Characteristics of Analog Optical Isolators

In most AOI circuits noise is usually so low that it is hardly ever considered. One notable exception is in applications where large voltages are placed across the cell. For a typical isolator, it takes 80 to 100 V across the photocell before the noise level starts to increase significantly.

DISTORTION

Analog Optical Isolators have found wide use as control elements in audio circuits because they possess two characteristics which no other active semiconductor device has: resistance output and low harmonic distortion. AOIs often exhibit distortion levels below -80 db when the voltage applied to the photocell output is kept below 0.5 V.

Figure 3 shows the typical distortion generated in typical AOIs. The distortion depends on the operating resistance level as well as the applied voltage. The minimum distortion or threshold distortion shown in Fig. 3 is a second harmonic of the fundamental frequency. The actual source of this distortion is unknown, but may be due to some type of crossover nonlinearity at the origin of the I-V curve of the photocell.

At high AC voltages, distortion to the waveform can be seen using an oscilloscope. The waveform is still symmetrical but contains the fundamental and the odd harmonics, the third harmonic being predominant. If there is DC as well as AC voltage on the photocell, both even and odd harmonics are generated.

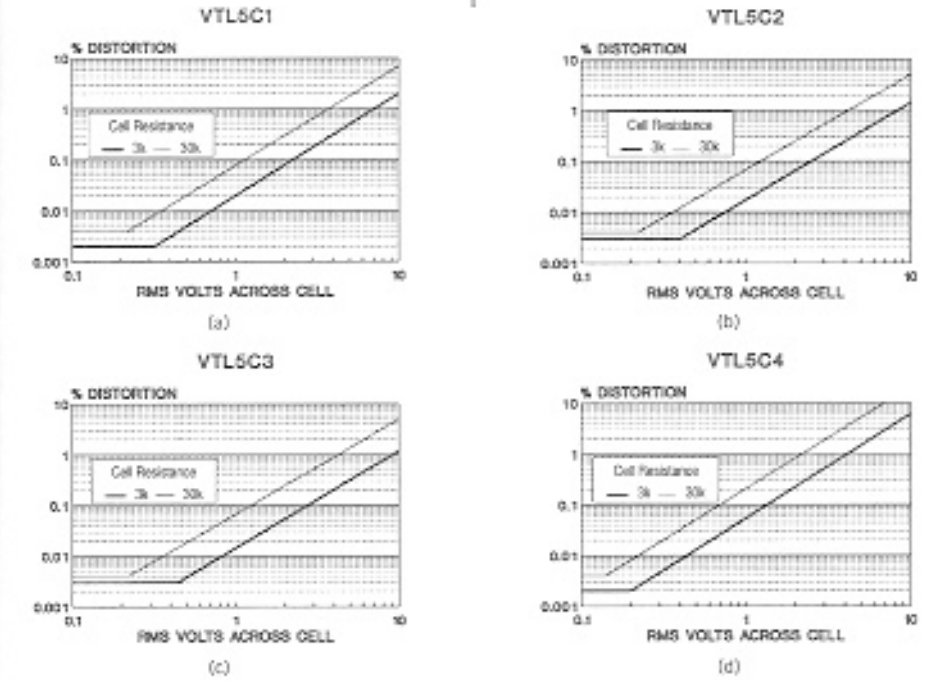

Fig 3. Typical LED AOI Distortion Characteristics