

TOSHIBA

T6B23

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

T 6 B 2 3

COLUMN DRIVER LSI FOR A DOT MATRIX LCD

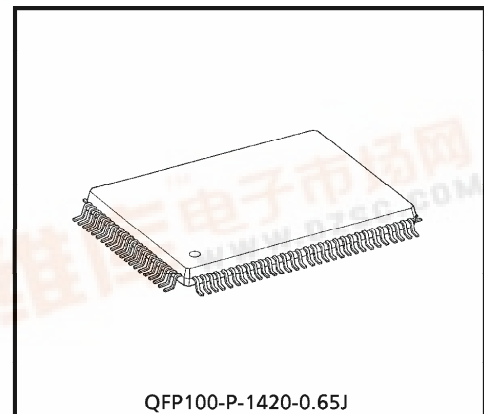
The T6B23 is a column driver with 80 output channels for a medium- or small-scale dot matrix LCD.

The T6B23 realizes low power consumption using the CMOS Si-Gate process.

The T6B23 can be connected to various types of extension driver like the T6A39 or T6A41.

FEATURES

- 80-output column driver
- Data output for extension driver : 1 (e.g. T6A39)
: 2 (e.g. T6A41)
- Two types of output format :
 - ① $O_1 \rightarrow O_{80}$
 - ② $O_{80} \rightarrow O_1$
- Low power consumption
- Logic voltage : $5.0V \pm 10\%$
- LCD drive voltage : $V_{DD} - 3.0V$ to $V_{DD} - 11.0V$
- 100-pin plastic flat package



Weight : 1.6g (typ.)

961001EBA2

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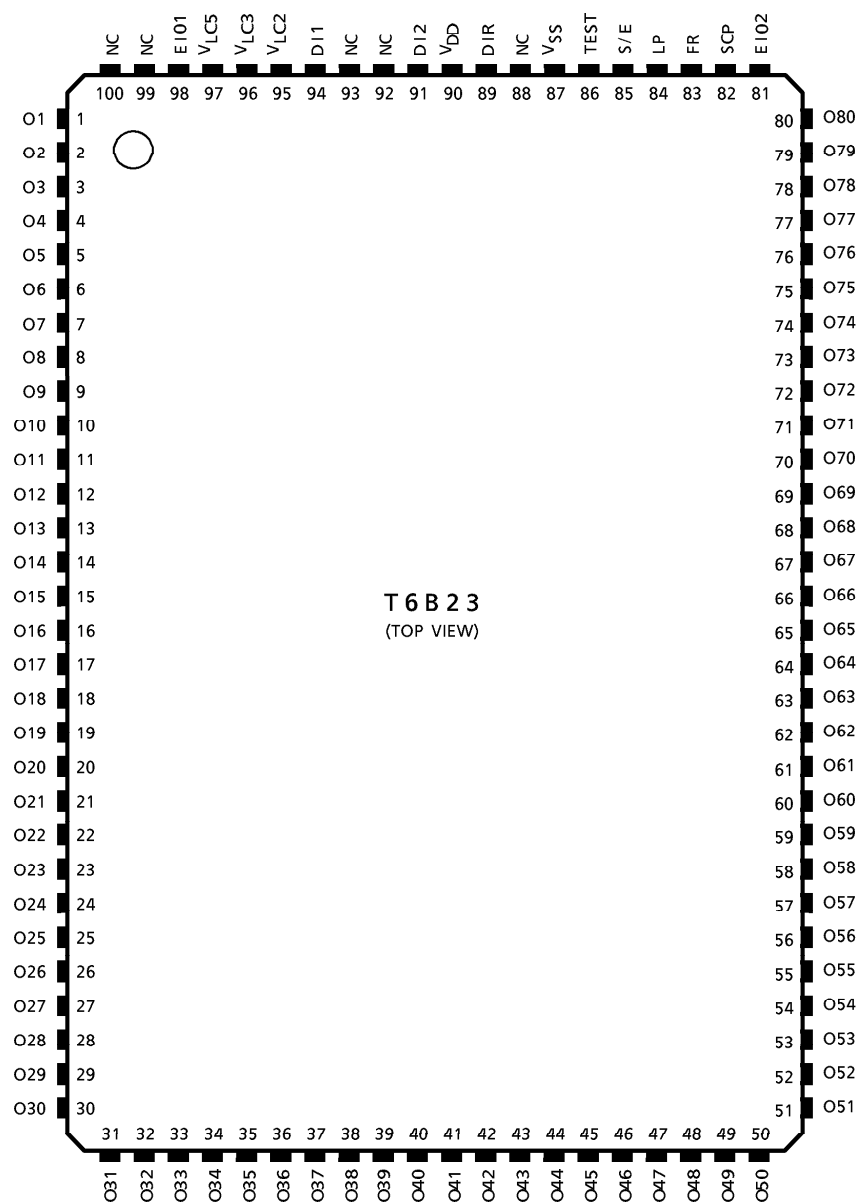
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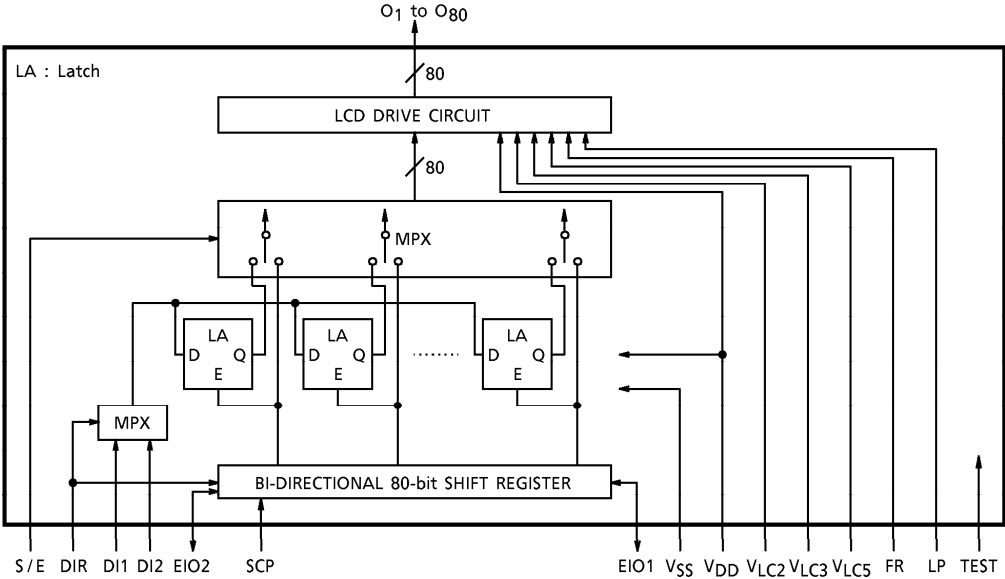
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PIN ASSIGNMENT



