Vincotech

# 80-M2166BA110M701-K799G01
target datasheet

**MiniSKiiP® CON 2** **1200 V / 110 A**

## Topology features

- Three-phase Rectifier
- Brake Chopper
- Temperature sensor

## Component features

- High inrush current capability

## Housing features

- Base isolation: $Al_2O_3$
- Easy assembly in one mounting step
- Flexible PCB design w/o pin holes
- Rugged solderless spring contacts

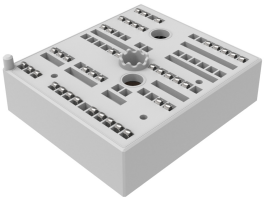
## Target applications

- Industrial Drives

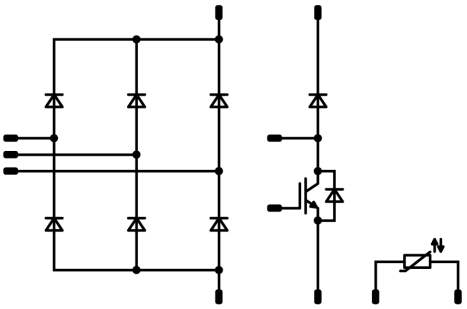
## Types

- 80-M2166BA110M701-K799G01

## MiniSKiiP® 2 16 mm housing



## Schematic



# Maximum Ratings

$T_j$ = 25 °C, unless otherwise specified

| Parameter | Symbol | Conditions | Value | Unit |
|---|---|---|---|---|
| **Brake Switch** | | | | |
| Collector-emitter voltage | $V_{CES}$ | | 1200 | V |
| Collector current (DC current) | $I_C$ | $T_j = T_{jmax}$ $T_s$ = 80 °C | 161 | A |
| Repetitive peak collector current | $I_{CRM}$ | $t_p$ limited by $T_{jmax}$ | 300 | A |
| Total power dissipation | $P_{tot}$ | $T_j = T_{jmax}$ $T_s$ = 80 °C | 317 | W |
| Gate-emitter voltage | $V_{GES}$ | | ±20 | V |
| Short circuit ratings | $t_{SC}$ | $V_{GE}$ = 15 V, $V_{CC}$ = 800 V $T_j$ = 150 °C | 9,5 | µs |
| Maximum junction temperature | $T_{jmax}$ | | 175 | °C |
| **Brake Diode** | | | | |
| Peak repetitive reverse voltage | $V_{RRM}$ | | 1200 | V |
| Forward current (DC current) | $I_F$ | $T_j = T_{jmax}$ $T_s$ = 80 °C | 55 | A |
| Repetitive peak forward current | $I_{FRM}$ | $t_p$ limited by $T_{jmax}$ | 100 | A |
| Total power dissipation | $P_{tot}$ | $T_j = T_{jmax}$ $T_s$ = 80 °C | 105 | W |
| Maximum junction temperature | $T_{jmax}$ | | 175 | °C |
| **Brake Sw. Protection Diode** | | | | |
| Peak repetitive reverse voltage | $V_{RRM}$ | | 1200 | V |
| Forward current (DC current) | $I_F$ | $T_j = T_{jmax}$ $T_s$ = 80 °C | 15 | A |
| Repetitive peak forward current | $I_{FRM}$ | $t_p$ limited by $T_{jmax}$ | 10 | A |
| Total power dissipation | $P_{tot}$ | $T_j = T_{jmax}$ $T_s$ = 80 °C | 41 | W |
| Maximum junction temperature | $T_{jmax}$ | | 175 | °C |

