



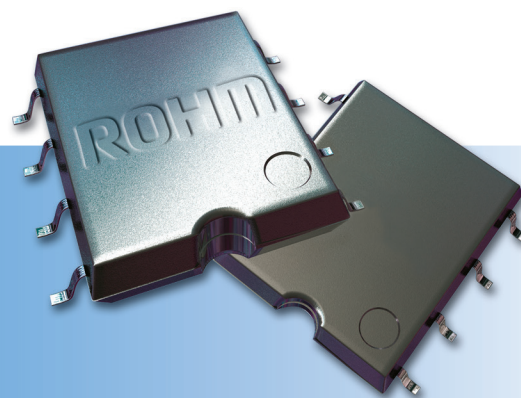
Innovations Embedded



Motor Drivers

H-bridge Driver Series

for brush motors



■ Portable ■ Automotive ■ Appliances ■ Medical

H-bridge Drivers

from ROHM Semiconductor

ROHM
SEMICONDUCTOR

DC brush motors are simple, reliable and low-cost. And now, to achieve the best possible performance and design flexibility, ROHM offers a complete line of H-bridge drivers for DC brush motors that combine a selection of analog and digital input control strategies with advanced, high-efficiency PWM motor speed control output. These powerful new ICs provide a unique V_{REF} to PWM conversion circuit that can quickly transform an existing analog speed control design into a high-performance, low power PWM configuration - sometimes by simply replacing the IC! Inputs are also provided for direct digital (PWM)

control from an external MCU or other motor control device.

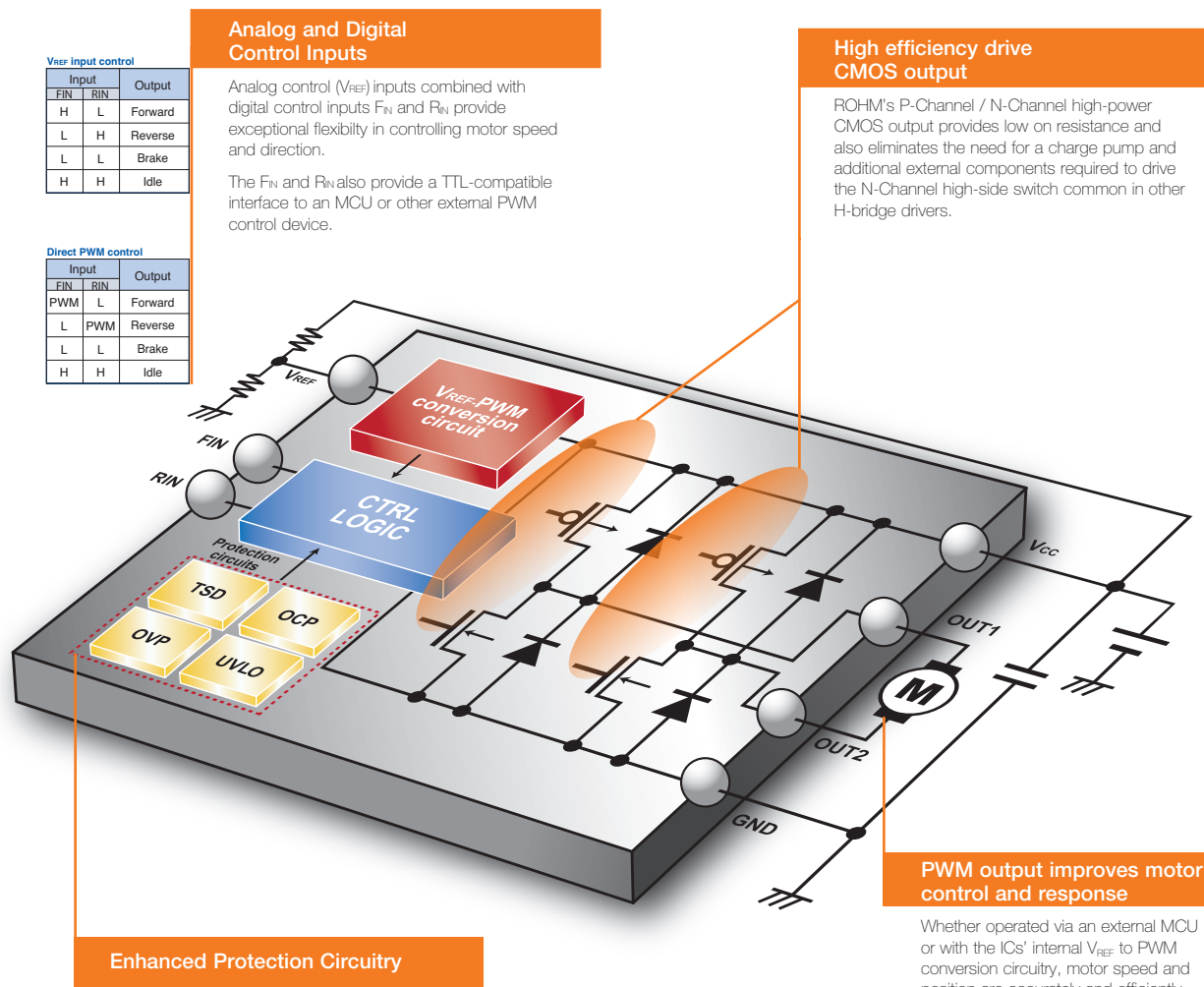
ROHM H-bridge ICs combine BiCMOS control and power MOSFET outputs to deliver exceptional performance with minimal external components, virtually zero standby current and high operating efficiency.

