DW8506

Low Power LED Driver

CONTENTS

1. General Description

DW8506 is an instant LED driver for low power LED applications. At DW8506 output stage, one regulated current port is designed to provide a uniform and constant current sink for driving LEDs within a large range of V_F variations. DW8506 easily provides users with a consistent current source. Users may adjust the output current up to 100mA through an external resistor R_S, which gives users flexibility in controlling the light intensity of LEDs. DW8506 can accommodate an input voltage up to 40V.

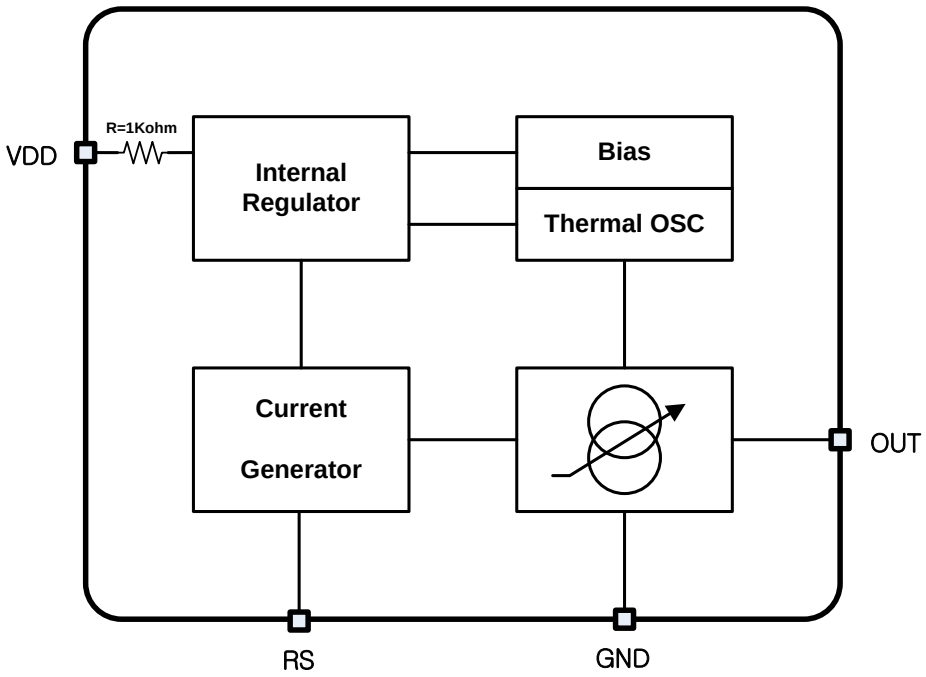
■ Features

- providing a constant output current regardless of input voltage or load voltage changes
- 7.5V to 40V supply voltage
- adjustable output current up to 100mA
- Built-in thermal derating circuit
- Output current adjusted through an external resistor
- SOT23-5L Package

■ Applications

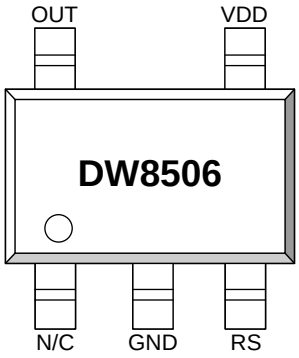
- LED light bulbs
- Signage and decorative LED lighting
- General lighting of flat panel displays
- RGB backlighting LED driver
- Current stabilizer with DC/DC or AC/DC
- Automotive lighting
- General purpose constant current source

2. Block Diagram



3. Pin Information

■ Pin placement and IC dimension



SOT23 - 5L

■ Pin Description

No.	Pin Name	Description	Note
1	N/C	No connect	
2	GND	Ground	
3	RS	Sets output current. Connect a resistor from RS to GND to set the LED bias current	
4	VDD	Supply voltage input.	
5	OUT	Output pin. Sink current is decided by the current on R_{SET} connected to RS.	

4. Absolute Maximum Ratings(1)

Symbol	Parameter	Ratings
VDD	Supply voltage	41V
OUT	OUT pin voltage	23V
V_{RS}	Reference voltage	5V
Θ_{JA}(2)	Package thermal resistance	95.03℃/W
T_{JOPR}	Junction Operating temperature	-40~+125℃
T_J	Junction temperature	+150℃
T_{STG}	Storage Temperature	-55~+150℃

Note (1) Stresses above the max. Values listed here may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. Maximum ratings are absolute ratings; exceeding only one of these values may cause irreversible damage to the integrated circuit.

