

DATA SHEET

EFD20/10/7

EFD cores and accessories

Supersedes data of September 2004

2008 Sep 01

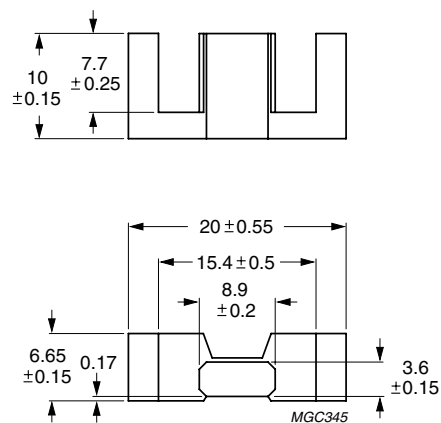
EFD cores and accessories

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CORES

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.52	mm ⁻¹
V_e	effective volume	1460	mm ³
l_e	effective length	47.0	mm
A_e	effective area	31.0	mm ²
A_{min}	minimum area	29	mm ²
m	mass of core half	≈ 3.5	g



Dimensions in mm.

Fig.1 EFD20/10/7 core half.

Core halves

A_L measured in combination with a non-gapped core half, clamping force for A_L measurements 20 ± 10 N, unless stated otherwise.

GRADE	A_L (nH)	μ_e	TOTAL AIR GAP (μm)	TYPE NUMBER
3C90	$63 \pm 3\%^{(1)}$	≈ 76	≈ 960	EFD20/10/7-3C90-E63
	$100 \pm 3\%$	≈ 121	≈ 510	EFD20/10/7-3C90-A100
	$160 \pm 5\%$	≈ 193	≈ 280	EFD20/10/7-3C90-A160
	$250 \pm 8\%$	≈ 302	≈ 160	EFD20/10/7-3C90-A250
	$315 \pm 10\%$	≈ 380	≈ 120	EFD20/10/7-3C90-A315
	$1300 \pm 25\%$	≈ 1570	≈ 0	EFD20/10/7-3C90
3C94	$63 \pm 3\%^{(1)}$	≈ 76	≈ 960	EFD20/10/7-3C94-E63
	$100 \pm 3\%$	≈ 121	≈ 510	EFD20/10/7-3C94-A100
	$160 \pm 5\%$	≈ 193	≈ 280	EFD20/10/7-3C94-A160
	$250 \pm 8\%$	≈ 302	≈ 160	EFD20/10/7-3C94-A250
	$315 \pm 10\%$	≈ 380	≈ 120	EFD20/10/7-3C94-A315
	$1300 \pm 25\%$	≈ 1570	≈ 0	EFD20/10/7-3C94
3C95 des	$1540 \pm 25\%$	≈ 1865	≈ 0	EFD20/10/7-3C95
3C96 des	$1200 \pm 25\%$	≈ 1450	≈ 0	EFD20/10/7-3C96
3F3	$63 \pm 3\%^{(1)}$	≈ 76	≈ 960	EFD20/10/7-3F3-E63
	$100 \pm 3\%$	≈ 121	≈ 510	EFD20/10/7-3F3-A100
	$160 \pm 5\%$	≈ 193	≈ 280	EFD20/10/7-3F3-A160
	$250 \pm 8\%$	≈ 302	≈ 160	EFD20/10/7-3F3-A250
	$315 \pm 10\%$	≈ 380	≈ 120	EFD20/10/7-3F3-A315
	$1200 \pm 25\%$	≈ 1450	≈ 0	EFD20/10/7-3F3

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GRADE	A_L (nH)	μ_e	TOTAL AIR GAP (μm)	TYPE NUMBER
3F35 des	920 $\pm 25\%$	≈ 1110	≈ 0	EFD20/10/7-3F35
3F4 des	63 $\pm 3\%$ ⁽¹⁾	≈ 76	≈ 900	EFD20/10/7-3F4-E63
	100 $\pm 3\%$	≈ 121	≈ 450	EFD20/10/7-3F4-A100
	160 $\pm 5\%$	≈ 193	≈ 230	EFD20/10/7-3F4-A160
	250 $\pm 8\%$	≈ 302	≈ 120	EFD20/10/7-3F4-A250
	315 $\pm 10\%$	≈ 380	≈ 80	EFD20/10/7-3F4-A315
	650 $\pm 25\%$	≈ 780	≈ 0	EFD20/10/7-3F4
3F45 prot	650 $\pm 25\%$	≈ 780	≈ 0	EFD20/10/7-3F45

