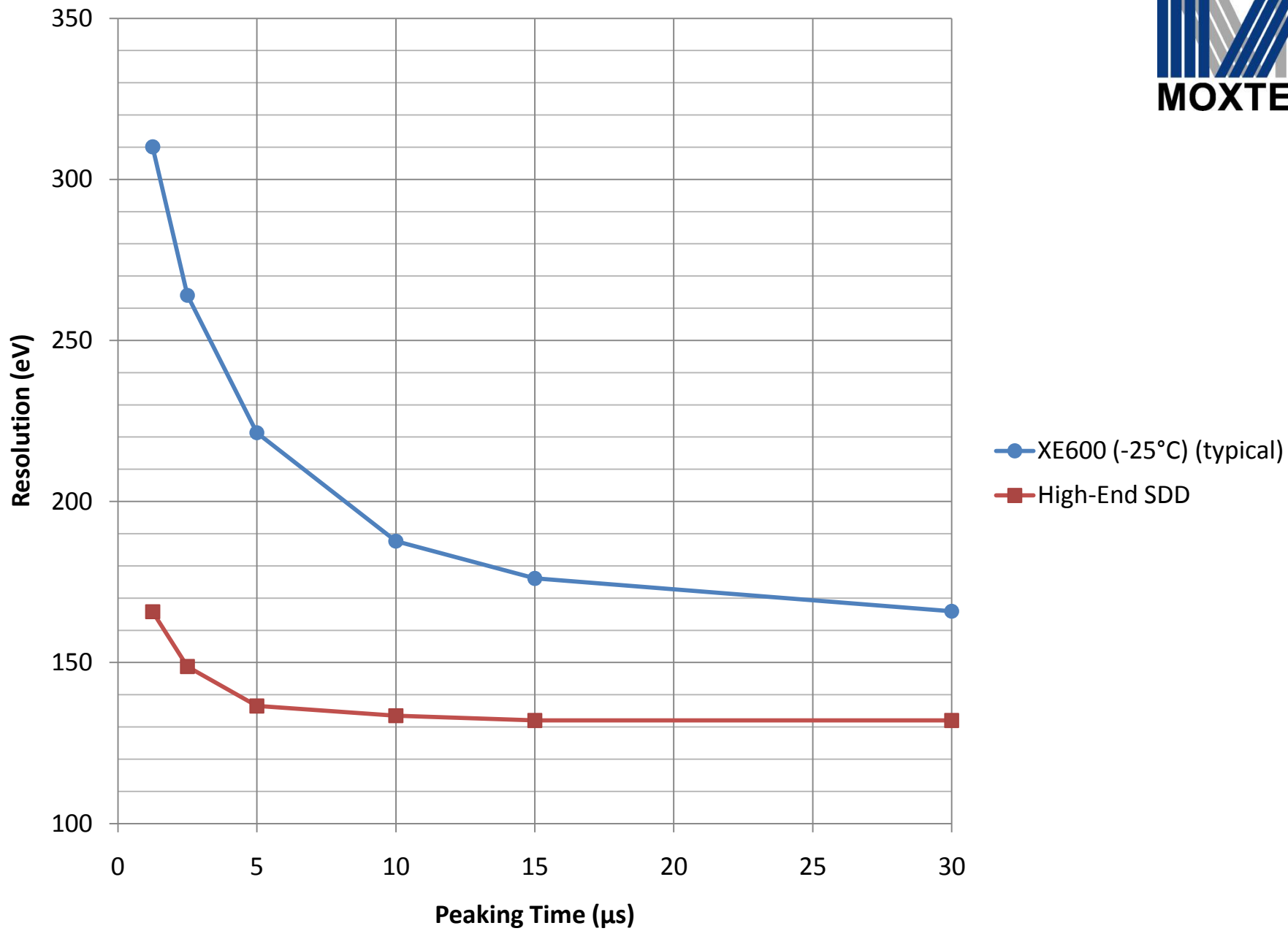
