



Vincotech

B0-SP10NAE600S7-LQ89F08Y

target datasheet

for virtual products created by Vincotech Product Creator, only for evaluation purposes,
no commitment for product development!

*flow*ANPC S3 split

950 V / 600 A

Features

- Three-level Active NPC topology
- Ultra efficient SiC Diodes
- Low inductive mid-power package

Target applications

- Solar Inverters

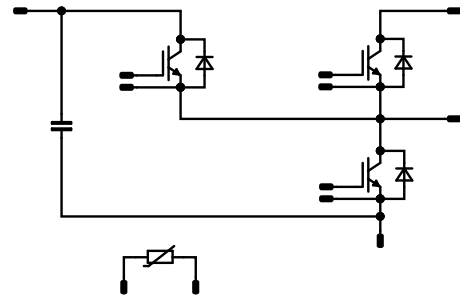
Types

- B0-SP10NAE600S7-LQ89F08Y

flow S3 12 mm housing



Schematic





Vincotech

B0-SP10NAE600S7-LQ89F08Y
target datasheet

Maximum Ratings

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

| Parameter | Symbol | Conditions | Value | Unit |
|-------------------------------------|------------|---------------------------------------|-------|------|
| AC Diode | | | | |
| Peak repetitive reverse voltage | V_{RRM} | | 950 | V |
| Continuous (direct) forward current | I_F | | 300 | A |
| Total power dissipation | P_{tot} | $T_j = T_{jmax}$ $T_s = 80\text{ °C}$ | 283 | W |
| Maximum junction temperature | T_{jmax} | | 175 | °C |

AC Switch

| | | | | |
|-----------------------------------|------------|---------------------------------------|----------|----|
| Collector-emitter voltage | V_{CES} | | 950 | V |
| Collector current | I_C | | 400 | A |
| Repetitive peak collector current | I_{CRM} | t_p limited by T_{jmax} | 800 | A |
| Total power dissipation | P_{tot} | $T_j = T_{jmax}$ $T_s = 80\text{ °C}$ | 367 | W |
| Gate-emitter voltage | V_{GES} | | ± 20 | V |
| Maximum junction temperature | T_{jmax} | | 175 | °C |

Neutral Point Switch

| | | | | |
|-----------------------------------|------------|---------------------------------------|----------|----|
| Collector-emitter voltage | V_{CES} | | 950 | V |
| Collector current | I_C | | 200 | A |
| Repetitive peak collector current | I_{CRM} | t_p limited by T_{jmax} | 400 | A |
| Total power dissipation | P_{tot} | $T_j = T_{jmax}$ $T_s = 80\text{ °C}$ | 276 | W |
| Gate-emitter voltage | V_{GES} | | ± 20 | V |
| Maximum junction temperature | T_{jmax} | | 175 | °C |



Vincotech

Maximum Ratings

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

| Parameter | Symbol | Conditions | Value | Unit |
|--|------------|--|-------------|------|
| DC-Link Diode | | | | |
| Peak repetitive reverse voltage | V_{RRM} | | 1200 | V |
| Continuous (direct) forward current | I_F | | 120 | A |
| Repetitive peak forward current | I_{FRM} | t_p limited by T_{jmax} | 546 | A |
| Surge (non-repetitive) forward current | I_{FSM} | Single Half Sine Wave, $t_p = 10\text{ ms}$ | 780 | A |
| Total power dissipation | P_{tot} | $T_j = T_{jmax}$ $T_s = 80\text{ °C}$ | 254 | W |
| Maximum junction temperature | T_{jmax} | | 175 | °C |
| DC-Link Switch | | | | |
| Collector-emitter voltage | V_{CES} | | 950 | V |
| Collector current | I_C | | 600 | A |
| Repetitive peak collector current | I_{CRM} | t_p limited by T_{jmax} | 1200 | A |
| Total power dissipation | P_{tot} | $T_j = T_{jmax}$ $T_s = 80\text{ °C}$ | 487 | W |
| Gate-emitter voltage | V_{GES} | | ±20 | V |
| Maximum junction temperature | T_{jmax} | | 175 | °C |
| Neutral Point Diode | | | | |
| Peak repetitive reverse voltage | V_{RRM} | | 950 | V |
| Continuous (direct) forward current | I_F | | 300 | A |
| Total power dissipation | P_{tot} | $T_j = T_{jmax}$ $T_s = 80\text{ °C}$ | 283 | W |
| Maximum junction temperature | T_{jmax} | | 175 | °C |
| Capacitor (DC) | | | | |
| Maximum DC voltage | V_{MAX} | | 750 | V |
| Operation Temperature | T_{op} | | -55 ... 150 | °C |



