



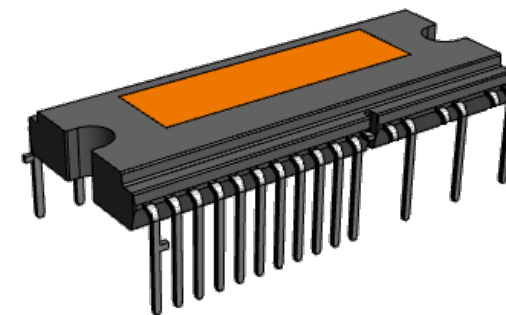
Working Together for a Greener Society

Future of Power Electronics and the Earth



High Voltage 3-phase Motor Driver

**SIM2-151A**



## ■ Overview

The SIM2-151A is a high voltage 3-phase motor driver in which transistors, pre-drive circuits, and bootstrap circuits (diodes and resistors) are highly integrated. The product can run on a 3-shunt current detection system and optimally control the inverter systems of medium-capacity motors that require universal input standards. The SIM2-151A comes in a compact DIP40 package and will best suit compressor-driven applications such as refrigerators and air conditioners.

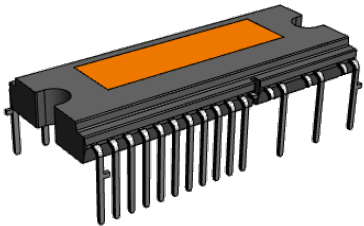
## ■ Applications

For motor drives such as:

- Compressor motor of refrigerator/air conditioner

## ■ Package

DIP40



## ■ Selection Guide

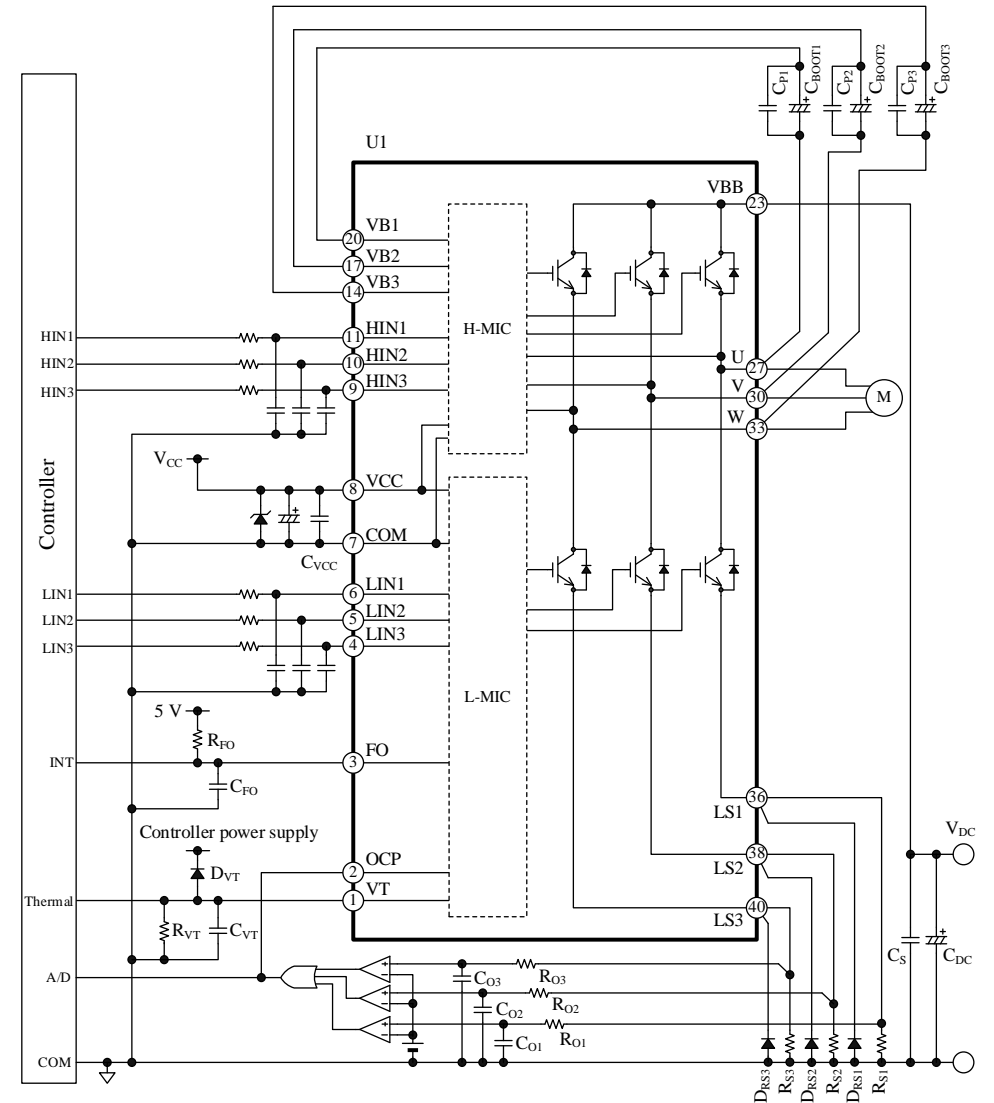
Part Number	$V_{CES}$	$I_C^*$	Output Transistor	$V_{CE(SAT)}$ (Typ.)	Thermal Resistance
SIM2-151A	600 V	15 A	FS-IGBT + FRD	1.6 V	3.6 °C/W

