



Vincotech

# 10-PY166RA170JR-LR59H08Y

datasheet

flowCON 1

1600 V / 170 A

## Features

- Three phase input rectifier
- Integrated temperature sensor

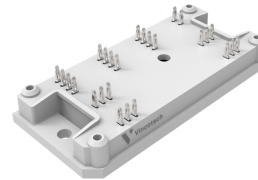
## Target applications

- Embedded Drives
- Industrial Drives

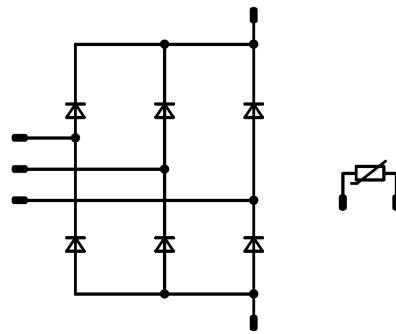
## Types

- 10-PY166RA170JR-LR59H08Y

## flow 1 12 mm housing



## Schematic





Vincotech

**10-PY166RA170JR-LR59H08Y**  
datasheet

## Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
<b>Rectifier Diode</b>				
Peak repetitive reverse voltage	$V_{RRM}$		1600	V
Forward current (DC current)	$I_F$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	153	A
Surge (non-repetitive) forward current	$I_{FSM}$	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 150\text{ °C}$	1750	A
Surge current capability	$I^2t$		15300	A <sup>2</sup> s
Total power dissipation	$P_{tot}$	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	173	W
Maximum junction temperature	$T_{jmax}$		150	°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			>12,7	mm
Clearance			8,69	mm
Comparative Tracking Index	CTI		≥ 600	

\*100 % tested in production



## 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	

### Rectifier Diode

#### Static

Forward voltage	$V_F$				140	25 125		1,15 1,11	1,5 <sup>(1)</sup>	V
Reverse leakage current	$I_R$	$V_r = 1600$ V				25 150			100 3000	μA

#### Thermal

Thermal resistance junction to sink <sup>(2)</sup>	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						0,4		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. $\pm 1$ %						3962		K
B-value	$B_{(25/100)}$	Tol. $\pm 1$ %						4000		K
Vincotech Thermistor Reference									I	

<sup>(1)</sup> Value at chip level

<sup>(2)</sup> Only valid with pre-applied Vincotech thermal interface material.



Vincotech

# 10-PY166RA170JR-LR59H08Y

datasheet

## Rectifier Diode Characteristics

figure 1.

Rectifier

Typical forward characteristics

$$I_F = f(V_F)$$

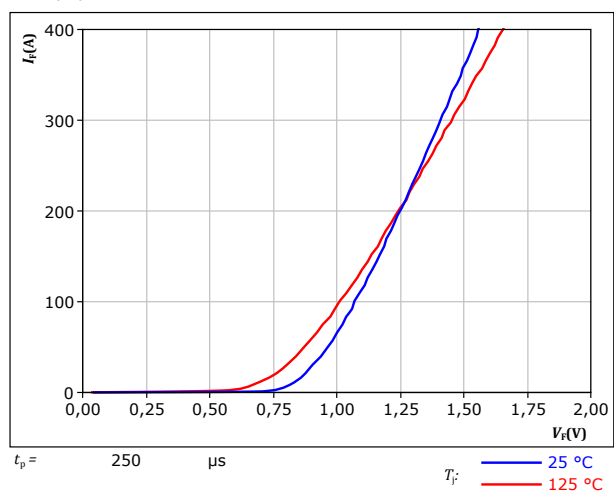
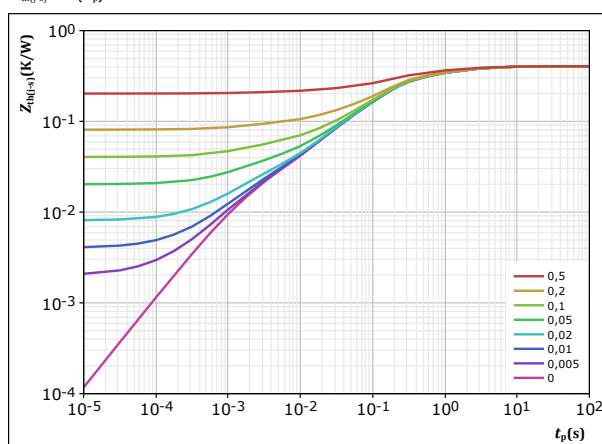


figure 2.

Rectifier

Transient thermal impedance as a function of pulse width

$$Z_{th(j-s)} = f(t_p)$$



$D =$	$t_p / T$	
$R_{th(j-s)} =$	0,405	K/W
Rectifier thermal model values		
$R$ (K/W)	$\tau$ (s)	
3,45E-02	4,59E+00	
9,19E-02	9,93E-01	
2,32E-01	1,60E-01	
3,31E-02	1,97E-02	
1,38E-02	1,63E-03	



Vincotech

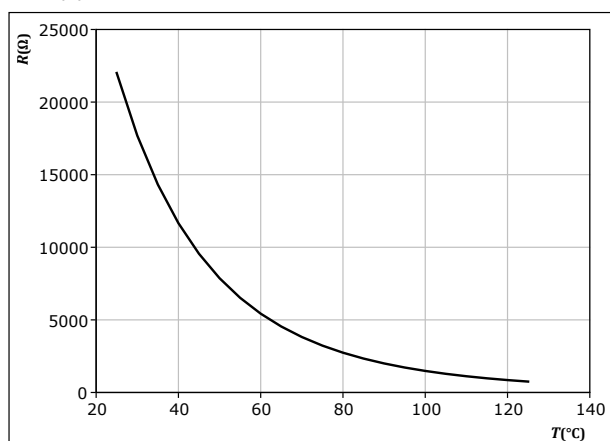
**10-PY166RA170JR-LR59H08Y**  
datasheet

