Ordering number:ENN5167

Thick Film Hybrid IC

STK681-050

Bidirectional DC Brush-Type Motor Driver (I_O=5A)

Overview

The STK681-050 is a bidirectional DC brush-type motor driver IC with brake function that incorporates MOSFET power elements.

Applications

- PPC drum and scanner motor drivers
- LBP drum motor drivers
- Printer head and carriage motor drivers
- General DC motor applications

Features

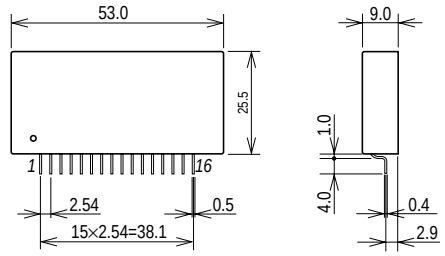
- H-bridge output stage configuration employing 4 MOSFETs
- Independent TTL/CMOSlevel control for each MOSFET (4-pin control)
- External signal control of forward, reverse and brake opreration
- MOSFETs supporting 12A peak starting current and 13.5A peak brake current (F3 and F4 ON)
- DC input supporting saturation operation
- Only 1 charge pump electrolytic capacitor required, compared with the STK6875 which requires 2

Package Dimensions

unit:mm

4163

[STK681-050]



SANYO : SIP16

Specifications

Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage 1	$V_{CC}1$ max	No signal	50	V
Maximum supply voltage 2	$V_{CC}2$ max	No signal	10	V
Maximum input voltage	Vin max	Pins 1, 3, 12, 14, 15	±10	V
Maximum motor starting current	I_O peak	1 pulse, pulse width=70ms	12	A
Maximum motor brake current 1 (F1 and F2 ON)	$I_{OB}1$ peak	1 pulse, pulse width=70ms	12	A
Maximum motor brake current 2 (F3 and F4 ON)	$I_{OB}2$ peak	1 pulse, pulse width=25ms	16	A
		1 pulse, pulse width=100ms	13.5	A
Allowable power dissipation 1	Pd1 max	No heatsink, total loss	5.2	W
Allowable power dissipation 2	Pd2 max	Arbitrary large heatsink, per MOSFET	25	W

Continued on next page

■ Any and all SANYO products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your SANYO representative nearest you before using any SANYO products described or contained herein in such applications.

■ SANYO assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges,or other parameters) listed in products specifications of any and all SANYO products described or contained herein.

SANYO Electric Co.,Ltd. Semiconductor Company
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

Continued from preceding page.

Parameter	Symbol	Conditions	Ratings	Unit
Thermal resistance	θ j-c	Per MOSFET	5	˚C/W
Junction temperature	Tj max	Per MOSFET	150	˚C
Operating substrate temperature	Tc max		105	˚C
Storage temperature	Tstg		–40 to +125	˚C

