

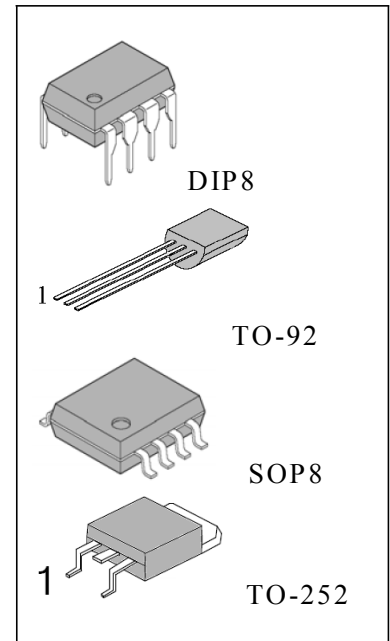
100mA Low-Dropout Voltage Regulator BL2950/BL2951

DESCRIPTION

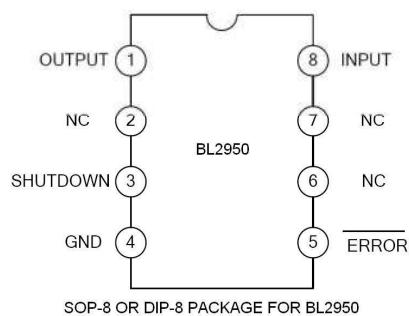
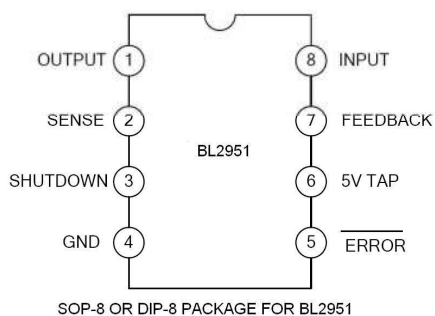
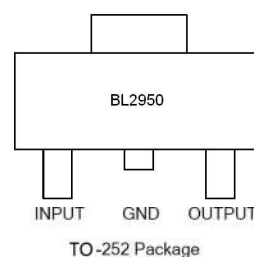
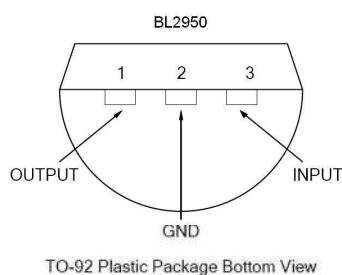
The BL2950/BL2951 are monolithic integrated voltage regulators with low dropout voltage, and low quiescent current. It includes many features that suitable for different applications.

FEATURES

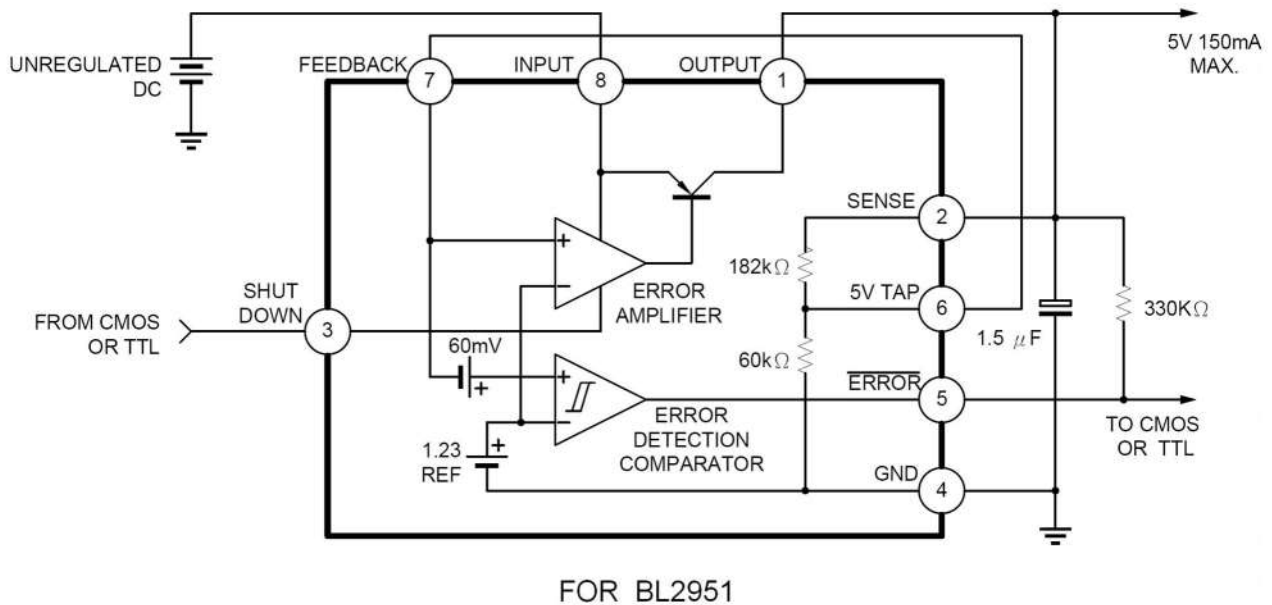
- Fixed output versions, 2.5V, 3V, 3.3V, 3.6V and 5V, are available.
- High accuracy output voltage.
- Extremely low quiescent current and dropout voltage.
- Extremely tight load and line regulation.
- Current and thermal limiting.
- Very low temperature coefficient.
- Logic controlled shutdown and err flog available for 8 pin package.
- Output voltage programmable for BL2951.



