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TECHNOTE **MG242817**, 24 Feb 2011

What are unbalanced smashed MOSFETs ?

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Solution

Warnings regarding "unbalanced smashed mosfets" usually refer to a case where the following things occur together:

1) source contains parallel mos devices
2) these devices are reduced (smashed) and treated as one source device
3) layout contains parallel mos devices (but a different number of devices)
4) these devices are reduced and treated as one layout device
5) the final layout device matches to the final source device, but they came from a different number to begin with so the warning is reported.

If you wish to disable these warnings, the following statement can be added to the SVRF rulefile used for LVS comparison:

LVS REPORT OPTION F

Note: when there is just one device in the schematic, and many in the layout, it is considered a common case and no warning should appear.

The exception happens when there are multiple devices in the source connected in parallel, and a different number in the layout. Perhaps the original idea was that multiple devices in the source may be an indication that the designer was concerned that a precise number of devices were to be drawn, instead of arbitrarily chosen by the mask designer.

Knowledge of the design goals for the chip or for the cell would be required to decide if the warning is important. If it is an analog design and the number of parallel devices in the schematic was important to match exactly in the drawn layout, then the warning becomes valuable. If the layout is

digital, and the circuit designer considers the number of fingers as a "don't care" then the warning is likely to be just a nuisance.

It may not be practical to draw the devices to make the warning go away if the devices in the schematic were parallel only as a matter of coincidence. For instance, the schematic may happen to contain two transistors in parallel just by chance, and it may be awkward to draw the corresponding layout devices as just two fingers. If you have flexibility to change the schematic, you could theoretically change the parallel devices in the schematic into one device, and then it wouldn't matter how many fingers existed in the drawn layout.

The layout and source connections match, it is just that the number of individual devices happened to be different to begin with, although the final number after reduction is the same between layout and source. If the circuit is sensitive, or analog, or something that requires the drawn number of fingers matches the schematic number of transistors, then the situation may deserve closer inspection.

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