Vincotech

10-PG12NA*008MR02-LC*9F18T

target datasheet

flow ANPC 1 Split — **1200 V / 8 mΩ**

Features

- Split Advanced NPC topology
- Ultra-high switching frequency with SiC MOSFETs
- Split topology for better thermal performance
- No x-conduction at high frequencies

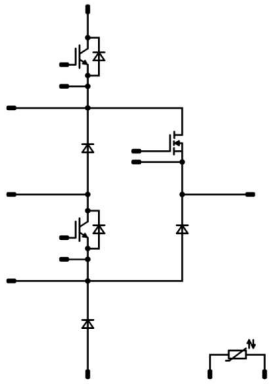
flow 1 12mm housing

10-PG12NAB008MR02-LC59F18T

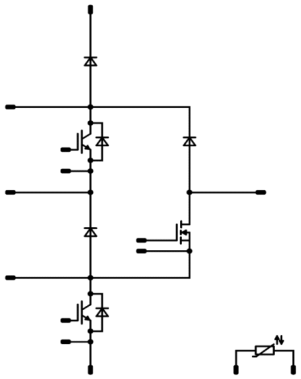
10-PG12NAC008MR02-LC69F18T

Schematic

10-PG12NAB008MR02-LC59F18T



10-PG12NAC008MR02-LC69F18T



Target applications

- Solar Inverters

Types

- 10-PG12NAB008MR02-LC59F18T
- 10-PG12NAC008MR02-LC69F18T

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Condition	Value	Unit
DC-Link Switch				
Collector-emitter voltage	V_{CES}		1200	V
Collector current	I_C	$T_j = T_{jmax}$ T_s = 80 °C	115	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 °C	190	W
Gate-emitter voltage	V_{GES}		±20	V
Maximum junction temperature	T_{jmax}		175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Condition	Value	Unit
DC-Link Switch Prot. Diode				
Peak repetitive reverse voltage	V_{RRM}		1200	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ T_s = 80 °C	72	A
Repetitive peak forward current	I_{FRM}		200	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	121	W
Maximum junction temperature	T_{jmax}		175	°C
DC-Link Diode				
Peak repetitive reverse voltage	V_{RRM}		1200	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ T_s = 80 °C	72	A
Repetitive peak forward current	I_{FRM}		200	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	121	W
Maximum junction temperature	T_{jmax}		175	°C
Neutral Point Switch				
Collector-emitter voltage	V_{CES}		1200	V
Collector current	I_C	$T_j = T_{jmax}$ T_s = 80 °C	115	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 °C	190	W
Gate-emitter voltage	V_{GES}		±20	V
Maximum junction temperature	T_{jmax}		175	°C
Neutral Point Switch Prot. Diode				
Peak Repetitive Reverse Voltage	V_{RRM}		1200	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ T_s = 80 °C	21	A
Surge (non-repetitive) forward current	I_{FSM}	50 Hz Single Half Sine Wave t_p = 10 ms T_j = 150 °C	65	A
Surge current capability	I^2t		21	A^2s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ T_s = 80 °C	64	W
Maximum Junction Temperature	T_{jmax}		175	°C

Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Condition	Value	Unit
Neutral Point Diode				
Peak Repetitive Reverse Voltage	V_{RRM}		1200	V
Continuous (direct) forward current	I_F	T_j = T_{jmax} T_s = 80°C	101	A
Repetitive peak forward current	I_{FRM}		300	A
Total power dissipation	P_{tot}	T_j = T_{jmax} T_s = 80°C	145	W
Maximum Junction Temperature	T_{jmax}		175	°C
Half-Bridge Switch				
Drain-source voltage	V_{DSS}		1200	V
Drain current	I_D	T_j=Tjmax T_s=80°C	152	A
Peak drain current	I_{DM}	t_p limited by T_{jmax}	685	A
Total power dissipation	P_{tot}	T_j=Tjmax T_s=80°C	186	W
Gate-source voltage	V_{GSS}		-4/22	V
Maximum Junction Temperature	T_{jmax}		175	°C
Half-Bridge Diode				
Peak repetitive reverse voltage	V_{RRM}		1200	V
Continuous (direct) forward current	I_F	T_j = T_{jmax} T_s = 80 °C	68	A
Repetitive peak forward current	I_{FRM}		252	A
Total power dissipation	P_{tot}	T_j = T_{jmax} T_s = 80 °C	142	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 s	4000	V
Creepage distance			min. 12,7	mm
Clearance			8,14	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	
DC-Link Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{GE} = V_{CE}$			0,015	25	5,4	6	6,6	V
Collector-emitter saturation voltage	V_{CEsat}		15		150	25 125 150		1,55 1,75 1,80	2,05	V
Collector-emitter cut-off current	I_{CES}		0	1200		25			160	µA
Gate-emitter leakage current	I_{GES}		20	0		25			500	nA
Internal gate resistance	r_g							3		Ω
Input capacitance	C_{ies}		0	10		25		30000		pF
Output capacitance	C_{oes}							880		
Reverse transfer capacitance	C_{res}							320		
Gate charge	Q_g		15	600	150	25		1000		nC
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material λ = 3,4 W/mK						0,50		K/W
DC-Link Switch Prot. Diode										
Static										
Forward voltage	V_F				100	25 125 150		1,82 1,96 1,97	2,1	V
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material λ = 3,4 W/mK						0,79		K/W
DC-Link Diode										
Static										
Forward voltage	V_F				100	25 125 150		1,82 1,96 1,97	2,1	V
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material λ = 3,4 W/mK						0,79		K/W

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	
Neutral Point Switch										
Static										
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{GE} = V_{CE}$			0,015	25	5,4	6	6,6	V
Collector-emitter saturation voltage	V_{CEsat}		15		150	25 125 150		1,55 1,75 1,80	2,05	V
Collector-emitter cut-off current	I_{CES}		0	1200		25			160	µA
Gate-emitter leakage current	I_{GES}		20	0		25			500	nA
Internal gate resistance	r_g							3		Ω
Input capacitance	C_{ies}		0	10		25		30000		pF
Output capacitance	C_{oes}							880		
Reverse transfer capacitance	C_{res}							320		
Gate charge	Q_g		15	600	150	25		1000		nC
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material λ = 3,4 W/mK						0,50		K/W
Neutral Point Switch Prot. Diode										
Static										
Forward voltage	V_F				15	25 125		2,37 2,47	2,71	V
Reverse leakage current	I_r			1200		25 150			60 1800	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material λ = 3,4 W/mK						1,49		K/W

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	
Neutral Point Diode										
Static										
Forward voltage	V_F				150	25 125 150		1,60 1,65 1,65	2,1	V
Reverse leakage current	I_r			1200		25			90	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material λ = 3,4 W/mK						0,66		K/W
Half-Bridge Switch										
Static										
Drain-source on-state resistance	$r_{DS(on)}$		18		100	25 125		8 12	10	mΩ
Gate-source threshold voltage	$V_{GS(th)}$	$V_{GS} = V_{DS}$			0,05	25	2,7		5,6	V
Gate to Source Leakage Current	I_{GSS}		-4/22	0		25			±500	nA
Zero Gate Voltage Drain Current	I_{DSS}		0	1200		25			50	µA
Internal gate resistance	r_g							1,4		Ω
Gate charge	Q_g							535		
Gate to source charge	Q_{GS}		18	600	100	25		110		nC
Gate to drain charge	Q_{GD}							205		
Short-circuit input capacitance	C_{iss}							6685		
Short-circuit output capacitance	C_{oss}	f= 1 MHz	0	800		25		380		pF
Reverse transfer capacitance	C_{rss}							135		
Body Diode Static										
Forward voltage	V_F		0		100	25		3,2		V
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material λ=3,4 W/mK						0,51		K/W

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	
Half-Bridge Diode										
Static										
Forward voltage	V_F				60	25 125		1,40 1,80	1,6	V
Reverse leakage current	I_R			1200		25 150			1200	µA
Thermal										
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material λ = 3,4 W/mK						0,67		K/W
Thermistor										
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

