



flowNPC 1 split

1500 V / 300 A

Features

- Enhanced efficiency
- Low inductive package
- Tandem diodes
- Enables 1500 VDC

Target applications

- Solar Inverters

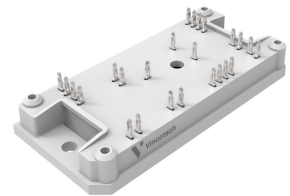
Types

- 10-PY12NID300N302-LK49F38Y
- 10-PY12NIF300N302-LK59F38Y

flow 1 12 mm housing

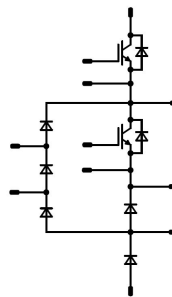


LK49F38Y

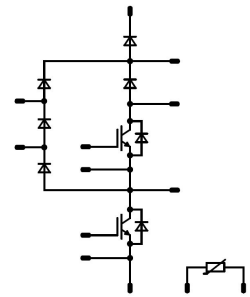


LK59F38Y

Schematic



LK49F38Y



LK59F38Y



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10-PY12NIx300N302-LKx9F38Y

target datasheet

Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
Buck Switch				
Collector-emitter voltage	V_{CES}		1200	V
Collector current	I_C		300	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	1200	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	296	W
Gate-emitter voltage	V_{GES}		± 15	V
Maximum junction temperature	T_{jmax}		175	°C
Buck Diode				
Peak repetitive reverse voltage	V_{RRM}		1300	V
Continuous (direct) forward current	I_F		200	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	400	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	242	W
Maximum junction temperature	T_{jmax}		175	°C
Boost Switch				
Collector-emitter voltage	V_{CES}		1200	V
Collector current	I_C		300	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	600	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	305	W
Gate-emitter voltage	V_{GES}		± 20	V
Short-circuit ratings	t_{SC}	$V_{GE} = 15\text{ V}$ $T_j = 150\text{ °C}$	9,5	μs
Maximum junction temperature	T_{jmax}		175	°C



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

Parameter	Symbol	Conditions	Value	Unit
Boost Diode				
Peak repetitive reverse voltage	V_{RRM}		1200	V
Continuous (direct) forward current	I_F		150	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 25\text{ °C}$	860	A
Surge current capability	I^2t	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 150\text{ °C}$	3700	A ² s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	199	W
Maximum junction temperature	T_{jmax}		175	°C
Boost Sw.Inv.Diode				
Peak repetitive reverse voltage	V_{RRM}		1200	V
Continuous (direct) forward current	I_F		150	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 25\text{ °C}$	860	A
Surge current capability	I^2t	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 150\text{ °C}$	3700	A ² s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	199	W
Maximum junction temperature	T_{jmax}		175	°C
Buck Sw. Protection Diode				
Peak repetitive reverse voltage	V_{RRM}		1200	V
Continuous (direct) forward current	I_F		25	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 25\text{ °C}$	100	A
Surge current capability	I^2t	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 150\text{ °C}$	50	A ² s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	71	W
Maximum junction temperature	T_{jmax}		175	°C



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

Parameter	Symbol	Conditions	Value	Unit
Boost Sw. Protection Diode				
Peak repetitive reverse voltage	V_{RRM}		1200	V
Continuous (direct) forward current	I_F		25	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 25\text{ °C}$	100	A
Surge current capability	I^2t	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 150\text{ °C}$	50	A ² s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	71	W
Maximum junction temperature	T_{jmax}		175	°C

Boost D. Protection Diode

Peak repetitive reverse voltage	V_{RRM}		1200	V
Continuous (direct) forward current	I_F		25	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 25\text{ °C}$	100	A
Surge current capability	I^2t	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 150\text{ °C}$	50	A ² s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	71	W
Maximum junction temperature	T_{jmax}		175	°C



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10-PY12NIX300N302-LKx9F38Y

target datasheet

Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
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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		LK49F38Y / LK59F38Y	> 12,7 / > 12,7	mm
Clearance		LK49F38Y / LK59F38Y	8,80 / 8,16	mm
Comparative Tracking Index	CTI		≥ 600	



