Power Choke Coil for Automotive application

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



Inc (A)

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	• Fig.1 Inductance v.s. DC current, Terr
 High-reliability 	: High vibration resistance as result of newly	ETQP5M470YFM(reference
	developed integral construction; under severe	60.0
	reliability conditions of automotive and other	50.0
	strenuous applications	
 High bias current 	: Excellent inductance stability using ferrous alloy	μ 1 40.0 9 1 1 40.0 1 1 1 1 1 1 1 1 1 1 1 1 1
	magnetic material (Fig.1)	eg 30.0 pp 20.0 → 100 °C
	: Excellent inductance stability over broad temp. range (Fig.1)	
	: New metal composite core technology	-+- 125 °C
 High efficiency 	: Low RDC of winding and low eddy-current loss of the core	10.0 150 °C
 AEC-Q200 Automotive 	qualified	0.0 0.5 1.0 1.5 2.0 2.5 3.0
		0.0 0.3 1.0 1.5 2.0 2.5 3.0

RoHS compliant

Recommended Applications

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

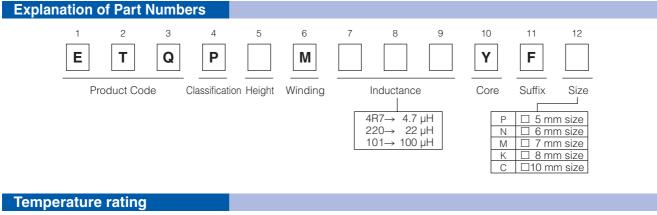
Boost-Converter, Buck-Converter DC/DC

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



Operatin	g temperature range	Tc : -40 °C to +150 °C(Including self-temperature rise)
Storage condition	After PWB mounting	
Storage condition	Before PWB mounting	Ta : -5 °C to +35 °C 85%RH max.

1. Series PCC-M0530M/PCC-M0540M (ETQP3M VFP/ETQP4M VFP)

Standard Parts									
		Inducta	ance *1	DCR (at 20	°C) (m Ω)	Rated Current (Typ. : A)			
Series	Part No.	LO	Tolerance	Тур.	Tolerance	∆T=	40K	△L=-30%	
		(µH)	(%)	(max.)	(%)	(*2)	(*3)	(*4)	
PCC-M0530M	ETQP3M2R2YFP	2.2		22.6 (24.8)		4.8	5.8	10.9	
[5.5×5.0×3.0(mm)]	ETQP3M3R3YFP	3.3	±20	31.3 (34.4)	. 10	4.1	5.0	8.6	
PCC-M0540M	ETQP4M4R7YFP	4.7	±20	36.0 (39.6)	±10	4.0	4.8	7.7	
[5.5×5.0×4.0(mm)]	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)

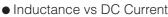
(*3) DC current which causes temperature rise of 40 K. Parts are soldered by reflow on multilayer PWB with high heat dissipation performance. Note: Heat radiation constant are approx. 52 K/W measured on 5.5×5.0×3.0 mm case size and approx. 48 K/W measured on 5.5×5.0×4.0 mm case size. See also (*5)

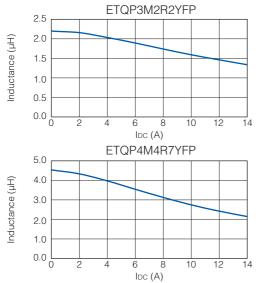
(*4) Saturation rated current : DC current which causes L(0) drop -30 %.

(*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.

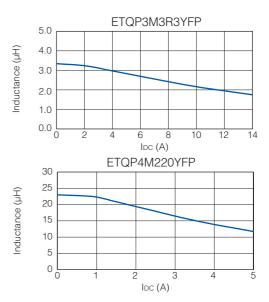
For higher operating temperature conditions, please contact Panasonic representative in your area.

