

MOS analog integrated circuits are always designed using a selected technology. The technologies that are available to the academic community or to business/government entities that desire rapid prototyping are located at the MOSIS URL (<http://www.mosis.org/test>). Under these technologies, SPICE parameters extracted from various MOSIS runs are listed. These parameters form the basis for the design decisions that are used in creation of analog IC cells.

In order to quickly extract design information relative to the given transistors, it is appropriate to compute a few device parameters associated with conductances, capacitances, threshold and other device characteristics of interest. The most convenient environment for accomplishing these computational tasks is that of the spreadsheet. If needed it can also include graphical analyses, although that is not an essential for assessment of the device characteristics.

The representative environment that is desired is represented by figure E1-1, which is an extract of data and analysis for the 0.5um AMI technology, MOSIS run T1AW

	A	B	C	D	E	F	G	H	I
1									
2			Exercise E-1			by	R Template		
4			eOX	0.0345	fF/um				
5			ni	1.50E+10	#/cm3	VT	0.0259	V	
6			L	1	um	VSB	1.15		
7									
8			MOSIS Technology			0.5um AMI	T1AW		
9			BSIM3V3 model parameters						
11			Tox	14	nm	Cox	2.4643	fF/um^2	
12			NCH	1.70E+17	#/cm3	phi	0.8398	V	
13									
15			Wn	10	um	LD=LS	1	um	
16						AD=AS	10	um^2	
17			VTHO	0.6530764		VTH			
18			UO	453.84685	cm2/Vs	Kp	111.84	uA/V2	
19			K1	0.9088687	/V	betaN	1118.4	uA/V2	
20			Cg	24.642857	fF				
21			CDGO	0.216	fF/um	CGD	2.16	fF	
22			CJ	0.4191468	fF/um2	CJD	4.1915	fF	
23			CJSW	0.3240521	fF/um	CJDSW	7.1291	fF	
24									
25			Wp	20	um	LD=LS	1	um	
26						AD=AS	20	um^2	
27			VTHO	-0.936955		VTH			
28			UO	222.9351	cm2/Vs	Kp	54.938	uA/V2	
29			K1	0.5409965	/V	betaP	1098.8	uA/V2	
30			Cg	49.285714	fF				
31			CGDO	0.25	fF/um	CGD	5.00	fF	
32			CJ	0.7261434	fF/um2	CJD	14.523	fF	
33			CJSW	0.2637023	fF/um	CJDSW	11.075	fF	

Figure E1-1: Spreadsheet (Excel) example and template for device characteristics.

As represented by the figure, the template should be organized and compact, and its function clear and direct if it is to be of any continued benefit.

Your task is therefore to construct an Excel spreadsheet file of the form represented by figure E1-1 for the MOSIS V01V technology file parameters (instead of the T1AW). Clearly indicate the title and your name. Use $W_n = 10\mu\text{m}$ and $W_p = 25\mu\text{m}$.

We later will insert rows and cells that (will) identify the transconductances, compliances, and drain conductance for a separate input value of current I_D and Early voltage.

Emphasis: Be concise and compact.

Electronic submission: For the MSU electronic submission environment it is essential that you create a pdf image of the assignment. If your system does not have a pdf print driver you will need to install one. (Do a Google search for pdf printer driver). Once installed Excel print function should be able to print a designated part of the page directly to a pdf file. Also the screen capture technique with transfer to MSWord through the 'Paint' utility (as shown in class) will also work. And it will be necessary when we are mixing graphics and table images from different software utilities.