



# High Speed SRAM

32K-Word By 8 Bit

CS18FS02565

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## Revision History

<u>Rev. No.</u>	<u>History</u>	<u>Issue Date</u>	<u>Remark</u>
1.0	New Issue	May. 05.2015	



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## DESCRIPTION

The CS18FS02565 series products are 32,768-words by 8-bits static RAMs fabricated with advanced 8" wafer submicron CMOS technology. Using unique CMOS peripheral circuits and special poly-load 4-transistor memory cells, the CS18FS02565 series products exhibit very high-speed performance with single +5-volt power supply while requiring low power and no clock or refreshing to operate. The CS18FS02565 is packed in 28-pin SOP-330mil, 28-pin SOJ-300mil, 28-pin PDIP-300mil and 28-pin TSOP(I)-8x13.4mm.

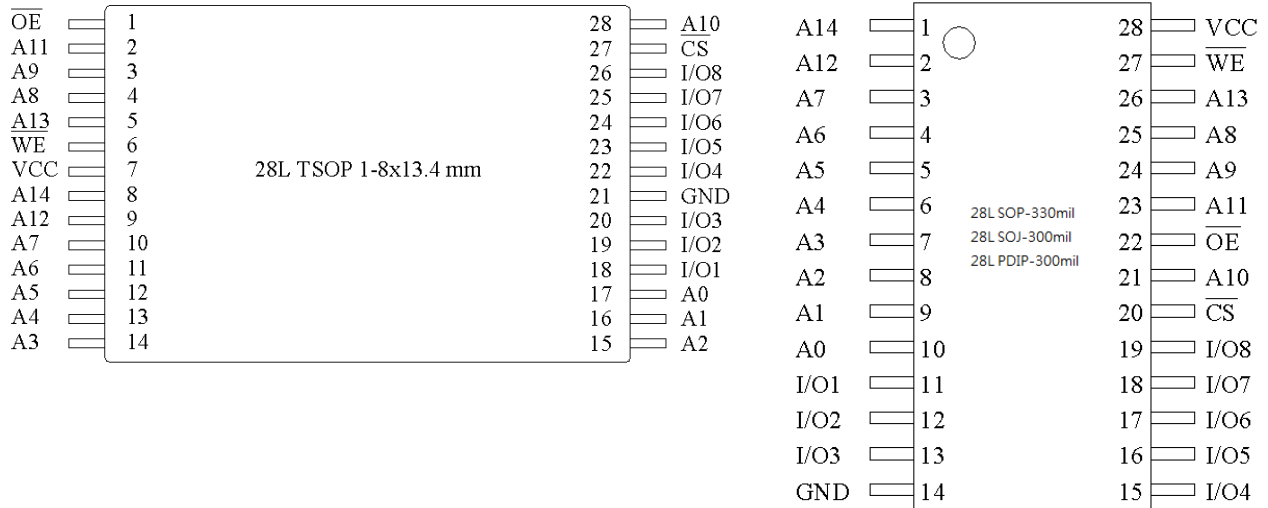
## FEATURES

- 32,768-word x 8-bit organization
- Operation voltage: 4.5 ~ 5.5V
- Fully static operation: no clock or refreshing required
- LVTTTL-compatible inputs and outputs
- Common I/O capability
- Low power consumption
  1. Active: 45/35 mA (Max.)
  2. Standby: 350  $\mu$ A
- Very high speed access: 10/12 ns
- Output Enable ( $\overline{OE}$ ) available for very fast access

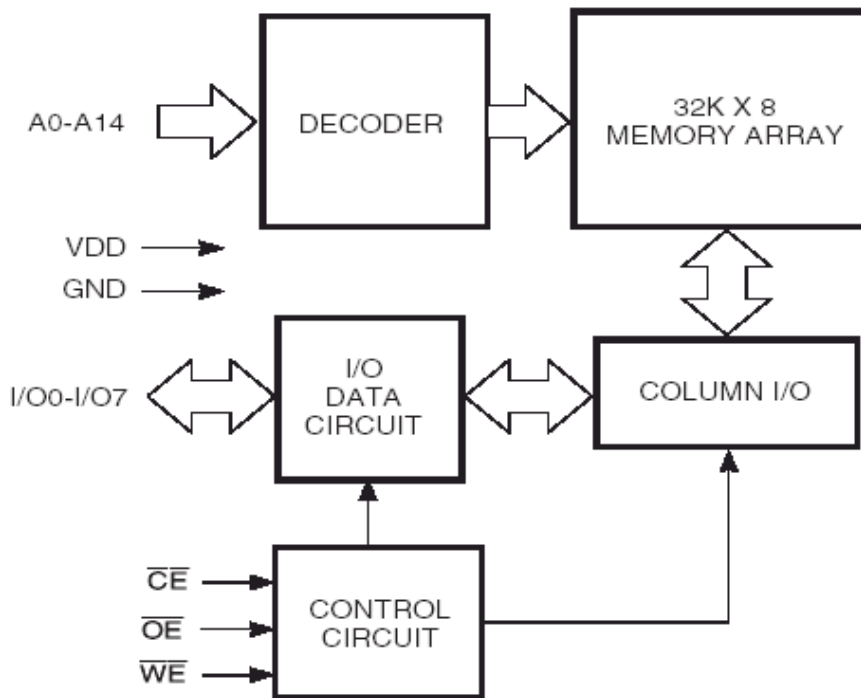
## PRODUCT FAMILY

Part No.	Operating Temp	Vcc. Range	Speed (ns)	Supply Current mA (Max.)	Package Type
CS18FS02565	0~70°C	4.5~5.5V	10	45	28 SOP 28 SOJ 28 TSOP 28 PDIP
			12	35	

