TS178R00 Series

Preliminary

1A Ultra Low Dropout Voltage Regulator w/Disable

ITO-220-4L **ITO-220-4SL**

Pin assignment:
1. Input
2. Output
3. Gnd
4. Enable

Low Dropout Voltage 0.5V max.

General Description

The TS178R00 Series is a low-dropout voltage regulator suitable for various electronic equipments. It provides constant voltage power source with ITO-220 4 lead full mold package.

Dropout voltage of TS178R00 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

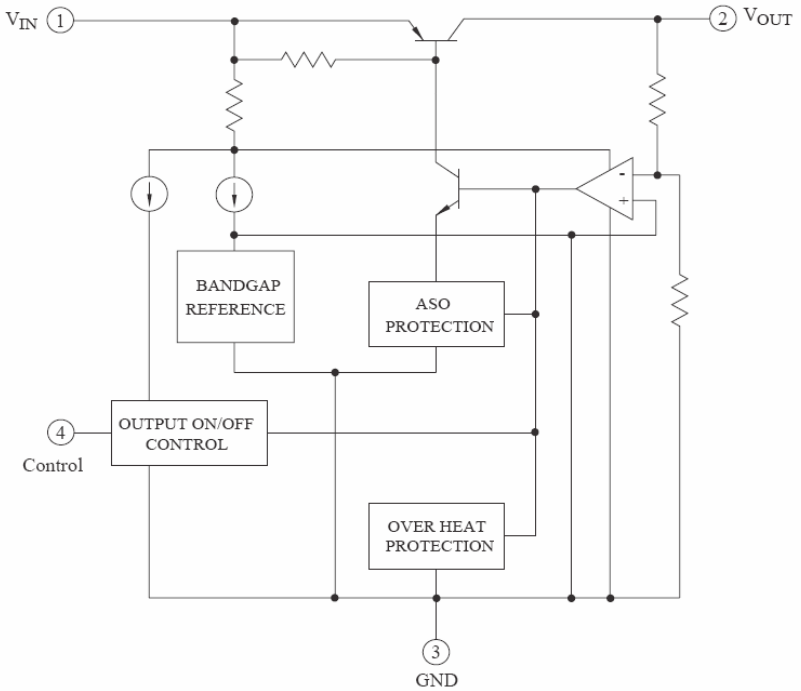
- ✧ Ultra Low Dropout performance 0.5Vmax 1A
- ✧ Over Current Protection, Thermal Shutdown
- ✧ Over Voltage Protection, Short Circuit Protection
- ✧ With Output Disable Function
- ✧ ± 2.4% Typical Total output
- ✧ TO-220 Full-Mold Package (4Pin)

Ordering Information

Part No.	Operating Temp. (Ambient)	Package
TS178RxxCI4	-20 ~ +85 °C	ITO-220-4L
TS178RxxCI4S		ITO-220-4SL

Note: Where xx denotes voltage option,
33=3.3V, 05=5.0V, 08=8.0V, 09=9.0V, 12=12V

Block Diagram



Absolute Maximum Ratings

Parameter	Symbol	Value	Unit	Remark
Input Voltage	Vin	30	V	--
Disable Voltage	Vdis	30	V	--
Output Current	Io	1.0	A	--
Power Dissipation 1	Pd1	1.5	W	No heat sink
Power Dissipation 2	Pd2	15	W	With heat sink
Junction Temperature	Tj	+150	°C	--
Operating Temperature	Topr	-20~ +80	°C	--
Thermal Resistance, Junction-to Case(Note2)	Rθjc	4.31	°C / W	--
Thermal Resistance, Junction-to Air(Note2)	Rθja	48.83	°C / W	--
Thermal Shutdown Temperature	Ttsd	150	°C	--

