



flowPIM 0

650 V / 40 A

Topology features

- Open Emitter configuration
- Temperature sensor
- Converter+Brake+Inverter

Component features

- Easy paralleling
- Low collector emitter saturation voltage
- Low turn-off losses
- Positive temperature coefficient

Housing features

- Base isolation: Al₂O₃
- Convex shaped substrate for superior thermal contact
- Thermo-mechanical push-and-pull force relief
- Press-fit pin
- Reliable cold welding connection

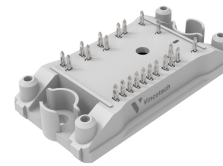
Target applications

- Embedded Drives
- Industrial Drives

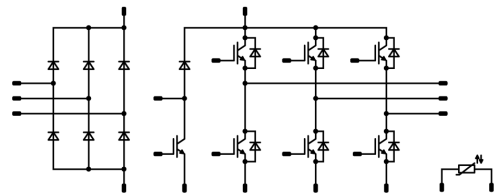
Types

- 10-PC07PMA040I7-P547B66Y

flow 0 12 mm housing



Schematic





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10-PC07PMA040I7-P547B66Y
target datasheet

Maximum Ratings

$T_j = 25\text{ }^\circ\text{C}$, unless otherwise specified

| Parameter | Symbol | Conditions | Value | Unit |
|-----------------------------------|------------|--|----------|------------------|
| Inverter Switch | | | | |
| Collector-emitter voltage | V_{CES} | | 650 | V |
| Collector current (DC current) | I_C | $T_j = T_{jmax}$ $T_s = 80\text{ }^\circ\text{C}$ | 30* | A |
| Repetitive peak collector current | I_{CRM} | t_p limited by T_{jmax} | 120 | A |
| Total power dissipation | P_{tot} | $T_j = T_{jmax}$ $T_s = 80\text{ }^\circ\text{C}$ | 65 | W |
| Gate-emitter voltage | V_{GES} | | ± 20 | V |
| Short circuit ratings | t_{SC} | $V_{GE} = 15\text{ V}$, $V_{CC} = 400\text{ V}$ $T_j = 150\text{ }^\circ\text{C}$ | 3 | μs |
| Maximum junction temperature | T_{jmax} | | 175 | $^\circ\text{C}$ |

| | | | | |
|---------------------------------|------------|---|-----|------------------|
| Inverter Diode | | | | |
| Peak repetitive reverse voltage | V_{RRM} | | 650 | V |
| Forward current (DC current) | I_F | $T_j = T_{jmax}$ $T_s = 80\text{ }^\circ\text{C}$ | 30* | A |
| Repetitive peak forward current | I_{FRM} | t_p limited by T_{jmax} | 120 | A |
| Total power dissipation | P_{tot} | $T_j = T_{jmax}$ $T_s = 80\text{ }^\circ\text{C}$ | 53 | W |
| Maximum junction temperature | T_{jmax} | | 175 | $^\circ\text{C}$ |

| | | | | |
|-----------------------------------|------------|--|----------|------------------|
| Brake Switch | | | | |
| Collector-emitter voltage | V_{CES} | | 650 | V |
| Collector current (DC current) | I_C | $T_j = T_{jmax}$ $T_s = 80\text{ }^\circ\text{C}$ | 30* | A |
| Repetitive peak collector current | I_{CRM} | t_p limited by T_{jmax} | 120 | A |
| Total power dissipation | P_{tot} | $T_j = T_{jmax}$ $T_s = 80\text{ }^\circ\text{C}$ | 65 | W |
| Gate-emitter voltage | V_{GES} | | ± 20 | V |
| Short circuit ratings | t_{SC} | $V_{GE} = 15\text{ V}$, $V_{CC} = 400\text{ V}$ $T_j = 150\text{ }^\circ\text{C}$ | 3 | μs |
| Maximum junction temperature | T_{jmax} | | 175 | $^\circ\text{C}$ |

**Maximum Ratings** $T_j = 25\text{ °C}$, unless otherwise specified

| Parameter | Symbol | Conditions | Value | Unit |
|---------------------------------|------------|---------------------------------------|-------|------|
| Brake Diode | | | | |
| Peak repetitive reverse voltage | V_{RRM} | | 650 | V |
| Forward current (DC current) | I_F | $T_j = T_{jmax}$ $T_s = 80\text{ °C}$ | 25 | A |
| Repetitive peak forward current | I_{FRM} | t_p limited by T_{jmax} | 60 | A |
| Total power dissipation | P_{tot} | $T_j = T_{jmax}$ $T_s = 80\text{ °C}$ | 41 | W |
| Maximum junction temperature | T_{jmax} | | 175 | °C |

