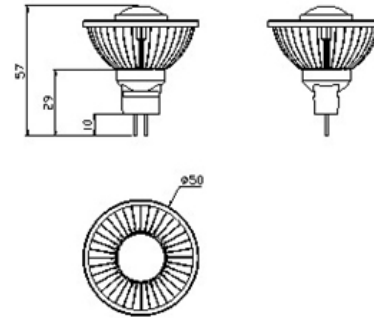


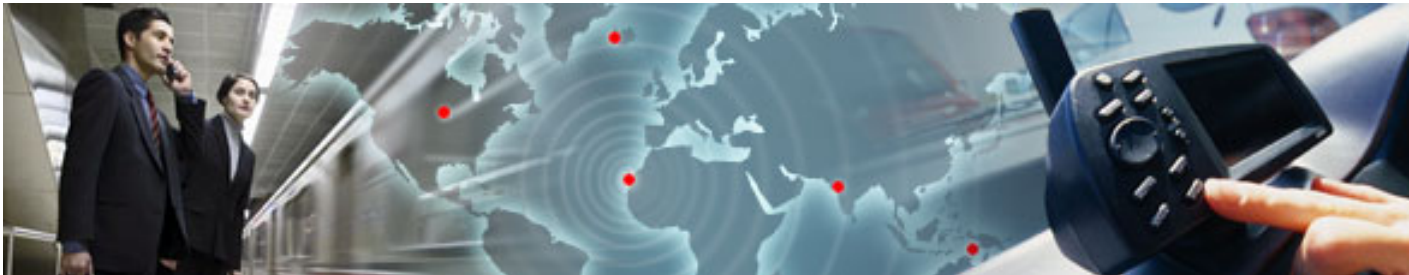


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电话：0755-8398 3377 135 9011 2223
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亞瑟萊特科技股份有限公司 AXEelite Technology Co., Ltd.



AXEelite Products for LED Lighting JULY 2010



TM - Wesley

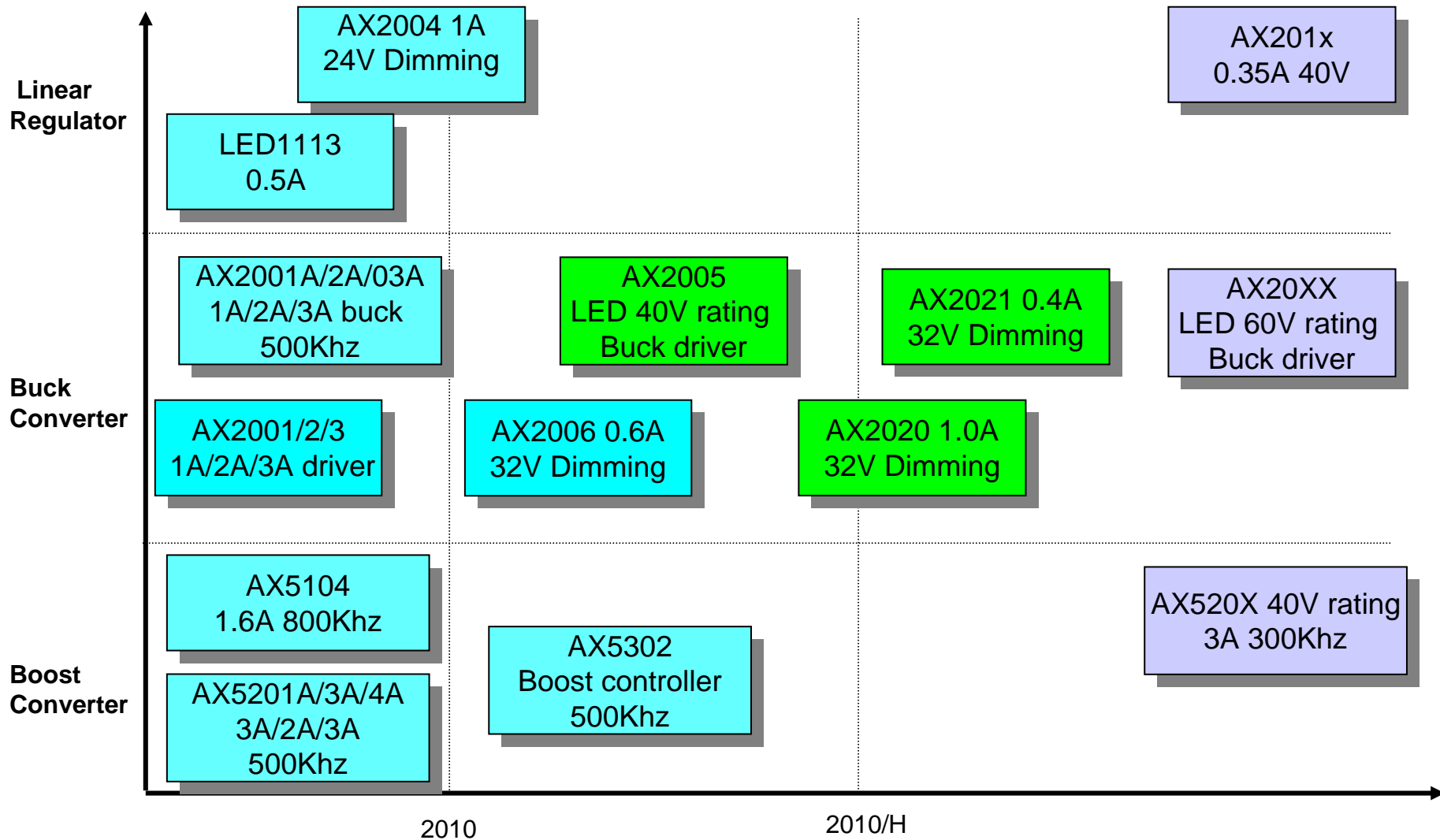
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LED Lighting Product Roadmap



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LED Lighting Product Category

Part number	Package Type	Input Voltage	Output Current	Output Voltage	Dimming Frequency	Shutdown Current	12 to 5V (2A)	Availability
							Efficiency(%)	
LED Driver (Linear Regulator)								
LED1113	SOT89-3	2.5 to 26V	0.5A	26V	-	-	-	NOW
AX2004	SOT89-5, SOP8, TO252-5	2.5 to 24V	1A	24V	2Khz	-	-	NOW
Part number	Package Type	Input Voltage	Driving Current	Output Voltage	Frequency	Shutdown Current	Efficiency(%)	Availability
LED Driver (Buck Converter)								
AX2001/A	SOP8	4 to 23V	1A	23V	330/500Khz	2uA	91	NOW
AX2002/A	SOP8	4 to 23V	2A	23V	330/500Khz	2uA	92	NOW
AX2003/A	SOP8	4 to 23V	3A	23V	330/500Khz	2uA	92	NOW
AX2005/A	SOP8-EP	8 to 40V	3A/2A	38V	300Khz	150uA	90	NOW
AX2006	SOT89-5	8 to 32V	0.6A	32V	Max. 1Mhz	-	85	NOW
AX2020	SOT89-5	8 to 32V	1A	32V	Max. 1Mhz	-	85	NOW
AX2021	TSOT23-5	8 to 32V	0.4A	32V	Max. 1Mhz	-	85	NOW
LED Driver (Buck Controller)								
AX2201	SOP8,MSOP8	4 to 23V	100mA	23V	330Khz	2uA	92	NOW

