DESCRIPTION

TM1618 is an LED Controller driven ASIC. 1 segment/grid output lines, MCU digital interface, data latch, High-voltage LED driver, key scan circuit dare all incorporated into a single chip to build a highly reliable peripheral device for a single chip microcomputer. Housed in a 18-pin DIP Package, TM1618 pin assignments and application circuit are optimized for easy PCB Layout and cost saving advantages.

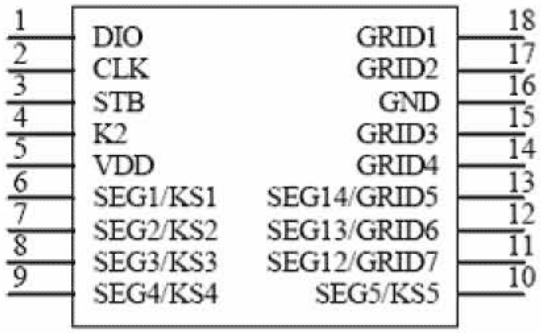
FEATURES

- CMOS Technology
- Display Modes (5segment, 7 grid to 8segment, 4grid)
- Key Scanning (5 x 1Bit)
- 8-Step Dimming Circuitry
- Serial Interface (CLK, STB, DIN, DOUT)
- Oscillatory Manners; RC Oscillation (450KHz ±5%)
- Built-in on-reset circuit
- Available in 18-pin, DIP Package

APPLICATION

- Micro-computer Peripheral Device
- VCR/VCD/DVD set
- Combi set

PIN CONFIGURATION:



TM1618

PIN DESCRIPTION

Pin Name	Description	Explanation
DIO	Data Input/Output	This pin inputs serial data at the rising edge of the shift clock (starting from the lower bit) This pin outputs serial data at the falling edge of the shift clock (starting from the lower bit)
STB	Serial Interface Strobe	This pin reads initialization serial data at the rising/falling edge of the shift clock then wait for the command. The data input after the STB has fallen is processed as a command. When this pin is “HIGH”, CLK is ignored
CLK	Clock Input Pin	This pin reads serial data at the rising edge and outputs data at the falling edge.
NC	NC	No Connect
K2	Key Data Input Pins	The data sent to these pins are latched at the end of the display cycle. (Internal Pull-Low Resistor)
Seg1/KS1~Seg5/KS5	Output Segment	Segment Output Pins (p-channel, open drain) Also acts as the key source
Grid1 ~ Grid2	Grid Output Pins	Grid Output Pins (N-Channel, open drain)
Grid3~Grid4	Grid Output Pins	Grid Output Pins (N-Channel, open drain)
Seg12/Grid7~Seg14/Grid5	Output (Seg/Grid)	Seg/Grid Multiplexing output
V_{DD}	Logic Power	5V±10%
V_{SS}	Logic Ground	Connects the system ground

ABSOLUTE MAXIMUM RATINGS (Ta=25°C, Vss=0V)

Parameter	Symbol	Ratings	Unit
Logic supply voltage	VDD	-0.5 ~+7.0	V
Logic input voltage	VI1	-0.5 ~VDD+0.5	V
Segment driver output current	IO1	-50	mA
Grid driver output current	IO2	+200	mA
Power Loss	PD	400	mW
Supply Temperature	Topt	-40 ~+80	°C
Storage Temperature	Tstg	-65 ~+150	°C

RECOMMONDED OPERATING RANGE

(Ta=-20 ~ +70°C, Vss=0V)

Parameter	Symbol	Min.	Typ	Max	Unit	Test Condition
Logic supply voltage	V_{DD}		5		V	-
High-level input voltage	V_{IH}	0.7VDD	-	VDD	V	-
Low-level input voltage	V_{IL}	0	-	0.3VDD	V	-

ELECTRICAL CHARACTERISTICS

(Ta=-20 ~+70°C, VDD=4.5 ~5.5V, Vss=0V)

Parameter	Symbol	Min.	Typ	Max.	Unit	Test Condition
High-level output current	Ioh1	-20	-25	-40	mA	Seg1 ~ Seg11, Vo=VDD-2V
	Ioh2	-20	-30	-50	mA	Seg1 ~ Seg11, Vo=VDD-3V
Low-level output current	IOL1	80	140	-	mA	Grid1 ~ Grid6 Vo=0.3V
Low-level output current	Idout	4	-	-	mA	VO=0.4, dout
High-level output current tolerance	Itolsg	-	-	5	%	VO=VDD-3V, Seg1 ~ Seg11
Output Pull-down	RL		10		k Ω	K1~K3
Input Current	II	-	-	±1	μA	VI=VDD/VSS
High-level input voltage	VIH	0.7 VDD	-		V	CLK, DIN, STB
Low-level input voltage	VIL	-	-	0.3VDD	V	CLK, DIN, STB
Lag voltage	VH	-	0.35	-	V	CLK,DIN,STB
Dynamic Current	IDDdyn	-	-	5	mA	Display off, No-load

