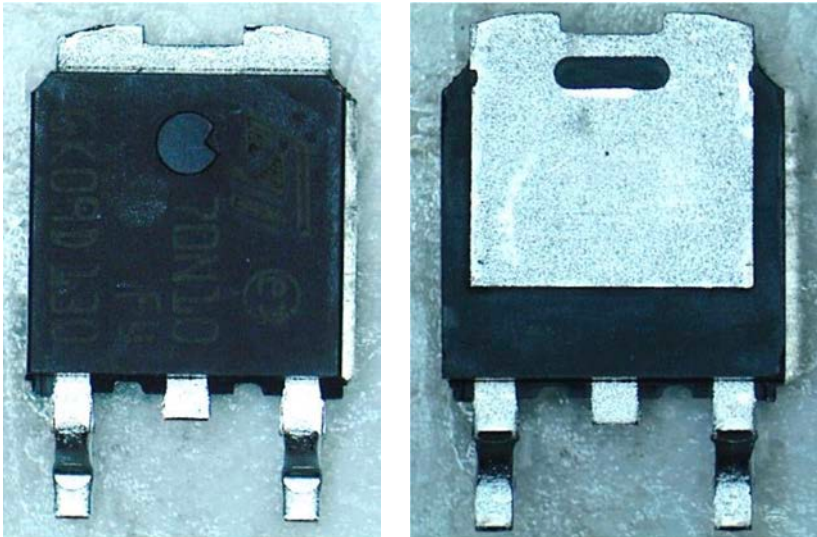


PICTURE BOOK

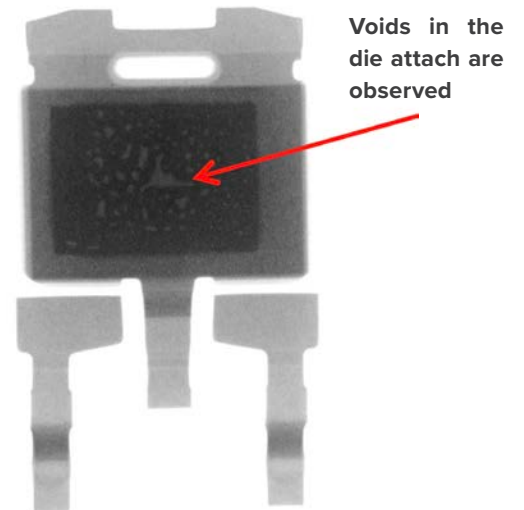
Level 1 Failure Analysis

Level 1 FAs include: non-destructive tests optical inspection, X-ray, C-SAM, and electrical characterization. This can complete an analysis or indicate the path for deeper analyses.