Performance Characteristics (Reference)

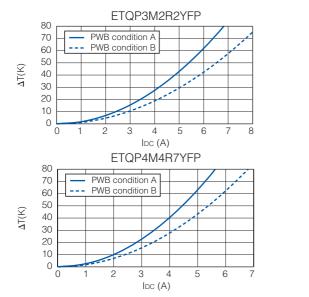


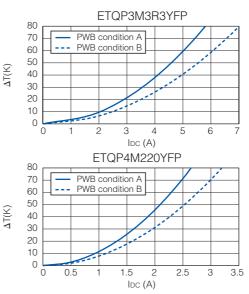






PWB condition A : Four-layer PWB (1.6 mm FR4), See also (*2) PWB condition B : Multilayer PWB with high heat dissipation performance. See also (*3)





2. Series PCC-M0630M/PCC-M0645M (ETQP3M VFN/ETQP4M VFN)

Standard Parts								
		Inducta	ance *1	DCR (at 20) °C) (mΩ)	Rated Current (Typ. : A)		
Series	Part No.	LO	Tolerance	Тур.	Tolerance	∆T=	40K	∆L=–30%
		(µH)	(%)	(max.)	(%)	(*2)	(*3)	(*4)
PCC-M0630M	ETQP3MR68YFN	0.68		6.3 (6.9)		9.8	12.0	24.0
[6.5×6.0×3.0(mm)]	ETQP3M1R0YFN	1.0]	7.9 (8.7)] [8.8	10.7	20.0
	ETQP4M6R8YFN	6.8	±20	39.3 (43.2)	±10	4.1	5.2	10.0
PCC-M0645M [6.5×6.0×4.5(mm)]	ETQP4M100YFN	10]	54.2 (59.6)] [3.3	4.5	8.3
[0.5×0.0×4.3(1111)]	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 %.

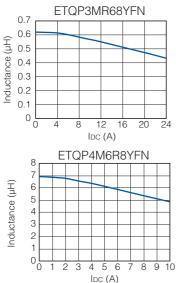
(*5) Within a suitable application, the part's temperature depends on circuit design and certain heat dissipation conditions. This should be double checked in a worst case operation mode.

In normal case, the max.standard operating temperature of +150 °C should not be exceeded.

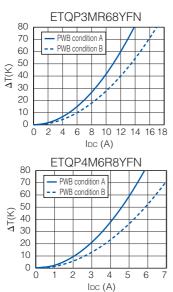
For higher operating temperature conditions, please contact Panasonic representative in your area.

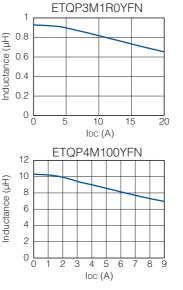
Performance Characteristics (Reference)

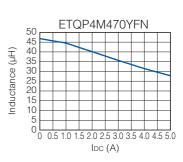
Inductance vs DC Current



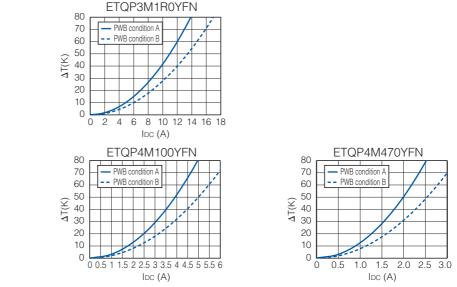
• Case Temperature vs DC Current







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									
		Inductance *1		DCR (at 2	0 °C) (mΩ)	Rated Current (Typ. : A)			
Series	Part No.	LO	Tolerance	Тур.	Tolerance	∆T=	:40K	∆L=–30%	
		(µH)	(%)	(max.)	(%)	(*2)	(*3)	(*4)	
	ETQP5M4R7YFM	4.7		20(23)		6.3	8.0	13.1	
	ETQP5M6R8YFM	6.8		26.7(29.4)	4 }	5.5	6.9	12.1	
PCC-M0754M	ETQP5M100YFM	10	1	37.6(41.3)		4.7	5.7	10.6	
[7.5×7.0×5.4(mm)]	ETQP5M220YFM	22	±20	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

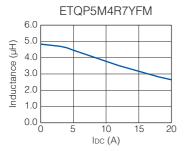
(*3) DC current which causes temperature rise of 40 K. Parts are soldered by reflow on multilayer PWB with high heat dissipation performance. Note: Heat radiation constant is approx. 31 K/W measured on 7.5×7.0×5.4 mm case size and approx. 29 K/W measured on 7.5×7.0×5.0 mm case size. See also (*5)
(*4) Saturation rated current : DC current which causes L(0) drop -30 %.