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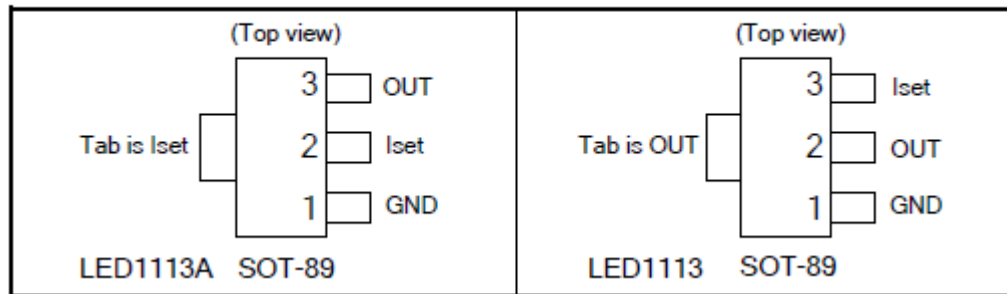


LED Lighting Product Category

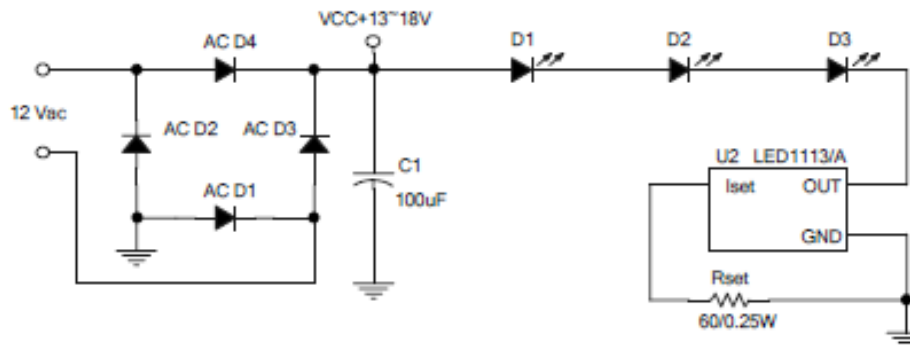
Part number	Package Type	Input Voltage	Switching Current	Output Voltage	Frequency	Shutdown Current	5 to 12V (1A)	3.3 to 5V (1A)	Availability
							Efficiency(%)	Efficiency(%)	
Step-up Simple Switch (Converter)									
AX5104	SOP8-EP	4 to 23V	1.6A	25V(Vfb=1V)	800K	1uA	80(0.3A)	-	NOW
AX5201	SOP8-EP	3 to 20V	3A	32V(Vfb=1V)	500K	1uA	92	91	NOW
AX5203	SOP8-EP	4 to 23V	3A	68V(Vfb=1V)	500K	1uA	92(12 to 24V/0.5A)		NOW
AX5204	SOP8-EP	3 to 20V	2A	32V(Vfb=1V)	500K	1uA	91(0.8A)	90(0.8A)	NOW
Part number	Package Type	Input Voltage	Driving Current	Output Voltage	Frequency	Shutdown Current	Efficiency(%)		Availability
Step-up Simple Switch (Controller)									
AX5302	SOP8	3 to 24V	100mA	Vfb=1V	500K	1uA	91		NOW

LED1113/A VIN26V / 0.5A

Pin Descriptions

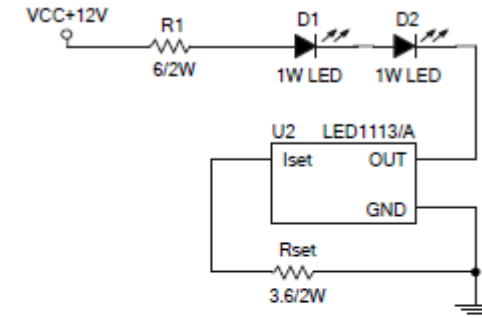


A.AC Input



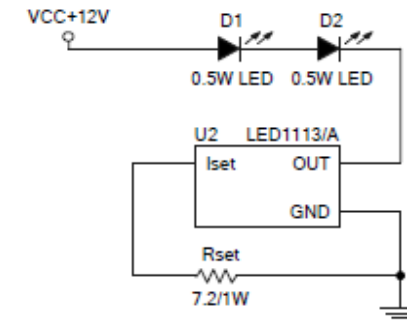
$I_{OUT} = 1.25V / 60 = 21mA$
 $V_{OUT} \geq 2.5V$
 1. $13V - V_{LED} - V_{SET} = 1.25V$
 $IC's PD = (1.25 * 0.02) = 0.03W$
 2. $18V - V_{LED} - V_{SET} = 6.25V$
 $IC's PD = (6.25 * 0.02) = 0.13W$
 $V_{LED} = 10.5V (3.5V * 3LED)$

B.DC Input



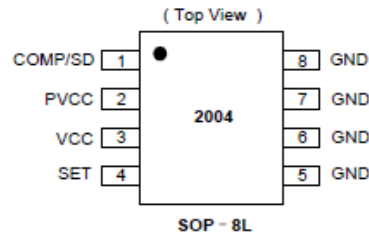
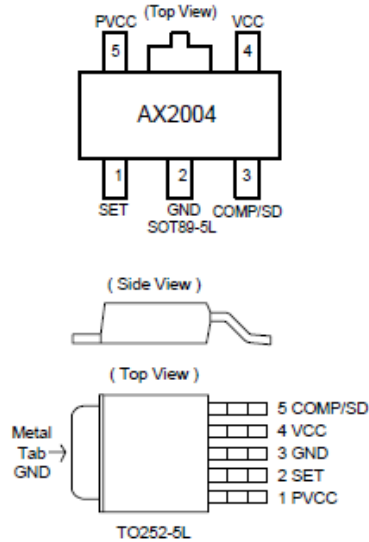
$I_{OUT} = 1.25V / 3.6 = 347mA$
 $V_{OUT} \geq 2.5V$
 1. $R1 = 6, VR1 = 2.08V$
 $R1's PD = 2.08 * 0.347 = 0.73W$
 2. $12V - VR1 - V_{LED} - V_{SET} = 1.67V$
 $IC's PD = 1.67 * 0.347 = 0.58W$

