

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 the devices 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	cm ² /V/s	Kp	111.84	uA/V ²	
19			K1	0.9088687	/V	betaN	1118.4	uA/V ²	
20			CJ	0.4191468	fF/um ²	CJD	4.1915	fF	
21			CJSW	0.3240521	fF/um ²	CJDSW	7.1291	fF	
22									
23			Wp	20	um	LD=LS		1	um
24						AD=AS		20	um ²
25			VTHO	-0.936955		VTH			
26			UO	222.9351	cm ² /V/s	Kp	54.938	uA/V ²	
27			K1	0.5409965	/V	betaP	1098.8	uA/V ²	
28			CJ	0.7261434	fF/um ²	CJD	14.523	fF	
29			CJSW	0.2637023	fF/um ²	CJDSW	11.075	fF	
30									

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 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 T77Z technology file parameters (instead of the T1AW). Clearly indicate the title

and your name. Also include cells that identify the transconductances, compliances, and drain conductance, for input values of current I_D and an Early voltage of 100V.

Later exercises may involve an expansion of this spreadsheet to include other information or analyses. So be concise and compact.

Keep in mind that, for my review, I will want a hardcopy (.pdf file) of your spreadsheet.