numen Technology 數能科技股份有限公司

20~65mA Single channel LED Driver

Features

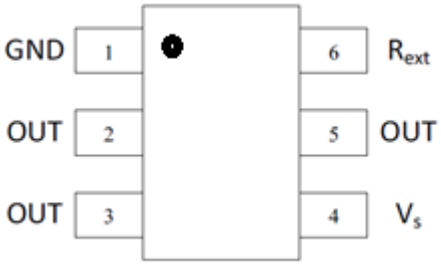
- LED drive current of 20mA
- Output current adjustable up to 65mA with external resistor
- Supply voltage up to 40V
- Easy paralleling of drivers to increase current
- Low voltage overhead of 1.4V
- High current accuracy at supply voltage variation
- High power dissipation of 400mW
- Reduced output current at higher temperatures - Negative thermal coefficient of -0.5% / K

Applications

- General LED lighting
- Decoration lighting for architecture
- RGB lighting
- RGB display / indicator

Package Type

- SOT 23-6
  (Part No.: NU402)



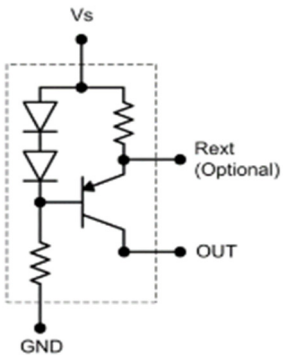
Product Description

NU402 is a small power linear current regulation component that can be easily used in various LED lighting applications. It is equipped the excellent feature of good load/line regulation capability, minimized chip current skew, stable output current in high power or load voltage fluctuating environment that can be used in wide area of LED lighting source to maintain the uniformity of light intensity.

Terminal Description

Pad N	Pin name	Function
1	GND	Power Ground
2,3,5	OUT	Regulated Output Current
4	Vs	Supply Voltage
6	R_{EXT}	External resistor for adjusting Output Current

Block Diagram



Maximum Ratings at T_A = 25°C

Parameters	Symbol	Value	Unit
Max Supply voltage	V_S	42	V
Max Output current	Iout	65	mA
Max Output voltage (at Vs=40V)	Vout	38	V
Reverse voltage between all terminals	V_R	0.5	V
Reverse voltage between all terminals	Ptot	400	mW
Max junction temperature	Tj	150	*V*
Thermal resistance (Junction-soldering point)	RthJS	50	K/W
Operating Temperature, Ts	Top	-40~+125	V
Operating Supply voltage rang (at Iout>18mA, Vs-Vout =1.4V)	V_S	5~40	V

Electrical Characteristics at T_A = 2 5°C, Rext = Open

Parameters	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
Collector-emitter breakdown voltage	Ic=1mA, Ib=0	$V_{BR(CEO)}$	40			V
Supply Current	Vs=10V	Is	340	440	540	uA
DC current gain	Ic=50mA, Vce=1V, Rext=0 Ohm	hFE	100	140	470	-
Internal Resistor	IRint =20mA	Rint	37	44	53	Ohm
Output Current	Vs=10V, Vout=8.6V	Iout1	18	20	22	mA
Voltage drop (V_S- V_E)	Iout=Iout1	Vdrop	0.83	0.88	0.93	V
Output current change versus T_A	Vs=10V, (Vs-Vout) =1.4V	AIout/Iout1		-0.5		%/K
Output current change versus V_S	Vs= 10V…40 V, (Vs-Vout)=1.4V	AIout/Iout1		1		%/V

Output Current Setting

The output current of NU402 is set by an external resistor (R_{EXT}). The output current can be figured out by following equation.

Iout (A)=0.9V/Rext +(Ω)+20mA

Example: I_{OUT} = 60mA

Rext=0.90.06-0.02(A)=22.5 (Ω)

Typical Characteristics

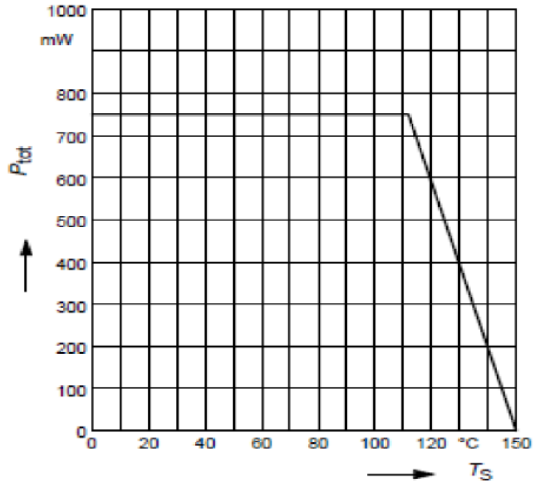


Fig.1 Permissible total power dissipation Ptot = f(Ts)