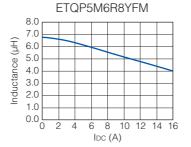
 (*4) Saturation rated current. De current which cases E(0) drop -30 %.
 (*5) Within a suitable application, the part's temperature depends on circuit design and certain heat dissipation conditions. This should be double checked in a worst case operation mode. In normal case, the max.standard operating temperature of +150 °C should not be exceeded.

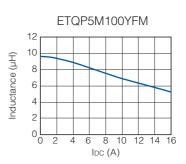
For higher operating temperature conditions, please contact Panasonic representative in your area.

Performance Characteristics (Reference)

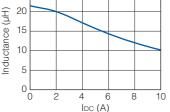
Inductance vs DC Current

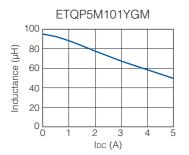


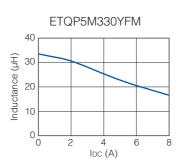


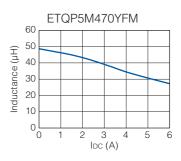












Power Inductors

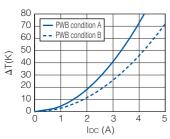
Panasonic

• Case Temperature vs DC Current

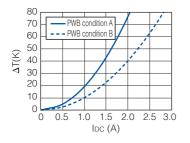
PWB condition A : Four-layer PWB (1.6 mm FR4), See also (*2) PWB condition B : Multilayer PWB with high heat dissipation performance. See also (*3)

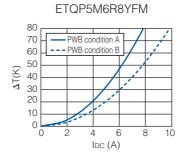
ETQP5M4R7YFM 80 70 PWB condition A PWB condition B 60 50 ΔT(K) 40 30 20 10 0 10 0 4 6 8 2 IDC (A)



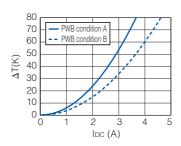


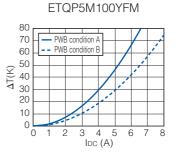
ETQP5M101YGM



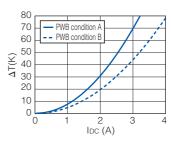


ETQP5M330YFM





ETQP5M470YFM



4. Series PCC-M0854M/PCC-M0850M (ETQP5M VFK/ETQP5M VGK)

Standard Parts									
		Inducta	ance *1	DCR (at 2	0 °C) (mΩ)	Rated Current (Typ. : A)			
Series	Part No.	LO	Tolerance	Тур.	Tolerance	∆T=	-40K	∆L=–30%	
		(µH)	(%)	(max.)	(%)	(*2)	(*3)	(*4)	
	ETQP5M2R5YFK	2.5		7.6(8.4)		11.9	14.0	20.1	
PCC-M0854M	ETQP5M100YFK	10		33(37)		5.7	6.7	13.0	
$[8.5 \times 8.0 \times 5.4(mm)]$	ETQP5M150YFK	15		48.2(53.1)		4.7	5.5	7.2	
[0.3×0.0×3.4(1111)]	ETQP5M220YFK	22	±20	63(70)) ±10 [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 %.

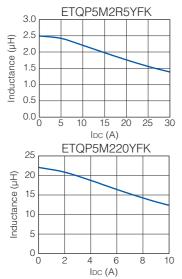
(*5) Within a suitable application, the part's temperature depends on circuit design and certain heat dissipation conditions. This should be double checked in a worst case operation mode.

In normal case, the max.standard operating temperature of + 150 °C should not be exceeded.

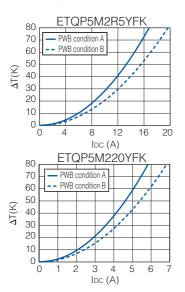
For higher operating temperature conditions, please contact Panasonic representative in your area.

