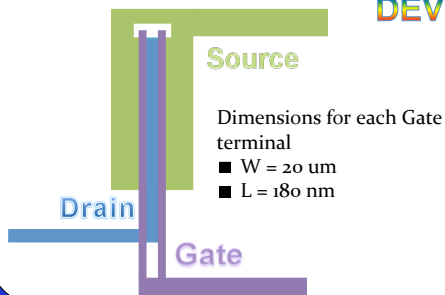


THERMAL CHARACTERIZATION OF MULTI-FINGER MOSFET

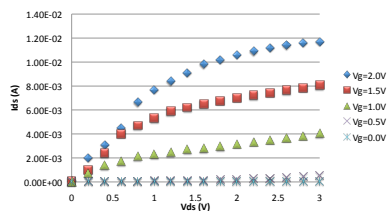
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DEVICE

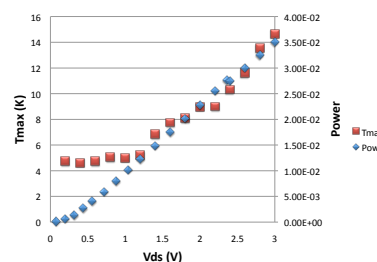


M3 Thermal Imaging IV Curves



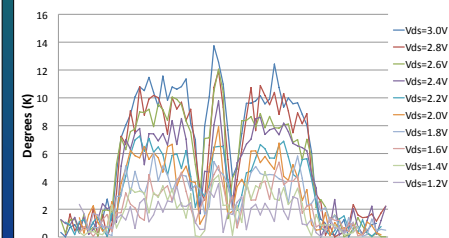
POWER COMPARISON

Vds vs Power/Tmax Vg=2.0V

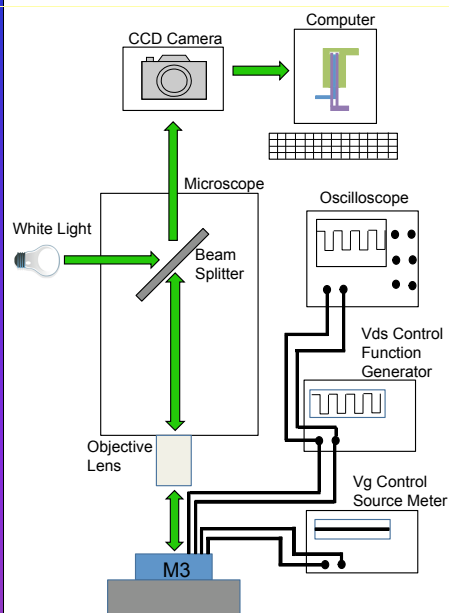


CROSS SECTION

Vg = 2.0V Horizontal Cross Section Vds (1.2V-3.0V)

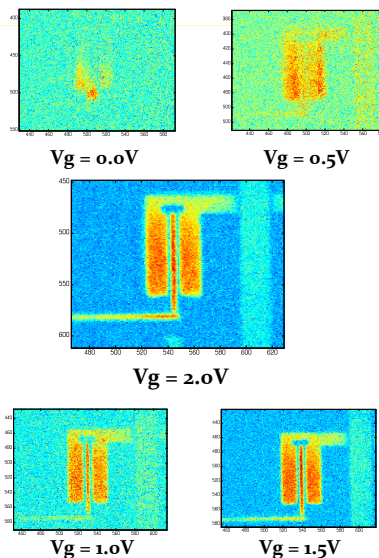


SET UP



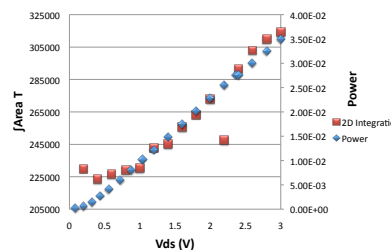
■ Thermoreflectance Set Up

THERMAL IMAGES

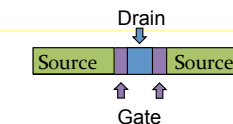


- All images taken with Vds = 3.0V.
- As Vg gets larger the thermal reflection is stronger, which is due to a larger Ids current.

Vds vs Power/ JArea T Vg=2.0V



- At the highest Vds and Vg we can see the Power Curve more closely follows the JArea T curve in comparison to the Tmax curve.



- Different regions are better defined at higher Vg values.
- The highest temperature is almost 14(K).
- Transistor is visible from Vds = 1.2V to 3.0V.
- There is approximately a 4 degree increase in Tmax for every 0.5V increase in Vg.
- With higher Vg we require smaller Vds values to obtain a clear transistor image.
- The drain peak is larger than the source peaks because a transistor is a 3 terminal device with an electrical potential peak near the drain, hence a larger peak temperature.

SUMMARY

- The higher Vg the more current and hence a stronger thermal reflection.
- The noise level was about 0.45(K)
- The trends from Tmax are similar to that of the power curve.
 - But we obtain better similarity in trend from the JArea T curve and the power curve.
- Clearer transistor images are visible at lower Vds values the higher Vg is set.
- We can observe an expected peak in temperature from drain in comparison to the source.