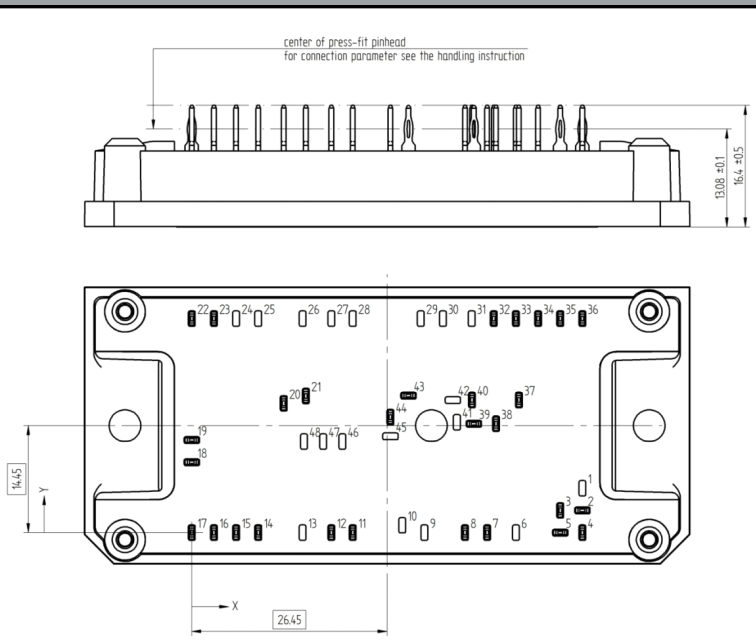
Version	Ordering Code
without thermal paste 12mm housing with Press-fit pins	10-PG12NAB008MR02-LC59F18T

	Name	Date code	UL & VIN	Lot	Serial
Text	NN-NNNNNNNNNNNNN-TTTTTTVV	WWYY	UL VIN	LLLLL	SSSS

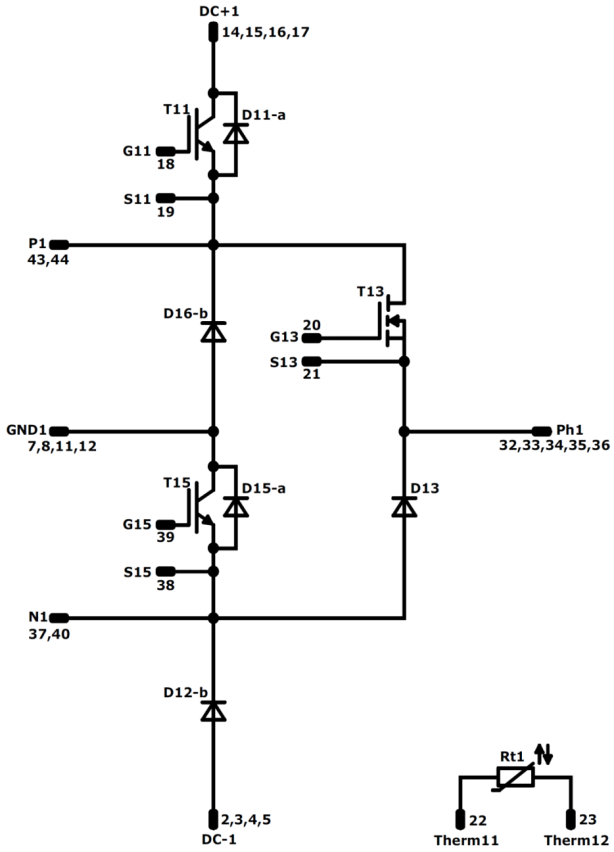
	Type&Ver	Lot number	Serial	Date code		
Datamatrix	TTTTTTVV	LLLLL	SSSS	WWYY		

