



## 378RXX

Preliminary

LINEAR INTEGRATED CIRCUIT

### 4 TERMINAL 2A OUTPUT LOW DROP VOLTAGE REGULATOR

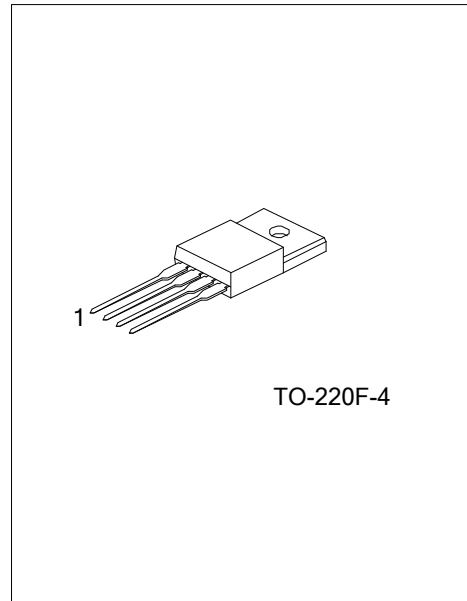
#### DESCRIPTION

The UTC **378RXX** Series are Low Drop Voltage Regulator suitable for various electronic equipments.

It provides constant voltage power source with TO-220 4 terminal lead full molded PKG. The Regulator has multi function such as over current protection, overheat protection and ON/OFF control.

#### FEATURES

- \*3.0A Output Low Drop Voltage Regulator.
- \* Built in ON/OFF Control Terminal.
- \* Built in Over Current Protection, Over Heat Protection Function.
- \* Halogen Free



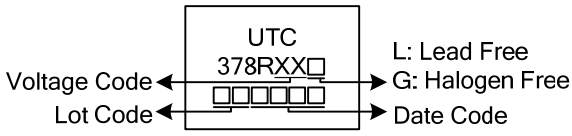
#### ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
378RXXL-TF4-T	378RXXG-TF4-T	TO-220F-4	Tube

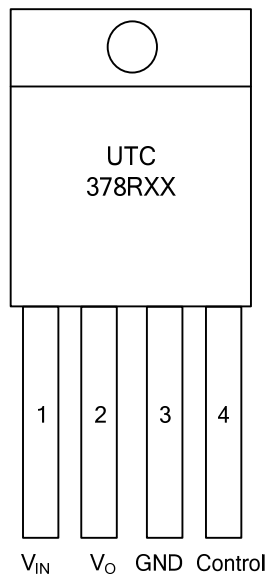
Note: xx: Output Voltage, refer to Marking Information.

<p>378RXXL-TF4-T</p> <p>(1)Packing Type (2)Package Type (3)Lead Free (4)Voltage Code</p>	<p>(1) T: Tube (2) TF4: TO-220F-4 (3) G: Halogen Free, L: Lead Free (4) xx: Refer to Marking Information</p>
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■ MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
TO-220F-4	33: 3.3V 05: 5.0V 09: 9.0V 12: 12V	 <p>UTC 378RXX□</p> <p>Voltage Code ←      → Date Code</p> <p>Lot Code ←      →</p> <p>L: Lead Free G: Halogen Free</p>