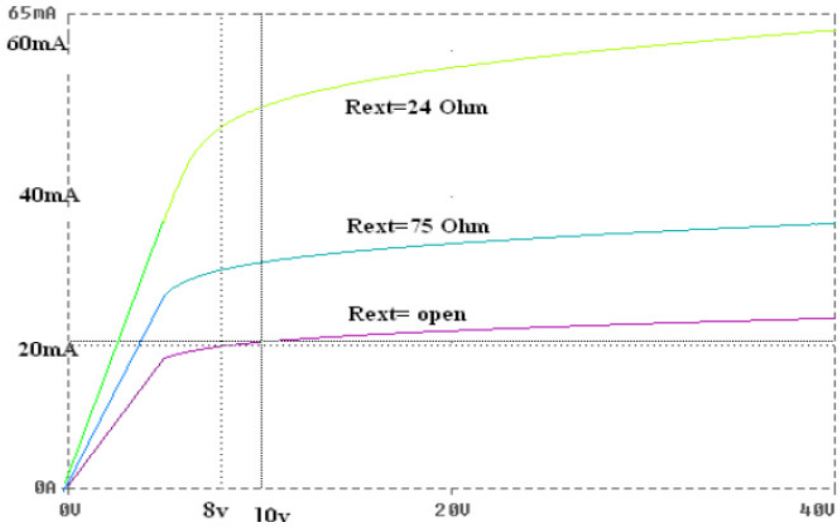


Fig. 2 Output current vs Supply voltage Vs-Vout=1.4V

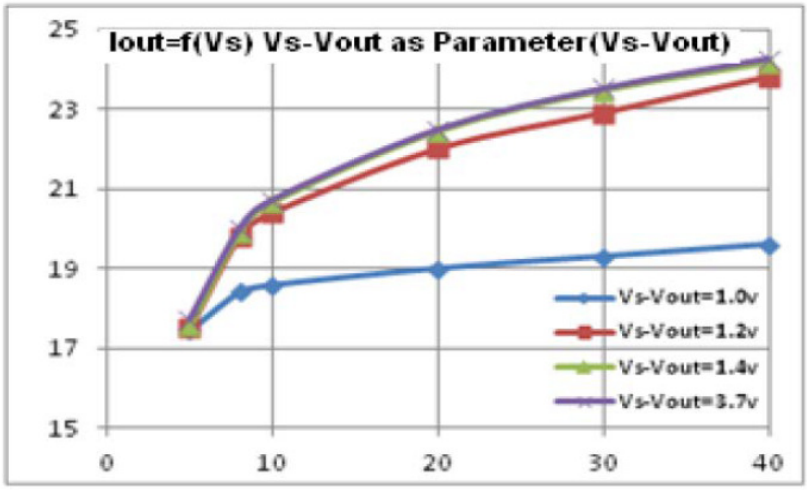


Fig. 3 Output Current(mA) vs Supply Voltage (V_S-V_{OUT}) as Parameter, Ta = 25°C

