TAIWAN SEMICONDUCTOR

RoHS COMPLIANCE

TS79L00 Series

3-Terminal 100mA Negative Voltage Regulator

TO-92

SOT-89

Pin Definition:
1. Ground
2. Input
3. Output

SOP-8

Pin Definition:

1. Output	8. N/C
2. Input	7. Input
3. Input	6. Input
4. N/C	5. Ground

General Description

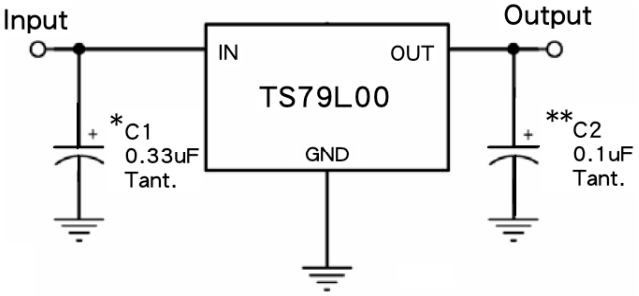
The TS79L00 Series of negative voltage regulators are inexpensive, easy-to-use devices suitable for a multitude of applications that require a regulated supply of up to 100mA. Like their higher power TS7900 and TS79M00 Series cousins, these regulators feature internal current limiting and thermal shutdown making them remarkably rugged. No external components are required with the TS79L00 devices in many applications.

These devices offer a substantial performance advantage over the traditional zener diode-resistor combination, as output impedance and quiescent current are substantially reduced.

Features

- Output Voltage Range -5 to -24V
- Output current up to 100mA
- No external components required
- Internal thermal overload protection
- Internal short-circuit current limiting
- Output transistor safe-area compensation
- Output voltage offered in 4% tolerance

Standard Application Circuit



A common ground is required between the input and the output voltages. The input voltage must remain typically 2.0V above the output voltage even during the low point on the Input ripple voltage.

XX = these two digits of the type number indicate voltage.

* = Cin is required if regulator is located an appreciable distance from power supply filter.

** = Co is not needed for stability; however, it does improve transient response.

Ordering Information

Part No.	Package	Packing
TS79L**xx**CT B0	TO-92	1Kpcs / Bulk
TS79L**xx**CT A3	TO-92	2Kpcs / Ammo
TS79L**xx**CY RM	SOT-89	1Kpcs / 7” Reel
TS79L**xx**CS RL	SOP-8	2.5Kpcs / 13” Reel

Note: Where **xx** denote voltage option

Absolute Maximum Rating (Ta = 25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Input Voltage	V_{IN}*	-35	V
Input Voltage	V_{IN}**	-40	V
Power Dissipation	P_D	Internal Limited	W
Operating Temperature range	T_{OPR}	0~+125	°C
Junction Temperature	T_J	+150	°C
Storage Temperature Range	T_{STG}	-65~+150	°C

Note: * TS79L05 to TS79L18
** TS79L24

TS79L00 Series

3-Terminal 100mA Negative Voltage Regulator

TS79L05 Electrical Characteristics

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

Parameter	Symbol	Test Condition		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	--	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	-7.5V≤Vin≤--25V		--	--	1.5	
		5mA≤Iout≤40mA		--	--	0.1	
Output Noise Voltage	Vn	10Hz≤f≤100KHz, Tj=25°C		--	40	--	μV
Ripple Rejection Ratio	RR	f=120Hz, -8V≤Vin≤-18V		41	49	--	dB
Voltage Drop	Vdrop	Iout=100mA, Tj=25°C		--	1.7	--	V
Peak Output Current	Io peak	Tj=25°C		--	0.15	--	A
Temperature Coefficient of Output Voltage	ΔVout/ ΔTj	Iout=5mA, 0°C≤Tj≤125°C		--	-0.65	--	mV/°C

TS79L06 Electrical Characteristics

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

Parameter	Symbol	Test Condition		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	--	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	-10.5V≤Vin≤-21V		--	--	1.5	
		5mA≤Iout≤40mA		--	--	0.1	
Output Noise Voltage	Vn	10Hz≤f≤100KHz, Tj=25°C		--	40	--	μV
Ripple Rejection Ratio	RR	f=120Hz, -10.5V≤Vin≤-21V		41	49	--	dB
Voltage Drop	Vdrop	Iout=100mA, Tj=25°C		--	1.7	--	V
Peak Output Current	Io peak	Tj=25°C		--	0.15	--	A
Temperature Coefficient of Output Voltage	ΔVout/ ΔTj	Iout=5mA, 0°C≤Tj≤125°C		--	-0.75	--	mV/°C

- 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.

