

Selection Guide

- 3-phase DC Brushless Motor Driver (35 V to 60 V)
- DC Brush Motor Driver (44 V)
- Stepper Motor Driver
 - Bipolar (40 V to 60 V)
 - Unipolar (100 V)

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<http://www.sanken-ele.co.jp/en>

SanKen has motor drivers for DC brush motors, DC brushless motors, and stepper motors in product lineup. You can choose the optimal ICs according to your applications.

Item	DC Brush Motor	DC Brushless Motor	Stepper Motor
Brush	Yes	No	No
Efficiency	Higher	Highest	High
Circuit Size	Smallest	Small	Smaller
Motor Operation Sound	Noisy	Quietest	Quieter
Lifetime	Limited by brush Several hundred to several thousand hours	Long Several tens of thousand to several hundreds of thousand hours	Long Several tens of thousand hours
System Price	Lowest	Low	Lower
Rotation Speed	Faster Several thousands of rpm	Fastest Several thousands to several tens of thousands of rpm	Fast (Step-out may happen)
Position Control	Precise	Precise	Most precise
Other Features	Speed control is easy. (Feedback control)	Speed control is easy. (Feedback control)	Position is controlled by open loop

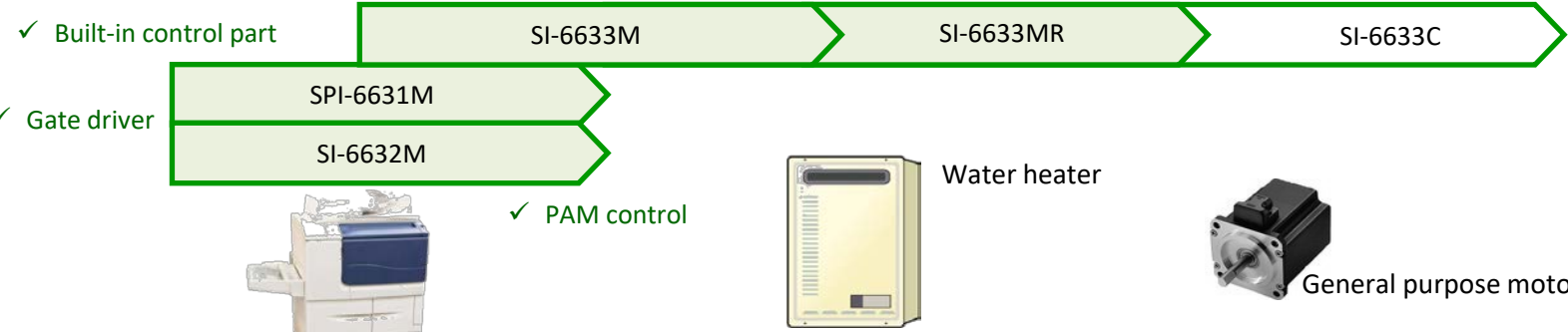
Applications of Motor Drivers (35 to 100 V)

You can choose the optimal ICs according to your applications and methods. Sanken's unipolar method motor drivers guarantee the avalanche resistance.

For 3-phase Brushless Motors

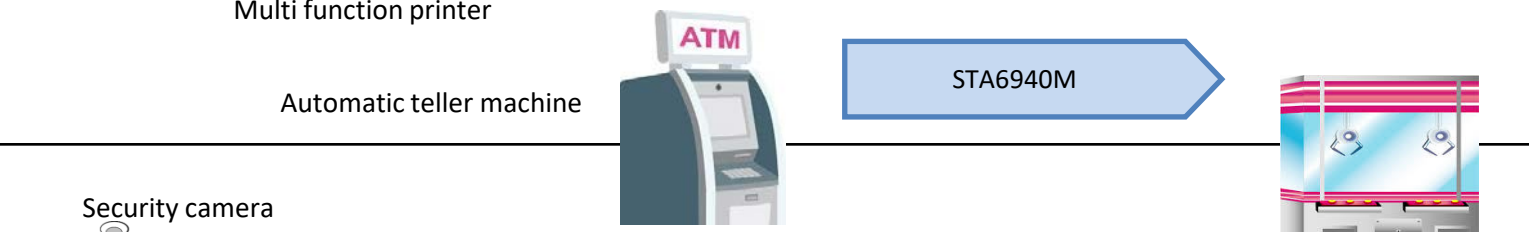
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- Built-in MOSFET
- Controller



