

20~65mA Single channel LED Driver

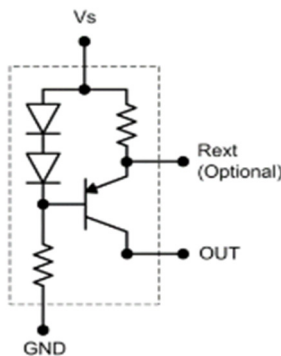
Features

- 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

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.

Block Diagram

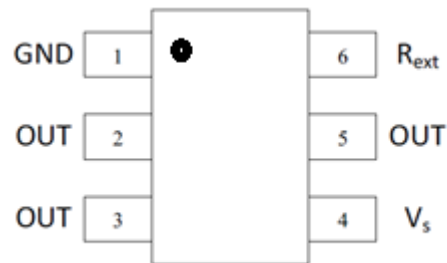


Applications

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

Package Type

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



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

Maximum Ratings at T_A = 25°C

Parameters	Symbol	Value	Unit
Max Supply voltage	V _s	42	V
Max Output current	I _{out}	65	mA
Max Output voltage (at V _s =40V)	V _{out}	38	V
Reverse voltage between all terminals	V _R	0.5	V
Reverse voltage between all terminals	P _{tot}	400	mW
Max junction temperature	T _j	150	°C
Thermal resistance (Junction-soldering point)	R _{thJS}	50	K/W
Operating Temperature, T _s	T _{op}	-40~+125	°C
Operating Supply voltage rang (at I _{out} >18mA, V _s -V _{out} =1.4V)	V _s	5~40	V

Electrical Characteristics at T_A = 25°C, R_{ext} = Open

Parameters	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
Collector-emitter breakdown voltage	I _c =1mA, I _b =0	V _{BR(CEO)}	40			V
Supply Current	V _s =10V	I _s	340	440	540	uA
DC current gain	I _c =50mA, V _{ce} =1V, R _{ext} =0 Ohm	hFE	100	140	470	-
Internal Resistor	I _{Rint} =20mA	R _{int}	37	44	53	Ohm
Output Current	V _s =10V, V _{out} =8.6V	I _{out1}	18	20	22	mA
Voltage drop (V _s - V _E)	I _{out} =I _{out1}	V _{drop}	0.83	0.88	0.93	V
Output current change versus T _A	V _s =10V, (V _s -V _{out}) =1.4V	ΔI _{out} /I _{out1}		-0.5		%/K
Output current change versus V _s	V _s = 10V...40 V, (V _s - V _{out})=1.4V	ΔI _{out} /I _{out1}		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.

