



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. V_{GS} of Q1 sets the V_{GS} of Q2 and V_{GS} of Q4 sets the V_{GS} of Q3. I_{DS} current through Q1 is equal to that of Q4, which in turn is set by R₁ and R_P. R_P is adjusted so that I_{OUT} is equal to 57μA. I_{DS} of Q2 is equal to I_{DS} of Q3, which is equal to I_{DS} of Q1 as Q1 and Q2 are matched and have equal V_{GS}. The set current measured across the two resistors R₁+ R_P is therefore equal to I_{OUT}. This circuit operates at 50ppm/°C tempco which means that the circuit can undergo a wide range of temperature values without affecting I_{OUT} = 57μA. 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 57μA 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