

### General Description:

The PCB-mounted current sensor is designed for accurate measurement of AC, DC and pulsed DC currents, offering reliable galvanic isolation between the primary and secondary circuits. It comes pre-calibrated to simplify integration and ensure consistent performance across a wide range of applications.

### Features:

- PCB mount
- Pre-calibrated
- AC and DC current measurement
- Compact and cost efficient design
- Fast response
- Good electrical Isolation
- RoHS & REACH compliant

### Advantages:

- Excellent measurement accuracy
- Low magnetic and electrical offset
- Good linearity
- Low sensitivity drift
- Easy installation (PCB mount)
- Low power consumption
- Light weight
- Robust Design

### Application:

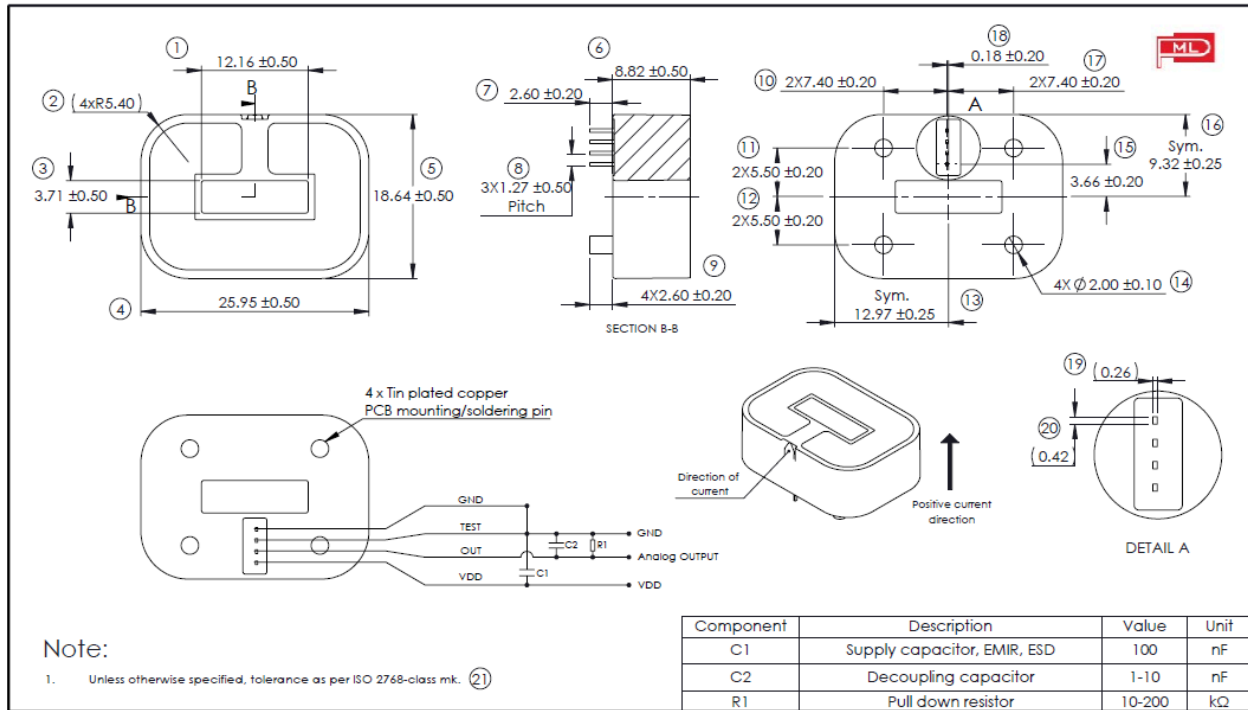
- Motor Control Units (MCUs) for Electric Vehicles
- Inverters for Electric Vehicles
- DC-DC Converters for Electric Vehicles
- Charging Systems for Solar and Electric Vehicles
- Battery Management and Monitoring Systems

### Absolute Maximum Ratings:

Parameter	Symbol	Value	Unit
Positive Supply Voltage (overvoltage)	$V_{DD}$	+10	V
Reverse Voltage Protection	$V_{S_{REV}}$	-0.3	V
Positive Output Voltage	$V_{OUT}$	+10	V
Output Current	$I_{OUT}$	+70	mA
Reverse Output Voltage	$V_{O_{REV}}$	-0.3	V
Reverse Output Current	$I_{O_{REV}}$	-50	mA
Operating Ambient Temperature Range	$T_A$	-40 to +150	°C
Storage Temperature Range	$T_S$	-55 to +165	°C
Magnetic Flux Density	$I_{P_{MAX}}$	±10	kA
ESD – Human Body Model	$ESD_{HMB}$	2	kV

**Note:** Exceeding the absolute maximum ratings may cause permanent damage. Exposure to absolute maximum-rated conditions for extended periods of time may affect the sensor reliability

**Product Drawing:**



**Ordering information:**

**Part Number:** T-CR-050-R0

**Note:** HNRB-500 comes factory calibrated for 500A<sub>PK</sub>. PML also supports HNRB-500 calibrated for other current ratings.