For DC Brush Motors

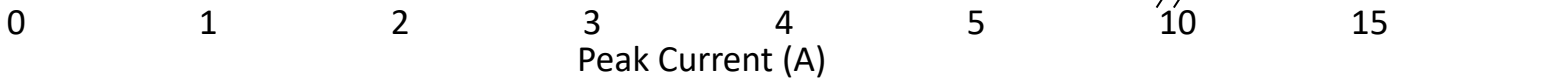
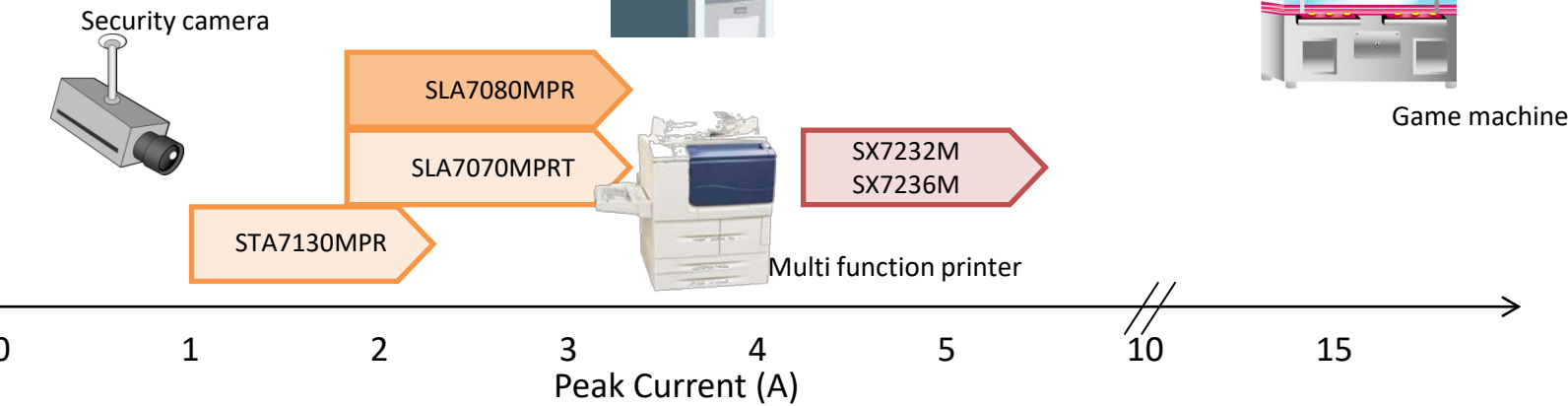
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For Stepper Motors

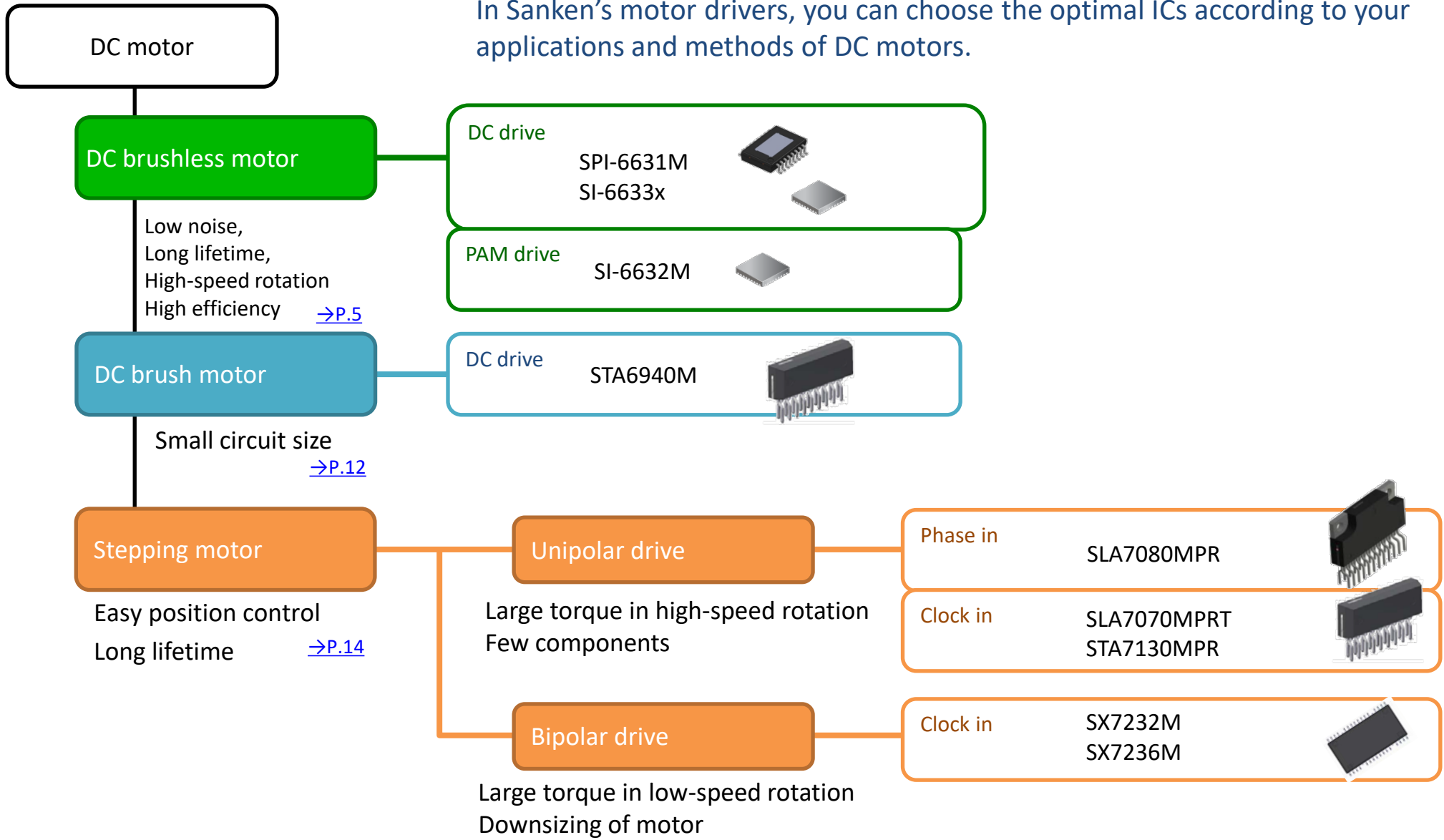
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- For Unipolar: Phase in, Clock in
- For Bipolar: Clock in


