TDK

April 2026

Mn-Zn Ferrite

Material characteristics

Ferrite for switching power supplies
Ferrite for high-frequency power supplies
Ferrite Cores for EMI Suppression
Ferrite for telecommunication

New Mn-based material lineup (including Under Development)

Development Status	Release Schedule	Material	Features
New Development	Existing	PEL95	No.1 low loss characteristics in the large core industry
New Development	Existing	PEM95	For large cores No.1 low heat generation performance under high load driving
New Development	Existing	PEH95	For extra-large cores No.1 low heat generation performance under high temperature and high load driving
New Development	Existing	PC91	High saturation magnetic flux density, Low loss
New Development	Existing	PCL47	PC47 material with improved temperature characteristics
New Development	Existing	PCT50	High Frequency, Wide Temperature Range Low Loss
New Development	Existing	HS45	High permeability over a wide temperature range
Under Development	Coming soon	PEM96	300kHz low loss Industry No.1High Temperature / Low Heat Generation Performance
Under Development	Coming soon	PC96	100kHz low loss Industry No.1 for Medium / Small Cores Low Loss Material
Under Development	Coming soon	HFxx	High μ & High Z Automotive grade
Under Development	Coming soon	PEL96	300kHz low loss material Focus on low temperature range
Under Development	Coming soon	PC5x	For large cores 500kHz low loss material

Material characteristics list

Ferrite for switching power supplies

Product Area	Recommended Frequency Range	Material	Features	μi	Pcv at 100kHz, 200mT [kW/m³]		Bs [mT]		Tc [°C]
				25°C	25°C	100°C	25°C	100°C	
For switching power supplies PC95 Series	<300kHz	PC95	Low loss in wide temperature range	3300	350	280	530	410	>215
	<300kHz	PEL95 New	No.1 low loss characteristics in the large core industry	4100	250	340	500	370	>180
	<300kHz	PEM95 New	For large cores No.1 low heat generation performance under high load driving	2900	440	320	520	410	>210
	<300kHz	PEH95 New	For extra-large cores No.1 low heat generation performance under high temperature and high load driving	2400	550	380	520	410	>210
For switching power supplies Low loss material	<100kHz	PE22	For General, Large Cores	1800	890	520	510	410	>200
	<100kHz	PC40	For General, Large Cores	2300	670	420	500	380	>200
	<300kHz	PC44	Low loss at 100°C	2400	600	300	510	390	>215
	<300kHz	PC47	World's smallest class loss at 100°C	2500	600	250	530	420	>230
	<300kHz	PCL47 New	PC47 material with improved temperature characteristics	2600	530	280	530	420	>230
For Switching Power Supplies Hi-μi materials	<100kHz	HS10	High permeability	10000	-	-	400	-	>120
	<300kHz	HS72	High permeability	7500	-	-	430	-	>130
	<500kHz	HS45 New	High permeability over a wide temperature range	4200	-	-	450		>150

Test core : T20 x 5 x 10

For choke coils

Product Area	Recommended Frequency Range	Material	Features	μi	Pcv at 100kHz, 200mT [kW/m³]		Bs [mT]		Tc [°C]
				25°C	25°C	100°C	25°C	100°C	
For choke coils High saturation magnetic flux density material	<300kHz	PC33	High saturation magnetic flux density at high temperatures	1400	1100	600	510	440	>290
	<300kHz	PC90	High saturation magnetic flux density, low loss	2200	680	320	540	450	>250
	<300kHz	PC91 New	High saturation magnetic flux density, low loss	2000	700	400	530	440	>240

Test core : T20 x 5 x 10

Ferrite for high-frequency power supplies

Product Area	Recommended Frequency Range	Material	Features	μi	Pcv at 100kHz, 200mT [kW/m³]		Bs [mT]		Tc [°C]
				25°C	25°C	100°C	25°C	100°C	
For high frequency power supplies	300~700kHz	PC50	High frequency low loss	1400	*130	*1 80	470	380	>240
	300~700kHz	PCT50 New	High Frequency, Wide Temperature Range Low Loss	1400	*100	*1 80	460	370	>230
	700kHz~4MHz	PC200	High performance, low loss at high frequencies	800	*145	*2 180	485	410	>280

Test core : T20 x 5 x 10
*1 : 500kHz,50mT
*2 : 1MHz,50mT

Ferrite Cores for EMI Suppression, telecommunication

Product Area	Recommended Frequency Range	Material	Features	μi	Pcv at 100kHz, 200mT [kW/m³]		Bs [mT]		Tc [°C]
				25°C	25°C	100°C	25°C	100°C	
For EMC	60kHz to 1MHz	HF90	For low frequencies, High impedance	5000	-	-	470	-	>165
	1MHz~	HF60	For high frequencies, High impedance	1600	-	-	410	-	>130
For communication equipment	<100kHz	H5A	Stable permeability over wide temperature range	4000	-	-	410	-	>130
	<100kHz	H5B2	Stable permeability over wide temperature range	7500	-	-	420	-	>130
	<100kHz	H5C2	High permeability	10000	-	-	400	-	>120
	<100kHz	HP5	Stable permeability over wide temperature range	5000	-	-	400	-	>140

Test core : T20 x 5 x 10

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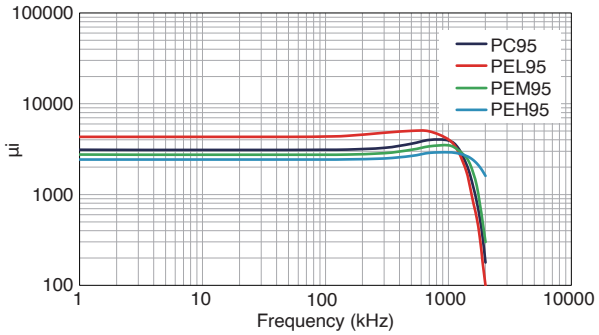
PC95 series for switching power supplies

Material characteristics

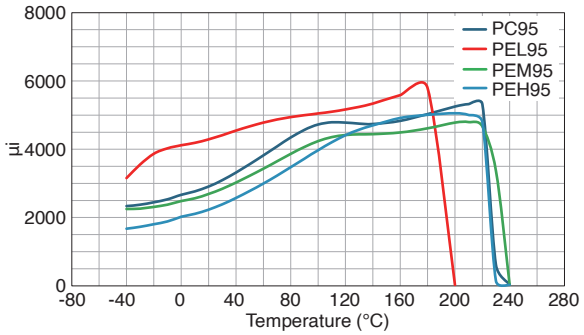
Material			PC95	PEL95 New!	PEM95 New!	PEH95 New!
Features			Low loss over a wide temperature range	For large cores Industry No.1 Low loss characteristics!	For large cores No.1 in High Load Driving Low Heat Generation Performance!	For extra-large cores No.1 in High Temperature / High Load Driving Low Heat Generation Performance!
				Product Overview of PEL95 Material	Product Overview of PEM95 Material	
Initial permeability	μi	25°C	3300±25%	4100±25%	2900±25%	2400±25%
Unit volume core loss	Pcv [kW/m³] 100kHz, 200mT	25°C	350	250	440	550
		60°C	300	270	360	460
		100°C	280	340	320	380
		120°C	330	390	340	360
Saturation magnetic flux density	Bs [mT] H=1194A/m	25°C	530	500	520	520
		60°C	480	460	480	480
		100°C	410	370	410	410
		120°C	380	330	370	370
Remanent flux density	Br [mT] H=1194A/m	25°C	85	65	85	110
		60°C	70	60	70	85
		100°C	60	60	55	60
		120°C	55	50	50	50
Coercive force	Hc [A/m] H=1194A/m	25°C	9.5	7	9	7
		60°C	7.5	6	8	7
		100°C	6.5	5	6	6
		120°C	6	5	6	6
Curie temperature	Tc [°C]		>215	>180	>210	>210
Density	Ds [kg/m³] x 10³		4.9	4.9	4.9	4.9
Electrical resistivity	ρ [Ωm]		6	9	9	9

Test core : T20 x 5 x 10
Typical value if tolerance is not specified

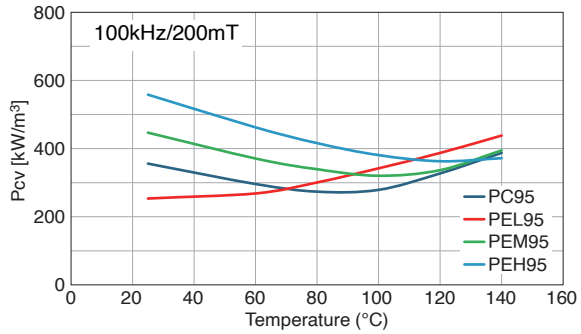
μi Frequency characteristics (Typ.)



