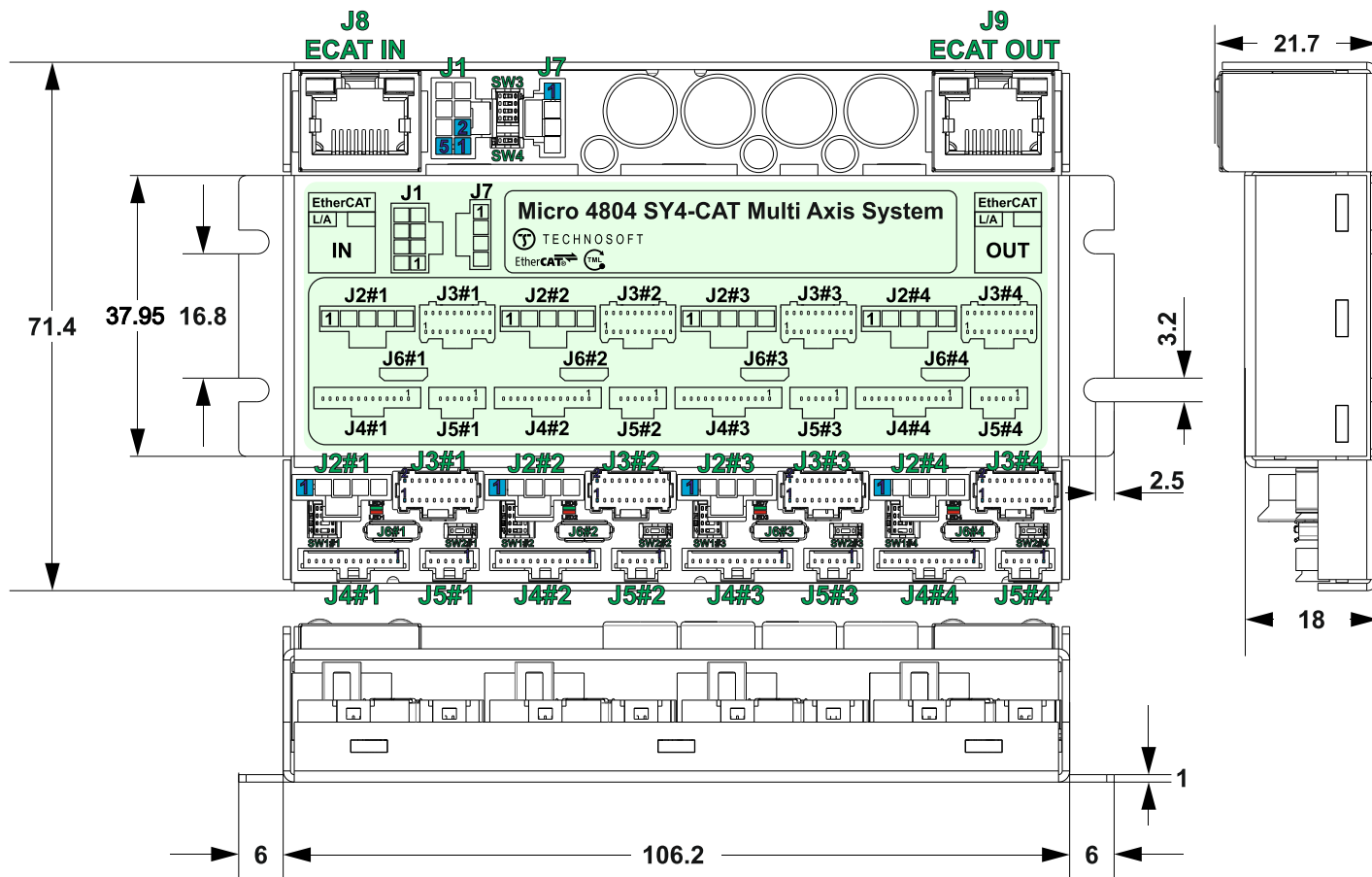




# Micro 4804 SY4-CAT Multi Axis System

## DATASHEET

P/N: P020.202.E404



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 + Dig. Hall                                       | Ⓢ     | Ⓢ    |          |             |             |
| Linear Halls                                                    | Ⓢ     |      |          |             |             |
| Digital Hall control only                                       | Ⓢ     |      |          |             |             |
| BISS / SSI / EnDAT / TAMAGAWA / Nikon / Sanyo Denki / Panasonic | Ⓢ     | Ⓢ    | Ⓢ        | Ⓢ           |             |
| Tacho                                                           |       |      | Ⓢ        |             |             |
| Open-loop (no sensor)                                           |       |      |          | Ⓢ           | Ⓢ           |

### Features

- Compact 4-axis EtherCAT motion system that integrates a motion controller and drive into a single unit, powered by MotionChip™ technology.
- Universal solution for control of rotary and linear brushless, brushed and 2 or 3-phase step motors
- Advanced motion control features, including CSP, CSV, CST, PVT, S-curve, electronic gearing, camming, and more.
- Motor supply: 48V nominal
- Motor output current per axis:
  - Nominal: 4A<sub>RMS</sub> / 5.7A amplitude for PMSM motors
  - 5A for DC / BLDC / Step motors
  - Peak: 11.3A<sub>RMS</sub> / 16A amplitude
- Logic supply: 24V nominal, 48V max

- Feedback Devices per axis:
  - 1 x Hall sensor interface (digital or linear)
- Feedback#1 and Feedback#2 can be:
  - Incremental encoder A / B (index Z only for Feedback #1): differential or single-ended;
  - Absolute encoder: differential or single-ended. Supported protocols: SSI, BiSS, EnDAT, Tamagawa, Panasonic, Nikon, Sanyo Denki.
- Integrated termination resistors for each axis's feedback connectors, selectable via sliding switches
- 1 x analogue input per axis, 12-bit, software selectable: 0-5V or ±10V; Reference, Feedback or General purpose
- 3 x digital inputs per axis: 2 for limit switches + one Enable, NPN, pull-up on-board to +5V. Pull to GND to activate.
- 3 x configurable I/Os per axis, each software selectable as:
  - Digital input, NPN, with pull-up on-board to +5V. Pull to GND to activate;
  - Digital output, NPN (open-collector), with pull-up on-board to +5V. Sink current: 1 x 1.5A to drive inductive loads (such as mechanical brake), 2 x 0.1A.
- EtherCAT connection: standard RJ45 ports
- Commissioning (set-up) possible through RS232, USB, FoE (File-over-EtherCAT) or EoE (Ethernet-over-EtherCAT)
- 24Kwords E<sup>2</sup>ROM per axis to store setup data, TML motion programs, cam tables and other user data
- 16Kwords SRAM memory per axis for data acquisition
- Operating ambient temperature: 0-40°C (over 40°C with de-rating)
- Programmable protections: any short-circuit between motor phases, GND and/or supply, over/under-voltage, over-current, I<sup>2</sup>t drive & motor, control error
- >98% voltage efficiency, >98% power efficiency

|                                                                                                      |                                |                                                                                                 |                                                                                |             |
|------------------------------------------------------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|-------------|
| Name<br>ALN                                                                                          | First edition<br>July 11, 2024 | Document template: P099.TQT.564.0001                                                            | Last edition<br>May 1, 2025                                                    | Visa:<br>AS |
|  <b>TECHNOSOFT</b> |                                | Title of document<br><br><b>Micro 4804 SY4-CAT<br/>Multi Axis System<br/>PRODUCT DATA SHEET</b> | N° document<br><br><b>P020.202.E404.DSH.10G</b><br><br><div>Page: 1 of 5</div> |             |