\* 20 A device development ongoing

## ■ Features

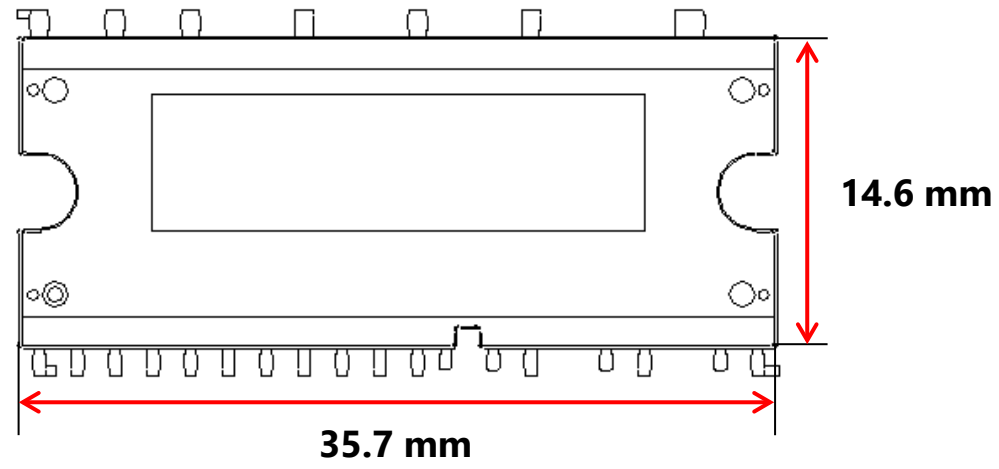
- Sufficient insulation distance:
  - Clearance: 2.788 mm (min.)
  - Creepage: 4.334 mm (min.)
- Pb-free (RoHS compliant)
- Isolation voltage: 2000 V (for 1 min)  
UL-recognized component (File No.: E118037)
- Temperature sensing function
- Built-in bootstrap diodes with current limiting resistors (250 Ω)
- CMOS-compatible input (3.3 V or 5 V)
- Fault signal output at protection activation
- Protections include:
  - Undervoltage Lockout for power supply
    - High-side (UVLO\_VB): auto-restart
    - Low-side (UVLO\_VCC): auto-restart
  - Overcurrent Protection (OCP): auto-restart
  - Thermal Shutdown (TSD): auto-restart, with an operating range of  $\pm 5\text{ }^{\circ}\text{C}$

## ■ Typical Application



### ■ Ultra-compact Package: DIP40

The SIM2-151A comes in an ultra-compact DIP40 package. This package adopts the DBC (Direct Bonding Copper) structure to decrease its size (resin area) to 521 mm<sup>2</sup> (35.7 mm x 14.6 mm). Compared to our conventional type, the SIM2-151A stands out for its package size reduced by 40% or more.



