

Low-Dropout, Constant-Current White LED with Dimming Control

FEATURES

- Up to 350mA LED Bias Current
- Constant Current Option :
 - 20/60/100/120/175/210/240/260 /300/350 mA
 - RSET : external resistor to set output current
- Simple LED Dimming Control
- Build in Morse Code S.O.S Signal and Single Flash Loop Flicker Function
- Low Dropout Voltage
- Low 0.05uA Shutdown Current
- 2.7V to 5V Supply Voltage Range
- TO-252 and SOP-8 lead-free Package
- ESD Human Body Mode Over 5KV
- Build in Thermal Protect 160 °C

GENERAL DESCRIPTION

The T6327A low-dropout bias supply for white LEDs is a high-performance alternative to the simple ballast resistors used in conventional white LED designs. The T6327A with internal LED dimming function . The T6327A Build in Morse Code S.O.S Signal and Single Flash Loop Flicker Function, significantly lower dropout voltage, and in some applications, significantly improved efficiency. The T6327A is available in TO-252 and SOP-8 lead-free package.

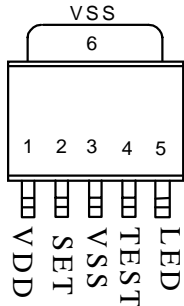
APPLICATIONS

- Handheld Electronics
- Flash Light
- Lighting

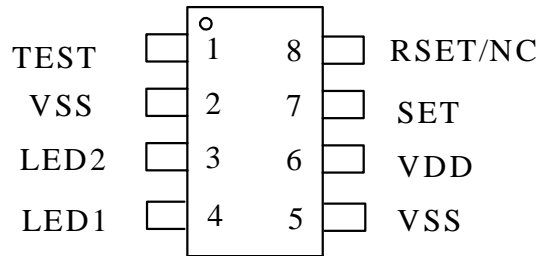
PART NUMBER EXAMPLES

Part number	Dimming step	Flicker mode	Current (mA)	package
T6327A-3020AWG	3	S.O.S	20	TO-252
T6327A-2020AWG	2	S.O.S	20	TO-252
T6327A-3020BWG	3	flash	20	TO-252
T6327A-2020BWG	2	flash	20	TO-252
T6327A-3020ADG	3	S.O.S	20	SOP-8
T6327A-2020ADG	2	S.O.S	20	SOP-8
T6327A-3020BDG	3	flash	20	SOP-8
T6327A-2020BDG	2	flash	20	SOP-8
T6327A-3350AWG	3	S.O.S	350	TO-252
T6327A-2350AWG	2	S.O.S	350	TO-252
T6327A-3350BWG	3	flash	350	TO-252
T6327A-2350BWG	2	flash	350	TO-252
T6327A-3350ADG	3	S.O.S	350	SOP-8
T6327A-2350ADG	2	S.O.S	350	SOP-8
T6327A-3350BDG	3	flash	350	SOP-8
T6327A-2350BDG	2	flash	350	SOP-8
T6327A-3ADG	3	S.O.S	RSET	SOP-8
T6327A-2ADG	2	S.O.S	RSET	SOP-8
T6327A-3BDG	3	flash	RSET	SOP-8
T6327A-2BDG	2	flash	RSET	SOP-8

PIN ARRANGEMENT(Top view)



TO-252



SOP-8

PIN DESCRIPTION

SYMBOL	TO-252	SOP-8	DESCRIPTION
TSET	4	1	Test pin, initial pull low, if pull high active test mode
RSET/NC	-	8	NC: No connection for internal resistor RSET : external resistor to set output current RSET terminal is used to connect an external resistor to set output current. The current flowing into RSET sets the bias current into each LED by $I_{LED_} = 250 \times I_{SET}$. RSET is internally biased to 0.306V.
VSS	3	2,5	Ground
VDD	1	6	Power supply
LED	5	3,4	LED Cathode Connection.
SET	2	7	Control dimming and flicker mode

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Voltage on any pin relative to GND	V _{IN}	-0.3 to 6	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°C)		1	W

Electrical Characteristics

 (Typical values are at T_A =25°C)

