Three Terminal Positive Voltage Regulator

Description

The YJ78L series are fixed-voltage monolithic integrated circuit voltage regulators. They can deliver up to 100mA of output current. In addition, the YJ78L series integrate internal current limit, short-circuit protection and thermal shutdown, so that they are basically not affected by overload. Therefore, the YJ78L series are widely used in various scenarios, such as on-card regulation for elimination of noise and distribution problems associated with single-point regulation.

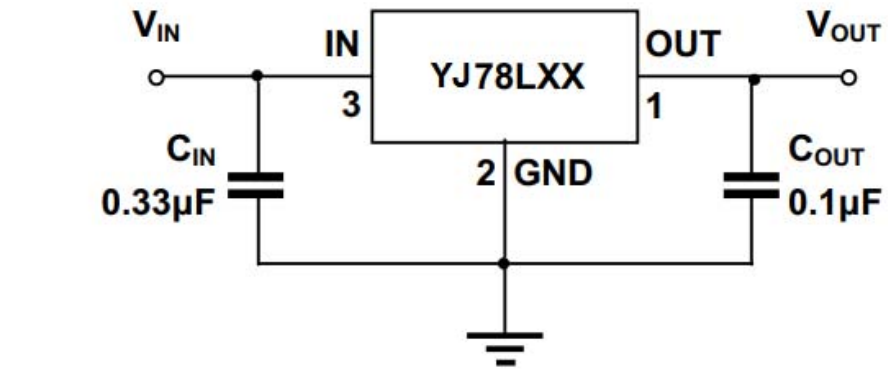
Features

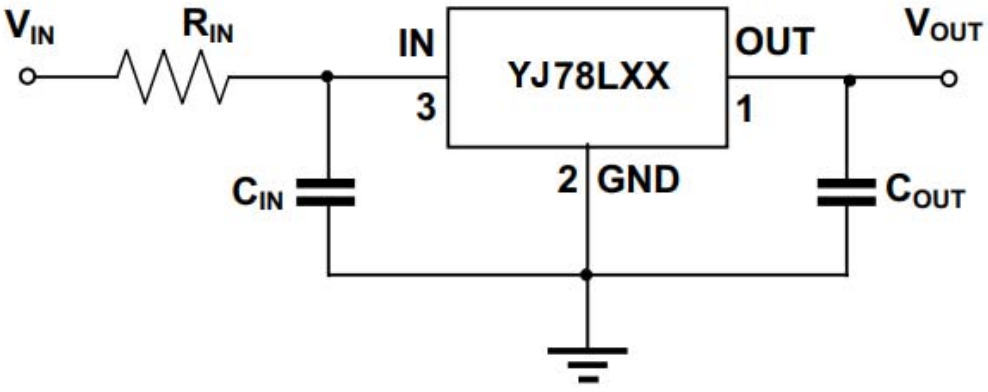
- Fixed Output Voltage of 5V,6V,8V,9V,10V, 12V,15V,18V and 24V Available.
- Output Current Up to 100mA.
- Thermal Overload Shutdown Protection.
- Short Circuit Protection.
- No External Components.

