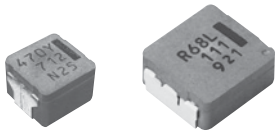
Power Choke Coil for Automotive application

Series: **PCC-M0530M (MC)** **PCC-M0540M (MC)**
PCC-M0630M (MC) **PCC-M0645M (MC)**
PCC-M0754M (MC) **PCC-M0750M (MC)**
PCC-M0854M (MC) **PCC-M0850M (MC)**
PCC-M1054M (MC) **PCC-M1050M (MC)**
PCC-M1050ML (MC) **PCC-M1060ML (MC)**



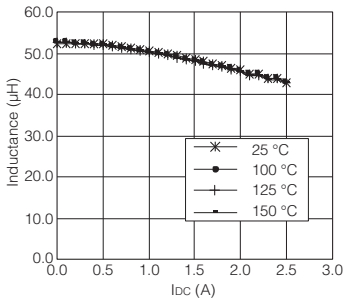
High heat resistance and high reliability
Using metal composite core (MC)

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

Features

- High heat resistance : Operation up to 150 °C including self-heating
- 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 (Fig.1)
- Low audible (buzz) noise : New metal composite core technology
- High efficiency : Low R_{DC} of winding and low eddy-current loss of the core
- AEC-Q200 Automotive 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
- Boost-Converter, Buck-Converter DC/DC

Standard Packing Quantity (Minimum Quantity/Packing Unit)

- 1,000 pcs./box (2 reel) : PCC-M0645M, M0754M, M0750M, M0854M, M0850M, M1054M, M1050M, M1050ML, M1060ML
- 2,000 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)

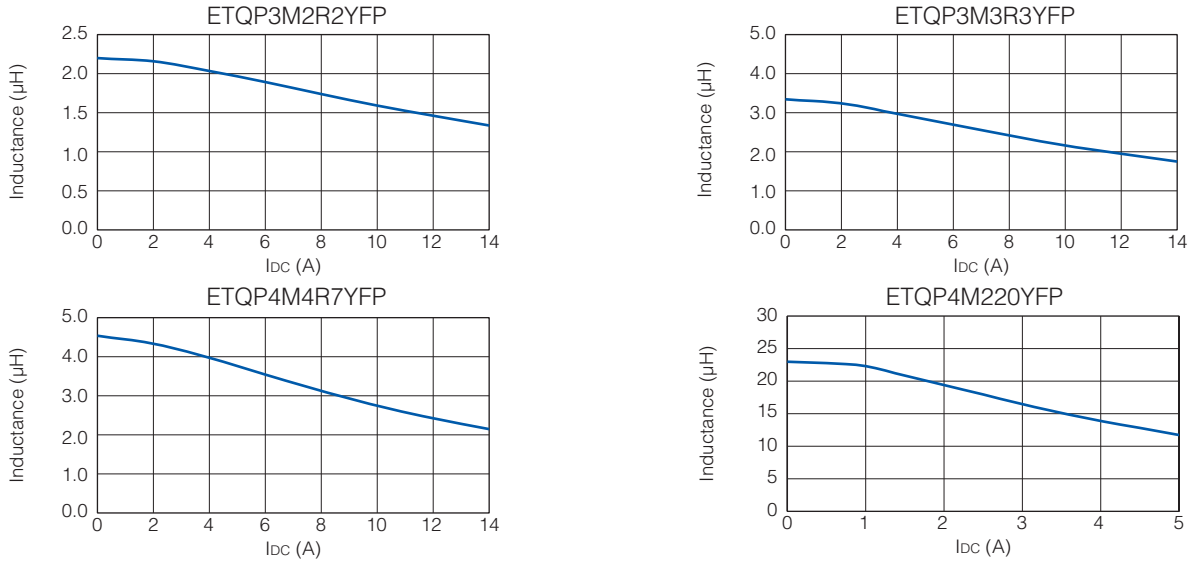
Standard Parts

Series	Part No.	Inductance *1		DCR (at 20 °C) (mΩ)		Rated Current (Typ. : A)		
		L0 (μH)	Tolerance (%)	Typ. (max.)	Tolerance (%)	ΔT=40K		ΔL=–30%
						(*2)	(*3)	(*4)
PCC-M0530M [5.5×5.0×3.0(mm)]	ETQP3M2R2YFP	2.2	±20	22.6 (24.8)	±10	4.8	5.8	10.9
	ETQP3M3R3YFP	3.3		31.3 (34.4)		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) 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 +150 °C should not be exceeded.
For higher operating temperature conditions, please contact Panasonic representative in your area.

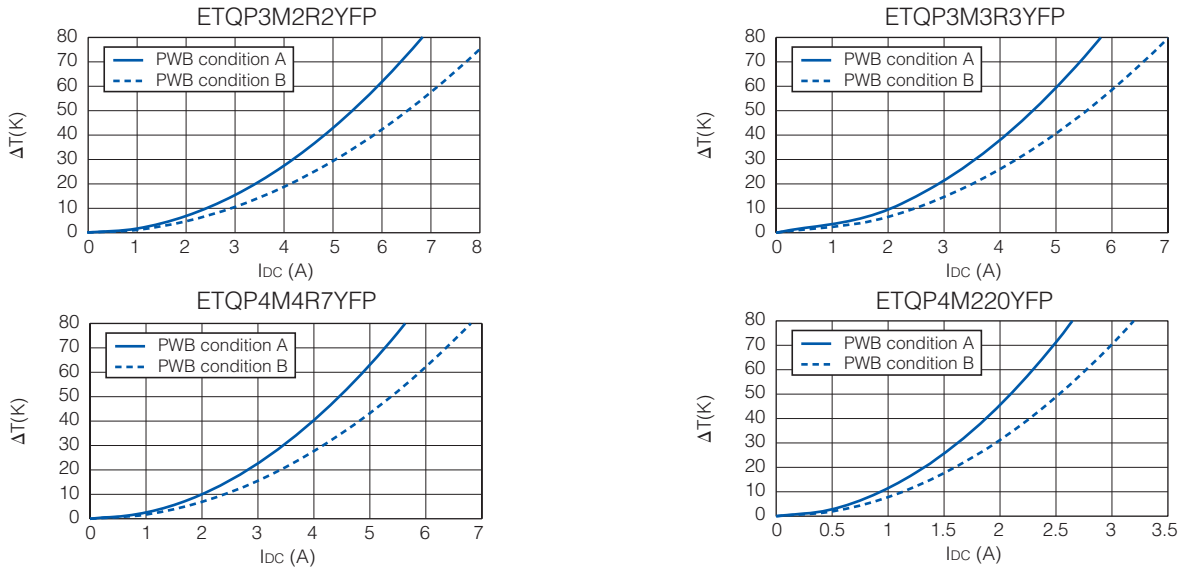
Performance Characteristics (Reference)

