

CONSTANT CURRENT LINEAR LED DRIVER

IK402U

DESCRIPTION

IK402U is a high-stable current source IC designed to be used as a constant current LED driver. Application of a constant current source provides continuous brightness of LED light and long LED life time. Moreover, a constant current source provides an over-temperature protection to LED.



FEATURE

- High-stability output current
- Low dropout voltage
- Easy adjustable output current
- Negative thermal coefficient of output current
- Small overall dimensions, possible chip mount in a single package with LED
- Low cost, no external elements, simple use
- LED drive current of 22 mA
- Supply voltage up to 42 V
- Easy paralleling of drivers to increase current
- Low voltage overhead of 1.2 V
- High current accuracy at supply voltage variation
- No EMI
- ESD Rating: Human Body Model 2000V
- Reduced output current at higher temperatures – negative thermal coefficient of - 0.1 %/K

APPLICATION

- Channel letters for advertising, 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

MAXIMUM RATINGS

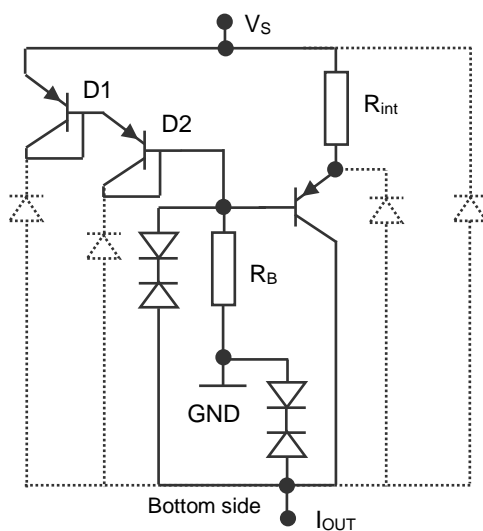
Parameter	Symbol	Value	Unit
Supply voltage	V_S	42	V
Output voltage	V_{OUT}	18.6	V
Reverse voltage between all terminals	V_R	0.5	V
Junction Temperature	T_j	-40...+150	°C

$P_{max} = (V_S - V_{OUT}) \times I_{OUT}$ is determined by the condition $T_j \leq 150^\circ\text{C}$

ELECTRICAL CHARACTERISTICS ($T_j = +25^\circ\text{C}$, unless otherwise noted)

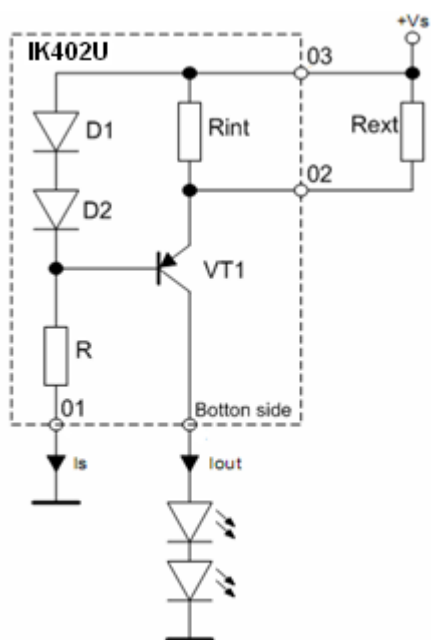
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Collector-emitter breakdown voltage	$V_{BR(CEO)}$	$I_C = 1 \text{ mA}, I_B = 0$	60	–	–	V
Supply current	I_S	$V_S = 10 \text{ V}$	340	440	540	μA
Output current	I_{OUT}	$V_S = 10 \text{ V}, V_{OUT} = 8.6 \text{ V}$	19	22	24	mA
Internal resistor	R_{INT}	$I_{Rint} = 20 \text{ mA}$	35	41	45	Ohm
Voltage drop ($V_S - V_E$)	V_{drop}	$I_C = 20 \text{ mA}$	0.7	0.82	0.9	V
DC current gain	h_{FE}	$I_C = 50 \text{ mA}, V_{CE} = 1 \text{ V}$	50	100	400	
DC Characteristics with stabilized LED load						
Lowest sufficient battery voltage overhead	V_{Smin}	$I_{OUT} > 18\text{mA}$	–	1.2	–	V
Output current change versus T_A	$\Delta I_{OUT}/I_{OUT}$	$V_S = 10 \text{ V},$ $T_A = (-45^\circ\text{C} \dots +85^\circ\text{C})$	–	-0.1	–	%/°C
Output current change versus V_S	$\Delta I_{OUT}/I_{OUT}$	$V_S = 10 \text{ V}$	–	1.0	–	%/V