BLOCK DIAGRAM



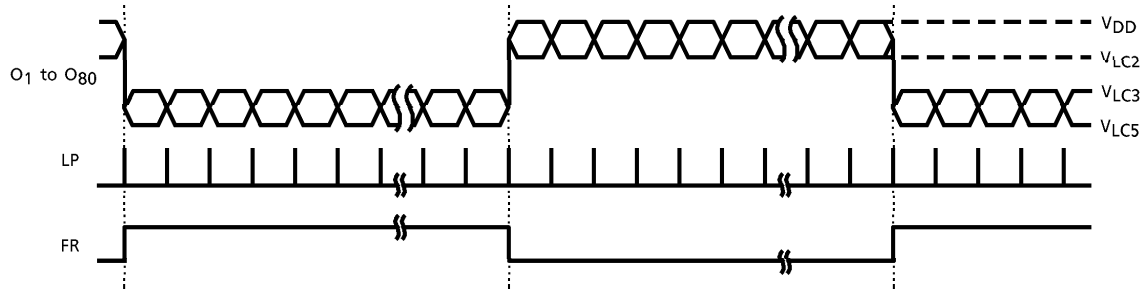
PIN FUNCTIONS

PIN NAME	I/O	FUNCTIONS	LEVEL
O1 to O80	Output	LCD drive output	V_{DD} to V_{LC5}
DI1, DI2	Input	Data signal input	V_{DD} to V_{SS}
EIO1, EIO2	I/O	ENABLE I/O When $S/E = H$, this pin is for input.	
SCP	Input	(Shift Clock Pulse) Shift clock pulse input	
FR	Input	(Frame) Frame signal input	
LP	Input	(Latch Pulse) Latch pulse signal input	
S/E	Input	Extension driver select input	
DIR	Input	Input data flow direction select input	
TEST	Input	Test pin: usually connected to V_{SS} .	
$V_{LC2, 3, 5}$	—	Power supply for LCD drive	—
V_{DD}	—	Power supply (5V)	
V_{SS}	—	Power supply (0V)	