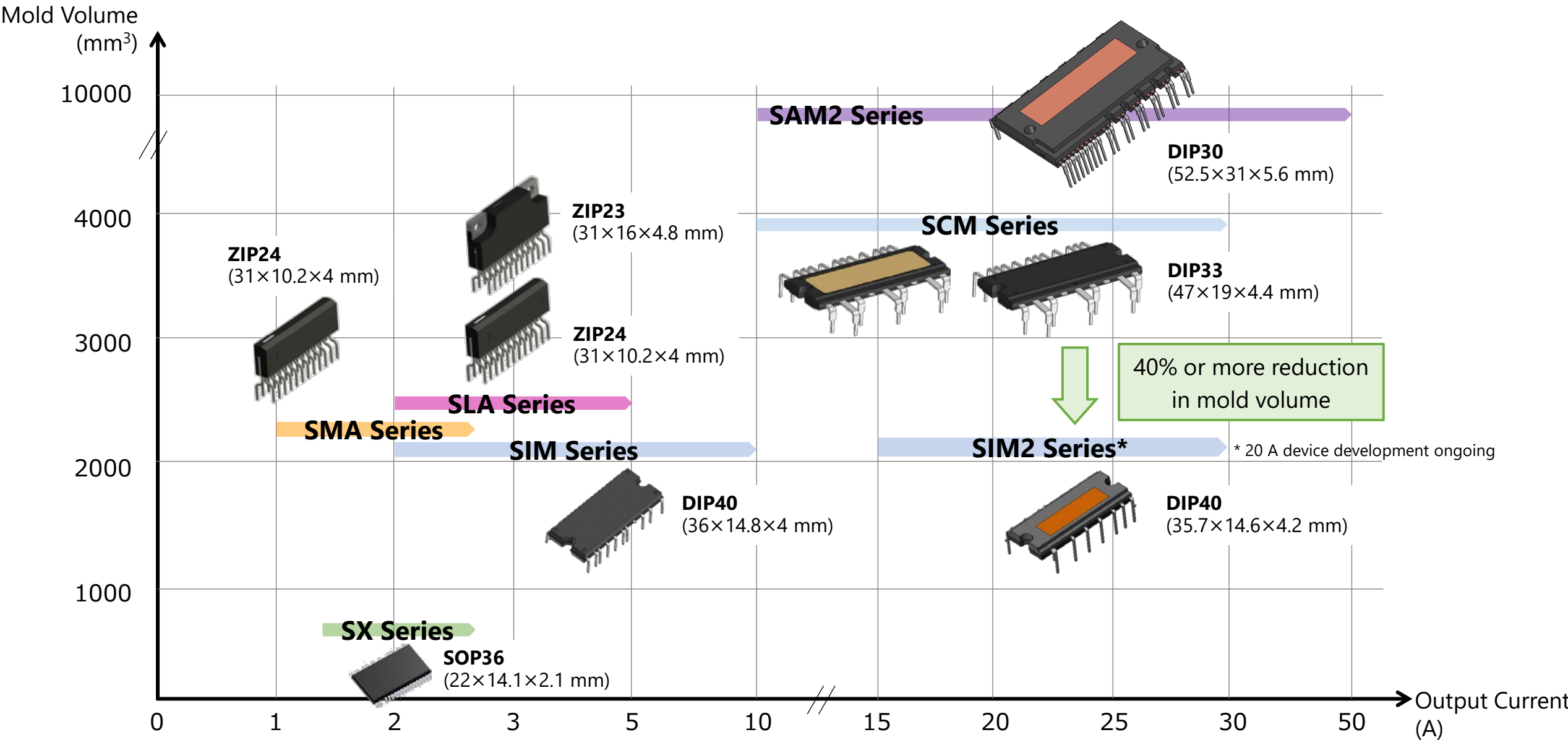
### ■ Enhanced Heat Dissipation

Owing to the DBC (Direct Bonding Copper) structure, the SIM2-151A is designed to fit into the compact package yet has a smaller thermal resistance. This allows the product to achieve higher heat dissipation performance.

