

Foreword

It is a source of amazement that, given a mask with which to perform the photolithography, all you need is a single crystal with a thin metal film deposited on its surface in order to make a surface acoustic wave device with outstanding performance. It can function as a band-pass filter, passing most of the signal in the pass band but providing 60 dB or more rejection out-of-band. It can be made into a matched filter capable of extracting a signal for noise when the strength of the signal is four orders of magnitude below the prevailing noise. How is it that such a seemingly simple device can achieve so much? An important part of the answer lies in the fact that it is dependent for its performance on *intrinsic* properties of the single crystal-surface acoustic wave velocity and piezo-electric constant. But a vital ingredient is the design of the mask for here is where the subtlety and sophistication enters. It is the design of the mask which makes the difference between a SAW device having either excellent or mediocre performance; the design of the lithography mask can be equated to the design of the device.

A major strength of Dr. Morgan's book is the logical and coherent development of those topics which underpin or are relevant to the design of SAW devices. This book provides a clear and careful treatment of topics ranging from the basic theory of bulk and surface acoustic waves, the electrical excitation and detection of surface waves, material properties, through to the design, performance and application of a range of key SAW devices. Though originally planned as a reference book for the SAW device design engineer, the development of the material is well suited to undergraduate and MSc courses. Students will appreciate not only the clear exposition of the central subject matter but also the linkage with such topics as the application of Fourier Transform techniques and signal processing as applied to radar, and to video and audio telecommunication systems.

Dr. Morgan's book, making its first appearance exactly one century after Rayleigh's classic paper recording his discovery of elastic surface waves, is now five years old. It says much for the original choice and treatment of the subject that virtually all is as relevant today as the day it was written.

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