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Ultra High Voltage LDMOS Device and Technology

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Sameer Pendharkar is a TI Fellow and Manager of the High Voltage silicon and wide bandgap technology development group at Texas Instruments. He is the author or co-author of more than 75 research papers and has more than 120 issued patents in the area of power and high voltage semiconductors. He has given invited talks and short courses on high voltage, ESD, reliability and power device technology at numerous conferences like IEDM, ISPSD, BCTM, ISPS and IRPS and has served on power and WBG technical sub-committees of several conferences.

The increased focus on green energy applications drives the need for ultra high voltage Bipolar-CMOS-DMOS technology (at least 700V) targeting applications like AC-DC adaptors and LED lighting. While the low and mid-voltage components in such a technology allow for logic and analog functional integration the high voltage LDMOS is typically the workhorse device that interfaces with the outside world. Depending on the targeted application, the HV LDMOS needs to either block the voltage with fast switching capability or need to have low resistance to minimize losses. This tutorial will provide an introduction to UHV BCD technologies with particular emphasis on LDMOS device design evolution and reliability and robustness characterization.