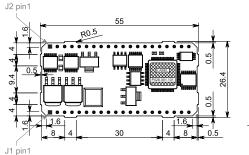
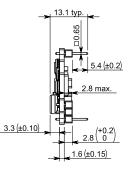
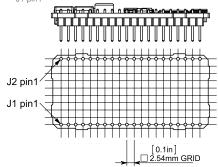


iPOS3602 MX-CAN DATASHEET P/N: P028.001.E101









Motor – sensor configurations							
Motor Sensor	PMSM	BLDC	DC BRUSH	STEP (2-ph)	STEP (3-ph)		
Incr. Encoder	7		(L)	7			
Incr. Encoder + Hall	T	T					
Analog Sin/Cos encoder	7						
Linear Halls	T						
Digital Halls	•						
Tacho			T				
Open-loop (no sensor)				T	7		

Connectors type						
Ref.	Producer	On-board connector	Mating connector			
	Fischer Elektronik	SL 11 112 020 G	BL 5 20			
J1, J2	-	Standard header square pin 0.635 x 0.635 mm; 2.54 mm pitch	Standard socket for square pin 0.635 x 0.635 mm; 2.54 mm pitch			

14	REF	ı	Analogue input, 12-bit, 0-5V. Used to read an analog position, speed or torque reference, or used as general purpose analogue input
15	Z / Z+	- 1	Incr. encoder Z (index) single-ended, or Z+ diff. input
16	Z- / LH3	ı	Incr. encoder Z- differential input, or linear Hall 3 input
17	A / A+ / Sin+	ı	Incr. encoder A single-ended, or A+ diff. input, or analogue encoder Sin+ diff. input
18	A- / Sin- / LH1	ı	Incr. encoder A- diff. input, or analogue encoder Sindiff. input, or linear Hall 1 input
19	B / B+ / Cos+	ı	Incr. encoder B single-ended, or B+ diff. input, or analogue encoder Cos+ diff. input
20	B- / Cos- / LH2	ı	Incr. encoder B- diff. input, or analogue encoder Cos-diff. input, or linear Hall 2 input

	Pin	Name	Type	Description
	1-2	A / A+	0	Phase A for 3-ph motors, A+ for 2-ph steppers, Motor+ for DC brush motors
	3-4	C / B+	0	Phase C for 3-ph motors, B+ for 2-ph steppers
	5-6	GND	-	Negative return (ground) of the motor supply
•	7	IN0	ı	5-36V digital input General-purpose
	8	IN1	ı	5-36V digital input
•	9	IN2 / LSP	1	5-36V digital input Positive limit switch input
	10 IN3 / LSN	IN3 / LSN	I	5-36V digital input Negative limit switch input
7	11	IN4 / Enable	I	5-36V digital input Drive enable input
7	12	GND	-	Return ground
	13	+5V _{OUT}	0	5V output supply
	14	AxisID 2	ı	Axis ID/Address input. 7 states: floating, strap to GND or +5V, resistor 4K7 or 22K to GND or +5V
•	15	AxisID 1	ı	Axis ID/Address input. 7 states: floating, strap to GND or +5V, resistor 4K7 or 22K to GND or +5V
	16 AxisID 0 I		ı	Axis ID/Address input. 7 states: floating, strap to GND or +5V, resistor 4K7 or 22K to GND or +5V
	17	Can-Lo	I/O	CAN-Bus negative line (dominant low)
	18	Can-Hi	I/O	CAN-Bus positive line (dominant high)
	19	232TX	0	RS-232 Data Transmission
	20	232RX		RS-232 Data Reception

Features

- Motor supply: 9-36V. Optional logic supply: 7-36V
- Output current: 2A cont. (BLDC mode); 3.2A_{PEAK}, up to 100KHz PWM
- Digital Hall sensor interface (single-ended and open collector)
- Incremental encoder interface (single-ended, open collector and differential)
- Linear Hall sensors interface
- Analogue sin/cos encoder interface (differential 1V_{pp})
- 5 digital inputs, 5-36V, NPN: Enable, 2 for limit switches, 2 generalpurpose
- 3 digital outputs, 5-36V, 0.5A, NPN O.C.: Ready, Error, 1 general-purpose
- 1 analogue input: 12-bit, 0-5V: Reference or general purpose
- RS-232 serial & CAN-bus 2.0B interfaces with h/w selectable addresses
- TMLCAN and CANopen (CiA 301v4.2 and 402v3.0) protocols
- 2K × 16 SRAM for data acquisition
- 4K × 16 E²ROM to store TML motion programs and data
- Operating ambient temperature: 0-40°C (over 40°C with derating)
- Hardware Protections: short-circuit between motor phases and from motor phases to GND, over-voltage, under-voltage and I²t
- Firmware: F509M+ or F524E+

C	Connector description						
	Pin	Name	Type	Description			
	1-2	B/A-	0	Phase B for 3-ph motors, A- for 2-ph steppers, Motor- for DC brush motors			
	3-4	CR / B-	0	Chopping resistor / Phase B- for step motors			
	5-6	+V _{MOT}	I	Positive terminal of the motor supply: 9 to $36V_{\text{DC}}$			
-	7	$+V_{LOG}$	ı	Positive terminal of the logic supply: 7 to $36V_{DC}$			
7	8	OUT3 / Ready	0	5-36V 0.5A drive ready output, active low, NPN open-collector/TTL pull-up. Also drives the green LED.			
	9	OUT2 / Error	0	5-36V 0.5A drive error output, active low, NPN open-collector/TTL pull-up. Also drives the red LED $$			
	10	Hall 1	ı	Digital input Hall 1 sensor			
	11	Hall 2	ı	Digital input Hall 2 sensor			
	12	Hall 3	<u> </u>	Digital input Hall 3 sensor			
	13	OUT0	0	5-36V 0.5A general-purpose digital output, NPN open-collector / TTL pull-up			