● 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)

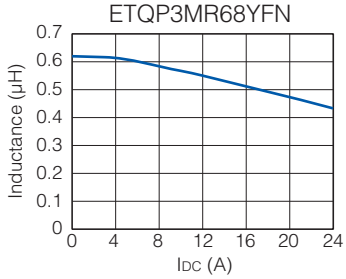
Standard Parts

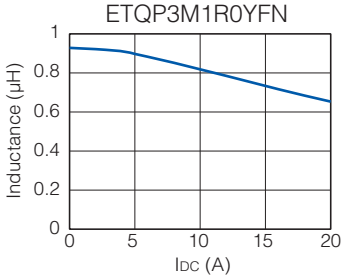
Series	Part No.	Inductance *1		DCR (at 20 °C) (mΩ)		Rated Current (Typ. : A)		
		L0 (μH)	Tolerance (%)	Typ. (max.)	Tolerance (%)	ΔT=40K (*2)	ΔT=40K (*3)	ΔL=–30% (*4)
PCC-M0630M [6.5×6.0×3.0(mm)]	ETQP3MR68YFN	0.68	±20	6.3 (6.9)	±10	9.8	12.0	24.0
	ETQP3M1R0YFN	1.0		7.9 (8.7)		8.8	10.7	20.0
PCC-M0645M [6.5×6.0×4.5(mm)]	ETQP4M6R8YFN	6.8		39.3 (43.2)		4.1	5.2	10.0
	ETQP4M100YFN	10		54.2 (59.6)		3.3	4.5	8.3
	ETQP4M470YFN	47		210 (231)		1.8	2.2	3.8

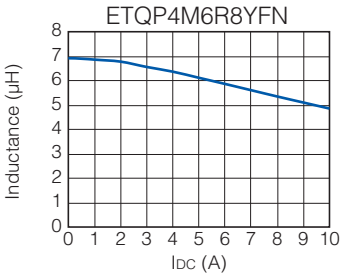
(*1) Measured at 100 kHz.
(*2) DC current which causes temperature rise of 40 K. Parts are soldered by reflow on four-layer PWB (1.6 mm FR4) and measured at room temperature. See also (*5)
(*3) DC current which causes temperature rise of 40 K. Partsare soldered by reflow on multilayer PWB with high heat 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) 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 +150 °C should not be exceeded.
For higher operating temperature conditions, please contact Panasonic representative in your area.

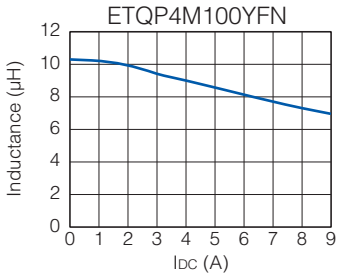
Performance Characteristics (Reference)

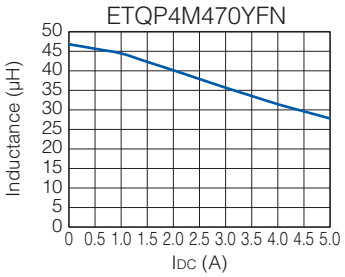
● Inductance vs DC Current





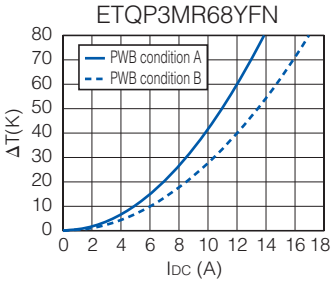


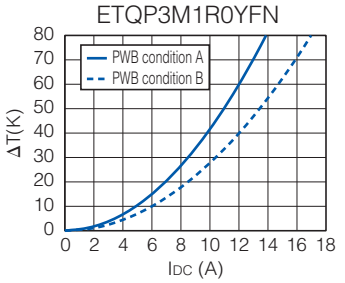


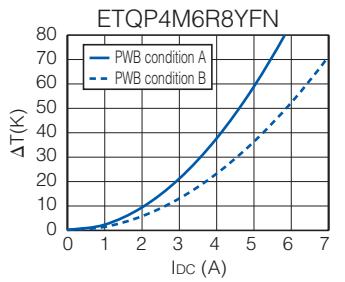


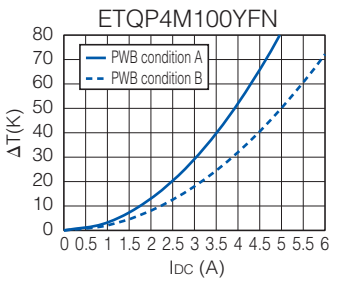
● Case Temperature vs DC Current

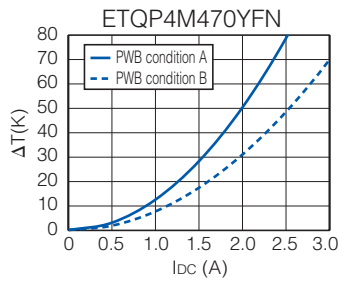
PWB condition A : Four-layer PWB (1.6 mm FR4), See also (*2)
PWB condition B : Multilayer PWB with high heat dissipation performance. See also (*3)











