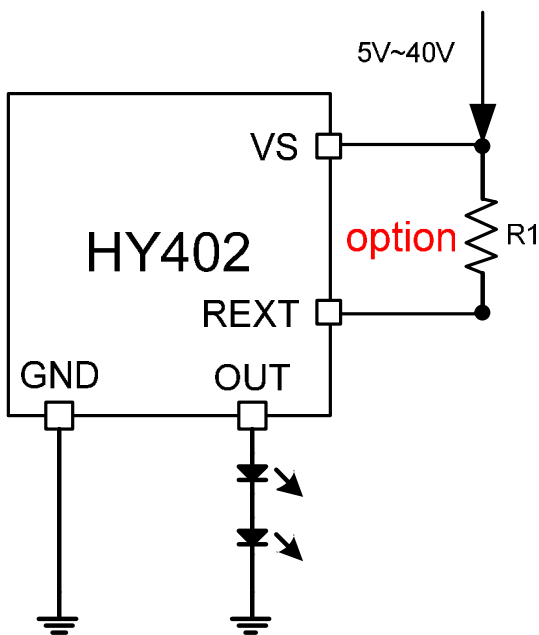




Description

The HY402 is trimmed to provide a constant current of $20\text{mA} \pm 10\%$ and up to 65 mA with external resistor at an input voltage of 5.0-40V. The device can be used as a two terminal constant current source or constant current sink. A typical application for the HY402 is to drive LEDs with a constant current of 20mA. Multiple HY402 can also be used in parallel to provide higher currents such as 40mA, 60mA or 80mA. The device is available in SOT (SOT-23) packages.

Typical Applications Circuit



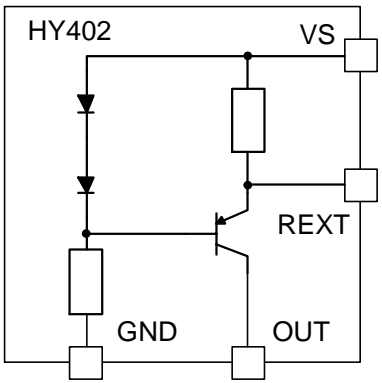
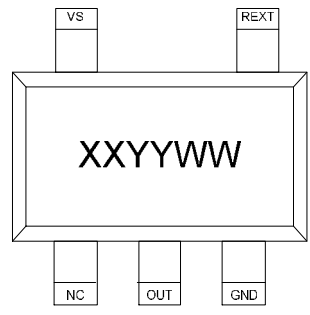
Features

- n LED drive current of 20mA
- n Output current adjustable up to 65mA with external resistor
- n Supply voltage up to 40V
- n Easy paralleling of drivers to increase current
- n Low voltage overhead of 1.4V
- n High current accuracy at supply voltage variation
- n No EMI
- n High power dissipation of 750mW
- n Reduced output current at higher temperatures - Negative thermal coefficient of $-0.5\% / \text{K}$

Applications

- n LED driver
- n Industrial lamp indicators
- n Signage
- n Accent lighting
- n Automotive
- n Constant current source
- n Constant current sink

SCHEMATIC DIAGRAM AND PIN DESCRIPTION

	1	NC	No Connect	 <p style="text-align: center; margin-top: 10px;">SOT23-5L XX = Device Code (402=HY402) YY=Year WW=Weekly</p>
	2	OUT	Output Pin	
	3	GND	Ground	
	4	REXT	External resistor to adjust output current	
	5	VS	Power supply	

ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	VALUE	UNIT
VS	Supply Voltage	42	V
I _{OUT}	Output Current	65	mA
V _{OUT}	Max Output Voltage	38	V
V _R	Reverse Voltage between all terminals	0.5	V
T _S	Operation Temperature	-40 to 125	°C
T _J	Max Junction Temperature	150	°C
P _D	Power Dissipation	750	mW
ESD	ESD Rating *	4	KV

