Absolute Maximum Rating

Input Voltage	Vin *	35	V
Input Voltage	Vin **	40	V
Power Dissipation TO-92	Pd	0.625	W
TO-89		0.5	
SOP-8		0.5	
Operating Junction Temperature Range	T_J	0 ~ +150	°C
Storage Temperature Range	T_{STG}	-65 ~ +150	°C

Note : * TS78L05 to TS78L18

** TS78L24

TS78L05 Electrical Characteristics

(Vin=10V, Iout=40mA, 0 °C≤Tj≤125 °C, Cin=0.33uF, Cout=0.1uF; unless otherwise specified.)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
Output voltage	Vout	Tj=25 °C		4.80	5	5.20	V
		7.5V≤Vin≤20V, 5mA≤Iout≤100mA		4.75	5	5.25	
Line Regulation	REGline	Tj=25 °C	7.5V≤Vin≤20V, Io=40mA	--	50	150	mV
Load Regulation	REGload	Tj=25 °C	5mA≤Iout≤100mA	--	20	60	
			5mA≤Iout≤40mA	--	10	30	
Quiescent Current	Iq	Iout=0, Tj=25 °C		--	3	6	mA
Quiescent Current Change	ΔIq	8V≤Vin≤20V		--	--	1.5	
		1mA≤Iout≤40mA		--	--	0.1	
Output Noise Voltage	Vn	10Hz≤f≤100KHz, Tj=25 °C		--	40	--	uV
Ripple Rejection Ratio	RR	f=120Hz, 8V≤Vin≤18V		41	49	--	dB
Voltage Drop	Vdrop	Tj=25 °C		--	1.7	--	V
Peak Output Current	Io peak	Tj=25 °C		--	0.15	--	A

- Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible, and thermal effects must be taken into account separately.
- This specification applies only for DC power dissipation permitted by absolute maximum ratings.

TS78L06 Electrical Characteristics

(Vin=11V, Iout=40mA, 0 °C≤Tj≤125 °C, Cin=0.33uF, Cout=0.1uF; unless otherwise specified.)

Parameter		Test Conditions		Min	Typ	Max	Unit
Output voltage	Vout	Tj=25 °C		5.76	6	6.24	V
		8.5V≤Vin≤21V, 5mA≤Iout≤100mA		5.70	6	6.30	
Line Regulation	REGline	Tj=25 °C	8.5V≤Vin≤21V, Io=40mA	--	50	150	mV
Load Regulation	REGload	Tj=25 °C	5mA≤Iout≤100mA	--	20	60	
			5mA≤Iout≤40mA	--	10	30	
Quiescent Current	Iq	Iout=0, Tj=25 °C		--	3	6	mA
Quiescent Current Change	ΔIq	9V≤Vin≤21V		--	--	1.5	
		1mA≤Iout≤40mA		--	--	0.1	
Output Noise Voltage	Vn	10Hz≤f≤100KHz, Tj=25 °C		--	40	--	uV
Ripple Rejection Ratio	RR	f=120Hz, 9V≤Vin≤19V		41	49	--	dB
Voltage Drop	Vdrop	Tj=25 °C		--	1.7	--	V
Peak Output Current	Io peak	Tj=25 °C		--	0.15	--	A

TS78L08 Electrical Characteristics

(Vin=14V, Iout=40mA, 0 °C≤Tj≤125 °C, Cin=0.33uF, Cout=0.1uF; unless otherwise specified.)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	Vout	Tj=25 °C		7.69	8	8.32	V
		10.5V≤Vin≤23V, 5mA≤Iout≤100mA		7.61	8	8.40	
Line Regulation	REGline	Tj=25 °C	10.5V≤Vin≤23V, Io=40mA	--	80	160	mV
Load Regulation	REGload	Tj=25 °C	5mA≤Iout≤100mA	--	25	80	
			5mA≤Iout≤40mA	--	10	40	
Quiescent Current	Iq	Iout=0, Tj=25 °C		--	3	6	mA
Quiescent Current Change	ΔIq	11V≤Vin≤23V		--	--	1.5	
		1mA≤Iout≤40mA		--	--	0.1	
Output Noise Voltage	Vn	10Hz≤f≤100KHz, Tj=25 °C		--	60	--	uV
Ripple Rejection Ratio	RR	f=120Hz, 13V≤Vin≤23V		37	57	--	dB
Voltage Drop	Vdrop	Tj=25 °C		--	1.7	--	V
Peak Output Current	Io peak	Tj=25 °C		--	0.15	--	A

- Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible, and thermal effects must be taken into account separately.
- This specification applies only for DC power dissipation permitted by absolute maximum ratings.

TS78L09 Electrical Characteristics

(Vin=15V, Iout=40mA, 0 °C≤Tj≤125 °C, Cin=0.33uF, Cout=0.1uF; unless otherwise specified.)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	Vout	Tj=25 °C		8.65	9	9.36	V
		11.5V≤Vin≤24V, 5mA≤Iout≤100mA		8.57	9	9.45	
Line Regulation	REGline	Tj=25 °C	11.5V≤Vin≤24V, Io=40mA	--	90	180	mV
Load Regulation	REGload	Tj=25 °C	5mA≤Iout≤100mA	--	30	90	
			5mA≤Iout≤40mA	--	15	45	
Quiescent Current	Iq	Iout=0, Tj=25 °C		--	3	6	mA
Quiescent Current Change	Δlq	12V≤Vin≤24V		--	--	0.8	
		5mA≤Iout≤40mA		--	--	0.5	
Output Noise Voltage	Vn	10Hz≤f≤100KHz, Tj=25 °C		--	60	--	uV
Ripple Rejection Ratio	RR	f=120Hz, 14V≤Vin≤24V		37	57	--	dB
Voltage Drop	Vdrop	Tj=25 °C		--	1.7	--	V
Peak Output Current	Io peak	Tj=25 °C		--	0.15	--	A

TS78L12 Electrical Characteristics

(Vin=19V, Iout=40mA, 0 °C≤Tj≤125 °C, Cin=0.33uF, Cout=0.1uF; unless otherwise specified.)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	Vout	Tj=25 °C		11.53	12	12.48	V
		14.5V≤Vin≤27V, 5mA≤Iout≤100mA		11.42	12	12.60	
Line Regulation	REGline	Tj=25 °C	14.5V≤Vin≤27V, Io=40mA	--	120	240	mV
Load Regulation	REGload	Tj=25 °C	5mA≤Iout≤100mA	--	40	120	
			5mA≤Iout≤40mA	--	20	60	
Quiescent Current	Iq	Tj=25 °C, Iout=0		--	3	6.5	mA
Quiescent Current Change	Δlq	16V≤Vin≤27V		--	--	1.5	
		5mA≤Iout≤40mA		--	--	0.1	
Output Noise Voltage	Vn	10Hz≤f≤100KHz, Tj=25 °C		--	80	--	uV
Ripple Rejection Ratio	RR	f=120Hz, 15V≤Vin≤25V		37	42	--	dB
Voltage Drop	Vdrop	Tj=25 °C		--	1.7	--	V
Peak Output Current	Io peak	Tj=25 °C		--	0.15	--	A

- Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible, and thermal effects must be taken into account separately.
- This specification applies only for DC power dissipation permitted by absolute maximum ratings.