3. Series PCC-M0754M/PCC-M0750M (ETQP5M□□□YFM/ETQP5M□□□YGM)

Standard Parts

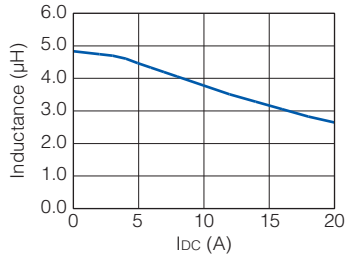
Series	Part No.	Inductance *1		DCR (at 20 °C) (mΩ)		Rated Current (Typ. : A)		
		L0 (μH)	Tolerance (%)	Typ. (max.)	Tolerance (%)	△T=40K (*2)	△T=40K (*3)	△L=–30% (*4)
PCC-M0754M [7.5×7.0×5.4(mm)]	ETQP5M4R7YFM	4.7	±20	20(23)	±10	6.3	8.0	13.1
	ETQP5M6R8YFM	6.8		26.7(29.4)		5.5	6.9	12.1
	ETQP5M100YFM	10		37.6(41.3)		4.7	5.7	10.6
	ETQP5M220YFM	22		92(102)		3.0	3.7	5.8
	ETQP5M330YFM	33		120(132)		2.6	3.3	4.8
	ETQP5M470YFM	48		156(172)		2.3	2.9	4.1
PCC-M0750M [7.5×7.0×5.0(mm)]	ETQP5M101YGM	95		348(382.8)		1.4	1.9	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 is approx. 31 K/W measured on 7.5×7.0×5.4 mm case size and approx. 29 K/W measured on 7.5×7.0×5.0 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 +150 °C should not be exceeded.
For higher operating temperature conditions, please contact Panasonic representative in your area.

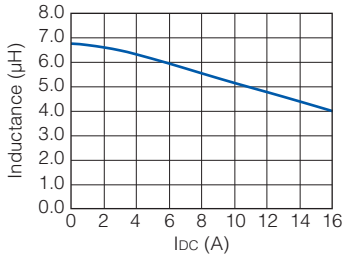
Performance Characteristics (Reference)

● Inductance vs DC Current

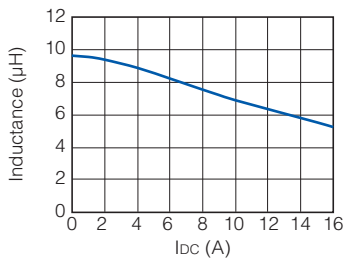
ETQP5M4R7YFM



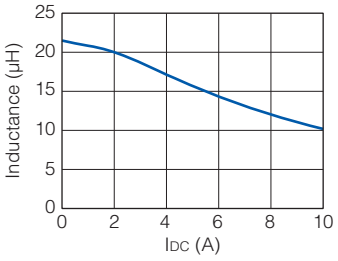
ETQP5M6R8YFM



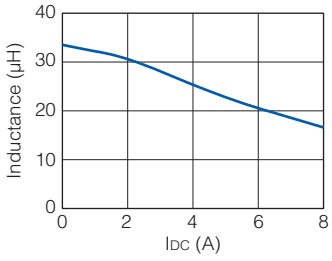
ETQP5M100YFM



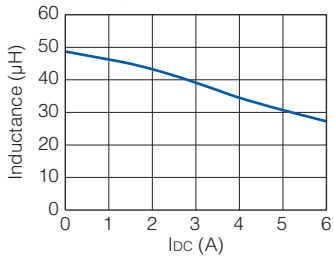
ETQP5M220YFM



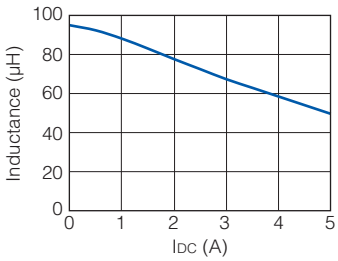
ETQP5M330YFM



ETQP5M470YFM



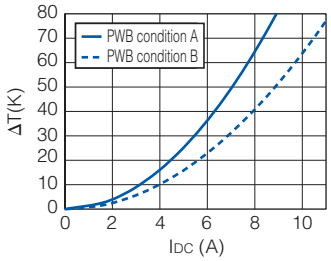
ETQP5M101YGM



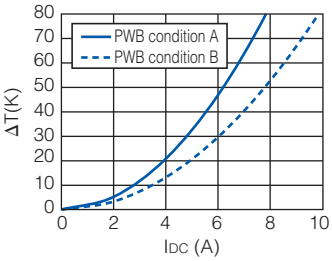
● Case Temperature vs DC Current

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)

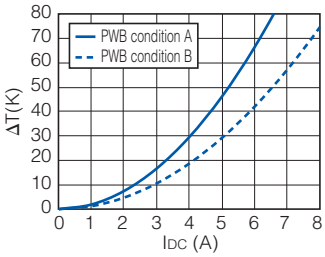
ETQP5M4R7YFM



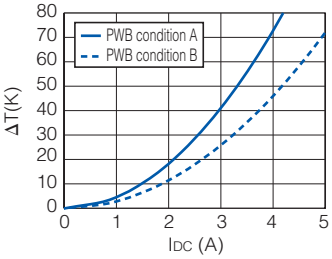
ETQP5M6R8YFM



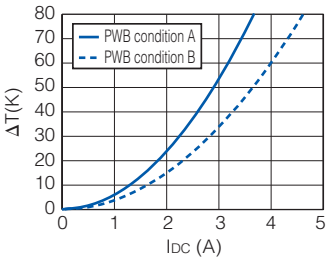
ETQP5M100YFM



ETQP5M220YFM



ETQP5M330YFM



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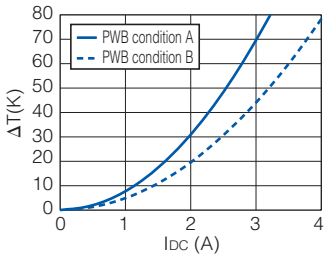
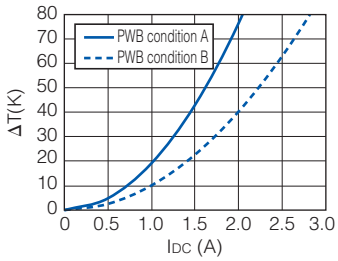


