
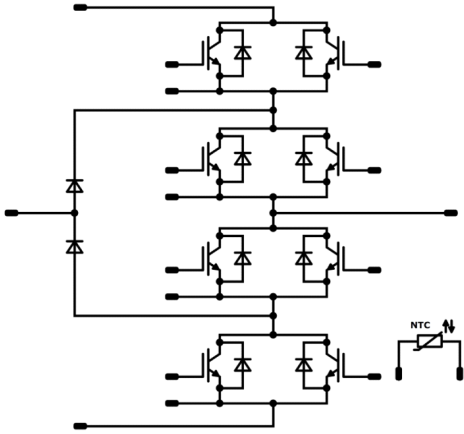




Vincotech

| <i>flow</i> NPC 1 | 650 V / 100 A |
|--|--|
| <div style="background-color: #eee; padding: 2px; margin-bottom: 5px;">Features</div> <ul style="list-style-type: none"> NPC inverter topology High-speed IGBT <i>flow</i> 1 12mm package NTC | <div style="background-color: #eee; padding: 2px; margin-bottom: 5px;"><i>flow</i> 1 12mm housing</div>  |
| <div style="background-color: #eee; padding: 2px; margin-bottom: 5px;">Target applications</div> <ul style="list-style-type: none"> Solar UPS | <div style="background-color: #eee; padding: 2px; margin-bottom: 5px;">Schematic</div>  |
| <div style="background-color: #eee; padding: 2px; margin-bottom: 5px;">Types</div> <ul style="list-style-type: none"> 10-FY07NIA100S503-M515F58 | |

Maximum Ratings

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

| Parameter | Symbol | Condition | Value | Unit |
|-----------------------------------|------------|--|----------|------------------|
| Buck Switch | | | | |
| Collector-emitter voltage | V_{CES} | | 650 | V |
| Collector current | I_C | $T_j = T_{jmax}$ $T_s = 80\text{ }^\circ\text{C}$ | 83 | A |
| Repetitive peak collector current | I_{CRM} | t_p limited by T_{jmax} | 300 | A |
| Total power dissipation | P_{tot} | $T_j = T_{jmax}$ $T_s = 80\text{ }^\circ\text{C}$ | 125 | W |
| Gate-emitter voltage | V_{GES} | | ± 20 | V |
| Maximum junction temperature | T_{jmax} | | 175 | $^\circ\text{C}$ |



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Maximum Ratings

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

| Parameter | Symbol | Condition | Value | Unit |
|-----------|--------|-----------|-------|------|
|-----------|--------|-----------|-------|------|

Buck Diode

| | | | | |
|-------------------------------------|------------|---------------------------------------|-----|----|
| Peak Repetitive Reverse Voltage | V_{RRM} | | 650 | V |
| Continuous (direct) forward current | I_F | $T_j = T_{jmax}$ $T_s = 80\text{ °C}$ | 82 | A |
| Repetitive peak forward current | I_{FRM} | | 200 | A |
| Total power dissipation | P_{tot} | $T_j = T_{jmax}$ $T_s = 80\text{ °C}$ | 106 | W |
| Maximum Junction Temperature | T_{jmax} | | 175 | °C |

Boost Switch

| | | | | |
|-----------------------------------|------------|---------------------------------------|-----|----|
| Collector-emitter voltage | V_{CES} | | 650 | V |
| Collector current | I_C | $T_j = T_{jmax}$ $T_s = 80\text{ °C}$ | 149 | A |
| Repetitive peak collector current | I_{CRM} | t_p limited by T_{jmax} | 450 | A |
| Total power dissipation | P_{tot} | $T_j = T_{jmax}$ $T_s = 80\text{ °C}$ | 164 | W |
| Gate-emitter voltage | V_{GES} | | ±20 | V |
| Maximum Junction Temperature | T_{jmax} | | 175 | °C |