Symbol	Description	Conditions	Min.	Typ.	Max	Unit	
V _{DD}	Operating voltage range	power supply input	2.7		5	V	
R _{SET}	RSET bias voltage	I _{SET} =400uA, no loading		0.306		V	
I _{SET}	SET input current range			100		uA	
I _{LED}	Maximum LED sink current	V _{DD} = 4.5V V _{LED} =3.5V	T6327A-350	329	350	371	mA
			T6327A-300	282	300	318	mA
			T6327A-260	244	260	275	mA
			T6327A-240	225	240	254	mA
			T6327A-210	197	210	222	mA
			T6327A-175	164	175	185	mA
			T6327A-120	112	120	127	mA
			T6327A-100	94	100	106	mA
			T6327A-060	56	60	63	mA
			T6327A-020	18.5	20	21.5	mA
I _{LSD}	LED leakage current in shutdown	V _{LED} = 3.3V, V _{DD} =0V, T _A =+25°C		0.02	1	uA	
t _{SH}	SET pin Signal pulse width		30			ms	
V _{IH}	Input high voltage	V _{SET} >V _{IH} for enable, V _{DD} =5V	2.0			V	
V _{IL}	Input low voltage	V _{SET} <V _{IL} for disable, V _{DD} =5V			0.8	V	
T _{TP}	Thermat Protect			160		°C	

Functional Description

The T6327A provides constant current bias supply for white LED designs. The T6327A Build in Morse Code S.O.S Signal and Single Flash Loop Flicker Function. The T6327A offers several advantages over using ballast resistors, such as improved LED dimming, lower bias variation with supply voltage changes, significantly lower dropout voltage, and in some applications, significantly improved efficiency.

Setting the Output Current

RSET controls the LED bias current. Current flowing into LED1 and LED2 250 times greater than the current flowing into RSET. Set the output current as follows:
 $I_{LED} = 250 (0.306V / RSET)$

SET Function

The SET is high active LED ON / OFF, dimming and flicker mode.

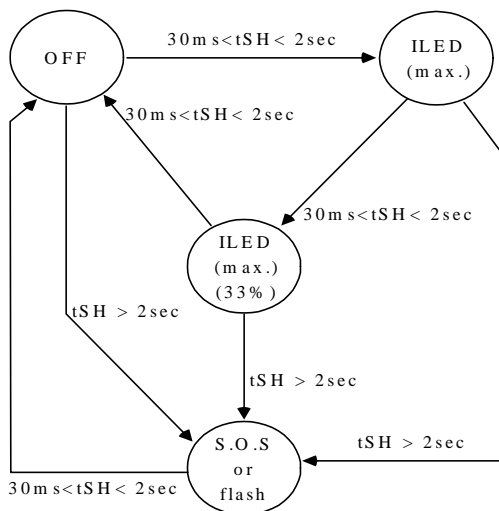
Dimming step :

If SET pin high pulse width(tSH) over 30ms and under 2sec(30ms < tSH < 2sec), dimming control jump to next step.

Mode1(2 dimming step) dimming and flicker step :

Off -> ILED(max.) -> ILED(max.)(33%) -> off / loop

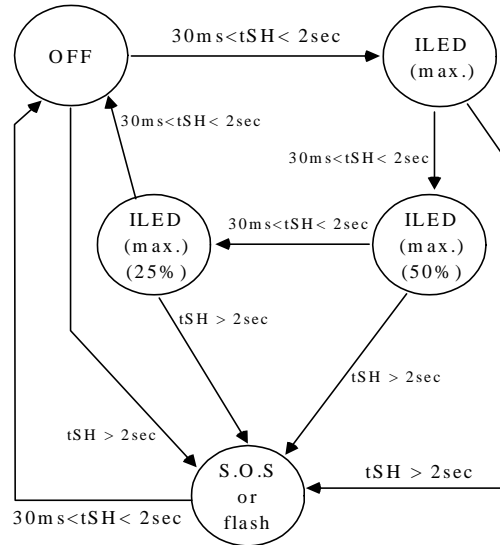
If tSH pulse width over 2sec of Any states(tSH>2sec), LED Flicker mode jump to Morse Code S.O.S Signal or Single Flash Loop Flicker Function.



Mode2 (3 dimming step) dimming and flicker step :

Off -> ILED(max.) -> ILED(max.)(50%) -> ILED(max.)(25%) -> off / loop

If tSH pulse width over 2sec of Any states(tSH>2sec), LED Flicker mode jump to Morse Code S.O.S Signal or Single Flash Loop Flicker Function.



