

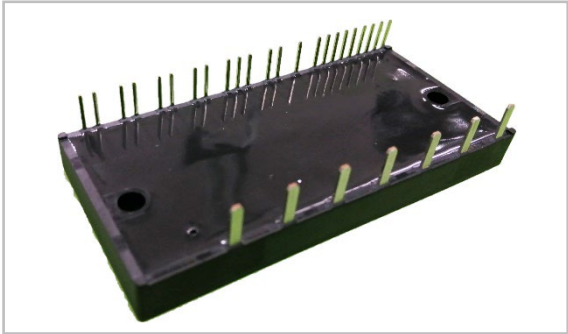
FUJITSU GENERAL ELECTRONICS LIMITED

FGI-6I035C120C1

IGBT MODULE

1200V/35A IPM

- Features
 - Can be mounted by replacing with a package made by another company and pin compatible. (Overcurrent setting is set internally.)
 - Bootstrap diode built-in.
 - SW speed and built-in protection circuit threshold adjustable.



- Usage

AC400V motor control inverter unit.

- Dimensions

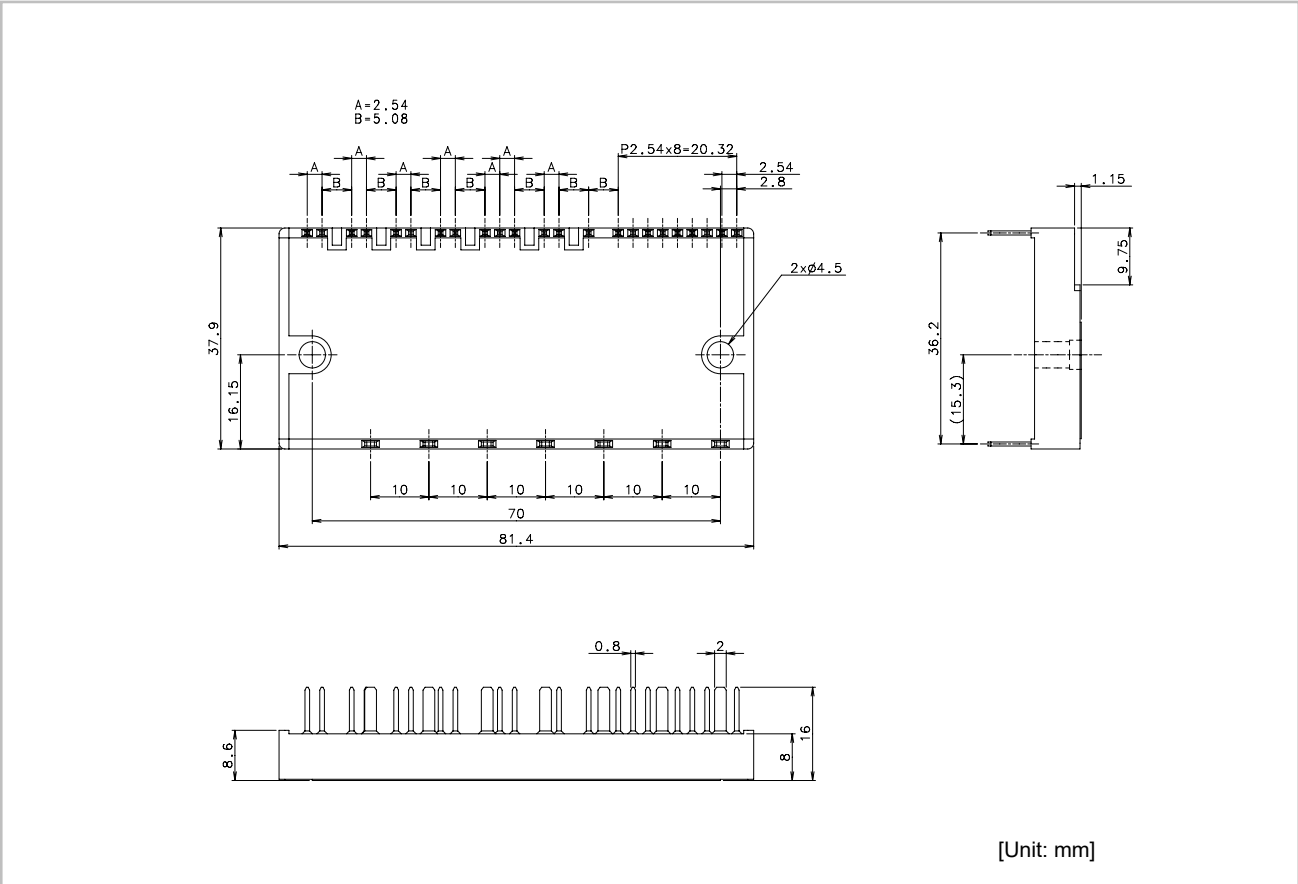


Fig.1. Dimensions

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■ Pin Functions

Pin No.	Name	Function	Pin No.	Name	Function
1	U _P	Signal Input for High-side U-phase	22	V _{NC}	Control Supply GND for Low-side
3	V _{P1}	Control Supply for High-side U-phase	23	V _{OT}	Temperature Sensor Output
4	V _{UFB}	High-side Bias Voltage for U-phase IGBT Driving	24	C _{IN}	Protection Circuit Input Terminal
6	V _{UFS}	High-side U-phase Drive Supply GND	25	N.C.	No Connect
7	V _P	Signal Input for High-side V-phase	26	F _O	Fault Output
9	V _{P1}	Control Supply for High-side V-phase	27	U _N	Signal Input for Low-side U-phase
10	V _{VFB}	High-side Bias Voltage for V-phase IGBT Driving	28	V _N	Signal Input for Low-side V-phase
12	V _{VFS}	High-side V-phase Drive Supply GND	29	W _N	Signal Input for Low-side W-phase
13	W _P	Signal Input for High-side W-phase	34	NW	Negative Bus Voltage Input for W-phase
14	V _{P1}	Control Supply for High-side W-phase	35	NV	Negative Bus Voltage Input for V-phase
15	V _{PC}	Control Supply GND for High-side	36	NU	Negative Bus Voltage Input for U-phase
16	V _{WFB}	High-side Bias Voltage for W-phase IGBT Driving	37	W	W-phase Output
18	V _{WFS}	High-side W-phase Drive Supply GND	38	V	V-phase Output
19	N.C.	No Connect	39	U	U-phase Output
21	V _{N1}	Control Supply for Low-side	40	P	Positive Bus Voltage Input