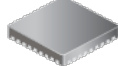
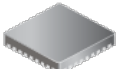


Motor Drivers (35 to 100 V) Overview

In SanKen's motor drivers, you can choose the optimal ICs according to your applications and methods of DC motors.



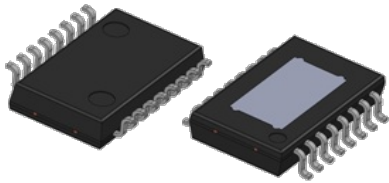
Optimal 3-phase brushless motor drivers of 12, 24, 48 V DC input. The IC for PAM control that changes the input voltage is available. You can choose optimal ICs according to your applications.

Type	MOSFETs	Peak Current	Part Number	Supply Voltage	Package	Features	Page
External Control IC	Built-in	3 A	SPI-6631M	35 V	HSOP16 		P.6
Trapezoidal Drive (120°) Hall Input PAM Control	Built-in	3 A	SI-6632M	50 V	QFN36 	<ul style="list-style-type: none"> ➤ 5 V Reg. output ➤ No Charge Pump circuit required 	P.8
Trapezoidal Control (120°) Hall Input PWM Control	Built-in	4 A / 2 A (DC)	SI-6633M	38 V	QFN36 	<ul style="list-style-type: none"> ➤ Speed monitor output ➤ Motor lock detection ➤ Simultaneous on prevention 	P.9
	Built-in	6 A / 3 A (DC)	SI-6633MR	38 V			
	External	—	SI-6633C	38 V			