### PIN CONFIGURATIONS



### BLOCK DIAGRAM





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## PIN DESCRIPTIONS

Symbols	Functions
A0~A14	Address Inputs
I/O1~I/O8	Data Inputs / Outputs
$\overline{CS}$	Chip Select Input
$\overline{WE}$	Write Enable Input
$\overline{OE}$	Output Enable Input
V <sub>cc</sub>	Power Supply
V <sub>ss</sub>	Ground

## TRUTH TABLE

$\overline{CS}$	$\overline{OE}$	$\overline{WE}$	Mode	I/O1~I/O8	V <sub>cc</sub> Current
H	X	X	Not Selected	High Z	I <sub>SB</sub> , I <sub>SB1</sub>
L	H	H	Output Disable	High Z	I <sub>DD</sub>
L	L	H	Read	Data Out	I <sub>DD</sub>
L	X	L	Write	Data In	I <sub>DD</sub>

## ABSOLUTE MAXIMUM RATINGS

Parameters	Rating	Unit
Supply Voltage to V <sub>ss</sub>	-0.5 to +7.0	V
Input/Output to V <sub>ss</sub>	-0.5 to V <sub>cc</sub> +0.5	V
Allowable Power Dissipation	1.5	W
Storage Temperature	-65 to +150	°C
Operating Temperature	0 to +70	°C

## OPERATING RANGE

Range	Ambient Temperature	V <sub>cc</sub>
Commercial	0~70°C	5.0V±5%



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## DC ELECTRICAL CHARACTERISTICS

(V<sub>CC</sub> = 5V, V<sub>SS</sub> = 0V, T<sub>a</sub> = 0 to 70°C)

Parameters	Symbols	Test Conditions	Min.	Typ.	Max	Unit	
Input Low Voltage	V <sub>IL</sub>	-	-0.3	-	0.8	V	
Input High Voltage	V <sub>IH</sub>	-	2.2	-	V <sub>CC</sub> +0.5	V	
Input Leakage Current	I <sub>LI</sub>	V <sub>IN</sub> = V <sub>SS</sub> to V <sub>CC</sub>	-1	-	+1	μA	
Output Leakage Current	I <sub>LO</sub>	V <sub>I/O</sub> = V <sub>SS</sub> to V <sub>CC</sub> , $\overline{CS}$ = V <sub>IH</sub> or $\overline{OE}$ = V <sub>IH</sub> or $\overline{WE}$ = V <sub>IL</sub>	-1	-	+1	μA	
Output Low Voltage	V <sub>OL</sub>	I <sub>OL</sub> = +8.0mA	-	-	0.4	V	
Output High Voltage	V <sub>OH</sub>	I <sub>OH</sub> = -4.0mA	2.4	-	-	V	
Operating Power Supply Current	I <sub>DD</sub>	$\overline{CS}$ = V <sub>IL</sub> , I/O = 0 mA	10	-	-	45	mA
		Cycle = MIN Duty = 100%	12	-	-	35	mA
Standby Power Supply Current	I <sub>SB</sub>	$\overline{CS}$ = V <sub>IH</sub> , Cycle = MIN Duty = 100%				1	mA
	I <sub>ST</sub>	$\overline{CS} \geq V_{CC} - 0.2V$				35	μA

Note: Typical characteristics are measured at V<sub>CC</sub> = 5 V, T<sub>a</sub> = 25°C

## AC Characteristics:

Capacitances (V<sub>CC</sub> = 5V, T<sub>a</sub> = 25°C, f = 1 MHz)

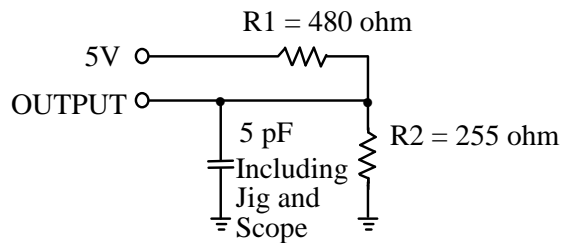
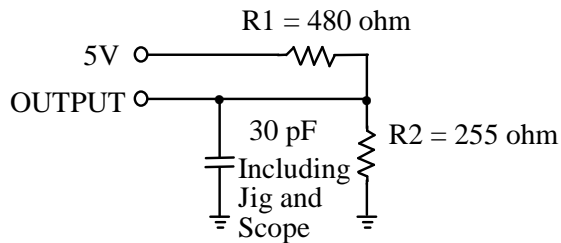
Parameters	Symbols	Conditions	Max.	Unit
Input Capacitance	C <sub>IN</sub>	V <sub>IN</sub> = 0V	8	pF
Input/Output Capacitance	C <sub>I/O</sub>	V <sub>OUT</sub> = 0V	10	pF

Note: These parameters are sampled but not 100% tested.