SWITHCING CHARACTERISTICS

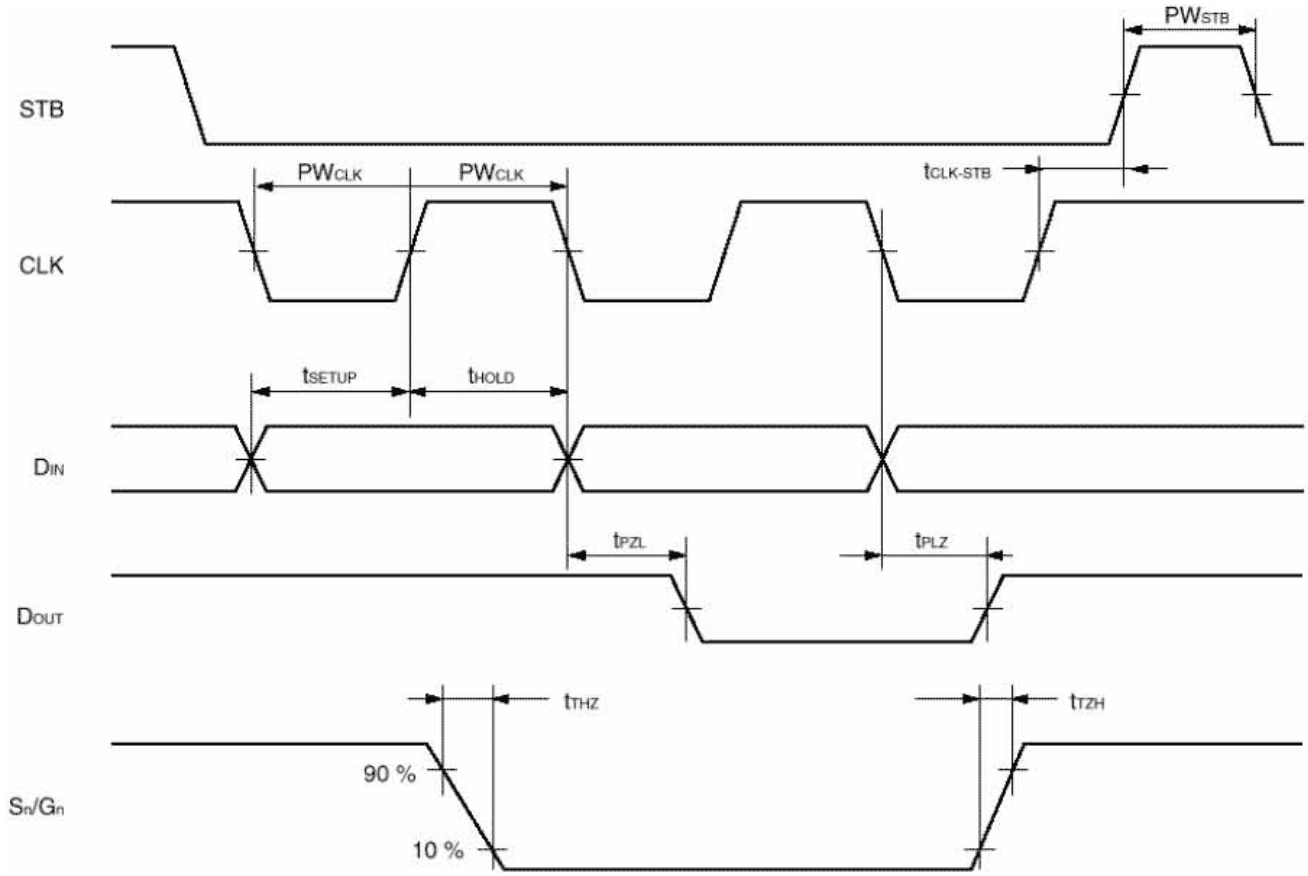
(Ta=-20 ~+70°C, VDD=4.5 ~5.5V)