$V_{LED} = 7V$



AX2004 VIN24V / 1.2A / Dimming function

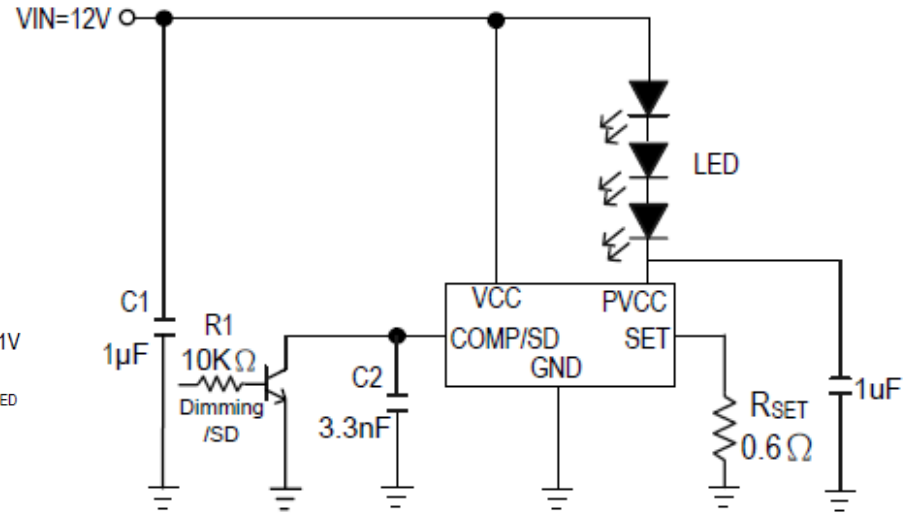
❖ PIN ASSIGNMENT



$$I_{LED} = \frac{V_{SET}}{R_{SET}}, V_{SET} = 0.21V$$

$$PD = (12V - V_{LED}) \times I_{LED}$$

$$0.2\Omega \leq R_{SET} \leq 1K$$



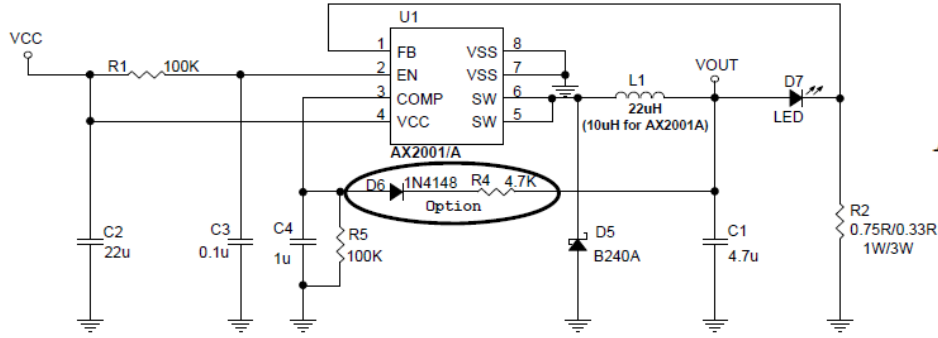
❖ ELECTRICAL CHARACTERISTICS

(V_{CC} = 12V, T_A = 25°C, unless otherwise specified)

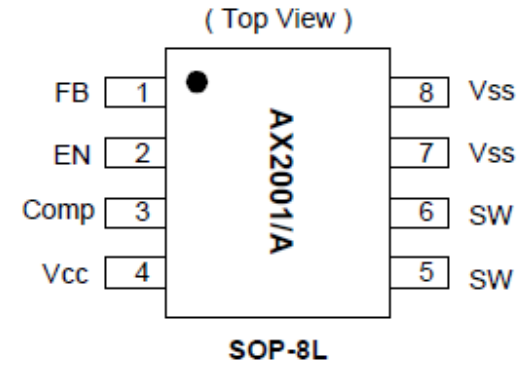
Characteristics	Symbol	Conditions	Min	Typ	Max	Unit
VCC input voltage	V _{CC}	R _{SET} = 20Ω	2.5	-	24	V
Quiescent Current	I _{CCQ}	LED open, I _{OUT} =0mA	-	1.5	3	mA
SET Voltage	V _{SET}	V _{CC} -V _{LED} > 2.5V	204	210	216	mV
Dropout Voltage	PV _{CC} - V _{SET}	ΔV _{SET} =2%V _{SET} ; R _{SET} = 1Ω	-	0.2	0.5	V
Output Current limit	I _L		1.2	-	-	A
Dimming Frequency	F _{DIM}		-	-	2	KHZ
Comp Current	I _{COMP}	V _{COMP} = 0V, V _{CC} = 12V	-	80	120	µA
Shutdown Current	I _{VCC-SD}	V _{COMP} = 0V	-	1	2	mA
	I _{PVCC-SD}		-	-	1	µA
Shutdown voltage	V _{SD}		-	-	0.8	V
Thermal shutdown	T _{SD}		-	150	-	°C
Thermal Shutdown Hysteresis	T _{SH}		-	40	-	°C



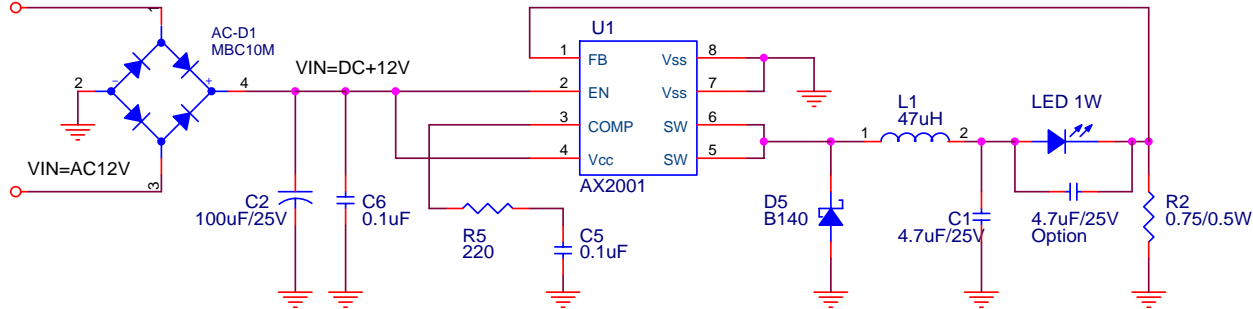
A. 1W/3W LED*1 for DC Input



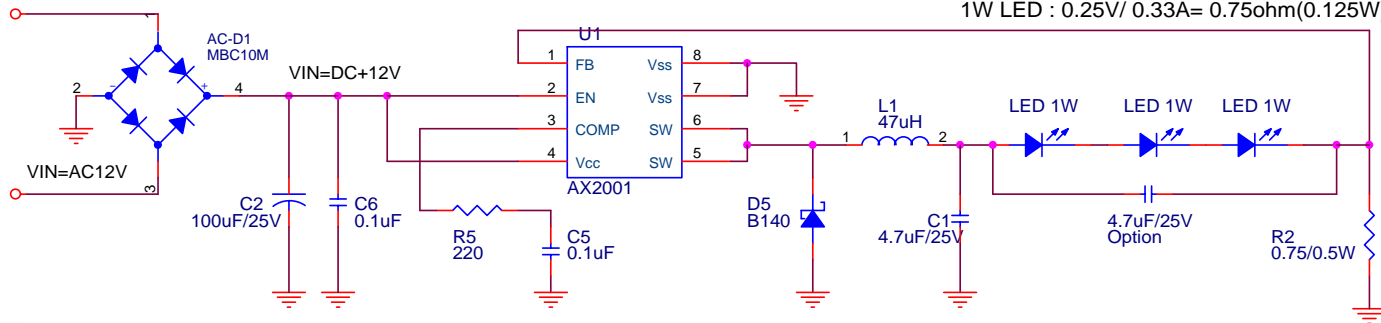
$$I_{LED} = \left(\frac{0.25V}{R2} \right)$$



