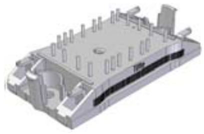
Vincotech

flowSOL 0 BI — **600V/25A**

Features

- High efficiency
- Ultra fast switching frequency
- Low inductive design
- SiC in boost and H bridge

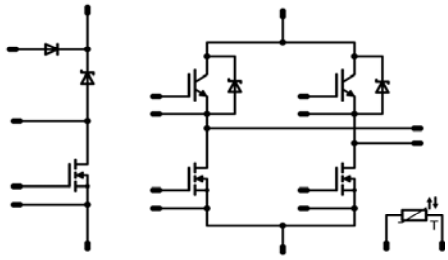
flow0 housing



Target Applications

- Transformerless solar inverters

Schematic



Types

- FZ06BIA070FS

Maximum Ratings

Tj=25°C, unless otherwise specified

Parameter	Symbol	Condition		Value	Unit
Bypass Diode					
Repetitive peak reverse voltage	V_{RRM}			1600	V
Forward current per diode	I_{FAV}	DC current	T_h=80°C T_c=80°C	28 38	A
Surge forward current	I_{FSM}	t_p=10ms	T_j=25°C	220	A
I2t-value	I^2t			220	A^2s
Power dissipation per Diode	P_{tot}	T_j=$T_j$max	T_h=80°C T_c=80°C	33 50	W
Maximum Junction Temperature	$T_j$max			150	°C
Input Boost MOSFET					
Drain to source breakdown voltage	V_{DS}			600	V
DC drain current	I_D	T_j=$T_j$max	T_h=80°C T_c=80°C	21 28	A
Pulsed drain current	I_{Dpulse}	t_p limited by $T_j$max		159	A
Power dissipation	P_{tot}	T_j=$T_j$max	T_h=80°C T_c=80°C	70 110	W
Gate-source peak voltage	V_{GS}			±20	V
Maximum Junction Temperature	$T_j$max			150	°C

Maximum Ratings

Tj=25°C, unless otherwise specified

Parameter	Symbol	Condition		Value	Unit
Input Boost Diode					
Peak Repetitive Reverse Voltage	V_{RRM}	T_j=25°C		600	V
DC forward current	I_F	T_j=$T_j$max	T_h=80°C T_c=80°C	16 23	A
Repetitive peak forward current	I_{FRM}	t_p limited by $T_j$max		140	A
Power dissipation	P_{tot}	T_j=$T_j$max	T_h=80°C T_c=80°C	31 56	W
Maximum Junction Temperature	$T_j$max			175	°C
Buck Diode					
Peak Repetitive Reverse Voltage	V_{RRM}	T_j=25°C		600	V
DC forward current	I_F	T_j=$T_j$max	T_h=80°C T_c=80°C	14 30	A
Repetitive peak forward current	I_{FRM}	t_p limited by $T_j$max	T_c=100°C	70	A
Power dissipation per Diode	P_{tot}	T_j=$T_j$max	T_h=80°C T_c=80°C	117 208	W
Maximum Junction Temperature	$T_j$max			175	°C
Buck MOSFET					
Drain to source breakdown voltage	V_{DS}			600	V
DC drain current	I_D	T_j=$T_j$max	T_h=80°C T_c=80°C	21 28	A
Pulsed drain current	I_{Dpulse}	t_p limited by $T_j$max	Tc=25°C	159	A
Power dissipation	P_{tot}	T_j=$T_j$max	T_h=80°C T_c=80°C	70 110	W
Gate-source peak voltage	Vgs			±20	V
Maximum Junction Temperature	$T_j$max			150	°C
Boost IGBT					
Collector-emitter break down voltage	V_{CE}			600	V
DC collector current	I_C	T_j=$T_j$max	T_h=80°C T_c=80°C	27 34	A
Repetitive peak collector current	I_{Cpuls}	t_p limited by $T_j$max		90	A
Power dissipation per IGBT	P_{tot}	T_j=$T_j$max	T_h=80°C T_c=80°C	53 81	W
Gate-emitter peak voltage	V_{GE}			±20	V
Short circuit ratings	t_{SC} V_{CC}	T_j≤150°C V_{GE}=15V		6 360	μs V
Maximum Junction Temperature	$T_j$max			175	°C