Part Number	I <sub>C</sub> *	Thermal Resistance
SIM2-151A	15 A	3.6 °C/W

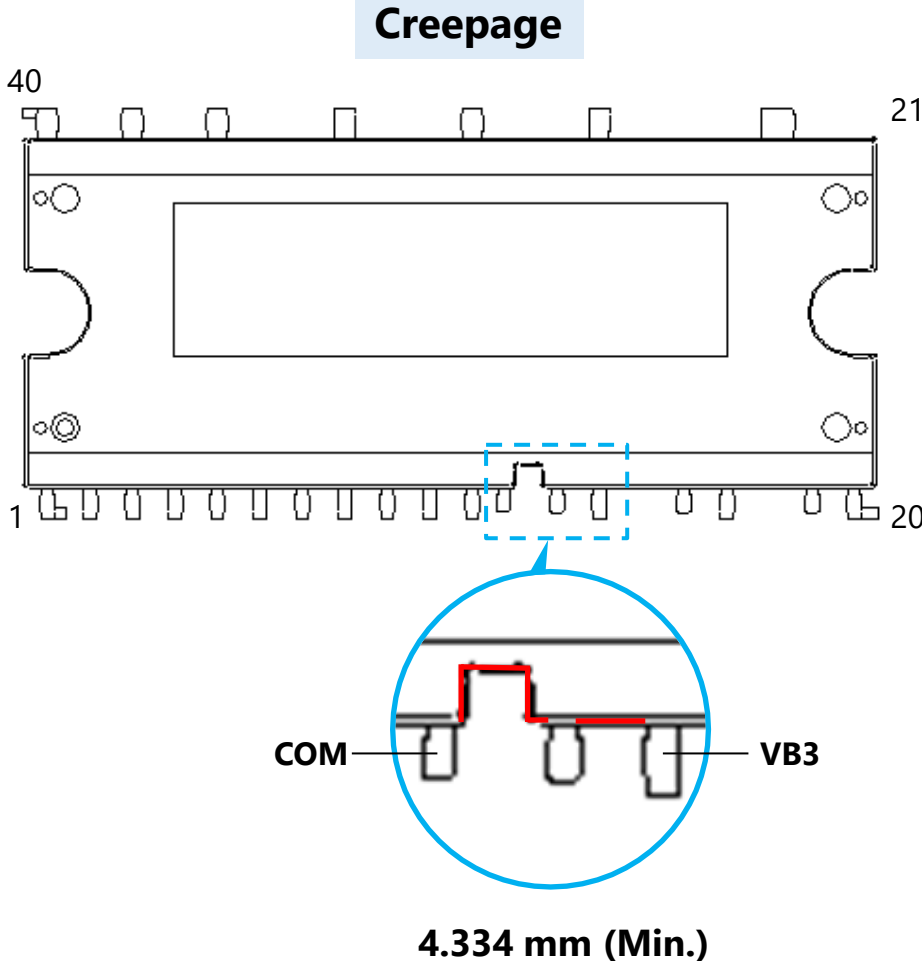
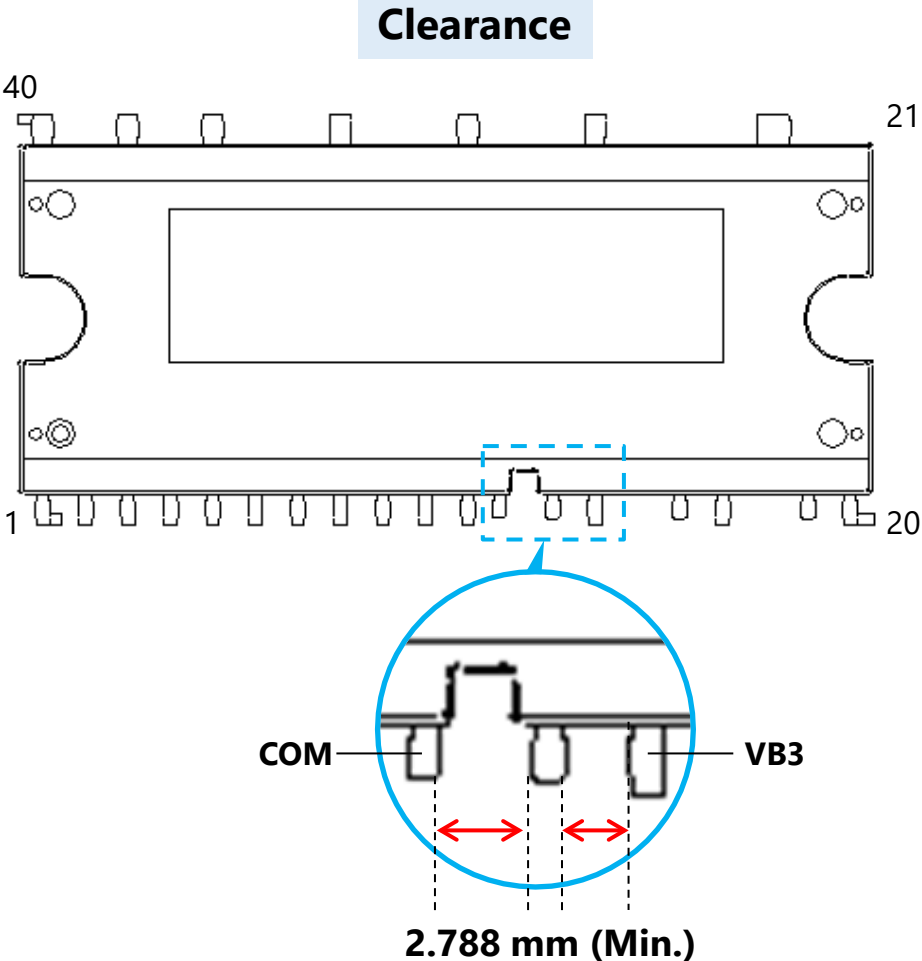
\* 20 A device development ongoing

