

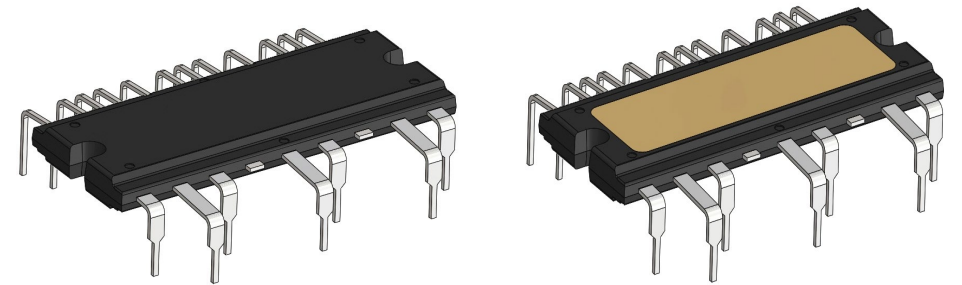


Working Together for a Greener Society

Future of Power Electronics and the Earth



# High Voltage 3-phase Motor Drivers SCM127xMA/MB Series



## ■ Overview

The SCM127xMA/MB series are high voltage 3-phase motor drivers in which transistors, pre-drive circuits, and bootstrap circuits (diodes and resistors) are highly integrated.

These products have functionally-rich protections such as the overcurrent protection (OCP), the short circuit protection (SCP), and the thermal shutdown (TSD). They have enhanced heat dissipation, allowing for thermal design with sufficient margin.

They can run on a 3-shunt current detection system and optimally control the inverter systems of medium-capacity motors that require universal input standards.

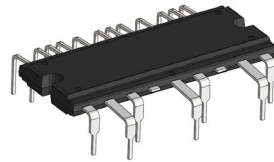
## ■ Application

For motor drives such as:

- Refrigerator Compressor Motor
- Air Conditioner Compressor Motor
- Washing Machine Main Motor
- Fan Motor
- Pump Motor

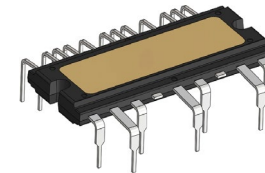
## ■ Package

SCM1272MA



DIP33 (Fully molded)

SCM127xMB



DIP33 (With heatsink)

