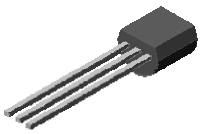
SN78Lxxx

3 Terminal Positive Voltage Regulator

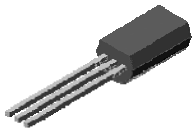
KODENSHI AUK

Semiconductor

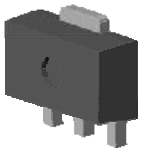
http:// www.auk.co.kr



TO-92



TO-92L



SOT-89

ORDERING INFORMATION

Product	Marking	Package
SN78Lxx	78Lxx	TO-92
SN78LxxL	78Lxx	TO-92L
SN78LxxF	78Lxx	SOT-89

▲ **Marking Detail Information**

78Lxx (①) GYWW (②)

① Device Code

② Grade & Year & Week Code

Description

The SN78Lxxx series are three-terminal positive regulators providing over 150mA output current with internal current limiting, thermal shutdown and safe area protection. These regulators are useful in a wide range of applications. Although they are just fixed voltage regulators, the SN78Lxxx series can be used with external components to obtain adjustable voltages and Currents. It also contains the TCE Cell to protect internal circuit from ESD damage.

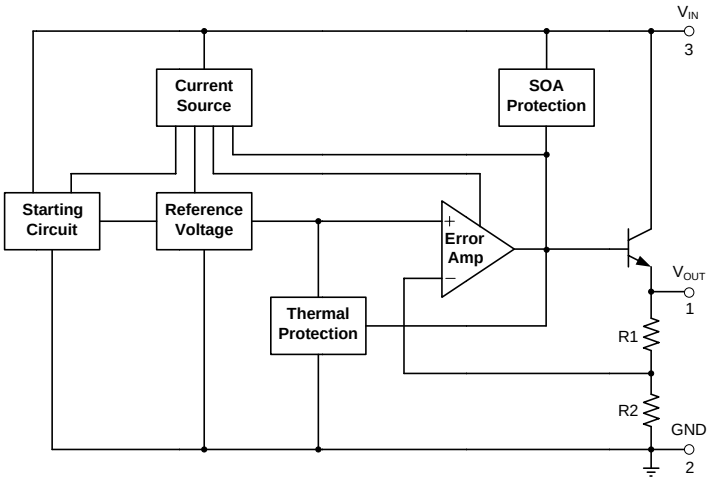
Application

- Consumer and personal electronics
- SMPS post-regulator / dc-to-dc modules
- High-efficiency linear power supplies

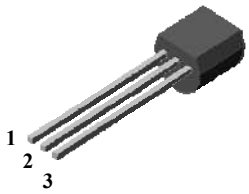
Features and Benefits

- Maximum Output Current up to 150mA
- Output Voltage : 5, 6, 8, 9, 10, 12, 15, 18, 24V
- Built in OVP, Short Circuit Current Limiting.
- Built in TSD Protection.
- No External Components Required.
- Ultra High level of ESD [Built in ESD Protection Cell]
  MM : 500V / HBM 5KV ↑

Equivalent Circuit



◈ Pin Configuration

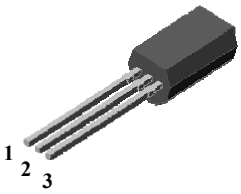


TO-92

1: V_{OUT}

2: GND

3: V_{IN}

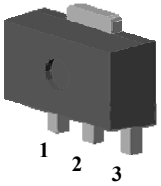


TO-92L

1: V_{OUT}

2: GND

3: V_{IN}



SOT-89

1: V_{OUT}

2: GND

3: V_{IN}

◈ Product Line-up

Product Name	V_{OUT}	Operating Junction Temperature	Package
SN78L05	5.0V	-40~125℃	TO-92
SN78L06	6.0V	-40~125℃	TO-92
SN78L08	8.0V	-40~125℃	TO-92
SN78L09	9.0V	-40~125℃	TO-92
SN78L10	10V	-40~125℃	TO-92
SN78L12	12V	-40~125℃	TO-92
SN78L15	15V	-40~125℃	TO-92
SN78L18	18V	-40~125℃	TO-92
SN78L24	24V	-40~125℃	TO-92
SN78L05L	5.0V	-40~125℃	TO-92L
SN78L06L	6.0V	-40~125℃	TO-92L
SN78L08L	8.0V	-40~125℃	TO-92L
SN78L09L	9.0V	-40~125℃	TO-92L
SN78L10L	10V	-40~125℃	TO-92L
SN78L12L	12V	-40~125℃	TO-92L
SN78L15L	15V	-40~125℃	TO-92L
SN78L18L	18V	-40~125℃	TO-92L
SN78L24L	24V	-40~125℃	TO-92L
SN78L05F	5.0V	-40~125℃	SOT-89
SN78L06F	6.0V	-40~125℃	SOT-89
SN78L08F	8.0V	-40~125℃	SOT-89
SN78L09F	9.0V	-40~125℃	SOT-89
SN78L10F	10V	-40~125℃	SOT-89
SN78L12F	12V	-40~125℃	SOT-89
SN78L15F	15V	-40~125℃	SOT-89
SN78L18F	18V	-40~125℃	SOT-89
SN78L24F	24V	-40~125℃	SOT-89

◈ Absolute Maximum Ratings (Ta = 25℃)

Parameter		Symbol	Limits	Unit
Input Voltage		V_{IN}	40.0 (V_O = 24V)	V
			35.0 (V_O = 12 to 18V)	
			30.0 (V_O = 5 to 10V)	
Power Dissipation	TO-92	P_d	625	mW
	TO-92L		800	mW
	SOT-89		800	mW
Junction Temperature		T_J	150	℃
Operating Junction Temperature Range		T_{opr}	-40 ~ +125	℃
Storage Temperature Range		T_{stg}	-55 ~ +150	℃

Absolute maximum ratings indicate limits beyond which damage to the component may occur. Electrical specifications do not apply when operating the device outside of its operating ratings. The maximum allowable power dissipation is a function of the maximum junction temperature, $T_{J(max)}$, the junction-to-ambient thermal resistance, θ_{JA}, and the ambient temperature, TA.
The maximum allowable power dissipation at any ambient temperature is calculated using:
$PD(max) = (T_{J(max)} - T_A) \div \theta_{JA}$. Exceeding the maximum allowable power dissipation will result in excessive die temperature, and the regulator will go into thermal shutdown.

