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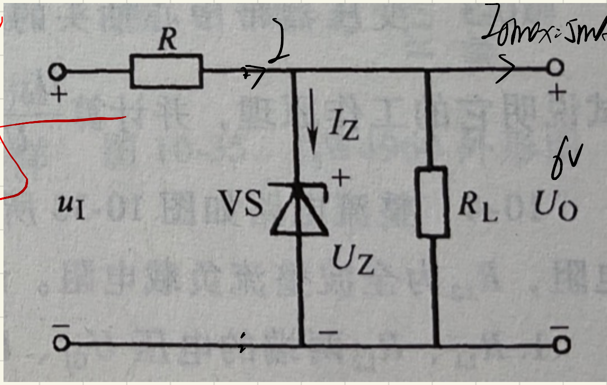
10-10



$U_Z=(5\sim6.5)V$

$I_Z=10mA$

$I_{Z\max}=38mA$

$U_2=15V$

(1) 不能稳压，可能会超出稳压范围从而烧坏稳压二极管

(2) 单相桥式整流电容滤波电路

$U_o=1.2U_2$ $\quad I_{Zmin}\le I_Z\le I_{Zmax}$

即 $U_I=1.2U_2$

当电网电压上升10%，且负载电流最小时

$U_{Imax}=1.1\times1.2U_2=19.8V$

$I_{Zmax}>\dfrac{U_{Imax}-U_Z}{R}-I_{omin}$

$=\dfrac{U_{Imax}-U_o}{R}$

$R\geqslant\dfrac{U_{Imax}-U_o}{I_{Zmax}}=\dfrac{19.8V-6V}{38\times10^{-3}A}=363\Omega$

当电网电压下降10%，且负载电流最大时

$U_{Imin}=1.2U_2\cdot0.9=16.2V$

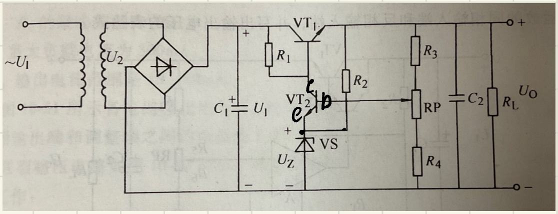
$I_{Zmin}<\dfrac{U_{Imin}-U_Z}{R}-I_{omax}$

$=\dfrac{U_{Imin}-U_o}{R}-I_{omax}$

$R\le\dfrac{U_{Imin}-U_o}{I_{Zmin}+I_{Omax}}=\dfrac{16.2V-6V}{15\times10^{-3}A}=680\Omega$

$363\Omega\le R\le680\Omega$

10-11



1. $U_1 = 24V$

   $U_2 = \frac{24}{1.2}V = 20V$

2. $U_{BE} = 0.7V$

   $U_Z = 5.3V$

   $\frac{U_{BE}+U_Z}{U_o} = \frac{R_4+R_P'}{R_3+R_P+R_4}$ $\quad U_o = (U_{BE}+U_Z)\frac{R_4+R_3+R_P}{R_4+R_P'}$

   当R_P滑动点在最下端 $R_P' = 0$

   $U_{o1} = 6\times\frac{3\times300}{300} = 18V$

   当R_P滑动点在最上端 $R_P' = R_P$

   $U_{o2} = 6\times\frac{3\times300}{2\times300} = 9V$

   ∴ $9V \le U_o \le 18V$

3. $R_3 = 600\Omega$

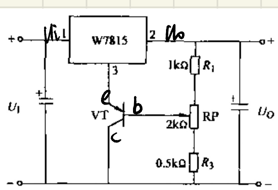
   $U_{omax} = 6\times\frac{600+2\times300}{300} = 6\times4 = 24V$

   又∵ 此时 $U_1 = 24V \doteq U_{omax}$

   $U_{CES} \approx 0V$ 三极管工作在饱和状态

   ∴ $U_{omax} = U_1 - U_{CES} = (24-2)V = 22V$

10-9



$U_{EB} = 0.2V$

$\frac{U_{EB}+U_{W7815}}{U_O} = \frac{R_1+R_P'}{R_1+R_P+R_3}$

$U_{omin} = (15+0.2)\times\frac{3.5k}{(1+2)k} = 15.2\times\frac{7}{6} = 17.7V$

$U_{omax} = (15+0.2)\times\frac{3.5k}{1k} = 53.2V$

$17.7V \le U_o \le 53.2V$