

Preliminary TS178RL00 Series

1A Ultra Low Dropout Voltage Regulator with Enable Function

ITO-220-4L



Pin Definition:

- 1. Input
- 2. Output
- 3. Ground
- 4. Enable

TO-252-5L (PPAK)



Pin Definition:

- 1. Input
- 2. Enable
- 3. Output
- 4. N/C
- 5. Ground

General Description

The TS178RL00 Series is a low-dropout voltage regulator suitable for various electronic equipments. It provides constant voltage power source with ITO-220-4L full mold package and TO-252-5L.

Dropout voltage of TS178RL00 Series is below 0.5V in full rated current (1A). This regulator has various functions such as a peak current protection, thermal shut down, over voltage protection and an output disable function.

Features

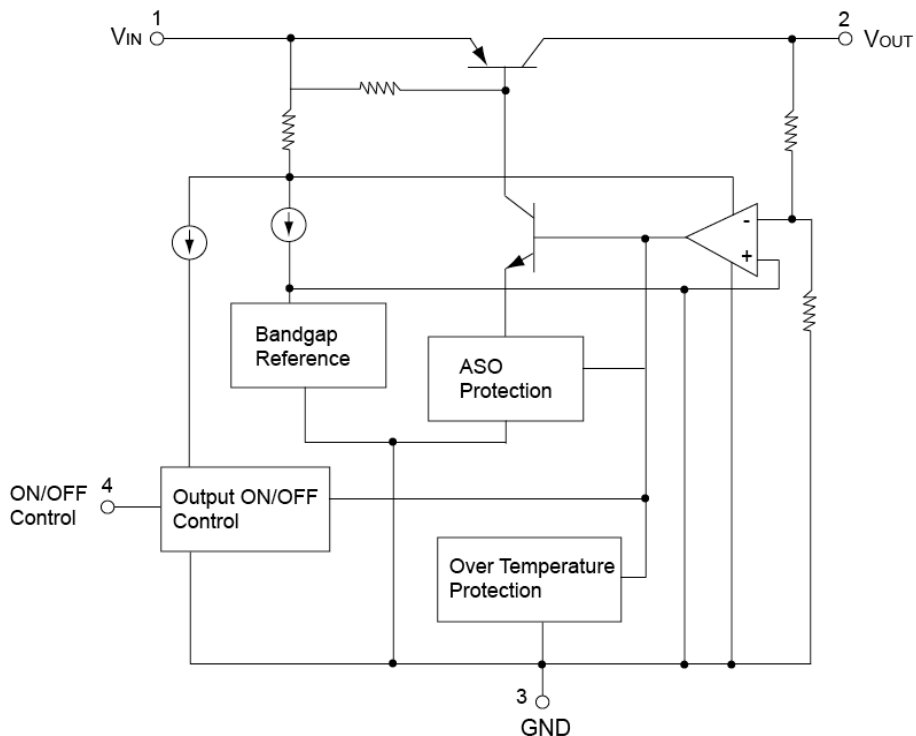
- Ultra Low Dropout performance 0.5Vmax. 1A
- Over Current Protection & Thermal Shutdown
- Short Circuit Protection
- Output Enable Function
- ±2.4% Typical Total output
- TO-220 Full-Mold Package (4Pin) and TO-25205L

Ordering Information

Part No.	Package	Packing
TS178RLxxCI4 C0	ITO-220-4L	50pcs / Tube
TS178RLxxCP5 RO	TO-252-5L	2.5Kpcs / 13" Reel

Note: Where **xx** denotes voltage option, **33=3.3V, 05=5V, 08=8V, 09=9V, 12=12V, 15=15V**

Block Diagram



Absolute Maximum Rating

Parameter	Symbol	Value	Unit	Remark	
Input Voltage	V_{IN}	18	V	--	
Disable Voltage	V_{DIS}	18	V	--	
Output Current	I_o	1	A	--	
Power Dissipation 1	ITO-220-4L	$P_D 1$	1.5	W	No heat sink
Power Dissipation 2		$P_D 2$	15	W	With heat sink
Power Dissipation	TO-252-5L	P_D	8	W	Infinite heat Sink
Junction Temperature	T_J	-40~+125	°C	--	
Thermal Resistance, Junction-to Case (Note2)	$R_{\theta JC}$	4.31	°C / W	--	
Thermal Resistance, Junction-to Air (Note2)	$R_{\theta JA}$	48.83	°C / W	--	
Thermal Shutdown Temperature	T_{SD}	150	°C	--	

