



**flowNPC S3**

**1500 V / 300 A**

**Features**

- Compact and low inductive design
- Three-level high efficient topology
- Optimized for bidirectional operation
- 950 V components enable 1500 V DC-Link voltage

**Target applications**

- Energy Storage Systems

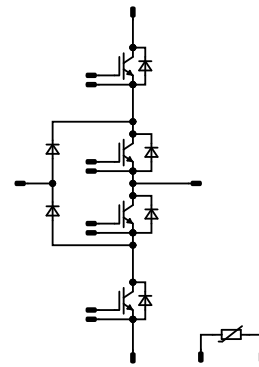
**Types**

- B0-SP10NIA300S705-LM00F98Y

**flow S3 12 mm housing**



**Schematic**





Vincotech

**B0-SP10NIA300S705-LM00F98Y**  
target datasheet

## Maximum Ratings

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

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

### Buck Switch

Collector-emitter voltage	$V_{CES}$		950	V
Collector current	$I_C$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	300	A
Repetitive peak collector current	$I_{CRM}$	$t_p$ limited by $T_{jmax}$	600	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	367	W
Gate-emitter voltage	$V_{GES}$		$\pm 20$	V
Maximum junction temperature	$T_{jmax}$		175	°C

### Buck Diode

Peak repetitive reverse voltage	$V_{RRM}$		950	V
Continuous (direct) forward current	$I_F$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	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

### Boost Switch

Collector-emitter voltage	$V_{CES}$		950	V
Collector current	$I_C$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	300	A
Repetitive peak collector current	$I_{CRM}$	$t_p$ limited by $T_{jmax}$	600	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	367	W
Gate-emitter voltage	$V_{GES}$		$\pm 20$	V
Maximum junction temperature	$T_{jmax}$		175	°C

### Boost Diode

Peak repetitive reverse voltage	$V_{RRM}$		950	V
Continuous (direct) forward current	$I_F$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	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



Vincotech

**B0-SP10NIA300S705-LM00F98Y**  
target datasheet

## Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
<b>Boost Sw. Inv. Diode</b>				
Peak repetitive reverse voltage	$V_{RRM}$		950	V
Continuous (direct) forward current	$I_F$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	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

## 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
Creepage distance			11,65	mm
Clearance			10,14	mm
Comparative Tracking Index	CTI		≥ 600	



Vincotech

### Characteristic Values

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

#### Buck Switch

##### Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,005	25	4,35	5,1	5,85	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		300	25 150		1,9 2,15	2,35	V
Collector-emitter cut-off current	$I_{CES}$		0	950		25			6	μA
Gate-emitter leakage current	$I_{GES}$		20	0		25			300	nA
Internal gate resistance	$r_g$							0,5		Ω
Input capacitance	$C_{ies}$							19500		pF
Output capacitance	$C_{oes}$	$f = 100$ kHz	0	25		25		417		pF
Reverse transfer capacitance	$C_{res}$							60		pF
Gate charge	$Q_g$		15		0	25		690		nC

##### Thermal

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

#### Buck Diode

##### Static

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

##### Thermal

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



Vincotech

**B0-SP10NIA300S705-LM00F98Y**  
target datasheet

### Characteristic Values

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

#### Boost Switch

##### Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,005	25	4,35	5,1	5,85	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		300	25 150		1,9 2,15	2,35	V
Collector-emitter cut-off current	$I_{CES}$		0	950		25			6	μA
Gate-emitter leakage current	$I_{GES}$		20	0		25			300	nA
Internal gate resistance	$r_g$							0,5		Ω
Input capacitance	$C_{ies}$							19500		pF
Output capacitance	$C_{oes}$	$f = 100$ kHz	0	25		25		417		pF
Reverse transfer capacitance	$C_{res}$							60		pF
Gate charge	$Q_g$		15		0	25		690		nC

##### Thermal

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

#### Boost Diode

##### Static

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

##### Thermal

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



Vincotech

**B0-SP10NIA300S705-LM00F98Y**  
target datasheet

### Characteristic Values

Parameter	Symbol	Conditions					Values			Unit
		$V_{GS}$ [V]	$V_{GE}$ [V]	$V_{DS}$ [V]	$V_{CE}$ [V]	$T_j$ [°C]	Min	Typ	Max	

#### Boost Sw. Inv. Diode

##### Static

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

##### Thermal

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

#### Thermistor

##### Static

Rated resistance	$R$					25		22		kΩ
Deviation of $R_{100}$	$\Delta_{R/R}$	$R_{100} = 1484$ Ω				100	-5		5	%
Power dissipation	$P$							5		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	



Vincotech

**B0-SP10NIA300S705-LM00F98Y**  
target datasheet

Ordering Code	
Version	Ordering Code
With thermal paste	B0-SP10NIA300S705-LM00F98Y-/6/