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■ Block Diagram

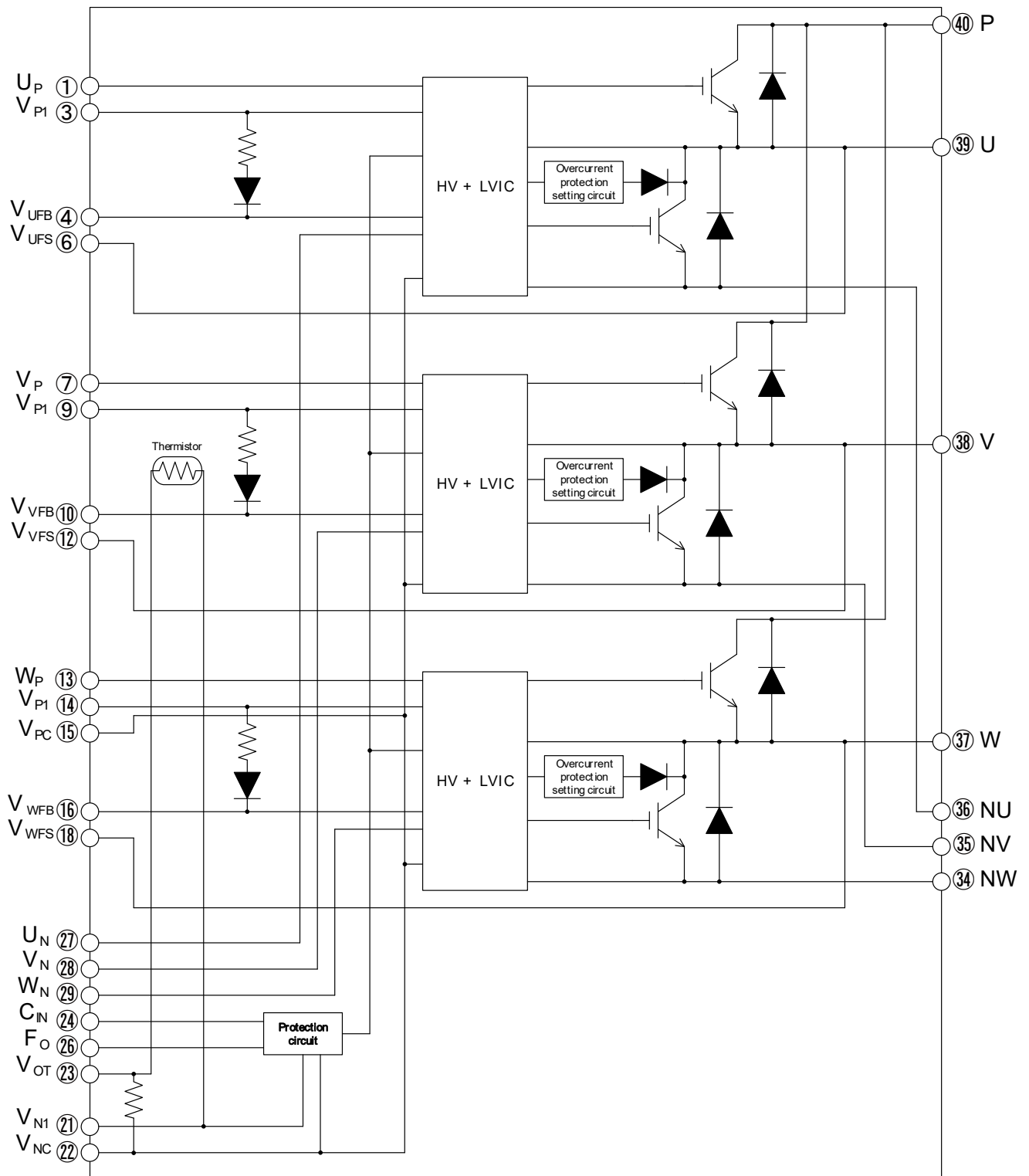


Fig.2. Block Diagram

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■ Absolute Maximum Ratings (T_j=25°C、V_D=V_{DB}=15V unless otherwise specified)

Items			Symbol	Min.	Max.	Units	
Inverter Block	DC Bus Voltage		V _{CC}	-	(900)	V	
	Bus Voltage (Surge)		V _{CC(SURGE)}	-	(1000)	V	
	Collector-Emitter Voltage		V _{CES}	0	1200	V	
	Collector Current	DC	Forward	+I _C	-	35	A
			Reverse	-I _C	-	35	A
	Collector Current (Peak)	1ms	Forward	+I _{CP}	-	70	A
			Reverse	-I _{CP}	-	70	A
Collector Power Dissipation		1 device	P _C	-	147	W	
Junction Temperature			T _J	-	150	°C	
Circuit Block	Supply Voltage (High-side)	Applied between V _{P1} -V _{PC} , V _{N1} -V _{NC}	V _D	-0.5	20	V	
		Applied between V _{UFB} -V _{UFS} , V _{WFB} -V _{WFS} , V _{NFB} -V _{NFS}	V _{DB}	-0.5	20	V	
	Input Signal Voltage	Applied between U _P , V _P , W _P -V _{PC} , U _N , V _N , W _N -V _{NC}	V _{IN}	-0.5	VD+0.5	V	
Control	Fault Signal Voltage	Applied between F _O -V _{NC}	V _{FO}	-0.5	VD+0.5	V	
	Fault Signal Current	Sink current of F _O terminal	I _{FO}	-	5	mA	
General	Self Operation "DC Bus Voltage" of Circuit Protection Between Upper-arm and Lower-arm		V _D =13.5~16.5V, T _j =125°C, less than 2μs, non-reptitive	V _{CC(PROT)}	-	800	V
	Operating Case Temperature			T _C	-30	100	°C
	Storage Temperature			T _{stg}	-40	125	°C
	Isolation Voltage			Viso	-	AC2500	Vrms
Screw Torque		Mounting Screw : M4		-	1.47	N·m	