# Package Guideline for High Voltage Motor Drivers



## ■ Ensured Clearance/Creepage

The SIM2-151A ensures sufficient insulation distance: a clearance of 2.788 mm (min.) between the high-voltage pins (COM – VB3), and a creepage of 4.334 mm (min.).



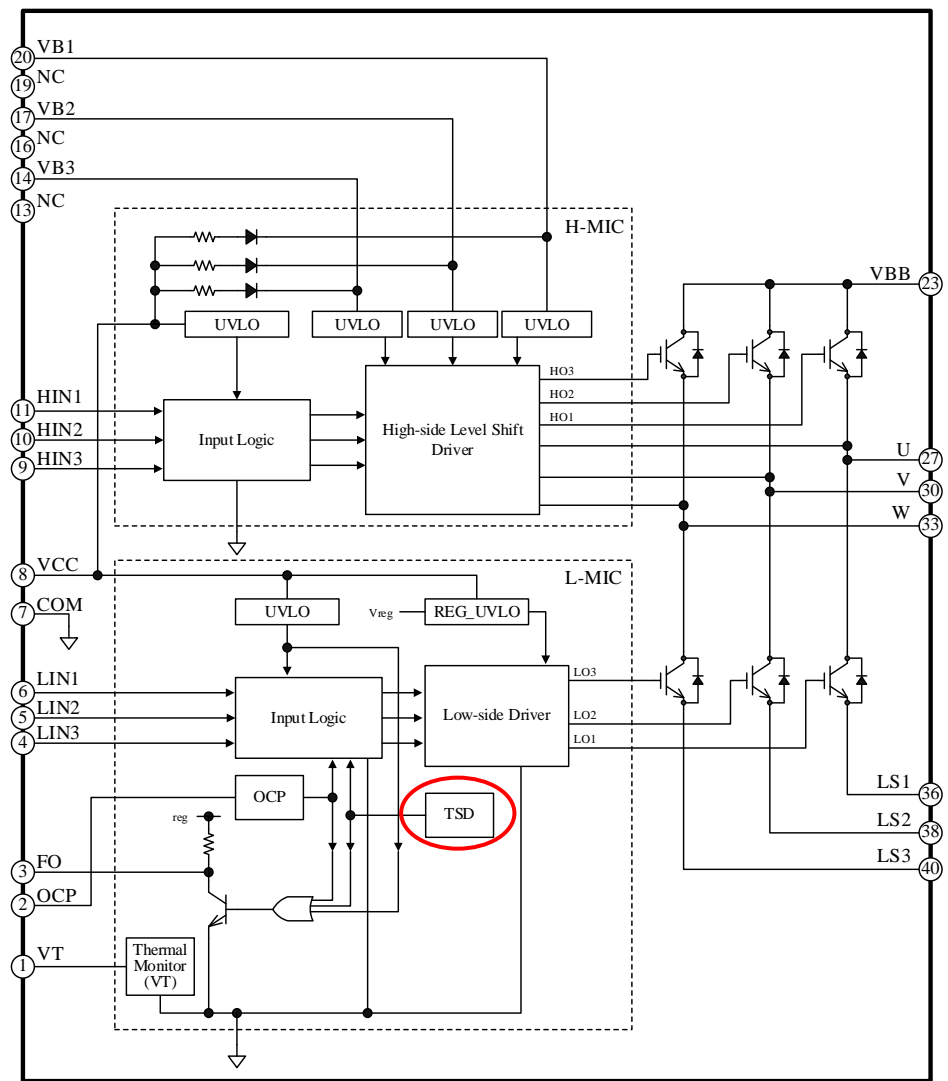
## ■ Thermal Shutdown (TSD)

