



flowPIM 1 + PFC

650 V / 30 A

Topology features

- 2-leg interleaved PFC + Inverter
- On-board Capacitors
- Open Emitter configuration
- Shunt
- Temperature sensor

Component features

- 5us short circuit withstand time
- High speed switching
- Low EMI
- Short tail current

Housing features

- Base isolation: Al₂O₃
- Convex shaped substrate for superior thermal contact
- Thermo-mechanical push-and-pull force relief
- Press-fit pin
- Reliable cold welding connection

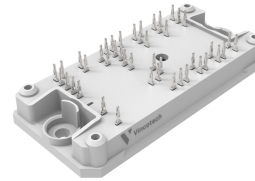
Target applications

- Embedded Drives
- Industrial Drives

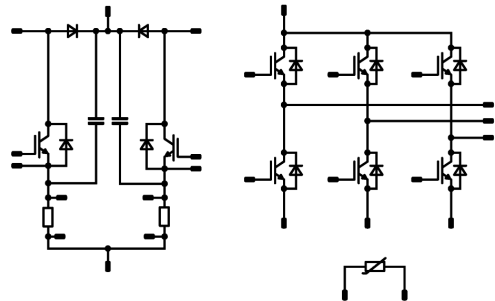
Types

- 10-PY07PPA030I703-PQ72E68T

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
Inverter Switch				
Collector-emitter voltage	V_{CES}		650	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	37	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	90	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	58	W
Gate-emitter voltage	V_{GES}		± 20	V
Short circuit ratings	t_{SC}	$V_{GE} = 15\text{ V}$, $V_{CC} = 400\text{ V}$ $T_j = 150\text{ °C}$	3	μs
Maximum junction temperature	T_{jmax}		175	$^{\circ}\text{C}$

Inverter Diode				
Peak repetitive reverse voltage	V_{RRM}		650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	25	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	60	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	41	W
Maximum junction temperature	T_{jmax}		175	$^{\circ}\text{C}$

PFC Switch				
Collector-emitter voltage	V_{CES}		650	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	30	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	90	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	58	W
Gate-emitter voltage	V_{GES}		± 20	V
Maximum junction temperature	T_{jmax}		175	$^{\circ}\text{C}$



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Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
PFC Diode				
Peak repetitive reverse voltage	V_{RRM}		600	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	49	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	60	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 25\text{ °C}$	310	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	66	W
Maximum junction temperature	T_{jmax}		175	°C

PFC Sw. Protection Diode

Peak repetitive reverse voltage	V_{RRM}		1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	15	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	10	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	41	W
Maximum junction temperature	T_{jmax}		175	°C

Shunt

DC current	I		31,6	A
Power dissipation	P_{tot}	$T_c = 70\text{ °C}$	2	W
Operation Temperature	T_{op}		-65 ... 170	°C

Capacitor (PFC)

Maximum DC voltage	V_{MAX}		630	V
Operation Temperature	T_{op}		-55 ... 150	°C



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10-PY07PPA030I703-PQ72E68T
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...+($T_{\text{jmax}} - 25$)	°C

Isolation Properties

Isolation voltage	V_{isol}	DC Test Voltage $t_p = 2\text{ s}$	6000	V
Creepage distance			>12,7	mm
Clearance			8,05	mm
Comparative Tracking Index	CTI		≥ 600	



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Characteristic Values

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

Inverter Switch

Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,0003	25	4,35	5	5,65	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		30	25		1,35	1,65	V
Collector-emitter cut-off current	I_{CES}		0	650		25			20	μA
Gate-emitter leakage current	I_{GES}		0	650		25			100	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}							1900		pF
Output capacitance	C_{oes}	$f = 1$ Mhz	0	25		25		62		pF
Reverse transfer capacitance	C_{res}							20		pF
Gate charge	Q_g	$V_{CC} = 520$ V	15		30	25		180		nC

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,64		K/W
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Inverter Diode

Static

Forward voltage	V_F				20	25		1,65	2	V
Reverse leakage current	I_R	$V_r = 650$ V				25			20	μA

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						2,34		K/W
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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	

PFC Switch

Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,0003	25	3,3	4	4,7	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		30	25		1,6	2,22	V
Collector-emitter cut-off current	I_{CES}		0	650		25			40	μA
Gate-emitter leakage current	I_{GES}		20	0		25			120	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}							1800		pF
Output capacitance	C_{oes}	$f = 1$ Mhz	0	25		25		45		pF
Reverse transfer capacitance	C_{res}							9		pF
Gate charge	Q_g	$V_{CC} = 520$ V	15		30	25		65		nC