Applications

- TV Board
- Air Conditioner
- Vehicle Mounted Radar
- Charging Device

■Typical Application

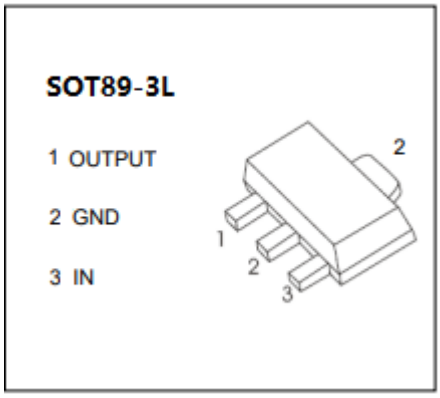




■Package and Ordering Information

Model	Part Number	Package Description	Temperature Range	Ordering Number	Marking Information	Packing Option
YJ78LXX	YJ78L05	SOT89-3L	-40°C ~ 125°C	YJ78L05LH3Y	78L05 YWWXXX	Tape & Reel 1000
	YJ78L06	SOT89-3L	-40°C ~ 125°C	YJ78L06LH3Y	78L06 YWWXXX	Tape & Reel 1000
	YJ78L08	SOT89-3L	-40°C ~ 125°C	YJ78L08LH3Y	78L08 YWWXXX	Tape & Reel 1000
	YJ78L09	SOT89-3L	-40°C ~ 125°C	YJ78L09LH3Y	78L09 YWWXXX	Tape & Reel 1000
	YJ78L10	SOT89-3L	-40°C ~ 125°C	YJ78L10LH3Y	78L10 YWWXXX	Tape & Reel 1000
	YJ78L12	SOT89-3L	-40°C ~ 125°C	YJ78L12LH3Y	78L12 YWWXXX	Tape & Reel 1000
	YJ78L15	SOT89-3L	-40°C ~ 125°C	YJ78L15LH3Y	78L15 YWWXXX	Tape & Reel 1000
	YJ78L18	SOT89-3L	-40°C ~ 125°C	YJ78L18LH3Y	78L18 YWWXXX	Tape & Reel 1000
	YJ78L24	SOT89-3L	-40°C ~ 125°C	YJ78L24LH3Y	78L24 YWWXXX	Tape & Reel 1000

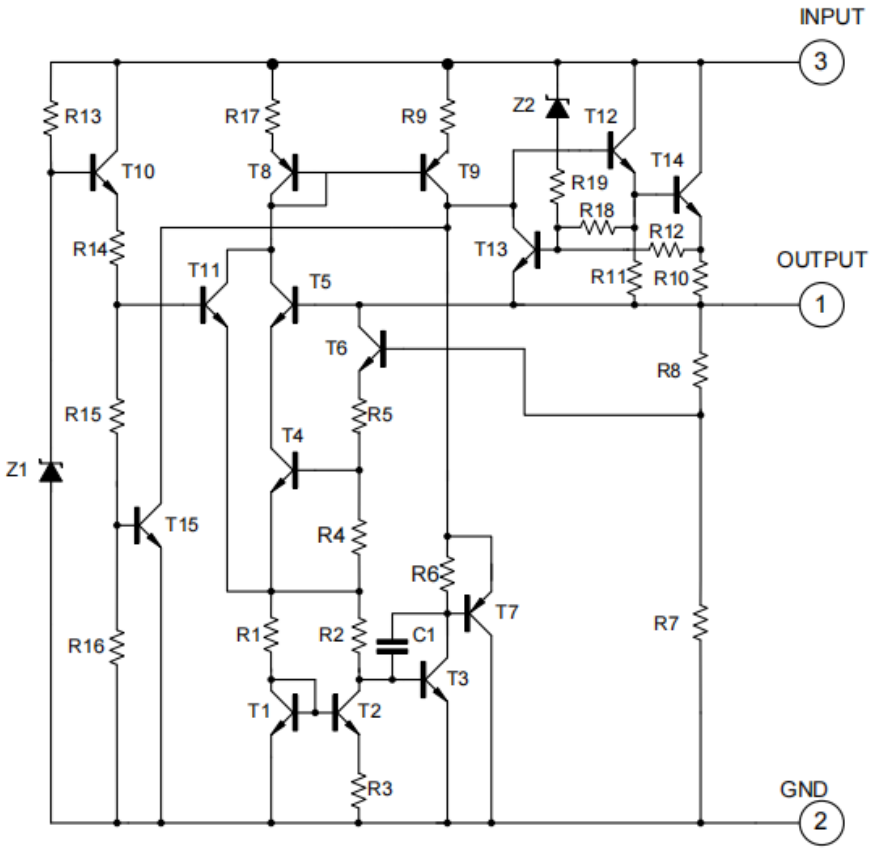
■Pin Configuration and Top Mark



78LXX：Part No.
XX：Output Voltage
YWW：Date Code
XXX：Tracking No.

