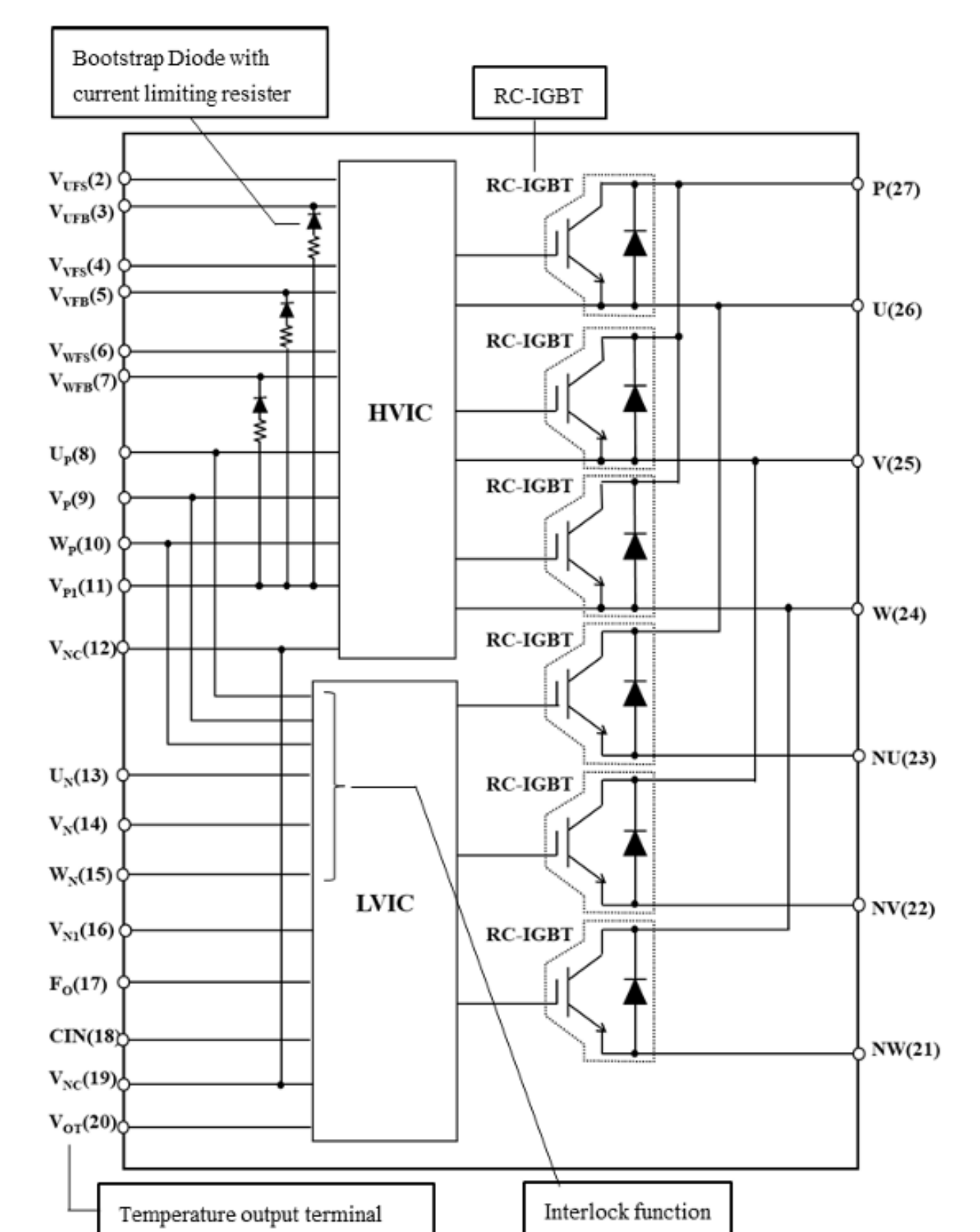
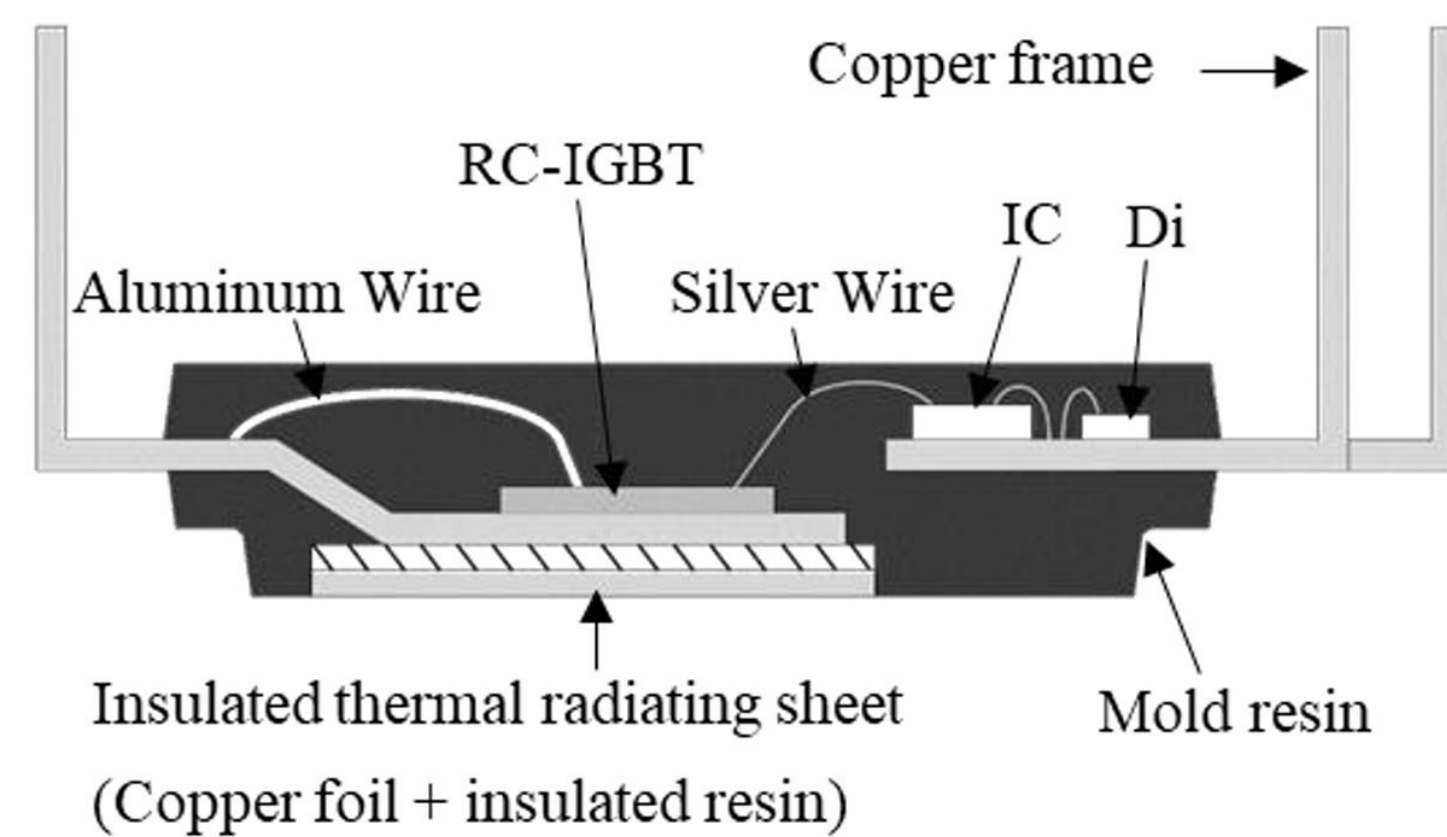
