AIN SHAMS UNIVERSITY

FACULTY OF ENGINEERING

Electronics Engineering and Electrical Communications

MEMS Infrared (IR) Source

A Thesis submitted in partial fulfilment of the requirements of the degree of

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(Electronics Engineering and Electrical Communications)

by

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A	Absorbance	
A_d	Detector active area	cm^2
D^*	Specific detectivity	$cm.Hz^{1/2}/W$
E	Incident energy	W/cm^2
μ	Electrical mobility	$m^2\,V^{-1}\,s^{-1}$
NA	Numerical aperture	
n_i	Intrinsic carrier concentration	cm^{-3}
n/p	Electrons / Holes concentration	cm^{-3}
P_{in}	Total input power	W
R_d	Detector responsivity	V/W or A/W
SNR	Signal-to-noise ratio	dB
T	Absolute temperature	K
ε	Emissivity	
λ_o	Wavelength	nm
v	Mode number	cm^{-1}

ABBREVIATIONS

BS	Black silicon
CaF_2	Calcium Fluoride
DRIE	Deep Reactive Ion Etching
FEM	Finite Element Method
FFT	Fast Fourier Transform
FT-IR	Fourier Transform Infrared
FTR	Full Travel Range
HF	Hydrogen fluoride
H_2O	Water
InGaAs	Indium Gallium Arsenide
InF_3	Indium Fluoride
IR	InfraRed
KOH	Potassium Hydroxide
MEMS	Micro-Electro-Mechanical Systems
NIR	Near-InfraRed
O_2	Oxygen
PbSe	Lead Selenide
RIE	Reactive Ion Etching
RMS	Root Mean Square
SEM	Scanning Electron Microscope
Si	Silicon
SiO_2	Silicon Dioxide
SOI	Silicon-On-Insulator
ZrF_4	Zirconium Fluoride