◈ Electrical characteristics

(V_{IN}=10V, C_{IN} = 0.33uF, C_{OUT} = 0.1 uF, I_{OUT} = 40mA, T_J=0℃~125℃ ; unless otherwise specified)

Characteristic	Symbol	Test Condition*		SN78L05x			Unit
				Min.	Typ.	Max.	
Output Voltage**	V_O	T_J =25℃		4.80	5.0	5.20	V
		7.0V ≤ V_{IN} ≤ 20.0V 1.0mA ≤ I_O ≤ 40mA		4.75	5.0	5.25	
Line Regulation	$\triangle V_{O(\triangle VI)}$	7.0V ≤ V_{IN} ≤ 20.0V	T_J =25℃	-	8.0	150	mV
		8.0V ≤ V_{IN} ≤ 20.0V		-	6.0	100	
Load Regulation	$\triangle V_{O(\triangle IL)}$	1.0mA ≤ I_O ≤ 100 mA	T_J =25℃	-	11	60	mV
		1.0mA ≤ I_O ≤ 40 mA		-	5.0	30	
Quiescent Current	I_{QC}	T_J =25℃		-	2.0	5.5	mA
Quiescent Current Change	$\triangle I_{QC}$	8.0V ≤ V_{IN} ≤ 20V		-	-	1.5	mA
		1.0mA ≤ I_O ≤ 40mA		-	-	0.1	
Ripple Rejection	RR	8.0V ≤ V_{IN} ≤ 18.0V f=120 Hz		41	80	-	dB
Dropout Voltage	V_{DROP}	T_J =25℃		-	1.7	-	V
Output Noise Voltage	V_N	10Hz ≤ f ≤ 100kHz	T_A =25℃	-	40	-	uV/ V_O
Temperature coefficient of Output voltage	$\triangle V_O$/ $\triangle$Temp	I_O=5.0 mA		-	-0.65	-	mV/℃

* Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into separately.

** This specification applies only for dc power dissipation permitted by absolute maximum ratings.

◈ Electrical characteristics

(V_{IN}=12V, C_{IN} = 0.33uF, C_{OUT} = 0.1 uF, I_{OUT} = 40mA, T_J=0℃~125℃ ; unless otherwise specified)

Characteristic	Symbol	Test Condition*		SN78L06x			Unit
				Min.	Typ.	Max.	
Output Voltage**	V_O	T_J =25℃		5.75	6.0	6.25	V
		8.5V ≤ V_{IN} ≤ 20V 1.0mA ≤ I_O ≤ 40mA		5.70	6.0	6.30	
Line Regulation	$\triangle V_{O(\triangle VI)}$	8.5V ≤ V_{IN} ≤ 20.0V	T_J =25℃	-	64	175	mV
		9.0V ≤ V_{IN} ≤ 20.0V		-	54	125	
Load Regulation	$\triangle V_{O(\triangle IL)}$	1.0mA ≤ I_O ≤ 100mA	T_J =25℃	-	12.8	80	mV
		1.0mA ≤ I_O ≤ 70 mA		-	5.8	40	
Quiescent Current	I_{QC}	T_J =25℃		-	-	5.5	mA
Quiescent Current Change	$\triangle I_{QC}$	9.0V ≤ V_{IN} ≤ 20.0V		-	-	1.5	mA
		1.0mA ≤ I_O ≤ 40mA		-	-	0.1	
Ripple Rejection	RR	10.0V ≤ V_{IN} ≤ 20.0V f=120 Hz		40	46	-	dB
Dropout Voltage	V_{DROP}	T_J =25℃		-	1.7	-	V
Output Noise Voltage	V_N	10Hz ≤ f ≤ 100kHz	T_A =25℃	-	40	-	uV/ V_O
Temperature coefficient of Output voltage	$\triangle V_O$/ $\triangle$Temp	I_O=5.0 mA		-	0.75	-	mV/℃

* Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into separately.

** This specification applies only for dc power dissipation permitted by absolute maximum ratings.

◈ Electrical characteristics

(V_{IN}=14V, C_{IN} = 0.33uF, C_{OUT} = 0.1 uF, I_{OUT} = 40mA, T_J=0℃~125℃ ; unless otherwise specified)

Characteristic	Symbol	Test Condition*		SN78L08x			Unit
				Min.	Typ.	Max.	
Output Voltage**	V_O	T_J =25℃		7.7	8.0	8.3	V
		10.5V ≤ V_{IN} ≤ 23.0V 1.0mA ≤ I_O ≤ 40mA		7.6	8.0	8.4	
Line Regulation	$\triangle V_{O(\triangle VI)}$	10.5V ≤ V_{IN} ≤ 23.0V	T_J =25℃	-	10	175	mV
		11.0V ≤ V_{IN} ≤ 23.0V		-	8.0	125	
Load Regulation	$\triangle V_{O(\triangle IL)}$	1.0mA ≤ I_O ≤ 100mA	T_J =25℃	-	15	80	mV
		1.0mA ≤ I_O ≤ 40 mA		-	8.0	40	
Quiescent Current	I_{QC}	T_J =25℃		-	2.0	5.5	mA
Quiescent Current Change	$\triangle I_{QC}$	11.0V ≤ V_{IN} ≤ 23.0V		-	-	1.5	mA
		1.0mA ≤ I_O ≤ 40mA		-	-	0.1	
Ripple Rejection	RR	11.5=0V ≤ V_{IN} ≤ 21.0V f=120 Hz		39	70	-	dB
Dropout Voltage	V_{DROP}	T_J =25℃		-	1.7	-	V
Output Noise Voltage	V_N	10Hz ≤ f ≤ 100kHz	T_A =25℃	-	60	-	uV/ V_O
Temperature coefficient of Output voltage	$\triangle V_O$/ $\triangle$Temp	I_O=5.0 mA		-	-0.8	-	mV/℃

* Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into separately.