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| Mating Connectors            |            |                                       |                                                                                                       |                                                                                             |
|------------------------------|------------|---------------------------------------|-------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| Producer                     | Part No.   | Connector                             | Description                                                                                           |                                                                                             |
| Molex                        | 1053071204 | J7                                    | 1x4 Nano-Fit, 2.5mm Pitch Nano-Fit Wire-to-Board Housing, 4 circuits                                  |                                                                                             |
| Molex                        | 1053071205 | J2#x <sup>1</sup>                     | 1x5 Nano-Fit, 2.5mm Pitch Nano-Fit Wire-to-Board Housing, 5 circuits                                  |                                                                                             |
| Molex                        | 5011892010 | J3#x <sup>1</sup>                     | 2x10 Pico-Clasp, 1mm Pitch Pico-Clasp Wire-to-Board Housing, 20 Circuits                              |                                                                                             |
| Molex                        | 5013301300 | J4#x <sup>1</sup>                     | 1x13 Pico-Clasp, 1mm Pitch Pico-Clasp Wire-to-Board Housing, 13 Circuits                              |                                                                                             |
| Molex                        | 1053081208 | J1                                    | Nano-Fit Receptacle Housing, TPA Capable, 2.5mm Pitch, Dual Row, 8 Circuits, Black, Glow-Wire Capable |                                                                                             |
| Tensility International Corp | 1002333    | J6#x <sup>1</sup>                     | USB cable, Cable USB A Male - Micro B Male, 1m, shielded, black, 9.6mm plastic width                  |                                                                                             |
| Molex                        | 0797582140 | J1, J7, J2#x <sup>1</sup>             | Pre-Crimped wires for Nano-Fit                                                                        | Cable Assembly, Nano-Fit Crimp Terminal Socket to Nano-Fit Crimp Terminal Socket, 300mm     |
| Molex                        | 0797581019 | J3#x <sup>1</sup> , J4#x <sup>1</sup> | Pre-Crimped wires for Pico-Clasp                                                                      | Cable Assembly, Pico-Clasp Crimp Terminal Socket to Pico-Clasp Crimp Terminal Socket, 300mm |
| Molex                        | 1053001400 | J1, J7, J2#x <sup>1</sup>             | Pins for Nano-Fit                                                                                     | Nano-Fit Crimp Terminal, Female, 0.76µm Gold (Au) Plating, Lubricated, 24-26 AWG            |
| Molex                        | 5011937000 | J3#x <sup>1</sup> , J4#x <sup>1</sup> | Pins for Pico-Clasp                                                                                   | 1.00mm Pitch, Pico-Clasp Female Crimp Terminal, Gold Plating 0.1µm, 28-32 AWG, Reel         |
| Molex                        | 638276000  | J1, J7, J2#x <sup>1</sup>             | Crimp tool Nano Fit                                                                                   | Crimp Tool, Ratchet, Molex Nano-Fit 105300 Series 26-24AWG Socket Contacts, 207129 Series   |
| Molex                        | 638191500  | J3#x <sup>1</sup> , J4#x <sup>1</sup> | Crimp tool Pico-Clasp                                                                                 | Crimp Tool, Ratchet, Molex Pico-Clasp 501193 & 501334 Series 32-28AWG Contacts              |

| Pin   | Name  | Type | Description                                                                                                                   |
|-------|-------|------|-------------------------------------------------------------------------------------------------------------------------------|
| 1,2,3 | +Vmot | I    | Positive terminal of the motor supply: 7 to 48 V <sub>DC</sub> . Internally connected to all 4 drives +V <sub>mot</sub> pins. |
| 4     | PE    | -    | Earth connection.                                                                                                             |
| 5,6,7 | GND   | -    | Ground return. Internally connected to other GND pins.                                                                        |
| 8     | PE    | -    | Earth connection                                                                                                              |

| Pin | Name  | Type | Description                                                               |
|-----|-------|------|---------------------------------------------------------------------------|
| 1   | A/A+  | O    | Phase A for 3-ph motors, A+ for 2-ph steppers, Motor+ for DC brush motors |
| 2   | B/A-  | O    | Phase B for 3-ph motors, A- for 2-ph steppers, Motor- for DC brush motors |
| 3   | C/B+  | O    | Phase C for 3-ph motors, B+ for 2-ph steppers                             |
| 4   | Cr/B- | O    | Chopping resistor / Phase B- for 2-ph steppers                            |
| 5   | PE    | -    | Earth connection for motor cable shielding                                |

| Pin | Name       | Type | Description                                                                                                                  |
|-----|------------|------|------------------------------------------------------------------------------------------------------------------------------|
| 1   | 232TX      | O    | RS-232 Data Transmission.                                                                                                    |
| 2   | 232RX      | I    | RS-232 Data Reception.                                                                                                       |
| 3   | GND        | -    | Ground return.                                                                                                               |
| 4   | +Vlog      | I    | Positive terminal of the logic supply input: 6 to 48 V <sub>DC</sub> . Internally connected to other +V <sub>log</sub> pins. |
| 5   | IN2/LSP    | I    | 5-48V digital NPN input. Positive limit switch input.                                                                        |
| 6   | IN3/LSN    | I    | 5-48V digital NPN input. Negative limit switch input.                                                                        |
| 7   | I/O0       | I/O  | 5-48V 1.5A NPN (sink) general-purpose digital programmable input IN0 or output OUT0                                          |
| 8   | I/O1       | I/O  | 5-48V 0.1A NPN (sink) general-purpose digital programmable input IN1 or output OUT1                                          |
| 9   | I/O4       | I/O  | 5-48V 0.1A NPN (sink) general-purpose digital programmable input IN4 or output OUT4                                          |
| 10  | IN5/Enable | I    | 5-48V digital NPN input. Drive Enable input.                                                                                 |
| 11  | GND        | -    | Ground return. Internally connected to other GND pins.                                                                       |
| 12  | AnalogIn   | I    | Analog input (range software selectable 0-5V or ±10V)                                                                        |
| 13  | +5V        | O    | Supply for all feedback sensors.                                                                                             |

