TABLE OF CONTENTS

LIST OF TABLE

LIST OF FIGURES

LIST OF FIGURES(Continued)

LIST OF FIGURES(Continued)

LIST OF FIGURES(Continued)

LIST OF FIGURES(Continued)

Figure **Page**

LIST OF FIGURES(Continued)

NOMENCLATURE

Symbol		Unit
A_k	surface area of the chip module	m^2
B	module height	m
B_X	length of PCB	m
B_Y	width of PCB	m
C_X	module spacing in X direction	m
C_Y	module spacing in Y direction	m
D_h	Hydraulic diameter	
h_k	heat transfer coefficient	$\frac{W}{m^{2\,o}C}$
H_{cw}	space between the module and the opposite wall of the air channel	m
k_{PCB}	thermal conductivity of PCB	$\frac{W}{m^oC}$
L_X	module length	m
L_Y	module width	m
Nu	Nusselt Number $\left(\frac{h_k L_x}{k}\right)$	
q_k	heat generated from the k module	Watt
Re_H	Reynolds number	
T	temperature	^oC
V_0	inlet air velocity, (m/s)	

NOMENCLATURE(Continued)

Symbol		**Unit**
V	air velocity over the module	m/s
VG_H	height of vortex generator	m
VG_L	length of vortex generator	m

Suffices

$V(1)$	with vortex(row 1)
$NV(1)$	no vortex(row 1)
$V(k)$	with vortex(row k)
$NV(k)$	no vortex(row k)
$V20$	with vortex(^{o}20 attack angle)
fd	fully developed flow