

Category: Current Source

CIRCUIT IDEAS FOR DESIGNERS

Schematic no. cs_11012.0

0.5% Precision Low Tempco P-channel Cascode Current Source

Description

This precision P-channel cascode current source is used when higher temperature stability is desired. This precision is achieved by using parts from the ALD3107xx Family of Precision Quad P-Channel Enhancement Mode EPAD Matched Pair MOSFET Array. Q1 is diode-connected with its source connected to V+ and Q4 is diode-connected with its source connected to the drain of Q1. VGs of Q1 sets the VGs of Q2 and VGs of Q4 sets the VGs of Q3. IDS current through Q1 is equal to that of Q4, which in turn is set by R1 and RP. RP is adjusted so that IOUT is equal to 57μ A. IDS of Q2 is equal to IDS of Q3, which is equal to IDS of Q1 as Q1 and Q2 are matched and have equal VGs. The set current measured across the two resistors R1+ RP is therefore equal to IOUT. This circuit operates at $50\text{ppm}/^{\circ}\text{C}$ tempco which means that the circuit can undergo a wide range of temperature values without affecting IOUT = 57μ A. The operating temperature range of this circuit is between +25°C and +85°C, giving an average temperature coefficient of 50ppm (parts per million). This 57μ A output current is valid for output voltage range from +1.9V to 3V for different parts with an average error of less than 0.5%.

For full schematic diagram and notes, please register and login at aldinc.com

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