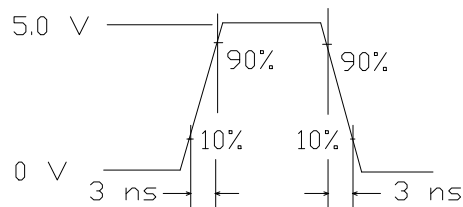
## AC TEST CONDICTIONS

Parameters	Conditions
Input Pulse Levels	0V to 3V
Input Rise and Fall Times	3 ns
Input and Output Timing Reference Level	1.5V
Output Load	CL = 30 pF, IOH/IOL = -4 mA / 8 mA

## AC TEST LOADS AND WAVEFORMS



(For  $T_{CLZ}$ ,  $T_{OLZ}$ ,  $T_{CHZ}$ ,  $T_{OHZ}$ ,  $T_{WHZ}$ ,  $T_{OW}$ )





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## AC PERFORMANCES

(V<sub>CC</sub> = 5V, V<sub>SS</sub> = 0V, T<sub>a</sub> = 0 to 70°C)

### (1) Read Cycle

Parameters	Symbols	CS18FS02565-10		CS18FS02565-12		Unit
		Min.	Max.	Min.	Max.	
Read Cycle Time	TRC	10	-	12	-	ns
Address Access Time	TAA	-	10	-	12	ns
Chip Select Access Time	TACS	-	10	-	12	ns
Output Enable to Output Valid	TAOE	-	6	-	6	ns
Chip Selection to Output in Low Z	TCLZ*	2	-	3	-	ns
Output Enable to Output in Low Z	TOLZ*	0	-	0	-	ns
Chip Deselection to Output in High Z	TCHZ*	-	5	-	6	ns
Output Disable to Output in High Z	TOHZ*	-	5	-	7	ns
Output Hold from Address Change	TOH	2	-	2	-	ns

*These parameters are sampled but not 100% tested*

### (2) Write Cycle

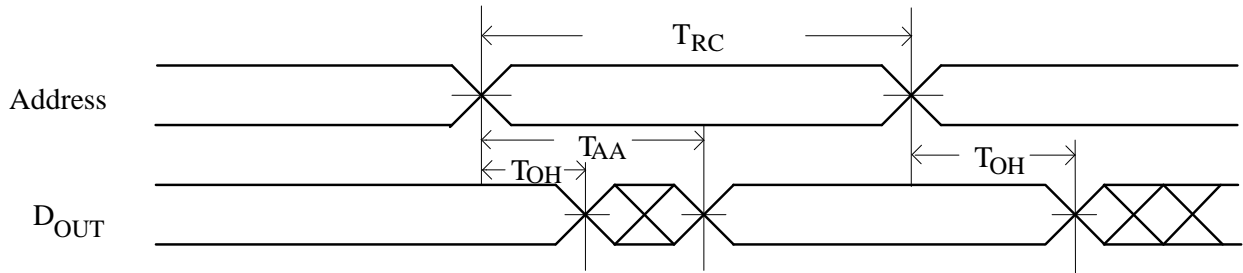
Parameters	Symbols	CS18FS02565-10		CS18FS02565-12		Unit
		Min.	Max.	Min.	Max.	
Write Cycle Time	TWC	10	-	12	-	ns
Chip Selection to End of Write	TCW	9	-	10	-	ns
Address Valid to End of Write	TAW	9	-	10	-	ns
Address Setup Time	TAS	0	-	0	-	ns
Write Pulse Width	TWP	9	-	9	-	ns
Write Recovery Time	TWR	0	-	0	-	ns
Data Valid to End of Write	TDW	7	-	7	-	ns
Data Hold from End of Write	TDH	0	-	0	-	ns
Write to Output in High Z	TWHZ*	-	6	-	6	ns
Output Disable to Output in High Z	TOHZ*	-	6	-	6	ns
Output Active from End of Write	TOW	0	-	0	-	ns