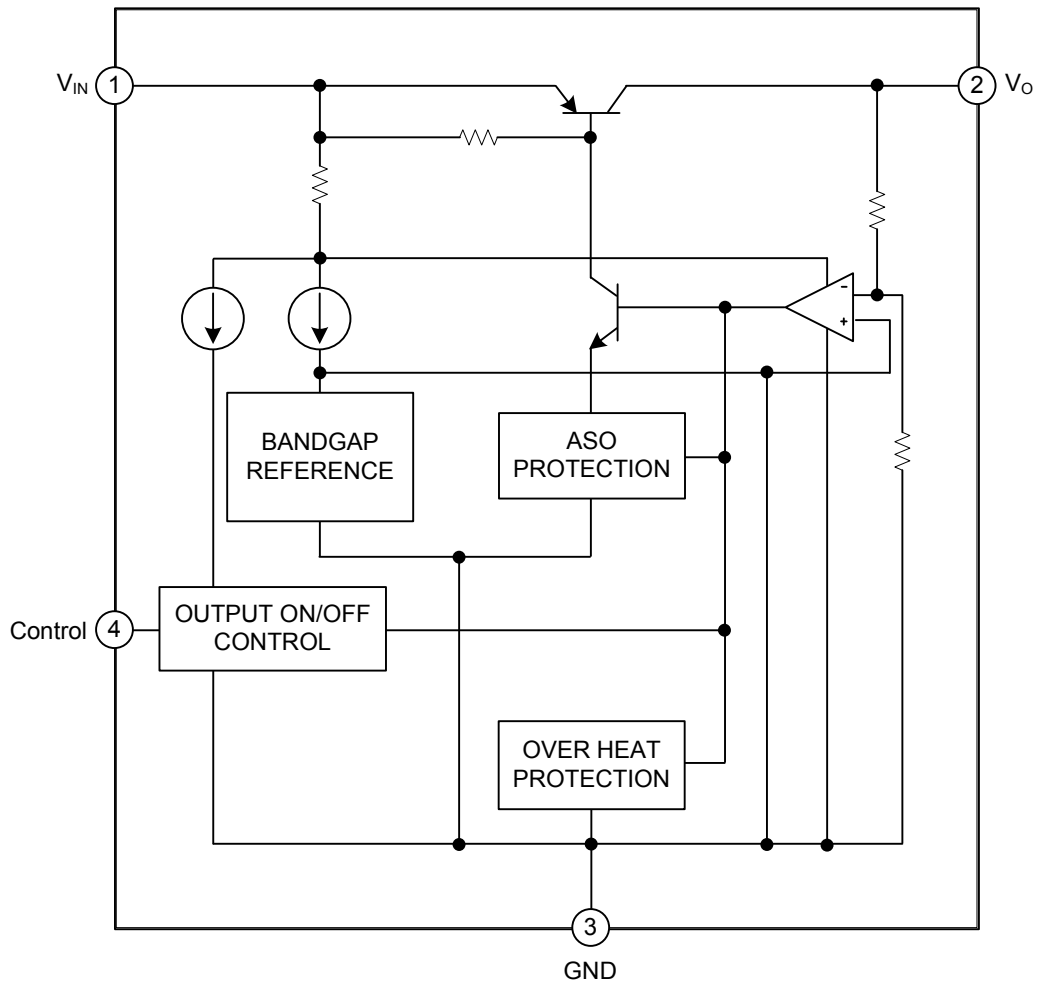
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	$V_{IN}$	Input DC supply voltage
2	$V_{OUT}$	Output voltage pin
3	GND	Ground pin for the IC
4	Control	ON/OFF control pin

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING ( $T_A = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT	REMARK
Input Voltage	$V_{IN}$	35	V	
ON/OFF Control Voltage	$V_C$	35	V	
Output Current	$I_O$	3	A	
Power Dissipation 1	$P_{D1}$	1.5	W	No heatsink
Power Dissipation 2	$P_{D2}$	15	W	with heatsink
Junction Temperature	$T_J$	125	$^\circ\text{C}$	
Operating Temperature	$T_{OPR}$	-20~80	$^\circ\text{C}$	
Storage Temperature	$T_{STG}$	-30~125	$^\circ\text{C}$	
Soldering Temperature (10sec)	$T_{SOL}$	260	$^\circ\text{C}$	

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.  
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ ELECTRICAL CHARACTERISTICS

(Unless otherwise specified,  $I_O=1.0\text{A}$ ,  $T_A = 25^\circ\text{C}$ , unless otherwise specified)

**For 378R33 ( $V_{IN}=5\text{V}$ )**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_O$		3.201	3.3	3.399	V
Load Regulation	Reg Load	$I_O=5\text{mA}\sim 3\text{A}$		0.1	2.0	%
Line Regulation	Reg Line	$V_{IN}=6\sim 12\text{V}$		0.5	2.5	%
Temperature Coefficient of Output Voltage	$T_C V_O$	$T_J=0\sim 125^\circ\text{C}$		$\pm 0.02$	$\pm 0.05$	$\%/^\circ\text{C}$
Ripple Rejection	$R \cdot R$		45	55		dB
Drop Out Voltage (Note)	$V_D$	$I_O=3\text{A}$			0.8	V
Output ON State for Control Voltage	$V_{C(ON)}$		2.0			V
Output ON State for Control Current	$I_{C(ON)}$	$V_C=2.7\text{V}$			20	$\mu\text{A}$
Output OFF State for Control Voltage	$V_{C(OFF)}$				0.8	V
Output OFF State for Control Current	$I_{C(OFF)}$	$V_C=0.4\text{V}$			-0.4	mA
Quiescent Current	$I_Q$	$I_O=0$			10	mA

