

Features

- Low power consumption
- Low voltage drop
- Low temperature coefficient
- High input voltage (up to 24V)
- High output current : 100mA ($P_d \leq 250mW$)
- Output voltage accuracy: tolerance $\pm 3\%$
- TO-92, SOT-89 and SOT-25 package

Applications

- Battery-powered equipment
- Communication equipment
- Audio/Video equipment

General Description

The TX3202_xx series is a set of three-terminal high current low voltage regulator implemented in CMOS technology. They can deliver 100mA output current and allow an input voltage as high as 24V. They are available with several fixed output voltages ranging from 3.0V to 5.0V. CMOS technology ensures low voltage drop and low quiescent current.

Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain variable voltages and currents.

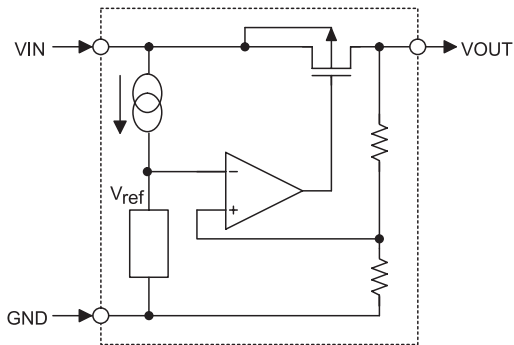
Selection Table

Part No.	Output Voltage	Package	Marking
TX3202_30	3.0V	TO-92 SOT-89 SOT-25	TX3202_xx (for TO-92) TX3202_xx (for SOT-89) TX3202_xx (for SOT-25)
TX3202_33	3.3V		
TX3202_36	3.6V		
TX3202_44	4.4V		
TX3202_50	5.0V		

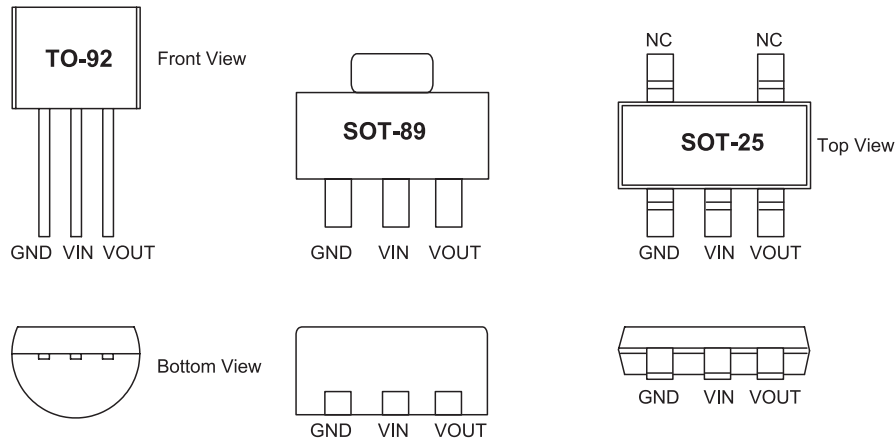
Note: "XX" stands for output voltages.

For lead free devices, TO-92 package will add a "#" mark at the end of the date code, whereas SOT-89 & SOT-25 packages will add a "#" mark at the end of the marking.

Block Diagram



Pin Assignment



Absolute Maximum Ratings

Supply Voltage	-0.3V to 26V	Storage Temperature	-50°C to 125°C
Power Consumption (*1)	250mW	Operating Temperature	-40°C to 85°C
Power Consumption (*2)	150mW		

Note: These are stress ratings only. Stresses exceeding the range specified under "Absolute Maximum Ratings" may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

*1: applied to SOT89 and TO-92

*2: applied to SOT-25

Electrical Characteristics

TX3202_30, +3.0V Output Type

Ta=25°C

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage Tolerance	5V	I _{OUT} =10mA	2.91	3.0	3.09	V
I _{OUT}	Output Current	5V	—	60	100	—	mA
ΔV _{OUT}	Load Regulation	5V	1mA ≤ I _{OUT} ≤ 50mA		60	150	mV
V _{DIF}	Voltage Drop	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	5V	No load	—	3.5	7	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	—	4V ≤ V _{IN} ≤ 24V I _{OUT} =1mA	—	0.2	—	%/V
V _{IN}	Input Voltage	—	—	—	—	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	5V	I _{OUT} =10mA 0°C < T _a < 70°C	—	±0.45	—	mV/°C

