Vincotech

V23990-P640-H10-PM
datasheet

***flow*CON 0** **1600 V / 42 A**

Topology features

- Three-phase Half Controlled Converter

Component features

- High inrush current capability

Housing features

- Base isolation: Al_2O_3
- Clip-in, reliable mechanical connection, qualified for wave soldering
- Convex shaped substrate for superior thermal contact
- Thermo-mechanical push-and-pull force relief
- Solder pin

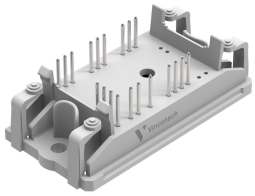
Target applications

- Industrial Drives
- Embedded Drives
- UPS

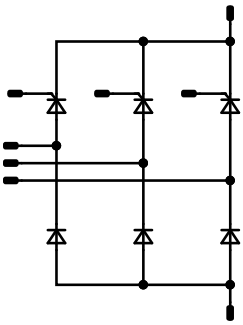
Types

- V23990-P640-H10-PM

flow 0 17 mm housing



Schematic



Maximum Ratings

T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions		Value	Unit
Rectifier Thyristor					
Repetitive peak reverse voltage	V_{RRM}			1600	V
Maximum RMS on-state current	I_{TRMSM}	$T_j = T_{jmax}$	T_s = 80 °C	55	A
Surge on-state current	I_{TSM}	Single Half Sine Wave, t_p = 10 ms	T_j = 130 °C	450	A
I2t value	I^2t	Single Half Sine Wave, t_p = 10 ms	T_j = 130 °C	1010	A^2s
Mean total power loss	$P_{tot}(AV)$	$T_j = T_{jmax}$	T_s = 80 °C	67	W
Maximum Junction Temperature	T_{jmax}			130	°C
Rectifier Diode					
Peak repetitive reverse voltage	V_{RRM}			1600	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$	T_s = 80 °C	78	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, t_p = 10 ms	T_j = 150 °C	740	A
Surge current capability	I^2t			2740	A^2s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$	T_s = 80 °C	88	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 s	6000	V
Isolation voltage	V_{isol}	AC Voltage	t_p = 1 min	2500	V
Creepage distance				>12,7	mm
Clearance				>12,7	mm
Comparative Tracking Index	CTI			≥ 200	

*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 Thyristor										
Static										
Direct reverse current	I_{RD}	V_r = 1600 V				25			200	µA
Holding current	I_H	I_T = A				25			165	mA
Latching current	I_L	t_p = µs I_G = A di_G/dt = A/µs				25			330	mA
Gate trigger voltage	V_{GT}					25			1,98	V
Gate trigger current	I_{GT}					25			100	mA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,75		K/W
Rectifier Diode										
Static										
Forward voltage	V_F				80	25 125 150		1,18 1,15	1,23(1) 1,17(1)	V
Reverse leakage current	I_R	V_r = 1600 V				25 150			50 1500	µA
Thermal										
Thermal resistance junction to sink(2)	$R_{th(j-s)}$	λ_{paste} = 3,4 W/mK (PSX)						0,79		K/W

(1) Value at chip level

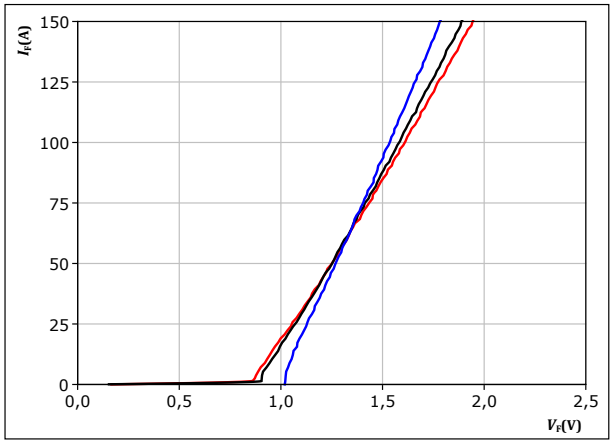
(2) Only valid with pre-applied Vincotech thermal interface material.

