



# TS378R00

## 3A 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 TS378R00 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 TS378R00 Series is below 0.5V in full rated current (3A). This regulator has various functions such as a peak current protection, thermal shut down, over voltage protection and an output disable function.

### Features

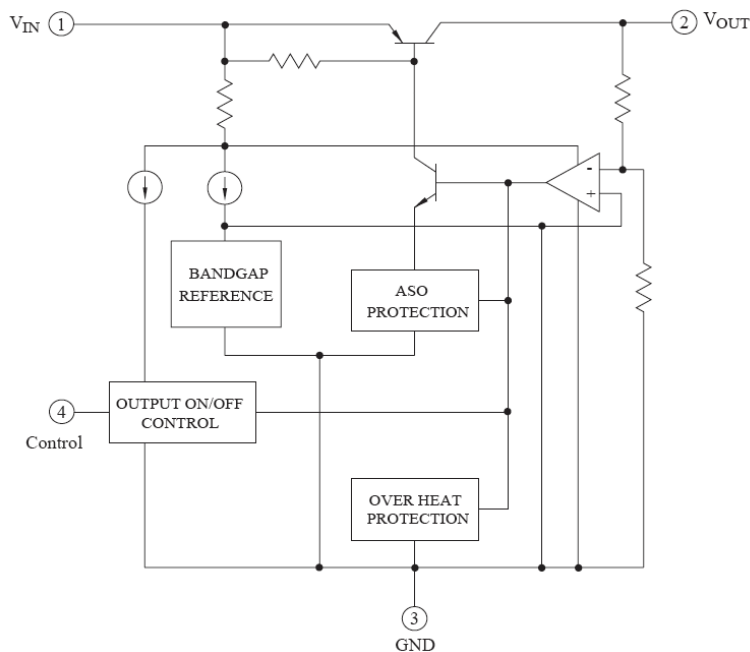
- ◇ Ultra Low Dropout performance 0.5Vmax 3A
- ◇ Over Current Protection, Thermal Shutdown
- ◇ Over Voltage Protection, Short Circuit Protection
- ◇ With Output Disable Function
- ◇  $\pm 2.4\%$  Typical Total output
- ◇ TO-220 Full-Mold Package (4Pin)

### Ordering Information

Part No.	Operating Temp.	Package
TS378RxxCI4	-40 ~ +125 °C	ITO-220-4L
TS378RxxCI4S		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	V <sub>in</sub>	30	V	--
Disable Voltage	V <sub>dis</sub>	30	V	--
Output Current	I <sub>o</sub>	3.0	A	--
Power Dissipation 1	P <sub>d1</sub>	1.5	W	No heat sink
Power Dissipation 2	P <sub>d2</sub>	15	W	With heat sink
Junction Temperature	T <sub>j</sub>	-40~+125	°C	--
Thermal Resistance, Junction-to Case(Note2)	R <sub>θjc</sub>	4.31	°C / W	--
Thermal Resistance, Junction-to Air(Note2)	R <sub>θja</sub>	48.83	°C / W	--
Thermal Shutdown Temperature	T <sub>tsd</sub>	150	°C	--

## Electrical Characteristics

**TS278R00 Series** (V<sub>in</sub>=Note 6, I<sub>o</sub>=1.0A, T<sub>a</sub>=25°C, unless otherwise specified).

Parameter		Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	TS378R33	V <sub>o</sub>		3.22	3.3	3.38	V
	TS378R05			4.88	5.0	5.12	
	TS378R08			7.80	8.0	8.20	
	TS378R09			8.78	9.0	9.22	
	TS378R12			11.7	12	12.3	
Load Regulation	REG <sub>load</sub>	5mA<I <sub>o</sub> <3A	--	0.1	2.0	%	
Line Regulation	REG <sub>line</sub>	Note 7	--	0.5	2.5	%	
Ripple Rejection Ratio	RR	Note1	45	55	--	dB	
Dropout Voltage	V <sub>drop</sub>	I <sub>o</sub> =3A	--	--	0.5	V	
Disable Voltage High	V <sub>disH</sub>	Output Active	2.0	--	--	V	
Disable Voltage Low	V <sub>disL</sub>	Output Disabled	--	--	0.8	V	
Disable Bias Current High	I <sub>disH</sub>	V <sub>dis</sub> =2.7V	--	--	20	uA	
Disable Bias Current Low	I <sub>disL</sub>	V <sub>dis</sub> =0.4V	--	--	-0.4	mA	
Quiescent Current	I <sub>q</sub>	I <sub>o</sub> =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.