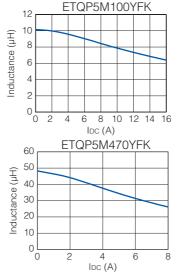
Performance Characteristics (Reference)

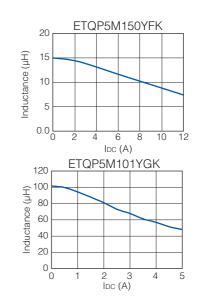
• Inductance vs DC Current



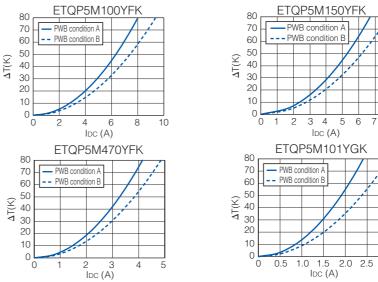
• Case Temperature vs DC Current







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)



Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use Should a safety concern arise regarding this product, please be sure to contact us immediately.

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5. Series PCC-M1054M/PCC-M1050M (ETQP5M VFC/ETQP5M VGC)

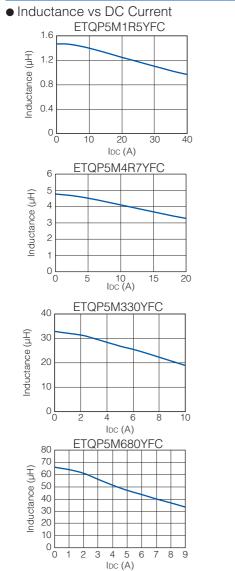
Standard Parts									
		Inducta	ance *1	DCR (at 20 °C) (m Ω)		Rated Current		(Тур. : А)	
Series	Part No.	LO	Tolerance	Тур.	Tolerance	∆T=	=40K	∆L=–30%	
		(µH)	(%)	(max.)	(%)	(*2)	(*3)	(*4)	
	ETQP5M1R5YFC	1.45		3.8(4.2)		17.9	21.4	35.1	
	ETQP5M2R5YFC	2.5		5.3(5.9)] [15.1	18.1	27.2	
	ETQP5M3R3YFC	3.3		7.1(7.9)		13.1	15.7	22.7	
PCC-M1054M	ETQP5M4R7YFC	4.7		10.2(11.3)		10.9	13.1	20.0	
$[10.7 \times 10.0 \times 5.4(\text{mm})]$	ETQP5M100YFC	10		23.8(26.2)] [7.1	8.5	10.7	
[10.7 × 10.0 × 5.4(1111)]	ETQP5M220YFC	22	±20	45(50)) ±10 [5.2	6.2	8.8	
	ETQP5M330YFC	32.5		68.5(75.4)] [4.2	5.0	7.6	
	ETQP5M470YFC	47	1	99(108.9)	1	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	

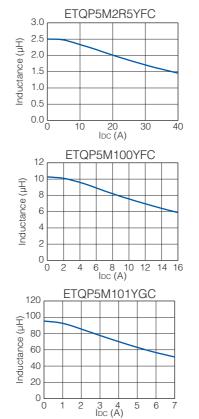
(*1) Measured at 100 kHz.

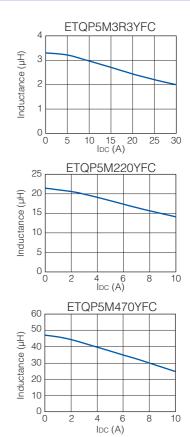
(*2) DC current which causes temperature rise of 40 K. Parts are soldered by reflow on four-layer PWB (1.6 mm FR4)

(*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 KW measured on 10.7×10.0x5.4 mm case size and approx. 26 KW measured on 10.7×10.0x5.0 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)

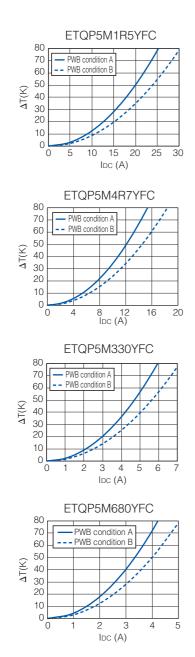


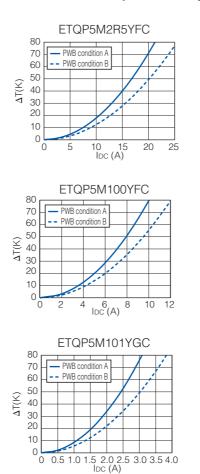


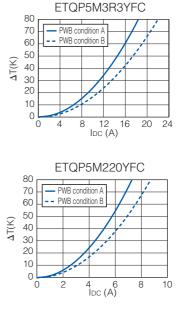


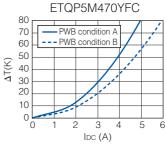
• Case Temperature vs DC Current

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 VLC/ETQP6M VLC)