| Pin | Name                    | Type | Description                                                                                                                  |
|-----|-------------------------|------|------------------------------------------------------------------------------------------------------------------------------|
| 1   | GND                     | -    | Ground return. Internally connected to other GND pins.                                                                       |
| 2   | Hall1                   | I    | Digital Hall, or Linear Hall sensor 1.                                                                                       |
| 3   | +5V                     | O    | 5V supply for all feedback sensors.                                                                                          |
| 4   | Hall2                   | I    | Digital Hall, or Linear Hall sensor 2.                                                                                       |
| 5   | +5V                     | O    | 5V supply for all feedback sensors.                                                                                          |
| 6   | Hall3                   | I    | Digital Hall, or Linear Hall sensor 3.                                                                                       |
| 7   | EncA1+/EncA1 Dt1+/Dt1   | I    | Encoder 1 A+ / Data+ diff. input or single-ended input. Set SW1 pin 1 for differential.                                      |
| 8   | GND                     | -    | Ground return.                                                                                                               |
| 9   | EncA1-/Dt1-             | I    | Encoder 1 A-/Data- diff. input. Set SW1 pin 1 for differential.                                                              |
| 10  | +5V                     | O    | 5V supply for all feedback sensors.                                                                                          |
| 11  | EncB1+/EncB1 Clk1+/Clk1 | I    | Encoder 1 B+ / Clock+ diff. input or single-ended input. Set SW1 pin 2 for differential.                                     |
| 12  | EncA2+/EncA2 Dt2+/Dt2   | I    | Incr. encoder 2 A / Data+ diff. input or single-ended input. Set SW1 pin 4 for differential.                                 |
| 13  | EncB1-/ Clk1-           | I    | Encoder 1 B- / Clock- diff. input. Set SW1 pin 2 for differential.                                                           |
| 14  | EncA2-/Dt2-             | I    | Incr. encoder 2 A- / Data - diff. input. Set SW1 pin 4 for differential.                                                     |
| 15  | Z1+                     | I    | Incr. encoder 1 Z / Z+ diff. input or single-ended input. Set SW1 pin 3 for differential.                                    |
| 16  | EncB2+/EncB2 Clk2+/Clk2 | I/O  | Encoder 2 B+ / Clock+ diff. input or single-ended input. Set SW2 pin1 for differential.                                      |
| 17  | Z1-                     | I    | Incr. encoder 1 Z- diff. input. Set SW1 pin 3 for differential.                                                              |
| 18  | EncB2-/ Clk2-           | I    | Encoder 2 B- / Clock- diff. input. Set SW2 pin1 for differential.                                                            |
| 19  | GND                     | -    | Ground return.                                                                                                               |
| 20  | +Vlog                   | I    | Positive terminal of the logic supply input: 6 to 48 V <sub>DC</sub> . Internally connected to other +V <sub>log</sub> pins. |

| Port              | Name     | Type | Description                               |
|-------------------|----------|------|-------------------------------------------|
| J8                | ECAT IN  | I    | EtherCAT standard RJ45 Ethernet IN port.  |
| J9                | ECAT OUT | O    | EtherCAT standard RJ45 Ethernet OUT port. |
| J6#x <sup>1</sup> | USB      | I/O  | Standard Micro USB for PC data transfer   |

| Pin               | Name      | Type | Description     |
|-------------------|-----------|------|-----------------|
| J5#x <sup>1</sup> | Reserved. | -    | Do not connect. |

| Pin | Name  | Type | Description                                                                                                                         |
|-----|-------|------|-------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Rsvd  | -    | Reserved. Do not connect.                                                                                                           |
| 2   | GND   | -    | Ground return. Internally connected to other GND pins.                                                                              |
| 3   | +Vlog | I    | Positive terminal of the logic supply input: 6 to 48 V <sub>DC</sub> . Internally connected to all 4 drives +V <sub>log</sub> pins. |
| 4   | PE    | -    | Earth connection                                                                                                                    |

| SW1#x <sup>1</sup> – Feedback Resistors selection |                                                                                               |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------|
| Position                                          | Description                                                                                   |
| 1                                                 | ON = Connect an 120Ω resistor between EncA1-/Dt1- and EncA1+/EncA1/Dt1+/Dt1 feedback pins.    |
| 2                                                 | ON = Connect an 120Ω resistor between EncB1/Clk1- and EncB1+/EncB1/Clk1+/Clk1 feedback pins.  |
| 3                                                 | ON = Connect an 120Ω resistor between Z1- and Z1+ feedback pins.                              |
| 4                                                 | ON = Connect an 120Ω resistor between EncA2-/Dt2- and EncA2+/EncA2/Dt2+/Dt2 feedback pins.    |
| SW2#x <sup>1</sup> – Feedback Resistors selection |                                                                                               |
| 1                                                 | ON = Connect an 120Ω resistor between EncB2-/Clk2- and EncB2+/EncB2/Clk2+/Clk2 feedback pins. |

| LEDs                   |                                |
|------------------------|--------------------------------|
| LED1, LED2, LED3, LED4 | Red EtherCAT® ERROR indicator. |
| LED5, LED6, LED7, LED8 | Green EtherCAT® RUN indicator. |

