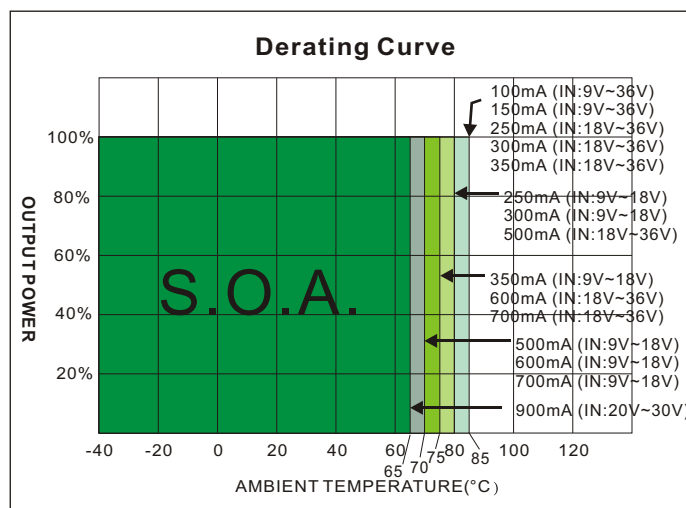
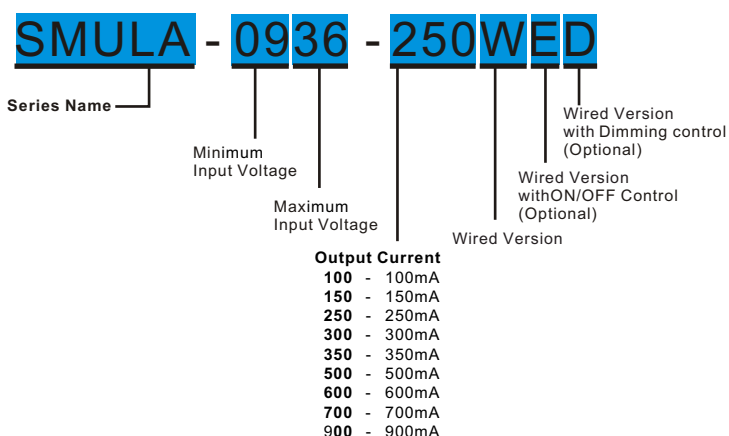