XX	Output Voltage（V）	XX	Output Voltage（V）
05	5	12	12
06	6	15	15
08	8	18	18
09	9	24	24
10	10	-	-

■Functional Block Diagram



■Absolute Maximum Ratings (unless otherwise noted)

Parameter		Symbol	Ratings	Unit
DC Input Voltage	5V≤V_{OUT}≤10V	V_{IN}	30	V
	12V≤V_{OUT}≤18V		35	
	V_{OUT}=24V		40	
Operating Junction Temperature		T_J	-40 to +125	℃
Storage Temperature		T_{STG}	-65 to +150	℃
Lead Temperature (Soldering, 10sec)		T_{LEAD}	260	℃

Notes:

1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.
2. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
3. This condition is only determined from design. It can't be 100% tested in mass production.

■ Recommended Operating Ratings

Parameter		Symbol	Ratings		Unit
			Min	Max	
Input Voltage	YJ78L05	V_{IN}	7	20	V
	YJ78L06		8	20	
	YJ78L08		10.5	23	
	YJ78L09		11.5	24	
	YJ78L10		12.5	25	
	YJ78L12		14.5	27	
	YJ78L15		17.5	30	
	YJ78L18		20.5	33	
	YJ78L24		26.5	39	
Output Current		I_{OUT}	-	100	mA
Operating Junction Temperature		T_J	-40	125	℃

■ Electrical Characteristics (C_{IN}=0.33μF, C_{OUT}=0.1μF, unless otherwise noted)

For YJ78L05(V_{IN}=10V, I_O=40mA)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_{OUT}	T_J=25℃	4.8	5	5.2	V
		1mA≤I_{OUT}≤40mA, 7V≤V_{IN}≤20V	4.75	5	5.25	
		1mA ≤I_{OUT}≤70mA	4.75	5	5.25	
Line Regulation	LNR	7V≤V_{IN}≤20V, T_J=25℃	-	32	150	mV
		8V≤V_{IN}≤20V, T_J=25℃	-	26	100	
Load Regulation	LDR	1mA≤I_{OUT}≤100mA, T_J=25℃	-	15	60	mV
		1mA≤I_{OUT}≤40mA, T_J=25℃	-	8	30	
Dropout Voltage	V_{DROP}	T_J=25℃	-	1.7	-	V
Quiescent Current	I_Q	I_{OUT} =0, T_J=25℃	-	3.8	6	mA
		I_{OUT} =0, T_J=125℃	-	-	5.5	
Quiescent Current Change	ΔI_Q	8V≤V_{IN}≤20V	-	-	1.5	mA
		1mA ≤I_{OUT}≤40mA	-	-	0.1	
Ripple Rejection	PSRR	8V≤V_{IN}≤18V, f = 120Hz, T_J=25℃	41	49	-	dB
Output Noise Voltage	V_N	10Hz≤ f ≤100KHz, T_J=25℃	-	42	-	μV

For YJ78L06(V_{IN}=11V, I_O=40mA)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_{OUT}	T_J=25℃	5.75	6	6.25	V
		1mA≤I_{OUT}≤40mA, 8V≤V_{IN}≤20V	5.7	6	6.3	
		1mA≤I_{OUT}≤70mA	5.7	6	6.3	
Line Regulation	LNR	8V≤V_{IN}≤20V, T_J=25℃	-	35	175	mV
		9V≤V_{IN}≤20V, T_J=25℃	-	29	125	
Load Regulation	LDR	1mA≤I_{OUT}≤100mA, T_J=25℃	-	16	80	mV
		1mA≤I_{OUT}≤40mA, T_J=25℃	-	9	40	
Dropout Voltage	V_{DROP}	T_J=25℃	-	1.7	-	V
Quiescent Current	I_Q	I_{OUT} =0, T_J=25℃	-	3.9	6	mA
		I_{OUT} =0, T_J=125℃	-	-	5.5	
Quiescent Current Change	ΔI_Q	9V≤V_{IN}≤20V	-	-	1.5	mA
		1mA≤I_{OUT}≤40mA	-	-	0.1	
Ripple Rejection	PSRR	9V≤V_{IN}≤19V, f = 120Hz, T_J=25℃	40	48	-	dB
Output Noise Voltage	V_N	10Hz≤ f ≤100KHz, T_J=25℃	-	46	-	μV