### General Electrical Specification:

Operating conditions  $T_A = 25^\circ\text{C}$ ,  $V_{DD} = 5V \pm 0.05\%$ , unless otherwise specified.

Parameter	Symbol	Test condition	Min	Typ	Max	Unit
Nominal Supply Voltage	$V_{DD}$		4.5	5	5.5	V
Nominal Supply Current	$I_{DD}$			12.5	15	mA
Output Impedance	$R_{OUT}$	$V_{OUT} = 50\% V_{DD}$		1	5	$\Omega$
Output Capacitive Load	$C_L$		1		10	nF
Output Resistive Load	$R_{LOAD}$	Output resistive load for high linearity and diagnostic band.	10	25	200	k $\Omega$
Linear Output Range	$V_{O_{LIN}}$	Pull-down $\geq 10\text{k}\Omega$	10		90	$\%V_{DD}$
Sensitivity	S			4.00		mV/A
Primary current <sup>(1)</sup>	$I_P$	DC	-500		500	$A_{PK}$
		AC	-353.5		353.5	$A_{RMS}$

<sup>(1)</sup>HNRB-500 comes factory calibrated for  $500A_{PK}$ . PML also supports HNRB-500 calibrated for other current ratings.

### Accuracy Specification:

Operating conditions  $T_A = 25^\circ\text{C}$ ,  $V_{DD} = 5V \pm 0.05\%$ , unless otherwise specified.

Parameter	Symbol	Test condition	Min	Typ	Max	Unit
Electrical Offset Voltage	$V_E$			$\pm 2$	$\pm 5$	mV
Magnetic Offset Current	$I_{MO}$				$\pm 0.4$	$\%I_P$
Sensitivity error @ $I_P$	$S_M$				$\pm 0.4$	$\%S$
Linearity error 0... $I_P$	NL				$\pm 0.32$	$\%I_P$
Measurement error 0... $I_P$	$E_M$				$\pm 1$	$\%I_P$

### Timing Specification:

Operating conditions  $T_A = 25^\circ\text{C}$ ,  $V_{DD} = 5V \pm 0.05\%$ , unless otherwise specified.

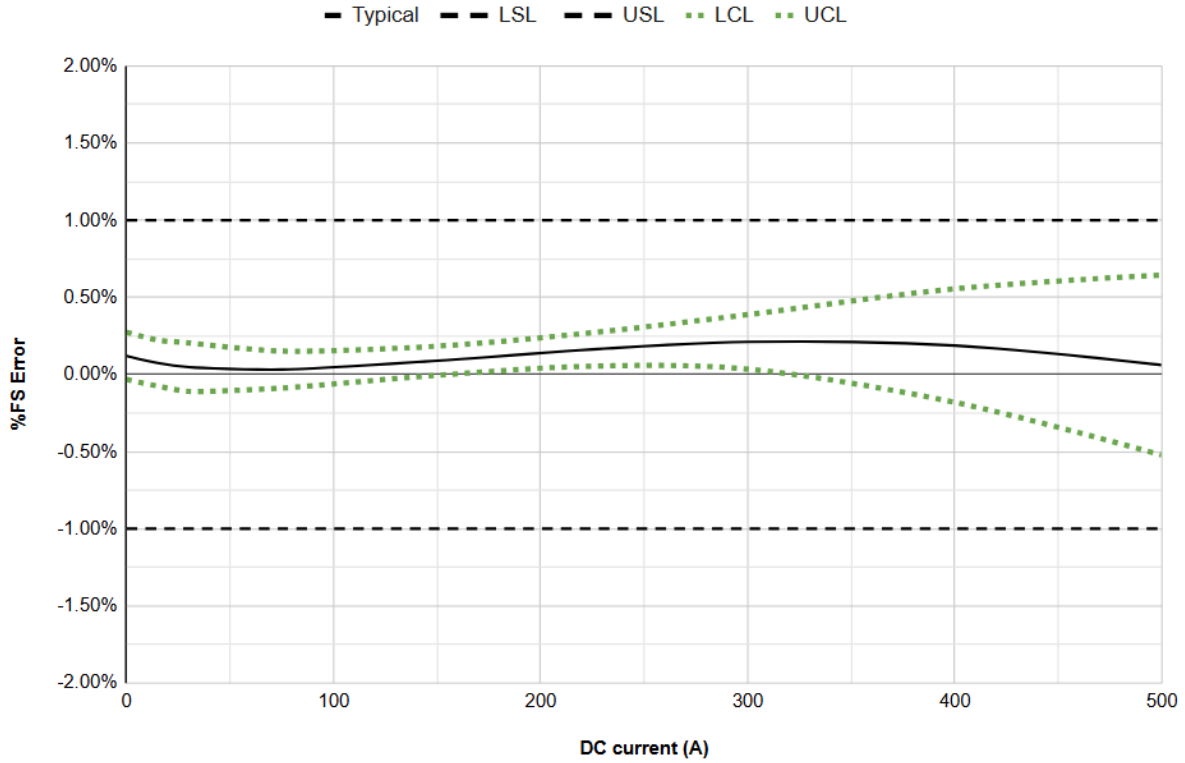
Parameter	Symbol	Test condition	Min	Typ	Max	Unit
Power on Delay	$T_{POD}$	$V_{OUT} = 100\% \text{ of F.S.}$			1	ms
Refresh rate	$T_{RR}$		0.8	1	2	$\mu\text{s}$
Step Response Time ( $C_L = 10\text{nF}$ )	$T_R$			6		$\mu\text{s}$
Bandwidth	BW			100		kHz