Name	First edition	Document template: P099.TQT.564.0001	Last edition Visa :	
A. N.	May 11, 2011		October 04, 2018	R. G.
		Title of document N° document		
(2) LE	CHNOSOFT	iPOS3602 MX-CAN	P028.001.E101.DSH.10I.docx	
		PRODUCT DATA SHEET		Page: 1 of 4



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Electrical characteristics

All parameters measured under the following conditions (unless otherwise specified):

Tamb = 0...40°C, VLOG = 24 VDC; VMOT = 36VDC

Supplies start-up / shutdown sequence: -anyLoad current (sinusoidal amplitude / continuous BLDC, DC, stepper) = 2A

Operating Condit	ions		Min.	Тур.	Max.	Units
Ambient temperate	ure1		0		+40	°C
Ambient humidity		Non-condensing	0		90	%Rh
Altitude / pressure	2	Altitude (vs. sea level) Ambient Pressure	-0.1	0 ÷ 2.5 0.75 ÷ 1	10.0	Km atm
Storage Conditio	ns	Ambient Fressure	Min.	Typ.	Max.	Units
Ambient temperate			-40	- 7	+85	°C
	ai c	Nan anadanaina				
Ambient humidity Ambient Pressure		Non-condensing	0		100 10.0	%Rh atm
		Not powered; applies to	0			
ESD capability (Human body mod	lal\	any accessible part			±0.5	kV
(Human body mod	iei)	Original packaging			±15	kV
Mechanical Mour	iting		Min.	Тур.	Max.	Units
Airflow	_			al convecti	on³, close	
Spacing required	_	ween adjacent drives ween drives and nearby	30			mm
for vertical	wal		30			mm
mounting	_	ween drives and roof-top	20			mm
		ween adjacent drives	4			mm
Spacing required	Bet wal	ween drives and nearby Is	5			mm
for horizontal mounting		ace needed for drive noval	10			mm
		ween drives and roof-top	15			mm
Insertion force	Usi	ng recommended mating		20	36	N
Extraction force		nectors; without retainer	5	10		N
Environmental C	hara	cteristics	Min.	Тур.	Max.	Units
Size (Length x Width x Height)	Glo	bal size	55	x 26.4 x 1	3.1	mm
Widan X Holgin)	Oic	541 5120	~	inch		
Weight			8			g
Power dissipation		e (no load) erating		3		W
Efficiency	Ор	craurig		98		%
Cleaning agents	Dry	cleaning is	Only Water- or Alcohol-			
Protection		ommended cording to IEC60529,	Offiny		Alcohol E	T
degree	UL			IP00		-
Logic Supply Inp			Min.	Тур.	Max.	Units
		minal values	7		36	V _{DC}
	driv	solute maximum values, re operating but outside	4.9		40	V _{DC}
Supply voltage		ranteed parameters solute maximum values,	0.7		40	.,
Cappi, railings		tinuous	-0.7		42	V _{DC}
		solute maximum values,				.,
	sur	†	-1		+45	V
		ration ≤ 10ms) · og = 7V		125	300	
		.og = 12V		80	200	٠.
Supply current	+V _L	og = 24V		50	125	mA
	+V _L	_{.og} = 40V		40	100	
Motor Supply Inp			Min.	Тур.	Max.	Units
1		minal values solute maximum values,	9		36	V _{DC}
	driv	solute maximum values, re operating but outside tranteed parameters	8.5		40	V _{DC}
Supply voltage	Abs	solute maximum values, itinuous	-0.7		42	V _{DC}
		solute maximum values, ge (duration ≤ 10ms)	-1		+45	٧
-	Idle			1	5	mA
L .	_	erating	-3.2	±2	+3.2	A
Supply current	Abs	solute maximum value, ort-circuit condition			5	А
	(du	ration ≤ 10ms) [†]				