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■ Electrical Characteristics (Tj=25°C, V_D=V_{DB}=15V unless otherwise specified)

Items		Symbol	Conditions	Min.	Typ.	Max.	Units	
Inverter Block	Collector-Emitter Saturation Voltage	V _{CE(sat)}	I _C =35A	Tj=25°C	-	1.83	2.35	V
				Tj=125°C	-	2.12	-	V
	Forward Voltage of FWD	V _{EC}	I _C =35A	Tj=25°C	-	2.27	2.99	V
				Tj=125°C	-	2.19	-	V
	Switching Times	t _{on}	V _{CC} =600V, I _C =35A, Tj=125°C V _{IN} =0↔5V Inductive load(between Upper-arm and Lower-arm)		1.9	2.4	2.6	μs
		t _{c(on)}			-	1.1	1.3	μs
		t _{off}			-	1.8	1.9	μs
t _{c(off)}				-	0.2	0.3	μs	
t _{rr}				-	0.5	-	μs	
Zero Gate Voltage Collector Current	I _{CES}	V _{CES}		-	-	1.0	mA	
Control Circuit Block	Control Circuit Current	I _D	Sum of V _{P1} -V _{PC} , V _{N1} -V _{NC}	V _{IN} =0V	-	-	8.0	mA
				V _{IN} =5V	-	-	20.0	
	Bootstrap Circuit Current	I _{DB}	V _{UFB} -V _{UFS} , V _{VFB} -V _{VFS} , V _{WFB} -V _{WFS}	V _{IN} =0V	-	-	1.4	mA
				V _{IN} =5V	-	-	1.4	
	Over Current Trip Level	I _{SC}	Tj=125°C		59.5	-	-	A
	Under Voltage Protection Leve of P-side	UV _{DBt}	Trip level		9.7	-	11.7	V
		UV _{DBr}	Trip level		10.5	-	12.5	V
	Under Voltage Protection Leve of N-side	UV _{Dt}	Trip level		7.0	-	11.0	V
		UV _{Dr}	Trip level		7.0	-	11.0	V
	Fault Output Voltage	V _{FOH}	F _O = 10kΩ, 5V pull-up		-	4.9	-	V
		V _{FOL}	I _{FO} = 1mA		-	-	0.95	V
	Fault Output Pulse Width	t _{FO}	-		-	2.40	-	ms
	Input Current	I _{IN}	V _{IN} =5V		0.6	1.0	1.4	mA
	Input Signal Threshold Voltage	V _{th(on)}	Applied between U _P , V _P , W _P -V _{PC} , U _N , V _N , W _N -V _{NC}	OFF→ON	-	-	4.0	V
V _{th(off)}		ON→OFF		1.0	-	-	V	
Output Voltage of Temperature Sensor	V _{OT}	Temperature of LVIC = 75°C		2.28	2.38	2.51	V	
Forward Voltage of Bootstrap Diode	V _F	I _{FB} = 10mA , Included voltage drop of limiting regisitance		-	0.75	-	V	
Built-in Limiting Resistor	R	In a bootstrap diode		31.4	33.0	34.7	Ω	

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■ Thermal Characteristics (Tc = 25°C)

Items			Symbol	Min.	Typ.	Max.	Units
Junction to Case Thermal Resistance	Inverter	IGBT	$R_{th(j-c)Q}$	-	-	0.85	°C/W
		FWD	$R_{th(j-c)F}$	-	-	1.05	°C/W

■ Mechanical Characteristics and Weight

Items	Conditions	Standard	Min.	Typ.	Max.	Units
Mounting Torque	Mounting Screw : M4	-	0.98	-	1.47	N·m
Terminal tensile strength	Load 19.6N	JEIAJ-ED-4701	10	-	-	s
Bending strength of terminal	90 degree bend at 9.8N load	JEIAJ-ED-4701	2	-	-	times
Weight	-	-	-	66.5	-	g

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