Standard Parts								
		Inducta	ance *1	DCR (at 20	$\Omega^{\circ}C)$ (m Ω)	Rate	d Current (Тур. : А)
Series	Part No.	LO	Tolerance	Тур.	Tolerance	∆T=	=40K	∆L=–30%
		(µH)	(%)	(max.)	(%)	(*2)	(*3)	(*4)
	ETQP5MR68YLC	0.68		1.75(1.93)		26.3	31.5	42.0
PCC-M1050ML [10.9×10.0×5.0(mm)]	ETQP5M1R0YLC	1.0		2.3(2.53)	±10	23.0	27.5	38.0
[10:5×10:0×3:0(1111)]	ETQP5M2R0YLC	2.0		4.6(5.06)		16.2	19.4	22.7
	ETQP6M1R5YLC	1.5	±20	3.2(3.52)		19.5	23.3	26.8
PCC-M1060ML	ETQP6M2R5YLC	2.5		4.5(5.0)	[16.3	19.6	27.0
[10.9×10.0×6.0(mm)] E	ETQP6M3R3YLC	3.3		6.0(6.6)	1 1	14.2	17.0	26.0
	ETQP6M4R7YLC	4.7		8.7(9.57)		11.8	14.1	13.2

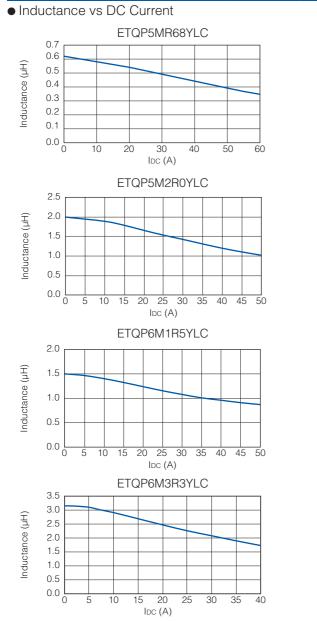
(*1) Measured at 100 kHz.

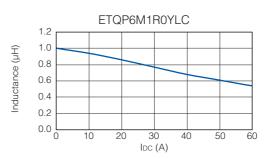
(*2) DC current which causes temperature rise of 40 K. Parts are soldered by reflow on four-layer PWB (1.6 mm FR4)

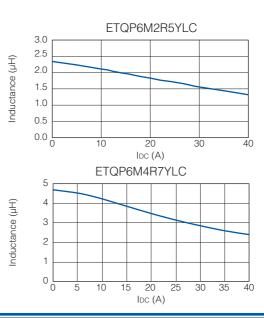
(*2) DC current which causes temperature. See also (*5)
(*3) DC current which causes temperature rise of 40 K. Parts are soldered by reflow on multilayer PWB with high heat dissipation performance. Note: Heat radiation constant are approx. 23 KW measured on 10.9×10.0×5.0 mm case size and approx. 23 KW 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)



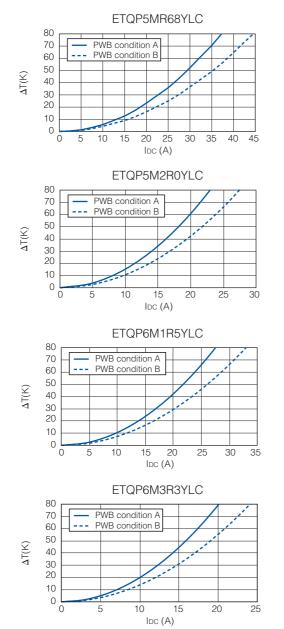


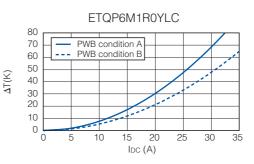


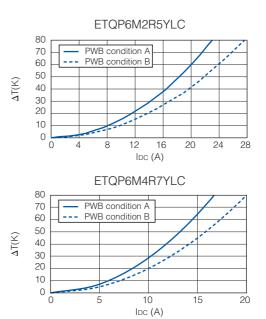
Power Inductors

• 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)