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,64		K/W
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PFC Diode

Static

Forward voltage	V_F				30	25 125		1,6 1,3	2,5	V
Reverse leakage current	I_R	$V_r = 600$ V				25			20	μA

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,45		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		

PFC Sw. Protection Diode

Static

Forward voltage	V_F			5	25 125 150		1,6 1,7 1,7	2,1	V
Reverse leakage current	I_R	$V_r = 1200$ V			25			20	μ A

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)					2,34		K/W
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Shunt

Static

Resistance	R						2		m Ω
Temperature coefficient	tc							275	ppm/K

Capacitor (PFC)

Static

Capacitance	C	DC bias voltage = 0 V			25		33		nF
Tolerance						-5		5	%



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Characteristic Values

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

Thermistor

Static

Rated resistance	R					25		22		kΩ
Deviation of R100	$A_{R/R}$	$R_{100} = 1484 \Omega$				100	-5		5	%
Power dissipation	P					25		130		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	




10-PY07PPA030I703-PQ72E68T

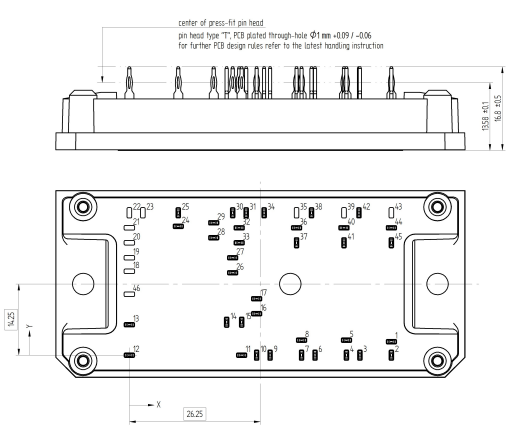
target datasheet

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Ordering Code	
Version	Ordering Code
Without thermal paste	10-PY07PPA030I703-PQ72E68T
With thermal paste (5,2 W/mK, PTM6000HV)	10-PY07PPA030I703-PQ72E68T-77/

Marking						
	Text	Name NN-NNNNNNNNNNNNNN- TTTTTWWYY UL TTTTTVV	Date code WWYY	UL & VIN UL VIN	Lot LLLLL	Serial SSSS
	Datamatrix	Type&Ver TTTTTTTVV	Lot number LLLLL	Serial SSSS	Date code WWYY	

Outline			
Pin table [mm]			
Pin	X	Y	Function
1	52,5	2,7	DC+Inv
2	52,5	0	DC+Inv
3	46,2	0	Ph3
4	43,5	0	Ph3
5	43,5	3	G16
6	37,2	0	Ph2
7	34,5	0	Ph2
8	34,5	3	G14
9	28,2	0	Ph1
10	25,5	0	Ph1
11	22,5	0	G12
12	0	0	PFC1
13	0	6,1	PFC2
14	19,5	6,6	S25
15	22,5	6,6	G25
16	25,5	8,3	S1sh2
17	25,5	11,3	S2sh2
18	not assembled		
19	not assembled		
20	not assembled		
21	not assembled		
22	not assembled		
23	not assembled		
24	9,8	25,8	PFC+
25	9,8	28,5	PFC+
26	20,7	16,5	S27
27	20,7	19,5	G27
28	16,9	23,5	S1sh3
29	16,9	26,5	S2sh3
30	20,7	28,5	PFC-
31	23,4	28,5	PFC-
32	22	25,5	Therm1
33	22	22,5	Therm2
34	27	28,5	DC-1
35	not assembled		
36	33,5	25,5	S1sh4
37	33,5	22,5	G11
38	36,5	28,5	DC-2
39	not assembled		
40	43	25,5	S1sh5
41	43	22,5	G13
42	46	28,5	DC-3
43	not assembled		
44	52,5	25,5	S1sh6
45	52,5	22,5	G15
46	not assembled		