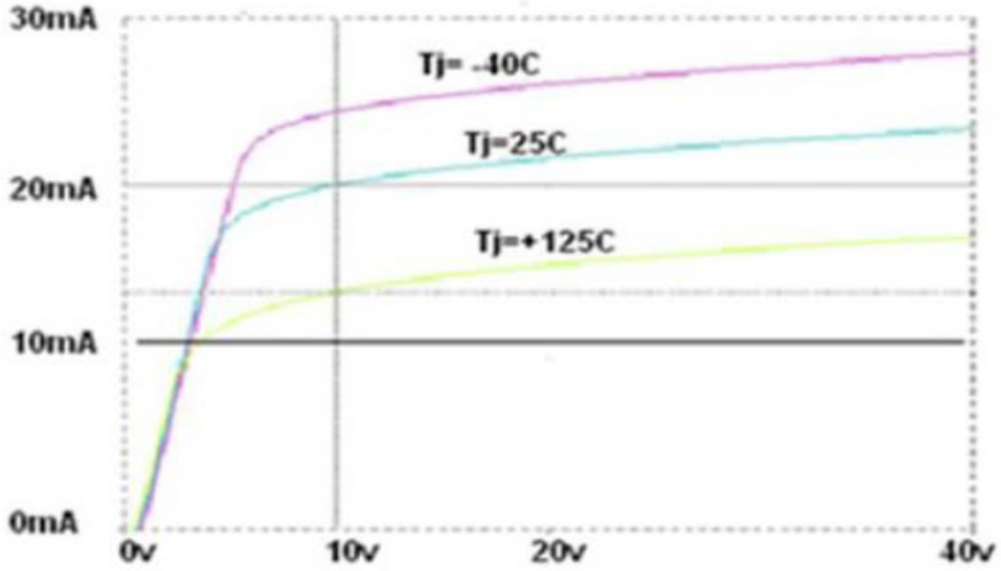


Fig. 4 Output Current vs Supply Voltage T_J as Parameter, (V_S-V_{OUT})=1.4V

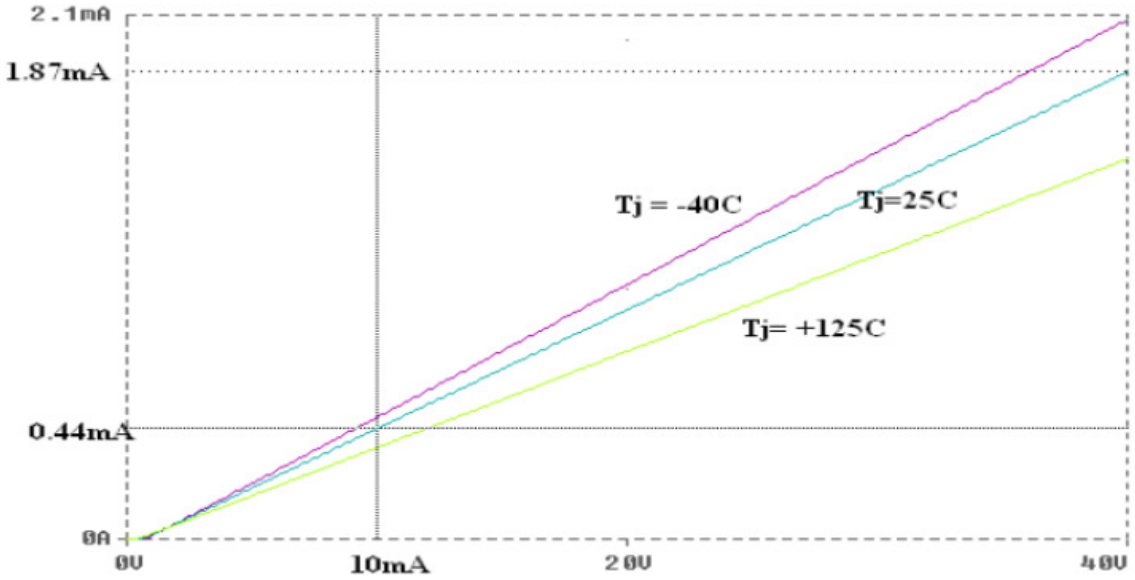
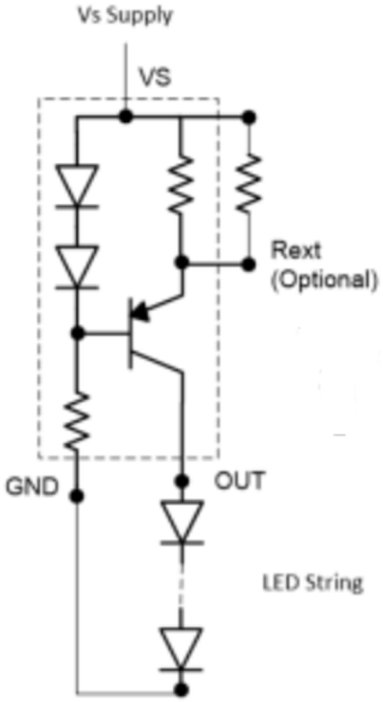