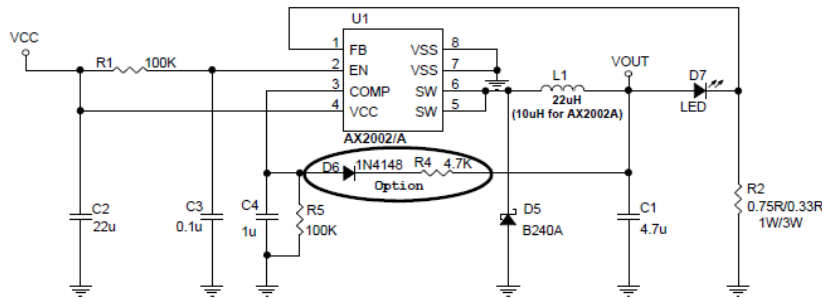
1W LED : 0.25V / 0.33A = 0.75ohm(0.125W)



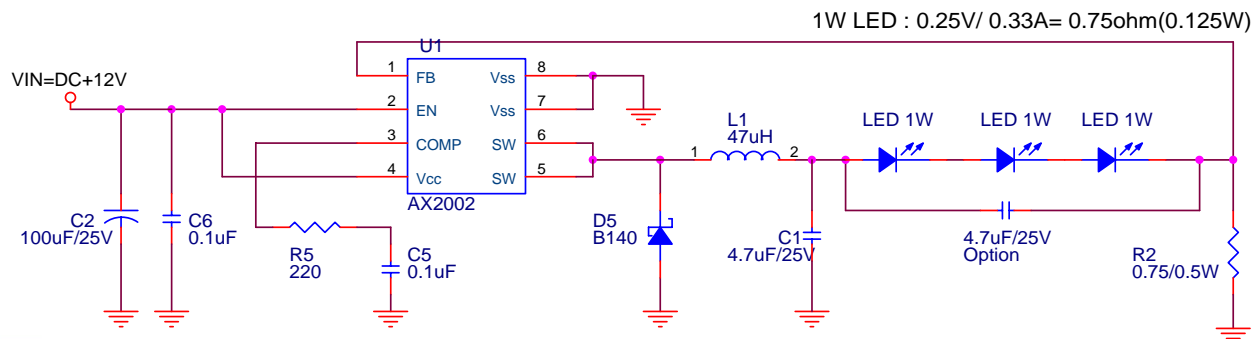
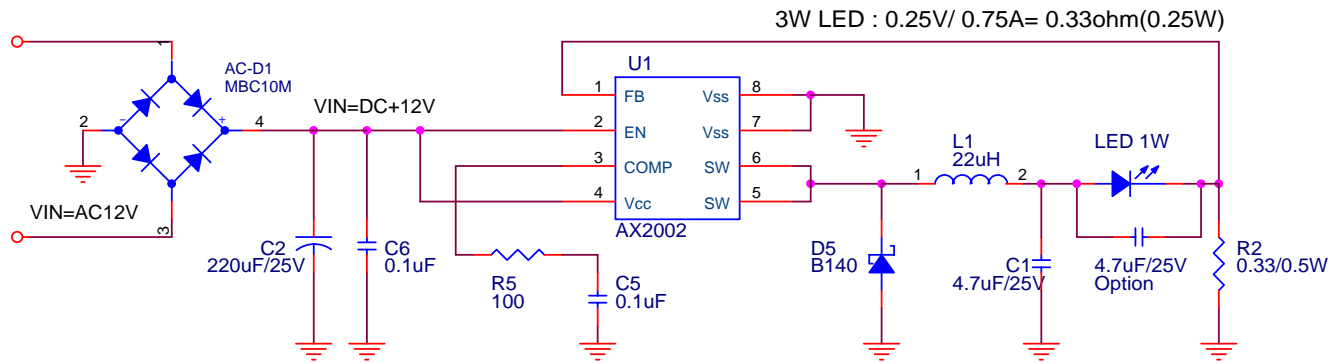
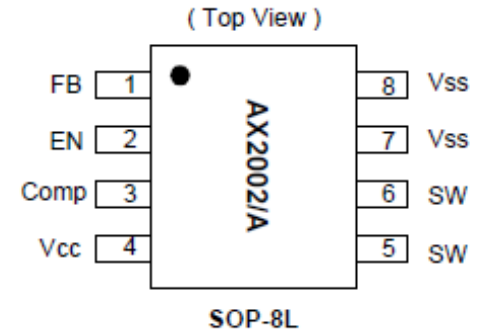
1W LED : 0.25V / 0.33A = 0.75ohm(0.125W)