PIN CONFIGURATION



BLOCK DIAGRAM



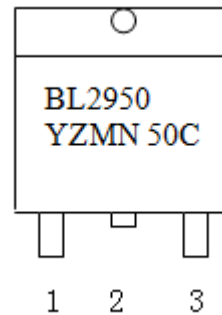
ORDERING INFORMATION

BL2950 XX XXX

Package:
DIP: DIP8
SOP: SOP8
TO2: TO-252
TO9: TO-92

Output Voltage:
25: 2.5V
30: 3.0V
33: 3.3V
36: 3.6V
50: 5.0V

MARKING INFORMATION (BL2950 TO-252)



“Y” stands for the last number of product year

“M” stands for the last number of product month

“50” stands for 5.0V output

ABSOLUTE MAXIMUM RATINGS ($T_a=25^{\circ}\text{C}$) *

Characteristic	Symbol	Limit	Unit
Supply voltage	V_{CC}	-0.3 ~ +30	V
Feedback voltage	V_{FB}	-1.5 ~ +30	V
Shutdown voltage	V_{SHDN}	-0.3 ~ +30	V
Power dissipation	P_D	Internally Limited	W
Operation junction temperature	T_J	-40 ~ +125	$^{\circ}\text{C}$
Storage temperature	T_{STG}	-65 ~ +150	$^{\circ}\text{C}$

*: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

THERMAL DATA

Characteristic		Symbol	Limit	Unit
Junction-to-Ambient	TO-92	Θ_{JA}	160	$^{\circ}\text{C}/\text{W}$
	TO-252		92	
	SOP8		180	
	DIP8		105	
Junction-to-Case	TO-92	Θ_{JC}	83	$^{\circ}\text{C}/\text{W}$
	TO-252		6	
	SOP8		45	

ELECTRICAL CHARACTERISTICS

 (unless otherwise specified: $V_{IN}=6V$, $I_L=100\mu A$, $C_L=1\mu F$, $T_J = 25^\circ C$)

For All Version

Characteristic	Symbol	Conditions	Min.	Typ.	Max	Unit
Output voltage	V_{OUT}	$T_J = 25^\circ C$ *1	$V_{OUT} \times 0.98$	V_{OUT}	$V_{OUT} \times 1.02$	V
		$-25^\circ C \leq T_J \leq +85^\circ C$ *1	$V_{OUT} \times 0.98$	V_{OUT}	$V_{OUT} \times 1.02$	
Output voltage	V_{OUT}	$100\mu A \leq I_L \leq 100mA$ $T_J \leq T_{J(max)}$	$V_{OUT} \times 0.98$	V_{OUT}	$V_{OUT} \times 1.02$	V
Output voltage temperature coefficient	TcV_o		20		100	ppm/ $^\circ C$
Line regulation	ΔV_{OUT}	$6V \leq V_{IN} \leq 30V$	0.03	0.1	0.2	%
Load regulation	ΔV_{OUT}	$100\mu A \leq I_L \leq 100mA$	0.04	0.1	0.2	%
Dropout voltage	V_D	$I_L = 100\mu A$	50	80	150	mV
		$I_L = 100mA$ *2	380	450	600	
Ground current	I_G	$I_L = 100\mu A$	75	120	140	μA
		$I_L = 100mA$	8	12	14	mA
Dropout ground current		$V_{IN}=4.5V$, $I_L = 100\mu A$	110	170	200	μA
Current limit	I_{LIMIT}	$V_{OUT} = 0$	160	200	220	mA
Output noise(10Hz~100kHz) (Bypass=0.01 μF pins 7 to 1(BL2951))	eN	$C_L=1\mu F$			430	μV
		$C_L=200\mu F$			160	
		$C_L=3.3\mu F$			100	

