

## 阅读申明

- 1.本站收集的数据手册和产品资料都来自互联网，版权归原作者所有。如读者和版权方有任何异议请及时告之，我们将妥善解决。
- 2.本站提供的中文数据手册是英文数据手册的中文翻译，其目的是协助用户阅读，该译文无法自动跟随原稿更新，同时也可能存在翻译上的不当。建议读者以英文原稿为参考以便获得更精准的信息。
- 3.本站提供的产品资料，来自厂商的技术支持或者使用者的心得体会等，其内容可能存在描述上的差异，建议读者做出适当判断。
- 4.如需与我们联系，请发邮件到marketing@iczoom.com，主题请标有“数据手册”字样。

## Read Statement

1. The datasheets and other product information on the site are all from network reference or other public materials, and the copyright belongs to the original author and original published source. If readers and copyright owners have any objections, please contact us and we will deal with it in a timely manner.
2. The Chinese datasheets provided on the website is a Chinese translation of the English datasheets. Its purpose is for reader's learning exchange only and do not involve commercial purposes. The translation cannot be automatically updated with the original manuscript, and there may also be improper translations. Readers are advised to use the English manuscript as a reference for more accurate information.
3. All product information provided on the website refer to solutions from manufacturers' technical support or users the contents may have differences in description, and readers are advised to take the original article as the standard.
4. If you have any questions, please contact us at marketing@iczoom.com and mark the subject with "Datasheets" .



## 2.5V - 2.6V PHASE LOCKED LOOP DIFFERENTIAL 1:10 SDRAM CLOCK DRIVER

**IDTCSPT857C**

### FEATURES:

- 1 to 10 differential clock distribution
- Optimized for clock distribution in DDR (Double Data Rate) SDRAM applications
- Operating frequency: 60MHz to 220MHz
- Very low skew:
  - <100ps for PC1600 - PC2700
  - <75ps for PC3200
- Very low jitter:
  - <75ps for PC1600 - PC2700
  - <50ps for PC3200
- 2.5V AV<sub>DD</sub> and 2.5V V<sub>DDQ</sub> for PC1600-PC2700
- 2.6V AV<sub>DD</sub> and 2.6V V<sub>DDQ</sub> for PC3200
- CMOS control signal input
- Test mode enables buffers while disabling PLL
- Low current power-down mode
- Tolerant of Spread Spectrum input clock
- Available in 48-pin TSSOP, 40-pin VFQFPN, and 56-pin VFBGA packages

### APPLICATIONS:

- Meets or exceeds JEDEC standard JESD 82-1A for registered DDR clock driver
- Meets proposed DDR1-400 specification
- For all DDR1 speeds: PC1600 (DDR200), PC2100 (DDR266), PC2700 (DDR333), PC3200 (DDR400)
- Along with SSTV16857, SSTVF16857, SSTV16859, SSTVM16859, SSTVF16859, DDR1 register, provides complete solution for DDR1 DIMMs

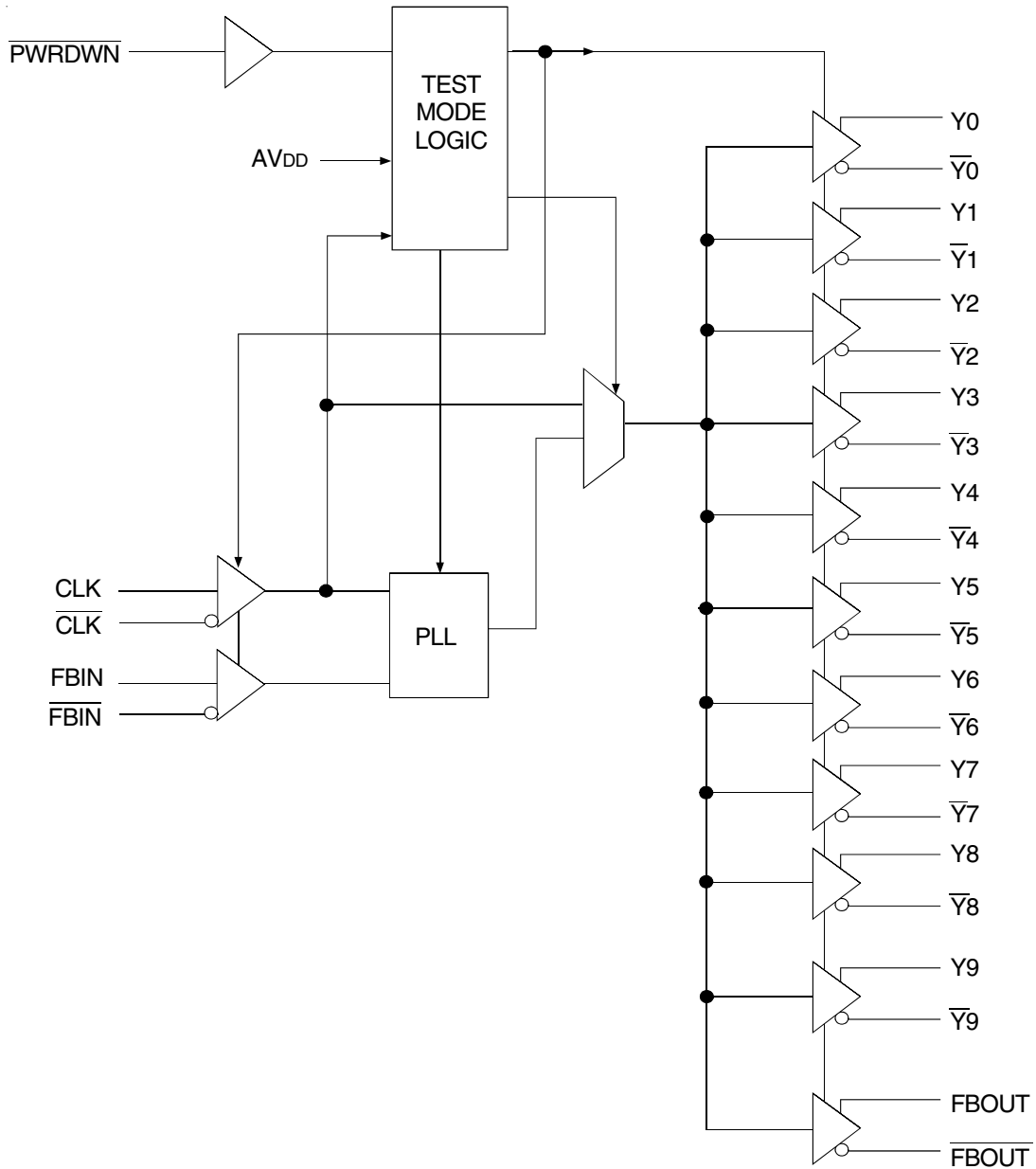
### DESCRIPTION:

The CSPT857C is a PLL based clock driver that acts as a zero delay buffer to distribute one differential clock input pair (CLK,  $\overline{\text{CLK}}$ ) to 10 differential output pairs ( $\overline{\text{Y}}[0:9]$ ,  $\overline{\text{Y}}[0:9]$ ) and one differential pair of feedback clock output (F $\overline{\text{BOUT}}$ , F $\overline{\text{BOUT}}$ ). External feedback pins (F $\overline{\text{BIN}}$ ,  $\overline{\text{FBIN}}$ ) for synchronization of the outputs to the input reference is provided. A CMOS Enable/Disable pin is available for low power disable. When the input frequency falls below approximately 20MHz, the device will enter power down mode. In this mode, the receivers are disabled, the PLL is turned off, and the output clock drivers are tristated, resulting in a current consumption of less than 200 $\mu$ A.

The CSPT857C requires no external components and has been optimised for very low I/O phase error, skew, and jitter, while maintaining frequency and duty cycle over the operating voltage and temperature range. The CSPT857C, designed for use in both module assemblies and system motherboard based solutions, provides an optimum high-performance clock source.

The CSPT857C is available in Commercial Temperature Range (0°C to +70°C) and Industrial Temperature Range (-40°C to +85°C). See Ordering Information for details.

### FUNCTIONAL BLOCK DIAGRAM

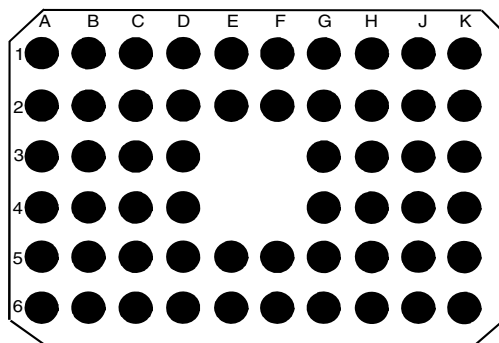
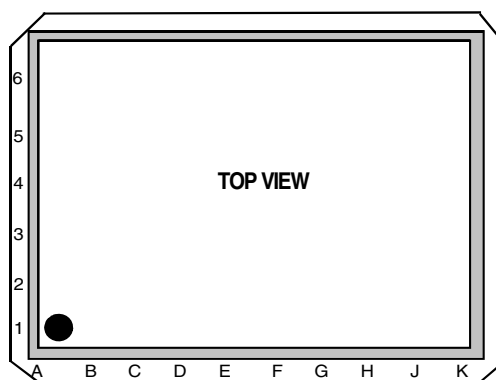


### PIN CONFIGURATIONS

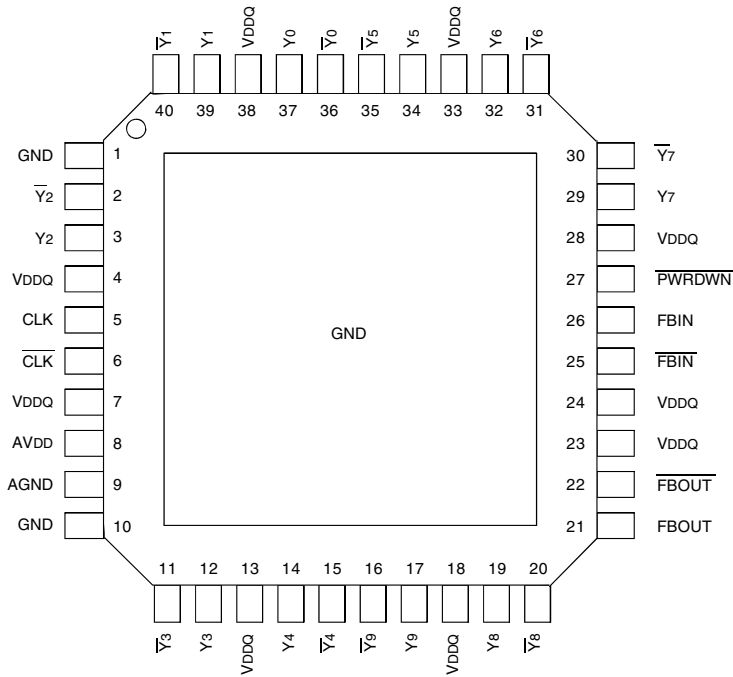
6	Y5	$\overline{Y6}$	GND	Y7	$\overline{PWR/DWN}$	FBIN	VDDQ	FBOUT	$\overline{Y8}$	Y9
5	$\overline{Y5}$	Y6	GND	$\overline{Y7}$	VDDQ	$\overline{FBIN}$	$\overline{FBOUT}$	GND	Y8	$\overline{Y9}$
4	GND	VDDQ	NC	NC			NC	NC	VDDQ	GND
3	GND	VDDQ	NC	NC			NC	NC	VDDQ	GND
2	$\overline{Y0}$	Y1	GND	$\overline{Y2}$	VDDQ	$\overline{CLK}$	AVDD	GND	Y3	$\overline{Y4}$
1	Y0	$\overline{Y1}$	GND	Y2	VDDQ	CLK	VDDQ	AGND	$\overline{Y3}$	Y4
	A	B	C	D	E	F	G	H	J	K