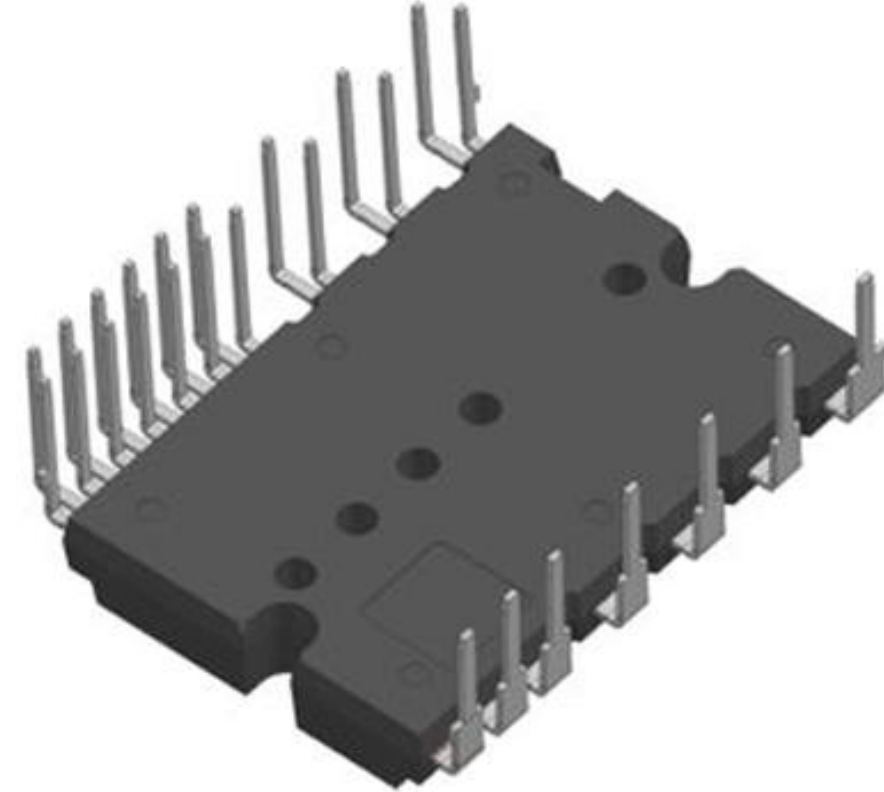