For BL2951 8pin Version Only

Characteristic	Symbol	Conditions	Min.	Typ.	Max	Unit
Reference voltage	V_{REF}		1.22	1.235	1.25	V
Reference voltage	V_{REF}	Over temperature *4	1.19		1.27	V
Feedback pin bias current	I_{FB}			20	40	nA
Reference voltage temperature coefficient	$V_{REF(TC)}$			50		ppm/ $^\circ C$
Feedback bias current temperature coefficient	$I_{FB(TC)}$			0.1		nA/ $^\circ C$
Error Comparator						
Output leakage current	$I_{O(LEAK)}$	$V_{OH}=30V$			1	μA
Output low voltage	V_{OL}	$V_{IN}=4.5V$, $I_{OL}=400\mu A$			250	mV
Threshold voltage	Upper	V_{THU} *3	3.2			%VO
	Lower	V_{THL} *3			7.6	%VO
Hysteresis	V_{HYS}	*3		15		mV

Continuous

Characteristic		Symbol	Conditions	Min.	Typ.	Max	Unit
Shutdown Input							
Input logic voltage	Low	V_{IL}	Regulator ON		1.3	0.7	V
	High	V_{IH}	Regulator OFF	2.0			
Shutdown pin input current		I_{SHDN}	$V_{SHDN}=2.4V$		30	50	μA
			$V_{SHDN}=30V$		450	600	
Regulator output current shutdown		I_{DFF}	$V_{SHDN} \geq 2V$, $V_{IN} \leq 30V$, $V_{OUT}=0$, Feedback pin tied to 5V Tap.		3	10	μA

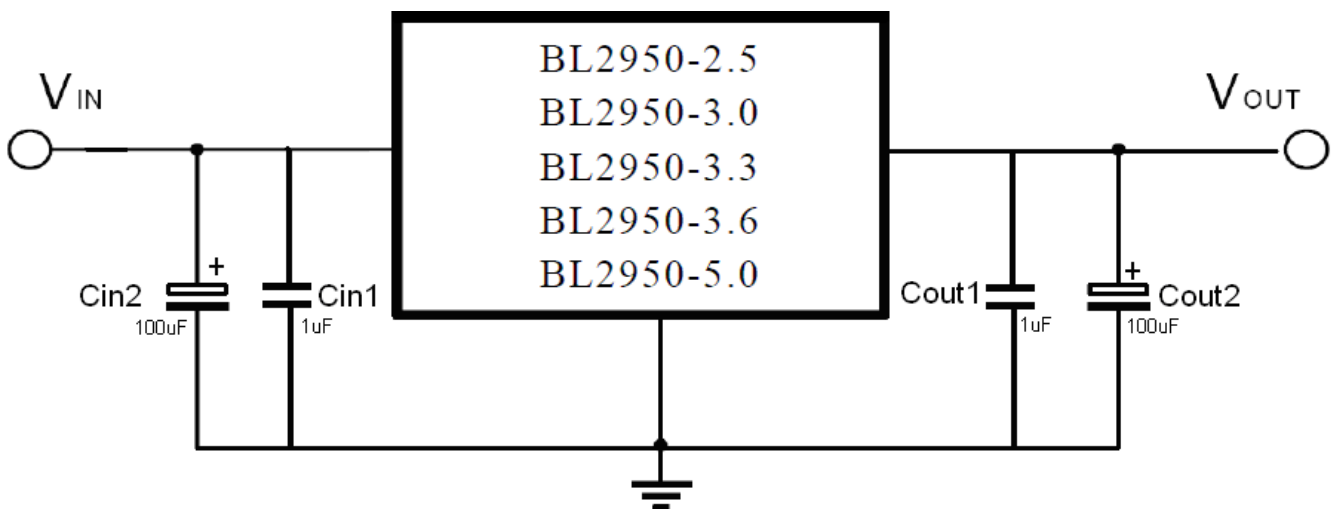
*1. Additional conditions for 8-pin versions are FB pin tied to $5V_{TAP}$, Output tied to Sense ($V_{OUT}=5V$) and $V_{SHDN} \leq 0.8V$

*2. Dropout Voltage is defined as the input to output differential at which the output voltage drops 100mV below its nominal value measured at 1V differential.

