



Vincotech

10-PY073AA050RG02-LK14L03Y-/3/

target datasheet

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

flow3xANPFC 1

650 V / 50 A

Features

- 3-Phase Application
- High power low inductive package
- High speed IGBT
- Integrated NTC

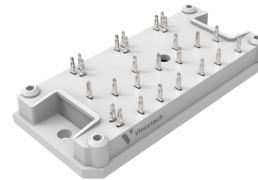
Target applications

- Charging Stations
- Power Supply

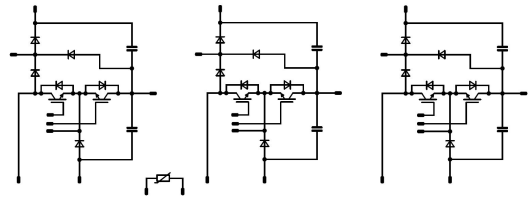
Types

- 10-PY073AA050RG02-LK14L03Y

flow 1 12 mm housing



Schematic





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Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
Neutral Point Switch				
Collector-emitter voltage	V_{CES}		650	V
Collector current	I_C		50	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	200	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	79	W
Gate-emitter voltage	V_{GES}		± 30	V
Maximum junction temperature	T_{jmax}		175	°C
Negative Boost Diode				
Peak repetitive reverse voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F		20	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	80	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 8,3\text{ ms}$ $T_j = 25\text{ °C}$	80	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	50	W
Maximum junction temperature	T_{jmax}		175	°C
Positive Boost Diode				
Peak repetitive reverse voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F		20	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	80	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 8,3\text{ ms}$ $T_j = 25\text{ °C}$	80	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	50	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
Positive Boost Blocking Diode				
Peak repetitive reverse voltage	V_{RRM}		1600	V
Continuous (direct) forward current	I_F		20	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 45\text{ °C}$	0	A
Surge current capability	I^2t	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 45\text{ °C}$	450	A ² s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	51	W
Maximum junction temperature	T_{jmax}		150	°C
Positive Boost Diode Protection Diode				
Peak repetitive reverse voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F		10	A
Repetitive peak forward current	I_{ERM}	t_p limited by T_{jmax}	20	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	32	W
Maximum junction temperature	T_{jmax}		175	°C
Neutral Point Diode				
Peak repetitive reverse voltage	V_{RRM}		1600	V
Continuous (direct) forward current	I_F		20	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 45\text{ °C}$	0	A
Surge current capability	I^2t	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 45\text{ °C}$	450	A ² s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	51	W
Maximum junction temperature	T_{jmax}		150	°C
Capacitor (DC)				
Maximum DC voltage	V_{MAX}		500	V
Operation Temperature	T_{op}		0 ... 125	°C



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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			>12.7mm	mm
Clearance			8.58mm	mm
Comparative Tracking Index	CTI		≥ 200	



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Characteristic Values

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

Neutral Point Switch

Static

Gate-emitter threshold voltage	$V_{GE(th)}$				0,03	25	5	6	7	V
Collector-emitter saturation voltage	V_{CEsat}		15		50	25 175		1,5 1,85	1,9	V
Collector-emitter cut-off current	I_{CES}		0	650		25			0,01	mA
Gate-emitter leakage current	I_{GES}		30	0		25			0,2	μ A
Input capacitance	C_{ies}	f = 1 Mhz	0	30		25		4200		pF
Output capacitance	C_{oes}							104		pF
Reverse transfer capacitance	C_{res}							79		pF
Gate charge	Q_g		15	400	50	25		141		nC

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,21		K/W
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Negative Boost Diode

Static

Forward voltage	V_F				20	25 150 175		1,35 1,55 1,63	1,55	V
Reverse leakage current	I_R			650		25 150 175		4 60 140	400	μ A

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,88		K/W
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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		

Positive Boost Diode

Static

Forward voltage	V_F				20	25 150 175		1,35 1,55 1,63	1,55	V
Reverse leakage current	I_R			650		25 150 175		4 60 140	400	μ A

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,88		K/W
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Positive Boost Blocking Diode

Static

Forward voltage	V_F				30	25 150			1,29 1,26	V
Reverse leakage current	I_R			1600		25			10	μ A

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,36		K/W
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Positive Boost Diode Protection Diode

Static

Forward voltage	V_F				10	25	1,23	1,55	1,87	V
Reverse leakage current	I_R			650		25			0,14	μ A

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						2,93		K/W
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Characteristic Values

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

Neutral Point Diode

Static

Forward voltage	V_F				30	25 150			1,29 1,26	V
Reverse leakage current	I_R			1600		25			10	μA

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						1,36		K/W
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Capacitor (DC)

Static

Capacitance	C							150		nF
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NTC

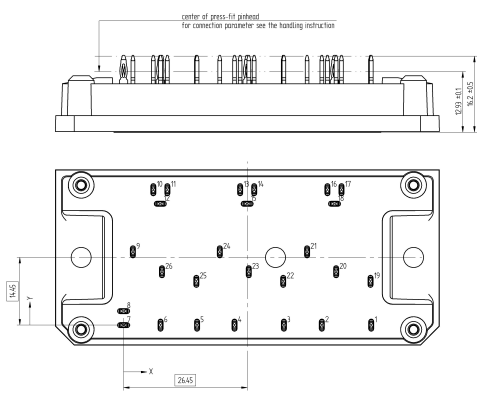
Static

Rated resistance	R					25		22		kΩ
Deviation of R_{100}	Δ_{RR}	$R_{100} = 1484 \Omega$				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	