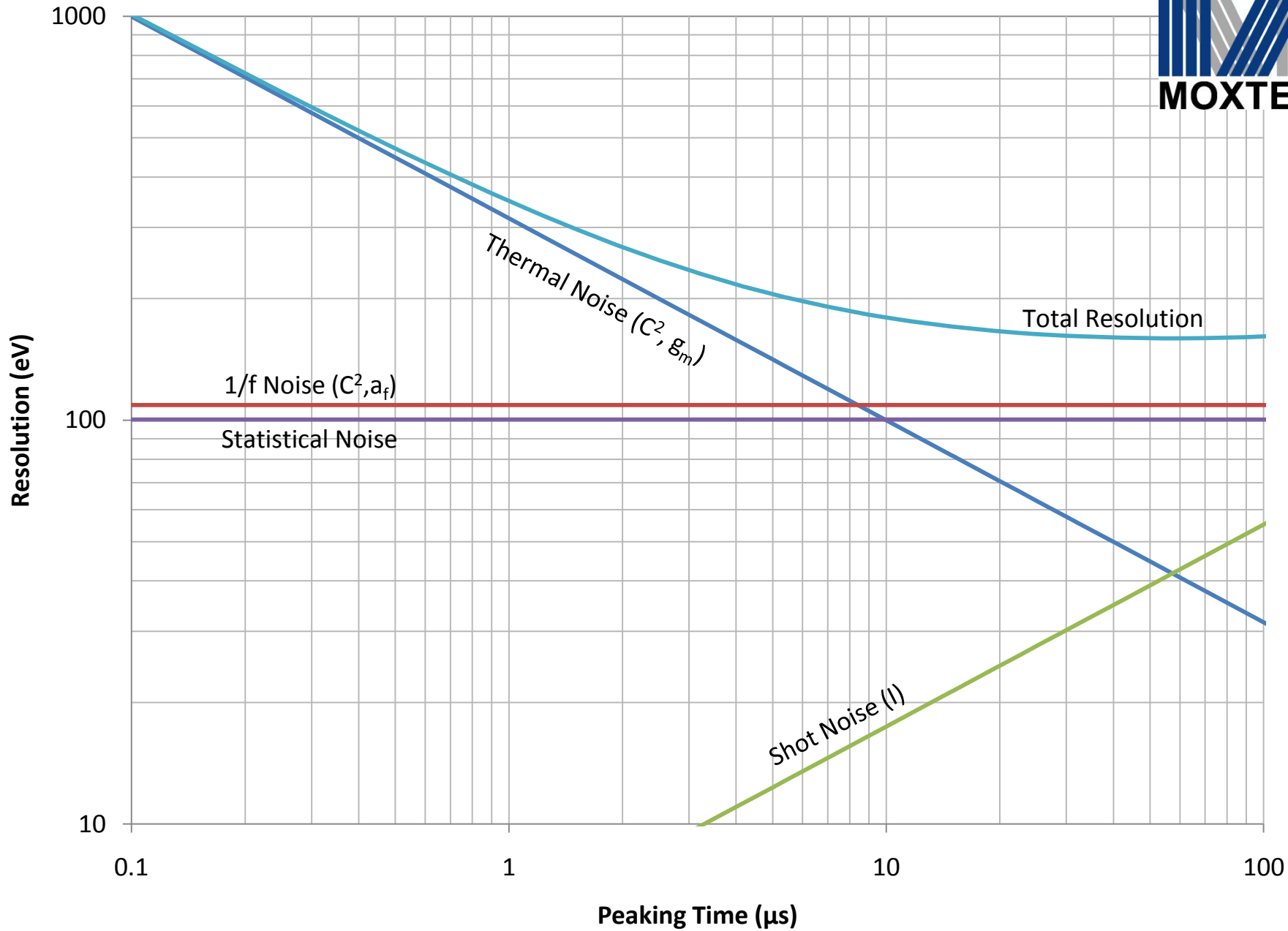