Rectifier Thyristor Characteristics

figure 1. **Thyristor**

Typical forward characteristics

$I_F = f(V_F)$



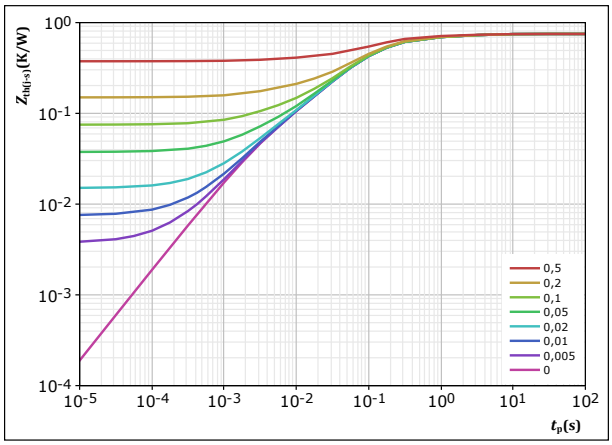
t_p = 250 µs

T_j: 25 °C, 100 °C, 125 °C

figure 2. **Thyristor**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,75 K/W

Thyristor thermal model values

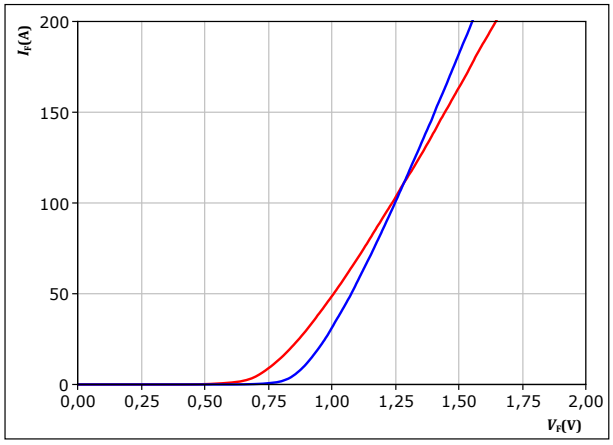
R (K/W)	τ (s)
5,49E-02	3,39E+00
1,27E-01	4,99E-01
4,30E-01	1,03E-01
1,02E-01	3,06E-02
3,72E-02	3,32E-03

Rectifier Diode Characteristics

figure 3. **Rectifier**

Typical forward characteristics

$I_F = f(V_F)$



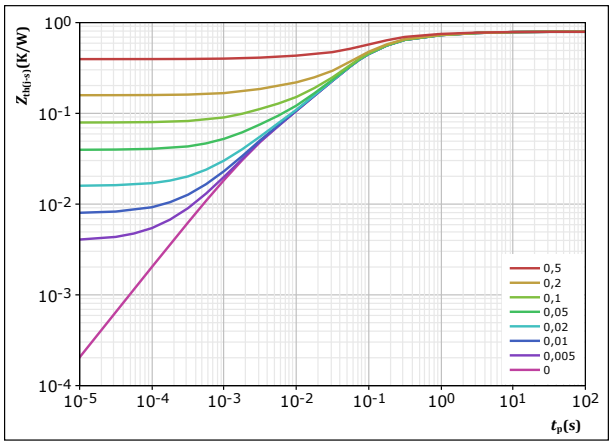
t_p = 250 µs

T_j: 25 °C, 125 °C

figure 4. **Rectifier**

Transient thermal impedance as a function of pulse width

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



D = t_p / T

$R_{th(j-s)}$ = 0,792 K/W

Rectifier thermal model values

R (K/W)	τ (s)
3,05E-02	5,90E+00
8,93E-02	1,13E+00
2,82E-01	1,79E-01
3,51E-01	6,17E-02
3,93E-02	3,00E-03

Ordering Code

Version	Ordering Code
Without thermal paste	V23990-P640-H10-PM
With thermal paste (5,2 W/mK, PTM6000HV)	V23990-P640-H10-/7/-PM
With thermal paste (3,4 W/mK, PSX-P7)	V23990-P640-H10-/3/-PM