Brake Sw. Protection Diode

| | | | | |
|---------------------------------|------------|---------------------------------------|-----|----|
| Peak repetitive reverse voltage | V_{RRM} | | 650 | V |
| Forward current (DC current) | I_F | $T_j = T_{jmax}$ $T_s = 80\text{ °C}$ | 25 | A |
| Repetitive peak forward current | I_{FRM} | t_p limited by T_{jmax} | 60 | A |
| Total power dissipation | P_{tot} | $T_j = T_{jmax}$ $T_s = 80\text{ °C}$ | 41 | W |
| Maximum junction temperature | T_{jmax} | | 175 | °C |

Rectifier Diode

| | | | | |
|--|------------|--|------|------------------|
| Peak repetitive reverse voltage | V_{RRM} | | 1600 | V |
| Forward current (DC current) | I_F | $T_j = T_{jmax}$ $T_s = 80\text{ °C}$ | 30* | A |
| Surge (non-repetitive) forward current | I_{FSM} | Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 150\text{ °C}$ | 400 | A |
| Surge current capability | I^2t | | 800 | A ² s |
| Total power dissipation | P_{tot} | $T_j = T_{jmax}$ $T_s = 80\text{ °C}$ | 66 | W |
| Maximum junction temperature | T_{jmax} | | 150 | °C |

* limited by pin current capability



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target datasheet

Maximum Ratings

$T_j = 25\text{ °C}$, unless otherwise specified

| Parameter | Symbol | Conditions | Value | Unit |
|-----------|--------|------------|-------|------|
|-----------|--------|------------|-------|------|

Module Properties

Thermal Properties

| | | | | |
|---|------------------|--|-----------------------------------|----|
| Storage temperature | T_{stg} | | -40...+125 | °C |
| Operation temperature under switching condition | T_{jop} | | -40...+($T_{\text{jmax}} - 25$) | °C |

Isolation Properties

| | | | | |
|----------------------------|-------------------|------------------------------------|------------|----|
| Isolation voltage | V_{isol} | DC Test Voltage $t_p = 2\text{ s}$ | 6000 | V |
| Creepage distance | | | >12,7 | mm |
| Clearance | | | 9,11 | mm |
| Comparative Tracking Index | CTI | | ≥ 200 | |



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Characteristic Values

| Parameter | Symbol | Conditions | | | | | Values | | | Unit |
|-----------|--------|--------------|--------------|--------------|------------------------|-----------|------------|-----|-----|------|
| | | V_{GS} [V] | V_{GE} [V] | V_{DS} [V] | I_C [A] I_D [A] | I_F [A] | T_j [°C] | Min | Typ | |

Inverter Switch

Static

| | | | | | | | | | | |
|--------------------------------------|--------------|-------------------|----|-----|--------|----|------|------|------|----|
| Gate-emitter threshold voltage | $V_{GE(th)}$ | $V_{CE} = V_{GE}$ | | | 0,0004 | 25 | 4,35 | 5 | 5,65 | V |
| Collector-emitter saturation voltage | V_{CEsat} | | 15 | | 40 | 25 | | 1,35 | 1,65 | V |
| Collector-emitter cut-off current | I_{CES} | | 0 | 650 | | 25 | | | 20 | μA |
| Gate-emitter leakage current | I_{GES} | | 20 | 0 | | 25 | | | 100 | nA |
| Internal gate resistance | r_g | | | | | | | None | | Ω |
| Input capacitance | C_{ies} | | | | | | | 2475 | | pF |
| Output capacitance | C_{oes} | $f = 1$ Mhz | 0 | 25 | | 25 | | 77 | | pF |
| Reverse transfer capacitance | C_{res} | | | | | | | 25 | | pF |
| Gate charge | Q_g | $V_{CC} = 520$ V | 15 | | 40 | 25 | | 235 | | nC |

Thermal

| | | | | | | | | | | |
|-------------------------------------|---------------|------------------------------------|--|--|--|--|--|------|--|-----|
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste} = 3,4$ W/mK (PSX) | | | | | | 1,46 | | K/W |
|-------------------------------------|---------------|------------------------------------|--|--|--|--|--|------|--|-----|

