VACUUMSCHMELZE	Specification	Item no.: T60404-N4648-X054

K-No.: 26567	**700A Current Sensor** For the electronic measurement of currents: DC, AC, pulsed, mixed with a galvanic Isolation between the primary circuit (high power) and the secondary circuit (electronic circuit)	Date: 12.07.2023

Customer: Standard type	Customers Part no:	Page 1 of 4

Description

- Closed loop (compensation) Current Sensor with magnetic probe
- Printed circuit board mounting
- Casing and materials UL-listed

Characteristics

- excellent accuracy
- very low offset current
- very low temperature dependency and offset current drift
- very low hysteresis of offset current
- short response time
- wide frequency bandwidth
- compact design
- reduced offset ripple

Applications

Mainly used for stationary operation in industrial applications:

- AC variable speed drives and servo motor drives
- static converters for DC motor drives
- Battery supplied applications
- Switched Mode Power Supplies (SMPS)
- Power supplies for welding applications
- Uninterruptable Power Supplies (UPS)

Electrical data - Ratings

I_{PN}	Primary nominal RMS current			700	A
R_M	Measuring resistance			0 … 200	Ω
I_{SN}	Secondary nominal RMS current			233	mA
K_N	Transformation ratio			(1) : 3000	

Accuracy – Dynamic performance data		**min.**	**typ.**	**max.**	**Unit**
$I_{P,max}$	Max. measuring range @V_C=±15V, R_M < 10Ω (t_{max} = 10sec)	1250			A
X	Accuracy @ I_{PN}, ϑ_A = 25°C			0.5	%
ε_L	Linearity			0.1	%
I_O	Offset current @ I_P = 0A, ϑ_A = 25°C			0.15	mA
t_r	Response time		<1		µs
t_{ra}	Reaction time		<1		µs
f	Frequency bandwidth (with reduced Amplitude)	DC…50			kHz

General data

ϑ_A	Ambient operation temperature (not with full I_{PN})[1)]	-40		85	°C
ϑ_S	Ambient storage temperature (acc. M3101)	-40		85	°C
m	Mass		165		g
V_C	Supply voltage	±14.25	±15	±15.75	V
I_C	Supply current at I_P = 0A and RT		±42		mA
	Constructed and manufactured and tested in accordance with IEC 61800-5-1 (2007) (Pin 1-4 to inner hole) Insulation material group 1, Pollution degree 2, Overvoltage category III				
s_{clear}	Clearance	8			mm
s_{creep}	Creepage	12			mm
$U_{sys, re}$	System voltage (reinforced insulation)			600	V_{RMS}
$U_{work, re}$	Working voltage (reinforced insulation)			1000	V_{RMS}
U_{PD}	Rated discharge voltage			1414	V_{PEAK}
$U_{sys, basic}$	System voltage (basic insulation)			1000	V_{RMS}
$U_{work, basic}$	Working voltage (basic insulation)			2400	V_{RMS}
	max. Potential Difference acc. to UL 508			600	V_{RMS}

[1)] Maximal continues primary current at given ambient temperatures:

ϑ_A	max. I_P
-40°C … 70°C	700A_{RMS}
-40°C … 85°C	400A_{RMS}

Date	Name	Issue	Amendment
12.07.2023	DJ	81	Page 4: under “AC Current Derating” Measured without feedback… deleted. Minor change
20.10.2020	DJ	81	Mechanical outline corrected. Is already introduced in production. Minor change