$$I_{out} (A) = 0.9V / R_{ext} + (0.02) + 20mA$$

Example: I_{OUT} = 60mA

$$R_{ext} = 0.90 / (0.06 - 0.02) = 22.5 (\Omega)$$

Typical Characteristics

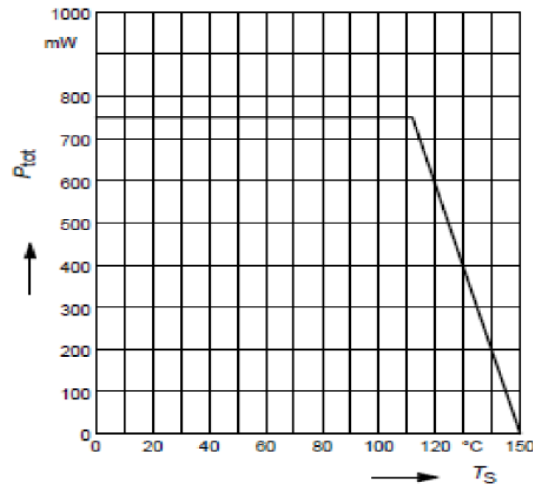


Fig.1 Permissible total power dissipation $P_{tot} = f(T_s)$

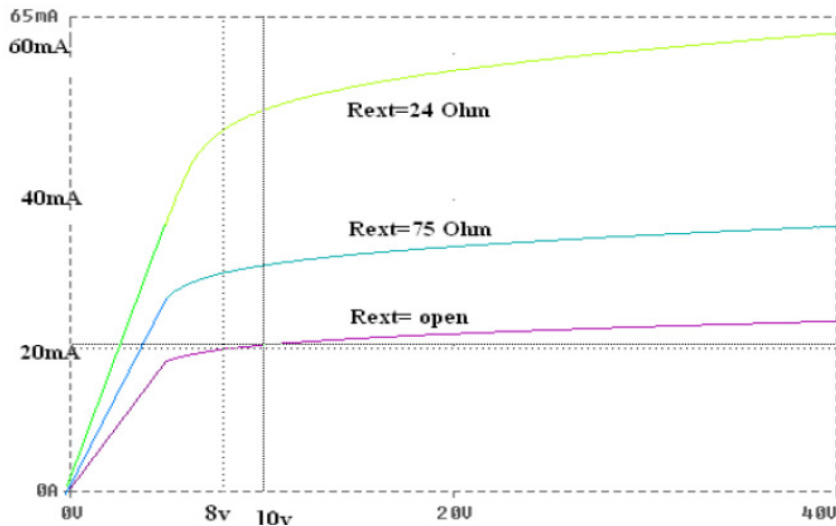


Fig. 2 Output current vs Supply voltage $V_s - V_{out} = 1.4V$

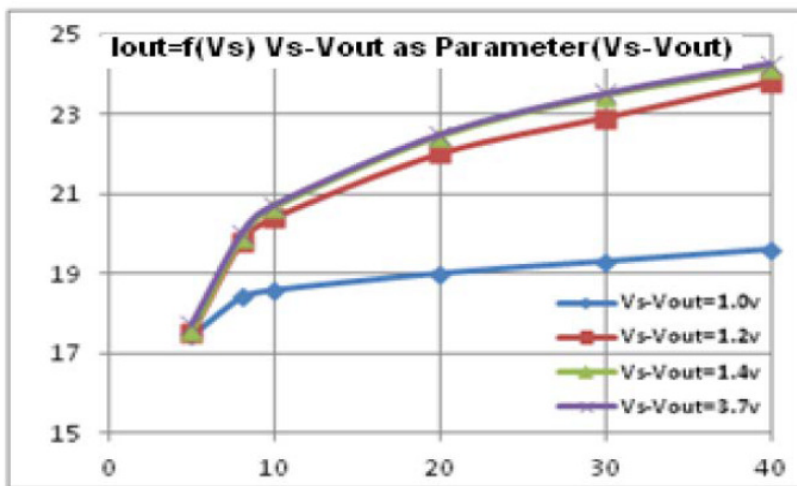


Fig. 3 Output Current (mA) vs Supply Voltage ($V_s - V_{out}$) as Parameter, $T_a = 25^\circ C$

