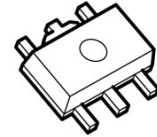


## Constant Current LED Driver with PWM Control

### ■ GENERAL DESCRIPTION

The NJW4616 is a constant current LED Driver with PWM control. 45V resisting constant current control and PWM control circuit can be offered with small package. It can achieve luminance control multiple white or blue and red LEDs. It can contribute to the reliability improvement of the system because it has an overcurrent protection and thermal shutdown circuit.

### ■ PACKAGE OUTLINE

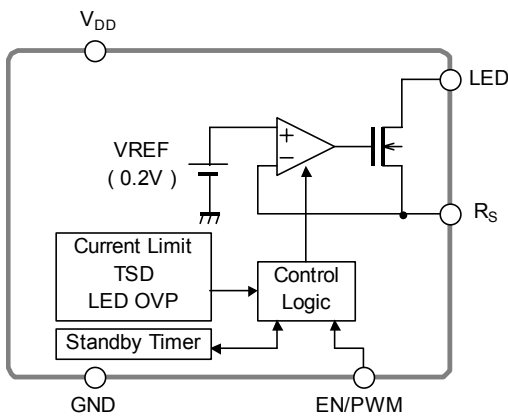


NJW4616U2  
(SOT-89-5)

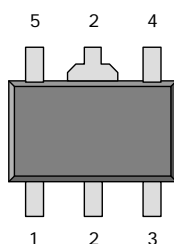
### ■ FEATURES

- Operating Voltage Range                    2.5V to 40V
- Recommended LED Drive Voltage  $V_{LED}=40V(max.)$
- LED Output Current                          $I_{LED}=300mA(max.)$
- Output Current Accuracy                     $\pm 2.0\%$
- To 11 of White LED can be operated. (at LED  $V_f=3.4V$ )
- Current Consumption                        450 $\mu A$  typ.
- With PWM Luminance Control and ON/OFF Control
- Internal Over Current Protection Circuit
- Internal Thermal Shutdown Circuit
- Package                                         SOT-89-5

### ■ BLOCK DIAGRAM



### ■ PIN CONFIGURATION



- 1: EN/PWM
- 2: GND
- 3:  $R_s$
- 4: LED
- 5:  $V_{DD}$

\* Please note that this device is still under the development and therefore the specifications are subject to change.

Advance Information

# NJW4616

## ■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETERS	SYMBOL	RATINGS	UNIT
VDD Power Supply	V <sub>DD</sub>	-0.3 to +45	V
Output voltage	V <sub>LED</sub>	-0.3 to +45	V
EN/PWM Pin Voltage	V <sub>ENPWM</sub>	-0.3 to +45	V
Power Consumption	P <sub>D</sub>	625 (*1) 2400 (*2)	mW
Junction Temperature	T <sub>j</sub>	-40 to +150	°C
Operating Temperature	Topr	-40 to +105	°C
Storage Temperature	Tstg	-40 to +150	°C

(\*1): Mounted on glass epoxy board. (76.2×114.3×1.6mm:based on EIA/JDEC standard, 2Layers)

(\*2): Mounted on glass epoxy board. (76.2×114.3×1.6mm:based on EIA/JDEC standard, 4Layers),

Internal Cu area: 74.2×74.2mm

## ■ RECOMMENDED OPERATING CONDITIONS

(Ta=25°C)

PARAMETERS	SYMBOL	CONDITIONS	MIN	TYP	MAX	Unit
Operating Voltage	V <sub>DD</sub>		2.5	-	40	V
Output Current	I <sub>LED</sub>		20	-	300	mA
Output Voltage	V <sub>LED</sub>		-	-	40	V

