

# DATA SHEET

**EFD20/10/7**

**EFD cores and accessories**

Supersedes data of September 2004

2008 Sep 01

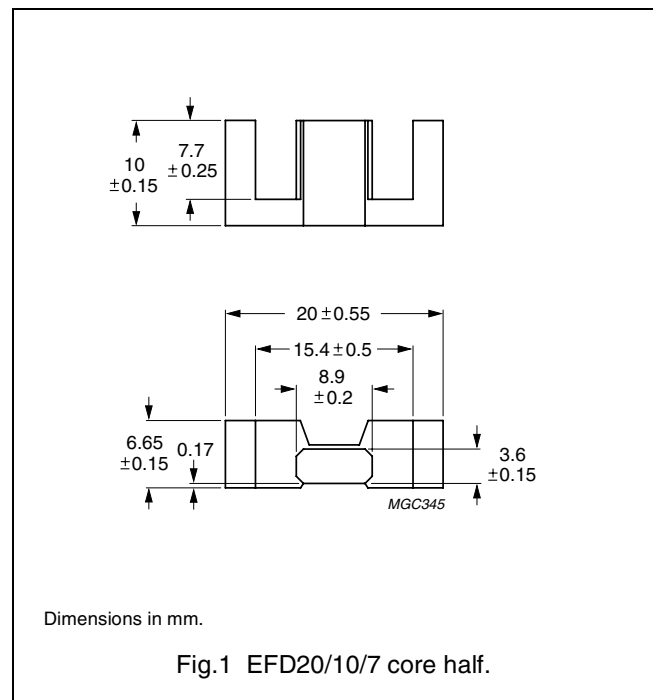


**FERROXCUBE**  
A YAGEO COMPANY

**CORES**

**Effective core parameters**

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



**Core halves**

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

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

## EFD cores and accessories

EFD20/10/7

GRADE	$A_L$ (nH)	$\mu_e$	TOTAL AIR GAP ( $\mu\text{m}$ )	TYPE NUMBER
3F35 <small>des</small>	920 $\pm$ 25%	$\approx$ 1110	$\approx$ 0	EFD20/10/7-3F35
3F4 <small>des</small>	63 $\pm$ 3% <sup>(1)</sup>	$\approx$ 76	$\approx$ 900	EFD20/10/7-3F4-E63
	100 $\pm$ 3%	$\approx$ 121	$\approx$ 450	EFD20/10/7-3F4-A100
	160 $\pm$ 5%	$\approx$ 193	$\approx$ 230	EFD20/10/7-3F4-A160
	250 $\pm$ 8%	$\approx$ 302	$\approx$ 120	EFD20/10/7-3F4-A250
	315 $\pm$ 10%	$\approx$ 380	$\approx$ 80	EFD20/10/7-3F4-A315
	650 $\pm$ 25%	$\approx$ 780	$\approx$ 0	EFD20/10/7-3F4
3F45 <small>prot</small>	650 $\pm$ 25%	$\approx$ 780	$\approx$ 0	EFD20/10/7-3F45

**Note**

1. Measured in combination with an equal gapped core half, clamping force for  $A_L$  measurements, 20  $\pm$ 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	$\geq$ 330	$\leq$ 0.16	$\leq$ 0.17	–	–	–
3C94	$\geq$ 330	–	$\leq$ 0.13	–	$\leq$ 0.8	–
3C95	$\geq$ 330	–	–	$\leq$ 0.86	$\leq$ 0.82	–
3C96	$\geq$ 330	–	$\leq$ 0.1	–	$\leq$ 0.6	$\leq$ 0.26
3F35	$\geq$ 300	–	–	–	–	$\leq$ 0.13
3F3	$\geq$ 315	–	$\leq$ 0.17	–	–	$\leq$ 0.28
3F4	$\geq$ 300	–	–	–	–	–