ETQP5M101YGM



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

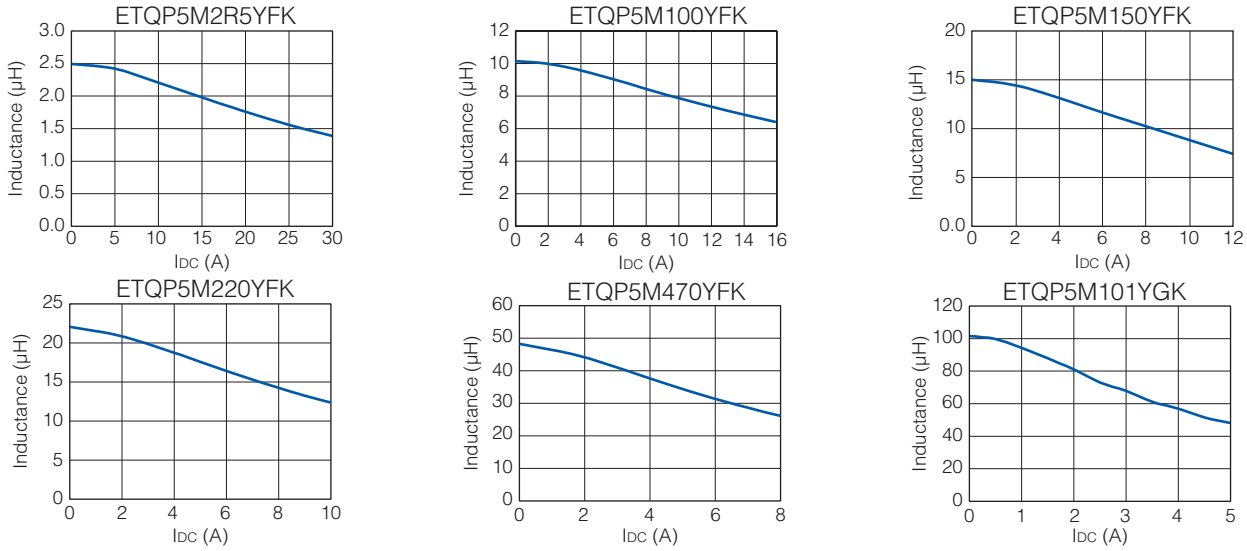
Standard Parts

Series	Part No.	Inductance *1		DCR (at 20 °C) (mΩ)		Rated Current (Typ. : A)		
		L0 (μH)	Tolerance (%)	Typ. (max.)	Tolerance (%)	ΔT=40K (*2)	ΔT=40K (*3)	ΔL=–30% (*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
	ETQP5M150YFK	15		48.2(53.1)		4.7	5.5	7.2
	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		302(333)		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) 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 + 150 °C should not be exceeded.
For higher operating temperature conditions, please contact Panasonic representative in your area.

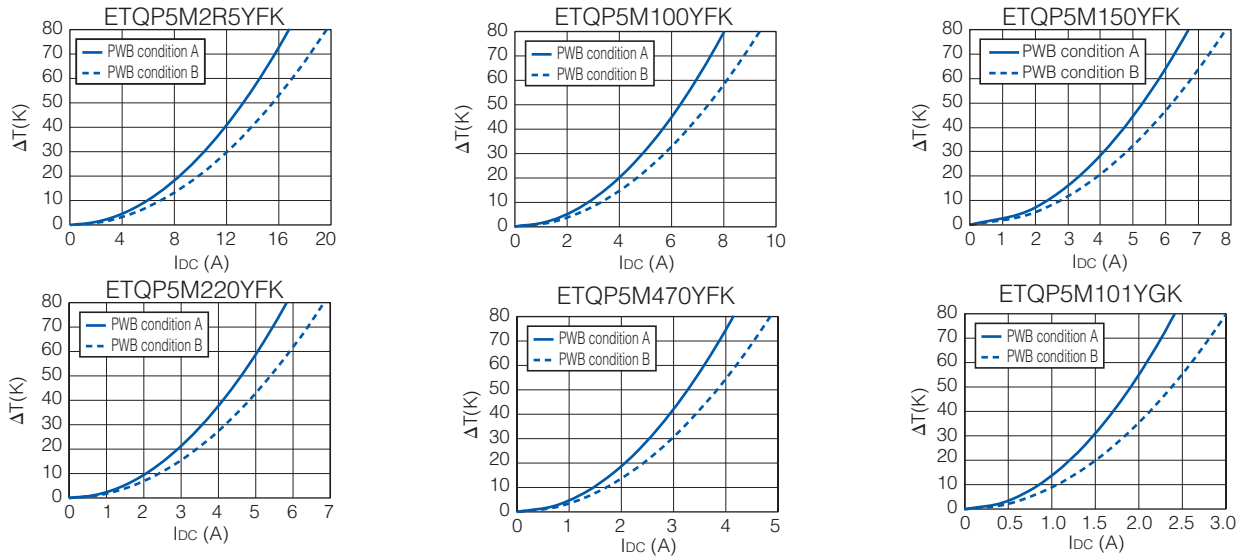
Performance Characteristics (Reference)

● 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)

