

Power Devices for Induction Accelerators

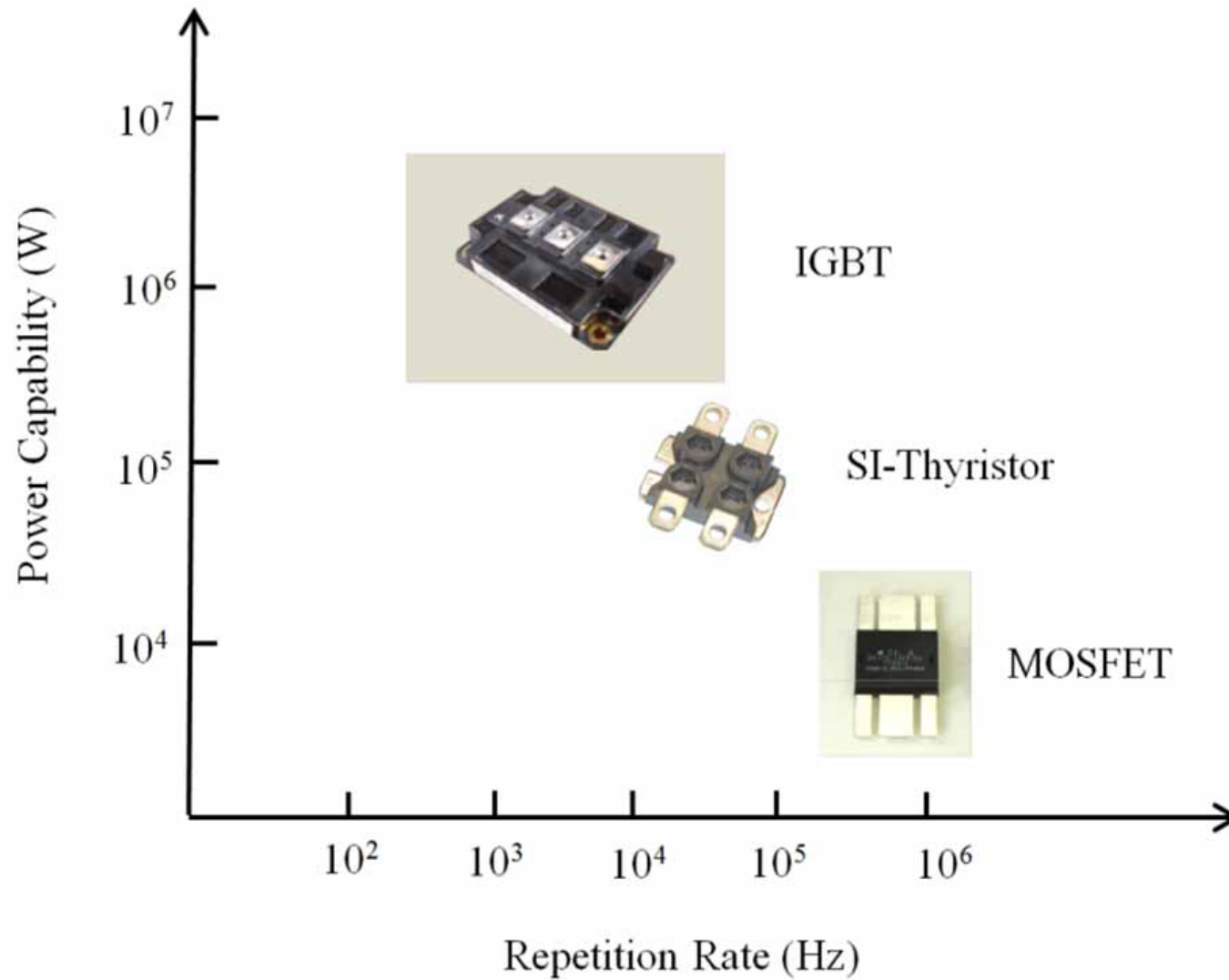
Weihua Jiang

Nagaoka University of Technology

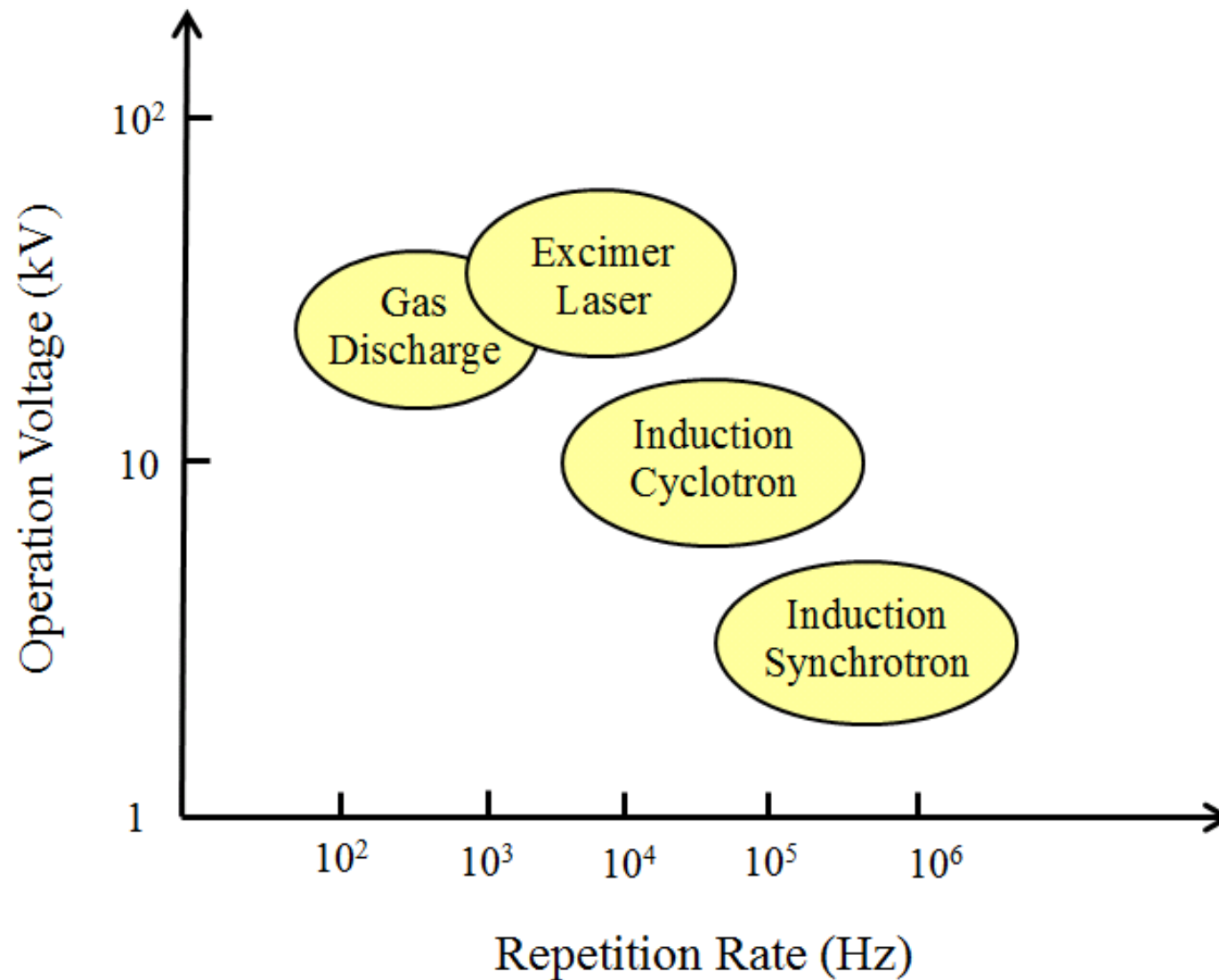
Extreme Energy-Density Research Institute Nagaoka University of Technology