# Maximum Ratings

$T_j$ = 25 °C, unless otherwise specified

| Parameter | Symbol | Conditions | Value | Unit |
|---|---|---|---|---|
| **Rectifier Diode** | | | | |
| Peak repetitive reverse voltage | $V_{RRM}$ | | 1600 | V |
| Forward current (DC current) | $I_F$ | $T_j$ = $T_{jmax}$, $T_s$ = 80 °C | 161 | A |
| Surge (non-repetitive) forward current | $I_{FSM}$ | Single Half Sine Wave, $t_p$ = 10 ms, $T_j$ = 150 °C | 1380 | A |
| Surge current capability | $I^2t$ | | 9520 | $A^2s$ |
| Total power dissipation | $P_{tot}$ | $T_j$ = $T_{jmax}$, $T_s$ = 80 °C | 182 | W |
| Maximum junction temperature | $T_{jmax}$ | | 150 | °C |
| **Module Properties** | | | | |
| **Thermal Properties** | | | | |
| Storage temperature | $T_{stg}$ | | -40…+125 | °C |
| Operation temperature under switching condition | $T_{jop}$ | | -40…+($T_{jmax}$ - 25) | °C |
| **Isolation Properties** | | | | |
| Isolation voltage | $V_{isol}$ | DC Test Voltage, $t_p$ = 2 s | 5500 | V |
| Creepage distance | | With std lid<br>For more informations see handling instructions | 6,3 | mm |
| Clearance | | With std lid<br>For more informations see handling instructions | 6,3 | mm |
| Comparative Tracking Index | CTI | | ≥ 600 | |

# Characteristic Values

| Parameter | Symbol | Conditions | | | | | Values | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | $V_{GE}$ [V]<br>$V_{GS}$ [V] | $V_{CE}$ [V]<br>$V_{DS}$ [V]<br>$V_F$ [V] | $I_C$ [A]<br>$I_D$ [A]<br>$I_F$ [A] | $T_j$ [°C] | Min | Typ | Max | |
| **Brake Switch** | | | | | | | | | | |
| **Static** | | | | | | | | | | |
| Gate-emitter threshold voltage | $V_{GE(th)}$ | | | 10 | 0,015 | 25 | 5,4 | 6 | 6,6 | V |
| Collector-emitter saturation voltage | $V_{CEsat}$ | | 15 | | 150 | 25<br>125<br>150 | | 1,55<br>1,75<br>1,8 | 1,85 | V |
| Collector-emitter cut-off current | $I_{CES}$ | | 0 | 1200 | | 25 | | | 100 | µA |
| Gate-emitter leakage current | $I_{GES}$ | | 20 | 0 | | 25 | | | 500 | nA |
| Internal gate resistance | $r_g$ | | | | | | | 3 | | Ω |
| Input capacitance | $C_{ies}$ | | 0 | 10 | | 25 | | 30000 | | pF |
| Output capacitance | $C_{oes}$ | | | | | | | 880 | | pF |
| Reverse transfer capacitance | $C_{res}$ | | | | | | | 320 | | pF |
| Gate charge | $Q_g$ | $V_{CC}$ = 600 V | 0/15 | | 150 | 25 | | 1000 | | nC |
| **Thermal** | | | | | | | | | | |
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste}$ = 2,5 W/mK (HPTP) | | | | | | 0,3 | | K/W |
| **Brake Diode** | | | | | | | | | | |
| **Static** | | | | | | | | | | |
| Forward voltage | $V_F$ | | | | 50 | 25<br>125<br>150 | | 1,65<br>1,65<br>1,65 | 2,1 | V |
| Reverse leakage current | $I_R$ | $V_r$ = 1200 V | | | | 25 | | | 40 | µA |
| **Thermal** | | | | | | | | | | |
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste}$ = 2,5 W/mK (HPTP) | | | | | | 0,9 | | K/W |