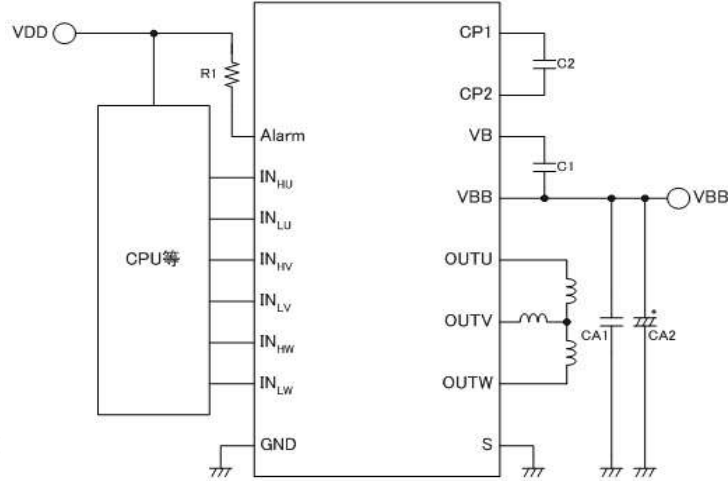
SPI-6631M

Package

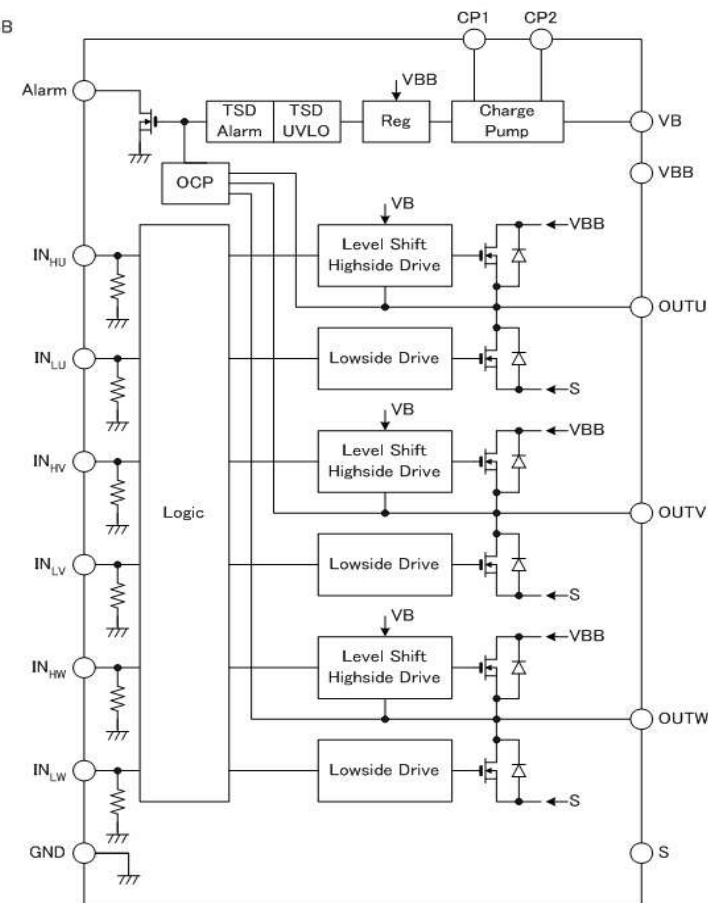
HSOP16



Block Diagram



Internal Block Diagram



Features

- ◆ Application for 12 and 24 VDC Input
- ◆ Built-in Charge Pump Circuit
- ◆ Reduces Power Consumption in Standby Operation
- ◆ Input Voltage Level: 3.3 V / 5.0 V
- ◆ Error Output
- ◆ Protections:
 - Overcurrent Protection (OCP)
 - Simultaneous On-state Prevention
 - Undervoltage Lockout (UVLO)
 - Thermal Shutdwon (TSD)

SI-6632M

Package

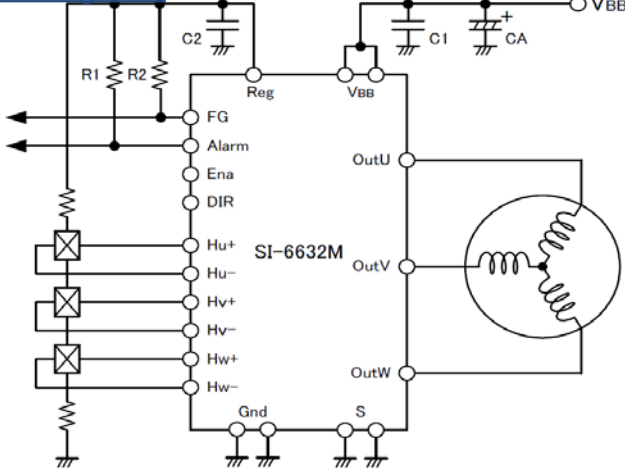
QFN36



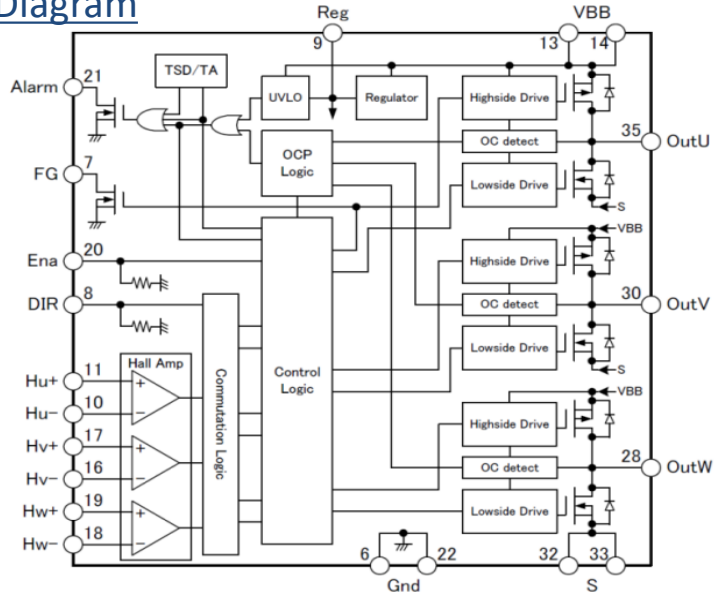
Features

- ◆ PAM (Pulse Amplitude Modulation) Control
- ◆ Trapezoidal Drive (120°)
- ◆ Hall Element and Hall IC Signal Input
- ◆ No External Components for Charge Pump (Pch MOSFET for Output High-side Switch)
- ◆ Input Voltage Level: 3.3 V / 5.0 V
- ◆ 5 V Regulator Output
- ◆ Error Output
- ◆ Protections:
 - Overcurrent Protection (OCP)
 - Simultaneous On-state Prevention
 - Undervoltage Lockout (UVLO)
 - Overheat Alarm Function
 - Thermal Shutdown (TSD)