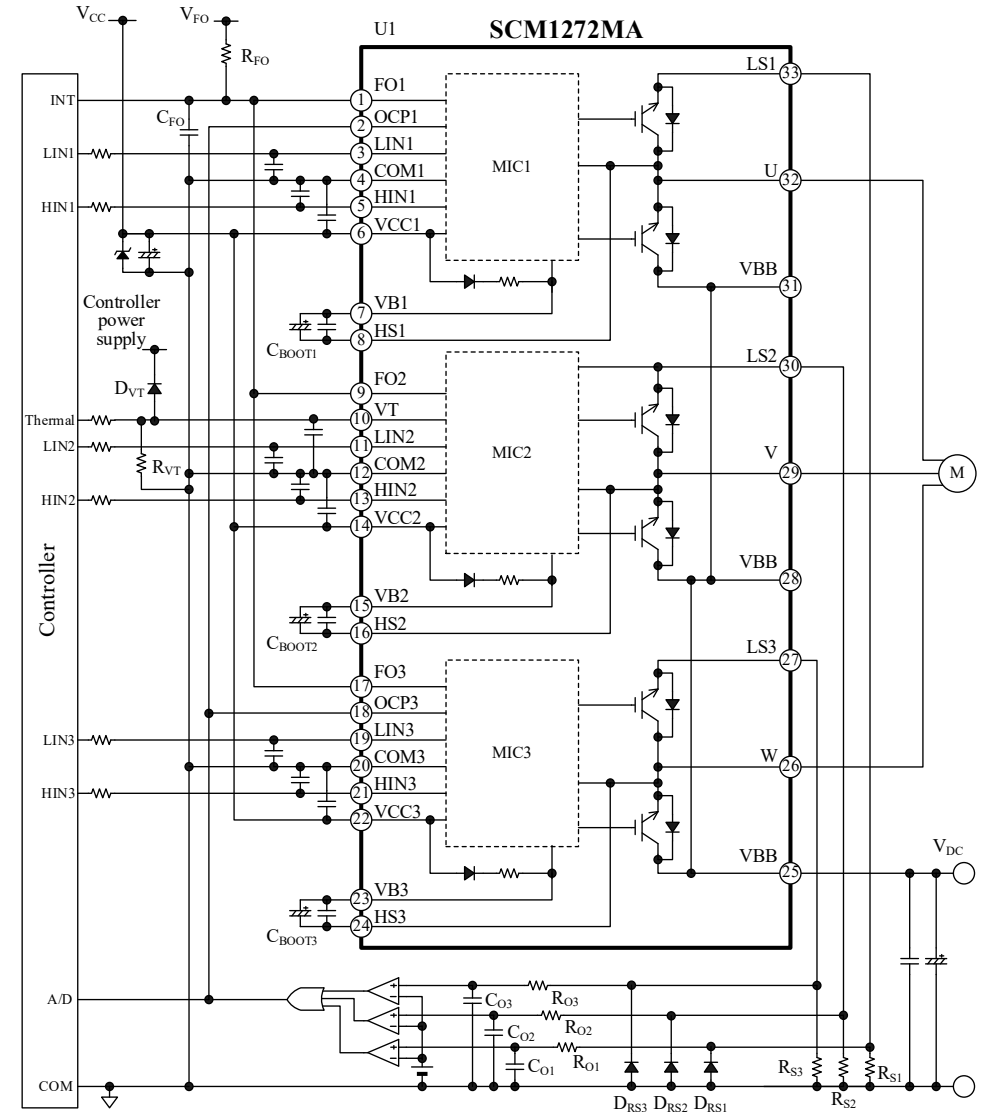
## ■ Selection Guide

| Part Number                      | $V_{CES}$ | $I_C$ | $V_{CE(SAT)}$<br>(Typ.) | Thermal<br>Resistance (Max.) | Package       |
|----------------------------------|-----------|-------|-------------------------|------------------------------|---------------|
| SCM1272MA                        | 600 V     | 15 A  | 1.7 V                   | 3.8 °C/W                     | Fully molded  |
| SCM1274MB                        |           | 20 A  | 1.7 V                   | 3.0 °C/W                     | With heatsink |
| SCM1276MB<br>(Under development) |           | 30 A  | 1.7 V                   | 3.0 °C/W                     | With heatsink |

## ■ Features

- Temperature sensing function
- In case of abnormal operation, all outputs shut down via the FO1, FO2, and FO3 pins connected together
- Built-in bootstrap diodes with current limiting resistors (22 Ω)
- CMOS-compatible input (3.3 V or 5 V)
- Pb-free (RoHS Compliant)
- 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
  - Simultaneous On-state Prevention: auto-restart
  - Short Circuit Protection (SCP): auto-restart
  - Thermal Shutdown (TSD): auto-restart

## ■ Typical Application



We have enhanced product safety by adding protection functions to the existing SCM127xMF series.

Having the short circuit protection (SCP), the SCM127xMA/MB can detect overcurrents in all phases.

