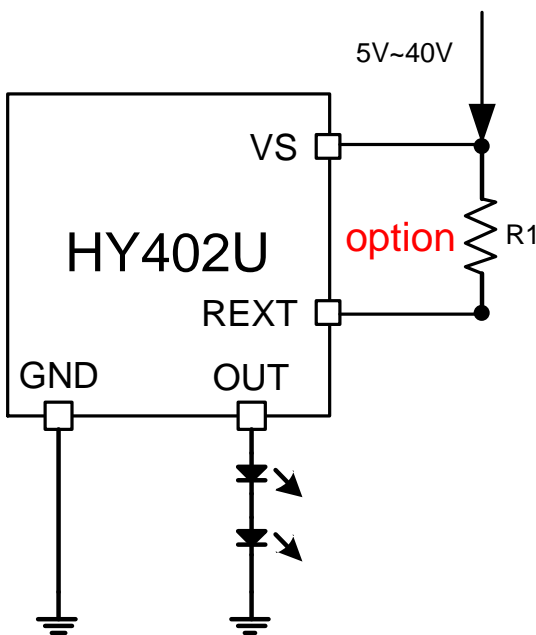




### Description

The HY402U 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 HY402U 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



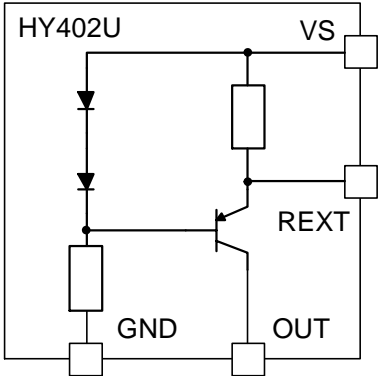
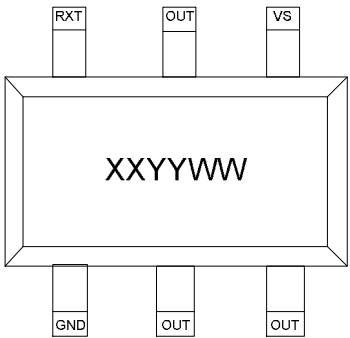
### Features

- 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  $-0.5\% / \text{K}$
- n Automotive qualified according AEC-Q100

### 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

	<b>1</b>	<b>GND</b>	Ground	 <p style="text-align: center;"><b>SOT23-6L</b></p> <p>XX = Device Code (2U=HY402U) YY=Year WW=Weekly</p>
	<b>2</b>	<b>OUT</b>	Output Pin	
	<b>3</b>	<b>OUT</b>	Output Pin	
	<b>4</b>	<b>VS</b>	Power supply	
	<b>5</b>	<b>OUT</b>	Output Pin	
	<b>6</b>	<b>REXT</b>	External resistor to adjust output current	

### ABSOLUTE MAXIMUM RATINGS

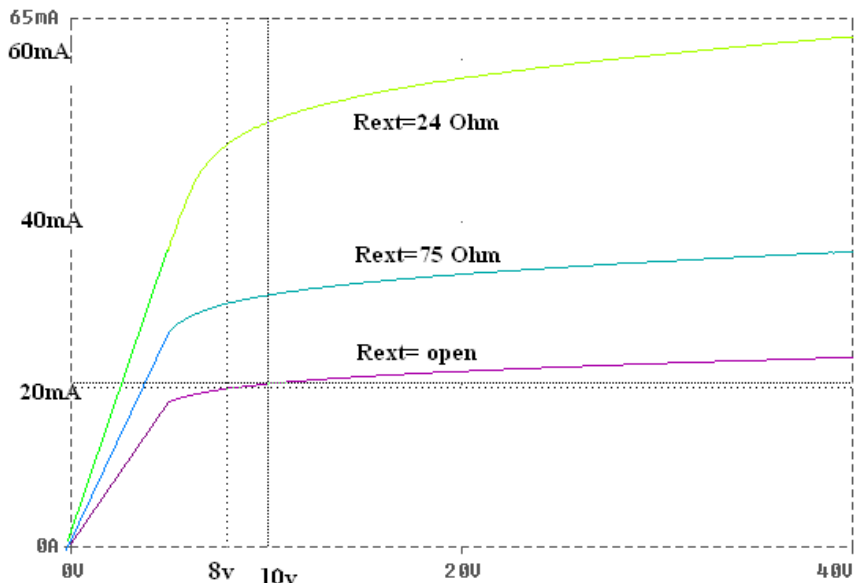
SYMBOL	PARAMETER	VALUE	UNIT
VS	Supply Voltage	42	<b>V</b>
$I_{OUT}$	Output Current	65	<b>mA</b>
VOUT	Max Output Voltage	38	<b>V</b>
VR	Reverse Voltage between all terminals	0.5	<b>V</b>
$T_s$	Operation Temperature	-40 to 125	<b>°C</b>
$T_J$	Max Junction Temperature	150	<b>°C</b>
$P_D$	Power Dissipation	750	<b>mW</b>



