



# DW8506

Low Power LED Driver

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## 1. General Description

The 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 a consistent current source. User may adjust the output current from up to 100mA through an external resistor,  $R_S$ , which gives users flexibility in controlling the light intensity of LEDs. In addition, users can precisely.

DW8506 also guarantees that LEDs can be cascaded to maximum 40V at the output port.

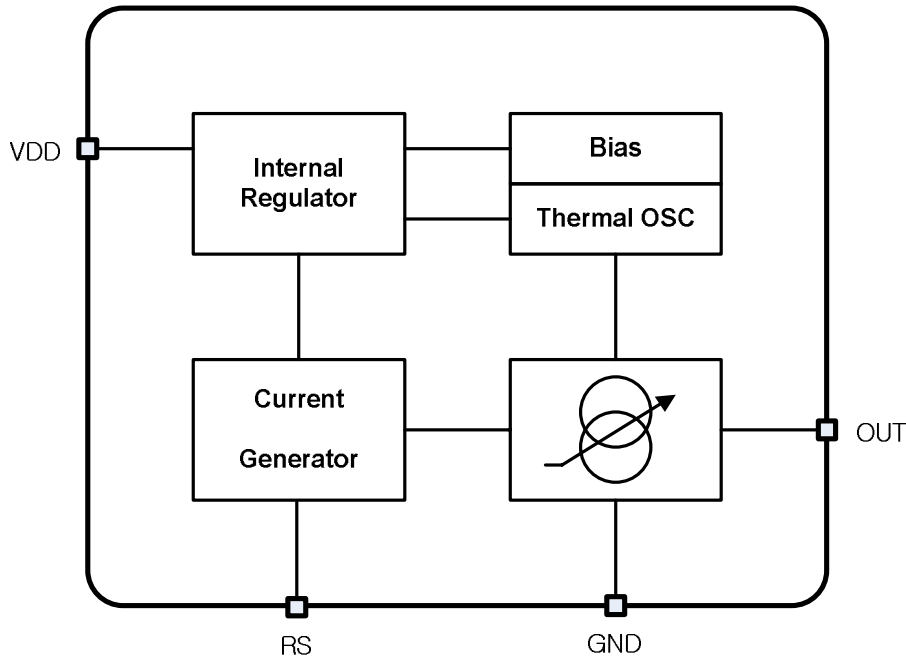
### ■ Features

- Constant output current invariant to supply and load voltage change
- 6.5V to 40V supply voltage
- Up to 100mA adjustable regulated output current
- Built-in thermal derating circuit
- Output current adjusted through an external resistor
- SOT-23-5L Package

### ■ Applications

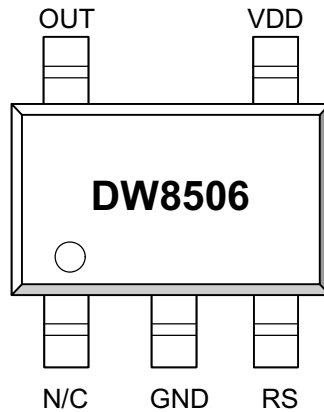
- LED light bulbs
- Signage and decorative LED lighting
- General lighting of flat panel displays
- RGB backlighting LED driver
- Current stabilizer with DC/DC or AC/DC
- Automotive lighting
- General purpose constant current source

## 2. Block Diagram



## 3. Pin Information

### ■ Pin placement and IC dimension



### ■ Pin Description

No.	Pin Name	Description	Note
1	N/C	No connect	
2	GND	Ground	
3	RS	Output current set input. 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

Symbol	Parameter		Ratings
VDD	Supply voltage		41V
V <sub>OUT</sub>	Output voltage		23V
VRS	Reference voltage		5V
θ <sub>JA</sub>	Package thermal resistance	SOT-23-5L	95.03°C/W
T <sub>OPR</sub>	Operating temperature		-35~+85°C
T <sub>J</sub>	Junction temperature		+150°C
T <sub>STG</sub>	Storage Temperature		-55~+150°C

- Note** 1. θ<sub>JA</sub> is measured in the convection at Ta=30°C on a high effective thermal conductivity test board(4 Layers, 2S2P) of JEDEC 51-7 thermal measurement standard.  
2. PCB dimension is 100x100x1.6mm and 4 layers.

