

DATA SHEET

E13/7/4

E cores and accessories

Supersedes data of September 2004

2008 Sep 01

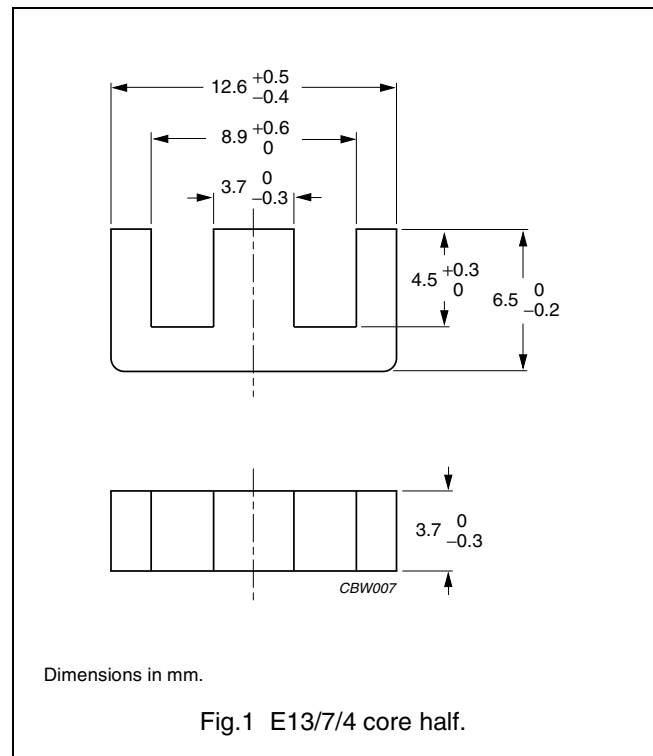


FERROXCUBE
A YAGEO COMPANY

CORE SETS

Effective core parameters

| SYMBOL | PARAMETER | VALUE | UNIT |
|---------------|-------------------|-------|------------------|
| $\Sigma(l/A)$ | core factor (C1) | 2.39 | mm ⁻¹ |
| V_e | effective volume | 369 | mm ³ |
| l_e | effective length | 29.7 | mm |
| A_e | effective area | 12.4 | mm ² |
| A_{min} | minimum area | 12.2 | mm ² |
| m | mass of core half | ≈ 0.9 | g |



Core halves

A_L measured in combination with a non-gapped core half, clamping force for A_L measurements, 15 ± 5 N.

| GRADE | A_L (nH) | μ_e | AIR GAP (μ m) | TYPE NUMBER |
|-------------------------|---------------|---------|-----------------------|-------------------|
| 3C90 | 63 ± 5% | ≈ 120 | ≈ 320 | E13/7/4-3C90-A63 |
| | 100 ± 8% | ≈ 190 | ≈ 175 | E13/7/4-3C90-A100 |
| | 160 ± 8% | ≈ 305 | ≈ 100 | E13/7/4-3C90-A160 |
| | 250 ± 15% | ≈ 480 | ≈ 55 | E13/7/4-3C90-A250 |
| | 315 ± 15% | ≈ 600 | ≈ 40 | E13/7/4-3C90-A315 |
| | 800 ± 25% | ≈ 1525 | ≈ 0 | E13/7/4-3C90 |
| 3C92 <small>des</small> | 630 ± 25% | ≈ 1200 | ≈ 0 | E13/7/4-3C92 |
| 3C94 | 800 ± 25% | ≈ 1525 | ≈ 0 | E13/7/4-3C94 |
| 3C96 <small>des</small> | 700 ± 25% | ≈ 1330 | ≈ 0 | E13/7/4-3C96 |
| 3F3 | 63 ± 5% | ≈ 120 | ≈ 320 | E13/7/4-3F3-A63 |
| | 100 ± 8% | ≈ 190 | ≈ 175 | E13/7/4-3F3-A100 |
| | 160 ± 8% | ≈ 305 | ≈ 100 | E13/7/4-3F3-A160 |
| | 250 ± 15% | ≈ 480 | ≈ 55 | E13/7/4-3F3-A250 |
| | 315 ± 15% | ≈ 600 | ≈ 40 | E13/7/4-3F3-A315 |
| | 700 ± 25% | ≈ 1330 | ≈ 0 | E13/7/4-3F3 |
| 3F35 <small>des</small> | 560 ± 25% | ≈ 1070 | ≈ 0 | E13/7/4-3F35 |

E cores and accessories

E13/7/4
(EF12.6)

Core halves of high permeability grades

Clamping force for A_L measurements, 15 ± 5 N.

