Parametric linear voltage regulator

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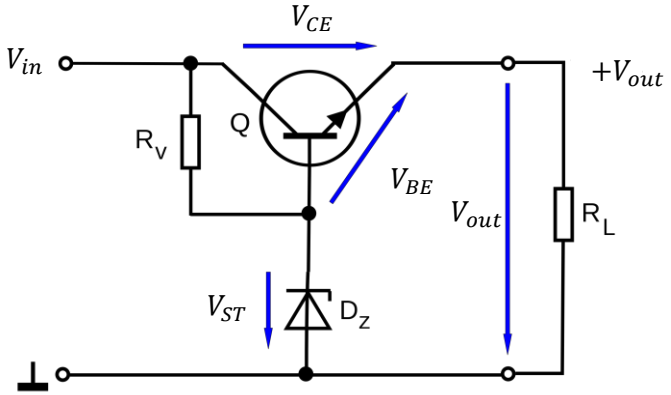
Summary

1. Parametric linear voltage regulator

2. Control test

Parametric linear voltage regulator

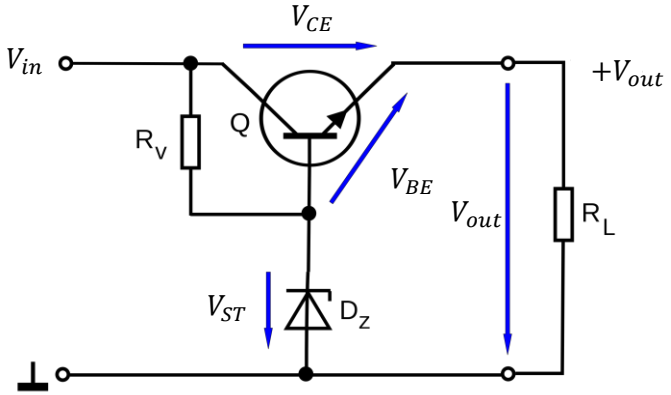


$$R_{\mathrm{v}} = \frac{\min V_R}{\min I_{\mathrm{D}} + \max I_{\mathrm{L}} / (h_{\mathrm{FE}} + 1)},$$

where

min V_R is the minimum voltage to be maintained across R_v,
min I_D is the minimum current to be maintained through the Zener diode,
max I_L is the maximum design load current,
h_{FE} is the forward current gain of the transistor (I_C/I_B).

Parametric linear voltage regulator



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Parametric linear voltage regulator

1. Calculate load current

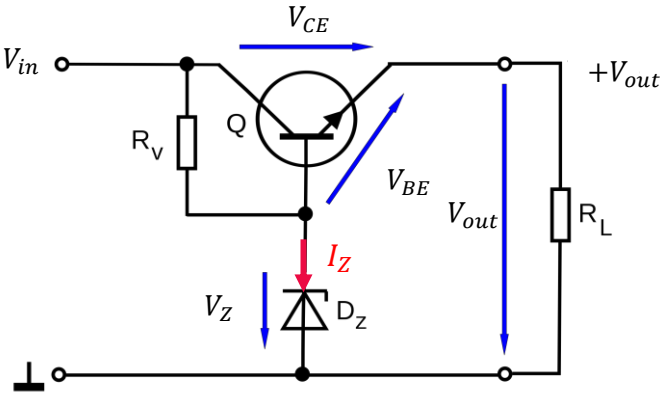
$$I_L = \frac{V_{out}}{R_L}$$

2. Define required stabilized voltage

$$V_Z = V_{out} + V_{BE}$$

3. Chose the transistor according to the requirement

$$V_{CE\_max} = (1.5 \ \ldots 2)V_{in\_max};\ I_{C\_max} > 2I_L$$



4. Choose R_v is selected based on the condition that current should flow through the transistor at a minimum input voltage

$$R_v = \frac{V_Z}{(1.5 \ \ldots 2)I_Z + \frac{V_{out}}{R_L(1 + h_{FE})}}$$

TEST 1

https://forms.yandex.com/cloud/6363408243f74f24464db4b5/

https://clck.ru/32Zfm6

1st deadline: 04.11.2022 15:15 (GMT +8)

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Thank you for your attention!