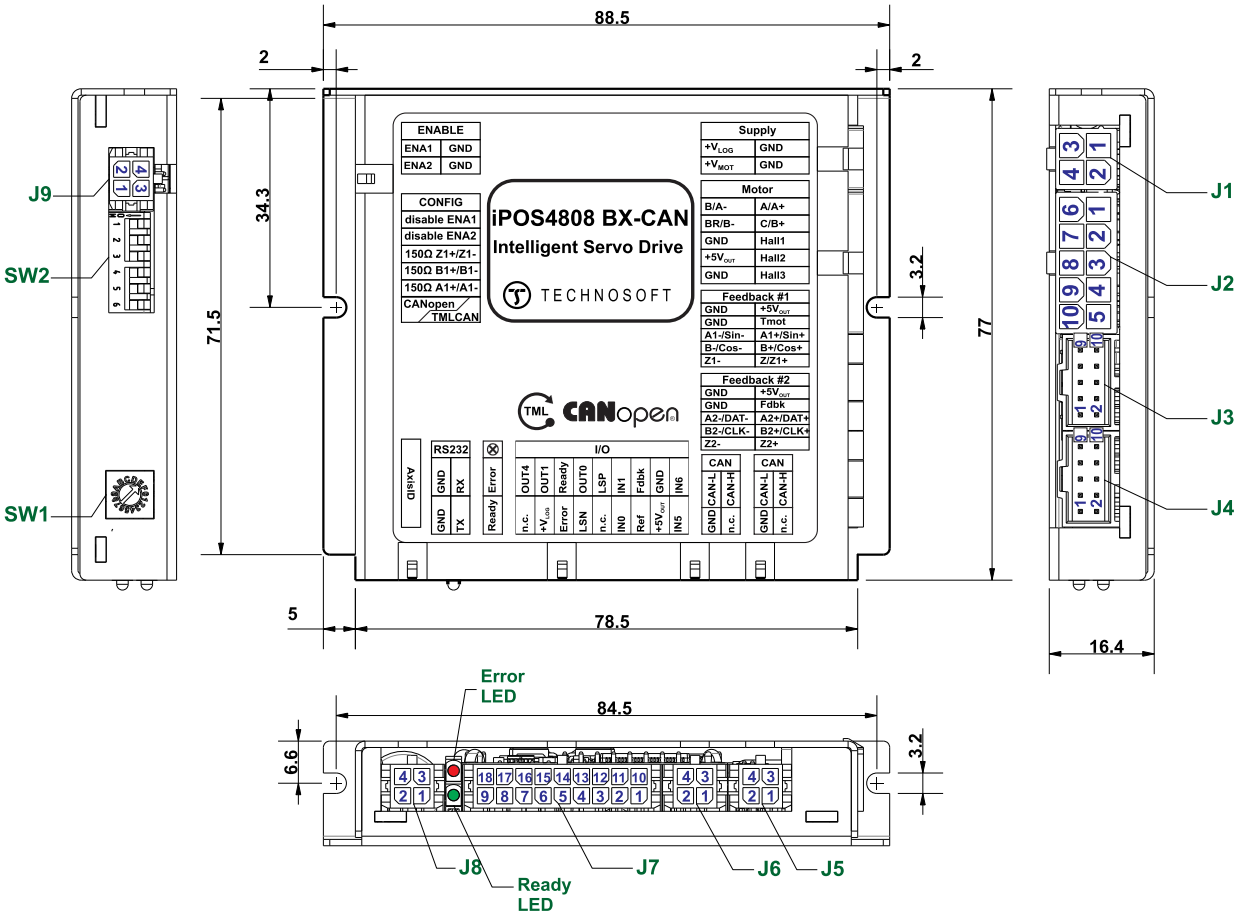

All dimensions are in mm; Drawing not to scale.