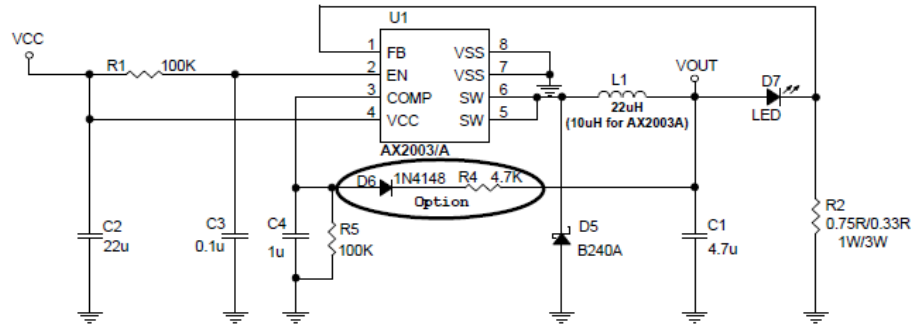
A. 1W/3W LED*1 for DC Input



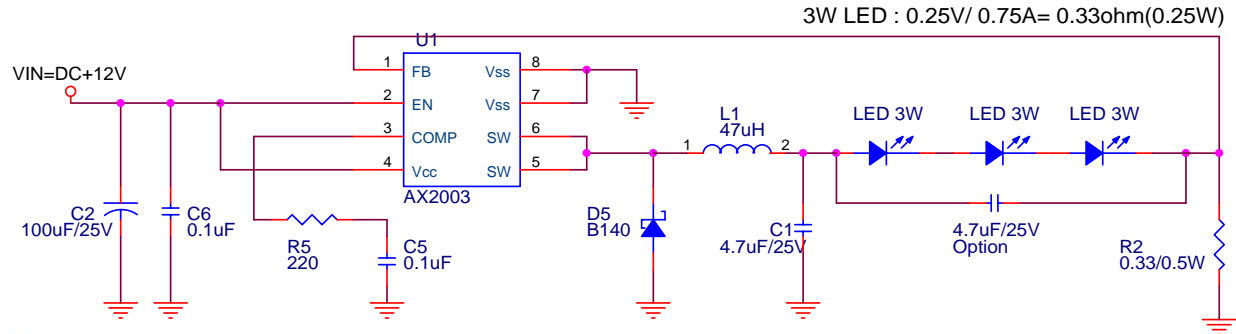
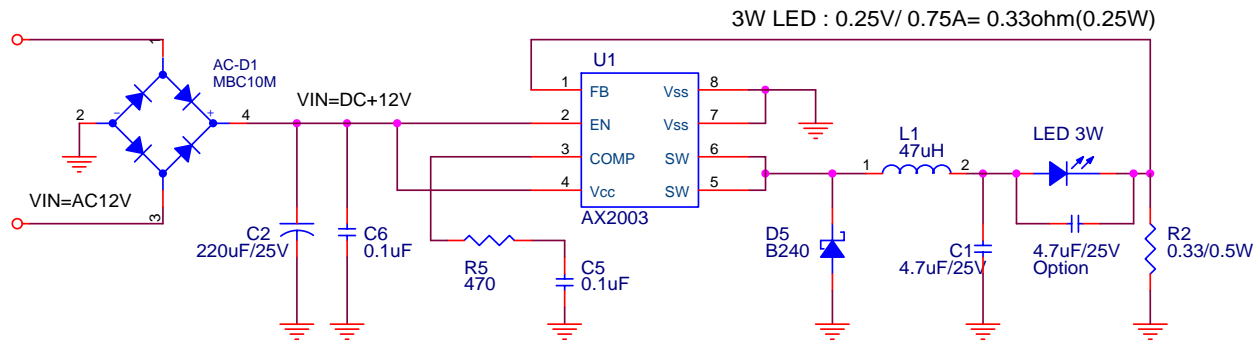
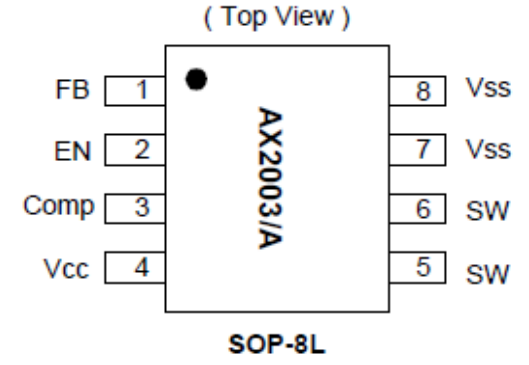
$$I_{LED} = \left(\frac{0.25V}{R2} \right)$$



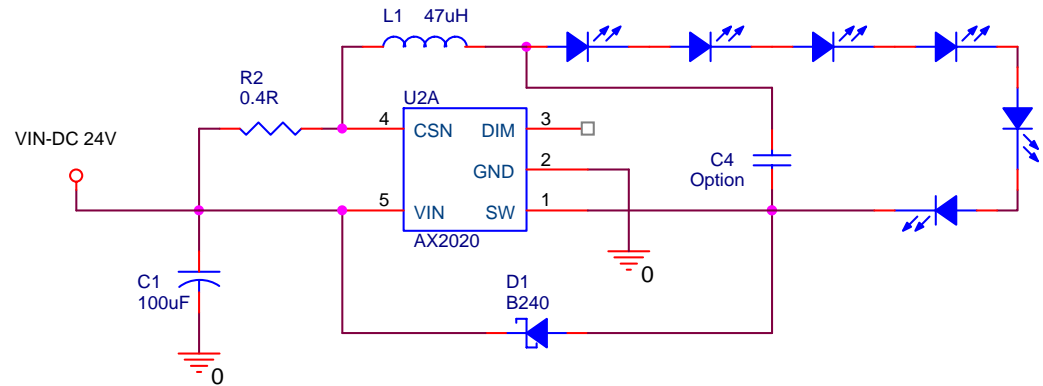
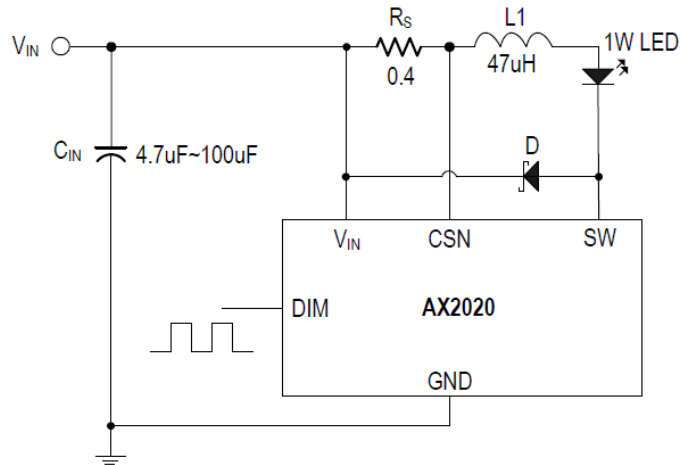
A. 1W/3W LED*1 for MLCC