*These parameters are sampled but not 100% tested*

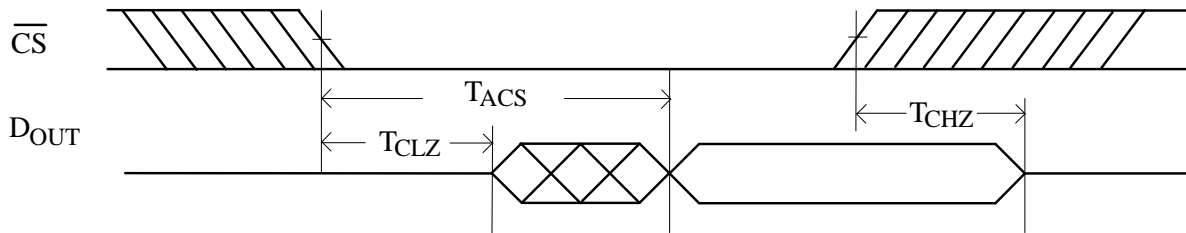


## TIMING WAVEFORMS

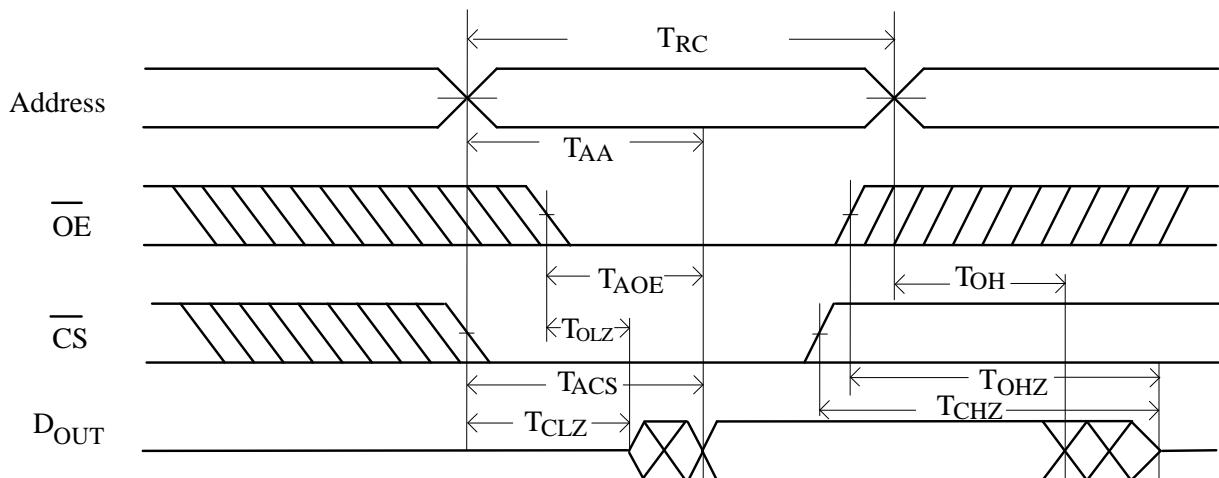
### Read Cycle 1 (Address Controlled)



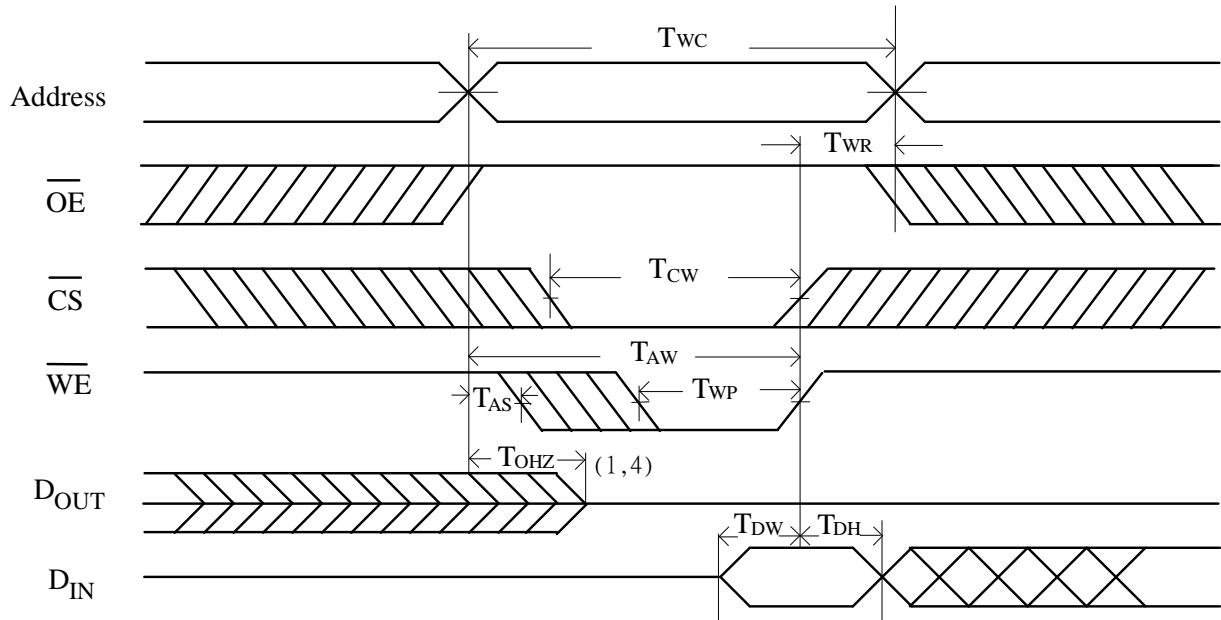
### Read Cycle 2 (Chip Select Controlled)