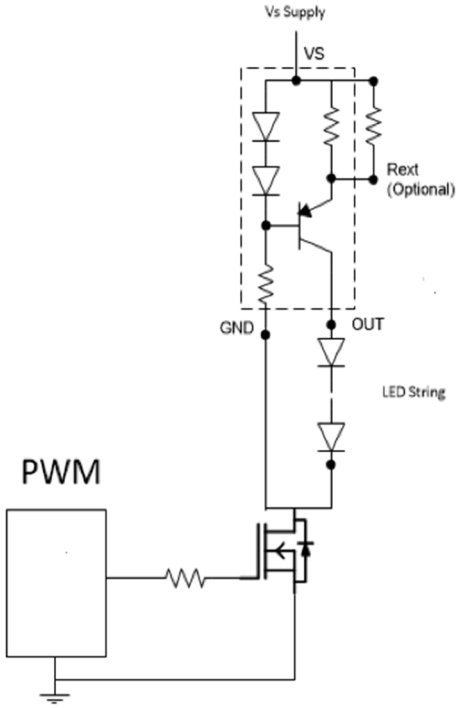
Fig. 5 Supply Current vs Supply Voltage

Typical Application Circuit

- DC power general lighting 1

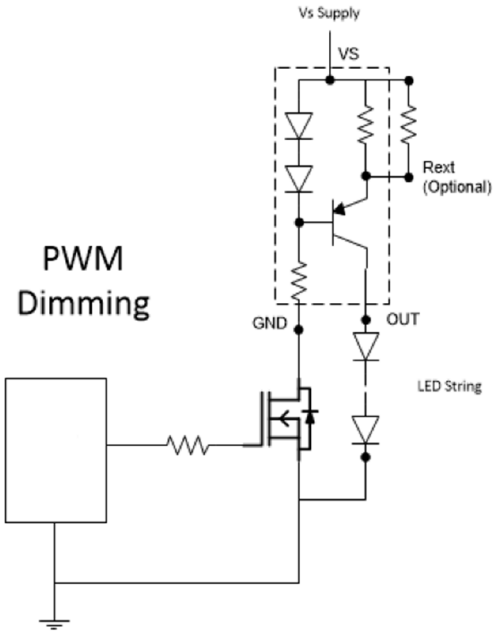


- DC power dimming application

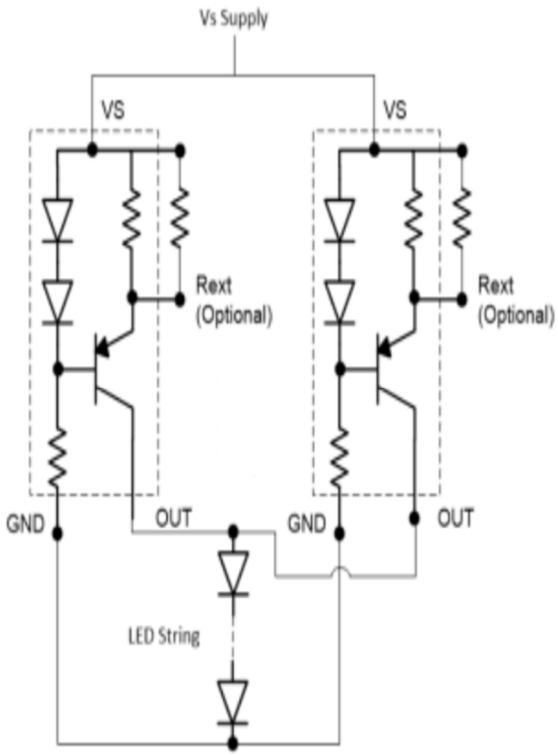


R_G: power supply transition slow down resistor

- DC PWM dimming application

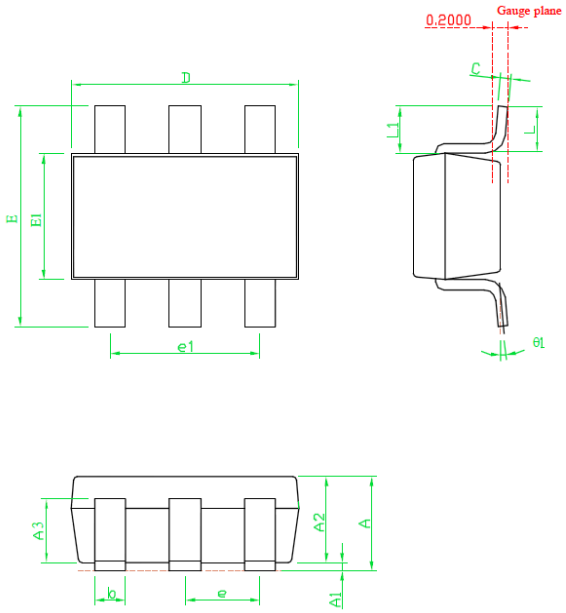


- DC power general lighting 2



Package Dimensions

- SOT 23-6



SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	1.00	1.10	1.40
A1	0.00	---	0.10
A2	1.00	1.10	1.30
A3	0.70	0.80	0.90
b	0.35	0.40	0.50
C	0.10	0.15	0.25
D	2.70	2.90	3.10
E1	1.40	1.60	1.80
e1	---	1.90(TYP)	---
E	2.60	2.80	3.00
L	0.37	---	---
θ1	1°	5°	9°
e	---	0.95(TYP)	---
L1	0.5	0.6	0.7

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