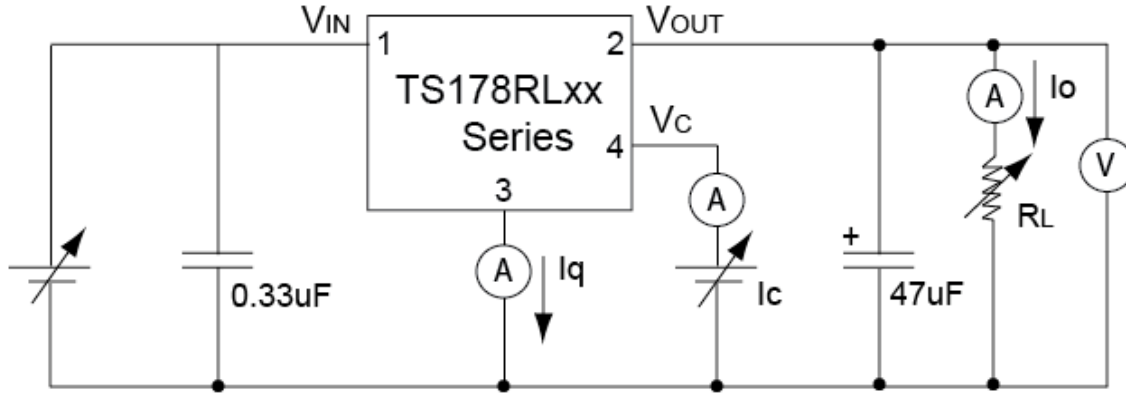
Electrical Specifications (V_{IN} =Note 6, I_o =1.0A, T_a =25°C, unless otherwise specified).

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_o		3.22	3.3	3.38	V
			4.88	5.0	5.12	
			7.80	8.0	8.20	
			8.78	9.0	9.22	
			11.71	12	12.28	
			14.64	15	15.36	
Load Regulation	REG_{LOAD}	$I_o = 5mA \sim 1A$	--	0.1	2.0	%
Line Regulation	REG_{LINE}	Note 7	--	0.5	2.5	%
Ripple Rejection Ratio	RR	Note1	45	55	--	dB
Dropout Voltage	V_{DROP}	$I_o = 1A$	--	--	0.5	V
Disable Voltage High	$V_{DIS H}$	Output Active	2.0	--	--	V
Disable Voltage Low	$V_{DIS L}$	Output Disabled	--	--	0.8	V
Disable Bias Current High	$I_{DIS H}$	$V_{DIS} = 2.7V$	--	--	20	uA
Disable Bias Current Low	$I_{DIS L}$	$V_{DIS} = 0.4V$	--	--	-0.4	mA
Quiescent Current	I_q	$I_o = 0A$	--	--	10	mA

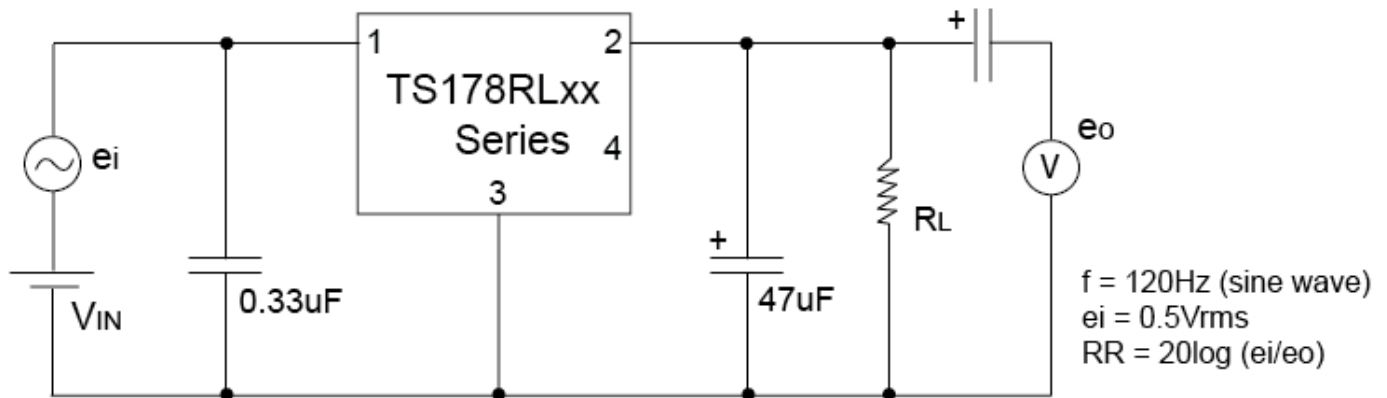
Note:

- These parameters, although guaranteed, are not 100% tested in production.
- Junction -to -case thermal resistance test environments.
- Pneumatic heat sink fixture.
- Clamping pressure 60psi through 12mm diameter cylinder.
- Thermal grease applied between PKG and heat sink fixture
- TS178RL33: $V_{IN} = 5V$, TS178RL05: $V_{IN} = 7V$, TS178RL08: $V_{IN} = 10V$, TS178RL09: $V_{IN} = 11V$, TS178RL12: $V_{IN} = 15V$, TS178RL15: $V_{IN} = 18V$
- TS178RL33: $V_{IN} = 4 \sim 10V$, TS178RL05: $V_{IN} = 6 \sim 12V$, TS178RL08: $V_{IN} = 9 \sim 18V$, TS178RL09: $V_{IN} = 10 \sim 18V$, TS178RL12: $V_{IN} = 13 \sim 18V$, TS178RL15: $V_{IN} = 16 \sim 18V$

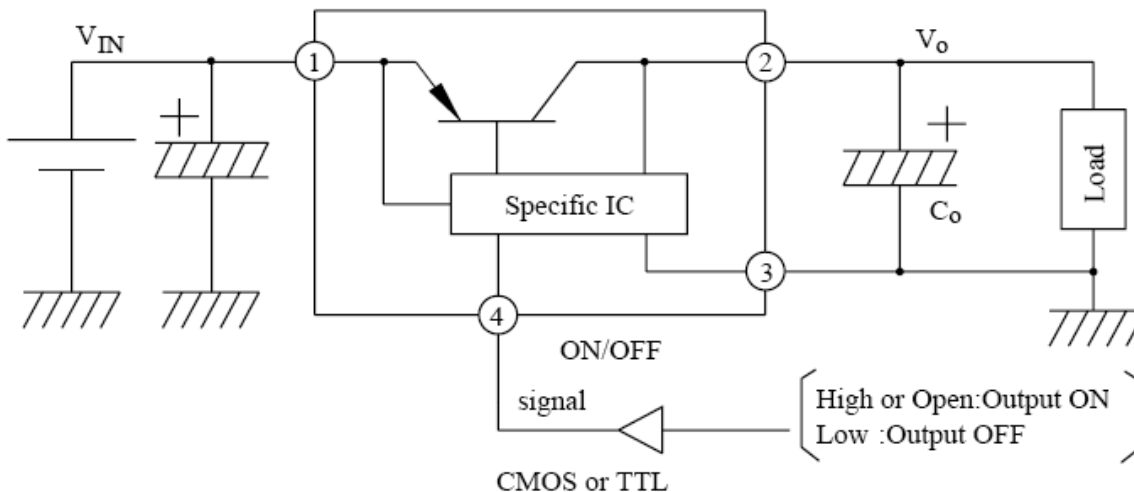
Standard Test Circuit



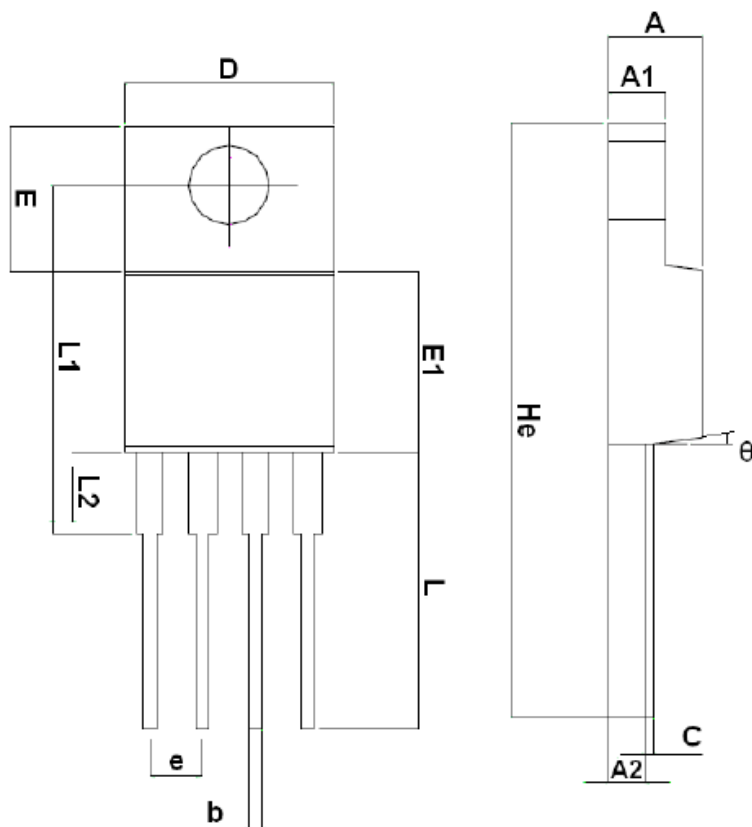
Ripple Rejection Test Circuit



Standard Application Circuit



ITO-220-4L Mechanical Drawing



ITO-220-4L DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.42	4.72	0.174	0.186
A1	2.69	2.89	0.136	0.114
A2	1.68	1.88	0.066	0.074
D	10.00	10.20	0.394	0.402