Motor – sensor configurations					
Sensor \ Motor	PMSM	BLDC	DC BRUSH	STEP (2-ph)	STEP (3-ph)
Incr. Encoder	✓		✓	✓	
Incr. Encoder + Hall	✓	✓			
Analog Sin/Cos encoder	✓		✓		
SSI	✓		✓		
BiSS-C*	✓				
Linear Halls**	✓				
Tacho			✓		
Open-loop (no sensor)				✓	✓

*currently in development
**optional, please ask Technosoft for details

- **Features**
- Motion controller and drive in a single compact unit based on MotionChip™ technology
- Universal solution for control of rotary and linear brushless, brushed and 2 or 3-phase step motors
- Advanced motion control capabilities (PVT,S-curve, electronic cam)
- Motor supply: 11-50V. Logic supply: 9-36V
- Output current: 8A cont. (BLDC mode); $20A_{PEAK}$, up to 100KHz PWM
- Separate ENABLE circuit: connect both ENA1 and ENA2 inputs to +24V, to allow motor PWM output operation
- Feedback Devices (dual-loop support)
  - 1st feedback devices supported:
    - Incremental encoder interface (single ended or differential)
    - pulse & direction interface (single ended) for external (master) digital reference
    - Analogue sin/cos encoder interface (differential $1V_{pp}$)
    - Digital Hall sensor interface (single-ended and open collector)
  - 2nd feedback devices supported:
    - Incremental encoder interface (differential)
    - pulse & direction interface (differential) for external (master) digital reference
    - SSI encoder interface
- 6 digital inputs, 12-36V, PNP/NPN programmable: 2 for limit switches, 4 general-purpose
- 5 digital outputs, 5-36V, 0.5A, NPN open-collector: Ready, Error, 3 general-purpose
- 2 analogue inputs: 12-bit, 0-5V: Reference, Feedback or general purpose
- RS-232 serial & CAN-bus 2.0B interfaces
- 16 h/w addresses selectable by h/w rotative hex switch
- TMLCAN and CANopen (CiA 301v4.2 and 402v3.0) protocols selectable by h/w switch
- 16k x 16 SRAM memory for data acquisition
- 16k x16 E^2ROM to store setup data, TML motion programs, cam tables and other user data
- Operating ambient temperature: 0-40°C (over 40°C with derating)
- NTC/PTC analogue Motor Temperature sensor input

Mating Connectors				
Producer	**Part No.**	**Connector**	**Description**	**Wire Gauge**
MOLEX	39-03-9042	J1	MINIFIT JR. receptacle housing, 2x2 way	AWG 18-20
MOLEX	39-03-9102	J2	MINIFIT JR. receptacle housing, 2x5 way	AWG 18-20
MOLEX	45750-1111	J1,J2	CRIMP PIN, MINIFIT JR., 13A	AWG 18-20
MOLEX	90142-0010	J3, J4	C-Grid III™ Crimp Housing Dual Row, 10 Circuits, with retention	AWG 22..24
	90143-0010		C-Grid III™ Crimp Housing Dual Row, 10 Circuits, without retention	
MOLEX	90119-0109	J3, J4	C-Grid III™ Crimp Terminal	AWG 22..24
MOLEX	43025-1800	J7	MICROFIT RECEPTACLE HOUSING, 2x9 WAY	AWG 20..24
MOLEX	43025-0400	J5, J6, J8, J9	MICROFIT RECEPTACLE HOUSING, 2x2 WAY	AWG 20..24
MOLEX	43030-0007	J5, J6, J7, J8, J9	CRIMP PIN, MICROFIT, 5A	AWG 20..24

Connectors Description

	Pin	Name	Type	Description
J1	1	GND	-	Negative return (ground) of the power supply
	2	GND	-	Negative return (ground) of the power supply
	3	+V_{LOG}	I	Positive terminal of the logic supply input: 9 to 36V_{DC}
	4	+V_{MOT}	I	Positive terminal of the motor supply: 11 to 50V_{DC}.

	Pin	Name	Type	Description
J2	1	A/A+	O	**Phase A** for 3-ph motors, A+ for 2-ph steppers, Motor+ for DC brush motors
	2	C/B+	O	**Phase C** for 3-ph motors, B+ for 2-ph steppers
	3	Hall 1	I	Digital input Hall 1 sensor
	4	Hall 2	I	Digital input Hall 2 sensor
	5	Hall 3	I	Digital input Hall 3 sensor
	6	B/A-	O	**Phase B** for 3-ph motors, A- for 2-ph steppers, Motor- for DC brush motors
	7	BR/B-	O	**Brake resistor** / Phase B- for step motors
	8	GND	-	Negative return (ground) of the motor supply
	9	+$5V_{OUT}$	O	5V output supply - internally generated
	10	GND	-	Negative return (ground) of the motor supply