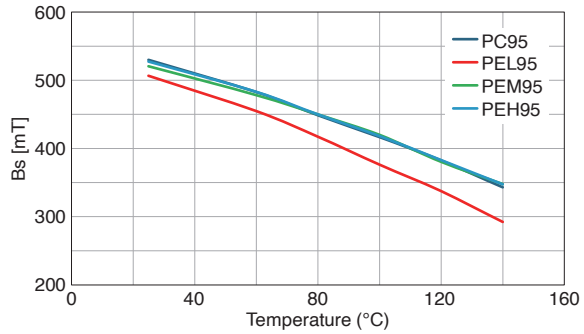
μi Temperature characteristics (Typ.)



Core loss Temperature characteristics (Typ.)



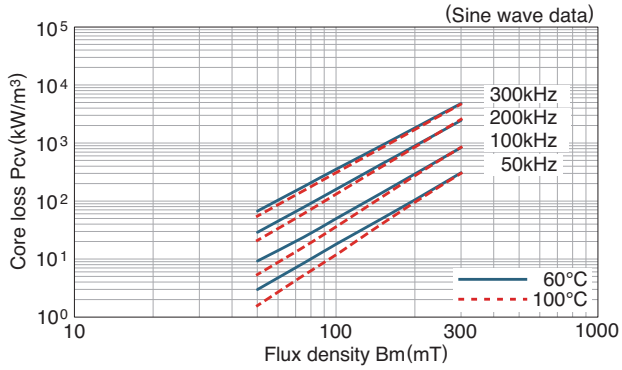
Bs Temperature characteristics (Typ.)



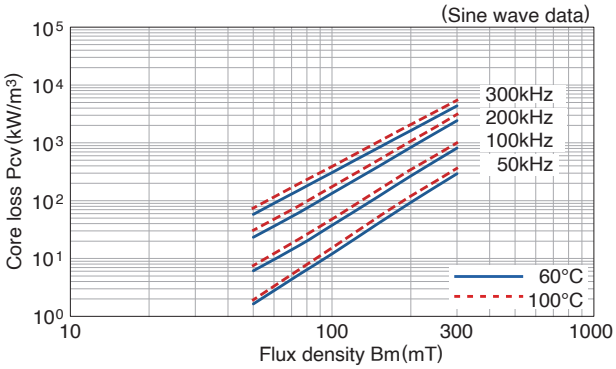
PC95 series for switching power supplies

Core loss Bm characteristics (Typ.)

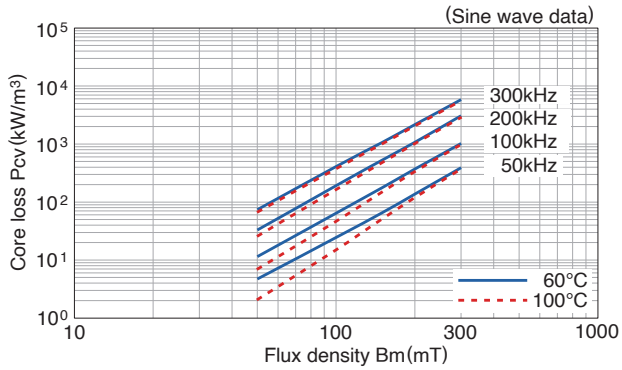
PC95



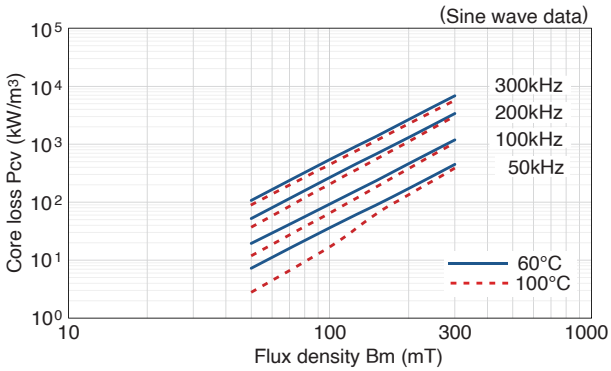
PEL95



PEM95



PEH95



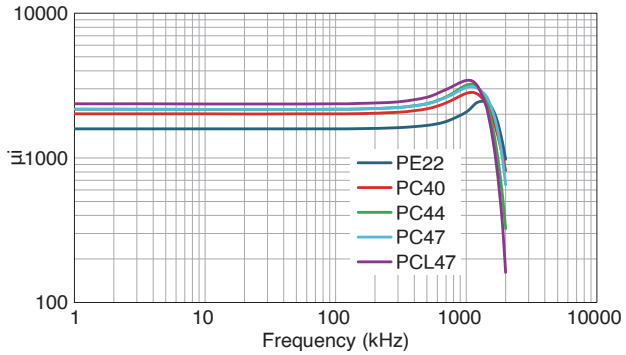
Low loss, high saturation magnetic flux density material for switching power supplies

Material characteristics

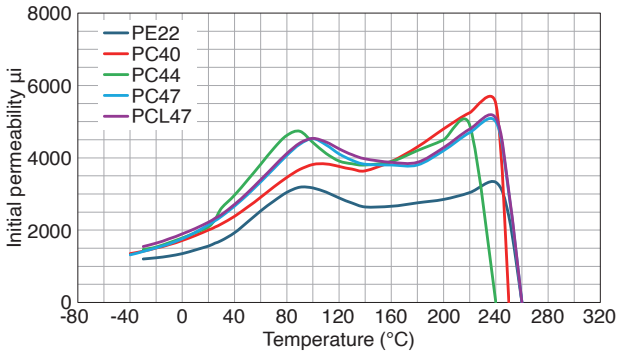
Material			PE22	PC40	PC44	PC47	PCL47
Features			For General, Large Cores	For General, Large Cores	Low loss at 100°C	World's smallest class loss at 100°C	PC47 material with improved temperature characteristics
Initial permeability	μi	25°C	1800±25%	2300±25%	2400±25%	2500±25%	2600±25%
Unit volume core loss	Pcv [kW/m^3] 100kHz, 200mT	25°C	890	670	620	600	530
		60°C	620	500	420	400	400
		100°C	520	420	320	250	280
		120°C	600	490	450	360	350
	Pcv [kW/m^3] 25kHz, 200mT	25°C	-	120	-	-	-
		100°C	80	70	-	-	-
Saturation magnetic flux density	Bs [mT] H=1194A/m	25°C	510	500	510	530	530
		60°C	470	450	460	480	480
		100°C	410	380	400	420	420
		120°C	370	350	380	390	390
Remanent flux density	Br [mT] H=1194A/m	25°C	140	125	150	180	160
		60°C	-	65	80	100	90
		100°C	-	40	50	60	60
		120°C	-	40	50	60	60
Coercive force	Hc [A/m] H=1194A/m	25°C	16	15	12	13	13
		60°C	-	10	8	9	9
		100°C	-	9	6	6	7
		120°C	-	8	6	7	7
Curie temperature	Tc [°C]		>200	>200	>215	>230	>230
Density	Ds [kg/m^3] x 10^3		4.8	4.8	4.8	4.9	4.9
Electrical resistivity	ρ [Ωm]		3	6.5	5	4	4