** This specification applies only for dc power dissipation permitted by absolute maximum ratings.

◈ Electrical characteristics

(V_{IN}=15V, C_{IN} = 0.33uF, C_{OUT} = 0.1 uF, I_{OUT} = 40mA, T_J=0℃~125℃ ; unless otherwise specified)

Characteristic	Symbol	Test Condition*		SN78L09x			Unit
				Min.	Typ.	Max.	
Output Voltage**	V_O	T_J =25℃		8.64	9.0	9.36	V
		11.5V ≤ V_{IN} ≤ 24.0V 1.0mA ≤ I_O ≤ 40mA		8.55	9.0	9.45	
Line Regulation	$\triangle V_{O(\triangle VI)}$	11.5V ≤ V_{IN} ≤ 24.0V	T_J =25℃	-	90	200	mV
		13.0V ≤ V_{IN} ≤ 24.0V		-	100	150	
Load Regulation	$\triangle V_{O(\triangle IL)}$	1.0mA ≤ I_O ≤ 100mA	T_J =25℃	-	20	90	mV
		1.0mA ≤ I_O ≤ 40mA		-	10	45	
Quiescent Current	I_{QC}	T_J =25℃		-	2.1	6.0	mA
Quiescent Current Change	$\triangle I_{QC}$	13.0V ≤ V_{IN} ≤ 24.0V		-	-	1.5	mA
		1.0mA ≤ I_O ≤ 40mA		-	-	0.1	
Ripple Rejection	RR	12.0V ≤ V_{IN} ≤ 22.0V f=120 Hz		38	44	-	dB
Dropout Voltage	V_{DROP}	T_J =25℃		-	2.0	-	V
Output Noise Voltage	V_N	10Hz ≤ f ≤ 100kHz	T_A =25℃	-	70	-	uV/ V_O
Temperature coefficient of Output voltage	$\triangle V_O$/ $\triangle$Temp	I_O=5.0 mA		-	-0.9	-	mV/℃

* Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into separately.

** This specification applies only for dc power dissipation permitted by absolute maximum ratings.

◈ Electrical characteristics

(V_{IN}=16V, C_{IN} = 0.33uF, C_{OUT} = 0.1 uF, I_{OUT} = 40mA, T_J=0℃~125℃ ; unless otherwise specified)

Characteristic	Symbol	Test Condition*		SN78L10x			Unit
				Min.	Typ.	Max.	
Output Voltage**	V_O	T_J =25℃		9.6	10.0	10.4	V
		12.5V ≤ V_{IN} ≤ 25.0V 1.0mA ≤ I_O ≤ 40mA		9.5	10.0	10.5	
Line Regulation	$\triangle V_{O(\triangle VI)}$	12.5V ≤ V_{IN} ≤ 25.0V	T_J =25℃	-	100	220	mV
		14.0V ≤ V_{IN} ≤ 25.0V		-	100	170	
Load Regulation	$\triangle V_{O(\triangle IL)}$	1.0mA ≤ I_O ≤ 100mA	T_J =25℃	-	20	94	mV
		1.0mA ≤ I_O ≤ 40mA		-	10	47	
Quiescent Current	I_{QC}	T_J =25℃		-	-	6.0	mA
Quiescent Current Change	$\triangle I_{QC}$	12.5V ≤ V_{IN} ≤ 25V		-	-	1.5	mA
		1.0mA ≤ I_O ≤ 40mA		-	-	0.1	
Ripple Rejection	RR	15.0V ≤ V_{IN} ≤ 25.0V f=120 Hz		38	43	-	dB
Dropout Voltage	V_{DROP}	T_J =25℃		-	1.7	-	V
Output Noise Voltage	V_N	10Hz ≤ f ≤ 100kHz	T_A =25℃	-	74	-	uV/ V_O
Temperature coefficient of Output voltage	$\triangle V_O$/ $\triangle$Temp	I_O=5.0 mA		-	0.95	-	mV/℃

* Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into separately.

** This specification applies only for dc power dissipation permitted by absolute maximum ratings.

◈ Electrical characteristics

(V_{IN}=19V, C_{IN} = 0.33uF, C_{OUT} = 0.1 uF, I_{OUT} = 40mA, T_J=0℃~125℃ ; unless otherwise specified)

Characteristic	Symbol	Test Condition*		SN78L12x			Unit
				Min.	Typ.	Max.	
Output Voltage**	V_O	T_J =25℃		11.5	12.0	12.5	V
		14.5V ≤ V_{IN} ≤ 27.0V 1.0mA ≤ I_O ≤ 40mA		11.4	12.0	12.6	
Line Regulation	$\triangle V_{O(\triangle VI)}$	14.5V ≤ V_{IN} ≤ 27.0V	T_J =25℃	-	20	250	mV
		16.0V ≤ V_{IN} ≤ 27.0V		-	15	200	
Load Regulation	$\triangle V_{O(\triangle IL)}$	1.0mA ≤ I_O ≤ 100mA	T_J =25℃	-	20	100	mV
		1.0mA ≤ I_O ≤ 40mA		-	10	50	
Quiescent Current	I_{QC}	T_J =25℃		-	2.1	6.0	mA
Quiescent Current Change	$\triangle I_{QC}$	16.0V ≤ V_{IN} ≤ 27.0V		-	-	1.5	mA
		1.0mA ≤ I_O ≤ 40mA		-	-	0.1	
Ripple Rejection	RR	15.0V ≤ V_{IN} ≤ 25.0V, f=120 Hz		37	65	-	dB
Dropout Voltage	V_{DROP}	T_J =25℃		-	2.0	-	V
Output Noise Voltage	V_N	10Hz ≤ f ≤ 100kHz	T_A =25℃	-	80	-	uV/ V_O
Temperature coefficient of Output voltage	$\triangle V_O$/ $\triangle$Temp	I_O=5.0 mA		-	-1.0	-	mV/℃

* Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into separately.

