Descriptions

The DW8505 is an instant On/Off LED driver for high power LED applications. At DW8505 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. DW8505 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
adjust LED brightness from 0% to 100% via output enable (EN) with Pulse Width Modulation. DW8505 also guarantees that LEDs can be cascaded to maximum

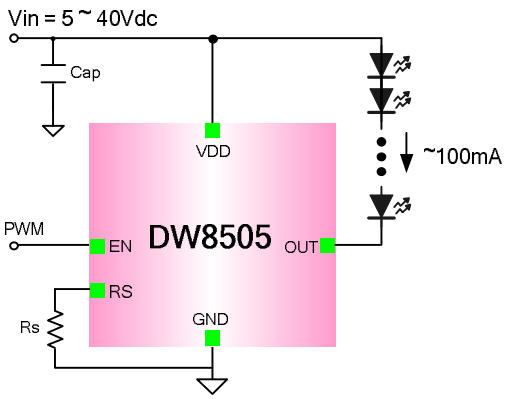
Features

- Constant output current invariant to supply and load voltage change
- 5V to 40V supply voltage
- Up to 100mA adjustable regulated output current
- Built-in thermal derating circuit
- Available PWM dimming control
- Output current adjusted through an external resistor
- TSV 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

Typical Application Circuit



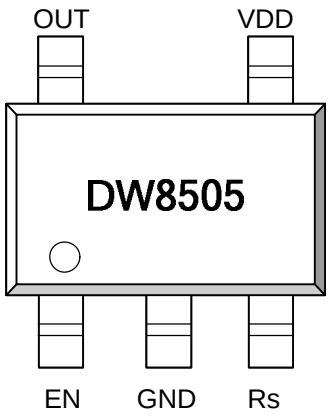
Ordering Information

Device	Marking	Package	Operating Temp
DW8505	E05	TSV	-35°C ~ +85°C

Package Information

Package	Size
TSV-5L	2.9 x 2.8 x 1(mm)

Pin Connection



Pin Description

Pin	Name	Description
1	EN	Output stage enable control pin. High enable the OUT pin. Dimming control is possible by PWM (Pulse width modulation). Typically, It operates under 30kHz.
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

Absolute Maximum Ratings

Characteristics	Symbol	Value	Unit
Supply voltage	V_{DD}	41	V
Output voltage	V_{OUT}	23	V
Enable voltage	V_{EN}	41	V
Reference voltage	VRS	5	V
Package thermal resistance	Θ_{JA}	220	℃/W
Operating temperature	T_{OPR}	-35~+85	℃
Storage Temperature	T_{STG}	-55~+150	℃

Note 1. θja is measured in the convection at Ta=25℃ on a high effective thermal conductivity test board(4 Layers, 2S2P) of JEDEC 51-7 thermal measurement standard.

Recommended Operation Conditions

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	V_{DD}	5	-	40	V
Enable voltage	V_{EN}	-	-	40	V
Output sink current	I_{OUT}	-	-	100	mA

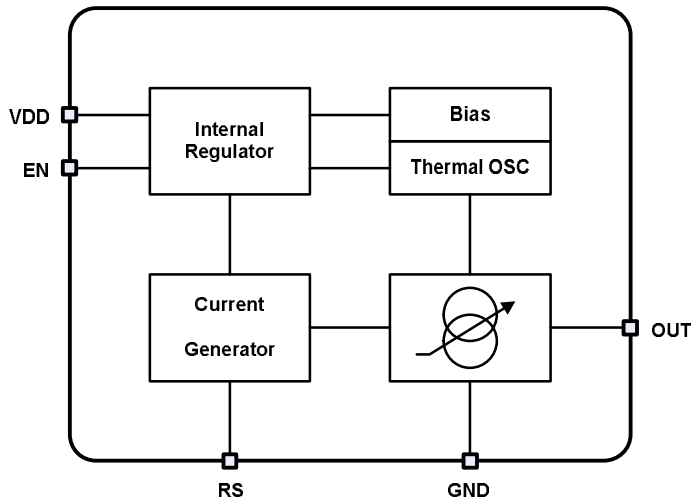
Electrical Characteristics

V_{DD} = 24V, EN= 0~24V, Ta = -35℃~+85℃, unless otherwise specified. Typical values are at T_A=+25℃