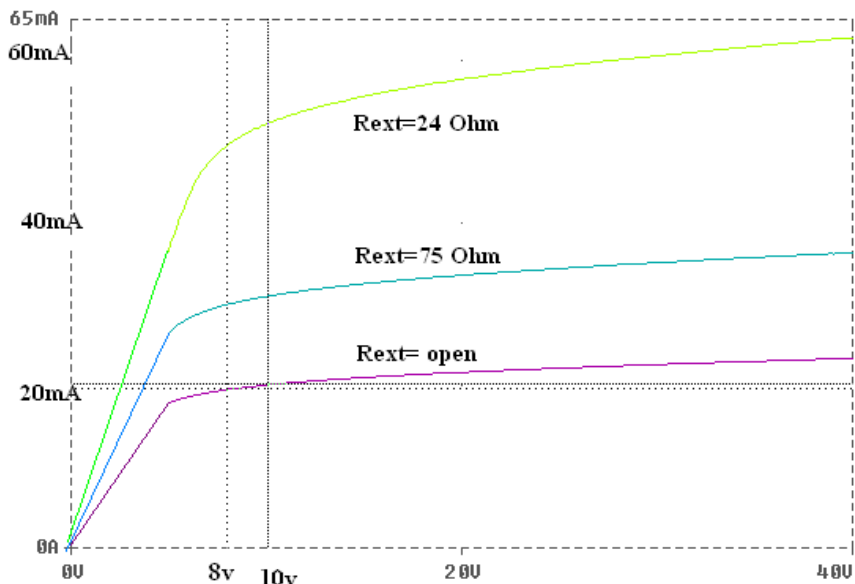
*Reference JEDEC JS-001-2010 for IO V.S. VS



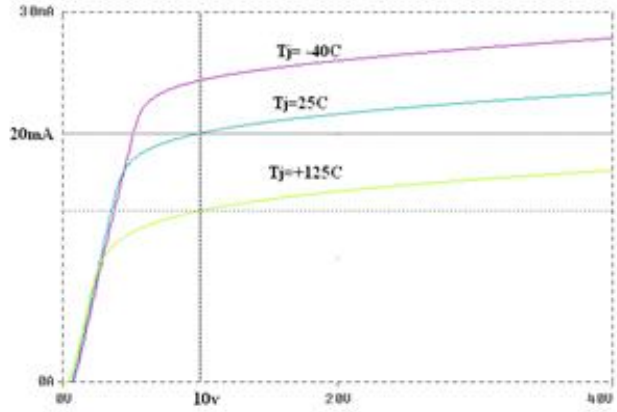
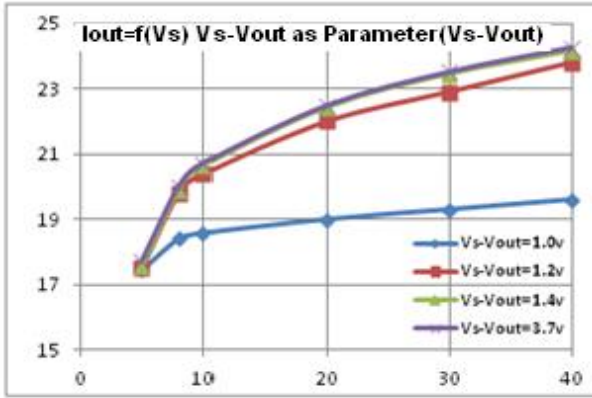
ELECTRICAL CHARACTERISTICS

(REXT = Open, TA = 25°C, UNLESS OTHERWISE SPECIFIED)

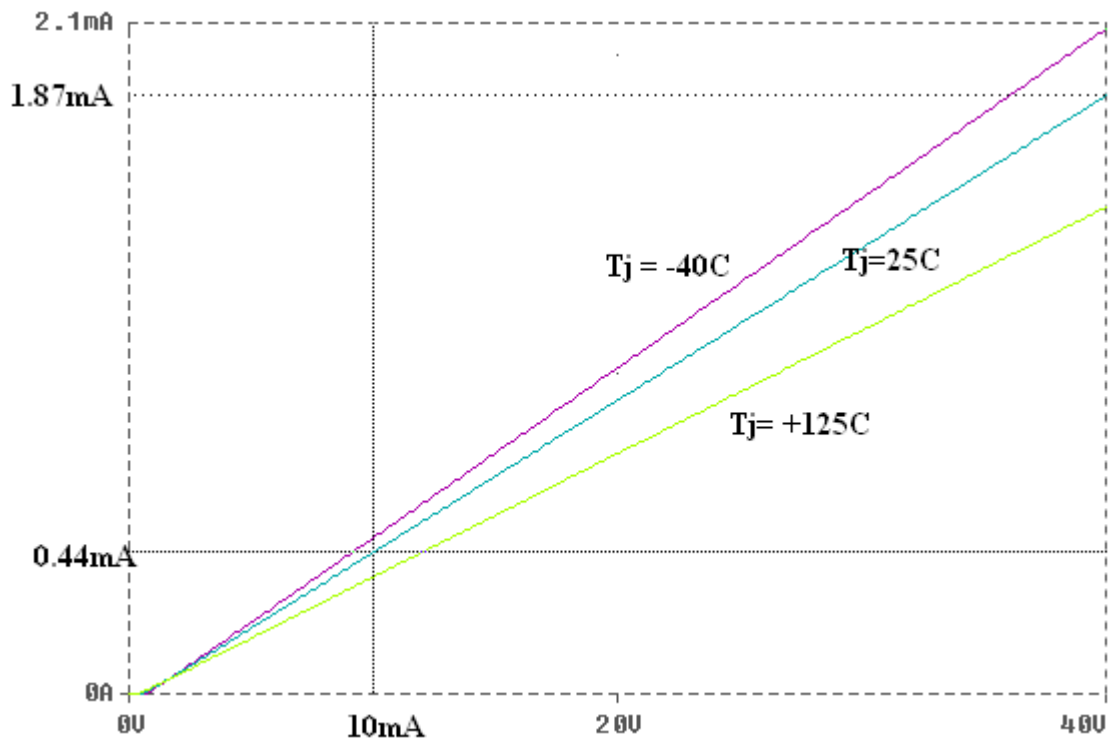
PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Supply Current	I _s	VS=10V		440	520	uA
Breakdown Voltage	VCE	IC=1mA, IB=0	40			V
Internal Resistor	IR	IS=20mA	37	44	53	Ω
DC Current Gain	hFE	Ic=50mA, Vce=1V, Rext=0 Ohm	100	140	470	
Output Current	I _{OUT}	VS=10V, OUT=8.6V	18	20	22	mA
Dropout Voltage	Vdrop	I _{OUT} =20mA	0.83	0.88	0.93	V
Line Regulation	ILR	VS=5V to 40V, OUT = VS-1.4V		1		%/V



