Features

- Low power consumption
- Low voltage drop
- Low temperature coefficient
- High input voltage (up to 32V)
- Output voltage accuracy: tolerance ±3%
- TO92 and SOT89 package

Applications

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

General Description

The **HM75**XXHB series is a set of three-terminal low power high voltage regulators implemented in CMOS technology. They allow input voltages as high as 32V. They are available with several fixed output voltages ranging from 2.5V to 5.0V. CMOS technology ensures low voltage drop and low quiescent current. Although designed primarily as fixed voltage regulators, these devices ca n be used with external components to obtain va riable voltages and currents.

Selection Table

Part No.	Output Voltage	Package	Marking
HM7525HBxx	2.5V	TO92 SOT89	75XX-H#(for TO92) 75XX-H#(for SOT89)
HM7527HBxx	2.7V		
HM7530HBxx	3.0V		
HM7533HBxx	3.3V		
HM7536HBxx	3.6V		
HM7540HBxx	4.0V		
HM7544HBxx	4.4V		
HM7550HBxx	5.0V		

Note:"XX" stands for output voltages.

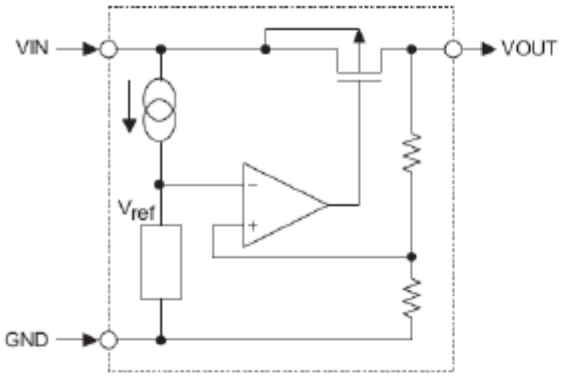
TO92 & SOT89 packages will add a "#" mark at the end of the marking.

Order Information

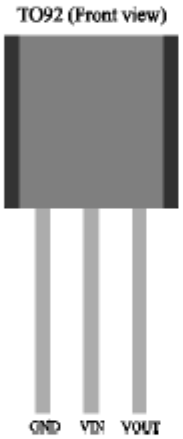
HM75①②③④⑤

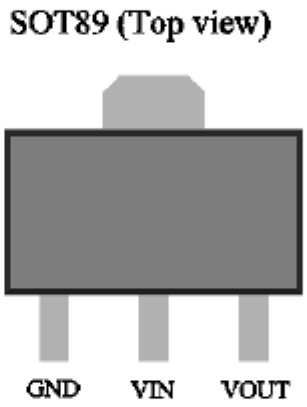
Designator	Symbol	Description
① ②	Integer	Output Voltage(2.5~5.0V)
③	H	Standard
④	T	Package:TO-92
	P	Package:SOT89
⑤	R	RoHS / Pb Free
	G	Halogen Free

Block Diagram



Pin Assignment





Absolute Maximum Ratings

Supply Voltage .....-0.3V to 40V Storage Temperature .....-50℃ to 125℃

Operating Temperature .....-40℃ to 85℃

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.

Thermal Information

Symbol	Parameter	Package	Max.	Unit
θ_{JA}	Thermal Resistance (Junction to Ambient) (Assume no ambient airflow, no heat sink)	TO92	200	℃/W
		SOT89	200	℃/W
P_D	Power Dissipation	TO92	0.50	W
		SOT89	0.50	W

Note: P_D is measured at Ta= 25℃

Electrical Characteristics

HM7525HBxx, +2.5V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	8V	I_{OUT}=10mA	2.425	2.500	2.575	V
I_{OUT}	Output Current	8V	-	-	70	-	mA
ΔV_{OUT}	Load Regulation	8V	1mA≤I_{OUT}≤20mA	-	60	100	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=1mA, ΔV_{OUT}=2%	-	100	-	mV
ISS	Current Consumption	8V	No load	-	2.5	5.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	3.5V≤V_{IN}≤24V I_{OUT}=1mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	32	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	8V	IOUT=10mA 0℃<Ta<70℃	-	±0.41	-	mV/℃

