

FGI-6I035C120C1

■ 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

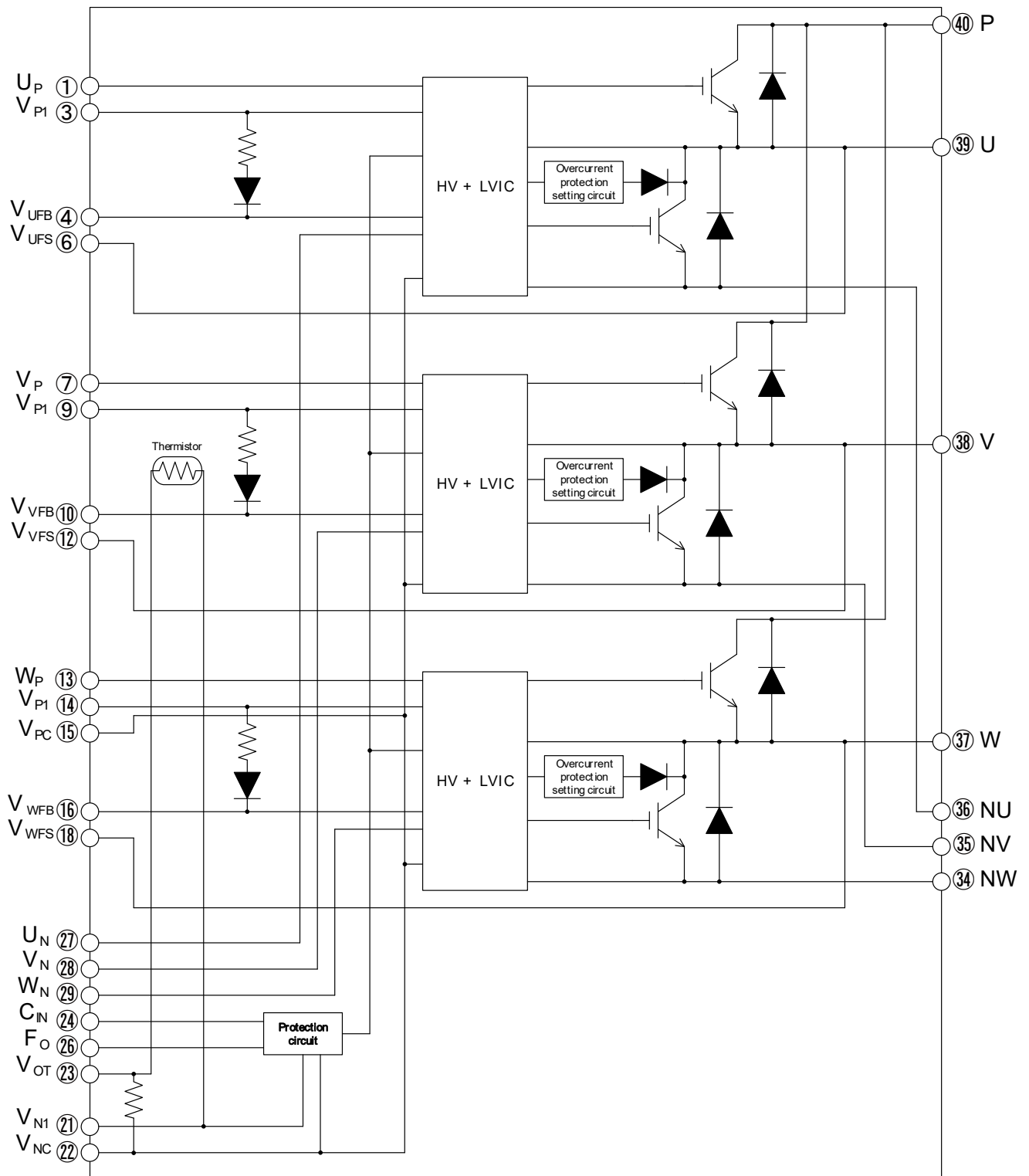


Fig.2. Block Diagram

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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 | |
| | Fault Signal Voltage | Applied between F _O -V _{NC} | V _{FO} | -0.5 | VD+0.5 | V | |
| Control | 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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