Compact DIIPM used in dual axes servo

Lu Siqing, Zhang Yuancheng, Shi Jinxin
Mitsubishi Electric & Electronic (Shanghai) Co., Ltd, China
Tao Rongning
THINKVO Automation Eqpt. Co., Ltd.

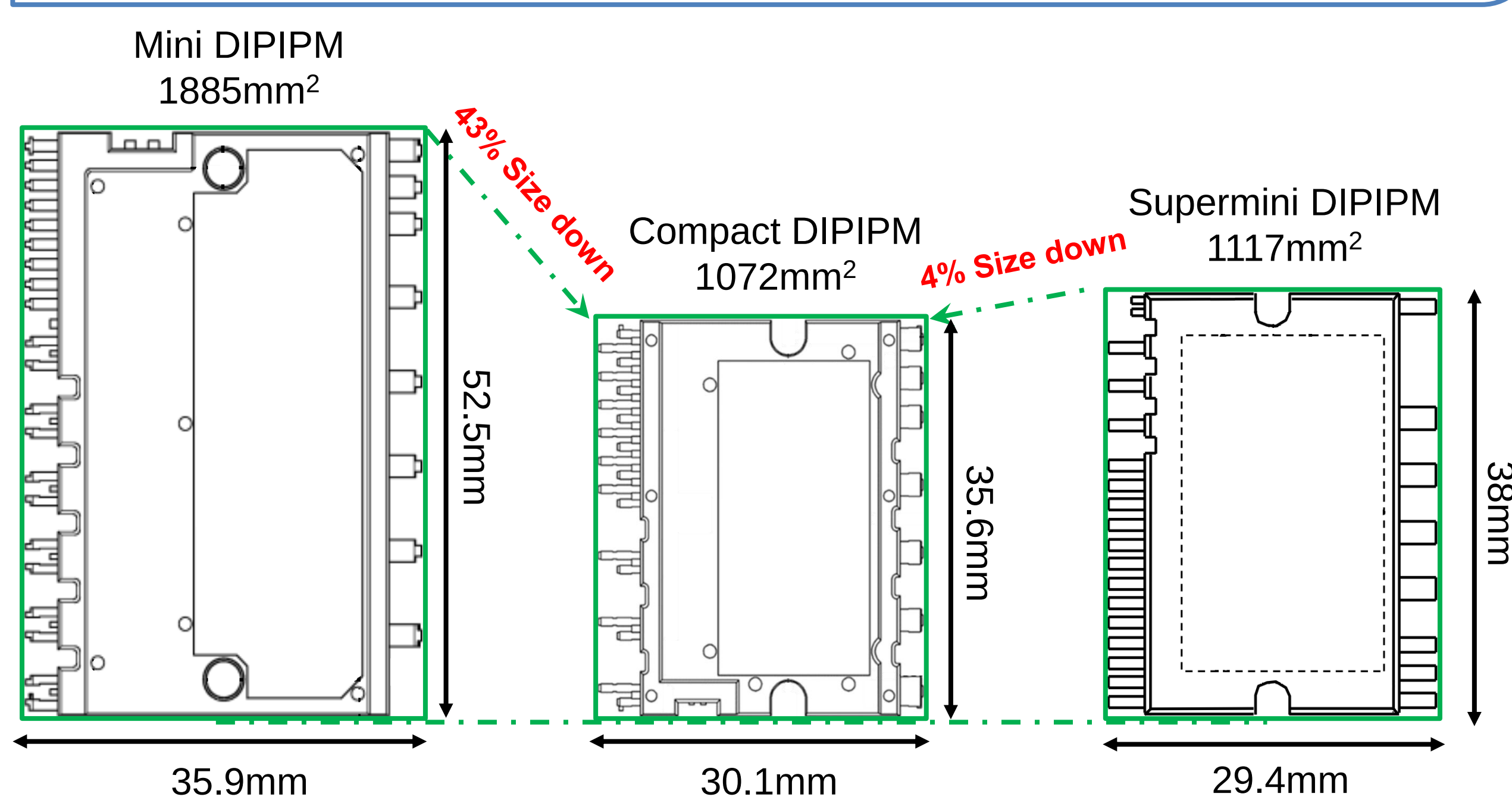
Compact Size for Industrial Application

- Adopted the 3rd generation RC-IGBT
- Widely T_{jop} -40 ~ +150 °C
- Enhanced Isolation Gap
- Employed input PWM interlock
- Low power consumption
- Compact Size: 35.6mm * 30.1mm