Inverter Diode

Static

| | | | | | | | | | | |
|-------------------------|-------|---------------|--|--|----|----|--|------|----|----|
| Forward voltage | V_F | | | | 40 | 25 | | 1,65 | 2 | V |
| Reverse leakage current | I_R | $V_r = 650$ V | | | | 25 | | | 20 | μA |

Thermal

| | | | | | | | | | | |
|-------------------------------------|---------------|------------------------------------|--|--|--|--|--|------|--|-----|
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste} = 3,4$ W/mK (PSX) | | | | | | 1,78 | | K/W |
|-------------------------------------|---------------|------------------------------------|--|--|--|--|--|------|--|-----|



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Characteristic Values

| Parameter | Symbol | Conditions | | | | | Values | | | Unit |
|-----------|--------|--------------|--------------|--------------|------------------------|-----------|------------|-----|-----|------|
| | | V_{GS} [V] | V_{GE} [V] | V_{DS} [V] | I_C [A] I_D [A] | I_F [A] | T_j [°C] | Min | Typ | |

Brake Switch

Static

| | | | | | | | | | | |
|--------------------------------------|---------------|-------------------|----|-----|--------|----|------|------|------|----|
| Gate-emitter threshold voltage | $V_{GE(th)}$ | $V_{CE} = V_{GE}$ | | | 0,0004 | 25 | 4,35 | 5 | 5,65 | V |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | | 15 | | 40 | 25 | | 1,35 | 1,65 | V |
| Collector-emitter cut-off current | I_{CES} | | 0 | 650 | | 25 | | | 20 | μA |
| Gate-emitter leakage current | I_{GES} | | 20 | 0 | | 25 | | | 100 | nA |
| Internal gate resistance | r_g | | | | | | | None | | Ω |
| Input capacitance | C_{ies} | | | | | | | 2475 | | pF |
| Output capacitance | C_{oes} | $f = 1$ Mhz | 0 | 25 | | 25 | | 77 | | pF |
| Reverse transfer capacitance | C_{res} | | | | | | | 25 | | pF |
| Gate charge | Q_g | $V_{CC} = 520$ V | 15 | | 40 | 25 | | 235 | | nC |

Thermal

| | | | | | | | | | | |
|-------------------------------------|---------------|------------------------------------|--|--|--|--|--|------|--|-----|
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste} = 3,4$ W/mK (PSX) | | | | | | 1,46 | | K/W |
|-------------------------------------|---------------|------------------------------------|--|--|--|--|--|------|--|-----|

Brake Diode

Static

| | | | | | | | | | | |
|-------------------------|-------|---------------|--|--|----|----|--|------|----|----|
| Forward voltage | V_F | | | | 20 | 25 | | 1,65 | 2 | V |
| Reverse leakage current | I_R | $V_r = 650$ V | | | | 25 | | | 20 | μA |

Thermal

| | | | | | | | | | | |
|-------------------------------------|---------------|------------------------------------|--|--|--|--|--|------|--|-----|
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste} = 3,4$ W/mK (PSX) | | | | | | 2,34 | | K/W |
|-------------------------------------|---------------|------------------------------------|--|--|--|--|--|------|--|-----|



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target datasheet

Characteristic Values

| Parameter | Symbol | Conditions | | | | | Values | | | Unit |
|-----------|--------|------------------------------|---|-------------------------------------|------------|-----|--------|-----|--|------|
| | | V_{GE} [V] V_{GS} [V] | V_{CE} [V] V_{DS} [V] V_F [V] | I_C [A] I_D [A] I_F [A] | T_j [°C] | Min | Typ | Max | | |

Brake Sw. Protection Diode

Static

| | | | | | | | | | | |
|-------------------------|-------|---------------|--|--|----|----|--|------|----|---------|
| Forward voltage | V_F | | | | 20 | 25 | | 1,65 | 2 | V |
| Reverse leakage current | I_R | $V_r = 650$ V | | | | 25 | | | 20 | μ A |

Thermal

| | | | | | | | | | | |
|-------------------------------------|---------------|------------------------------------|--|--|--|--|--|------|--|-----|
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste} = 3,4$ W/mK (PSX) | | | | | | 2,34 | | K/W |
|-------------------------------------|---------------|------------------------------------|--|--|--|--|--|------|--|-----|

Rectifier Diode

Static

| | | | | | | | | | | |
|-------------------------|-------|----------------|--|--|----|-----------|--|-----|-------------|---------|
| Forward voltage | V_F | | | | 35 | 25 | | 1,2 | 1,5 | V |
| Reverse leakage current | I_R | $V_r = 1600$ V | | | | 25 150 | | | 100 2000 | μ A |