TS78L15 Electrical Characteristics

(Vin=23V, Iout=40mA, 0 °C≤Tj≤125 °C, Cin=0.33uF, Cout=0.1uF; unless otherwise specified.)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	Vout	Tj=25 °C		14.42	15	15.60	V
		17.5V≤Vin≤30V, 5mA≤Iout≤100mA		14.28	15	15.75	
Line Regulation	REGline	Tj=25 °C	17.5V≤Vin≤30V, Io=200mA	--	150	300	mV
Load Regulation	REGload	Tj=25 °C	5mA≤Iout≤100mA	--	50	150	
			5mA≤Iout≤40mA	--	25	75	
Quiescent Current	Iq	Tj=25 °C, Iout=0		--	3	6.5	mA
Quiescent Current Change	Δlq	20V≤Vin≤30V		--	--	1.5	
		5mA≤Iout≤40mA		--	--	0.1	
Output Noise Voltage	Vn	10Hz≤f≤100KHz, Tj=25 °C		--	90	--	uV
Ripple Rejection Ratio	RR	f=120Hz, 18V≤Vin≤28V		34	39	--	dB
Voltage Drop	Vdrop	Tj=25 °C		--	1.7	--	V
Peak Output Current	Io peak	Tj=25 °C		--	0.15	--	A

TS78L18 Electrical Characteristics

(Vin=27V, Iout=40mA, 0 °C≤Tj≤125 °C, Cin=0.33uF, Cout=0.1uF; unless otherwise specified.)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	Vout	Tj=25 °C		17.30	18	18.72	V
		21V≤Vin≤33V, 5mA≤Iout≤100mA		17.14	18	18.90	
Line Regulation	REGline	Tj=25 °C	21V≤Vin≤33V, Io=40mA	--	180	360	mV
Load Regulation	REGload	Tj=25 °C	5mA≤Iout≤100mA	--	60	180	
			5mA≤Iout≤40mA	--	30	90	
Quiescent Current	Iq	Tj=25 °C, Iout=0		--	3	6.5	mA
Quiescent Current Change	Δlq	21V≤Vin≤33V		--	--	1.5	
		5mA≤Iout≤40mA		--	--	0.1	
Output Noise Voltage	Vn	10Hz≤f≤100KHz, Tj=25 °C		--	150	--	uV
Ripple Rejection Ratio	RR	f=120Hz, 23V≤Vin≤33V		33	48	--	dB
Voltage Drop	Vdrop	Tj=25 °C		--	1.7	--	V
Peak Output Current	Io peak	Tj=25 °C		--	0.15	--	A

- Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible, and thermal effects must be taken into account separately.
- This specification applies only for DC power dissipation permitted by absolute maximum ratings.