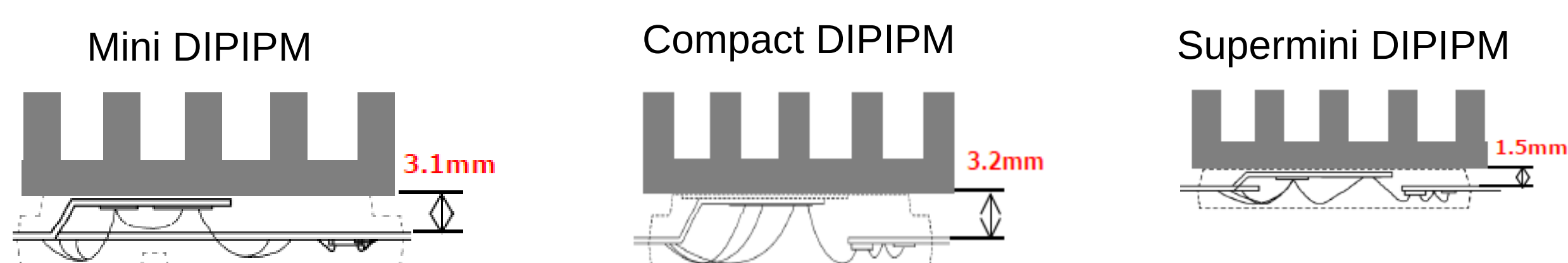


Compact Size with Enhanced Isolation Gap

Smaller Size

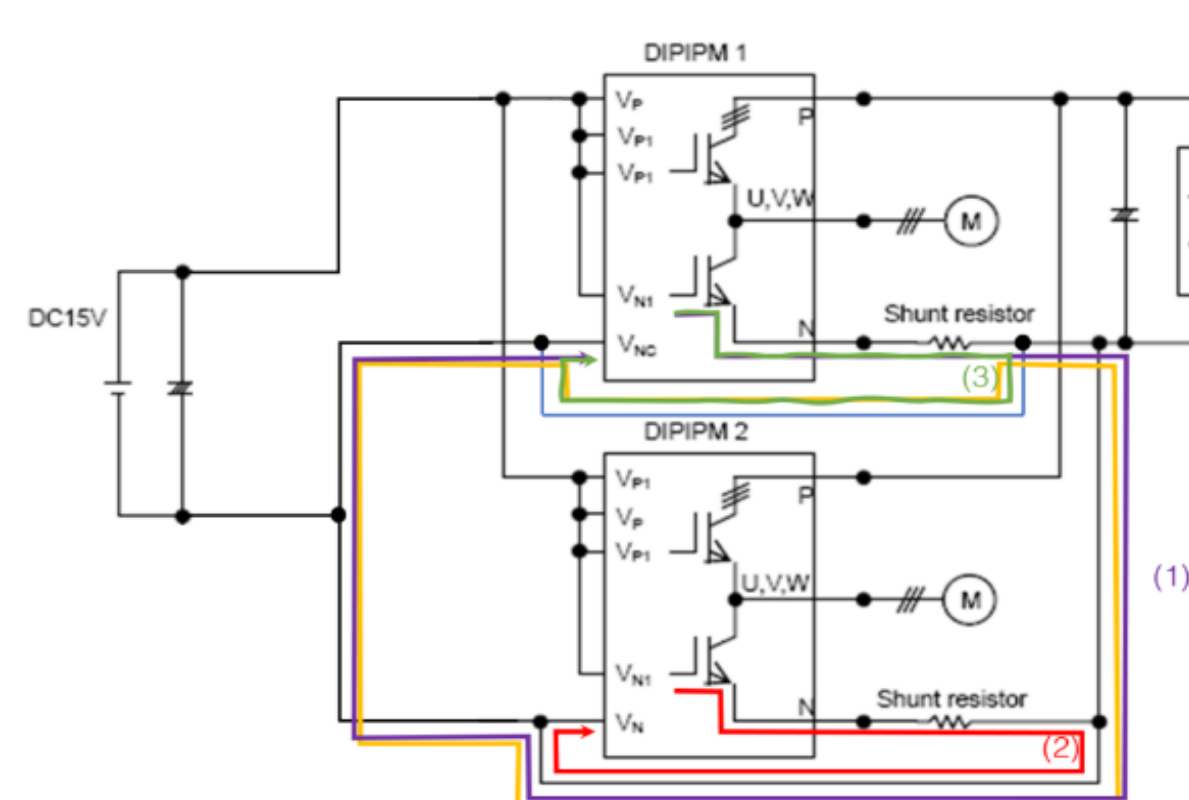


Larger Isolation Gap