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

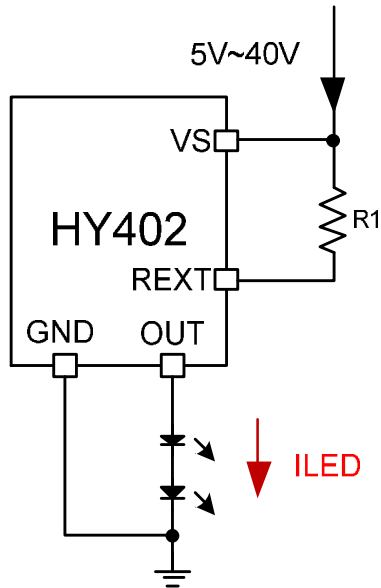


Output current vs Supply voltage



Supply current vs Supply voltage

APPLICATION INFORMATION

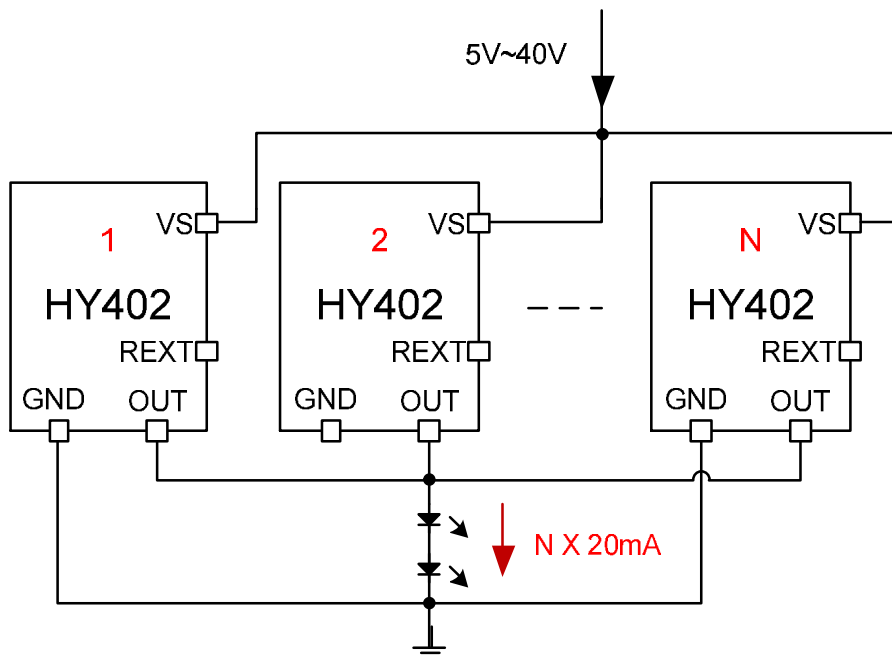


$$I_{LED} = \frac{\text{Drop Voltage}}{\text{Resistor}}$$

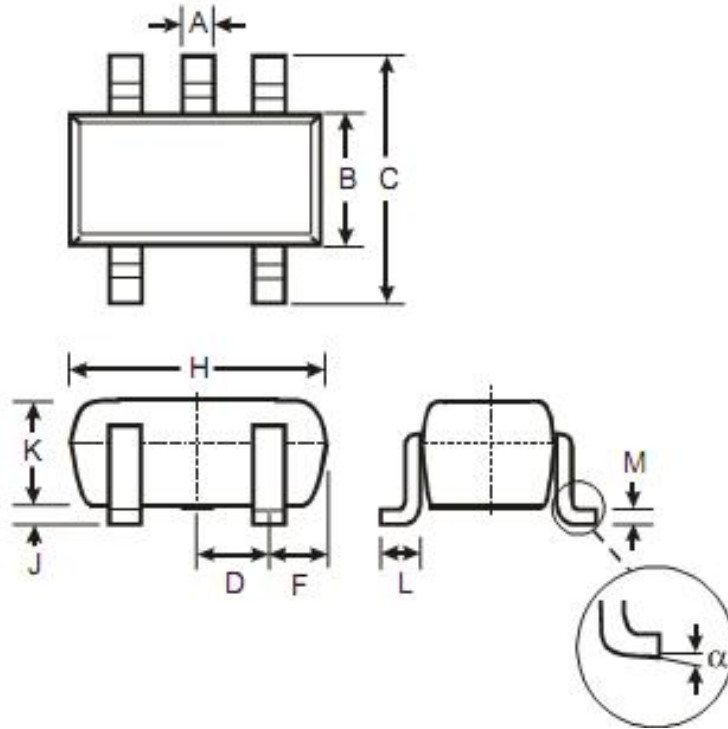
$$I_{LED} = \frac{0.88}{44 \parallel R1} = \frac{0.88 \times (44 + R1)}{44 \times R1}$$