<sup>1</sup> "x" can be drive 1, 2, 3 or 4

|                                                                                                      |                                                                                             |                                                                 |                             |             |
|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------|-------------|
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| SW3 & SW4 - AxisID Selection |       |       |       |       |              |          |          |          |  |
|------------------------------|-------|-------|-------|-------|--------------|----------|----------|----------|--|
| SW4                          | SW3   |       |       |       | Drive AxisID |          |          |          |  |
|                              | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Drive #1     | Drive #2 | Drive #3 | Drive #4 |  |
| off                          | off   | off   | off   | off   | 1            | 2        | 3        | 4        |  |
| off                          | off   | off   | off   | on    | 9            | 10       | 11       | 12       |  |
| off                          | off   | off   | on    | off   | 17           | 18       | 19       | 20       |  |
| off                          | off   | off   | on    | on    | 25           | 26       | 27       | 28       |  |
| off                          | off   | on    | off   | off   | 33           | 34       | 35       | 36       |  |
| off                          | off   | on    | off   | on    | 41           | 42       | 43       | 44       |  |
| off                          | off   | on    | on    | off   | 49           | 50       | 51       | 52       |  |
| off                          | off   | on    | on    | on    | 57           | 58       | 59       | 60       |  |
| off                          | on    | off   | off   | off   | 65           | 66       | 67       | 68       |  |
| off                          | on    | off   | off   | on    | 73           | 74       | 75       | 76       |  |
| off                          | on    | off   | on    | off   | 81           | 82       | 83       | 84       |  |
| off                          | on    | off   | on    | on    | 89           | 90       | 91       | 92       |  |
| off                          | on    | on    | off   | off   | 97           | 98       | 99       | 100      |  |
| off                          | on    | on    | off   | on    | 105          | 106      | 107      | 108      |  |
| off                          | on    | on    | on    | off   | 113          | 114      | 115      | 116      |  |
| off                          | on    | on    | on    | on    | 121          | 122      | 123      | 124      |  |
| on                           | off   | off   | off   | off   | 129          | 130      | 131      | 132      |  |
| on                           | off   | off   | off   | on    | 137          | 138      | 139      | 140      |  |
| on                           | off   | off   | on    | off   | 145          | 146      | 147      | 148      |  |
| on                           | off   | off   | on    | on    | 153          | 154      | 155      | 156      |  |
| on                           | off   | on    | off   | off   | 161          | 162      | 163      | 164      |  |
| on                           | off   | on    | off   | on    | 169          | 170      | 171      | 172      |  |
| on                           | off   | on    | on    | off   | 177          | 178      | 179      | 180      |  |
| on                           | off   | on    | on    | on    | 185          | 186      | 187      | 188      |  |
| on                           | on    | off   | off   | off   | 193          | 194      | 195      | 196      |  |
| on                           | on    | off   | off   | on    | 201          | 202      | 203      | 204      |  |
| on                           | on    | off   | on    | off   | 209          | 210      | 211      | 212      |  |
| on                           | on    | off   | on    | on    | 217          | 218      | 219      | 220      |  |
| on                           | on    | on    | off   | off   | 225          | 226      | 227      | 228      |  |
| on                           | on    | on    | off   | on    | 233          | 234      | 235      | 236      |  |
| on                           | on    | on    | on    | off   | 241          | 242      | 243      | 244      |  |
| on                           | on    | on    | on    | on    | 249          | 250      | 251      | 252      |  |

## Electrical characteristics

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

- $V_{LOG} = 24$  VDC;  $V_{MOT} = 48$  VDC;  $F_{PWM} = 20$  kHz
- Ambient temperature =  $25^{\circ}\text{C}$  (typical values) /  $0^{\circ}\text{C} \dots 40^{\circ}\text{C}$  (min/max values)
- Supplies start-up / shutdown sequence: -any-
- Load current = nominal
- Data is provided for each axis of the system

| Operating Conditions                      |                                             | Min.                                     | Typ.         | Max.            | Units              |
|-------------------------------------------|---------------------------------------------|------------------------------------------|--------------|-----------------|--------------------|
| Ambient temperature                       |                                             | 0                                        |              | 40 <sup>1</sup> | $^{\circ}\text{C}$ |
| Ambient humidity                          | Non-condensing                              | 0                                        |              | 90              | %Rh                |
|                                           | Altitude (vs. sea level)                    | -0.1                                     | 0 $\pm$ 2.5  | 2               | Km                 |
| Altitude / pressure <sup>2</sup>          | Ambient Pressure                            | 0                                        | 0.75 $\pm$ 1 | 10.0            | atm                |
| Storage Conditions                        |                                             | Min                                      | Typ          | Max             | Units              |
| Ambient temperature                       |                                             | -40                                      |              | 100             | $^{\circ}\text{C}$ |
| 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 |                                          |              | $\pm 5$         | kV                 |
|                                           | Original packaging                          |                                          |              | $\pm 15$        | kV                 |
| Mechanical Mounting                       |                                             | Min                                      | Typ          | Max             | Units              |
| Airflow                                   |                                             | natural convection, closed box, vertical |              |                 |                    |
| Spacing required between adjacent drives  |                                             | 10                                       |              |                 | mm                 |
| Spacing required above drive              |                                             | For counter-connectors & cable bending   | 30           | 80              |                    |
| Environmental Characteristics             |                                             | Min.                                     | Typ.         | Max.            | Units              |
| Size (Length x Width x Height)            | Global size                                 | 118.2 x 71.4 x 21.7                      |              |                 | mm                 |
|                                           |                                             | ~4.65 x 2.81 x 0.85                      |              |                 | inch               |
| Weight                                    |                                             | 159                                      |              |                 | g                  |
| Cleaning agents                           | Dry cleaning is recommended                 | Only Water- or Alcohol- based            |              |                 |                    |
| Protection degree                         | According to IEC60529                       | IP20                                     |              |                 |                    |
| Power dissipation                         | Idle ( $I_{MOT} = 0\text{A}$ )              |                                          | 1            | 1.2             | W                  |
|                                           | Full power ( $I_{MOT} = \text{nominal}$ )   |                                          | 2.0          | 2.4             |                    |
| Power efficiency                          | Full power ( $I_{MOT} = \text{nominal}$ )   |                                          | 98.7         |                 | %                  |
| Voltage efficiency                        | $f_{PWM} = 20\text{KHz}$                    |                                          | 98.3         |                 |                    |
|                                           | $f_{PWM} = 100\text{KHz}$                   |                                          | 91.4         |                 |                    |
| Surface temperature of metallic baseplate |                                             |                                          | 40           |                 | $^{\circ}\text{C}$ |