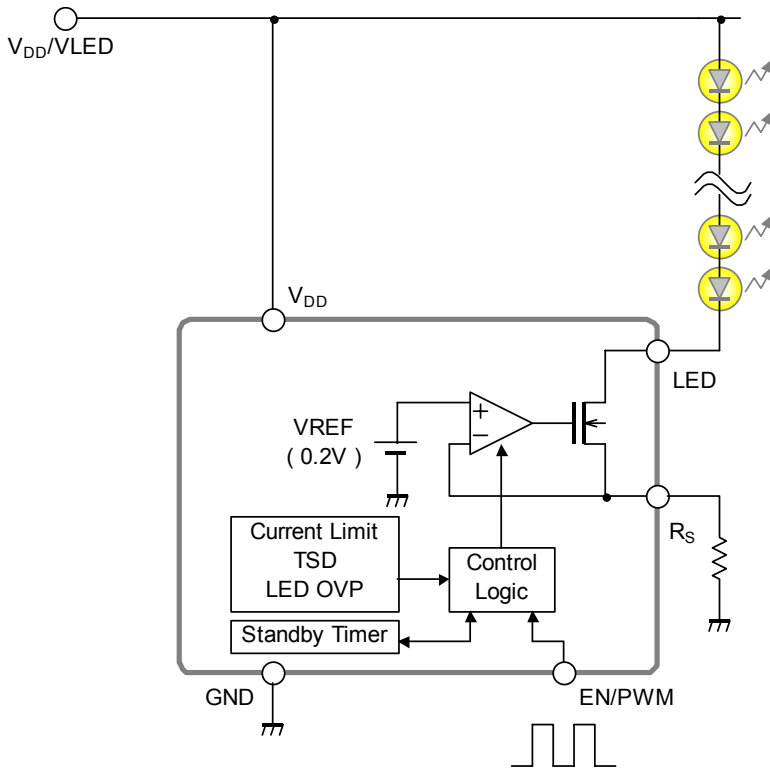
## ■ ELECTRICAL CHARACTERISTICS

(Unless otherwise noted, V<sub>DD</sub>=12V, V<sub>LED</sub>=1.0V, R<sub>S</sub>=2Ω, V<sub>ENPWM</sub>=V<sub>DD</sub>, Ta=25°C)

PARAMETERS	SYMBOL	CONDITIONS	MIN	TYP	MAX	Unit
Quiescent Current	I <sub>DD</sub>		-	340	550	μA
Quiescent Current at OFF State	I <sub>DD OFF</sub>	V <sub>ENPWM</sub> =GND	-	-	0.1	μA
Output Current Accuracy	ΔI <sub>LED</sub>		-2	-	+2	%
Output Pin Leak Current	I <sub>LEAK</sub>	V <sub>ENPWM</sub> =GND, V <sub>DD</sub> =40V, V <sub>LED</sub> =40V	-	-	0.1	μA
OFF Delay Time	t <sub>D OFF</sub>		10	25	50	ms
EN/PWM Pin ON Voltage1	V <sub>ENPWM ON1</sub>	V <sub>DD</sub> <5V, I <sub>LED</sub> =OFF→ON	0.7V <sub>DD</sub>	-	V <sub>DD</sub>	V
EN/PWM Pin ON Voltage2	V <sub>ENPWM ON2</sub>	V <sub>DD</sub> ≥5V, I <sub>LED</sub> =OFF→ON	3.5	-	V <sub>DD</sub>	V
EN/PWM Pin OFF Voltage	V <sub>ENPWM OFF</sub>	I <sub>LED</sub> =ON→OFF	0	-	0.5	V
EN/PWM Pin Input Current	I <sub>ENPWM</sub>		-	7	-	μA
RS Pin Leak Current	I <sub>OUT RS</sub>	LED=OPEN	-	4	-	μA
PWM Pin ON Delay Time	t <sub>PWM ON</sub>	V <sub>ENPWM</sub> =L→H, I <sub>LED</sub> =OFF→ON, R <sub>S</sub> =0.62Ω	-	10	-	μs
PWM Pin OFF Delay Time	t <sub>PWM OFF</sub>	V <sub>ENPWM</sub> =H→L, I <sub>LED</sub> =ON→OFF, R <sub>S</sub> =0.62Ω	-	1.2	-	μs
LED Short Protection Detect Voltage	V <sub>LED_SHORT</sub>	R <sub>S</sub> = 0Ω, I <sub>LED</sub> = I <sub>LED MAX</sub> → I <sub>LED MAX</sub> × 0.5	-	22	-	V
Maximum Output Current	I <sub>LED MAX</sub>	R <sub>S</sub> = 0Ω	330	600	-	mA

\* Please note that this device is still under the development and therefore the specifications are subject to change.

■ TYPICAL APPLICATION



The  $R_s$  Resistance Setting formula:  $R_s(\Omega) = \frac{0.2(V)}{I_{LED}(A)}$

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Advance Information

## MEMO

Advance Information

**[CAUTION]**

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