/A+, B/A-, C/B+,	-	Min.	Тур.	Max.	Units	
BLDC motors wi	ith Hall-based			2		
for PMSM motor sinusoidal contro amplitude value)	rs with FOC ol (sinusoidal)			2	A	
			1.41			
maximum 24s	-3.2		+3.2	Α		
measurement ra		±4.3	±5	А		
					μs	
including typical	mating		±0.3	±0.5	V	
			±0.5	±1	mA	
Recommended	F _{PWM}	250				
value, for curren	40 kHz				1	
	of 60 kHz	100			μН	
	80 kHz	60	1	1	1	
+ V MOT = 30 V	100 kHz	45				
Minimum	20 kHz	75				
	40 KHZ	25				
	. 60 KHZ				μН	
+V _{MOT} = 36 V	80 kHz					
-					1	
					μs	
error	100 kHz	50			\dashv	
FS = Full Scale	accuracy		±4	±8	%FS	
IN3/I SN IN4/F	nahle)	Min.	Тур.	Max.	Units	
, 1140/ 2014, 114-7/2			TTL / CMOS / LVTTL (3.3V) / Open- collector / NPN / 24V outputs			
Input floating (w			ector / NPN	I / 24V out		
disconnected)			ector / NPN Logic	I / 24V out		
disconnected) Logic "LOW"		colle	Logic	I / 24V out		
disconnected) Logic "LOW" Logic "HIGH"	iring		Logic 0 5÷24	I / 24V out		
disconnected) Logic "LOW" Logic "HIGH" Floating voltage	iring	colle	Logic	I / 24V out		
disconnected) Logic "LOW" Logic "HIGH" Floating voltage connected) Absolute maxim	iring	colle 2	Logic 0 5÷24	I / 24V out		
disconnected) Logic "LOW" Logic "HIGH" Floating voltage connected)	(not um,	2 -10	Logic 0 5÷24	1 / 24V out HIGH 0.8 +30	puts	
disconnected) Logic "LOW" Logic "HGH" Floating voltage connected) Absolute maxim continuous Absolute maxim (duration ≤ 1s) togic "LOW"	(not um, um, surge	colle 2	Logic 0 5÷24 3	1/24V out HIGH 0.8 +30 +40	puts	
disconnected) Logic "LOW" Logic "HIGH" Floating voltage connected) Absolute maxim continuous Absolute maxim (duration ≤ 15) Logic "LOW"; ull	(not um, um, surge	2 -10	Logic 0 5÷24	1 / 24V out HIGH 0.8 +30	puts	
disconnected) Logic "LOW" Logic "HIGH" Floating voltage connected) Absolute maxim continuous Absolute maxim (duration ≤ 1S) [†] Logic "LOW"; ull Logic "HIGH"; In	(not um, um, surge	2 -10	Logic 0 5÷24 3	1/24V out HIGH 0.8 +30 +40	puts	
disconnected) Logic "LOW" Logic "HIGH" Floating voltage connected) Absolute maxim continuous Absolute maxim (duration ≤ 1S) Logic "LOW"; ull Logic "HIGH"; In pull-up to +3.3	(not um, surge led to GND ternal 4.7ΚΩ	2 -10 -20	Logic 0 5÷24 3 0.6 0	1/24V out HIGH 0.8 +30 +40 1 0	V	
disconnected) Logic "LOW" Logic "HIGH" Floating voltage connected) Absolute maxim continuous Absolute maxim (duration ≤ 15) Logic "LOW"; ull Logic "HIGH"; In pull-up to +3.3 Logic "HIGH"; P	(not um, surge led to GND sternal 4.7ΚΩ ulled to +5V	2 -10 -20	Logic 0 5÷24 3	+30 +40 0.2	V	
disconnected) Logic "LOW" Logic "HIGH" Floating voltage connected) Absolute maxim continuous Absolute maxim (duration ≤ 1S) Logic "LOW"; ull Logic "HIGH"; In pull-up to +3.3	(not um, surge led to GND sternal 4.7ΚΩ ulled to +5V	2 -10 -20	ector / NPN Logic 0 5÷24 3 0.6 0 0.15	1/24V out HIGH 0.8 +30 +40 1 0	V	
disconnected) Logic "LOW" Logic "HIGH" Floating voltage connected) Absolute maxim continuous Absolute maxim (duration ≤ 15) Logic "LOW"; ull Logic "HIGH"; In pull-up to +3.3 Logic "HIGH"; P	(not um, surge led to GND sternal 4.7ΚΩ ulled to +5V	-10 -20	ector / NPN Logic 0 5÷24 3 0.6 0 0.15	+30 +40 1 0.2 2.5	V mA	
disconnected) Logic "LOW" Logic "HIGH" Floating voltage connected) Absolute maxim continuous Absolute maxim (duration ≤ 15) Logic "LOW"; ull Logic "HIGH"; In pull-up to +3.3 Logic "HIGH"; P	(not um, um, surge led to GND sternal 4.7KΩ ulled to +5V ulled to +24V	-10 -20 0	ector / NPN Logic 0 5÷24 3 0.6 0 0.15	+30 +40 1 0.2 2.5	V mA	
disconnected) Logic "LOW" Logic "HIGH" Floating voltage connected) Absolute maxim continuous Absolute maxim (duration ≤ 1S) Logic "LOW"; ull Logic "HIGH"; In pull-up to +3.3 Logic "HIGH"; P Logic "HIGH"; P	(not um, surge led to GND sternal 4.7KΩ ulled to +5V ulled to +24V	-10 -20 0 3.3	ector / NPN Logic 0 5÷24 3 0.6 0 0.15	+30 +40 1 0.2 2.5	y mA kHz μs	
disconnected) Logic "LOW" Logic "HIGH" Floating voltage connected) Absolute maxim continuous Absolute maxim (duration ≤ 1S) Logic "LOW"; ull Logic "HIGH"; In pull-up to +3.3 Logic "HIGH"; P Logic "HIGH"; P	(not um, surge led to GND sternal 4.7ΚΩ ulled to +5V ulled to +24V	-10 -20 0 3.3 ±5 Min.	Logic 0 5÷24 3 0.6 0 0.15 2	+30 +40 1 0.2 2.5 150 Max.	mA kHz µs kV Units	
disconnected) Logic "LOW" Logic "HIGH" Floating voltage connected) Absolute maxim continuous Absolute maxim (duration ≤ 1S) Logic "LOW"; ull Logic "HIGH"; In pull-up to +3.3 Logic "HIGH"; P Human body mo or, OUT3/ Ready All outputs (OUT OUT2/Error, OU	(not um, surge led to GND sternal 4.7KΩ ulled to +5V ulled to +24V	Colle	Logic O	1/ 24V out HIGH 0.8 +30 +40 1 0 0.2 2.5 150 Max. en-collect	mA kHz µs kV Units	