| Logic Supply Input (+V <sub>LOG</sub> )                   |                                                                                   |                                                                  | Min                                                               | Typ.  | Max.                  | Units            |
|-----------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------|-------------------------------------------------------------------|-------|-----------------------|------------------|
| Supply voltage                                            | Nominal values                                                                    |                                                                  | 6                                                                 | 24    | 48                    | V <sub>DC</sub>  |
|                                                           | Absolute maximum values, drive operating but outside guaranteed parameters        |                                                                  | 4.9                                                               |       | 50                    | V <sub>DC</sub>  |
|                                                           | Absolute maximum values, continuous                                               |                                                                  | -0.5                                                              |       | 53                    | V <sub>DC</sub>  |
| Supply current                                            | +V <sub>LOG</sub> = 12V                                                           |                                                                  |                                                                   | 90    | 150                   | mA               |
|                                                           | +V <sub>LOG</sub> = 24V                                                           |                                                                  |                                                                   | 60    | 90                    |                  |
|                                                           | +V <sub>LOG</sub> = 48V                                                           |                                                                  |                                                                   | 45    | 60                    |                  |
| Utilization category                                      |                                                                                   | Acc. to 60947-4-1 (I <sub>PEAK</sub> ≤ 1.05 * I <sub>NOM</sub> ) |                                                                   | DC-1  |                       |                  |
| Motor Supply Input (+V <sub>MOT</sub> )                   |                                                                                   |                                                                  | Min                                                               | Typ.  | Max.                  | Units            |
| Supply voltage                                            | Nominal values                                                                    |                                                                  | 7                                                                 |       | 48                    | V <sub>DC</sub>  |
|                                                           | Absolute maximum values, drive operating but outside guaranteed parameters        |                                                                  | 6                                                                 |       | 50                    | V <sub>DC</sub>  |
|                                                           | Absolute maximum values, continuous                                               |                                                                  | -0.5                                                              |       | 53                    | V <sub>DC</sub>  |
| Supply current                                            | Idle                                                                              |                                                                  |                                                                   | 0.3   |                       | mA               |
|                                                           | Operating                                                                         |                                                                  | -16                                                               | ±7    | +16                   | A                |
| Voltage measurement error                                 |                                                                                   |                                                                  |                                                                   | ±0.15 | ±0.25                 | V                |
| Utilization category                                      |                                                                                   | Acc. to 60947-4-1 (I <sub>PEAK</sub> ≤ 4.0 * I <sub>NOM</sub> )  |                                                                   | DC-3  |                       |                  |
| Motor Outputs (A/A+, B/A-, C/B+, CR/B-)                   |                                                                                   |                                                                  | Min.                                                              | Typ.  | Max.                  | Units            |
| Nominal current                                           | PMSM motors sinusoidal amplitude                                                  |                                                                  |                                                                   |       | ±5.7                  | A                |
|                                                           | PMSM motors sinusoidal RMS                                                        |                                                                  |                                                                   |       | 4                     | A <sub>RMS</sub> |
|                                                           | DC/BLDC/STEP motors continuous                                                    |                                                                  |                                                                   |       | 5                     | A                |
| Peak current                                              | maximum 4 seconds                                                                 |                                                                  | -16                                                               |       | +16                   | A                |
| Short-circuit protection threshold                        |                                                                                   |                                                                  |                                                                   | ±25   | ±28                   | A                |
| Short-circuit protection delay                            |                                                                                   |                                                                  | 2.6                                                               |       | 3.5                   | µs               |
| On-state voltage drop                                     | Nominal output current; including typical mating connector contact resistance     |                                                                  |                                                                   | 50    | 70                    | mV               |
| Off-state leakage current                                 |                                                                                   |                                                                  |                                                                   | 0.3   | 1                     | mA               |
| Current measurement                                       | Accuracy (FS = Full Scale)                                                        |                                                                  |                                                                   | ±1    | ±1.5                  | %FS              |
|                                                           | Noise (current ≤ 2A)                                                              |                                                                  |                                                                   | ±4    | ±6                    | mA               |
|                                                           | Noise (current ≥ 2A)                                                              |                                                                  |                                                                   | ±30   | ±50                   |                  |
|                                                           | Offset drift (compensated @ AxisOn)                                               |                                                                  |                                                                   |       | ±0.16                 | mA/°C            |
| Motor inductance (phase-to-phase)                         | Recommended value to avoid spurious short-circuit protection, triggered by ripple | Fast loop <sup>3</sup> V <sub>MOT</sub>                          |                                                                   |       |                       | µH               |
|                                                           |                                                                                   | 50µs 48V                                                         |                                                                   | 133   |                       |                  |
|                                                           |                                                                                   | 100µs 48V                                                        |                                                                   | 266   |                       |                  |
|                                                           |                                                                                   | 50µs 24V                                                         |                                                                   | 66    |                       |                  |
|                                                           |                                                                                   | 100µs 24V                                                        |                                                                   | 133   |                       |                  |
| Motor electrical time-constant (L/R)                      | Recommended value for ±5% current measurement error                               | F <sub>PWM</sub> = 20 kHz                                        |                                                                   | 330   |                       | µs               |
|                                                           |                                                                                   | F <sub>PWM</sub> = 40 kHz                                        |                                                                   | 170   |                       |                  |
|                                                           |                                                                                   | F <sub>PWM</sub> = 60 kHz                                        |                                                                   | 140   |                       |                  |
|                                                           |                                                                                   | F <sub>PWM</sub> = 80 kHz                                        |                                                                   | 80    |                       |                  |
|                                                           |                                                                                   | F <sub>PWM</sub> = 100 kHz                                       |                                                                   | 66    |                       |                  |
| Digital Inputs (IN0, IN1, IN2/LSP, IN3/LSN, IN4, IN5/ENA) |                                                                                   |                                                                  | Min.                                                              | Typ.  | Max.                  | Units            |
| Mode compliance                                           |                                                                                   |                                                                  | NPN (sink)                                                        |       |                       |                  |
| Default state                                             |                                                                                   |                                                                  | Input floating (wiring disconnected)                              |       |                       |                  |
| Input voltage                                             | Logic "LOW"                                                                       | IN0, IN1, IN4, IN5/ENA                                           |                                                                   | 1.4   | 1.8                   | V                |
|                                                           |                                                                                   |                                                                  | Logic "HIGH"                                                      | 3.1   | 2.5                   |                  |
|                                                           | Hysteresis                                                                        |                                                                  | 0.9                                                               | 1.1   | 1.4                   |                  |
|                                                           | Logic "LOW"                                                                       | IN2/LSP, IN3/LSN                                                 |                                                                   | 1.4   | 1.6                   |                  |
|                                                           |                                                                                   |                                                                  | Logic "HIGH"                                                      | 4     | 3.5                   |                  |
|                                                           | Hysteresis                                                                        |                                                                  |                                                                   | 0.6   |                       |                  |
|                                                           | Floating voltage (not connected)                                                  |                                                                  |                                                                   | 4.7   |                       |                  |
| Absolute maximum, continuous                              | IN2/LSP, IN3/LSN, IN5/ENA                                                         | -2                                                               |                                                                   | +80   |                       |                  |
|                                                           |                                                                                   | IN0, IN1, IN4                                                    | -0.5                                                              |       | V <sub>LOG</sub> +0.5 |                  |
| Input current                                             | Logic "LOW"; Pulled to GND                                                        |                                                                  |                                                                   | 6.5   | 8                     | mA               |
|                                                           | Logic "HIGH"; Pulled to +24V                                                      |                                                                  |                                                                   | 0.2   | 0.4                   |                  |
| Input frequency                                           |                                                                                   |                                                                  | 0                                                                 |       | 500                   | kHz              |
| Minimum pulse                                             |                                                                                   |                                                                  | 1                                                                 |       |                       | µs               |
| ESD protection - Human body model                         |                                                                                   |                                                                  | ±2                                                                |       |                       | kV               |
| Hall Inputs (Hall1, Hall2, Hall3)                         |                                                                                   |                                                                  | Min.                                                              | Typ.  | Max.                  | Units            |
| Mode compliance                                           |                                                                                   |                                                                  | TTL / CMOS / Open-collector (NPN sink), or analog (linear) 0...5V |       |                       |                  |
| Default state                                             | Input floating (Wiring disconnected)                                              |                                                                  | 4.5                                                               | 4.8   | 5.2                   | V                |
| Input voltage                                             | Digital                                                                           | Logic "LOW"                                                      |                                                                   | 1.5   | 1.7                   |                  |
|                                                           |                                                                                   | Logic "HIGH"                                                     | 3                                                                 | 2.5   |                       |                  |
|                                                           |                                                                                   | Hysteresis                                                       |                                                                   | 0.5   |                       |                  |
|                                                           | Analog                                                                            | 0                                                                | 0.5...4.5                                                         | 4.95  |                       |                  |
| Input current                                             | Logic "LOW"; Pull to GND                                                          |                                                                  |                                                                   | 2.4   |                       | mA               |
|                                                           | Logic "HIGH"; Internal 2.2KΩ pull-up to +5                                        |                                                                  |                                                                   | 0     |                       |                  |
| Minimum pulse width                                       |                                                                                   |                                                                  |                                                                   | 66    |                       | µs               |
| ESD protection - Human body model                         |                                                                                   |                                                                  |                                                                   | ±15   |                       | kV               |