Vincotech

B0-SP10NAE600S7-LQ89F08Y
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_{jmax} - 25) | °C |

Isolation Properties

| | | | | |
|----------------------------|-------------------|------------------------------------|------------|----|
| Isolation voltage | V_{isol} | DC Test Voltage $t_p = 2\text{ s}$ | 6000 | V |
| Isolation voltage | V_{isol} | AC Voltage $t_p = 1\text{ min}$ | 2500 | V |
| Creepage distance | | | min. 12,7 | mm |
| Clearance | | | 11,77 | mm |
| Comparative Tracking Index | CTI | | ≥ 600 | |



Vincotech

Characteristic Values

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

AC Diode

Static

| | | | | | | | | | | |
|-------------------------|-------|--|--|-----|-----|-----------|-----|-------------|-----|----|
| Forward voltage | V_F | | | | 300 | 25 150 | 2,1 | 2,5 2,35 | 2,8 | V |
| Reverse leakage current | I_R | | | 950 | | 25 | | | 12 | μA |

Thermal

| | | | | | | | | | | |
|-------------------------------------|---------------|---|--|--|--|--|--|------|--|-----|
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste} = 3 \text{ W/mK}$ (TCP) | | | | | | 0,34 | | K/W |
|-------------------------------------|---------------|---|--|--|--|--|--|------|--|-----|

AC Switch

Static

| | | | | | | | | | | |
|--------------------------------------|---------------|-------------------|----|-----|--------|-----------|------|-------------|------|----|
| Gate-emitter threshold voltage | $V_{GE(th)}$ | $V_{CE} = V_{GE}$ | | | 0,0065 | 25 | 4,15 | 4,85 | 5,65 | V |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | | 15 | | 400 | 25 150 | | 1,3 1,35 | 1,4 | V |
| Collector-emitter cut-off current | I_{CES} | | 0 | 950 | | 25 | | | 8 | μA |
| Gate-emitter leakage current | I_{GES} | | 20 | 0 | | 25 | | | 200 | nA |
| Input capacitance | C_{ies} | f = 100 kHz | 0 | 25 | | 25 | | 49200 | | pF |
| Reverse transfer capacitance | C_{res} | | | | | | | 220 | | pF |

Thermal

| | | | | | | | | | | |
|-------------------------------------|---------------|---|--|--|--|--|--|------|--|-----|
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste} = 3 \text{ W/mK}$ (TCP) | | | | | | 0,26 | | K/W |
|-------------------------------------|---------------|---|--|--|--|--|--|------|--|-----|



Vincotech

Characteristic Values

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

Neutral Point Switch

Static

| | | | | | | | | | | |
|--------------------------------------|---------------|-------------------|----|-----|--------|-----------|------|-------------|------|----|
| Gate-emitter threshold voltage | $V_{GE(th)}$ | $V_{CE} = V_{GE}$ | | | 0,0033 | 25 | 4,35 | 5,1 | 5,85 | V |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | | 15 | | 200 | 25 150 | | 1,9 2,15 | 2,35 | V |
| Collector-emitter cut-off current | I_{CES} | | 0 | 950 | | 25 | | | 4 | μA |
| Gate-emitter leakage current | I_{GES} | | 20 | 0 | | 25 | | | 200 | nA |
| Input capacitance | C_{ies} | f = 100 kHz | 0 | 25 | | 25 | | 13000 | | pF |
| Reverse transfer capacitance | C_{res} | | | | | | | 40 | | pF |

Thermal

| | | | | | | | | | | |
|-------------------------------------|---------------|---|--|--|--|--|--|------|--|-----|
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste} = 3 \text{ W/mK}$ (TCP) | | | | | | 0,34 | | K/W |
|-------------------------------------|---------------|---|--|--|--|--|--|------|--|-----|

DC-Link Diode

Static

| | | | | | | | | | | |
|-------------------------|-------|--|--|------|-----|----|--|-----|------|----|
| Forward voltage | V_F | | | | 120 | 25 | | 1,5 | 1,8 | V |
| Reverse leakage current | I_R | | | 1200 | | 25 | | 210 | 1200 | μA |

Thermal

| | | | | | | | | | | |
|-------------------------------------|---------------|---|--|--|--|--|--|------|--|-----|
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste} = 3 \text{ W/mK}$ (TCP) | | | | | | 0,37 | | K/W |
|-------------------------------------|---------------|---|--|--|--|--|--|------|--|-----|



