Abstract: Photonic signal processing is attractive because it leverages the advantages of the optical domain to benefit from the wide bandwidth, low loss, and natural immunity to electromagnetic interference (EMI) that photonics offers. Recently there has been a strong drive to realise photonic integrated circuits using silicon photonics. Advances in integrated microwave photonic signal processing and sensing are presented. These include optical single sideband modulators, optical vector network analysers with high resolution, multi-function processors, and integrated photonic sensors using optical micro-ring resonators that demonstrate extremely high sensitivity. These microwave photonic processors provide new capabilities for the realisation of high-performance signal processing and sensing.

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