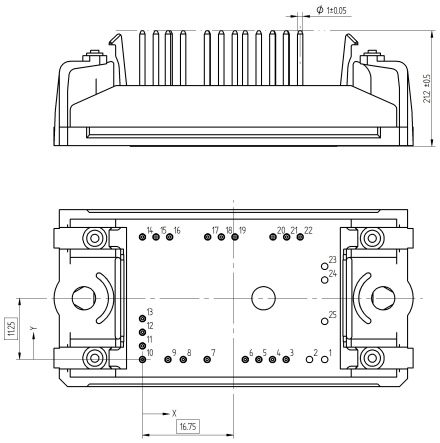
Marking

Text	**VIN**	**Date code**	**Type&Ver**	**UL**	**Lot**	**Serial**
	VIN	WWYY	TTTTTTTVV	UL	LLLLL	SSSS
Datamatrix	**Type&Ver**	**Lot number**	**Serial**	**Date code**		
	TTTTTTTVV	LLLLL	SSSS	WWYY		

Outline

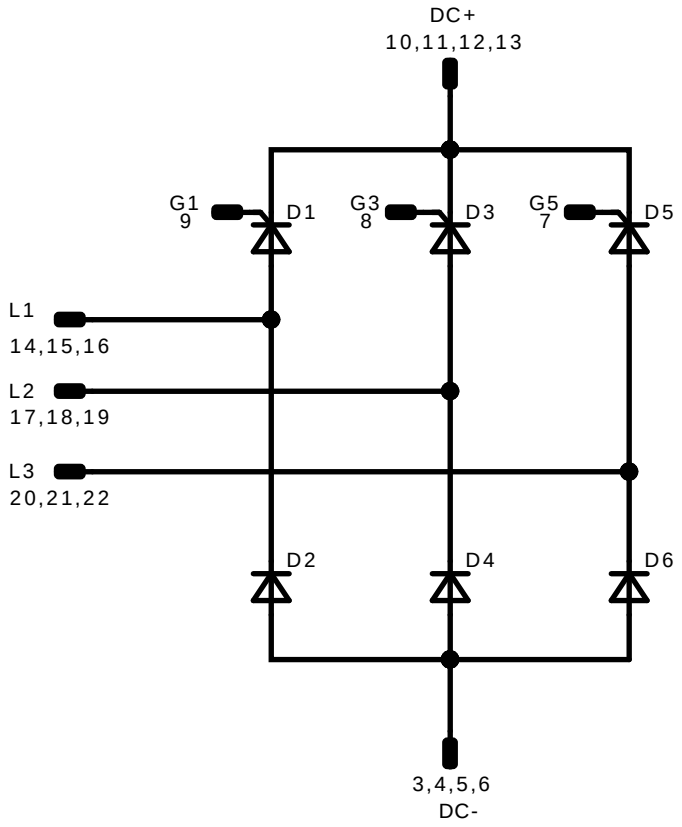
Pin table [mm]

Pin	X	Y	Function
1	not assembled		
2	not assembled		
3	26,4	0	DC-
4	23,9	0	DC-
5	21,4	0	DC-
6	18,9	0	DC-
7	11,9	0	G5
8	7,5	0	G3
9	4,7	0	G1
10	0	0	DC+
11	0	2,5	DC+
12	0	5	DC+
13	0	7,5	DC+
14	0	22,5	L1
15	2,5	22,5	L1
16	5	22,5	L1
17	12	22,5	L2
18	14,5	22,5	L2
19	17	22,5	L2
20	24	22,5	L3
21	26,5	22,5	L3
22	29	22,5	L3
23	not assembled		
24	not assembled		
25	not assembled		



Tolerance of pinpositions: ±0,5mm at the end of pins
Dimension of coordinate axis is only offset without tolerance

Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
D1, D3, D5	Thyristor	1600 V	55 A	Rectifier Thyristor	
D2, D4, D6	Rectifier	1600 V	80 A	Rectifier Diode	

Packaging instruction				
Standard packaging quantity (SPQ) 135	>SPQ	Standard	<SPQ	Sample

Handling instruction
Handling instructions for *flow* 0 packages see vincotech.com website.

Package data
Package data for *flow* 0 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
V23990-P640-H10-PM-D2-14	7 May. 2023	New Datasheet format, module is unchanged Updated Rectifier Thyristor characteristic	