disconnected) Logic "LOW" Logic "HIGH" Floating voltage connected) Absolute maxim continuous Absolute maxim (duration ≤ 1S) Logic "LOW"; ull Logic "LOW"; ull Logic "HIGH"; In pull-up to +3.3 Logic "HIGH"; P Logic "HIGH"; P Human body mc or, OUT3/ Ready All outputs (OUT OUT2/Error, OU Ready, Error	(not um, surge ed to GND ternal 4.7KΩ ulled to +5V ulled to +24V	Colle	Logic O S÷24 3 O O O O O O O O	1/ 24V out HIGH 0.8 +30 +40 1 0 0.2 2.5 150 Max. en-collect	mA kHz µs kV Units	
disconnected) Logic "LOW" Logic "HIGH" Floating voltage connected) Absolute maxim continuous Absolute maxim (duration ≤ 1S) Logic "LOW"; ull Logic "HGH"; IP Logic "HIGH"; P Logic "HIGH"; P Human body mc or, OUT3/ Ready All outputs (OUT OUT2/Error, OUT2/Error, OUT2/Error, OUT3/ Ready, Error Not supplied (+\)	(not um, surge ed to GND ternal 4.7KΩ ulled to +5V ulled to +24V	Colle	Logic O	+30 +40 1 0 0.2 2.5 150 Max. en-collect	mA kHz µs kV Units	
disconnected) Logic "LOW" Logic "HIGH" Floating voltage connected) Absolute maxim continuous Absolute maxim (duration ≤ 1S) Logic "LOW"; ull Logic "HIGH"; In pull-up to +3.3 Logic "HIGH"; P Logic "HIGH"; P Human body mc or, OUT3/ Ready All outputs (OUT OUT2/Error, OU Ready, Error Not supplied (+\\ or to GND)	(not um, surge led to GND sternal 4.7KΩ ulled to +5V ulled to +24V lodel lode	Colle	Logic 0 5÷24 3 0.6 0 0.15 2 Typ. MOS / Op 2: as above High-Z (/ 24V out HIGH	mA kHz µs kV Units	
disconnected) Logic "LOW" Logic "HIGH" Floating voltage connected) Absolute maxim continuous Absolute maxim (duration ≤ 1S) Logic "LOW"; ull Logic "HIGH"; In pull-up to +3.3 Logic "HIGH"; P Human body mo or, OUT3/ Ready All outputs (OUT OUT2/Error, OU Ready, Error Not supplied (+\ or to GND) Immediately	(not um, surge led to GND sternal 4.7KΩ ulled to +5V ulled to +24V loadel loads) To, T3/Ready) /Log floating OUT0	Colle	Logic O	/ 24V out HIGH	mA kHz µs kV Units	
disconnected) Logic "LOW" Logic "HIGH" Floating voltage connected) Absolute maxim continuous Absolute maxim (duration ≤ 1S) Logic "LOW"; ull Logic "HGH"; In pull-up to +3.3 Logic "HIGH"; P Logic "HIGH"; P Togic "HIGH"; P Logic "HIGH"; P Togic "HIGH"; P	(not um, surge led to GND ternal 4.7KΩ ulled to +5V ulled to +24V lodel lodge floating OUT2/Error, OUT3/Ready)	Colle	Logic 0 5÷24 3 0.6 0 0.15 2 Typ. MOS / Op 2: as above High-Z (/ 24V out HIGH	mA kHz µs kV Units	
disconnected) Logic "LOW" Logic "HIGH" Floating voltage connected) Absolute maxim continuous Absolute maxim (duration ≤ 1S) Logic "LOW"; ull Logic "HIGH"; In pull-up to +3.3 Logic "HIGH"; P Logic "HIGH"; P Human body mc or, OUT3/ Ready All outputs (OUT OUT2/Error, OU Ready, Error Not supplied (+\ or to GND) Immediately after power- up	(not um, surge ed to GND ternal 4.7KΩ ulled to +5V ulled to +24V edel) (not um, surge ed to GND ternal 4.7KΩ ulled to +5V ulled to +5V ulled to +24V edel) (not um, surge ed to GND ternal 4.7KΩ edel) (not um, surge ed to GND ternal 4.7KΩ edel) (not um, surge ed to GND ternal 4.7KΩ edel ed.	Colle	Logic O	/ 24V out HIGH	mA kHz µs kV Units	
	for DC brushed, BLDC motors w trapezoidal cont for PMSM motor sinusoidal contramplitude value for PMSM motor sinusoidal contramplitude value for PMSM motor sinusoidal contramplitude value) maximum 24s Mominal output including typical connector contate value, for currer ripple max. ±5% full range; +V _{MOT} = 36 V Minimum value, limited by short-circuit protection +V _{MOT} = 36 V Recommended value for ±5% current measure-ment error FS = Full Scale	for DC brushed, steppers and BLDC motors with Hall-based trapezoidal control for PMSM motors with FOC sinusoidal control (sinusoidal amplitude value) for PMSM motors with FOC sinusoidal control (sinusoidal effective value) maximum 24s Measurement range Nominal output current; including typical mating connector contact resistance Recommended value, for current ripple max. ±5% of full range; +V _{MOT} = 36 V Minimum value, limited by short-circuit protection; +V _{MOT} = 36 V Recommended value for ±5% current measure-ment error Recommended value for ±5% current fook kHz do kHz	for DC brushed, steppers and BLDC motors with Hall-based trapezoidal control for PMSM motors with FOC sinusoidal control (sinusoidal amplitude value) for PMSM motors with FOC sinusoidal control (sinusoidal effective value) maximum 24s -3.2 Measurement range 5 5 5 5 5 5 5 5 5	for DC brushed, steppers and BLDC motors with Hall-based trapezoidal control for PMSM motors with FOC sinusoidal control (sinusoidal amplitude value) for PMSM motors with FOC sinusoidal control (sinusoidal effective value) maximum 24s -3.2 measurement range ±4.3 Nominal output current; including typical mating connector contact resistance ±0.3 Recommended value, for current ripple max. ±5% of full range; +V _{MOT} = 36 V Minimum value, limited by short-circuit protection; +V _{MOT} = 36 V Recommended value for ±5% current ripple max. ±5% of the foliation of the fol	Second S	