	Pin	Name	Type	Description
J3	1	Z1-	I	Incr. encoder1 Z- diff. input
	2	Z1+	I	Incr. encoder1 Z single-ended, or Z+ diff. input
	3	B1-/Cos-	I	Incr. encoder1 B- diff. input, or analogue encoder Cos- diff. input
	4	B1+/Cos+/Dir	I	Incr. encoder1 B single-ended, or B+ diff. input, or Dir, or analogue encoder Cos+ diff. input
	5	A1- /Sin-	I	Incr. encoder1 A- diff. input, or analogue encoder Sin- diff. input
	6	A1+/Sin+/ Pulse	I	Incr. encoder1 A single-ended, or A+ diff. input, or Pulse, or analogue encoder Sin+ diff. input
	7	GND	-	Return ground for sensors supply
	8	Temp Mot	I	NTC/PTC input. Used to read an analog temperature value
	9	GND	-	Return ground for sensors supply
	10	+$5V_{OUT}$	O	5V output supply for I/O usage

	Pin	Name	Type	Description
J4	1	Z2-	I	Incr. encoder2 Z- diff. input; has 150Ω resistor between pins 1 and 2
	2	Z2+	I	Incr. encoder2 Z+ diff. input ; has 150Ω resistor between pins 1 and 2
	3	B2-/Dir-/CLK-/MA-	I/O	Incr. encoder2 B- diff. input, or Dir-, or Clock- for SSI, or Master- for BiSS; has 150Ω resistor between pins 3 and 4
	4	B2+/Dir+/CLK+/MA+	I/O	Incr. encoder2 B+ diff. input, or Dir+, or Clock+ for SSI, or Master+ for BiSS; has 150Ω resistor between pins 3 and 4
	5	A2- /Pulse-/ Data-/SL-	I	Incr. encoder2 A- diff. input, or Pulse-, or Data- for SSI, or Slave- for BiSS; has 150Ω resistor between pins 5 and 6
	6	A2+/Pulse+/ Data+/SL+	I	Incr. encoder2 A+ diff. input, or Pulse+, or Data+ for SSI, or Slave+ for BiSS; has 150Ω resistor between pins 5 and 6
	7	GND	-	Return ground for sensors supply
	8	FDBK	I	Analogue input, 12-bit, 0-5V. Used to read an analogue position or speed feedback (as tacho), or used as general purpose analogue input; Also connected to J7 pin12.
	9	GND	-	Return ground for sensors supply
	10	+$5V_{OUT}$	O	5V output supply for sensors usage

	Pin	Name	Type	Description
J5 & J6	1	n.c.	-	J5 pin1 is internally connected only to J6 pin1.
	2	GND	-	Return ground for RS-232 pins
	3	CAN Hi	I/O	CAN-Bus positive line(dominant high)
	4	CAN Lo	I/O	CAN-Bus negative line (dominant low)

	Pin	Name	Type	Description
J7	1	IN5	I	12-36V general-purpose digital PNP/NPN input
	2	+$5V_{OUT}$	O	5V output supply for I/O usage
	3	REF	I	Analogue input, 12-bit, 0-5V. Used to read an analog position, speed or torque reference, or used as general purpose analogue input
	4	IN0	I	12-36V general-purpose digital PNP/NPN input
	5	n.c.	-	not connected
	6	IN3/LSN	I	12-36V digital PNP/NPN input. Negative limit switch input
	7	OUT2/Error	O	12-36V 0.5A, drive Error output, active low, NPN open-collector/TTL pull-up. Also drives the red Error LED.
	8	+V_{LOG}	I	Positive terminal of the logic supply: 9 to 36V_{DC}. Also internally connected to J1 pin 3.
	9	n.c.	-	not connected
	10	IN6	I	12-36V general-purpose digital PNP/NPN input
	11	GND	-	Return ground for I/O pins
	12	FDBK	I	Analogue input, 12-bit, 0-5V. Used to read an analogue position or speed feedback (as tacho), or used as general purpose analogue input; Connected also to J4 pin 8.
	13	IN1	I	12-36V general-purpose digital PNP/NPN input
	14	IN2/LSP	I	12-36V digital PNP/NPN input. Positive limit switch input
	15	OUT0	O	5-36V 0.5A, general-purpose digital output, NPN open-collector/TTL pull-up
	16	OUT3/Ready	O	5-36V 0.5A, drive Ready output, active low, NPN open-collector/TTL pull-up. Also drives the green Ready LED.
	17	OUT1	O	5-36V 0.5A, general-purpose digital output, NPN open-collector/TTL pull-up
	18	OUT4	O	5-36V 0.5A, general-purpose digital output, NPN open-collector/TTL pull-up

