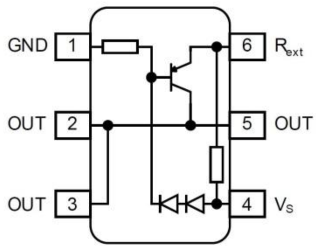
HM402U
LED Driver

GENERAL DESCRIPTION

The HM402U is a cost efficient LED driver to drive low power LEDs. The advantages towards resistor biasing are: light output despite varying forward voltages in different LED strings, despite voltage drop across long supply lines, light output independent from supply voltage variations and longer lifetime of the LEDs due to reduced output current at higher temperatures (negative thermal coefficient). The advantages towards discrete solutions are: lower assembly cost, smaller form factor, higher reliability due to less soldering joints, high output current accuracy. Dimming is possible by using an external digital transistor.

The HM402U can be operated at higher supply voltages by putting LEDs between the supply voltage V_S and the power supply pin of the LED driver. The HM402U is a perfect fit for numerous low power LED applications to combining small form factor with low cost. These LED drivers offer several advantages to resistors like significally higher current control at very low voltage drop ensuring high lifetime of LEDs.

PIN CONFIGURATION



Package: SC74
Pin Assignment:
1=Gnd
2, 3, 5=Out
4=Vs
6=Rext

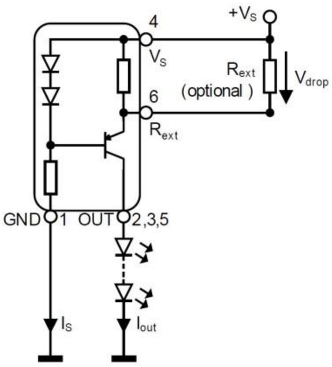
FEATURES

- 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
- No EMI
- High power dissipation of 750mW
- Reduced output current at higher temperatures - Negative thermal coefficient of -0.5% / K

APPLICATIONS

- LED strips for decorative lighting
- Aircraft, train, ship illumination
- Retrofits for general lighting, white goods like refrigerator lighting
- Medical lighting
- Automotive applications like CHMSL and rear combination lights

TYPICAL APPLICATION



ABSOLUTE MAXIMUM RATINGS

Parameters	Symbol	Ratings	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
Total Power Dissipation, T_S = 125°C	P_{tot}	750	mW
Max. Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	-65 to +150	°C
Thermal Resistance (Junction-soldering point)	Rth_{JS}	50	K/W
Operating Temperature, T_S	T_S	-40 to +125	°C

T_S = temperature of soldering point.

RECOMMENDED OPERATING CONDITIONS

Parameters	Symbol	Ratings	Unit
Operating Ambient Temperature Range	T_{OPR}	-40 to +85	°C
Operating Supply Voltage Range (at I_{OUT}≥18mA, V_S-V_{OUT} =1.4V)	V_S	5 to 40	V

ELECTRICAL CHARACTERISTICS

At T_A=25°C, Rext=Open, unless otherwise specified.

Parameters	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
Collector-emitter Breakdown Voltage	$V_{BR(CEO)}$	I_C=1mA, I_B=0	40			V
Supply Current	I_S	V_S=10V	340	440	540	µA
DC Current Gain	h_{FE}	I_C =50mA, V_{CE}=1V, Rext=0 Ohm	100	140	470	-
Internal Resistor	R_{int}	I_{Rint} =10mA	37	44	53	Ohm
Output Current	I_{OUT1}	V_S =10V, V_{OUT}=8.6V	18	20	22	mA
Voltage Drop (V_S - V_E)	V_{drop}	I_{OUT}=I_{OUT1}	0.83	0.88	0.93	V
Output Current Change versus T_A	$\Delta I_{OUT}/I_{OUT1}$	V_S=10V, (V_S-V_{OUT}) =1.4V		-0.5		%/K
Output Current Change versus V_S	$\Delta I_{OUT}/I_{OUT1}$	V_S= 10V to 40V, (V_S-V_{OUT})=1.4V		1		%/V

TYPICAL PERFORMANCE CHARACTERISTICS

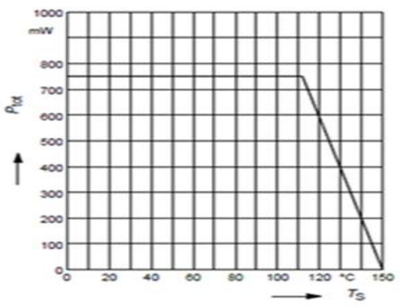


Fig. 1 Permissible Total Power Dissipation
P_{tot} vs T_S

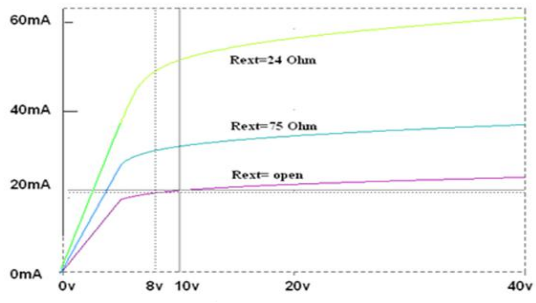


Fig. 2 Output Current vs Supply Voltage,
(V_S-V_{OUT}) =1.4V

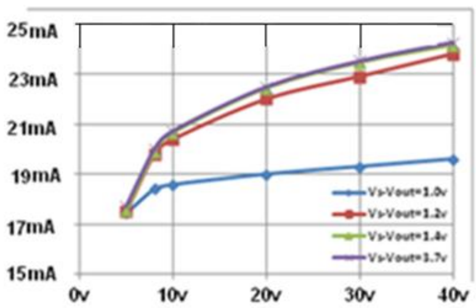


Fig. 3 Output Current vs Supply Voltage
(V_S-V_{OUT}) as Parameter, Ta = 25°C

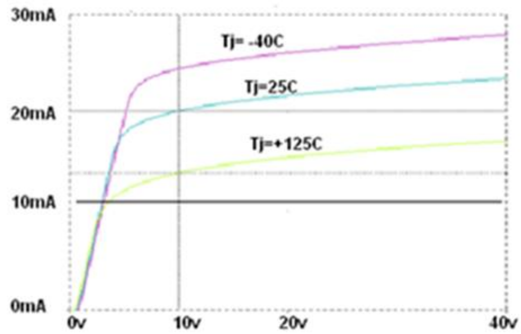


Fig. 4 Output Current vs Supply Voltage
T_J as Parameter, (V_S-V_{OUT})=1.4V

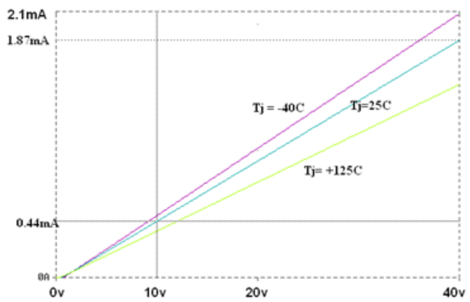


Fig. 5 Supply Current vs Supply Voltage