Elektronische Bauelemente

SSMG501 Series

Low Power Constant Current LED Driver

RoHS Compliant Product
A suffix of "-C" specifies halogen or lead -free

DESCRIPTION

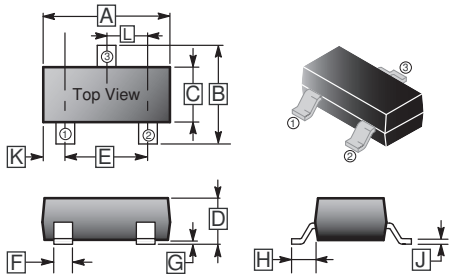
SSMG501 is a simple general purpose current regulation component that can be easily used in various LED lighting applications. With the excellent load/line regulation and minimized chip current skew, SSMG501 keep LED's current very stable even when power or load fluctuate in a wide range and make intensity very uniform in large area of LED light source.

Except power supply function, the VDD pin of SSMG501 is output enable (OE) also, and can be used in digital PWM controlled circuit to achieve more precise current adjusting in gray level applications.

The minimized power supply voltage let SSMG501 be used as a current regulative diode (CRD) when VDD and VP pin are tight together. This application makes SSMG501 very easy to be used. Just like a diode, when this diode is inserted in LED series, the current in circuit is regulated.

In high supply voltage and low LED load voltage application, two or more single channel SSMG501 can be connected in series to share redundant high voltage. the extra redundant voltage can be share by each SSMG501 by a reasonable mechanism. This special capability let SSMG501 very suit for the usage of wide range power supply that many liner type LED drivers cannot work.

SOT-23



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.70	3.10	G	0.09	0.18
B	2.10	3.00	H	0.45	0.70
C	1.20	1.80	J	0.08	0.25
D	0.89	1.40	K	-	-
E	1.78	2.04	L	0.89	1.02
F	0.30	0.50			

FEATURES

- 18mA~30mA constant current regulator
- Self power structure, no extra power supply is needed
- 0.4V~17V output voltage
- 2μS/2μS current rising/falling time
- Cascade-able for higher voltage application
- No external current setting resistor is needed
- 1.6V~12V supply voltage
- PWM dimming by V_{DD} pin
- -40℃~120℃ junction operating temperature
- Less than 1%/V load(or line) regulation

APPLICATIONS

- General LED Lighting
- LED back lighting
- LED torch/flashing
- RGB lighting

MARKING CODE

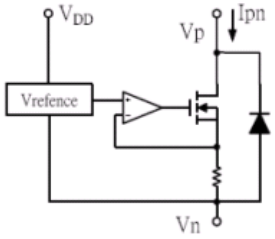
SSMG501-18: 1A18
SSMG501-20: 1A20
SSMG501-25: 1A25
SSMG501-30: 1A30

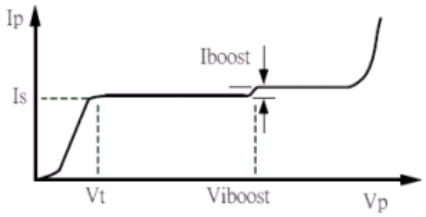
Note: 18, 20, 25, 30 = Output Current(mA)

PACKAGE INFORMATION

Weight: 0.07800g (Approximately)

BLOCK DIAGRAMS PER CHANNEL AND IDEAL I_V CHARACTERISTICS





TERMINAL DESCRIPTION

Pin name	Function	Pin #
VDD	Power supply	②
VP	Current in	①
VN	Current out	③

ABSOLUTE MAXIMUM RATINGS (T_A = 25℃)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{DD}	0 ~ 17	V
Output Voltage	V_P	-0.2 ~ 20	V
Output Current	I_{PN}	IS** +10%	mA
Power Dissipation	P_D	250	mW
Thermal Resistance	$R_{\theta JA}$	300	℃/W
Operating Temperature	T_{OPR}	-40 ~ +85	℃
Storage Temperature	T_{STG}	-55 ~ +150	℃