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

HM7527HBxx, +2.7V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	8V	I_{OUT}=10mA	2.619	2.700	2.781	V
I_{OUT}	Output Current	8V	-	-	70	-	mA
ΔV_{OUT}	Load Regulation	8V	1mA≤I_{OUT}≤20mA	-	60	100	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=1mA, ΔV_{OUT}=2%	-	100	-	mV
ISS	Current Consumption	8V	No load	-	2.5	5.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	3.7V≤V_{IN}≤24V I_{OUT}=1mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	32	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	8V	IOUT=10mA 0℃<Ta<70℃	-	±0.43	-	mV/℃

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

HM7530HBxx, +3.0V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	8V	I_{OUT}=10mA	2.91	3.00	3.09	V
I_{OUT}	Output Current	8V	-	-	80	-	mA
ΔV_{OUT}	Load Regulation	8V	1mA≤I_{OUT}≤20mA	-	60	100	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=1mA, ΔV_{OUT}=2%	-	100	-	mV
ISS	Current Consumption	8V	No load	-	2.5	5.0	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	-	-	-	-	32	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	8V	IOUT=10mA 0℃<Ta<70℃	-	±0.45	-	mV/℃

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

HM7533HBxx, +3.3V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	8V	I_{OUT}=10mA	3.201	3.300	3.399	V
I_{OUT}	Output Current	8V	-	-	80	-	mA
ΔV_{OUT}	Load Regulation	8V	1mA≤I_{OUT}≤20mA	-	60	100	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=1mA, ΔV_{OUT}=2%	-	100	-	mV
ISS	Current Consumption	8V	No load	-	2.5	5.0	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	-	-	-	-	32	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	8V	IOUT=10mA 0℃<Ta<70℃	-	±0.5	-	mV/℃

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

HM7536HBxx, +3.6V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	8V	I_{OUT}=10mA	3.492	3.600	3.708	V
I_{OUT}	Output Current	8V	-	-	80	-	mA
ΔV_{OUT}	Load Regulation	8V	1mA≤I_{OUT}≤20mA	-	60	100	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=1mA, ΔV_{OUT}=2%	-	100	-	mV
ISS	Current Consumption	8V	No load	-	2.5	5.0	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	-	-	-	-	32	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	8V	IOUT=10mA 0℃<Ta<70℃	-	±0.6	-	mV/℃

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

HM7540HBxx, +4.0V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	8.0V	I_{OUT}=10mA	3.880	4.000	4.120	V
I_{OUT}	Output Current	8.0V	-	-	80	-	mA
ΔV_{OUT}	Load Regulation	8.0V	1mA≤I_{OUT}≤20mA	-	60	100	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=1mA, ΔV_{OUT}=2%	-	100	-	mV
ISS	Current Consumption	8.0V	No load	-	2.5	5.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	5.0V≤V_{IN}≤24V I_{OUT}=1mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	32	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	8.0V	IOUT=10mA 0℃<Ta<70℃	-	±0.6	-	mV/℃

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	8V	I_{OUT}=10mA	4.268	4.400	4.532	V
I_{OUT}	Output Current	8V	-	-	80	-	mA
ΔV_{OUT}	Load Regulation	8V	1mA≤I_{OUT}≤20mA	-	60	100	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=1mA, ΔV_{OUT}=2%	-	100	-	mV
ISS	Current Consumption	8V	No load	-	2.5	5.0	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	-	-	-	-	32	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	8V	IOUT=10mA 0℃<Ta<70℃	-	±0.7	-	mV/℃