(2) θ_{JA} is measured in the convection at Ta=30℃ on a high effective thermal conductivity test board(4 Layers, 2S2P) of JEDEC 51-7 thermal measurement standard. PCB dimension is 100mmx100mmx1.6mm and 4 layers.

5. Recommended Operating Condition

Symbol	Parameter	Min.	Typ.	Max.	Unit
VDD	Supply voltage	7.5		40	V
I_{OUT}	Output sink current			100	mA

6. Electrical Specification

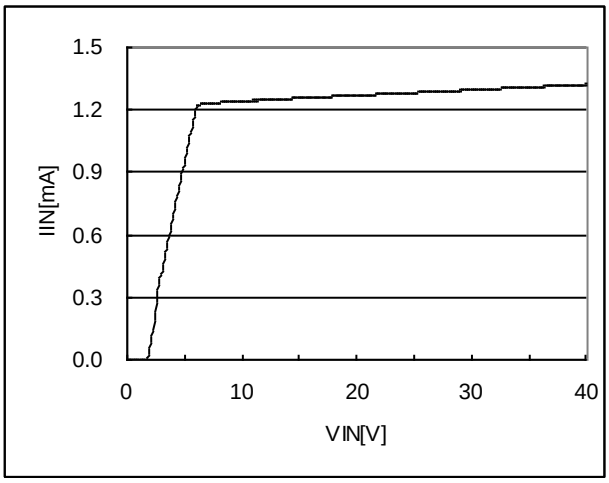
(VDD = 24V, typical values are at T_A=+25℃, unless otherwise specified.)

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Unit
Input Supply Voltage	V_{DD}	I_{SET} = 50mA,	7.5	-	40	V
Output Linearity Voltage	V_{OUT_LINE}		-	-	3	V
Quiescent Current	I_Q	I_{SET} = 50mA,	1	-	1.5	mA
LED Output Dropout Voltage	V_{DROP}	I_{SET} = 50mA,			500	mV
Thermal Derating	T_D		-	140	-	℃
Thermal Derating Hysteresis	T_{DHYS}		-	20	-	℃
R_{SET} Voltage	V_{SET}		-	1.208	-	V
Output Current by R_{SET}	I_{OUT}	R_{SET} = 2.4Kohm	-	50.33	-	mA

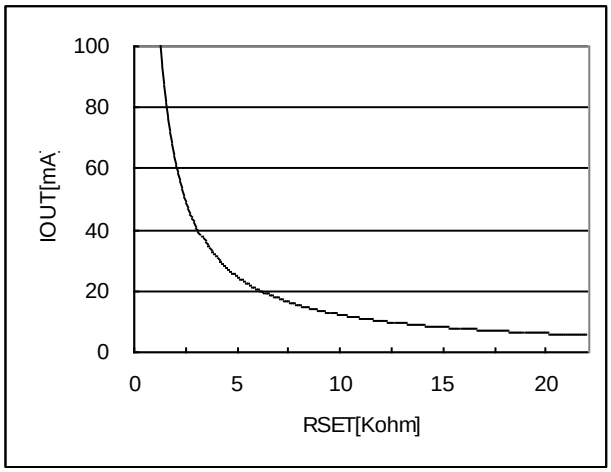
Note : Output dropout voltage : 90% x I_{OUT}

7. Typical Operating Characteristics

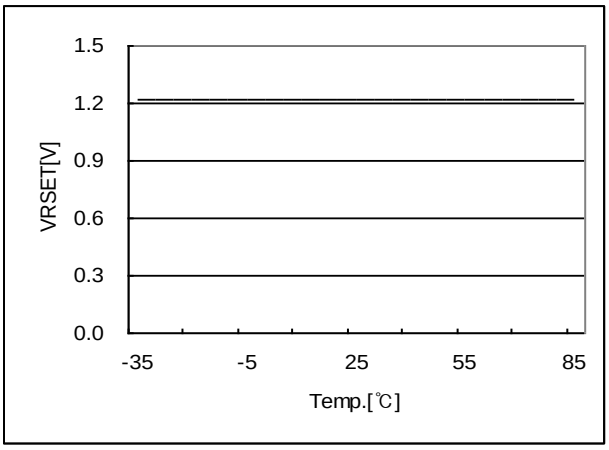
(V_{DD} = 12V, V_{OUT} =2V, typical values are at T_A=+25℃, unless otherwise specified.)



