

Chapter 3: Semiconductor electronic devices

chapter3_3 Transistor Circuits for analyzing E-MOSFET Q-point conditions.

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% Onwubolu, G. C.  
% Mechatronics: Principles & Applications  
% Elsevier  
%  
% Mechatronics: Principles & Applications Toolbox Version 1.0  
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%  
% Chapter 3.6: Transistor Circuits  
%  
% Example 3.3  MATLAB's calculating power is demonstrated by analyzing  
% E-MOSFET Q-point conditions.  
  
'Example 3.3'          % Display label.  
Vdd=40;  
Vds=8;  
Vt=4;  
Idss=6E-3;  
R1=3E+6;  
R2=2E+6;  
Rd=10E+3;  
  
% Commence computation  
Vgg=(R2/(R1+R2))*Vdd  
Rg=R1*R2/(R1+R2)  
E=Vdd-Vds-Vgg;  
D=Idss*Rd;  
C=D-E;  
B=-(2*D/Vt+1);  
A=D/(Vt^2);  
%Solve quadratic equation  
Vs=[A B C];  
%rootsVs  
V=roots(Vs)  
if V(1)>Vt  
    Id=Idss*(V(1)/Vt-1)^2  
else Id=Idss*(V(2)/Vt-1)^2  
end  
Rs=(Vdd-Id*Rd-Vds)/Id  
pause
```