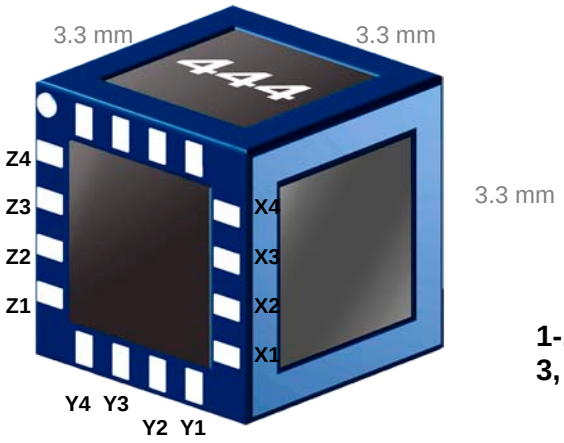
HE444 series 3D Analog Hall sensors

3 separate, totally independent axes, central crossing point



PRELIMINARY

1-, 2+: Supply current
3, 4: Hall voltage

Note: component laser marking '444', or user defined, with date code, dimensions are in mm, this picture shows the solder / bond pads at the bottom, marking can be at the top, this picture does not show all details

Features

- Precise tracking between axes
- Magnetic axes cross in one point
- 100% independent axes
- Very low offset voltages
- Ultra low offset drift
- Large range, easily up to **5 Tesla**
- Very small linearity error
- Low noise, and high bandwidth
- Low TC of sensitivity
- Very good PHE suppression
- Very wide temperature range
- Small package
- Ceramic enclosure
- Moves 3D Hall sensing into 6 digits

Typical applications

- Calibration of other 3D sensors
- 3D current measurement
- Measuring 3D magnetic field strength
- and 3D magnetic field vector
- 3D movement sensing
- Measuring oil pipe wall thickness
- Measuring oil pipe cracks from inside
- Precise 3D magnetometers
- Precise 3D positioning (and tilt)
- Mapping magnetic fields
- Universities, research facilities
- NMR, MRI with magnetic direction
- In liquid Nitrogen and Helium
- In ovens

These are "green" devices, RoHS, lead free, and compliant with Japanese demands. The text on the device can be customer specific, depending on the type. A date and manufacturing code will be added.

Mounting

- The surface can be soldered
- The surface can also be bonded with bond wires
- On special demand, we can also supply the parts with twisted pair wires welded to the contacts
- On special demand, flex foil can be attached

Order codes

Version	Order code	More information
Solder / bond pads	HE444	standard
Twisted pair	HE444T	length is 20 cm, MOQ 5 pieces
On flex foil	HE444F	MOQ 10 pieces, setup costs apply
High temperature	HE444H	HE444 with extended temperature range, MOQ 20 pieces

Combination of the extensions above are possible: HE444TH, HE444FH

Standard items are delivered from stock, other items can be delivered on special demand, minimum order quantities (MOQ) and setup costs apply for non-stock items. Deliveries start January 2012. Parts can be delivered om customer specific PCB, flex foil or ceramics, thin/thick film.

Electrical parameters

Absolute Maximum Ratings per axis (limit values)

Parameter	Symbol	Value	Unit
Standard operating temperature range[I] Extended temperature range (H version only)	T_A T_{AE}	-40 to +175 -70 to +250	°C
Storage temperature rate Extended temperature range (H version only)	T_{stg} T_{stgE}	-50 to +180 -80 to +250	°C
Supply current[II], note: see Advised current	I_1	10	mA

Characteristics per axis, (T_A = 25°C), preliminary and subject to change, applies to Standard operating temperature range

Thermal Conductivity in air	G_{thA}		mW/K
Thermal Conductivity soldered	G_{thC}		mW/K
Nominal Supply Current[III], note: see Advised current	I_{1N}	5	mA
Advised supply current (S/N optimal range)	I_{1A}	0,1 to 3	mA
Open-circuit Sensitivity	K_{B0}	90..190	V/AT
Open-circuit Hall Voltage $I_1 = I_{1N}$, $B = 0.1$ T	V_{20}	45…95 typical 50	mV
Planar Hall Effect Error[IV]	ΔV_{PHE} (or F_{PHE})	typical < 20	ppm
Temperature coefficient of the open-circuit Hall voltage, $I_1 = I_{1N}$, $B = 0.2$ T @25°C	TC_{V20}	0..- 0.03 typical -0.015	%/K
Ohmic Offset Voltage, $I_1 = 1$ mA, $B = 0$ T	V_{R0}	≤ ± 200 typical < ± 100	µV
Temperature coefficient of the Ohmic Offset Voltage, $I_1 = 1$ mA, $B = 0$ T	TC_{VR0}	±10 typical < ± 2	µT/K
		typical < ± 0,25	µV/K
Maximum change of the Ohmic Offset Voltage within the temperature range	$\lvert \Delta V_{R0} \rvert$	typical 50 to 100	µV
Drift of Ohmic Offset Voltage 0.1 to 1.0 sec. after power up, $I_1 = I_{1N}$, $B = 0$ T	dV_0		mV

Drift of Ohmic Offset Voltage from 1.0 sec to 3 min. after power up, $I_1 = I_{1N}$, $B = 0$ T	ΔV_0		mV
Supply side internal resistance, $B = 0$ T	R_{10}	450...650 typical 500	Ω
Temperature coefficient of the Supply side internal resistance, $B = 0$ T	TC_{R10}	typical 0.35	%/K
Hall side internal resistance, $B = 0$ T	R_{20}	450...850 typical 500	Ω
Temperature coefficient of the Hall side internal resistance, $B = 0$ T	TC_{R20}	typical 0.35	%/K
Linearity of Hall voltage[V] $B = 0...0.5$ T, $I_1 = 1$ mA	$\Delta V_{20-0.5}$ (or $F_{L-0.5}$)	≤ ± 0.2 typical ≤ ± 0.1	%
Linearity of Hall voltage $B = 0...1.0$ T, $I_1 = 1$ mA	ΔV_{20-1} (or F_{L-1})	≤ ± 0.2 typical ≤ ± 0.1	%
Linearity of Hall voltage $B = 0...2.4$ T, $I_1 = 1$ mA	ΔV_{20-2} (or F_{L-2})	limit not specified typical ≤ ± 0.2	%
Bandwidth (-3dB point)[VI]	B	not specified yet, guaranteed 100 kHz, typical much more	kHz
Rise time (to <>%)		not specified yet	
Noise figure[VII]	F	≤ 10	dB

[I] In fact capable of a much lower temperatures, for ultra low temperatures below -70 °C downto 0 °K we recommend the HE444 version, not the HE444H, the HE444H is recommended at high temperatures
[II] Per axis, allowed but advised to be much smaller, the advised current gives the best signal/noise ratio
[III] Per axis, advised to be smaller, the advised current gives the best signal/noise ratio
[IV] Influence of magnetic vectors from other direction than the direction of the axis
[V] Typical and limit much better than specified
[VI] Per axis, possibly compensated with RC network
[VII] At advised current, contact us for advise

All data is subject to change without prior notice, future versions may be improved

Manufacturer
The Netherlands
Tel: +31 65 159 0081
Fax: +31 84 741 3475
Email: info@hoeben.com
www.hoeben.com

Distributor
Germany
Tel: +49 7243 71578 10
Fax: +49 7243 71578 55
Email: info@clevertrade.biz
www.clevertrade.biz