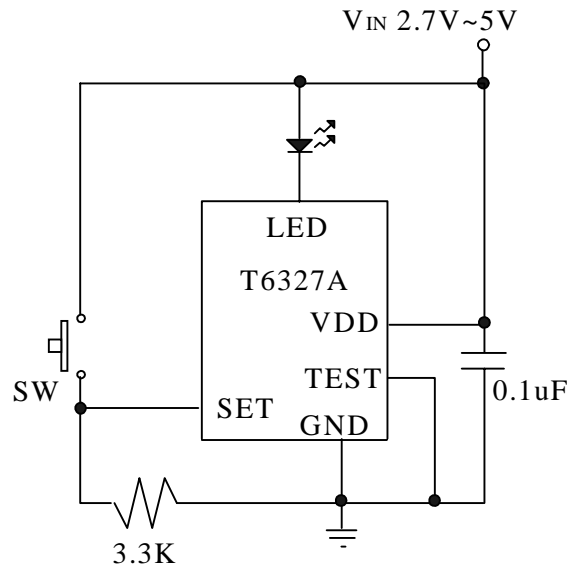
TEST Function

The test pin is high active, if test pin turns high, the internal circuit can start the self-test function, if the function test pass, then LED turns on.

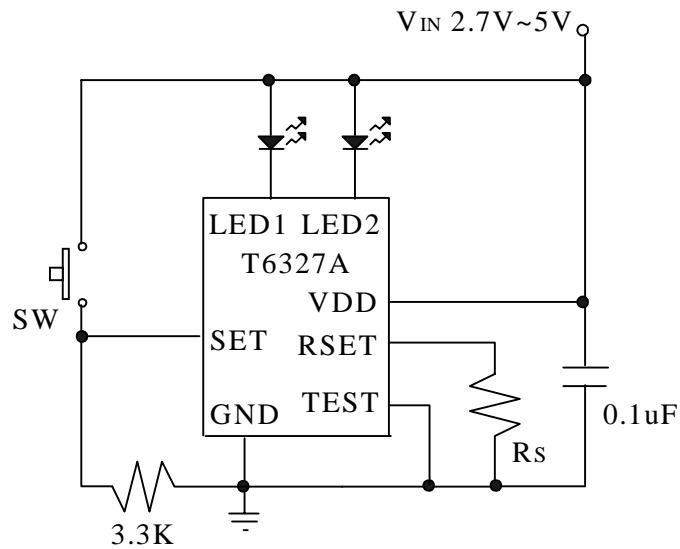
Applications Information

Very Low-Cost, High-Efficiency Solution . A battery (single Li+ or three NiMH cells) powers the LEDs directly. This is the least expensive and most efficient architecture. Due to the high forward voltage of white LEDs, the LED dimming may dim slightly at the end of battery life. The T6327A current regulating architecture and low dropout greatly minimize this effect compared to using simple ballast resistors.

TYPICAL APPLICATION CIRCUITS



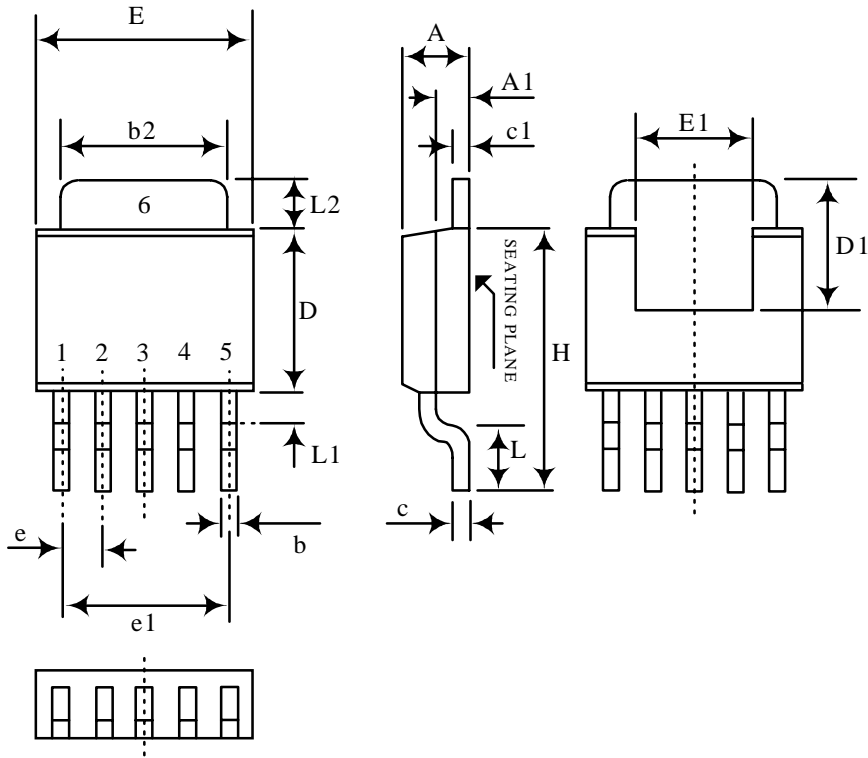
Very low-cost, high-efficiency solution for TO-252 package