**PART NUMBER STRUCTURE**

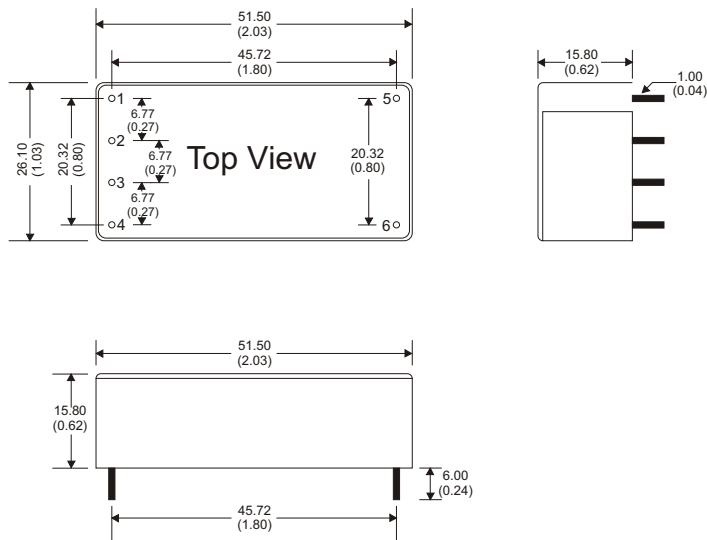


**MODEL SELECTION GUIDE**

MODEL NUMBER	INPUT	OUTPUT		OUTPUT Current	OUTPUT	EFFICIENCY @FL(%, max)	Ripple and Noise mVpk-pk, max.	Capacitor Load(μF)
	Voltage Range (Vdc)	Voltage Range (Vdc)	Current (mA)	Accuracy (%)	Power (W), max.			
SMULA-0936-100	9 - 36	14 - 48	100	±5	4.8	83 ~ 88	250	47
SMULA-0936-150	9 - 36	14 - 48	150	±5	7.2	86 - 91	350	100
SMULA-0936-250	9 - 36	14 - 48	250	±5	12.0	89 - 93	450	100
SMULA-0936-300	9 - 36	14 - 48	300	±5	14.4	89 - 94	450	100
SMULA-0936-350	9 - 36	14 - 48	350	±5	16.8	89.5 - 94	600	100
SMULA-0936-500	9 - 18	14 - 45	500	±5	24.0	90 - 95	650	47
	18 - 36	23 - 48						
SMULA-0936-600	9 - 18	14 - 38	600	±5	28.8	91 - 95	650	47
	18 - 36	23 - 48						
SMULA-0936-700	9 - 18	14 - 32	700	±5	33.6	91.5 - 95	700	47
	18 - 36	23 - 48						
SMULA-2030-900	20 - 30	25 - 48	900	±5	43.2	92 ~ 95	400	47
SMULA-0936-100WED	9 - 36	14 - 48	100	±5	4.8	83 ~ 88	250	47
SMULA-0936-150WED	9 - 36	14 - 48	150	±5	7.2	86 - 91	350	100
SMULA-0936-250WED	9 - 36	14 - 48	250	±5	12.0	89 - 93	450	100
SMULA-0936-300WED	9 - 36	14 - 48	300	±5	14.4	89 - 94	450	100
SMULA-0936-350WED	9 - 36	14 - 48	350	±5	16.8	89.5 - 94	600	100
SMULA-0936-500WED	9 - 18	14 - 45	500	±5	24.0	90 - 95	650	47
	18 - 36	23 - 48						
SMULA-0936-600WED	9 - 18	14 - 38	600	±5	28.8	91 - 95	650	47
	18 - 36	23 - 48						
SMULA-0936-700WED	9 - 18	14 - 32	700	±5	33.6	91.5 - 95	700	47
	18 - 36	23 - 48						
SMULA-2030-900WED	20 - 30	25 - 48	900	±5	43.2	92 ~ 95	400	47

**MECHANICAL DIMENSION**

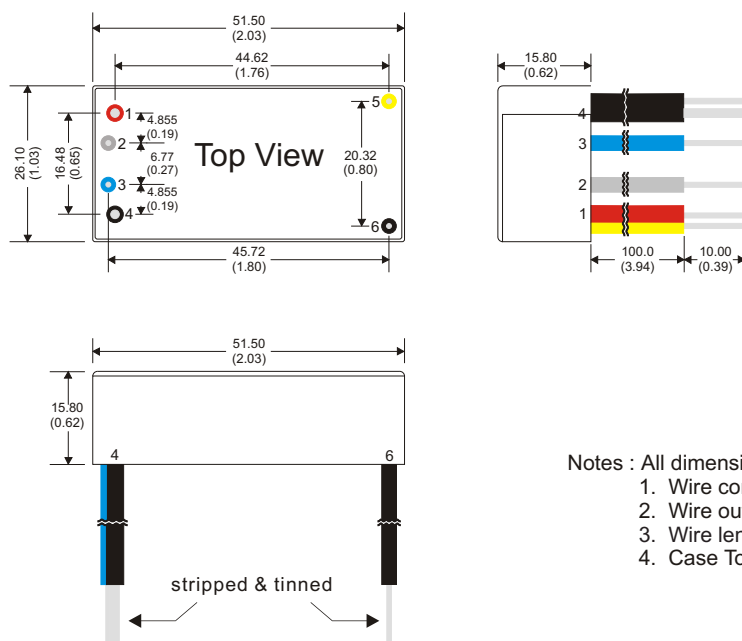
**Pinned Version**



PIN CONNECTIONS		
PIN #	CONNECTIONS	
1	+Vi	+DC Supply
2	DIM	PWM/ Analog Dimming Control
3	EN	Remote ON/OFF
4	-Vi	-DC Supply (GND)
5	+ LED	LED Anode Connection
6	- LED	LED Cathode Connection