Circuit Diagram



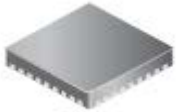
Block Diagram



SI-6633x Series

Package

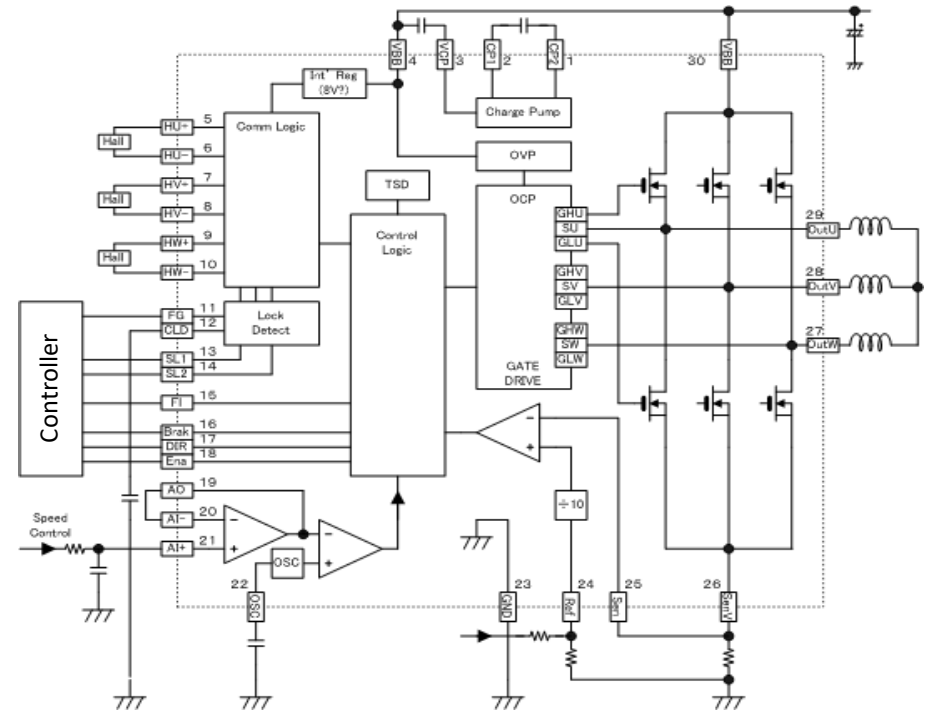
QFN36



Features

- ◆ Application for 12 and 24 VDC Input
- ◆ Trapezoidal Drive (120°)
- ◆ Current Control (off time fixed)
- ◆ Hall Element and Hall IC Signal Input
- ◆ Built-in Charge Pump Circuit
- ◆ Reduces Power Consumption in Standby Operation
- ◆ Input Voltage Level
SI-6633M: 5.0 V
SI-6633MR/C: 3.3 V / 5.0 V
- ◆ Speed Monitor Output
- ◆ Error Output
- ◆ Protections
Overcurrent Protection (OCP)
Simultaneous On-state Prevention
Undervoltage Lockout (UVLO)
Thermal Shutdown (TSD)
Motor Lock Detection


Block Diagram (SI-6633M)



Series Selection Guide

Part Number	MOSFETs	I _o	Remarks
SI-6633M	Built-in	4 A / 2 A (DC)	
SI-6633MR		6 A / 3 A (DC)	
SI-6633C	—	—	Controller

Optimal motor driver IC for DC brushless motor of 12 and 24 VDC input.

Part Number	Package	Power Supply Voltage (max.)	Peak Current	Features	Page
STA6940M	ZIP18 	44 V	8 A / 4 A (DC)	<ul style="list-style-type: none">➤ Built-in OCP and TSD➤ Overcurrent detection point is set externally.	P.10

STA6940M

Package

ZIP18

(Full mold)

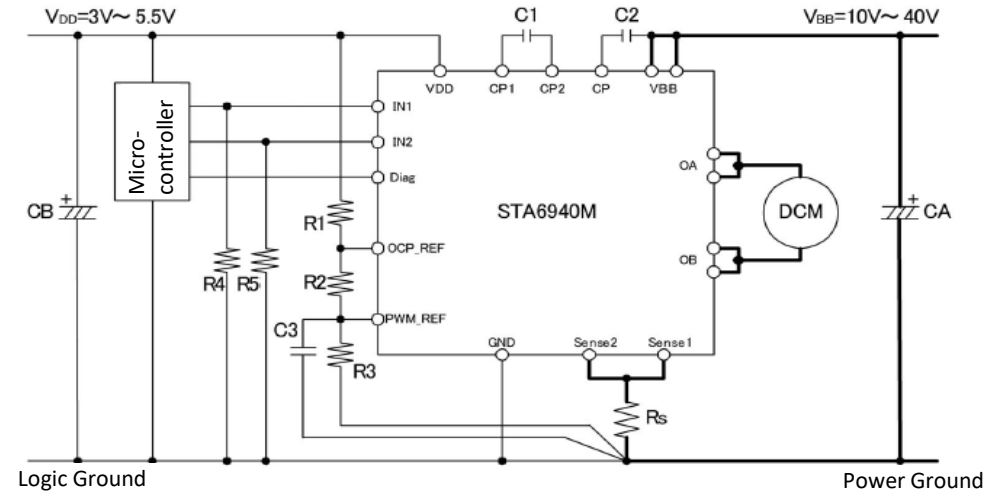


LF No. 434

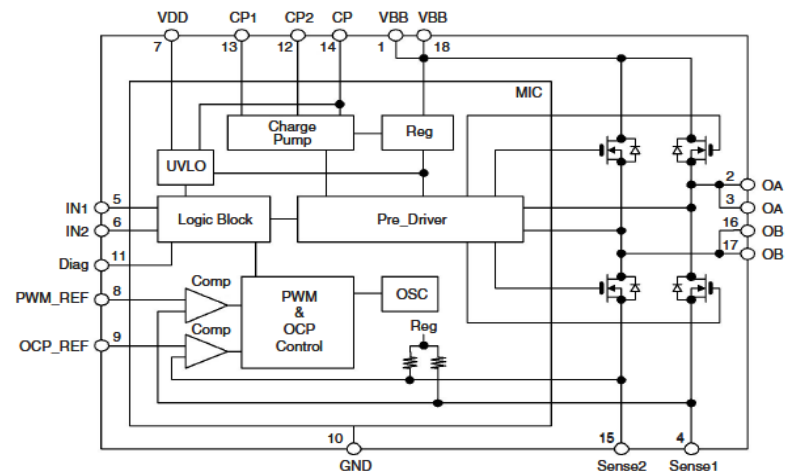
Features

- ◆ Application for 12 and 24 VDC Input
- ◆ Output Current: 8 A / 4 A (DC)
- ◆ Input Voltage Level: 3.3 V / 5.0 V
- ◆ Error Signal Output
- ◆ Protections:
 - Overcurrent Protection
 - Undervoltage Lockout (UVLO)
 - Thermal Shutdown (TSD)