VFBGA  
TOP VIEW

### 56 BALL VFBGA PACKAGE LAYOUT



PIN CONFIGURATIONS



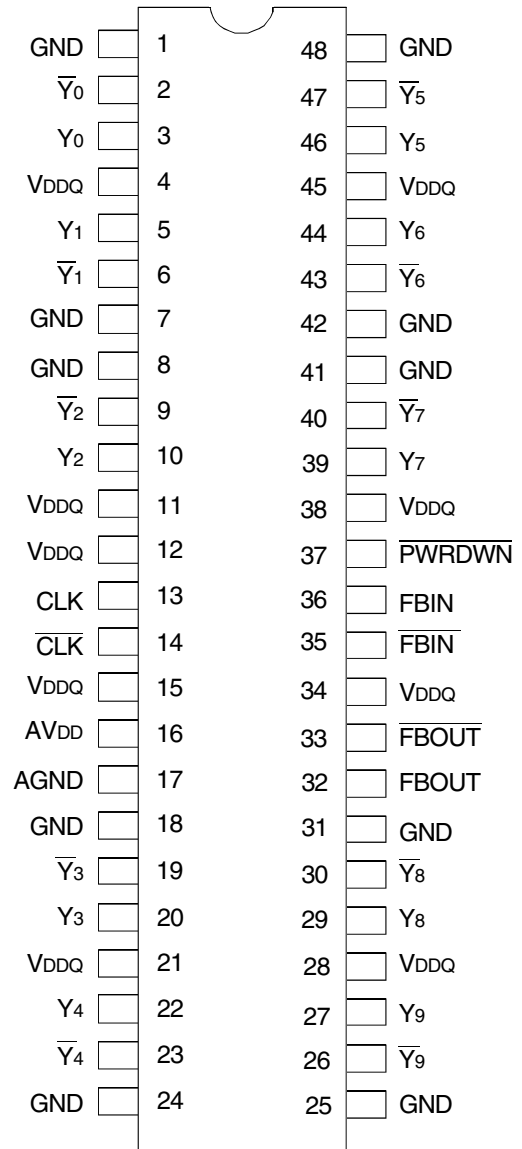
VFQFPN  
TOP VIEW

ABSOLUTE MAXIMUM RATINGS(1)

Symbol	Rating	Max	Unit
VDDQ, AVDD	Supply Voltage Range	-0.5 to +3.6	V
VI(2)	Input Voltage Range	-0.5 to VDDQ + 0.5	V
VO(2)	Voltage range applied to any output in the high or low state	-0.5 to VDDQ + 0.5	V
IiK (VI < 0)	Input Clamp Current	-50	mA
IoK (VO < 0 or VO > VDDQ)	Output Clamp Current	±50	mA
Io (VO = 0 to VDDQ)	Continuous Output Current	±50	mA
VDDQ or GND	Continuous Current	±100	mA
TSTG	Storage Temperature Range	-65 to +150	°C

NOTES:

1. Stresses greater than those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.
2. The input and output negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
3. The maximum package power dissipation is calculated using a junction temperature of 150°C and a board trace length of 750 mils.



TSSOP  
TOP VIEW

CAPACITANCE(1)

Parameter	Description	Min.	Typ.	Max.	Unit
CIN	Input Capacitance VI = VDDQ or GND	2.5	—	3.5	pF
CI(Δ)	Delta Input Capacitance VI = VDDQ or GND	-0.25	—	0.25	pF
CL	Load Capacitance	—	14	—	pF

NOTE:

1. Unused inputs must be held high or low to prevent them from floating.

## RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min.	Typ.	Max.	Unit	
AV <sub>DD</sub>	Supply Voltage	V <sub>DDQ</sub> -0.12	V <sub>DDQ</sub>	2.7	V	
V <sub>DDQ</sub>	I/O Supply Voltage	PC1600-PC2700	2.3	2.5	2.7	V
		PC3200	2.5	2.6	2.7	
T <sub>A</sub>	Operating Free-Air Temperature	-40	—	+85	°C	

## PIN DESCRIPTION (TSSOP/TVSOP)

Pin Name	Pin Number	Description
AGND	17	Ground for analog supply
AV <sub>DD</sub>	16	Analog supply
CLK, $\overline{\text{CLK}}$	13, 14	Differential clock input
$\overline{\text{FBIN}}$ , FBIN	35, 36	Feedback differential clock input
FBO <sub>UT</sub> , $\overline{\text{FBOU}}\overline{\text{T}}$	32, 33	Feedback differential clock output
GND	1, 7, 8, 18, 24, 25, 31, 41, 42, 48	Ground
$\overline{\text{PWRDWN}}$	37	Output enable for Y and $\overline{\text{Y}}$
V <sub>DDQ</sub>	4, 11, 12, 15, 21, 28, 34, 38, 45	I/O supply
Y <sub>[0:9]</sub>	3, 5, 10, 20, 22, 27, 29, 39, 44, 46	Buffered output of input clock, CLK
$\overline{\text{Y}}_{[0:9]}$	2, 6, 9, 19, 23, 26, 30, 40, 43, 47	Buffered output of input clock, $\overline{\text{CLK}}$

## PIN DESCRIPTION (VFBGA)

Pin Name	Pin Number	Description
AGND	H1	Ground for analog supply
AV <sub>DD</sub>	G2	Analog supply
CLK, $\overline{\text{CLK}}$	F1, F2	Differential clock input
$\overline{\text{FBIN}}$ , FBIN	F5, F6	Feedback differential clock input
FBO <sub>UT</sub> , $\overline{\text{FBOU}}\overline{\text{T}}$	H6, G5	Feedback differential clock output
GND	A3, A4, C1, C2, C5, C6, H2, H5, K3, K4	Ground
$\overline{\text{PWRDWN}}$	E6	Output enable for Y and $\overline{\text{Y}}$
V <sub>DDQ</sub>	B3, B4, E1, E2, E5, G1, G6, J3, J4	I/O supply
Y <sub>[0:9]</sub>	A1, A6, B2, B5, D1, D6, J2, J5, K1, K6	Buffered output of input clock, CLK
$\overline{\text{Y}}_{[0:9]}$	A2, A5, B1, B6, D2, D5, J1, J6, K2, K5	Buffered output of input clock, $\overline{\text{CLK}}$

## PIN DESCRIPTION (MLF)

Pin Name	Pin Number	Description
AGND	9	Ground for analog supply
AV <sub>DD</sub>	8	Analog supply
CLK, $\overline{\text{CLK}}$	5, 6	Differential clock input
$\overline{\text{FBIN}}$ , FBIN	25, 26	Feedback differential clock input
FBO <sub>UT</sub> , $\overline{\text{FBOU}}\overline{\text{T}}$	21, 22	Feedback differential clock output
GND	1, 10	Ground
$\overline{\text{PWRDWN}}$	27	Output enable for Y and $\overline{\text{Y}}$
V <sub>DDQ</sub>	4, 7, 13, 18, 23, 24, 28, 33, 38	I/O supply
Y <sub>[0:9]</sub>	3, 12, 14, 17, 19, 29, 32, 34, 37, 39	Buffered output of input clock, CLK
$\overline{\text{Y}}_{[0:9]}$	2, 11, 15, 16, 20, 30, 31, 35, 36, 40	Buffered output of input clock, $\overline{\text{CLK}}$

FUNCTION TABLE<sup>(1)</sup>

INPUTS				OUTPUTS				
AVDD	PWRDWN	CLK	CLK	Y	Y	FBOU	FBOU	PLL
GND	H	L	H	L	H	L	H	Bypassed/OFF
GND	H	H	L	H	L	H	L	Bypassed/OFF
X	L	L	H	Z	Z	Z	Z	OFF
X	L	H	L	Z	Z	Z	Z	OFF
Nominal <sup>(2)</sup>	H	L	H	L	H	L	H	ON
Nominal <sup>(2)</sup>	H	H	L	H	L	H	L	ON
Nominal <sup>(2,3)</sup>	X	<20MHz	<20MHz	Z	Z	Z	Z	OFF

## NOTES:

- H = HIGH Voltage Level  
L = LOW Voltage Level  
Z = High-Impedance OFF-State  
X = Don't Care
- AVDD nominal is 2.5V for PC1600, PC2100, and PC2700. AVDD nominal is 2.6V for PC3200.
- Additional feature that senses when the clock input is less than approximately 20MHz and places the part in sleep mode. Receiver inputs and PLL are turned off and outputs = tristate.

## DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE FOR PC1600 - PC2700

Following Conditions Apply Unless Otherwise Specified:

Commercial: TA = 0°C to +70°C; Industrial: TA = -40°C to +85°C

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V <sub>IK</sub>	Input Clamp Voltage (All Inputs)	V <sub>DDQ</sub> = 2.3V, I <sub>I</sub> = -18mA	—	—	-1.2	V
V <sub>IL(dc)</sub>	Static Input LOW Voltage	PWRDWN	-0.3	—	0.7	V
V <sub>IH(dc)</sub>	Static Input HIGH Voltage	PWRDWN	1.7	—	V <sub>DDQ</sub> + 0.3	V
V <sub>IL(ac)</sub>	Dynamic Input LOW Voltage	CLK, CLK, FBIN, FBIN	—	—	0.7	V
V <sub>IH(ac)</sub>	Dynamic Input HIGH Voltage	CLK, CLK, FBIN, FBIN	1.7	—	V <sub>DDQ</sub>	V
V <sub>OL</sub>	Output LOW Voltage	AVDD/VDDQ = Min., I <sub>OL</sub> = 100μA	—	—	0.1	V
		AVDD/VDDQ = Min., I <sub>OL</sub> = 12mA	—	—	0.6	V
V <sub>OH</sub>	Output HIGH Voltage	AVDD/VDDQ = Min., I <sub>OH</sub> = -100μA	V <sub>DDQ</sub> - 0.1	—	—	V
		AVDD/VDDQ = Min., I <sub>OH</sub> = -12mA	1.7	—	—	V
V <sub>IX</sub>	Input Differential Cross Voltage		V <sub>DDQ</sub> /2 - 0.2	—	V <sub>DDQ</sub> /2 + 0.2	V
V <sub>ID(DC)</sub> <sup>(1)</sup>	DC Input Differential Voltage		0.36	—	V <sub>DDQ</sub> + 0.6	V
V <sub>ID(AC)</sub> <sup>(1)</sup>	AC Input Differential Voltage		0.7	—	V <sub>DDQ</sub> + 0.6	V
I <sub>IN</sub>	Input Current	V <sub>DDQ</sub> = 2.7V, V <sub>I</sub> = 0V to 2.7V	—	—	±10	μA
I <sub>DDP</sub>	Power-Down Current on VDDQ and AVDD	AVDD/VDDQ = Max., CLK = 0MHz or PWRDWN = L	—	100	200	μA
I <sub>DDQ</sub>	Dynamic Power Supply Current on VDDQ	AVDD/VDDQ = Max., CLK = 200MHz, 120Ω/14pF	—	320	360	mA
		AVDD/VDDQ = Max., CLK = 170MHz, 120Ω/14pF	—	250	300	mA
I <sub>ADD</sub>	Dynamic Power Supply Current on AVDD	AVDD/VDDQ = Max., CLK = 170MHz	—	—	12	mA

## NOTE:

- V<sub>ID</sub> is the magnitude of the difference between the input level on CLK and the input level on CLK.

## DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE FOR PC3200

Following Conditions Apply Unless Otherwise Specified:

Commercial: TA = 0°C to +70°C; Industrial: TA = -40°C to +85°C

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V <sub>IK</sub>	Input Clamp Voltage (All Inputs)	V <sub>DDQ</sub> = 2.5V, I <sub>I</sub> = -18mA	—	—	-1.2	V
V <sub>IL(dc)</sub>	Static Input LOW Voltage	$\overline{\text{PWRDWN}}$	-0.3	—	0.7	V
V <sub>IH(dc)</sub>	Static Input HIGH Voltage	$\overline{\text{PWRDWN}}$	1.7	—	V <sub>DDQ</sub> + 0.3	V
V <sub>IL(ac)</sub>	Dynamic Input LOW Voltage	CLK, $\overline{\text{CLK}}$ , FBIN, $\overline{\text{FBIN}}$	—	—	0.7	V
V <sub>IH(ac)</sub>	Dynamic Input HIGH Voltage	CLK, $\overline{\text{CLK}}$ , FBIN, $\overline{\text{FBIN}}$	1.7	—	V <sub>DDQ</sub>	V
V <sub>OL</sub>	Output LOW Voltage	Av <sub>DD</sub> /V <sub>DDQ</sub> = Min., I <sub>OL</sub> = 100μA	—	—	0.1	V
		Av <sub>DD</sub> /V <sub>DDQ</sub> = Min., I <sub>OL</sub> = 12mA	—	—	0.6	V
V <sub>OH</sub>	Output HIGH Voltage	Av <sub>DD</sub> /V <sub>DDQ</sub> = Min., I <sub>OH</sub> = -100μA	V <sub>DDQ</sub> - 0.1	—	—	V
		Av <sub>DD</sub> /V <sub>DDQ</sub> = Min., I <sub>OH</sub> = -12mA	1.7	—	—	V
V <sub>IX</sub>	Input Differential Cross Voltage		V <sub>DDQ</sub> /2 - 0.2	—	V <sub>DDQ</sub> /2 + 0.2	V
V <sub>ID(DC)</sub> <sup>(1)</sup>	DC Input Differential Voltage		0.36	—	V <sub>DDQ</sub> + 0.6	V
V <sub>ID(AC)</sub> <sup>(1)</sup>	AC Input Differential Voltage		0.7	—	V <sub>DDQ</sub> + 0.6	V
I <sub>IN</sub>	Input Current	V <sub>DDQ</sub> = 2.7V, V <sub>I</sub> = 0V to 2.7V	—	—	±10	μA
I <sub>DDP</sub>	Power-Down Current on V <sub>DDQ</sub> and Av <sub>DD</sub>	Av <sub>DD</sub> /V <sub>DDQ</sub> = Max., CLK = 0MHz or $\overline{\text{PWRDWN}}$ = L	—	100	200	μA
I <sub>DDQ</sub>	Dynamic Power Supply Current on V <sub>DDQ</sub>	Av <sub>DD</sub> /V <sub>DDQ</sub> = Max., CLK = 200MHz, 120Ω/14pF	—	320	360	mA
		Av <sub>DD</sub> /V <sub>DDQ</sub> = Max., CLK = 200MHz, 120Ω/14pF	—	250	300	mA
I <sub>ADD</sub>	Dynamic Power Supply Current on Av <sub>DD</sub>	Av <sub>DD</sub> /V <sub>DDQ</sub> = Max., CLK = 200MHz	—	—	12	mA

## NOTE:

1. V<sub>ID</sub> is the magnitude of the difference between the input level on CLK and the input level on  $\overline{\text{CLK}}$ .