FUNCTION OF DATA AND ENABLE PINS

S / E DIR		DI1	DI2	EIO1	EIO2	DATA FLOW	FIRST DATA	LAST DATA	MODE
L	L	Open	DATA INPUT	ENABLE signal input	ENABLE signal output	$O_{80} \rightarrow O_1$	O_1	O_{80}	ENABLE
L	H	DATA INPUT	Open	ENABLE signal output	ENABLE signal input	$O_1 \rightarrow O_{80}$	O_{80}	O_1	
H	L	Open	Open	DATA INPUT	DATA OUTPUT	$O_1 \rightarrow O_{80}$	O_{80}	O_1	SHIFT
H	H	Open	Open	DATA OUTPUT	DATA INPUT	$O_{80} \rightarrow O_1$	O_1	O_{80}	

TIMING DIAGRAM



ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

ITEM	SYMBOL	RATING	UNIT
Supply Voltage (1)	V_{DD} (Note 1)	- 0.3 to 7.0	V
Supply Voltage (2)	V_{LC2} , V_{LC3} , V_{LC5} (Note 1, 2)	$V_{DD} - 12.0$ to $V_{DD} + 0.3$	V
Input Voltage	V_{IN} (Note 1)	- 0.3 to $V_{DD} + 0.3$	V
Operating Temperature	T_{opr}	- 20 to 75	°C
Storage Temperature	T_{stg}	- 55 to 125	°C

- (Note 1) Referenced to $V_{SS} = 0$ V
(Note 2) Ensure that the following condition is always maintained.
 $V_{DD} \geq V_{LC2} \geq V_{LC3} \geq V_{LC5}$.

ELECTRICAL CHARACTERISTICS

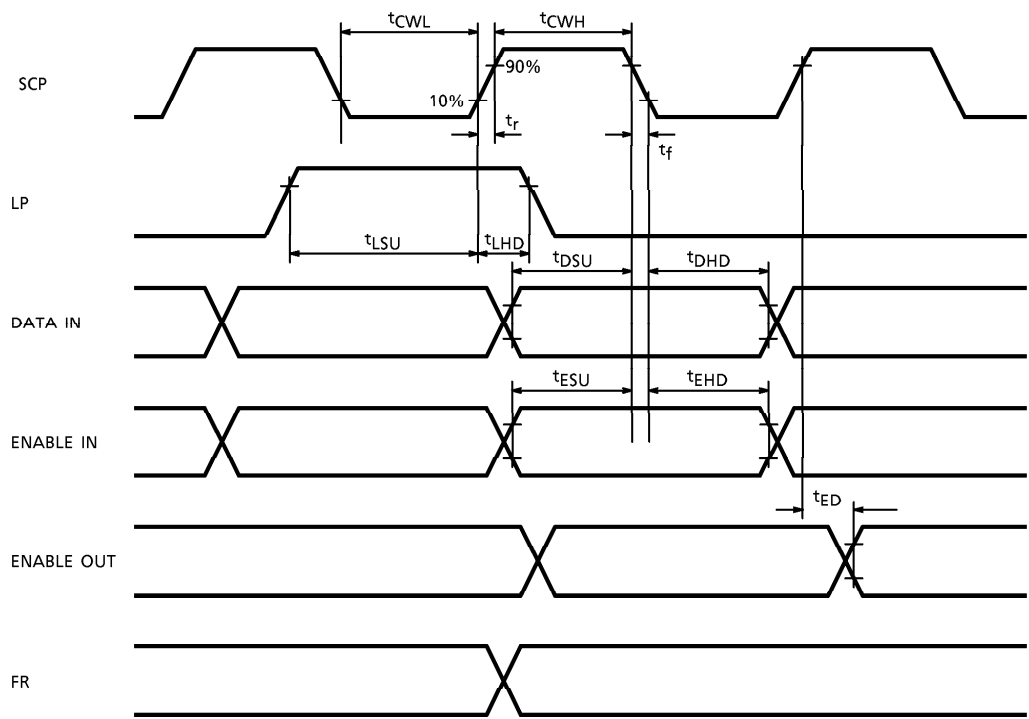
DC CHARACTERISTICS

TEST CONDITIONS (Unless otherwise noted, $V_{SS} = 0V$, $V_{DD} = 5.0V \pm 10\%$, $V_{LC5} = 0V$, $T_a = -20$ to $75^\circ C$)