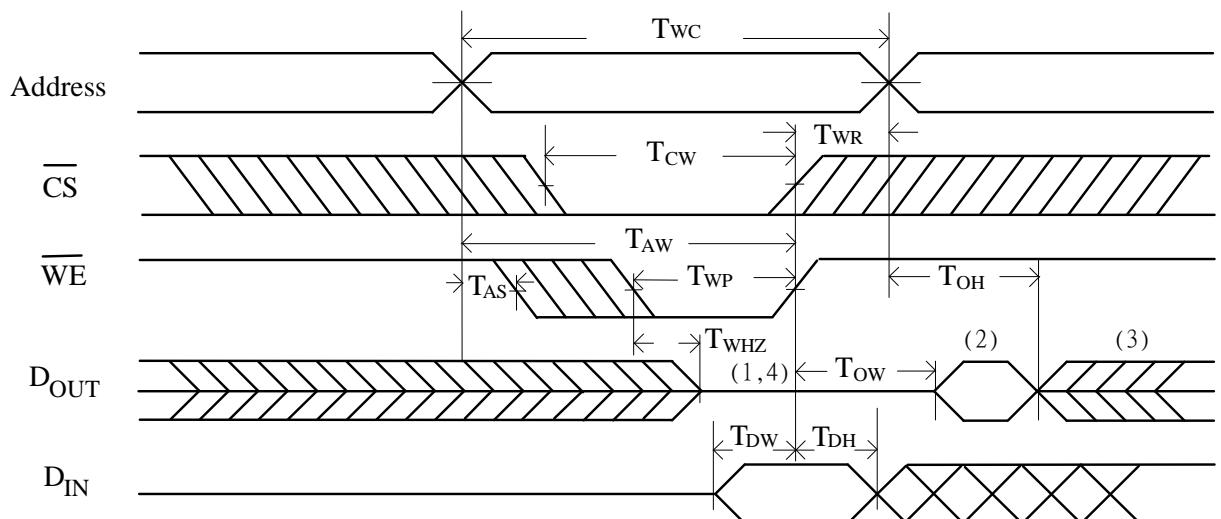
### Read Cycle 3 (Output Enable Controlled)



## Write Cycle 1 ( $\overline{OE}$ Clock)



## Write Cycle 2 ( $\overline{OE} = V_{IL}$ Fixed)



Notes:



# High Speed SRAM

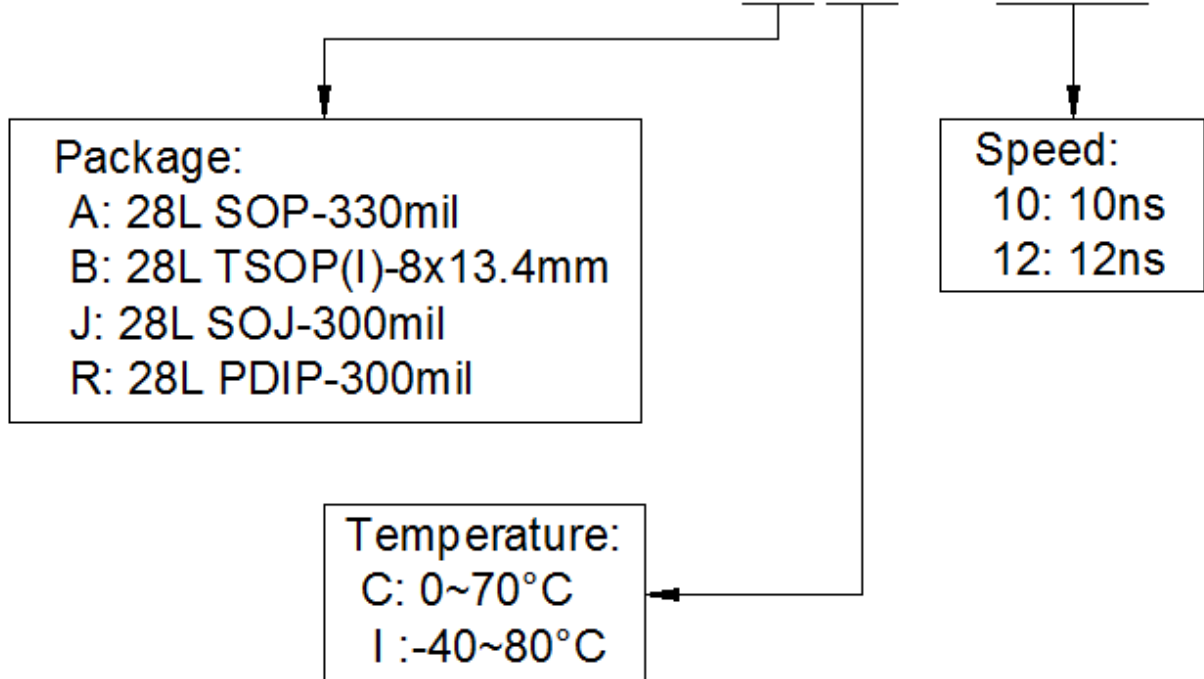
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1. During this period, I/O pins are in the output state, so input signals of opposite phase to the outputs should not be applied.
2. The data output from DOUT are the same as the data written to DIN during the write cycle.
3. DOUT provides the read data for the next address.
4. Transition is measured  $\pm 500\text{mV}$  from steady state with  $CL = 5\text{pF}$ . This parameter is guaranteed but not 100% tested.

