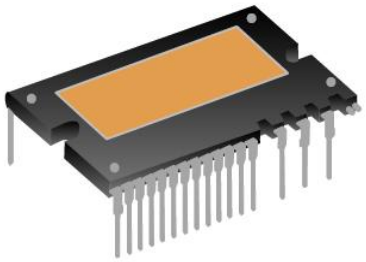
## Description

CRM60GH15EB are 3-phase Integrated Power Modules (IPM) designed for advanced appliance motor drive applications such as refrigerator compressor and pumps.

CRM60GH15EB Integrated 6 low-loss IGBTs and FRDs, 3-phase full bridge drivers in a familiar package. The modules are optimized for low EMI characteristics.

## Features

- 600V/15A three-phase inverter
- Works with 3.3V/5V MCU
- Integrated under-voltage protection
- Integrated high accurate short-circuit current protection
- Integrated >40μs fault duration time
- Integrated built-in temperature-sensing
- Integrated over temperature protection
- Integrated bootstrap diodes with current limiting resistor
- Isolation rating: 1500 Vrms/min



DIP-24B

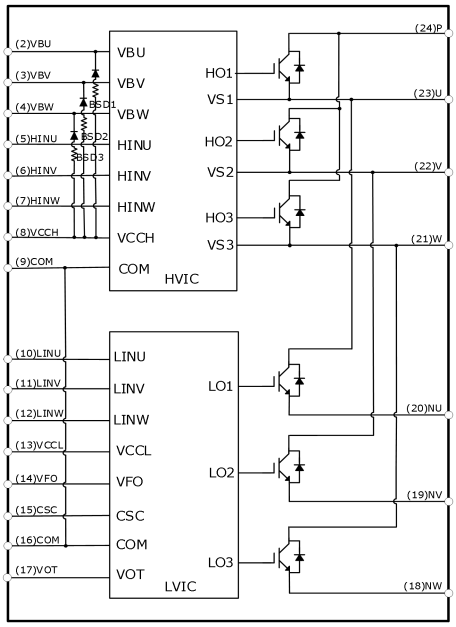
## Applications

- Refrigerator compressor
- Air conditioning compressor
- Low-power inverters
- Pumps

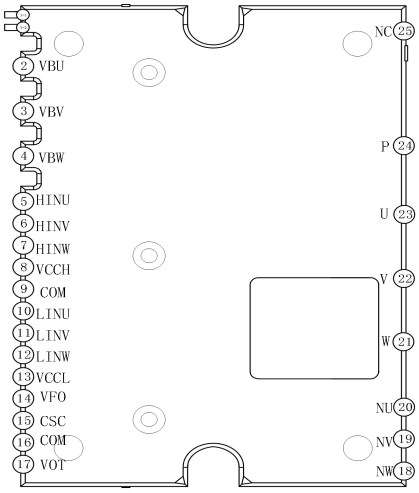
## Package Marking and Ordering Information

| Part # | Marking | Package | Packing Factory Code | Packing | Quantity | Green |
|---|---|---|---|---|---|---|
| CRM60GH15EB | CRM60GH15EB | DIP-24B | 1 | Tube | 360EA | ROHS/HF |
| CRM60GH15EB | CRM60GH15EB | DIP-24B | 6 | Tube | 300EA | ROHS/HF |

