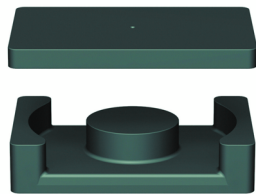


Planar cores for power applications

Integrating ferrite cores into the PCB has become common in the power supply market. In those low-profile designs ferrite planar cores with low losses and high saturation are widespread. The trends are increasing the power density of the throughput transformer and the current in the output inductor. Ferrite cores are considered a key component for these targets. EPCOS has extended the range of planar ferrite cores to meet the new requirements.

Besides the standard ELP core series, EPCOS now offers extended series of planar cores with round center posts:



ER 9.5 to ER 32 and EQ 13 to EQ 30. This wide range of shapes improves the design capabilities for individual power converter solutions.

Customer-specific heights can be supplied as well as different air gap requirements for all series.

All EPCOS planar cores are available in the well-known EPCOS power materials. Preferred materials are N97 and N92. N97 is optimized for low losses, N92 for high saturation currents in the output chokes. N87 is suitable for standard requirements. For frequencies higher than 400 kHz, we recommend N49.

Advantages

ELP cores:

- Standardized to IEC 61860

ER cores:

- Optimized winding area
- Small overall footprint (core and winding)
- Less EMI
- Minimized winding length

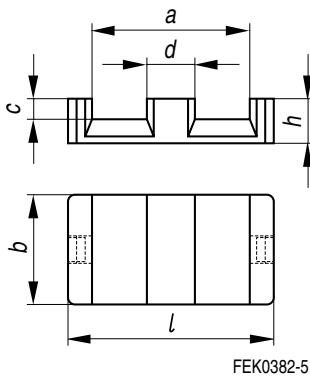
EQ cores:

- Optimized cross section
- Small overall footprint (core and winding)
- Less EMI
- Minimized winding length

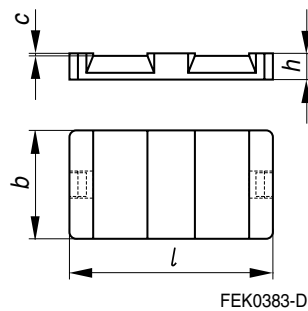
Planar core sets		Material (code number) A _L values (nH)		Ordering code	
Piece 1	Piece 2	N92 (92)	N97 (97)	Piece 1 or set	Piece 2
ELP	I			ELP	I
ELP14/3.5/5	I14/1.5/5	900 ±25%	1300 ±25%	B66281G0000X1**	B66281P0000X1**
ELP18/4/10	I18/2/10	2300 ±25%	3000 ±25%	B66453G0000X1**	B66453P0000X1**
ELP22/6/16	I22/2.5/16	4000 ±25%	5250 ±25%	B66455G0000X1**	B66455P0000X1**
ELP32/6/20	I32/3/20	4800 ±25%	6300 ±25%	B66457G0000X1**	B66457P0000X1**
ER	ER or I			ER	ER or I
ER9.5/2.5/5	ER9.5/2.5/5	660 +30/-20%	840 +30/-20%	B65523J0000R0**	(sets)
ER11/2.5/6	ER11/2.5/6	900 +30/-20%	1200 +30/-20%	B65525J0000R0**	(sets)
ER14.5/3/7	ER14.5/3/7	1100 +30/-20%	1500 +30/-20%	B65513J0000R0**	(sets)
ER18/3/10	ER18/3/10	1800 ±25%	2300 ±25%	B66480G0000X1**	B66480G0000X1**
ER23/5/13	I23/2/13	2600 ±25%	3400 ±25%	B66482G0000X1**	B66482P0000X1**
ER24/5/8.5	ER24/5/8.5	1800 ±25%	2400 ±25%	B66352G0000X1**	B66352G0000X1**
ER25/6/15	I25/3/15	3400 ±25%	4600 ±25%	B66484G0000X1**	B66484P0000X1**
ER26/6/8	ER26/6/8	1900 ±25%	2600 ±25%	B66508G0000X1**	B66508G0000X1**
ER32/5/21	ER32/5/21	3800 ±25%	5000 ±25%	B66501G0000X1**	B66501G0000X1**
EQ	I			EQ	I
EQ13/3	I13/1	1550 ±25%	1750 ±25%	B66479G0000X1**	B66479P0000X1**
EQ20/6	I20/2	3400 ±25%	4400 ±25%	B66483G0000X1**	B66483P0000X1**
EQ25/6	I25/2	4450 ±25%	5750 ±25%	B66481G0000X1**	B66481P0000X1**
EQ30/8	I30/3	4600 ±25%	6000 ±25%	B66506G0000X1**	B66506P0000X1**