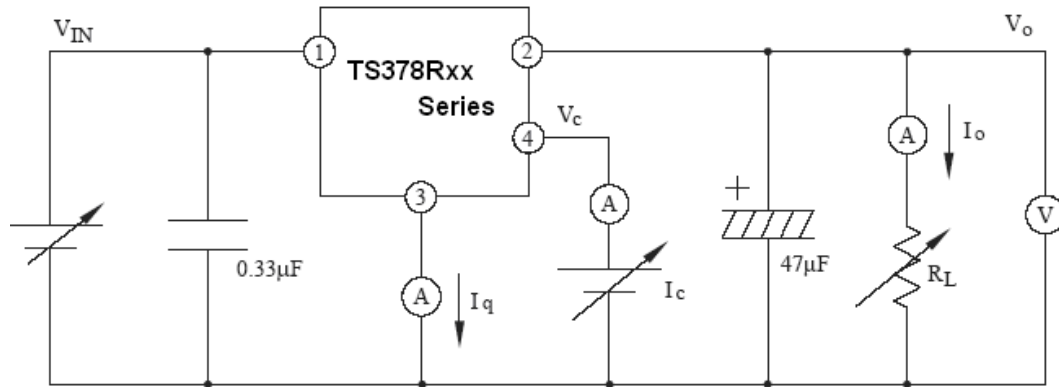
5. Thermal grease applied between PKG and heat sink fixture

6. TS378R33: V<sub>in</sub>=5V, TS378R05: V<sub>in</sub>=7V, TS378R08: V<sub>in</sub>=10V, TS378R09: V<sub>in</sub>=11V, TS378R12: V<sub>in</sub>=15V

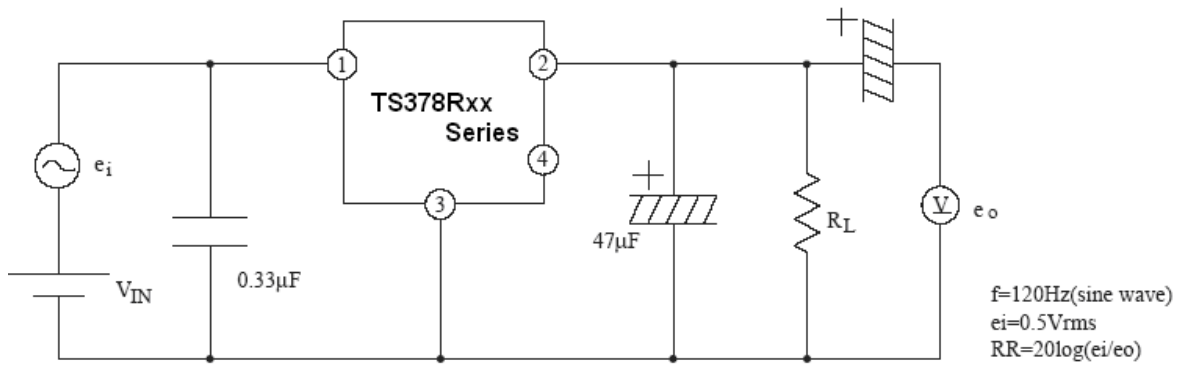
7. TS378R33: V<sub>in</sub>=4~10V, TS378R05: V<sub>in</sub>=6~12V, TS378R08: V<sub>in</sub>=9~25V, TS378R09: V<sub>in</sub>=10~25V,