SCHEMATIC DIAGRAM

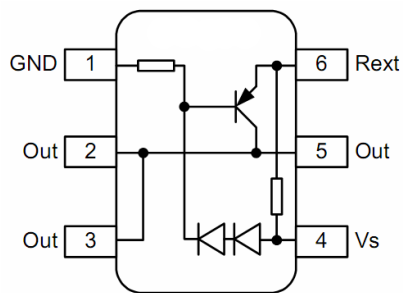


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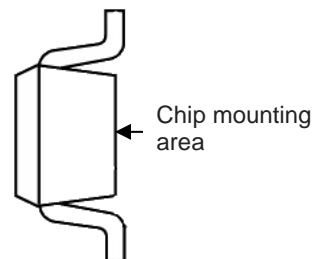
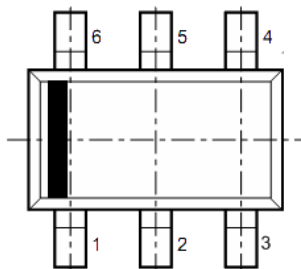
APPLICATIONS INFORMATION



Typical Application

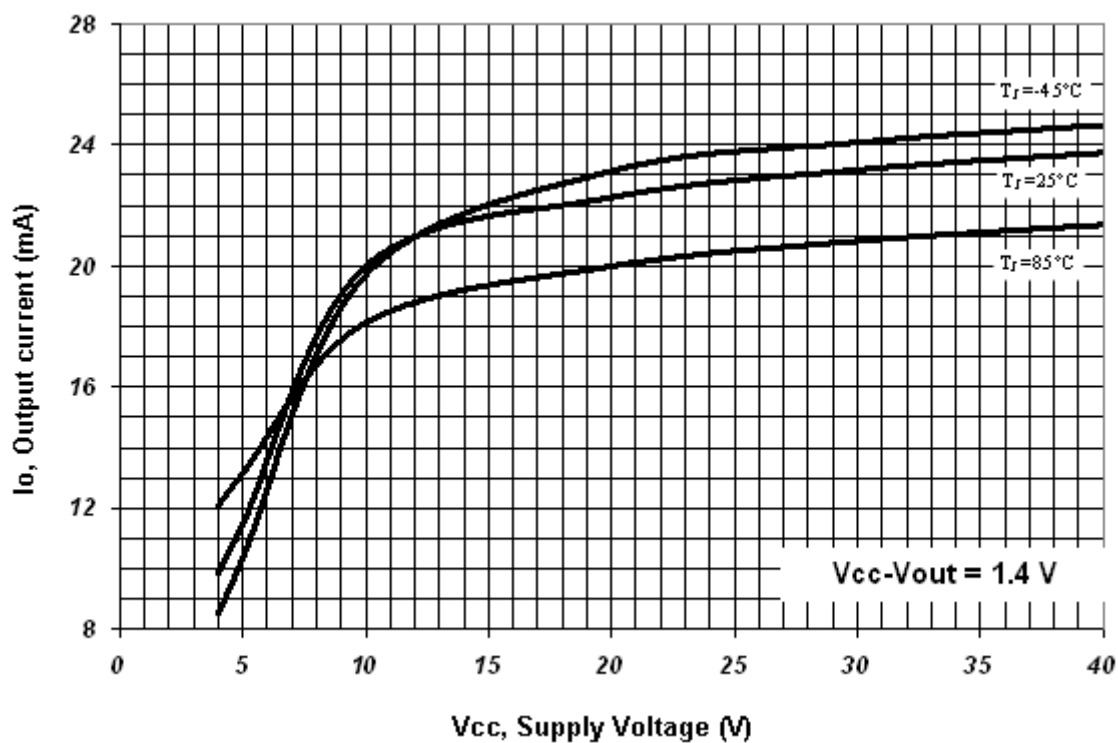


SOT-23-6 (SC-74)