E	6.85	7.05	0.269	0.278
E1	8.54	8.74	0.336	0.344
L	13.15	13.55	0.518	0.533
L2	16.56	16.76	0.652	0.660
L2	3.60	3.80	0.142	0.150
He	28.44	28.92	1.119	1.159
C	0.48		0.019	
E	2.54(TYP)		0.1(TYP)	
b	0.635(TYP)		0.025(TYP)	
θ	4°	7°	4°	7°

Marking Diagram

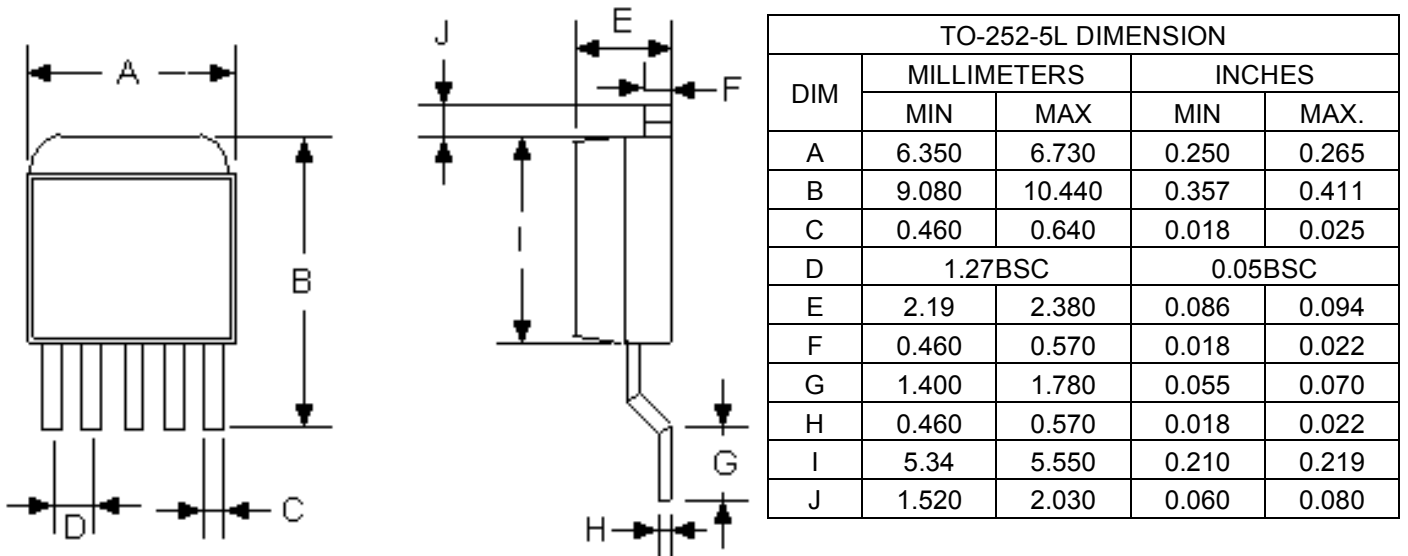


- XX** = Voltage Code
(33=3.3V, 05=5V, 08=8V, 09=9V, 12=12V, 15=15V)
- Y** = Year Code
- M** = Month Code
(A=Jan, B=Feb, C=Mar, D=Apl, E=May, F=Jun, G=Jul, H=Aug, I=Sep, J=Oct, K=Nov, L=Dec)
- L** = Lot Code
- CI4** = Package Code for Adjustable type
(CI4 = ITO-220-4L)

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TO-252-5L Mechanical Drawing



Marking Diagram



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(33=3.3V, 05=5V, 08=8V, 09=9V, 12=12V, 15=15V)
- Y** = Year Code
- M** = Month Code
(A=Jan, B=Feb, C=Mar, D=Apr, E=May, F=Jun, G=Jul, H=Aug, I=Sep, J=Oct, K=Nov, L=Dec)
- L** = Lot Code
- CP5** = Package Code for Adjustable type
(CP5 = TO-252-5L)

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