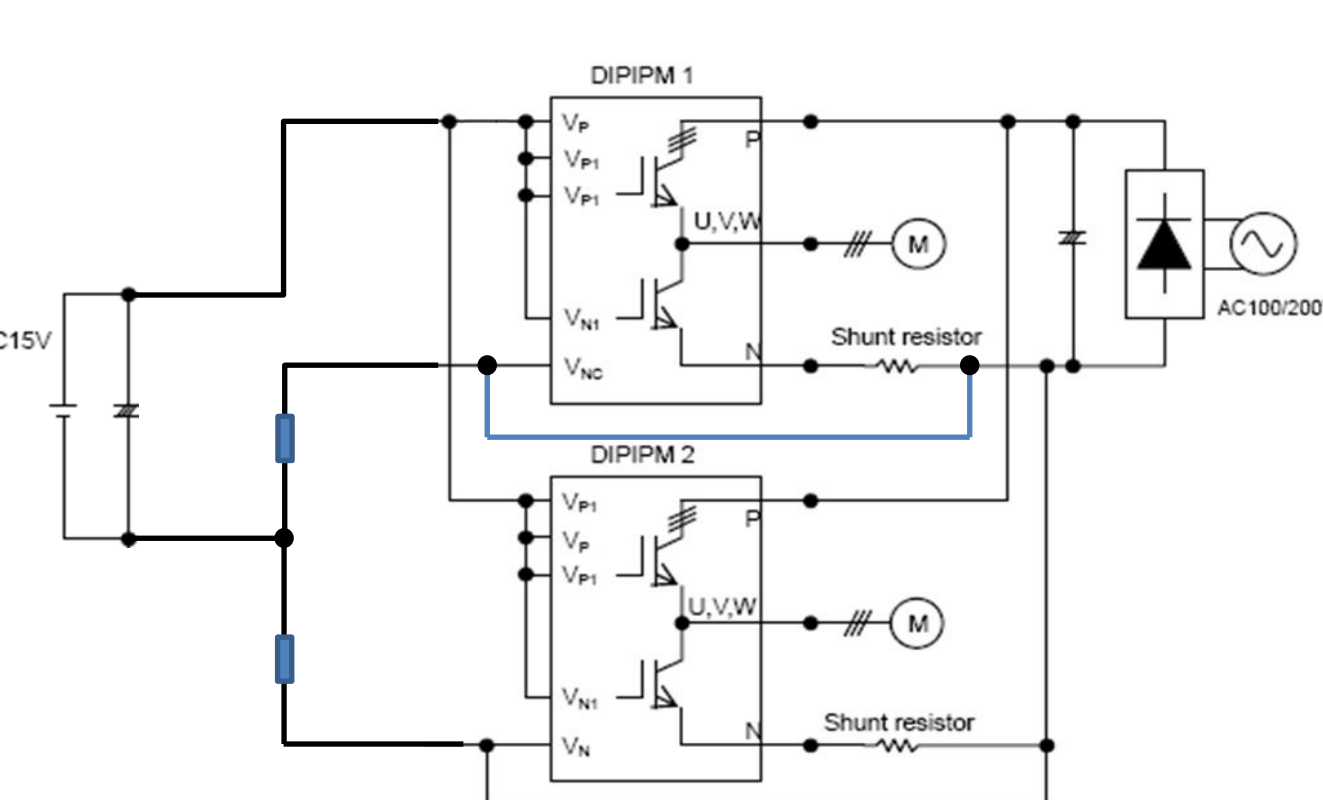


Process of Ground Routing

Current Routing

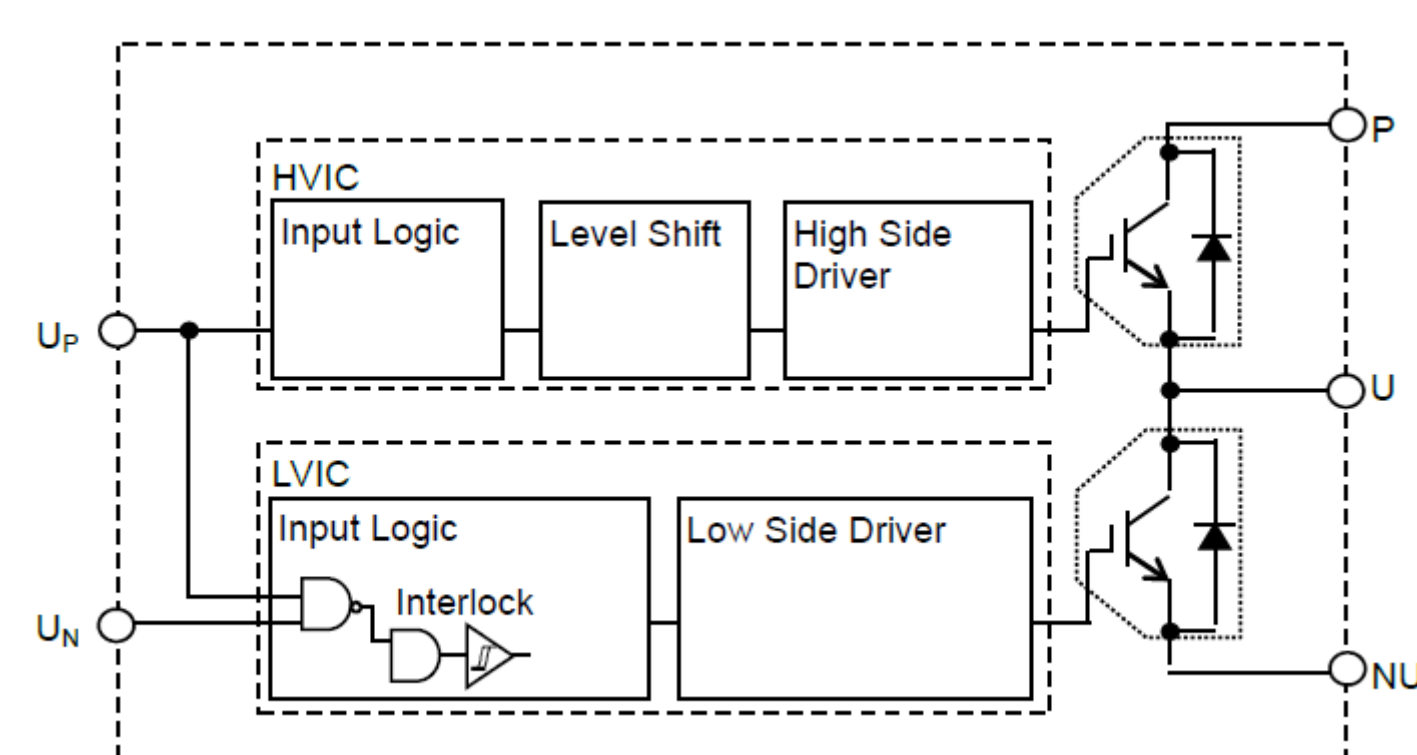


Ground Routing



Interlock Function