Maximum Ratings

Tj=25°C, unless otherwise specified

Parameter	Symbol	Condition		Value	Unit
Thermal Properties					
Storage temperature	T_{stg}			-40…+125	°C
Operation temperature under switching condition	T_{op}			-40…+(Tjmax - 25)	°C
Insulation Properties					
Insulation voltage	V_{is}	t=2s	DC voltage	4000	V
Creepage distance				min 12,7	mm
Clearance				min 12,7	mm

Characteristic Values

Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V] or V_{GS} [V]	V_r [V] or V_{CE} [V] or V_{DS} [V]	I_C [A] or I_F [A] or I_D [A]	T_j	Min	Typ	Max	
Bypass Diode										
Forward voltage	solar inverte				15	Tj=25°C Tj=125°C	0,7	1,06 0,99	1,3	V
Threshold voltage (for power loss calc. only)	V_{to}					Tj=25°C Tj=125°C		0,90 0,75		V
Slope resistance (for power loss calc. only)	r_t					Tj=25°C Tj=125°C		0,01 0,02		Ω
Reverse current	I_r			1200		Tj=25°C Tj=125°C			0,05	mA
Thermal resistance chip to heatsink per chip	R_{thJH}	Thermal grease thickness≤50um λ = 1 W/mK						2,12		K/W
Input Boost MOSFET										
Static drain to source ON resistance	$R_{DS(on)}$		10		26	Tj=25°C Tj=125°C		0,07 0,17		Ω
Gate threshold voltage	$V_{(GS)th}$	VGS=VDS			0,0017	Tj=25°C Tj=125°C	2,5	3	3,5	V
Gate to Source Leakage Current	I_{gss}		20	0		Tj=25°C Tj=125°C			200	nA
Zero Gate Voltage Drain Current	I_{dss}		0	600		Tj=25°C Tj=125°C			25000	nA
Turn On Delay Time	$t_{d(ON)}$					Tj=25°C Tj=125°C		16		
Rise Time	t_r					Tj=25°C Tj=125°C		12		
Turn off delay time	$t_{d(OFF)}$	Rgoff=1,7 Ω Rgon=1,7 Ω	13	400	26	Tj=25°C Tj=125°C		83		ns
Fall time	t_f					Tj=25°C Tj=125°C		5		
Turn-on energy loss per pulse	E_{on}					Tj=25°C Tj=125°C		tbd tbd		mWs
Turn-off energy loss per pulse	E_{off}					Tj=25°C Tj=125°C		tbd tbd		
Total gate charge	Q_g					Tj=25°C Tj=125°C		170		
Gate to source charge	Q_{gs}	Rgon=1,7 Ω	10	480	26	Tj=25°C Tj=125°C		21		nC
Gate to drain charge	Q_{gd}					Tj=25°C Tj=125°C		87		
Input capacitance	C_{iss}							3800		
Output capacitance	C_{oss}	f=1MHz	0	100		Tj=25°C		215		pF
Reverse transfer capacitance	C_{rss}							tbd		
Thermal resistance chip to heatsink per chip	R_{thJH}	Thermal grease thickness≤50um λ = 1 W/mK						1,00		K/W
Input Boost Diode										
Forward voltage	V_F				12	Tj=25°C Tj=150°C		1,60 1,90	1,8	V
Reverse leakage current	I_{rm}		10	480	12	Tj=25°C Tj=150°C			400	μA
Peak recovery current	I_{RRM}					Tj=25°C Tj=150°C		tbd		A
Reverse recovery time	t_{rr}					Tj=25°C Tj=150°C		tbd		ns
Reverse recovery charge	Q_{rr}	Rgon=1,7 Ω	10	480	12	Tj=25°C Tj=150°C		tbd		μC
Reverse recovered energy	E_{rec}					Tj=25°C Tj=150°C		tbd		mWs
Peak rate of fall of recovery current	di(rec)max /dt					Tj=25°C Tj=150°C		tbd		A/μs
Thermal resistance chip to heatsink per chip	R_{thJH}	Thermal grease thickness≤50um λ = 1 W/mK						2,50		K/W