** This specification applies only for dc power dissipation permitted by absolute maximum ratings.

◈ Electrical characteristics

(V_{IN}=23V, C_{IN} = 0.33uF, C_{OUT} = 0.1 uF, I_{OUT} = 40mA, T_J=0℃~125℃ ; unless otherwise specified)

Characteristic	Symbol	Test Condition*		SN78L15x			Unit
				Min.	Typ.	Max.	
Output Voltage**	V_O	T_J =25℃		14.4	15.0	15.6	V
		17.5V ≤ V_{IN} ≤ 30.0V 1.0mA ≤ I_O ≤ 40mA		14.25	15.0	15.75	
Line Regulation	$\triangle V_{O(\triangle VI)}$	17.5V ≤ V_{IN} ≤ 30.0V	T_J =25℃	-	25	300	mV
		20.0V ≤ V_{IN} ≤ 30.0V		-	20	250	
Load Regulation	$\triangle V_{O(\triangle IL)}$	1.0mA ≤ I_O ≤ 100mA	T_J =25℃	-	25	150	mV
		1.0mA ≤ I_O ≤ 40mA		-	12	75	
Quiescent Current	I_{QC}	T_J =25℃		-	2.1	6.0	mA
Quiescent Current Change	$\triangle I_{QC}$	20.0V ≤ V_{IN} ≤ 30.0V		-	-	1.5	mA
		1.0mA ≤ I_O ≤ 40mA		-	-	0.1	
Ripple Rejection	RR	18.5V ≤ V_{IN} ≤ 28.5V f=120 Hz		34	60	-	dB
Dropout Voltage	V_{DROP}	T_J =25℃		-	1.7	-	V
Output Noise Voltage	V_N	10Hz ≤ f ≤ 100kHz	T_A =25℃	-	90	-	uV/ V_O
Temperature coefficient of Output voltage	$\triangle V_O$/ $\triangle$Temp	I_O=5.0 mA		-	-1.3	-	mV/℃

* Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into separately.

** This specification applies only for dc power dissipation permitted by absolute maximum ratings.

◈ Electrical characteristics

(V_{IN}=27V, C_{IN} = 0.33uF, C_{OUT} = 0.1 uF, I_{OUT} = 40mA, T_J=0℃~125℃ ; unless otherwise specified)

Characteristic	Symbol	Test Condition*		SN78L18x			Unit
				Min.	Typ.	Max.	
Output Voltage**	V_O	T_J =25℃		17.3	18.0	18.7	V
		21.0V ≤ V_{IN} ≤ 33.0V 1.0mA ≤ I_O ≤ 40mA		17.1	18.0	18.9	
Line Regulation	$\triangle V_{O(\triangle VI)}$	21.0V ≤ V_{IN} ≤ 33.0V	T_J =25℃	-	145	300	mV
		22.0V ≤ V_{IN} ≤ 33.0V		-	135	250	
Load Regulation	$\triangle V_{O(\triangle IL)}$	1.0mA ≤ I_O ≤ 100mA	T_J =25℃	-	30	170	mV
		1.0mA ≤ I_O ≤ 40mA		-	15	85	
Quiescent Current	I_{QC}	T_J =25℃		-	2.2	6.0	mA
Quiescent Current Change	$\triangle I_{QC}$	21.0V ≤ V_{IN} ≤ 33.0V		-	-	1.5	mA
		1.0mA ≤ I_O ≤ 40mA		-	-	0.1	
Ripple Rejection	RR	23.0V ≤ V_{IN} ≤ 33.0V f=120 Hz		34	48	-	dB
Dropout Voltage	V_{DROP}	T_J =25℃		-	1.7	-	V
Output Noise Voltage	V_N	10Hz ≤ f ≤ 100kHz	T_A =25℃	-	150	-	uV/ V_O
Temperature coefficient of Output voltage	$\triangle V_O$/ $\triangle$Temp	I_O=5.0 mA		-	-1.8	-	mV/℃

* Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into separately.

** This specification applies only for dc power dissipation permitted by absolute maximum ratings.

◈ Electrical characteristics

(V_{IN}=33V, C_{IN} = 0.33uF, C_{OUT} = 0.1 uF, I_{OUT} = 40mA, T_J=0℃~125℃ ; unless otherwise specified)

Characteristic	Symbol	Test Condition*		SN78L24x			Unit
				Min.	Typ.	Max.	
Output Voltage**	V_O	T_J =25℃		23.0	24.0	25.0	V
		27.0V ≤ V_{IN} ≤ 38.0V 1.0mA ≤ I_O ≤ 40mA, P_D ≤ 15W		22.8	24.0	25.2	
Line Regulation	$\triangle V_{O(\triangle VI)}$	27.0V ≤ V_{IN} ≤ 38.0V	T_J =25℃	-	160	300	mV
		28.0V ≤ V_{IN} ≤ 38.0V		-	150	250	
Load Regulation	$\triangle V_{O(\triangle IL)}$	1.0mA ≤ I_O ≤ 100mA	T_J =25℃	-	40	200	mV
		1.0mA ≤ I_O ≤ 4mA		-	20	100	
Quiescent Current	I_{QC}	T_J =25℃		-	2.2	6.0	mA
Quiescent Current Change	$\triangle I_{QC}$	28.0V ≤ V_{IN} ≤ 38.0V		-	-	1.5	mA
		1.0mA ≤ I_O ≤ 40mA		-	-	0.1	
Ripple Rejection	RR	28.0V ≤ V_{IN} ≤ 38.0V f=120 Hz		34	45	-	dB
Dropout Voltage	V_{DROP}	T_J =25℃		-	1.7	-	V
Output Noise Voltage	V_N	10Hz ≤ f ≤ 100kHz	T_A =25℃	-	200	-	uV/ V_O
Temperature coefficient of Output voltage	$\triangle V_O$/ $\triangle$Temp	I_O=5.0 mA		-	-2.0	-	mV/℃

* Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into separately.