| GRADE | A_L (nH) | μ_e | AIR GAP (μm) | TYPE NUMBER |
|-------|-----------------|----------------|------------------------------|--------------|
| 3E27 | $1500 \pm 25\%$ | ≈ 2800 | ≈ 0 | E13/7/4-3E27 |

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 = 100 °C | f = 400 kHz; $\hat{B} = 50$ mT; T = 100 °C |
| 3C90 | ≥ 320 | ≤ 0.05 | ≤ 0.05 | – | – |
| 3C92 | ≥ 370 | – | ≤ 0.04 | ≤ 0.2 | – |
| 3C94 | ≥ 320 | – | ≤ 0.04 | ≤ 0.2 | – |
| 3C96 | ≥ 340 | – | ≤ 0.03 | ≤ 0.16 | – |
| 3F3 | ≥ 320 | – | ≤ 0.05 | – | ≤ 0.07 |
| 3F35 | ≥ 300 | – | – | – | – |

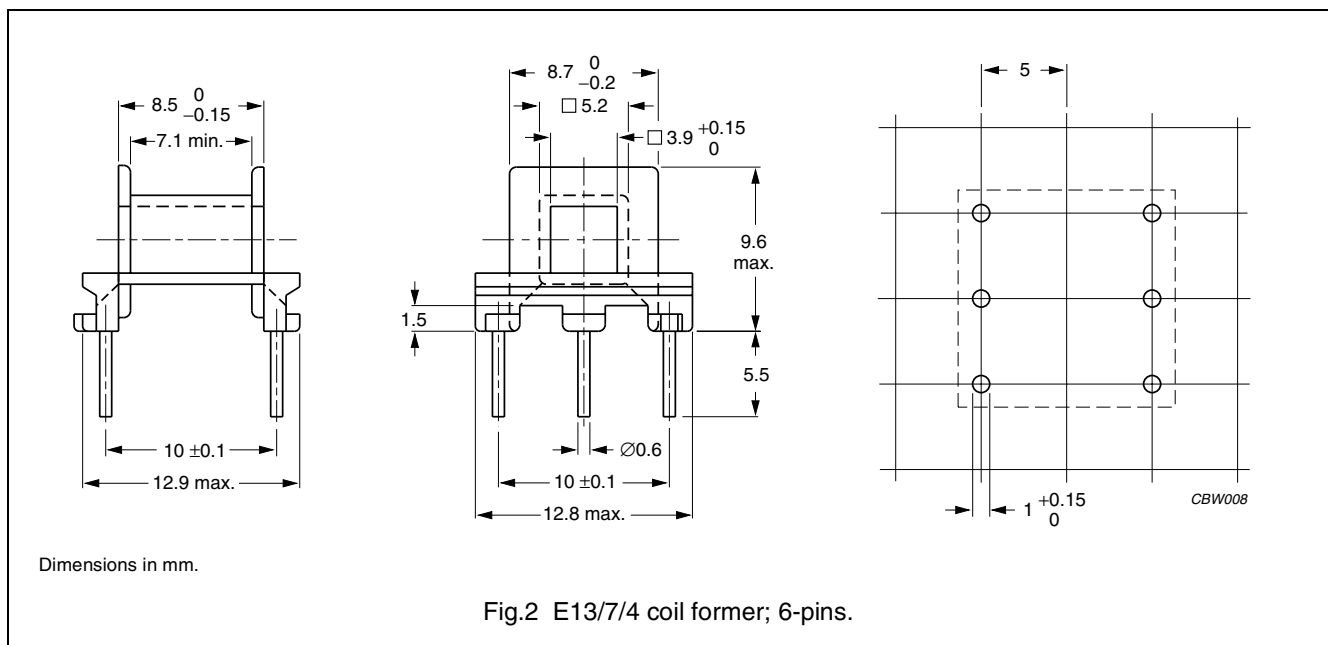
Properties of core sets under power conditions (continued)

| 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 = 3 MHz; $\hat{B} = 10$ mT; T = 100 °C |
| 3C90 | ≥ 320 | – | – | – | – |
| 3C92 | ≥ 370 | – | – | – | – |
| 3C94 | ≥ 320 | – | – | – | – |
| 3C96 | ≥ 340 | ≤ 0.14 | – | – | – |
| 3F3 | ≥ 315 | – | – | – | – |
| 3F35 | ≥ 300 | ≤ 0.05 | ≤ 0.39 | – | – |

COIL FORMER

General data for 6-pins E13/7/4 coil former

| PARAMETER | SPECIFICATION |
|-------------------------------|--|
| Coil former material | polyamide (PA6.6), glass reinforced, flame retardant in accordance with "UL 94V-0"; UL file number E41871(M) |
| Pin material | copper-tin alloy (CuSn), tin (Sn) plated |
| Maximum operating temperature | 130 °C, "IEC 60085", class B |
| 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 |