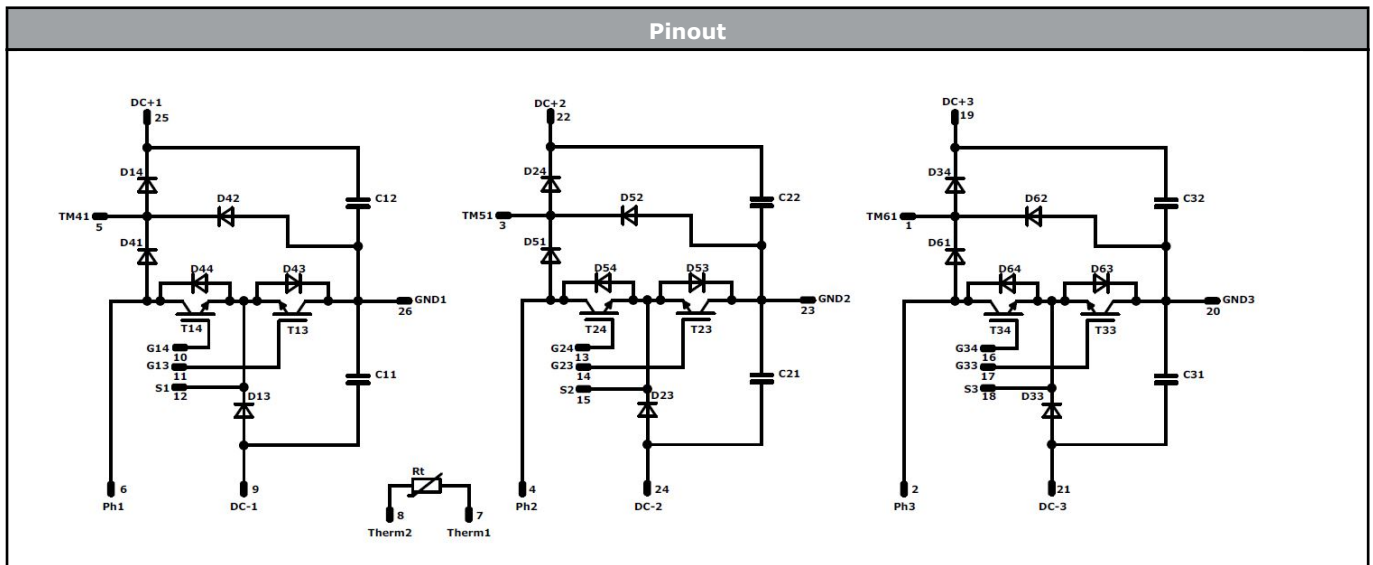
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Ordering Code & Marking									
Version			Ordering Code						
without thermal paste 12 mm housing with Press-fit pins			10-PY073AA050RG02-LK14L03Y						
with thermal paste 12 mm housing with Press-fit pins			10-PY073AA050RG02-LK14L03Y-/3/						
NN-NNNNNNNNNNNNNN 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	
TTTTTITTV		LLLLL	SSSS	WWYY					

Pin table [mm]				Outline	
Pin	X	Y	Function		
1	52,9	0	TM61		
2	42,35	0	Ph3		
3	34,25	0	TM51		
4	23,7	0	Ph2		
5	15,7	0	TM41		
6	7,9	0	Ph1		
7	0	0	Therm1		
8	0	3	Therm2		
9	2	15,65	DC-1		
10	6,35	28,9	G14		
11	9,35	28,9	G13		
12	7,85	25,9	S1		
13	24,9	28,9	G24		
14	27,9	28,9	G23		
15	26,4	25,9	S2		
16	43,55	28,9	G34		
17	46,55	28,9	G33		
18	45,05	25,9	S3		
19	52,75	9,35	DC+3		
20	45,4	11,4	GND3		
21	39,2	15,65	DC-3		
22	34,1	9,35	DC+2		
23	26,75	11,4	GND2		
24	20,55	15,65	DC-2		
25	15,55	9,35	DC+1		
26	8,2	11,4	GND1		



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Identification					
ID	Component	Voltage	Current	Function	Comment
T13, T14, T23, T24, T33, T34	IGBT	650 V	50 A	Neutral Point Switch	
D13, D23, D33	FWD	650 V	20 A	Negative Boost Diode	
D14, D24, D34	FWD	650 V	20 A	Positive Boost Diode	
D41, D51, D61	Rectifier	1600 V	20 A	Positive Boost Blocking Diode	
D42, D52, D62	FWD	650 V	10 A	Positive Boost Diode Protection Diode	
D43, D44, D53, D54, D63, D64	Rectifier	1600 V	20 A	Neutral Point Diode	
C11, C12, C21, C22, C31, C32	Capacitor	500 V		Capacitor (DC)	
Rt	Thermistor			NTC	




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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-PY073AA050RG02-LK14L03Y-/3/-T1-14	10 Feb. 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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