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

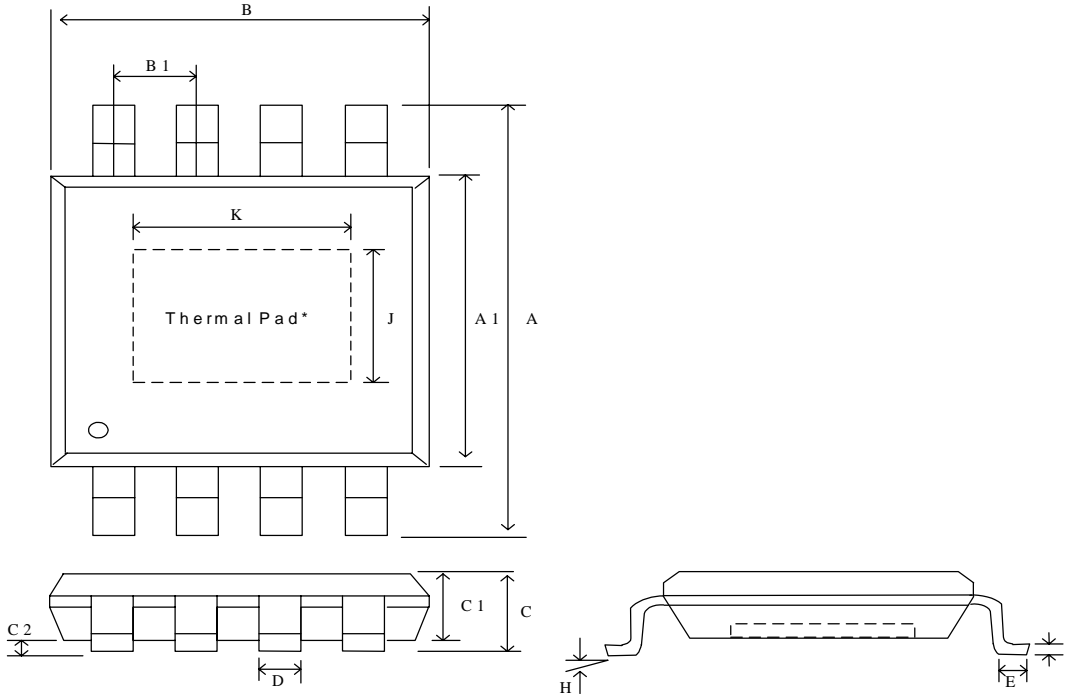
PACKAGE DIMENSIONS

5-LEAD TO-252



Symbol	Dimension in inch		Dimension in mm	
	Min.	Max.	Min.	Max.
A	0.087	0.094	2.20	2.40
A1	0.040	0.050	1.00	1.27
b	0.016	0.24	0.40	0.60
b2	0.205	0.213	5.20	5.40
c	0.017	0.023	0.43	0.58
c1	0.017	0.023	0.43	0.58
D	0.213	0.224	5.40	5.70
D1	0.150 (REF.)		3.80 (REF.)	
E	0.250	0.262	6.35	6.65
E1	0.150 (REF.)		3.80 (REF.)	
e	0.050 (TYP.)		1.27 (TYP.)	
e1	0.200 (TYP.)		5.08 (TYP.)	
H	0.313	0.338	7.94	8.6
L	0.055	0.070	1.40	1.78
L1	0.043	0.047	1.09	1.19
L2	0.050	0.060	1.30	1.50

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	0.10	-	0.25	0.001	-	0.004
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.