¹ Operating temperature can be extended up to **+65°C** with reduced current and power ratings.
² iPOS360x can be operated in vacuum (no altitude restriction), but at altitudes over 2,500m, current and power rating are reduced due to thermal dissipation efficiency.

³ In case of forced cooling (conduction or ventilation) the spacing requirements may drop substantially down to zero as long as the ambient temperature is kept below the maximum operating limit

Name	First edition	Document template: P099.TQT.564.0001	Last edition Visa :	
A. N.	May 11, 2011		October 04, 2018	R. G.
		Title of document	N° document	
TECHNOSOFT			B000 004 E404 B011 401 1	
W	CHNOSOFI	iPOS3602 MX-CAN	P028.001.E101.DSH.10l.do	СХ



iPOS3602 MX-CAN DATASHEET P/N: P028.001.E101



	Logic "LOW"; o = 0.5A	utput current		0.2	0.8	
Output voltage	Logic "HIGH";	OUT2/Error, OUT3/ Ready	2.9	3	3.3	٧
	current = 0,	OUT0	4	4.5	5	
	Logic "HIGH", e	external load		V_{LOG}		
	Absolute maxin continuous	-0.5		V _{LOG} +0.5	V	
	Absolute maxin		-1		V _{LOG} +1	
	(duration ≤ 1S) Logic "LOW", si	ink current,			0.5	Α
	continuous Logic "LOW", si	ink current,			1	А
Output current	pulse ≤ 5 sec. Logic "HIGH", source current;				2	mA
	external load to GND; V _{OUT} >= 2.0V	Ready OUT0			4	mA
	Logic "HIGH", locurrent; external +VLOG; VOUT = V	al load to		0.1	0.2	mA
Minimum pulse width	1 VLOG, VO01 = V	LOG MAX = 40 V	2			μs
ESD protection	Human body m	odel	±5			kV
Digital Hall Inputs			Min.	Тур.	Max.	Units
Mode		idiləj				
compliance	Input floating		TTL	/ CMOS /	Open-colle	ector
Default state	(wiring disconne	ected)		Logic		ı
	Logic "LOW" Logic "HIGH"		2	<u>0</u> 5	0.8	
Input voltage	Floating voltage (not connected)			4.4		V
	Absolute maxin	-10		+15		
	(duration ≤ 1S) Logic "LOW"; P	ull to GND			1.2	
Input current	Logic "HIGH"; In pull-up to +5		0	0	0	mA
Minimum pulse width			2			μs
ESD protection	Human body m	odel	±5			kV
Encoder Inputs (A/A+, A-, B/B+, I	B-, Z/Z+, Z)	Min.	Тур.	Max.	Units
Single-ended mode compliance	Leave negative disconnected	inputs	TTL	/ CMOS /	Open-colle	ector
Input voltage,	Logic "LOW"				1.6	
single-ended mode A/A+,	Logic "HIGH" Floating voltage	e (not	1.8	4.5		V
B/B+	connected) Logic "LOW"				1.2	
Input voltage, single-ended	Logic "HIGH"		1.4			V
mode Z/Z+	Floating voltage connected)	e (not		4.7		•
Input current,	Logic "LOW"; P	ull to GND		2.5	3	
single-ended mode A/A+, B/B+, Z/Z+	Logic "HIGH"; In pull-up to +5	nternal 2.2KΩ	0	0	0	mA
Differential mode compliance	For full RS422	compliance,		TIA/EIA	-422-A	•
Input voltage,	Hysteresis		±0.06	±0.1	±0.2	
differential mode	Common-mode (A+ to GND, etc	c.)	-7		+7	V
Input impedance, differential	A+ to A-, B+ to Z+ to Z-	B-	4.2 6.1	4.7 7.2		kΩ
	Single-ended m collector / NPN	node, Open-	0		500	kHz
Input frequency	Differential mode ended driven by (TTL / CMOS)		0		10	MH z
Minimum	Single-ended m		1			μs
Minimum pulse width	Differential mode ended driven by (TTL / CMOS)	de, or Single-	50			ns
	,					