ITEM		SYMBOL	TEST CIR- CUIT	TEST CONDITIONS	MIN	TYP.	MAX	UNIT	PIN NAME	
Operating Voltage (1)		—	—	—	4.5	5.0	5.5	V	V _{DD}	
Operating Voltage (2)		—	—	—	V _{DD} - 11.0	—	V _{DD} - 3.0	V	V _{LC5}	
Input Voltage	H Level	V _{IH}	—	—	V _{DD} - 1.0	—	V _{DD}	V	(*)	
	L Level	V _{IL}	—	—	0	—	1.0	V	(*)	
Output Voltage	H Level	V _{OH}	—	I _{OH} = - 0.4mA	V _{DD} - 0.4	—	V _{DD}	V	EIO1, EIO2	
	L Level	V _{OL}	—	I _{OH} = 0.4mA	0	—	0.4	V	EIO1, EIO2	
Output Resistance		R _{COL}	—	I _d = ± 50μA	—	—	30	kΩ	O ₁ to O ₈₀	
Operating Frequency		f _{scp}	—	Ta = - 20 to 75°C	—	—	400	kHz	SCP	
Current Consumption		I _{SS}	—	V _{DD} = 5.0V V _{LC2} = 3.0V V _{LC3} = 2.0V V _{LC5} = 0.0V f _{FR} = 39Hz f _{scp} = 250kHz O ₁ to O ₈₀ : No Load	Binary Data Input	—	—	1.0	mA	V _{SS}
				Input Data : LOW Constant	—	—	0.4	mA		

(*) SCP, LP, FR, EIO1, EIO2, DI1, DI2, DIR, S/E, TEST

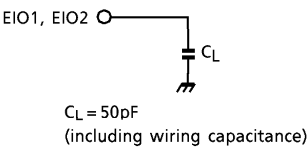
AC CHARACTERISTICS



TEST CONDITIONS ($V_{SS} = 0V$, $V_{DD} = 5V \pm 10\%$, $V_{LC5} = 0V$, $T_a = -20$ to $75^\circ C$)

ITEM	SYMBOL	MIN	MAX	UNIT
Operating Frequency	f_{scp}	—	400	kHz
SCP Pulse Width	t_{CWH} , t_{CWL}	800	—	ns
SCP Rise / Fall Time	t_r , t_f	—	200	ns
LP Set-up Time	t_{LSU}	500	—	ns
LP Hold Time	t_{LHD}	—	10	ns
Data Set-up Time	t_{DSU} (Note 1)	300	—	ns
Data Hold Time	t_{DHD} (Note 1)	300	—	ns
Enable Set-up Time	t_{ESU} (Note 2)	300	—	ns
Enable Hold Time	t_{EHD} (Note 2)	300	—	ns
Enable Delay Time	t_{ED} (Note 3)	—	500	ns