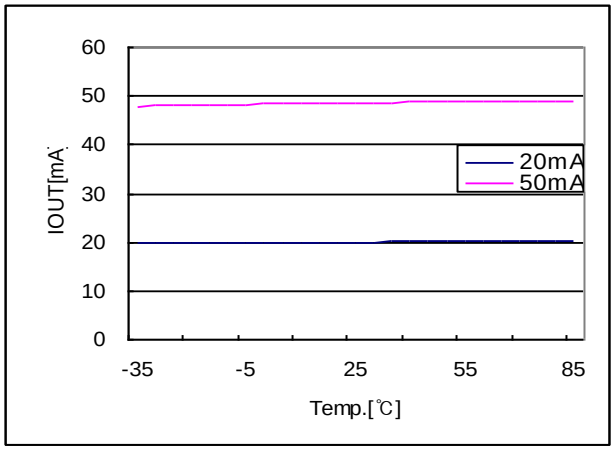
Quiescent vs. VIN



IOUT vs. RSET



VRSET vs. Temperature



IOUT vs. Temperature.

8. Typical Applications circuit

(LED V_F = 3.3V, I_F = 20mA)

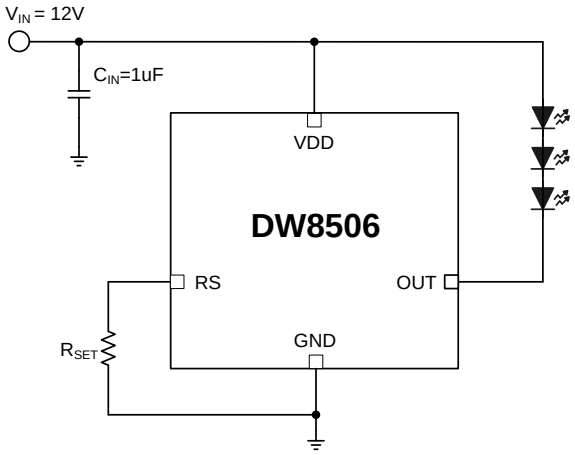


Figure 1. V_{IN}=12V, 3 LED (3S1P)

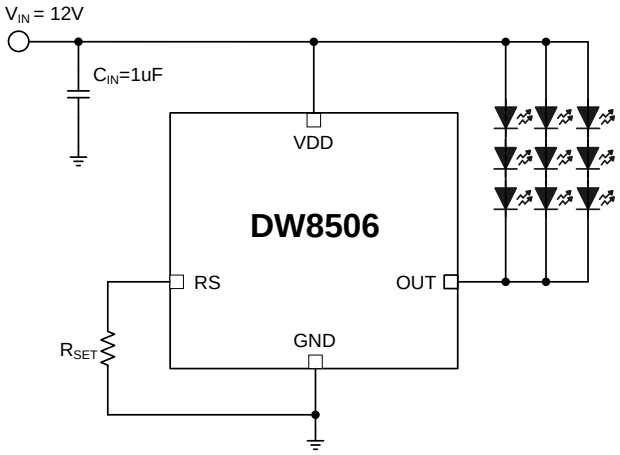


Figure 2. V_{IN}=12V, 9 LED (3S3P)

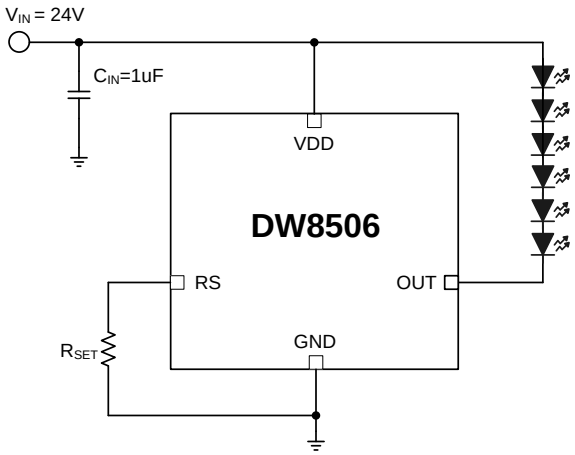


Figure 3. V_{IN}=24V, 6LED (6S1P)