All dimensions are typical in millimeters ( inches )  
 1. Pin diameter: 1.0 ±0.05 ( 0.04 ±0.002 )  
 2. Pin pitch and length tolerance: ±0.35 ( ±0.014 )  
 3. Case Tolerance: ±0.5 ( ±0.02 )

**Wired Version**



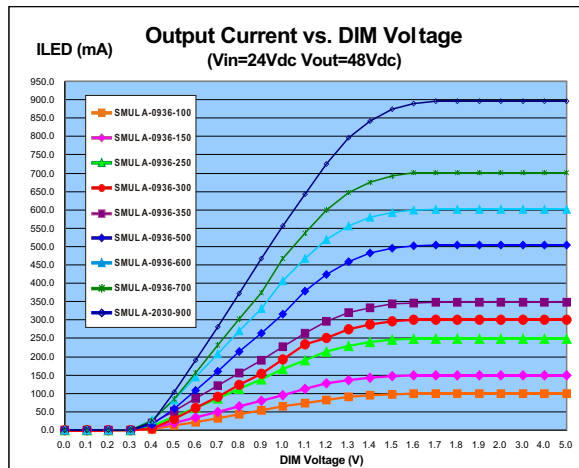
CONNECTIONS		
Wires #	CONNECTIONS	
1 (Red)	+Vi	+DC Supply
2 (White)	DIM	PWM/ Analog Dimming Control
3 (Blue)	EN	Remote ON/OFF
4 (Black)	-Vi	-DC Supply (GND)
5 (Yellow)	+ LED	LED Anode Connection
6 (Black)	- LED	LED Cathode Connection

Notes : All dimensions are typical in millimeters ( inches ).  
 1. Wire core diameter: 0.80±0.1 ( 0.031±0.004 ) & 1.40±0.1 ( 0.055±0.004 )  
 2. Wire outside diameter: 2.4±0.1 ( 0.094±0.004 ) & 2.7±0.1 ( 0.106±0.004 )  
 3. Wire length = 100 + 10 stripped & tinned = 110±5 ( 4.33±0.197 ) total  
 4. Case Tolerance: ±0.50 ( ±0.02 )

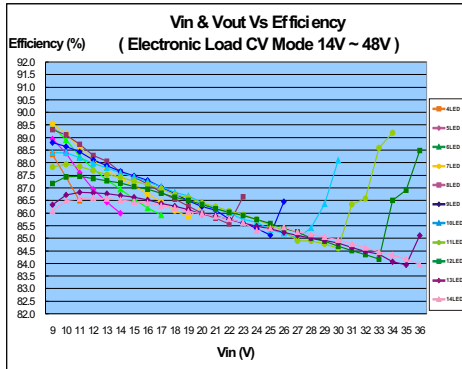
**NOTE**

1. To prevent the burned out of driver, The output voltage must be 5.0Vdc higher than input voltage.
2. DO NOT operate the driver over output power.
3. The Output ripple has been rather low, it's recommended not to increase the additional output capacitor, otherwise there will be time delay while starting up under cool starting.
4. There is protection while output is shorted, after the short occurs, input current will be cut off and recover while short is removed.
5. The reference value of under voltage protection -- 7.6V means under the condition of cool start and full discharge of output, protection starts when input voltage is lower under 7.6V.
6. Please note, PWM dimming means PWM signals is converted into mimic analog voltage by internal circuits and then do the dimming. The advantage of such approach is to reduce the EMI.

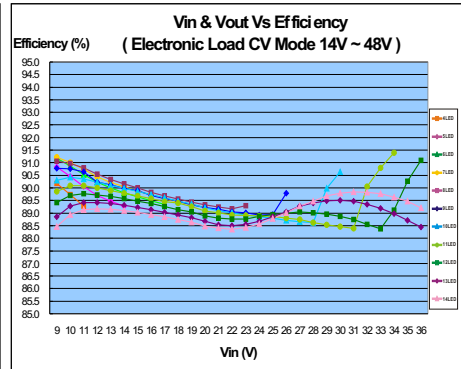
Typical electrical characteristic curves