**For 378R05 ( $V_{IN}=7\text{V}$ )**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_O$		4.88	5.0	5.12	V
Load Regulation	Reg Load	$I_O=5\text{mA}\sim 3\text{A}$		0.1	2.0	%
Line Regulation	Reg Line	$V_{IN}=6\sim 12\text{V}$		0.5	2.5	%
Temperature Coefficient of Output Voltage	$T_C V_O$	$T_J=0\sim 125^\circ\text{C}$		$\pm 0.02$	$\pm 0.05$	$\%/^\circ\text{C}$
Ripple Rejection	$R \cdot R$		45	55		dB
Drop Out Voltage (Note)	$V_D$	$I_O=3\text{A}$			0.8	V
Output ON State for Control Voltage	$V_{C(ON)}$		2.0			V
Output ON State for Control Current	$I_{C(ON)}$	$V_C=2.7\text{V}$			20	$\mu\text{A}$
Output OFF State for Control Voltage	$V_{C(OFF)}$				0.8	V
Output OFF State for Control Current	$I_{C(OFF)}$	$V_C=0.4\text{V}$			-0.4	mA
Quiescent Current	$I_Q$	$I_O=0$			10	mA

■ ELECTRICAL CHARACTERISTICS (Cont.)

For 378R06 ( $V_{IN}=8V$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_O$		5.85	6.0	6.15	V
Load Regulation	Reg Load	$I_O=5mA\sim 3A$		0.1	2.0	%
Line Regulation	Reg Line	$V_{IN}=7\sim 15V$		0.5	2.5	%
Temperature Coefficient of Output Voltage	$T_C V_O$	$T_J=0\sim 125^\circ C$		$\pm 0.02$	$\pm 0.05$	$\%/^\circ C$
Ripple Rejection	$R \cdot R$		45	55		dB
Drop Out Voltage (Note)	$V_D$	$I_O=3A$			0.8	V
Output ON State for Control Voltage	$V_{C(ON)}$		2.0			V
Output ON State for Control Current	$I_{C(ON)}$	$V_C=2.7V$			20	$\mu A$
Output OFF State for Control Voltage	$V_{C(OFF)}$				0.8	V
Output OFF State for Control Current	$I_{C(OFF)}$	$V_C=0.4V$			-0.4	mA
Quiescent Current	$I_Q$	$I_O=0$			10	mA

For 378R08 ( $V_{IN}=10V$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_O$		7.80	8.0	8.20	V
Load Regulation	Reg Load	$I_O=5mA\sim 3A$		0.1	2.0	%
Line Regulation	Reg Line	$V_{IN}=9\sim 25V$		0.5	2.5	%
Temperature Coefficient of Output Voltage	$T_C V_O$	$T_J=0\sim 125^\circ C$		$\pm 0.02$	$\pm 0.05$	$\%/^\circ C$
Ripple Rejection	$R \cdot R$		45	55		dB
Drop Out Voltage (Note)	$V_D$	$I_O=3A$			0.8	V
Output ON State for Control Voltage	$V_{C(ON)}$		2.0			V
Output ON State for Control Current	$I_{C(ON)}$	$V_C=2.7V$			20	$\mu A$
Output OFF State for Control Voltage	$V_{C(OFF)}$				0.8	V
Output OFF State for Control Current	$I_{C(OFF)}$	$V_C=0.4V$			-0.4	mA
Quiescent Current	$I_Q$	$I_O=0$			10	mA

For 378R09 ( $V_{IN}=15V$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_O$		8.78	9.0	9.22	V
Load Regulation	Reg Load	$I_O=5mA\sim 3A$		0.1	2.0	%
Line Regulation	Reg Line	$V_{IN}=10\sim 25V$		0.5	2.5	%
Temperature Coefficient of Output Voltage	$T_C V_O$	$T_J=0\sim 125^\circ C$		$\pm 0.02$	$\pm 0.05$	$\%/^\circ C$
Ripple Rejection	$R \cdot R$		45	55		dB
Drop Out Voltage (Note)	$V_D$	$I_O=3A$			0.8	V
Output ON State for Control Voltage	$V_{C(ON)}$		2.0			V
Output ON State for Control Current	$I_{C(ON)}$	$V_C=2.7V$			20	$\mu A$
Output OFF State for Control Voltage	$V_{C(OFF)}$				0.8	V
Output OFF State for Control Current	$I_{C(OFF)}$	$V_C=0.4V$			-0.4	mA
Quiescent Current	$I_Q$	$I_O=0$			10	mA

■ ELECTRICAL CHARACTERISTICS (Cont.)