For YJ78L08(V_{IN}=14V, I_O=40mA)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_{OUT}	T_J=25℃	7.7	8	8.3	V
		1mA≤I_{OUT}≤40mA, 10.5V≤V_{IN}≤23V	7.6	8	8.4	
		1mA≤I_{OUT}≤70mA	7.6	8	8.4	
Line Regulation	LNR	10.5V≤V_{IN}≤23V, T_J=25℃	-	42	175	mV
		11V≤V_{IN}≤23V, T_J=25℃	-	36	125	
Load Regulation	LDR	1mA≤I_{OUT}≤100mA, T_J=25℃	-	18	80	mV
		1mA≤I_{OUT}≤40mA, T_J=25℃	-	10	40	
Dropout Voltage	V_{DROP}	T_J=25℃	-	1.7	-	V
Quiescent Current	I_Q	I_{OUT} =0, T_J=25℃	-	4	6	mA
		I_{OUT} =0, T_J=125℃	-	-	5.5	
Quiescent Current Change	ΔI_Q	11V≤V_{IN}≤23V	-	-	1.5	mA
		1mA≤I_{OUT}≤40mA	-	-	0.1	
Ripple Rejection	PSRR	13V≤V_{IN}≤23V, f = 120Hz, T_J=25℃	37	46	-	dB
Output Noise Voltage	V_N	10Hz≤ f ≤100KHz, T_J=25℃	-	54	-	μV

For YJ78L09(V_{IN}=16V, I_O=40mA)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_{OUT}	T_J=25℃	8.6	9	9.4	V
		1mA≤I_{OUT}≤40mA, 12V≤V_{IN}≤24V	8.55	9	9.45	
		1mA≤I_{OUT}≤70mA	8.55	9	9.45	
Line Regulation	LNR	12V≤V_{IN}≤24V, T_J=25℃	-	45	175	mV
		13V≤V_{IN}≤24V, T_J=25℃	-	40	125	
Load Regulation	LDR	1mA≤I_{OUT}≤100mA, T_J=25℃	-	19	90	mV
		1mA≤I_{OUT}≤40mA, T_J=25℃	-	11	40	
Dropout Voltage	V_{DROP}	T_J=25℃	-	1.7	-	V
Quiescent Current	I_Q	I_{OUT} =0, T_J=25℃	-	4.1	6	mA
		I_{OUT} =0, T_J=125℃	-	-	5.5	
Quiescent Current Change	ΔI_Q	13V≤V_{IN}≤24V	-	-	1.5	mA
		1mA≤I_{OUT}≤40mA	-	-	0.1	
Ripple Rejection	PSRR	15V≤V_{IN}≤24V, f = 120Hz, T_J=25℃	38	45	-	dB
Output Noise Voltage	V_N	10Hz≤ f ≤100KHz, T_J=25℃	-	58	-	μV