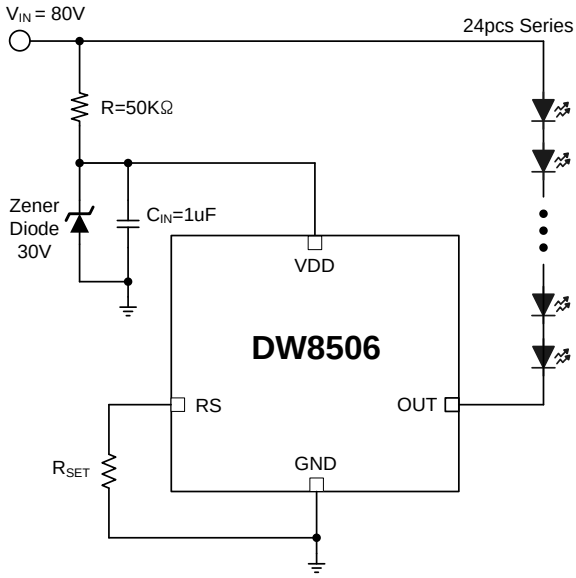


Figure 4. High Voltage Application (V_{IN}≥35V)

9. Detailed Descriptions

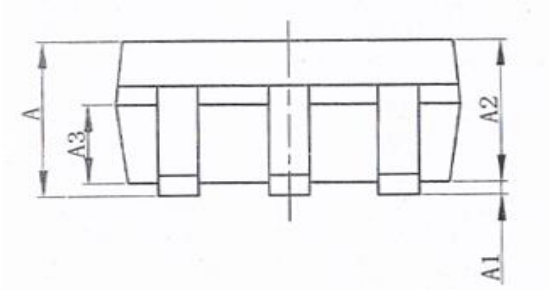
■ Setting Output Current

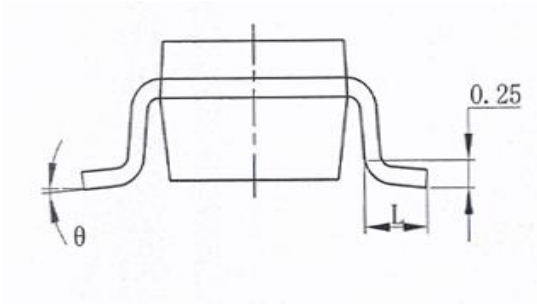
R_{SET}[Kohm] = (1.208 [V] /I_{OUT} [mA]) X 100

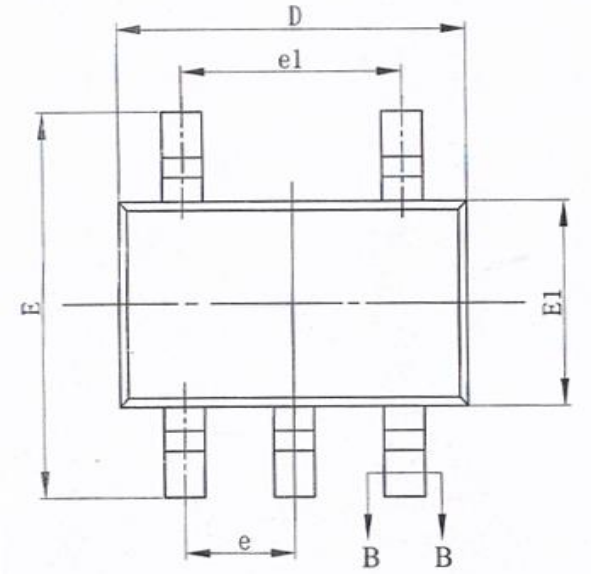
R_{SET} (Kohm)	I_{OUT} (mA)
4.026	30
2.416	50
2.013	60
1.510	80
1.208	100

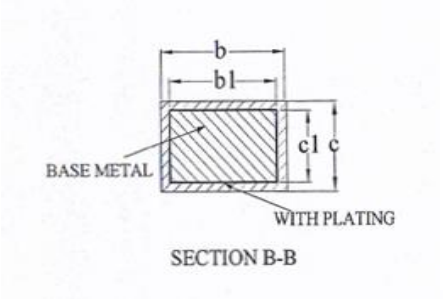
10. Package Dimension

Package Name : SOT23-5L
Package Size : 2.92mm * 2.8mm, Thickness : 1.25mm
Pin Pitch : 0.95mm









SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.25
A1	0.04	—	0.10
A2	1.00	1.10	1.20
A3	0.55	0.65	0.75
b	0.38	—	0.48
b1	0.37	0.40	0.43
c	0.11	—	0.21
c1	0.10	0.13	0.16
D	2.72	2.92	3.12
E	2.60	2.80	3.00
E1	1.40	1.60	1.80
e	0.95BSC		
e1	1.90BSC		
L	0.30	—	0.60
θ	0	—	8°