# Characteristic Values

| Parameter | Symbol | Conditions | | | | | Values | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | $V_{GE}$ [V]<br>$V_{GS}$ [V] | $V_{CE}$ [V]<br>$V_{DS}$ [V]<br>$V_F$ [V] | $I_C$ [A]<br>$I_D$ [A]<br>$I_F$ [A] | $T_j$ [°C] | Min | Typ | Max | |
| **Brake Sw. Protection Diode** | | | | | | | | | | |
| **Static** | | | | | | | | | | |
| Forward voltage | $V_F$ | | | | 5 | 25<br>125<br>150 | | 1,6<br>1,7<br>1,7 | 2,1 | V |
| Reverse leakage current | $I_R$ | $V_r$ = 1200 V | | | | 25 | | | 20 | µA |
| **Thermal** | | | | | | | | | | |
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste}$ = 2,5 W/mK (HPTP) | | | | | | 2,31 | | K/W |
| **Rectifier Diode** | | | | | | | | | | |
| **Static** | | | | | | | | | | |
| Forward voltage | $V_F$ | | | | 77 | 25<br>125 | | 1<br>0,9 | 1,21<br>1,1 | V |
| Reverse leakage current | $I_R$ | $V_r$ = 1600 V | | | | 25 | | | 50 | µA |
| **Thermal** | | | | | | | | | | |
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste}$ = 2,5 W/mK (HPTP) | | | | | | 0,38 | | K/W |

# Characteristic Values

| Parameter | Symbol | Conditions | | | | | Values | | | Unit |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | $V_{GE}$ [V]<br>$V_{GS}$ [V] | $V_{CE}$ [V]<br>$V_{DS}$ [V]<br>$V_F$ [V] | $I_C$ [A]<br>$I_D$ [A]<br>$I_F$ [A] | $T_j$ [°C] | Min | Typ | Max | |
| **Thermistor** | | | | | | | | | | |
| **Static** | | | | | | | | | | |
| Rated resistance | $R$ | | | | | 25 | | 1 | | kΩ |
| Deviation of R100 | $\Delta_{R/R}$ | $R_{100}$ = 1670 Ω | | | | 100 | -2 | | 2 | % |
| Maximum Current | $I_{max}$ | | | | | | | 3 | | mA |
| Power dissipation constant | $d$ | | | | | 25 | | 0,76 | | mW/K |
| A-value | $A$ | | | | | | | $7{,}635 \times 10^{-3}$ | | 1/K |
| B-value | $B$ | | | | | | | $1{,}73 \times 10^{-5}$ | | $1/K^2$ |
| Vincotech Thermistor Reference | | | | | | | | | E | |

## Ordering Code

| Version | Ordering Code |
|---|---|
| With std lid (6.5mm height) + no thermal grease | 80-M2166BA110M701-K799G01-/0A/ |
| With thin lid (2.8mm height) + no thermal grease | 80-M2166BA110M701-K799G01-/0B/ |
| With std lid (6.5mm height) + thermal grease (0,8 W/mK, P12, silicone-based) | 80-M2166BA110M701-K799G01-/1A/ |
| With thin lid (2.8mm height) + thermal grease (0,8 W/mK, P12, silicone-based) | 80-M2166BA110M701-K799G01-/1B/ |
| With std lid (6.5mm height) + thermal grease (2,5 W/mK, TG20032, silicone-free) | 80-M2166BA110M701-K799G01-/4A/ |
| With thin lid (2.8mm height) + thermal grease (2,5 W/mK, TG20032, silicone-free) | 80-M2166BA110M701-K799G01-/4B/ |
| With std lid (6.5mm height) + thermal grease (2,5 W/mK, HPTP, silicone-based) | 80-M2166BA110M701-K799G01-/5A/ |
| With thin lid (2.8mm height) + thermal grease (2,5 W/mK, HPTP, silicone-based) | 80-M2166BA110M701-K799G01-/5B/ |

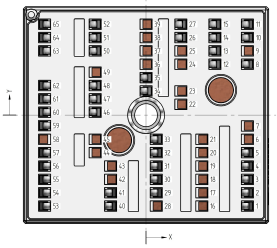
## Marking


| | Name | | Date code | UL & VIN | Lot | Serial |
|---|---|---|---|---|---|---|
| **Text** | NN-NNNNNNNNNNNNNN-TTTTTTVV | | WWYY | UL VIN | LLLLL | SSSS |
| **Datamatrix** | **Type&Ver** | **Lot number** | **Serial** | **Date code** | | |
| | TTTTTTVV | LLLLL | SSSS | WWYY | | |