Note

1. Measured in combination with an equal gapped core half, clamping force for A_L measurements, 20 ± 10 N.

Properties of core sets under power conditions

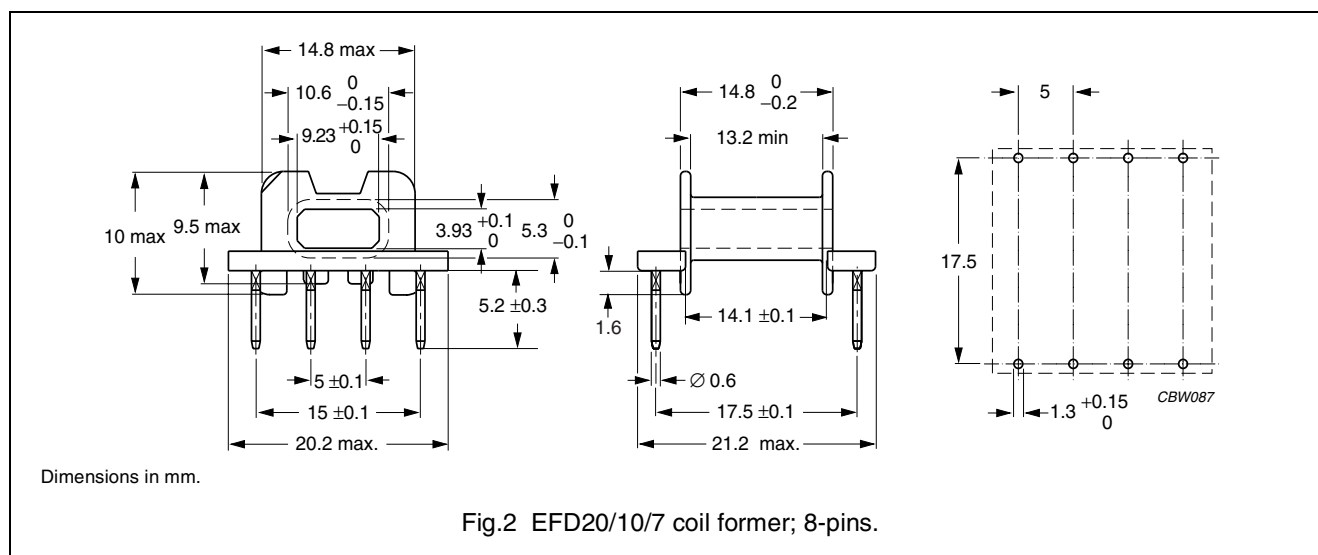
GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 200 mT; T = 25 °C	f = 100 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C90	≥ 330	≤ 0.16	≤ 0.17	–	–	–
3C94	≥ 330	–	≤ 0.13	–	≤ 0.8	–
3C95	≥ 330	–	–	≤ 0.86	≤ 0.82	–
3C96	≥ 330	–	≤ 0.1	–	≤ 0.6	≤ 0.26
3F35	≥ 300	–	–	–	–	≤ 0.13
3F3	≥ 315	–	≤ 0.17	–	–	≤ 0.28
3F4	≥ 300	–	–	–	–	–

Properties of core sets under power conditions (continued)

GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 500 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 500 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3C90	≥ 330	–	–	–	–	–
3C94	≥ 330	–	–	–	–	–
3C95	≥ 330	–	–	–	–	–
3C96	≥ 330	≤ 0.5	–	–	–	–
3F35	≥ 300	≤ 0.2	≤ 1.5	–	–	–
3F3	≥ 315	–	–	–	–	–
3F4	≥ 300	–	–	≤ 0.43	–	≤ 0.7
3F45	≥ 300	–	–	≤ 0.34	≤ 1.25	≤ 0.55

