

全集成全桥直流马达驱动芯片的设计

郭振宗, 何进, 罗将, 王豪, 常胜, 黄启俊
(武汉大学 物理科学与技术学院, 湖北 武汉 430072)

摘要: 基于 CSMC 0.5 μm HV CMOS 工艺, 实现了一款具有优良动态性能和全面失效保护功能的全集成全桥直流马达驱动芯片. 芯片提供了待机、正转、反转和制动四种基本驱动模式, 以及脉冲宽度调制 (PWM) 调速和模拟电压调速两种调速模式; 集成了全面的失效保护电路, 包括欠压保护电路、过温保护电路和过流保护电路. 流片封装后的样片测试结果表明, 芯片各工作模式正常; 在电源电压分别为 5 V, 4 V, 3 V 时, 驱动 MOS 管的导通电阻分别约为 0.65 Ω , 0.8 Ω , 1 Ω ; 在 2.5~ 5.5 V 工作电压范围内, 可以提供最大值为 1 A 的驱动电流.

关键词: 马达驱动芯片; PWM; 全面失效保护; CMOS

Design of Fully-integrated and H-bridge for DC Motor Driver IC

GUO Zhen-zong, HE Jin, LUO Jiang, WANG Hao,
CHANG Sheng, HUANG Qi-jun

(School of Physics and Technology, Wuhan University, Wuhan 430072, China)

Abstract: A fully integrated and H-bridge DC motor driver with excellent dynamic performance and comprehensive fail-safe function has been implemented in CSMC 0.5- μm HV CMOS technology. In addition to operation with four basic modes, such as idle, forward, reverse and brake, this IC also can drive motor with two kinds of speed regulated modes: pulse width modulator (PWM) signal and analog voltage. The IC integrates comprehensive fail-safe circuits, including the under voltage protection circuit, over-temperature protection circuit and overcurrent protection circuit. The measured results of packaged IC sample show that all drive modes operated well. The power MOSFET's on resistance are about 0.65 Ω , 0.8 Ω and 1 Ω when supply voltage were 5 V, 4 V and 3 V, respectively. The IC can output a maximum of 1 A dc current within a supply voltage range of 2.5-5.5 V.

Key words: motor driver IC; PWM; comprehensive fail-safe; CMOS

作者简介:

郭振宗 男, (1982-), 硕士. 研究方向为模拟集成电路设计.

何进 男, (1975-), 副教授, 博士生导师. 研究方向为模拟、射频、毫米波集成电路设计与系统.

罗将 (通讯作者) 男, (1990-), 硕士. 研究方向为射频、毫米波集成电路设计. E-mail: luojiang@whu.edu.cn.