ELECTRICAL CHARACTERISTICS AND RECOMMENDED OPERATING CONDITIONS

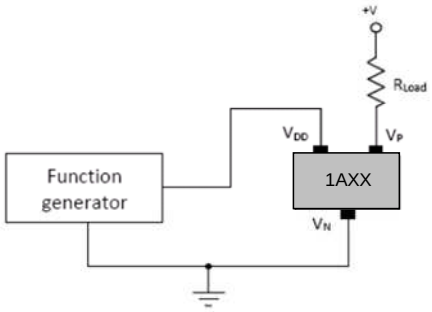
PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Supply Voltage	V_{DD}	Room Temp.	1.6	-	12	V
Supply Current	I_{DD}	-	100	150	250	μA
Output Voltage	V_P	V_{DD}=5V, $I_P \fallingdotseq I_S$**	0.4	-	17	V
		V_{DD}=3V, $I_P \fallingdotseq I_S$**	0.45	-	17	V
		V_{DD}=1.7V, $I_P \fallingdotseq I_S$**	1.2	-	17	V
Output Current	I_S	Spec	15	-	30	mA
Leakage	$I_{Leakage}$	0.4V > V_{DD} > 0V, V_P=15V	1	-	5	μA
Line Regulation	%/V_{DD}	12V > V_{DD} > 1.6V	-	-	±1	%/V
Load Regulation	%/V_P	10V > V_P > 1.6V	-	-	±1	%/V
Thermal Regulation	%/10℃	V_{DD}=VP=2V	-	-	±0.5	%/10℃
Threshold Voltage	V_{iboost}	I_P=IS*1.1	11	12	13	V
Current Boost	I_{boost}	V_P=Viboost	7	10	13	%* IS

** I_S is output saturation current.

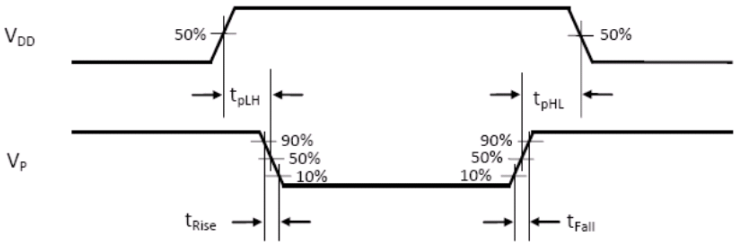
SWITCHING CHARACTERISTICS (T_A = 25℃)

PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Propagation Delay Time VDD "L" →"H"	t_{pLH}	VP=1V, VDD=0V→3V	-	1	-	μS
Output Current Rising Time	t_{Rise}	VP=1V, VDD=0V→3V	-	1.5	5	μS
Propagation Delay Time VDD "H" →"L"	t_{pHL}	VP=1V, VDD=3V→0V	-	1	-	μS
Output Current Falling Time	t_{Fall}	VP=1V, VDD=3V→0V	-	1.5	5	μS