Boost Diode/Boost Inverse Diode

| | | | | |
|-------------------------------------|------------|---------------------------------------|-----|----|
| Peak Repetitive Reverse Voltage | V_{RRM} | | 650 | V |
| Continuous (direct) forward current | I_F | $T_j = T_{jmax}$ $T_s = 80\text{ °C}$ | 83 | A |
| Repetitive peak forward current | I_{FRM} | | 200 | A |
| Total power dissipation | P_{tot} | $T_j = T_{jmax}$ $T_s = 80\text{ °C}$ | 119 | W |
| Maximum Junction Temperature | T_{jmax} | | 175 | °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 $t_p = 2\text{ s}$ | 4000 | V |
| Creepage distance | | | min. 12,7 | mm |
| Clearance | | | 8,07 | mm |
| Comparative Tracking Index | CTI | | > 200 | |



Characteristic Values

| Parameter | Symbol | Conditions | | | | | Value | | | 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 | | |

Buck Switch

Static

| | | | | | | | | | | |
|--------------------------------------|--------------|-------------------|----|-----|-------|----|-----|------|------|----|
| Gate-emitter threshold voltage | $V_{GE(th)}$ | $V_{GE} = V_{CE}$ | | | 0,001 | 25 | 3,2 | 4 | 4,8 | V |
| Collector-emitter saturation voltage | V_{CEsat} | | 15 | | 100 | 25 | | 1,35 | 1,75 | V |
| Collector-emitter cut-off current | I_{CES} | | 0 | 650 | | 25 | | | 100 | μA |
| Gate-emitter leakage current | I_{GES} | | 20 | 0 | | 25 | | | 200 | nA |
| Internal gate resistance | r_g | | | | | | | none | | Ω |
| Input capacitance | C_{ies} | | | | | | | 6200 | | pF |
| Output capacitance | C_{oes} | $f = 1$ MHz | 0 | 25 | | 25 | | 176 | | |
| Reverse transfer capacitance | C_{res} | | | | | | | 24 | | |
| Gate charge | Q_g | | 15 | 520 | 100 | 25 | | 240 | | nC |

Thermal

| | | | | | | | | | | |
|-------------------------------------|---------------|---|--|--|--|--|--|------|--|-----|
| Thermal resistance junction to sink | $R_{th(j-s)}$ | phase-change material $\lambda = 3,4$ W/mK | | | | | | 0,76 | | K/W |
|-------------------------------------|---------------|---|--|--|--|--|--|------|--|-----|

Buck Diode

Static

| | | | | | | | | | | |
|-------------------------|-------|--|--|-----|-----|------------------|--|----------------------|------|----|
| Forward voltage | V_F | | | | 100 | 25 125 150 | | 1,50 1,43 1,40 | 1,77 | V |
| Reverse leakage current | I_r | | | 650 | | 25 | | | 5,3 | μA |

Thermal

| | | | | | | | | | | |
|-------------------------------------|---------------|---|--|--|--|--|--|------|--|-----|
| Thermal resistance junction to sink | $R_{th(j-s)}$ | phase-change material $\lambda = 3,4$ W/mK | | | | | | 0,90 | | K/W |
|-------------------------------------|---------------|---|--|--|--|--|--|------|--|-----|



Characteristic Values

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

Boost Switch

Static

| Parameter | Symbol | Conditions | V_{GS} [V] | V_{GE} [V] | V_{DS} [V] | I_D [A] | T_j [°C] | Min | Typ | Max | Unit |
|--------------------------------------|--------------|-------------------|--------------|--------------|--------------|-----------|------------|-----|--------------|------|------|
| Gate-emitter threshold voltage | $V_{GE(th)}$ | $V_{GE} = V_{CE}$ | | | | 0,002 | 25 | 4,2 | 5 | 5,8 | V |
| Collector-emitter saturation voltage | V_{CEsat} | | 15 | | | 150 | 25 150 | | 1,10 1,09 | 1,45 | V |
| Collector-emitter cut-off current | I_{CES} | | 0 | 650 | | | 25 | | | 80 | μA |
| Gate-emitter leakage current | I_{GES} | | 20 | 0 | | | 25 | | | 200 | nA |
| Internal gate resistance | r_g | | | | | | | | none | | Ω |
| Input capacitance | C_{ies} | $f = 1$ MHz | 0 | 25 | | | 25 | | 23250 | | pF |
| Reverse transfer capacitance | C_{res} | | | | | | | | 60 | | |
| Gate charge | Q_g | | 15 | 520 | 75 | 25 | | | 872 | | nC |