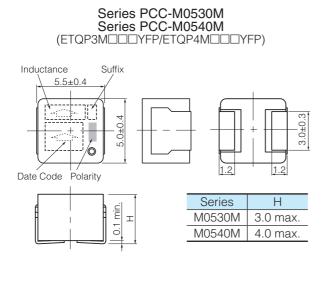




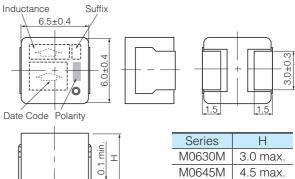


Dimensions in mm (not to scale)

Dimensional tolerance unless noted : ±0.5

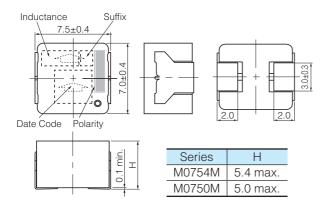


Series PCC-M0630M Series PCC-M0645M (ETQP3MDDDYFN/ETQP4MDDDYFN)



M0645M 4.

Series PCC-M0754M Series PCC-M0750M (ETQP5MDDDYFM/YGM)



Series PCC-M0854M Series PCC-M0850M (ETQP5MDDCYFK/YGK)



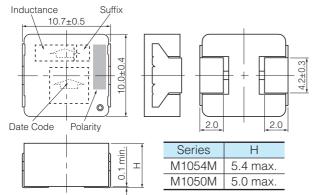
 Image: 2.0 product
 Image: 2.0 product

 Series
 H

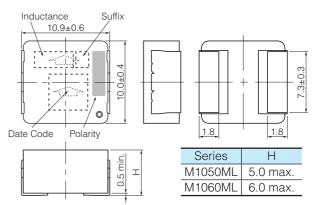
 M0854M
 5.4 max.

 M0850M
 5.0 max.





Series PCC-M1050ML Series PCC-M1060ML (ETQP5MDDDYLC/ETQP6MDDDYLC)

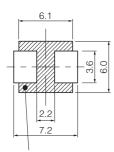


Recommended Land Pattern in mm (not to scale)

Dimensional tolerance unless noted : ±0.5

Series PCC-M0530M

Series PCC-M0540M (ETQP3MUUUYFP/ETQP4MUUUYFP)



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

Series PCC-M0630M Series PCC-M0645M (ETQP3MUUUYFN/ETQP4MUUUYFN)

71

28

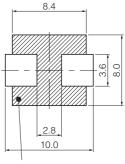
8.8

The same as the left

V

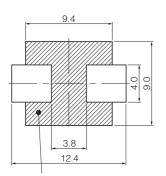
3.6 0

Series PCC-M0754M Series PCC-M0750M (ETQP5MUUUYFM/YGM)



The same as the left

Series PCC-M0854M Series PCC-M0850M (ETQP5MDDYFK/YGK)



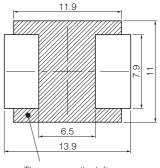
Don't wire on the pattern on shaded portion the PWB

Series PCC-M1054M Series PCC-M1050M (ETQP5MDDYFC/YGC)

11.7 4.0 6.1 13.7 The same as the left

Series PCC-M1050ML Series PCC-M1060ML

 $(ETQP5M \square \square YLC/ETQP6M \square \square YLC)$



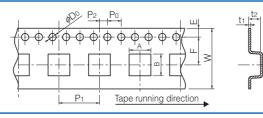
The same as the left.

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

Please see Data Files

Packaging Methods (Taping)

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



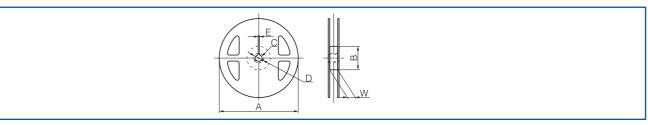
Power Choke Coils for Automotive application

Series	A	В	W	E	F	P1	P2	Po	φDo	t1	t2
PCC-M0530M	5.6	6.1									3.3
PCC-M0540M	5.0	0.1									4.3
PCC-M0630M	7.1	6.6	16.0		7 5	10.0				0.4	3.3
PCC-M0645M	1.1	0.0	16.0	4 75	7.5	12.0		1.0		0.4	5.0
PCC-M0754M/M0750M	8.1	7.6		1.75			2.0	4.0	1.5		6.0
PCC-M0854M/M0850M	9.1	8.6									0.0
PCC-M1054M/M1050M PCC-M1050ML/M1060ML	10.7	11.9	24.0		11.5	16.0				0.5	6.3

