Institute for Technology Development

ADVANCED MICROELECTRONICS DIVISION

SCALABLE CMOS (SCMOS) DOUBLE METAL I / C STANDARD CELL LIBRARY	**dfrf301** D_FF_W/Q_&_ASY_RST	DATE: Mar 6,1990 VERSION: dlmV2.2

*************** FLIP-FLOP TIMING INFO ********************

2u NOMINAL CASE SPECIAL TIMING

Data Setup time = 7.50 ns

Data Hold time = 6.00 ns

Maximum clock rise time > 500 ns

Clock pulse width = 5.50 ns

Reset pulse width = 2.50 ns

2u WORST CASE SPECIAL TIMING

Data Setup time = 7.00 ns

Data Hold time = 6.00 ns

Maximum clock rise time > 500 ns

Clock pulse width = 6.00 ns

Reset pulse width = 2.50 nswq

SCALABLE CMOS (SCMOS) DOUBLE METAL I / C STANDARD CELL LIBRARY	**dfrf301** D_FF_W/Q_&_ASY_RST	DATE: Mar 6,1990 VERSION: dlmV2.2

************** SPICE DECK CONTINUED **************

```
M99x8 153 24 gnd gnd NMOS W=13.0U L=2.0U
M103x8 153 60 154 gnd NMOS W=13.0U L=2.0U
M107x8 154 57 58 gnd NMOS W=13.0U L=2.0U
M115x8 58 27 155 gnd NMOS W=17.0U L=2.0U
M119x8 155 Q 156 gnd NMOS W=17.0U L=2.0U
M123x8 156 60 gnd gnd NMOS W=17.0U L=2.0U
M144x4 Q 58 gnd gnd NMOS W=21.0U L=2.0U
C1 CLK2 gnd 6.27fF
C2 57 gnd 119.27fF
C3 DATA1 gnd 9.68fF
C4 27 gnd 119.38fF
C5 Q gnd 101.70fF
C6 60 gnd 35.05fF
C7 58 gnd 132.11fF
C9 120 gnd 15.65fF
C10 22 gnd 97.35fF
C11 24 gnd 98.04fF
C12 121 gnd 79.68fF
C13 123 gnd 12.95fF
C14 124 gnd 17.81fF
C15 150 gnd 11.35fF
C16 152 gnd 9.21fF
C17 151 gnd 9.21fF
C18 153 gnd 8.33fF
C19 154 gnd 8.33fF
C20 155 gnd 10.09fF
C21 156 gnd 10.09fF
```

**************** SPICE DECK ********************

```
*** Generated from dfrf301.mag by magic's spice generator
*** technology: scmos
*** extraction style: lambda=1.0
*** units per lambda: dlm V2.20
*** timestamp: 636652611
*** version: dlm V2.2
*** Capacitance Threshold = 5000 units
*** Resistance Scale      = 1000 units


M8x41 57 CLK2 vdd vdd PMOS W=29.0U L=2.0U
M16x41 27 57 vdd vdd PMOS W=29.0U L=2.0U
M34x44 120 DATA1 vdd vdd PMOS W=26.0U L=2.0U
M38x44 120 57 22 vdd PMOS W=26.0U L=2.0U
M46x44 22 27 121 vdd PMOS W=22.0U L=2.0U
M54x44 121 24 vdd vdd PMOS W=22.0U L=2.0U
M62x44 121 60 vdd vdd PMOS W=22.0U L=2.0U
M80x44 24 22 vdd vdd PMOS W=22.0U L=2.0U
M96x45 123 24 vdd vdd PMOS W=21.0U L=2.0U
M100x45 123 27 58 vdd PMOS W=21.0U L=2.0U
M8x4 57 CLK2 gnd gnd NMOS W=24.0U L=2.0U
M16x4 27 57 gnd gnd NMOS W=24.0U L=2.0U
M114x40 124 57 vdd vdd PMOS W=30.0U L=2.0U
M118x40 124 Q 58 vdd PMOS W=30.0U L=2.0U
M126x39 58 60 vdd vdd PMOS W=31.0U L=2.0U
M144x39 Q 58 vdd vdd PMOS W=31.0U L=2.0U
M42x4 150 DATA1 gnd gnd NMOS W=19.0U L=2.0U
M46x4 150 27 22 gnd NMOS W=19.0U L=2.0U
M54x8 22 60 152 gnd NMOS W=15.0U L=2.0U
M58x8 152 24 151 gnd NMOS W=15.0U L=2.0U
M62x8 151 57 gnd gnd NMOS W=15.0U L=2.0U
M83x8 24 22 gnd gnd NMOS W=15.0U L=2.0U
```

2-micron delay information.