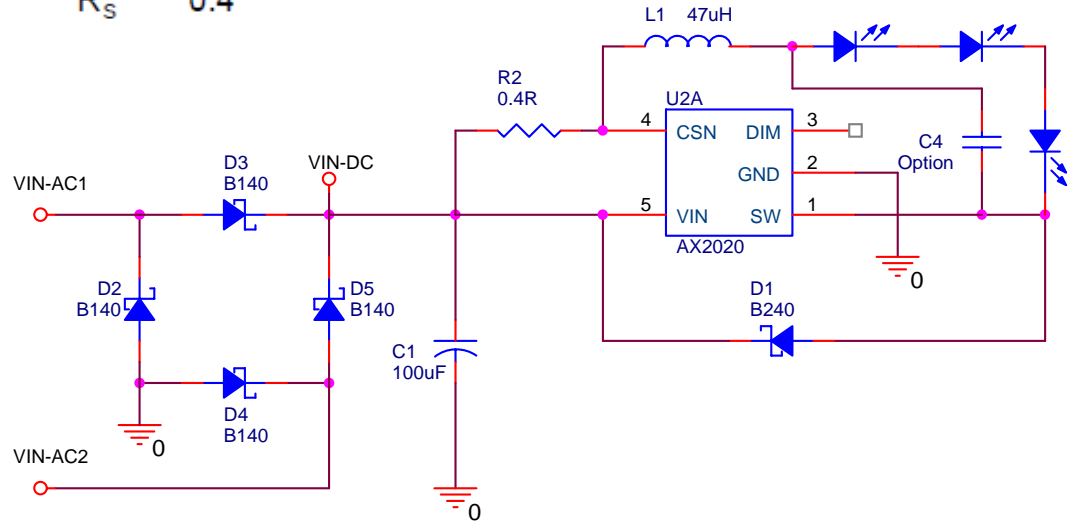
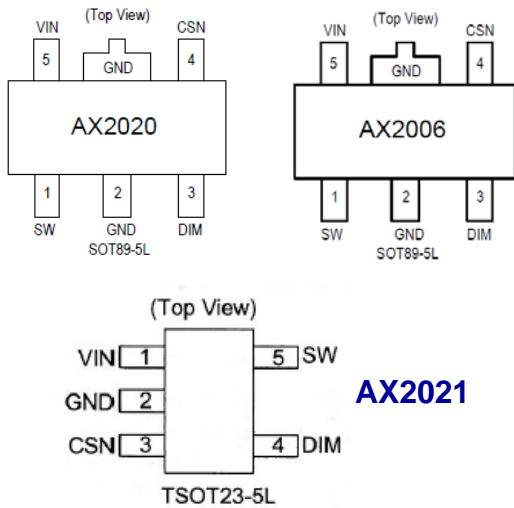
$$I_{LED} = \left(\frac{0.25V}{R2} \right)$$



❖ APPLICATION CIRCUIT

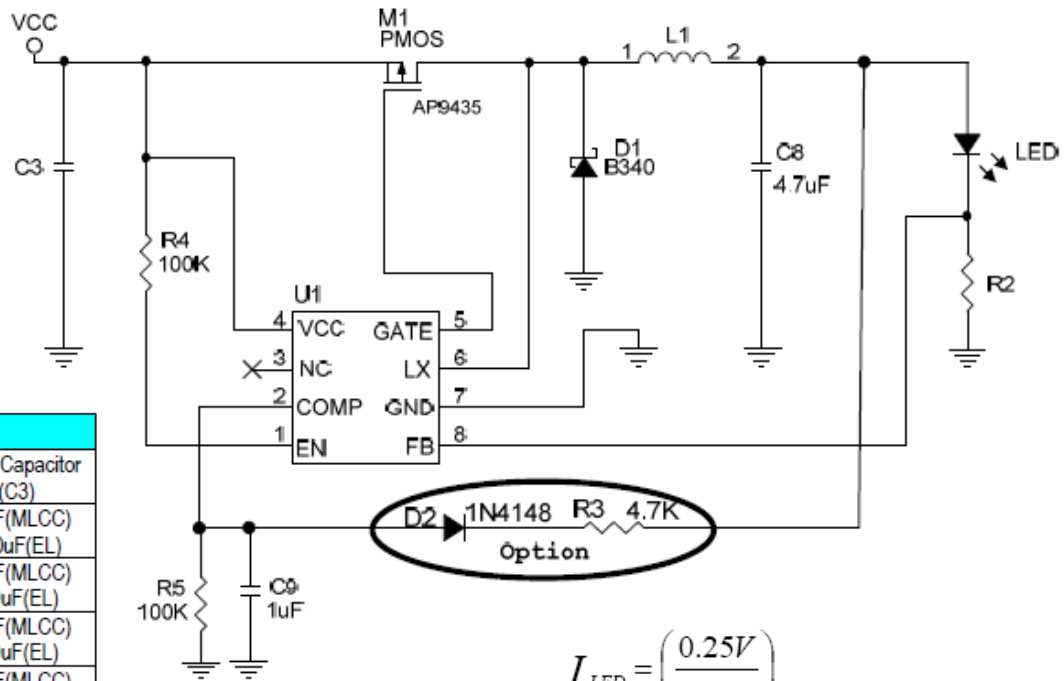
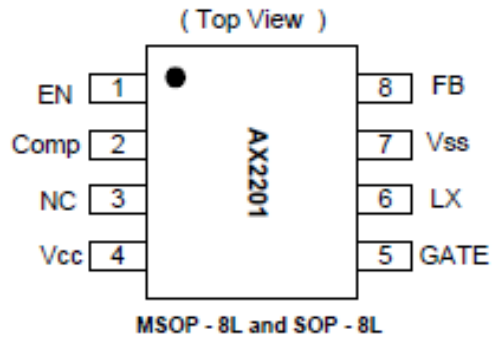


$$I_{LED} = \frac{V_{CSN}}{R_s} = \frac{0.130}{0.4} = 0.325A$$



AX2201 LED Controller/ VIN 23V

A. 1W/3W LED*1 for DC Input

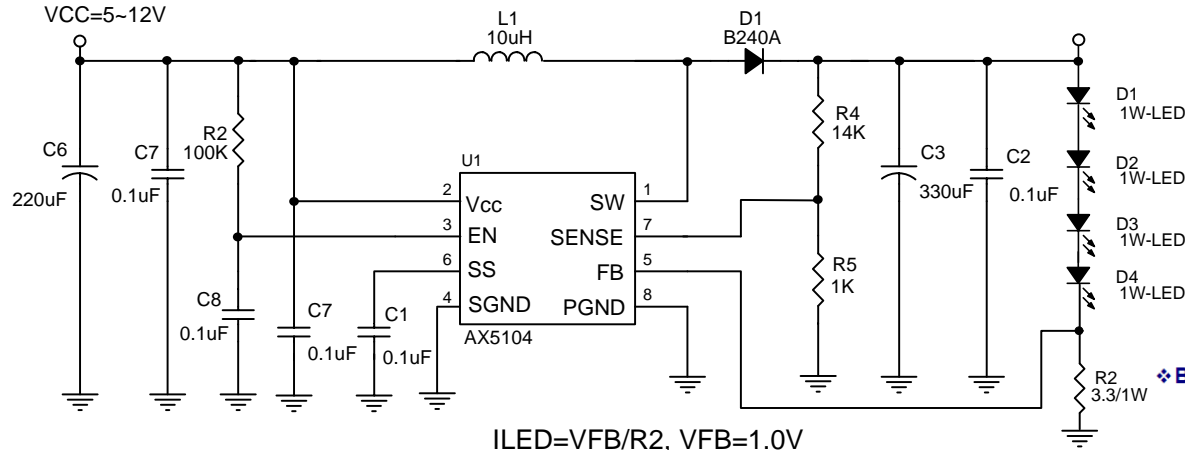


Recommend Operating Conditions					
LED	I _{LED}	R2	VCC Range	Inductor (L1)	Input Capacitor (C3)
1W LED*1	350m	0.715Ω/0.125W	5~23V	22uH	10uF(MLCC) 100uF(EL)
3W LED*1	750m	0.333Ω/0.25W	5~23V	22uH	22uF(MLCC) 100uF(EL)
	900m	0.278Ω/0.5W	5~23V	22uH	22uF(MLCC) 100uF(EL)
1W+1W LED	350m	0.715Ω/0.125W	10~23V	15uH	10uF(MLCC) 100uF(EL)
3W+3W LED	750m	0.333Ω/0.25W	10~23V	15uH	22uF(MLCC) 100uF(EL)
	900m	0.278Ω/0.5W	10~23V	15uH	22uF(MLCC) 100uF(EL)
1W+1W+1W LED	350m	0.715Ω/0.125W	14~23V	10uH	10uF(MLCC) 100uF(EL)
3W+3W+3W LED	750m	0.333Ω/0.25W	14~23V	10uH	22uF(MLCC) 100uF(EL)
	900m	0.278Ω/0.5W	14~23V	10uH	22uF(MLCC) 100uF(EL)