Allowable Operating Ranges at Ta = 25˚C

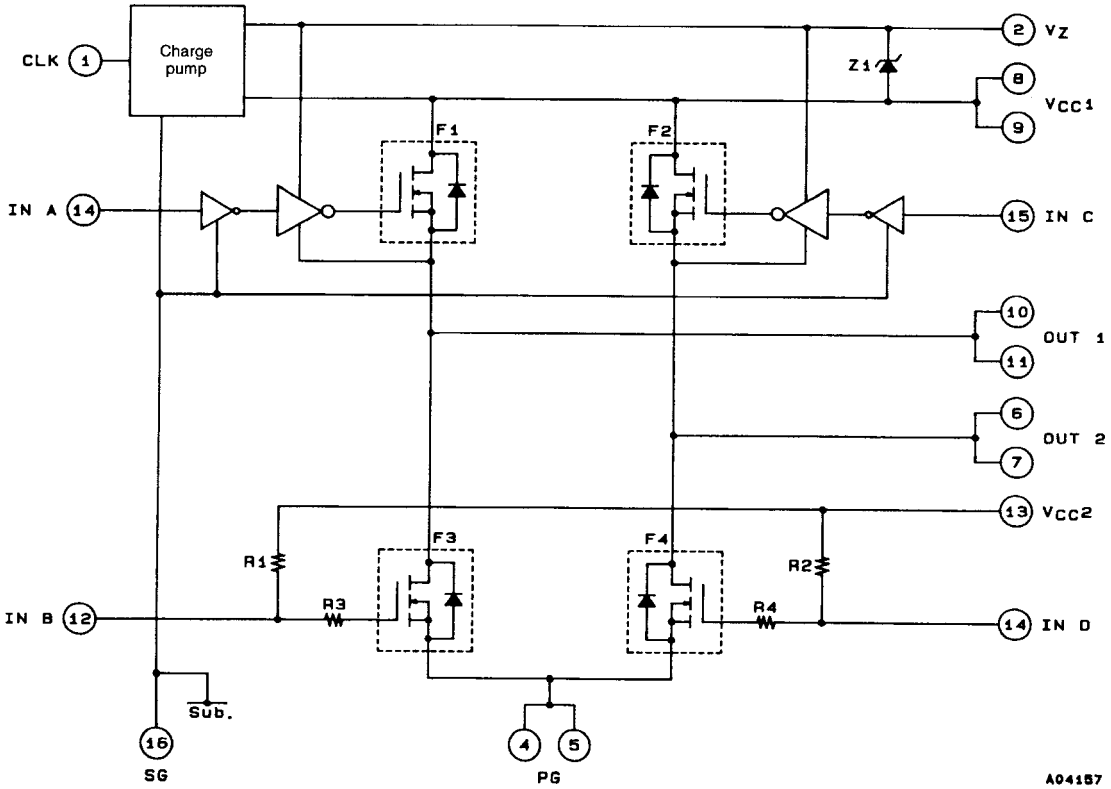
Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage 1	$V_{CC}1$	With signal	18 to 42	V
Supply voltage 2	$V_{CC}2$	With signal	4.75 to 7.00	V
Input voltage	Vin	Pins 1, 3, 12, 14, 15	–7 to +7	V
Motor output current	I_O	PWM frequency f_P=25kHz	5	A
Motor starting current	I_{OD}	1 pulse, t=200ms	8	A
Motor brake current 1 (F1 and F2 ON)	$I_{OB}1$	Triangle wave, 1 pulse, pulse width=100ms	11	A
Motor brake current 2 (F3 and F4 ON)	$I_{OB}2$	Triangle wave, 1 pulse, pulse width=100ms	13.5	A
PWM frequency	f_P		0 to 30	kHz
CLK input frequency	f_{CLK}	40 to 60% duty	10 to 30	kHz
Sensing voltage	V_S	Between pins 4/5 and ground	0 to 0.6	V
Gate input voltage	V_{IG}	Between pins 3/12 and SG	$V_{CC}2$	V
MOSFET withstand voltage	V_{DSS}	F1, F2, F3, F4	60	V

Electrical Characteristics at Ta = 25˚C, V_{CC}1=24V, V_{CC}2=5.0V, f_{CLK}=25kHz

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Output saturation voltage 1	Vst1	I_O=5A, F1, F2		0.75	1.05	V
Output saturation voltage 2	Vst2	I_O=5A, F3, F4		0.43	0.65	V
Output leakage current	I_L	Pins 12, 14, 15=0.8V, pin 3 open			100	µA
		Pins 3, 14, 15=0.8V, pin 12 open				
Supply current	I_{CCO}	Pins 3, 12, 14, 15=0.8V	2.0	2.7	4.0	mA
Input ON voltage	V_{IH}	Pins 1, 14, 15	2.0		$V_{CC}2$	V
Input OFF voltage	V_{IL}	Pins 1, 3, 12, 14, 15			0.80	V
Input ON current	I_{IH}	Pins 1, 14, 15 (V_{IH}=2.7V)		0.21	0.42	mA
Input OFF current	I_{IL}	Pins 3, 12 (V_{IL}=0.4V)		1.0	1.2	mA
Diode forward-bias voltage	V_F	I_F=5A		1.0	1.4	V
Turn ON delay time 1	$t_{d\text{-}ON}1$	F1, F2 (I_O=5A)		0.6		µs
Turn OFF delay time 1	$t_{d\text{-}OFF}1$	F1, F2 (I_O=5A)		3.9		µs
Turn ON delay time 2	$t_{d\text{-}ON}2$	F3, F4 (I_O=5A)		0.2		µs
Turn OFF delay time 2	$t_{d\text{-}OFF}12$	F3, F4 (I_O=5A)		0.6		µs