## Thermistor Characteristics

**figure 3.** Thermistor

Typical NTC characteristic as function of temperature



$$R_T = f(T)$$





datasheet

Ordering Code	
Version	Ordering Code
Without thermal paste	10-PY166RA170JR-LR59H08Y
With thermal paste	10-PY166RA170JR-LR59H08Y-/3/

Marking							
<div><div>NN-NNNNNNNNNNNNN TTTTTWWYY UL VIN LLLL SSSS</div><div></div><div></div></div>	Text	Name		Date code	UL & VIN	Lot	Serial
		NN-NNNNNNNNNNNNN- TTTTTVV		WWYY	UL VIN	LLLLL	SSSS
	Datamatrix	Type&Ver	Lot number	Serial	Date code		
	TTTTTTTVV	LLLLL	SSSS	WWYY			

### Pin table [mm]

Pin	X	Y	Function
1	52,2	0	DC-Rect
2	49,5	0	DC-Rect
3	46,8	0	DC-Rect
4	5,4	0	DC-Rect
5	2,7	0	DC-Rect
6	0	0	DC-Rect
7	52,2	10,9	DC+Rect
8	49,5	10,9	DC+Rect
9	46,8	10,9	DC+Rect
10	5,4	10,9	DC+Rect
11	2,7	10,9	DC+Rect
12	0	10,9	DC+Rect
13	52,2	25	Therm1
14	52,2	28,2	Therm2
15	34	20,1	ACIn3
16	34	22,8	ACIn3
17	34	25,5	ACIn3
18	34	28,2	ACIn3
19	17	20,1	ACIn2
20	17	22,8	ACIn2
21	17	25,5	ACIn2
22	17	28,2	ACIn2
23	0	20,1	ACIn1
24	0	22,8	ACIn1
25	0	25,5	ACIn1
26	0	28,2	ACIn1

### Outline

center of press-fit pin head,  
pin head type "Y" PHS pushed through-hole Ø15 mm  $\pm 0.09$  / -0.06  
for further PHS design rules refer to the latest handling instruction

40.1  
26.1

Tolerance of pinpositions:  $\pm 0.5$ mm of the end of pins  
Dimension of coordinate axis is only offset without tolerance

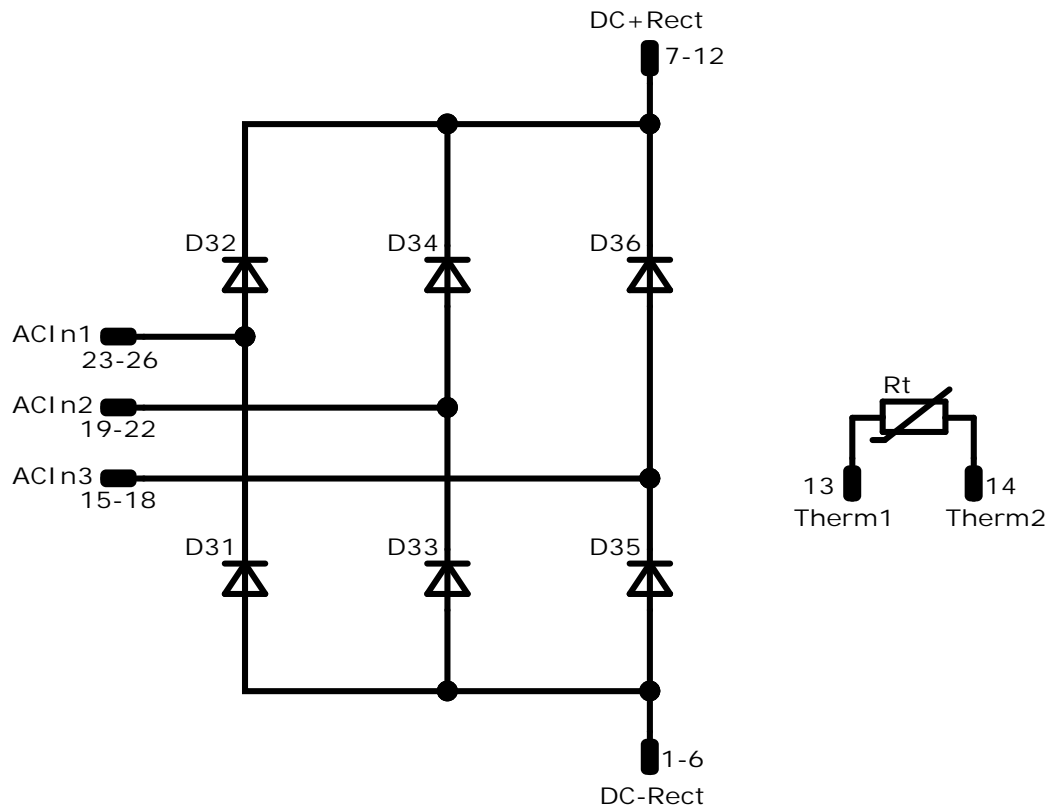


Vincotech

# 10-PY166RA170JR-LR59H08Y

datasheet

## Pinout



## Identification

ID	Component	Voltage	Current	Function	Comment
D31, D32, D33, D34, D35, D36	Rectifier	1600 V	140 A	Rectifier Diode	
Rt	Thermistor			Thermistor	



Vincotech

**10-PY166RA170JR-LR59H08Y**  
datasheet

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
Package data for <i>flow 1</i> packages see vincotech.com website.

Vincotech thermistor reference
See Vincotech thermistor reference table at 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-PY166RA170JR-LR59H08Y-D1-14	12 Feb. 2021		

#### 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.