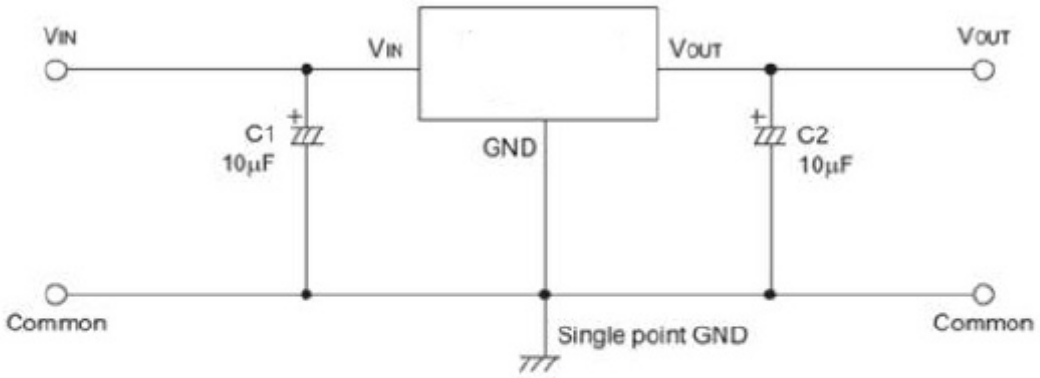
Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

HM7550HBxx, +5.0V Output Type

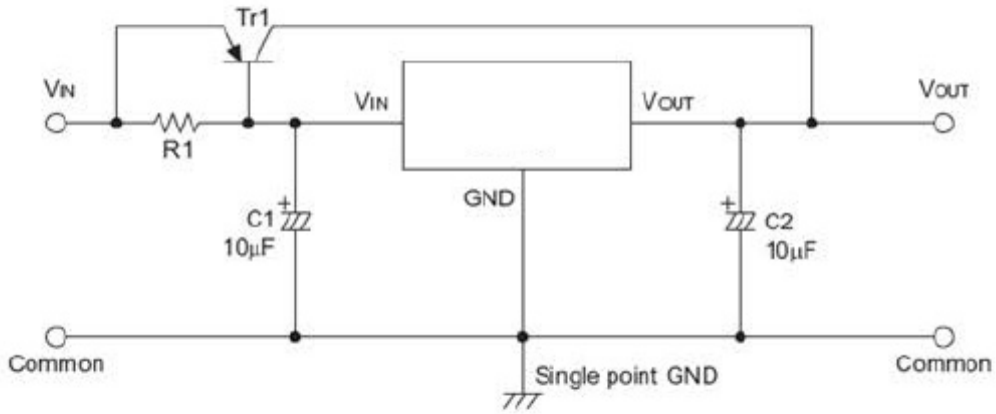
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	8V	I_{OUT}=10mA	4.85	5.00	5.15	V
I_{OUT}	Output Current	8V	-	-	100	-	mA
ΔV_{OUT}	Load Regulation	8V	1mA≤I_{OUT}≤20mA	-	60	100	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=1mA, ΔV_{OUT}=2%	-	100	-	mV
ISS	Current Consumption	8V	No load	-	2.5	5.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	6V≤V_{IN}≤24V I_{OUT}=1mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	32	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	8V	IOUT=10mA 0℃<Ta<70℃	-	±0.75	-	mV/℃