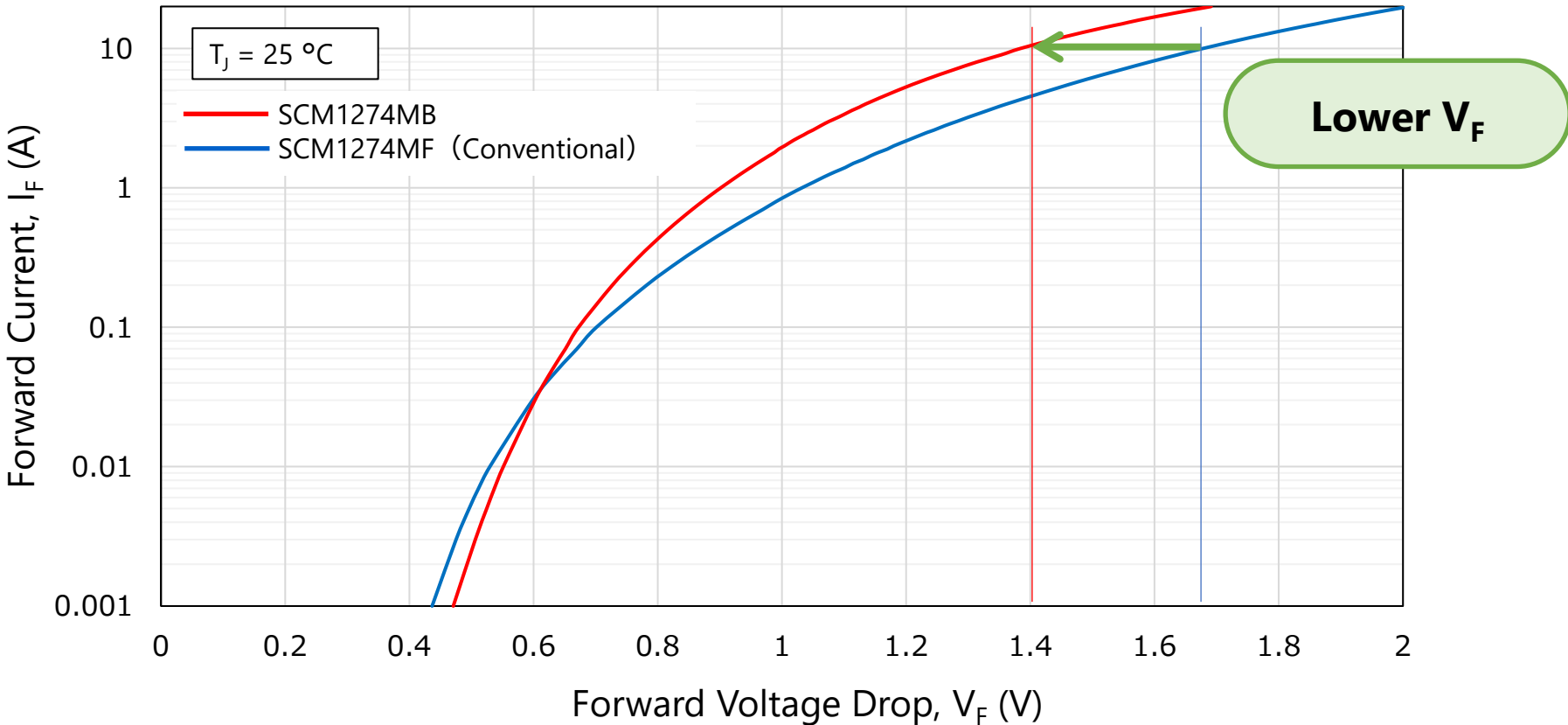
This shortens the period of time until the output transistors are turned off in the V-phase short circuit.

| Protection                                   | SCM127xMF              | SCM127xMA/MB   |
|--|------------------------|--|
| Simultaneous On-state Prevention             | ✓                      | ✓  |
| Undervoltage Lockout for Power Supply (UVLO) | ✓                      | ✓  |
| Overcurrent Protection (OCP)                 | ✓<br>(U- and W-phases) | ✓<br>(U- and W-phases)   |
| Short Circuit Protection (SCP)               | —                      | ✓<br><b>(V-phases)</b>   |
| Thermal Shutdown (TSD)                       | —                      | ✓<br><b>(U- and W-phases)</b>  |
| Fault Signal Output at Protection Activation | ✓<br>(U- and W-phases) | ✓<br><b>(U-, V-, and W-phases)</b>   |
| Temperature Sensing Function                 | ✓                      | ✓<br><b>(Improved temperature-sensing accuracy by changing the slope of <math>V_T - T_{J(MTC)}</math> characteristics)</b> |
| Shutdown Signal Input                        | ✓                      | ✓  |

The SCM127xMB series improves freewheeling diode characteristics of the output transistors compared with our conventional type, the SCM127xMF series. This leads to higher efficiency and lower noise.