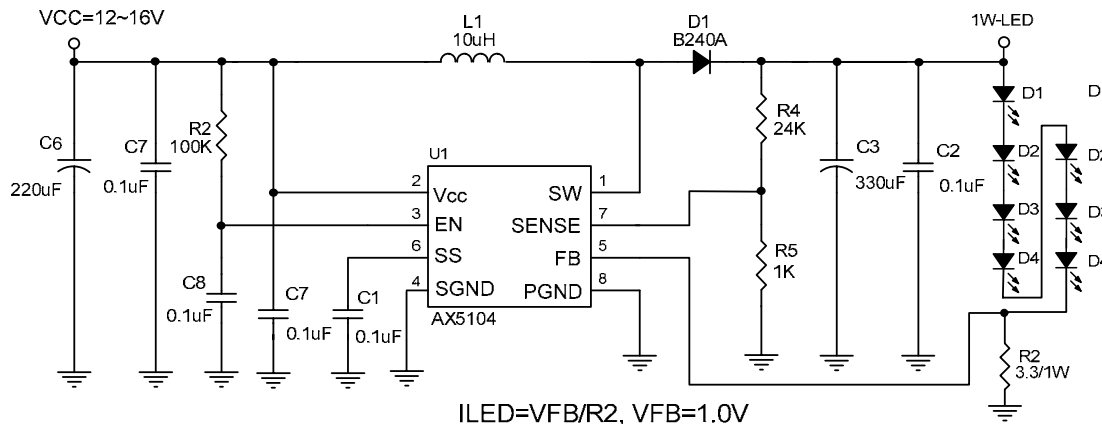
$$I_{LED} = \left(\frac{0.25V}{R2} \right)$$

Table 1 Resistor select for LED output current setting

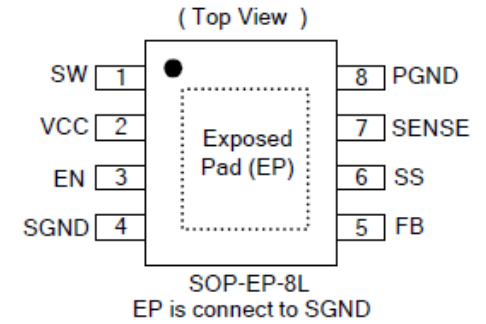
I _{LED}	R2	
20mA	12.5Ω	5mW
350mA	0.715Ω	87.5mW
750mA	0.333Ω	189mW
1.5A	0.167Ω	375mW



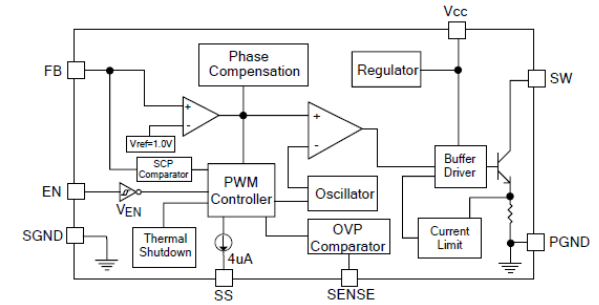
$I_{LED} = V_{FB} / R_2, V_{FB} = 1.0V$
 $OVP = V_{SENSE} (1 + R_4 / R_5), V_{SENSE} = 1.0V$



$I_{LED} = V_{FB} / R_2, V_{FB} = 1.0V$
 $OVP = V_{SENSE} (1 + R_4 / R_5), V_{SENSE} = 1.0V$

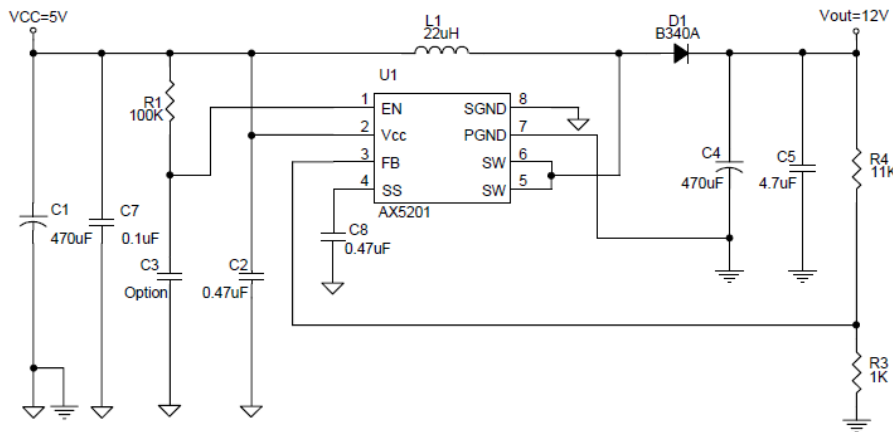
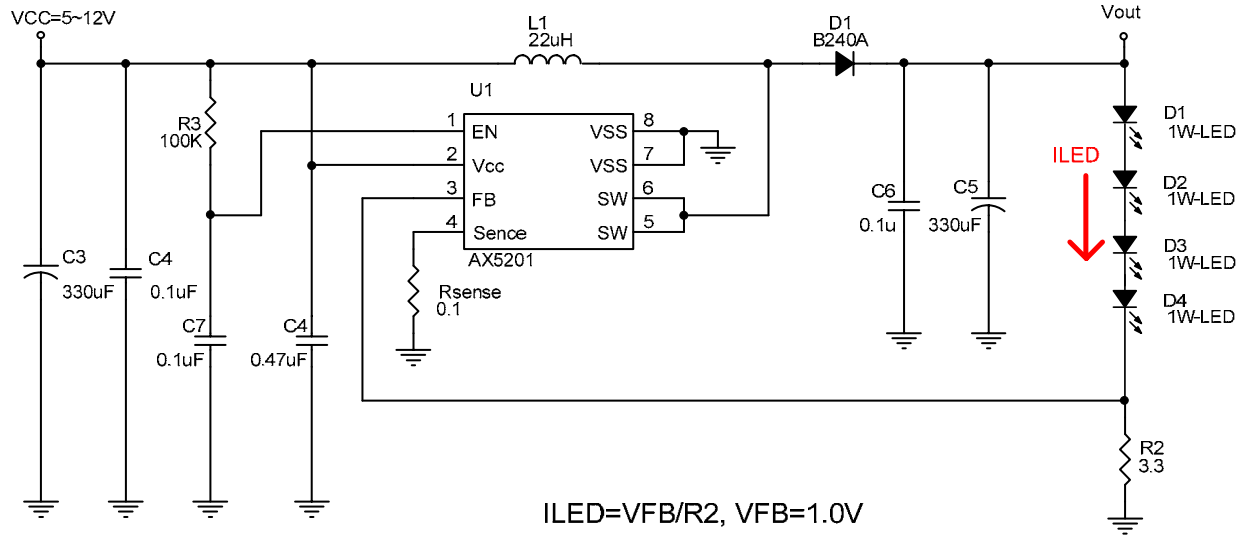