	Pin	Name	Type	Description
J8	1	232TX	O	RS-232 Data Transmission
	2	GND	-	Return ground for RS-232 pins
	3	232RX	I	RS-232 Data Reception
	4	GND	-	Return ground for RS-232 pins

	Pin	Name	Type	Description
J9	1	ENA2	I	Enable circuit input2; connect ENA1&ENA2 to +24V to activate motor operation
	2	ENA1	I	Enable circuit input1; connect ENA1&ENA2 to +24V to activate motor operation
	3	GND	-	Return ground
	4	GND	-	Return ground

SW1 Axis ID selection		
Switch	**Position**	**Description**
SW1	**0..F**	H/W Axis ID = 1 to 15 when switch is 1 to F Exception: SW1 = 0 -->Axis ID = 255.

SW2 HW Configuration selection DIP switch		
Pin	**Position**	**Description**
1	**down(ON)**	Disable ENA1 functionality. Connects internally +V_{LOG} to ENA1
2	**down(ON)**	Disable ENA2 functionality. Connects internally +V_{LOG} to ENA2
3	**down(ON)**	Connect an 150Ω resistor between Z1+ and Z1- feedback pins
4	**down(ON)**	Connect an 150Ω resistor between B1+ and B1- feedback pins
5	**down(ON)**	Connect an 150Ω resistor between A1+ and A1- feedback pins
6	**down(ON)**	Select CANopen communication protocol
	up(OFF)	Select TMLCAN communication protocol

Electrical characteristics

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

- VLOG = 24 VDC; VMOT = 48VDC
- Supplies start-up / shutdown sequence: -any-
- Load current (sinusoidal amplitude / continuous BLDC, DC, stepper) = 8A

Operating Conditions		**Min.**	**Typ.**	**Max.**	**Units**
Ambient temperature		0		40[1, 3]	ºC
Ambient humidity	Non-condensing	0		90	%Rh
Altitude / pressure[2]	Altitude (vs. sea level)	-0.1	0 ÷ 2.5	[2]	Km
	Ambient Pressure	0 [2]	0.75 ÷ 1	10.0	atm
Storage Conditions		**Min.**	**Typ.**	**Max.**	**Units**
Ambient temperature		-40		105	ºC
Ambient humidity	Non-condensing	0		100	%Rh
Ambient Pressure		0		10.0	atm
ESD capability (Human body model)	Not powered; applies to any accessible part			±0.5	kV
	Original packaging			±15	kV
Mechanical Mounting		**Min.**	**Typ.**	**Max.**	**Units**
Airflow		natural convection[3], closed box			
Environmental Characteristics		**Min.**	**Typ.**	**Max.**	**Units**
Size (Length x Width x Height)	Without mating connectors	88.5 x 77 x 16.4			mm
		~3.48 x 3.03 x 0.65			inch
	With recommended mating connectors.	98 x 85 x 19.5			mm
		~3.86 x 3.35 x 0.77			inch
Weight	Without mating connectors	TBD			g
Power dissipation	Idle (no load)		TBD		W
	Operating		TBD		
Efficiency			98		%
Cleaning agents	Dry cleaning is recommended	Only Water- or Alcohol- based			
Protection degree	According to IEC60529, UL508	IP20			-