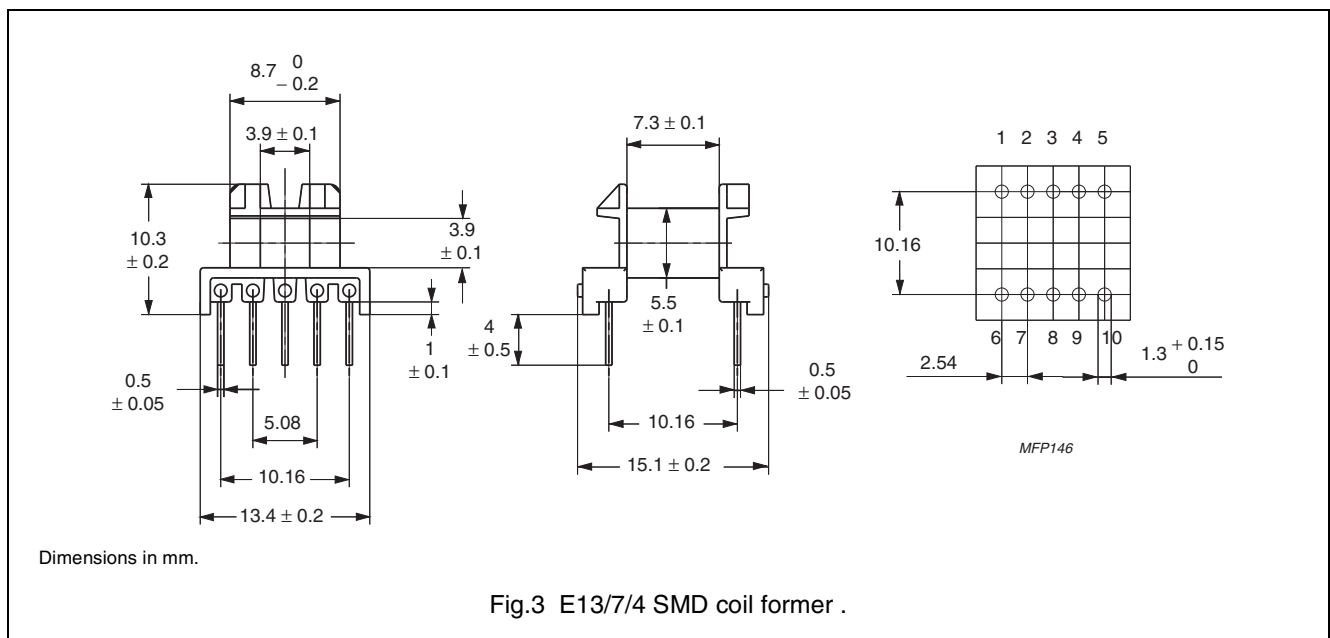
Winding data and area product for E13/7/4 6-pins coil former

| 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 | 11.6 | 7.1 | 24 | 144 | CPH-E13/7/4-1S-6P |

COIL FORMER

General data for 10-pads E13/7/4 SMD coil former

| PARAMETER | SPECIFICATION |
|-------------------------------|---|
| Coil former material | phenolformaldehyde (PF), glass reinforced, flame retardant in accordance with "UL 94V-0"; UL file number E59481 |
| Pin material | copper-clad steel, 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 |



Winding data and area product for E13/7/4 SMD coil former

| NUMBER OF SECTIONS | NUMBER OF PINS | PIN POSITIONS USED | WINDING AREA (mm ²) | MINIMUM WINDING WIDTH (mm) | AVERAGE LENGTH OF TURN (mm) | AREA PRODUCT Ae x Aw (mm ⁴) | TYPE NUMBER |
|--------------------|----------------|--------------------|---------------------------------|----------------------------|-----------------------------|---|----------------------|
| 1 | 10 | all | 10.4 | 7.2 | 29.6 | 129 | CSH-E13/7/4-1S-10P-C |
| 1 | 6 | 1,2,4,5,7,9 | 10.4 | 7.2 | 29.6 | 129 | CSH-E13/7/4-1S-6P-C |
| 1 | 7 | 1,2,3,4,5,7,9 | 10.4 | 7.2 | 29.6 | 129 | CSH-E13/7/4-1S-7P-C |

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E13/7/4
(EF12.6)




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. |

DISCLAIMER

Life support applications — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Ferroxcube customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Ferroxcube for any damages resulting from such application.

PRODUCT STATUS DEFINITIONS

| 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. |