#### ■ Absolute Maximum Ratings

Use of the IC in excess of absolute maximum ratings such as the applied voltage or operating temperature range (T<sub>J</sub>) may result in IC damage. Assumptions should not be made regarding the state of the IC (short mode or open mode) when such damage is suffered. The implementation of a physical safety measure such as a fuse should be considered when use of the IC in a special mode when the absolute maximum ratings may be exceeded is anticipated.

#### 5. Recommended Operating Condition

Symbol	Parameter	Min.	Typ.	Max.	Unit
VDD	Supply voltage	5		40	V
I <sub>OUT</sub>	Output sink current		60		mA

## 6. Electrical Specification

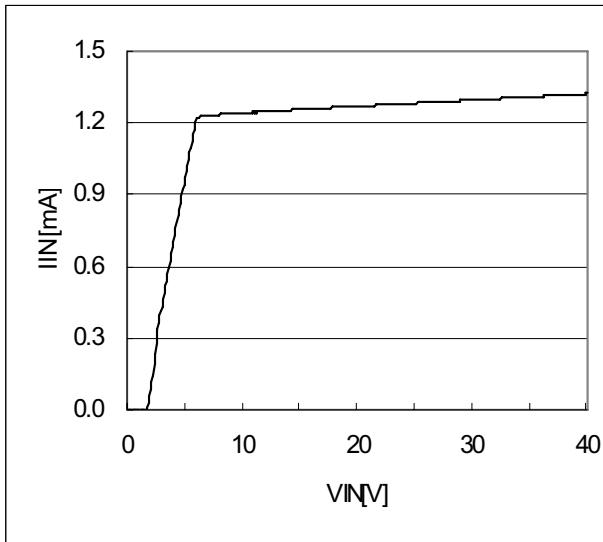
(VDD = 24V, T<sub>A</sub> = -35°C ~ +85°C, unless otherwise specified. Typical values are at T<sub>A</sub> = +25°C)

Characteristic	Symbol	Condition	Min	Typ	Max	Unit
Input supply voltage	V <sub>DD</sub>		6.5	-	40	V
Output linearity voltage	V <sub>OUT_LINE</sub>	I <sub>SET</sub> = 50mA,	-	-	3	V
Quiescent current	I <sub>Q</sub>	I <sub>SET</sub> = 50mA,	1	-	1.5	mA
LED output drop-out voltage	V <sub>DROP</sub>	I <sub>SET</sub> = 50mA,	-	-	500	mV
Thermal derating	T <sub>D</sub>		-	140	-	°C
Thermal derating hysteresis	T <sub>DHYS</sub>		-	20	-	°C
Rset Voltage	V <sub>SET</sub>		1.16	1.22	1.28	V
Output current by Rset	R <sub>SET</sub>	6.1KΩ	19	20	21	mA
		2.44KΩ	47.5	50	52.5	
		1.525KΩ	76	80	84	

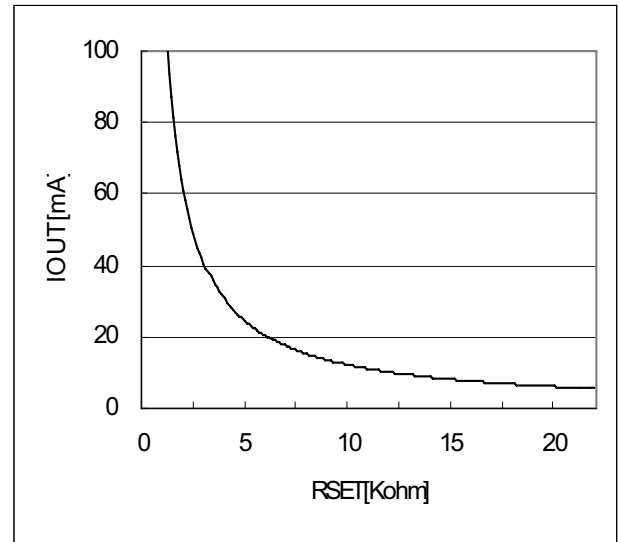
**Note** : Output dropout voltage : 90% x I<sub>OUT</sub>