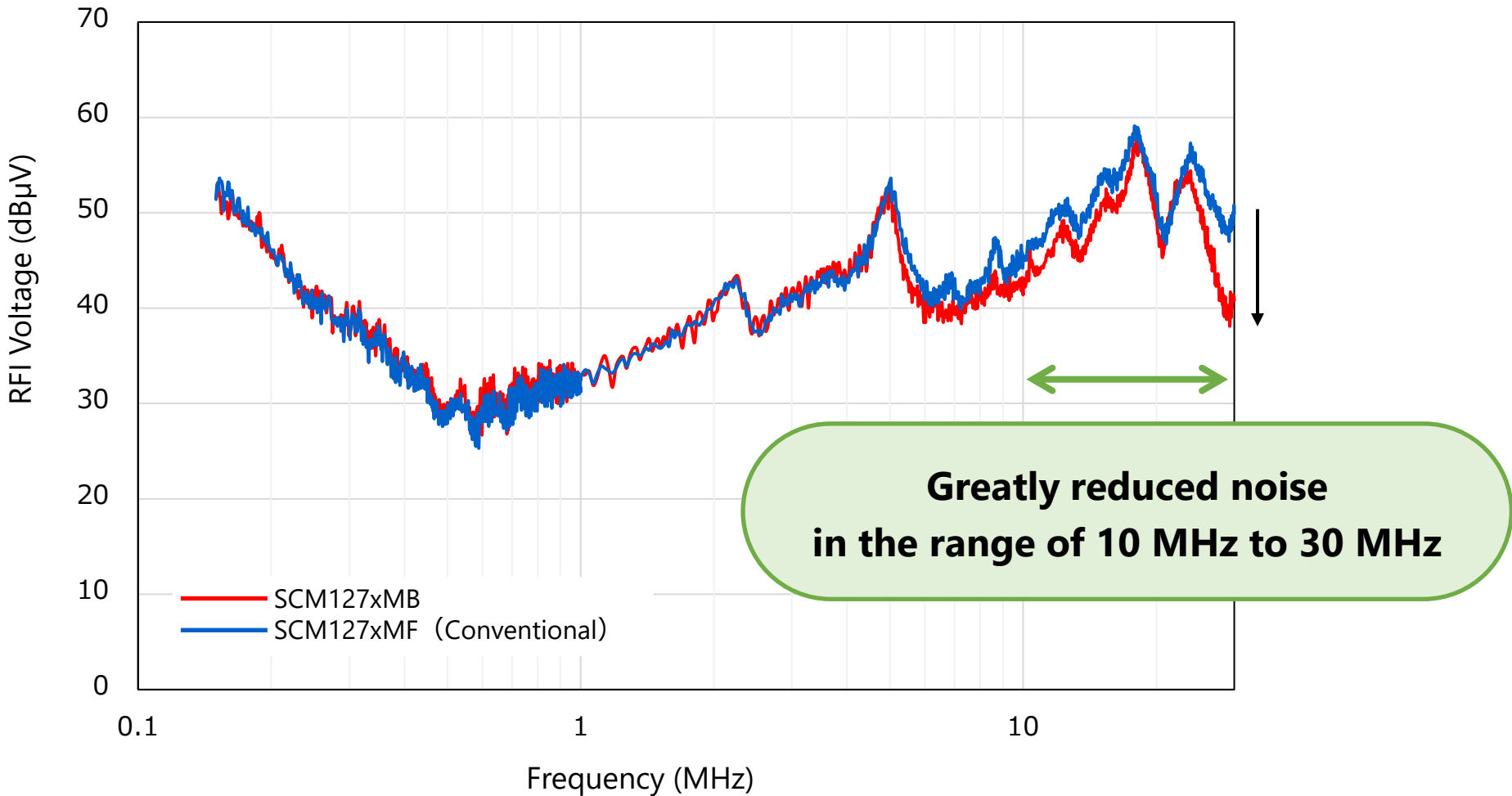
### ■ Higher Efficiency

Efficiency is improved in the operating range (up to 10 A) by reducing the  $V_F$  of the freewheeling diode.



## ■ Lower Noise

Noise is reduced by changing characteristics at turn-off.