Fully integrated circuit protection is also provided, including:

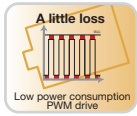
- Internal shoot through protection
- ESD protection
- fault protection (current, voltage, temp)

The ROHM H-bridge drive product line is offered with pin-compatible devices optimized for 7 V, 18 V and 36 V maximum supply voltages to optimize power consumption; and in single and dual channel configurations.

These latest ROHM H-bridge ICs are pin-compatible with earlier (linear output) models making it possible to migrate to PWM control without any modifications to the PCB layout.

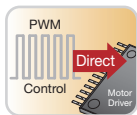


Designed for Performance and Flexibility



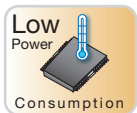
Voltage-controlled PWM conversion system

- Basic voltage control is simple thanks to the built-in V_{REF} - PWM conversion circuit. ROHM H-bridge PWM drivers deliver precise control, high efficiency and low power consumption.



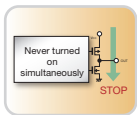
Direct PWM control signal input

- PWM pulses from an external MCU can be used to control motor speed. Inputs are TTL compatible.



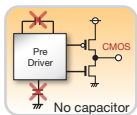
Low power consumption

- Using PWM control, the power dissipation of the IC is vastly improved over linear control, removing the requirements for heatsinks in many applications.



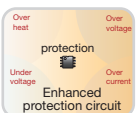
Internal shoot-through current prevention

- Overlap current during motor braking or reversal is completely eliminated without the use of external components, resulting in improved reliability and increased energy savings.



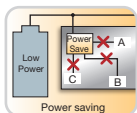
Complementary MOSFET output stage

- The CMOS output stages eliminate the need for a charge pump and external capacitors to operate the high side driver. Components in the application circuit are minimized.



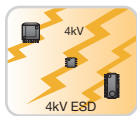
Enhanced protection circuit

- Four protection circuits are provided to ensure high reliability: Overcurrent Protection (OCP), Overvoltage Protection (OVP), Thermal Shut Down (TSD) and Undervoltage Lock Out (UVLO).



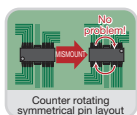
Power saving circuit

- This circuit turns off all other internal circuits during standby mode reducing the standby current to virtually zero.



4kV ESD voltage

- Protection from ESD voltage of up to 4 kV Human Body Model (HBM) has been achieved through optimization of processes and circuitry, ensuring high reliability in any environment.



Independent control for each channel

- For 2-Channel models, the overcurrent protection in each channel utilizes independent control. Symmetrical pin layout eliminates 180° rotational mismatching.