## 7. Typical Operating Characteristics

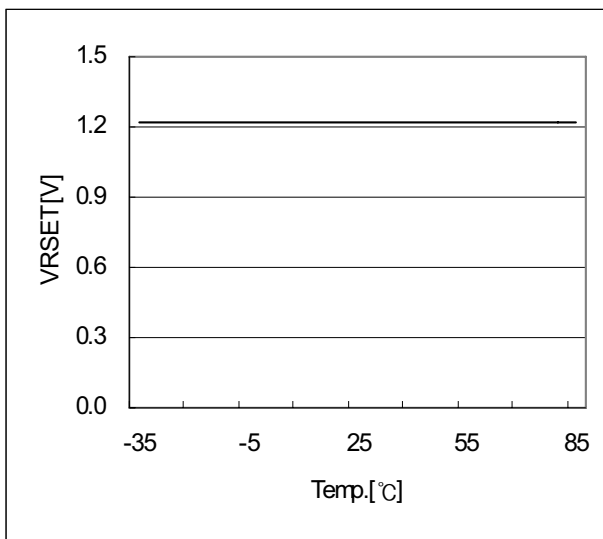
( $V_{DD} = 12V$ ,  $V_{OUT} = 2V$ ,  $T_a = -35^{\circ}C \sim +85^{\circ}C$ , unless otherwise specified. Typical values are at  $T_A = +25^{\circ}C$ )



