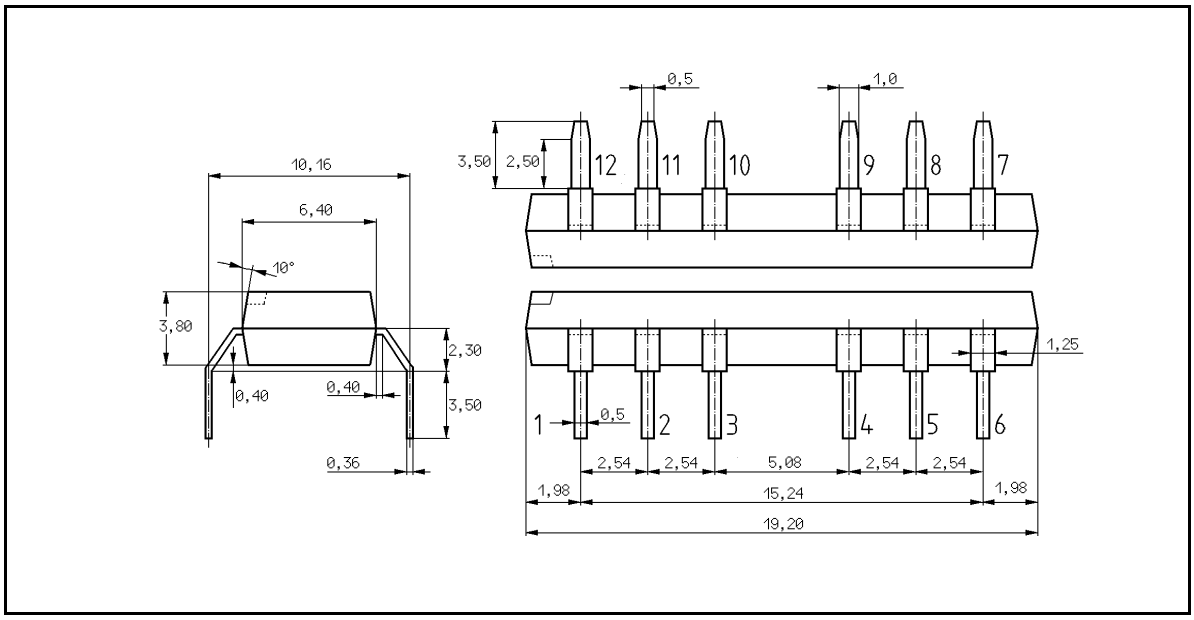
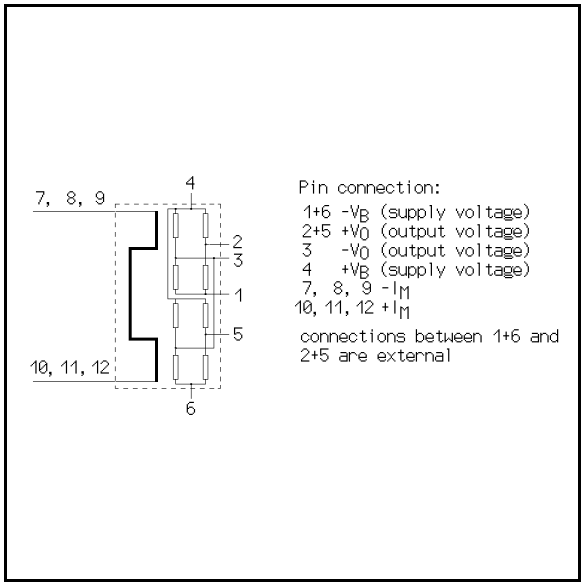
Current Sensor

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 °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 °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°C
Bridge supply current (constant current source)	I_{br}	-	13	-	mA	T_{amb} = -25...+100°C
Offset coefficient of $V_{outoff1}$ (current supply rejection ratio)	CSRR	-	±1.5	±2.5	mV/mA	
Offset voltage (static, constant)	$V_{outoff1}$	-	±19	æ32	mV	I_{br} =13mA and R_{br} = 0.8kΩ
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	µV/K	I_{br} =13mA and R_{br} = 0.8kΩ
Open circuit sensitivity (absolute V_{out}/I_m, with offset compensation, no disturbing field allowed)	S_a	2.7	3.9	5.1	mV/A	I_{br} =13mA and R_{br} = 0.8kΩ
Resistance of the conductor	R	-	0.7	-	mΩ	$I_m \leq 10A$
Operating frequency	f_{max}	0	-	100	kHz	

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions
Temparature coefficient of S_a	T_{csi}	-	-	-0.12	%/K	I_{br} =13mA and R_{br} = 0.8kΩ
Output voltage range	V_{out}	-	–	<æ100	mV	I_{br} =13mA and R_{br} = 0.8kΩ
Nonlinearity error of S_a	NLE	-	|6|	–	%	I_{m1} = 1A; I_{m2} = 2A
Disturbance signal influence on disturbing field H_d (V_{out} =I_m*S_a + V_{outhd})	V_{outhd}	-	±0.5	-	mV	I_{br} =13m; R_{br} = 0.8kΩ and H_d = 10A/m in 50mm distance to sensor

Equations of condition:

$V_{outoff1}$ [mV] = CSRR [mV/mA] * I_{br} [mA]
CSRR [mV/mA] = (R_{34} + R_{12} - R_{24} - R_{13}) [Ω] * 0.5 (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 10, 11, 12 : -I_m
pin 2, 5: -V_{out} and pin 3: +V_{out}

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

Devices are identified by type on the body of the device: ZMC10D ZMC10D

Ordering information: ZMC10D..... in boxes

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