For YJ78L10(V_{IN}=17V, I_O=40mA)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_{OUT}	T_J=25℃	9.6	10	10.4	V
		1mA≤I_{OUT}≤40mA, 13V≤V_{IN}≤25V	9.5	10	10.5	
		1mA ≤I_{OUT}≤70mA	9.5	10	10.5	
Line Regulation	LNR	13V≤V_{IN}≤25V, T_J=25℃	-	51	175	mV
		14V≤V_{IN}≤25V, T_J=25℃	-	42	125	
Load Regulation	LDR	1mA≤I_{OUT}≤100mA, T_J=25℃	-	20	90	mV
		1mA≤I_{OUT}≤40mA, T_J=25℃	-	11	40	
Dropout Voltage	V_{DROP}	T_J=25℃	-	1.7	-	V
Quiescent Current	I_Q	I_{OUT} =0, T_J=25℃	-	4.2	6	mA
		I_{OUT} =0, T_J=125℃	-	-	5.5	
Quiescent Current Change	ΔI_Q	14V≤V_{IN}≤25V	-	-	1.5	mA
		1mA≤I_{OUT}≤40mA	-	-	0.1	
Ripple Rejection	PSRR	15V≤V_{IN}≤25V, f = 120Hz, T_J=25℃	37	44	-	dB
Output Noise Voltage	V_N	10Hz≤ f ≤100KHz, T_J=25℃	-	62	-	μV

For YJ78L12(V_{IN}=19V, I_O=40mA)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_{OUT}	T_J=25℃	11.5	12	12.5	V
		1mA≤I_{OUT}≤40mA, 14.5V≤V_{IN}≤27V	11.4	12	12.6	
		1mA≤I_{OUT}≤70mA	11.4	12	12.6	
Line Regulation	LNR	14.5V≤V_{IN}≤27V, T_J=25℃	-	55	250	mV
		16V≤V_{IN}≤27V, T_J=25℃	-	49	200	
Load Regulation	LDR	1mA≤I_{OUT}≤100mA, T_J=25℃	-	22	100	mV
		1mA≤I_{OUT}≤40mA, T_J=25℃	-	13	50	
Dropout Voltage	V_{DROP}	T_J=25℃	-	1.7	-	V
Quiescent Current	I_Q	I_{OUT} =0, T_J=25℃	-	4.3	6.5	mA
		I_{OUT} =0, T_J=125℃	-	-	6	
Quiescent Current Change	ΔI_Q	16V≤V_{IN}≤27V	-	-	1.5	mA
		1mA ≤I_{OUT}≤40mA	-	-	0.1	
Ripple Rejection	PSRR	15V≤V_{IN}≤25V, f = 120Hz, T_J=25℃	37	42	-	dB
Output Noise Voltage	V_N	10Hz≤ f ≤100KHz, T_J=25℃	-	70	-	μV

For YJ78L15(V_{IN}=23V, I_O=40mA)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_{OUT}	T_J=25℃	14.4	15	15.6	V
		1mA≤I_{OUT}≤40mA, 17.5V≤V_{IN}≤30V	14.25	15	15.75	
		1mA≤I_{OUT}≤70mA	14.25	15	15.75	
Line Regulation	LNR	17.5V≤V_{IN}≤30V, T_J=25℃	-	65	300	mV
		19V≤V_{IN}≤30V, T_J=25℃	-	58	250	
Load Regulation	LDR	1mA≤I_{OUT}≤100mA, T_J=25℃	-	25	150	mV
		1mA≤I_{OUT}≤40mA, T_J=25℃	-	15	75	
Dropout Voltage	V_{DROP}	T_J=25℃	-	1.7	-	V
Quiescent Current	I_Q	I_{OUT} =0, T_J=25℃	-	4.6	6.5	mA
		I_{OUT} =0, T_J=125℃	-	-	6	
Quiescent Current Change	ΔI_Q	19V≤V_{IN}≤30V	-	-	1.5	mA
		1mA≤I_{OUT}≤40mA	-	-	0.1	
Ripple Rejection	PSRR	18.5V≤V_{IN}≤28.5V, f = 120Hz, T_J=25℃	34	39	-	dB
Output Noise Voltage	V_N	10Hz≤ f ≤100KHz, T_J=25℃	-	82	-	μV