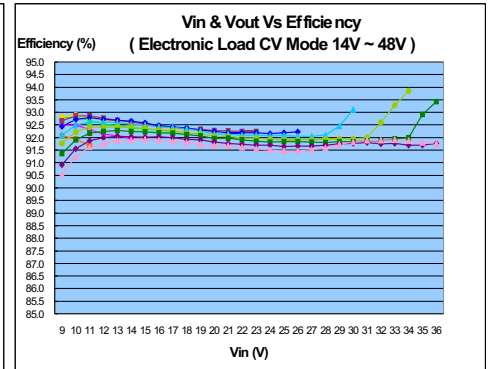
SMULA-0936-100



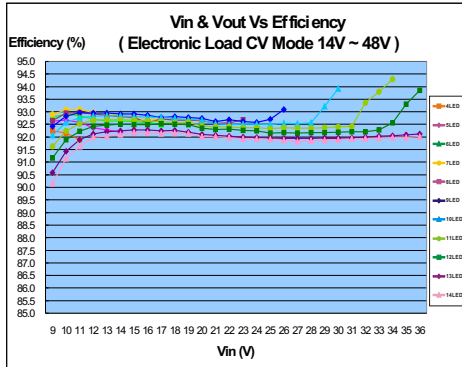
SMULA-0936-150



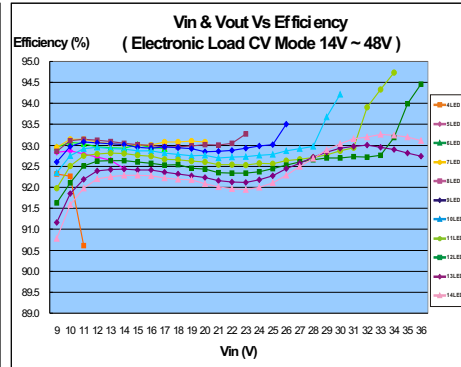
SMULA-0936-250



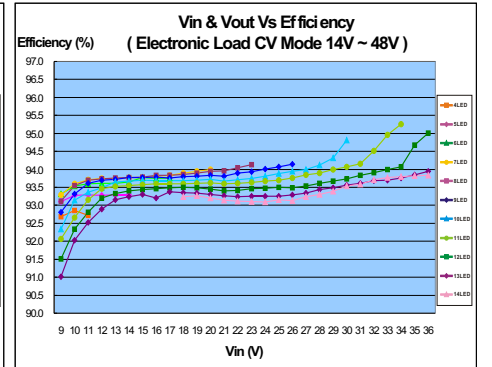
SMULA-0936-300



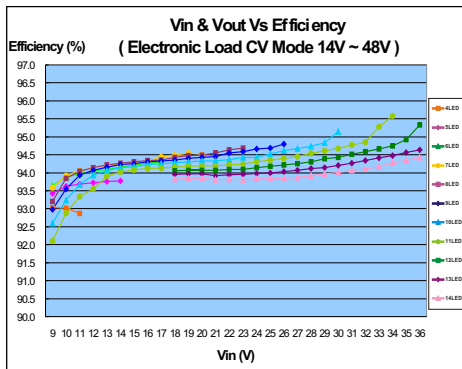
SMULA-0936-350



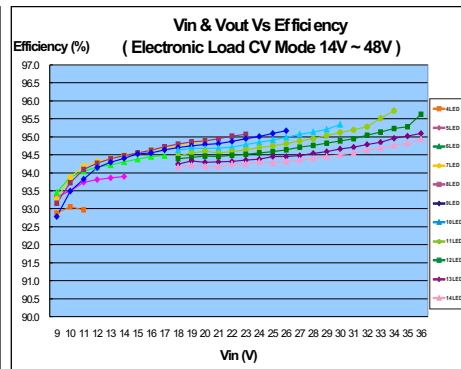
SMULA-0936-500



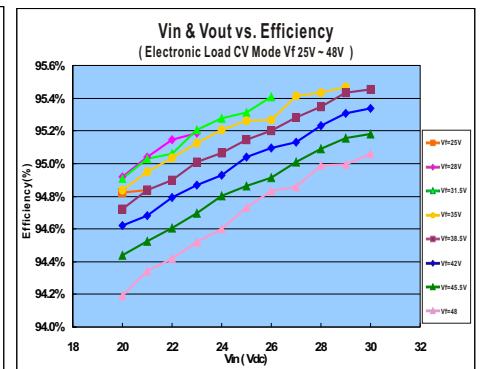
SMULA-0936-600



SMULA-0936-700

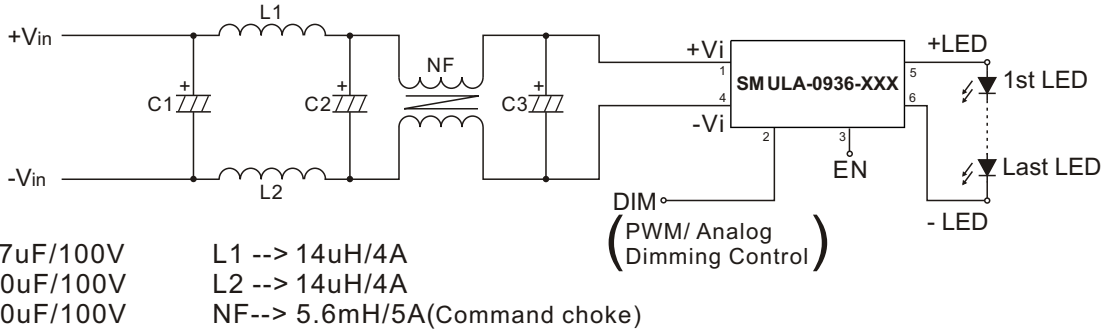


SMULA-2030-900



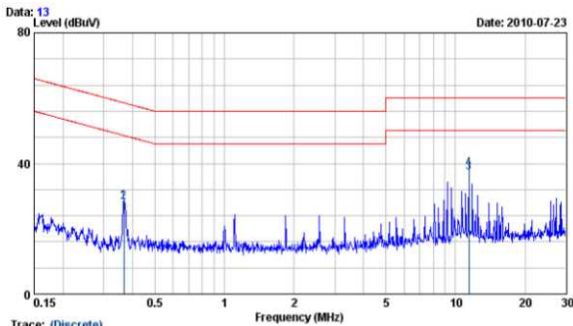
EMC Characteristics