Outline

Pin table [mm]				Pin table [mm]			
Pin	X	Y	Function	Pin	X	Y	Function
1	Not assembled			30	Not assembled		
2	52,9	3	DC-1	31	Not assembled		
3	49,9	3	DC-1	32	40,9	28,9	Ph1
4	52,9	0	DC-1	33	43,9	28,9	Ph1
5	49,9	0	DC-1	34	46,9	28,9	Ph1
6	Not assembled			35	49,9	28,9	Ph1
7	40	0	GND1	36	52,9	28,9	Ph1
8	37	0	GND1	37	44,3	17,9	N1
9	Not assembled			38	41,2	14,7	S15
10	Not assembled			39	38,2	14,7	G15
11	21,8	0	GND1	40	37,95	17,9	N1
12	18,9	0	GND1	41	Not assembled		
13	Not assembled			42	Not assembled		
14	9	0	DC+1	43	29,35	18,5	P1
15	6	0	DC+1	44	26,9	15,6	P1
16	3	0	DC+1	45	Not assembled		
17	0	0	DC+1	46	Not assembled		
18	0	9,5	G11	47	Not assembled		
19	0	12,5	S11	48	Not assembled		
20	12,45	17,45	G13				
21	15,45	18,45	S13				
22	0	28,9	Therm11				
23	3	28,9	Therm12				
24	Not assembled						
25	Not assembled						
26	Not assembled						
27	Not assembled						
28	Not assembled						
29	Not assembled						



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T11	IGBT	1200 V	150 A	DC-Link Switch	
D11-a	FWD	1200 V	100 A	DC-Link Switch Prot. Diode	
D12-b	FWD	1200 V	100 A	DC-Link Diode	
T15	IGBT	1200 V	150 A	Neutral Point Switch	
D15-a	FWD	1200 V	15 A	Neutral Point Switch Prot. Diode	
D16-b	FWD	1200 V	150 A	Neutral Point Diode	
T13	MOSFET	1200 V	8 mΩ	Half-Bridge Switch	
D13	FWD	1200 V	60 A	Half-Bridge Diode	
Rt1	Thermistor			Thermistor	

Vincotech

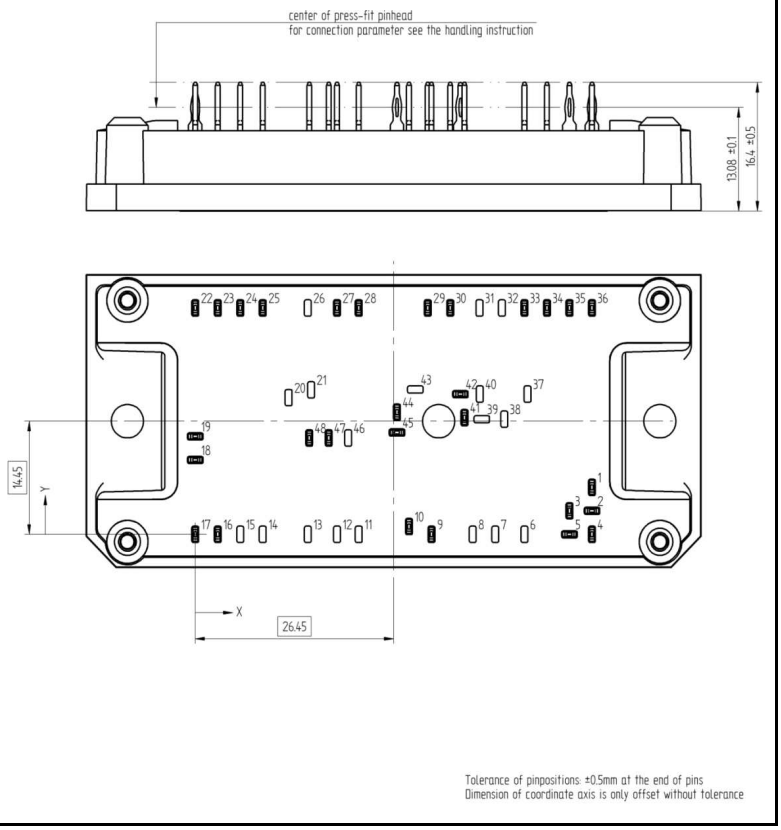
Ordering Code & Marking

Version	Ordering Code
without thermal paste 12mm housing with Press-fit pins	10-PG12NAC008MR02-LC69F18T