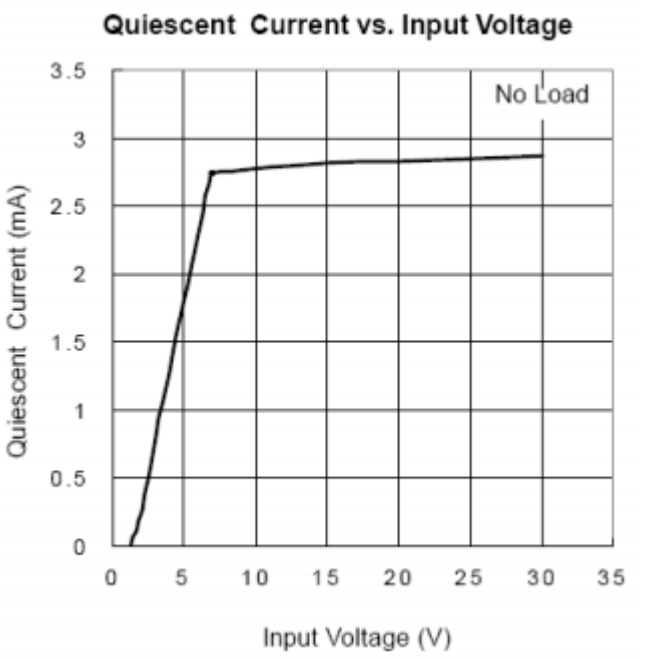
For YJ78L18(V_{IN}=26V, I_O=40mA)

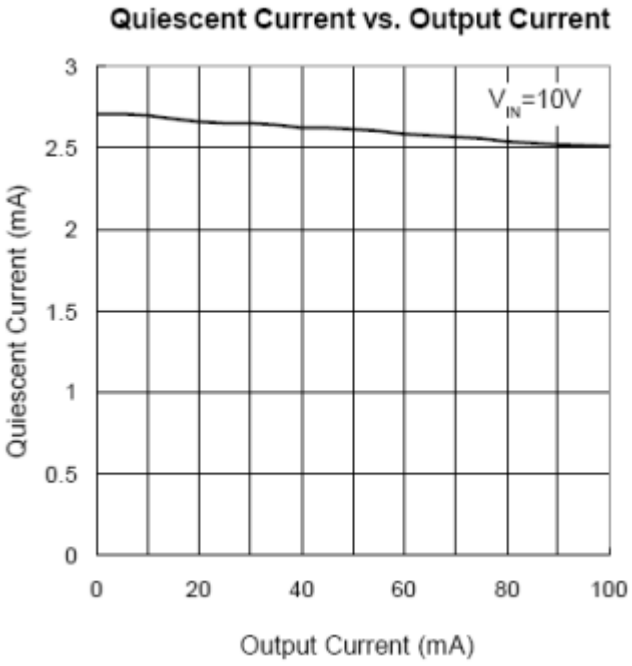
Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_{OUT}	T_J=25℃	17.3	18	18.7	V
		1mA≤I_{OUT}≤40mA, 20.5V≤V_{IN}≤33V	17.1	18	18.9	
		1mA≤I_{OUT}≤70mA	17.1	18	18.9	
Line Regulation	LNR	20.5V≤V_{IN}≤33V, T_J=25℃	-	70	360	mV
		22V≤V_{IN}≤33V, T_J=25℃	-	64	300	
Load Regulation	LDR	1mA≤I_{OUT}≤100mA, T_J=25℃	-	27	180	mV
		1mA≤I_{OUT}≤40mA, T_J=25℃	-	19	90	
Dropout Voltage	V_{DROP}	T_J=25℃	-	1.7	-	V
Quiescent Current	I_Q	I_{OUT} =0, T_J=25℃	-	4.7	6.5	mA
		I_{OUT} =0, T_J=125℃	-	-	6	
Quiescent Current Change	ΔI_Q	22V≤V_{IN}≤33V	-	-	1.5	mA
		1mA≤I_{OUT}≤40mA	-	-	0.1	
Ripple Rejection	PSRR	21.5V≤V_{IN}≤31.5V, f = 120Hz, T_J=25℃	32	36	-	dB
Output Noise Voltage	V_N	10Hz≤ f ≤100KHz, T_J=25℃	-	89	-	μV