## Internal Electrical Schematic



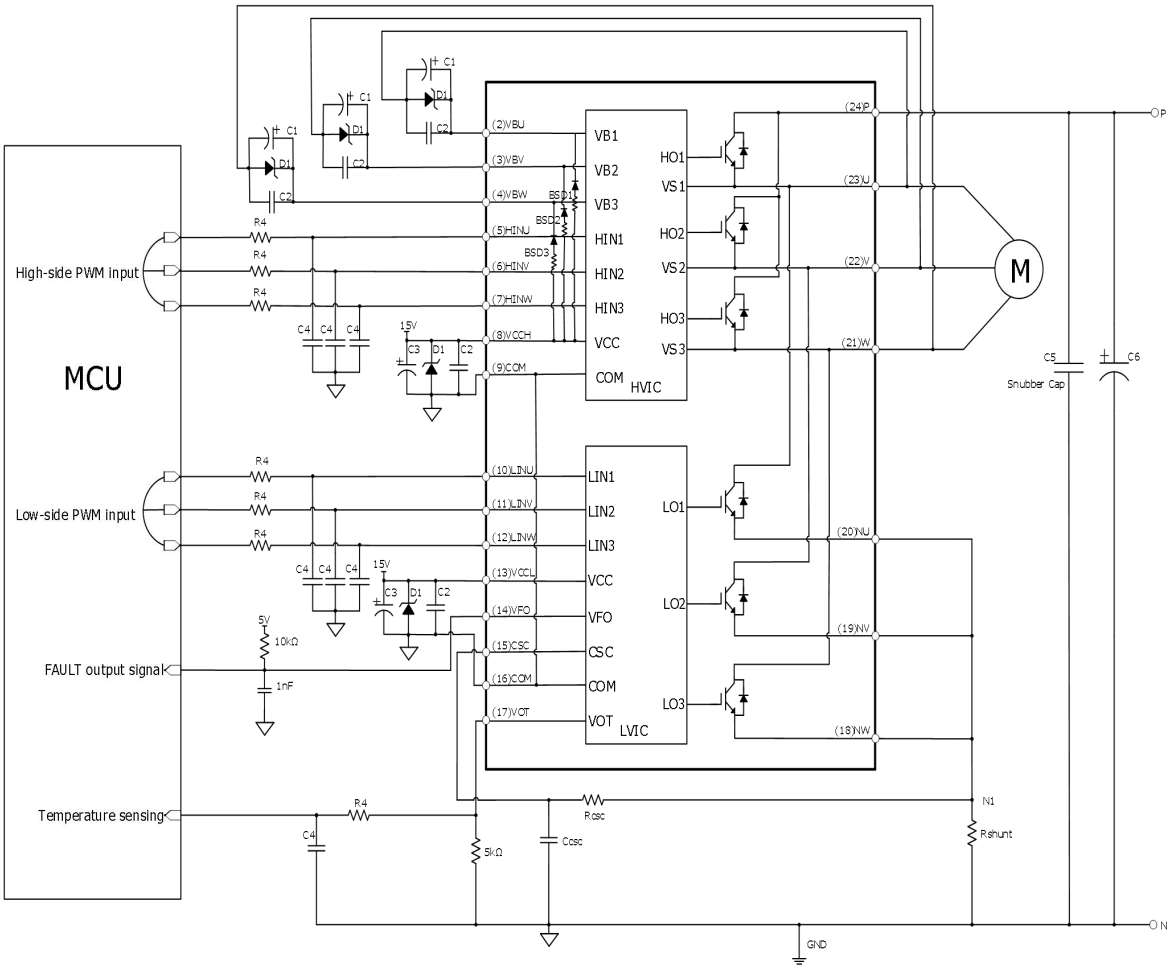
## Module Pin-Out Description




Bottom view

| Pin Number | Pin Name | Description |
|---|---|---|
| 2 | VBU | High Side Floating Supply Voltage U |
| 3 | VBV | High Side Floating Supply Voltage V |
| 4 | VBW | High Side Floating Supply Voltage W |
| 5 | HINU | Logic Input for High Side Gate Driver - Phase U |
| 6 | HINV | Logic Input for High Side Gate Driver - Phase V |
| 7 | HINW | Logic Input for High Side Gate Driver - Phase W |
| 8 | VCCH | High side IC supply voltage |
| 9 | COM | Logic Ground |
| 10 | LINU | Logic Input for Low Side Gate Driver - Phase U |
| 11 | LINV | Logic Input for Low Side Gate Driver - Phase V |
| 12 | LINW | Logic Input for Low Side Gate Driver - Phase W |
| 13 | VCCL | Low side IC supply voltage |
| 14 | VFO | Fault output / Temperature monitor |
| 15 | CSC | External capacitance, Short-current detection input |
| 16 | COM | Logic Ground |
| 17 | VOT | Output for Temperature Sensing |
| 18 | NW | Phase W Low Side Emitter |
| 19 | NV | Phase V Low Side Emitter |
| 20 | NU | Phase U Low Side Emitter |
| 21 | W | Output - Phase W, High Side Floating Supply Offset W |
| 22 | V | Output - Phase V, High Side Floating Supply Offset V |
| 23 | U | Output - Phase U, High Side Floating Supply Offset U |
| 24 | P | DC Bus Voltage Positive |
| 25 | NC | Not Connected |