Characteristic Values

Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V] or V_{GS} [V]	V_r [V] or V_{CE} [V] or V_{DS} [V]	I_C [A] or I_F [A] or I_D [A]	T_j	Min	Typ	Max	
Buck Diode										
Diode forward voltage	V_F				6	Tj=25°C Tj=150°C		1,60 1,90	1,8	V
Peak reverse recovery current	I_{RRM}	Rgon=1,7 Ω	10	480	6	Tj=25°C Tj=150°C		tbd		A
Reverse recovery time	t_{rr}	Rgon=1,7 Ω	10	480	6	Tj=25°C Tj=150°C		tbd		ns
Reverse recovered charge	Q_{rr}	Rgon=1,7 Ω	10	480	6	Tj=25°C Tj=150°C		tbd		µC
Peak rate of fall of recovery current	di(rec)max /dt	Rgon=1,7 Ω	10	480	6	Tj=25°C Tj=150°C		tbd		A/µs
Reverse recovered energy	Erec	Rgon=1,7 Ω	10	480	6	Tj=25°C Tj=150°C		tbd		mWs
Thermal resistance chip to heatsink per chip	R_{thJH}	Thermal grease thickness≤50um λ = 1 W/mK						3,50		K/W
Buck MOSFET										
Static drain to source ON resistance	$R_{ds(on)}$		10		26	Tj=25°C Tj=125°C		70 170		mΩ
Gate threshold voltage	$V_{(GS)th}$			V_{DS}=V_{GS}	0,0017	Tj=25°C Tj=125°C	2,5	3	3,5	V
Gate to Source Leakage Current	I_{gss}		20	0		Tj=25°C Tj=125°C			200	nA
Zero Gate Voltage Drain Current	I_{dss}		0	600		Tj=25°C Tj=125°C			25000	nA
Turn On Delay Time	$t_{d(ON)}$	Rgoff=1,7 Ω Rgon=1,7 Ω	13	400	26	Tj=25°C Tj=125°C		16		ns
Rise Time	t_r	Rgoff=1,7 Ω Rgon=1,7 Ω	13	400	26	Tj=25°C Tj=125°C		12		ns
Turn off delay time	$t_{d(OFF)}$	Rgoff=1,7 Ω Rgon=1,7 Ω	13	400	26	Tj=25°C Tj=125°C		83		ns
Fall time	t_f	Rgoff=1,7 Ω Rgon=1,7 Ω	13	400	26	Tj=25°C Tj=125°C		5		ns
Turn-on energy loss per pulse	E_{on}	Rgoff=1,7 Ω Rgon=1,7 Ω	13	400	26	Tj=25°C Tj=125°C		tbd tbd		mWs
Turn-off energy loss per pulse	E_{off}	Rgoff=1,7 Ω Rgon=1,7 Ω	13	400	26	Tj=25°C Tj=125°C		tbd tbd		mWs
Total gate charge	Q_g		10	480	26	Tj=25°C		170		nC
Gate to source charge	Q_{gs}		10	480	26	Tj=25°C		21		nC
Gate to drain charge	Q_{gd}		10	480	26	Tj=25°C		87		nC
Input capacitance	C_{iss}	f=1MHz	0	100		Tj=25°C		3800		pF
Output capacitance	C_{oss}	f=1MHz	0	100		Tj=25°C		215		pF
Reverse transfer capacitance	C_{rss}	f=1MHz	0	100		Tj=25°C		tbd		pF
Thermal resistance chip to heatsink per chip	R_{thJH}	Thermal grease thickness≤50um λ = 1 W/mK						1,00		K/W

Characteristic Values

Parameter	Symbol	Conditions					Value			Unit
			V_{GE} [V] or V_{GS} [V]	V_r [V] or V_{CE} [V] or V_{DS} [V]	I_C [A] or I_F [A] or I_D [A]	T_j	Min	Typ	Max	
Boost IGBT										
Gate emitter threshold voltage	$V_{GE(th)}$	$V_{CE}=V_{GE}$			0,00043	Tj=25°C Tj=150°C	5	5,8	6,5	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		30	Tj=25°C Tj=150°C		1,39 1,51		V
Collector-emitter cut-off incl diode	I_{CES}		0	600		Tj=25°C Tj=150°C			0,2	mA
Gate-emitter leakage current	I_{GES}		20	0		Tj=25°C Tj=150°C			650	nA
Integrated Gate resistor	R_{gint}							none		Ω
Input capacitance	C_{ies}	f=1MHz	0	25		Tj=25°C		1630		pF
Output capacitance	C_{oss}							108		
Reverse transfer capacitance	C_{rss}							50		
Gate charge	Q_{Gate}		15	480	30	Tj=25°C		167		nC
Thermal resistance chip to heatsink per chip	R_{thJH}	Thermal grease thickness≤50um λ = 1 W/mK						1,78		K/W