Characteristics	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input supply voltage	V_{DD}		5	-	40	V
Output linearity voltage	V_{OUT_LINE}	V_{DD}=24V, I_{SET}= 60mA,	-	-	3	V
Output current	I_{OUT}		-	-	100	mA
Quiescent Current	I_{Q_ON}	EN = 24V	0.3	0.45	1	mA
	I_{Q_OFF}	EN = 0V	85	120	250	uA
EN input leakage current	I_{EN_LIK}		30	45	60	uA
Input high voltage	V_{IH}		2	-	-	V
Input low voltage	V_{IL}		-	-	0.8	V
LED output drop-out voltage	V_{DROP}	V_{DD}=24V , I_{SET}=60mA	-	100	-	mV
Thermal derating	T_D		-	140	-	℃
Thermal derating hysteresis	T_{DHYS}		-	15	-	℃
Rset Voltage	V_{SET}		0.59	0.61	0.63	V
Output current by Rset	R_{SET}	30.5KΩ	19	20	21	mA
		10.1KΩ	57	60	63	mA
		6.1KΩ	95	100	105	mA

Note2 : Output dropout voltage : 90% x I_{OUT}

Block Diagram



Application notice

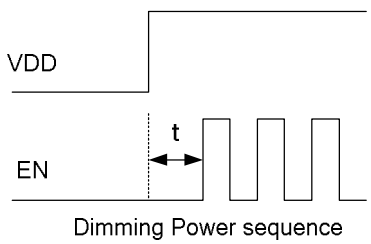
Setting Output Current

Iout [mA] = (610[mV]/Rset[ohm])X 1000

Rset(kΩ)	Iout(mA)
30.5	20
10.16	60
6.1	100

Power sequence

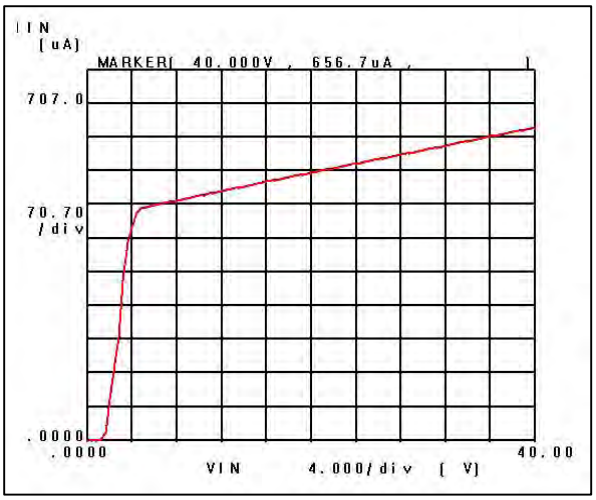
There is an electrostatic diode between VDD and EN.
When dimming control, It must input EN signal after inputs VDD. (t ≥ 1ms)
If not use Dimming control, EN connect to VDD.



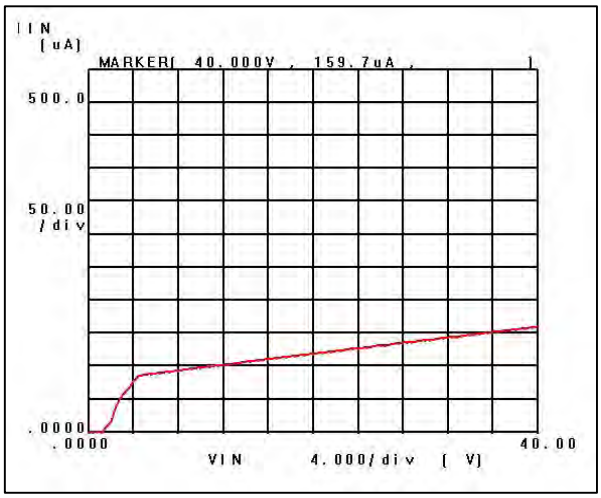
Dimming Power sequence

Electrical Characteristics Curves

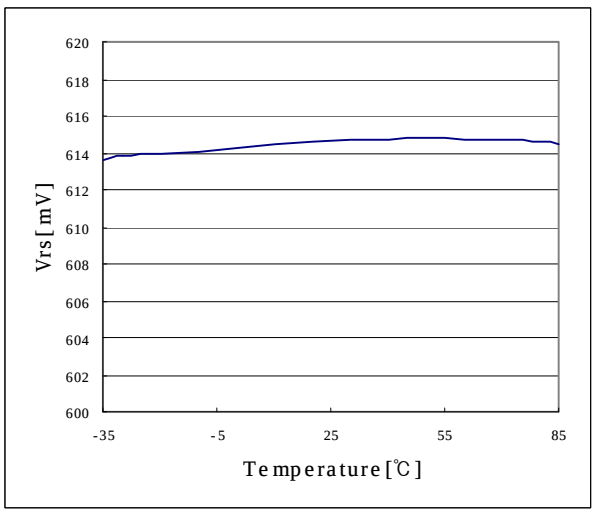
V_{DD} = 12V, V_{OUT} =2V, Ta = -35℃~+85℃, unless otherwise specified. Typical values are at T_A=+25℃



