

tRDL in Graphic Memory (16M/32M SGRAM & 1Mx16/2Mx32 SDRAM)

Abstract

The desire for the faster graphic memory product upto 200MHz has been tremendously increased over the graphic application market. As you might know, tRDL=1CLK become the bottleneck in achieving higher frequency among most memory vendors.

To fulfill the customers' request for the fast memory, we've decided to support both tRDL=2CLK and also tRDL=1CLK for customers who can not accommodate tRDL=2CLK change because of their design limitation.

Samsung's strategy for tRDL

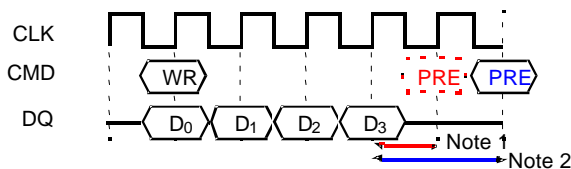
Our basic standard unit of tRDL is the 2CLK regardless of frequencies. For the customer who can not accommodate tRDL=2CLK in their current controller design, we also support tRDL=1CLK upto 183MHz within restricted amounts and it is distinguished by bucket code "NV". Refer to the table 1 for further information.

Table 1 : tRDL in Graphic Memory

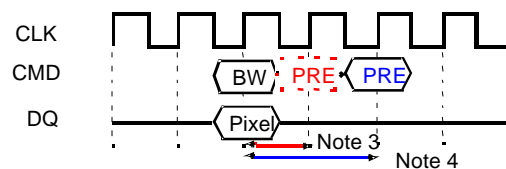
Bin	-5	-C	-6	-7	-8	-10
Frequency	200MHz	183MHz	166MHz	143MHz	125MHz	100MHz
256Kx32 SGRAM B-die	N/A		N/A	tRDL = 1CLK		
512Kx32 SGRAM M-die			tRDL = 1CLK			
1Mx16 SDRAM C-die			tRDL = 1CLK			
2Mx32 SDRAM B-die	N/A				tRDL=1CLK	
1Mx16 SDRAM D-die	N/A		Standard : tRDL = 1CLK Optional : tRDL = 2CLK for the -6 (Distinguished by bucket code "J")			
512Kx32 SGRAM A-die	tRDL=2CLK	Standard : tRDL = 2CLK Optional : tRDL= 1CLK (Distinguished by bucket code "NV")				
1Mx32 SGRAM M-die						
2Mx32 SDRAM C-die						

Timing diagram in each case of tRDL=2CLK and tRDL=1CLK

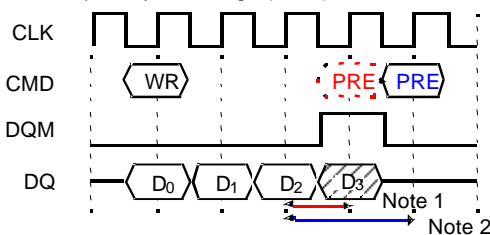
1) Normal Write (BL=4) with Precharge / Auto-Precharge



2) Block write with Precharge / Auto-Precharge



3) Write Interrupted by Precharge (BL=4)



- Note 1 : tRDL=1CLK
- Note 2 : tRDL=2CLK
- Note 3 : tBPL=1CLK
- Note 4 : tBPL=2CLK