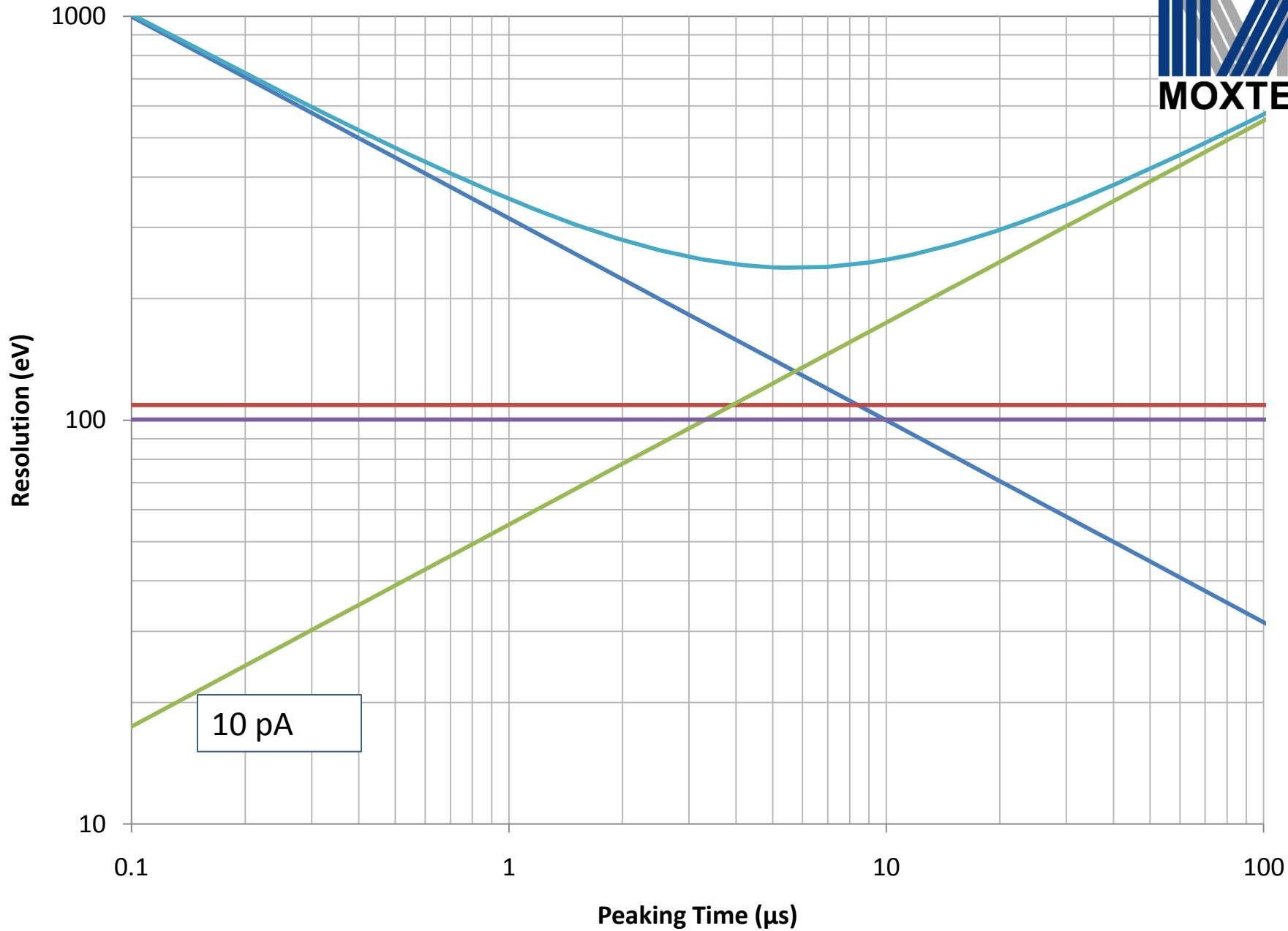
Bridging the Price/Performance Gap Between Silicon Drift and Silicon PIN Diode Detectors