Thermal

| | | | | | | | | | | |
|-------------------------------------|---------------|------------------------------------|--|--|--|--|--|------|--|-----|
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste} = 3,4$ W/mK (PSX) | | | | | | 1,06 | | K/W |
|-------------------------------------|---------------|------------------------------------|--|--|--|--|--|------|--|-----|

Thermistor

Static


| | | | | | | | | | | |
|--------------------------------|----------------|---------------------------|--|--|--|-----|----|------|---|------------|
| Rated resistance | R | | | | | 25 | | 22 | | k Ω |
| 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 | |

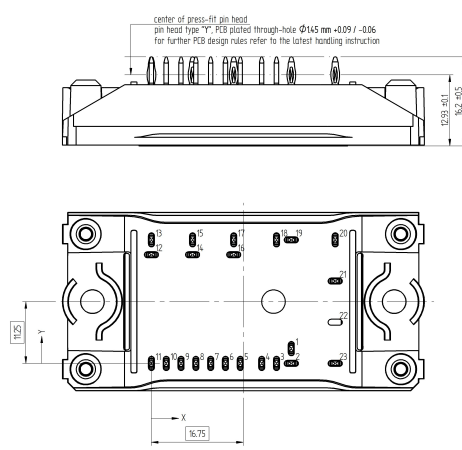


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10-PC07PMA040I7-P547B66Y
target datasheet

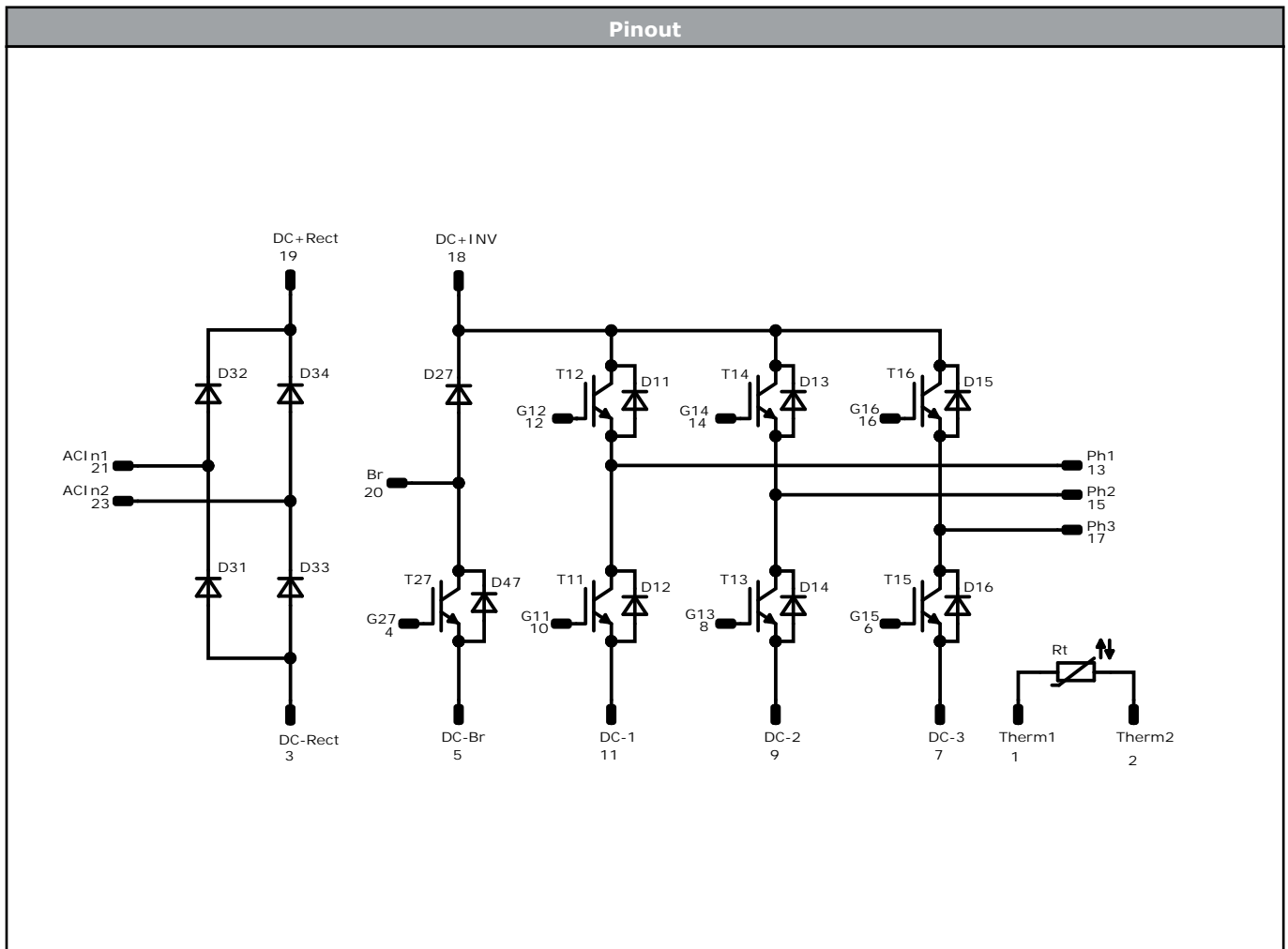
| Ordering Code | |
|--|------------------------------|
| Version | Ordering Code |
| Without thermal paste | 10-PC07PMA040I7-P547B66Y |
| With thermal paste (5,2 W/mK, PTM6000HV) | 10-PC07PMA040I7-P547B66Y-/7/ |

