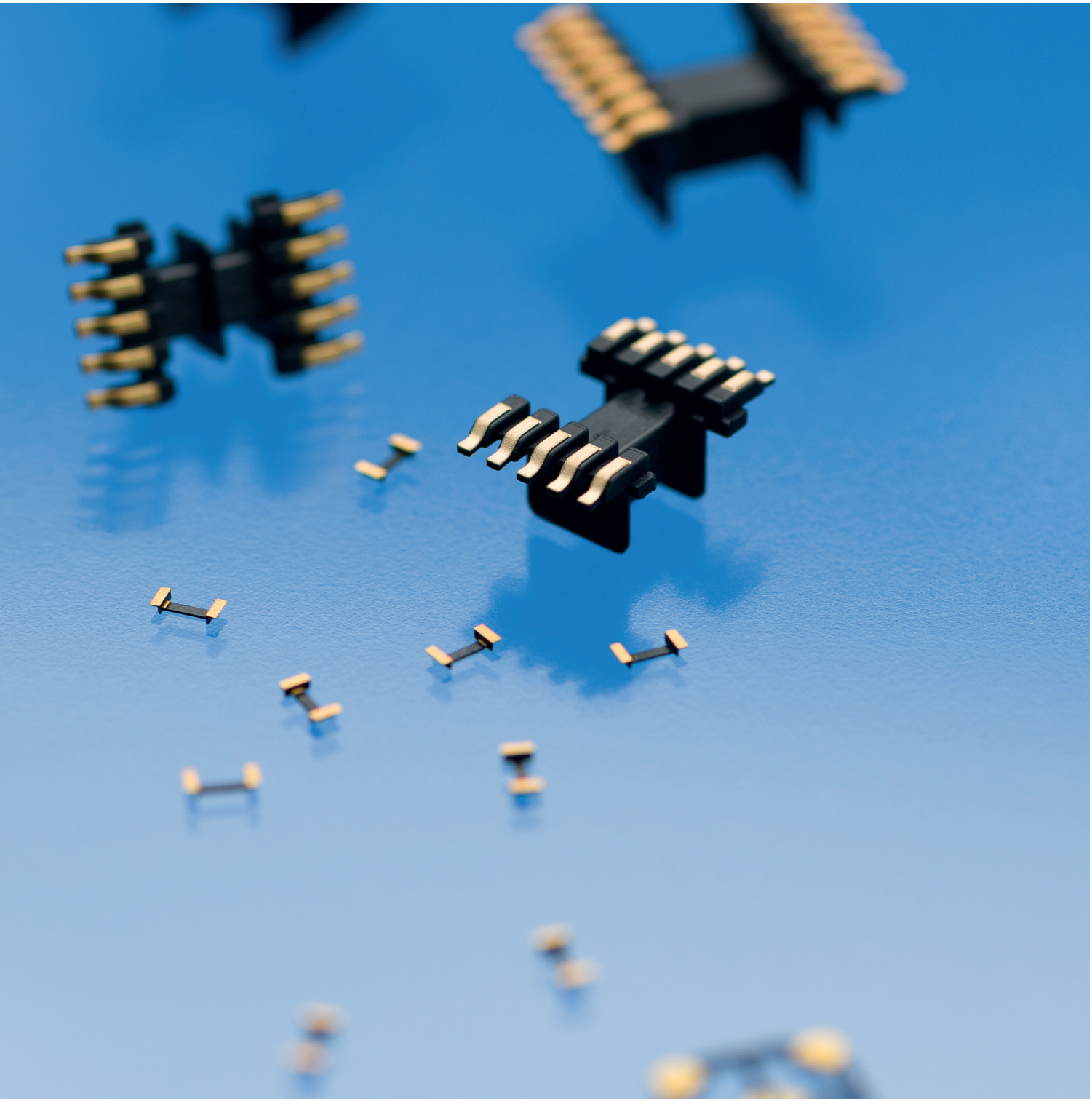
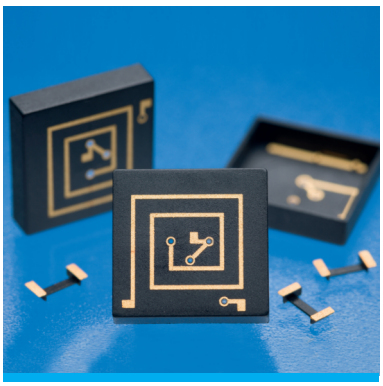
LDS / SMD3 – Laser Direct Structuring