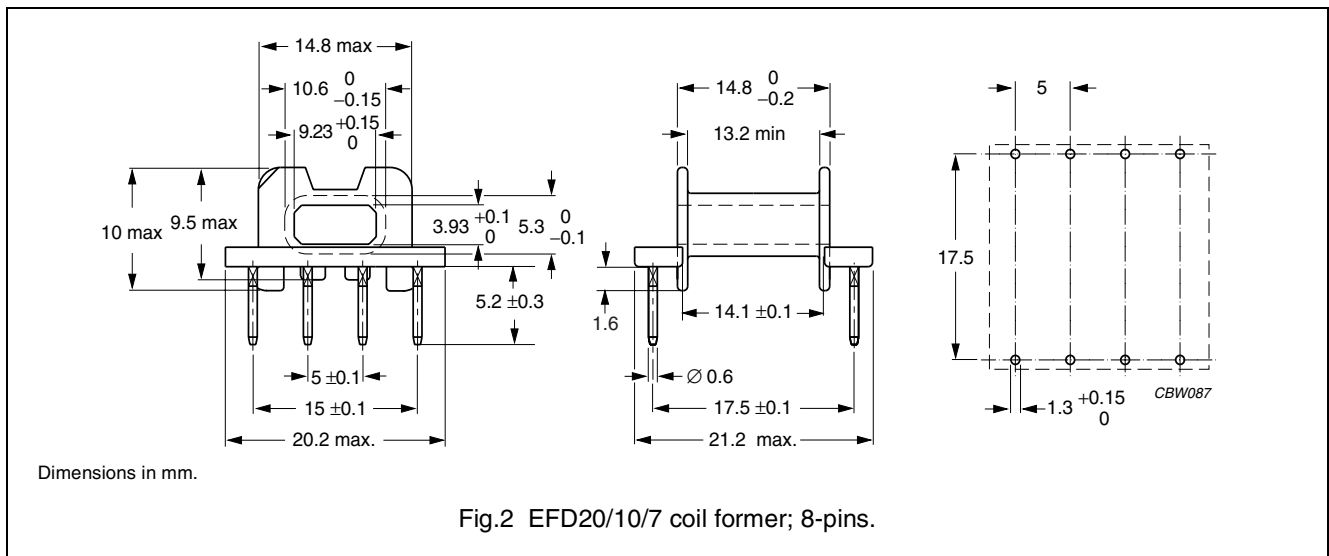
**Properties of core sets under power conditions (continued)**

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	$\geq$ 330	–	–	–	–	–
3C94	$\geq$ 330	–	–	–	–	–
3C95	$\geq$ 330	–	–	–	–	–
3C96	$\geq$ 330	$\leq$ 0.5	–	–	–	–
3F35	$\geq$ 300	$\leq$ 0.2	$\leq$ 1.5	–	–	–
3F3	$\geq$ 315	–	–	–	–	–
3F4	$\geq$ 300	–	–	$\leq$ 0.43	–	$\leq$ 0.7
3F45	$\geq$ 300	–	–	$\leq$ 0.34	$\leq$ 1.25	$\leq$ 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 <sup>2</sup> )	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	AREA PRODUCT Ae x Aw (mm <sup>4</sup> )	TYPE NUMBER
1	26.4	13.2	36.5	818	CSH-EFD20-1S-8P <sup>(1)</sup>

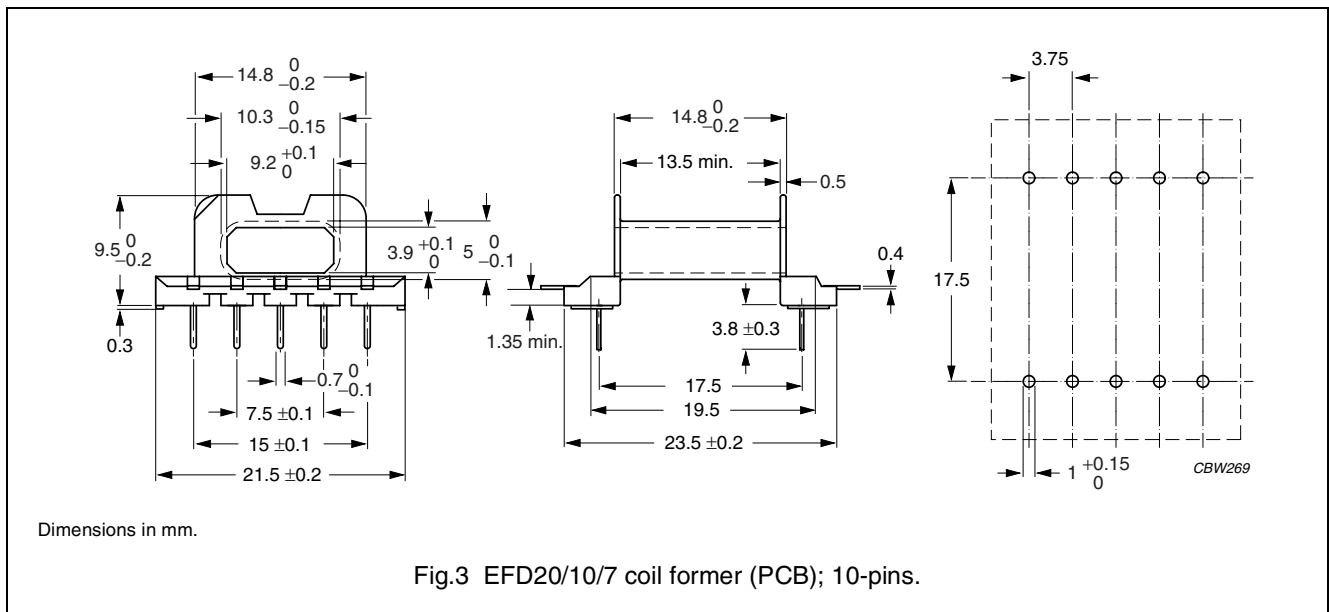
**Note**

- Also available with post-inserted pins.