Test core : T20 x 5 x 10
Typical value if tolerance is not specified

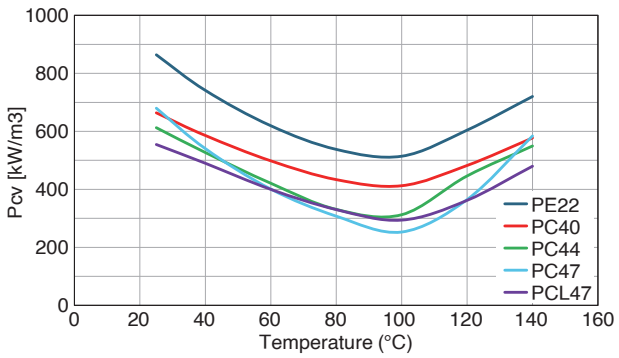
μi Frequency characteristics (Typ.)



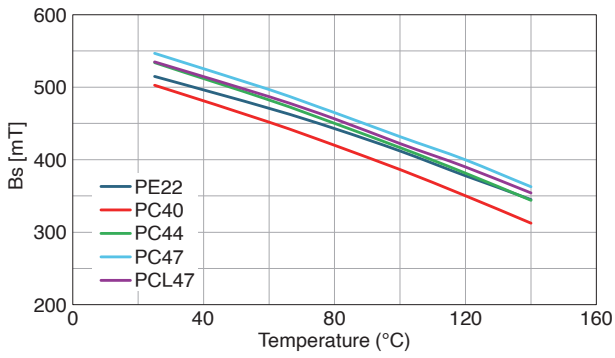
μi Temperature characteristics (Typ.)



Core loss Temperature characteristics (Typ.)



Bs Temperature characteristics (Typ.)



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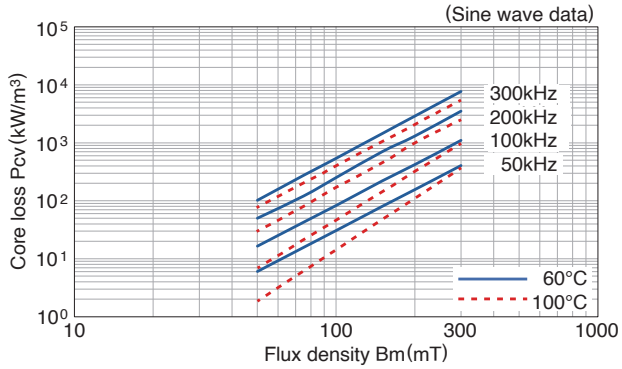
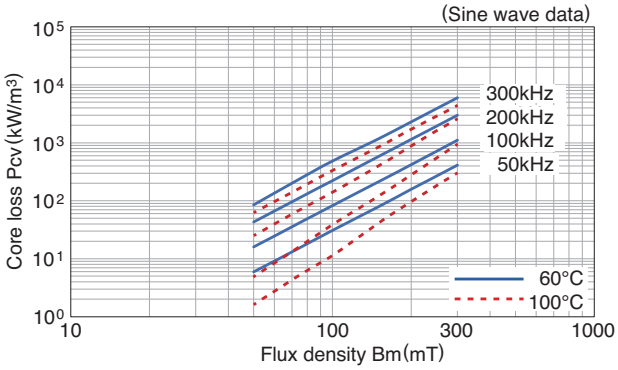
Low loss, high saturation magnetic flux density material for switching power supplies

Core loss Bm characteristics (Typ.)

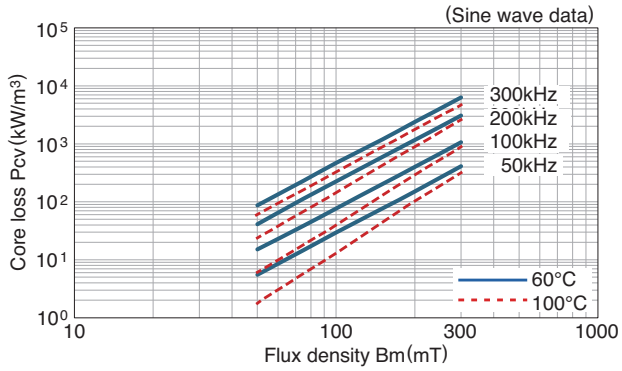
PC44



PC47



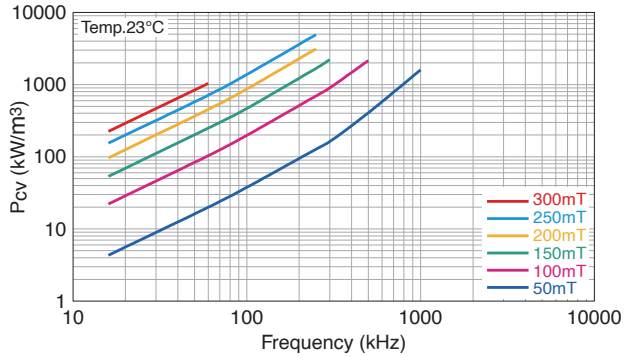
PCL47

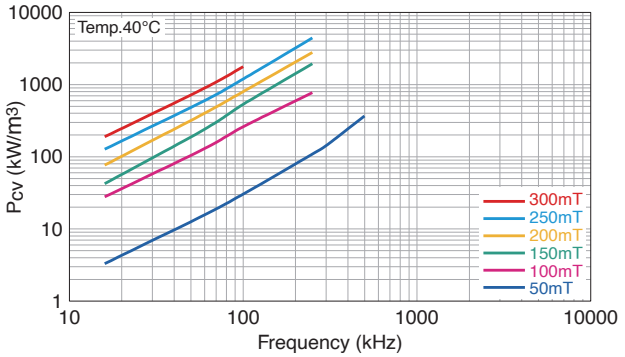


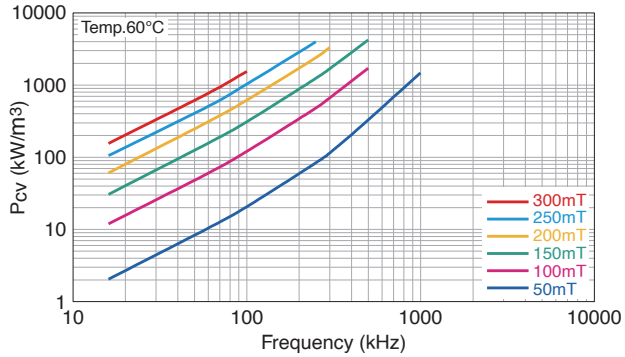
Low loss, high saturation magnetic flux density material for switching power supplies

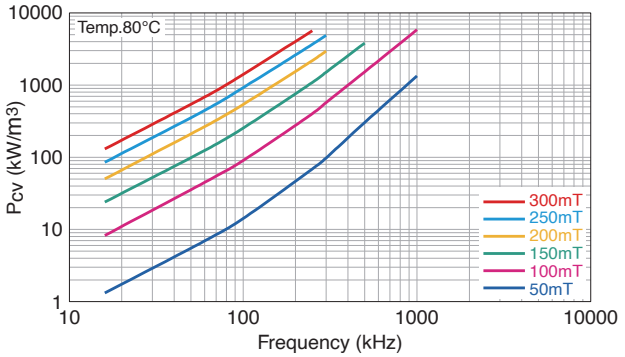
Core loss Frequency characteristics (Typ.)