## Outline

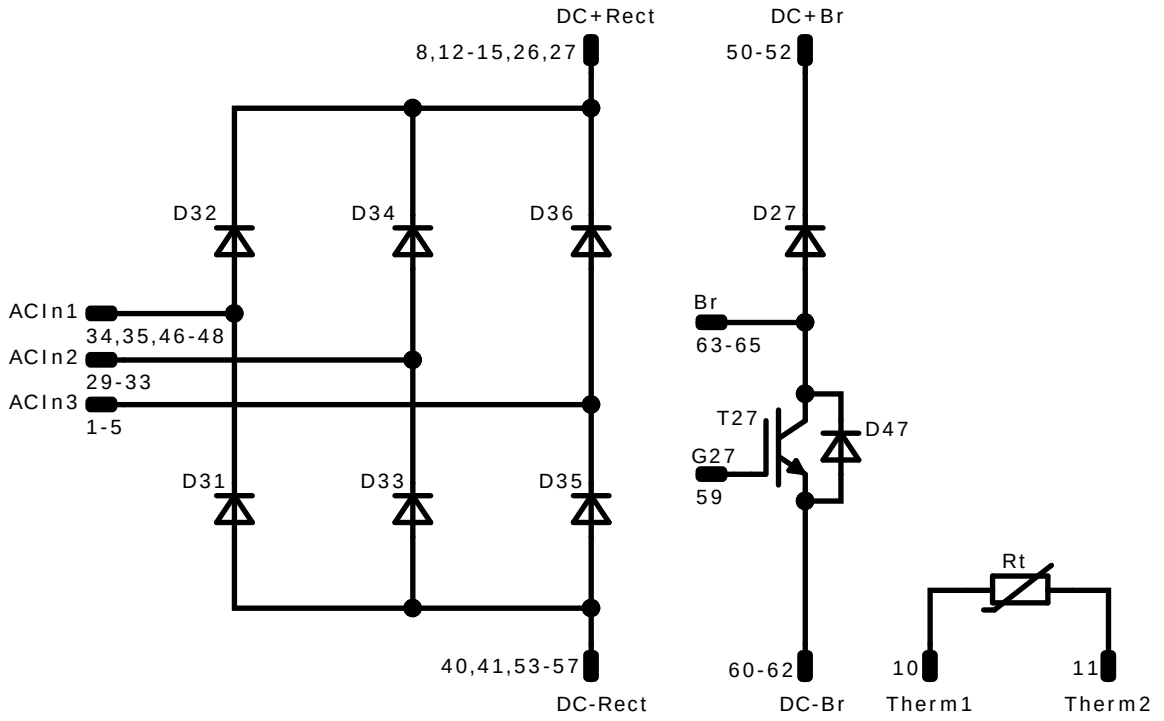
Pin table [mm]