Editor: R&D-PD CS	Designer: DJ		MC-PM: NSch.			Released: SB

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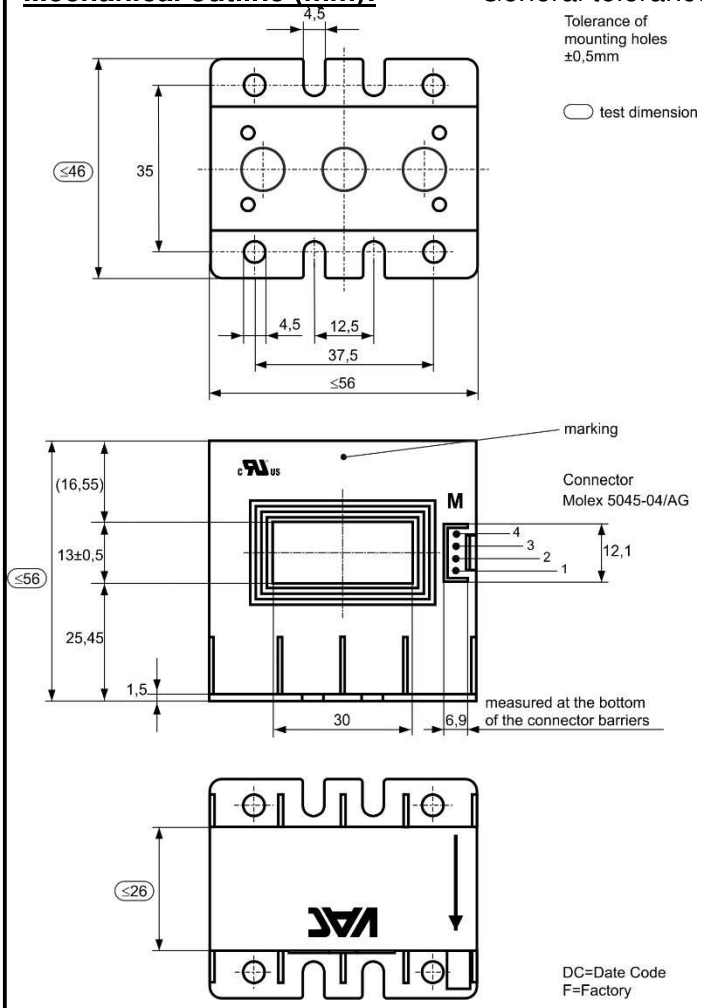
Mechanical outline (mm):

General tolerances DIN ISO 2768-c



Connections:
Pins 1-4: 0.64mm x 0.64mm

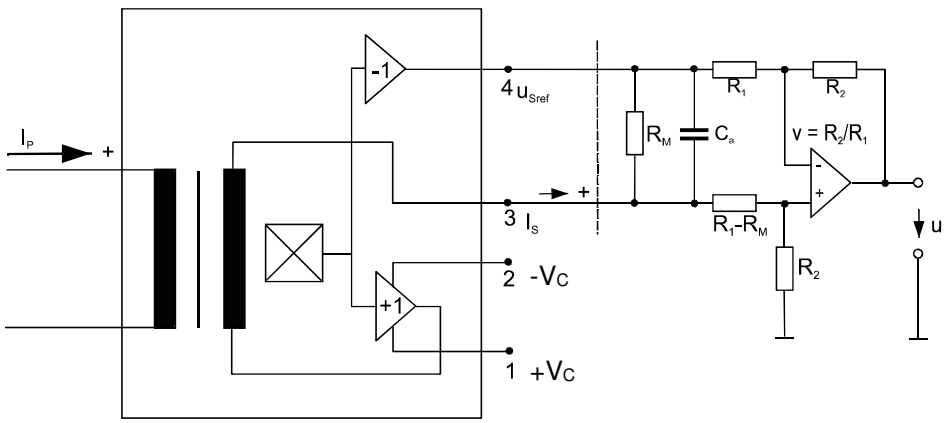
Marking:

UL-sign 4648-X054 F DC

F: Factory
DC: Datecode

Datecode Format: [YYWW]
Example: 1946: 2019, Week 46

Schematic diagram:



REMARK:
Pin4 must NEVER be connected to ground.

Sensor will be destroyed!

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Electrical data: (investigate by a type checking)

		min.	typ.	max.	Unit
$V_{C,tot}$	maximum supply voltage (without function) ±15.75V to ±18V: for 1s per hour			±18	V
R_S	Secondary coil resistance @ ϑ_A = 85°C			60	Ω
X_{TI}	Temperature drift of X @ ϑ_A = -40°C ... 85°C			0.1	%
I_{Ot}	Long term drift of I_O			0.1	mA
I_{OT}	Offset current temperature drift I_O @ ϑ_A = -40°C … 85°C			0.05	mA
I_{OH}	Hysteresis current @ I_P = 0A (caused by I_P = 3 x I_{PN})			0.15	mA
$\Delta I_O/\Delta V_C$	Supply voltage rejection ratio			0.1	mA/V
i_{OSS}	Offsetripple* (with 1 MHz-Filter, first order)		0.3	0.8	mA_{PP}
i_{OSS}	Offsetripple* (with 100 kHz-Filter, first order)		0.1		mA_{PP}
i_{OSS}	Offsetripple* (with 20 kHz-Filter, first order)		0.05		mA_{PP}
C_k	Maximum possible coupling capacity (primary - secondary)		20		pF
	Mechanical stress according to M3209/3 Settings: 10-2000Hz, 1min/oct, 2 hours		2		g

Routine Tests: (Measurement after temperature balance of the samples at room temperature, SC=significant characteristic)

K_N (SC)	(100%) M3011/6:	Transformation ratio	2985 ... 3015	
I_O	(100%) M3226:	Offset current	0.15	mA
U_d	(100%) M3014:	Test voltage, 1s	1.8	kV_{RMS}
U_{PDE} U_{PD}*1.875	(AQL 1/S4) M3024:	Partial discharge voltage (extinction)	1.5 1.875	kV_{RMS}