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10-PY12NIx300N302-LKx9F38Y

target datasheet

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	

Buck Switch

Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,0018	25	4,5	5,5	6,5	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		300	25		1,75	2,1	V
Collector-emitter cut-off current	I_{CES}		0	1200		25			800	μA
Gate-emitter leakage current	I_{GES}		20	0		25			1600	nA
Input capacitance	C_{ies}	f = 1 Mhz	0	30		25		35000		pF
Output capacitance	C_{oes}							816		pF
Reverse transfer capacitance	C_{res}							460		pF
Gate charge	Q_g		15	600	300	25		1516		nC

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						0,32		K/W
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Buck Diode

Static

Forward voltage	V_F				200	25 175		2,7 2,56	3,84	V
Reverse leakage current	I_R			1300		25			10,6	μA

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						0,39		K/W
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10-PY12NIx300N302-LKx9F38Y

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		

Boost Switch

Static

Gate-emitter threshold voltage	$V_{GE(th)}$				0,03	25	5,4	6	6,6	V
Collector-emitter saturation voltage	V_{CEsat}		15		300	25 125 150		1,55 1,75 1,8	1,85	V
Collector-emitter cut-off current	I_{CES}		0	1200		25			200	μA
Gate-emitter leakage current	I_{GES}		20	0		25			1000	nA
Input capacitance	C_{ies}	f =	0	10		25		60000		pF
Output capacitance	C_{oes}							1760		pF
Reverse transfer capacitance	C_{res}							640		pF
Gate charge	Q_g	$V_{CC} = 600$ V	15		300	25		2000		nC

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						0,31		K/W
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Boost Diode

Static

Forward voltage	V_F				150	25 150 175		2,17 2,11 1,96	2,49 2,42 2,27	V
Reverse leakage current	I_R			1200		25 150		14000	240 28000	μA

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						0,48		K/W
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10-PY12NIx300N302-LKx9F38Y

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		

Boost Sw.Inv.Diode

Static

Forward voltage	V_F				150	25 150 175		2,17 2,11 1,96	2,49 2,42 2,27	V
Reverse leakage current	I_R			1200		25 150			240 28000	μ A

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						0,48		K/W
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Buck Sw. Protection Diode

Static

Forward voltage	V_F				25	25 150 175		2,41 2,45 2,3	2,74 2,79 2,62	V
Reverse leakage current	I_R			1200		25 150			60 3300	μ A

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,34		K/W
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10-PY12NIx300N302-LKx9F38Y

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		

Boost Sw. Protection Diode

Static

Forward voltage	V_F				25	25 150 175		2,41 2,45 2,3	2,74 2,79 2,62	V
Reverse leakage current	I_R			1200		25 150			60 3300	μA

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,34		K/W
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Boost D. Protection Diode

Static

Forward voltage	V_F				25	25 150 175		2,41 2,45 2,3	2,74 2,79 2,62	V
Reverse leakage current	I_R			1200		25 150			60 3300	μA

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,34		K/W
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10-PY12NIX300N302-LKx9F38Y

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	

Thermistor

Static



Rated resistance	R					25		22		kΩ
Deviation of R_{100}	$A_{R/R}$	$R_{100} = 1484 \Omega$				100	-5		5	%
Power dissipation	P							5		mW
Power dissipation constant	d					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	



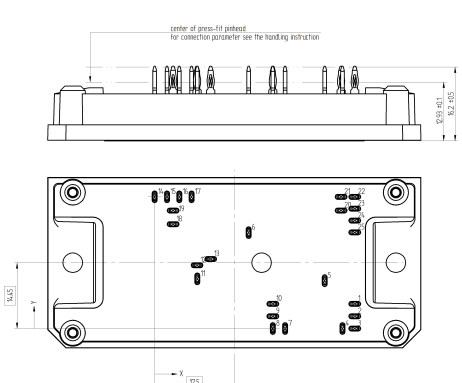
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target datasheet