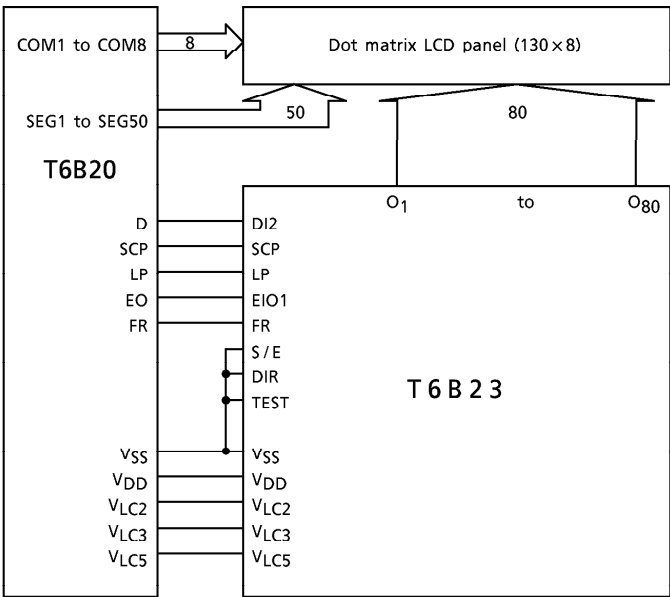
LOAD CIRCUIT



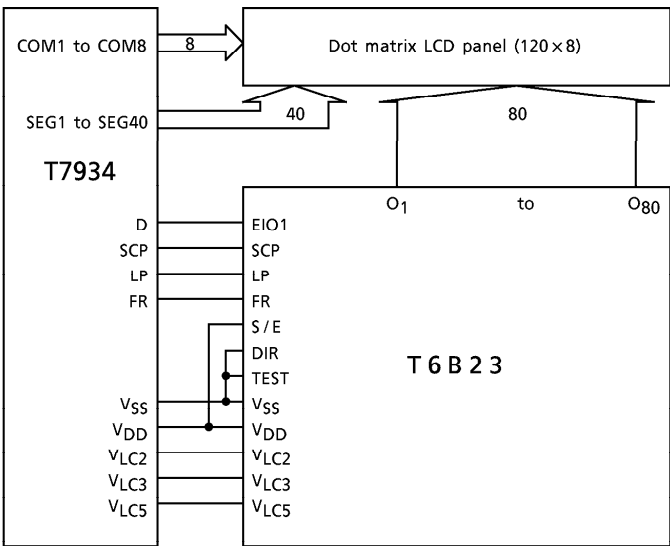
- (Note 1) Applies to DI1 and DI2.
- (Note 2) Applies to EIO1 and EIO2.
- (Note 3) With load circuit connected

APPLICATION CIRCUIT

(a) S / E = L (ENABLE mode)

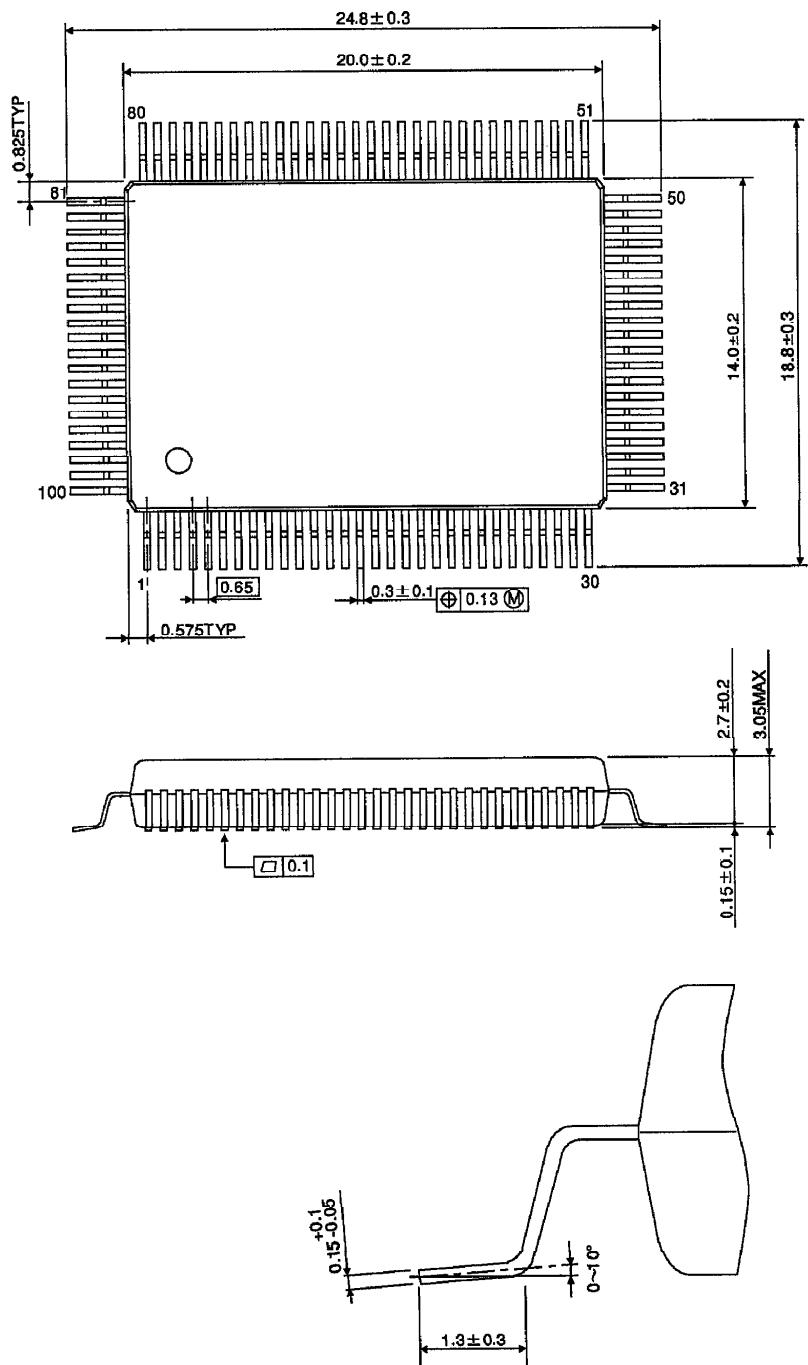


(b) S / E = H (SHIFT mode)



OUTLINE DRAWING
QFP100-P-1420-0.65J

Unit : mm



Weight : 1.6g (Typ.)