

NACL.XXXP-S6/SP3VN 电流传感器 Current Transducer

I_{PN} = 100, 150, 200, 250A

The NACL.XXXP-S6/SP3VN Current Transducer is for the electronic measurement of DC, AC or pulsed currents, with galvanic separation between the primary circuit and the secondary circuit.

Features

- Closed loop multi-range current transducer
- Voltage output
- Unipolar supply voltage.

Standards

- EN 50178:2017
- IEC 61010-1:2010
- IEC 62109-1:2010



Typical application

- Solar inverter
- Uninterruptible Power Supplies (UPS)
- Switched model power supplies (SMPS)
- Frequency converter
- Battery supplied application
- Static converter for DC motor drives

Absolute rating

Parameter	Symbol	Unit	Specification			Conditions
			Min	Typical	Max	
Maximum supply voltage	U _{C max}	V			7	
Maximum primary current	I _{P max}	A			10×I _{PN}	
Ambient storage temperature	T _S	°C	-40		105	
Ambient operating temperature	T _A	°C	-40		85	
Electrostatic discharge voltage	V _{ESD}	kV			4	HBM
Primary busbar temperature	T _{B max}	°C			110	

Insulation coordination

Parameter	Symbol	Unit	Specification			Conditions
			Min	Typical	Max	
Dielectric withstand voltage	V _D	kV		3		RMS voltage for AC test 50Hz, 1min
Impulse withstand voltage	V _{Ni}	kV			8	1.2/50us
Insulation resistance	R _{INS}	MΩ	500			500V
Clearance distance	d _{CI}	mm	12.9			Shortest distance through air
Creepage distance	d _{CP}	mm	12.9			Shortest path along device body
Comparative tracking index	CTI	V		600		
Case material	-	-		V0		According to UL 94

Electrical parameters (XXXP=100P)

At T_A = 25°C, U_C = +5 V, R_L = 10 kΩ, internal referenece unless otherwise noted.

Parameter	Symbol	Unit	Specification			Conditions
			Min	Typical	Max	
Primary current, nominal range	I _{PN}	A		100		RMS current
Primary current, measuring range	I _{PM}	A	-270		270	
Supply voltage	U _C	V	4.75	5	5.25	
Current consumption	I _C	mA			20	N _S = 1300 turns
Nominal sensitivity	G _{th}	mV/A		6.25		625mV@I _{PN}
Reference voltage @I _P = 0A	V _{ref}	V	2.485	2.5	2.515	Internal reference
External Reference voltage	V _{ref}	V	0.5		2.75	
Electrical offset voltage @I _P = 0A	V _{OE}	mV	-2		2	V _{out} - V _{ref}
Temperature coefficient of V _{OE}	TCV _{OE}	ppm/°C	-50		+50	ppm/k of I _{PN} , -40°C~+85°C
Sensitivity error	ε _S	% of I _{PN}	-0.8		0.8	@I _{PN}
Linearity error	ε _L	% of I _{PN}	-0.2		0.2	@I _{PN}
Temperature coefficient of V _{ref}	TCV _{ref}	ppm/K	-100		100	ppm/k of 2.5V , -40°C~+85°C
Temperature coefficient of G	TCG	ppm/K	-70		70	ppm/k of I _{PN} , -40°C~+85°C
Step response time to 90 % I _{PN}	t _r	μs			2	di/dt ≥ 50 A/μs
Frequency bandwidth ¹⁾	BW	kHz		100		±3 dB
Load resistance	R _L	KΩ	10			

Electrical parameters(XXXP=150P)At $T_A = 25^{\circ}\text{C}$, $U_C = +5\text{ V}$, $R_L = 10\text{ k}\Omega$, internal refernece unless otherwise noted.