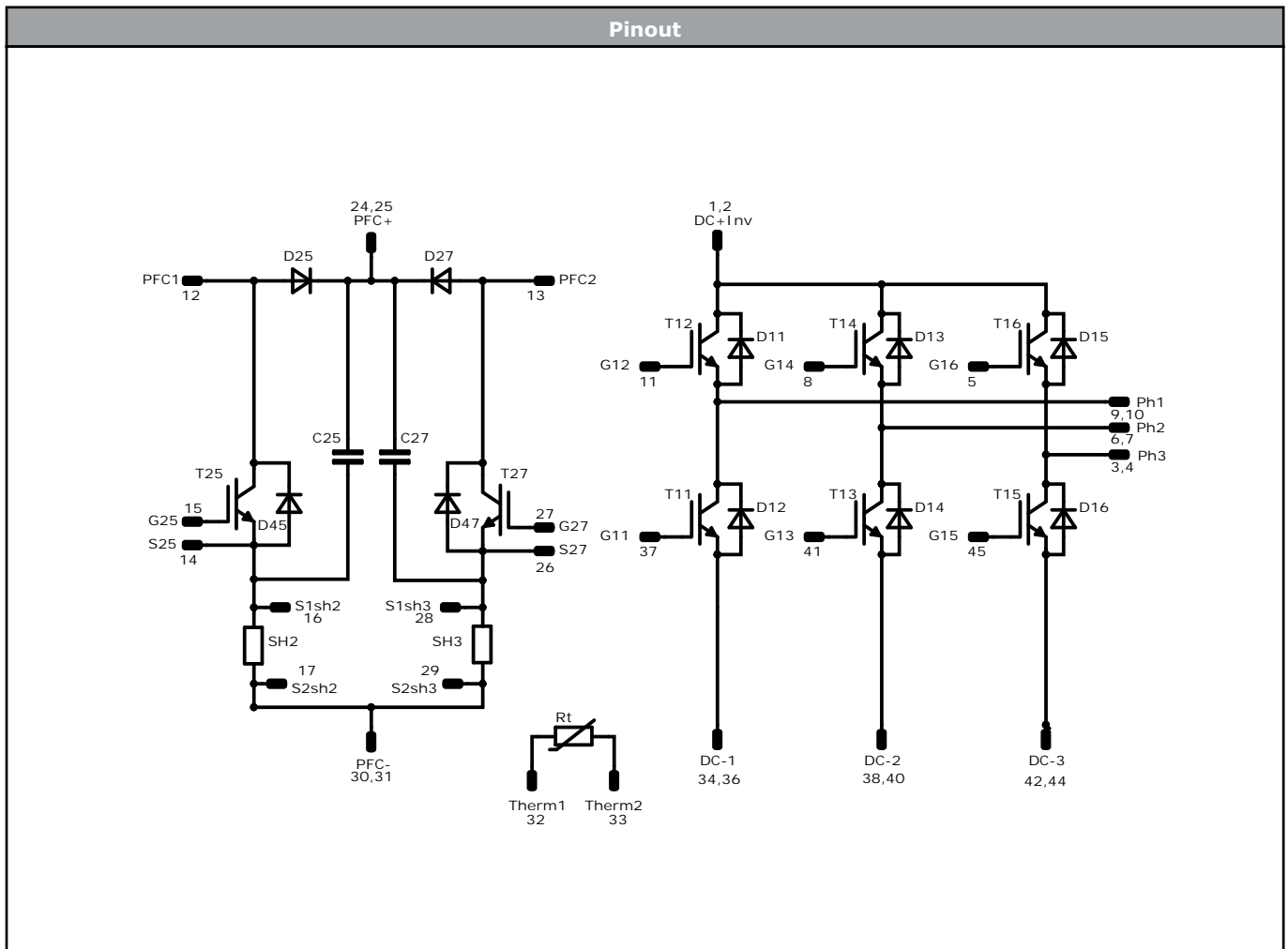


center of press-fit pin head
pin head type "T", PB plated through-hole $\Phi 1 \text{ mm} \pm 0,09 / -0,06$
for further PCB design rules refer to the latest handling instruction

Tolerance of positions: $\pm 0,5 \text{ mm}$ at the end of pins.
Dimension of coordinate axis is only offset without tolerance



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Identification					
ID	Component	Voltage	Current	Function	Comment
T11, T12, T13, T14, T15, T16	IGBT	650 V	30 A	Inverter Switch	
D11, D12, D13, D14, D15, D16	FWD	650 V	20 A	Inverter Diode	
T25, T27	IGBT	650 V	30 A	PFC Switch	
D25, D27	FWD	600 V	30 A	PFC Diode	
D45, D47	FWD	1200 V	5 A	PFC Sw. Protection Diode	
SH2, SH3	Shunt			Shunt	
C25, C27	Capacitor	630 V		Capacitor (PFC)	
Rt	Thermistor			Thermistor	



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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
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 UL 1557 recognized under E192116 up to a junction temperature under switching condition $T_{j,op}=175^{\circ}\text{C}$ and up to 3500VAC/1min isolation voltage. For more information see vincotech.com website.



Document No.:	Date:	Modification:	Pages
10-PY07PPA030I703-PQ72E68T-T1-14	11 Dec. 2024	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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