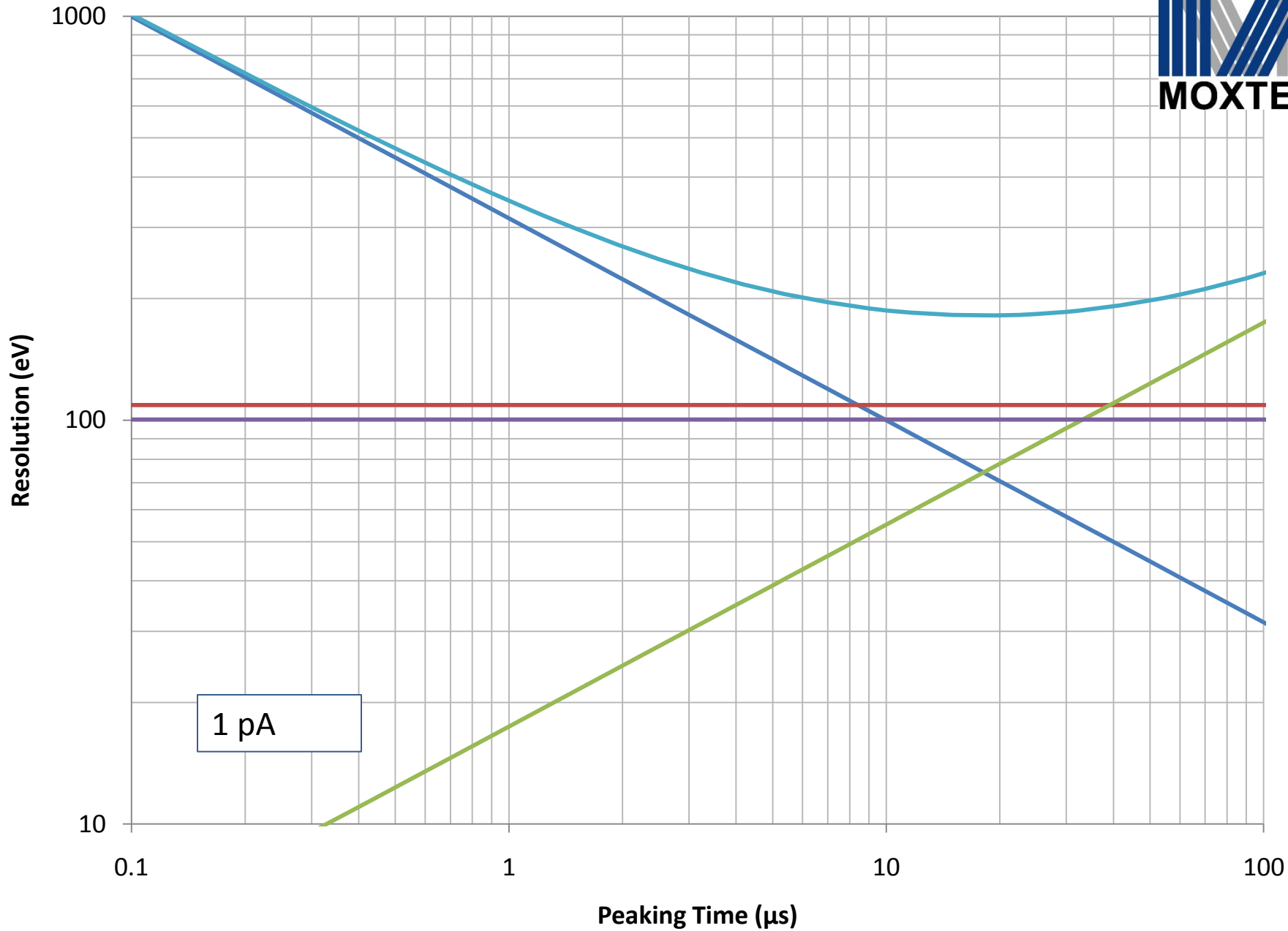
Derek Hullinger
Keith Decker
Jerry Smith
Chris Carter

