



STK6713BMK3

Stepping Motor Fixed-current Driver

Overview

The STK6713BMK3 is a unipolar fixed-current chopper-type 4-phase stepping motor driver hybrid IC (HIC) which uses a MOSFET power device. The excitation sequence signal is active low.

Applications

- Serial printer, line printer, PPC, laser beam printer (LBP) paper feed and carriage motor drivers

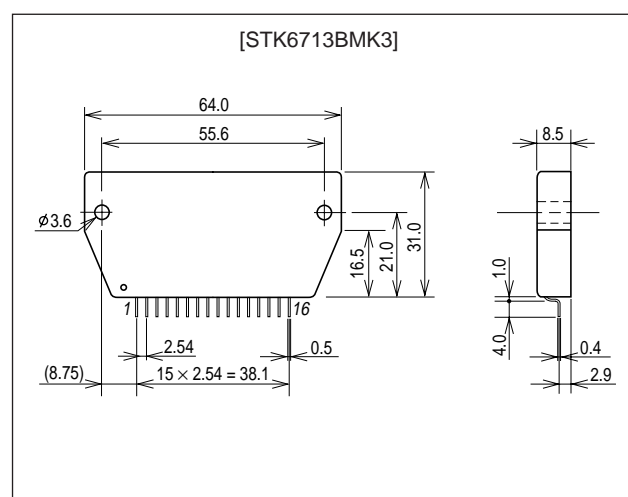
Features

- Fixed-current driver device which uses MOSFET
- Input signal supporting TTL level (Active Low drive type)
- On-chip current detection resistor

Package Dimensions

unit: mm

4131



Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage 1	V _{CC1max}	No input signal	52	V
Maximum supply voltage 2	V _{CC2max}	No input signal	7	V
Maximum phase current	I _{OH max}	per phase, R/L = 5Ω/10mH, 0.5 s 1 pulse, V _{CC} input	3.9	A
Repeated avalanche handling capability	E _{ar max}		42	mJ
Storage temperature	T _{stg}		-40 to +125	°C
Junction temperature	T _{j max}		150	°C
Operating substrate temperature	T _{c max}		105	°C

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Allowable Operating Conditions at $T_a = 25^\circ\text{C}$

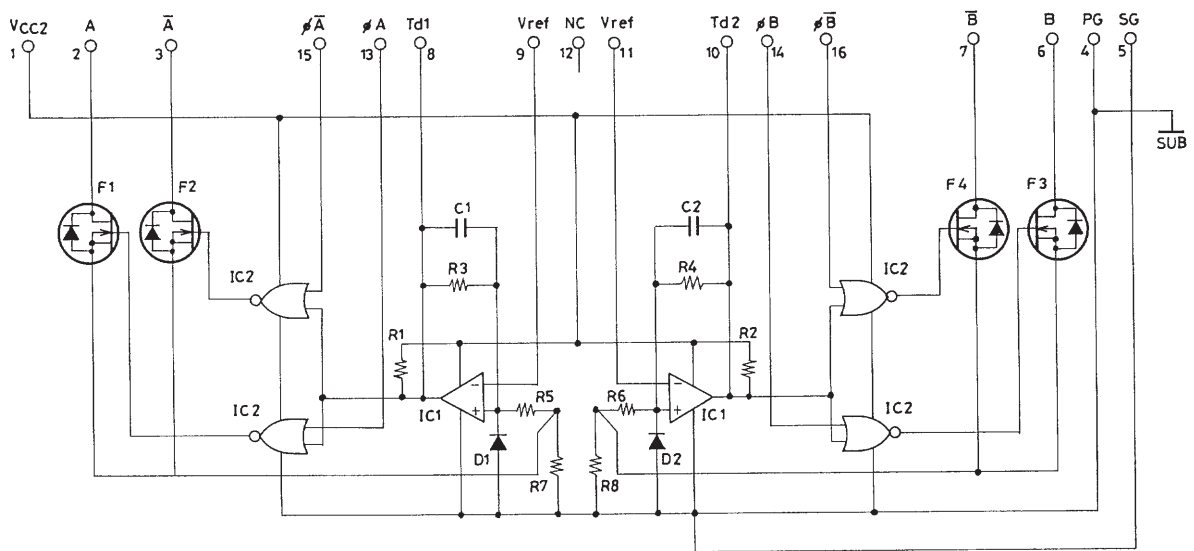
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Supply voltage 1	V_{CC1}	With input signal	18		42	V
Supply voltage 2	V_{CC2}	With input signal	4.75	5.0	5.25	V
Phase driver withstand voltage	V_{DSS}		100			V
Phase current	I_{OH} max	Duty 50%			3.0	A