Thermal

| Parameter | Symbol | Conditions | V_{GS} [V] | V_{GE} [V] | V_{DS} [V] | I_D [A] | T_j [°C] | Min | Typ | Max | Unit |
|-------------------------------------|---------------|---|--------------|--------------|--------------|-----------|------------|-----|------|-----|------|
| Thermal resistance junction to sink | $R_{th(j-s)}$ | phase-change material $\lambda = 3,4$ W/mK | | | | | | | 0,58 | | K/W |

Boost Diode/Boost Inverse Diode

Static

| Parameter | Symbol | Conditions | V_{GS} [V] | V_{GE} [V] | V_{DS} [V] | I_D [A] | T_j [°C] | Min | Typ | Max | Unit |
|-------------------------|--------|------------|--------------|--------------|--------------|-----------|------------|-----|--------------|------|------|
| Forward voltage | V_F | | | | | 100 | 25 150 | | 1,77 1,57 | 1,82 | V |
| Reverse leakage current | I_r | | | 650 | | | 25 | | | 54 | μA |

Thermal


| Parameter | Symbol | Conditions | V_{GS} [V] | V_{GE} [V] | V_{DS} [V] | I_D [A] | T_j [°C] | Min | Typ | Max | Unit |
|-------------------------------------|---------------|---|--------------|--------------|--------------|-----------|------------|-----|-----|-----|------|
| Thermal resistance junction to sink | $R_{th(j-s)}$ | phase-change material $\lambda = 3,4$ W/mK | | | | | | | 0,8 | | K/W |

Thermistor

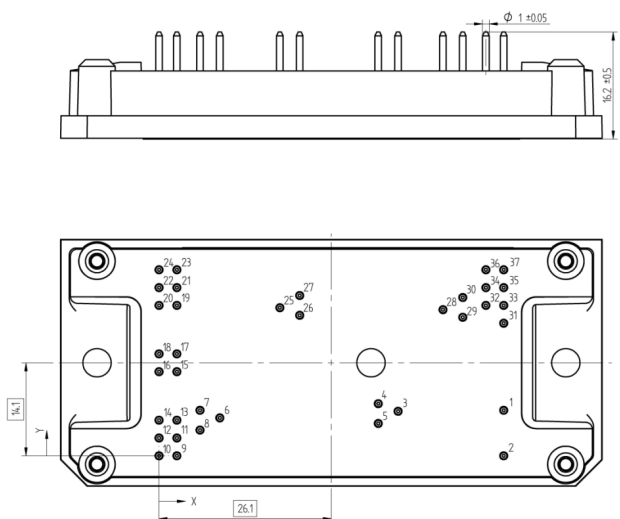
| Parameter | Symbol | Conditions | V_{GS} [V] | V_{GE} [V] | V_{DS} [V] | I_D [A] | T_j [°C] | Min | Typ | Max | Unit |
|----------------------------|----------------|--------------------|--------------|--------------|--------------|-----------|------------|-----|------|-----|------|
| Rated resistance | R | | | | | | 25 | | 22 | | kΩ |
| Deviation of R_{100} | $\Delta_{R/R}$ | $R_{100} = 1484$ Ω | | | | | 100 | -5 | | 5 | % |
| Power dissipation | P | | | | | | 25 | | 5 | | mW |
| Power dissipation constant | | | | | | | 25 | | 1,5 | | mW/K |
| B-value | $B_{(25/50)}$ | Tol. ± 1 % | | | | | 25 | | 3962 | | K |
| B-value | $B_{(25/100)}$ | Tol. ± 1 % | | | | | 25 | | 4000 | | K |
| Vincotech NTC Reference | | | | | | | | | | I | |