Parameter	Symbol	Unit	Specification			Conditions
			Min	Typical	Max	
Primary current, nominal range	I_{PN}	A		150		RMS current
Primary current, measuring range	I_{PM}	A	-450		450	
Supply voltage	U_C	V	4.75	5	5.25	
Current consumption	I_C	mA			20	$N_S = 1473\text{ turns}$
Nominal sensitivity	G_{th}	mV/A		4.16		625mV@ I_{PN}
Reference voltage @ $I_P = 0\text{ A}$	V_{ref}	V	2.485	2.5	2.515	Internal reference
External Reference voltage	V_{ref}	V	0.5		2.75	
Electrical offset voltage @ $I_P = 0\text{ A}$	V_{OE}	mV	-2		2	$V_{out} - V_{ref}$
Temperature coefficient of V_{OE}	TCV_{OE}	ppm/ $^{\circ}\text{C}$	-50		+50	ppm/k of I_{PN} , $-40^{\circ}\text{C}\sim+85^{\circ}\text{C}$
Sensitivity error	ε_S	% of I_{PN}	-0.8		0.8	@ I_{PN}
Linearity error	ε_L	% of I_{PN}	-0.2		0.2	@ I_{PN}
Temperature coefficient of V_{ref}	TCV_{ref}	ppm/K	-100		100	ppm/k of 2.5V, $-40^{\circ}\text{C}\sim+85^{\circ}\text{C}$
Temperature coefficient of G	TCG	ppm/K	-70		70	ppm/k of I_{PN} , $-40^{\circ}\text{C}\sim+85^{\circ}\text{C}$
Step response time to 90 % I_{PN}	t_r	μs			2	$di/dt \geq 50\text{ A}/\mu\text{s}$
Frequency bandwidth ¹⁾	BW	kHz		100		$\pm 3\text{ dB}$
Load resistance	R_L	K Ω	10			

Electrical parameters(XXXP=200P)At $T_A = 25^{\circ}\text{C}$, $U_C = +5\text{ V}$, $R_L = 10\text{ k}\Omega$, internal refernece unless otherwise noted.

Parameter	Symbol	Unit	Specification			Conditions
			Min	Typical	Max	
Primary current, nominal range	I_{PN}	A		200		RMS current
Primary current, measuring range	I_{PM}	A	-450		450	
Primary current, measuring range (transformer effect)	I_{PM}	A	-600		600	$\varepsilon_S \leq \pm 5\%$, $di/dt \geq 50\text{ A}/\mu\text{s}$
Supply voltage	U_C	V	4.75	5	5.25	
Current consumption	I_C	mA			20	$N_S = 1500\text{ turns}$
Nominal sensitivity	G_{th}	mV/A		3.125		625mV@ I_{PN}
Reference voltage @ $I_P = 0\text{ A}$	V_{ref}	V	2.485	2.5	2.515	Internal reference
External Reference voltage	V_{ref}	V	0.5		2.75	
Electrical offset voltage @ $I_P = 0\text{ A}$	V_{OE}	mV	-2		2	$V_{out} - V_{ref}$
Temperature coefficient of V_{OE}	TCV_{OE}	ppm/ $^{\circ}\text{C}$	-50		+50	ppm/k of I_{PN} , $-40^{\circ}\text{C}\sim+85^{\circ}\text{C}$
Sensitivity error	ε_S	% of I_{PN}	-0.8		0.8	@ I_{PN}
Linearity error	ε_L	% of I_{PN}	-0.2		0.2	@ I_{PN}
Temperature coefficient of V_{ref}	TCV_{ref}	ppm/K	-100		100	ppm/k of 2.5V, $-40^{\circ}\text{C}\sim+85^{\circ}\text{C}$
Temperature coefficient of G	TCG	ppm/K	-70		70	ppm/k of I_{PN} , $-40^{\circ}\text{C}\sim+85^{\circ}\text{C}$
Step response time to 90 % I_{PN}	t_r	μs			2	$di/dt \geq 50\text{ A}/\mu\text{s}$
Frequency bandwidth ¹⁾	BW	kHz		100		$\pm 3\text{ dB}$
Load resistance	R_L	K Ω	10			

Electrical parameters(XXXP=250P)At $T_A = 25^{\circ}\text{C}$, $U_C = +5\text{ V}$, $R_L = 10\text{ k}\Omega$, internal refernece unless otherwise noted.