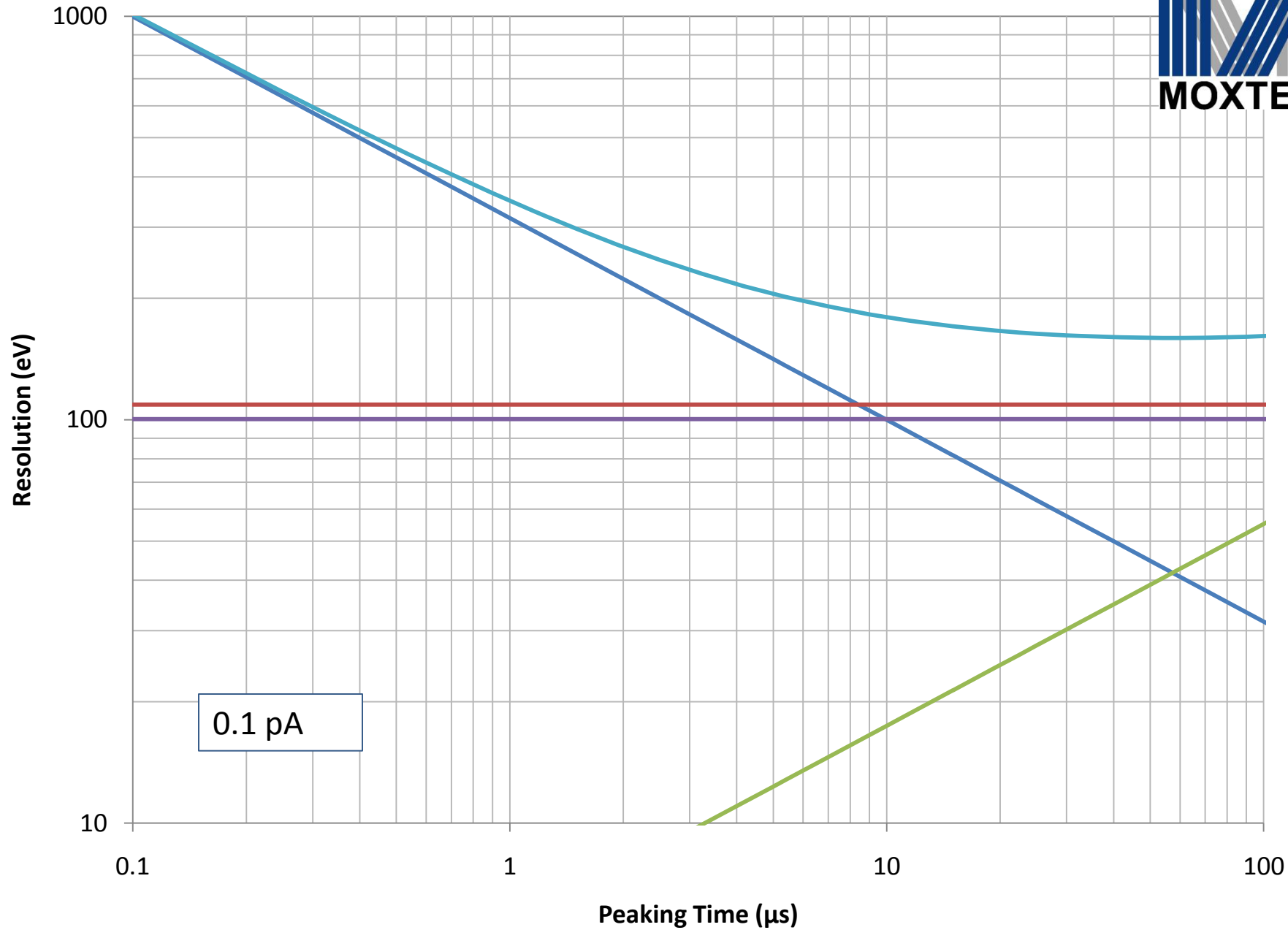
Moxtek, Inc.

