

FEATURES

- Low Voltage Detection and Indication:
Detect Voltage Level Options by External Resistor.
- Up to 1.0A LED Bias Current.
- External Resistor to set Output Current.
- Simple LED Dimming Control.
- Build-in Morse Code S.O.S Signal and Single Flash Loop Flash Function.
- Low Dropout Voltage.
- 2.5V to 6V Supply Voltage Range.
- SOP-8 lead-free Package.
- ESD Human Body Mode Over 4KV.
- Thermal Protection 160 °C .
- Embedded OTP ROM for Function Options.

GENERAL DESCRIPTION

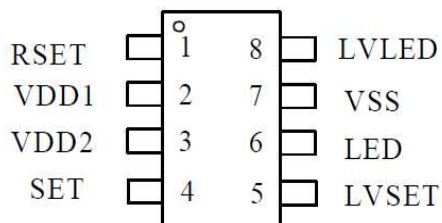
T8341AD provides the low-dropout bias supply and the high performance alternative solution for the white LEDs application. The build-in Low Voltage Detection and Indication function can provide the internal LED dimming. Morse Code S.O.S Signal and Single Flash Loop Flash Function are supported with the significantly lower dropout voltage. A embedded OTP ROM can provide a flexibility of function selection. The T8341AD is available in SOP-8 lead-free package.

Applications

- Handheld Electronics
- Flash Light
- Lighting
- Bike lights

PART NUMBER EXAMPLES

PART NO.	PACKAGE
T8341AD	SOP-8

PIN ARRANGEMENT (Top view)**SOP-8****PIN DESCRIPTION**

SYMBOL	SOP-8	DESCRIPTION
RSET	1	Connect to an external resistor to set output current.
VSS	7	Ground
VDD1	2	Analog Power Input (*Note)
VDD2	3	Digital Power Input (*Note)
LED	6	LED Cathode Connection.
SET	4	Control ON/OFF or dimming and Flash mode
LVLED	8	Low Voltage Detection Indicator LED Cathode Connection.
LVSET	5	Connect to an external resistor to set “low voltage detection” level.

*Note: The connection to the power supply is necessary.

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Voltage on any pin relative to GND	V_{IN}	-3 to +7	V
Operating Temperature Rang	T_A	-40 to +85	°C
Maximum Soldering Temperature (at leads, 10 sec)	T_{LEAD}	300	°C
Storage Temperature Rang	T_s	-65 to +150	°C
Continuous Power Dissipation ($T_A = +70\text{ }^{\circ}\text{C}$)	SOP-8	800	mW

Electrical Characteristics

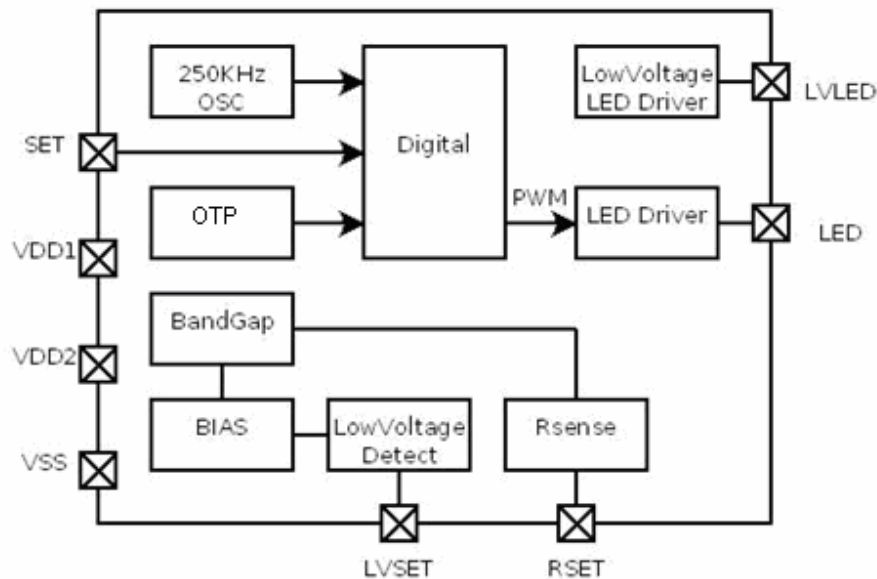
(Typical values are at $T_A=25^{\circ}\text{C}$, $V_{DD}=5\text{V}$)