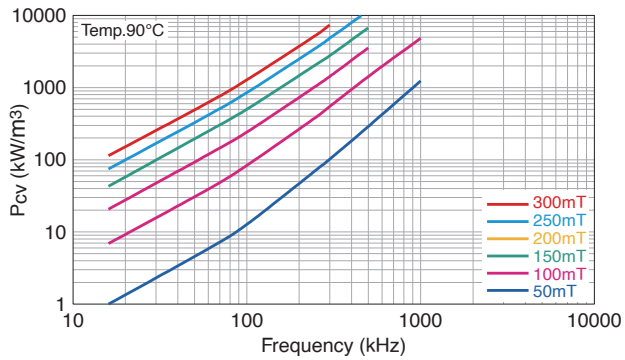
PE22

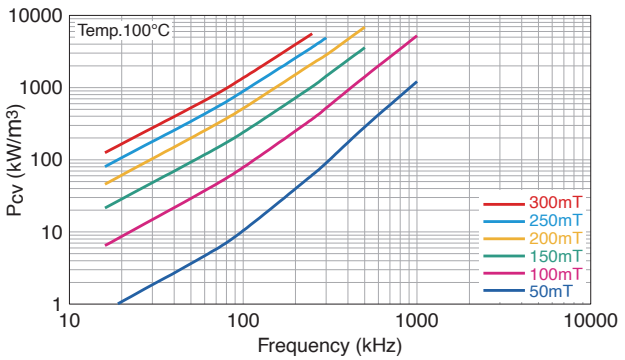


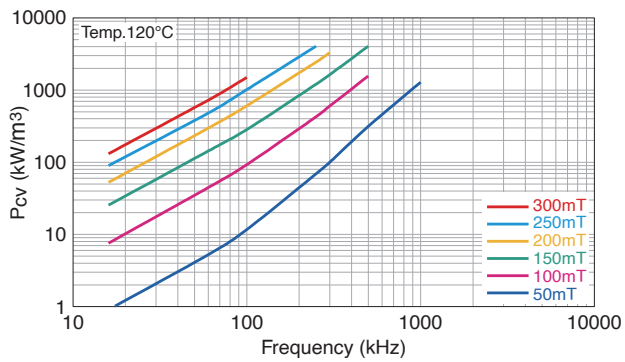












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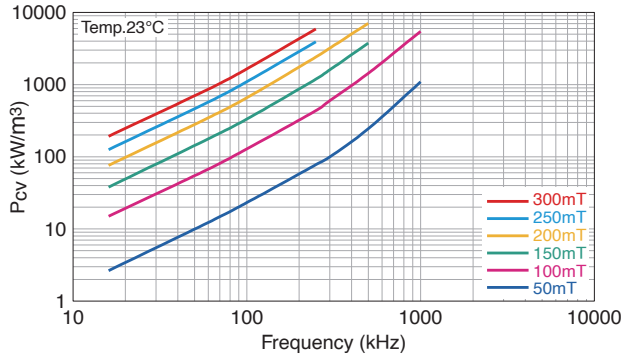
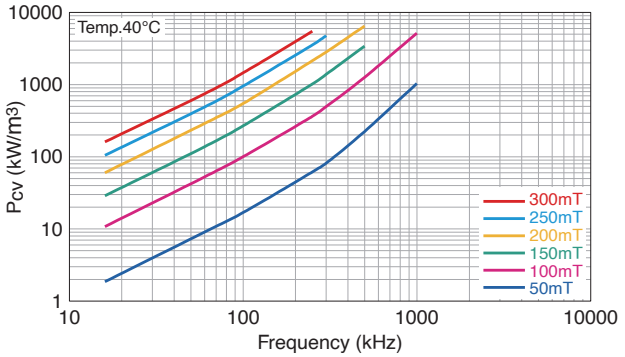
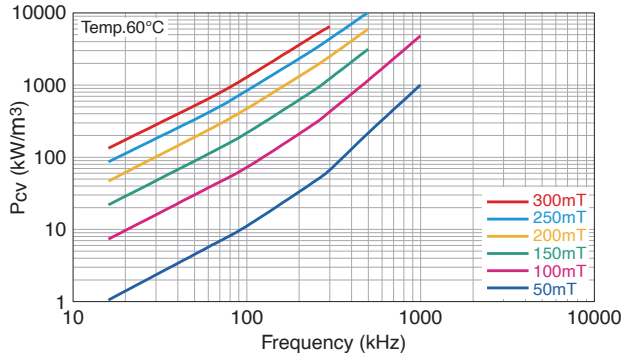
Low loss, high saturation magnetic flux density material for switching power supplies

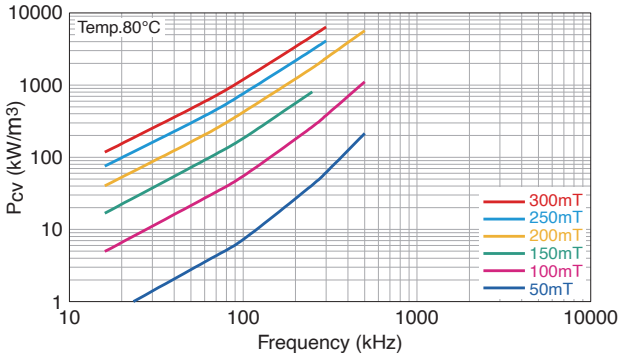
Core loss Frequency characteristics (Typ.)