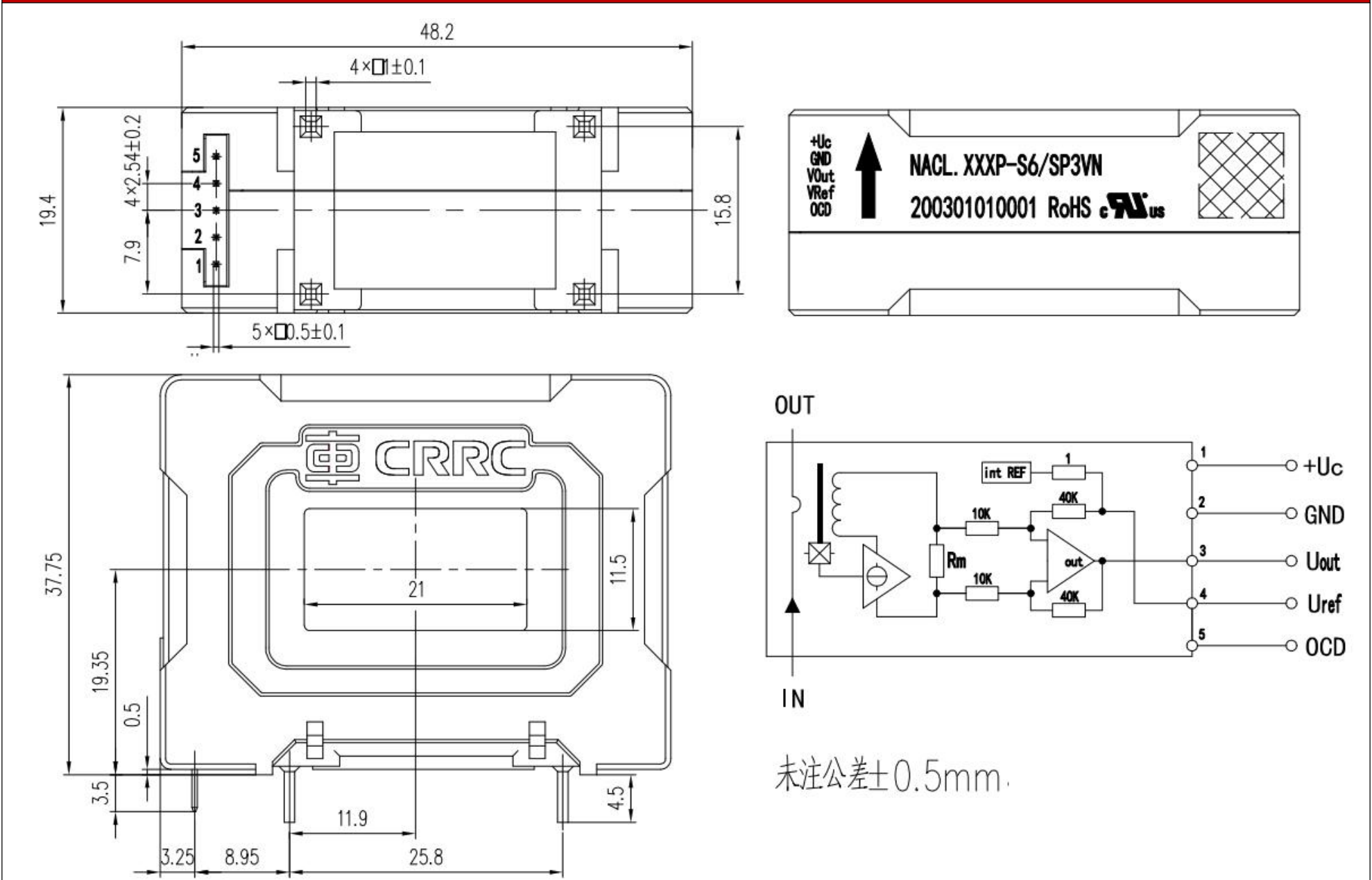
Parameter	Symbol	Unit	Specification			Conditions
			Min	Typical	Max	
Primary current, nominal range	I_{PN}	A		250		RMS current
Primary current, measuring range	I_{PM}	A	-450		450	
Primary current, measuring range (transformer effect)	I_{PM}	A	-650		650	$\varepsilon_S \leq \pm 5\%$, $di/dt \geq 50\text{ A}/\mu\text{s}$
Supply voltage	U_C	V	4.75	5	5.25	
Current consumption	I_C	mA			20	$N_S = 1815\text{ turns}$
Nominal sensitivity	G_{th}	mV/A		2.7		675mV@ I_{PN}
Reference voltage @ $I_P = 0\text{ A}$	V_{ref}	V	2.485	2.5	2.515	Internal reference