<sup>1</sup> Operating temperature at higher temperatures is possible with reduced current and power ratings  
<sup>2</sup> Micro 4804 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.

<sup>3</sup> Fast loop period of 50 $\mu\text{s}$  is not possible with all feedback device types.

|                                                                                               |                                |                                                                                             |                                                                 |             |
|-----------------------------------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-------------|
| Name<br>ALN                                                                                   | First edition<br>July 11, 2024 | Document template: P099.TQT.564.0001                                                        | Last edition<br>May 1, 2025                                     | Visa:<br>AS |
|  TECHNOSOFT |                                | Title of document<br><b>Micro 4804 SY4-CAT<br/>Multi Axis System<br/>PRODUCT DATA SHEET</b> | N° document<br><b>P020.202.E404.DSH.10G</b><br><br>Page: 3 of 5 |             |



# Micro 4804 SY4-CAT Multi Axis System DATASHEET P/N: P020.202.E404

| Digital Outputs (OUT0, OUT1, OUT4)                                                                                |                                                                                 |                                                            |                       | Min.                                   | Typ.             | Max.                  | Units |
|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|------------------------------------------------------------|-----------------------|----------------------------------------|------------------|-----------------------|-------|
| Mode compliance                                                                                                   |                                                                                 |                                                            |                       | NPN (sink) 24V                         |                  |                       |       |
| Load type                                                                                                         |                                                                                 |                                                            |                       | Resistive, Inductive                   |                  |                       |       |
| Default state                                                                                                     | Not supplied (+V <sub>LOG</sub> floating)                                       |                                                            |                       | High-Z (floating)                      |                  |                       |       |
|                                                                                                                   | Immediately after power-up                                                      |                                                            |                       | Logic "HIGH"                           |                  |                       |       |
| Output voltage                                                                                                    | Logic "LOW"; output current = 1.5A for OUT0/ 0.05A for OUT1, OUT4               |                                                            |                       |                                        |                  | 0.4                   | V     |
|                                                                                                                   | Logic "HIGH"; output current = 0, no load                                       |                                                            |                       | 4                                      | 4.7              | 5.2                   |       |
|                                                                                                                   | Logic "HIGH", external load to +V <sub>LOG</sub>                                |                                                            |                       |                                        | V <sub>LOG</sub> |                       |       |
|                                                                                                                   | Absolute maximum, continuous (free-wheeling diodes to +V <sub>LOG</sub> to GND) |                                                            |                       | -0.5                                   |                  | V <sub>LOG</sub> +0.5 |       |
|                                                                                                                   | Absolute maximum, surge (duration ≤ 1s) <sup>†</sup>                            |                                                            |                       | -1                                     |                  | V <sub>LOG</sub> +1   |       |
| Output current                                                                                                    | Logic "LOW", sink current, short duration, duty cycle ≤1%                       | 5s max                                                     | OUT1, OUT4            |                                        |                  | 0.1                   | A     |
|                                                                                                                   |                                                                                 |                                                            | OUT0                  |                                        |                  | 2                     |       |
|                                                                                                                   | 0.5s max                                                                        | OUT1, OUT4                                                 |                       |                                        | 0.15             |                       |       |
|                                                                                                                   |                                                                                 | OUT0                                                       |                       |                                        | 2.5              |                       |       |
|                                                                                                                   | Logic "LOW", sink current, continuous; V <sub>OUT</sub> ≤ 0.4V                  |                                                            |                       |                                        | 0.05             |                       |       |
|                                                                                                                   |                                                                                 |                                                            |                       |                                        | 1.5              |                       |       |
|                                                                                                                   | Logic "HIGH", source current; external load to GND; V <sub>OUT</sub> ≥ 2.0V     |                                                            |                       |                                        |                  | 5                     |       |
| Logic "HIGH", leakage current; external load to +V <sub>LOG</sub> ; V <sub>OUT</sub> = V <sub>LOG</sub> max = 40V |                                                                                 |                                                            | V <sub>LOG</sub> =24V | 0.18                                   | 0.2              | mA                    |       |
|                                                                                                                   |                                                                                 |                                                            | V <sub>LOG</sub> =48V | 0.42                                   | 0.45             | mA                    |       |
| Minimum pulse width                                                                                               |                                                                                 |                                                            |                       | 0.5                                    |                  |                       | μs    |
| ESD protection - Human body model                                                                                 |                                                                                 |                                                            |                       | ±25                                    |                  |                       | kV    |
| Supply Output (+5V)                                                                                               |                                                                                 |                                                            |                       | Min.                                   | Typ.             | Max.                  | Units |
| Output voltage                                                                                                    |                                                                                 | Current sourced = 400mA <sup>1</sup>                       |                       | 5.05                                   | 5.2              | 5.25                  | V     |
| Output current <sup>1</sup>                                                                                       |                                                                                 | Output voltage ≥ 4.85V                                     |                       |                                        |                  | 1,200                 | mA    |
| Short-circuit to GND protection                                                                                   |                                                                                 |                                                            |                       | Yes / Drive resets at event            |                  |                       |       |
| Over-voltage protection                                                                                           |                                                                                 |                                                            |                       | NOT protected                          |                  |                       |       |
| ESD protection                                                                                                    |                                                                                 | Human body model                                           |                       | ±1                                     |                  |                       | KV    |
| Encoder Inputs (A1+, A1-, B1+, B1-, Z1+, Z1-, A2+, A2-, B2+, B2-) <sup>2</sup>                                    |                                                                                 |                                                            |                       | Min.                                   | Typ.             | Max                   | Units |
| Single-ended mode compliance                                                                                      |                                                                                 | Leave A1-, B1-, Z1-, A2-, B2- floating                     |                       | TTL / CMOS / Open-collector (NPN sink) |                  |                       |       |
| Single-ended threshold                                                                                            |                                                                                 | A1+, B1+, Z1+, A2+, B2+                                    |                       | 1.3                                    | 1.4              | 1.5                   | V     |
| Single-ended input current                                                                                        |                                                                                 | Input pulled to GND against on-board 2.2 KΩ pull-up to +5V |                       |                                        | 2.4              | 2.7                   | mA    |
| Differential mode compliance                                                                                      |                                                                                 | For full RS422 compliance, see <sup>1</sup>                |                       | TIA/EIA-422-A                          |                  |                       |       |
| Input voltage                                                                                                     | Hysteresis                                                                      |                                                            |                       | ±0.03                                  | ±0.05            | ±0.2                  | V     |
|                                                                                                                   | Differential mode                                                               |                                                            |                       | -15                                    |                  | +15                   |       |