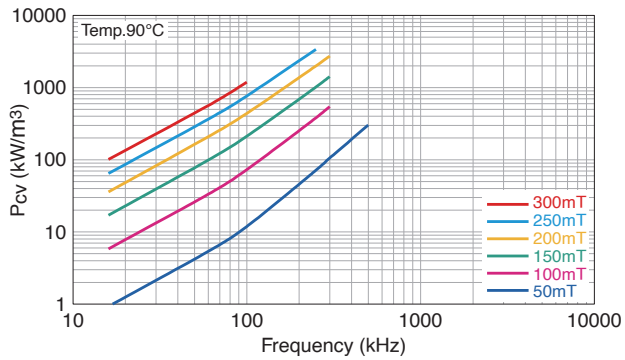
PC40

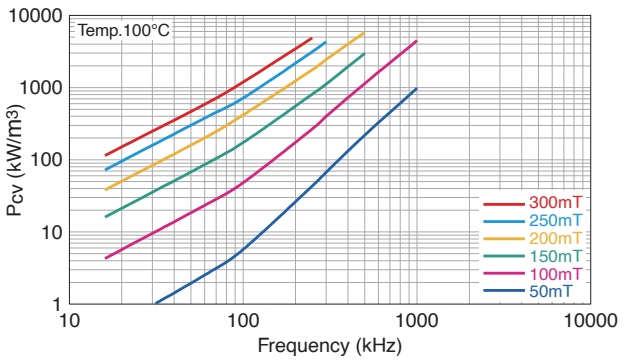


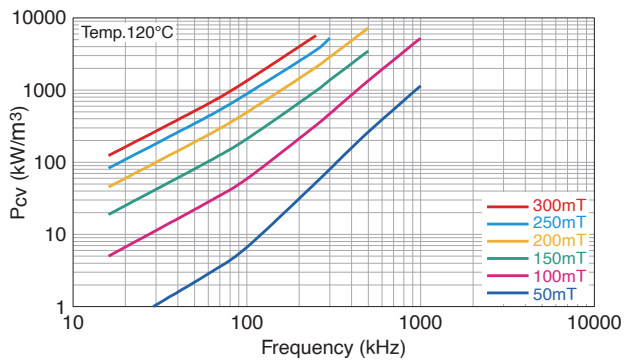












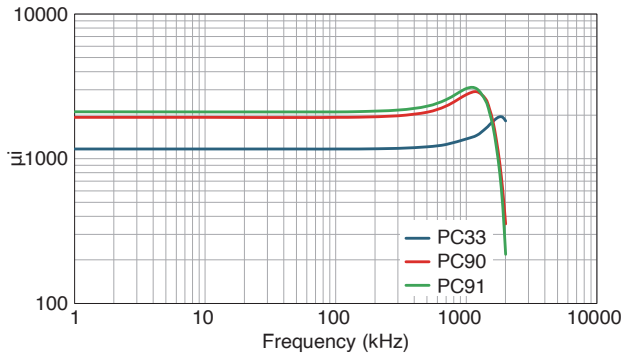
Low loss, high saturation magnetic flux density material for choke coils

Material characteristics

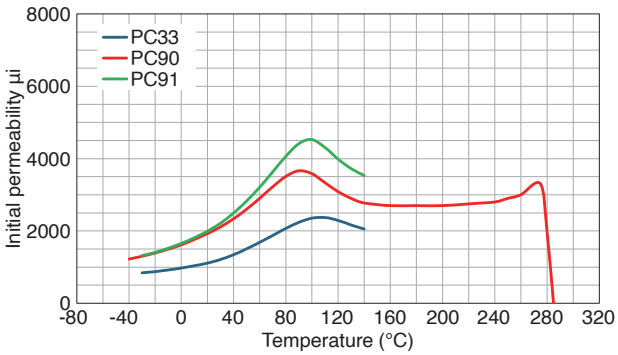
Material			PC33	PC90	PC91 New!
Features			High saturation magnetic flux density at high temperatures	High saturation magnetic flux density, Low loss	High saturation magnetic flux density, Low loss
Initial permeability	μi	25°C	1400±25%	2200±25%	2000±25%
Unit volume core loss	Pcv [kW/m^3] 500kHz, 50mT	25°C	1250	680	700
		60°C	900	470	480
		100°C	560	320	400
		120°C	580	460	390
Saturation magnetic flux density	Bs [mT] H=1194A/m	25°C	530	540	530
		60°C	500	500	490
		100°C	455	450	440
		120°C	430	420	415
Remanent flux density	Br [mT] H=1194A/m	25°C	215	170	260
		60°C	125	95	140
		100°C	65	60	85
		120°C	50	60	80
Coercive force	Hc [A/m] H=1194A/m	25°C	20	13	14
		60°C	14	9	10
		100°C	10	6.5	8
		120°C	9	7	8
Curie temperature	Tc [°C]		>290	>250	>240
Density	Ds [kg/m^3] x 10^3		4.9	4.9	4.9
Electrical resistivity	ρ [Ωm]		2.5	4	

Test core : T20 x 5 x 10
Typical value if tolerance is not specified

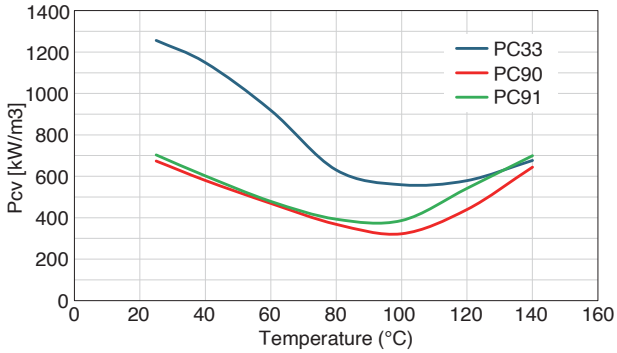
μi Frequency characteristics (Typ.)



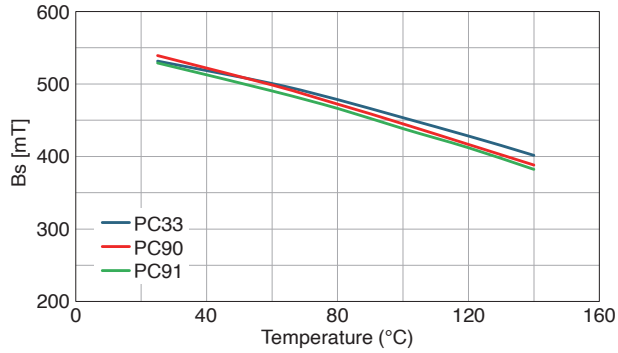
μi Temperature characteristics (Typ.)



Core loss Temperature characteristics (Typ.)



Bs Temperature characteristics (Typ.)

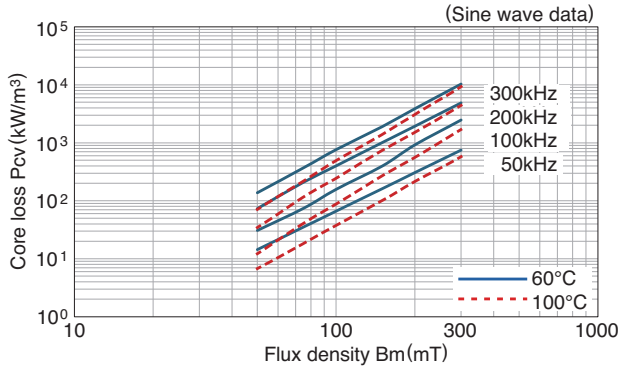


⚠ Please be sure to request delivery specifications that provide further details on the features and specifications of the products for proper and safe use. (10/18)
Please note that the contents may change without any prior notice due to reasons such as upgrading.

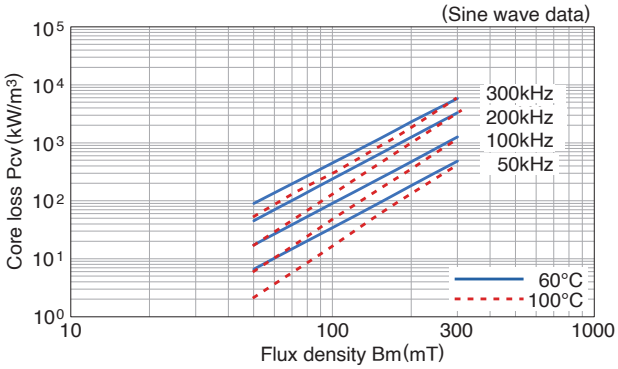
Low loss, high saturation magnetic flux density material for choke coils

Core loss Bm characteristics (Typ.)

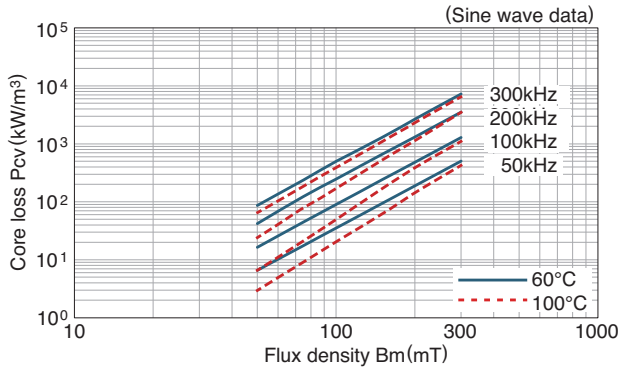
PC33



PC90



PC91



⚠ Please be sure to request delivery specifications that provide further details on the features and specifications of the products for proper and safe use. (11/18)
Please note that the contents may change without any prior notice due to reasons such as upgrading.