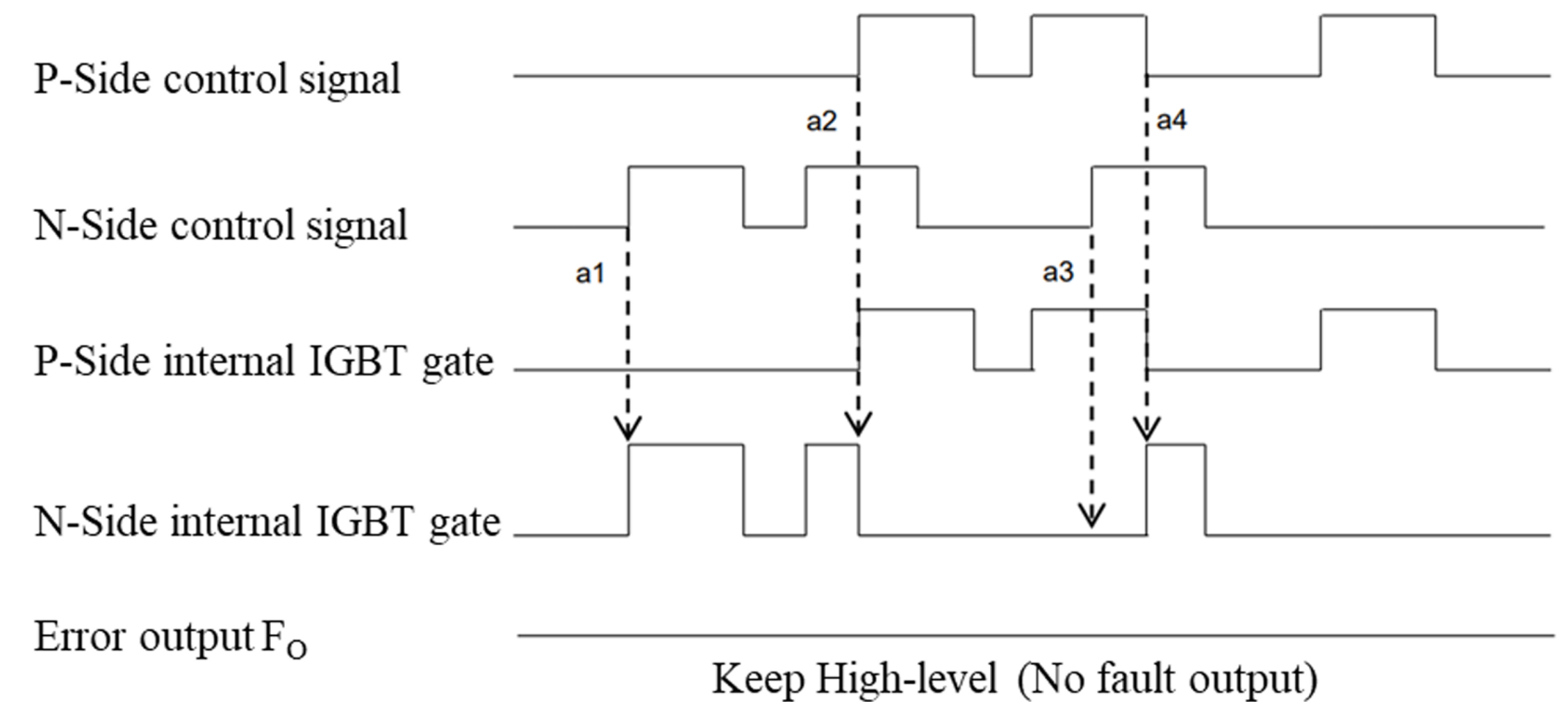
Function Block Diagram



Interlock Sequence

- ❑ a1. Normal operation: IGBT ON and outputs current.
- ❑ a2. When N-side is ON state(H), if P-Side turn ON(L→H), N-Side shut off.
- ❑ a3. When P-side is ON state(H), if N-side turn ON(L→H), N-side shut off.
- ❑ a4. If P-side turn OFF(H→L) and N-side is ON state(H), N-side turn ON.

