Question #1

12. ¼w resistor → 6.5mm long
1206 SMD resistor → 3.2mm long
0402 SMD resistor → 1.0 mm long

- RF sinusoidal excitation
- v thru resistors is 0.6c

? where can each resistor safely be considered lumped (frequency)?

? use lambda versus component size criterion

Safely lumped is where component size is $\leq 0.01\lambda$

for the case where $v = 0.6c$, $\lambda = \frac{0.6c}{f}$

so for ¼w resistor, $6.5mm \leq \frac{0.6c(.01)}{f}$; $f = \frac{0.6(300\times10^6)(.01)\frac{m}{s}}{.0065m}$

$= \underline{\underline{276.9MHz}}$ (¼w)

for 1206 (3.2mm), $3.2mm \leq \frac{0.6c(.01)}{f}$; $f = \frac{0.6(300\times10^6)(.01)\frac{m}{s}}{.0032m}$

$= \underline{\underline{562.5MHz}}$

for 0402 (1.0mm), $1.0mm \leq \frac{0.6c(.01)}{f}$; $f = \frac{0.6(300\times10^6)(.01)\frac{m}{s}}{.001m}$

$f = \underline{\underline{1.8GHz}}$