## Application Circuit

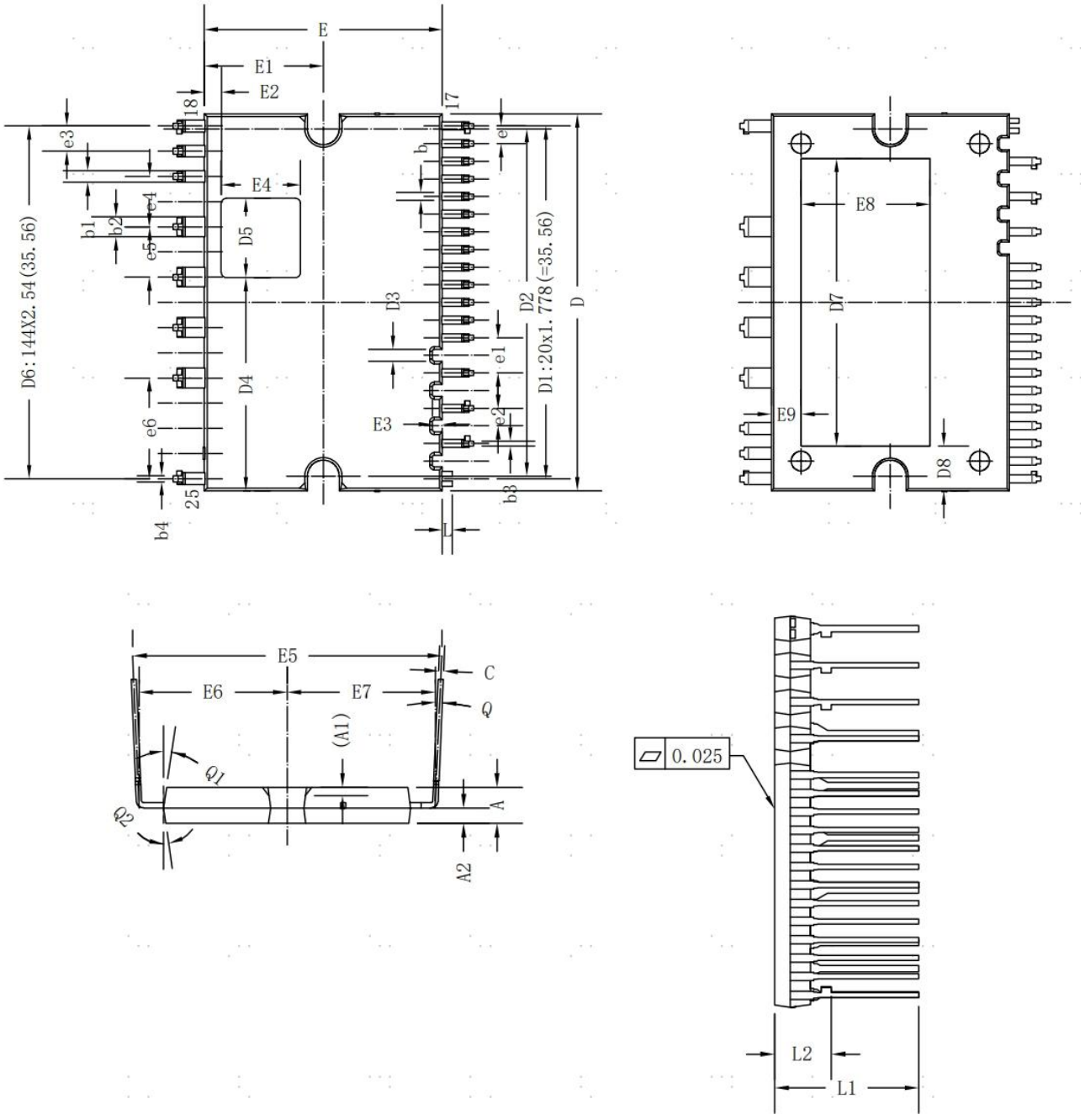



**Remark:**

1. To prevent malfunction, the wiring of each input should be as short as possible.
2. Input drive is High-Active type.There is a 5kΩ （typ.）pull-down resistor integrated in the IC input circuit.And adding RC filter circuit to the input will prevent the surge noise caused by incorrect input.
3. To prevent surge damage, it is recommended to add a high-frequency non-inductive flat capacitor (0.1μF to 0.22μF) between P and N. The cable connection of the capacitor should be as short as possible.
4. The line between the current detection resistor and the IPM should be as short as possible, otherwise the large surge voltage generated by the connecting inductor may cause damage.
5. All capacitors should be mounted as close to the terminals of the IPM as possible.
6. $F_O$ output is open drain type.It should be pulled up to the positive side of 5V power supply by a resistor of about 10kΩ.
7. The time constant $R_{CSC}$ and $C_{CSC}$ of the protection circuit should be selected in the range of 1.5-2.0 μs.

## Package Outline

**DIP-24B** **UNIT:mm**




| SYMBOL | COMMON | | | SYMBOL | COMMON | | |
|---|---|---|---|---|---|---|---|
| | Dimensions millimeter | | | | Dimensions millimeter | | |
| | Min | Nom | Max | | Min | Nom | Max |
| A | 3.400 | 3.500 | 3.600 | (E3) | 0.900 | 1.100 | 1.300 |
| (A1) | 0.400 | 0.500 | 0.600 | E4 | 7.800 | 8.000 | 8.200 |
| A2 | 1.450 | 1.500 | 1.550 | E5 | 28.900 | 29.400 | 29.900 |
| b | 0.750 | 0.900 | 1.050 | E6 | 13.900 | 14.400 | 14.900 |
| b1 | 1.150 | 1.200 | 1.250 | E7 | 13.900 | 14.400 | 14.900 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| b2 | 1.950 | 2.000 | 2.050 | E8 | 12.500 | 13.000 | 13.500 |