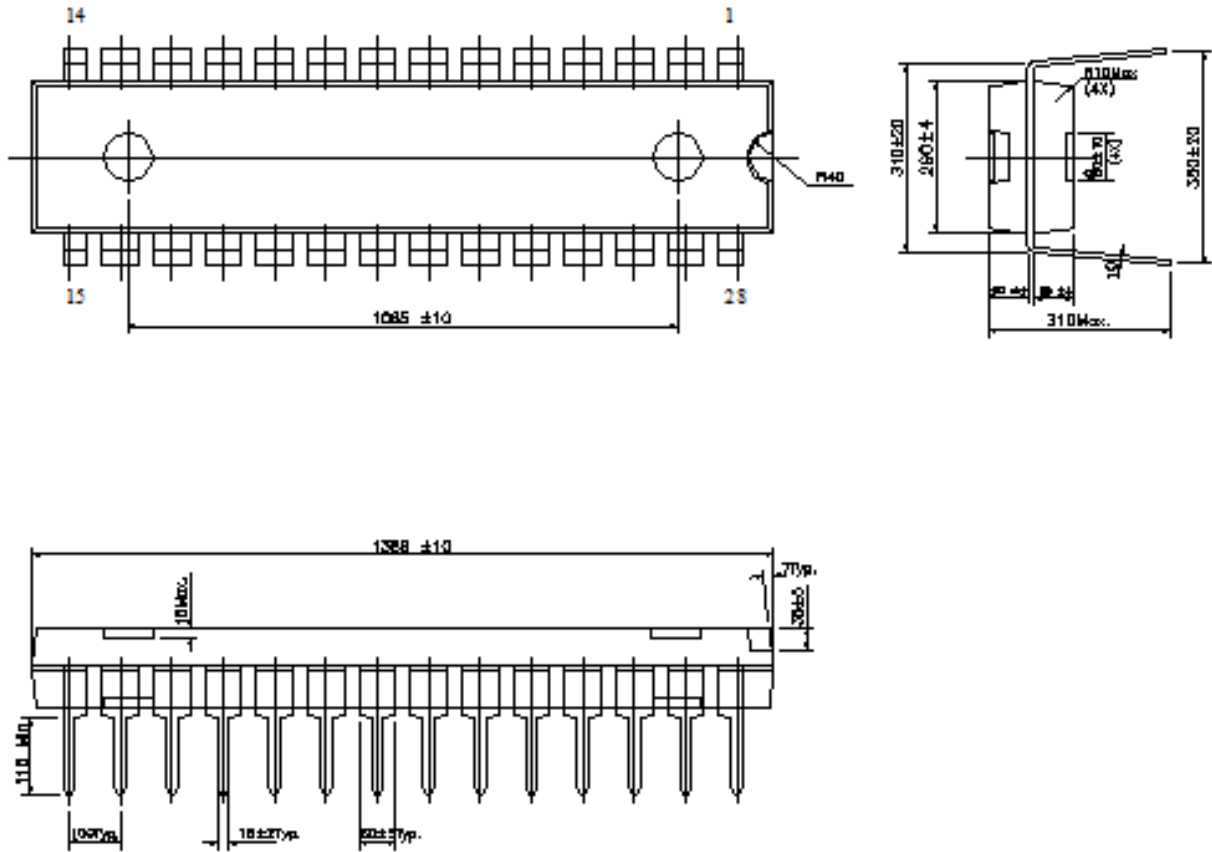
## ORDER INFORMATION

# CS18FS02565XX - XX



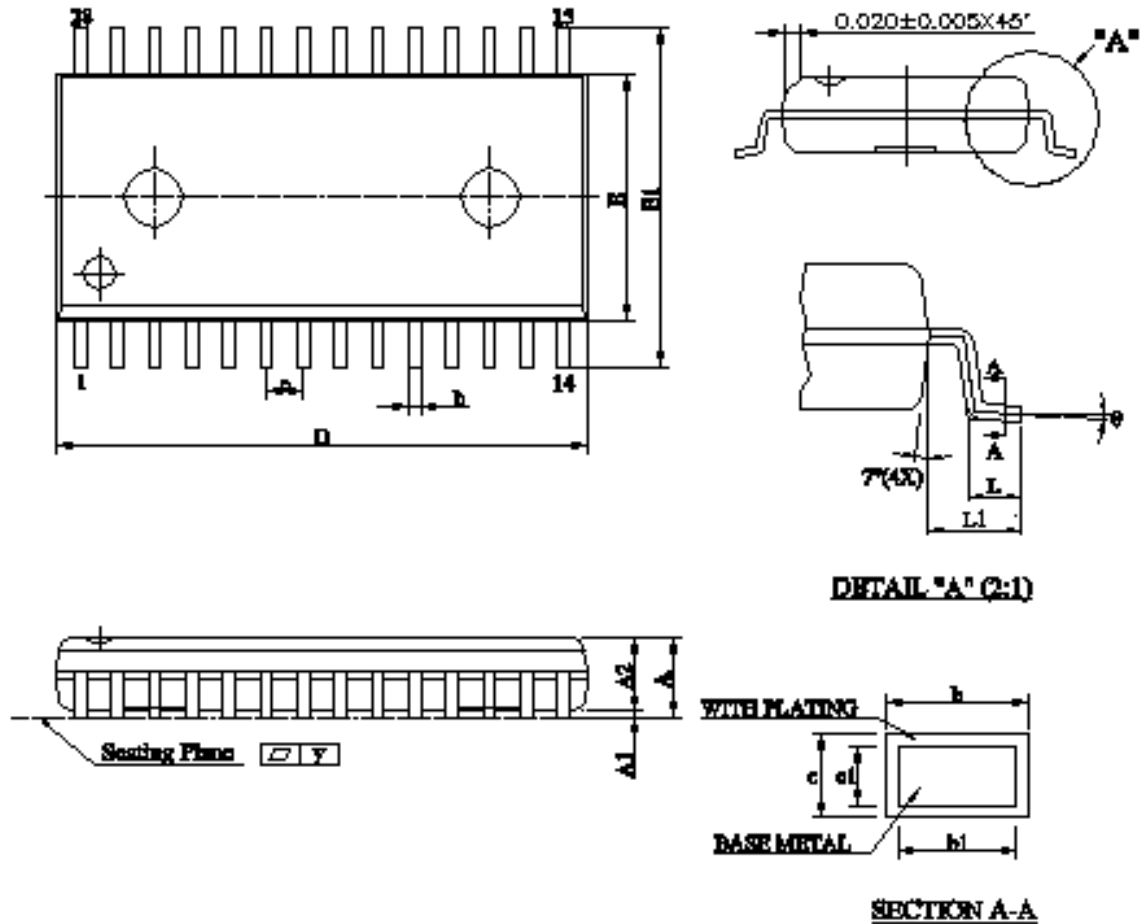
### PACKAGE OUTLINE

28 pin PDIP-300mil



Note: Plating thickness spec : 0.3 mil ~ 0.8 mil

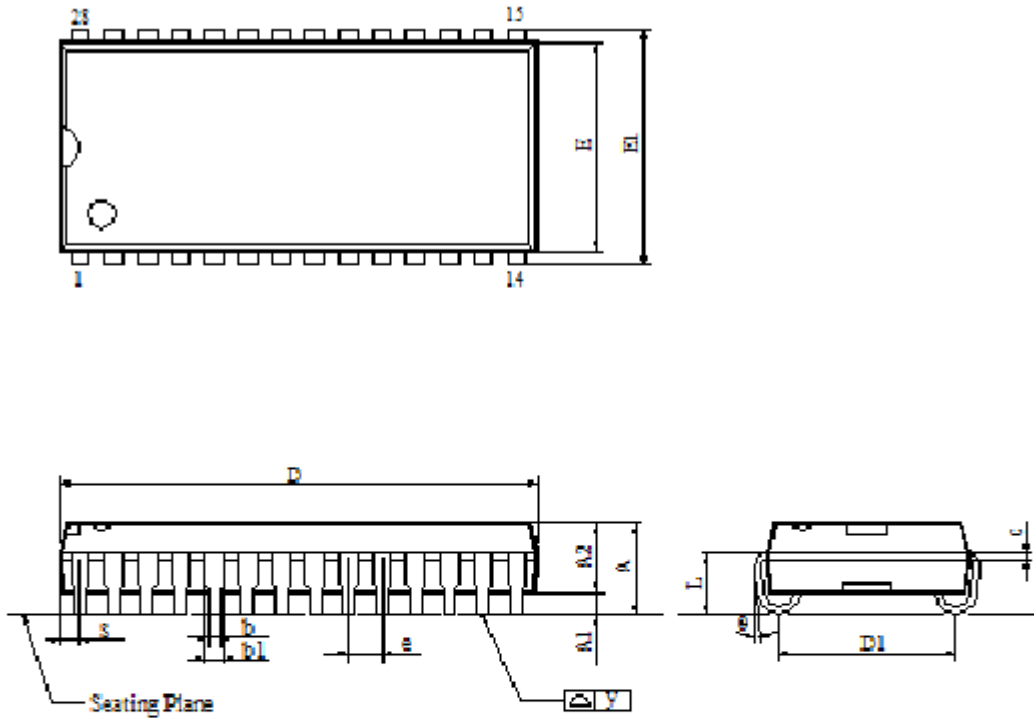
28 pin SOP-330mil



Note: Plating thickness spec : 0.3 mil ~ 0.8 mil.

SYMBOL		A	A1	A2	b	b1	c	c1	D	E	E1	e	L	L1	y	⊙
UNIT																
mm	Min.	2.540	0.102	2.362	0.35	0.35	0.20	0.20	17.983	8.280	11.506	1.118	0.700	1.520	-	0°
	Nom.	2.692	0.226	2.489	-	-	-	-	18.110	8.407	11.811	1.270	0.964	1.720	-	-
	Max.	2.844	0.350	2.616	0.50	0.45	0.32	0.28	18.237	8.534	12.116	1.422	1.228	1.920	0.1	10°
inch	Min.	0.100	0.004	0.093	0.014	0.014	0.008	0.008	0.708	0.326	0.453	0.044	0.0276	0.0598	-	0°
	Nom.	0.106	0.009	0.098	-	-	-	-	0.713	0.331	0.465	0.050	0.0380	0.0677	-	-
	Max.	0.112	0.014	0.103	0.020	0.018	0.012	0.011	0.718	0.336	0.477	0.056	0.0484	0.0756	0.004	10°