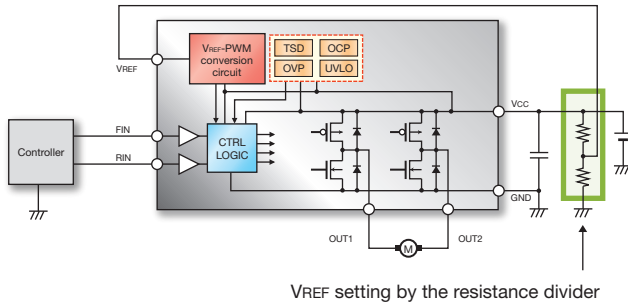


Complete lineup

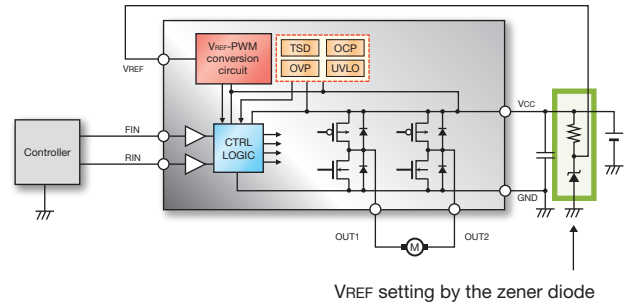
- ROHM's lineup of H-bridge drivers offers a wide selection of supply voltages, output currents, single and dual channels in pin-compatible package configurations.

