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| **Abstract:** |  |
| Abstract— The recent growth in application areas in civil and military telecommunication engineering and technology has generated bulk consumer marketplaces for systems based on radio frequency (RF)/microwave semiconductor devices. This paper describes a comprehensive review on  RF/microwave semiconductor device technology. The principal aim is to trace its history and evolution stages, then to find out the present status and future prospects, potential civil and military application areas, limitations, opportunities and challenges of RF semiconductor devices as well as to explore its appropriateness for future RF device applications. While digging out, the  device physics of various compound and hetero-junction semiconductors’ characteristics are also described so that the important reasons for the technological challenges of RF semiconductor materials are well understood. Comparative pictures are also presented among various RF devices in tabular forms in terms of their Figure of Merits (FOM). | |