Vincotech

| Ordering Code & Marking | | | | | | |
|---|---------------------------|------------|-----------|---------------------------|-------|--------|
| Version | | | | Ordering Code | | |
| without thermal paste 12mm housing with solder pins | | | | 10-FY07NIA100S503-M515F58 | | |
|  | | | | | | |
| Text | Name | | Date code | UL & VIN | Lot | Serial |
| | NN-NNNNNNNNNNNNNN-TTTTTUV | | WWYY | UL VIN | LLLLL | SSSS |
| Datamatrix | Type&Ver | Lot number | Serial | Date code | | |
| | TTTTTUV | LLLLL | SSSS | WWYY | | |

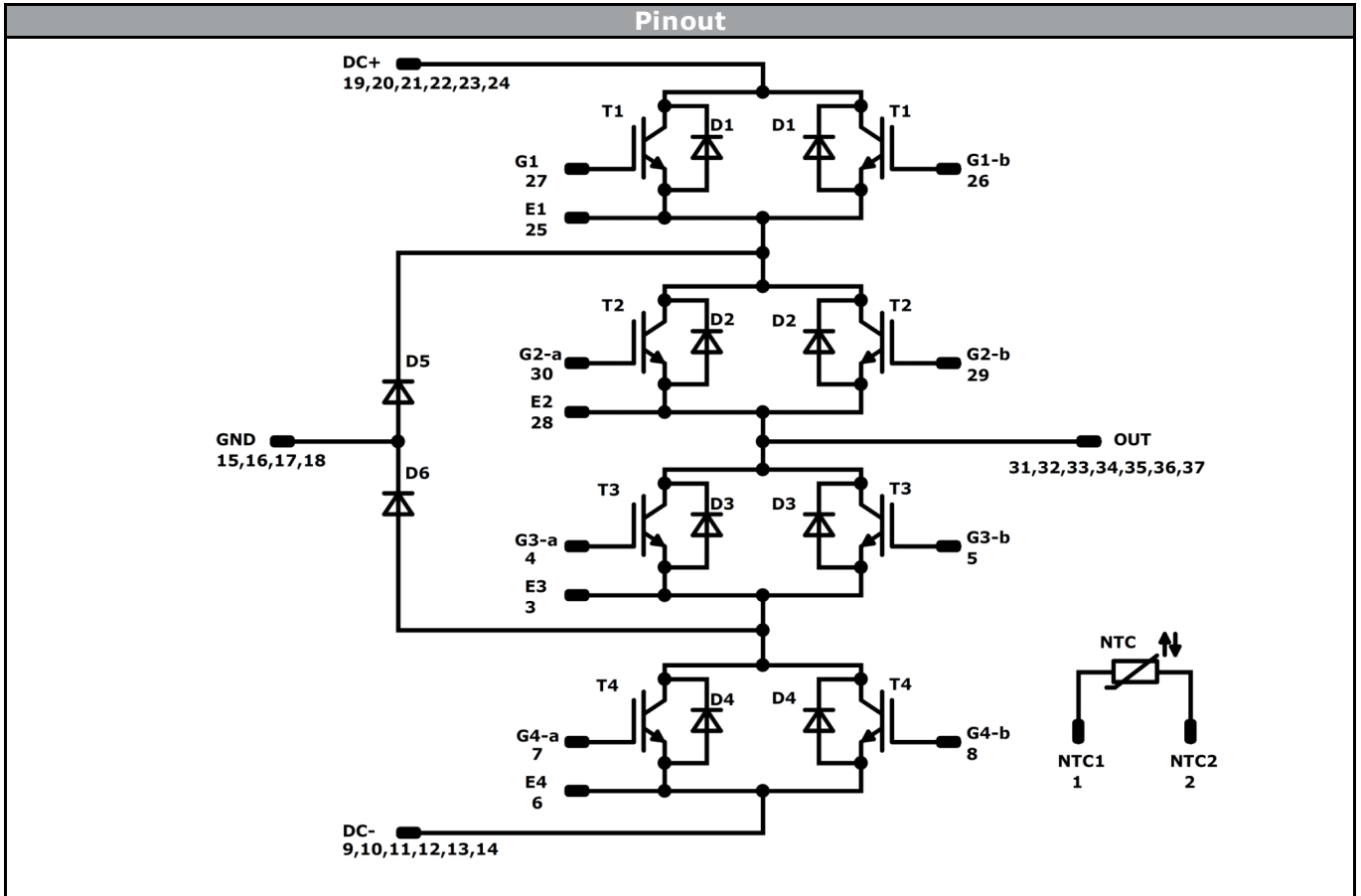
| Outline | | | | | | | |
|----------------|------|-------|----------|----------------|------|------|----------|
| Pin table [mm] | | | | Pin table [mm] | | | |
| Pin | X | Y | Function | Pin | X | Y | Function |
| 1 | 52,2 | 6,9 | NTC1 | 30 | 46 | 24 | G2-a |
| 2 | 52,2 | 0 | NTC2 | 31 | 52,2 | 20,1 | OUT |
| 3 | 36,2 | 6,75 | E3 | 32 | 49,5 | 22,8 | OUT |
| 4 | 33,2 | 7,9 | G3-a | 33 | 52,2 | 22,8 | OUT |
| 5 | 33,2 | 4,9 | G3-b | 34 | 49,5 | 25,5 | OUT |
| 6 | 9,2 | 5,75 | E4 | 35 | 52,2 | 25,5 | OUT |
| 7 | 6,2 | 6,9 | G4-a | 36 | 49,5 | 28,2 | OUT |
| 8 | 6,2 | 3,9 | G4-b | 37 | 52,2 | 28,2 | OUT |
| 9 | 2,7 | 0 | DC- | | | | |
| 10 | 0 | 0 | DC- | | | | |
| 11 | 2,7 | 2,7 | DC- | | | | |
| 12 | 0 | 2,7 | DC- | | | | |
| 13 | 2,7 | 5,4 | DC- | | | | |
| 14 | 0 | 5,4 | DC- | | | | |
| 15 | 2,7 | 12,75 | GND | | | | |
| 16 | 0 | 12,75 | GND | | | | |
| 17 | 2,7 | 15,45 | GND | | | | |
| 18 | 0 | 15,45 | GND | | | | |
| 19 | 2,7 | 22,8 | DC+ | | | | |
| 20 | 0 | 22,8 | DC+ | | | | |
| 21 | 2,7 | 25,5 | DC+ | | | | |
| 22 | 0 | 25,5 | DC+ | | | | |
| 23 | 2,7 | 28,2 | DC+ | | | | |
| 24 | 0 | 28,2 | DC+ | | | | |
| 25 | 18,3 | 22,45 | E1 | | | | |
| 26 | 21,3 | 21,3 | G1-b | | | | |
| 27 | 21,3 | 24,3 | G1-a | | | | |
| 28 | 43 | 22,15 | E2 | | | | |
| 29 | 46 | 21 | G2-b | | | | |