VREF Setting Drive

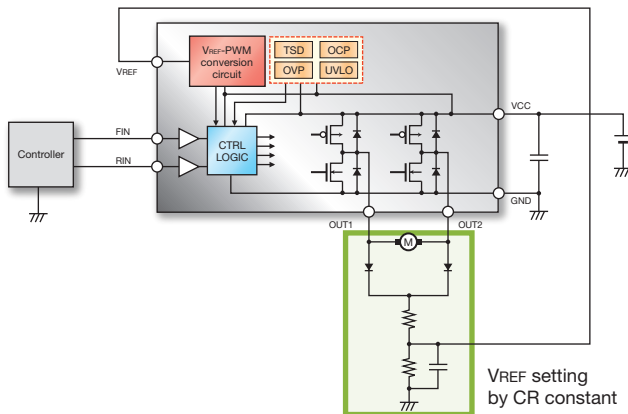
A) Regulated power supply



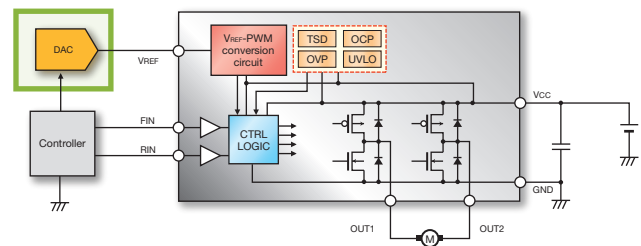
B) Unstable power supply



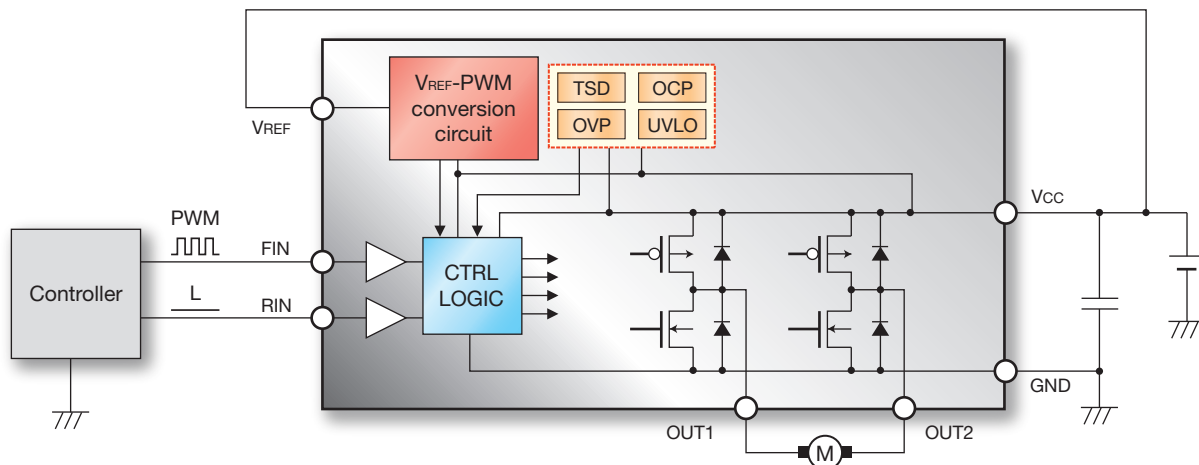
C) Soft start



D) VREF setting by a D/A converter












Direct PWM Drive



H-bridge Driver Series

Selection Guide

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Part Number	V _{CC} Max	Channels	Supply Voltage	Output Current	ON Resistance	Package									
BD6210F	7 V	ONE	3 - 5.5 V	0.5 A	1.0 Ω	SOP8	■	■	■	■	■	■	■	■	■
BD6210HFP	7 V	ONE	3 - 5.5 V	0.5 A	1.0 Ω	HRP7	■	■	■	■	■	■	■	■	■
BD6211F	7 V	ONE	3 - 5.5 V	1.0 A	1.0 Ω	SOP8	■	■	■	■	■	■	■	■	■
BD6211HFP	7 V	ONE	3 - 5.5 V	1.0 A	1.0 Ω	HRP7	■	■	■	■	■	■	■	■	■
BD6212FP	7 V	ONE	3 - 5.5 V	2.0 A	0.5 Ω	HSOP25	■	■	■	■	■	■	■	■	■
BD6212HFP	7 V	ONE	3 - 5.5 V	2.0 A	0.5 Ω	HRP7	■	■	■	■	■	■	■	■	■
BD6215FV	7 V	TWO	3 - 5.5 V	0.5 A	1.0 Ω	SSOP-B24		■	■	■	■	■	■	■	■
BD6215FP	7 V	TWO	3 - 5.5 V	0.5 A	1.0 Ω	HSOP25	■	■	■	■	■	■	■	■	■
BD6216FP	7 V	TWO	3 - 5.5 V	1.0 A	1.0 Ω	HSOP25	■	■	■	■	■	■	■	■	■
BD6216FM	7 V	TWO	3 - 5.5 V	1.0 A	1.0 Ω	HSOP-M28	■	■	■	■	■	■	■	■	■
BD6217FM	7 V	TWO	3 - 5.5 V	2.0 A	0.5 Ω	HSOP-M28	■	■	■	■	■	■	■	■	■
BD6220F	18 V	ONE	6 - 15 V	0.5 A	1.5 Ω	SOP8	■	■	■	■	■	■	■	■	■
BD6220HFP	18 V	ONE	6 - 15 V	0.5 A	1.5 Ω	HRP7	■	■	■	■	■	■	■	■	■
BD6221F	18 V	ONE	6 - 15 V	1.0 A	1.5 Ω	SOP8	■	■	■	■	■	■	■	■	■
BD6221HFP	18 V	ONE	6 - 15 V	1.0 A	1.5 Ω	HRP7	■	■	■	■	■	■	■	■	■
BD6222FP	18 V	ONE	6 - 15 V	2.0 A	0.5 Ω	HSOP25	■	■	■	■	■	■	■	■	■
BD6222HFP	18 V	ONE	6 - 15 V	2.0 A	0.5 Ω	HRP7	■	■	■	■	■	■	■	■	■
BD6225FV	18 V	TWO	6 - 15 V	0.5 A	1.5 Ω	SSOP-B24		■	■	■	■	■	■	■	■
BD6225FP	18 V	TWO	6 - 15 V	0.5 A	1.5 Ω	HSOP25	■	■	■	■	■	■	■	■	■
BD6226FP	18 V	TWO	6 - 15 V	1.0 A	1.5 Ω	HSOP25	■	■	■	■	■	■	■	■	■
BD6226FM	18 V	TWO	6 - 15 V	1.0 A	1.5 Ω	HSOP-M28	■	■	■	■	■	■	■	■	■
BD6227FM	18 V	TWO	6 - 15 V	2.0 A	0.5 Ω	HSOP-M28	■	■	■	■	■	■	■	■	■
BD6230F	36 V	ONE	6 - 32 V	0.5 A	1.5 Ω	SOP8	■	■	■	■	■	■	■	■	■
BD6230HFP	36 V	ONE	6 - 32 V	0.5 A	1.5 Ω	HRP7	■	■	■	■	■	■	■	■	■
BD6231F	36 V	ONE	6 - 32 V	1.0 A	1.5 Ω	SOP8	■	■	■	■	■	■	■	■	■
BD6231HFP	36 V	ONE	6 - 32 V	1.0 A	1.5 Ω	HRP7	■	■	■	■	■	■	■	■	■
BD6232FP	36 V	ONE	6 - 32 V	2.0 A	1.0 Ω	HSOP25	■	■	■	■	■	■	■	■	■
BD6232HFP	36 V	ONE	6 - 32 V	2.0 A	1.0 Ω	HRP7	■	■	■	■	■	■	■	■	■
BD6235FV	36 V	TWO	6 - 32 V	0.5 A	1.5 Ω	SSOP-B24		■	■	■	■	■	■	■	■
BD6235FP	36 V	TWO	6 - 32 V	0.5 A	1.5 Ω	HSOP25	■	■	■	■	■	■	■	■	■
BD6236FP	36 V	TWO	6 - 32 V	1.0 A	1.5 Ω	HSOP25	■	■	■	■	■	■	■	■	■
BD6236FM	36 V	TWO	6 - 32 V	1.0 A	1.5 Ω	HSOP-M28	■	■	■	■	■	■	■	■	■
BD6237FM	36 V	TWO	6 - 32 V	2.0 A	1.0 Ω	HSOP-M28	■	■	■	■	■	■	■	■	■