TS79L00 Series

3-Terminal 100mA Negative Voltage Regulator

TS79L08 Electrical Characteristics

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

Parameter	Symbol	Test Condition		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≤-25V	--	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	-10.5V≤Vin≤-23V		--	--	1.5	
		5mA≤Iout≤40mA		--	--	0.1	
Output Noise Voltage	Vn	10Hz≤f≤100KHz, Tj=25°C		--	60	--	μV
Ripple Rejection Ratio	RR	f=120Hz, -11V≤Vin≤-23V		37	57	--	dB
Voltage Drop	Vdrop	Iout=100mA, Tj=25°C		--	1.7	--	V
Peak Output Current	Io peak	Tj=25°C		--	0.15	--	A
Temperature Coefficient of Output Voltage	ΔVout/ ΔTj	Iout=5mA, 0°C≤Tj≤125°C		--	-0.8	--	mV/°C

TS79L09 Electrical Characteristics

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

Parameter	Symbol	Test Condition		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	--	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	ΔIq	=11V≤Vin≤=23V		--	--	1.5	
		5mA≤Iout≤40mA		--	--	0.1	
Output Noise Voltage	Vn	10Hz≤f≤100KHz, Tj=25°C		--	60	--	μV
Ripple Rejection Ratio	RR	f=120Hz, =13V≤Vin≤=24V		37	57	--	dB
Voltage Drop	Vdrop	Iout=100mA, Tj=25°C		--	1.7	--	V
Peak Output Current	Io peak	Tj=25°C		--	0.15	--	A
Temperature Coefficient of Output Voltage	ΔVout/ ΔTj	Iout=5mA, 0°C≤Tj≤125°C		--	-0.9	--	mV/°C

- 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.
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TS79L12 Electrical Characteristics

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

Parameter	Symbol	Test Condition		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	--	120	240	mV
Load Regulation	REGload	Tj=25°C	5mA≤Iout≤100mA	--	40	120	
			5mA≤Iout≤40mA	--	20	60	
Quiescent Current	Iq	Iout=0, Tj=25°C		--	3	6.5	mA
Quiescent Current Change	ΔIq	-16V≤Vin≤-27V		--	--	1.5	
		5mA≤Iout≤40mA		--	--	0.1	
Output Noise Voltage	Vn	10Hz≤f≤100KHz, Tj=25°C		--	80	--	μV
Ripple Rejection Ratio	RR	f=120Hz, -11V≤Vin≤-23V		37	42	--	dB
Voltage Drop	Vdrop	Iout=100mA, Tj=25°C		--	1.7	--	V
Peak Output Current	Io peak	Tj=25°C		--	0.15	--	A
Temperature Coefficient of Output Voltage	ΔVout/ ΔTj	Iout=5mA, 0°C≤Tj≤125°C		--	-1.0	--	mV/ °C

TS79L15 Electrical Characteristics

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

Parameter	Symbol	Test Condition		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≤-24V	--	150	30	mV
Load Regulation	REGload	Tj=25°C	5mA≤Iout≤100mA	--	50	150	
			5mA≤Iout≤40mA	--	25	75	
Quiescent Current	Iq	Iout=0, Tj=25°C		--	3	6.6	mA
Quiescent Current Change	ΔIq	-20V≤Vin≤-30V		--	--	1.5	
		5mA≤Iout≤40mA		--	--	0.1	
Output Noise Voltage	Vn	10Hz≤f≤100KHz, Tj=25°C		--	90	--	μV
Ripple Rejection Ratio	RR	f=120Hz, -18V≤Vin≤-28V		34	39	--	dB
Voltage Drop	Vdrop	Iout=100mA, Tj=25°C		--	1.7	--	V
Peak Output Current	Io peak	Tj=25°C		--	0.15	--	A
Temperature Coefficient of Output Voltage	ΔVout/ ΔTj	Iout=5mA, 0°C≤Tj≤125°C		--	-1.3	--	mV/°C