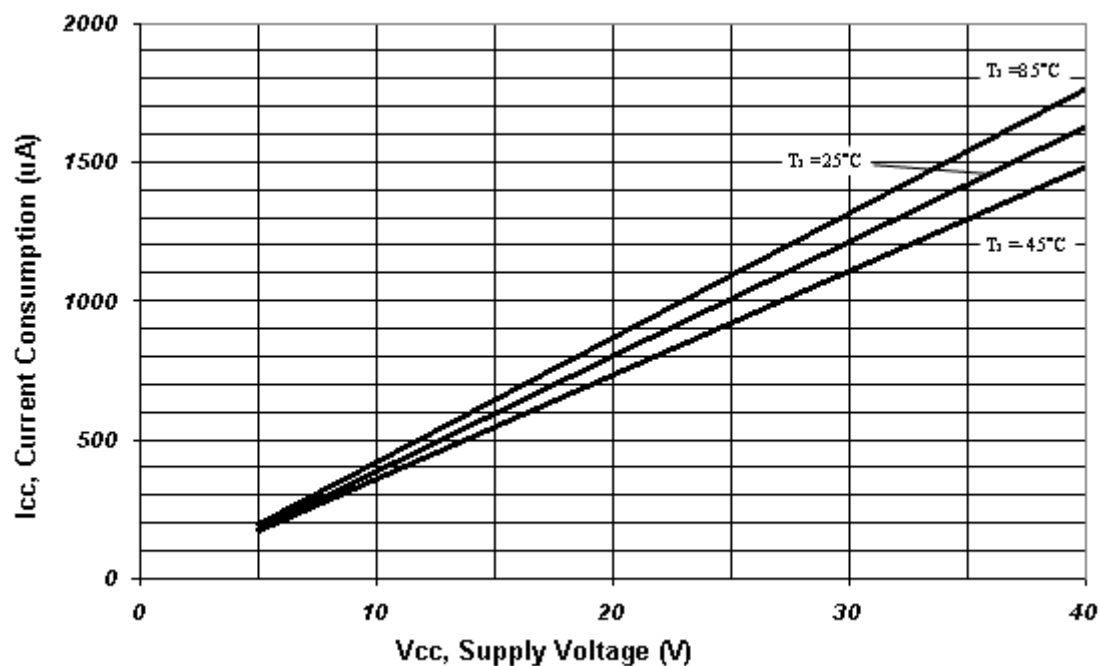


TYPICAL REFERENCE DIAGRAMS

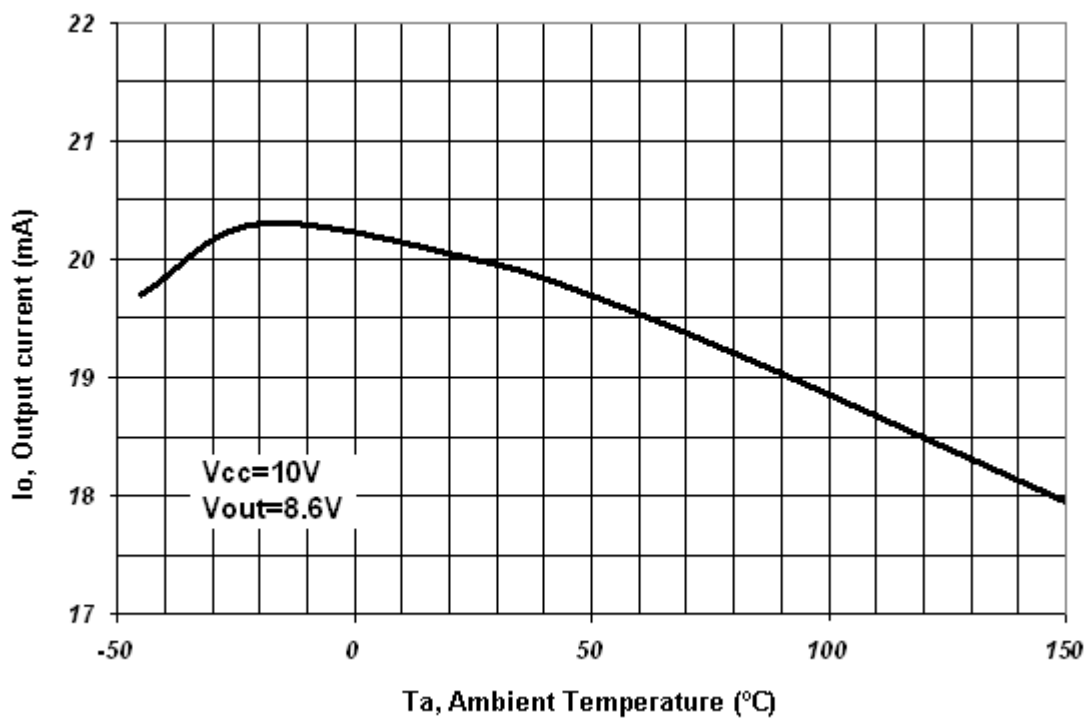
Output Current vs. Supply Voltage



Current Consumption vs. Supply Voltage



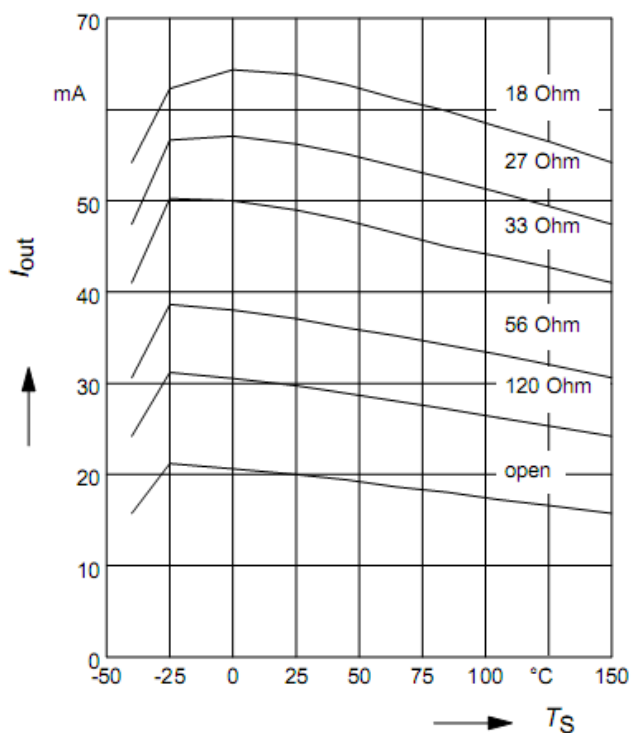
Output Current vs. Ambient Temperature



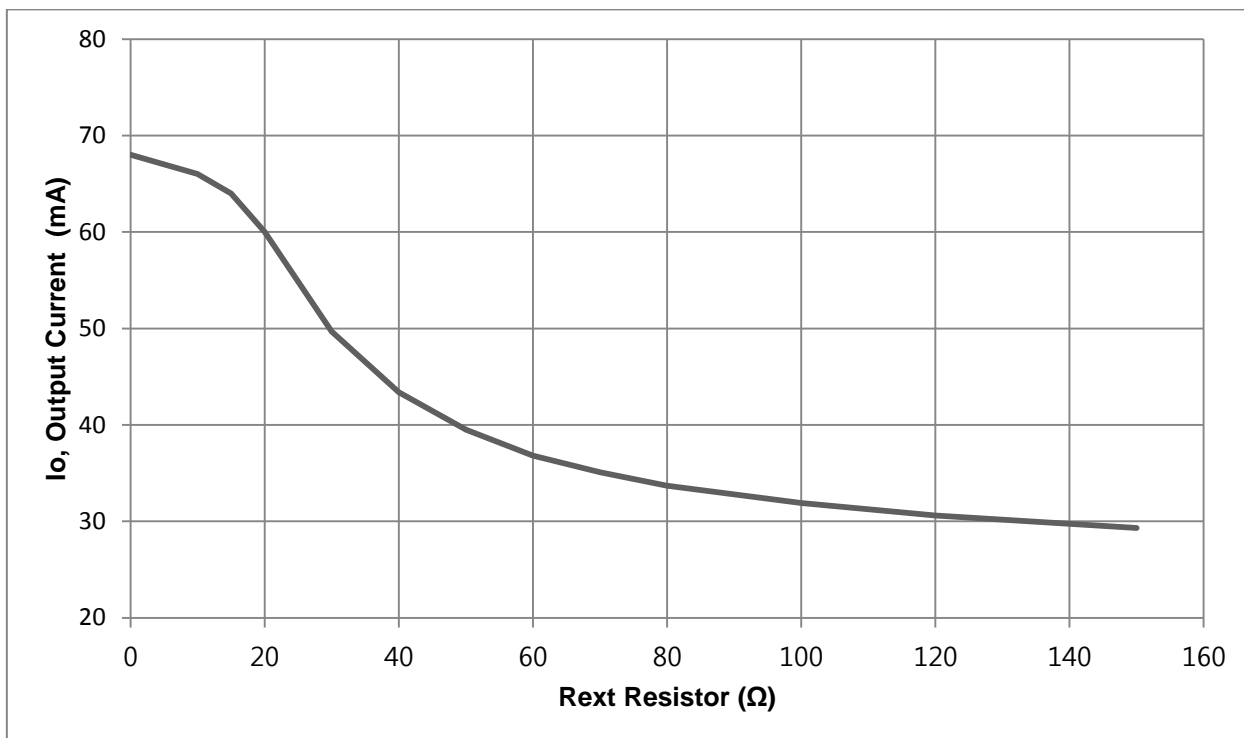
Output current

