

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

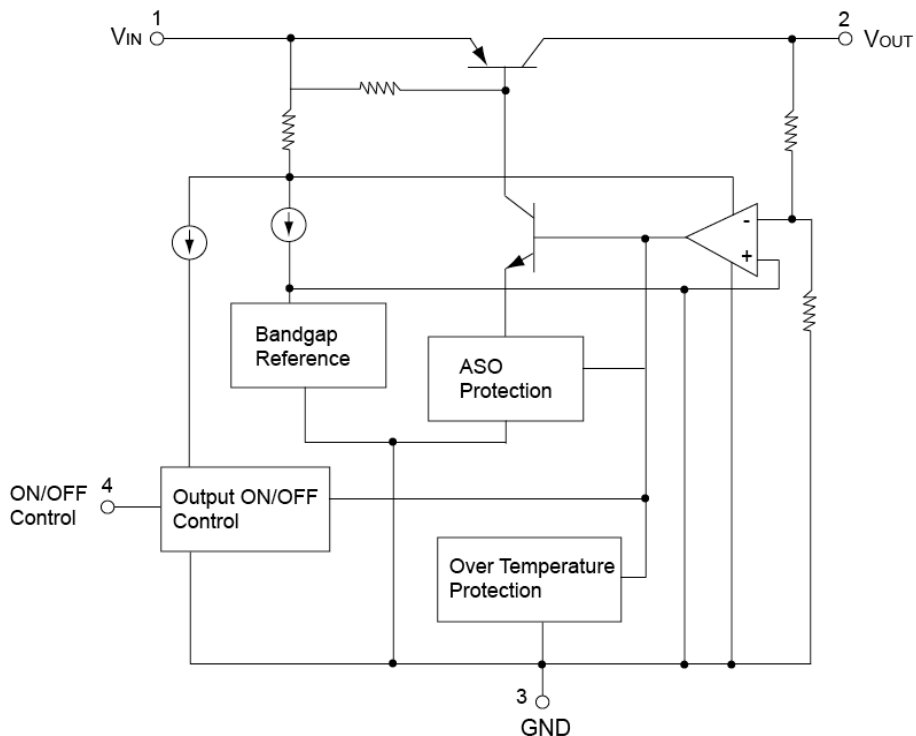
- Ultra Low Dropout performance 0.5Vmax. 1A
- Over Current Protection & Thermal Shutdown
- Short Circuit Protection
- Output Enable Function
- ±2.4% Typical Total output
- TO-220 Full-Mold Package (4Pin) and TO-25205L

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	--	

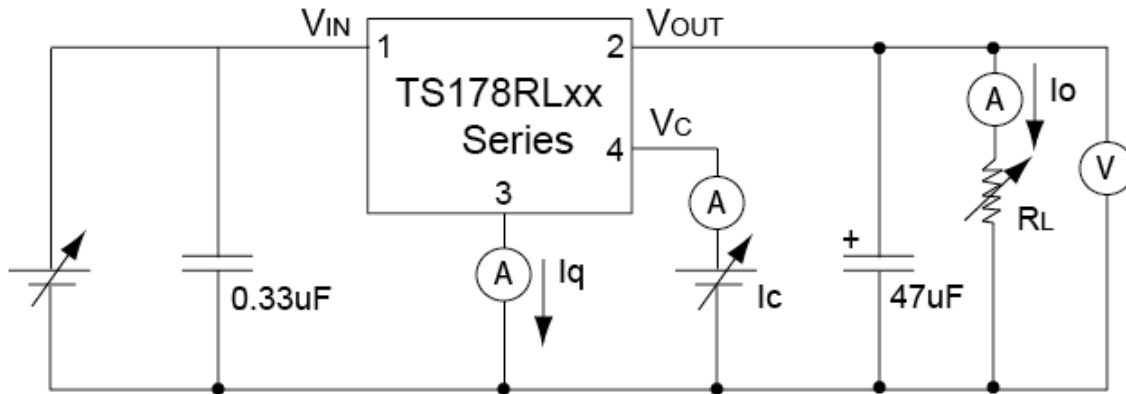
Electrical Specifications (V_{IN} =Note 6, I_o =1.0A, T_a =25°C, unless otherwise specified).