Input voltage, any pin to GND					
any pin to GND	Absolute maximum values,	-7		+7	
, .	continuous				V
ESD protection	Absolute maximum, surge	-11		+14	
	(duration ≤ 1S) †				11/
Linear Hall Inputs	Human body model	±1 Min.	T	Man	kV Units
Linear Hall Inputs	· · · · · · · · · · · · · · · · · · ·		Typ.	Max.	V
	Operational range Absolute maximum values.	0	0.5÷4.5	4.9	V
Input voltage	continuous	-7		+7	
input voltage	Absolute maximum, surge				V
	(duration ≤ 1S) [†]	-11		+14	
Input current	Input voltage 0+5V	-1	±0.9	+1	mA
Interpolation	Depending on software			11	bits
Resolution	settings				
Frequency ESD protection	Human hadu madal	0 ±1		1	kHz kV
Sin-Cos Encoder	Human body model				
(Sin+, Sin-, Cos+,		Min.	Тур.	Max.	Units
Input voltage,	Sin+ to Sin-, Cos+ to Cos-		1	1.25	Vpp
differential	·		-		VPP
	Operational range	-1	2.5	4	
Input voltage,	Absolute maximum values, continuous	-7		+7	.,
any pin to GND	Absolute maximum, surge				V
	(duration ≤ 1S)	-11		+14	
	Differential, Sin+ to Sin-,				
Input impedance	Cos+ to Cos- ²	4.2	4.7		kΩ
, ,	Common-mode, to GND		2.2		kΩ
Resolution with	Software selectable, for one	2		10	bits
interpolation	sine/cosine period				
Frequency	Sin-Cos interpolation	0		450	kHz MH
rrequericy	Quadrature, no interpolation	0		10	Z
ESD protection	Human body model	±1			kV
Analog 05V Inp	uts (REF)	Min.	Тур.	Max.	Units
	Operational range	0		4.95	
	Absolute maximum values,	-12		+18	1
Input voltage	continuous	12		110	V
	Absolute maximum, surge			±36	
	(duration ≤ 1S)				
Input impedance	To GND		30		kΩ
Resolution Integral linearity	}		12	±2	bits bits
Offset error			±2	±10	bits
Gain error			±1%	±3%	% FS ³
Bandwidth (-3dB)	Software selectable	0		1	kHz
	Human body model	±5			111
ESD protection	xisID 0, AxisID 1, AxisID 2)	8.45			kV
ESD protection		Min.	Тур.	Max.	Units
Axis ID Inputs (Axis ID Inputs (Axis ID Inputs (Axis ID Inputs Input Inputs Input In		Not con	nected; St	rap to GNE	Units O; Strap
ESD protection	7 levels	Not con to +5\	nected; Str /; 4.7KΩ to	rap to GNI GND; 4.7	Units D; Strap KΩ to
ESD protection Axis ID Inputs (Axis ID Inputs) External connections		Not con to +5\	nected; St	rap to GNI GND; 4.7 D; 22KΩ t	Units D; Strap KΩ to o +5V;
ESD protection Axis ID Inputs (Axis ID Inputs) External connections Pin current	Use to size PCB tracks	Not con to +5\ +5V; 22	nected; Str /; 4.7KΩ to	rap to GNI GND; 4.7	Units D; Strap KΩ to 0 +5V; mA
ESD protection Axis ID Inputs (Axis ID Inputs) External connections		Not con to +5\	nected; Str /; 4.7KΩ to	rap to GNI GND; 4.7 D; 22KΩ t	Units D; Strap KΩ to o +5V;
ESD protection Axis ID Inputs (Axis ID Inputs (Axis ID Inputs) External connections Pin current 4.7ΚΩ/22ΚΩ	Use to size PCB tracks Power rating	Not con to +5\ +5V; 23	nected; Str /; 4.7KΩ to	rap to GNE GND; 4.7 D; 22KΩ t ±0.5	Units D; Strap KΩ to o +5V; mA mW
ESD protection Axis ID Inputs (A) External connections Pin current 4.7ΚΩ/22ΚΩ resistor ESD protection	Use to size PCB tracks Power rating Torelance	Not con to +5V; 2: 3 ±5	nected; Sti /; 4.7KΩ to 2KΩ to GN	rap to GNE GND; 4.7 D; 22KΩ t ±0.5	Units D; Strap KΩ to O +5V; MA MW % kV
ESD protection Axis ID Inputs (A) External connections Pin current 4.7ΚΩ/22ΚΩ resistor ESD protection RS-232	Use to size PCB tracks Power rating Torelance	Not con to +5\ +5V; 23	nected; Str /; 4.7KΩ to 2KΩ to GN Typ.	rap to GNE GND; 4.7 D; 22ΚΩ t ±0.5 ±5	Units D; Strap KΩ to o +5V; mA mW
ESD protection Axis ID Inputs (A) External connections Pin current 4.7ΚΩ/22ΚΩ resistor ESD protection	Use to size PCB tracks Power rating Torelance	Not con to +5V; 2: 3 ±5	nected; Sti /; 4.7KΩ to 2KΩ to GN	rap to GNE GND; 4.7 D; 22ΚΩ t ±0.5 ±5	Units D; Strap KΩ to O +5V; MA MW % kV
ESD protection Axis ID Inputs (Axis ID Inputs) External connections Pin current 4.7κΩ/22κΩ resistor ESD protection RS-232 Compliance Bit rate Short-circuit	Use to size PCB tracks Power rating Torelance Human body model	Not con to +5\ +5\; 2: 3 ±5 Min.	nected; Str /; 4.7KΩ to 2KΩ to GN Typ.	rap to GNE GND; 4.7 D; 22ΚΩ to ±0.5 ±5 Max. -232-C 115200	Units D; Strap KΩ to 0 +5V; MA MW % kV Units
ESD protection Axis ID Inputs (Axis ID Inputs) External connections Pin current 4.7ΚΩ/22ΚΩ resistor ESD protection RS-232 Compliance Bit rate Short-circuit ESD protection	Use to size PCB tracks Power rating Torelance Human body model Software selectable	Not con to +5\/ +5\/; 2: 3 ±5 Min. 9600	nected; Str /; 4.7KΩ to 2KΩ to GN Typ. TIA/EIA	rap to GNE GND; 4.7 D; 22KΩ t ±0.5 ±5 Max. -232-C 115200 nteed	Units D; Strap $K\Omega$ to $o+5V$; mA mW $%$ kV Units
ESD protection Axis ID Inputs (A) External connections Pin current 4.7ΚΩ/22ΚΩ resistor ESD protection RS-232 Compliance Bit rate Short-circuit ESD protection CAN-Bus	Use to size PCB tracks Power rating Torelance Human body model Software selectable 232TX short to GND	Not con to +5\(+5\(\); 2: 3 ±5 Min. 9600 ±2 Min.	nected; Str /; 4.7KΩ to 2KΩ to GN Typ. TIA/EIA Guara	map to GNIC GND; 4.7 D; 22KΩ t ±0.5 ±5 Max. -232-C 115200 nteed	Units Cype Strap (Compared to the compared t
ESD protection Axis ID Inputs (Axis ID Inputs) External connections Pin current 4.7ΚΩ/22ΚΩ resistor ESD protection RS-232 Compliance Bit rate Short-circuit ESD protection	Use to size PCB tracks Power rating Torelance Human body model Software selectable 232TX short to GND	Not con to +5\(+5\(\); 2: 3 ±5 Min. 9600 ±2 Min.	nected; Str /; 4.7KΩ to 2KΩ to GN Typ. TIA/EIA	map to GNIC GND; 4.7 D; 22KΩ t ±0.5 ±5 Max. -232-C 115200 nteed	Units Cystrap (Compared to the compared to t