Logic Supply Input (+V_{LOG})		**Min.**	**Typ.**	**Max.**	**Units**
Supply voltage	Nominal values	9		36	V_{DC}
	Absolute maximum values, drive operating but outside guaranteed parameters	8		40	V_{DC}
	Absolute maximum values, continuous	-0.6		42	V_{DC}
	Absolute maximum values, surge (duration ≤ 10ms) †	-1		+45	V
Supply current	+V_{LOG} = 12V		130		mA
	+V_{LOG} = 24V		90	280	
	+V_{LOG} = 40V		85		
Motor Supply Input (+V_{MOT})		**Min.**	**Typ.**	**Max.**	**Units**
Supply voltage	Nominal values	11		50	V_{DC}
	Absolute maximum values, drive operating but outside guaranteed parameters	9		52	V_{DC}
	Absolute maximum values, continuous	-0.6		54	V_{DC}
	Absolute maximum values, surge (duration ≤ 10ms) †	-1		57	V
Supply current	Idle		1	5	mA
	Operating	-20	±8	+20	A
	Absolute maximum value, short-circuit condition (duration ≤ 10ms) †			26	A
Motor Outputs (A/A+, B/A-, C/B+, BR/B-)		**Min.**	**Typ.**	**Max.**	**Units**
Nominal output current, continuous[4]	for DC brushed, steppers and BLDC motors with Hall-based trapezoidal control			8	A
	for PMSM motors with FOC sinusoidal control (sinusoidal amplitude value)			8	
	for PMSM motors with FOC sinusoidal control (sinusoidal effective value)			5.66	
Motor output current, peak	maximum 2.5s	-20		+20	A
Short-circuit protection threshold		±22	±26	±30	A
Short-circuit protection delay		5	10		µs
On-state voltage drop	Nominal output current; including typical mating connector contact resistance		±0.3	±0.5	V
Off-state leakage current			±0.5	±1	mA
Motor inductance (phase-to-phase)	Recommended value, for current ripple max. ±5% of full range; +V_{MOT} = 36 V	F_{PWM}			µH
		20 kHz	330		
		40 kHz	150		
		60 kHz	120		
		80 kHz	80		
		100 kHz	60		
	Minimum value, limited by short-circuit protection; +V_{MOT} = 36 V	20 kHz	120		µH
		60 kHz	40		
		40 kHz	30		
		80 kHz	15		
		100 kHz	8		
Motor electrical time-constant (L/R)	Recommended value for ±5% current measure-ment error	20 kHz	250		µs
		40 kHz	125		
		60 kHz	100		
		80 kHz	63		
		100 kHz	50		
Current measurement	FS = Full Scale accuracy		±4	±8	%FS

[1] Operating temperature at higher temperatures is possible with reduced current and power ratings

[2] iPOS4808 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 maximum ambient temperature can be increased substantially.

[4] @20Khz F_{PWM}

Digital Inputs (IN0, IN1, IN2/LSP, IN3/LSN, IN5, IN6)[1]		**Min.**	**Typ.**	**Max.**	**Units**
Mode compliance		PNP			
Default state	Input floating (wiring disconnected)	Logic LOW			
Input voltage	Logic "LOW"	-36	0	2.4	V
	Logic "HIGH"	7.5	24	36	
	Hysteresis	1.2	2.4	2.8	
	Floating voltage (not connected)		0		
	Absolute maximum, continuous	-36		+39	
	Absolute maximum, surge (duration ≤ 1S)†	-50		+50	
Input current	Logic "LOW"; pulled to GND		0		mA
	Logic "HIGH"; pulled to +24V		9	10	

Mode compliance		NPN			
Default state	Input floating (wiring disconnected)	Logic HIGH			
Input voltage	Logic "LOW"	-36	0	2.2	V
	Logic "HIGH"	7.5		36	
	Hysteresis	1.2	2.4	2.8	
	Floating voltage (not connected)		23		
	Absolute maximum, continuous	-36		+39	
	Absolute maximum, surge (duration ≤ 1S)†	-50		+50	
Input current	Logic "LOW"; Pulled to GND		9	10	mA
	Logic "HIGH"; Pulled to +24V			0.4	

Input frequency		0		150	kHz
Minimum pulse		3.3			µs
ESD protection	Human body model	±2			kV