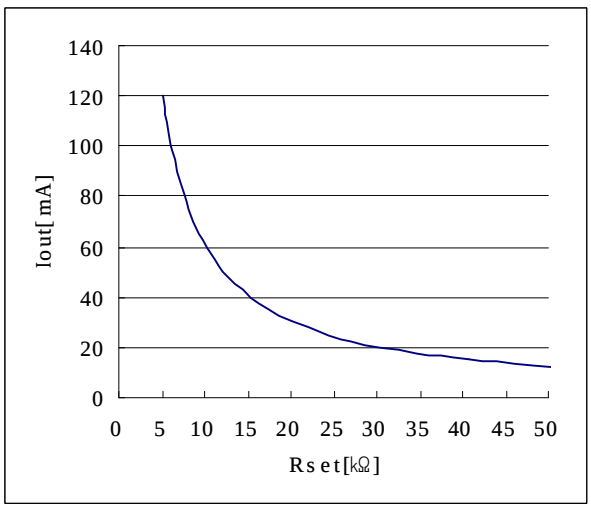
Quiescent vs. VDD



Ishutdown vs. VDD



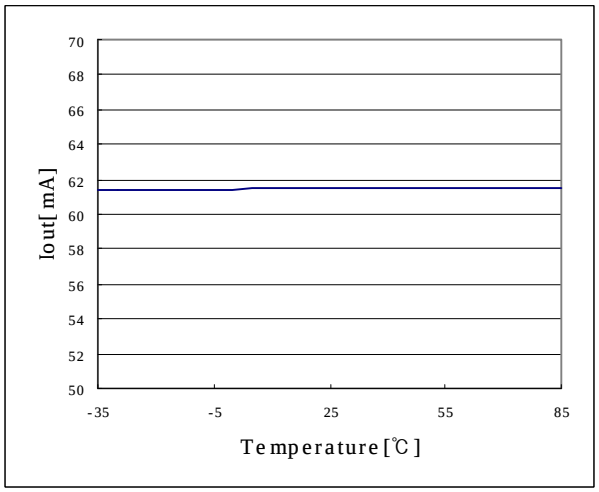
Vreference vs. Temp.



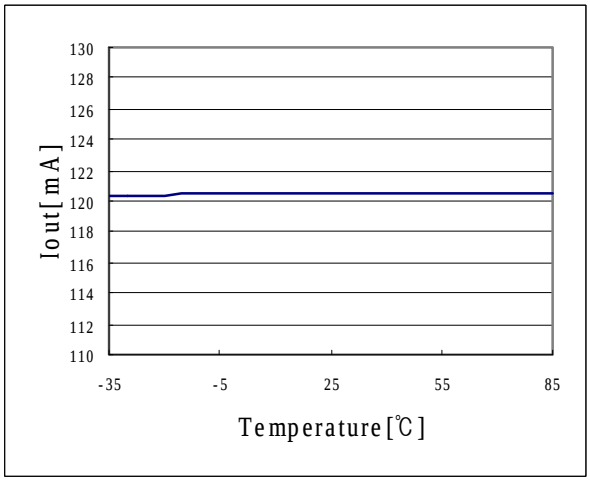
IOUT vs. Rset

Electrical Characteristics Curves

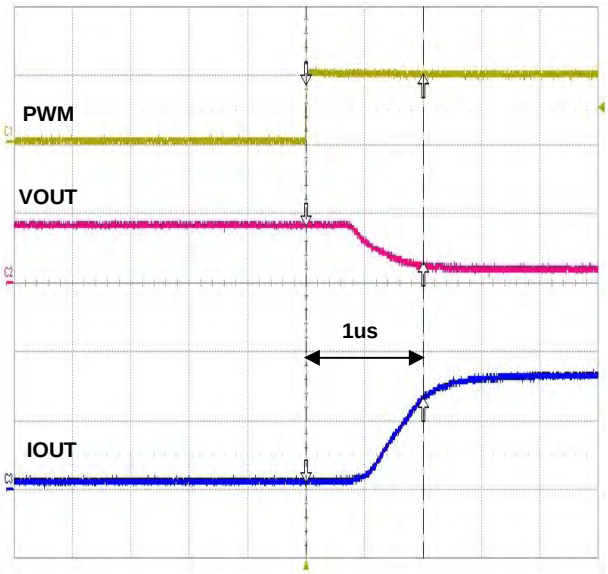
V_{DD} = 12V, V_{OUT} =2V, Ta = -35℃~+85℃, unless otherwise specified. Typical values are at T_A=+25℃