Note: For the **Boost IGBT** only LF switching allowed

Thermistor										
Rated resistance*	R_{25}	Tol. ±5%				Tj=25°C	20,9	22	23,1	kΩ
	R_{100}					Tj=100°C		1486		Ω
Power dissipation	P					Tj=25°C		200		mW
B-value	$B_{(25/100)}$	Tol. ±3%				Tj=25°C		3998		K

* see details on **Thermistor** charts on **Figure 2.**

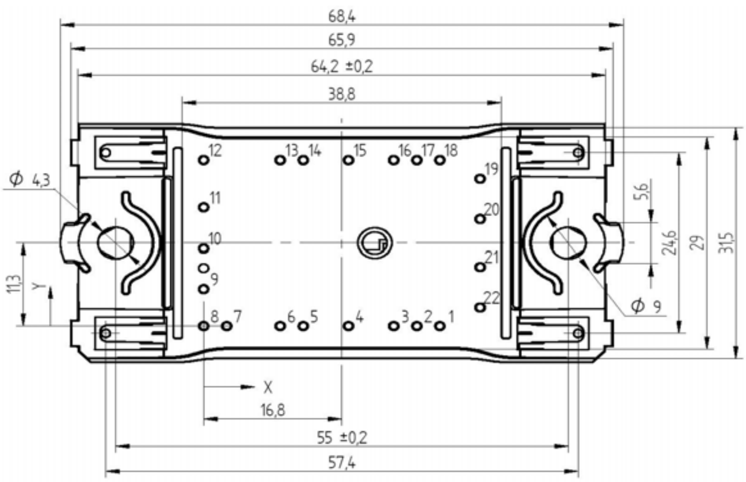
Ordering Code and Marking - Outline - Pinout

Ordering Code & Marking

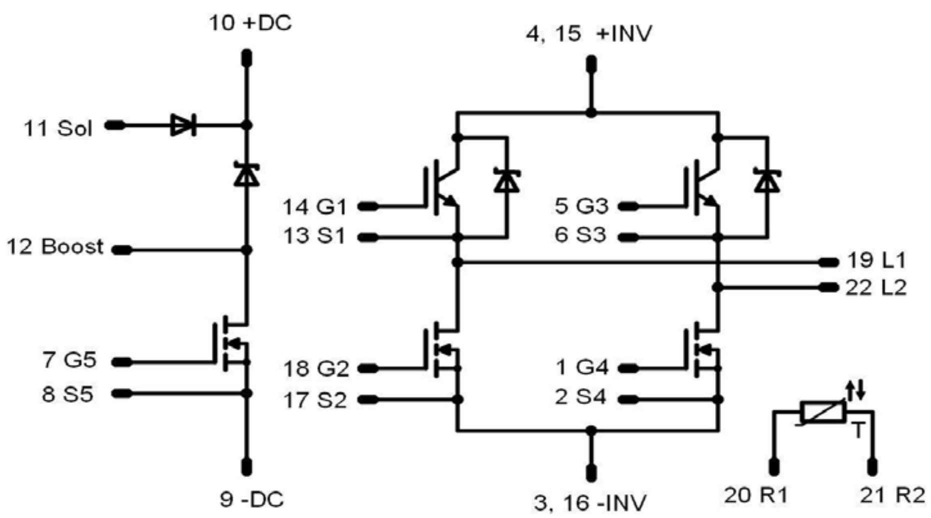
	Ordering Code	in DataMatrix as	in packaging barcode as
without thermal paste 12mm housing	10-FZ06BIA070FS-P894E	P894E	P894E

Outline

Pin table		
Pin	X	Y
1	28,7	0
2	25,9	0
3	23,1	0
4	17,6	0
5	12,1	0
6	9,3	0
7	2,8	0
8	0	0
9	0	5,05
10	0	10,55
11	0	16,15
12	0	22,6
13	9,3	22,6
14	12,1	22,6
15	17,6	22,6
16	23,1	22,6
17	25,9	22,6
18	28,7	22,6
19	33,6	20,05
20	33,6	14,55
21	33,6	8,05
22	33,6	2,55



Pinout



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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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