Coilformers and Components



LDS Laser Direct Structuring

The LDS-method uses special plastic materials with additives. After a partial activation by laser conductor layers are created in a chemical reaction. NORWE has further developed this technology by using cross-linked plastic materials to allow winding on the plastic without solder-pins.



The advantages are convincing – downsized components, simplified connecting technology, lower weight, optimal coplanarity, through connection as well as the possibility to provide smaller and medium-sized series without expenses for a pinning technique.

NORWE uses this method amongst others for SMD-components of the SMD3-series and already for solutions to customers' specifications. Our specialists will be glad to answer your questions.

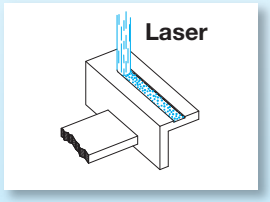
The NORWE LDS-process

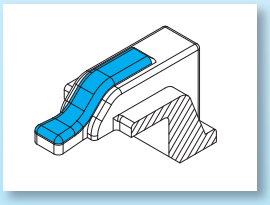
Step 1

The components to be laser structured are produced by injection moulding. NORWE uses a plastic material doped with additives which has specially been developed for laser structuring and cross-linking. This technology allows the use of high temperatures during the soldering process.

Step 2

The plastic components are activated with a laser beam. This process induces a chemical reaction at which the metal particles that track form the nuclei for the subsequent metallization. In addition to the activation the laser creates a micro-roughened surface in which the copper is firmly anchored during the metallization. There are practically no limits regarding the width or tracking of metallized surfaces – even three-dimensional designs, like for the SMD3-coilformers, are possible.





Step 3

The metallization of the components takes place in current-free copper baths. The desired thickness of the copper layer can be influenced by changing the exposure time in the baths. The copper is coated with a nickel layer. A thin gold finish is created, to ensure best solder properties.

Step 4

The finished components are compatible with conventional winding and soldering processes, as due to the plastic material used they withstand short-term temperatures of 450–500° C. The gold finish ensures short solder times in the tin bath. Moreover the coilformers which are mostly SMD-components are reflow solderable without any restrictions.

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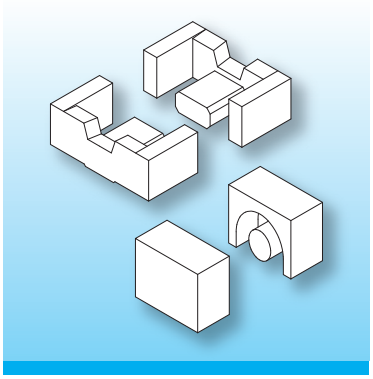
EE Ferrite Cores
The tables below show the dimensions and the magnetic characteristics per set of the ferrite cores for the coilformers shown in this catalogue. The data can be used as an orientation in the design of application specific converters. Specific details on the ferrite cores and materials should be available from the catalogues of the ferrite manufacturers.



l_e - effective length

A_e - effective area

A_{min} - core cross section

V_e - effective volume

Dimensions in mm/inch.