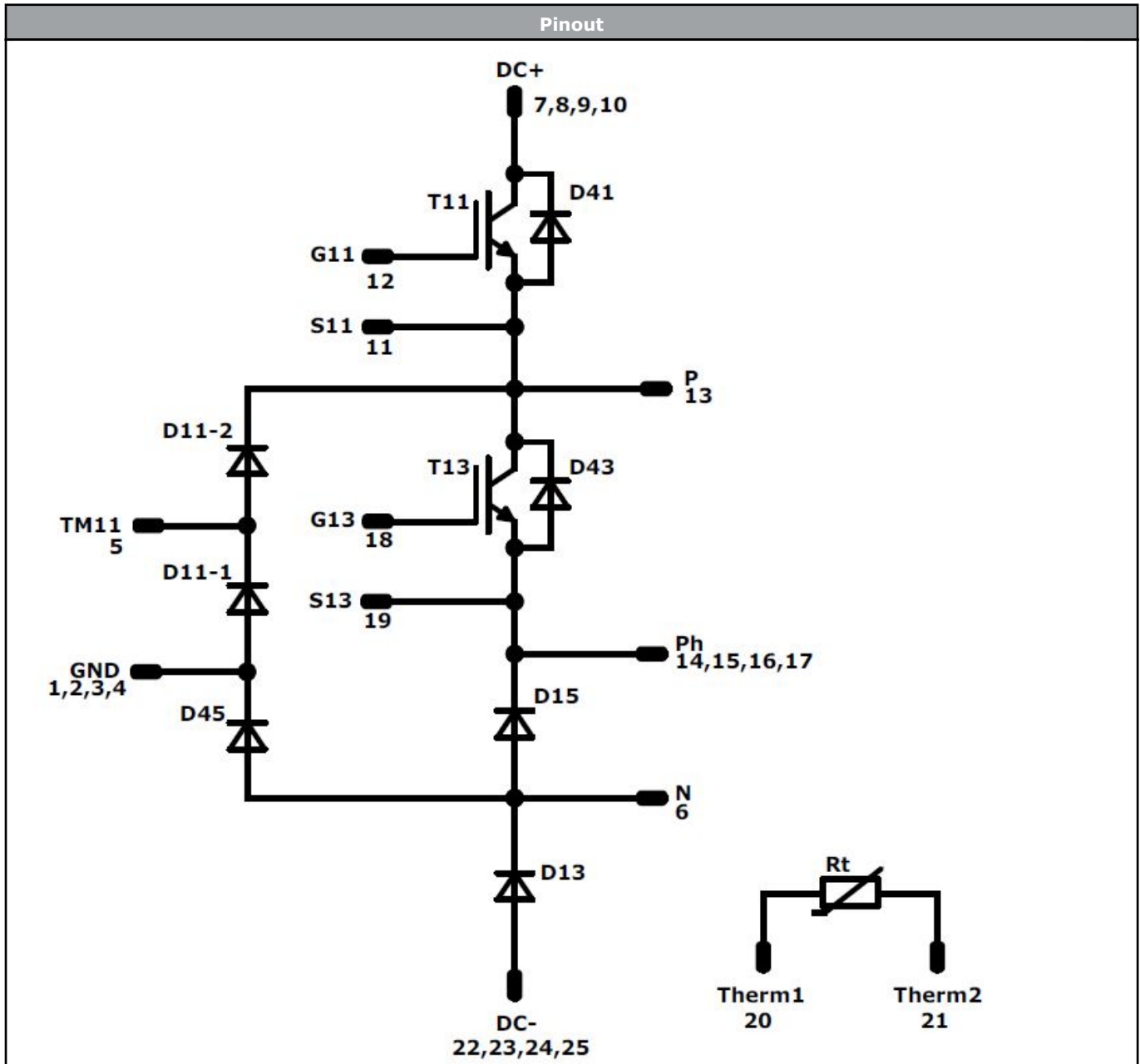
Ordering Code & Marking								
Version				Ordering Code				
without thermal paste 12 mm housing with press-fit pins				10-PY12NID300N302-LK49F38Y				
with thermal paste 12 mm housing with press-fit pins				10-PY12NID300N302-LK49F38Y-/3/				
NN-NNNNNNNNNNNNNN TTTTITTV WWYY UL VIN LLLLL SSSS			Text	Name	Date code	UL & VIN	Lot	Serial
				NN-NNNNNNNNNNNNNN-TTTTITTV	WWYY	UL VIN	LLLLL	SSSS
			Datamatrix	Type&Ver	Lot number	Serial	Date code	
			TTTTITTV	LLLLL	SSSS	WWYY		