TX3202_33, +3.3V Output Type

Ta=25°C

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage Tolerance	5.5V	I _{OUT} =10mA	3.201	3.3	3.399	V
I _{OUT}	Output Current	5.5V	—	60	100	—	mA
ΔV _{OUT}	Load Regulation	5.5V	1mA≤I _{OUT} ≤50mA	—	60	150	mV
V _{DIF}	Voltage Drop	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	5.5V	No load	—	3.5	7	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	—	4.5V≤V _{IN} ≤24V I _{OUT} =1mA	—	0.2	—	%/V
V _{IN}	Input Voltage	—	—	—	—	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	5.5V	I _{OUT} =10mA 0°C<T _a <70°C	—	±0.5	—	mV/°C

TX3202_36, +3.6V Output Type

Ta=25°C

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage Tolerance	5.6V	I _{OUT} =10mA	3.492	3.6	3.708	V
I _{OUT}	Output Current	5.6V	—	60	100	—	mA
ΔV _{OUT}	Load Regulation	5.6V	1mA≤I _{OUT} ≤50mA	—	60	150	mV
V _{DIF}	Voltage Drop	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	5.6V	No load	—	3.5	7	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	—	4.6V≤V _{IN} ≤24V I _{OUT} =1mA	—	0.2	—	%/V
V _{IN}	Input Voltage	—	—	—	—	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	5.6V	I _{OUT} =10mA 0°C<T _a <70°C	—	±0.6	—	mV/°C

TX3202_44, +4.4V Output Type

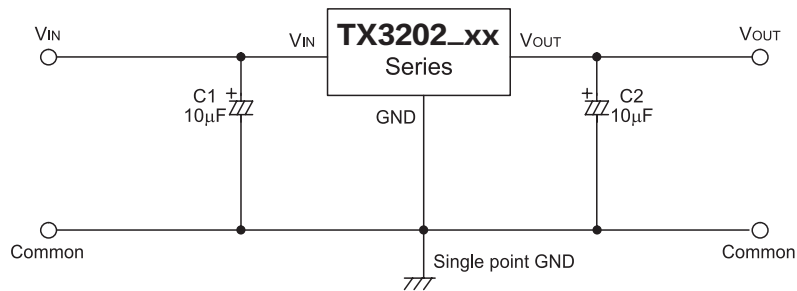
Ta=25°C

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage Tolerance	6.4V	I _{OUT} =10mA	4.268	4.4	4.532	V
I _{OUT}	Output Current	6.4V	—	60	100	—	mA
ΔV _{OUT}	Load Regulation	6.4V	1mA≤I _{OUT} ≤50mA	—	60	150	mV
V _{DIF}	Voltage Drop	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	6.4V	No load	—	3.5	7	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	—	5.4V≤V _{IN} ≤24V I _{OUT} =1mA	—	0.2	—	%/V
V _{IN}	Input Voltage	—	—	—	—	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	6.4V	I _{OUT} =10mA 0°C<T _a <70°C	—	±0.7	—	mV/°C

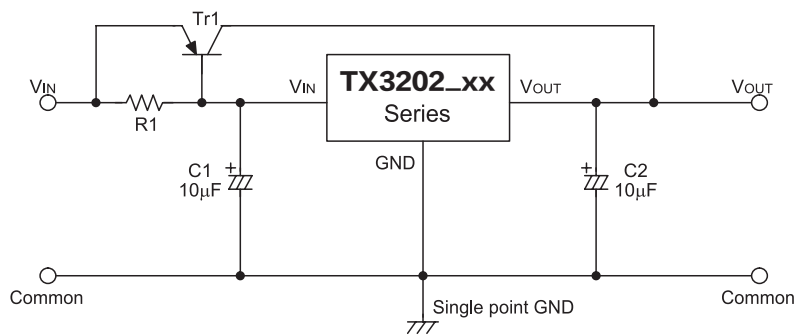
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage Tolerance	7V	$I_{OUT}=10\text{mA}$	4.85	5.0	5.15	V
I_{OUT}	Output Current	7V	—	100	150	—	mA
ΔV_{OUT}	Load Regulation	7V	$1\text{mA} \leq I_{OUT} \leq 70\text{mA}$	—	60	150	mV
V_{DIF}	Voltage Drop	—	$I_{OUT}=1\text{mA}$	—	100	—	mV
I_{SS}	Current Consumption	7V	No load	—	3.5	7	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	—	$6\text{V} \leq V_{IN} \leq 24\text{V}$ $I_{OUT}=1\text{mA}$	—	0.2	—	%/V
V_{IN}	Input Voltage	—	—	—	—	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	7V	$I_{OUT}=10\text{mA}$ $0^{\circ}\text{C} < T_a < 70^{\circ}\text{C}$	—	± 0.75	—	$\text{mV}/^{\circ}\text{C}$