TS378R12: V<sub>in</sub>=13~29V

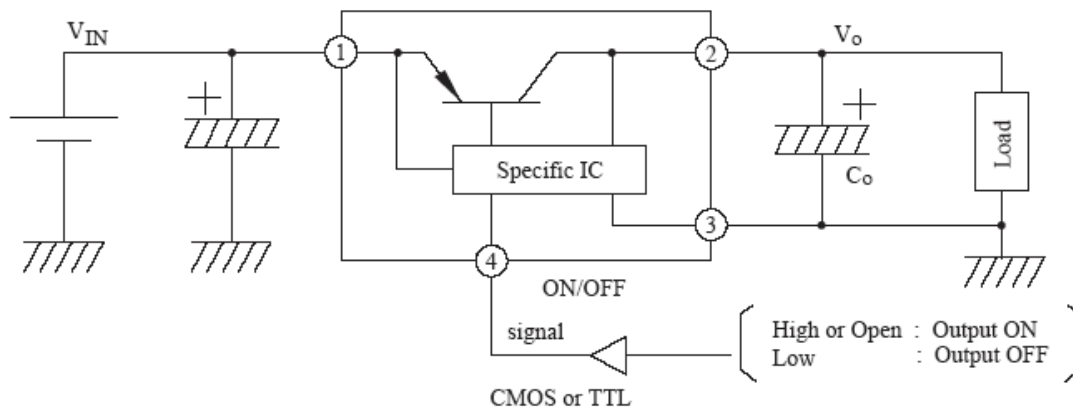
### Standard Test Circuit



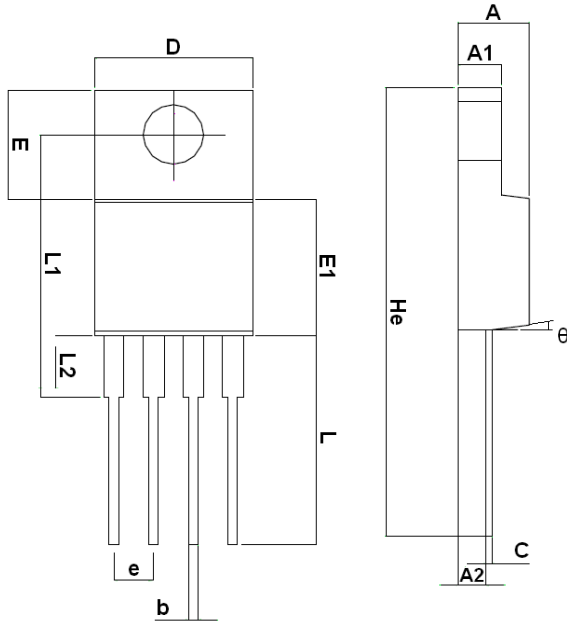
### Ripple Rejection Test Circuit



### Standard Application Circuit

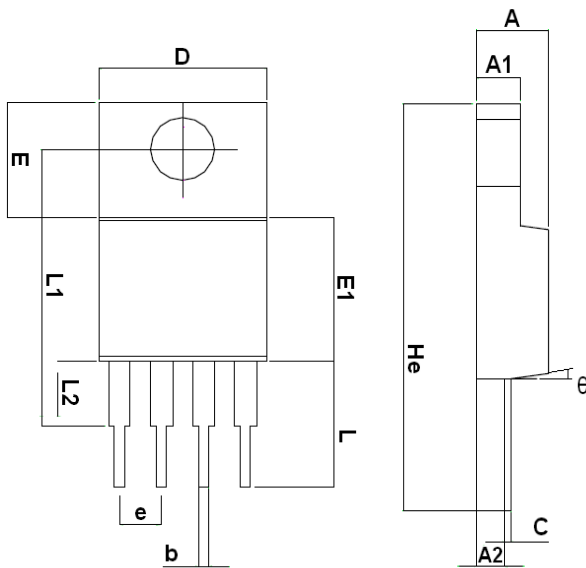


### ITO-220-4L Mechanical Drawing



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°

### 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)	
θ	4°	7°	4°	7°