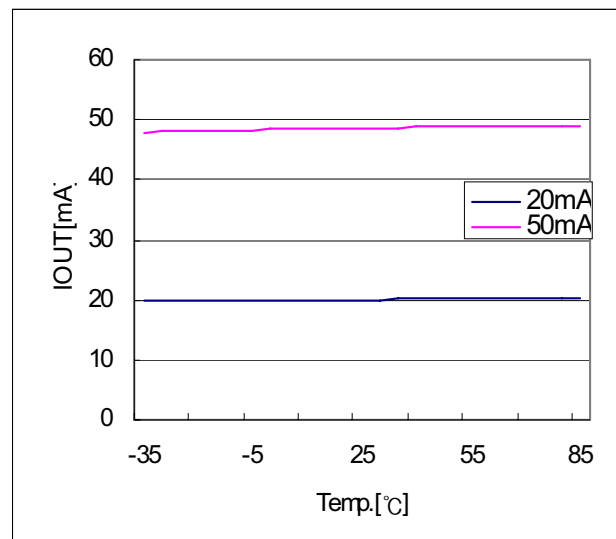
**Quiescent vs. VIN**



**IOUT vs. RSET**



**VRSET vs. Temperature**



**IOUT vs. Temperature.**

### 8. Typical Applications circuit

※ LED VF = 3.3V, IF = 20mA

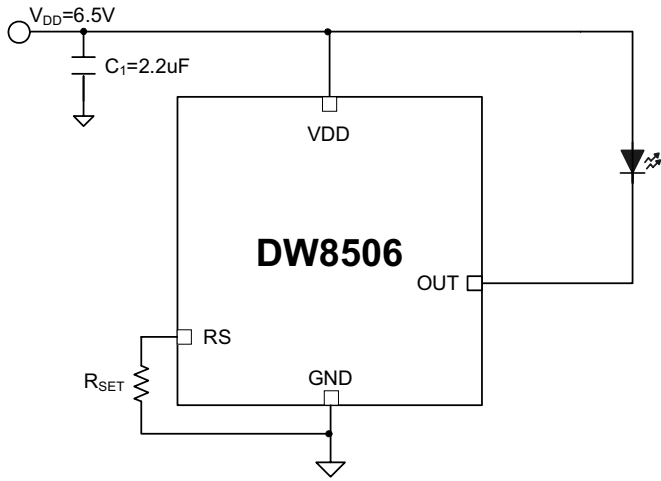


Figure 1. VDD=6.5V

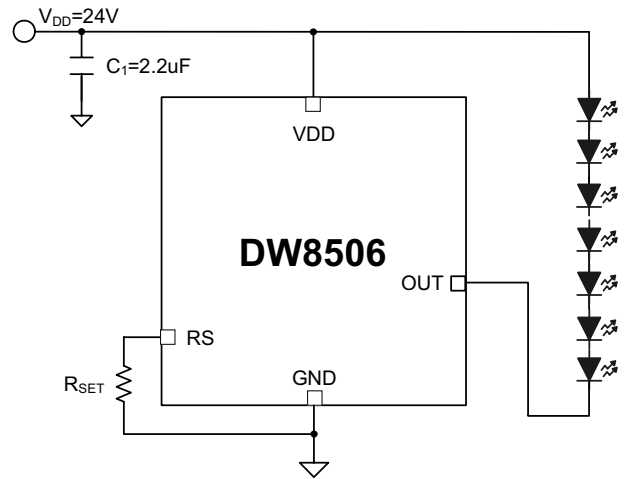


Figure 2. VDD=24V

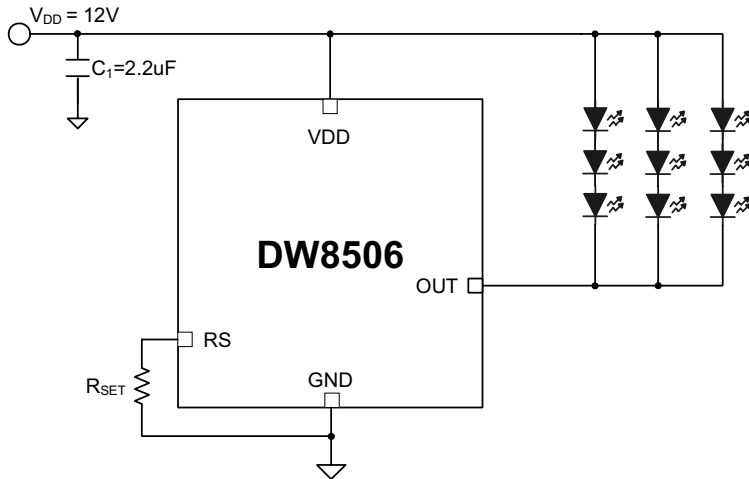


Figure 3. VDD=12V, 9 LED

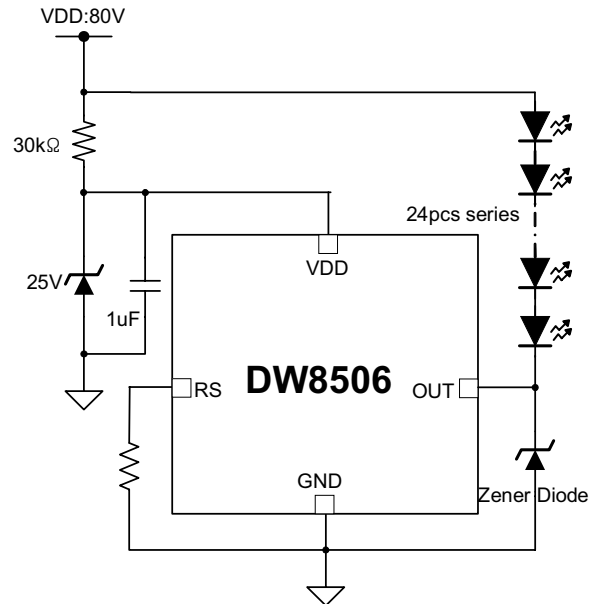


Figure 4. VDD ≥ 35V, 24



## 9. Detailed Descriptions

### ■ Setting Output Current

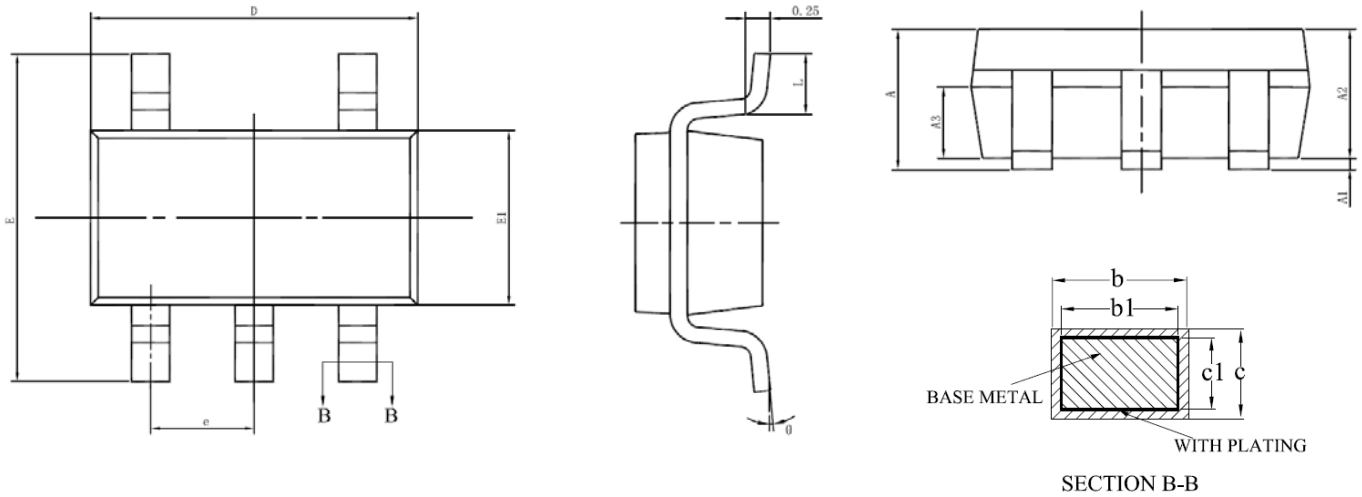