COIL FORMERS**General data**

PARAMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass-reinforced, flame retardant in accordance with "UL94 V-0"; UL file number E167521(M)
Pin material	copper-tin alloy (CuSn), Ni flash, tin (Sn) plated, see note 1
Maximum operating temperature	180 °C, "IEC 60085", class H
Resistance to soldering heat	"IEC 60068-2-20", Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	"IEC 60068-2-20", Part 2, Test Ta, method 1: 235 °C, 2 s

**Winding data and area product for EFD20 coil former with 8-pins**

NUMBER OF SECTIONS	WINDING AREA (mm ²)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	AREA PRODUCT Ae x Aw (mm ⁴)	TYPE NUMBER
1	26.4	13.2	36.5	818	CSH-EFD20-1S-8P ⁽¹⁾

Note

- Also available with post-inserted pins.

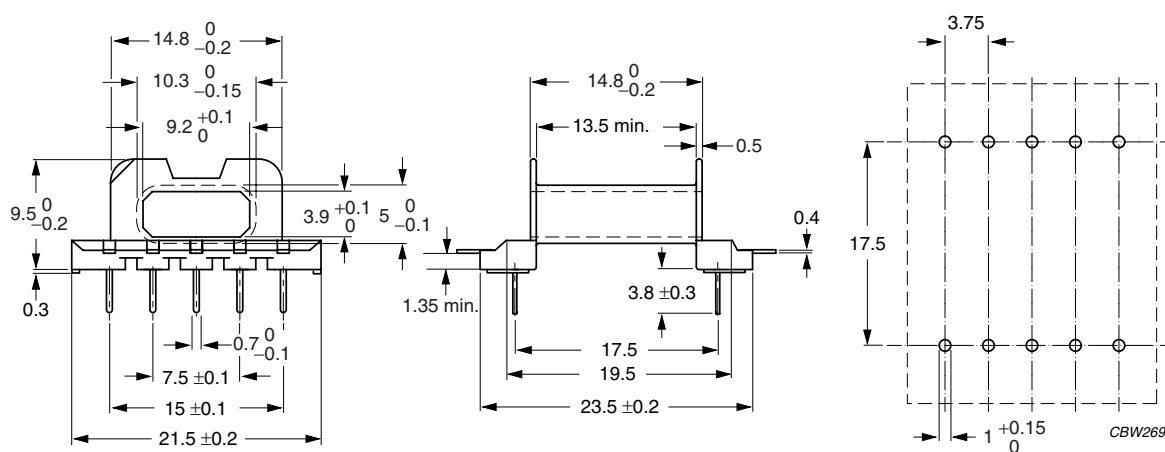
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COIL FORMERS

General data

PARAMETER	SPECIFICATION
Coil former material	liquid crystal polymer (LCP), glass reinforced, flame retardant in accordance with "UL94 V-0"; UL file number E54705 (M)
Pin material	copper-tin alloy (CuSn), Ni flash, tin (Sn) plated
Maximum operating temperature	155 °C, "IEC 60085", class F
Resistance to soldering heat	"IEC 60068-2-20", Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	"IEC 60068-2-20", Part 2, Test Ta, method 1: 235 °C, 2 s



Dimensions in mm.

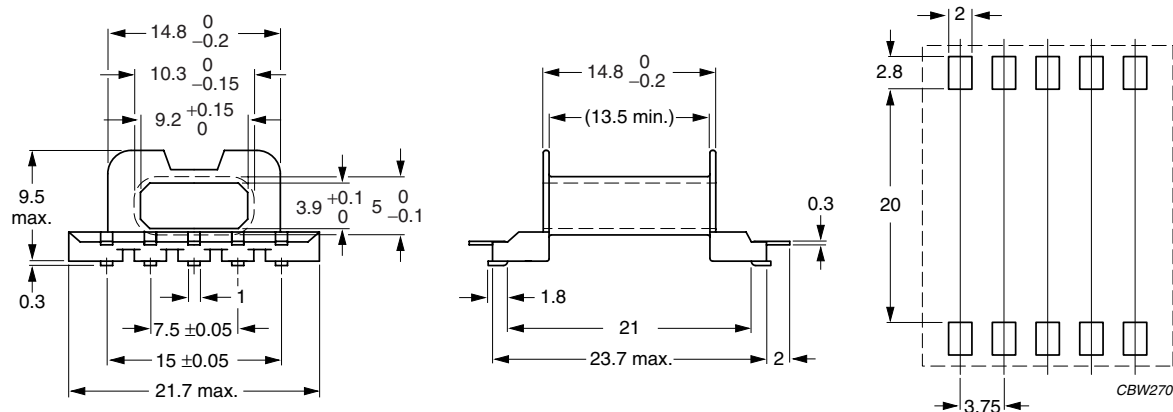
Fig.3 EFD20/10/7 coil former (PCB); 10-pins.

