

35. (a) In region *a* of the graph,

$$\begin{aligned}
 |i_d| &= \varepsilon_0 \left| \frac{d\Phi_E}{dt} \right| = \varepsilon_0 A \left| \frac{dE}{dt} \right| \\
 &= (8.85 \times 10^{-12} \text{ F/m})(1.6 \text{ m}^2) \left| \frac{4.5 \times 10^5 \text{ N/C} - 6.0 \times 10^5 \text{ N/C}}{4.0 \times 10^{-6} \text{ s}} \right| = 0.71 \text{ A}.
 \end{aligned}$$

(b)  $i_d \propto dE/dt = 0$ .

(c) In region *c* of the graph,

$$|i_d| = \varepsilon_0 A \left| \frac{dE}{dt} \right| = (8.85 \times 10^{-12} \text{ F/m})(1.6 \text{ m}^2) \left| \frac{-4.0 \times 10^5 \text{ N/C}}{15 \times 10^{-6} \text{ s} - 10 \times 10^{-6} \text{ s}} \right| = 1.1 \text{ A} .$$