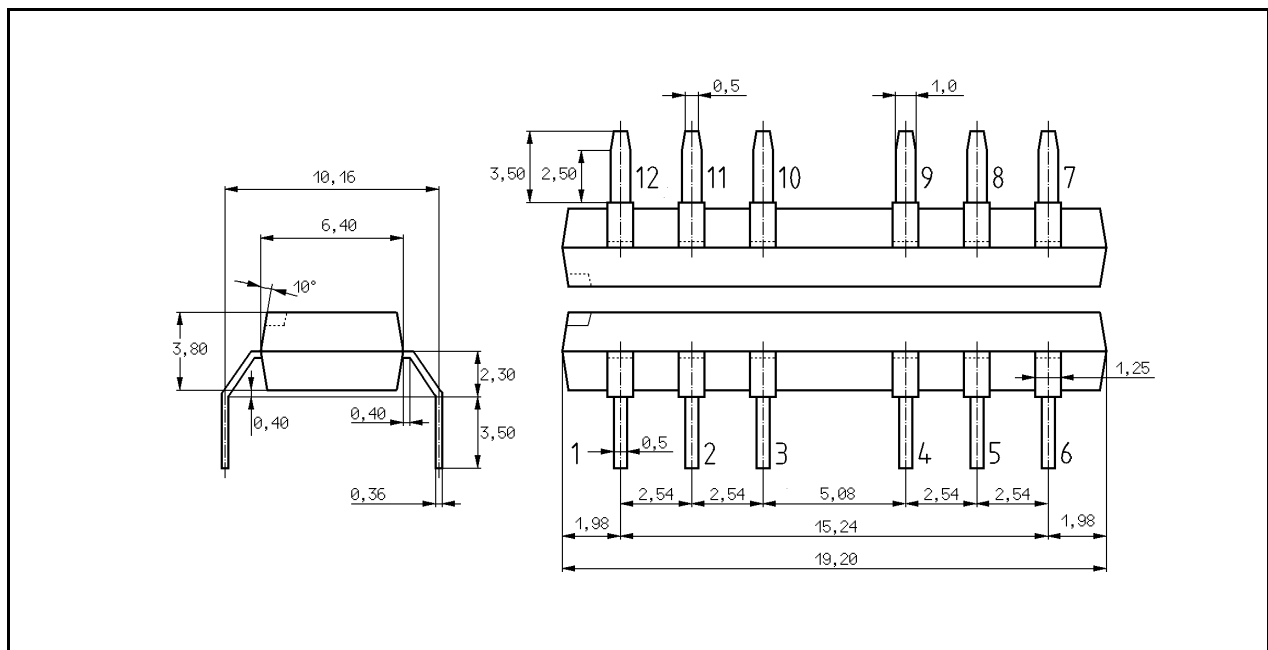


Current Sensor

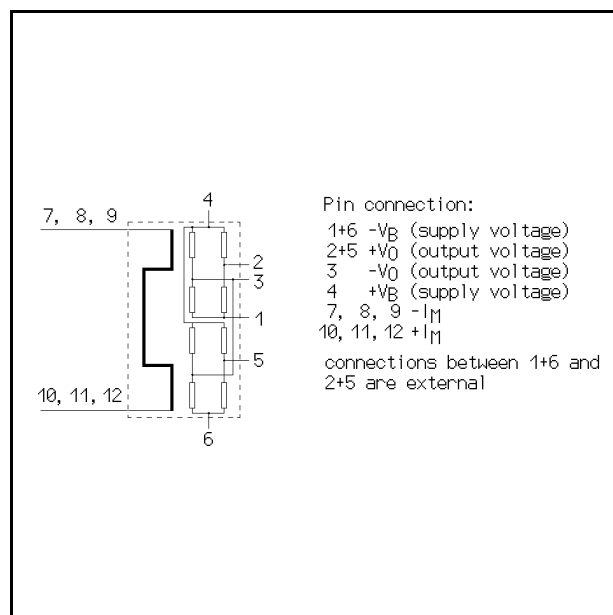
Issue 2 - July 2006

ZMC10D



FEATURES

- Package : mod. DIL-14 (12 pin)
- Double magnetic sensor chip (employing the magnetoresistive effect of thin film permalloy) measures the magnetic field generated by an internal current-carrying conductor
- measurable direct or alternating current I_M up to 10A
- supply voltage 12 V
- no auxiliary field H_X required
- it's possible to overload the conductor (between pin's 8,9,10 and 11,12,13) with 300A for 10 ms at $T_{amb} = 25\text{ }^{\circ}\text{C}$



ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol		Unit
Supply voltage	V_{br}	12	V
Supply current	I_{br}	20	mA
Measurable current at DC: absolute value at AC: peak value	I_m	10	A
Operating temperature range	T_{amb}	-25 to +100	°C
Storage temperature range	T_{stg}	-25 to +125	°C

ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25\text{ °C}$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions
Input-Output-Insulation (pin 7, 8, 9, 10, 11, 12 shorted together and pin 1, 2, 3, 4, 5, 6 shorted together)	I_{i-o}	-	-	5	nA	test voltage: 2000V DC test time: 1s
Bridge resistance	R_{br}	600	800	1300	Ω	
Temperature coefficient of bridge resistance	T_{crbr}	-	+0.3	-	%/K	$T_{amb} = -25...+100\text{ °C}$
Bridge supply current (con- stant current source)	I_{br}	-	13	-	mA	$T_{amb} = -25...+100\text{ °C}$
Offset coefficient of $V_{outoff1}$ (current supply re- jection ratio)	CSRR	-	± 1.5	± 2.5	mV/mA	
Offset voltage (static, con- stant)	$V_{outoff1}$	-	± 19	≈ 32	mV	$I_{br} = 13\text{mA}$ and $R_{br} = 0.8\text{k}\Omega$
Offset voltage (dynamic, nonlinear)	$V_{outoff2}$	-	-	± 2	mV	in dependence on I_m and T_{amb}
Temperature coefficient of $V_{outoff1}$	T_{cvoff1}	-35	-	+35	$\mu\text{V/K}$	$I_{br} = 13\text{mA}$ and $R_{br} = 0.8\text{k}\Omega$
Open circuit sensitivity (absolute V_{out}/I_m , with off- set compensation, no dis- turbance field allowed)	S_a	2.7	3.9	5.1	mV/A	$I_{br} = 13\text{mA}$ and $R_{br} = 0.8\text{k}\Omega$
Resistance of the conductor	R	-	0.7	-	m Ω	$I_m \leq 10\text{A}$
Operating frequency	f_{max}	0	-	100	kHz	

ZMC 10D

ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions
Temperature coefficient of S_a	T_{csi}	-	-	-0.12	%/K	$I_{br} = 13\text{mA}$ and $R_{br} = 0.8\text{k}\Omega$
Output voltage range	V_{out}	-	-	$< \pm 10$ 0	mV	$I_{br} = 13\text{mA}$ and $R_{br} = 0.8\text{k}\Omega$
Nonlinearity error of S_a	NLE	-	6	-	%	$I_{m1} = 1\text{A}$; $I_{m2} = 2\text{A}$
Disturbance signal influence on disturbing field H_d ($V_{out} = I_m \cdot S_a + V_{outhd}$)	V_{outhd}	-	± 0.5	-	mV	$I_{br} = 13\text{mA}$; $R_{br} = 0.8\text{k}\Omega$ and $H_d = 10\text{A/m}$ in 50mm distance to sensor

Equations of condition:

$$V_{outoff1} [\text{mV}] = \text{CSRR} [\text{mV/mA}] \cdot I_{br} [\text{mA}]$$

$$\text{CSRR} [\text{mV/mA}] = (R_{34} + R_{12} - R_{24} - R_{13}) [\Omega] \cdot 0.5 \quad (\text{at } I_m = 0)$$

pinning of magnetoresistive resistors:

R_{34} : between pin 3 and pin 4

R_{12} : between pin 1 and pin 2

R_{24} : between pin 2 and pin 4

R_{13} : between pin 1 and pin 3

external connections:

pin 2 shorted to pin 5

pin 1 shorted to pin 6

Circuit connections:

condition: pin4: $+I_{br}$ and pin 1,6: $-I_{br}$

pin 7, 8, 9 : $+I_m$ pin 2, 5: $-V_{out}$ and pin 3: $+V_{out}$
pin 10, 11, 12 : $-I_m$

pin 7, 8, 9 : $-I_m$ pin 2, 5: $+V_{out}$ and pin 3: $-V_{out}$
pin 10, 11, 12 : $+I_m$

Devices are identified by type on the body of the device:

ZMC10D ZMC10D

Ordering information:

ZMC10D..... in boxes

Europe	Americas	Asia Pacific	Corporate Headquarters
Zetex GmbH Streitfeldstraße 19 D-81673 München Germany	Zetex Inc 700 Veterans Memorial Highway Hauppauge, NY 11788 USA	Zetex (Asia Ltd) 3701-04 Metroplaza Tower 1 Hing Fong Road, Kwai Fong Hong Kong	Zetex Semiconductors plc Zetex Technology Park, Chadderton Oldham, OL9 9LL United Kingdom
Telefon: (49) 89 45 49 49 0 Fax: (49) 89 45 49 49 49 europe.sales@zetex.com	Telephone: (1) 631 360 2222 Fax: (1) 631 360 8222 usa.sales@zetex.com	Telephone: (852) 26100 611 Fax: (852) 24250 494 asia.sales@zetex.com	Telephone: (44) 161 622 4444 Fax: (44) 161 622 4446 hq@zetex.com

For international sales offices visit **www.zetex.com/offices**

Zetex products are distributed worldwide. For details, see **www.zetex.com/salesnetwork**

This publication is issued to provide outline information only which (unless agreed by the company in writing) may not be used, applied or reproduced for any purpose or form part of any order or contact or be regarded as a representation relating to the products or services concerned. The company reserves the right to alter without notice the specification, design, price or conditions of supply of any product or service.