Vincotech

Characteristic Values

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

DC-Link Switch

Static

| | | | | | | | | | | |
|--------------------------------------|--------------|-------------------|----|-----|--------|-----------|------|--------------|------|----|
| Gate-emitter threshold voltage | $V_{GE(th)}$ | $V_{CE} = V_{GE}$ | | | 0,0098 | 25 | 4,35 | 5,1 | 5,85 | V |
| Collector-emitter saturation voltage | V_{CEsat} | | 15 | | 600 | 25 150 | | 1,85 2,15 | 2,25 | V |
| Collector-emitter cut-off current | I_{CES} | | 0 | 950 | | 25 | | | 12 | μA |
| Gate-emitter leakage current | I_{GES} | | 20 | 0 | | 25 | | | 300 | nA |
| Input capacitance | C_{ies} | f = 100 kHz | 0 | 25 | | 25 | | 37800 | | pF |
| Reverse transfer capacitance | C_{res} | | | | | | | 120 | | pF |

Thermal

| | | | | | | | | | | |
|-------------------------------------|---------------|---|--|--|--|--|--|------|--|-----|
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste} = 3 \text{ W/mK}$ (TCP) | | | | | | 0,19 | | K/W |
|-------------------------------------|---------------|---|--|--|--|--|--|------|--|-----|

Neutral Point Diode

Static

| | | | | | | | | | | |
|-------------------------|-------|--|--|-----|-----|-----------|-----|-------------|-----|----|
| Forward voltage | V_F | | | | 300 | 25 150 | 2,1 | 2,5 2,35 | 2,8 | V |
| Reverse leakage current | I_R | | | 950 | | 25 | | | 12 | μA |

Thermal

| | | | | | | | | | | |
|-------------------------------------|---------------|---|--|--|--|--|--|------|--|-----|
| Thermal resistance junction to sink | $R_{th(j-s)}$ | $\lambda_{paste} = 3 \text{ W/mK}$ (TCP) | | | | | | 0,34 | | K/W |
|-------------------------------------|---------------|---|--|--|--|--|--|------|--|-----|



Vincotech

B0-SP10NAE600S7-LQ89F08Y
target datasheet

Characteristic Values

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

Thermistor

Static

| | | | | | | | | | | |
|--------------------------------|----------------|-------------------------|--|--|--|-----|----|------|---|------|
| Rated resistance | R | | | | | 25 | | 22 | | kΩ |
| Deviation of R100 | $A_{R/R}$ | $R_{100} = 1484 \Omega$ | | | | 100 | -5 | | 5 | % |
| Power dissipation | P | | | | | | | 5 | | mW |
| Power dissipation constant | | | | | | 25 | | 1,5 | | mW/K |
| B-value | $B_{(25/50)}$ | | | | | 25 | | 3962 | | K |
| B-value | $B_{(25/100)}$ | | | | | 25 | | 4000 | | K |
| Vincotech Thermistor Reference | | | | | | | | | I | |

Capacitor (DC)



Static

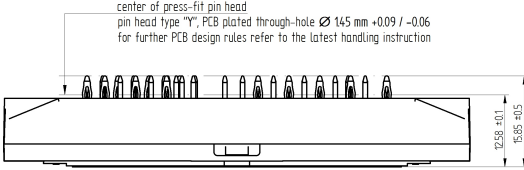
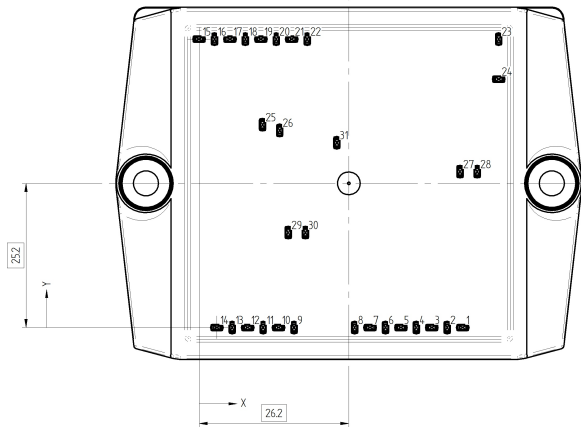
| | | | | | | | | | | |
|-------------|-----|--|--|--|--|--|--|----|--|----|
| Capacitance | C | | | | | | | 33 | | nF |
|-------------|-----|--|--|--|--|--|--|----|--|----|