Circuit Diagram



Block Diagram


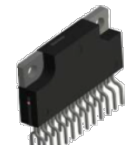



Stepper Motor Driver Overview

Optimal motor drivers for stepper motors of 12, 24, and 48 VDC input.

You can choose the optimal ICs according to your applications such as circuit method, input method, and step angle.

SanKen's unipolar type motor drivers guarantee the avalanche energy resistance. Therefore, external components are not required for the protection of MOSFETs in abnormal operations such as coil open.

Circuit Method	Series	Package	Supply Voltage (max.)	Built-in MOSFETs Breakdown Voltage	Peak Current	Input Method	Partition Number	Detection Resistance	Page
Unipolar	STA7130MPR	ZIP18 	46 V	100 V	1 A to 2 A	Clock in	1 to 8	Built-in	P.12
	SLA7070MPRT	ZIP23 (with Fin) 			2 A to 3 A		1 to 16		P.13
	SLA7080MPR					Phase in	1 to 2		P.14
Bipolar	SX7230M	SOP36 	40 V /60 V	40 V /60 V	5 A	Clock in	1 to 16	—	P.15

STA7130MPR Series

Package

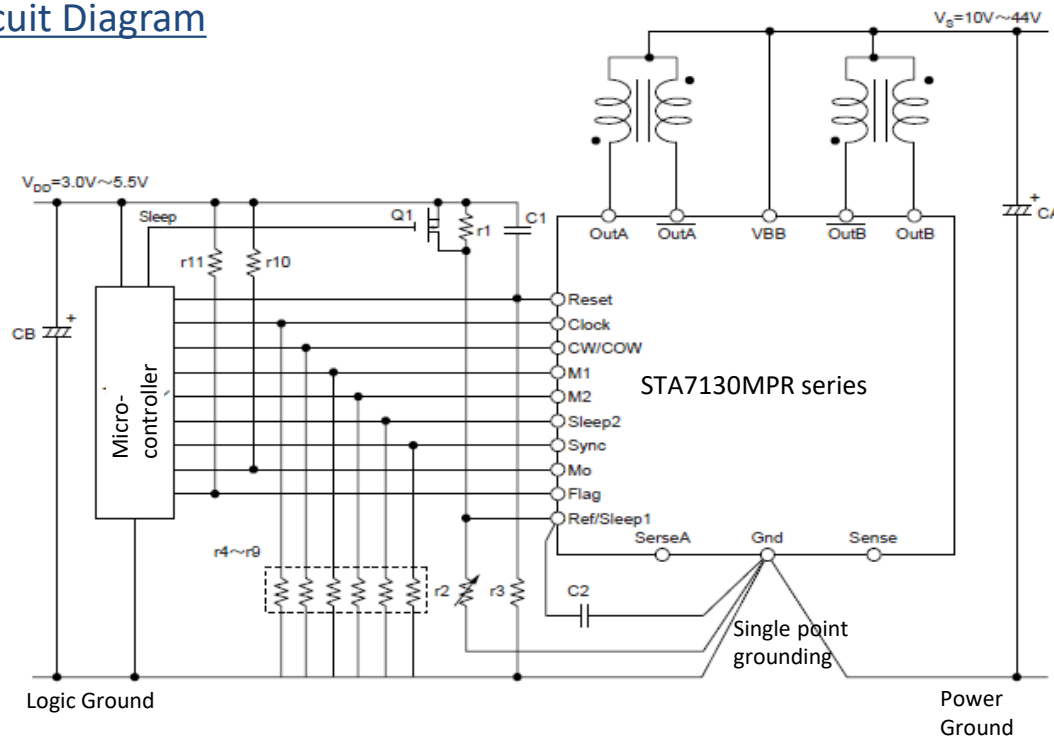
ZIP18
(Full mold)



Features

- ◆ Application for 12 and 24 VDC Input
- ◆ Clock In Type
- ◆ Partition Number: 1 to 16
- ◆ Input Voltage Level: 3.3 V / 5.0 V
- ◆ Constant Current Control (off time fixed)
- ◆ Low Power Consumption
(reduces power consumption in standby operation)
- ◆ Built-in Current Detection Resistor
- ◆ Prevention of Abnormal Noise in Motor Hold
- ◆ Avalanche Energy Resistance Guaranteed
- ◆ Protections:
Overcurrent Protection (OCP)
Protection of Motor Coil Open / Short
Thermal Shutdown (TSD)