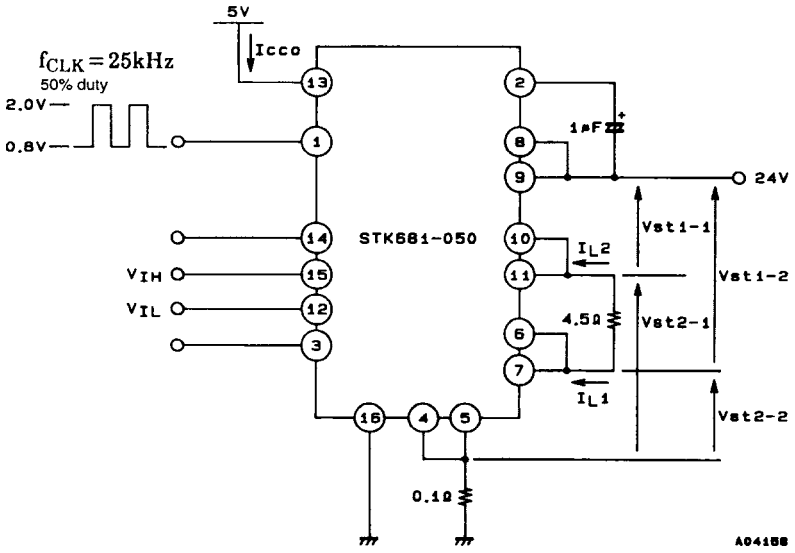
Note : All tests made using a constant-voltage supply.

Block Diagram



Test Circuit

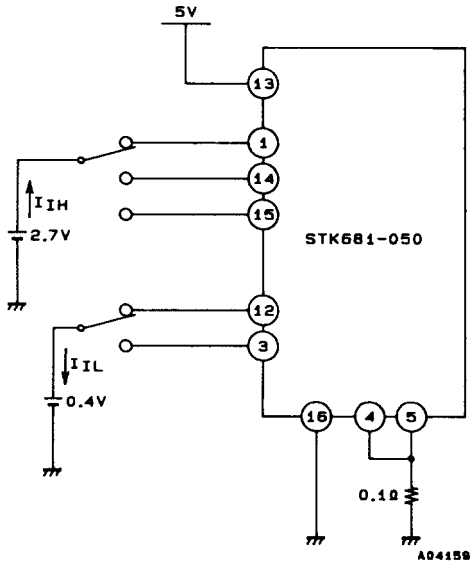
Vst1, Vst2, I_{CCO}, I_L



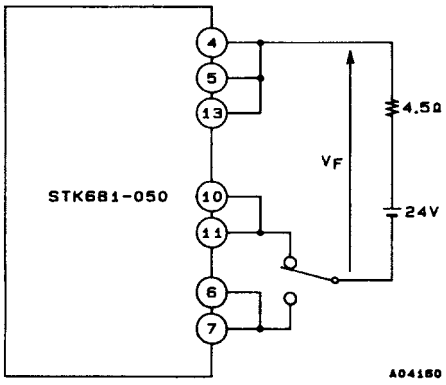
Test parameter	Input conditions			
	Pin 14	Pin 15	Pin 12	Pin 13
Vst1-1	High	Low	Low	Open
Vst1-2	Low	High	Open	Low
Vst2-1	Low	High	Open	Low
Vst2-2	High	Low	Low	Open
I_{CCO}	Low	Low	Low	Low
I_L1	Low	Low	Low	Open
I_L2	Low	Low	Open	Low