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

| Pin table [mm] | | | | Outline | |
|----------------|---------------|------|----------|---|--|
| Pin | X | Y | Function |  <p>center of press-fit pin head pin head type "Y", PCB plated through-hole $\Phi 14.5$ mm $+0.09$ / -0.06 for further PCB design rules refer to the latest handling instruction</p> <p>Tolerance of pinpositions ± 0.5mm at the end of pins Dimension of coordinate axis is only offset without tolerance</p> | |
| 1 | 25,5 | 2,7 | Therm1 | | |
| 2 | 25,5 | 0 | Therm2 | | |
| 3 | 22,8 | 0 | DC-Rect | | |
| 4 | 20,1 | 0 | G27 | | |
| 5 | 16,2 | 0 | DC-Br | | |
| 6 | 13,5 | 0 | G15 | | |
| 7 | 10,8 | 0 | DC-3 | | |
| 8 | 8,1 | 0 | G13 | | |
| 9 | 5,4 | 0 | DC-2 | | |
| 10 | 2,7 | 0 | G11 | | |
| 11 | 0 | 0 | DC-1 | | |
| 12 | 0 | 19,8 | G12 | | |
| 13 | 0 | 22,5 | Ph1 | | |
| 14 | 7,5 | 19,8 | G14 | | |
| 15 | 7,5 | 22,5 | Ph2 | | |
| 16 | 15 | 19,8 | G16 | | |
| 17 | 15 | 22,5 | Ph3 | | |
| 18 | 22,8 | 22,5 | DC+Inv | | |
| 19 | 25,5 | 22,5 | DC+Rect | | |
| 20 | 33,5 | 22,5 | Br | | |
| 21 | 33,5 | 15 | ACIn1 | | |
| 22 | not assembled | | | | |
| 23 | 33,5 | 0 | ACIn2 | | |



Vincotech



| Identification | | | | | |
|------------------------------|------------|---------|---------|----------------------------|---------|
| ID | Component | Voltage | Current | Function | Comment |
| T11, T12, T13, T14, T15, T16 | IGBT | 650 V | 40 A | Inverter Switch | |
| D11, D12, D13, D14, D15, D16 | FWD | 650 V | 40 A | Inverter Diode | |
| T27 | IGBT | 650 V | 40 A | Brake Switch | |
| D27 | FWD | 650 V | 20 A | Brake Diode | |
| D47 | FWD | 650 V | 20 A | Brake Sw. Protection Diode | |
| D31, D32, D33, D34 | Rectifier | 1600 V | 35 A | Rectifier Diode | |
| Rt | Thermistor | | | Thermistor | |



| Packaging instruction | | | | |
|---------------------------------------|------|----------|------|--------|
| Standard packaging quantity (SPQ) 135 | >SPQ | Standard | <SPQ | Sample |

| Handling instruction |
|---|
| Handling instructions for <i>flow 0</i> packages see vincotech.com website. |

| Package data |
|--|
| Package data for <i>flow 0</i> 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 $T_{j,op}=175^{\circ}C$ and up to 3500VAC/1min isolation voltage. For more information see vincotech.com website. |



| Document No.: | Date: | Modification: | Pages |
|--------------------------------|--------------|-----------------------|-------|
| 10-PC07PMA040I7-P547B66Y-T1-14 | 25 Sep. 2024 | Release for Promotion | |

| 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. |

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