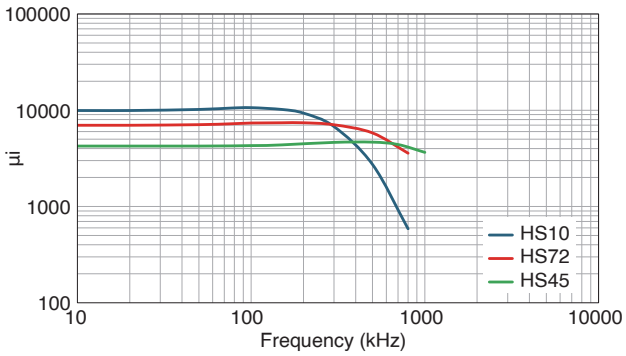
High-μi Ferrite for switching power supplies

Material characteristics

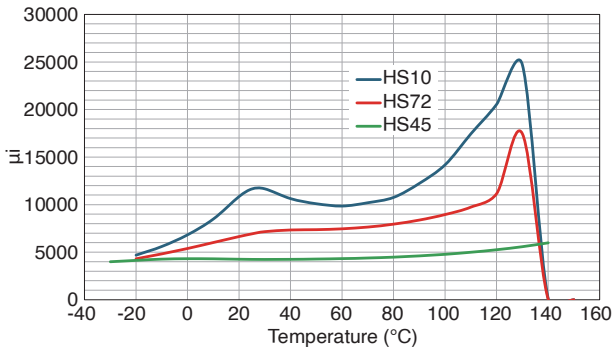
Material			HS10	HS72	HS45 New!
Features			High permeability	High permeability	High permeability over a wide temperature range
Initial permeability	μi	100kHz	10000±25%	7500±25%	4200±25%
		500kHz	-	2000min.	-
Relative loss factor	tanδ/μi x 10^{-6}	100kHz	30	30	30
Saturation magnetic flux density	Bs [mT] H=1194A/m	25°C	400	430	470
Remanent flux density	Br [mT] H=1194A/m	25°C	70	55	55
Coercive force	Hc [A/m] H=1194A/m	25°C	3	4	7
Curie temperature	Tc [°C]		>120	>130	>150
Density	Ds [kg/m^3] x 10^3		4.9	4.9	4.9
Electrical resistivity	ρ [Ωm]		0.2	0.2	0.7

Test core : T31 x 8 x 19
Typical value if tolerance is not specified

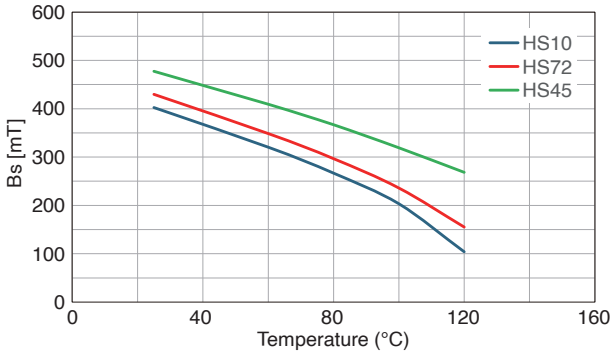
μi Frequency characteristics (Typ.)



μi Temperature characteristics (Typ.)



Bs Temperature characteristics (Typ.)



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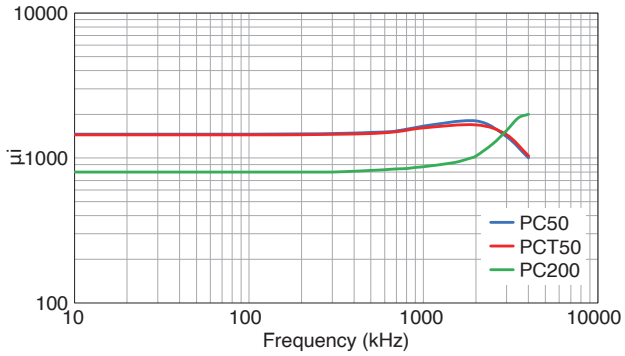
Ferrite for high-frequency power supplies

Material characteristics

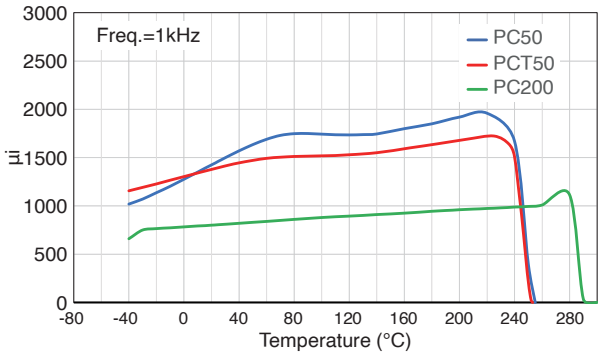
Material			PC50	PCT50 New!	PC200
Features			Low loss at high frequencies	High Frequency Low loss over a wide temperature range	High Characteristics Low loss at high frequencies
					Product Overview of PC200 Low Loss Ferrite Material for High Frequencies
Initial permeability	μi	25°C	1400±25%	1400±25%	800±25%
Unit volume core loss	Pcv [kW/m^3] 500kHz, 50mT	25°C	130	100	60
		60°C	80	70	60
		100°C	80	70	70
		120°C	90	80	90
	Pcv [kW/m^3] 1000kHz, 50mT	25°C	440	400	145
		60°C	470	420	170
		100°C	560	490	180
		120°C	690	580	205
	Pcv [kW/m^3] 2000kHz, 30mT	25°C	-	-	160
		60°C	-	-	180
		100°C	-	-	200
		120°C	-	-	220
Saturation magnetic flux density	Bs [mT] H=1194A/m	25°C	470	460	480
		100°C	380	370	410
Remanent flux density	Br [mT] H=1194A/m	25°C	140	117	141
		100°C	98	97	144
Coercive force	Hc [A/m] H=1194A/m	25°C	37	33	51
		100°C	27	28	48
Curie temperature	Tc [°C]		>240	>230	>280
Density	Ds [kg/m^3] x 10^3		4.8	4.8	4.9
Electrical resistivity	ρ [Ωm]		30	30	22

Test core : T20 x 5 x 10
Typical value if tolerance is not specified

μi Frequency characteristics (Typ.)

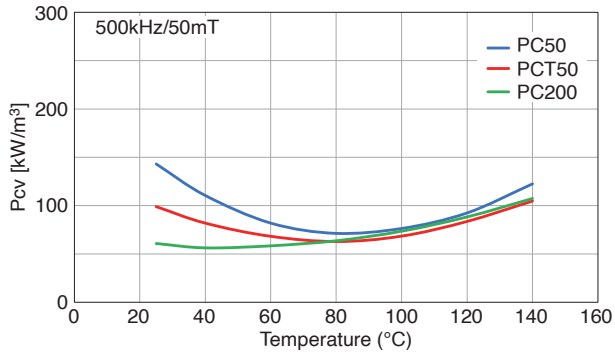


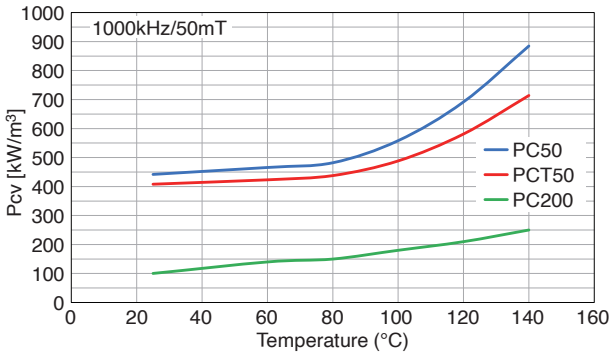
μi Temperature characteristics (Typ.)