Power Semiconductor Devices



Applications of Short Repetitive Pulsed Power



Power Semiconductor Devices



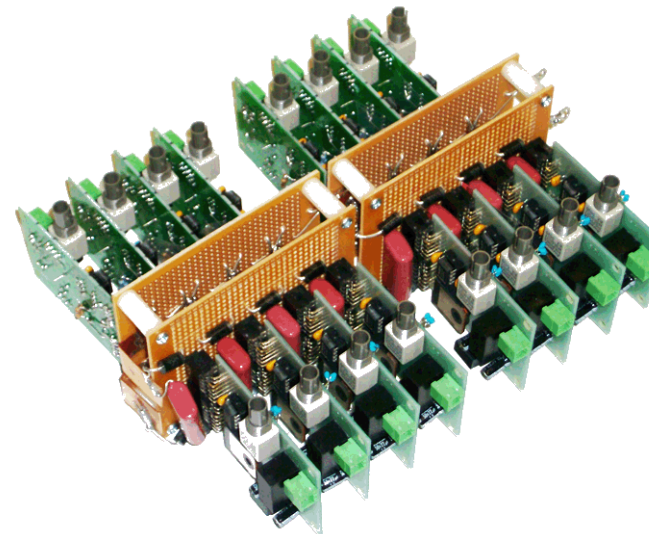
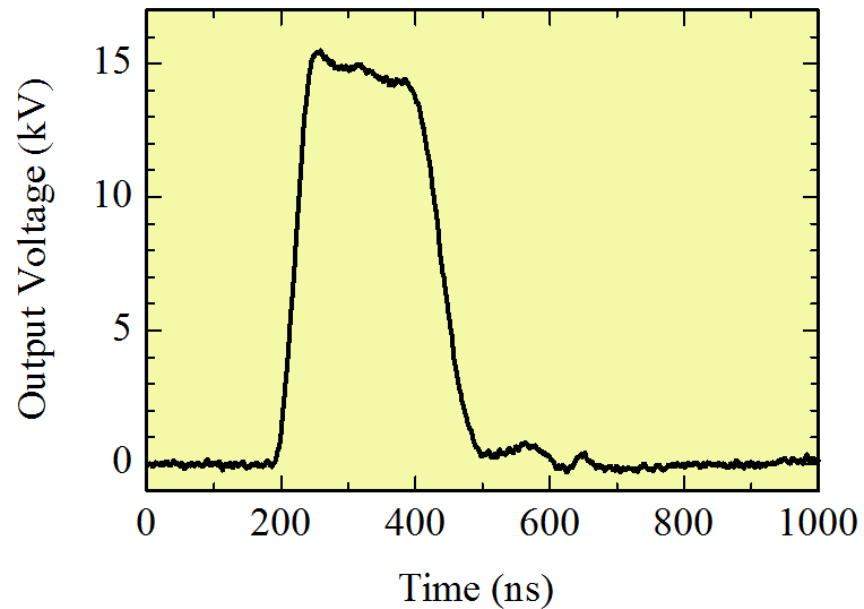
SiThy