Electrical Characteristics

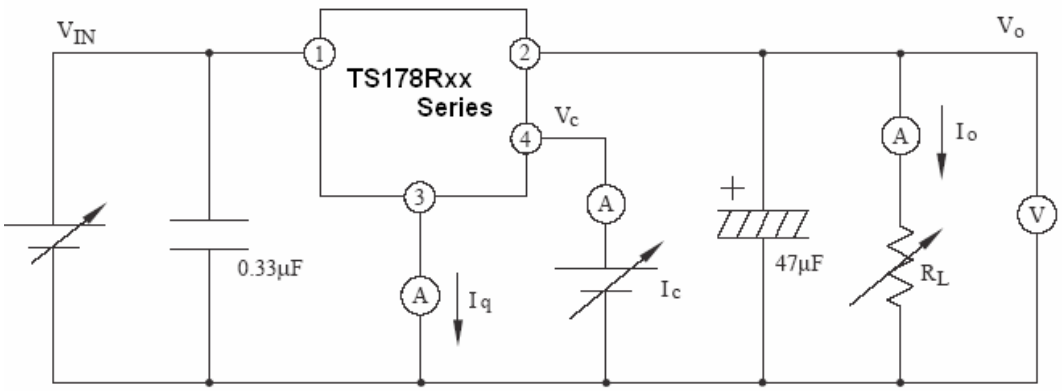
TS178R00 Series (Vin=Note 6, Io=1.0A, Ta=25°C , unless otherwise specified).

Parameter		Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	TS178R33	Vo		3.22	3.3	3.38	V
	TS178R05			4.88	5.0	5.12	
	TS178R08			7.80	8.0	8.20	
	TS178R09			8.78	9.0	9.22	
	TS178R12			11.7	12	12.3	
Load Regulation		REGload	5mA<Io<1A	--	0.1	2.0	%
Line Regulation		REGline	Note 7	--	0.5	2.5	%
Ripple Rejection Ratio		RR	Note1	45	55	--	dB
Dropout Voltage		Vdrop	Io=1A	--	--	0.5	V
Disable Voltage High		VdisH	Output Active	2.0	--	--	V
Disable Voltage Low		VdisL	Output Disabled	--	--	0.8	V
Disable Bias Current High		IdisH	Vdis=2.7V	--	--	20	uA
Disable Bias Current Low		IdisL	Vdis=0.4V	--	--	-0.4	mA
Quiescent Current		Iq	Io=0A	--	--	10	mA

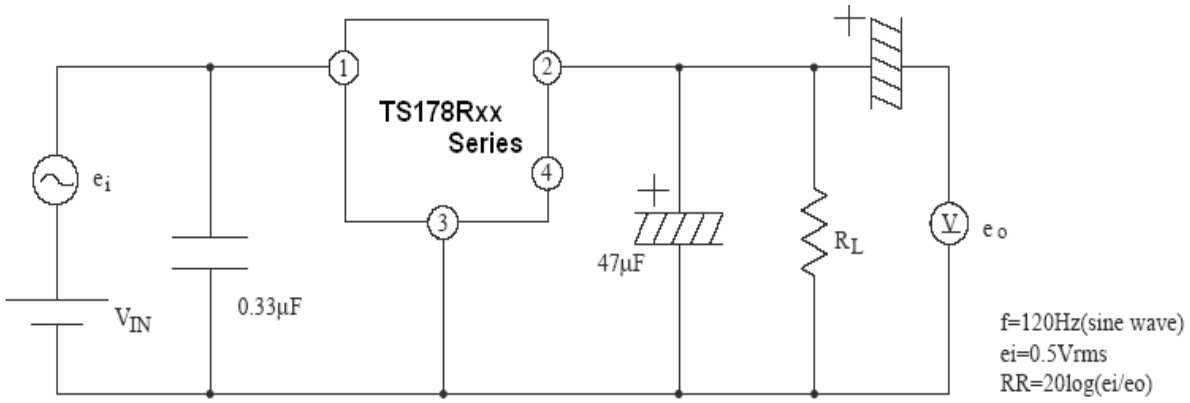
Note: 1.These parameters, although guaranteed, are not 100% tested in production.

