Vincotech

# 10-F112VPA080MS-LK88A09
target datasheet

***flow*PIM 1 + 3xPFC** **1200 V / 80 mΩ**

## Topology features

- 3ph Vienna rectifier
- Inverter
- Open Emitter configuration
- Temperature sensor

## Component features

- High Blocking Voltage with low drain source on state resistance
- High speed SiC-MOSFET technology
- Resistant to Latch-up

## Housing features

- Base isolation: $Al_2O_3$
- Convex shaped substrate for superior thermal contact
- Thermo-mechanical push-and-pull force relief
- Solder pin

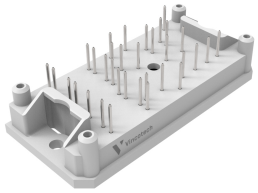
## Target applications

- Embedded Drives
- HVAC
- Heat Pumps
- Industrial Drives

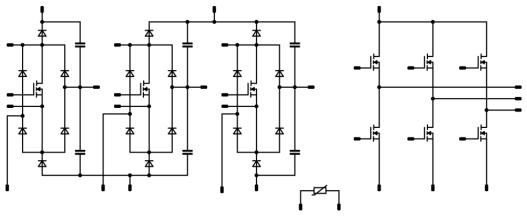
## Types

- 10-F112VPA080MS-LK88A09

## *flow* 1 17 mm housing



## Schematic



# Maximum Ratings

$T_j$ = 25 °C, unless otherwise specified

| Parameter | Symbol | Conditions | Value | Unit |
|---|---|---|---|---|
| **Inverter Switch** | | | | |
| Drain-source voltage | $V_{DSS}$ | | 1200 | V |
| Drain current (DC current)[2] | $I_D$ | $T_j$ = $T_{jmax}$ $T_s$ = 80 °C | 24 | A |
| Peak drain current | $I_{DM}$ | $t_p$ limited by $T_{jmax}$ | 68 | A |
| Total power dissipation | $P_{tot}$ | $T_j$ = $T_{jmax}$ $T_s$ = 80 °C | 52 | W |
| Gate-source voltage | $V_{GSS}$ | static | 0 / 18 | V |
| | | dynamic | -5 / 22 | V |
| Maximum Junction Temperature | $T_{jmax}$ | | 175 | °C |
| [1]Calculation based on chip supplier datasheet at $T_j$=175°C | | | | |
| **Boost Switch** | | | | |
| Drain-source voltage | $V_{DSS}$ | | 600 | V |
| Drain current (DC current) | $I_D$ | $T_j$ = $T_{jmax}$ $T_s$ = 80 °C | 16 | A |
| Peak drain current | $I_{DM}$ | $t_p$ limited by $T_{jmax}$ | 100 | A |
| Avalanche energy, single pulse | $E_{AS}$ | $V_{DD}$ = 50 V $I_D$ = 5,1 A | 105 | mJ |
| Avalanche energy, repetitive | $E_{AR}$ | $V_{DD}$ = 50 V $I_D$ = 5,1 A | 0,53 | mJ |
| MOSFET dv/dt ruggedness | $dv/dt$ | $V_{DS}$= 0..400 V $T_s$ = 25 °C | 80 | V/ns |
| Total power dissipation | $P_{tot}$ | $T_j$ = $T_{jmax}$ $T_s$ = 80 °C | 49 | W |
| Gate-source voltage | $V_{GSS}$ | static | ±20 | V |
| Reverse diode dv/dt | $dv/dt$ | | 50 | V/ns |
| Maximum Junction Temperature | $T_{jmax}$ | | 150 | °C |