Key



PIN Compatibility Matrix



PWM Driven



Built-In Thermal Shutdown



Built-In Undervoltage Lock Out



Vref Setting



Built-In Overcurrent Protection



Built-In Overvoltage Protection



4kV ESD Voltage



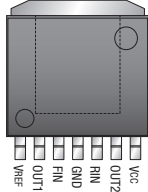
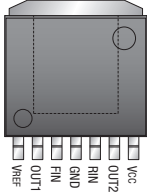
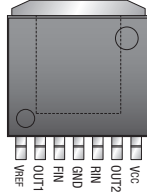
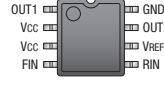

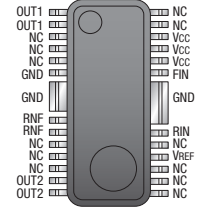
Standby Power Save Mode

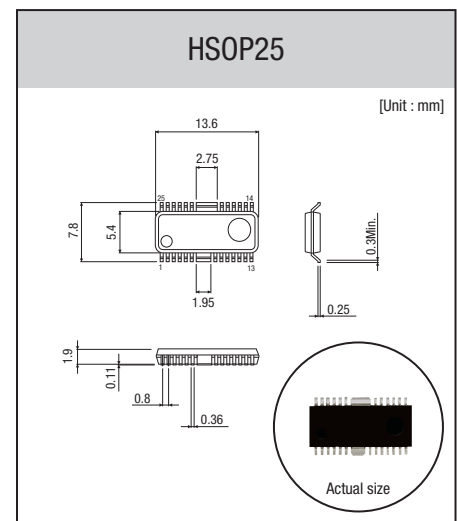
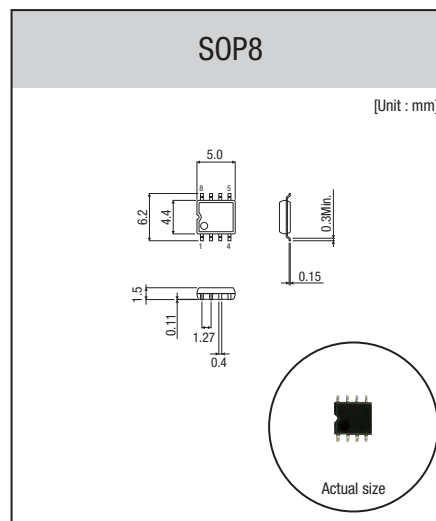
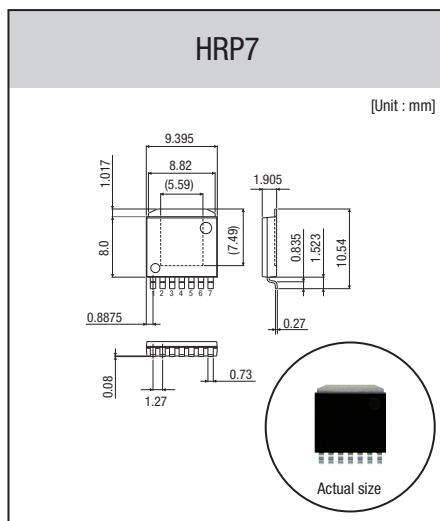
Order Guide

H-bridge Driver Series

PIN Configuration & Compatibility Matrix

1-Channel Drivers

	0.5A	1.0A	2.0A
1ch	<p>HRP7</p> 	<p>HRP7</p> 	<p>HRP7</p> 
	7V BD6210HFP	7V BD6211HFP	7V BD6212HFP
	18V BD6220HFP	18V BD6221HFP	18V BD6222HFP
	36V BD6230HFP	36V BD6231HFP	36V BD6232HFP
	SOP8	SOP8	HSOP25
			