Vincotech

B0-SP10NAE600S7-LQ89F08Y
target datasheet

| Ordering Code & Marking | | | | | | | | | | |
|--|---|---|----------------------------|------------------------------|--------|-----------|-----------|------|-----|--------|
| Version | | | | Ordering Code | | | | | | |
| with thermal paste 12mm housing with Press-fit pins | | | | B0-SP10NAE600S7-LQ89F08Y-/6/ | | | | | | |
| NN-NNNNNNNNNNNNNN TTTTITTV WWYY VIN LLLLL SSSS |  |  | Text | | Name | | Date code | VIN | Lot | Serial |
| | | | NN-NNNNNNNNNNNNNN-TTTTITTV | | WWYY | VIN | LLLLL | SSSS | | |
| | | | Type&Ver | Lot number | Serial | Date code | | | | |
| TTTTITTV | | LLLLL | SSSS | WWYY | | | | | | |

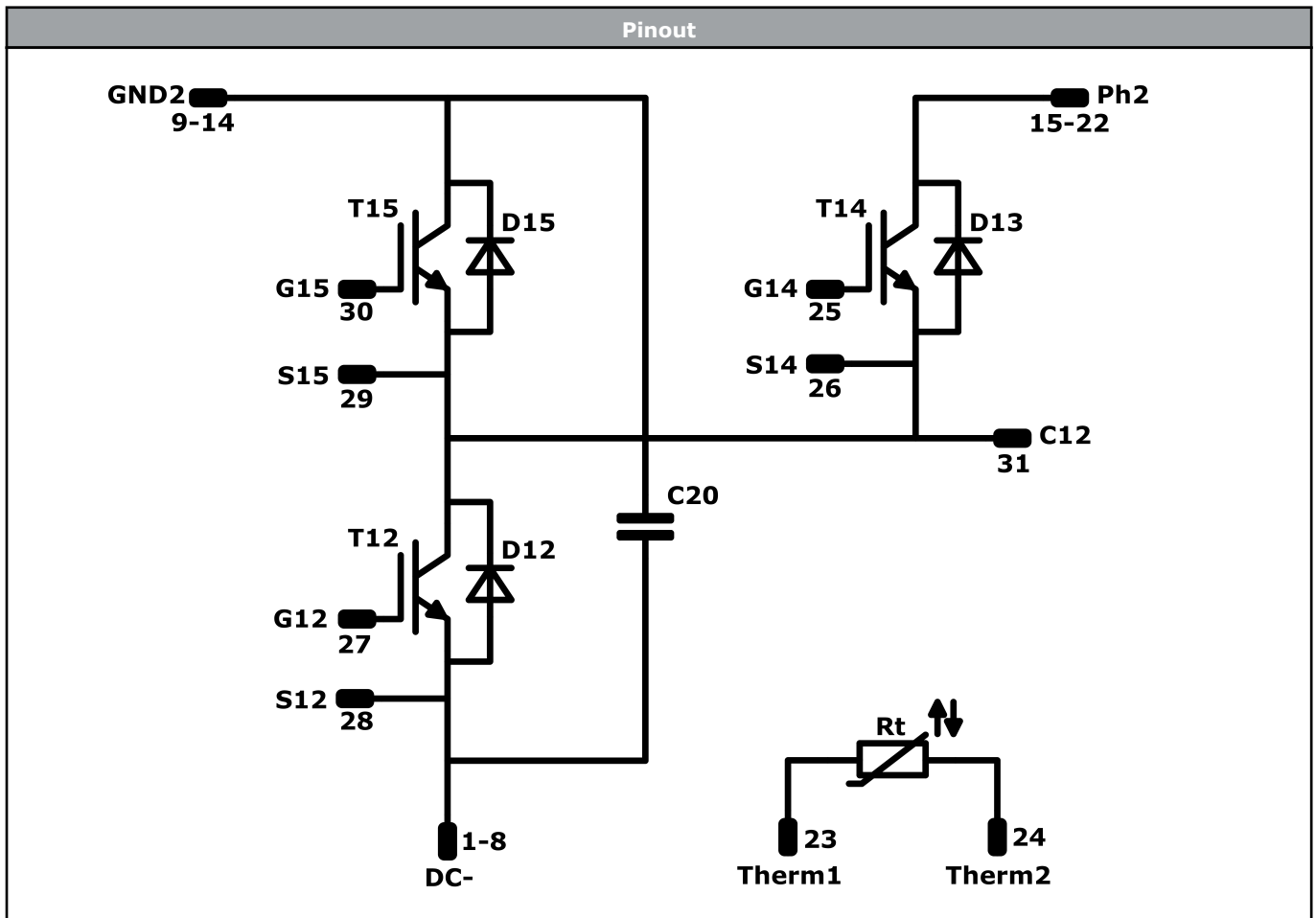
| Pin ta | | | | Outline | |
|--------|-------|-------|----------|---|--|
| Pin | X | Y | Function | | |
| 1 | 46.1 | 0 | DC- |  | |
| 2 | 43.4 | 0 | DC- | | |
| 3 | 40.7 | 0 | DC- | | |
| 4 | 38 | 0 | DC- | | |
| 5 | 35.3 | 0 | DC- | | |
| 6 | 32.6 | 0 | DC- | | |
| 7 | 29.9 | 0 | DC- | | |
| 8 | 27.2 | 0 | DC- | | |
| 9 | 16.6 | 0 | GND2 | | |
| 10 | 13.9 | 0 | GND2 | | |
| 11 | 11.2 | 0 | GND2 | | |
| 12 | 8.5 | 0 | GND2 | | |
| 13 | 5.8 | 0 | GND2 | | |
| 14 | 3.1 | 0 | GND2 | | |
| 15 | 0 | 50.4 | Ph2 |  | |
| 16 | 2.7 | 50.4 | Ph2 | | |
| 17 | 5.4 | 50.4 | Ph2 | | |
| 18 | 8.1 | 50.4 | Ph2 | | |
| 19 | 10.8 | 50.4 | Ph2 | | |
| 20 | 13.5 | 50.4 | Ph2 | | |
| 21 | 16.2 | 50.4 | Ph2 | | |
| 22 | 18.9 | 50.4 | Ph2 | | |
| 23 | 52.4 | 50.4 | Therm1 | | |
| 24 | 52.4 | 43.4 | Therm2 | | |
| 25 | 11.1 | 35.45 | G14 | | |
| 26 | 14.1 | 34.45 | S14 | | |
| 27 | 45.65 | 27.25 | G12 | | |
| 28 | 48.65 | 27.25 | S12 | | |
| 29 | 15.6 | 16.6 | S15 | | |
| 30 | 18.6 | 16.6 | G15 | | |
| 31 | 24.1 | 32.3 | C12 | | |

