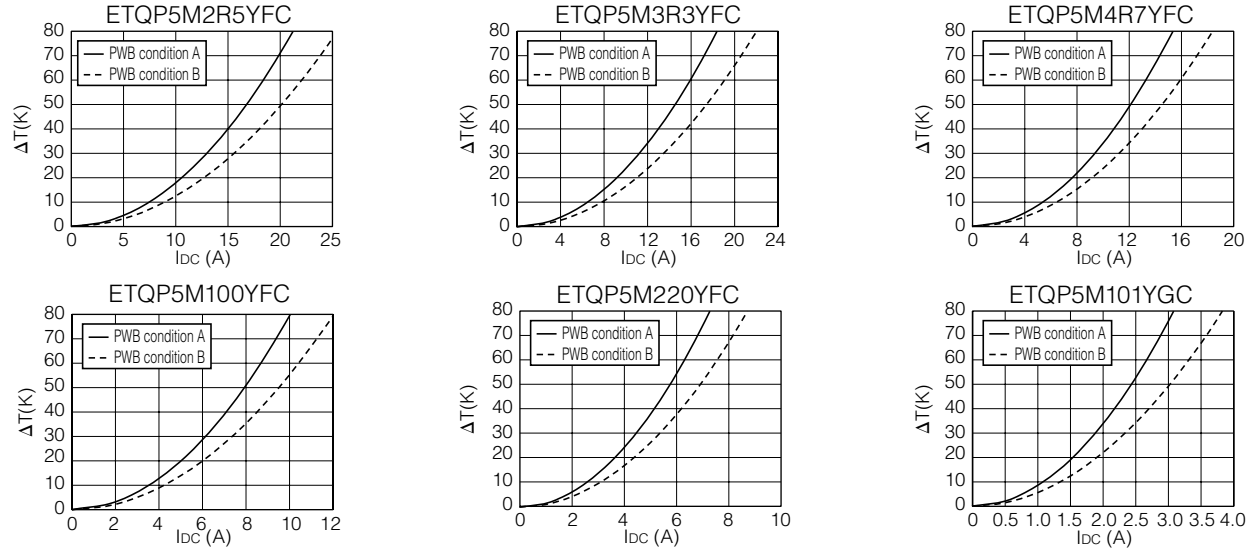
■ Performance Characteristics (Reference)

● Inductance vs DC Current



● 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)



6. Series PCC-M1050ML/PCC-M1060ML (ETQP5M□□□YLC/ETQP6M□□□YLC)

■ Standard Parts

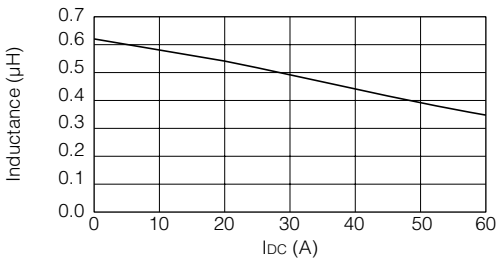
Series	Part No.	Inductance *1		DCR (at 20 °C) (mΩ)		Rated Current (Typ. : A)		
		L0 (μH)	Tolerance (%)	Typ. (max.)	Tolerance (%)	△T=40K		△L=–30%
						(*2)	(*3)	(*4)
PCC-M1050ML [10.9×10.0×5.0(mm)]	ETQP5MR68YLC	0.68	±20	1.75 (1.93)	±10	26.3	31.5	42.0
PCC-M1060ML [10.9×10.0×6.0(mm)]	ETQP6M2R5YLC	2.5	±20	4.5 (5.0)	±10	16.3	19.6	27.0

(*1) Measured at 100 kHz.
(*2) DC current which causes temperature rise of 40 K. 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 40 K. Parts are soldered by reflow on multilayer PWB with high heat dissipation performance. Note: Heat radiation constant are approx. 23 K/W measured on 10.9×10.0×5.0 mm case size and approx. 23 K/W measured on 10.9×10.0×6.0 mm case size. See also (*5)
(*4) Suturation 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 +150 °C should not be exceeded.
For higher operating temperature conditions, please contact Panasonic representative in your area.