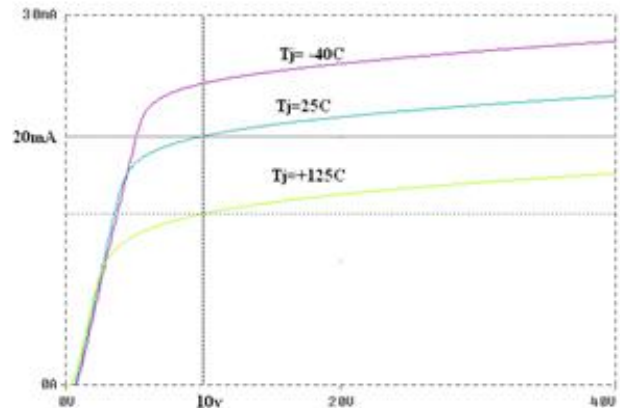
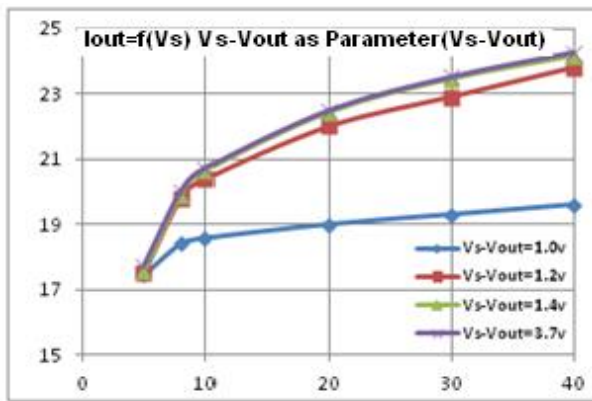
### ELECTRICAL CHARACTERISTICS

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

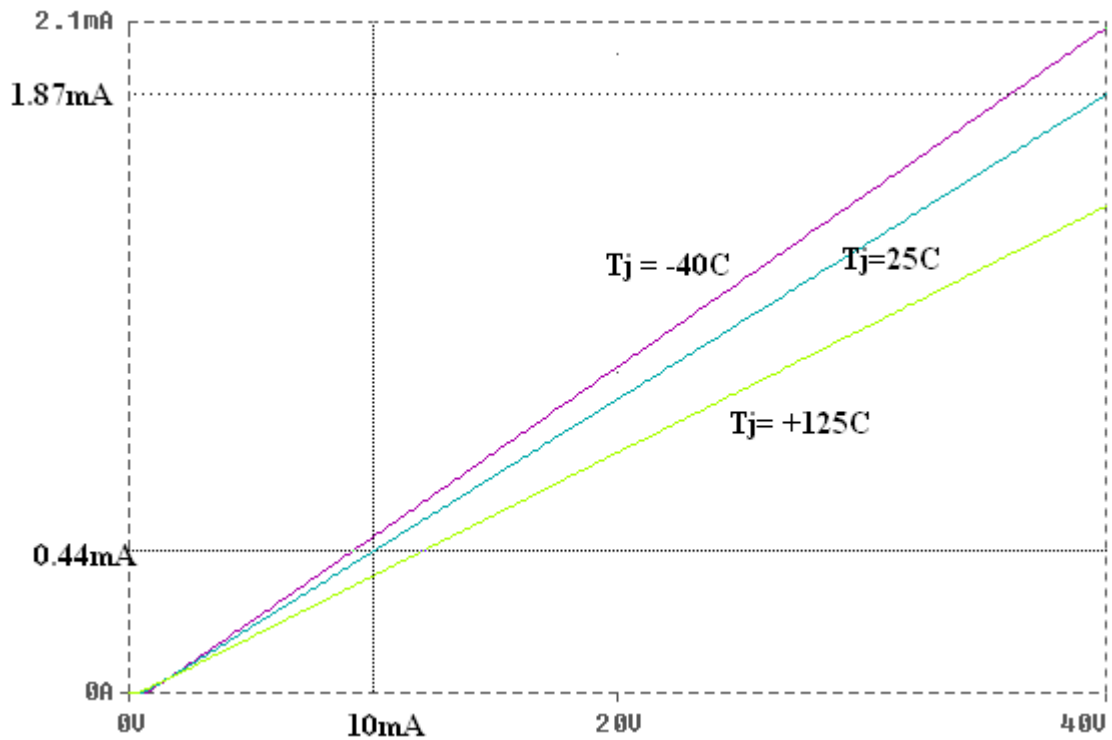
PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Supply Current	I <sub>S</sub>	VS=10V		440	520	uA
Breakdown Voltage	VCE	IC=1mA, IB=0	40			V
Internal Resistor	IR	IS=20mA	37	44	53	Ω
DC Current Gain	hFE	Ic=50mA, Vce=1V, Rext=0 Ohm	100	140	470	
Output Current	I <sub>OUT</sub>	VS=10V, OUT=8.6V	18	20	22	mA
Dropout Voltage	Vdrop	I <sub>OUT</sub> =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  
 $V_s - V_{out} = 1.4V$