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

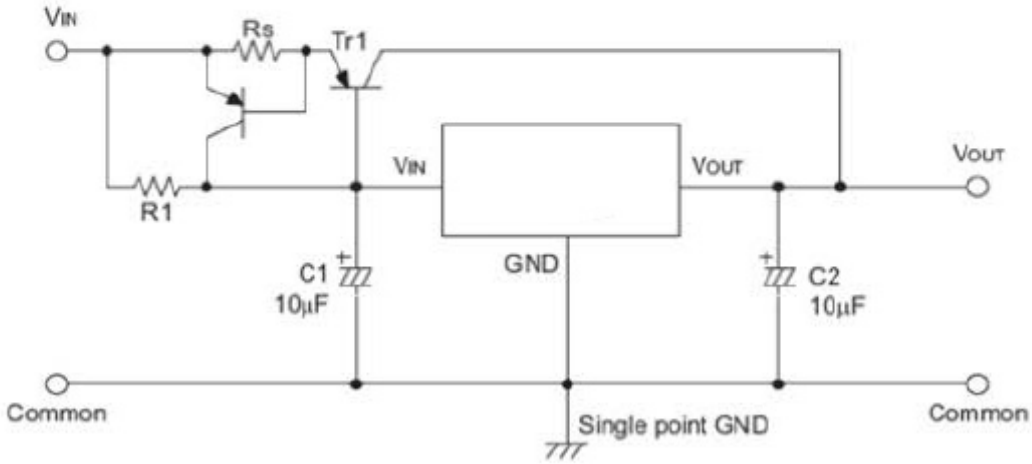
Basic Circuits

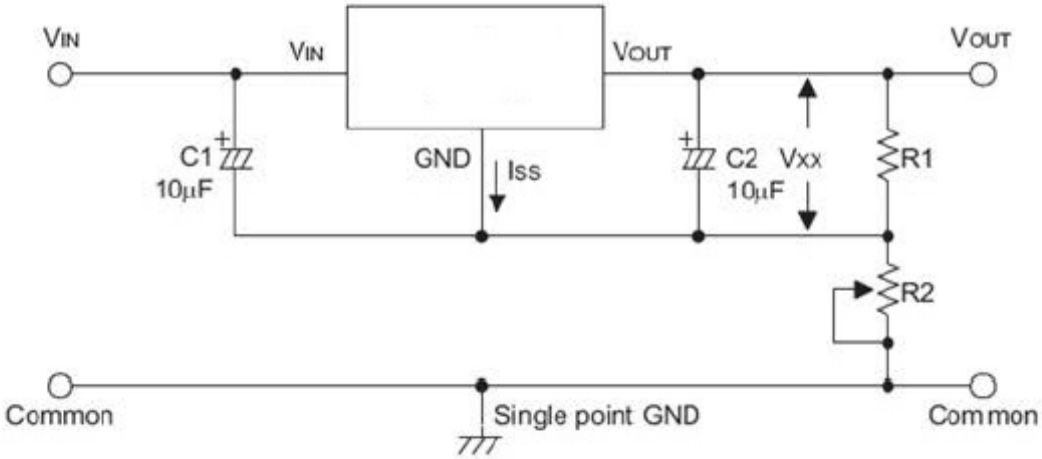


High Output Current Positive Voltage Regulator

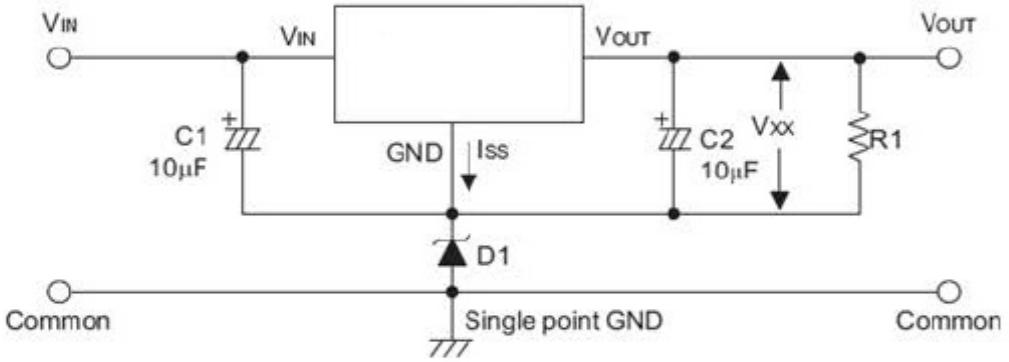


Short-Circuit Protection by Tr1