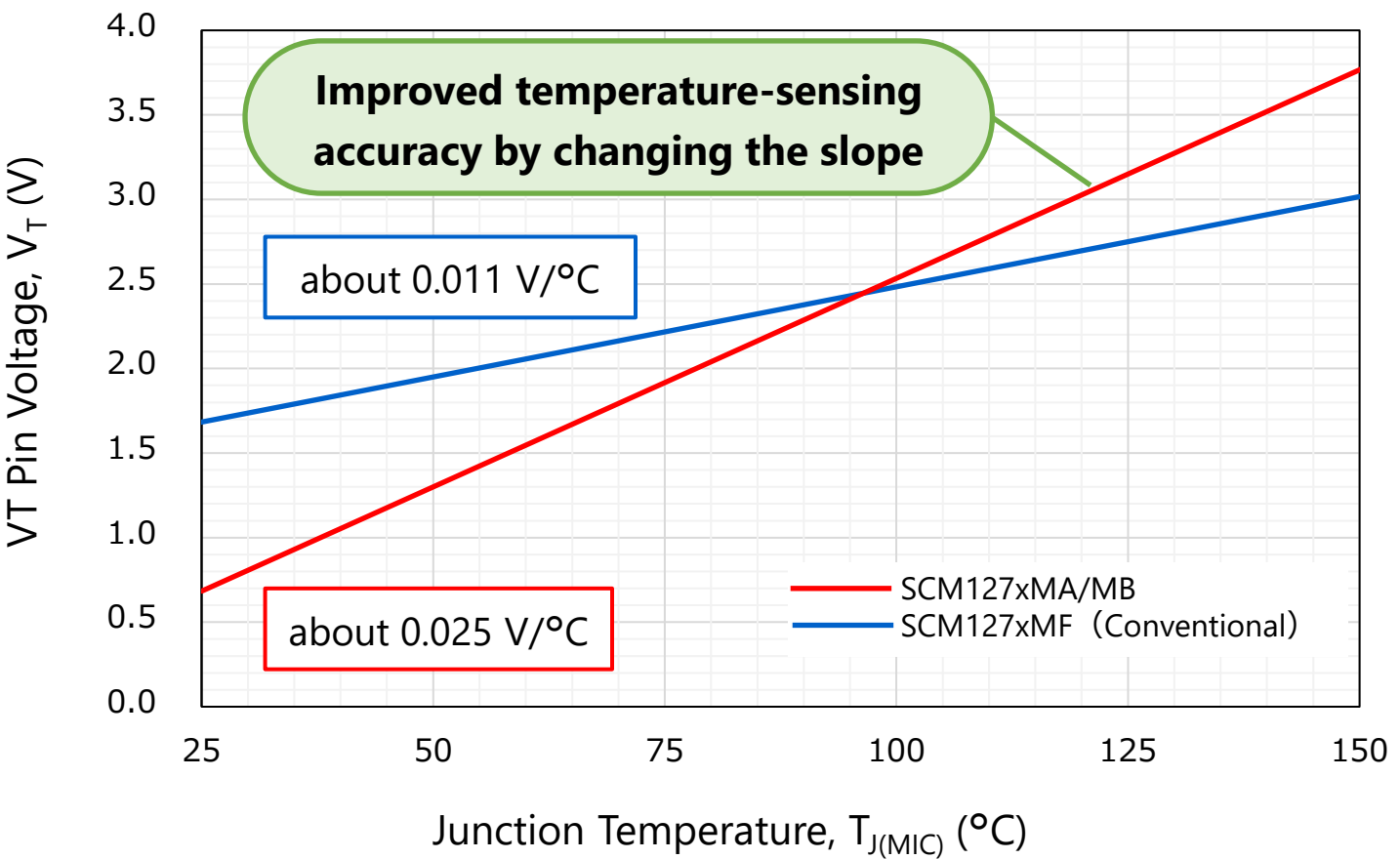


The SCM127xMF series and SCM127xMA/MB series have the temperature sensing function.

This function monitors the junction temperature of the internal control IC using a temperature-sensing voltage that the VT pin outputs.