$$R_{set}[\text{Kohm}] = ( 1.22 [\text{V}] / I_{out} [\text{mA}] ) \times 100$$

Rset (KΩ)	Iout (mA)
12.2	10
6	20.33
2.4	50.8
1.5	81.3
1.22	100

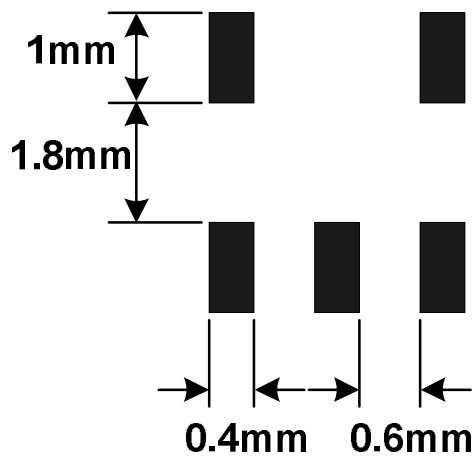
## 10. Package Dimension

### Package Dimension

- Package Name : SOT-23-5L,
- Package Size : 2.92mm \* 2.8mm, Thickness : 1.3mm
- Pin Pitch : 0.95mm



### Foot Print



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.30
A1	0.04	—	0.10
A2	1.00	1.10	1.20
A3	0.55	0.65	0.75
b	0.34	—	0.43
b1	0.33	0.35	0.38
c	0.15	—	0.21
c1	0.14	0.15	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		
L	0.30	—	0.60
θ	0	—	8°