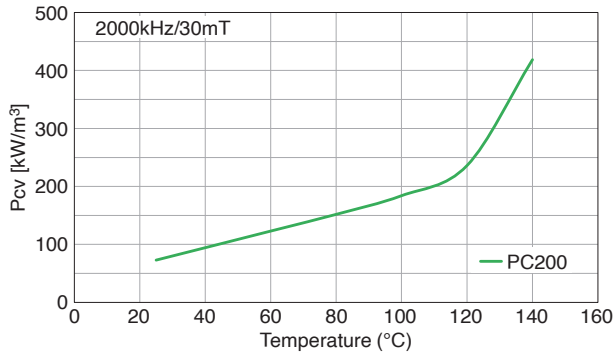


Ferrite for high-frequency power supplies

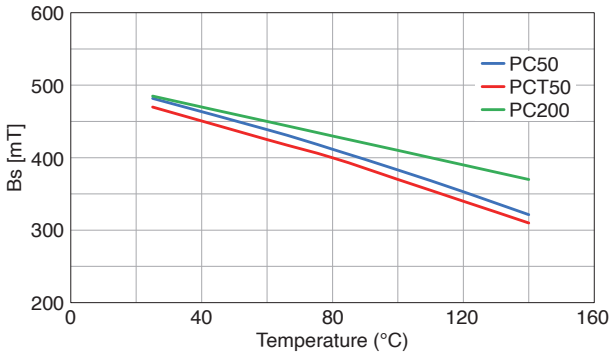
Core loss Temperature characteristics (Typ.)





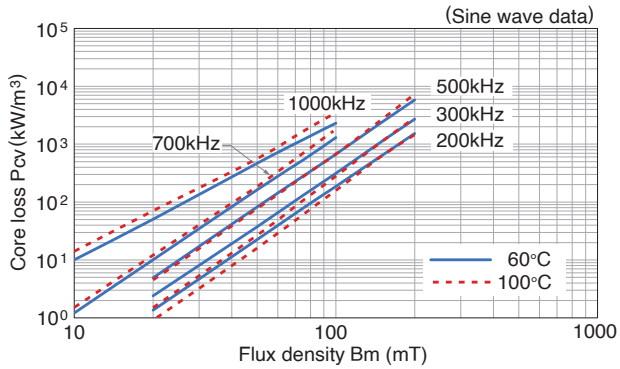


Bs Temperature characteristics (Typ.)

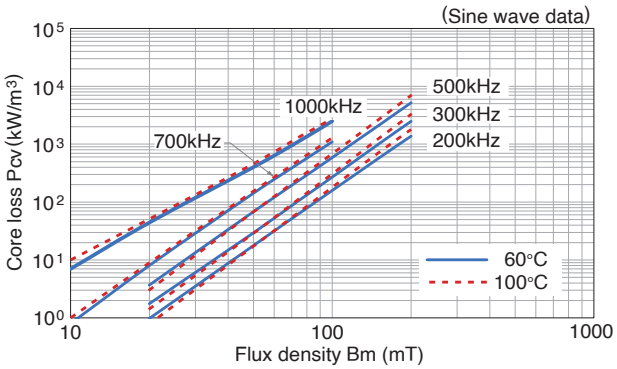


Core loss for each material (Typ.)

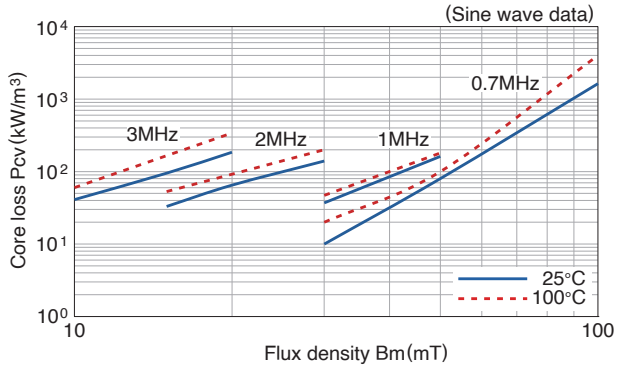
PC50



PCT50



PC200

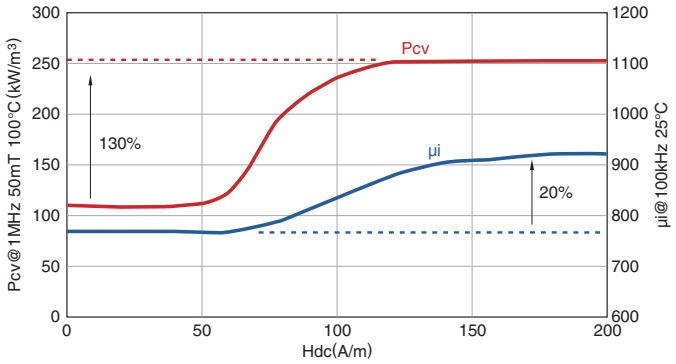


PC200 ferrite for high-frequency power supplies

PRECAUTIONS FOR USE OF PC200 MATERIALS

The characteristics of the PC200 material change as follows depending on the application of a DC magnetic field such as a magnet or the magnitude of the applied magnetic field (Hdc) at the time of use.
The characteristics of the PC200 material are changed as follows in the reliability test.
PC200 material recommends use by a little low magnetic field of a special quality change.
The larger the size of PC200 material, the less the material characteristics will be fully demonstrated.
It is recommended that PC200 be used in shapes with A dimensions of 50 mm or less.

Characteristic change due to applied magnetic field



Characteristic change due to applied magnetic field	Change rate (Typ.)
Pcv at 1MHz, 50mT, 100°C	+130%
μi at 100kHz, 25°C	+20%

Reliability test results

Characteristics change by thermal shock test	Change rate (Typ.)
Pcv at 1MHz, 50mT, 100°C	−18%
μi at 100kHz, 25°C	−7%

Test conditions: −40 to 125°C. 1000 cycles. Exposure time = 30 minutes

Characteristic changes due to high temperature storage tests	Change rate (Typ.)
Pcv at 1MHz, 50mT, 100°C	−32%
μi at 100kHz, 25°C	−14%

Test conditions: 125±2°C. Retention time = 2000 hours

Characteristic changes due to low temperature storage tests	Change rate (Typ.)
Pcv at 1MHz, 50mT, 100°C	±5% max.
μi at 100kHz, 25°C	±5% max.

Test conditions: −40±3°C. Retention time = 2000 hours

Characteristics change by humidity endurance tests	Change rate (Typ.)
Pcv at 1MHz, 50mT, 100°C	±5% max.
μi at 100kHz, 25°C	±5% max.