** This specification applies only for dc power dissipation permitted by absolute maximum ratings.

Fig.1 Quiescent Current vs. Junction Temperature

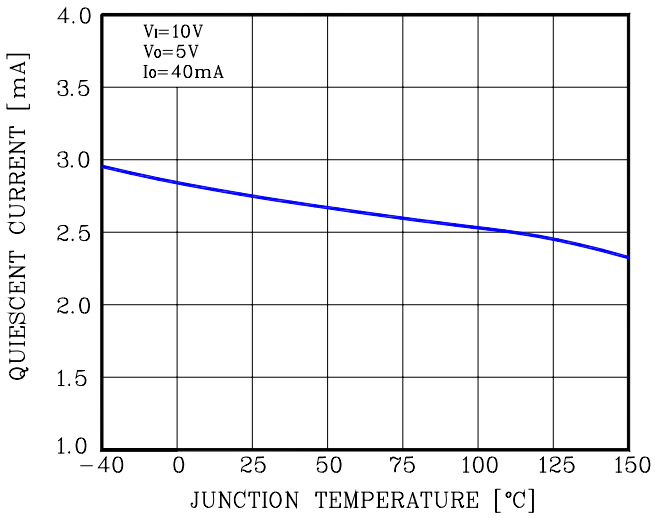


Fig.2 Output Peak Current vs. Input to Output Differential

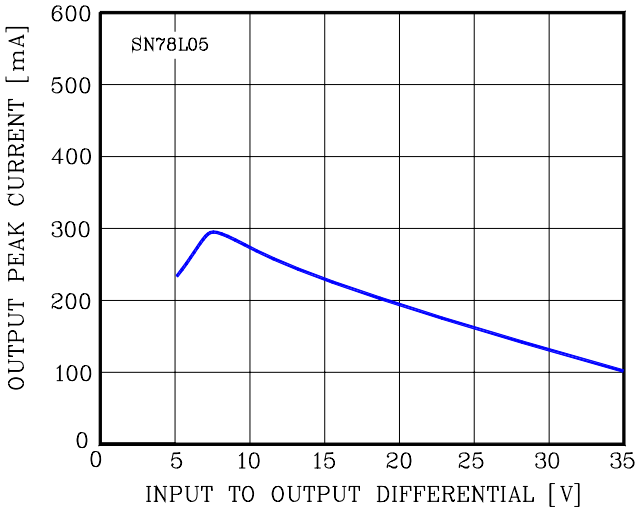


Fig.3 Output Voltage vs. Junction Temperature

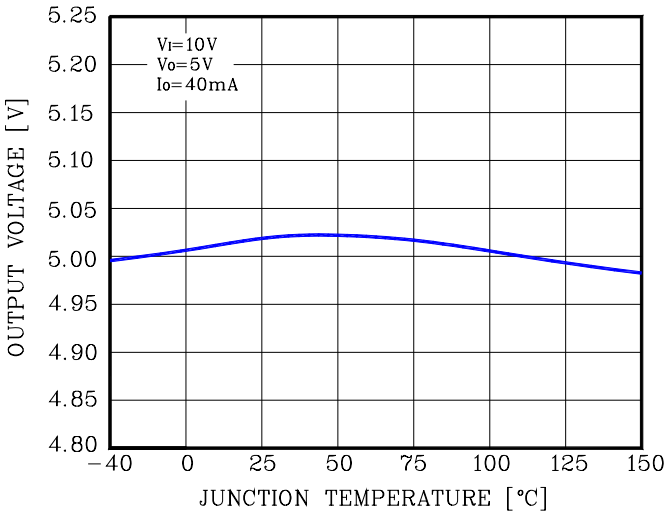


Fig.4 Dropout Voltage vs. Input Voltage

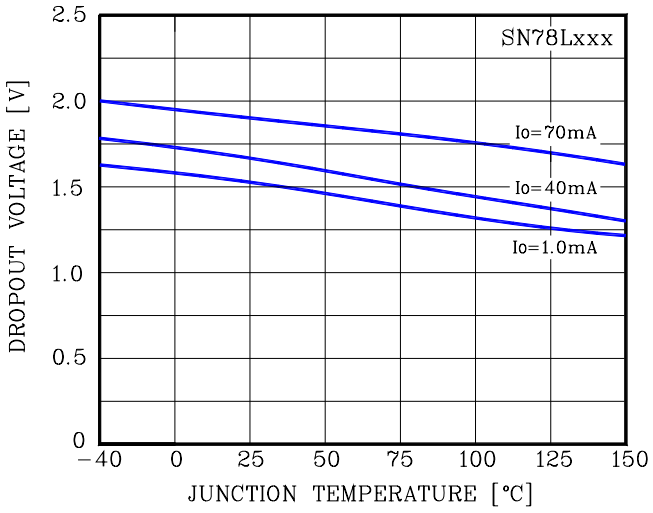