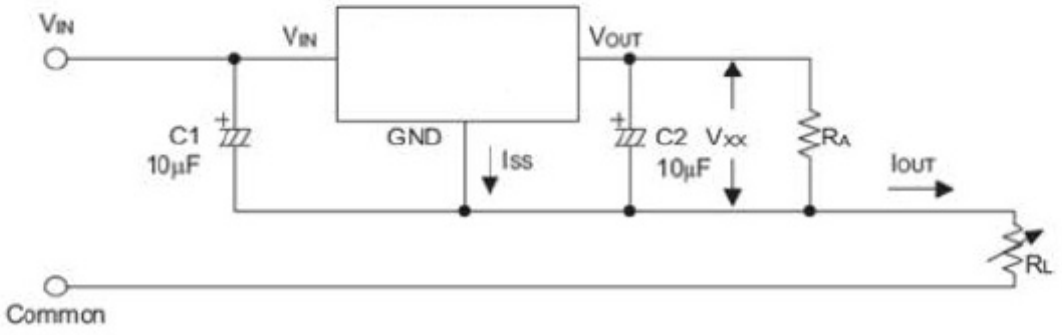


Circuit for Increasing Output Voltage



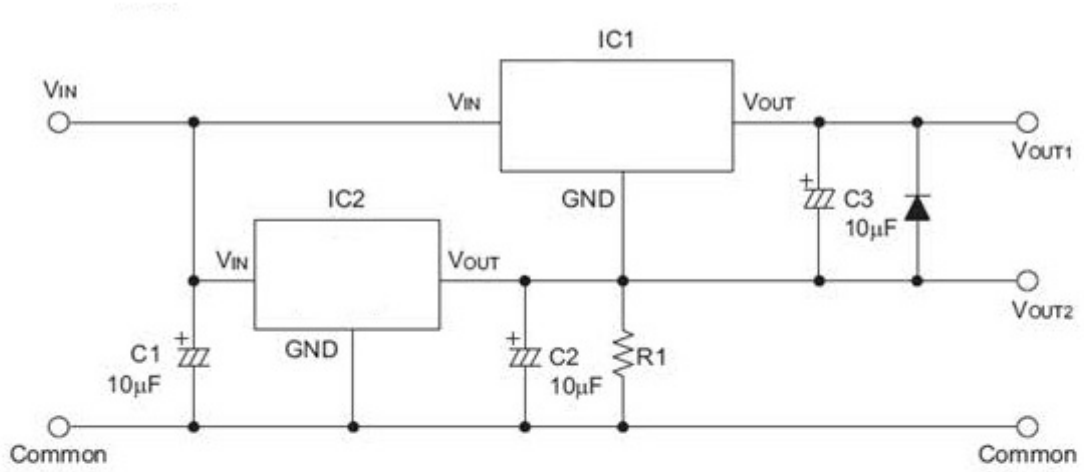
$V_{OUT}=V_{XX}+V_{D1}$

Constant Current Regulator



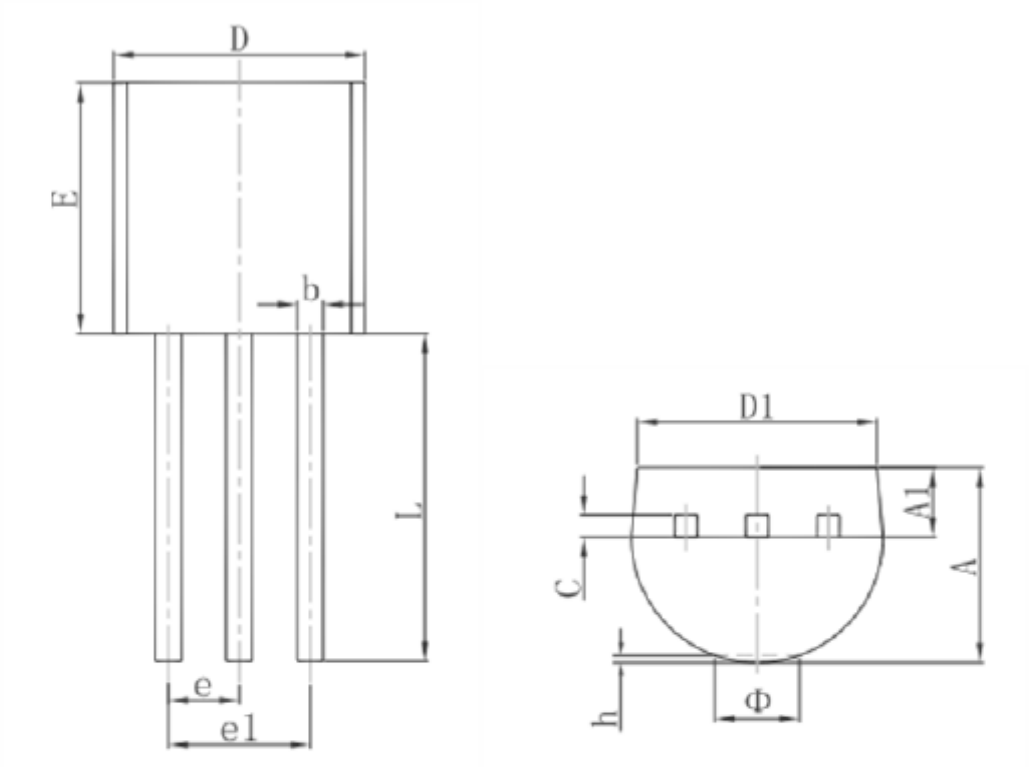
$$I_{OUT} = \frac{V_{XX}}{R_A} + I_{SS}$$