IGBT



SiC-JFET



Power Semiconductor Devices



MOSFET



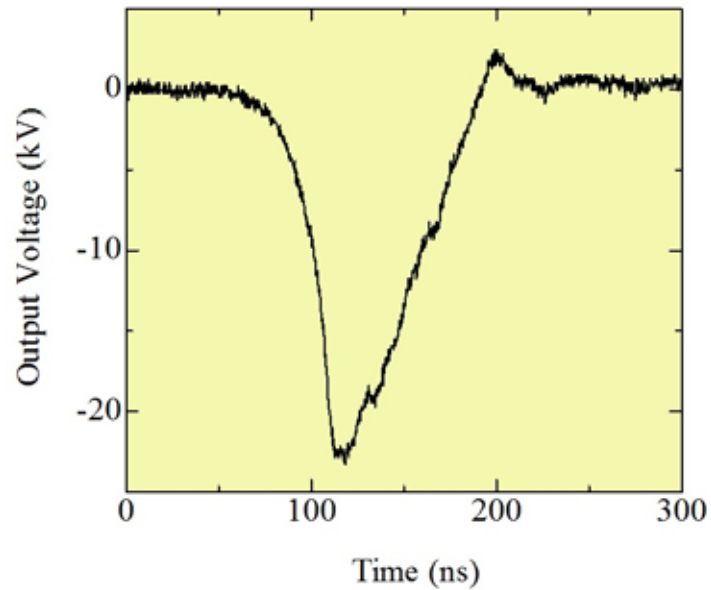
SiThy



IGBT



SiC-JFET



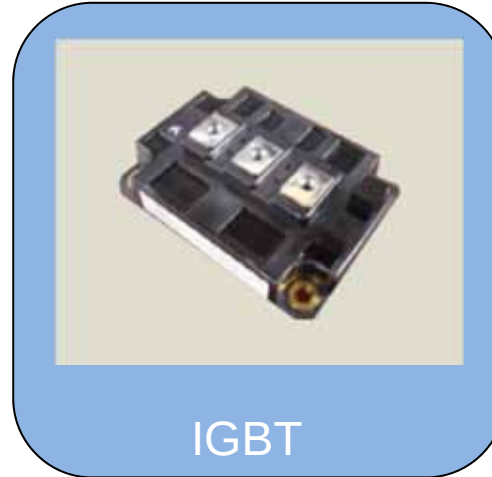
Power Semiconductor Devices



MOSFET



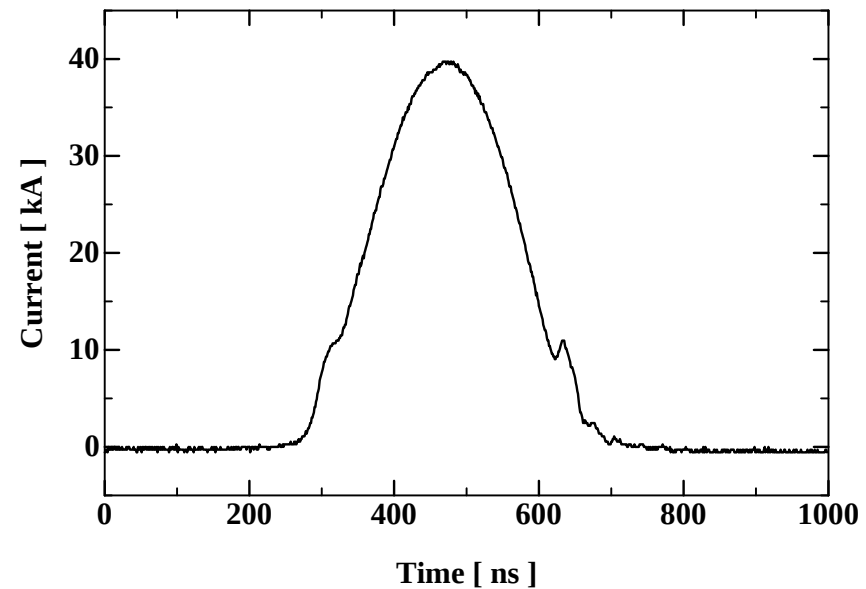
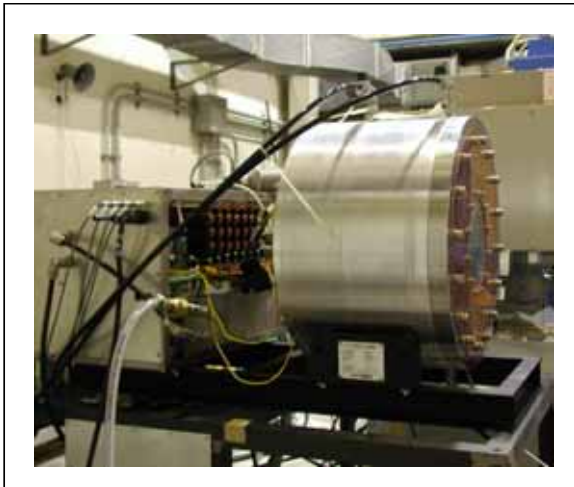
SiThy