## TIMING REQUIREMENTS FOR PC1600 - PC2700

Symbol	Parameter	Min.	Max.	Unit
f <sub>CLK</sub>	Operating Clock Frequency <sup>(1,2)</sup>	60	200	MHz
	Application Clock Frequency <sup>(1,3)</sup>	60	200	MHz
t <sub>DC</sub>	Input Clock Duty Cycle	40	60	%
t <sub>L</sub>	Stabilization Time <sup>(4)</sup>	—	100	μs

## NOTES:

- The PLL will track a spread spectrum clock input.
- Operating clock frequency is the range over which the PLL will lock, but may not meet all timing specifications.
- Application clock frequency is the range over which timing specifications apply.
- Stabilization time is the time required for the integrated PLL circuit to obtain phase lock of its feedback signal to its reference signal after power up.

## TIMING REQUIREMENTS FOR PC3200

Symbol	Parameter	Min.	Max.	Unit
f <sub>CLK</sub>	Operating Clock Frequency <sup>(1,2)</sup>	60	220	MHz
	Application Clock Frequency <sup>(1,3)</sup>	60	220	MHz
t <sub>DC</sub>	Input Clock Duty Cycle	40	60	%
t <sub>L</sub>	Stabilization Time <sup>(4)</sup>	—	100	μs

## NOTES:

- The PLL will track a spread spectrum clock input.
- Operating clock frequency is the range over which the PLL will lock, but may not meet all timing specifications.
- Application clock frequency is the range over which timing specifications apply.
- Stabilization time is the time required for the integrated PLL circuit to obtain phase lock of its feedback signal to its reference signal after power up.



## SWITCHING CHARACTERISTICS FOR PC1600 - PC2700

Symbol	Description	Test Conditions	Min.	Typ. <sup>(1)</sup>	Max.	Unit
t <sub>PLH</sub> <sup>(1)</sup>	LOW to HIGH Level Propagation Delay Time	Test mode, CLK to any output		4.5		ns
t <sub>PHL</sub> <sup>(1)</sup>	HIGH to LOW Level Propagation Delay Time	Test mode, CLK to any output		4.5		ns
t <sub>JIT(PER)</sub>	Jitter (period), see figure 6	66MHz	-90		90	ps
		100/ 133/ 167/ 200 MHz	-75		75	
t <sub>JIT(CC)</sub>	Jitter (cycle-to-cycle), see figure 3	66MHz	-180		180	ps
		100/ 133/ 167/ 200 MHz	-75		75	
t <sub>JIT(HPER)</sub>	Half-Period Jitter, see figure 7	66MHz	-160		160	ps
		100/ 133/ 167/ 200 MHz	-100		100	
t <sub>SLR(O)</sub>	Output Clock Slew Rate (Single-Ended)	100/ 133/ 167/ 200 MHz (20% to 80%)	1		2.5	V/ns
t <sub>SLR(I)</sub>	Input Clock Slew Rate		1		4	V/ns
t(∅)	Static Phase Offset, see figure 4 <sup>(2,3)</sup>	66/ 100/ 133/ 167/ 200 MHz	-50		50	ps
t <sub>SK(O)</sub>	Output Skew, see figure 5				75	ps
t <sub>R, F</sub>	Output Rise and Fall Times (20% to 80%)	Load: 120Ω / 14pF	650		900	ps
V <sub>OX</sub> <sup>(5)</sup>	Output Differential Voltage	Differential outputs are terminated with 120Ω	V <sub>DDO</sub> /2 -0.15		V <sub>DDO</sub> /2 +0.15	V
The PLL on the CSPT857 will meet all the above test parameters while supporting SSC synthesizers <sup>(4)</sup> with the following parameters:						
SSC	Modulation Frequency	—	30	—	50	KHz
SSC	Clock Input Frequency Deviation	—	0	—	-0.5	%
f <sub>3dB</sub>	PLL Loop Bandwidth	—	—	5	—	MHz

## NOTES:

1. Refers to transition of non-inverting output.
2. Static phase offset does not include jitter.
3. t(∅) is measured with input clock slew rate t<sub>SLR(I)</sub> = 2V/ns and an input differential voltage V<sub>ID</sub> of 1.75V.
4. The SSC requirements meet the Intel PC100 SDRAM Registered DIMM specification.
5. V<sub>OX</sub> is specified at the SDRAM clock input or test load.

## SWITCHING CHARACTERISTICS FOR PC3200

Symbol	Description	Test Conditions	Min.	Typ. <sup>(1)</sup>	Max.	Unit
t <sub>PLH</sub> <sup>(1)</sup>	LOW to HIGH Level Propagation Delay Time	Test mode, CLK to any output		4.5		ns
t <sub>PHL</sub> <sup>(1)</sup>	HIGH to LOW Level Propagation Delay Time	Test mode, CLK to any output		4.5		ns
t <sub>JIT(PER)</sub>	Jitter (period), see figure 6	66MHz	-90		90	ps
		200 MHz	-50		50	
t <sub>JIT(CC)</sub>	Jitter (cycle-to-cycle), see figure 3	66MHz	-180		180	ps
		200 MHz	-75		75	
t <sub>JIT(HPER)</sub>	Half-Period Jitter, see figure 7	66MHz	-160		160	ps
		200 MHz	-75		75	
t <sub>SLR(O)</sub>	Output Clock Slew Rate (Single-Ended)	200 MHz (20% to 80%)	1		2.5	V/ns
t <sub>SLR(I)</sub>	Input Clock Slew Rate		1		4	V/ns
t(φ)	Static Phase Offset, see figure 4 <sup>(2,3)</sup>	200 MHz	-50		50	ps
t <sub>SK(O)</sub>	Output Skew, see figure 5				75	ps
t <sub>R, F</sub>	Output Rise and Fall Times (20% to 80%)	Load: 120Ω / 14pF	650		900	ps
V <sub>OX</sub> <sup>(5)</sup>	Output Differential Voltage	Differential outputs are terminated with 120Ω	V <sub>DDO</sub> /2 -0.15		V <sub>DDO</sub> /2 +0.15	V
The PLL on the CSPT857 will meet all the above test parameters while supporting SSC synthesizers <sup>(4)</sup> with the following parameters:						
SSC	Modulation Frequency	—	30	—	50	KHz
SSC	Clock Input Frequency Deviation	—	0	—	-0.5	%
f <sub>3dB</sub>	PLL Loop Bandwidth	—	—	5	—	MHz

## NOTES:

1. Refers to transition of non-inverting output.
2. Static phase offset does not include jitter.
3. t(φ) is measured with input clock slew rate t<sub>SLR(I)</sub> = 2V/ns and an input differential voltage V<sub>ID</sub> of 1.75V.
4. The SSC requirements meet the Intel PC100 SDRAM Registered DIMM specification.
5. V<sub>OX</sub> is specified at the SDRAM clock input or test load.