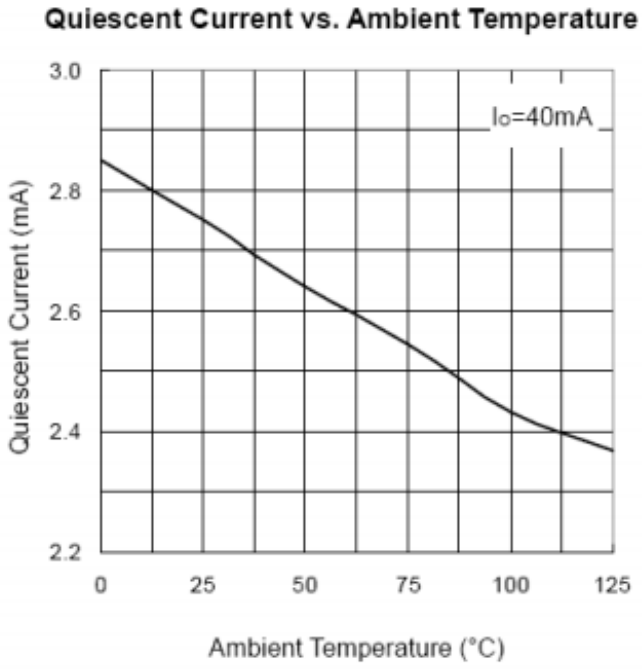
For YJ78L24(V_{IN}=32V, I_O=40mA)

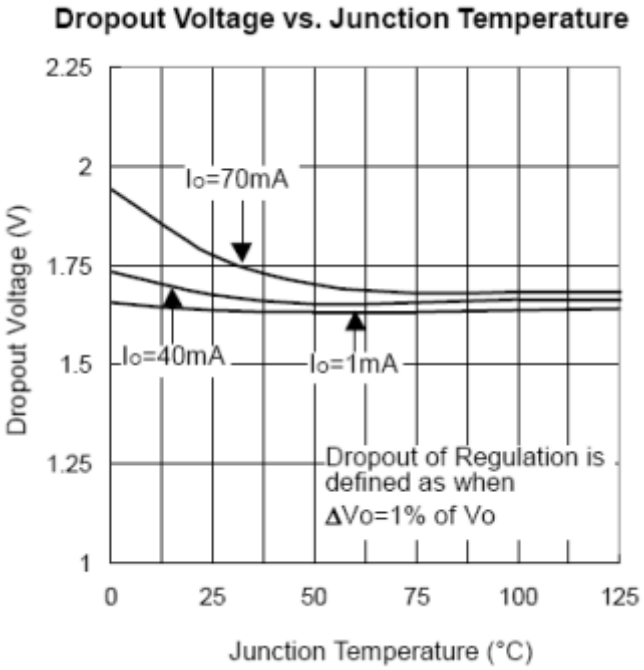
Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output Voltage	V_{OUT}	T_J=25℃	23	24	25	V
		1mA≤I_{OUT}≤40mA, 26.5V≤V_{IN}≤39V	22.8	24	25.2	
		1mA≤I_{OUT}≤70mA	22.8	24	25.2	
Line Regulation	LNR	26.5V≤V_{IN}≤39V, T_J=25℃	-	95	480	mV
		29V≤V_{IN}≤39V, T_J=25℃	-	78	400	
Load Regulation	LDR	1mA≤I_{OUT}≤100mA, T_J=25℃	-	41	240	mV
		1mA≤I_{OUT}≤40mA, T_J=25℃	-	28	120	
Dropout Voltage	V_{DROP}	T_J=25℃	-	1.7	-	V
Quiescent Current	I_Q	I_{OUT} =0, T_J=25℃	-	4.8	6.5	mA
		I_{OUT} =0, T_J=125℃	-	-	6	
Quiescent Current Change	ΔI_Q	28V≤V_{IN}≤39V	-	-	1.5	mA
		1mA≤I_{OUT}≤40mA	-	-	0.1	
Ripple Rejection	PSRR	27.5V≤V_{IN}≤37.5V, f = 120Hz, T_J=25℃	30	33	-	dB
Output Noise Voltage	V_N	10Hz≤ f ≤100KHz, T_J=25℃	-	97	-	μV