Digital Outputs (OUT0, OUT1, OUT2/Error, OUT3/ Ready, OUT4)			**Min.**	**Typ.**	**Max.**	**Units**
Mode compliance	All outputs (OUT0, OUT1, OUT2/Error, OUT3/Ready)		TTL / open-collector / NPN 24V			
Default state	Not supplied (+V_{LOG} floating or to GND)		High-Z (floating)			
	Immediately after power-up	OUT0, OUT1, OUT4	Logic "HIGH"			
		OUT2/Error, OUT3/ Ready	Logic "LOW"			
	Normal operation	OUT0, OUT1, OUT2/Error	Logic "HIGH"			
		OUT3/Ready	Logic "LOW"			
Output voltage	Logic "LOW"; output current = 0.5A				0.8	V
	Logic "HIGH"; output current = 0, no load	OUT2/Error, OUT3/ Ready	2.9	3	3.3	
		OUT0, OUT1, OUT4	4	4.5	5	
	Logic "HIGH", external load to +V_{LOG}			V_{LOG}		
	Absolute maximum, continuous		-0.5		V_{LOG}+0.5	
	Absolute maximum, surge (duration ≤ 1S)†		-1		V_{LOG}+1	
Output current	Logic "LOW", sink current				0.5	A
	Logic "LOW", sink current, pulse ≤ 5 sec.				1	A
	Logic "HIGH", source current; external load to GND; V_{OUT} >= 2.0V	OUT2/Error, OUT3/ Ready			2	mA
		OUT0, OUT1, OUT4			4	mA
	Logic "HIGH", leakage current; external load to +V_{LOG}; V_{OUT} = V_{LOG} max = 40V			0.1	0.2	mA
Minimum pulse width			2			µs
ESD protection	Human body model		±15			kV

Digital Hall Inputs (Hall1, Hall2, Hall3)		**Min.**	**Typ.**	**Max.**	**Units**
Mode compliance		TTL / CMOS / Open-collector			
Default state	Input floating (wiring disconnected)	Logic HIGH			
Input voltage	Logic "LOW"		0	0.8	V
	Logic "HIGH"	2	5		
	Floating voltage (not connected)		4.4		
	Absolute maximum, surge (duration ≤ 1S)†	-10		+15	
Input current	Logic "LOW"; Pull to GND			1.2	mA
	Logic "HIGH"; Internal 4.7KΩ pull-up to +5	0	0	0	
Minimum pulse width		2			µs
ESD protection	Human body model	±5			kV

Encoder1 Inputs (A1/A1+, A1-, B1/B1+, B1-, Z1/Z1+, Z1-)		**Min.**	**Typ.**	**Max.**	**Units**
Single-ended mode compliance	Leave negative inputs disconnected	TTL / CMOS / Open-collector			
Input voltage, single-ended mode A/A+, B/B+	Logic "LOW"			1.6	V
	Logic "HIGH"	1.8			
	Floating voltage (not connected)		3.3		
Input voltage, single-ended mode Z/Z+	Logic "LOW"			1.2	V
	Logic "HIGH"	1.4			
	Floating voltage (not connected)		4.7		
Input current, single-ended mode A/A+, B/B+, Z/Z+	Logic "LOW"; Pull to GND		5.5	6	mA
	Logic "HIGH"; Internal 2.2KΩ pull-up to +5	0	0	0	
Differential mode compliance	For full RS422 compliance, see [2]	TIA/EIA-422-A			
Input voltage, differential mode	Hysteresis	±0.06	±0.1	±0.2	V
	Common-mode range (A+ to GND, etc.)	-7		+7	
Input impedance, differential	A1+ to A1-, B1+ to B1-		1		kΩ
	Z1+ to Z1-		1		
Input frequency	Single-ended mode, Open-collector / NPN	0		5	MHz
	Differential mode, or Single-ended driven by push-pull (TTL / CMOS)	0		10	MHz
Minimum pulse width	Single-ended mode, Open-collector / NPN	1			µs
	Differential mode, or Single-ended driven by push-pull (TTL / CMOS)	50			ns
Input voltage, any pin to GND	Absolute maximum values, continuous	-7		+7	V
	Absolute maximum, surge (duration ≤ 1S)†	-11		+14	
ESD protection	Human body model	±1			kV

Encoder2 Inputs (A2+/Data+, A2-/Data-, B2+/Clk+, B2-/Clk-, Z2+, Z2-)[3]		**Min.**	**Typ.**	**Max.**	**Units**
Differential mode compliance		TIA/EIA-422-A			
Input voltage	Hysteresis	±0.06	±0.1	±0.2	V
	Differential mode	-14		+14	
	Common-mode range (A+ to GND, etc.)	-11		+14	
Input impedance, differential	A2+, B2+, Z2+ A2-, B2-, Z2-		150		Ω
Input frequency	Differential mode	0		10	MHz
Minimum pulse width	Differential mode	50			nS

[1] The digital inputs are software selectable as PNP or NPN

[2] For full RS-422 compliance, 150Ω termination resistors must be connected across the differential pairs, set SW2 pins 3, 4 and 5 to ON.