2. Junction -to -case thermal resistance test environments.
3. Pneumatic heat sink fixture.
4. Clamping pressure 60psi through 12mm diameter cylinder.
5. Thermal grease applied between PKG and heat sink fixture
6. TS178R33: Vin=5V, TS178R05: Vin=7V, TS178R08: Vin=10V, TS178R09: Vin=11V, TS178R12: Vin=15V
7. TS178R33: Vin=4~10V, TS178R05: Vin=6~12V, TS178R08: Vin=9~25V, TS178R09: Vin=10~25V, TS178R12: Vin=13~29V

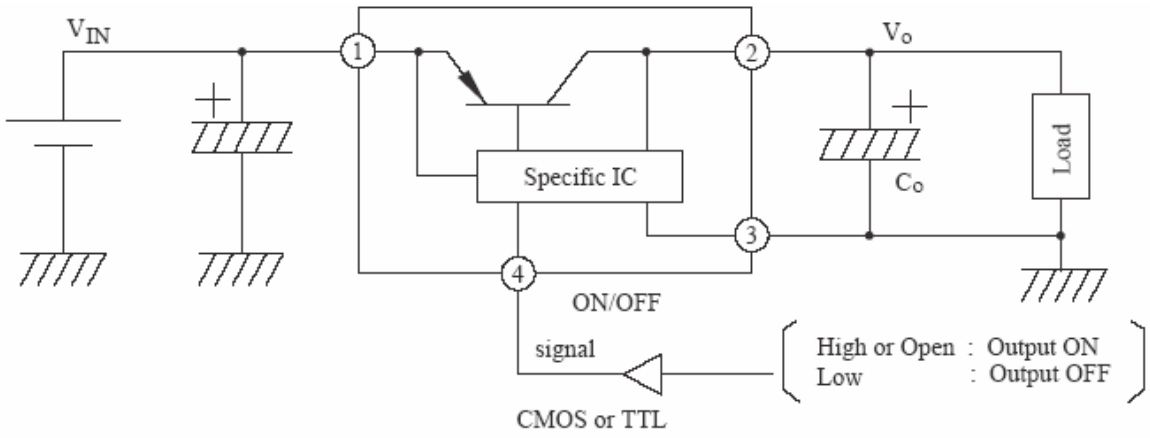
Standard Test Circuit



Ripple Rejection Test Circuit