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TS79L00 Series

3-Terminal 100mA Negative Voltage Regulator

TS79L18 Electrical Characteristics

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

Parameter	Symbol	Test Condition		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	-21≤Vin≤-33V	--	180	360	mV
Load Regulation	REGload	Tj=25°C	5mA≤Iout≤100mA	--	60	180	
			5mA≤Iout≤40mA	--	30	90	
Quiescent Current	Iq	Iout=0, Tj=25°C		--	3	6.5	mA
Quiescent Current Change	ΔIq	-21V≤Vin≤-33V		--	--	1.5	
		5mA≤Iout≤40mA		--	--	0.1	
Output Noise Voltage	Vn	10Hz≤f≤100KHz, Tj=25°C		--	150	--	μV
Ripple Rejection Ratio	RR	f=120Hz, -23V≤Vin≤-33V		33	48	--	dB
Voltage Drop	Vdrop	Iout=100mA, Tj=25°C		--	1.7	--	V
Peak Output Current	Io peak	Tj=25°C		--	0.15	--	A
Temperature Coefficient of Output Voltage	ΔVout/ ΔTj	Iout=5mA, 0°C≤Tj≤125°C		--	-1.5	--	mV/°C

TS79L24 Electrical Characteristics

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

Parameter	Symbol	Test Condition		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	-27≤Vin≤-38V	--	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	-27V≤Vin≤-38V		--	--	1.5	
		5mA≤Iout≤40mA		--	--	0.1	
Output Noise Voltage	Vn	10Hz≤f≤100KHz, Tj=25°C		--	200	--	μV
Ripple Rejection Ratio	RR	f=120Hz, -29V≤Vin≤-35V		31	45	--	dB
Voltage Drop	Vdrop	Iout=100mA, Tj=25°C		--	1.7	--	V
Peak Output Current	Io peak	Tj=25°C		--	0.15	--	A
Temperature Coefficient of Output Voltage	ΔVout/ ΔTj	Iout=5mA, 0°C≤Tj≤125°C		--	-2.0	--	mV/°C

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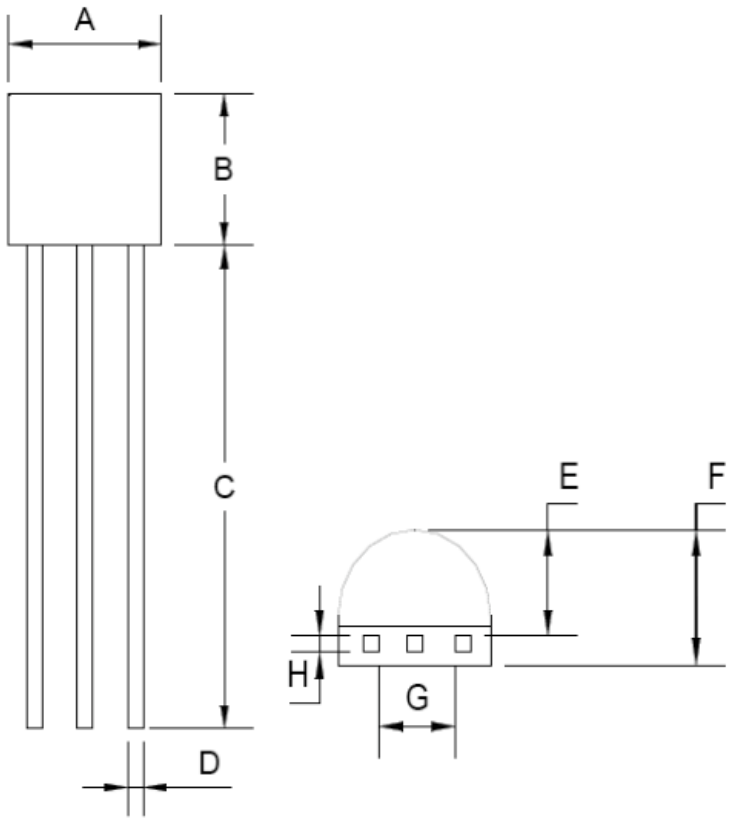
TS79L00 Series

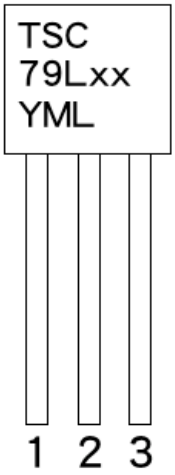
3-Terminal 100mA Negative Voltage Regulator