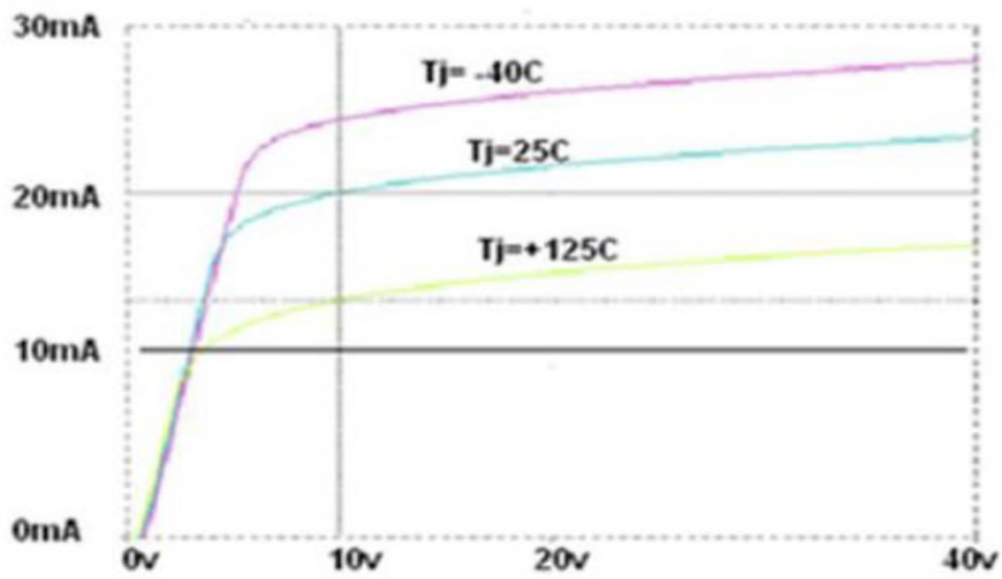


Fig. 4 Output Current vs Supply Voltage T_j as Parameter, (V_S-V_{OUT})=1.4V

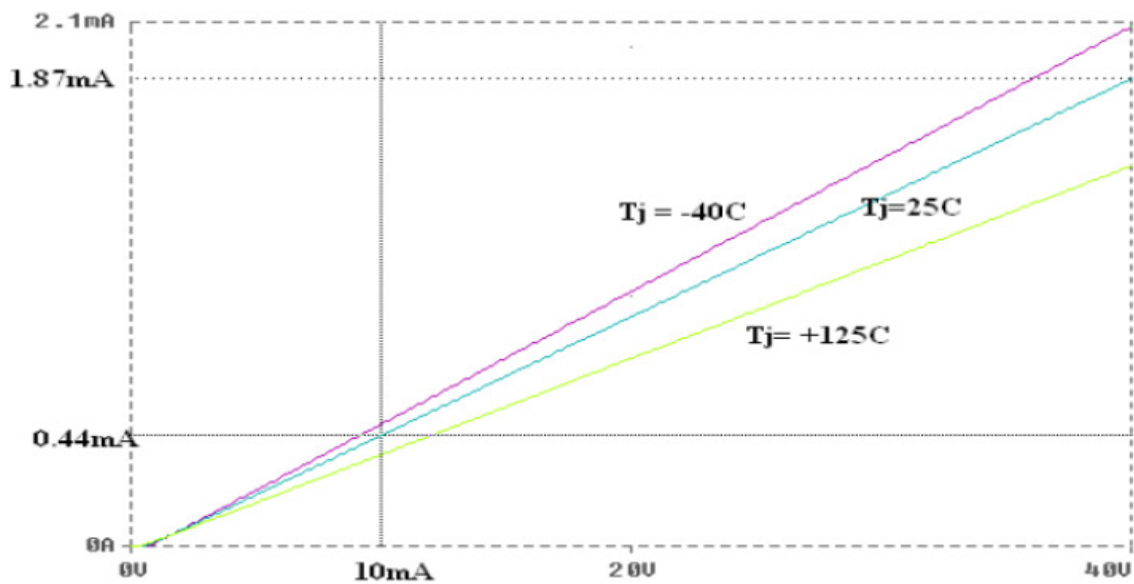
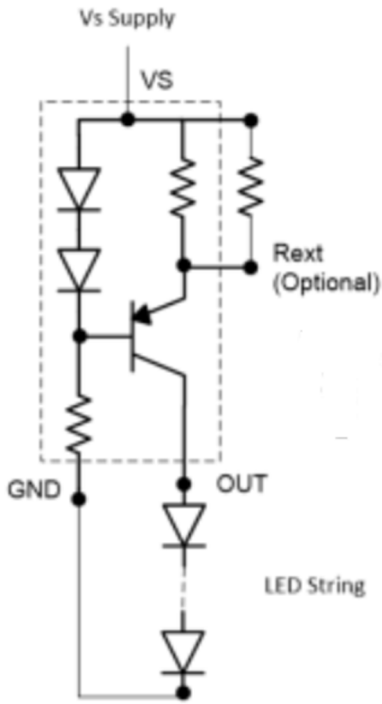