For 378R010 ( $V_{IN}=16V$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_O$		9.75	10.0	10.25	V
Load Regulation	Reg Load	$I_O=5mA\sim 3A$		0.1	2.0	%
Line Regulation	Reg Line	$V_{IN}=11\sim 26V$		0.5	2.5	%
Temperature Coefficient of Output Voltage	$T_C V_O$	$T_J=0\sim 125^\circ C$		$\pm 0.02$	$\pm 0.05$	$\%/^\circ C$
Ripple Rejection	$R \cdot R$		45	55		dB
Drop Out Voltage (Note)	$V_D$	$I_O=3A$			0.8	V
Output ON State for Control Voltage	$V_{C(ON)}$		2.0			V
Output ON State for Control Current	$I_{C(ON)}$	$V_C=2.7V$			20	$\mu A$
Output OFF State for Control Voltage	$V_{C(OFF)}$				0.8	V
Output OFF State for Control Current	$I_{C(OFF)}$	$V_C=0.4V$			-0.4	mA
Quiescent Current	$I_Q$	$I_O=0$			10	mA

For 378R012 ( $V_{IN}=18V$ )

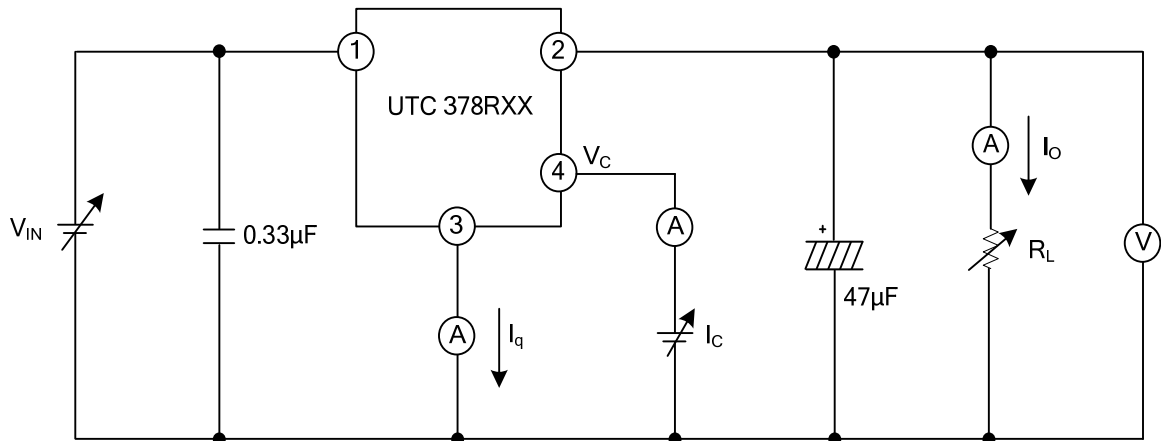
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_O$		11.70	12.0	12.30	V
Load Regulation	Reg Load	$I_O=5mA\sim 3A$		0.1	2.0	%
Line Regulation	Reg Line	$V_{IN}=13\sim 29V$		0.5	2.5	%
Temperature Coefficient of Output Voltage	$T_C V_O$	$T_J=0\sim 125^\circ C$		$\pm 0.02$	$\pm 0.05$	$\%/^\circ C$
Ripple Rejection	$R \cdot R$		45	55		dB
Drop Out Voltage (Note)	$V_D$	$I_O=3A$			0.8	V
Output ON State for Control Voltage	$V_{C(ON)}$		2.0			V
Output ON State for Control Current	$I_{C(ON)}$	$V_C=2.7V$			20	$\mu A$
Output OFF State for Control Voltage	$V_{C(OFF)}$				0.8	V
Output OFF State for Control Current	$I_{C(OFF)}$	$V_C=0.4V$			-0.4	mA
Quiescent Current	$I_Q$	$I_O=0$			10	mA

For 378R015 ( $V_{IN}=21V$ )