Symbol	Description	Conditions	Min.	Typ.	Max.	Unit
VDD	Operating voltage range	power supply input	2.5		6	V
VRSET	RSET bias voltage	no loading	0.475	0.5	0.525	V
ISET	SET input current range			100		μA
I _{LED}	Maximum LED sink current	$0.5\text{V} \geq V_{in-} - V_{LED} \leq 0.8\text{V}$ $V_{in-} - V_{LED} \geq 0.8\text{V}, I_{LED} < 1\text{A}$ $I_{LED} = 360 * (0.5 / RSET)$			1.0	A
IDD	Quiescent supply current	$V_{DD} = 5\text{V}$ $V_{LED} = 3.5\text{V}$ SET LED OFF			2	μA
V_{LED}	LED operating range		0.7		$V_{DD}-1$	V
I_{LVLED}	Low voltage detection output	4mA		Options ± 10		%
V_{LVLED}	LVLED operating range		0.7		$V_{DD}-1$	V
V_{LVSET}	Low voltage detection level	LVSET reference current	24.75	27.5	30.25	μA
		LVSET minimum voltage		$0.1 * V_{DD}$		V
ILSD	LED current in shutdown Standby Current	$V_{LED} = 3.3\text{V}$, $V_{DD} = 5\text{V}$, $T_A = +25\text{ }^{\circ}\text{C}$			1	μA
t_{SH}	SET pin Signal pulse width		30			mS
V_{IH}	VSET Input high voltage	$V_{SET} > V_{IH}$ for enable, $V_{DD} = 5\text{V}$	2			V
V_{IL}	VSET Input low voltage	$V_{SET} < V_{IL}$ for disable, $V_{DD} = 5\text{V}$			0.8	V
T_{TP}	Thermal Protect	Thermal Protect $\pm 10\%$		160		°C

Notes:

*Parameters are not tested at production. Parameters are guaranteed by design, characterization and process control.

Block Diagram



Output Current Setting

RSET pin controls the LED bias current. I_{max} Current flowing into LED is 360 times greater than the current flowing into RSET.

User can set the output current as the following formula:
each channel:

$$\text{ILED} = 360 (0.5\text{V} / \text{RSET})$$

T8341 LED Pin (V_{LED}) operating range $0.7V > V_{LED} < VDD-1V$

Reference				
I LED(A)	1	0.8	0.5	0.3
RSET(Ω)	180	225	360	600

Power on the Function Options

The T8341AD can choose the initial states when powering on. The flexibility design allows starting the steps with all function in loop or choosing only the certain functions.

Dimming Function Option

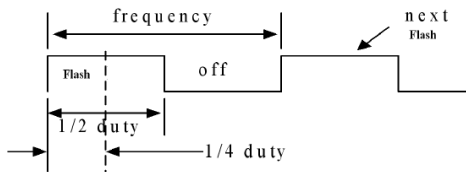
Dimming options are to set the output current 1/2, 1/3, 1/4, 1/5 and 1/6. This function can be the multiple choices as needed.

Flash Function Option

Flash frequency options: 1Hz / 2 Hz /4 Hz / 6 Hz

Flash duty options: 1/2, 1/4, 1/8, 1/16

For example:



S.O.S frequency options:

The time length of S.O.S and the interval time can be followed as the below table:

	Option1	Option2	Option3	Option4
time length of S.O.S	17.4sec	8.6sec	4.28sec	2.86sec

Low Voltage Detection

The T8341AD builds in Low Voltage Detection and Indication function. If VIN voltage drops to the default value of Detection Voltage, LVLED pin will turn on to lighten the low voltage indicator.

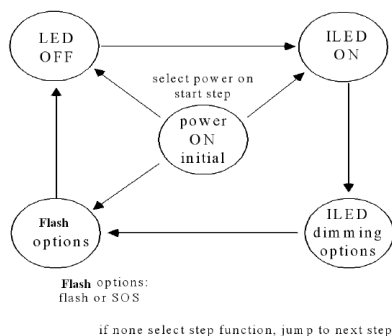
Detected options:

- Voltage level detection options are subject to the External Resistor, user can set the voltage level as following formula:

$$LV = 55\mu A * RLVS$$
- LVLED output current: 4 mA

Function of SET

When keeping at high level, SET pin will active as the requested function in order, like LED ON / OFF, dimming and Flash mode.