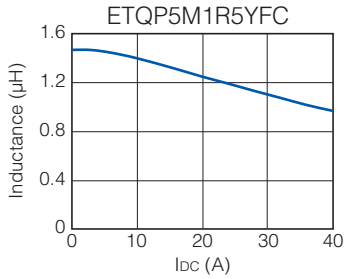
Standard Parts

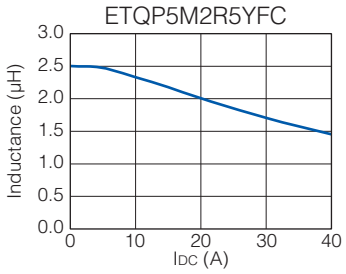
Series	Part No.	Inductance *1		DCR (at 20 °C) (mΩ)		Rated Current (Typ. : A)		
		L0 (μH)	Tolerance (%)	Typ. (max.)	Tolerance (%)	△T=40K (*2)	△T=40K (*3)	△L=−30% (*4)
PCC-M1054M [10.7×10.0×5.4(mm)]	ETQP5M1R5YFC	1.45	±20	3.8(4.2)	±10	17.9	21.4	35.1
	ETQP5M2R5YFC	2.5		5.3(5.9)		15.1	18.1	27.2
	ETQP5M3R3YFC	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	8.8
	ETQP5M330YFC	32.5		68.5(75.4)		4.2	5.0	7.6
	ETQP5M470YFC	47		99(108.9)		3.5	4.2	6.8
	ETQP5M680YFC	66		136(149.6)		3.0	3.6	4.9
PCC-M1050M [10.7×10.0×5.0(mm)]	ETQP5M101YGC	97		208(229)		2.2	2.7	3.0

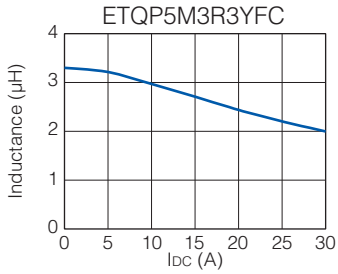
(*1) Measured at 100 kHz.
(*2) DC current which causes temperature rise of 40 K. Parts are soldered by reflow on four-layer PWB (1.6 mm FR4) and measured at room temperature. See also (*5)
(*3) DC current which causes temperature rise of 40 K. Parts are soldered by reflow on multilayer PWB with high 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) 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 +150 °C should not be exceeded.
For higher operating temperature conditions, please contact Panasonic representative in your area.

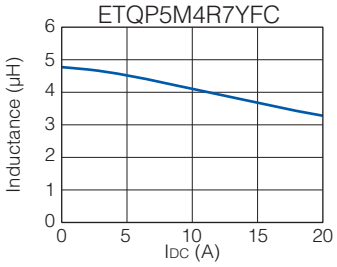
Performance Characteristics (Reference)

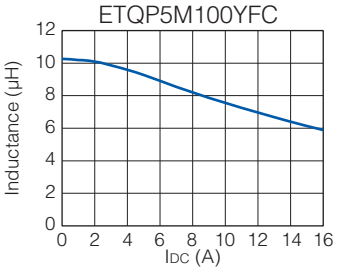
● Inductance vs DC Current

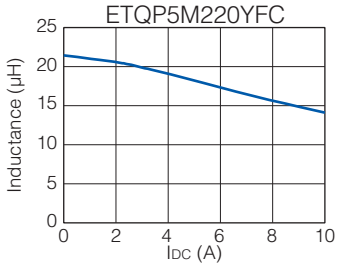


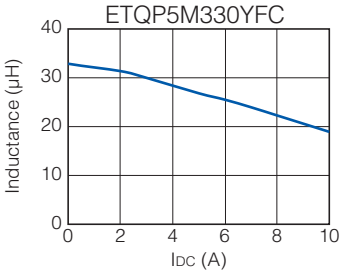


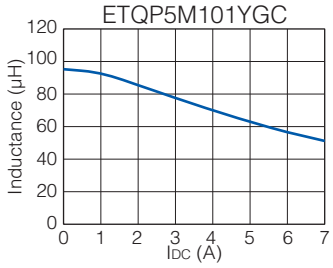


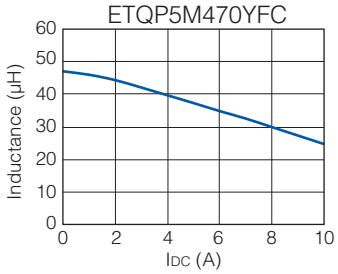


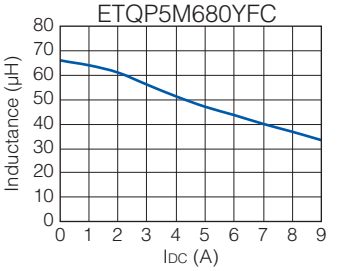








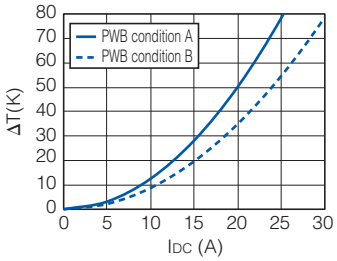




● Case Temperature vs DC Current

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)

ETQP5M1R5YFC



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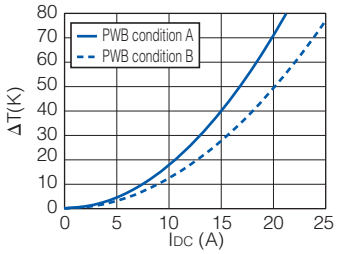

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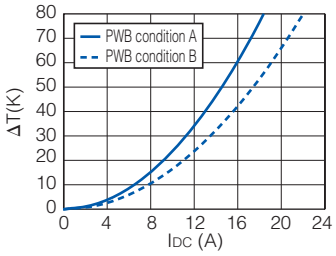

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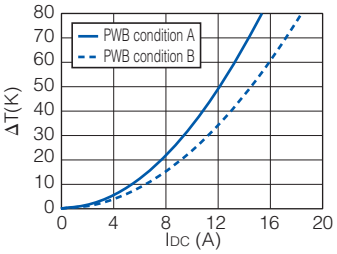