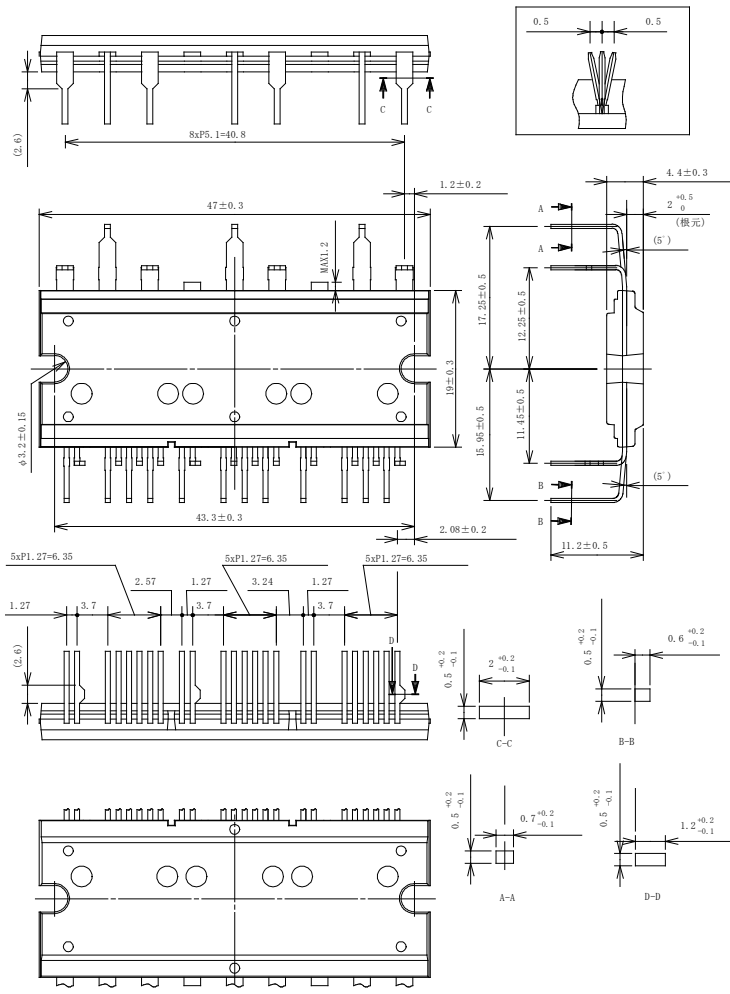
In the SCM127xMA/MB series, the slope of the  $V_T - T_{J(MIC)}$  characteristic is changed.

This allows the junction temperature of the control IC to be monitored with high accuracy.