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SiC-JFET



Power Semiconductor Devices



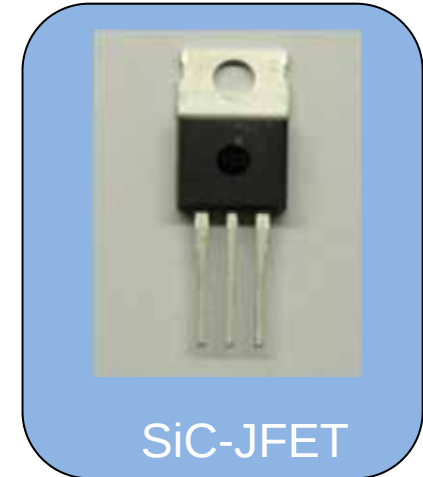
MOSFET



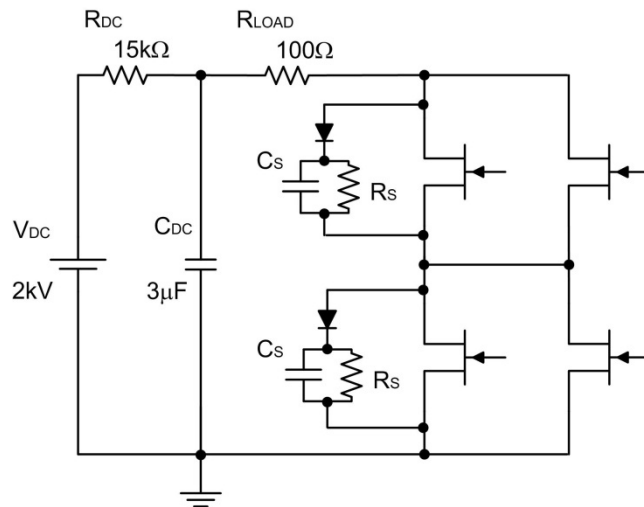
SiThy



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SiC-JFET



Power Semiconductor Devices



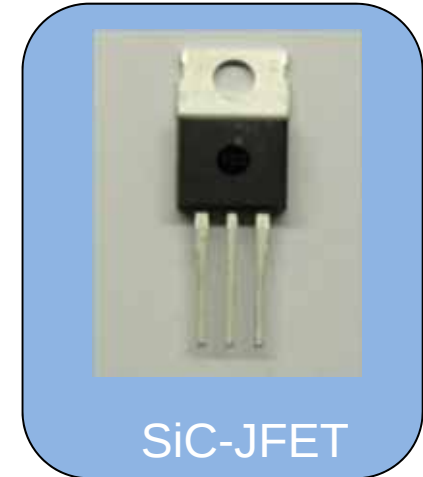
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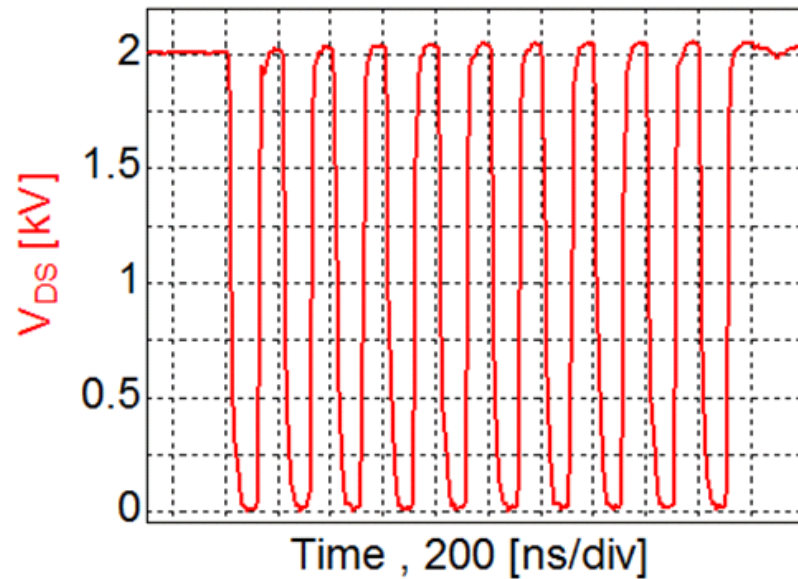
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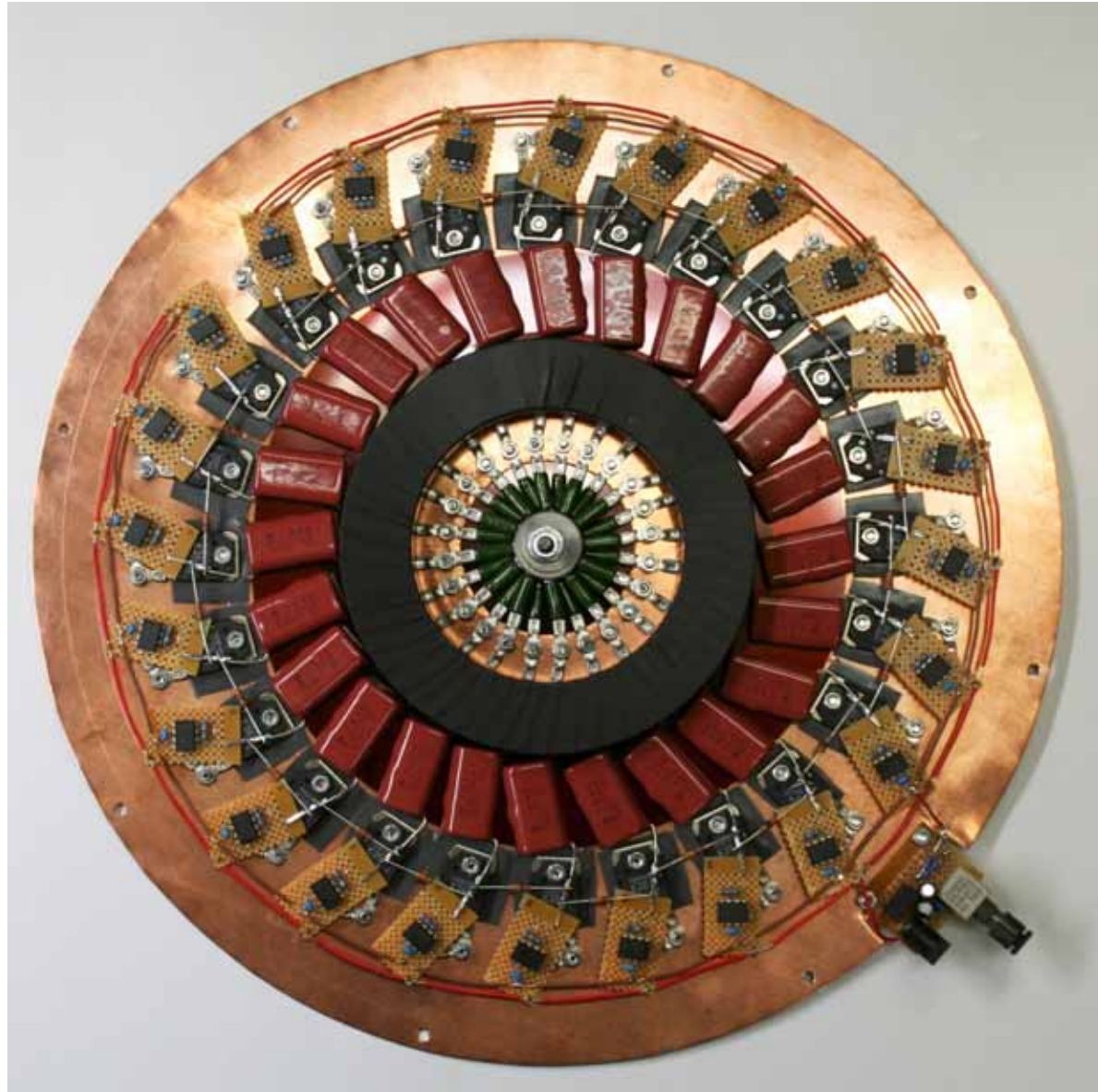
IGBT