Winding data and area product for EFD20/10/7 coil former (PCB) with 10-pins

NUMBER OF SECTIONS	WINDING AREA (mm ²)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	AREA PRODUCT Ae x Aw (mm ⁴)	TYPE NUMBER
1	27.7	13.5	34.1	859	CPH-EFD20-1S-10PD-Z

COIL FORMERS**General data**

PARAMETER	SPECIFICATION
Coil former material	liquid crystal polymer (LCP), glass reinforced, flame retardant in accordance with "UL94 V-0"; UL file number E83005 (M)
Pin material	copper-tin alloy (CuSn), tin (Sn) plated
Maximum operating temperature	155 °C, "IEC 60085", class F
Resistance to soldering heat	"IEC 60068-2-20", Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	"IEC 60068-2-20", Part 2, Test Ta, method 1: 235 °C, 2 s



Dimensions in mm.

Fig.4 EFD20/10/7 coil former (SMD); 10-solder pads.

Winding data and area product for EFD20/10/7 coil former (SMD) with 10-solder pads

NUMBER OF SECTIONS	WINDING AREA (mm ²)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	AREA PRODUCT Ae x Aw (mm ⁴)	TYPE NUMBER
1	27.7	13.5	34.1	859	CPHS-EFD20-1S-10P

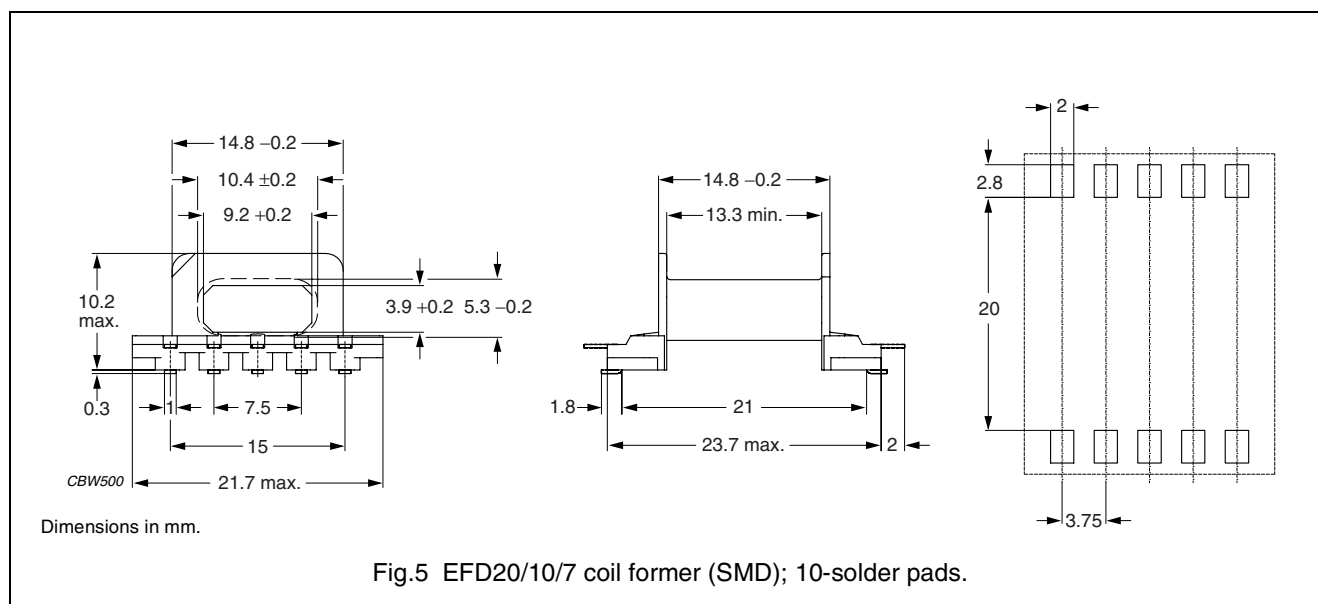
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COIL FORMERS