High side module 10-PY12NID300N302-LK49F38Y

Pin table [mm]				Outline
Pin	X	Y	Function	 <p>center of press-fit pinhead for connection geometry see the handling instruction</p> <p>10,3 ± 0,1 16,2 ± 0,05</p> <p>14,5</p> <p>19,5</p> <p>Tolerance of positions: ±0,5mm at the end of pins Extension of coordinate axis is only offset without tolerance</p>
1	43,95	5,4	GND	
2	43,95	2,7	GND	
3	43,95	0	GND	
4	41,25	0	GND	
5	37,35	10,5	TM11	
6	20,65	21,05	N	
7	28,65	0	DC+	
8	25,95	0	DC+	
9	25,95	2,7	DC+	
10	25,95	5,4	DC+	
11	9,35	10,9	S11	
12	9,3	13,9	G11	
13	12,3	15,25	P	
14	0	28,9	Ph	
15	2,7	28,9	Ph	
16	5,4	28,9	Ph	
17	8,1	28,9	Ph	
18	4,05	22,9	G13	
19	4,05	25,9	S13	
20	40,95	25,9	Therm1	
21	40,95	28,9	Therm2	
22	43,95	28,9	GND	
23	43,95	26,3	GND	
24	43,95	23,7	DC-	
25	43,95	21,1	GND	



High side module 10-PY12NID300N302-LK49F38Y





Identification					
ID	Component	Voltage	Current	Function	Comment
T11	IGBT	1200 V	300 A	Buck Switch	
D11	FWD	1300 V	200 A	Buck Diode	
T13	IGBT	1200 V	300 A	Boost Switch	
D13	FWD	1200 V	150 A	Boost Diode	
D15	FWD	1200 V	150 A	Boost Sw.Inv.Diode	
D41	FWD	1200 V	25 A	Buck Sw. Protection Diode	
D43	FWD	1200 V	25 A	Boost Sw. Protection Diode	
D45	FWD	1200 V	25 A	Boost D. Protection Diode	
Rt	Thermistor			Thermistor	



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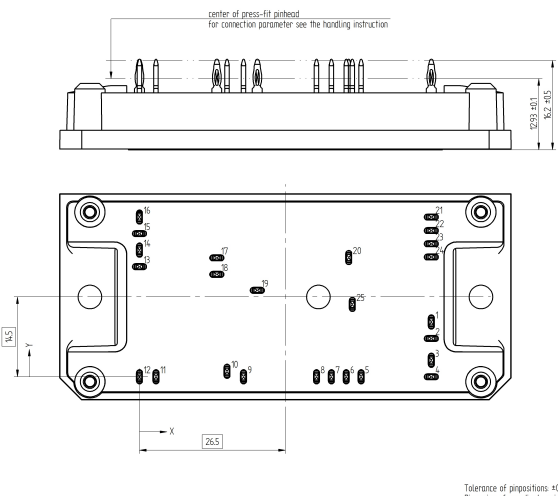
10-PY12NIX300N302-LKx9F38Y

target datasheet

Ordering Code & Marking								
Version			Ordering Code					
without thermal paste 12 mm housing with press-fit pins			10-PY12NIF300N302-LK59F38Y					
with thermal paste 12 mm housing with press-fit pins			10-PY12NIF300N302-LK59F38Y-/3/					
NN-NNNNNNNNNNNNNN TTTTITTV WWYY UL VIN LLLLL SSSS			Text	Name	Date code	UL & VIN	Lot	Serial
				NN-NNNNNNNNNNNNNN-TTTTITTV	WWYY	UL VIN	LLLLL	SSSS
			Datamatrix	Type&Ver	Lot number	Serial	Date code	
			TTTTITTV	LLLLL	SSSS	WWYY		

Low side module 10-PY12NIF300N302-LK59F38Y

Pin table [mm]				Outline
Pin	X	Y	Function	
1	53	9,95	GND	
2	53	6,95	GND	
3	53	3	GND	
4	53	0	GND	
5	40,25	0	DC-	
6	37,55	0	DC-	
7	34,85	0	DC-	
8	32,15	0	DC-	
9	18,9	0	G12	
10	15,9	1	S12	
11	3	0	Therm1	
12	0	0	Therm2	
13	0	20	Ph	
14	0	23	Ph	
15	0	26	Ph	
16	0	29	Ph	
17	14,05	21,6	G14	
18	14,05	18,6	S14	
19	21,4	15,7	N	
20	38	21,65	P	
21	53	29	DC+	
22	53	26,55	DC+	
23	53	24,15	DC+	
24	53	21,75	DC+	
25	38,65	13,15	TM12	