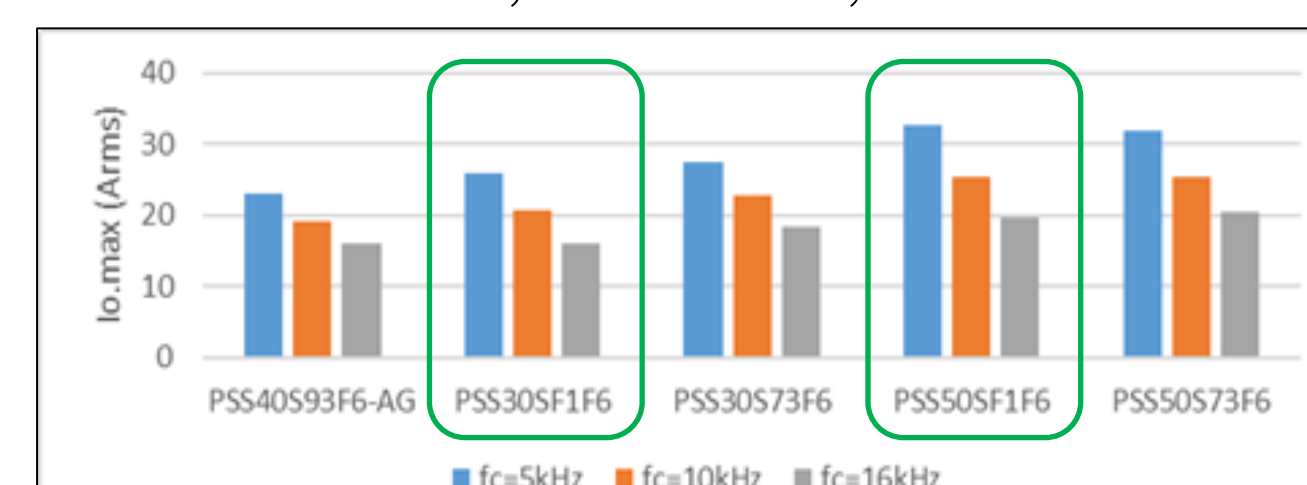
Timing chart of interlock



Lower Power Losses

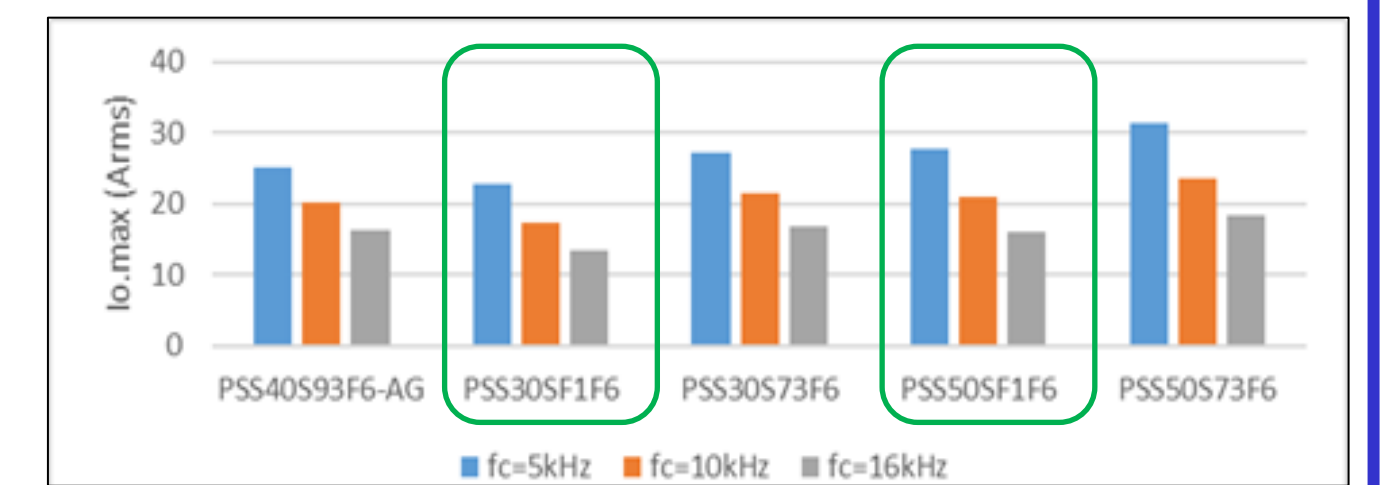
Normal Working

Conditions:
 $V_{CC} = 300V$, $f_c = 5/10/16kHz$, $PF = 0.9$,
 Modulation = 1, $F_o = 50Hz$, $T_s = 100^\circ C$



Motor Lock

Conditions:
 $V_{CC} = 300V$, $f_c = 5/10/16kHz$, $PF = 0.9$,
 Modulation = 0.1, $F_o = 1Hz$, $T_s = 90^\circ C$



Conclusion

- ✓ High current density, low power losses Compact DIIPM helps to achieve dual axials servo in compact size.
- ✓ The control signal interlock function further enhances DIIPM's anti-interference ability against noise and improves the reliability of the dual axis servo system in complex electromagnetic environments.
- ✓ To use DIIPMs in dual axial servo application, increasing impedance in the control circuit and controlling the ground current path ultimately reduced circuit noise and achieved stable operation of the system.



Mitsubishi Electric & Electronic (Shanghai) Co., Ltd, China
Email: LuSQ@mesh.china.meap.com