❖ Block Diagram

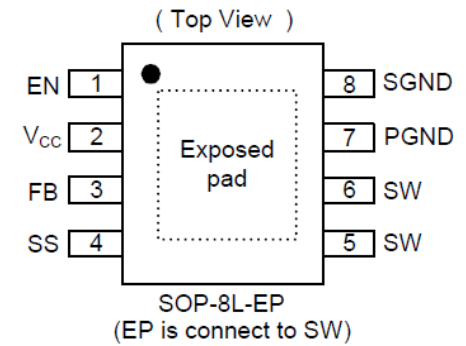


❖ FEATURES

- Input voltage: 4V to 23V
- Output voltage: 4.5V to 25V
- Duty ratio: 0% to 83% PWM control
- Maximum switch current is 1.8A
- Oscillation frequency: 800 KHz (typ.)

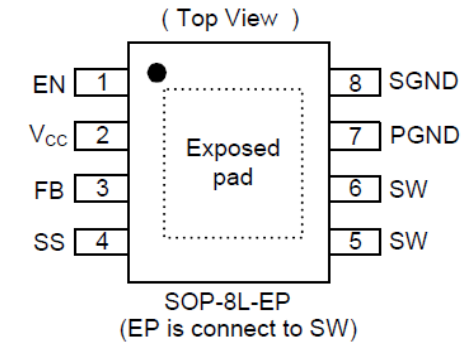
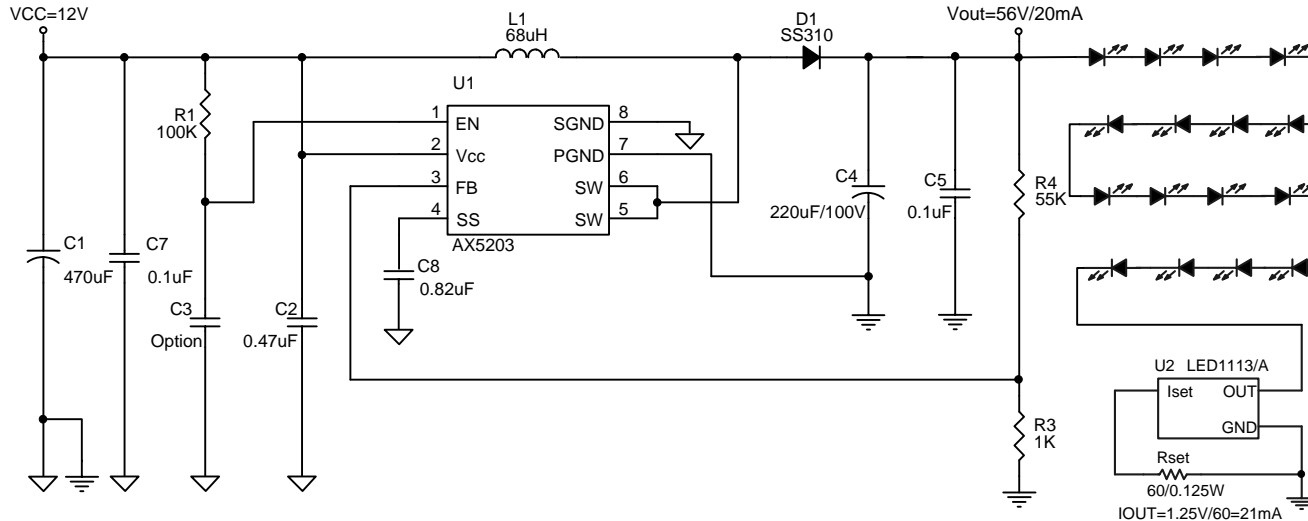


$$V_{OUT} = V_{FB} \times \left(1 + \frac{R_4}{R_3}\right), V_{FB} = 1.0V, R_3 = 1K \sim 3K\Omega$$

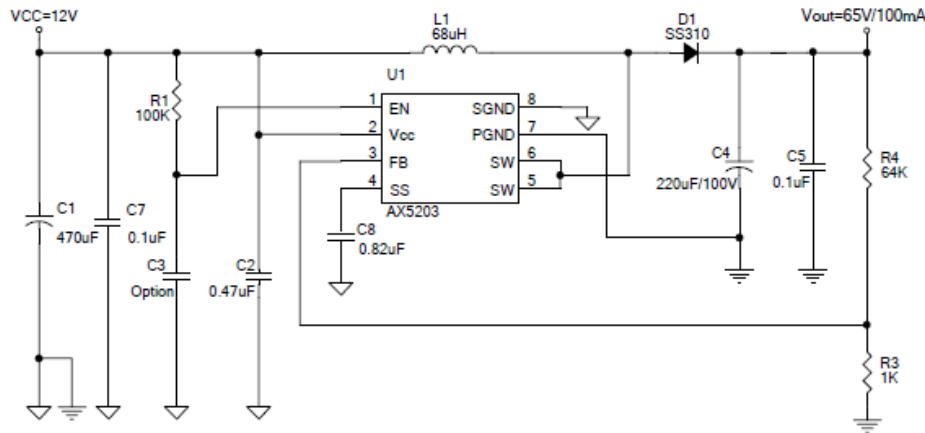


❖ FEATURES

- Input voltage : 3V to 20V
- Output voltage : 3.3V to 32V
- Duty ratio : 0% to 85% PWM control
- Oscillation frequency : 500KHz.



❖ Application Circuit



❖ FEATURES

- Input voltage : 4.5V to 23V
- Output voltage : 5 V to 68V
- Duty ratio : 0% to 85% PWM control
- Oscillation frequency : 500KHz.
- Enable and Thermal Shutdown function.
- Internal Current limit.
- Built-in N-channel MOSFET

$$V_{OUT} = V_{FB} \times \left(1 + \frac{R4}{R3}\right), V_{FB} = 1.0V, R3 = 1K \sim 3K$$