# Maximum Ratings

$T_j$ = 25 °C, unless otherwise specified

| Parameter | Symbol | Conditions | | Value | Unit |
|---|---|---|---|---|---|
| **Boost Diode** | | | | | |
| Peak repetitive reverse voltage | $V_{RRM}$ | | | 600 | V |
| Forward current (DC current) | $I_F$ | $T_j$ = $T_{jmax}$ | $T_s$ = 80 °C | 35 | A |
| Surge (non-repetitive) forward current | $I_{FSM}$ | Single Half Sine Wave, $t_p$ = 10 ms | $T_j$ = 25 °C | 185 | A |
| Total power dissipation | $P_{tot}$ | $T_j$ = $T_{jmax}$ | $T_s$ = 80 °C | 50 | W |
| Maximum junction temperature | $T_{jmax}$ | | | 175 | °C |
| **Negative Boost Diode** | | | | | |
| Peak repetitive reverse voltage | $V_{RRM}$ | | | 600 | V |
| Forward current (DC current) | $I_F$ | $T_j$ = $T_{jmax}$ | $T_s$ = 80 °C | 35 | A |
| Surge (non-repetitive) forward current | $I_{FSM}$ | Single Half Sine Wave, $t_p$ = 10 ms | $T_j$ = 25 °C | 185 | A |
| Total power dissipation | $P_{tot}$ | $T_j$ = $T_{jmax}$ | $T_s$ = 80 °C | 50 | W |
| Maximum junction temperature | $T_{jmax}$ | | | 175 | °C |
| **Neutral Point Diode** | | | | | |
| Peak repetitive reverse voltage | $V_{RRM}$ | | | 1600 | V |
| Forward current (DC current)[4] | $I_F$ | $T_j$ = $T_{jmax}$ | $T_s$ = 80 °C | 34 | A |
| Surge (non-repetitive) forward current | $I_{FSM}$ | Single Half Sine Wave, $t_p$ = 8,3 ms | $T_j$ = 25 °C | 150 | A |
| Surge current capability | $I^2t$ | | | 112 | $A^2s$ |
| Total power dissipation | $P_{tot}$ | $T_j$ = $T_{jmax}$ | $T_s$ = 80 °C | 39 | W |
| Maximum junction temperature | $T_{jmax}$ | | | 150 | °C |