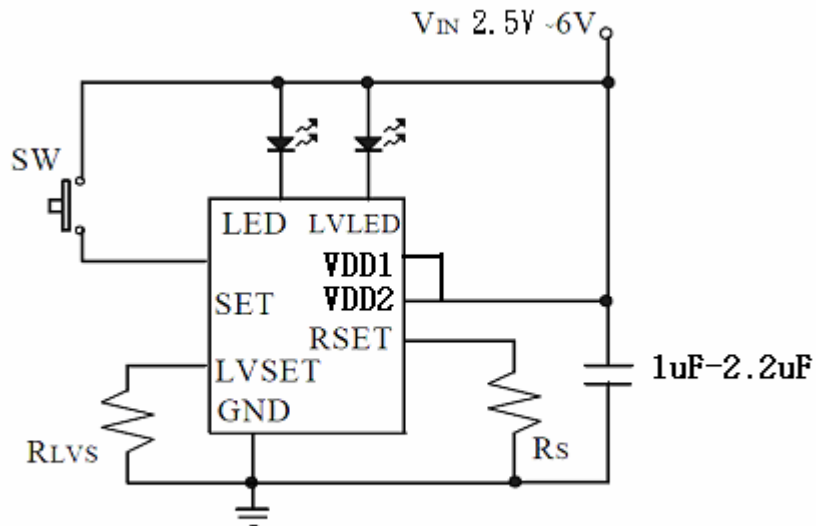


OTP Table of Function Options

Options item	Options				
Power-On State	LED OFF	LED ON	Flicker		
OFF State	LED OFF				
Dimming	1/2	1/3	1/4	1/5	1/6
Flicker Frequency	1Hz	2Hz	4Hz	6Hz	
Flicker Duty	1/2	1/4	1/8	1/16	
Flash Options	SUPER	S.O.S	Flash		
S.O.S Speed	17.4 Sec	8.6 Sec	4.28 Sec	2.86 Sec	
LVLED Current	4mA				
Package	SOP-8				

Application Circuit

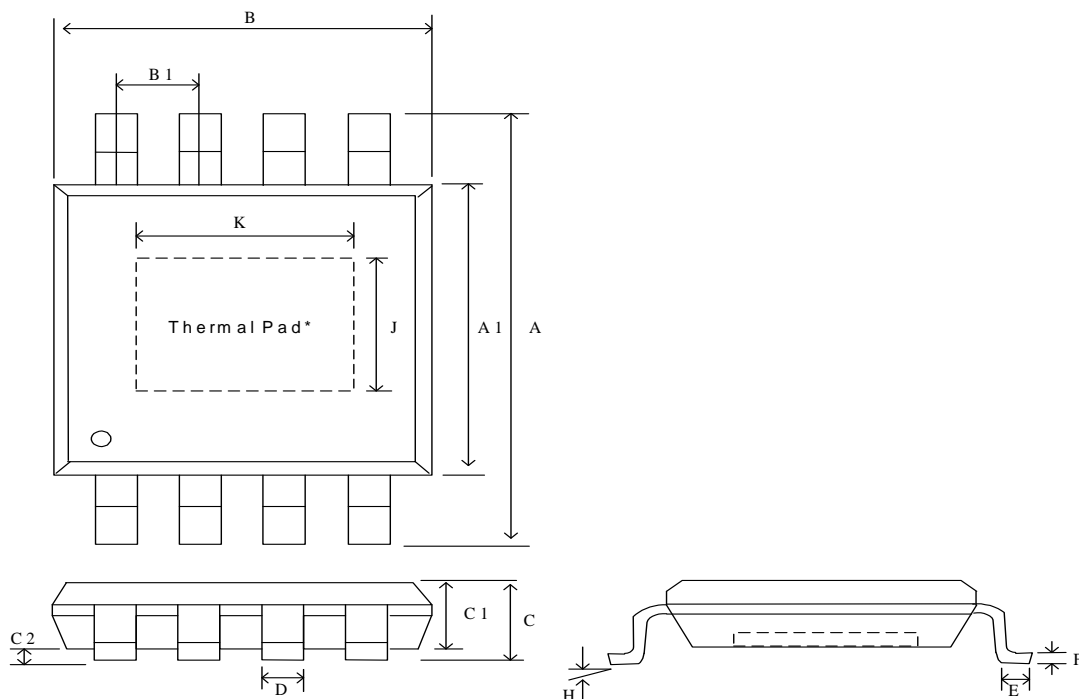
Refer to Block Diagram.



Very low-cost, high-efficiency solution for SOP-8 package

PACKAGE DIMENSIONS

8-LEAD SOP



Symbol	Dimension in mm			Dimension in inch		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	5.70	6.00	6.30	0.224	0.236	0.248
A1	3.75	3.95	4.10	0.148	0.156	0.164
B	-	-	5.13	-	-	0.202
B1	-	1.27	-	-	0.050	-
C	-	-	1.80	-	-	0.071
C1	1.35	1.55	1.75	0.052	0.061	0.069
C2	0	-	0.15	0.000	-	0.006
D	0.31	0.41	0.51	0.012	0.016	0.020
E	0.30	0.50	0.70	0.012	0.020	0.028
F	0.10	0.15	0.25	0.004	0.006	0.010
J		2.23 REF			0.088 REF	
K		2.97 REF			0.117 REF	
H	0~8°			0~8°		

***Note:**

The thermal pad on the IC's bottom has to be mounted on the copper foil.

To eliminate the noise influence, the thermal pad is suggested to be connected to GND on PCB.

In addition, desired thermal conductivity will be improved, if a heat-conducting copper foil on PCB is soldered with thermal pad. The thermal pad enhances the power dissipation. As a result, a large amount of current can be sunk safely in one package.