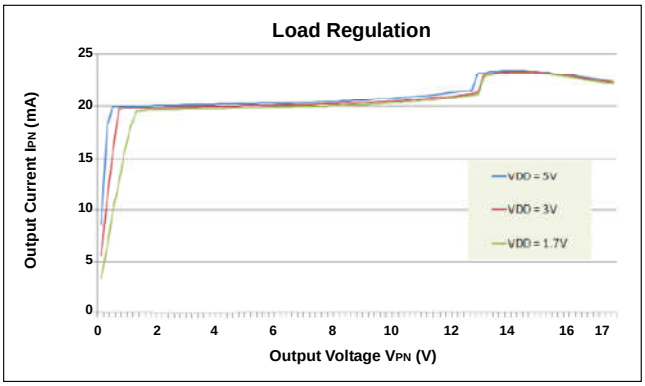
TEST CIRCUIT

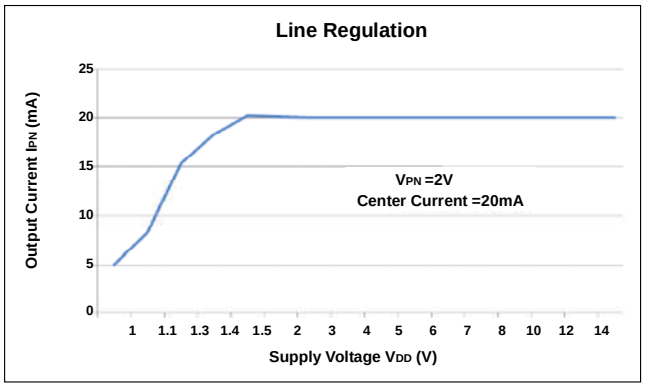


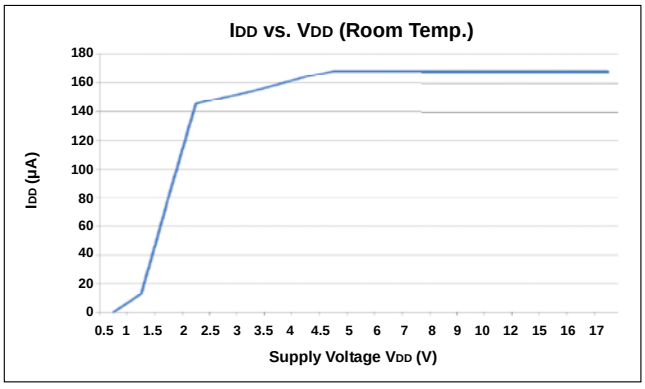
TIMING WAVEFORM

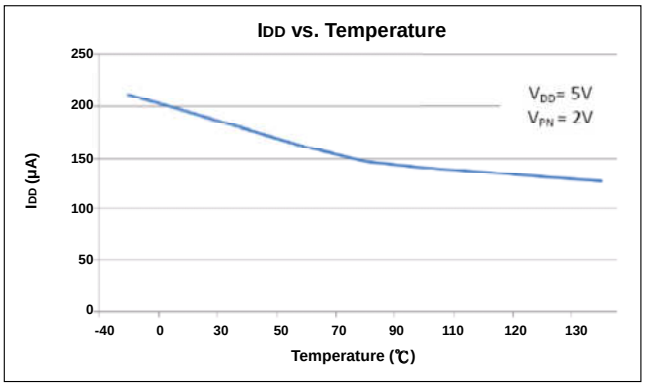


CHARACTERISTIC CURVE



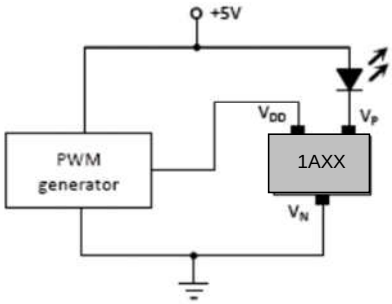




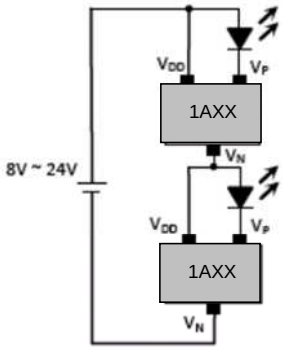


APPLICATION CIRCUITS

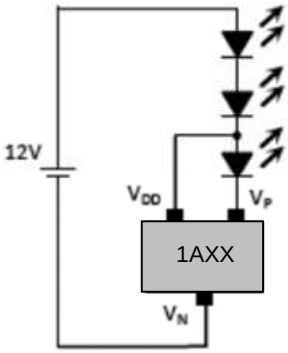
● 5V PWM Lighting Application



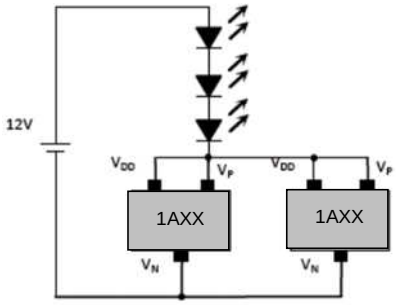
● High Voltage Drop Application



● 12V Lighting Application



● Parallel Application



● 36V Lighting Application

LED V_f = 3.3 V ~ 3.5 V
V_{DD} = 35.5 V ~ 40 V