Jaeger 3rd ed

13.75

$V_{DS} = 6\,V.$

$V_{TN} = +1\,V.$

$$i_D = \tfrac{1}{2} K_n (V_{GS} - V_{TN})^2 (1 + \lambda V_{DS})$$

$$g_m = K_n (V_{GS} - V_{TN})(1 + \lambda V_{DS}) = \sqrt{2 K_n I_D (1 + \lambda V_{DS})}$$

$$\cong K_n (V_{GS} - V_{TN}) \cong \sqrt{2 K_n I_D}$$

$$r_o = \frac{1 + \lambda V_{DS}}{\lambda I_D} \cong \frac{1}{\lambda I_D} \qquad \mu_f = g_m r_o$$

I_D	g_m	r_o	μ_f	s.s. limit $V_{gs} \le 0.2(V_{GS} - V_{TN})$
(0.8mA)	800μS	(40KΩ)	32	0.2(2V) = 400mV peak
(50μA)	(200μS)	640KΩ	128	0.2(0.5V) = 100mV peak
(10mA)	2.83mS	3.2KΩ	9.05	0.2(7.07V) = 1.414 V peak

$$\lambda = \frac{1}{r_o I_D - V_{DS}} = \frac{1}{26\,V.} = 0.0385\,V^{-1}$$

$$K_n = \frac{g_m^2}{2 I_D (1 + \lambda V_{DS})} = 325\,\mu A/V^2$$

[circled entries given; others calculated]