Tolerance of pinpositions: ±0.5mm at the end of pins
Dimension of coordinate axis is only offset without tolerance



Vincotech



| Identification | | | | | |
|-----------------------|------------|---------|---------|---------------------|---------|
| ID | Component | Voltage | Current | Function | Comment |
| T1, T4 | IGBT | 650 V | 100 A | Buck Switch | |
| D5, D6 | FWD | 650 V | 100 A | Buck Diode | |
| T2, T3 | IGBT | 650 V | 150 A | Boost Switch | |
| D1, D4 | FWD | 650 V | 100 A | Boost Diode | |
| D2, D3 | FWD | 650 V | 100 A | Boost Inverse Diode | |
| NTC | Thermistor | | | Thermistor | |




Vincotech

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

| Handling instruction |
|---|
| Handling instructions for <i>flow 1</i> packages see vincotech.com website. |

| Package data |
|--|
| Package data for <i>flow 1</i> packages see vincotech.com website. |

| UL recognition and file number |
|---|
| This device is certified according to UL 1557 standard, UL file number E192116. For more information see vincotech.com website.  |

| Document No.: | Date: | Modification: | Pages |
|----------------------------------|--------------|---------------|-------|
| 10-FY07NIA100S503-M515F58 -T1-14 | 13 Sep. 2016 | | |

| 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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