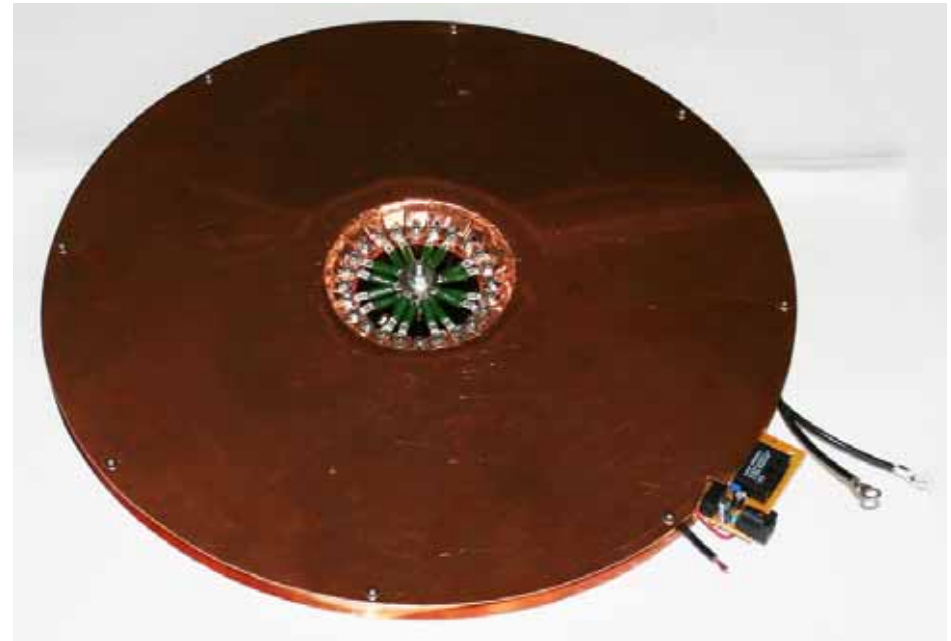
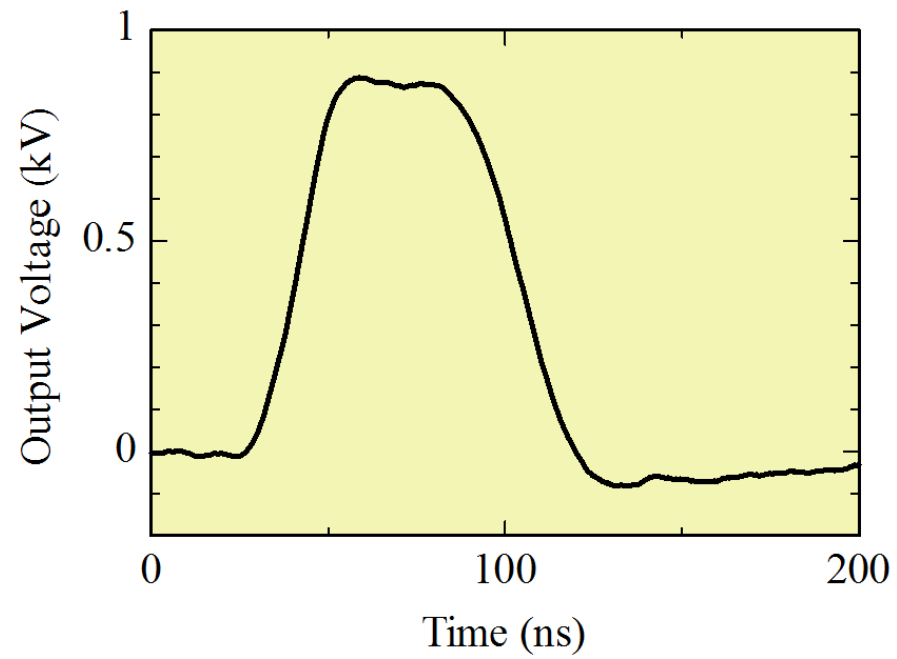
SiC-JFET