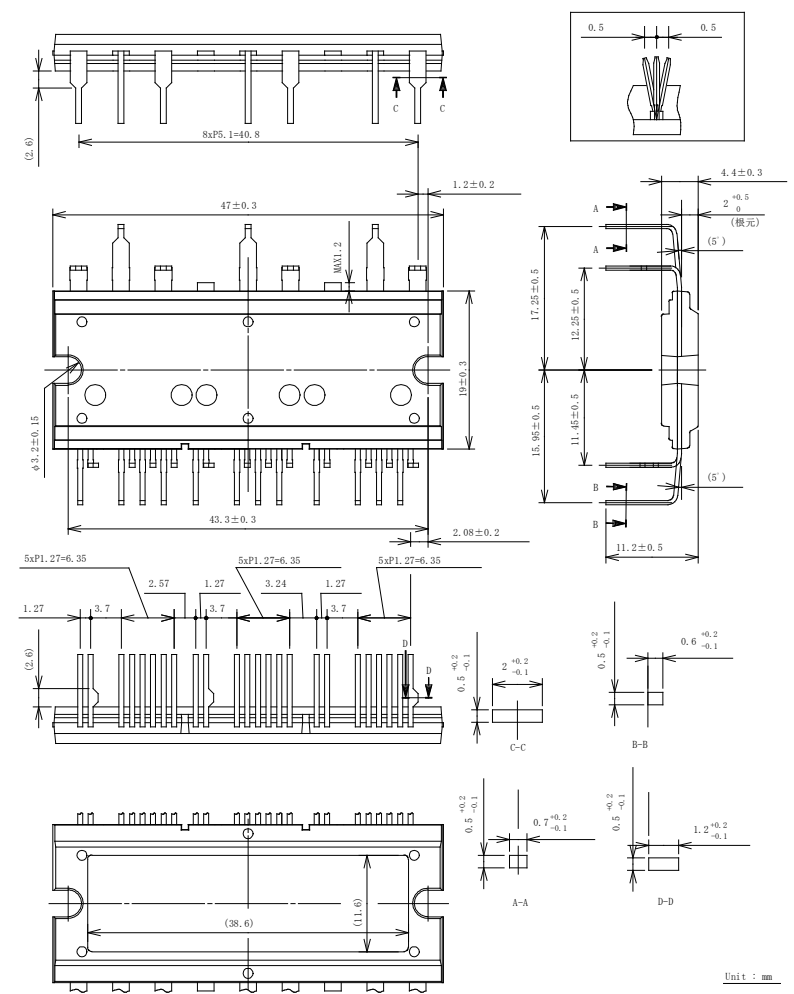
## SCM1272MA

### DIP33 (Leadform 2551)

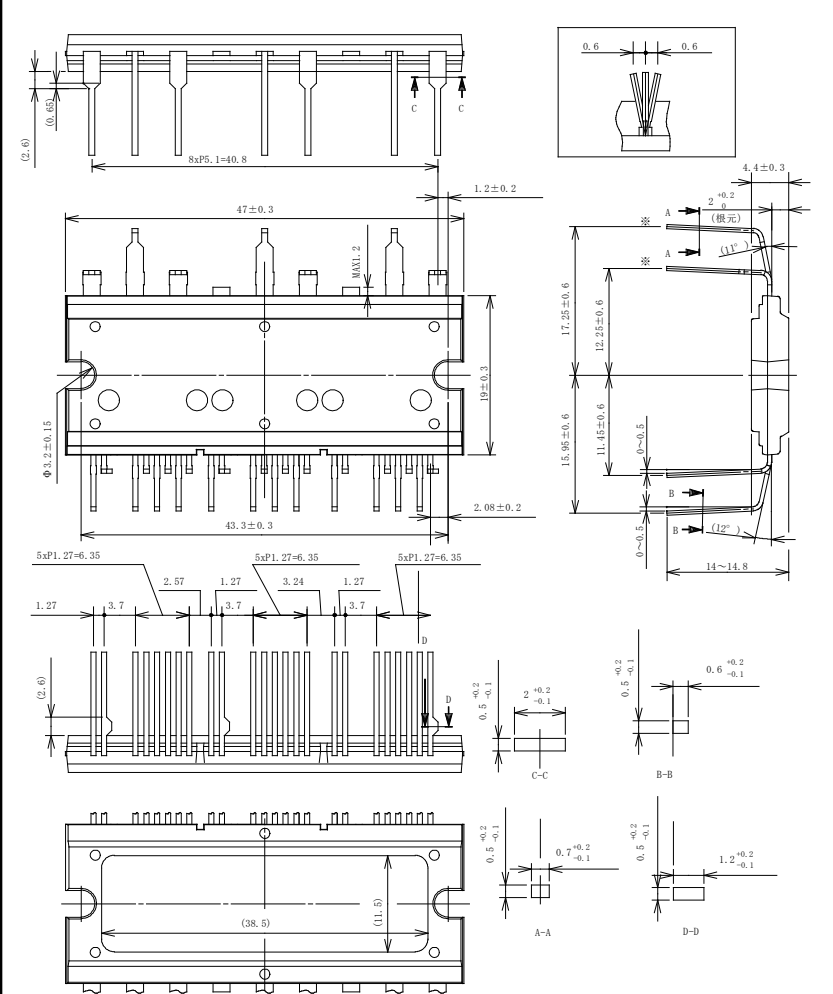


## SCM127xMB

### DIP33 (Leadform 2552)



### DIP33 (Leadform 2557: Long Lead Type)





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