Test conditions: 60±2°C, 90-95%R.H.(Ⅲ)　Retention time = 2000 hours

* Evaluated by toroidal shape Pcv: Core loss μi: Initial permeability

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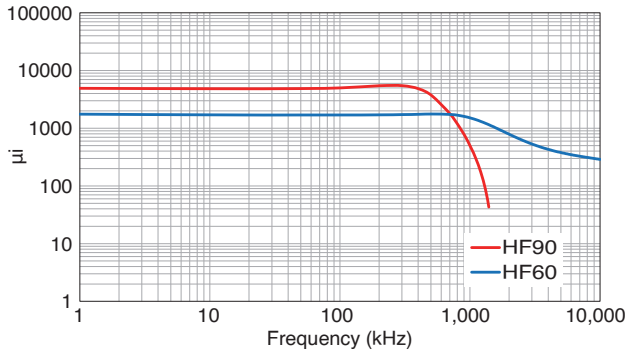
Ferrite Cores for EMI Suppression

Material characteristics

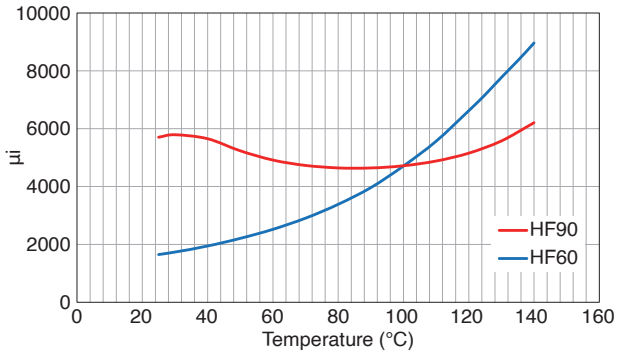
Material			HF90	HF60
Features			For low frequencies High impedance	For high frequencies High impedance
Initial permeability	μi	25°C	5000	1600
Saturation magnetic flux density	Bs [mT] H=1194A/m	25°C	470	410
Curie temperature	Tc [°C]		>165	>130
Electrical resistivity	ρ [Ωm]		0.3	4

Test core : T20 x 5 x 10
Typical value if tolerance is not specified

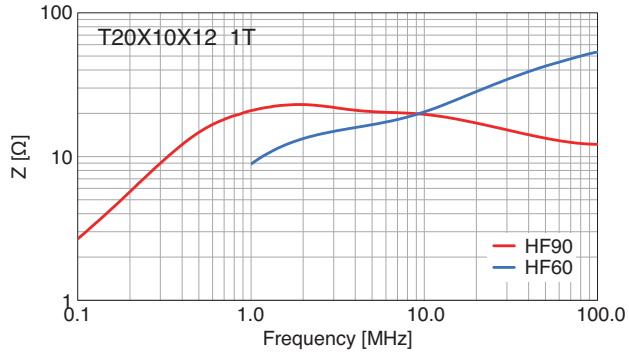
μi Frequency characteristics (Typ.)



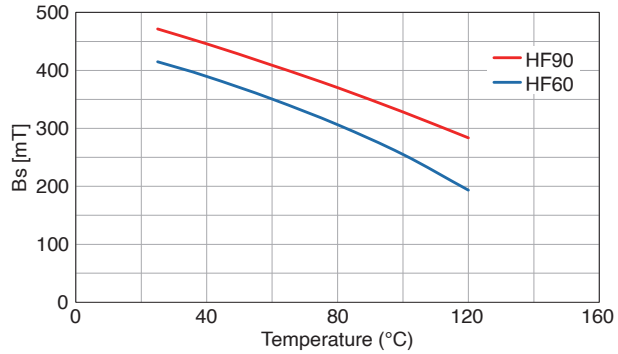
μi Temperature characteristics (Typ.)



Impedance vs. Frequency characteristics



Bs Temperature characteristics (Typ.)



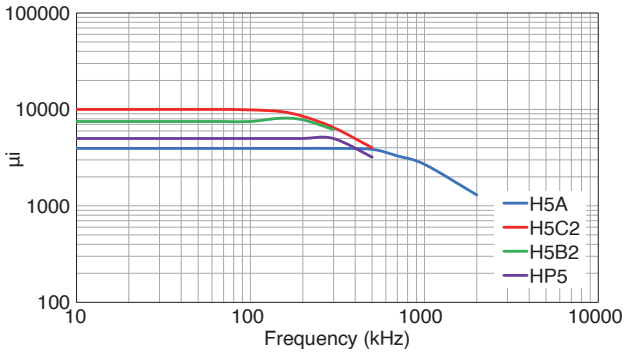
Ferrite for telecommunication

Material characteristics

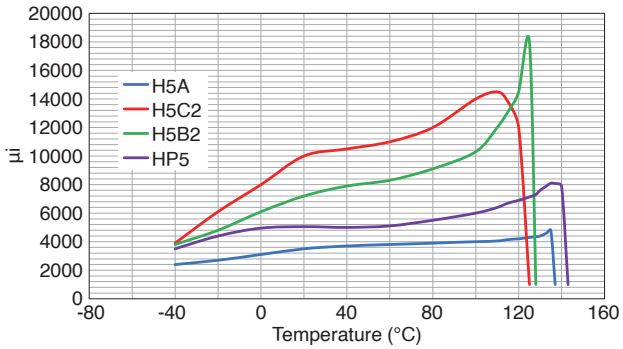
Material			H5A	H5B2	H5C2	HP5
Features			Wide temperature range Stable permeability	Wide temperature range Stable permeability	High permeability	Wide temperature range Stable permeability
Initial permeability	μi	100kHz	3300 +40%/-0%	7500±25%	10000±30%	5000±20%
Relative loss factor	tanδ/μi x 10^{-6}	10kHz	<2.5	<6.5	<7.0	<3.5
		100kHz	<10	-	-	-
Temperature factor of initial permeability	αμir	-30 to +20°C	-0.5 to 2.0	0 to 1.8	-0.5 to 1.5	-
		0 to 20°C	-	-	-	* ±12.5%
		20 to 70°C	-0.5 to 2.0	0 to 1.8	-0.5 to 1.5	* ±12.5%
Saturation magnetic flux density	Bs [mT] H=1194A/m	25°C	410	420	400	400
Remanent flux density	Br [mT] H=1194A/m	25°C	100	40	90	65
Coercive force	Hc [A/m] H=1194A/m	25°C	8.0	5.6	7.2	7.2
Curie temperature	Tc [°C]		>130	>130	>120	>140
Hysteresis material constant	ηB [10^{-6}/mT]		<0.8	<1.0	<1.4	<0.4
Disaccommodation factor	DF x 10^{-6}		<3	<3	<2	<3
Density	Ds [kg/m^3] x 10^3		4.8	4.9	4.9	4.8
Electrical resistivity	ρ [Ωm]		1	0.1	0.15	0.15

Test core : T31 x 7 x 19(H5A, H5C2), T10 x 2.5 x 5(H5B2, HP5)
Typical value if tolerance is not specified

μi Frequency characteristics (Typ.)



μi Temperature characteristics (Typ.)



⚠ REMINDERS FOR USING THESE PRODUCTS

Please be sure to read this manual thoroughly before using the products.

The products listed on this catalog are intended for use in general electronic equipment (AV equipment, telecommunications equipment, home appliances, amusement equipment, computer equipment, personal equipment, office equipment, measurement equipment, industrial robots) under a normal operation and use condition.
The products are not designed or warranted to meet the requirements of the applications listed below, whose performance and/or quality require a more stringent level of safety or reliability, or whose failure, malfunction or trouble could cause serious damage to society, person or property.
Please understand that we are not responsible for any damage or liability caused by use of the products in any of the applications below or for any other use exceeding the range or conditions set forth in this specification sheet.
If you intend to use the products in the applications listed below or if you have special requirements exceeding the range or conditions set forth in the each catalog, please contact us.

(1) Aerospace/aviation equipment
(2) Transportation equipment (cars, electric trains, ships, etc.)
(3) Medical equipment
(4) Power-generation control equipment
(5) Atomic energy-related equipment
(6) Seabed equipment
(7) Transportation control equipment
(8) Public information-processing equipment
(9) Military equipment
(10) Electric heating apparatus, burning equipment
(11) Disaster prevention/crime prevention equipment
(12) Safety equipment
(13) Other applications that are not considered general-purpose applications

When using these products in general purposes and standard use, it is recommended that protection circuits are used, devices are secured, and backup circuits are kept for increased safety.