Path	Timing	Nominal Case		Worst Case	
		No Load	1pF	No Load	1pF
CLK2---Q	Pd 0--1	3.70	5.32	8.49	11.72
	Pd 1--0	3.88	5.12	8.31	10.59
	Tr 0--1	1.23	4.27	2.72	8.88
	Tf 1--0	1.37	3.52	2.05	6.15
RST3---Q	Pd 0--1	N/A	N/A	N/A	N/A
	Pd 1--0	1.22	2.35	2.96	4.53
	Tr 0--1	N/A	N/A	N/A	N/A
	Tf 1--0	1.39	2.94	2.90	5.57

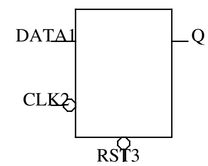
Cell Device Sizes

Transistor	Width (λ)	Length (λ)
62	24	2
63	24	2
51	19	2
50	19	2
55	15	2
54	15	2
53	15	2
56	13	2
61	17	2
59	17	2
58	21	2
57	13	2
64	13	2
60	17	2
52	15	2
33	29	2
32	29	2
20	26	2
21	26	2
25	22	2
23	22	2
27	21	2
26	21	2
31	30	2
29	30	2
30	31	2
28	31	2
24	22	2
22	22	2

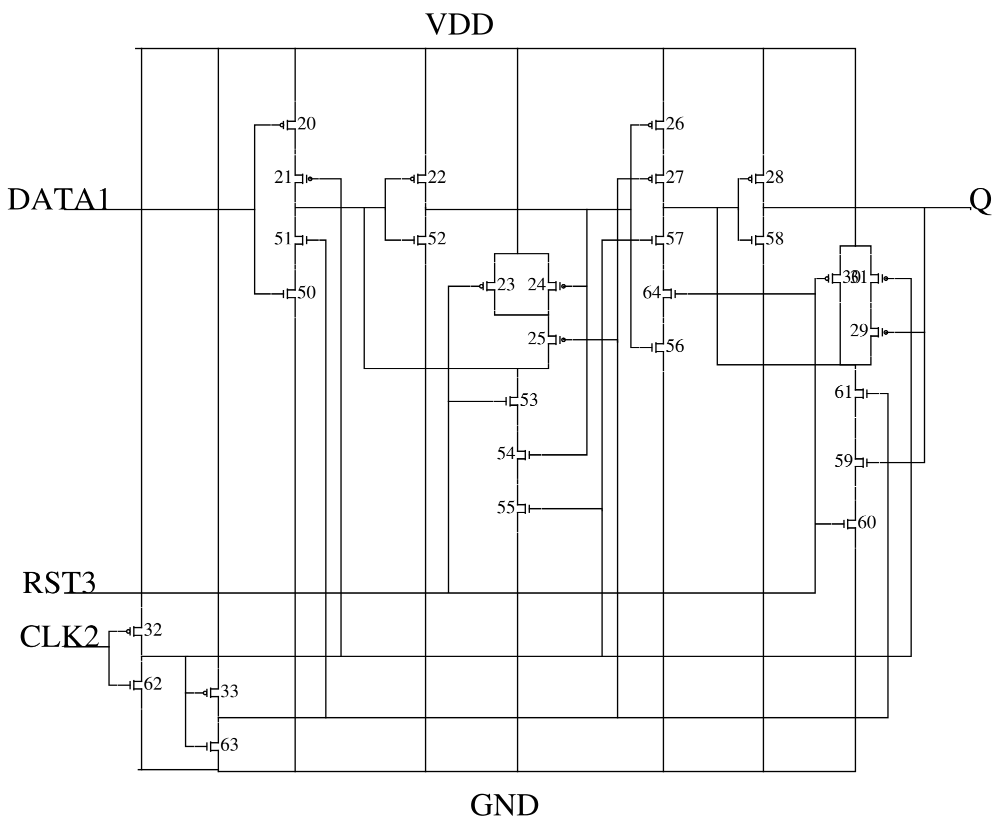
Institute for Technology Development

ADVANCED MICROELECTRONICS DIVISION

SCALABLE CMOS (SCMOS) DOUBLE METAL I / C STANDARD CELL LIBRARY	**dfrf301** D_FF_W/Q_&_ASY_RST	DATE: Mar 6,1990 VERSION: dlmV2.2



SYMBOL



LOGIC EQUATIONS: Q = [(Qn-1 * C) + (Dn-1 * C')]*R

Truth Table

C	D	R	Q
l2h	-	1	Qn-1
h2l	-	1	D
-	-	0	0

Institute for Technology Development

ADVANCED MICROELECTRONICS DIVISION

SCALABLE CMOS (SCMOS) DOUBLE METAL I / C STANDARD CELL LIBRARY	**dfrf301** D_FF_W/Q_&_ASY_RST	DATE: Mar 6,1990 VERSION: dlmV2.2

TERMINAL LOCATION (In Lambda)

GRID	PIN_NAME	Y_LOC	CLASS
1	FeedThru	----	----
2	CLK2	24	1
3	FeedThru	----	----
4	DATA1	26	0
5	Blocked		----
6	Blocked		----
7	Blocked		----
8	FeedThru	----	----
9	FeedThru	----	----
10	Blocked		----
11	FeedThru	----	----
12	Blocked		----
13	Blocked		----
14	FeedThru	----	----
15	FeedThru	----	----
16	Blocked		----
17	RST3	27	2
18	FeedThru	----	----
19	Q	31	0