**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



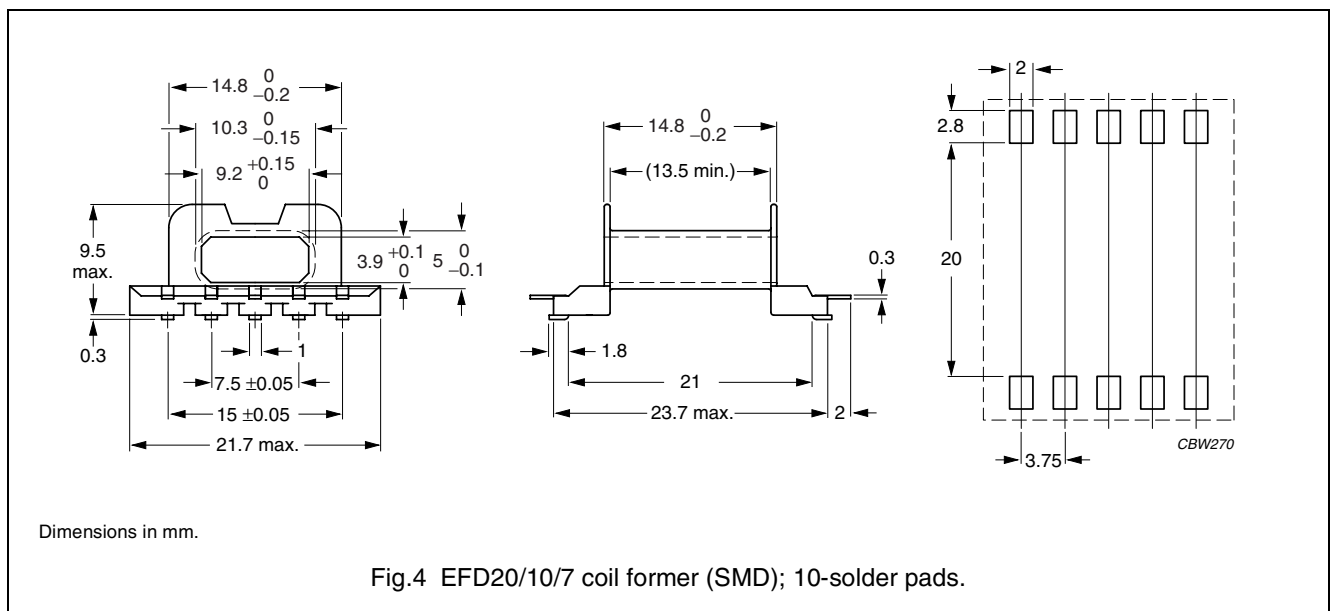
**Winding data and area product for EFD20/10/7 coil former (PCB) with 10-pins**

NUMBER OF SECTIONS	WINDING AREA (mm <sup>2</sup> )	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	AREA PRODUCT Ae x Aw (mm <sup>4</sup> )	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