Electrical Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC1} = 36\text{V}$, $V_{CC2} = 5\text{V}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Output saturation voltage	V_{ST}	$R_L=14\Omega$, $V_{IN}=0.8\text{V}$		1.5	2.1	V
Output current (average)	$I_{O\text{ ave}}$	Load; $R/L=3.5\Omega/3.8\text{mH}$, $V_{IN}=0.8\text{V}$ per phase	0.477	0.53	0.583	A
Pin 1 current consumption (average)	I_{CC2}	Load; $R/L=3.5\Omega/3.8\text{mH}$, $V_{IN}=0.8\text{V}$ per phase		10	20	mA
FET diode forward voltage	V_{df}	$I_f = 1.0\text{A}$		1.2	1.8	V
TTL input ON voltage	V_{IH}	Input voltage when F1, 2, 3, 4 OFF	2.0			V
TTL input OFF voltage	V_{IL}	Input voltage when F1, 2, 3, 4 ON			0.8	V
Switching time	t_{ON}	$R_L=24\Omega$, $V_{IN}=0.8\text{V}$		120		ns
	t_{OFF}	$R_L=24\Omega$, $V_{IN}=0.8\text{V}$		0.2		μs

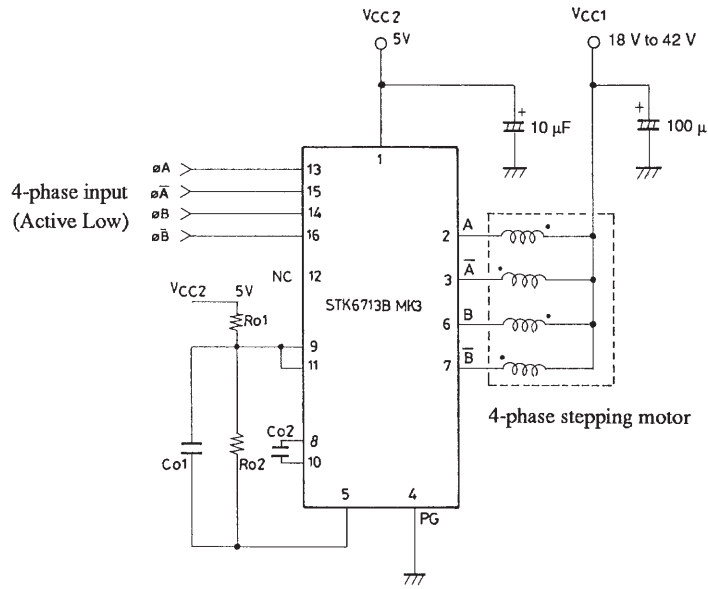
Note: With regulated voltage power supply.

Equivalent Circuit



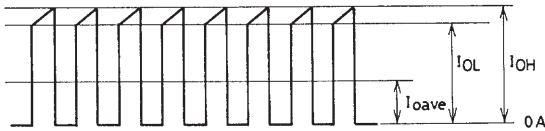
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Application Circuit



Note: For reference, when $I_{OH} \approx 1.1A$, $R_{O1} = 6.8k\Omega$ and $R_{O2} = 390\Omega$.

Output current waveform when phases held (locked)



Measure output current values in this state.

$$I_{OH} = K \times \frac{R_{O2}}{R_{O1} + R_{O2}} \times V_{CC2}/R_7$$

$$K \approx 1.3$$

$$R_7 = R_8 = 0.33\Omega \pm 3\%$$

To reduce noise during motor hold, it is possible to mount $C_{O1} \approx 0.01 \mu F$ and $C_{O2} \approx 100-200 pF$. Normally these are not required.

Note: Both input signals cannot be L at the same time.

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