	7V BD6210F	7V BD6211F	7V BD6212FP
	18V BD6220F	18V BD6221F	18V BD6222FP
	36V BD6230F	36V BD6231F	36V BD6232FP

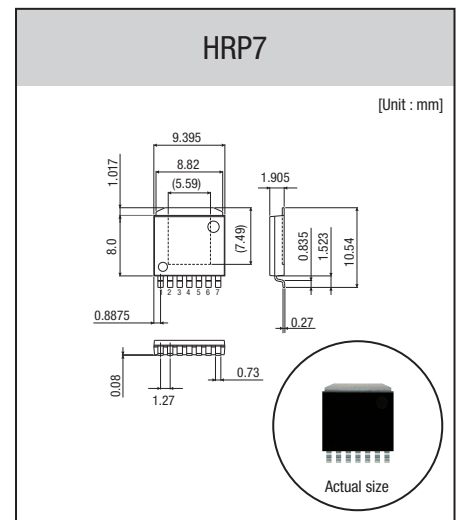
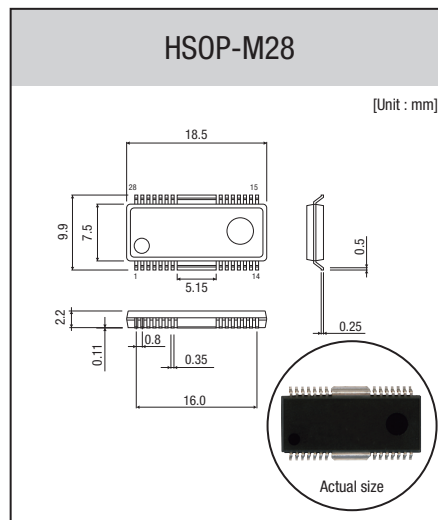
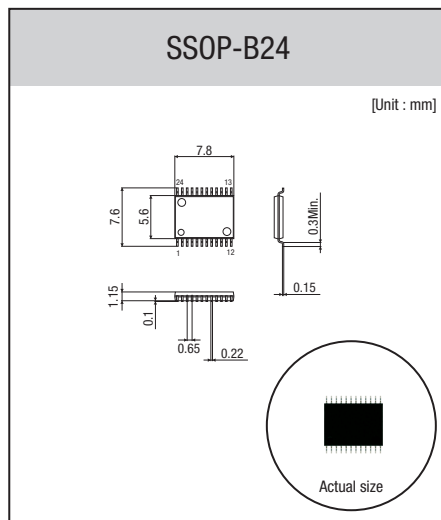


H-bridge Driver Series

PIN Configuration & Compatibility Matrix

2-Channel Drivers

	0.5A (I/O Max)	1.0A	2.0A																				
2ch	<div><p>SSOP-B24</p><p>PIN COMPATIBILITY</p></div>	<div><p>HSOP-M28</p><p>PIN COMPATIBILITY</p></div>	<div><p>HSOP-M28</p><p>PIN COMPATIBILITY</p></div>																				
	<div><p>7V BD6215FV</p><p>18V BD6225FV</p><p>36V BD6235FV</p><p>PIN COMPATIBILITY</p></div>	<div><p>7V BD6216FM</p><p>18V BD6226FM</p><p>36V BD6236FM</p><p>PIN COMPATIBILITY</p></div>	<div><p>7V BD6217FM</p><p>18V BD6227FM</p><p>36V BD6237FM</p><p>PIN COMPATIBILITY</p></div>																				
	<div><p>HSOP25</p><p>PIN COMPATIBILITY</p></div>	<div><p>HSOP25</p><p>PIN COMPATIBILITY</p></div>	<table><tr><th>PIN Name</th><th>Description</th></tr><tr><td>VCC</td><td>Power supply</td></tr><tr><td>VREF A/B</td><td>VREF setting pin A/B</td></tr><tr><td>FIN A/B</td><td>Control input (FWD) A/B</td></tr><tr><td>RIN A/B</td><td>Control input (REV) A/B</td></tr><tr><td>OUT1 A/B</td><td>Driver output 1 A/B</td></tr><tr><td>OUT2 A/B</td><td>Driver output 2 A/B</td></tr><tr><td>GND</td><td>Ground (Common)</td></tr><tr><td>NC</td><td>NC (No Connection)</td></tr><tr><td>RNF A/B</td><td>Power ground A/B</td></tr></table>	PIN Name	Description	VCC	Power supply	VREF A/B	VREF setting pin A/B	FIN A/B	Control input (FWD) A/B	RIN A/B	Control input (REV) A/B	OUT1 A/B	Driver output 1 A/B	OUT2 A/B	Driver output 2 A/B	GND	Ground (Common)	NC	NC (No Connection)	RNF A/B	Power ground A/B
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