Circuit Diagram



Series Selection Guide

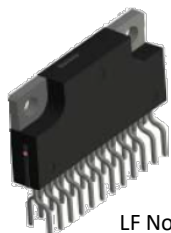
Part Number	Input Method	Partition Number	I_o	Main Supply Voltage (Max.)	MOSFETs Breakdown Voltage
STA7130MPR	Clock in	1 to 8	1.0 A	46 V	100 V
STA7131MPR			1.5 A		
STA7132MPR			2.0 A		

SLA7070MPRT Series

Package

ZIP23

(with aluminum fin)

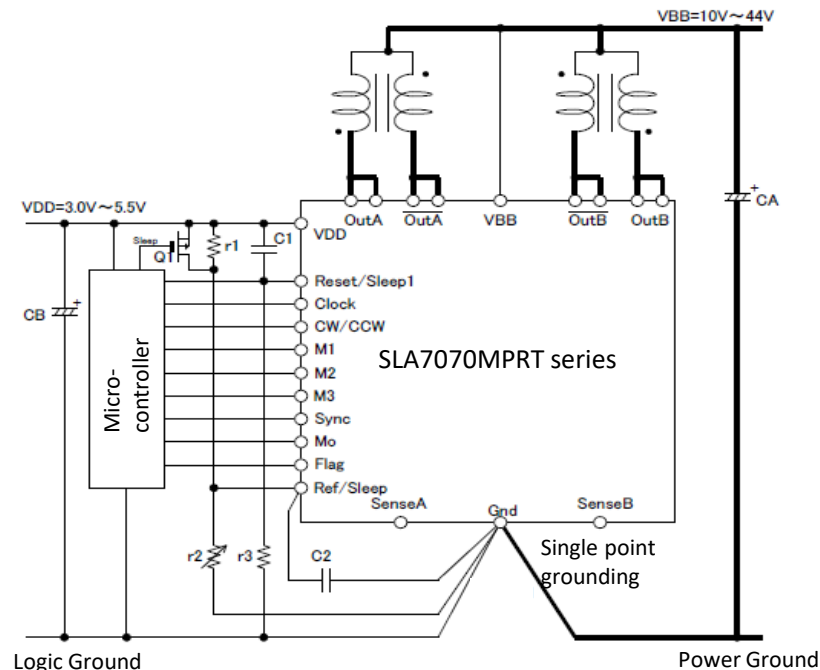


LF No. 2151

Features

- ◆ Application for 12 and 24 VDC Input
- ◆ Clock In Type
- ◆ Partition Number: 1 to 16
- ◆ Input Voltage Level: 3.3 V / 5.0 V
- ◆ Constant Current Control (off time fixed)
- ◆ Low Power Consumption
(reduces power consumption in standby operation)
- ◆ Built-in Current Detection Resistor
- ◆ Prevention of Abnormal Noise in Motor Hold
- ◆ Avalanche Energy Resistance Guaranteed
- ◆ Protections:
Overcurrent Protection (OCP)
Protection of Motor Coil Open / Short
Thermal Shutdown (TSD)

Circuit Diagram



Series Selection Guide

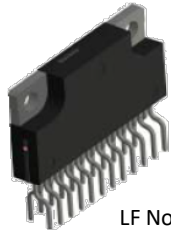
Part Number	Input Method	Partition Number	I_o	Main Supply Voltage (Max.)	MOSFETs Breakdown Voltage
SLA7072MPRT	Clock in	1 to 2	2 A	46 V	100 V
SLA7073MPRT			3 A		
SLA7078MPRT		1~16	3 A		

SLA7080MPR Series

Package

ZIP23

(with alumni fin)