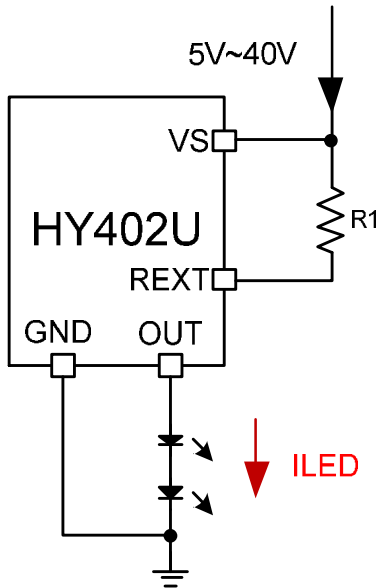


**Output current vs Supply voltage**



**Supply current vs Supply voltage**

### APPLICATION INFORMATION

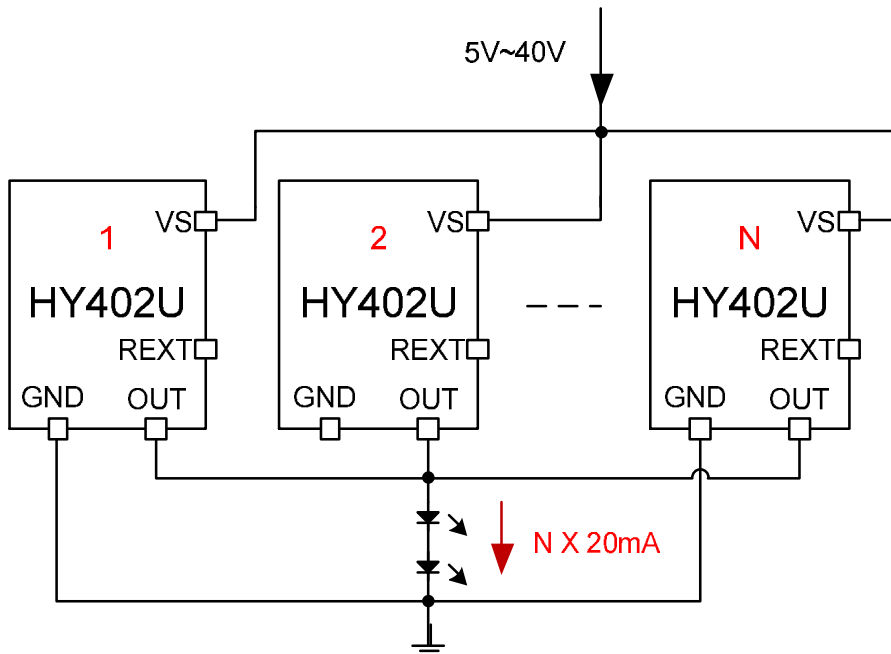


$$I_{LED} = \frac{\text{Drop Voltage}}{\text{Resistor}}$$

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

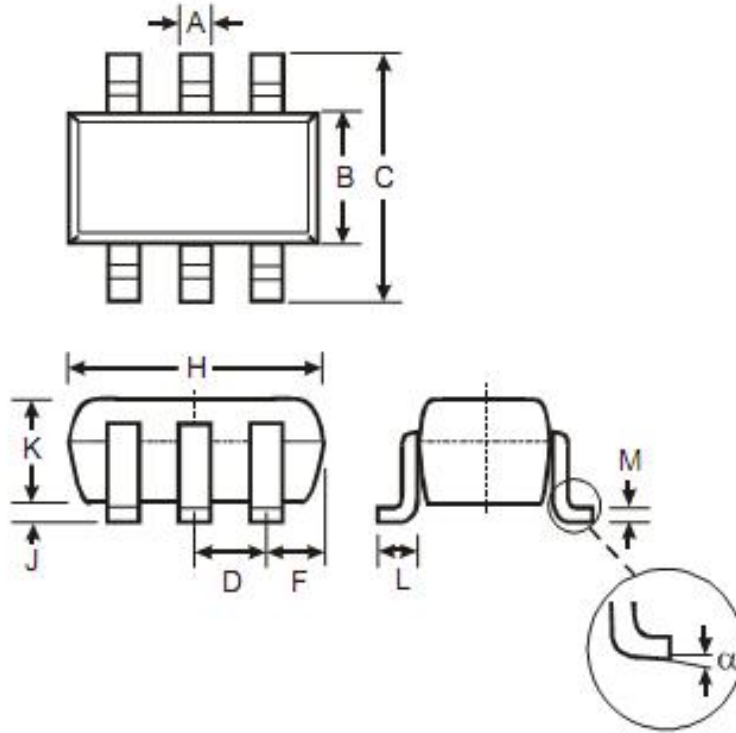
( $R1 > 20\Omega$ )