*3. Comparator thresholds are expressed in terms of percentage value of voltage output.

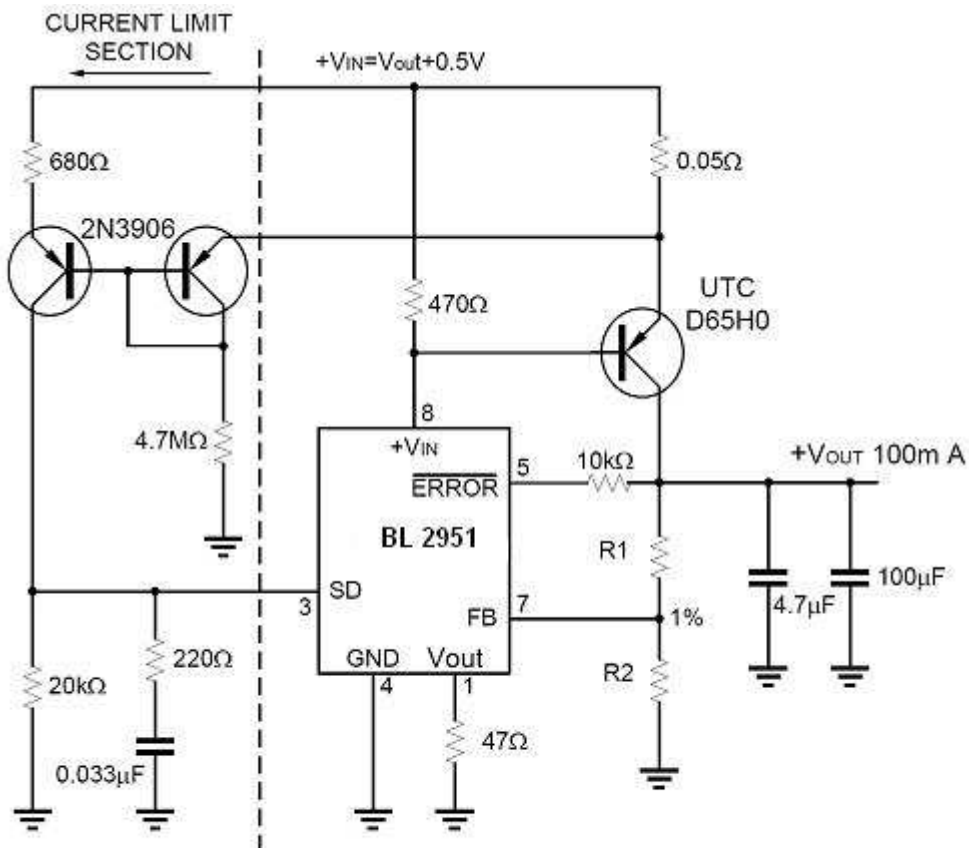
*4. $V_{REF} \leq V_{OUT} \leq (V_{IN}-1V)$, $2.3V \leq V_{IN} \leq 30V$, $100\mu A \leq I_L \leq 100mA$, $T_J \leq T_{J(MAX)}$

APPLICATION CIRCUITS



Note:

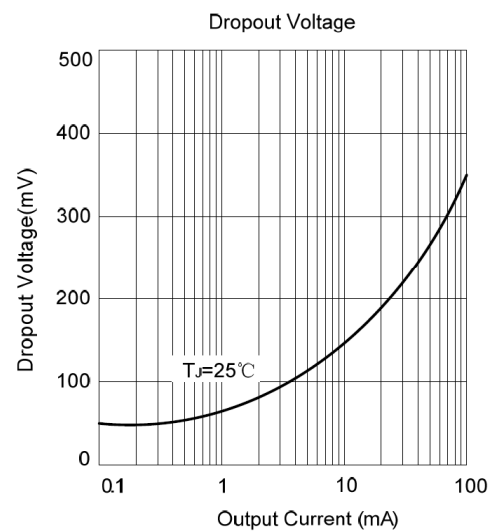
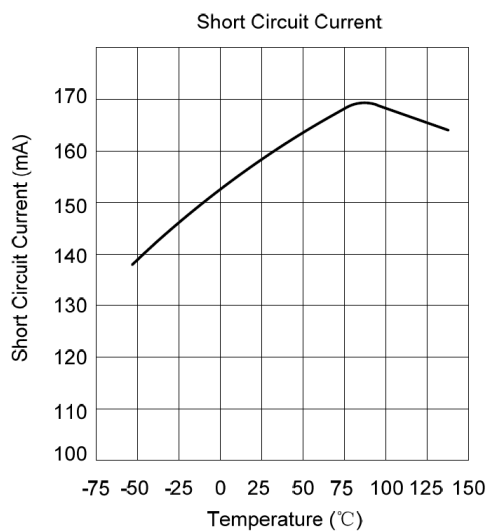
1. Please use a capacitor C_{in1} with $1\mu F$ or more between V_{IN} and GND pin. ($C_{in1} \geq 1\mu F$)
2. Please use a capacitor C_{out1} with $1\mu F$ or more between V_{OUT} and GND pin. ($C_{out1} \geq 1\mu F$)

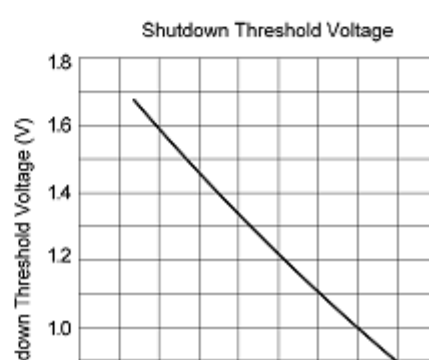
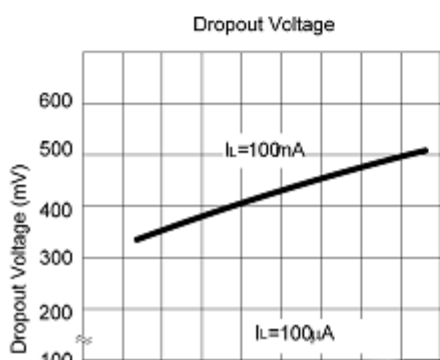
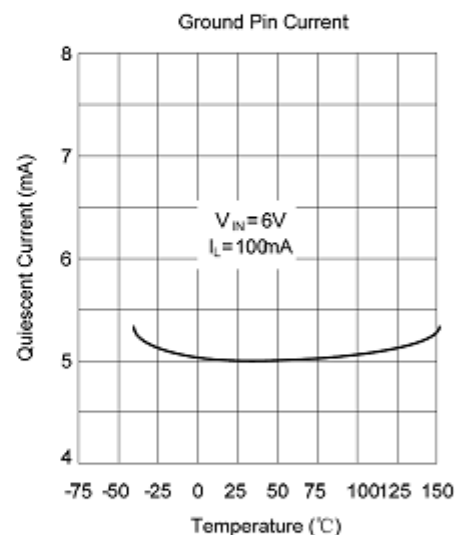
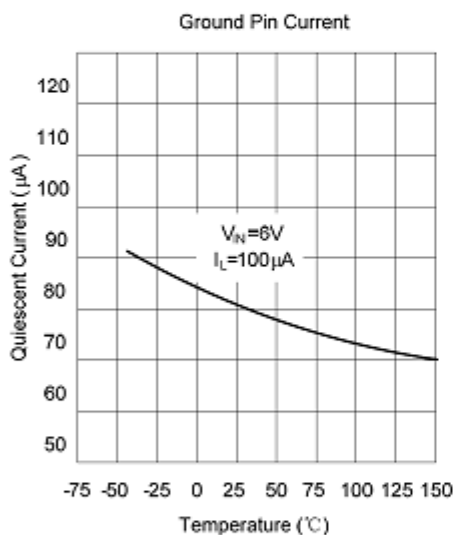
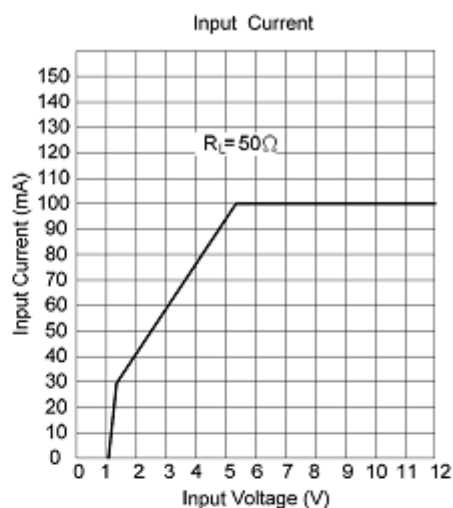
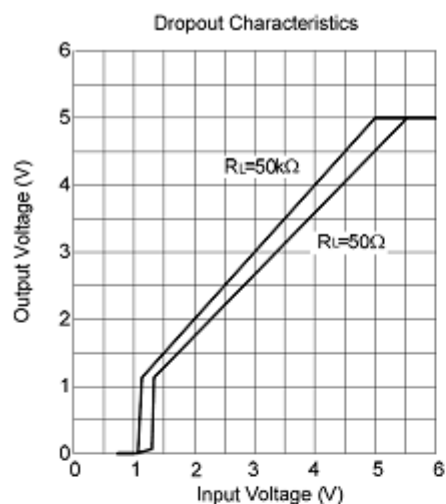