Application Circuits

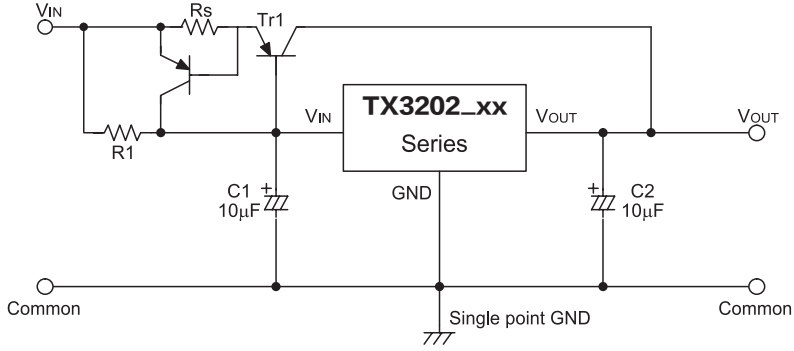
Basic Circuit



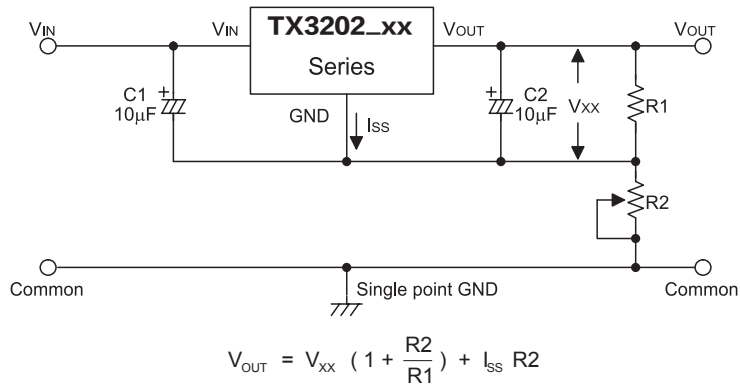
High Output Current Positive Voltage Regulator