Dimensions and characteristics

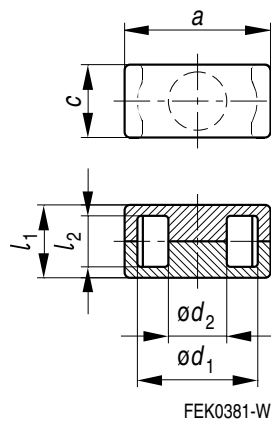
ELP cores



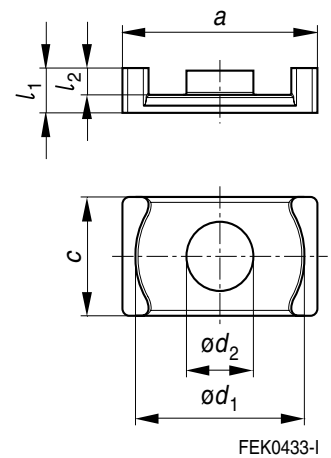
I cores



ER 9.5 ... ER 14.5

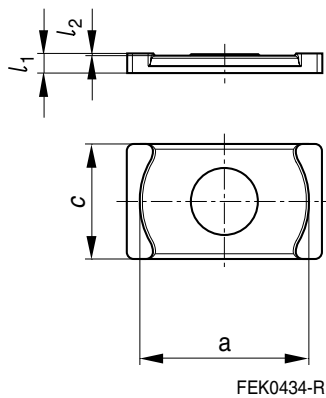


ER 18 ... ER 32



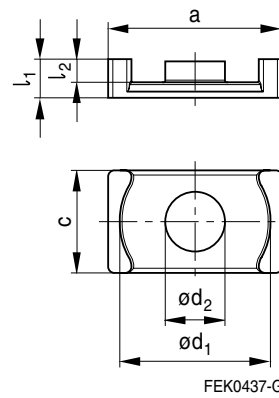
Planar core sets		Magnetic characteristics (sets)					Dimensions		
Type		l_e/A_e	l_e	A_e	A_{min}	V_e	ELP, ER, EQ		
Piece 1	Piece 2	(mm ⁻¹)	(mm)	(mm ²)	(mm ²)	(mm ³)	(mm)	(mm)	(mm)
ELP	I						l	b	a
ELP14/3.5/5	I14/1.5/5	1.152	16.7	14.5	13.9	242	14.00 ±0.30	5.00 ±0.10	11.00 ±0.25
ELP18/4/10	I18/2/10	0.514	20.3	39.5	38.9	802	18.00 ±0.35	10.00 ±0.20	14.00 ±0.30
ELP22/6/16	I22/2.5/16	0.332	26.1	78.5	77.9	2049	21.80 ±0.40	15.80 ±0.30	16.80 ±0.40
ELP32/6/20	I32/3/20	0.270	35.1	130.0	128.0	4563	31.75 ±0.65	20.35 ±0.40	25.40 ±0.50
ER	ER or I						a	c	d₁
ER9.5/2.5/5	ER9.5/2.5/5	1.544	13.6	8.8	—	120	9.50 -0.30	5.00 -0.20	7.50 +0.25
ER11/2.5/6	ER11/2.5/6	1.137	14.1	12.4	—	175	11.00 -0.35	6.00 -0.20	8.70 +0.30
ER14.5/3/7	ER14.5/3/7	1.080	19.0	17.6	—	334	14.50 ±0.20	6.70 ±0.10	11.80 ±0.20
ER18/3/10	ER18/3/10	0.732	22.1	30.2	30.1	667	18.00 ±0.35	9.70 ±0.20	15.60 ±0.30
ER23/5/13	I23/2/13	0.530	26.6	50.2	50.0	1335	23.20 ±0.45	12.50 ±0.25	20.20 ±0.40
ER24/5/8.5	ER24/5/8.5	0.851	31.3	36.8	34.0	1152	24.39 ±0.60	8.51 ±0.25	18.59 ±0.60
ER25/6/15	I25/3/15	0.399	28.1	70.4	69.4	1978	25.00 ±0.50	14.80 ±0.30	21.70 ±0.40
ER26/6/8	ER26/6/8	0.805	34.3	42.6	42.0	1461	25.90 -0.90	7.50 ±0.20	20.30 ±0.50
ER32/5/21	ER32/5/21	0.346	38.0	109.8	98.5	4172	32.00 ±0.60	21.00 ±0.40	29.70 ±0.50
EQ	I						a	c	d₁
EQ13/3	I13/1	0.8030	15.9	19.8	19.2	315	12.80 ±0.30	8.7 ±0.25	11.2 ±0.30
EQ20/6	I20/2	0.4197	25.1	59.8	55.0	1501	20.00 ±0.35	14.0 ±0.30	18.0 ±0.35
EQ25/6	I25/2	0.2943	26.4	89.7	82.8	2368	25.00 ±0.40	18.0 ±0.30	22.0 ±0.40
EQ30/8	I30/3	0.2917	31.5	108.0	95.0	3402	30.00 ±0.40	20.0 ±0.30	26.0 ±0.40