Fig.5 Line Transient Response

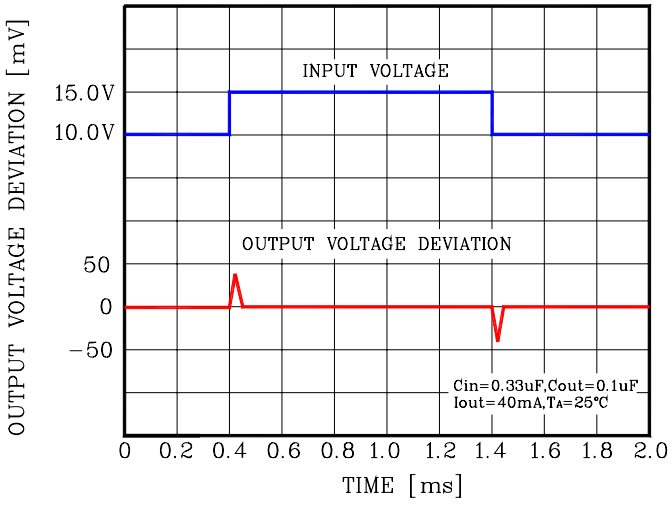
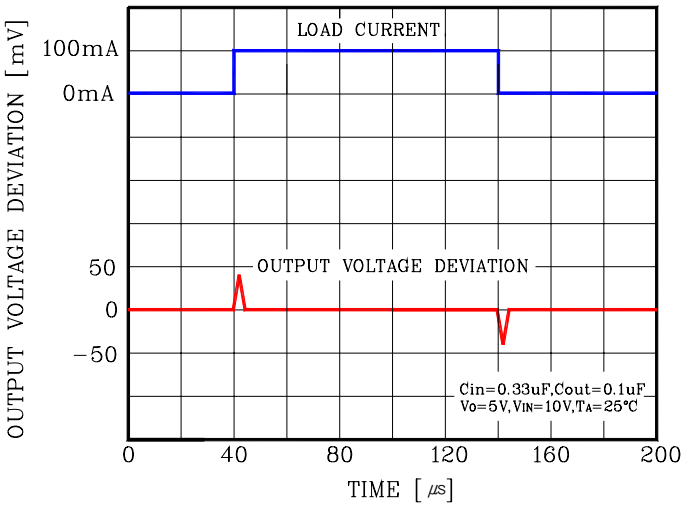
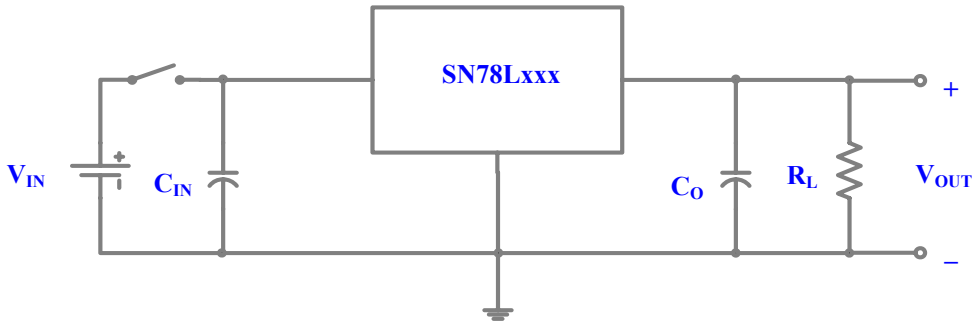


Fig.6 Load Transient Response



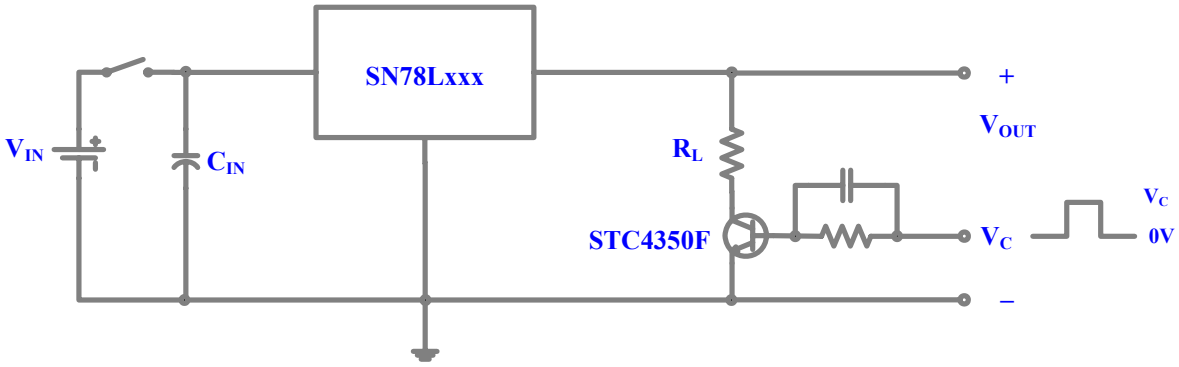
Typical Application

Fixed Output Regulator

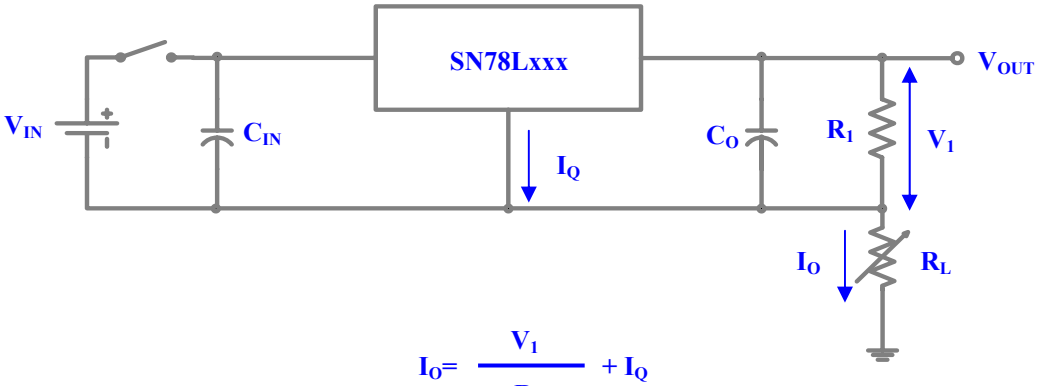


1) C_{IN} should be required if regulators are located far from power supply filter
2) C_O improves output stability and transient response