|                                                                                                                   | Common-mode range (A+ to GND, etc.)                                             |                                                            |                       | -7                                     |                  | +12                   |       |
| Input impedance, differential                                                                                     | Common-mode (A1+ to GND, etc.)                                                  |                                                            |                       |                                        | 2.2              |                       | kΩ    |
|                                                                                                                   | Differential (A1+ to A1-, etc.)                                                 |                                                            |                       |                                        | 4.4              |                       |       |
| Input frequency                                                                                                   |                                                                                 | Differential mode                                          |                       | 0                                      |                  | 15                    | MHz   |
| Minimum pulse width                                                                                               |                                                                                 | Differential mode                                          |                       | 33                                     |                  |                       | ns    |
| ESD protection                                                                                                    |                                                                                 | Human body model                                           |                       | ±30                                    |                  |                       | kV    |
| RS-232                                                                                                            |                                                                                 |                                                            |                       | Min.                                   | Typ.             | Max.                  | Units |
| Compliance                                                                                                        |                                                                                 |                                                            |                       | TIA/EIA-232-C                          |                  |                       |       |
| Bit rate                                                                                                          | Default                                                                         |                                                            |                       | 9600                                   |                  |                       |       |
|                                                                                                                   | Software selectable                                                             |                                                            |                       | 9600                                   |                  | 115200                | Baud  |
| Output voltage                                                                                                    |                                                                                 |                                                            |                       | ±5                                     | ±5.7             |                       | V     |
| Short-circuit                                                                                                     |                                                                                 | 232TX to GND                                               |                       | Guaranteed                             |                  |                       |       |
| Input voltage                                                                                                     |                                                                                 | Absolute maximum, continuous                               |                       | -30                                    |                  | +30                   | V     |
| ESD protection                                                                                                    |                                                                                 | Human body model                                           |                       | ±15                                    |                  |                       | kV    |
| Absolute encoder interface:<br>SSI, BISS-C, EnDAT, Tamagawa, Nikon, Sanyo Denki                                   |                                                                                 |                                                            |                       | Min                                    | Typ.             | Max                   | Units |
| Single-ended mode                                                                                                 |                                                                                 | Not recommended, reduced robustness & speed                |                       |                                        |                  |                       |       |
| Differential mode compliance                                                                                      |                                                                                 | For full RS422 compliance, see <sup>2</sup>                |                       | TIA/EIA-422-A                          |                  |                       |       |
| Output voltage                                                                                                    | Differential; 50Ω differential load                                             |                                                            |                       | 1.5                                    | 3.3              |                       | V     |
|                                                                                                                   | Common-mode, referenced to GND                                                  |                                                            |                       | 1                                      | 1.7              | 3                     |       |
| CLOCK frequency                                                                                                   | Nikon, Sanyo Denki                                                              |                                                            |                       | 2.5, 4                                 |                  |                       |       |
|                                                                                                                   | Panasonic, Tamagawa                                                             |                                                            |                       | 2.5                                    |                  |                       |       |
|                                                                                                                   | All others                                                                      |                                                            |                       | 1, 2, 3, 4                             |                  |                       |       |
| Output Short- circuit protection                                                                                  |                                                                                 | Common-mode voltage ±15V                                   |                       | Yes, protected                         |                  |                       |       |
| DATA format                                                                                                       | Software selectable                                                             |                                                            |                       | Binary / Gray                          |                  |                       |       |
|                                                                                                                   |                                                                                 |                                                            |                       | Single-turn / Multi-turn               |                  |                       |       |
|                                                                                                                   |                                                                                 |                                                            |                       | Counting direction                     |                  |                       |       |
|                                                                                                                   |                                                                                 |                                                            |                       | CRC type                               |                  |                       |       |
| DATA resolution                                                                                                   |                                                                                 | Including CRC, flags, ...                                  |                       |                                        |                  | 64                    | Bits  |
| If total resolution >31 bits, some bits must be ignored by software setting to achieve a max. 31 bits resolution  |                                                                                 |                                                            |                       |                                        |                  |                       |       |

<sup>1</sup> Specified currents are intended per drive. Each drive has separate +5V outputs

<sup>2</sup> To achieve full RS-422 compatibility and enhance noise rejection, it is necessary to connect an 120Ω resistor across each signal pair (A1+/A1-, B1+/B1-, Z1+/Z1-, A2+/A2-, B2+/B2-). This can be done through SW1 and SW2.

| Analog Input (REF/ FDBK)                |                                         | Min                           | Typ. | Max  | Units    |
|-----------------------------------------|-----------------------------------------|-------------------------------|------|------|----------|
| Input voltage                           | Operational range                       | 0...5, -10...+10              |      |      |          |
|                                         | Absolute maximum values, continuous     | -22                           |      | +26  | V        |
|                                         | Absolute maximum, surge (duration ≤ 1s) |                               |      | ±38  |          |
| Input impedance                         | To 1.44V                                |                               | 20   |      | kΩ       |
| Bandwidth (-3dB)                        | Software selectable                     | 0                             |      | 5.3  | kHz      |
| Resolution                              |                                         |                               | 12   |      | bits     |
| Integral linearity                      |                                         |                               |      | ±1   | bits     |
| Offset error                            | Range -10V ... +10V                     |                               | ±10  | ±30  | mV       |
|                                         | Range 0 ... +5V                         |                               | ±15  | ±40  |          |
| Gain error                              | Range -10V ... +10V                     |                               | ±30  | ±50  | mV       |
|                                         | Range 0 ... +5V                         |                               | ±25  | ±40  |          |
| ESD protection                          | Human body model                        | ±1.5                          |      |      | kV       |
| EtherCAT®                               |                                         | Min.                          | Typ. | Max. | Units    |
| Compliance                              |                                         | IEEE802.3, IEC61158           |      |      |          |
| Software protocols compatibility        |                                         | CoE, FoE, EoE, IEC61800-7-301 |      |      |          |
| Transmission line                       | According to TIA/EIA-568-5-A            | 5                             | 5e   | 6    | Category |
|                                         |                                         | UTP                           | FTP  | STP  | Shield   |
| Auto                                    | swap + / - inside a pair                | Yes (MLT3 encoding)           |      |      |          |
|                                         | swap Rx / Tx pairs                      | Yes (auto-MDI/MDIX)           |      |      |          |
|                                         | Swap port0(IN) / port1(OUT)             | NO (EtherCAT requirement)     |      |      |          |
| Configured Station Alias (using AxisID) |                                         | 1 ÷ 252                       |      |      | -        |
| ESD protection                          | Human body model                        | ±5                            |      |      | kV       |