Parameter	Symbol	Min.	Typ	Max.	Unit	Test Condition	
Oscillation Frequency	fosc	-	500	-	KHz	R=16.5kΩ	
Propagation delay time	tPLZ	-	-	300	ns	CLK→D_{OUT} CL=15pF, RL=10kΩ	
	tPZL	-	-	100	ns		
Rise time	TTZH1	-	-	2	μs	CL=300pF	Seg1~Seg11
	TTZH2	-	-	0.5	μs		Grid1~Grid4 Seg12/Grid7~Seg14/Grid5
Fall time	TTHz	-	-	120	μs	CL=300pF, Segn, Gridn,	
Maximal clock frequency	Fmax	1	-	-	MHz	On 50% duty factor	
Input capacitance	CI	-	-	15	pF	-	

***TIMING DIAGRAM** (Ta=-20 ~+70°C, VDD=4.5 ~5.5V)

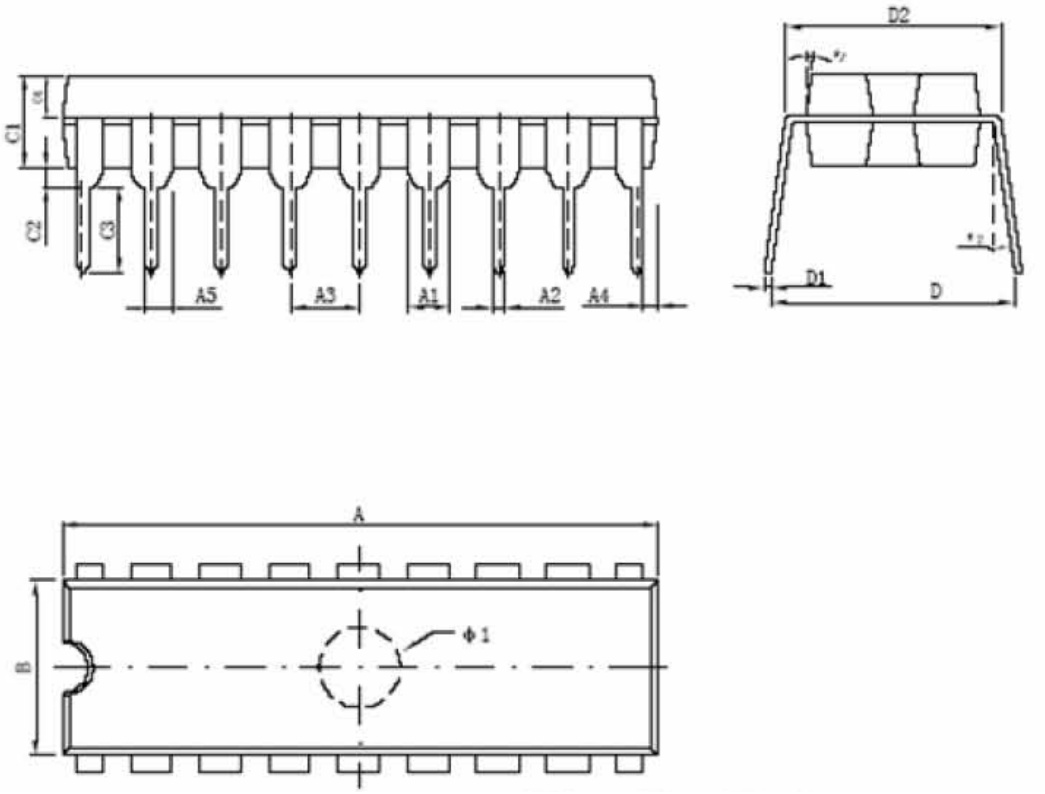
Parameter	Symbol	Min.	Typ	Max.	Unit	Test Condition
Clock Pulse wideth	PWCLK	400	-	-	ns	-
Strobe pulse wideth	PWSTB	1	-	-	μs	-
Data setup time	tSETUP	100	-	-	ns	-
Data hold time	tHOLD	100	-	-	ns	-
CLK→STB time	tCLK STB	1	-	-	μs	CLK↑→STB↑
Wait time	tWAIT	1	-	-	μs	CLK↑→CLK↓

TIMING FAVEFORM



PACKAGE:

Size / Lable	Min.(mm)	Max.(mm)	Size / Lable	Min. (mm)	Max.(mm)
A1	21.9	22.10	C3	3.4	3.6
A1	1.40TYP		C4	1.58TYP	
A2	0.43	0.57	D	8.10	8.60
A3	2.54TYP		D1	0.20	0.35
A4	0.59TYP		D2	7.62	7.87
A5	0.95TYP		Φ1	3.0TYP	
B	6.3	6.5	Θ1	8° TYP	
C1	3.4	3.6	Θ2	5° TYP	
C2	0.6	0.8			



.All specs and applications shown above subject to change without prior notice.