General data

PARAMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass reinforced, flame retardant in accordance with "UL94 V-0"; UL file number E41429 (M)
Solder pad material	copper-tin alloy (CuSn), tin (Sn) plated
Maximum operating temperature	180 °C, "IEC 60085", class H
Resistance to soldering heat	"IEC 60068-2-20", Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	"IEC 60068-2-20", Part 2, Test Ta, method 1: 235 °C, 2 s



Winding data and area product for EFD20/10/7 coil former (SMD) with 10-solder pads

NUMBER OF SECTIONS	NUMBER OF SOLDER PADS	WINDING AREA (mm ²)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	AREA PRODUCT Ae x Aw (mm ⁴)	TYPE NUMBER
1	10	27.2	13.3	34.9	843	CSHS-EFD20-1S-10P-Z

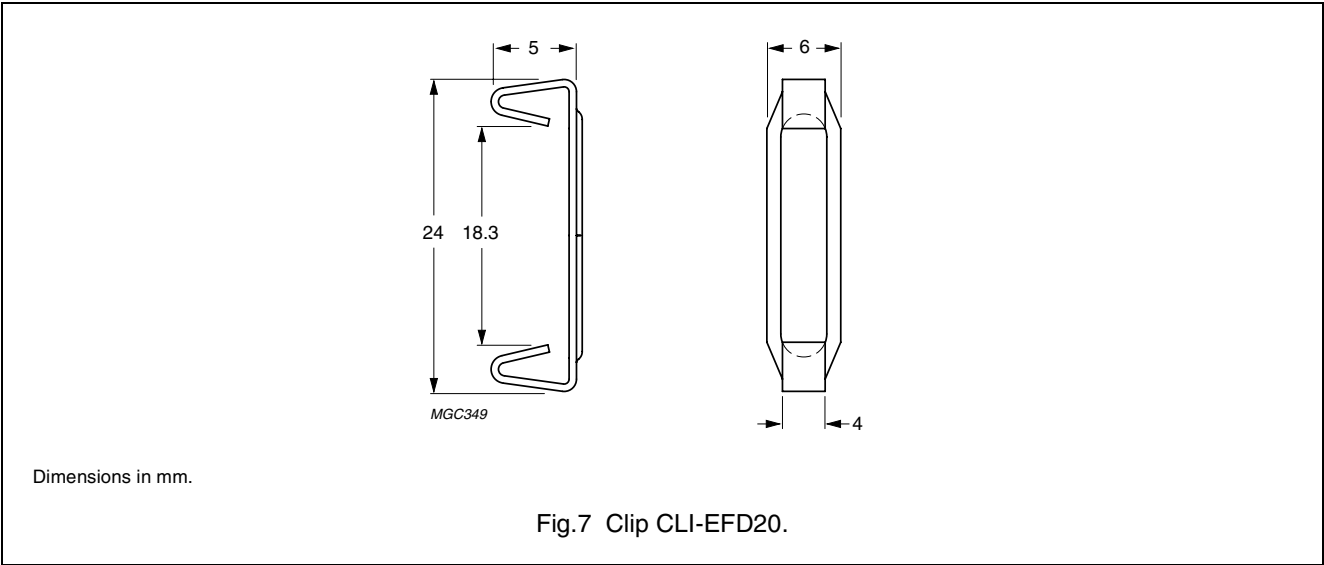
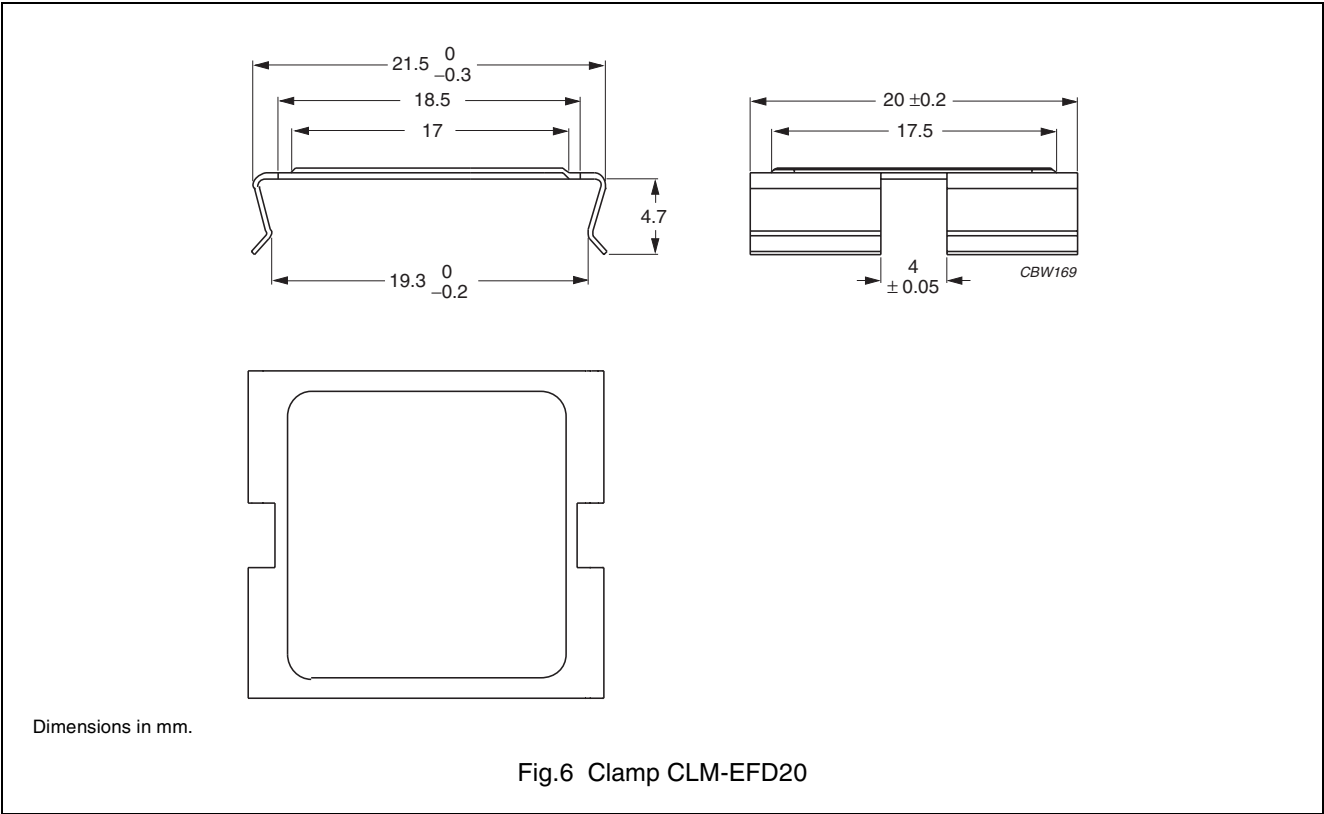
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MOUNTING PARTS

General data

ITEM	REMARKS	FIGURE	TYPE NUMBER
Clamp	stainless steel (CrNi); clamping force $\approx 30\text{ N}$	6	CLM-EFD20
Clip	stainless steel (CrNi); clamping force $\approx 20\text{ N}$	7	CLI-EFD20



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DATA SHEET STATUS DEFINITIONS

DATA SHEET STATUS	PRODUCT STATUS	DEFINITIONS
Preliminary specification	Development	This data sheet contains preliminary data. Ferroxcube reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product specification	Production	This data sheet contains final specifications. Ferroxcube reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

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STATUS	INDICATION	DEFINITION
Prototype		These are products that have been made as development samples for the purposes of technical evaluation only. The data for these types is provisional and is subject to change.
Design-in		These products are recommended for new designs.
Preferred		These products are recommended for use in current designs and are available via our sales channels.
Support		These products are not recommended for new designs and may not be available through all of our sales channels. Customers are advised to check for availability.