ESD protection Axis ID Inputs (A) External connections Pin current 4.7ΚΩ/22ΚΩ resistor ESD protection RS-232 Compliance Bit rate Short-circuit ESD protection CAN-Bus	Use to size PCB tracks Power rating Torelance Human body model Software selectable 232TX short to GND	Not con to +5\(+5\(\); 2: 3 ±5 Min. 9600 ±2 Min.	nected; Str /; 4.7KΩ to 2KΩ to GN Typ. TIA/EIA Guara	map to GNIC GND; 4.7 D; 22KΩ t ±0.5 ±5 Max. -232-C 115200 nteed	Units Strap KΩ to 0 +5V; mA mW % kV Units Baud kV Units C2v3.0 Kbp Kbp C2v3.0 Kbp C2 Strap Strap C2v3.0
ESD protection Axis ID Inputs (Axis ID Inputs) External connections Pin current 4.7κΩ/22κΩ resistor ESD protection RS-232 Compliance Bit rate Short-circuit ESD protection CAN-Bus Compliance	Use to size PCB tracks Power rating Torelance Human body model Software selectable 232TX short to GND Human body model Software selectable	Not con to +5\(\)+5\(\); 2\(\) +5\(\); 2\(\) \$\frac{\pmatrix}{2}\$ \$\frac{\pmatrix}{2}\$ Min. 1SO118	nected; Str /; 4.7KΩ to 2KΩ to GN Typ. TIA/EIA Guara	ap to GNI; GND; 4.7 D; 22KΩ t ±0.5 ±5 Max232-C 115200 nteed Max. 01v4.2 & 4	Units Cystrap (Compared to the compared to t
ESD protection Axis ID Inputs (Axis ID Inputs (Axis ID Inputs) External connections Pin current 4.7ΚΩ/22ΚΩ resistor ESD protection RS-232 Compliance Bit rate Short-circuit ESD protection CAN-Bus Compliance	Use to size PCB tracks Power rating Torelance Human body model Software selectable 232TX short to GND Human body model Software selectable	Not con to +5\(\)+5\(\); 2\(\) +5\(\); 2\(\) \$\frac{\pmatrix}{2}\$ \$\frac{\pmatrix}{2}\$ Min. 1SO118	nected; Str /; 4.7KΩ to 2KΩ to GN Typ. TIA/EIA Guara	ap to GNIC GND; 4.7 D; 22KΩ t ±0.5 ±5 Max232-C 115200 nteed Max. 01v4.2 & 4 1000 25	Units D; Strap KΩ to 0 +5V; mA mW % kV Units Baud kV Units 02v3.0 Kbp s
ESD protection Axis ID Inputs (Axis ID Inputs) External connections Pin current 4.7κΩ/22κΩ resistor ESD protection RS-232 Compliance Bit rate Short-circuit ESD protection CAN-Bus Compliance	Use to size PCB tracks Power rating Torelance Human body model Software selectable 232TX short to GND Human body model Software selectable	Not con to +5\(\)+5\(\); 2\(\) +5\(\); 2\(\) \$\frac{\pmatrix}{2}\$ \$\frac{\pmatrix}{2}\$ Min. 1SO118	nected; Str /; 4.7KΩ to 2KΩ to GN Typ. TIA/EIA Guara	ap to GNI; GND; 4.7 D; 22KΩ t ±0.5 ±5 Max232-C 115200 nteed Max. 01v4.2 & 4	Units); Strap KΩ to 0 +5V; mA mW % kV Units Baud kV Units 02v3.0 Kbp
ESD protection Axis ID Inputs (Axis ID Inputs (Axis ID Inputs) External connections Pin current 4.7ΚΩ/22ΚΩ resistor ESD protection RS-232 Compliance Bit rate Short-circuit ESD protection CAN-Bus Compliance	Use to size PCB tracks Power rating Torelance Human body model Software selectable 232TX short to GND Human body model Software selectable 1Mbps 800Kbps 500Kbps ≤ 250Kbps	Not con to +5\(\)+5\(\); 2\(\) +5\(\); 2\(\) \$\frac{\pmatrix}{2}\$ \$\frac{\pmatrix}{2}\$ Min. 1SO118	nected; Str /; 4.7KΩ to 2KΩ to GN Typ. TIA/EIA Guara	rap to GNIC GND; 4.7 D; 22KΩ t ±0.5 ±5 Max232-C 115200 nteed Max. 01v4.2 & 4 1000 25 50	Units D; Strap KΩ to 0 +5V; mA mW % kV Units Baud kV Units 02v3.0 Kbp s
ESD protection Axis ID Inputs (Axis ID Inputs (Axis ID Inputs) External connections Pin current 4.7ΚΩ/22ΚΩ resistor ESD protection RS-232 Compliance Bit rate Short-circuit ESD protection CAN-Bus Compliance	Use to size PCB tracks Power rating Torelance Human body model Software selectable 232TX short to GND Human body model Software selectable 1Mbps 800Kbps 500Kbps 5250Kbps 5250Kbps Between CAN-Hi, CAN-Lo	Not con to +5\(\frac{1}{2}\) +5\(\frac{1}{2}\); 2: 3 ±5 Min. 9600 ±2 Min. ISO118 125	nected; Sti; 4.7KΩ to; 4.7KΩ to GN Typ. TIA/EIA Guara Typ. 998, CiA-30	rap to GNIC GND; 4.7 D; 22KΩ t ±0.5 ±5 Max232-C 115200 nteed Max2100 Max25 Max232-C 115200 nteed Max25 -25	Units D; Strap KΩ to 0 +5V; mA mW % kV Units Baud kV Units 02v3.0 Kbp s
ESD protection Axis ID Inputs (A) External connections Pin current 4.7ΚΩ/22ΚΩ resistor ESD protection RS-232 Compliance Bit rate Short-circuit ESD protection CAN-Bus Compliance Bit rate Bus length Resistor	Use to size PCB tracks Power rating Torelance Human body model Software selectable 232TX short to GND Human body model Software selectable 1Mbps 800Kbps 500Kbps ≤ 250Kbps Between CAN-Hi, CAN-Lo Strapping option	Not con to +5\(\frac{1}{2}\) +5V; 2: 3 ±5 Min. 9600 ±2 Min. ISO118 125	Typ. Tla/Ela Guara Typ. 998, CiA-30	rap to GNIC GND; 4.7 D; 22KΩ t ±0.5 ±5 Max232-C 115200 nteed Max. 01v4.2 & 4 1000 25 50 100 250 -board); 1-195 &	Units D; Strap KΩ to 0 +5V; mA mW % kV Units Baud kV Units 02v3.0 Kbp s
ESD protection Axis ID Inputs (Axis ID Inputs (Axis ID Inputs) External connections Pin current 4.7κΩ/22κΩ resistor ESD protection RS-232 Compliance Bit rate Short-circuit ESD protection CAN-Bus Compliance Bit rate Bus length	Use to size PCB tracks Power rating Torelance Human body model Software selectable 232TX short to GND Human body model Software selectable 1Mbps 800Kbps 500Kbps 5250Kbps 5250Kbps Between CAN-Hi, CAN-Lo	Not con to +5\(\frac{1}{2}\) +5V; 2: 3 ±5 Min. 9600 ±2 Min. ISO118 125	nected; Sti; 4.7KΩ to; 4.7KΩ to GN Typ. TIA/EIA Guara Typ. 998, CiA-30	rap to GNIC GND; 4.7 D; 22KΩ t ±0.5 ±5 Max232-C 115200 nteed Max. 01v4.2 & 4 1000 25 50 100 250 -board); 1-195 &	Units D; Strap KΩ to 0 +5V; mA mW % kV Units Baud kV Units 02v3.0 Kbp s