$I_{out}(T_S)$, $V_S = 10V$, $V_S - V_{out} = 1.4V$

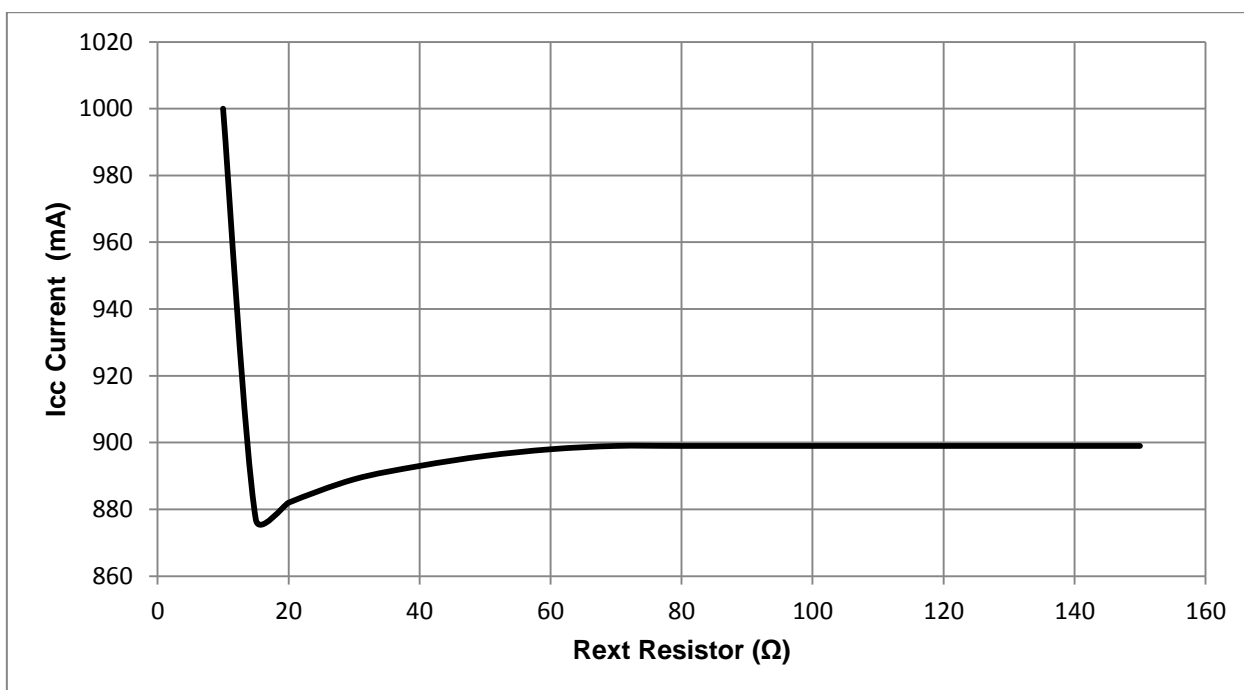
$R_{EXT} = \text{Parameter}$



Output Current vs. Rext Resistor

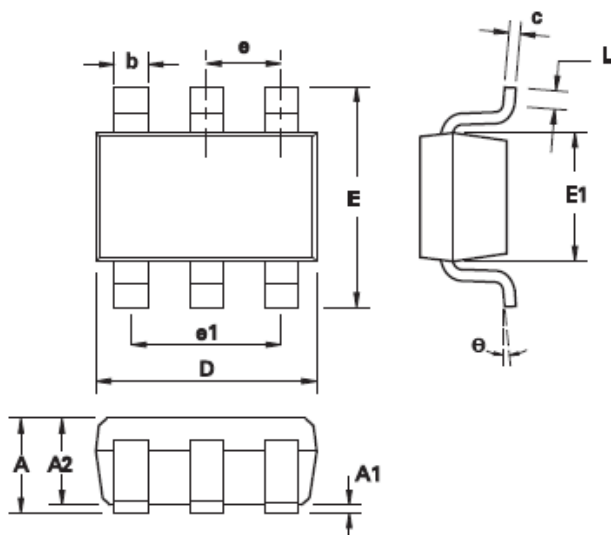


Current consumption vs. Rext Resistor



PACKAGE DIMENSION

SOT-23-6



DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.90	1.45	0.0354	0.0570
A1	0.00	0.15	0.00	0.0059
A2	0.90	1.30	0.0354	0.0511
b	0.35	0.50	0.0078	0.0196
C	0.09	0.26	0.0035	0.0102
D	2.70	3.10	0.1062	0.1220
E	2.20	3.20	0.0866	0.1181
E1	1.30	1.80	0.0511	0.0708
L	0.10	0.60	0.0039	0.0236
e	0.95 REF		0.0374 REF	
e1	1.90 REF		0.0748 REF	
L	0°	30°	0°	30°

Note: Controlling dimensions are in millimeters. Approximate dimensions are provided in inches