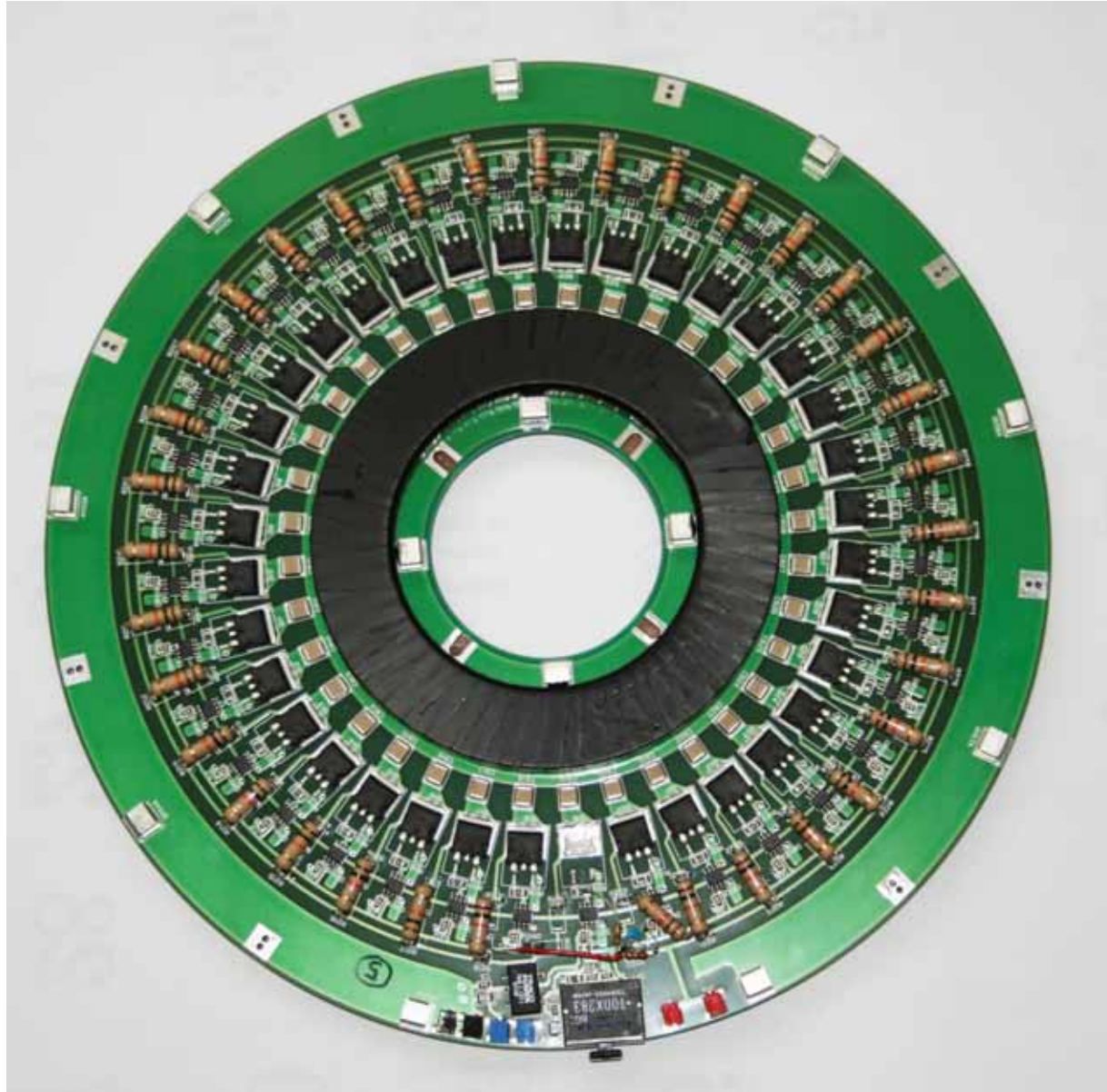
Linear Transformer Driver (LTD)



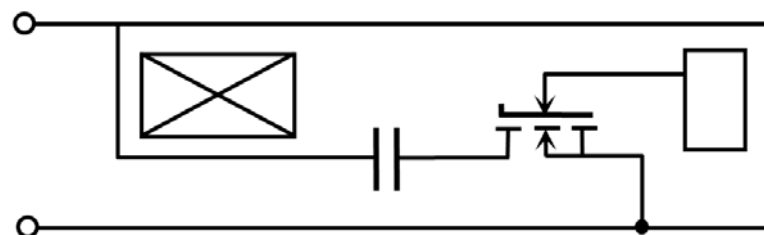
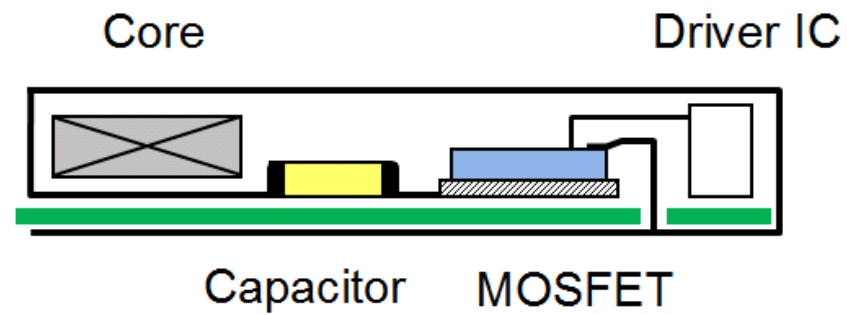
LTD Module Using MOSFET