Standard Application Circuit



Electrical Characteristics Curve

Figure 1: Output Voltage vs. Input Voltage

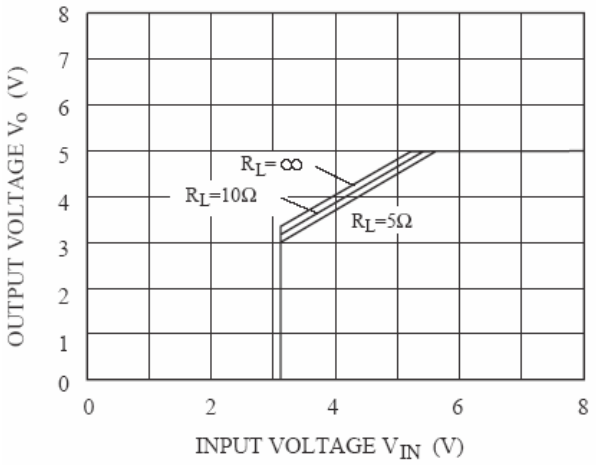


Figure 2: Bias Current vs. Input Voltage

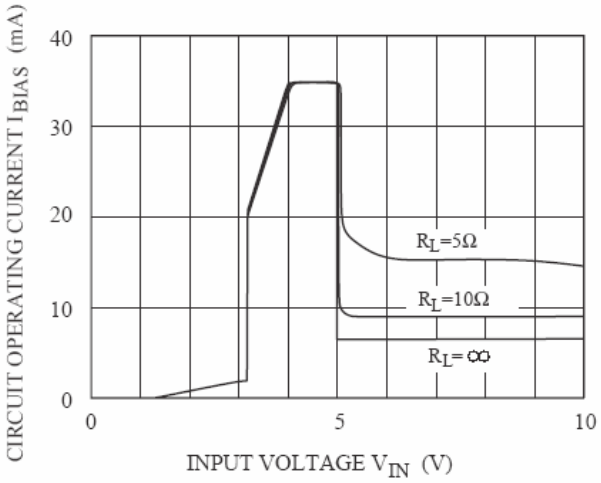


Figure 3: Dropout Voltage vs. Junction Temperature

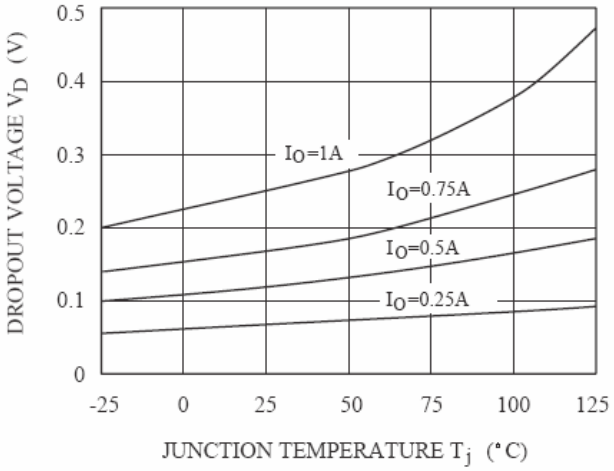


Figure 4: Bias Current vs. Junction Temperature

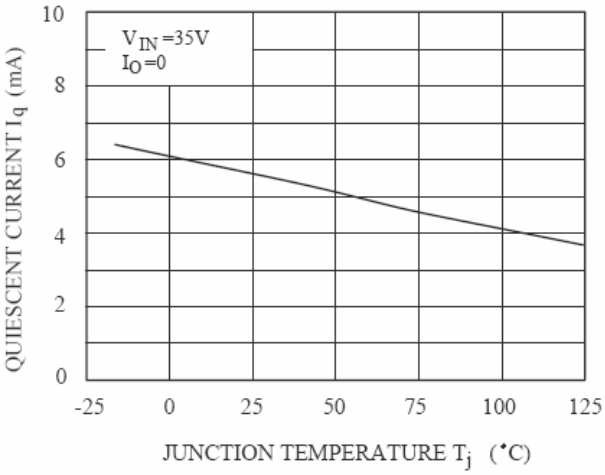


Figure 5: Over Current Protection

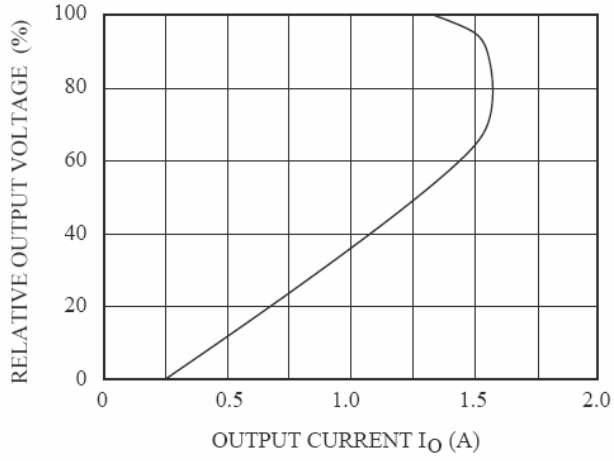
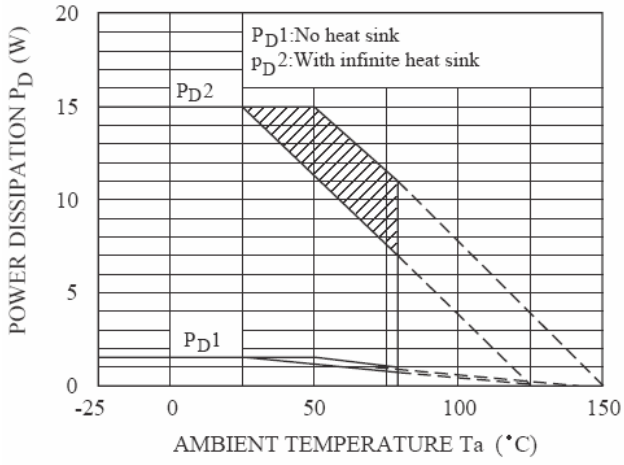