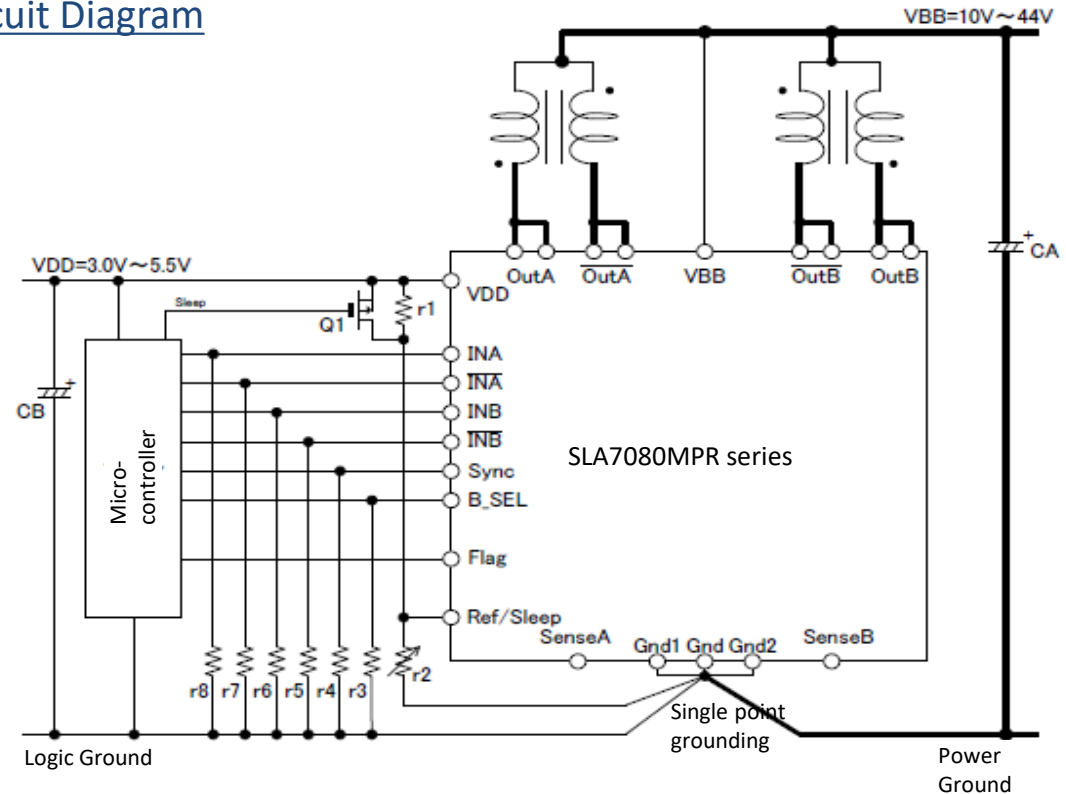


LF No. 2151

Features

- ◆ Application for 12 and 24 VDC Input
- ◆ Phase In Type
- ◆ Partition Number: 1 to 2
- ◆ Input Voltage Level: 3.3 V / 5.0 V
- ◆ Constant Current Control (off time fixed)
- ◆ Low Power Consumption
(reduces power consumption in standby operation)
- ◆ Built-in Current Detection Resistor
- ◆ Prevention of Abnormal Noise in Motor Hold
- ◆ Avalanche Energy Resistance Guaranteed
- ◆ Protections:
Overcurrent Protection (OCP)
Protection of Motor Coil Open / Short
Thermal Shutdown (TSD)

Circuit Diagram



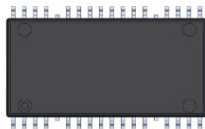
Series Selection Guide

Part Number	Input Method	Partition Number	I_o	Main Supply Voltage (Max.)	MOSFETs Breakdown Voltage
SLA7082MPR	Phase in	1 to 2	2 A	46 V	100 V
SLA7083MPR			3 A		

SX7230M Series

Package

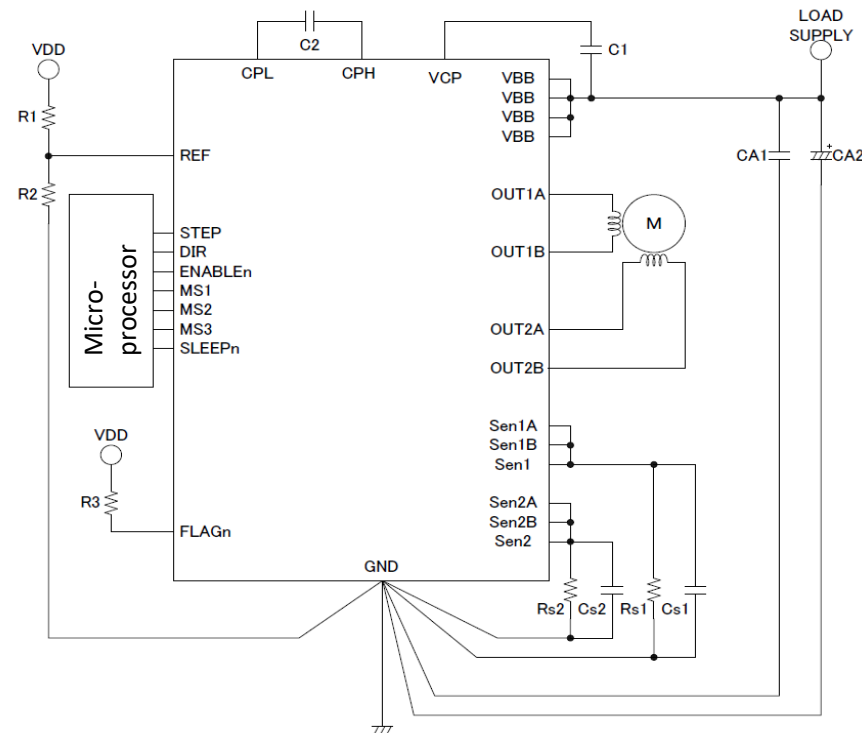
SOP36



Features

- ◆ Application for 12, 24, and 48 V DC Input
- ◆ Clock In Type (partition number: 1 to 16)
- ◆ Input Voltage Level: 3.3 V / 5.0 V
- ◆ Constant Current Control (off time fixed)
- ◆ Low Power Consumption
(reduces power consumption in standby operation)
- ◆ Built-in Dead Time Circuit
- ◆ Error Output
- ◆ Protections:
 - Overcurrent Protection (OCP)
 - Protection of Motor Coil Open / Short
 - Thermal Shutdown (TSD)

Circuit Diagram (SX7232M / 36M)



Series Selection Guide

Part Number	Input Method	Partition Number	I_o	Main Supply Voltage (Max.)
SX7232M	Clock in	1 to 16	5 A	40 V
SX7236M				60 V

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