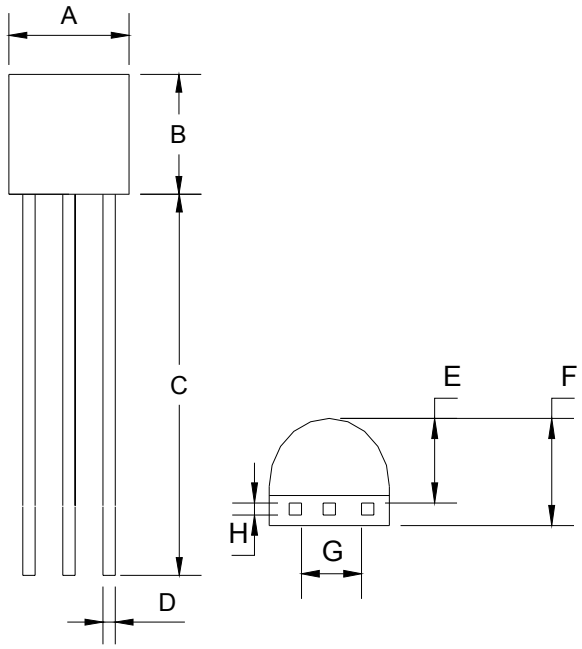
TS78L24 Electrical Characteristics

(Vin=33V, Iout=40mA, 0 °C≤Tj≤125 °C, Cin=0.33uF, Cout=0.1uF; unless otherwise specified.)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	Vout	Tj=25 °C		23.07	24	24.96	V
		27V≤Vin≤38V, 5mA≤Iout≤100mA		22.85	24	25.20	
Line Regulation	REGline	Tj=25 °C	27V≤Vin≤38V, Io=40mA	--	200	400	mV
Load Regulation	REGload	Tj=25 °C	5mA≤Iout≤100mA	--	80	240	
			5mA≤Iout≤40mA	--	40	120	
Quiescent Current	Iq	Iout=0, Tj=25 °C		--	4	7	mA
Quiescent Current Change	ΔIq	28V≤Vin≤38V		--	--	1.5	
		5mA≤Iout≤40mA		--	--	0.1	
Output Noise Voltage	Vn	10Hz≤f≤100KHz, Tj=25 °C		--	200	--	uV
Ripple Rejection Ratio	RR	f=120Hz, 29V≤Vin≤35V		31	45	--	dB
Voltage Drop	Vdrop	Tj=25 °C		--	1.7	--	V
Peak Output Current	Io peak	Tj=25 °C		--	0.15	--	A

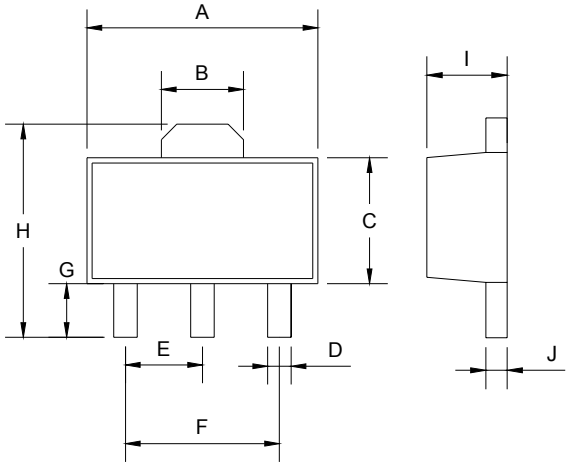
- Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible, and thermal effects must be taken into account separately.
- This specification applies only for DC power dissipation permitted by absolute maximum ratings.

TO-92 Mechanical Drawing



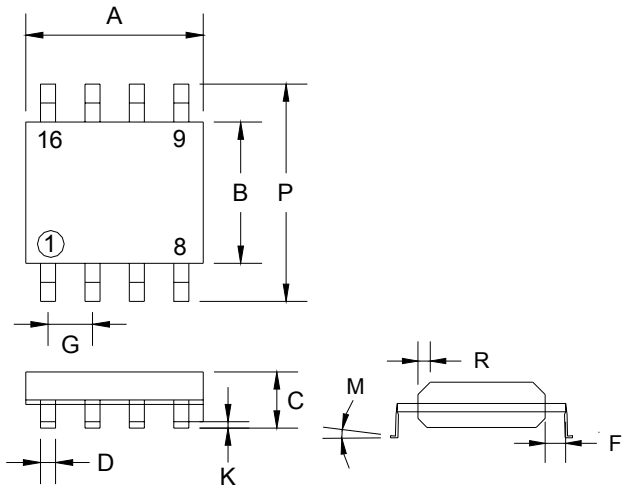
TO-92 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.30	4.70	0.169	0.185
B	4.30	4.70	0.169	0.185
C	14.30(typ)		0.563(typ)	
D	0.43	0.49	0.017	0.019
E	2.19	2.81	0.086	0.111
F	3.30	3.70	0.130	0.146
G	2.42	2.66	0.095	0.105
H	0.37	0.43	0.015	0.017

SOT-89 Mechanical Drawing



SOT-89 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.40	4.60	0.173	0.181
B	1.50	1.7	0.059	0.070
C	2.30	2.60	0.090	0.102
D	0.40	0.52	0.016	0.020
E	1.50	1.50	0.059	0.059
F	3.00	3.00	0.118	0.118
G	0.89	1.20	0.035	0.047
H	4.05	4.25	0.159	0.167
I	1.4	1.6	0.055	0.068
J	0.35	0.44	0.014	0.017

SOP-8 Mechanical Drawing



SOP-8 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.196
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 (typ)		0.05 (typ)	
K	0.10	0.25	0.004	0.009
M	0^o	7^o	0^o	7^o
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

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