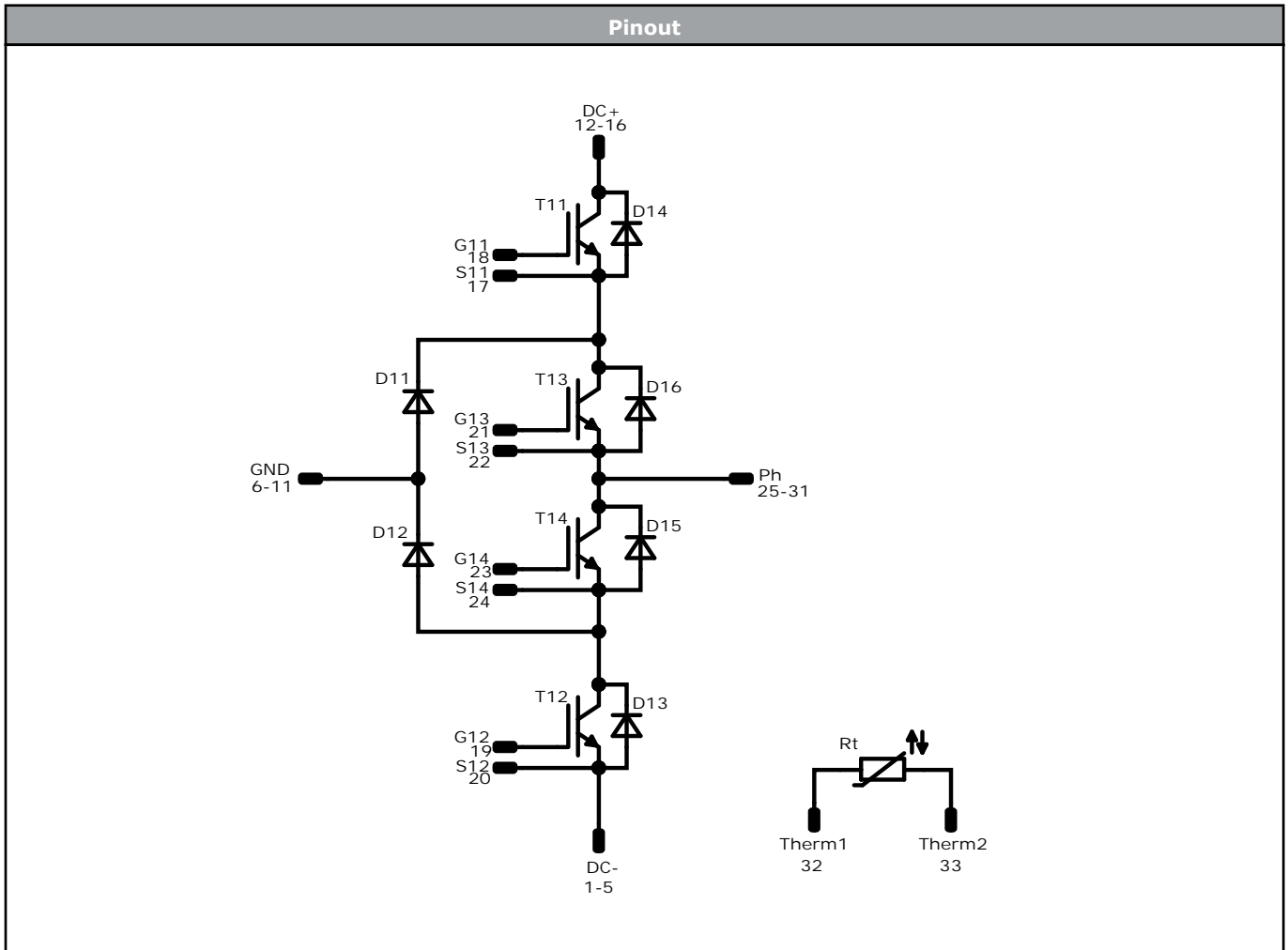
Marking						
	Text	Name	Date code	Logo	Lot	Serial
		NN-NNNNNNNNNNNNNN- TTTTTVV	WWYY	VIN	LLLLL	SSSS
	Datamatrix	Type&Ver	Lot number	Serial	Date code	
		TTTTTVV	LLLLL	SSSS	WWYY	

Pin table [mm]				Outline	
Pin	X	Y	Function	<p>center of gross-fit pin head pin head type "V": PCB plated through-hole <math>\phi 145</math> mm <math>\pm 0.09</math> / -0.06 for further PCB design rules refer to the latest handling instruction</p> <p>Tolerance of preprietary <math>\phi 10</math>mm at the end of pins Dimension of cathode case is only offset without tolerance</p>	
1	52,4	0	DC-		
2	49,6	0	DC-		
3	44,2	0	DC-		
4	41,5	0	DC-		
5	38,8	0	DC-		
6	32,95	0	GND		
7	30,25	0	GND		
8	27,55	0	GND		
9	24,85	0	GND		
10	22,15	0	GND		
11	19,45	0	GND		
12	13,7	0	DC+		
13	11	0	DC+		
14	8,3	0	DC+		
15	2,7	0	DC+		
16	0	0	DC+		
17	1	15,5	S11		
18	0	18,5	G11		
19	39,95	21,15	G12		
20	38,95	24,15	S12		
21	10,7	38,95	G13		
22	9,7	41,95	S13		
23	26,65	37,55	G14		
24	25,65	40,55	S14		
25	23,65	50,4	Ph		
26	26,35	50,4	Ph		
27	29,05	50,4	Ph		
28	31,75	50,4	Ph		
29	34,45	50,4	Ph		
30	37,15	50,4	Ph		
31	39,85	50,4	Ph		
32	0	50,4	Therm1		
33	3	50,4	Therm2		



Vincotech

**B0-SP10NIA300S705-LM00F98Y**  
target datasheet



Identification					
ID	Component	Voltage	Current	Function	Comment
T11, T12	IGBT	950 V	300 A	Buck Switch	
D11, D12	FWD	950 V	300 A	Buck Diode	
T13, T14	IGBT	950 V	300 A	Boost Switch	
D13, D14	FWD	950 V	300 A	Boost Diode	
D15, D16	FWD	950 V	300 A	Boost Sw. Inv. Diode	
Rt	Thermistor			Thermistor	





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

Document No.:	Date:	Modification:	Pages
B0-SP10NIA300S705-LM00F98Y-T1-14	20 May, 2020		

**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.