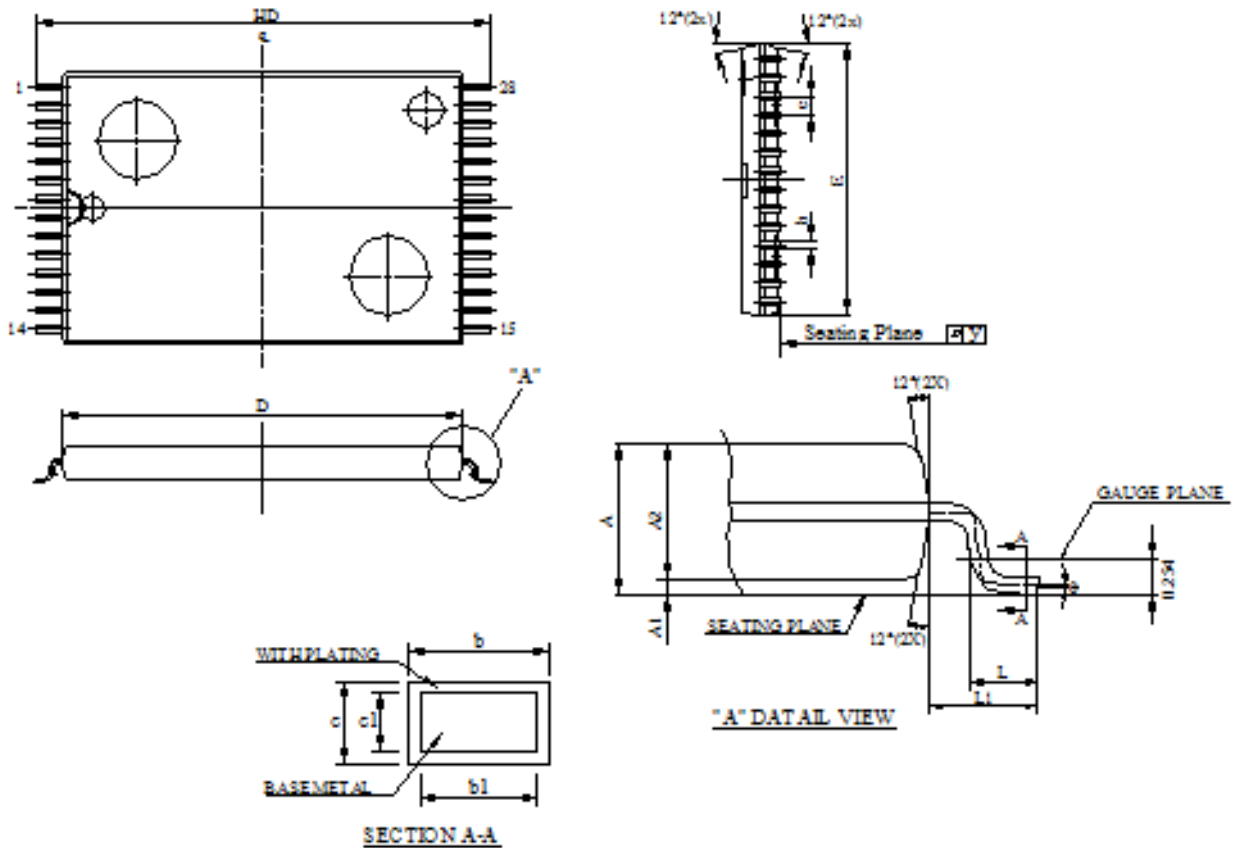
28 pin SOJ-300mil



Note: Plating thickness spec : 0.3 mil ~ 0.8 mil.

SYMBOL	A	A1	A2	b1	b	c	D	E	e	D1	E1	L	s	y	θ	
mm	Min.	-	0.69	2.41	0.66	0.41	0.20	-	7.49	1.12	6.22	8.31	1.96	-	-	0°
	Norm.	-	-	2.54	0.71	0.46	0.25	18.03	7.62	1.27	6.73	8.56	2.21	-	-	-
	Max.	3.56	-	2.67	0.81	0.56	0.36	18.54	7.75	1.42	7.24	8.81	2.46	1.14	0.10	10°
inch	Min.	-	0.027	0.095	0.026	0.016	0.008	-	0.295	0.044	0.245	0.327	0.077	-	-	0°
	Norm.	-	-	0.100	0.028	0.018	0.010	0.710	0.300	0.050	0.265	0.337	0.087	-	-	-
	Max.	0.140	-	0.105	0.032	0.022	0.014	0.730	0.305	0.056	0.285	0.347	0.097	0.045	0.004	10°

28 pin TSOP(I)-8x13.4mm



Note: Plating thickness spec : 0.3 mil ~ 0.8 mil

SYMBOL		A	A1	A2	b	b1	c	c1	D	E	e	HD	L	L1	y	θ
UNIT																
mm	Min.	1.00	0.050	0.95	0.17	0.17	0.10	0.10	11.70	7.90	0.45	13.20	0.40	0.70	-	0°
	Nom.	1.10	0.115	1.00	0.22	0.20	-	-	11.80	8.00	0.55	13.40	0.50	0.80	-	-
	Max.	1.20	0.180	1.05	0.27	0.23	0.21	0.16	11.90	8.10	0.65	13.60	0.70	0.90	0.1	8°
inch	Min.	0.0393	0.0019	0.037	0.007	0.007	0.004	0.004	0.461	0.311	0.018	0.520	0.0157	0.0275	-	0°
	Nom.	0.0433	0.0045	0.039	0.009	0.008	-	-	0.465	0.315	0.022	0.528	0.0197	0.0315	-	-
	Max.	0.0473	0.0071	0.041	0.011	0.009	0.008	0.006	0.469	0.319	0.026	0.536	0.0277	0.0355	0.004	8°