(R1 > 20Ω)

External Resistor



Parallel Operation

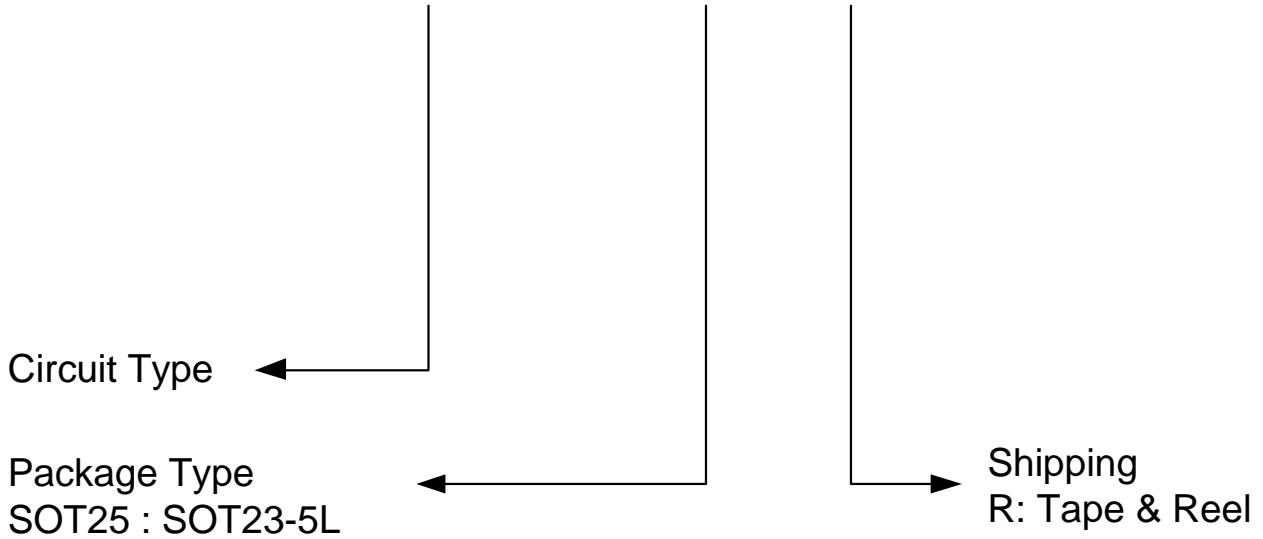
Package Outline Dimensions


SOT-25			
Dim	Min	Max	Typ
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	—	—	0.95
F	—	—	—
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
α	0°	8°	—
All Dimensions in mm			



ORDERING INFORMATION

HY402 ST25 R



ORDER NUMBER	PACKAGE	SHIPPING
HY402ST25R	SOT23-5L	3,000 UNITS/ TAPE & REEL