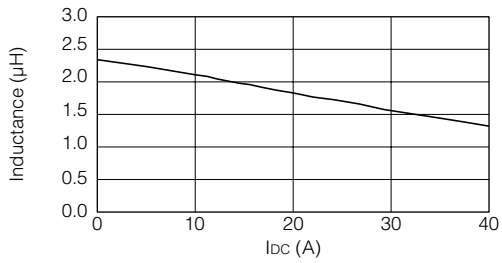
■ Performance Characteristics (Reference)

● Inductance vs DC Current

ETQP5MR68YLC



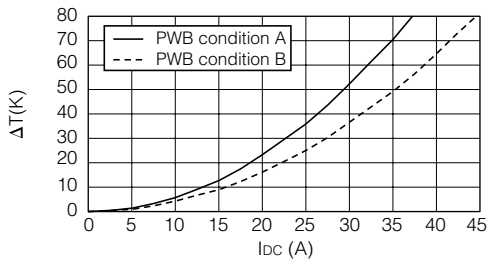
ETQP6M2R5YLC



● 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)

ETQP5MR68YLC



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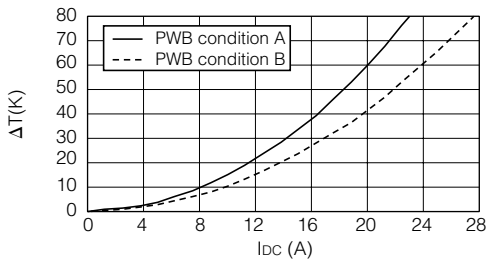
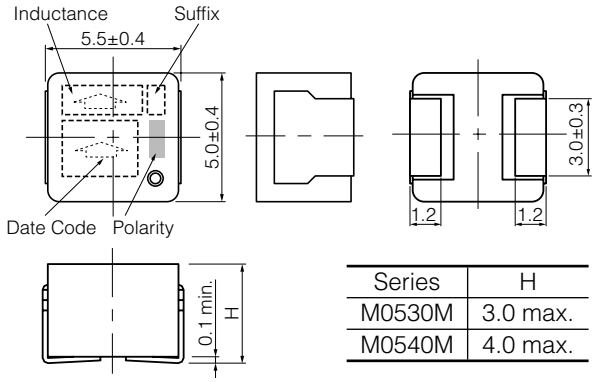


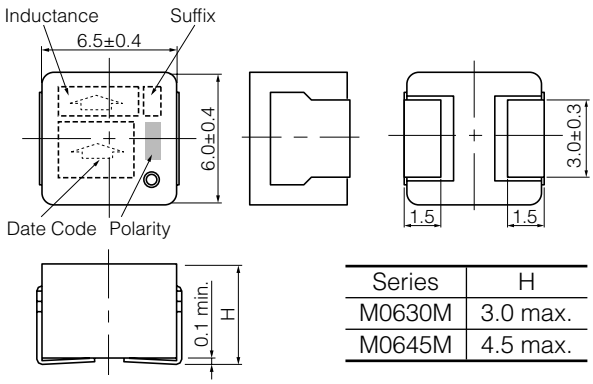
■ Dimensions in mm (not to scale)
Dimensional tolerance unless noted : ±0.5

Series PCC-M0530M
Series PCC-M0540M
(ETQP3M□□□YFP/ETQP4M□□□YFP)



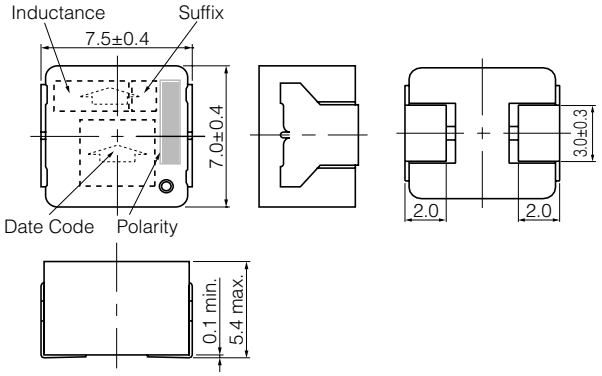
Series	H
M0530M	3.0 max.
M0540M	4.0 max.

Series PCC-M0630M
Series PCC-M0645M
(ETQP3M□□□YFN/ETQP4M□□□YFN)

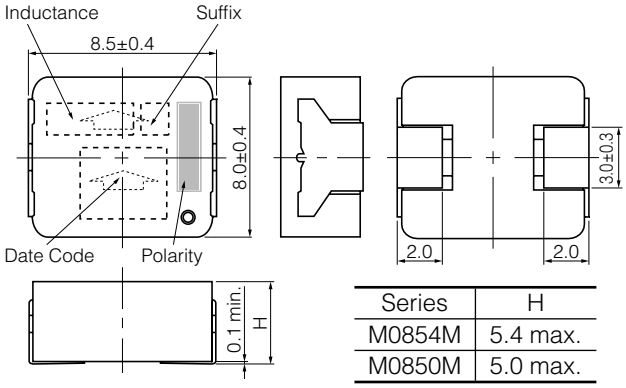


Series	H
M0630M	3.0 max.
M0645M	4.5 max.