Dual Supply


IC1
VIN
VIN
VOUT
VOUT1
GND
C3
10μF
IC2
VIN
VOUT
VOUT2
C1
10μF
GND
C2
10μF
R1
Common
Common

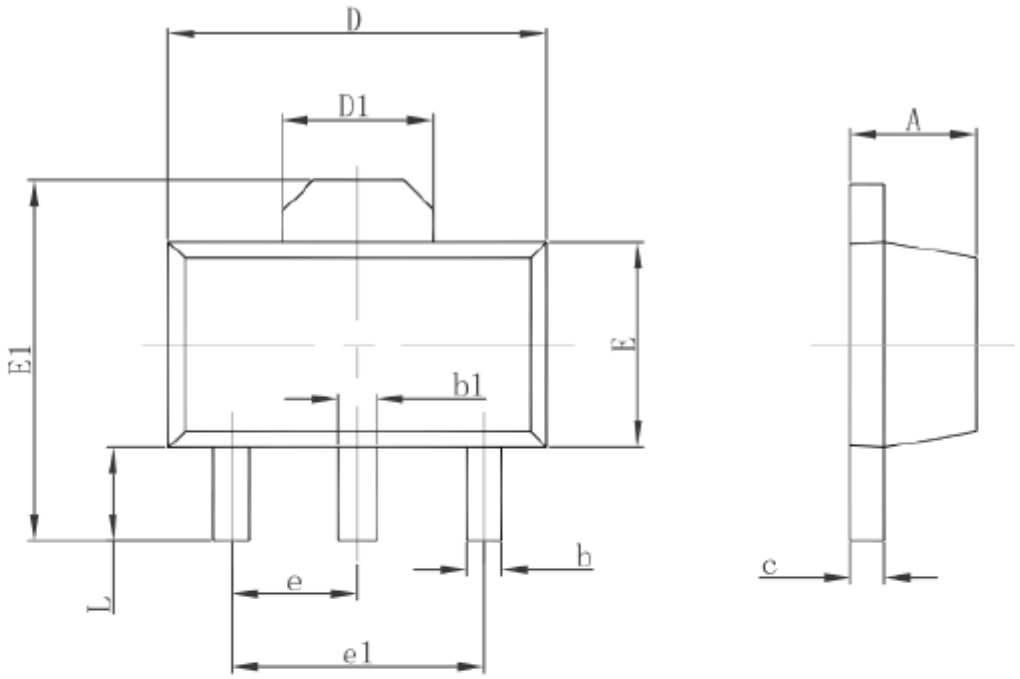
Package Information

3-pin TO92 Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	3.300	3.700	0.130	0.146
A1	1.100	1.400	0.043	0.055
b	0.380	0.550	0.015	0.022
c	0.360	0.510	0.014	0.020
D	4.300	4.700	0.169	0.185
D1	3.430		0.135	
E	4.300	4.700	0.169	0.185
e	1.270 TYP.		0.050 TYP.	
e1	2.440	2.640	0.096	0.104
L	14.100	14.500	0.555	0.571
Φ		1.600		0.063
h	0.000	0.380	0.000	0.015

3-pin SOT89 Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047