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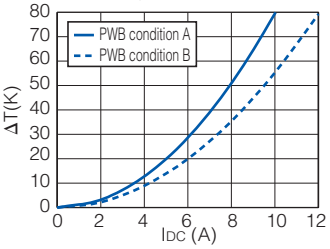
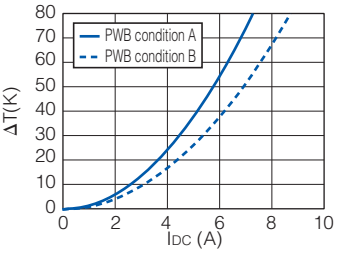


ETQP5M220YFC



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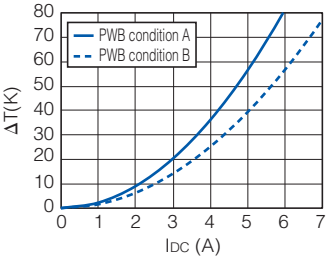

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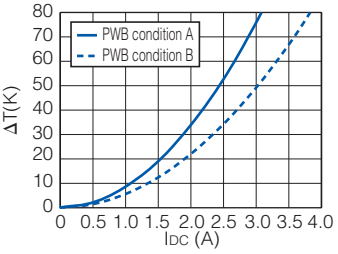

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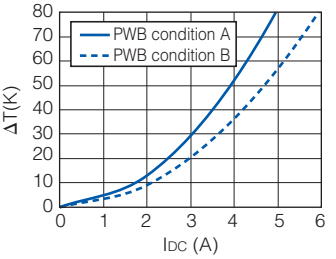
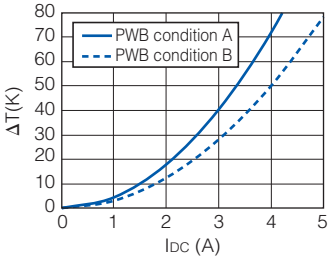


ETQP5M680YFC



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

Standard Parts

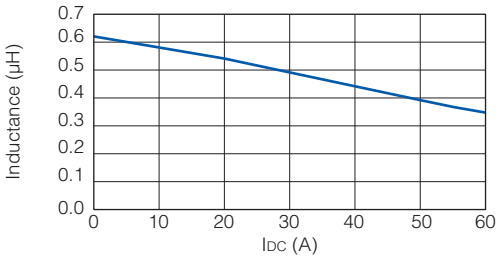
Series	Part No.	Inductance *1		DCR (at 20 °C) (mΩ)		Rated Current (Typ. : A)		
		L0 (μH)	Tolerance (%)	Typ. (max.)	Tolerance (%)	ΔT=40K (*2)	ΔT=40K (*3)	ΔL=−30% (*4)
PCC-M1050ML [10.9×10.0×5.0(mm)]	ETQP5MR68YLC	0.68	±20	1.75(1.93)	±10	26.3	31.5	42.0
	ETQP5M1R0YLC	1.0		2.3(2.53)		23.0	27.5	38.0
	ETQP5M2R0YLC	2.0		4.6(5.06)		16.2	19.4	22.7
PCC-M1060ML [10.9×10.0×6.0(mm)]	ETQP6M1R5YLC	1.5		3.2(3.52)		19.5	23.3	26.8
	ETQP6M2R5YLC	2.5		4.5(5.0)		16.3	19.6	27.0
	ETQP6M3R3YLC	3.3		6.0(6.6)		14.2	17.0	26.0
	ETQP6M4R7YLC	4.7		8.7(9.57)		11.8	14.1	13.2

(*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) 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 +150 °C should not be exceeded.
For higher operating temperature conditions, please contact Panasonic representative in your area.

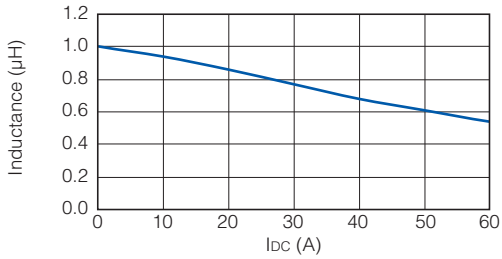
Performance Characteristics (Reference)