[3] Encoder2 differential input pins have internal 150Ω termination resistors connected across

Sin-Cos Encoder Inputs (Sin+, Sin-, Cos+, Cos-)		**Min.**	**Typ.**	**Max.**	**Units**
Input voltage, differential	Sin+ to Sin-, Cos+ to Cos-		1	1.25	V_{PP}
Input voltage, any pin to GND	Operational range	-1	2.5	4	V
	Absolute maximum values, continuous	-7		+7	
	Absolute maximum, surge (duration ≤ 1S) †	-11		+14	
Input impedance	Differential, Sin+ to Sin-, Cos+ to Cos- [1]	4.2	4.7		kΩ
	Common-mode, to GND		2.2		kΩ
Resolution with interpolation	Software selectable, for one sine/cosine period	2		10	bits
Frequency	Sin-Cos interpolation	0		450	kHz
	Quadrature, no interpolation	0		10	MHz
ESD protection	Human body model	±1			kV
Analog 0…5V Inputs (REF, FDBK)		**Min.**	**Typ.**	**Max.**	**Units**
Input voltage	Operational range	0		5	V
	Absolute maximum values, continuous	-12		+18	
	Absolute maximum, surge (duration ≤ 1S) †			±36	
Input impedance	To GND		28		kΩ
Resolution			12		bits
Integral linearity				±2	bits
Offset error			±2	±10	bits
Gain error			±1%	±3%	% FS [2]
Bandwidth (-3Db)	Software selectable	0		1	kHz
ESD protection	Human body model	±5			kV
RS-232		**Min.**	**Typ.**	**Max.**	**Units**
Compliance		TIA/EIA-232-C			
Bit rate	Software selectable	9600		115200	Baud
Short-circuit	232TX short to GND	Guaranteed			
ESD protection	Human body model	±2			kV
Enable circuit (ENA1, ENA2)		**Min.**	**Typ.**	**Max.**	**Units**
Enable function		Disables motor power when either ENA1 or ENA2 is disconnected from the power source			
Mode compliance		PNP			
Default state	Input floating (wiring disconnected)	Logic LOW			
Input voltage	Logic “LOW”	-36	0	4	V
	Logic “HIGH”	15	24	36	
	Absolute maximum, continuous	-50		+50	
Input current	Logic “LOW”; pulled to GND		0		mA
	Logic “HIGH”, pulled to +24V		2	2.5	
Pulse duration	Ignored low-high-low			TBD	ms
	Ignored high-low-high			TBD	
	Accepted pulse	TBD			
ESD protection	Human body model	±2			kV

CAN-Bus		**Min.**	**Typ.**	**Max.**	**Units**
Compliance		ISO11898, CiA-301v4.2 & 402v3.0			
Bit rate	Software selectable	125		1000	Kbps
Bus length	1Mbps			25	m
	500Kbps			100	
	≤ 250Kbps			250	
Resistor	Between CAN-Hi, CAN-Lo	none on-board			
Node addressing	by hardware through SW1	1 ÷ 15 ; 255 (all bits 0)			-
	by software using EasySetup	1-255			
ESD protection	Human body model	±15			kV
Supply Output (+5V)		**Min.**	**Typ.**	**Max.**	**Units**
Output voltage	Current sourced = 250mA	4.8	5	5.2	V
Output current		600	650		mA
Short-circuit		NOT protected			
Over-voltage		NOT protected			
ESD protection	Human body model	±1			kV

† 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.

[1] For many applications, a 150Ω termination resistor should be connected across SIN+ to SIN-, and across COS+ to COS- (set SW2 switches 3 and 4 to ON). Please consult the feedback device datasheet for confirmation.

[2] “FS” stands for “Full Scale”