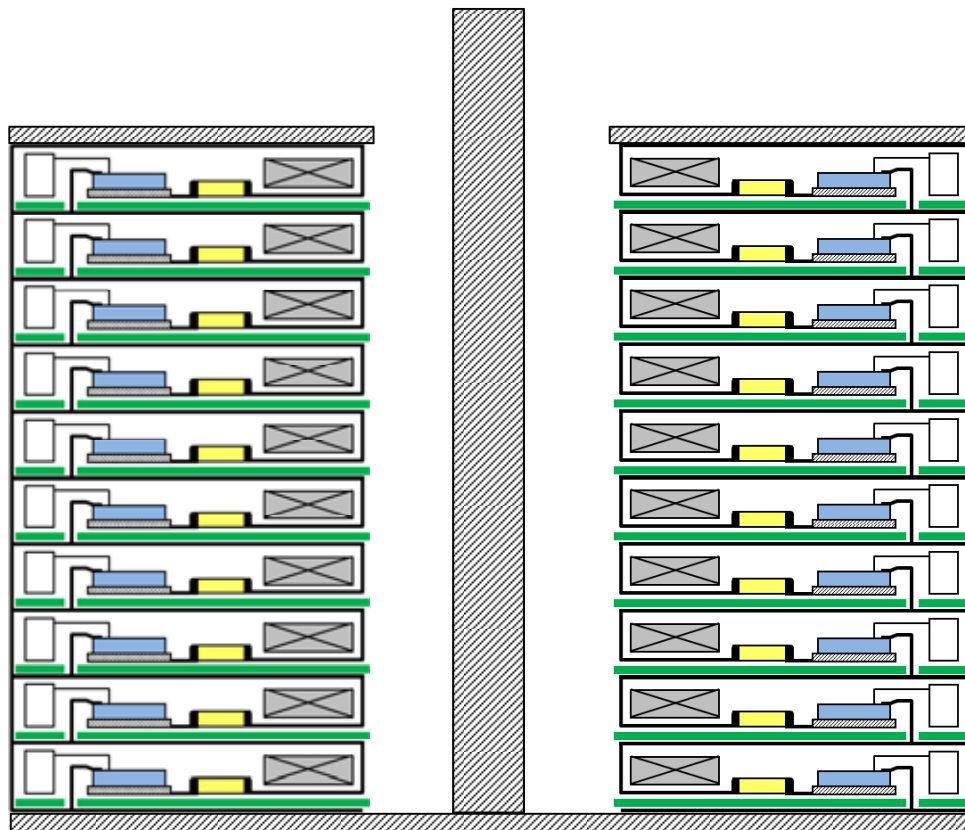
LTD Module Using MOSFET



LTD Module Using MOSFET



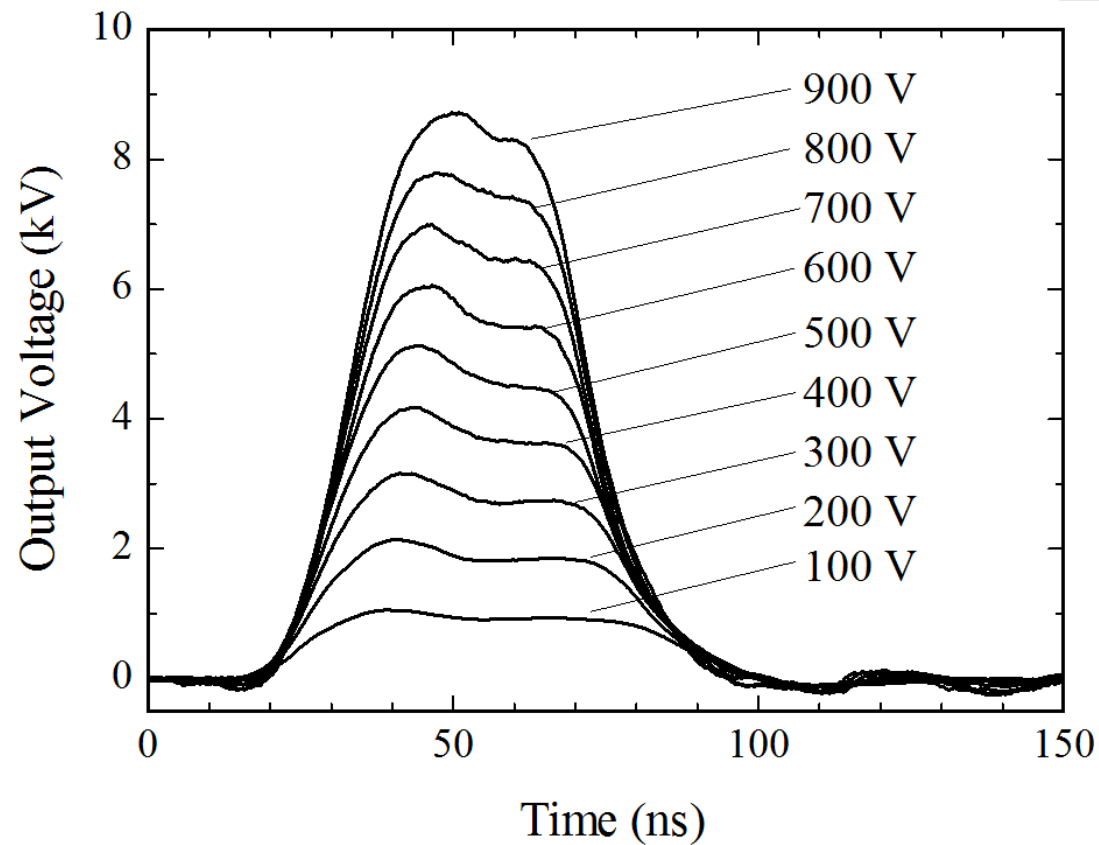
LTD Module Using MOSFET



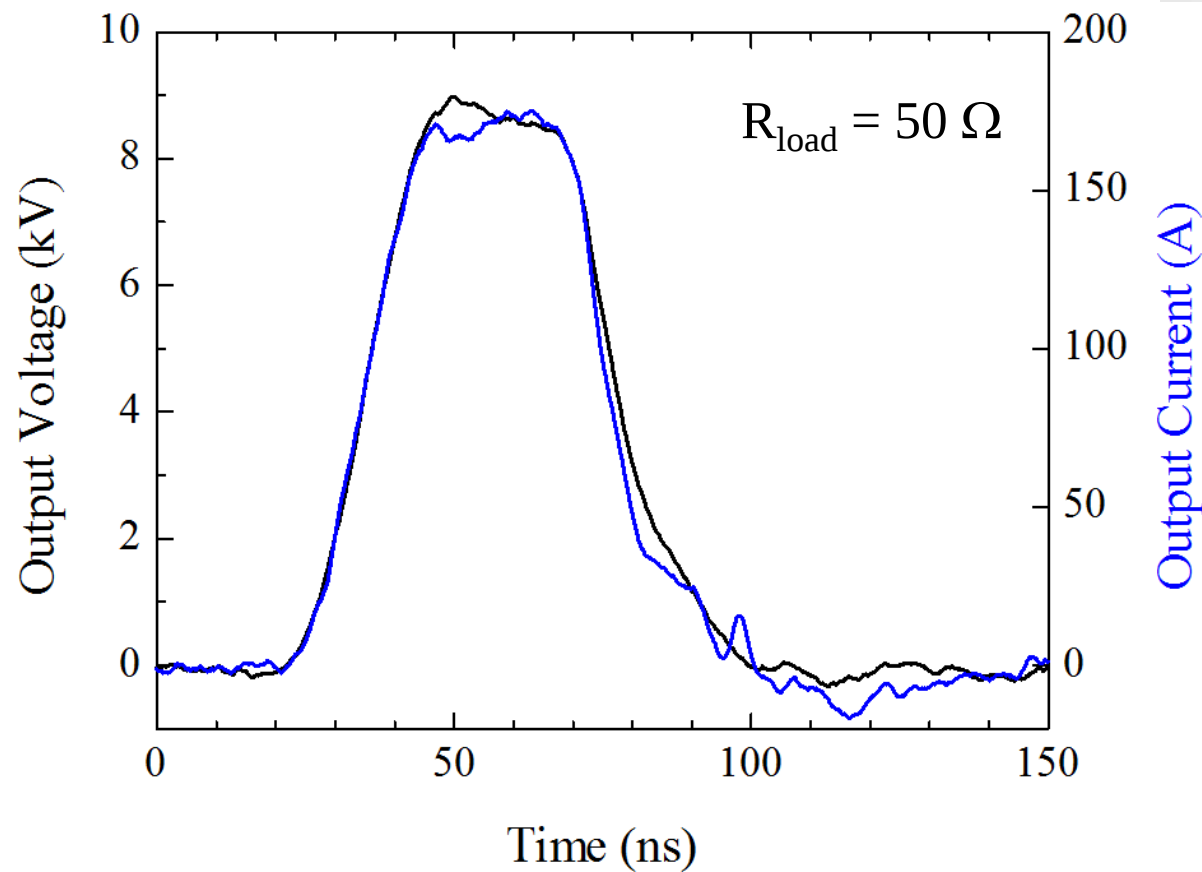
Diameter	28 cm
Height	12 cm
Weight	7 kg

10 Modules
350 Switches

LTD Module Using MOSFET



LTD Module Using MOSFET