Parameter	Symbol	Unit	Specification			Conditions
			Min	Typical	Max	
External Reference voltage	V_{ref}	V	0.5		2.75	
Electrical offset voltage @ $I_P = 0A$	V_{OE}	mV	-2.5		2.5	$V_{out} - V_{ref}$
Temperature coefficient of V_{OE}	TCV_{OE}	ppm/°C	-50		+50	ppm/k of I_{PN} , -40°C~+85°C
Sensitivity error	ε_S	% of I_{PN}	-1		1	@ I_{PN}
Linearity error	ε_L	% of I_{PN}	-0.1		0.1	@ I_{PN}
Temperature coefficient of V_{ref}	TCV_{ref}	ppm/K	-100		100	ppm/k of 2.5V, -40°C~+85°C
Temperature coefficient of G	TCG	ppm/K	-70		70	ppm/k of I_{PN} , -40°C~+85°C
Step response time to 90 % I_{PN}	t_r	μs			2.2	$di/dt \geq 70 A/\mu s$
Frequency bandwidth ¹⁾	BW	kHz		100		±3 dB
Load resistance	R_L	KΩ	10			

Notes:

- 1) The frequency bandwidth test is for small signal.
- 2) Please contact CRRC if current transducer is applied in some extreme cases, for example: high frequency ripple, high temperature, larger operating frequency.....

Dimensions (in mm)

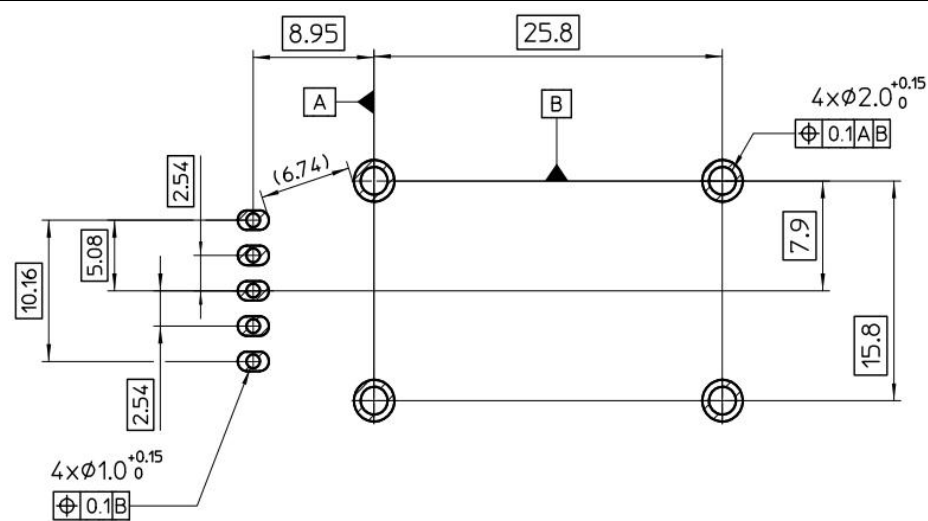


PIN NO.	PIN NAME	Function
1	+U _C	Positive supply voltage
2	GND	Ground connection
3	V _{OUT}	Vout output voltage
4	V _{ref}	Internal reference output voltage.
5	OCD	Not connection

Mechanical characteristics

- Mass: 50g
- General tolerance: ±0.5mm

PCB footprint according to the product (in mm)



Note:

- Wave soldering profile: maximum 260°C for 10 seconds.
- Maximum PCB thickness: 2.5mm.

Remarks

- It is advised to use a primary conductor (busbar) that fills transducer through-hole.
- Be aware of the influence of the external field if nearby transducers are too close (relay, capacitor, choke...).

Comments:

- Items with “*” in this datasheet are recommended value for reference only. The final value must be determined by customer.
- CRRC reserves the right to carry out modifications on its transducers, in order to improve them.