EMC Countermeasures Suggestion



Conducted Emissions Test

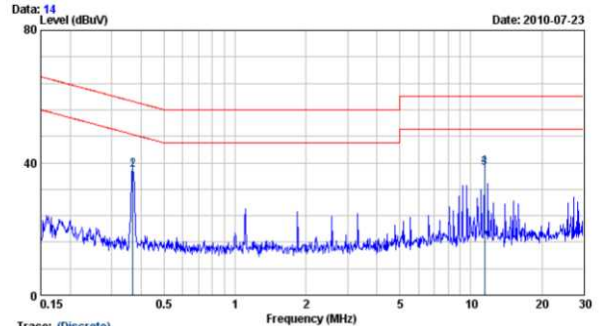
Vin=24V Vout=48V( LED Load Vf=3.5V · 14LED ≐ 48V )  
 POLARITY:NEUTRAL



Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.367	9.81	0.02	18.39	28.22	58.56	1-30.35	QP
0.367	9.81	0.02	18.34	28.17	48.56	1-20.40	AVERAGE
11.405	110.30	0.13	26.73	37.16	50.00	1-12.84	AVERAGE
11.405	110.30	0.13	27.92	38.35	60.00	1-21.65	QP

REMARKS: 1.Level(dBuV)=Read Level(dBuV)+LISN Factor(dB)+Cable loss(dB)  
 2.Over Limit value(dB)=Level(dBuV)-Limit Line(dBuV)