■Typical Characteristics(78L05)



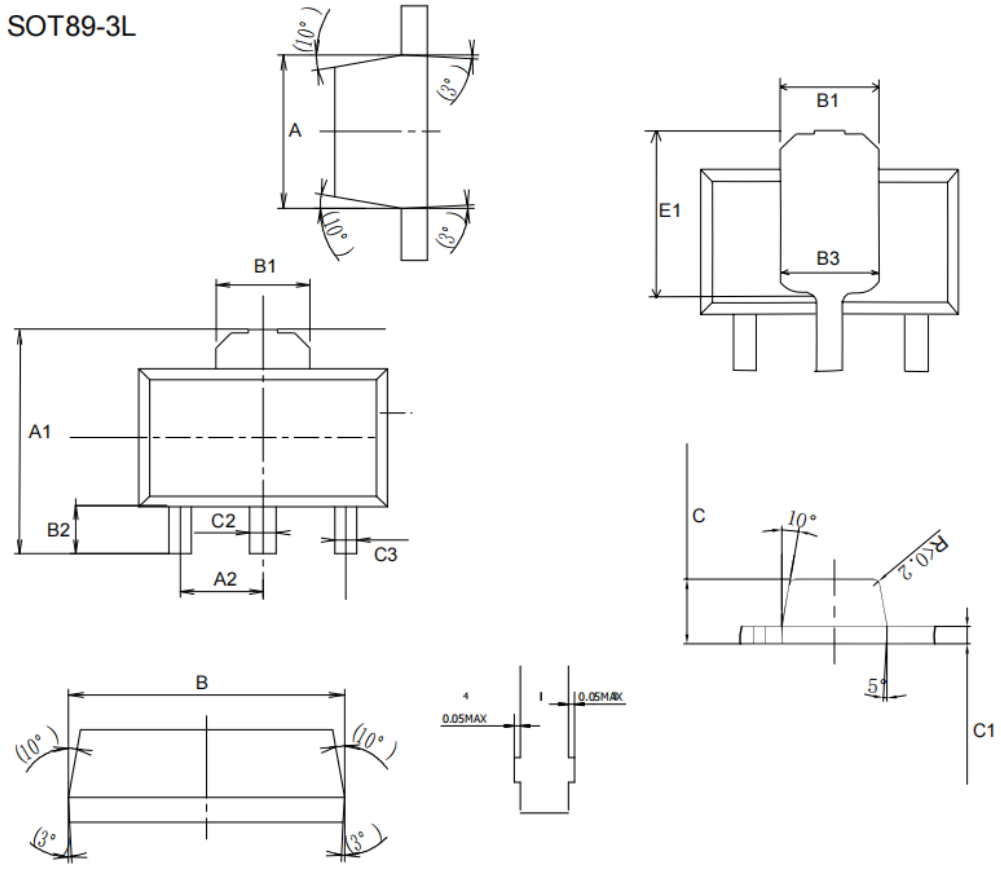






■ Package Outline Drawing

SOT89-3L



COMMON DIMENSIONS CUNITS MEASURE=MILLIMETER			
SYMBOL	MIN	MID	MAX
A	2.35	2.45	2.55
A1	4.135	4.235	4.335
A2	1.45	1.50	1.55
B	4.40	4.50	4.60
B1		1.55 REF	
B2	0.95	1.00	1.05
B3		1.63 REF	
C	1.45	1.50	1.55
C1	0.39	0.40	0.41
C2	0.4	0.48	0.55
C3	0.35	0.4	0.45
E1	2.65	2.75	2.85

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