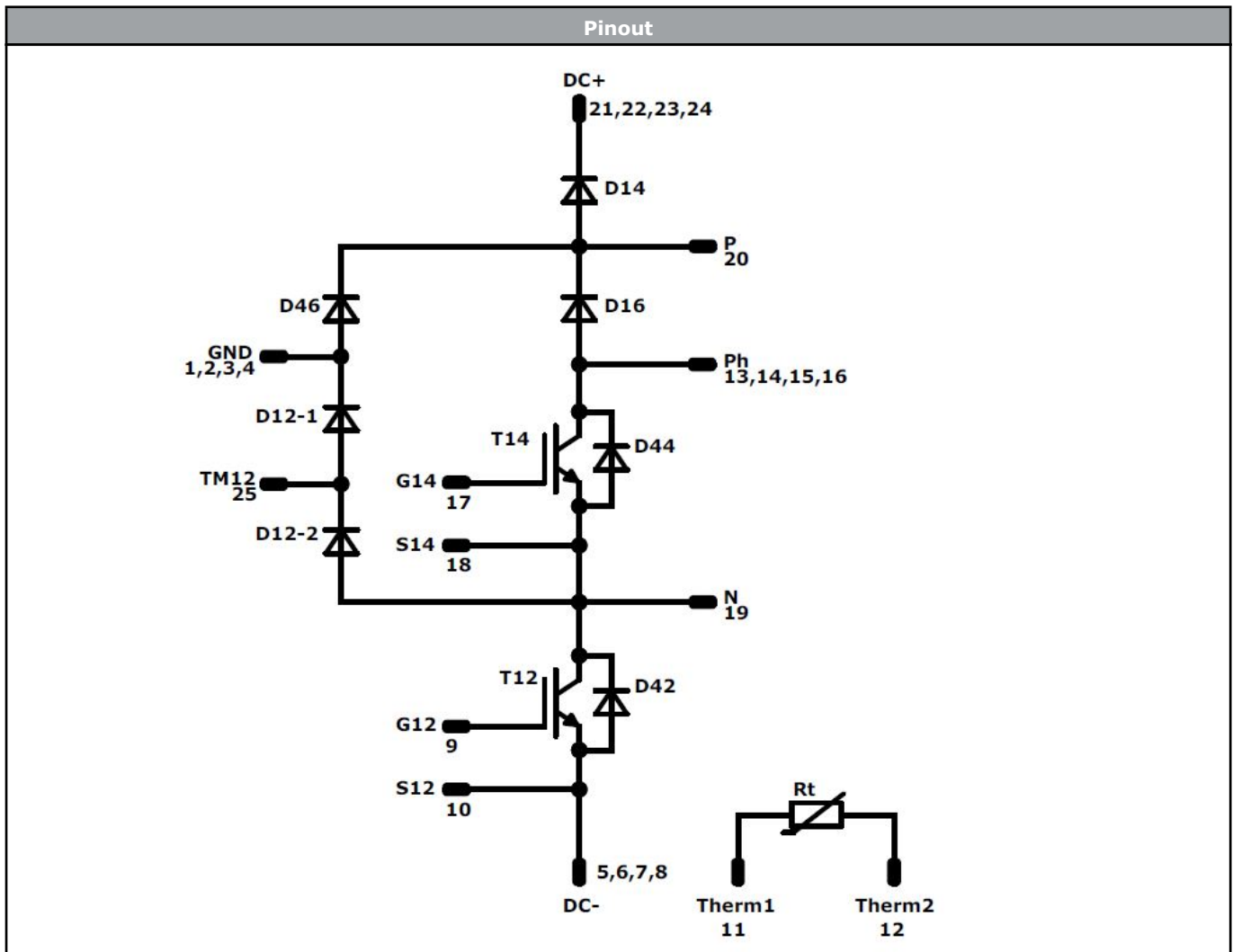


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10-PY12NIX300N302-LKx9F38Y

target datasheet

Low side module 10-PY12NIF300N302-LK59F38Y




Identification					
ID	Component	Voltage	Current	Function	Comment
T12	IGBT	1200 V	300 A	Buck Switch	
D12	FWD	1300 V	200 A	Buck Diode	
T14	IGBT	1200 V	300 A	Boost Switch	
D14	FWD	1200 V	150 A	Boost Diode	
D16	FWD	1200 V	150 A	Boost Sw.Inv.Diode	
D42	FWD	1200 V	25 A	Buck Sw. Protection Diode	
D44	FWD	1200 V	25 A	Boost Sw. Protection Diode	
D46	FWD	1200 V	25 A	Boost D. Protection Diode	
Rt	Thermistor			Thermistor	



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
Packaging 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-PY12NIX300N302-LKx9F38Y-T1-14	20 Mar. 2019	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.

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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.

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