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

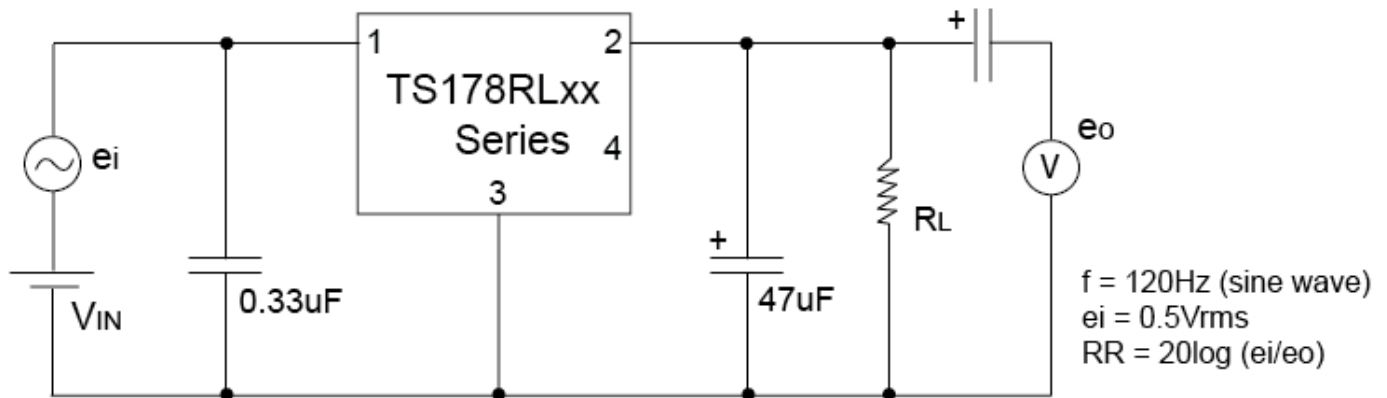
Note:

- 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: $V_{IN} = 16 \sim 18V$

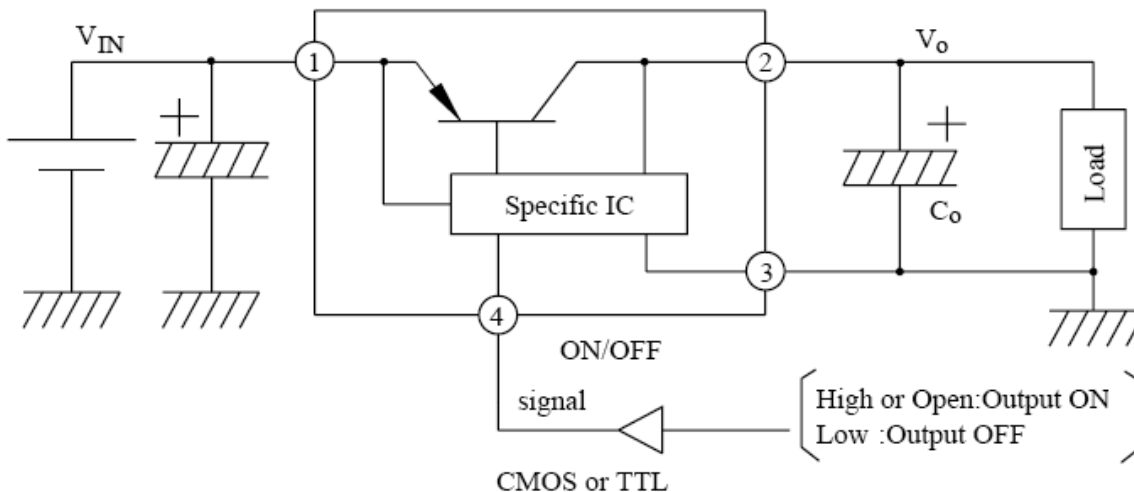
Standard Test Circuit



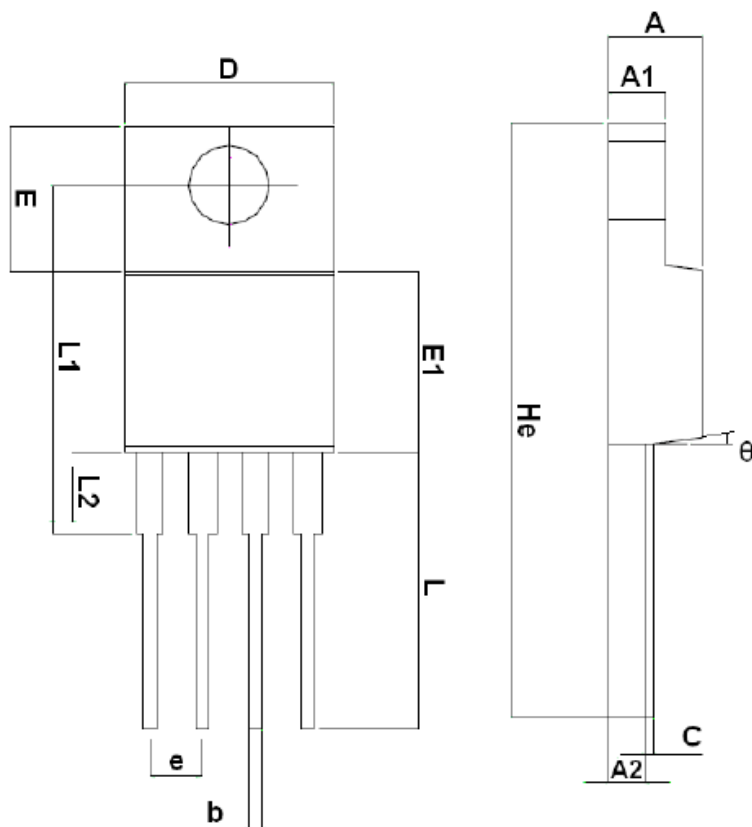
Ripple Rejection Test Circuit



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

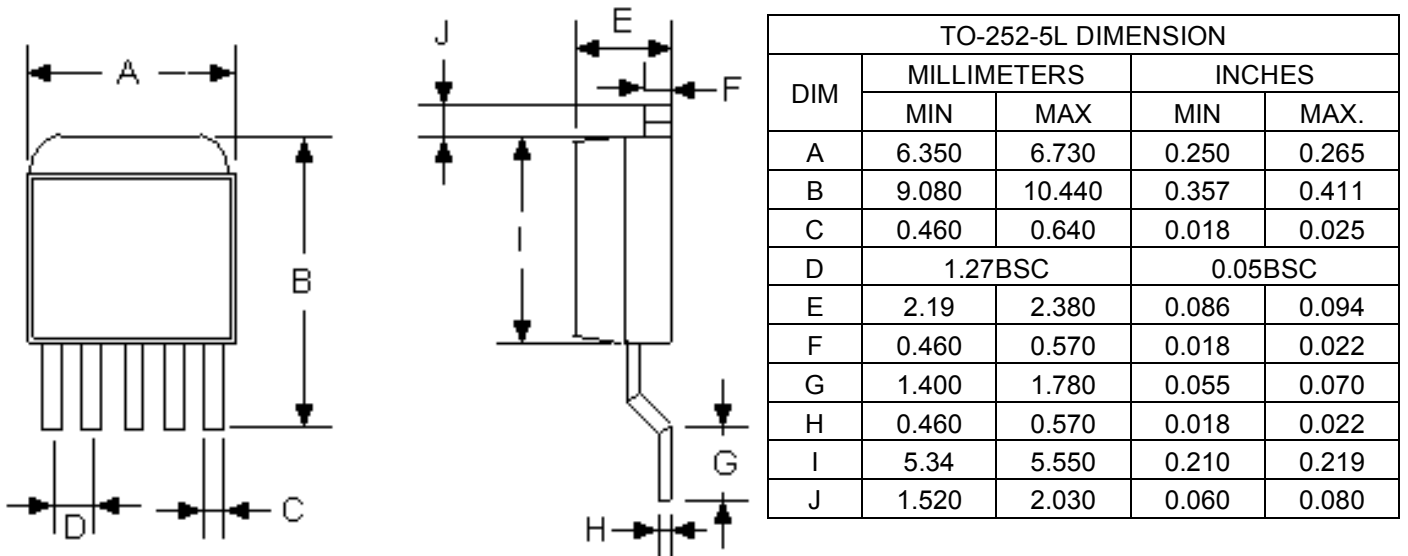


- XX** = Voltage Code
(33=3.3V, 05=5V, 08=8V, 09=9V, 12=12V, 15=15V)
- Y** = Year Code
- M** = Month Code
(A=Jan, B=Feb, C=Mar, D=Apr, E=May, F=Jun, G=Jul, H=Aug, I=Sep, J=Oct, K=Nov, L=Dec)
- L** = Lot Code
- CI4** = Package Code for Adjustable type
(CI4 = ITO-220-4L)

Preliminary TS178RL00 Series

1A Ultra Low Dropout Voltage Regulator with Enable Function

TO-252-5L Mechanical Drawing



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=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)

Preliminary **TS178RL00 Series**
1A Ultra Low Dropout Voltage Regulator
with Enable Function

Notice

Specifications of the products displayed herein are subject to change without notice. TSC or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, to any intellectual property rights is granted by this document. Except as provided in TSC's terms and conditions of sale for such products, TSC assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of TSC products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify TSC for any damages resulting from such improper use or sale.