I cores



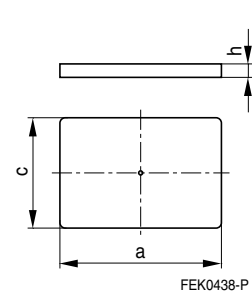
FEK0434-R

EQ cores



FEK0437-G

I cores



FEK0438-P

Dimensions ELP, ER, EQ							Planar core sets	
(mm)	(mm)	(mm)	I cores				Type	
d	h	c	l	b	c	h	Piece 1	Piece 2
3.00 ±0.05	3.50 ±0.10	2.00 ±0.10	14.00 ±0.30	5.00 ±0.10	0.2 max	1.50 ±0.10	ELP14/3.5/5	I14/1.5/5
4.00 ±0.10	4.00 ±0.10	2.00 ±0.10	18.00 ±0.35	10.00 ±0.20	0.2 max	2.00 ±0.10	ELP18/4/10	I18/2/10
5.00 ±0.10	5.70 ±0.10	3.20 ±0.10	21.80 ±0.40	15.80 ±0.30	0.2 max	2.50 ±0.10	ELP22/6/16	I22/2.5/16
6.35 ±0.15	6.35 ±0.15	3.20 ±0.15	31.75 ±0.65	20.35 ±0.40	0.3 max	3.15 ±0.15	ELP32/6/20	I32/3/20
d ₂	l ₁	l ₂	a	c	l ₁	l ₂	ER	ER or I
3.50 -0.20	2.50 -0.10	1.60 +0.15	—	—	—	—	ER9.5/2.5/5	ER9.5/2.5/5
4.25 -0.20	2.50 -0.10	1.50 +0.15	—	—	—	—	ER11/2.5/6	ER11/2.5/6
4.70 ±0.10	2.95 ±0.05	1.65 ±0.10	—	—	—	—	ER14.5/3/7	ER14.5/3/7
6.20 ±0.15	3.15 ±0.10	1.60 ±0.10	—	—	—	—	ER18/3/10	ER18/3/10
8.00 ±0.20	5.10 ±0.10	3.10 ±0.10	23.20 ±0.45	12.50 ±0.25	2.10 ±0.10	0.2 max	ER23/5/13	I23/2/13
6.61 ±0.25	5.00 ±0.10	3.00 ±0.10	—	—	—	—	ER24/5/8.5	ER24/5/8.5
9.40 ±0.20	5.50 ±0.10	3.10 ±0.10	25.00 ±0.50	14.80 ±0.30	2.50 ±0.10	0.2 max	ER25/6/15	I25/3/15
7.50 ±0.15	5.90 -0.20	3.00 ±0.10	—	—	—	—	ER26/6/8	ER26/6/8
11.20 ±0.20	5.10 ±0.10	2.70 ±0.10	—	—	—	—	ER32/5/21	ER32/5/21
d ₂	l ₁	l ₂	a	c	h		EQ	I
5.0 ±0.15	2.85 ±0.075	1.75 ±0.15	12.80 ±0.30	8.7 ±0.25	1.10 ±0.10	—	EQ13/3	I13/1
8.8 ±0.15	6.30 ±0.1	4.10 ±0.15	20.00 ±0.35	14.0 ±0.30	2.30 ±0.05	—	EQ20/6	I20/2
11.0 ±0.20	5.60 ±0.05	3.20 ±0.15	25.00 ±0.40	18.0 ±0.30	2.30 ±0.05	—	EQ25/6	I25/2
11.0 ±0.20	8.00 ±0.15	5.30 ±0.20	30.00 ±0.40	20.0 ±0.30	2.70 ±0.10	—	EQ30/8	I30/3

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