[3]Calculation based on chip supplier datasheet at $T_j$=150°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)[6] | $I_F$ | $T_j$ = $T_{jmax}$ $T_s$ = 80 °C | 34 | A |
| Surge (non-repetitive) forward current | $I_{FSM}$ | Single Half Sine Wave, $t_p$ = 8,3 ms $T_j$ = 25 °C | 150 | A |
| Surge current capability | $I^2t$ | | 112 | $A^2s$ |
| Total power dissipation | $P_{tot}$ | $T_j$ = $T_{jmax}$ $T_s$ = 80 °C | 39 | W |
| Maximum junction temperature | $T_{jmax}$ | | 150 | °C |
| [5]Calculation based on chip supplier datasheet at $T_j$=150°C | | | | |
| **Capacitor (DC)** | | | | |
| Maximum DC voltage | $V_{MAX}$ | | 630 | V |
| Operation Temperature | $T_{op}$ | | -55 ... 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 | 6000 | V |
| Creepage distance | | | >12,7 | mm |
| Clearance | | | 12,67 | 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 | |
| **Inverter Switch** | | | | | | | | | | |
| **Static** | | | | | | | | | | |
| Drain-source on-state resistance | $r_{DS(on)}$ | | 18 | | 15 | 25<br>150 | | 80<br>88 | 110 | mΩ |
| Gate-source threshold voltage | $V_{GS(th)}$ | | | | 0,0015 | 25 | 3,6 | 4,6 | 5,6 | V |
| Gate to Source Leakage Current | $I_{GSS}$ | | 22 | 0 | | 25 | | | 200 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | | 0 | 1200 | | 25 | | | 50 | µA |
| Internal gate resistance | $r_g$ | | | | | | | 3 | | Ω |
| Short-circuit input capacitance | $C_{iss}$ | | 0 | 10 | 0 | 25 | | 2000 | | pF |
| Reverse transfer capacitance | $C_{rss}$ | | | | | | | 46 | | |
| **Thermal** | | | | | | | | | | |
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste}$ = 3,4 W/mK (PSX) | | | | | | 1,82 | | K/W |
| **Boost Switch** | | | | | | | | | | |
| **Static** | | | | | | | | | | |
| Drain-source on-state resistance | $r_{DS(on)}$ | | 10 | | 10,5 | 25 | | 77 | 99 | mΩ |
| Gate-source threshold voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}$ | | | 0,00053 | 25 | 3 | 3,5 | 4 | V |
| Gate to Source Leakage Current | $I_{GSS}$ | | 20 | 0 | | 25 | | | 100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | | 0 | 600 | | 25 | | | 1 | µA |
| Internal gate resistance | $r_g$ | | | | | | | 5,9 | | Ω |
| Gate charge | $Q_g$ | | 0/10 | 400 | 10,5 | 25 | | 45 | | nC |
| Short-circuit input capacitance | $C_{iss}$ | $f$ = 250 kHz | 0 | 400 | 0 | 25 | | 1952 | | pF |
| Short-circuit output capacitance | $C_{oss}$ | | | | | | | 33 | | |
| **Thermal** | | | | | | | | | | |
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste}$ = 3,4 W/mK (PSX) | | | | | | 1,43 | | 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 | |
| **Boost Diode** | | | | | | | | | | |
| **Static** | | | | | | | | | | |
| Forward voltage | $V_F$ | | | | 15 | 25<br>125 | | 1,6<br>1,3 | 2,5 | V |
| Reverse leakage current | $I_R$ | $V_r$ = 600 V | | | | 25 | | | 10 | µA |
| **Thermal** | | | | | | | | | | |
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste}$ = 3,4 W/mK (PSX) | | | | | | 1,89 | | K/W |
| **Negative Boost Diode** | | | | | | | | | | |
| **Static** | | | | | | | | | | |
| Forward voltage | $V_F$ | | | | 15 | 25<br>125 | | 1,6<br>1,3 | 2,5 | V |
| Reverse leakage current | $I_R$ | $V_r$ = 600 V | | | | 25 | | | 10 | µA |
| **Thermal** | | | | | | | | | | |
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste}$ = 3,4 W/mK (PSX) | | | | | | 1,89 | | K/W |
| **Neutral Point Diode** | | | | | | | | | | |
| **Static** | | | | | | | | | | |
| Forward voltage | $V_F$ | | | | 7 | 25<br>150 | | 1<br>0,95 | 1,11<br>1,01 | V |
| Reverse leakage current | $I_R$ | $V_r$ = 1600 V | | | | 25<br>150 | | | 5<br>700 | µA |
| **Thermal** | | | | | | | | | | |
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste}$ = 3,4 W/mK (PSX) | | | | | | 1,78 | | 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 | |
| **Rectifier Diode** | | | | | | | | | | |
| **Static** | | | | | | | | | | |
| Forward voltage | $V_F$ | | | | 7 | 25<br>150 | | 1<br>0,95 | 1,11<br>1,01 | V |
| Reverse leakage current | $I_R$ | $V_r$ = 1600 V | | | | 25<br>150 | | | 5<br>700 | µA |
| **Thermal** | | | | | | | | | | |
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste}$ = 3,4 W/mK (PSX) | | | | | | 1,78 | | K/W |
| **Capacitor (DC)** | | | | | | | | | | |
| **Static** | | | | | | | | | | |
| Capacitance | $C$ | DC bias voltage = 0 V | | | | 25 | | 33 | | nF |
| Tolerance | | | | | | | -5 | | 5 | % |
| **Thermistor** | | | | | | | | | | |
| **Static** | | | | | | | | | | |
| Rated resistance | $R$ | | | | | 25 | | 22 | | kΩ |
| Deviation of R100 | $\Delta_{R/R}$ | $R_{100}$ = 1484 Ω | | | | 100 | -5 | | 5 | % |
| Power dissipation | $P$ | | | | | 25 | | 130 | | mW |
| Power dissipation constant | $d$ | | | | | 25 | | 1,5 | | mW/K |
| B-value | $B_{(25/50)}$ | Tol. ±1 % | | | | | | 3962 | | K |
| B-value | $B_{(25/100)}$ | Tol. ±1 % | | | | | | 4000 | | K |
| Vincotech Thermistor Reference | | | | | | | | | I | |