| b3 | 0.450 | 0.500 | 0.550 | E9 | 2.600 | 3.000 | 3.400 |
| b4 | 0.500 | 0.600 | 0.700 | e | 1.728 | 1.778 | 1.828 |
| C | 0.300 | 0.425 | 0.550 | e1 | 3.506 | 3.556 | 3.606 |
| D | 37.500 | 38.000 | 38.500 | e2 | 1.728 | 1.778 | 1.828 |
| (D1) | 35.510 | 35.560 | 35.610 | e3 | 2.490 | 2.540 | 2.590 |
| (D2) | 34.850 | 35.000 | 35.150 | e4 | 5.030 | 5.080 | 5.130 |
| D3 | 1.100 | 1.200 | 1.300 | e5 | 5.030 | 5.080 | 5.130 |
| D4 | 21.300 | 21.500 | 21.700 | e6 | 10.110 | 10.160 | 10.210 |
| D5 | 7.800 | 8.000 | 8.200 | L | 0.900 | 1.000 | 1.100 |
| D6 | 35.510 | 35.560 | 35.610 | L1 | 13.500 | 14.000 | 14.500 |
| D7 | 28.500 | 29.000 | 29.500 | L2 | 5.200 | 5.500 | 5.800 |
| D8 | 4.100 | 4.500 | 4.900 | (Q) | 0° | 2.5° | 5° |
| E | 23.500 | 24.000 | 24.500 | Q1 | 7° | 9° | 11° |
| E1 | 11.850 | 12.000 | 12.150 | Q2 | 7° | 9° | 11° |
| E2 | 1.500 | 1.700 | 1.900 | | | | |

## Revision History

| Revision | Date | Major changes |
|---|---|---|
| 1.0 | 2024/06/17 | Release of formal version |
| 1.1 | 2024/09/02 | Update the thermal resistance value |
| 1.2 | 2025/06/30 | Update the Dimensions Limitation Specification |

## Disclaimer

Unless otherwise specified in the datasheet, the product is designed and qulified as a standard commercial product and is not intended for use in applications that require extraordinary levels of quality and reliability, such as automotive, aviation/aerospace and life-support devices or systems.

Any and all semicondutor products have certain probability to fail or malfunction, which may result in personal injury, death or property damage. Customer are solely responsible for providing adequate safe measures when design their systems.

CRM(CQ) reserves the right to improve product design, function and reliability without notice.