**Note:** The accuracy specifications are defined for the factory calibrated sensitivity. The HNRB-500 accuracy may vary from above specifications based on the user application.

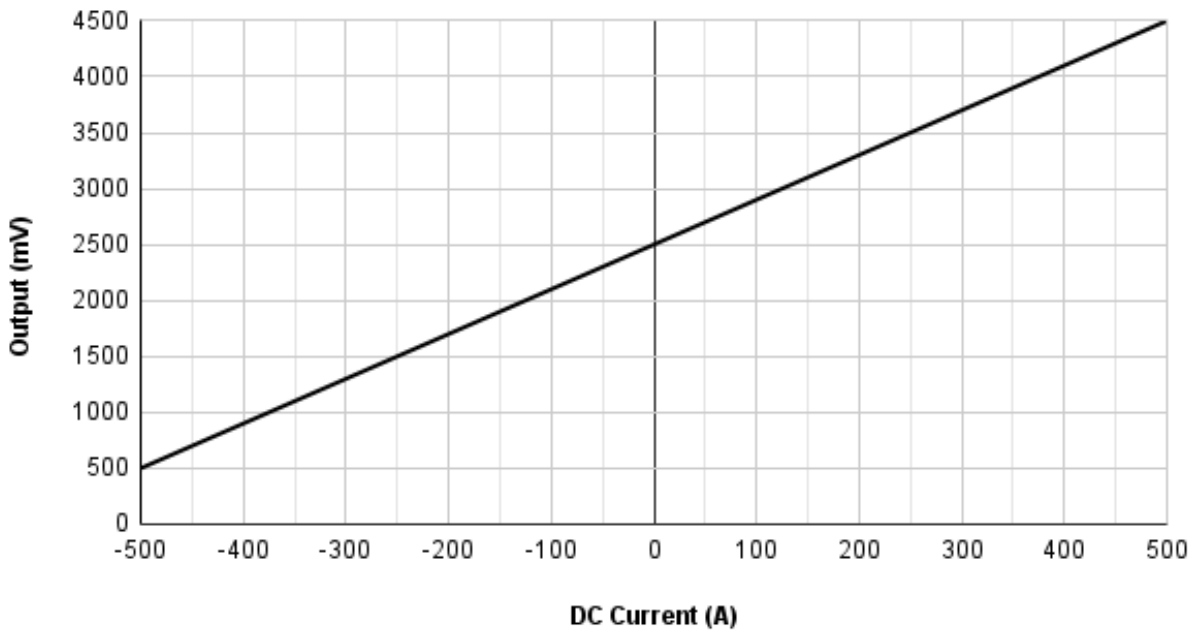
**Typical Performance:**

Operating conditions  $T_A = 25^\circ\text{C}$ ,  $V_{DD} = 5V \pm 0.05\%$ , unless otherwise specified.

**DC current (A) vs %Fs Error**



**DC current (A) vs Output(mV)**



## Disclaimer:

### PML Disclaimer

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