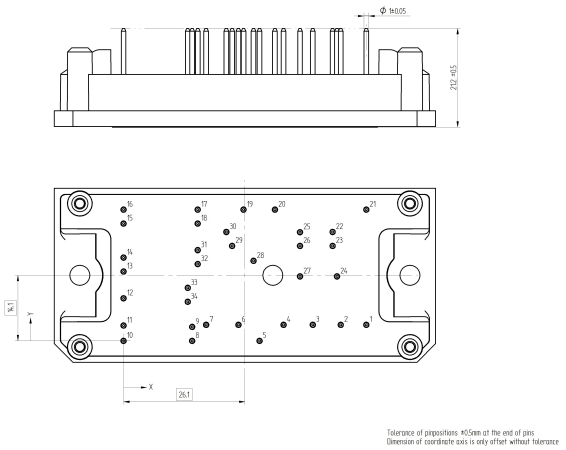
| Ordering Code | |
|---|---|
| **Version** | **Ordering Code** |
| Without thermal paste | 10-F112VPA080MS-LK88A09 |
| With thermal paste (5,2 W/mK, PTM6000HV) | 10-F112VPA080MS-LK88A09-/7/ |

## Marking

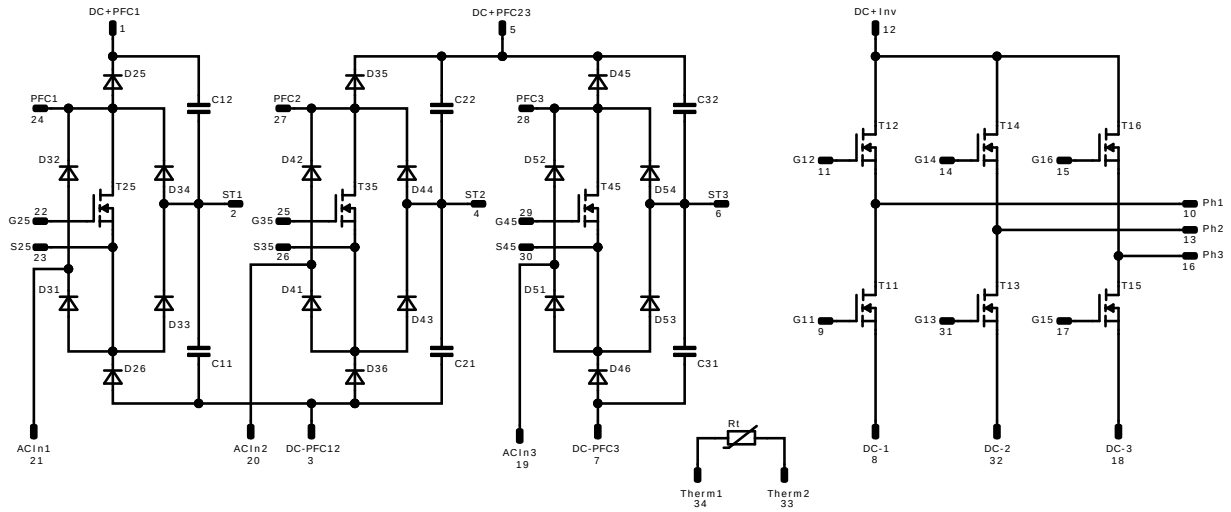

| | Name | | Date code | UL & VIN | Lot | Serial |
|---|---|---|---|---|---|---|
| **Text** | NN-NNNNNNNNNNNNNN-TTTTTTVV | | WWYY | UL VIN | LLLLL | SSSS |
| **Datamatrix** | **Type&Ver** | **Lot number** | **Serial** | **Date code** | | |
| | TTTTTTVV | LLLLL | SSSS | WWYY | | |