Type testing: (Precondition acc. to M3236)

$\hat{U}_W$	HV transient test acc. to M3064 (1.2µs / 50µs) 5 pulses -> polarity +, 5 pulses -> polarity -	8	kV
U_d	Test voltage acc. to M3014, 60s	3.6	kV_{RMS}
U_{PDE} U_{PD}*1.875	Partial discharge voltage (extinction) acc. to M3024	1.5 1.875	kV_{RMS}

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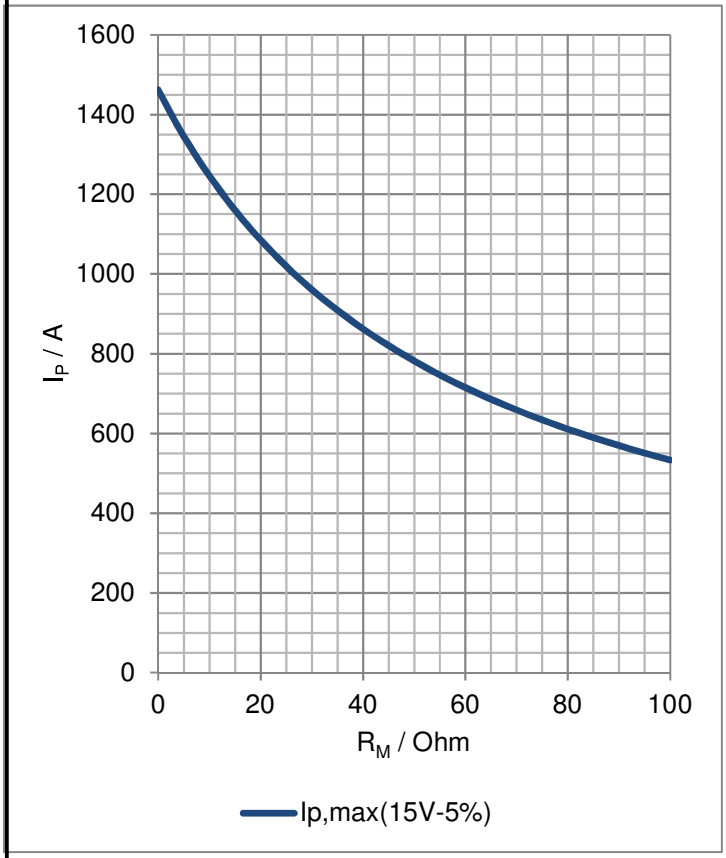
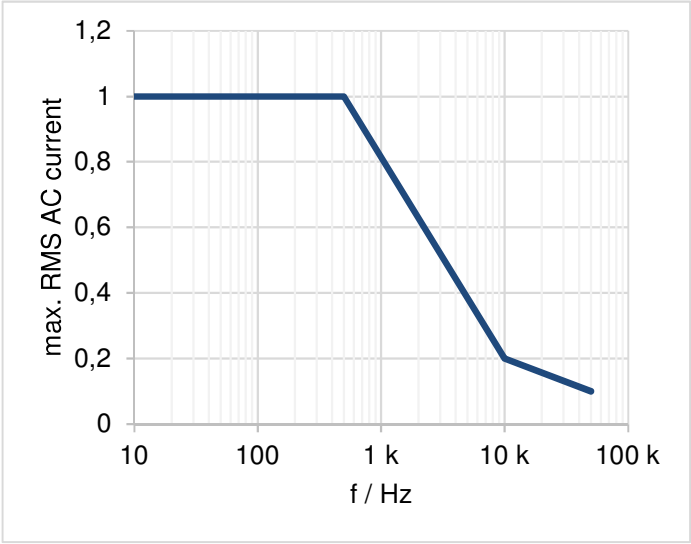
Limit curve of measurable current:



AC Current Derating:



***Possible way to reduce the Offset ripple by a Low-Pass-Filter**

The offset ripple can be reduced by an external low pass. Simplest solution is a passive low pass filter of 1st order with cutoff frequency:

$$f_g = \frac{1}{2 * \pi * R_M * C_a}$$

In this case the response time is enlarged:

$$t_r' \geq t_r + 2{,}5 * R_M * C_a$$

Other instructions

- Current direction: A positive output current appears at point I_S, if primary current flows in direction of the arrow.
- Temperature of the primary conductor should not exceed 105°C.
- The PCBA of this sensor is covered with conformal coating and the sensor is filled with resin.
- Housing and bobbin material UL-listed: Flammability class 94V-0. Resin UL-listed: Flammability class 94V-2.
- Further standards: UL508, UL-file: E317483, category NMTR2 / NMTR8

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