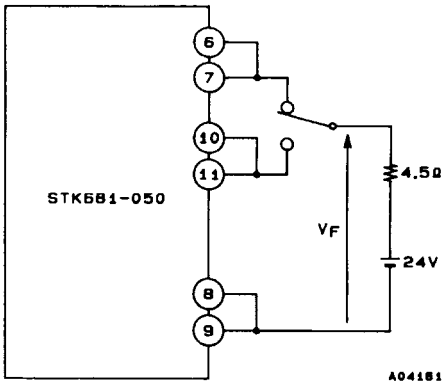
High : V_{IH}=2.0V
Low : V_{IL}=0.8V

I_{IH}, I_L

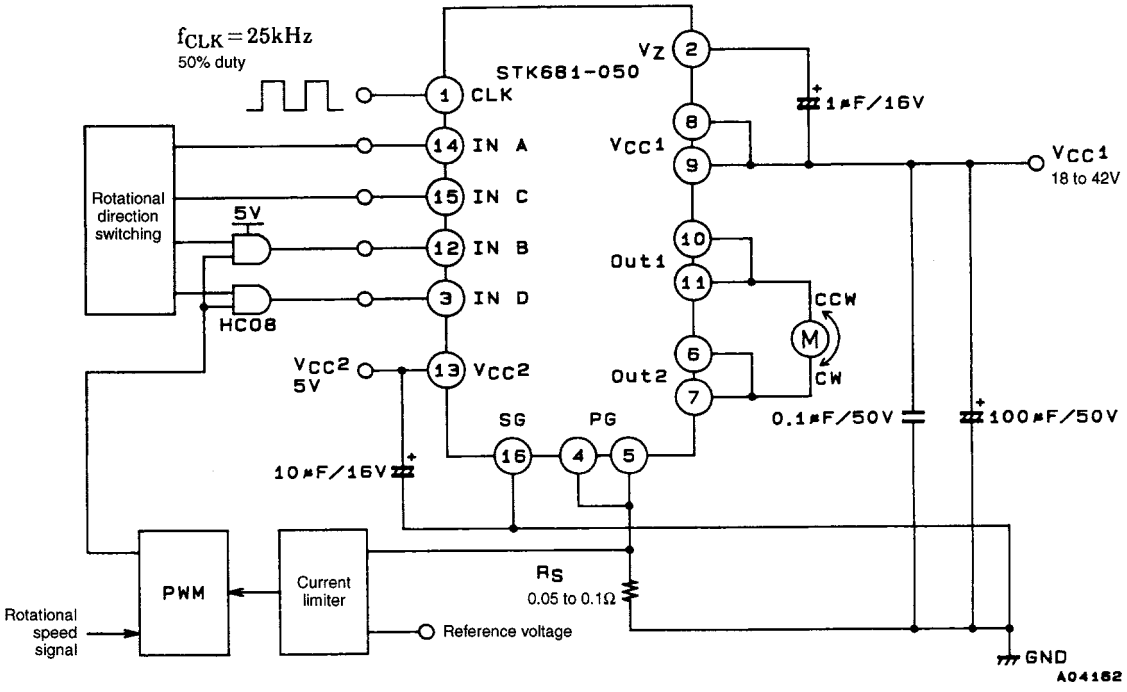


V_F





Sample Application Circuit



Mode	IN A	IN C	IN B	IN D
Standby (before drive)	Low	Low	Low	Low
CW	High	Low	Low	PWM
CCW	Low	High	PWM	Low
Brake	Low	Low	$V_{CC}2$	$V_{CC}2$
Inhibit mode	High	×	High	×
	×	High	×	High

High : $V_{IH} \geq 2.7V$
Low : $V_{IL} \leq 0.4V$
High level during PWM operation=$V_{CC}2$
×=don't care

- Specifications of any and all SANYO products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.
- SANYO Electric Co., Ltd. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.
- In the event that any or all SANYO products(including technical data,services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.
- No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of SANYO Electric Co., Ltd.
- Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the SANYO product that you intend to use.
- Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. SANYO believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

This catalog provides information as of October, 1999. Specifications and information herein are subject to change without notice.

This datasheet has been download from:

www.datasheetcatalog.com

Datasheets for electronics components.