Vin=24V Vout=48V( LED Load Vf=3.5V · 14LED ≐ 48V )  
 POLARITY:LINE

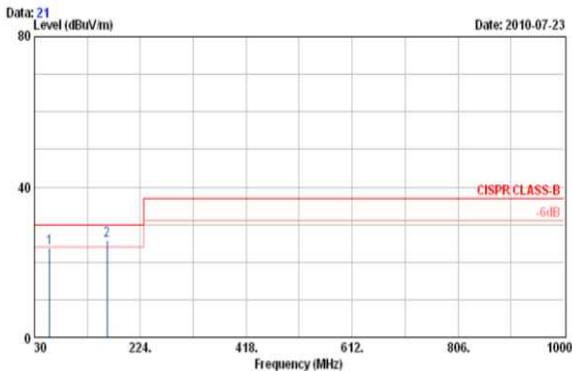


Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.369	9.82	0.02	27.72	37.56	58.52	1-20.96	QP
0.369	9.82	0.02	28.11	37.95	48.52	1-10.57	AVERAGE
11.409	110.35	0.13	27.87	38.35	50.00	1-11.65	AVERAGE
11.409	110.35	0.13	28.32	38.80	60.00	1-21.20	QP

REMARKS: 1.Level(dBuV)=Read Level(dBuV)+LISN Factor(dB)+Cable loss(dB)  
 2.Over Limit value(dB)=Level(dBuV)-Limit Line(dBuV)

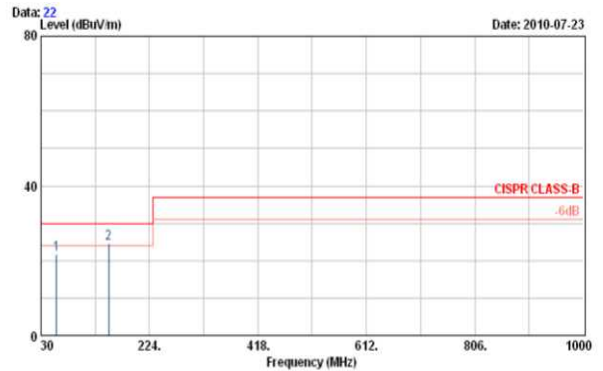
Radiation Emissions Test Result

Vin=12V Vout=32V( LED Load Vf=3.5V · 9LED ≐ 32V )  
 POLARITY:HORIZONTAL



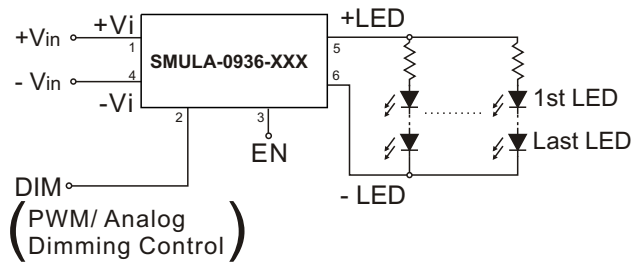
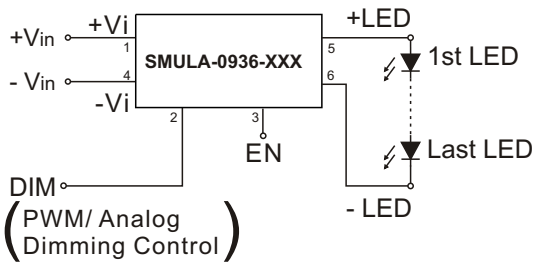
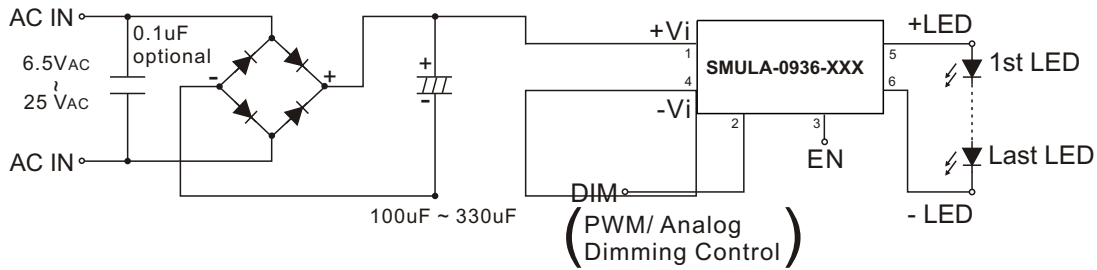
Freq. MHz	Reading dBuV	Antenna Factor dB/m	Cable Loss dB	Measure Level dBuV/m	Limit dBuV/m	Over Limit dBuV/m	Detector
57.50	14.48	7.88	1.41	23.77	30.00	-6.23	QP
162.88	10.46	12.21	3.03	25.70	30.00	-4.30	QP

