

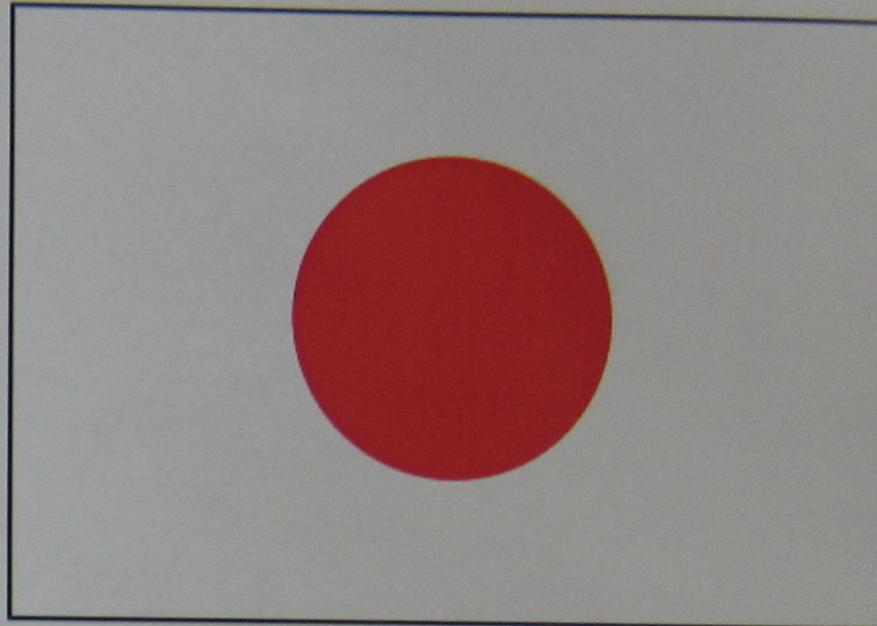
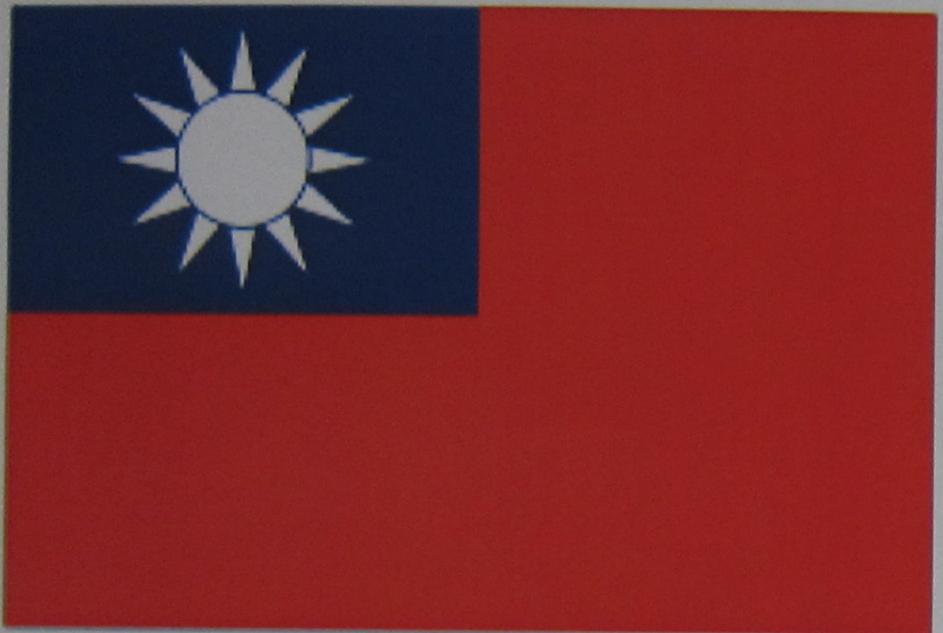
Measurement of Safe Operating Area (SOA)

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Outline

- Introduction to SOA.
- Forward Bias SOA.
 - 1. Measurement.
 - 2. Way to Improve FBSOA of LDMOS.
- Reversed Bias SOA.
 - 1. Unclamped Inductive Switching (UIS) Test Circuit.
 - 2. Clamped Inductive Switching (CIS) Test Circuit.
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- Summary.
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Welcome to HANWA
Prof. Ming-Dou Ker (柯 明道 博士)
National Chiao Tung University
(台湾国立交通大学)

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A man in a dark suit and glasses stands at the front of the room, facing the audience. He is gesturing with his right hand as he speaks.

National Chiao-Tung University, Institute of Electronics

tSOA Test Circuit and Waveform^[3]

- $t_0 < t < t_{fail}$: $V_{gs} = I_{diode} \cdot R_{gs} > V_{th}$
 $V_{ds} = I_{diode} \cdot R_{gs} + BVZ$
MOS on, $I_{ds} = I_{MOS,channel}$
Power dissipation = $V_{ds} \cdot I_{ds}$
- $t_{fail} < t$: Hot carrier turns on parasitic BJT
 $I_{ds} = I_{BJT}$, $I = I_{diode} = 0A$, $V_{gs} = V_{ds} = 0V$, MOS off.

Diagram of the test circuit showing a diode in series with the gate, a resistor R_{gs} , and a bias voltage BVZ . The drain voltage V_{ds} is measured across the load JL . The current I_{ds} is shown in the time domain, starting at 0A, jumping to a constant value between t_0 and t_{fail} , and then dropping to 0A after t_{fail} .

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