$$V_{OUT} = 1.23V \cdot (1 + R1/R2)$$

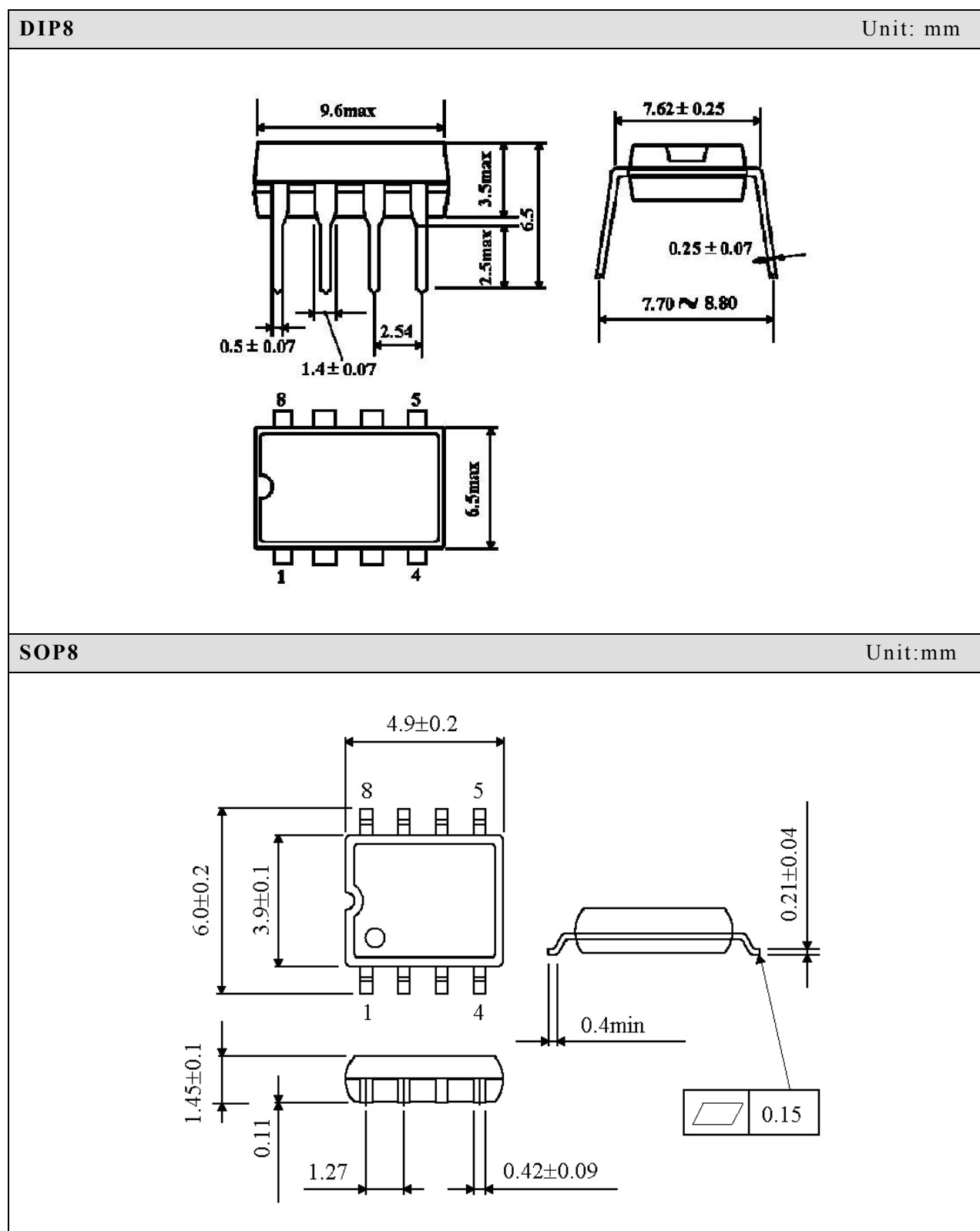
For 5V output use internal resistors. Wire pin 6 to 7 and wire pin 2 to +Vout

