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# 10-PY073AA050RG01-LK14L08Y-/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

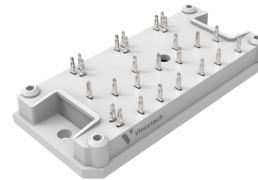
## Target applications

- Charging Stations
- Power Supply

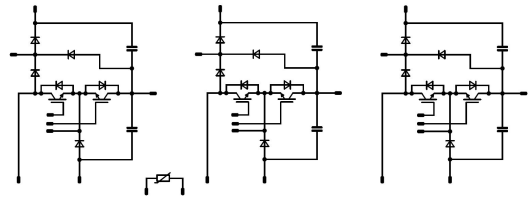
## Types

- 10-PY073AA050RG01-LK14L08Y

## 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
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### Neutral Point Switch

Collector-emitter voltage	$V_{CES}$		650	V
Collector current	$I_C$		50	A
Repetitive peak collector current	$I_{CRM}$	$i_p$ 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	$V_{GES}$		$\pm 30$	V
Maximum junction temperature	$T_{jmax}$		175	°C

### Negative Boost Diode

Peak repetitive reverse voltage	$V_{RRM}$		600	V
Continuous (direct) forward current	$I_F$		30	A
Surge (non-repetitive) forward current	$I_{FSM}$	$T_j = 25\text{ °C}$	300	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	66	W
Maximum junction temperature	$T_{jmax}$		175	°C

### Positive Boost Diode

Peak repetitive reverse voltage	$V_{RRM}$		600	V
Continuous (direct) forward current	$I_F$		30	A
Surge (non-repetitive) forward current	$I_{FSM}$	$T_j = 25\text{ °C}$	300	A
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	66	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
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### 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 <sup>2</sup> 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	$I_{FRM}$	$t_p$ 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 <sup>2</sup> 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	$T_{\text{stg}}$		-40...+125	°C
Operation temperature under switching condition	$T_{\text{jop}}$		-40...+( $T_{\text{jmax}}$ - 25)	°C

#### Isolation Properties

Isolation voltage	$V_{\text{isol}}$	DC Test Voltage $t_p = 2\text{ s}$	6000	V
Isolation voltage	$V_{\text{isol}}$	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
		$V_{GE}$ [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	$V_{GE(th)}$				0,03	25	5	6	7	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	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	$\mu$ 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	$V_F$				30	25 125	1,88	2,1 1,6	2,78	V
Reverse leakage current	$I_R$			600		25 125			10 500	$\mu$ A

##### Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,43		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	$V_F$				30	25 125	1,88	2,1 1,6	2,78	V
Reverse leakage current	$I_R$			600		25 125			10 500	$\mu$ A

##### Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,43		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	$\mu$ 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	$\mu$ 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
		$V_{GE}$ [V]	$V_{GS}$ [V]	$V_{CE}$ [V]	$V_{DS}$ [V]	$I_C$ [A]	$I_D$ [A]	$T_j$ [°C]	Min	Typ	

#### 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

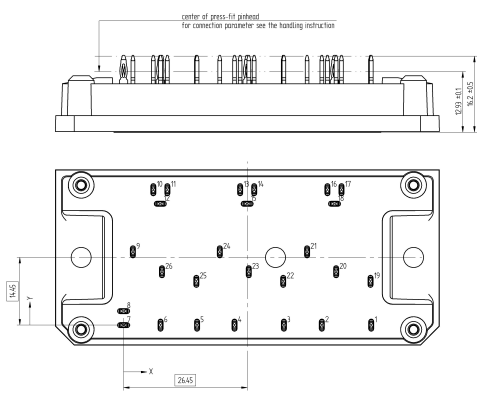
##### Static

Rated resistance	$R$					25		22		kΩ
Deviation of $R_{100}$	$\Delta_{RR}$	$R_{100} = 1484 \Omega$				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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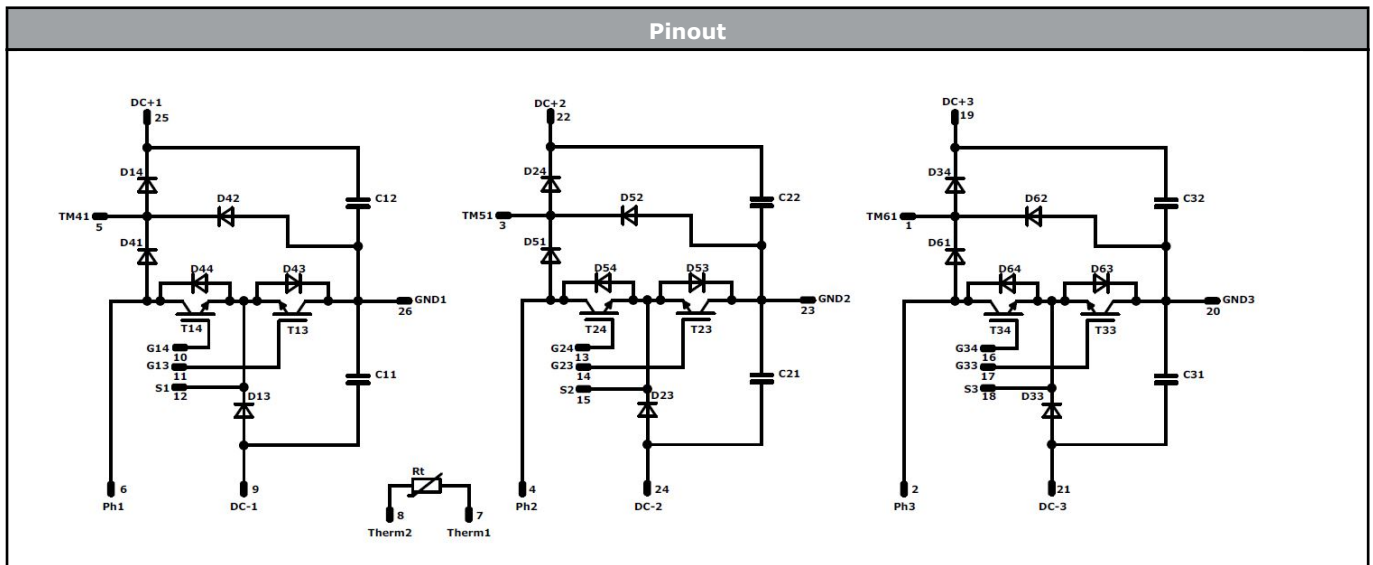
Ordering Code & Marking									
Version			Ordering Code						
without thermal paste 12 mm housing with Press-fit pins			10-PY073AA050RG01-LK14L08Y						
with thermal paste 12 mm housing with Press-fit pins			10-PY073AA050RG01-LK14L08Y-/3/						
NN-NNNNNNNNNNNNNN TTTTITTV WWYY UL VIN LLLLL SSSS			Text		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			

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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<b>Identification</b>					
<b>ID</b>	<b>Component</b>	<b>Voltage</b>	<b>Current</b>	<b>Function</b>	<b>Comment</b>
T13, T14, T23, T24, T33, T34	IGBT	650 V	50 A	Neutral Point Switch	
D13, D23, D33	FWD	600 V	30 A	Negative Boost Diode	
D14, D24, D34	FWD	600 V	30 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-PY073AA050RG01-LK14L08Y-/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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