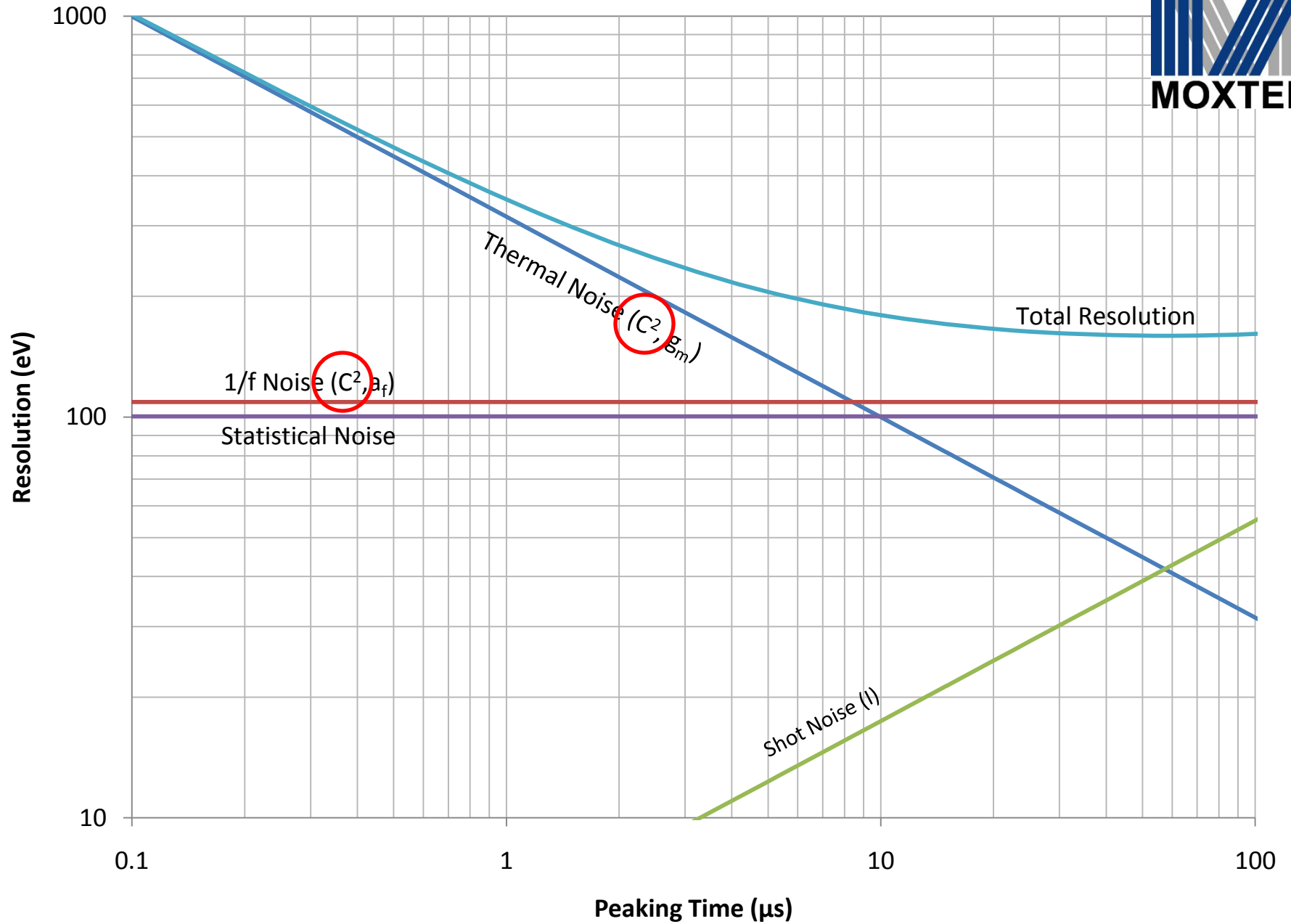




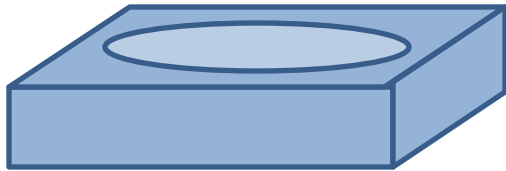




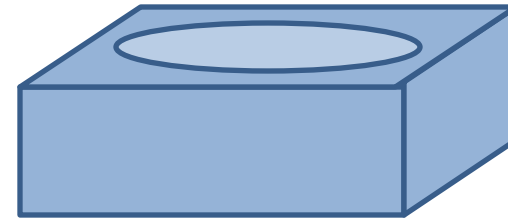




Reducing Diode Capacitance



400 μm



625 μm

Anode-to-Substrate Capacitance

$$C = \epsilon \frac{A}{d}$$

$$\frac{(1.04 \times 10^{-10} \text{ F/m})(6 \times 10^{-6} \text{ m}^2)}{(0.0004 \text{ m})}$$

= 1.6 pF

$$\frac{(1.04 \times 10^{-10} \text{ F/m})(6 \times 10^{-6} \text{ m}^2)}{(0.000625 \text{ m})}$$