 $^{^2}$ For many applications, an 120 $\!\Omega$ termination resistor should be connected across SIN+ to SIN-, and across COS+ to COS-. Please consult the feedback device datasheet for confirmation.

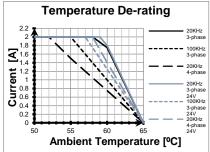
	³ "FS" stands for "Full Scale"						
Name	First edition	Document template: P099.TQT.564.0001	Last edition	Visa :			
A. N.	May 11, 2011		October 04, 2018	R. G.			
(Title of document	N° document				
(1)	TECHNOSOFT	iPOS3602 MX-CAN	P028.001.E101.DSH	l.10l.docx			
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 $^{^1}$ For full RS-422 compliance, 120 Ω termination resistors must be connected across the differential pairs, as close as possible to the drive input pins.

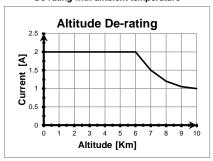
HS	1	
	HS	HS

Supply Output (+5V)		Min.	Тур.	Max.	Units	
Output voltage	Current sourced = 250mA	4.8	5	5.2	V	
Output current		250	350		mA	
Short-circuit		NOT protected				
Over-voltage		NOT protected				
ESD protection	Human body model	±1			kV	
Conformity		Min.	Тур.	Max.	Units	
EU Declaration		2014/30/EU (EMC), 2014/35/EU (LVD), 2011/65/EU (ROHS), 1907/2006/EC (REACH), 93/68/EEC (CE Marking Directive), EC 428/2009 (non dual-use item, output frequency limited to 590Hz)				

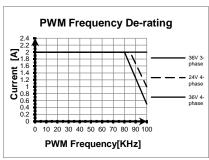
[†] Stresses beyond values listed under "absolute maximum ratings" may cause permanent damage to the device. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.



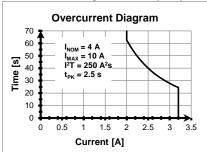
De-rating with ambient temperature



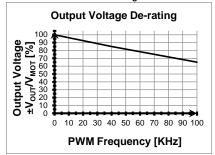
De-rating with altitude



Current De-rating with PWM frequency



Over-current diagram



Output Voltage De-rating with PWM frequency¹

 1 V_{OUT} – the output voltage, V_{MOT} – the motor supply voltage

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		Title of document	N° document	
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