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

Marking Diagram



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

Y = Year Code

M = Month Code
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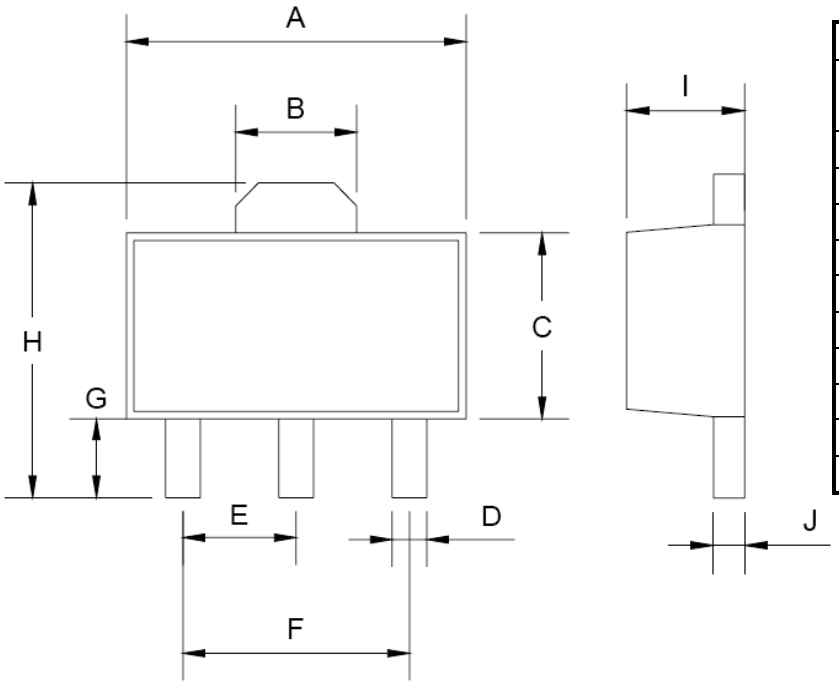
L = Lot Code

TS79L00 Series

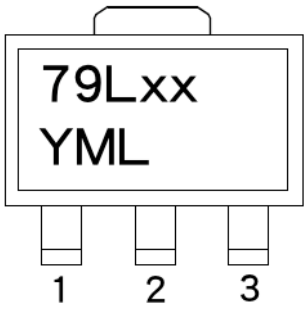
3-Terminal 100mA Negative Voltage Regulator

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

Marking Diagram



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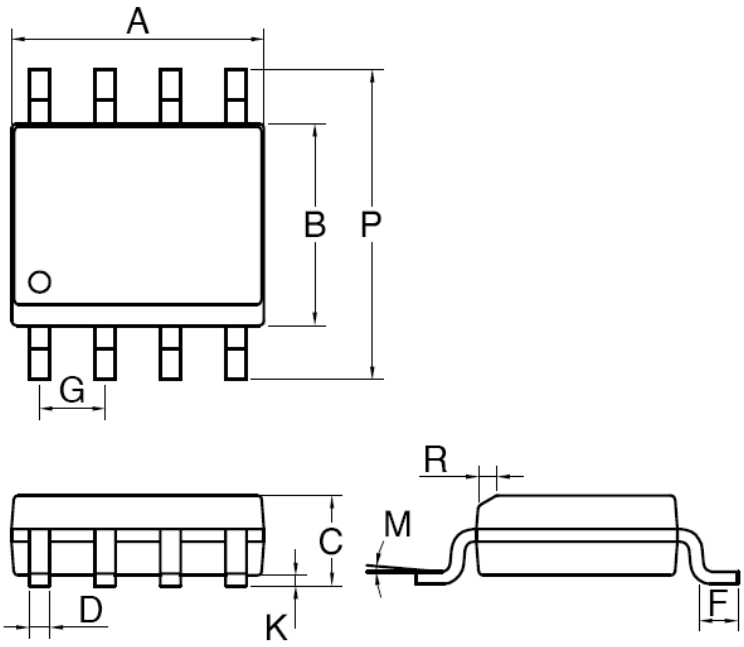
TS79L00 Series

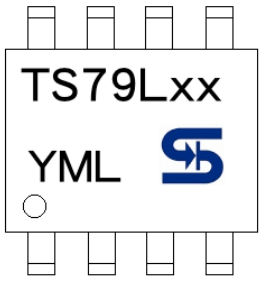
3-Terminal 100mA Negative Voltage Regulator

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	1.27BSC		0.05BSC	
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

Marking Diagram



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