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



Vincotech

B0-SP10NAE600S7-LQ89F08Y
target datasheet



| Identification | | | | | |
|----------------|------------|---------|---------|----------------------|---------|
| ID | Component | Voltage | Current | Function | Comment |
| D13 | FWD | 950 V | 300 A | AC Diode | |
| T14 | IGBT | 950 V | 400 A | AC Switch | |
| T15 | IGBT | 950 V | 200 A | Neutral Point Switch | |
| D15 | FWD | 1200 V | 120 A | DC-Link Diode | |
| T12 | IGBT | 950 V | 600 A | DC-Link Switch | |
| D12 | FWD | 950 V | 300 A | Neutral Point Diode | |
| Rt | Thermistor | | | Thermistor | |
| C20 | Capacitor | | | Capacitor (DC) | |



| Packaging instruction | | | | |
|--------------------------------------|------|----------|------|--------|
| Standard packaging quantity (SPQ) 45 | >SPQ | Standard | <SPQ | Sample |

| Handling instruction |
|--|
| Handling instructions for <i>flow</i> S3 packages see vincotech.com website. |

| Package data |
|---|
| Packaging data for <i>flow</i> S3 packages see vincotech.com website. |

| Document No.: | Date: | Modification: | Pages |
|--------------------------------|--------------|-----------------|-------|
| B0-SP10NAE600S7-LQ89F08Y-T1-14 | 20 Feb. 2020 | 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. |

Disclaimer

The information, specifications, procedures, methods and recommendations herein (together "information") are presented by Vincotech to reader in good faith, are believed to be accurate and reliable, but may well be incomplete and/or not applicable to all conditions or situations that may exist or occur. Vincotech reserves the right to make any changes without further notice to any products to improve reliability, function or design. No representation, guarantee or warranty is made to reader as to the accuracy, reliability or completeness of said information or that the application or use of any of the same will avoid hazards, accidents, losses, damages or injury of any kind to persons or property or that the same will not infringe third parties rights or give desired results. It is reader's sole responsibility to test and determine the suitability of the information and the product for reader's intended use.

LIFE SUPPORT POLICY

Vincotech products are not authorised for use as critical components in life support devices or systems without the express written approval of Vincotech.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in labelling can be reasonably expected to result in significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.