● Inductance vs DC Current

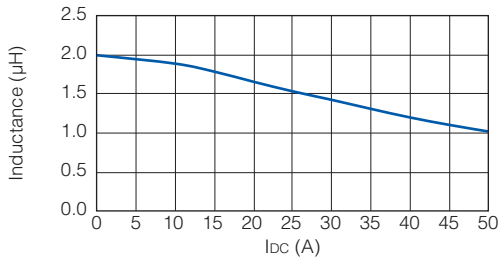
ETQP5MR68YLC



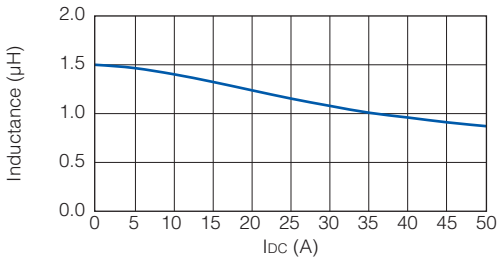
ETQP6M1R0YLC



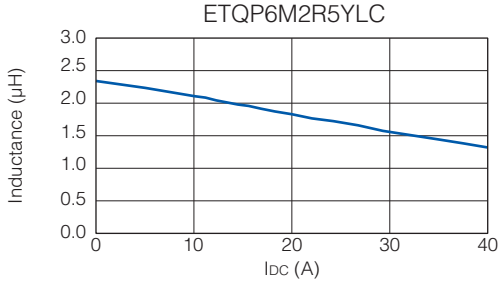
ETQP5M2R0YLC



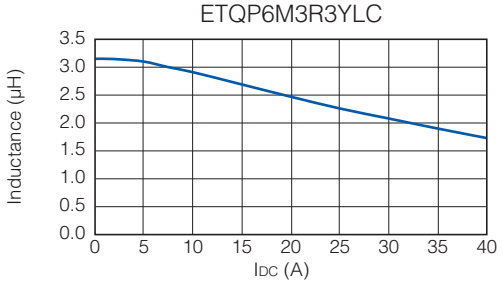
ETQP6M1R5YLC



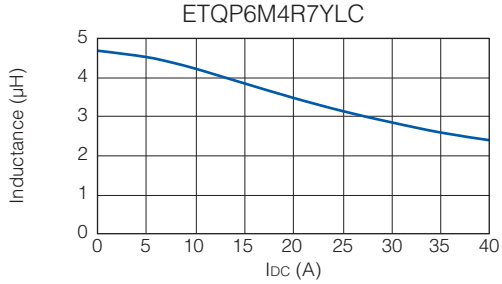
ETQP6M2R5YLC



ETQP6M3R3YLC



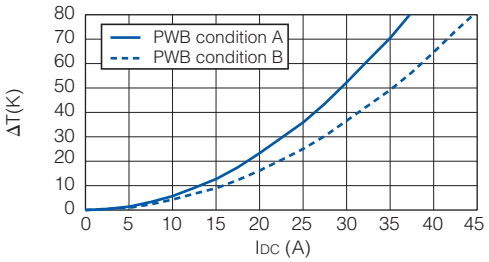
ETQP6M4R7YLC



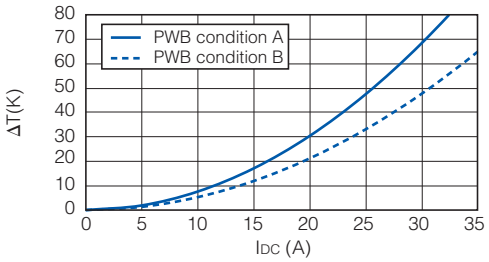
● Case Temperature vs DC Current

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



ETQP6M1R0YLC



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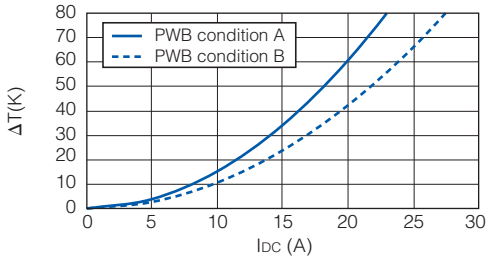
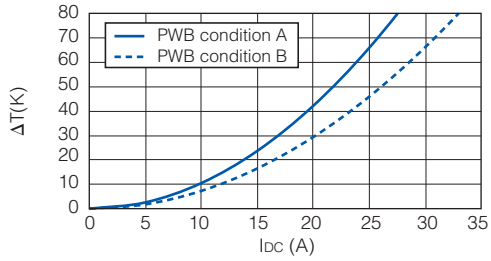


ETQP6M1R5YLC



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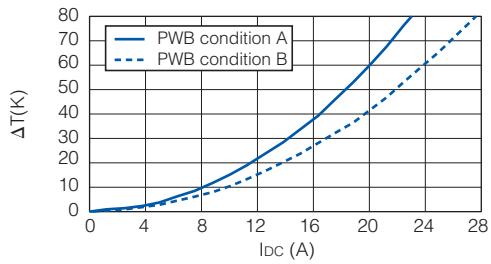

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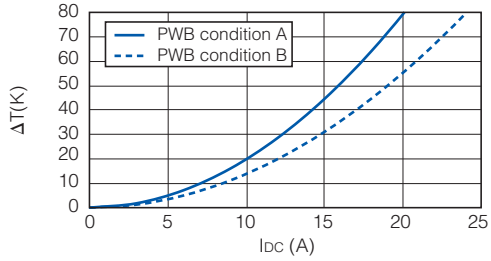
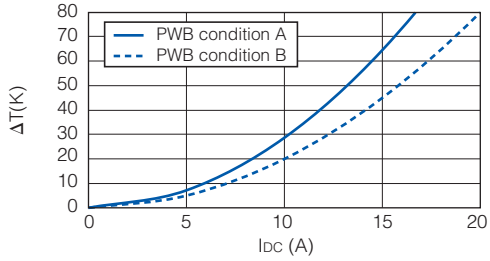


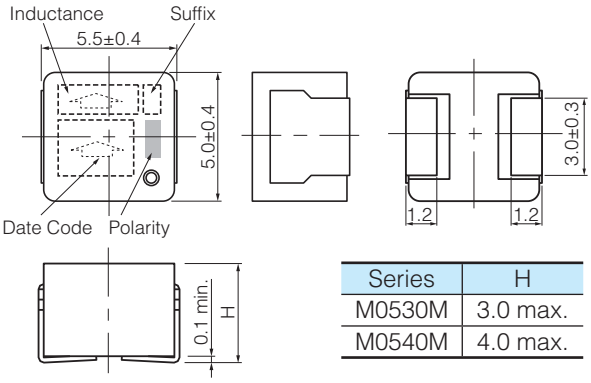
ETQP6M4R7YLC



Dimensions in mm (not to scale)

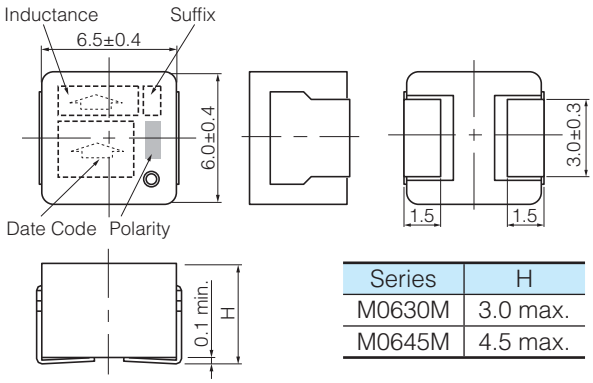
Dimensional tolerance unless noted : ±0.5

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



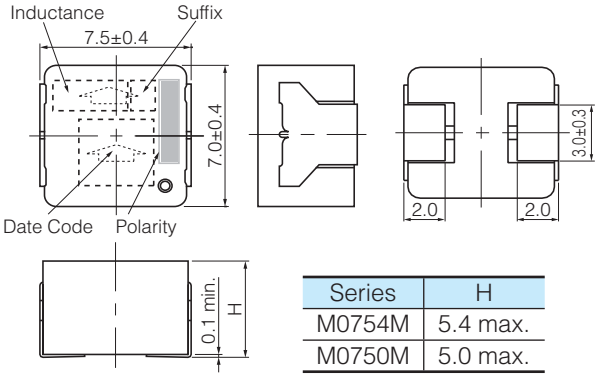
Series	H
M0530M	3.0 max.
M0540M	4.0 max.