Load Regulation

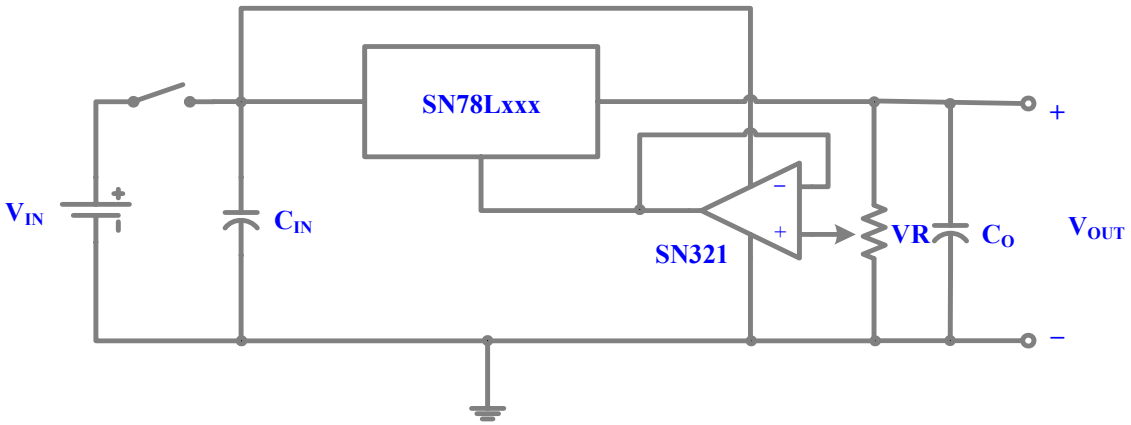


Constant Current Regulator

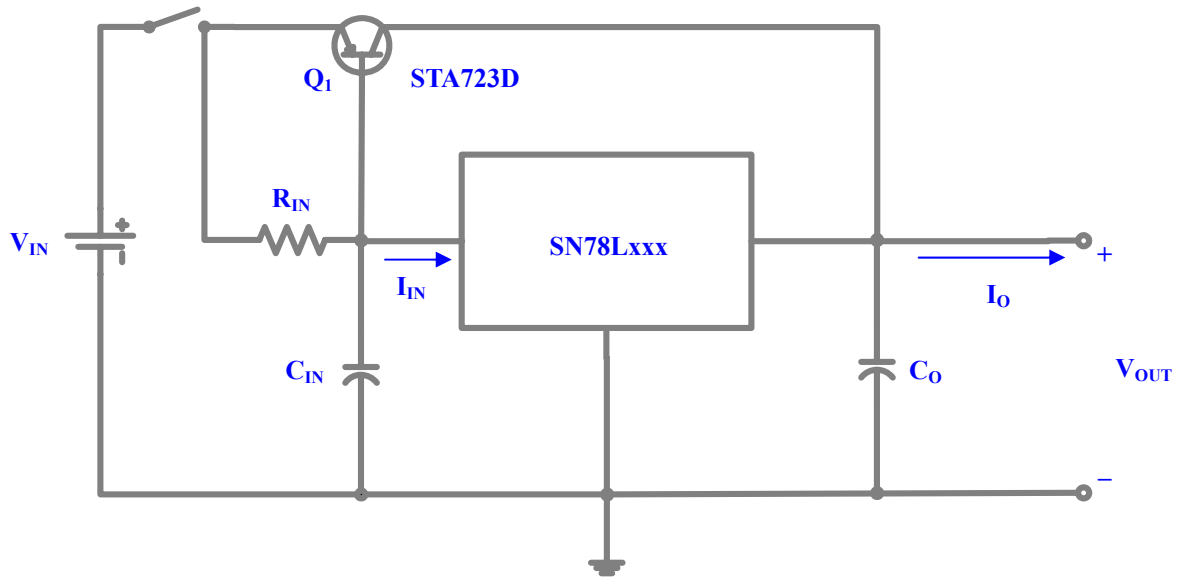


$$I_O = \frac{V_1}{R_1} + I_Q$$

Adjustable Output Regulator

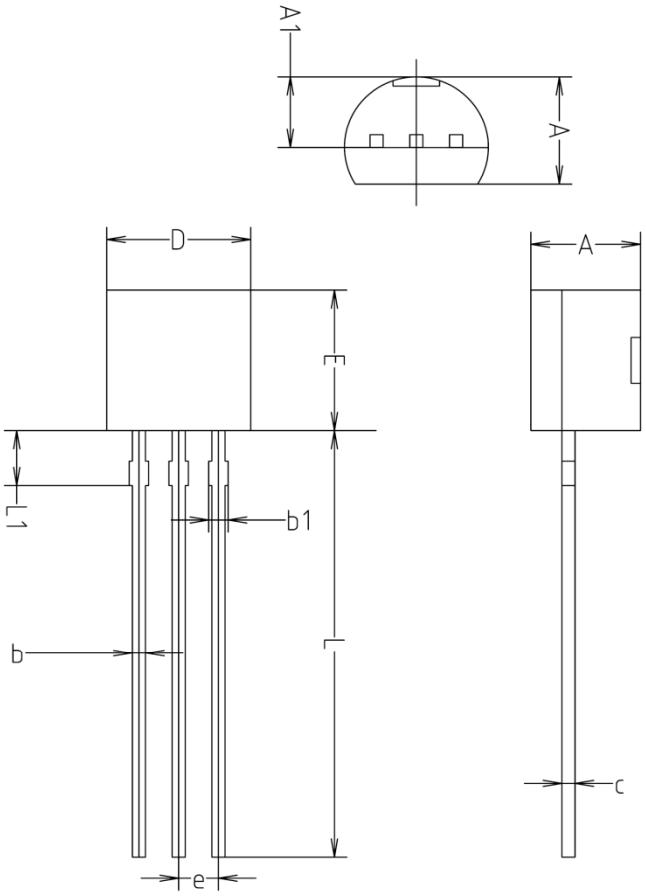


High Current Voltage Regulator



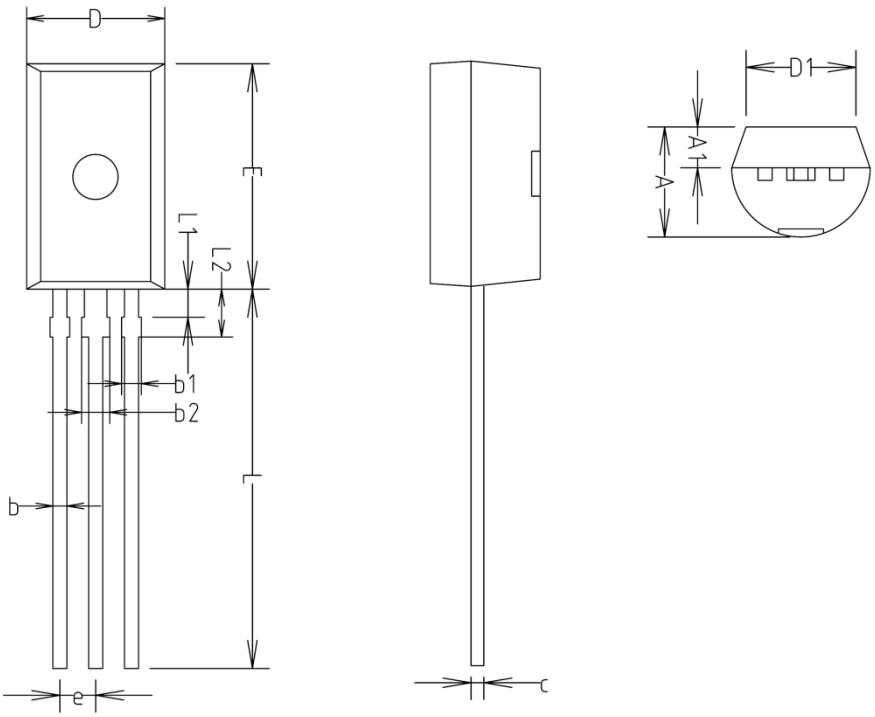
$$I_O = I_{IN} + \beta_{Q1}(I_{IN} - V_{BEQ1} / R_{IN})$$

◈ TO-92 Outline Dimension (Unit : mm)



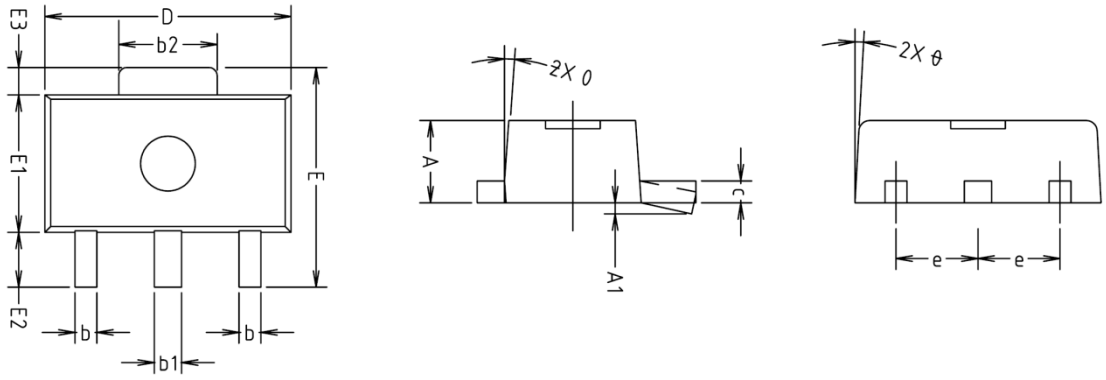
SYMBOL	MILLMETERS(mm)		
	MINIMUM	NOMINAL	MAXIMUM
A	3.40	3.50	3.66
A1	2.46	2.51	2.59
b	0.39	0.44	0.53
b1	0.39	–	0.63
c	0.35	0.42	0.47
D	4.48	4.60	4.70
E	4.48	4.60	4.70
e	1.17	1.27	1.37
L	13.70	14.00	14.77
L1	1.55	1.70	2.15

◈ TO-92L Outline Dimension (Unit : mm)



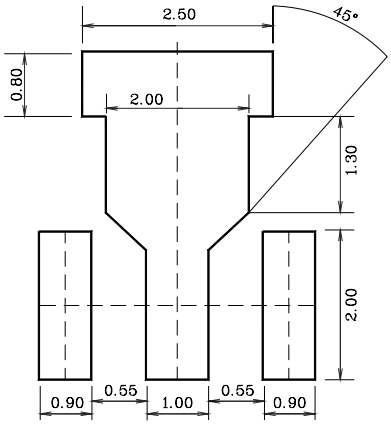
SYMBOL	MILLMETERS(mm)			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	3.70	3.90	4.10	
A1	1.25	1.45	1.65	
b	0.40	0.50	0.60	
b1	–	–	0.70	
b2	–	–	1.00	
c	0.35	0.45	0.55	
D	4.70	4.90	5.10	
D1	3.70	3.90	4.10	
E	7.80	8.00	8.20	
e	1.27 TYP			
L	13.10	13.50	13.90	
L1	0.90	1.00	1.10	
L2	1.50	1.70	1.90	

◈ SOT-89 Outline Dimension (Unit : mm)



SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	1.40	1.50	1.60	
A1	0.00	–	0.10	
b	0.38	0.42	0.48	
b1	0.48	0.52	0.58	
b2	1.79	1.82	1.87	
c	0.40	0.42	0.46	
D	4.40	4.50	4.70	
E	3.70	4.00	4.30	
E1	2.40	2.50	2.70	
E2	0.80	1.00	1.20	
E3	0.40	0.50	0.60	
e	1.50 TYP.			
θ	4° TYP.			

※ Recommend PCB solder land [Unit: mm]



The AUK Corp. products are intended for the use as components in general electronic equipment (Office and communication equipment, measuring equipment, home appliance, etc.).

Please make sure that you consult with us before you use these AUK Corp. products in equipments which require high quality and / or reliability, and in equipments which could have major impact to the welfare of human life(atomic energy control, airplane, spaceship, transportation, combustion control, all types of safety device, etc.). AUK Corp. cannot accept liability to any damage which may occur in case these AUK Corp. products were used in the mentioned equipments without prior consultation with AUK Corp..

Specifications mentioned in this publication are subject to change without notice.