### TEST CIRCUIT AND SWITCHING WAVEFORMS

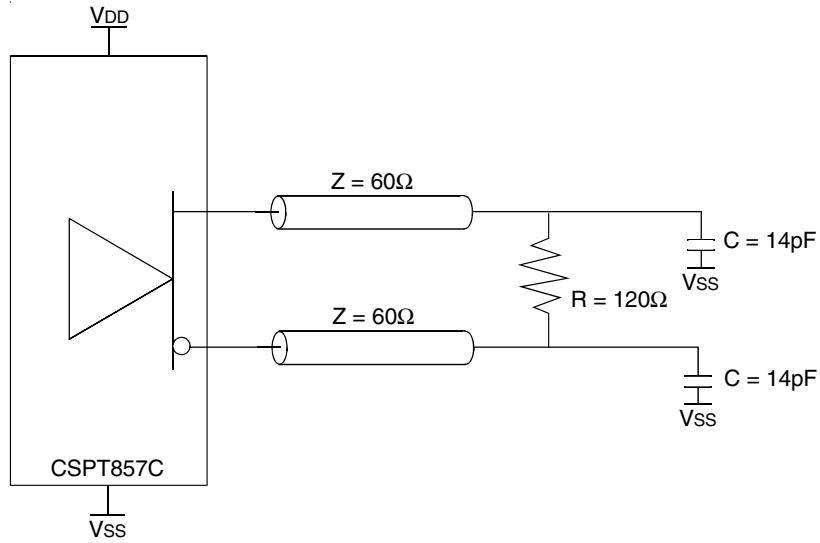


Figure 1. Output Load

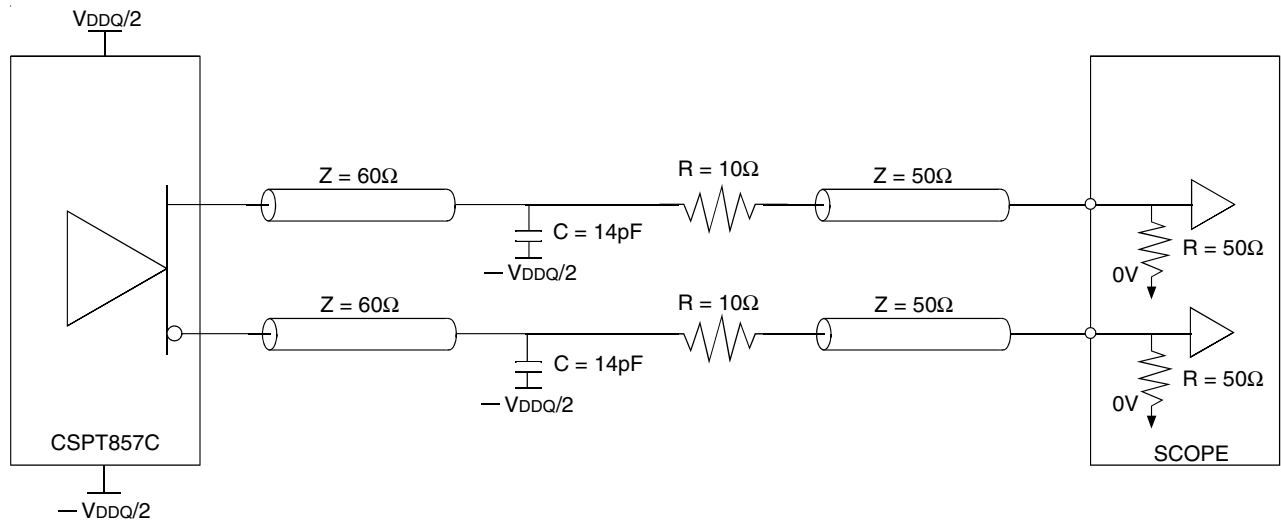
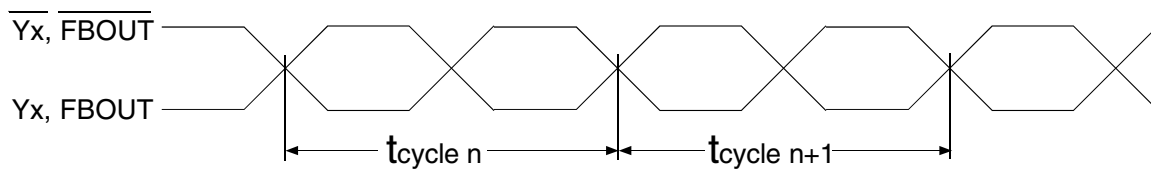


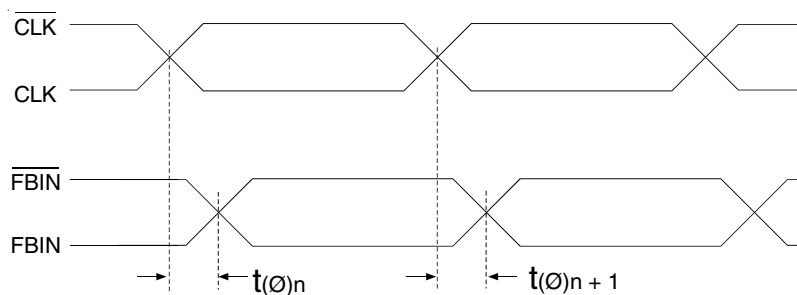
Figure 2. Output Load Test Circuit

## TEST CIRCUIT AND SWITCHING WAVEFORMS



$$t_{\text{jit(cc)}} = t_{\text{cycle } n} - t_{\text{cycle } n+1}$$

Figure 3. Cycle-to-Cycle jitter



$$t(\phi) = \frac{\sum_{n=1}^{n=N} t(\phi)_n}{N} \quad (N \text{ is a large number of samples})$$