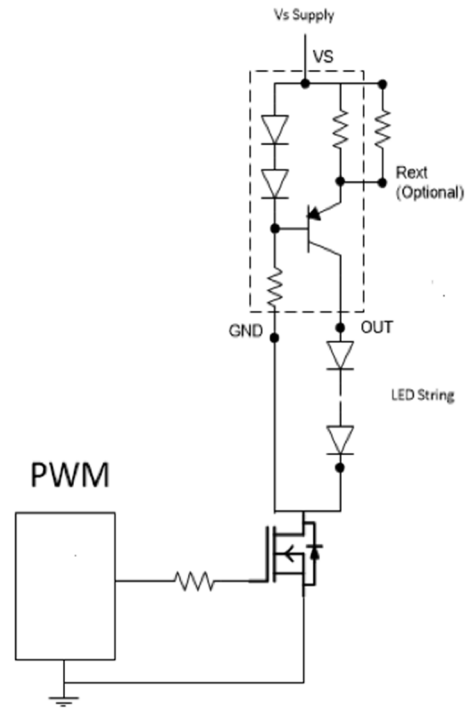
Fig. 5 Supply Current vs Supply Voltage

Typical Application Circuit

- DC power general lighting 1

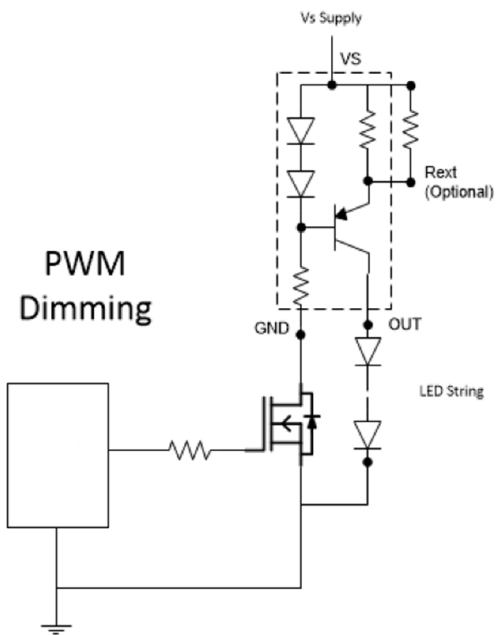


- DC power dimming application

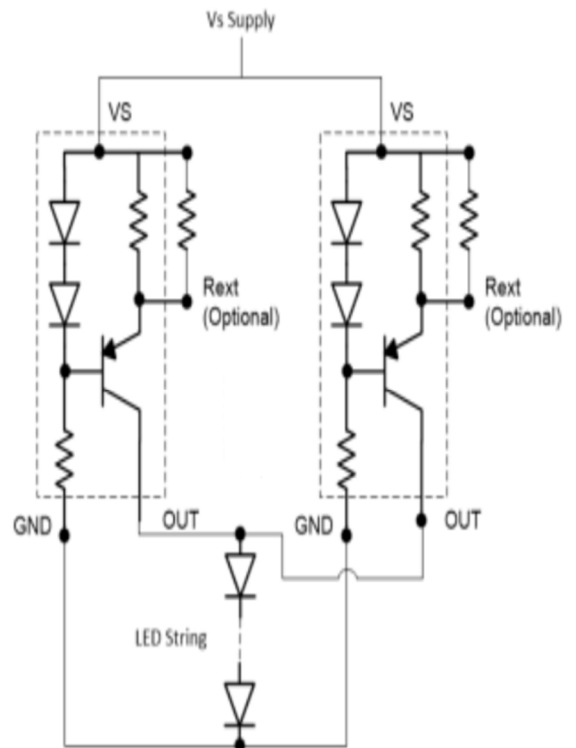


R_G: power supply transition slow down resistor

- DC PWM dimming application

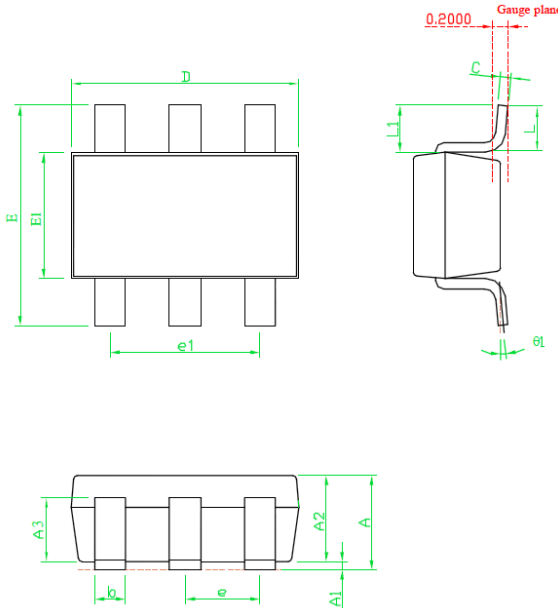


- DC power general lighting 2



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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