PACKAGE OPTICAL INSPECTION

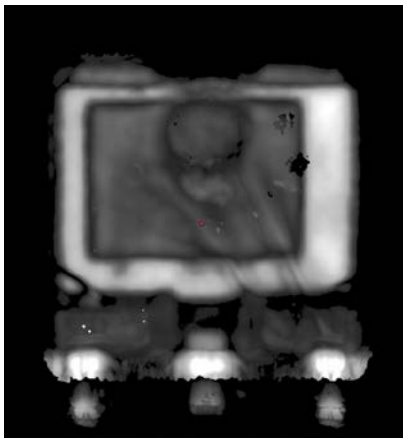


X-RAY INSPECTION

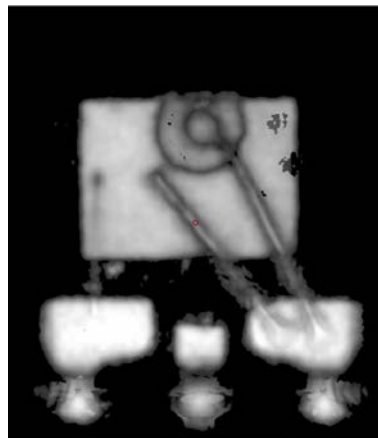


C-SAM INSPECTION

PADDLE



DIE SURFACE



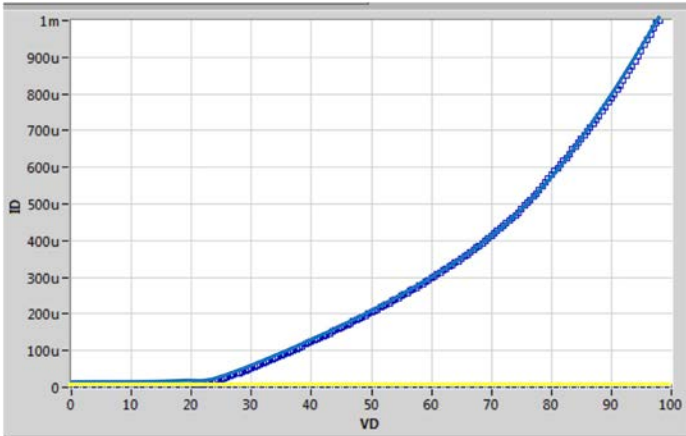
THRU SCAN



Level 1 Failure Analysis

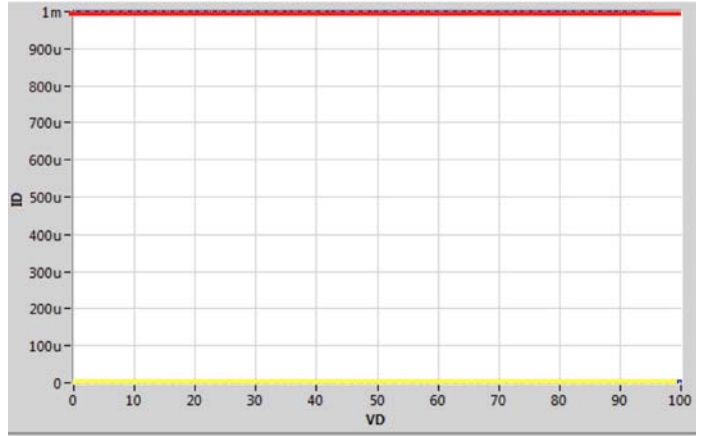
ELECTRICAL CHARACTERIZATION

Drain I-V curve: Good vs. Leaky device



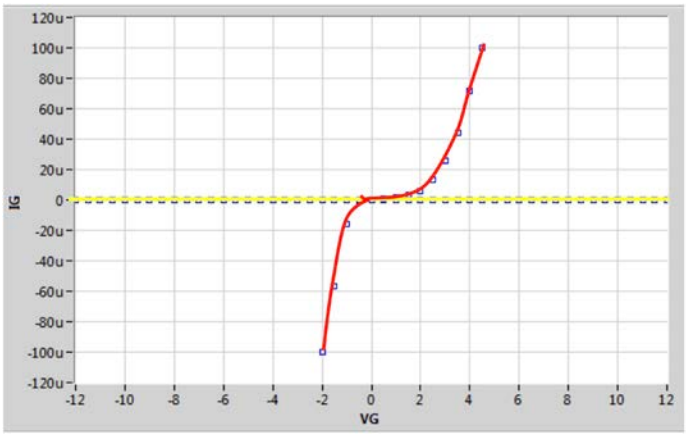
Blue =leaky device
Yellow=good device

Drain I-V curve: Good vs. Short device



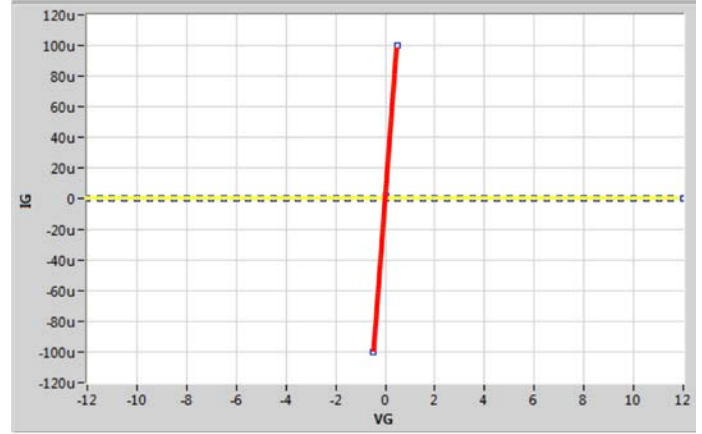
Red =short device
Yellow=good device

Gate I-V curve: Good vs. Leaky device



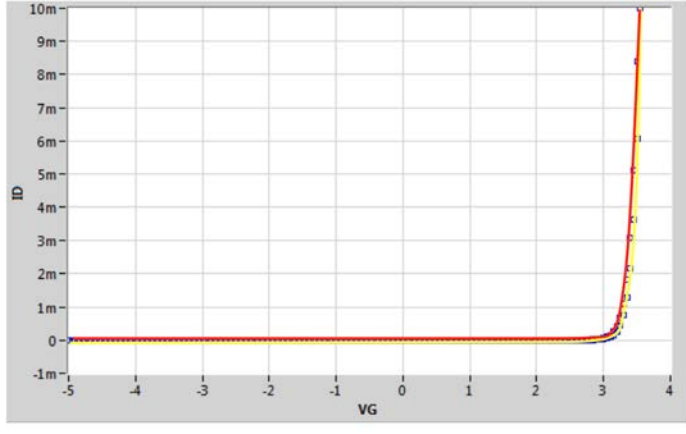