Magnetic Characteristics/per set Type:	l_e mm / inch	A_e mm² / inch²	A_{min} mm² / inch²	V_e mm³ / inch³
EF 5	12.70 / 0.500	2.50 / 0.004	–	31.40 / 0.002
EF 6.3	12.20 / 0.480	3.30 / 0.005	2.60 / 0.004	40.30 / 0.002
EF 8	18.40 / 0.724	5.40 / 0.008	5.40 / 0.008	100.00 / 0.006
EF 8.8	15.50 / 0.610	5.00 / 0.008	3.60 / 0.006	78.00 / 0.005
EF 10	22.90 / 0.902	8.40 / 0.013	8.10 / 0.013	192.00 / 0.012
EF 12.6	29.60 / 1.165	12.40 / 0.019	12.20 / 0.019	367.00 / 0.022
EF 16	37.60 / 1.480	20.10 / 0.031	19.40 / 0.030	750.00 / 0.046

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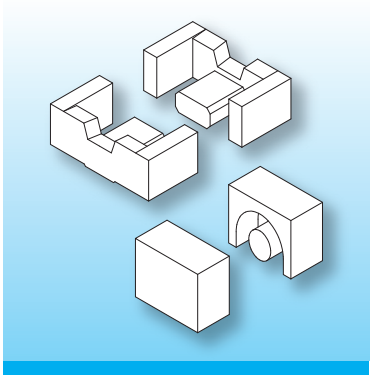


l_e - effective length

A_e - effective area

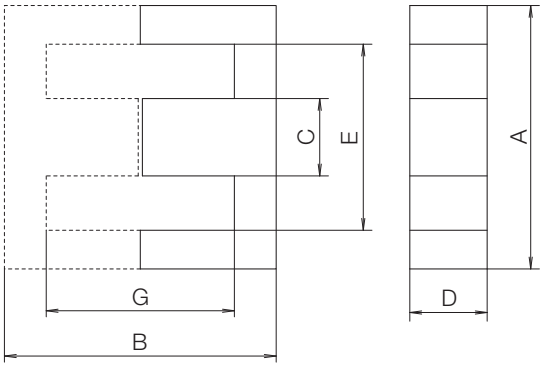
A_{min} - core cross section

V_e - effective volume

Dimensions in mm/inch.

Type	A	B	C	D	E	G
EE 5	5.25 ±0.10 0.207 ±0.004	5.30 –0.10 0.209 –0.004	1.40 –0.10 0.055 –0.004	2.00 –0.10 0.079 –0.004	3.80 +0.20 0.150 +0.008	4.00 +0.20 0.157 +0.008
EE 6.3*	6.30 –0.25 0.248 –0.010	5.80 –0.20 0.228 –0.008	1.40 –0.10 0.055 –0.004	2.00 –0.10 0.079 –0.004	3.60 +0.20 0.142 +0.008	3.70 +0.20 0.146 +0.008
EE 8	8.00 ±0.15 0.315 ±0.006	8.10 –0.20 0.319 –0.008	2.40 –0.10 0.094 –0.004	2.40 –0.10 0.094 –0.004	5.60 +0.20 0.220 +0.008	5.60 +0.20 0.220 +0.008
EE 8.8	9.00 ±0.25 0.354 ±0.010	8.20 –0.40 0.329 –0.016	1.90 ±0.12 0.075 ±0.005	2.00 –0.20 0.079 –0.008	5.20 ±0.13 0.205 ±0.005	4.06 +0.50 0.160 +0.020
EE 10	10.00 ±0.20 0.394 ±0.008	10.00 –0.24 0.394 –0.009	3.00 –0.12 0.118 –0.005	3.00 –0.12 0.118 –0.005	7.00 +0.30 0.276 +0.012	7.00 +0.24 0.276 +0.009
EE 12.6	12.60 ±0.40 0.496 ±0.016	13.00 –0.40 0.512 –0.016	3.70 –0.30 0.146 –0.012	3.70 –0.30 0.146 –0.012	8.90 +0.60 0.350 +0.024	9.00 +0.60 0.354 +0.024
EE 16	16.10 ±0.60 0.634 ±0.024	8.20 –0.30 0.323 –0.012	4.70 –0.30 0.185 –0.012	4.70 –0.40 0.185 –0.016	11.30 +0.60 0.445 +0.024	11.40 +0.80 0.449 +0.031

* EE 6.3 suitable for coilformer EE 5.



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