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



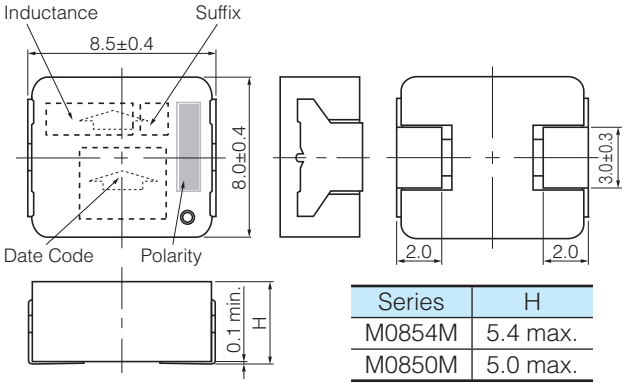
Series	H
M0630M	3.0 max.
M0645M	4.5 max.

Series PCC-M0754M
Series PCC-M0750M
(ETQP5M□□□YFM/YGM)



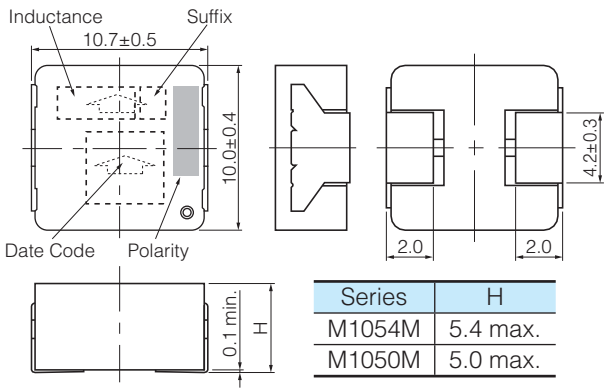
Series	H
M0754M	5.4 max.
M0750M	5.0 max.

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



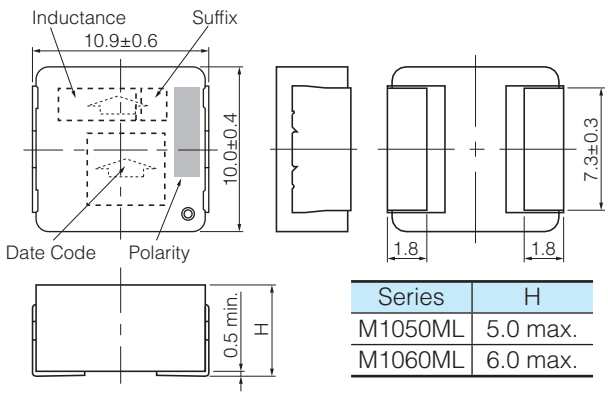
Series	H
M0854M	5.4 max.
M0850M	5.0 max.

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)

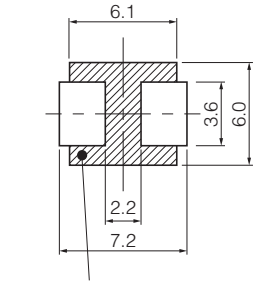


Series	H
M1050ML	5.0 max.
M1060ML	6.0 max.

Recommended Land Pattern in mm (not to scale)

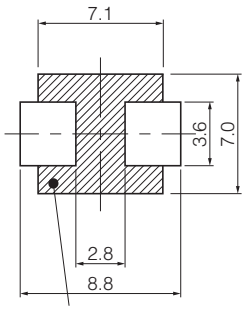
Dimensional tolerance unless noted : ±0.5

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



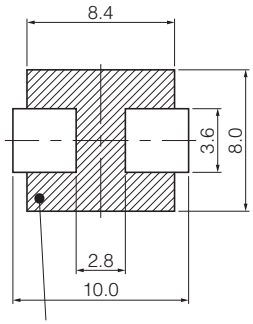
Don't wire on the pattern
on shaded portion the PWB.

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



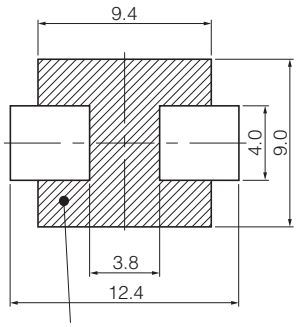
The same as the left.

Series PCC-M0754M
Series PCC-M0750M
(ETQP5M□□□YFM/YGM)



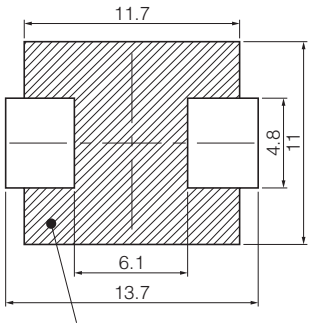
The same as the left.

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



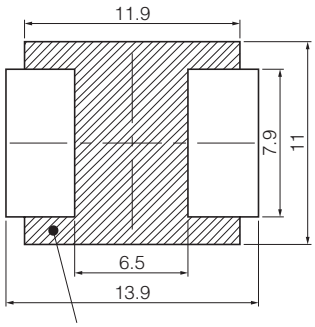
Don't wire on the pattern
on shaded portion the PWB.

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



The same as the left.

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



The same as the left.

■ As for Packaging Methods, Soldering Conditions and Safety Precautions (Power Choke Coils for Automotive application),

Please see Data Files