Series PCC-M0754M
(ETQP5M□□□YFM)

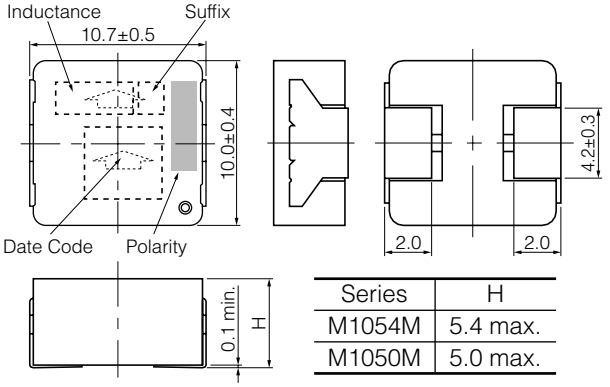


Series PCC-M0854M
Series PCC-M0850M
(ETQP5M□□□YFK/YGK)



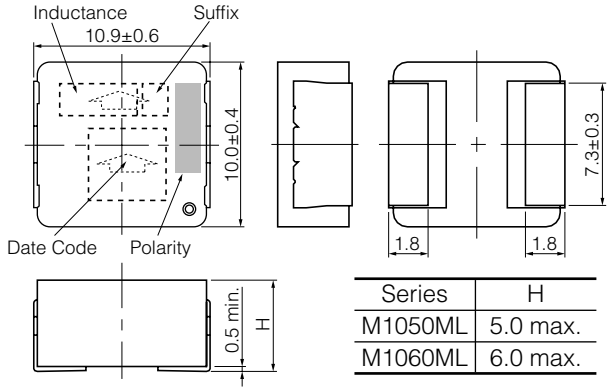
Series	H
M0854M	5.4 max.
M0850M	5.0 max.

Series PCC-M1054M
Series PCC-M1050M
(ETQP5M□□□YFC/YGC)



Series	H
M1054M	5.4 max.
M1050M	5.0 max.

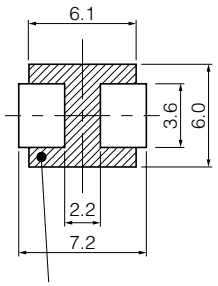
Series PCC-M1050ML
Series PCC-M1060ML
(ETQP5M□□□YLC/ETQP6M□□□YLC)



Series	H
M1050ML	5.0 max.
M1060ML	6.0 max.

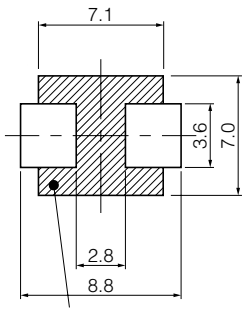
■ Recommended Land Pattern in mm (not to scale)
Dimensional tolerance unless noted : ±0.5

Series PCC-M0530M
Series PCC-M0540M
(ETQP3M□□□YFP/ETQP4M□□□YFP)



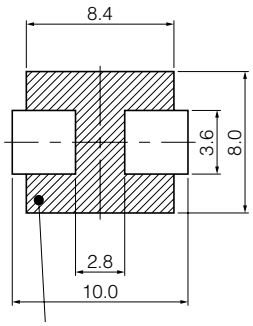
Don't wire on the pattern
on shaded portion the PWB.

Series PCC-M0630M
Series PCC-M0645M
(ETQP3M□□□YFN/ETQP4M□□□YFN)



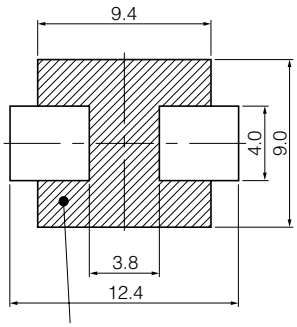
The same as the left.

Series PCC-M0754M
(ETQP5M□□□YFM)



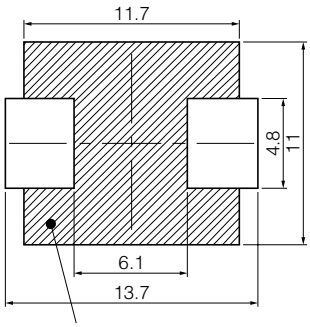
The same as the left.

Series PCC-M0854M
Series PCC-M0850M
(ETQP5M□□□YFK/YGK)



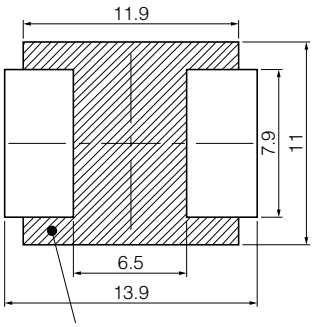
Don't wire on the pattern
on shaded portion the PWB.

Series PCC-M1054M
Series PCC-M1050M
(ETQP5M□□□YFC/YGC)



The same as the left.

Series PCC-M1050ML
Series PCC-M1060ML
(ETQP5M□□□YLC/ETQP5M□□□YLC)



The same as the left.

■ Packaging Methods, Soldering Conditions and Safety Precautions (Power Choke Coils for high reliability use)
Please see Data Files