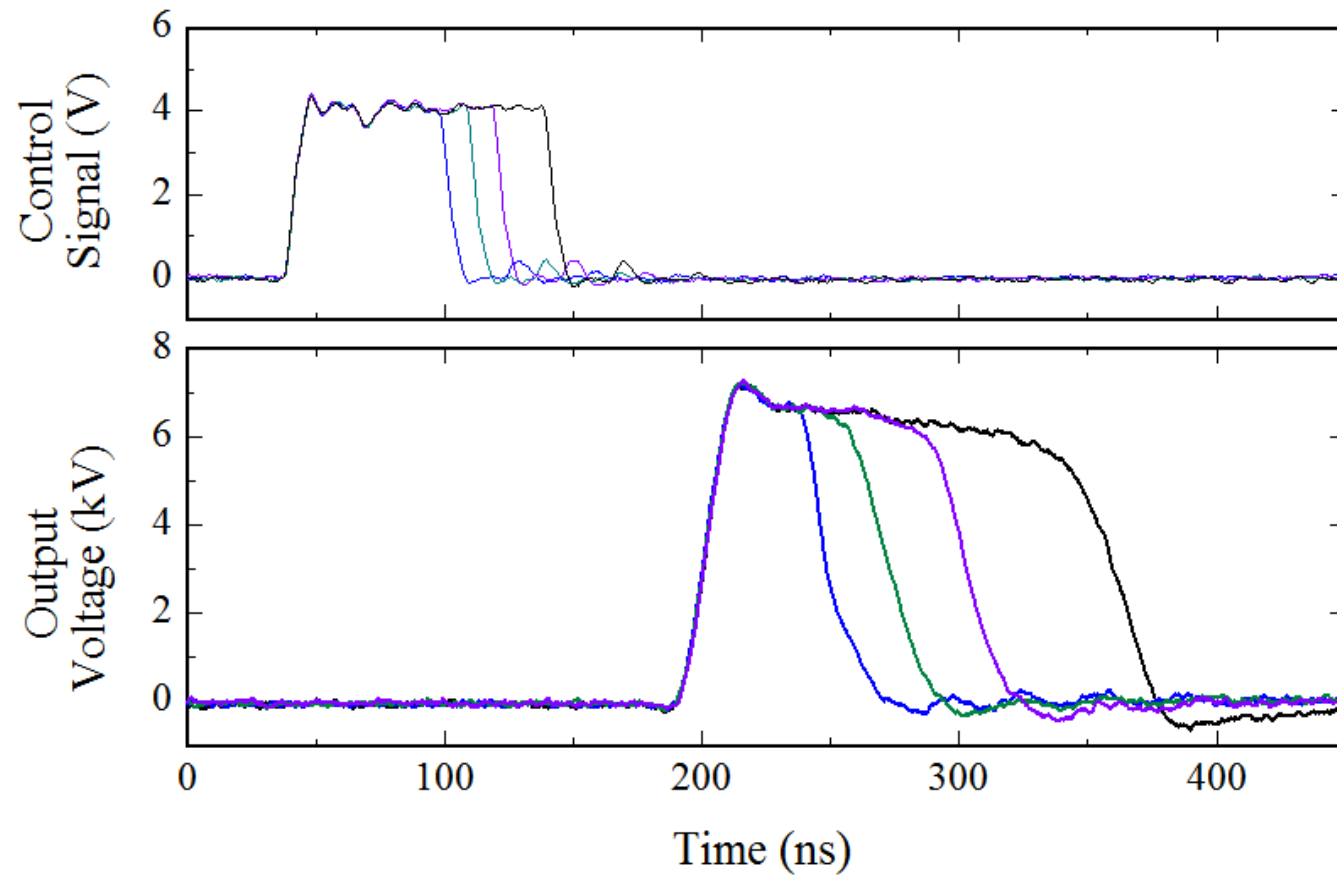
FWHM $\sim 42 \, \text{ns}$

$T_{\text{rise}} \sim 17 \, \text{ns}$

$T_{\text{fall}} \sim 22 \, \text{ns}$

$f = 1 \, \text{kHz}$

LTD Module Using MOSFET



SUMMARY

- ◆ Compact LTD module using power MOSFETs
- ◆ Demonstration experiment with 10 modules
- ◆ Potential pulsed power source for general-purpose applications