Power Choke Coils for consumer use

Series	A	В	W	E	F	P1	P ₂	Po	φDo	t1	t2
PCC-M0512W	5.6	5.85	12.0		5.5	8.0					1.4
PCC-M0630L	7.1	8.0									3.2
PCC-M0630W	7.2	7.5	16.0		7.5	12.0					3.3
PCC-M0730L	7.6	8.9	10.0		7.5	12.0					4.2
PCC-M0740L	7.6	8.9									4.3
PCC-M1040W	10.6	11.0									4.0
PCC-M1040L	10.6	11.8]	1.75			2.0	4.0	1.5	0.4	5.2
PCC-M1250L	13.1	14.8									5.3
PCC-D124H			24.0		11.5	16.0					5.2
PCC-D125H	13.5	13.5	24.0		11.5	10.0					5.2
PCC-D126H											6.2
PCC-D126F	13.0	13.0									6.0
PCC-F126F	13.0	13.0									0.0

• Taping Reel Dimensions in mm (not to scale)



Power Choke Coils for Automotive application

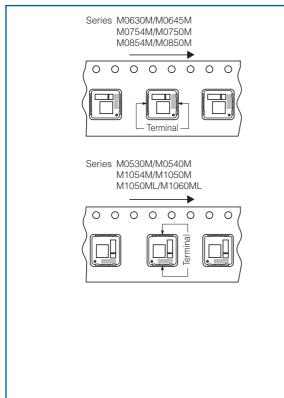
Series	A	В	С	D	E	W
PCC-M0530M/M0540M PCC-M0630M/M0645M PCC-M0754M/M0750M PCC-M0854M/M0850M	330	100	13	21	2	17.5
PCC-M1054M/M1050M PCC-M1050ML/M1060ML						25.5

Power Choke Coils for consumer use

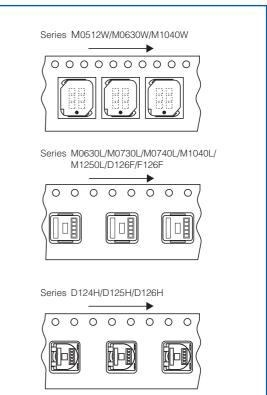
Series	А	B	С	D	E	W
PCC-M0512W		(80)				13.5
PCC-M0630L/M0630W	330					17.5
PCC-M1040W						25.5
PCC-M0730L/M0740L		80	13	21	2	17.5
PCC-M1040L	380	00				
PCC-M1250L/D124H/D125H/ D126H/D126F/F126F	300					25.4

Component Placement (Taping)

• Power Choke Coils for Automotive application



• Power Choke Coils for consumer use



Standard Packing Quantity/Reel

• Power Choke Coils for Automotive application

Series	Minimum Quantity / Packing Unit	Quantity per reel
PCC-M0530M/M0540M	2,000 pcs. / box (2 reel)	1,000 pcs.
PCC-M0630M		
PCC-M0645M		
PCC-M0754M/M0750M	1,000 pcs. / box (2 reel)	500 pcs.
PCC-M0854M/M0850M		
PCC-M1054M/M1050M		
PCC-M1050ML/M1060ML		

• Power Choke Coils for consumer use

Series	Minimum Quantity / Packing Unit	Quantity per reel
	, ,	3 1
PCC-M0512W	6,000 pcs. / box (2 reel)	3,000 pcs.
PCC-M0730L	3,000 pcs. / box (2 reel)	1,500 pcs.
PCC-M0740L		
PCC-M0630L	2,000 pcs. / box (2 reel)	1,000 pcs.
PCC-M0630W		
PCC-M1040L		
PCC-M1040L	1,000 pcs. / box (2 reel)	500 pcs.
(ETQP4LR19WFC)		
PCC-M1040W		
PCC-M1250L		
PCC-D124H		
PCC-D125H		
PCC-D126H		
PCC-D126F		
PCC-F126F		

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