**External Resistor**



**Parallel Operation**

### Package Outline Dimensions

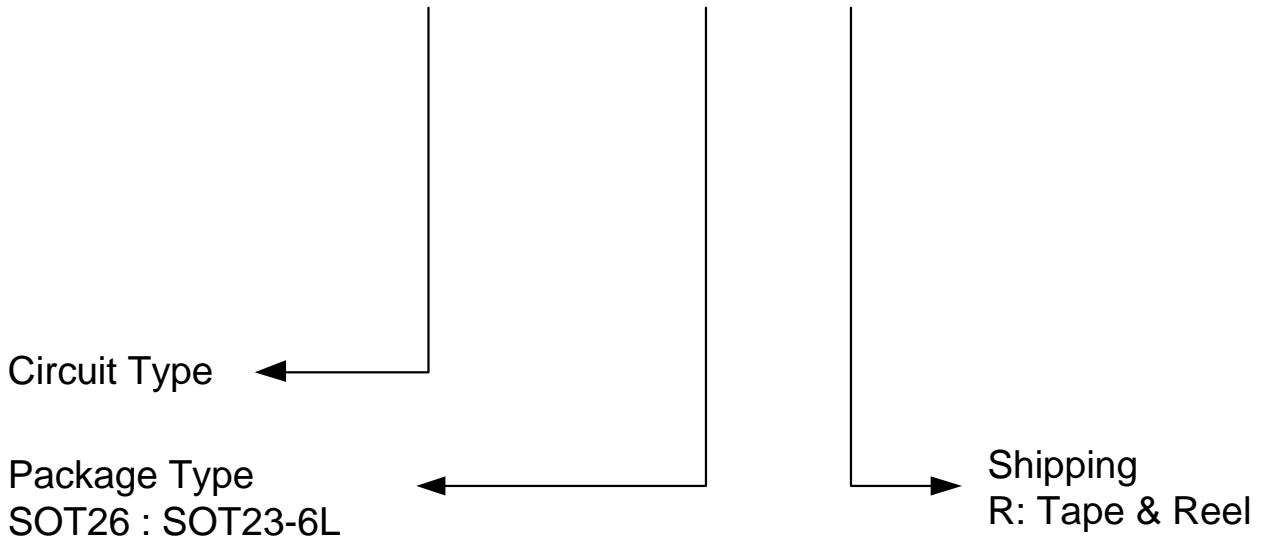


SOT-26			
Dim	Min	Max	Typ
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	—	—	0.95
F	—	—	—
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
$\alpha$	0°	8°	—
<b>All Dimensions in mm</b>			



**ORDERING INFORMATION**

HY402U ST26 R



ORDER NUMBER	PACKAGE	SHIPPING
HY402UST26R	SOT23-6L	3,000 UNITS/ TAPE & REEL