= 1.0 pF

Requirements

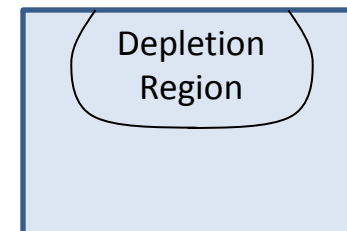
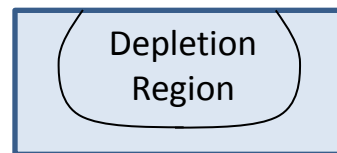
- Low Leakage Current Process

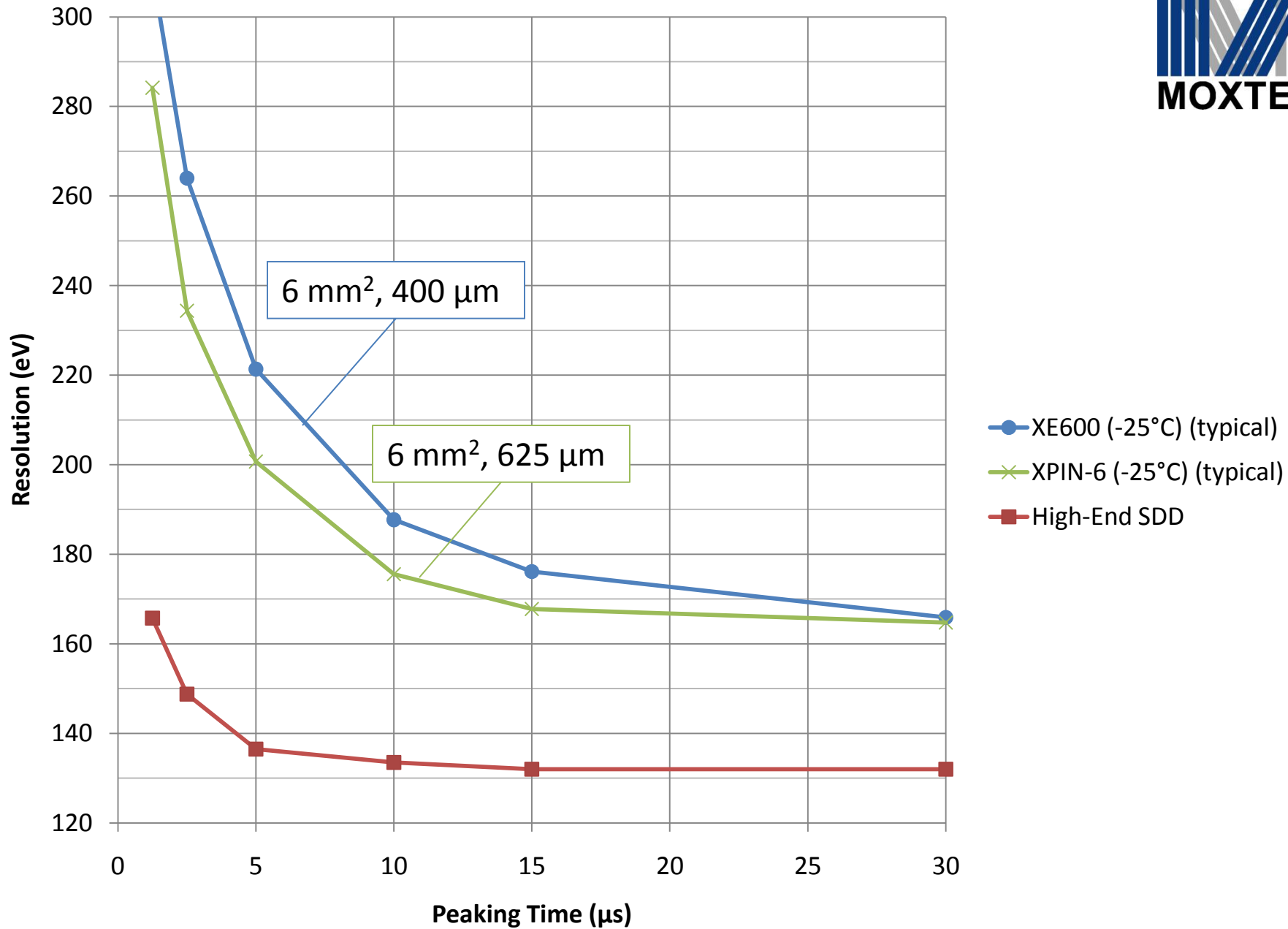
$I \propto$ Depleted Volume