The SIM2-151A has the thermal shutdown (TSD) function.

This function starts to operate when the internal control part exceeds the TSD operating temperature,  $T_{DH} = 120\text{ }^{\circ}\text{C}$  (typ.).

In addition, the TSD function is precisely designed so that the operating temperature varies within  $\pm 5\text{ }^{\circ}\text{C}$  of its typical value.

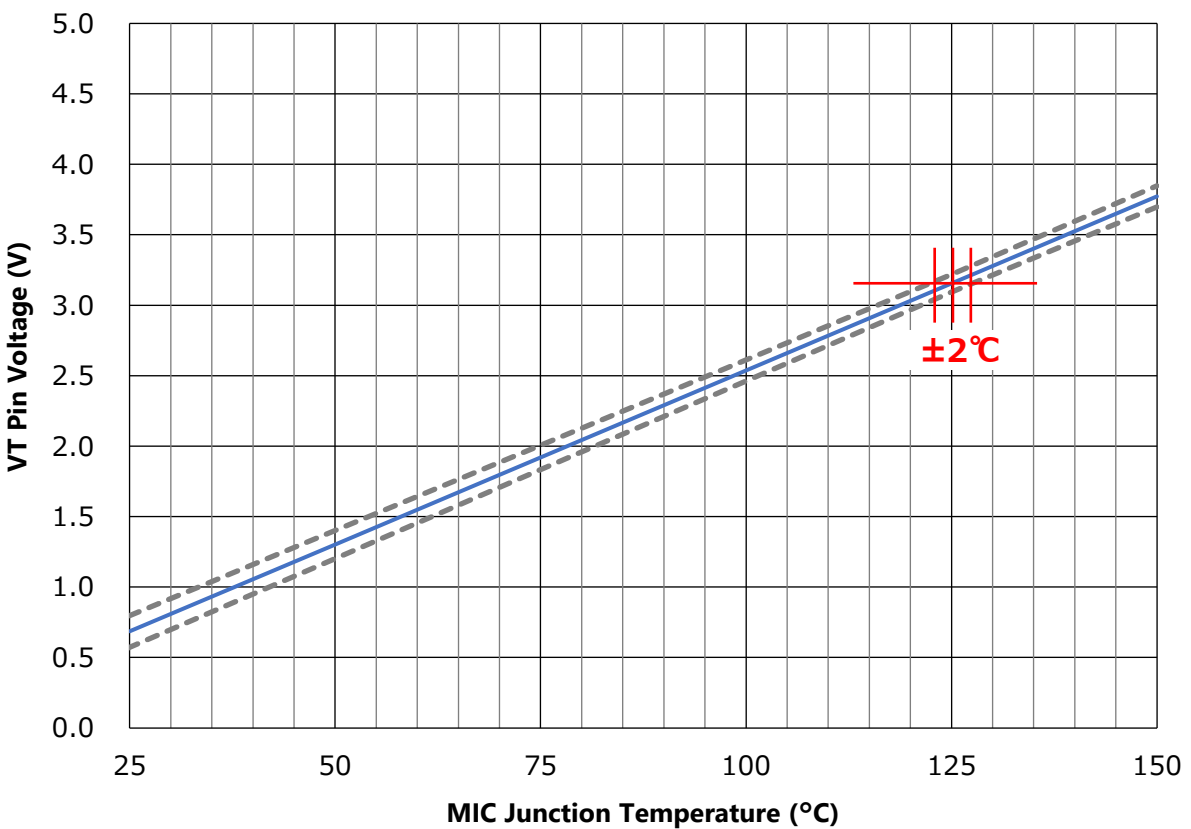
### SIM2-151A Block Diagram



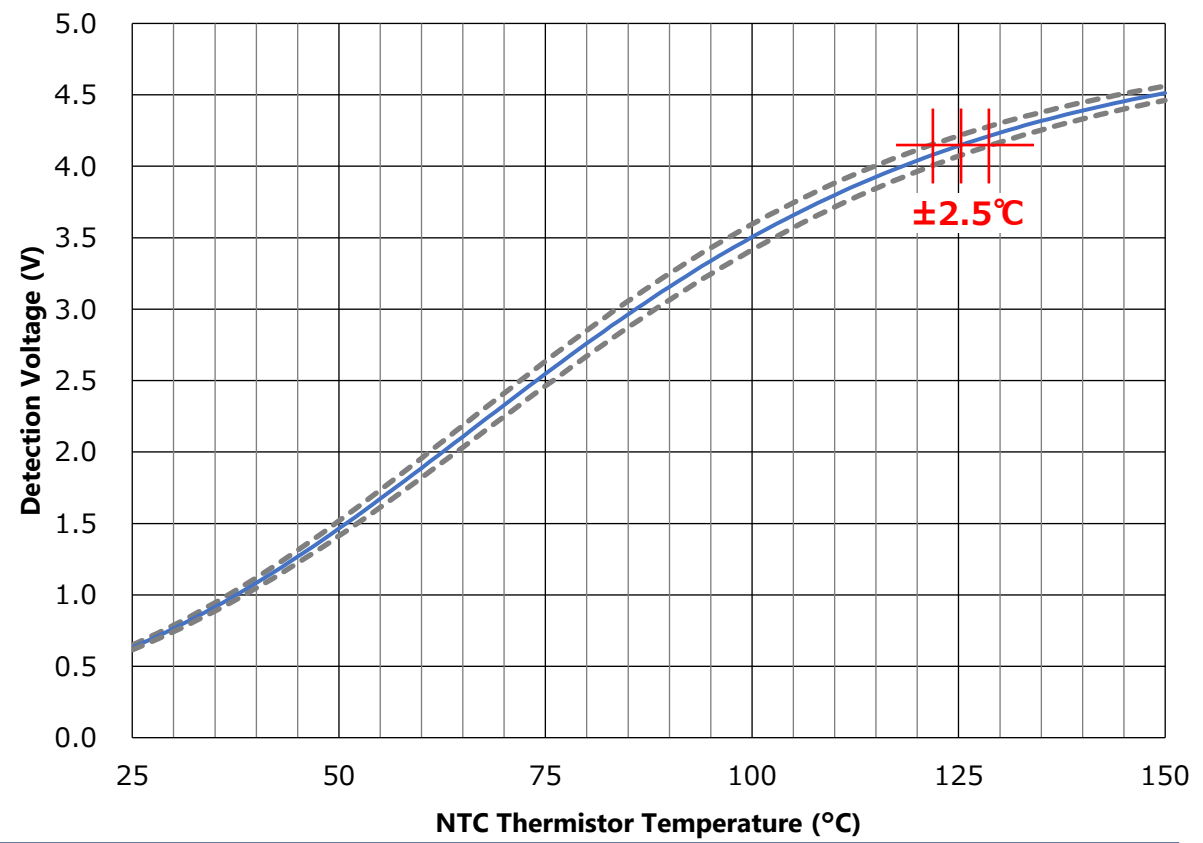
## ■ Precise Temperature Monitor

The SIM2-151A incorporates the temperature sensing function. This function monitors the junction temperature of the internal control IC using a temperature-sensing voltage that the VT pin outputs. With a variation of  $\pm 1.6\%$  in junction temperature over temperature sensing voltage, the product boasts its preciseness equivalent to that of thermistor-mounted devices.

### SIM2-151A (Temp. Sensing Function)



### Temp. Monitor Example with NTC Thermistor





## Important Notes

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