CHARACTERISTICS CURVE



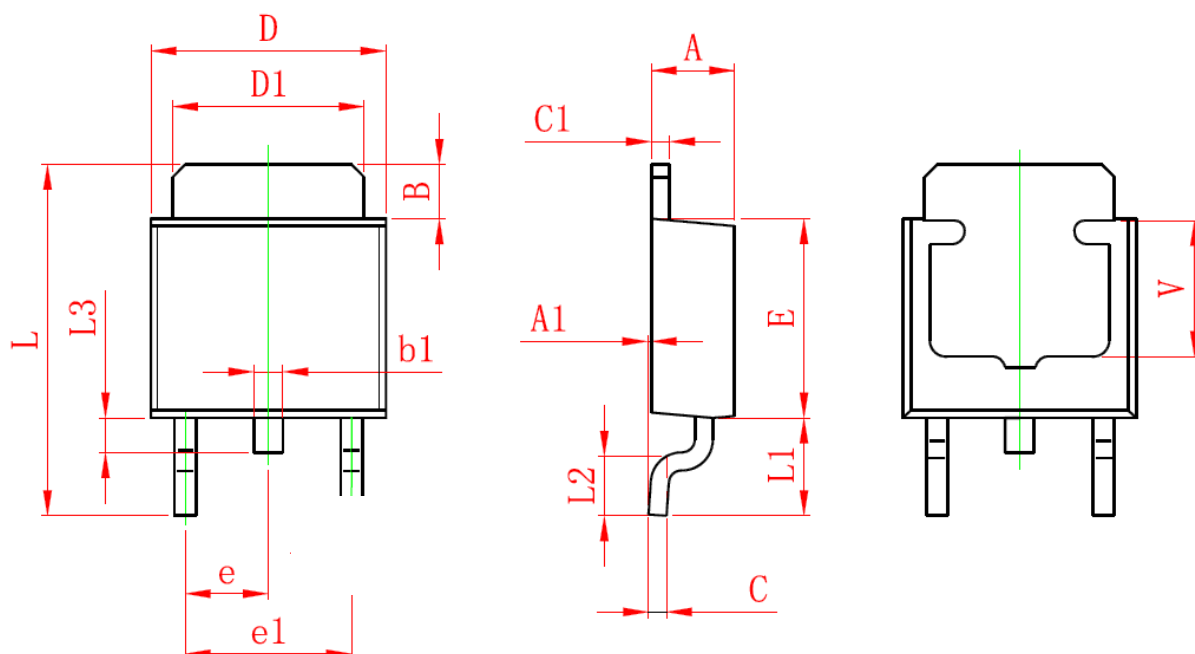


OUTLINE DRAWING



TO-252

Unit: mm



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300 TYP.		0.091 TYP.	
e1	4.500	4.700	0.177	0.185
L	9.500	9.900	0.374	0.390
L1	2.550	2.900	0.100	0.114
L2	1.400	1.780	0.055	0.070
L3	0.600	0.900	0.024	0.035
V	3.800 REF.		0.150 REF.	

TO-92

Unit:mm