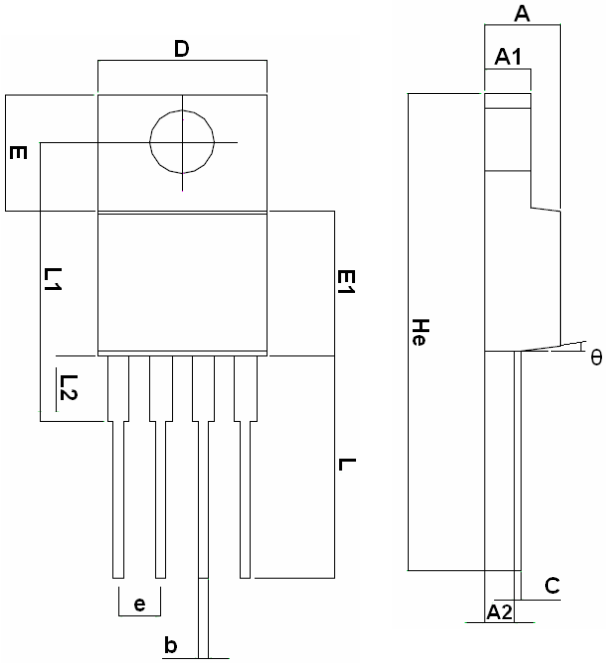


Figure 6: Power Dissipation vs. Junction Temperature

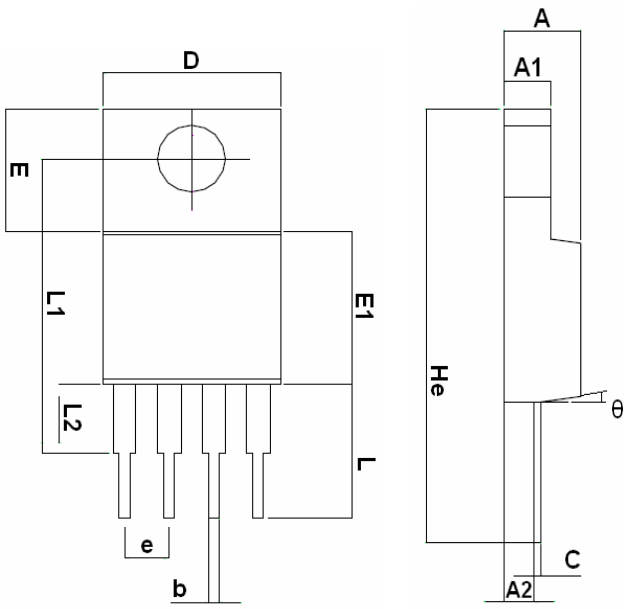


ITO-220-4L Mechanical Drawing



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)	
□	4C	7C	4C	7C

ITO-220-4SL Mechanical Drawing



ITO-220-4SL 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	8.32	8.72	0.328	0.343
L2	16.56	16.76	0.652	0.660
L2	3.60	3.80	0.142	0.150
He	23.72	24.72	0.934	0.973
C	0.48		0.019	
E	2.54(TYP)		0.1(TYP)	
b	0.635(TYP)		0.025(TYP)	
□	4C	7C	4C	7C