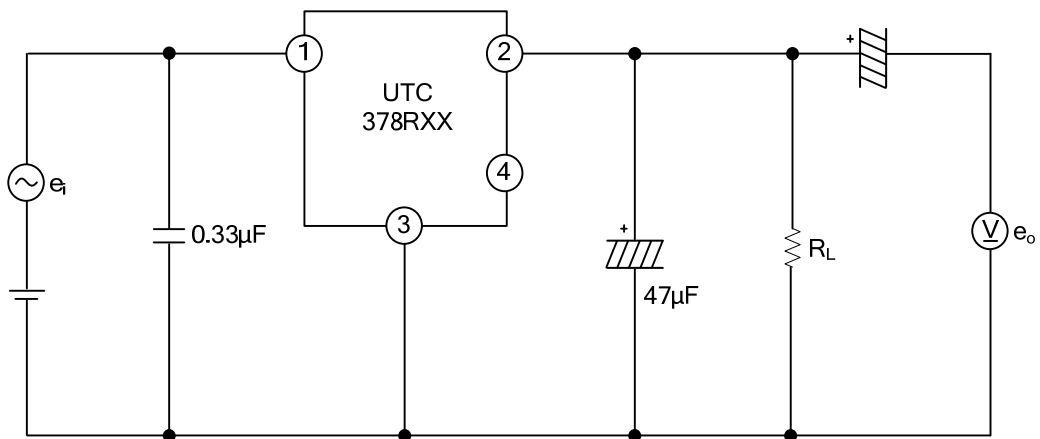
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_O$		14.70	15.0	15.30	V
Load Regulation	Reg Load	$I_O=5mA\sim 3A$		0.1	2.0	%
Line Regulation	Reg Line	$V_{IN}=16\sim 32V$		0.5	2.5	%
Temperature Coefficient of Output Voltage	$T_C V_O$	$T_J=0\sim 125^\circ C$		$\pm 0.02$	$\pm 0.05$	$\%/^\circ C$
Ripple Rejection	$R \cdot R$		45	55		dB
Drop Out Voltage (Note)	$V_D$	$I_O=3A$			0.8	V
Output ON State for Control Voltage	$V_{C(ON)}$		2.0			V
Output ON State for Control Current	$I_{C(ON)}$	$V_C=2.7V$			20	$\mu A$
Output OFF State for Control Voltage	$V_{C(OFF)}$				0.8	V
Output OFF State for Control Current	$I_{C(OFF)}$	$V_C=0.4V$			-0.4	mA
Quiescent Current	$I_Q$	$I_O=0$			10	mA

Note: Input voltage shall be the value when output voltage is 95% in comparison with the initial value.

■ TEST CIRCUIT



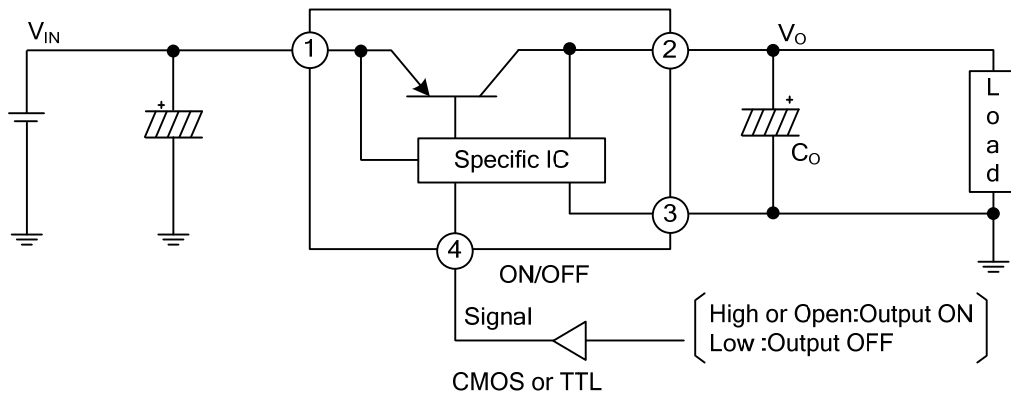
Standard Test Circuit



f=120Hz (sine wave)  
 $e_i=0.5V_{rms}$   
 $RR=20\log(e_i/e_o)$

Ripple Rejection Test Circuit

■ TYPICAL APPLICATION CIRCUIT



Application Circuit Standard



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