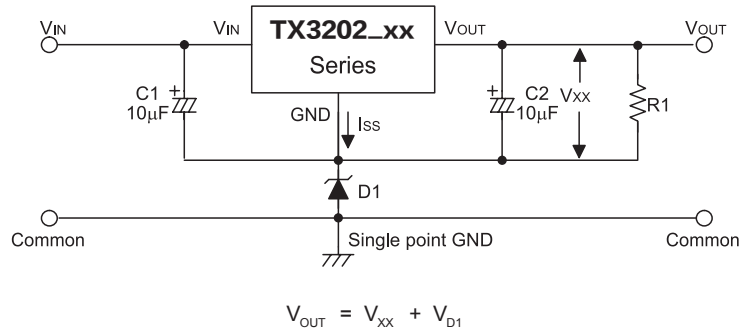
Short-Circuit Protection for Tr1



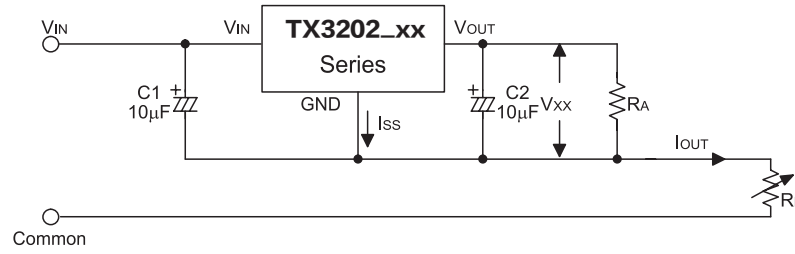
Circuit for Increasing Output Voltage



Circuit for Increasing Output Voltage

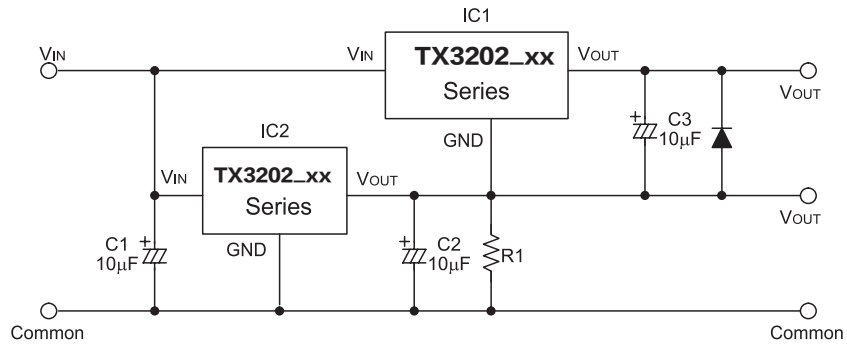


Constant Current Regulator



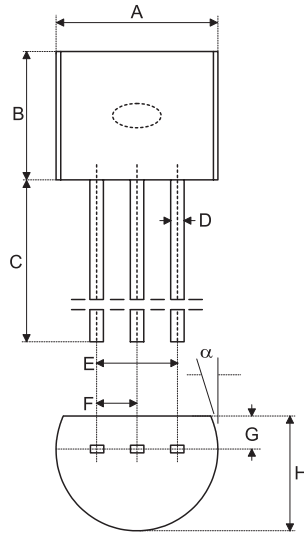
$$I_{OUT} = \frac{V_{xx}}{R_A} + I_{SS}$$

Dual Supply



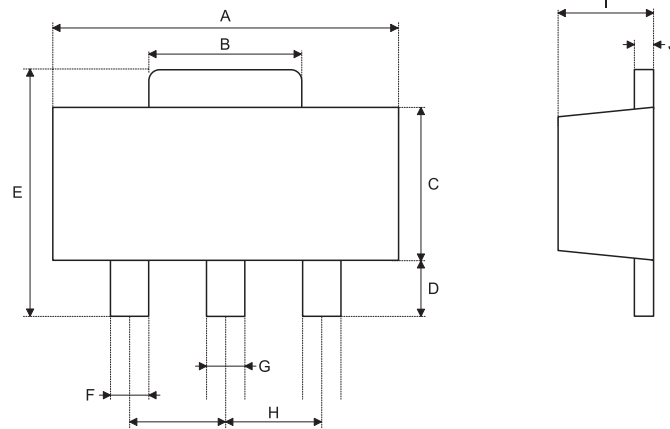
Package Information

3-pin T0-92 Outline Dimensions



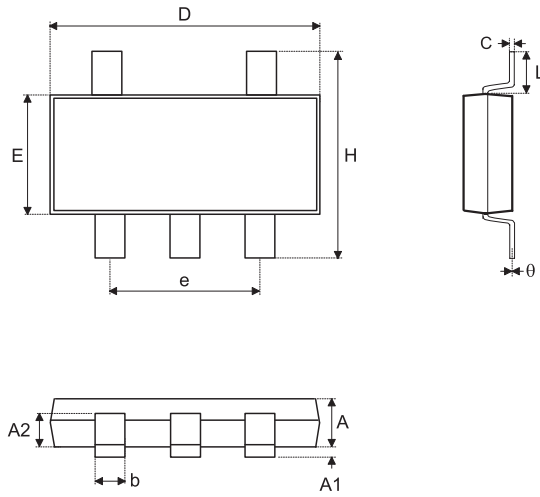
Symbol	Dimensions in mil		
	M in.	Nom .	M ax.
A	170	—	200
B	170	—	200
C	500	—	—
D	11	—	20
E	90	—	110
F	45	—	55
G	45	—	65
H	130	—	160
I	8	—	18
α	4°	—	6°

3-pin SOT-89 Outline Dimensions



Symbol	Dimensions in mil		
	Min.	Nom.	Max.
A	173	—	181
B	64	—	72
C	90	—	102
D	35	—	47
E	155	—	167
F	14	—	19
G	17	—	22
H	—	59	—
I	55	—	63
J	14	—	17

5-pin SOT-25 Outline Dimensions



Symbol	Dimensions in mm		
	M in.	Nom .	Max.
A	1.00	—	1.30
A1	—	—	0.10
A2	0.70	—	0.90
b	0.35	—	0.50
C	0.10	—	0.25
D	2.70	—	3.10
E	1.40	—	1.80
e	—	1.90	—
H	2.60	—	3
L	0.37	—	—
θ	1°	—	9°