Red =leaky device
Yellow=good device

Gate I-V curve: Good vs. Short device



Red =short device
Yellow=good device

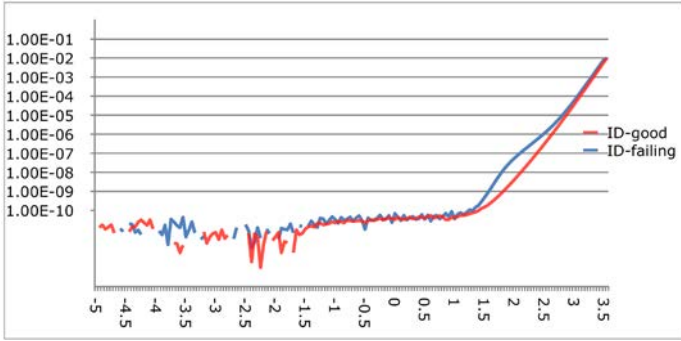
Vth I-V curve: Good vs. Leaky device



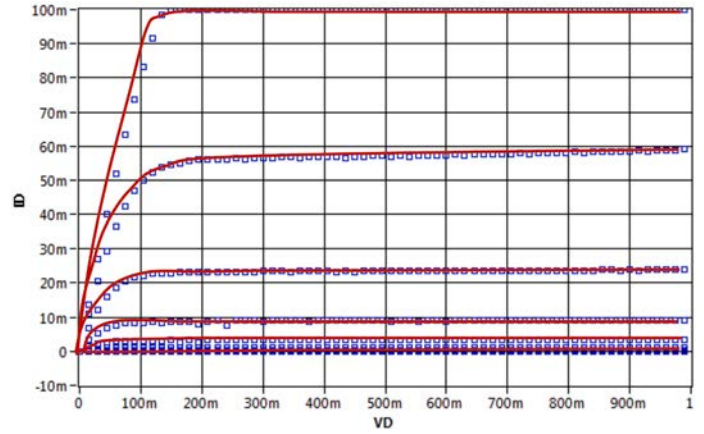
Red = device suffering from negative V_{th} shift due to leaky Drain current in transistor
Yellow=good device

Level 1 Failure Analysis

Vth I-V curve: Good vs. Leaky device (log scale)

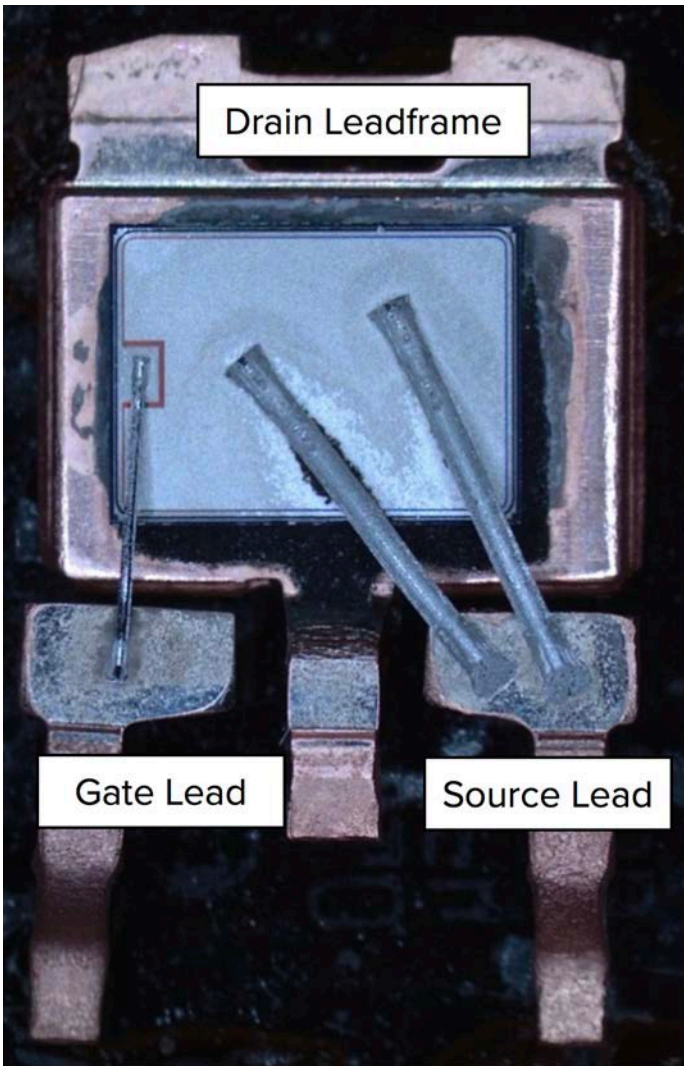


Transistor Characteristic Curves



DECAPSULATION

Full boil out to remove all the encapsulation material



Using drop method to preserve encapsulation material and protect leads