Figure 4. Static Phase Offset

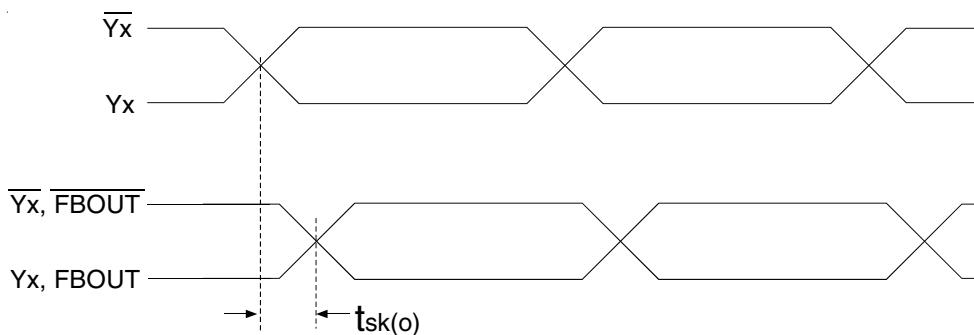
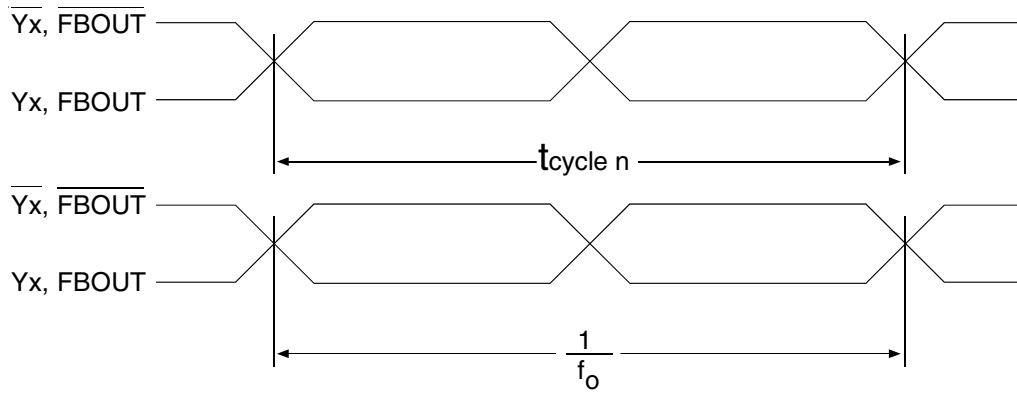


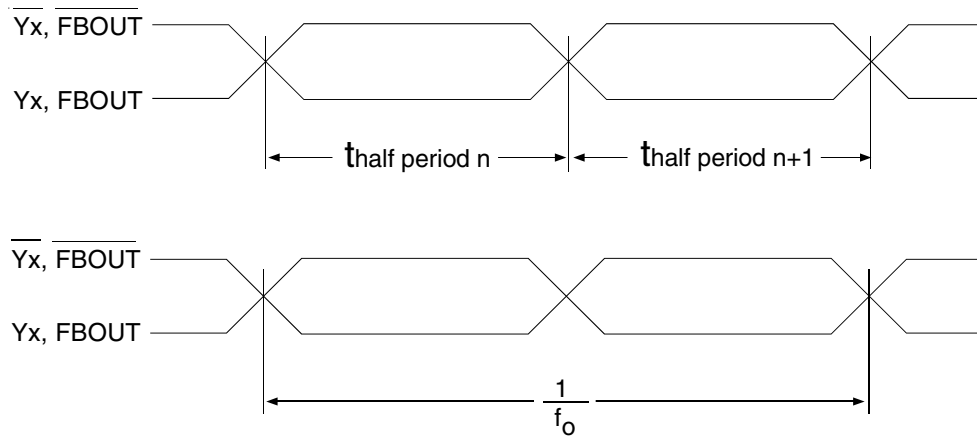
Figure 5. Output Skew

TEST CIRCUIT AND SWITCHING WAVEFORMS



$$t_{\text{jit(per)}} = t_{\text{cycle } n} - \frac{1}{f_0}$$

Figure 6. Period jitter



$$t_{\text{jit(hper)}} = t_{\text{half period } n} - \frac{1}{2f_0}$$

Figure 7. Half-Period jitter

## TEST CIRCUIT AND SWITCHING WAVEFORMS



Figure 8. Input and Output Slew Rates

## APPLICATION INFORMATION

Clock Structure	# of SDRAM Loads per Clock	Clock Loading on the PLL outputs (pF)	
		Min.	Max.
#1	2	4	7
#2	4	8	14