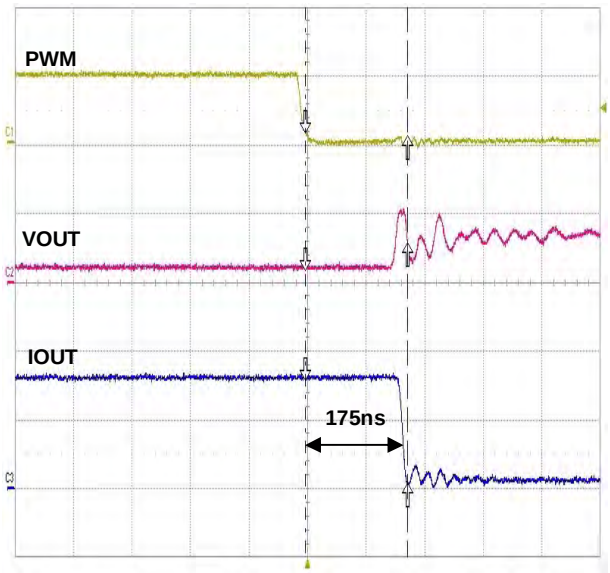
IOUT vs. Temp



IOUT vs. Temp



PWM Rising Time



PWM Falling Time

Typical Applications

※ LED VF = 3.3V, IF = 20mA

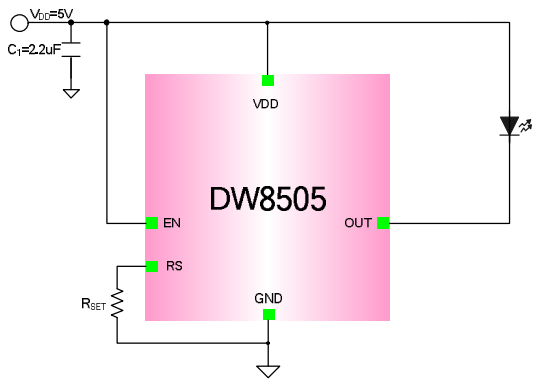


Figure 1. VDD=5V

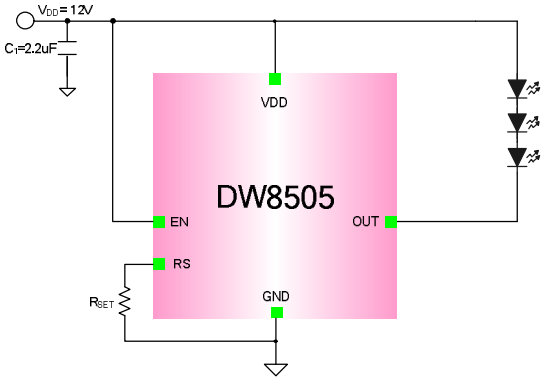


Figure 2. VDD=12V

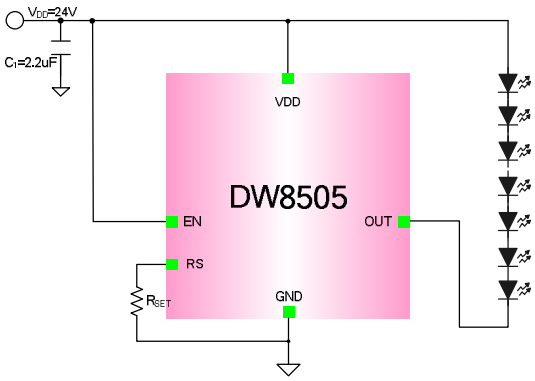


Figure 3. VDD=24V

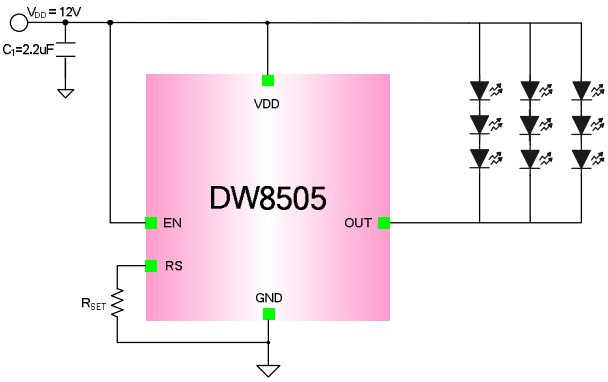


Figure 4. VDD=12V, 9 LED

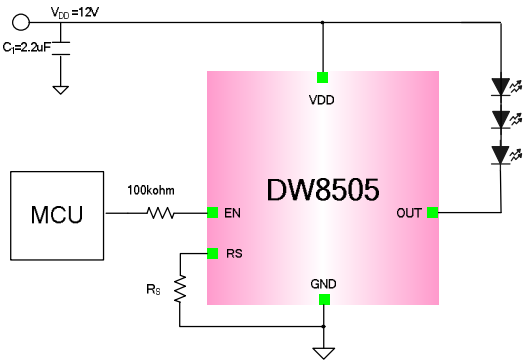


Figure 5. PWM Typical Application

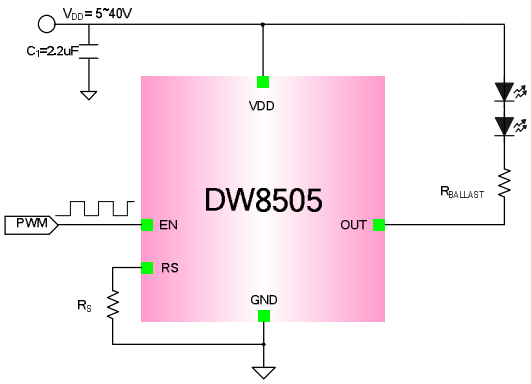
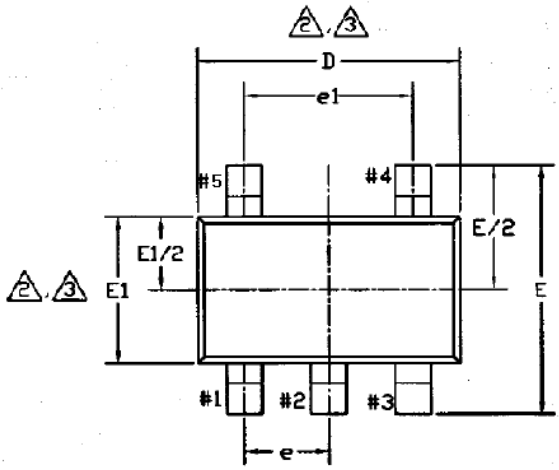
