Ordering number : ENN4352A

Thick Film Hybrid IC

# 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

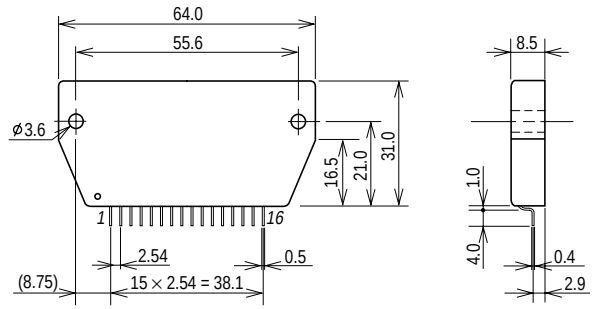
- Fixed-current driver device which uses MOSFET
- Input signal supporting TTL level (Active Low drive type)
- On-chip current detection resistor

## Package Dimensions

unit: mm

**4131**

[STK6713BMK3]




## Specifications

### Maximum Ratings at Ta = 25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Maximum supply voltage 1 | $V_{CC}$1max | No input signal | 52 | V |
| Maximum supply voltage 2 | $V_{CC}$2max | No input signal | 7 | V |
| Maximum phase current | $I_{OH}$ max | per phase, R/L = 5Ω/10mH,<br>0.5 s 1 pulse, $V_{CC}$ input | 3.9 | A |
| Repeated avalanche handling capability | Ear max | | 42 | mJ |
| Storage temperature | Tstg | | –40 to +125 | °C |
| Junction temperature | Tj max | | 150 | °C |
| Operating substrate temperature | Tc max | | 105 | °C |

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## Allowable Operating Conditions at Ta = 25°C

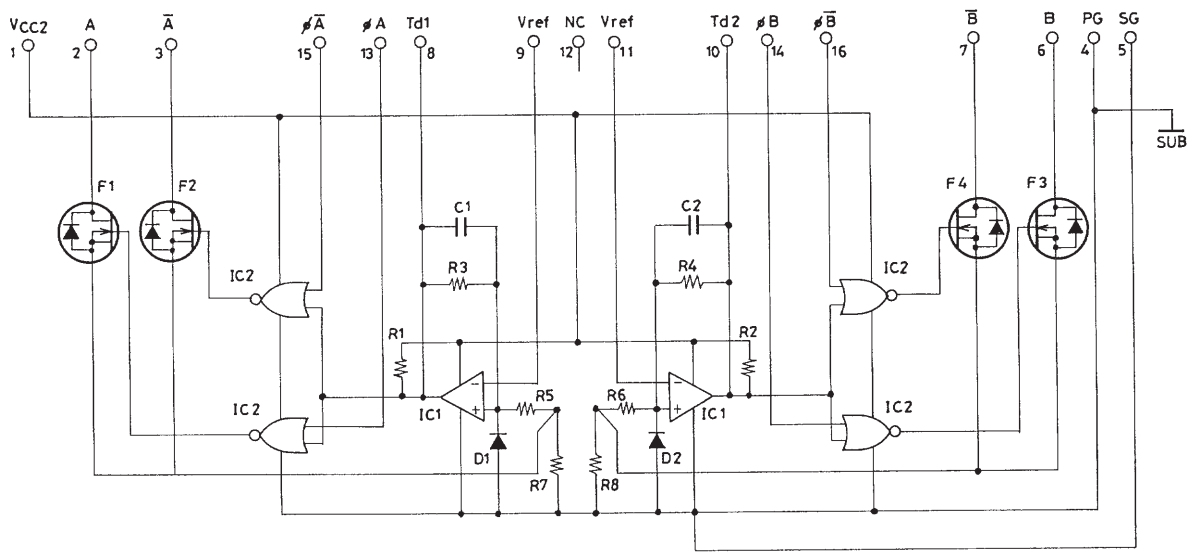
| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Supply voltage 1 | $V_{CC}1$ | With input signal | 18 | | 42 | V |
| Supply voltage 2 | $V_{CC}2$ | With input signal | 4.75 | 5.0 | 5.25 | V |
| Phase driver withstand voltage | $V_{DSS}$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

## Electrical Characteristics at Ta = 25°C, $V_{CC}1$ = 36V, $V_{CC}2$ = 5V

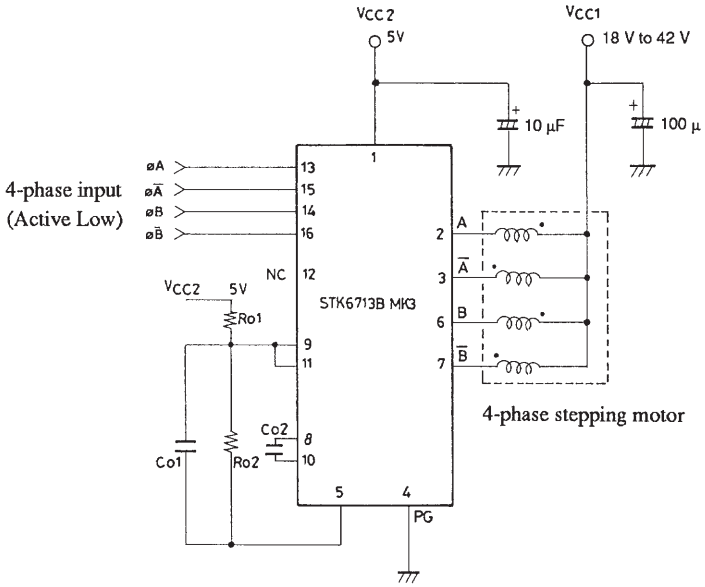
| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Output saturation voltage | $V_{ST}$ | $R_L$=14Ω, $V_{IN}$=0.8V | | 1.5 | 2.1 | V |
| Output current (average) | Io ave | Load; R/L=3.5Ω/3.8mH, $V_{IN}$=0.8V per phase | 0.477 | 0.53 | 0.583 | A |
| Pin 1 current consumption (average) | $I_{CC}2$ | Load; R/L = 3.5Ω/3.8mH, $V_{IN}$ = 0.8V per phase | | 10 | 20 | mA |
| FET diode forward voltage | Vdf | $I_f$ = 1.0A | | 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 | $t_{ON}$ | $R_L$=24Ω, $V_{IN}$=0.8V | | 120 | | ns |
| | $t_{OFF}$ | $R_L$=24Ω, $V_{IN}$=0.8V | | 0.2 | | µs |

Note: With regulated voltage power supply.

## Equivalent Circuit

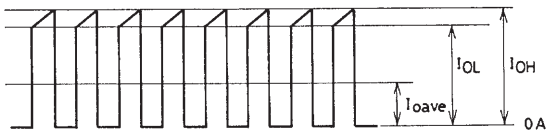


## Application Circuit




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.

$$I_{OH} = K \times \frac{R_{O2}}{R_{O1} + R_{O2}} \times V_{CC}2/R_7$$

$K \approx 1.3$

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

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

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