## Outline

| Pin table [mm] | | | |
|---|---|---|---|
| Pin | X | Y | Function |
| 1 | 52,2 | 3,45 | DC+PFC1 |
| 2 | 46,7 | 3,45 | ST1 |
| 3 | 40,7 | 3,45 | DC-PFC12 |
| 4 | 34,4 | 3,45 | ST2 |
| 5 | 29,25 | 0 | DC+PFC23 |
| 6 | 24,7 | 3,45 | ST3 |
| 7 | 17,75 | 3,45 | DC-PFC3 |
| 8 | 14,75 | 0 | DC-1 |
| 9 | 14,75 | 3 | G11 |
| 10 | 0 | 0 | Ph1 |
| 11 | 0 | 3,3 | G12 |
| 12 | 0 | 9,15 | DC+Inv |
| 13 | 0 | 14,9 | Ph2 |
| 14 | 0 | 17,9 | G14 |
| 15 | 0 | 25,2 | G16 |
| 16 | 0 | 28,2 | Ph3 |
| 17 | 15,95 | 28,2 | G15 |
| 18 | 15,95 | 25,2 | DC-3 |
| 19 | 25,8 | 28,2 | ACIn3 |
| 20 | 32,55 | 28,2 | ACIn2 |
| 21 | 52,2 | 28,2 | ACIn1 |
| 22 | 44,95 | 23,4 | G25 |
| 23 | 44,95 | 20,4 | S25 |
| 24 | 45,9 | 13,85 | PFC1 |
| 25 | 37,95 | 23,35 | G35 |
| 26 | 37,95 | 20,4 | S35 |
| 27 | 37,95 | 13,85 | PFC2 |
| 28 | 27,95 | 17,2 | PFC3 |
| 29 | 23,35 | 20,4 | G45 |
| 30 | 22,1 | 23,4 | S45 |
| 31 | 15,95 | 19,5 | G13 |
| 32 | 15,95 | 16,5 | DC-2 |
| 33 | 13,8 | 11,4 | Therm2 |
| 34 | 13,8 | 8,4 | Therm1 |



## Pinout




## Identification

| ID | Component | Voltage | Current | Function | Comment |
|---|---|---|---|---|---|
| T11, T12, T13, T14, T15, T16 | MOSFET | 1200 V | 80 mΩ | Inverter Switch | |
| T25, T35, T45 | MOSFET | 600 V | 77 mΩ | Boost Switch | |
| D25, D35, D45 | FWD | 600 V | 15 A | Boost Diode | |
| D26, D36, D46 | FWD | 600 V | 15 A | Negative Boost Diode | |
| D33, D34, D43, D44, D53, D54 | Rectifier | 1600 V | 12 A | Neutral Point Diode | |
| D31, D32, D41, D42, D51, D52 | Rectifier | 1600 V | 12 A | Rectifier Diode | |
| C11, C12, C21, C22, C31, C32 | Capacitor | 630 V | | Capacitor (DC) | |
| Rt | Thermistor | | | Thermistor | |

| Packaging instruction | | | | |
|---|---|---|---|---|
| Standard packaging quantity (SPQ) 100 | >SPQ | Standard | <SPQ | Sample |

| Handling instruction |
|---|
| Handling instructions for *flow* 1 packages see vincotech.com website. |

| Package data |
|---|
| Package data for *flow* 1 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 $T_{j,op}$=175°C and up to 3500VAC/1min isolation voltage. For more information see vincotech.com website. |

| Document No.: | Date: | Modification: | Pages |
|---|---|---|---|
| 10-F112VPA080MS-LK88A09-T1-14 | 1 Jun. 2026 | 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. |