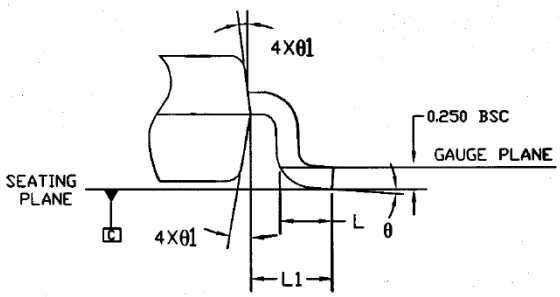


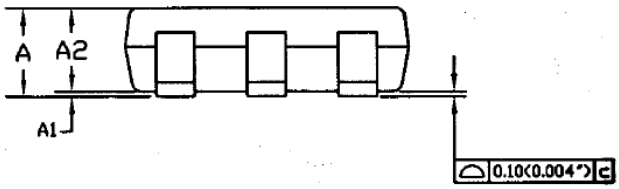
Figure 6. $R_{VALLAST}$ Application

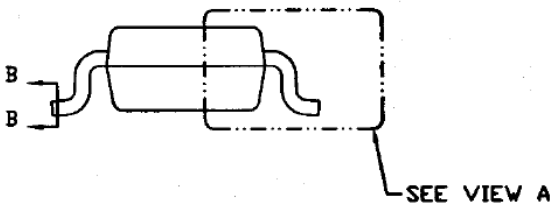
Package Dimension (TSV-5L 2.95 x 2.8 x 1)





VIEW A





SYMBOL	SPECIFICATION		
	DIMENSIONS MILLIMETER		
	MIN.	NOM.	MAX.
A	0.913	1.00	1.10
A1	0.013	0.05	0.10
A2	0.90	0.95	1.00
b	0.30	-	0.50
b1	0.30	0.35	0.40
c	0.135	-	0.20
c1	0.12	0.15	0.16
D	2.90	2.95	2.975
E	2.70	2.80	2.90
E1	1.525	1.60	1.675
e	0.95 BSC		
e1	1.90 BSC		
L	0.30	0.40	0.60
L1	0.60 REF.		
θ	0°	4°	8°
θ1	4°	10°	12°

Foot Print