

Jaeger 3rd ed

13.54

$$g_m = \frac{I_C}{V_T}$$

$$\mu_f = g_m r_o$$

$$r_{\pi} = \frac{\beta_0}{g_m}$$

$$\begin{cases} i_C = \beta_F i_B \text{ but} \\ i_C = g_m v_{\pi} = \beta_0 i_b \end{cases}$$

$$r_o = \frac{V_A + V_{CE}}{I_C} \approx \frac{V_A}{I_C}$$

lower case "c"

given $V_{CE} = 10V$ and circled entries in table

I_C	g_m	r_{π}	r_o	μ_f
2mA	80mS	150 Ω	40K Ω	3200
3mA	0.12S	500 Ω	26.7K	3200
3.125 μ A	125 μ S	480K Ω	25.6M Ω	3200

$$V_A = I_C r_o - V_{CE} = 70V$$

$$\beta_0 = g_m r_{\pi} = 60$$

(we're assuming it doesn't change with I_C)