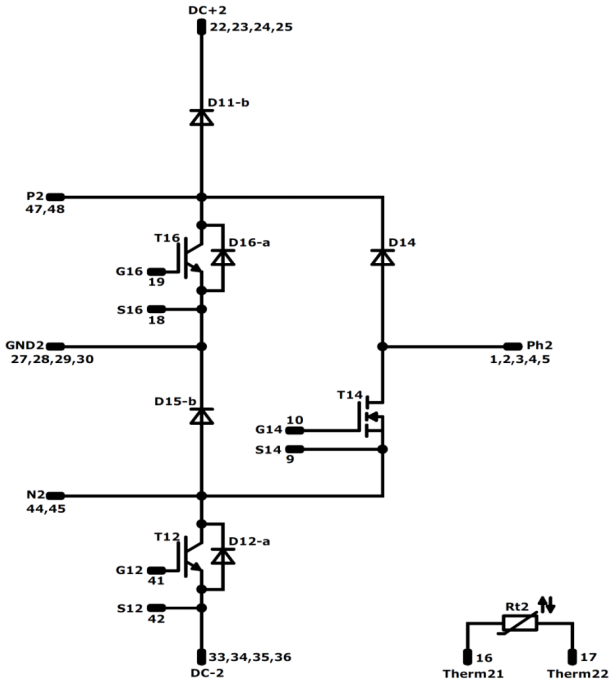
	Name		Date code	UL & VIN	Lot	Serial
Text	NN-NNNNNNNNNNNNN-TTTTTTVV		WWYY	UL VIN	LLLLL	SSSS
	Type&Ver	**Lot number**	**Serial**	**Date code**		
Datamatrix	TTTTTTTVV	LLLLL	SSSS	WWYY		

Outline

Pin table [mm]				Pin table [mm]			
Pin	X	Y	Function	Pin	X	Y	Function
1	52,9	6	Ph2	30	34	28,9	GND2
2	52,9	3	Ph2	31	Not assembled		
3	49,9	3	Ph2	32	Not assembled		
4	52,9	0	Ph2	33	43,9	28,9	DC-2
5	49,9	0	Ph2	34	46,9	28,9	DC-2
6	Not assembled			35	49,9	28,9	DC-2
7	Not assembled			36	52,9	28,9	DC-2
8	Not assembled			37	Not assembled		
9	31,5	0	S14	38	Not assembled		
10	28,5	1	G14	39	Not assembled		
11	Not assembled			40	Not assembled		
12	Not assembled			41	35,9	14,9	G12
13	Not assembled			42	35,35	17,9	S12
14	Not assembled			43	Not assembled		
15	Not assembled			44	26,9	15,6	N2
16	3	0	Therm21	45	26,9	13	N2
17	0	0	Therm22	46	Not assembled		
18	0	9,5	S16	47	17,8	12,3	P2
19	0	12,5	G16	48	15,2	12,3	P2
20	Not assembled						
21	Not assembled						
22	0	28,9	DC+2				
23	3	28,9	DC+2				
24	6	28,9	DC+2				
25	9	28,9	DC+2				
26	Not assembled						
27	18,9	28,9	GND2				
28	21,8	28,9	GND2				
29	31	28,9	GND2				



Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T12	IGBT	1200 V	150 A	DC-Link Switch	
D12-a	FWD	1200 V	100 A	DC-Link Switch Prot. Diode	
D11-b	FWD	1200 V	100 A	DC-Link Diode	
T16	IGBT	1200 V	150 A	Neutral Point Switch	
D16-a	FWD	1200 V	15 A	Neutral Point Switch Prot. Diode	
D15-b	FWD	1200 V	150 A	Neutral Point Diode	
T14	MOSFET	1200 V	8 mΩ	Half-Bridge Switch	
D14	FWD	1200 V	60 A	Half-Bridge Diode	
Rt2	Thermistor			Thermistor	

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

Handling instruction
Handling instructions for *flow* 1 packages see vincotech.com website.

Package data
Package data for *flow* 1 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-PG12NAx008MR02-LCx9F18T-T1-14	06 Jan. 2017		

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.