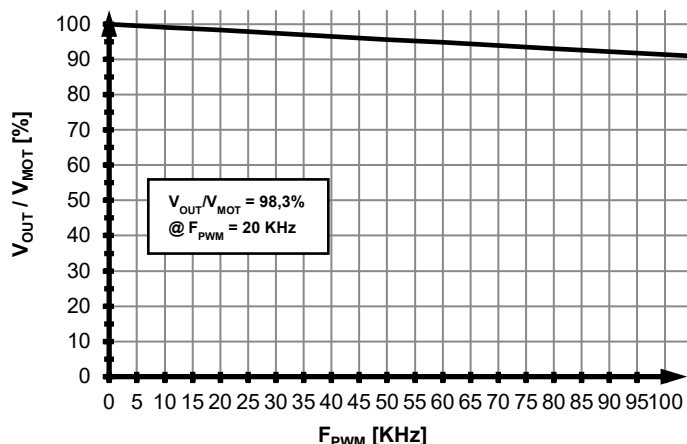
<sup>†</sup> Stresses beyond values listed under "absolute maximum ratings" may cause permanent damage to the device. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

|                                                                                               |                                |                                                                                             |                                                                 |             |
|-----------------------------------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-------------|
| Name<br>ALN                                                                                   | First edition<br>July 11, 2024 | Document template: P099.TQT.564.0001                                                        | Last edition<br>May 1, 2025                                     | Visa:<br>AS |
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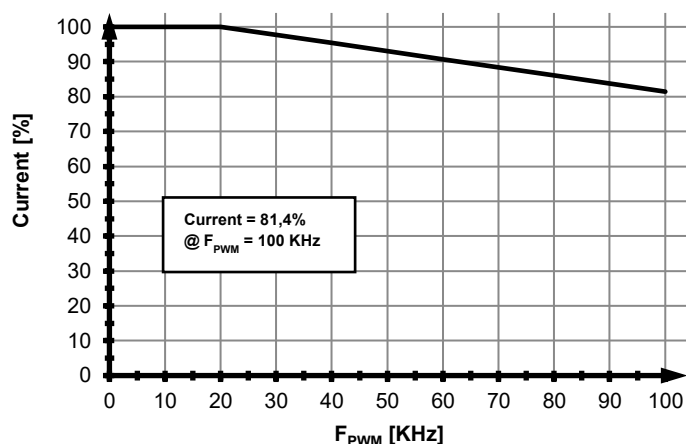


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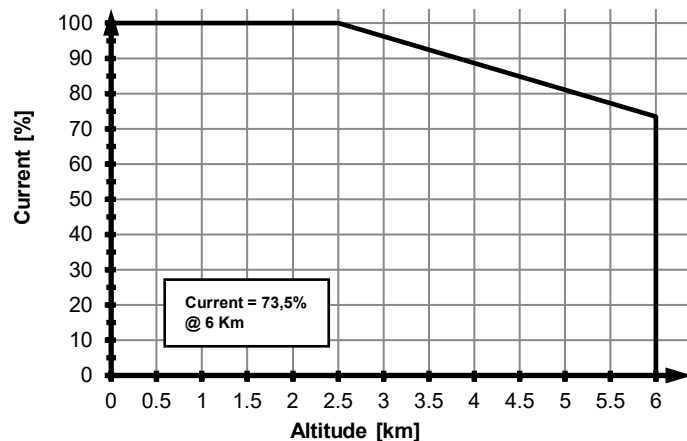
Micro 4804 SY



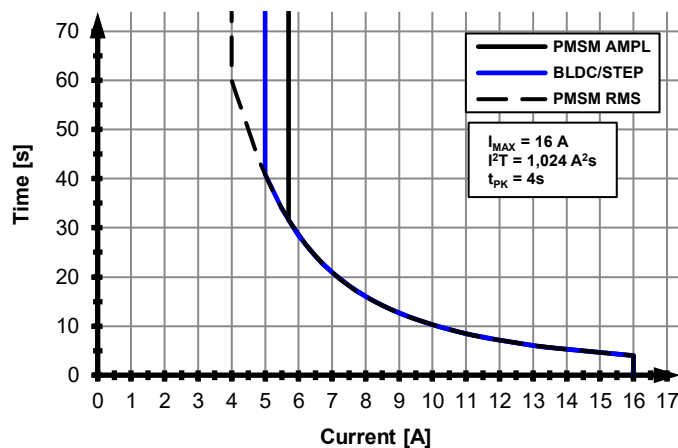
Micro 4804 SY



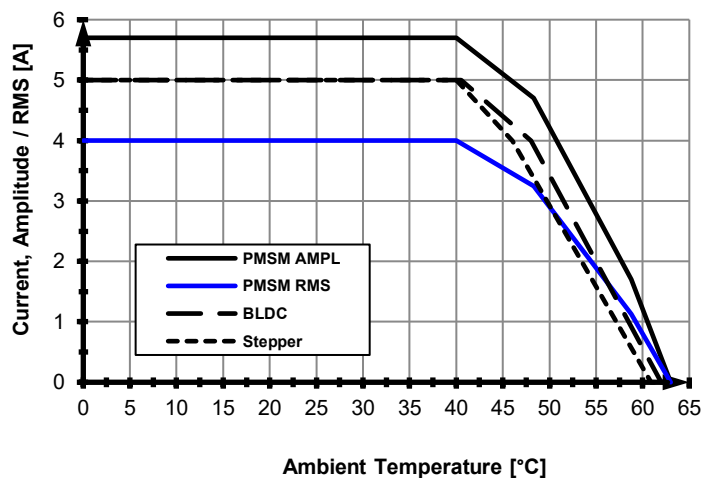
Micro 4804 SY



Micro 4804 SY



Micro 4804 SY



|                                                                                                      |                                |                                                                                             |                             |                                                                 |
|------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------|
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