Vin=24V Vout=48V( LED Load Vf=3.5V · 14LED ≐ 48V )  
 POLARITY:HORIZONTAL

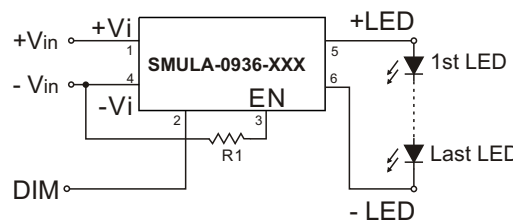
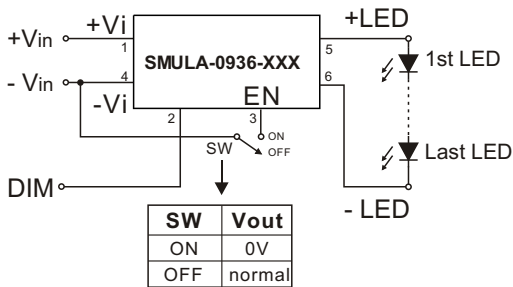


Freq. MHz	Reading dBuV	Antenna Factor dB/m	Cable Loss dB	Measure Level dBuV/m	Limit dBuV/m	Over Limit dBuV/m	Detector
57.83	12.47	7.82	1.44	21.73	30.00	-8.27	QP
158.90	9.12	12.74	2.87	24.73	30.00	-5.27	QP

Typical Application



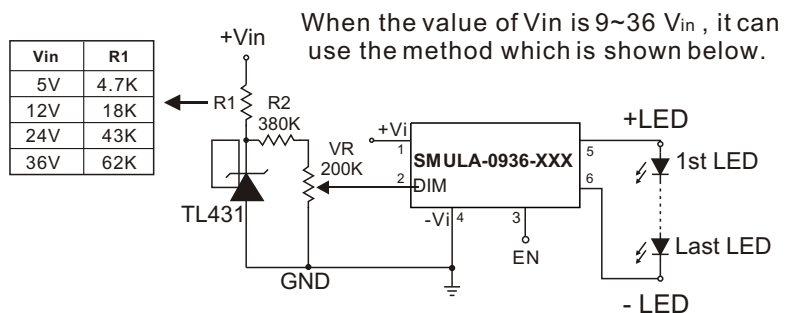
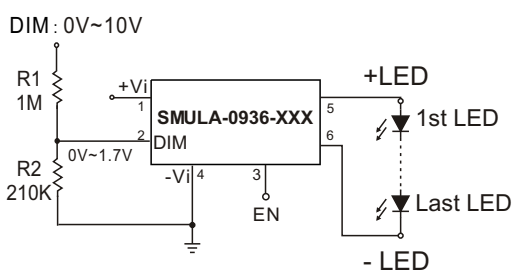
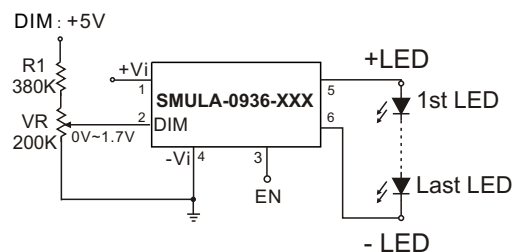
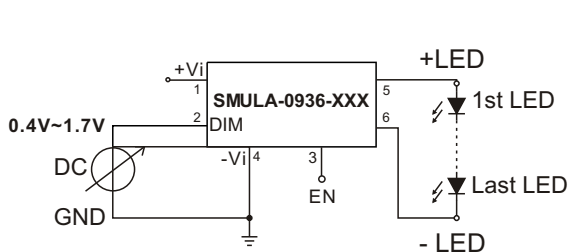
Under Voltage Protection