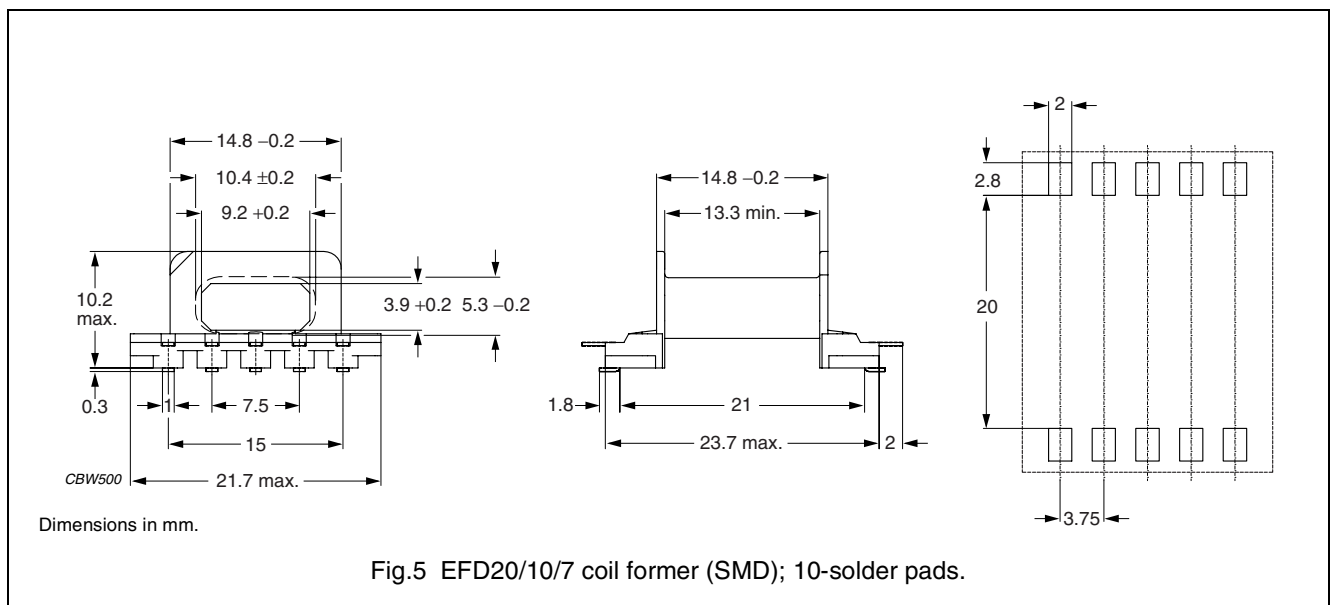
**Winding data and area product for EFD20/10/7 coil former (SMD) with 10-solder pads**

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

**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



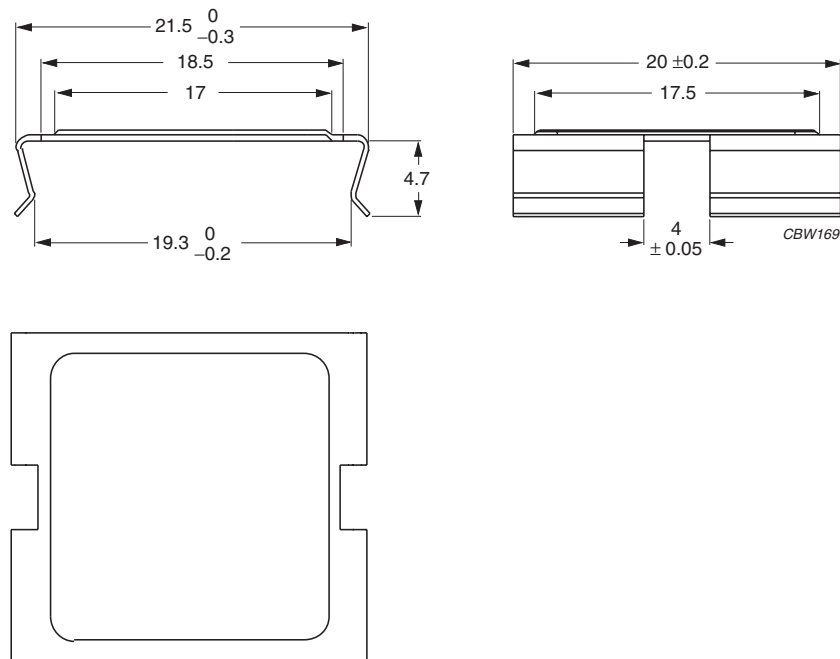
**Winding data and area product for EFD20/10/7 coil former (SMD) with 10-solder pads**

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

**MOUNTING PARTS**

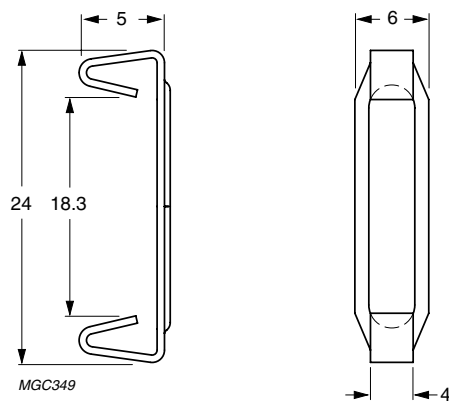
**General data**

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



Dimensions in mm.

Fig.6 Clamp CLM-EFD20



Dimensions in mm.

Fig.7 Clip CLI-EFD20.






**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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**PRODUCT STATUS DEFINITIONS**

STATUS	INDICATION	DEFINITION
<b>Prototype</b>		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.
<b>Design-in</b>		These products are recommended for new designs.
<b>Preferred</b>		These products are recommended for use in current designs and are available via our sales channels.
<b>Support</b>		These products are <b>not</b> recommended for new designs and may not be available through all of our sales channels. Customers are advised to check for availability.

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