- Higher Bias or
Higher Resistivity

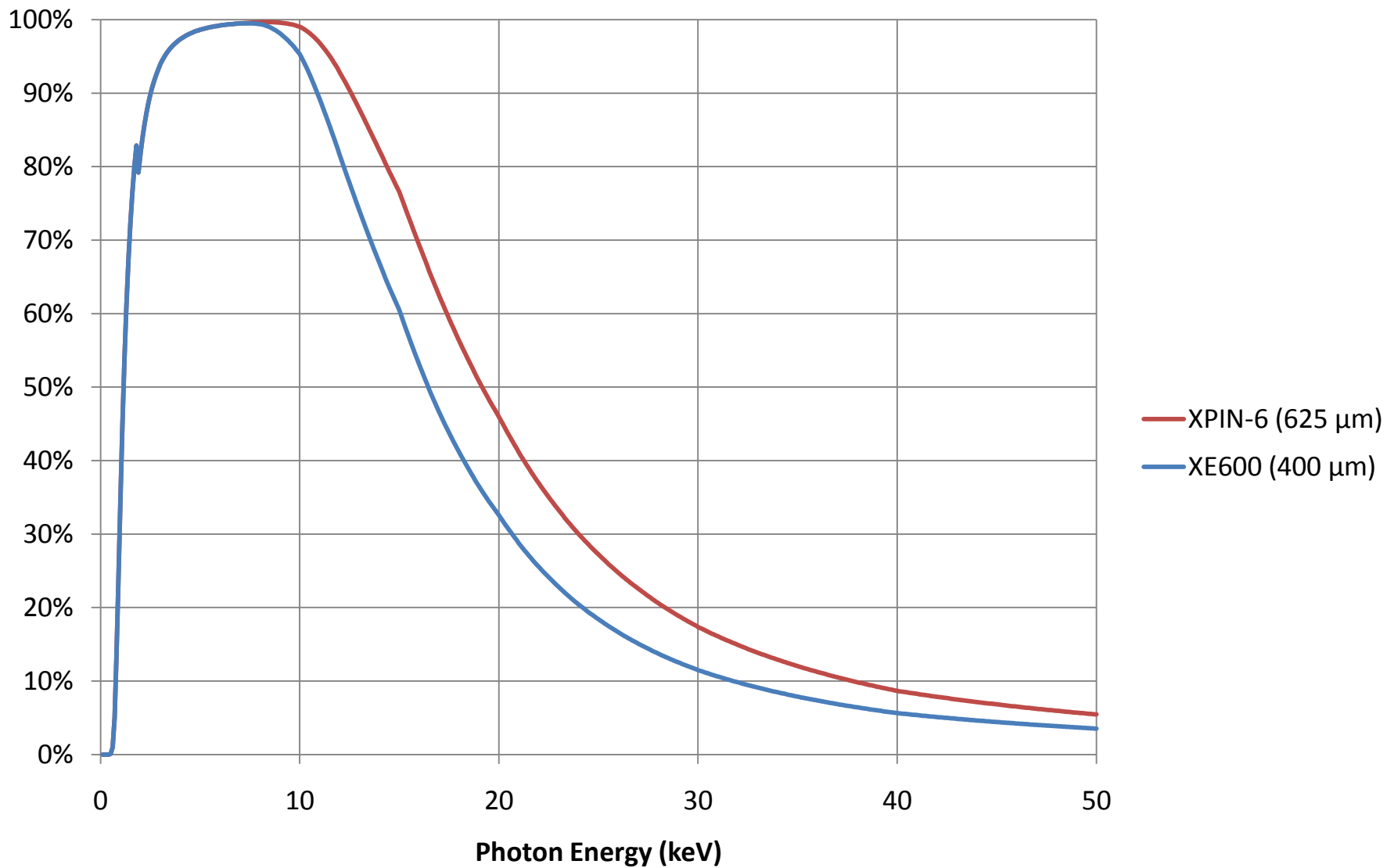
$C \propto$ Depleted Thickness

$$V_{depl} = \frac{qN_d d^2}{2\epsilon}$$





Absorption



Peak-to-Background