R1	100mA~700mA		900mA	
	Module ON	Module OFF	Module ON	Module OFF
X	7.6V	6.8V	15.6V	14.6V
12K	11.0V	10.2V	21.5V	19.7V
10K	11.5V	10.7V	22.5V	20.7V
7.5K	13.0V	12.2V	25.0V	22.5V
4.7K	16.2V	15.4V		
3.3K	20.5V	19.7V		
2.7K	23.2V	22.2V		
2.4K	25.0V	24.0V		
2.0K	28.5V	27.5V		
1.8K	30.8V	29.8V		

The R1 Value Only Supplies The Reference

Output Current Adjustment Control By External DC Control Voltage



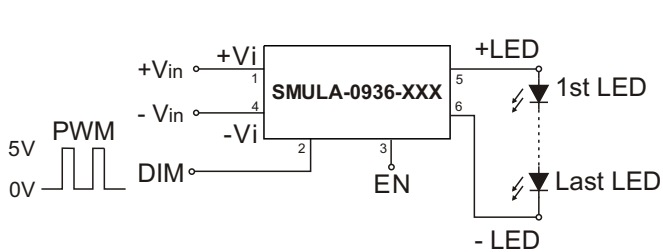
When the value of Vin is 9~36 Vin, it can use the method which is shown below.

Typical Application

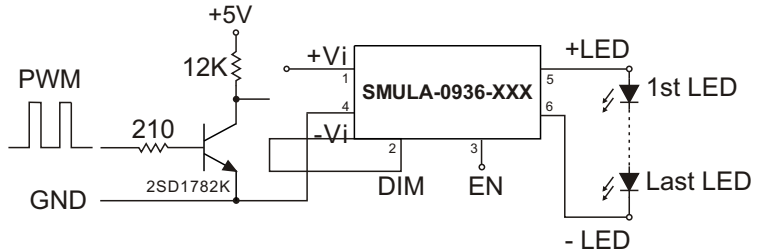
## Output Current Adjustment Control By PWM Control

### Directly driving DIM input

A Pulse Width Modulated (PWM) signal can be applied to the DIM pin, as shown below

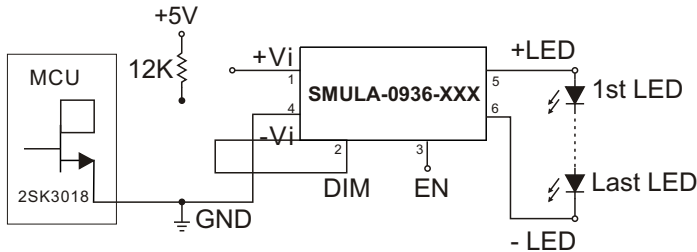


### Driving the DIM input via open collector transistor



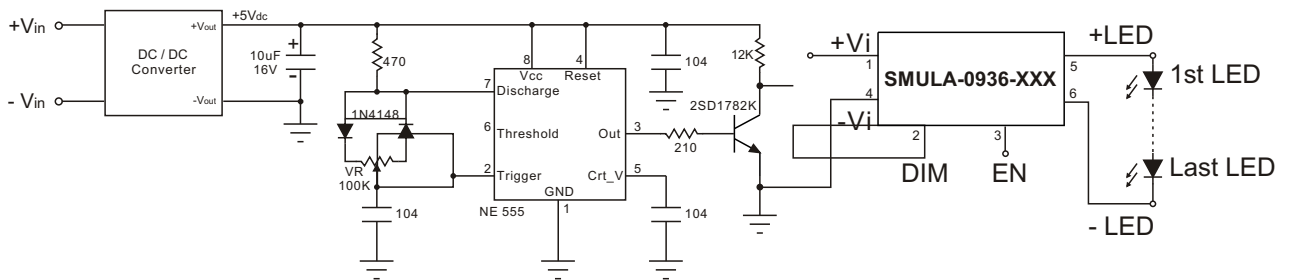
### Driving the DIM input from a microcontroller

Another possibility is to drive the device from the open drain output of a microcontroller. The diagram below shows one method of doing this:



## Output Current Adjustment By PWM Control (Dimming)

To avoid visible flicker the PWM signal must be greater than 100Hz.



## Output Current Adjustment By PWM Control (Flash)