## APPLICATION INFORMATION

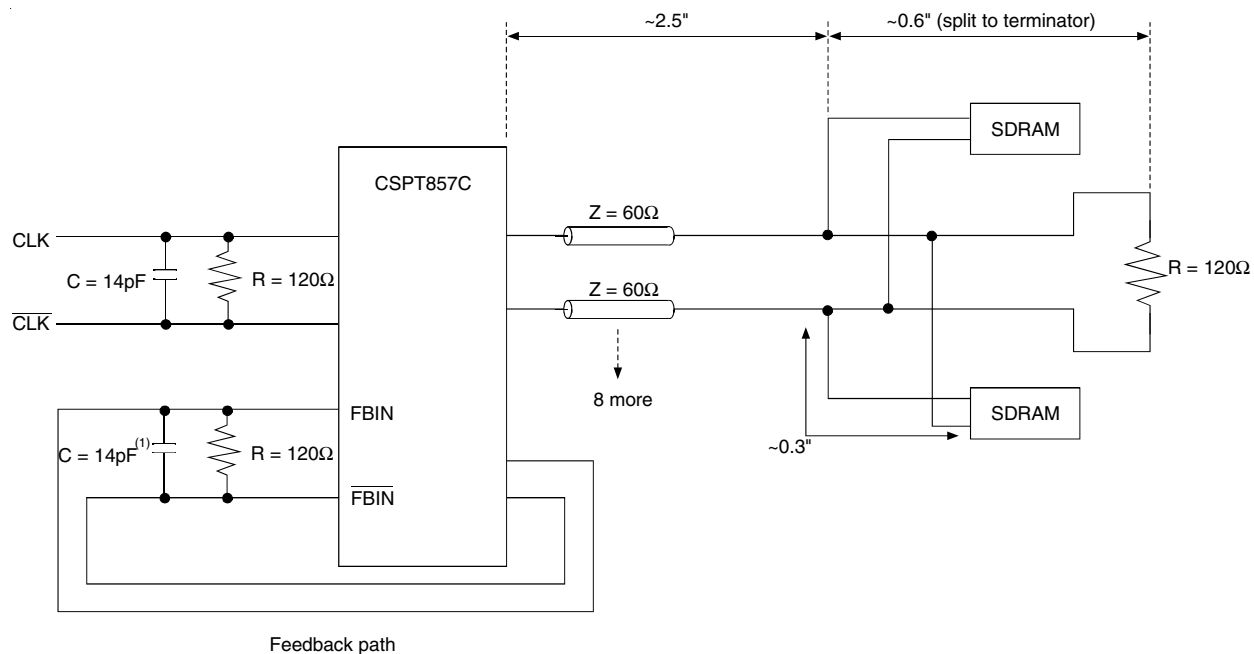


Figure 9. Clock Structure 1

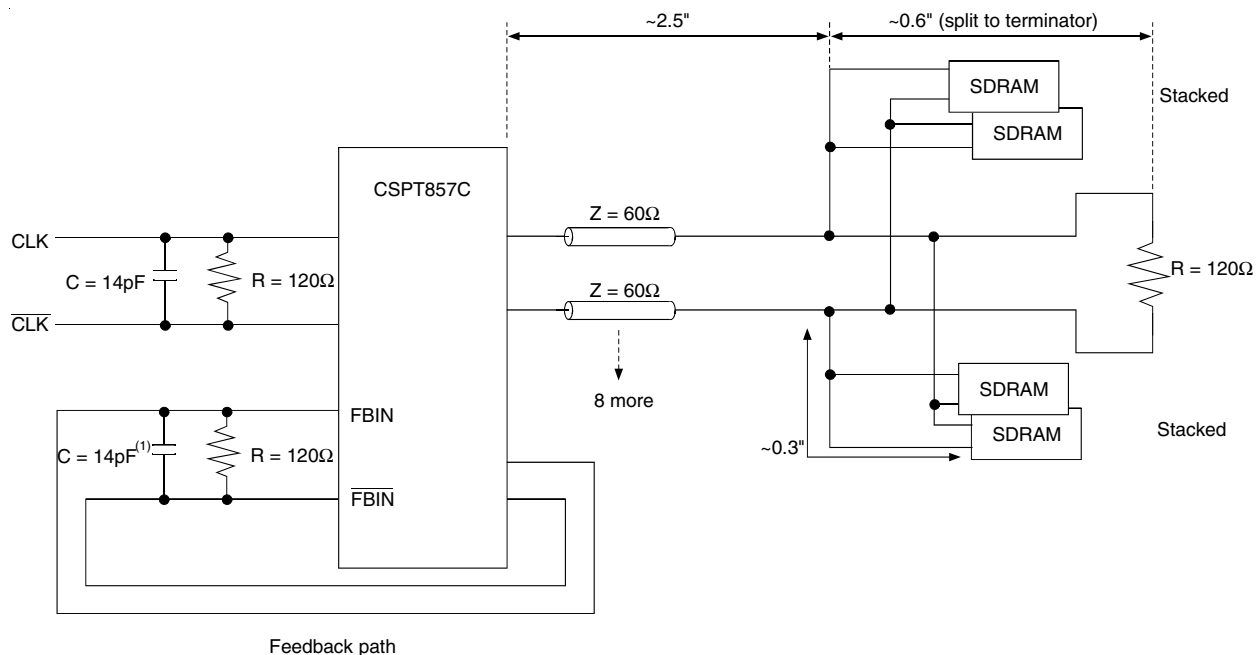
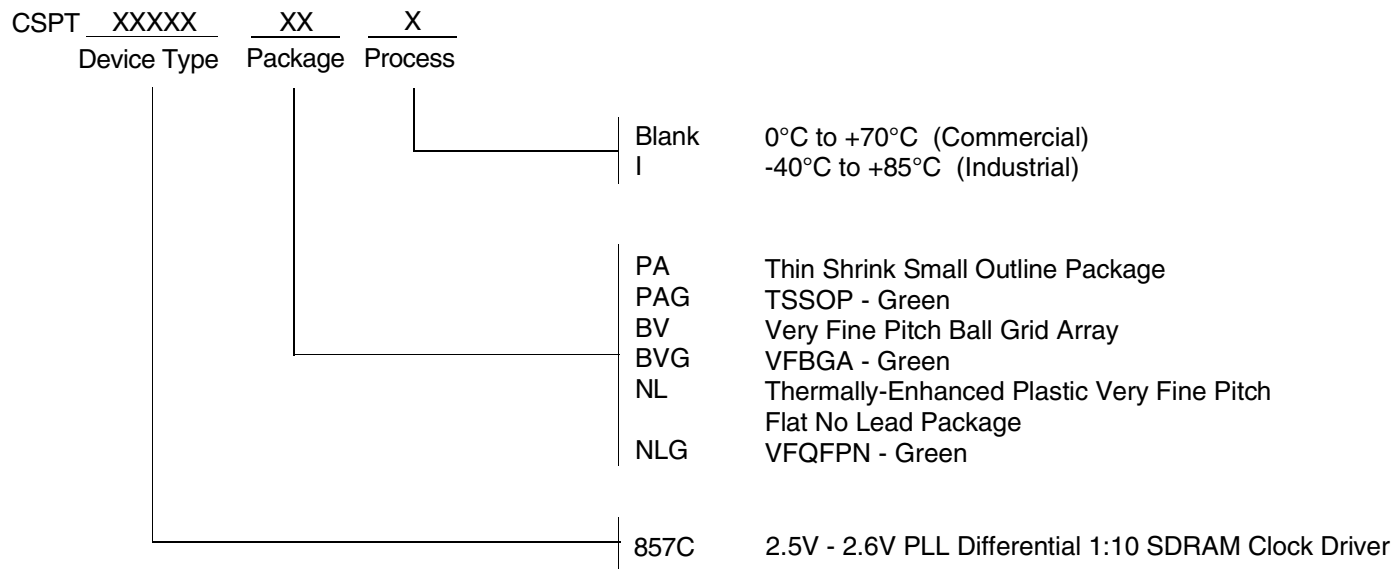


Figure 10. Clock Structure 2

**NOTE:**

1. Memory module vendors may need to adjust the feedback capacitive load in order to meet DDR SDRAM registered DIMM timing requirements.

ORDERING INFORMATION



**CORPORATE HEADQUARTERS**  
6024 Silver Creek Valley Road  
San Jose, CA 95138

**for SALES:**  
800-345-7015 or 408-284-8200  
fax: 408-284-2775  
www.idt.com

**for Tech Support:**  
logichelp@idt.com