| Pin | X | Y | Function | 34 | 0,03 | 5,8 | ACIn1 |
|---|---|---|---|---|---|---|---|
| 1 | 24,38 | -21,8 | ACIn3 | 35 | 0,03 | 9 | ACIn1 |
| 2 | 24,38 | -18,6 | ACIn3 | 36 | not assembled | | |
| 3 | 24,38 | -15,4 | ACIn3 | 37 | not assembled | | |
| 4 | 24,38 | -12,2 | ACIn3 | 38 | not assembled | | |
| 5 | 24,38 | -9 | ACIn3 | 39 | not assembled | | |
| 6 | not assembled | | | 40 | -8,5 | -21,8 | DC-Rect |
| 7 | not assembled | | | 41 | -8,5 | -18,6 | DC-Rect |
| 8 | 24,38 | 12,2 | DC+Rect | 42 | not assembled | | |
| 9 | not assembled | | | 43 | not assembled | | |
| 10 | 24,38 | 18,6 | Therm1 | 44 | not assembled | | |
| 11 | 24,38 | 21,8 | Therm2 | 45 | not assembled | | |
| 12 | 16,58 | 12,2 | DC+Rect | 46 | -12,22 | 0,7 | ACIn1 |
| 13 | 16,58 | 15,4 | DC+Rect | 47 | -12,22 | 3,9 | ACIn1 |
| 14 | 16,58 | 18,6 | DC+Rect | 48 | -12,22 | 7,1 | ACIn1 |
| 15 | 16,58 | 21,8 | DC+Rect | 49 | not assembled | | |
| 16 | not assembled | | | 50 | -12,22 | 15,4 | DC+Br |
| 17 | not assembled | | | 51 | -12,22 | 18,6 | DC+Br |
| 18 | not assembled | | | 52 | -12,22 | 21,8 | DC+Br |
| 19 | not assembled | | | 53 | -24,38 | -21,8 | DC-Rect |
| 20 | not assembled | | | 54 | -24,38 | -18,6 | DC-Rect |
| 21 | not assembled | | | 55 | -24,38 | -15,4 | DC-Rect |
| 22 | not assembled | | | 56 | -24,38 | -12,2 | DC-Rect |
| 23 | not assembled | | | 57 | -24,38 | -9 | DC-Rect |
| 24 | not assembled | | | 58 | not assembled | | |
| 25 | not assembled | | | 59 | -24,38 | -2,5 | G27 |
| 26 | 8,38 | 18,6 | DC+Rect | 60 | -24,38 | 0,7 | DC-Br |
| 27 | 8,38 | 21,8 | DC+Rect | 61 | -24,38 | 3,9 | DC-Br |
| 28 | not assembled | | | 62 | -24,38 | 7,1 | DC-Br |
| 29 | 2,46 | -18,6 | ACIn2 | 63 | -24,38 | 15,4 | Br |
| 30 | 2,46 | -15,4 | ACIn2 | 64 | -24,38 | 18,6 | Br |
| 31 | 2,46 | -12,2 | ACIn2 | 65 | -24,38 | 21,8 | Br |
| 32 | 2,46 | -9 | ACIn2 | | | | |
| 33 | 2,46 | -5,8 | ACIn2 | | | | |



Pad positions refers to center point. For more informations on pad design please see package data

## Pinout




## Identification

| ID | Component | Voltage | Current | Function | Comment |
|---|---|---|---|---|---|
| T27 | IGBT | 1200 V | 150 A | Brake Switch | |
| D27 | FWD | 1200 V | 50 A | Brake Diode | |
| D47 | FWD | 1200 V | 5 A | Brake Sw. Protection Diode | |
| D31, D32, D33, D34, D35, D36 | Rectifier | 1600 V | 140 A | Rectifier Diode | |
| Rt | Thermistor | | | Thermistor | |

| Packaging instruction | | | | |
|---|---|---|---|---|
| Standard packaging quantity (SPQ) 72 | >SPQ | Standard | <SPQ | Sample |

| Handling instruction |
|---|
| Handling instructions for MiniSKiiP® 2 packages see vincotech.com website. |

| Package data |
|---|
| Package data for MiniSKiiP® 2 packages see vincotech.com website. |

| Vincotech thermistor reference |
|---|
| See Vincotech thermistor reference table at vincotech.com website. |

| UL recognition and file number |
|---|
| This device is UL 1557 recognized under E192116 up to a junction temperature under switching condition $T_{j,op}$=150°C and up to 2500VAC/1min isolation voltage. For more information see vincotech.com website. |

| Document No.: | Date: | Modification: | Pages |
|---|---|---|---|
| 80-M2166BA110M701-K799G01-T1-14 | 1 Aug. 2025 | Initial Release | |

| Product status definition | | |
|---|---|---|
| **Datasheet Status** | **Product Status** | **Definition** |
| Target | Formative or In Design | This datasheet contains the design specifications for product development. Specifications may change in any manner without notice. The data contained is exclusively intended for technically trained staff. |