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LOW VOLTAGE BULK-DRIVEN SELF-BIASED HIGH SWING CASCODE CURRENT MIRROR

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ABSTRACT :

In this paper, a completely unique low voltage self-biased high swing cascode current mirror (SHCCM) using bulk-driven NMOS transistors is planned. It additionally removes the need of threshold voltage from the signal path, thereby permitting permitting rise within the obtainable voltage headroom and reducing the whole provide voltage of circuits. what is more, it's absolutely compatible with the quality CMOS processes . However, a crucial disadvantage of the bulk-driven technique is that the body transconductance (gmb) is about 3 to five times smaller than the gate transconductance (gm) .

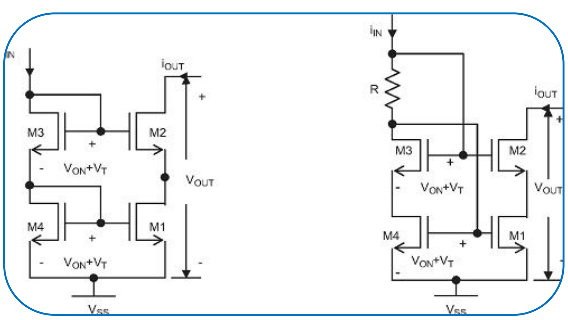
KEYWORDS : *swing cascode current mirror (SHCCM) , voltage of circuits.*

INTRODUCTION

Moreover, in bulk-driven circuits if each NMOS and PMOS need to be bulk-driven, then twin-well technology has to be used for fabrication [1-5]. High performance current mirror is one in every of the foremost necessary and helpful elementary unit of assorted analog computer circuit styles. Its economical style improves the performance of the integrated circuits [2]. numerous low voltage high performance bulk-driven current mirrors are reported earlier. The first current mirror (CM) reported during this context was easy bulk-driven current mirror [3]. This mirror was compatible for low power provide applications thanks to its low input drop. However, its current matching characteristic and output resistance were poor.

DISCUSSION

A bulk-driven cascode current mirror capable of 1-V operation was planned in 1998 . This bulk-driven CM has improved input and output current matching characteristic beside improved output resistance. However, its vary of operation was restricted. Later on, a coffee voltage regulated body-driven CMOS CM was reported [2]. This CM was proof against the edge voltage limitation and was determined to be in operation over wider current vary with higher accuracy than bulk-driven CMs reported earlier. However, to increase the present in operation vary and to induce improvement in input and output resistances of the CM, a feedback amplifier supported gate- driven cascode MOSFETs was used, that additional inflated the minimum power provide demand for correct operation of the circuit. Current mirror is a 2 port circuit, designed to generate a scaled duplicate of associate degree input current at a high-impedance output node. It keeps the output current constant despite loading. The major factors influencing the performance of a decent CM area unit, its in operation vary, bandwidth, output resistance



and therefore the mini- mum drop needed across input and output terminals of the mirror. This drop is needed to stay the transistors of the CM in saturation mode. Cascode current mirror (CCM) is employed to realize higher current matching characteristics at input and output nodes. It additionally helps in achieving high output electrical phenomenon. In this configuration, the output resistance of the circuit is inflated by a issue of gmr0, (where g is transconducatnce and r0 is output resistance of the MOSFET) [4-6]. This makes CCM extremely appropriate as compared to easy current mirror for completely different applications such as high performance telescopic opamps, second generation current con- veyers, voltage to current convertor, variable gain low noise amplifier etc. . However, voltage swing gets reduced in CCM. A easy gate-driven CCM is shown in Fig. 1. Let, the minimum output voltage needed to maintain the MOSFET's of the CM in saturation region be VOUT. Lower the price of VOUT, higher is that the voltage swing of the mirror.

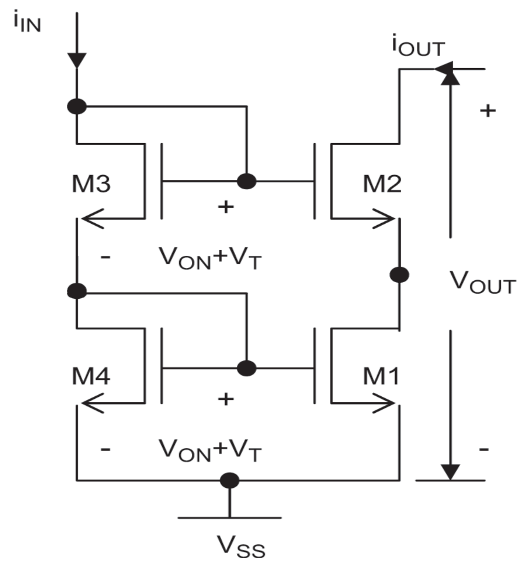


Fig. 1. Gate-driven CCM.

For any MOSFET to operate in saturation mode, minimum drain to source potential is given as:

$$V_{DS\,(min)} = V_{GS} - V_T = V_{ON} \quad (1)$$

where V_T is threshold voltage of MOSFET.

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