



278RXX

LINEAR INTEGRATED CIRCUIT

4 TERMINAL 2A OUTPUT LOW DROP VOLTAGE REGULATOR

DESCRIPTION

The UTC **278RXX** Series are Low Drop Voltage Regulator suitable for various electronic equipments.

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

FEATURES

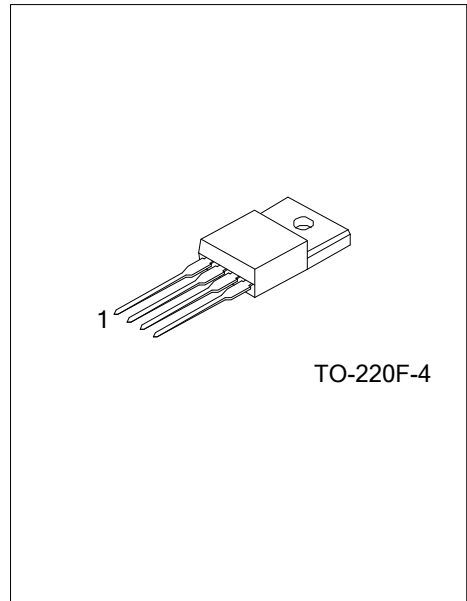
- * 2.0A Output Low Drop Voltage Regulator.
- * Built in ON/OFF Control Terminal.
- * Built in Over Current Protection, Over Heat Protection Function.

ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
278RXXL-TF4-T	278RXXG-TF4-T	TO-220F-4	Tube

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

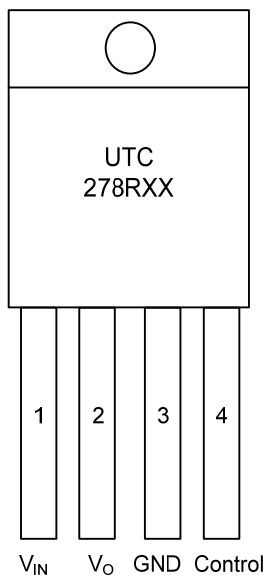
<p>278RXXG-TF4-T</p>	<ul style="list-style-type: none"> (1) T: Tube (2) TF4: TO-220F-4 (3) G: Halogen Free and Lead Free, L: Lead Free (4) XX: Refer to Marking Information
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MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
TO-220F-4	05: 5.0V 08: 8.0V 12: 12V 15: 15V 33: 3.3V	<p>The marking diagram shows a rectangular area divided into three sections. The top section contains 'UTC' and '278RXX' followed by a small square. The middle section contains 'Voltage Code' with an arrow pointing to a small square. The bottom section contains 'Lot Code' with an arrow pointing to a row of five small squares. To the right of the diagram, there are three lines: 'L: Lead Free', 'G: Halogen Free', and 'Date Code' with an arrow pointing to a small square.</p>

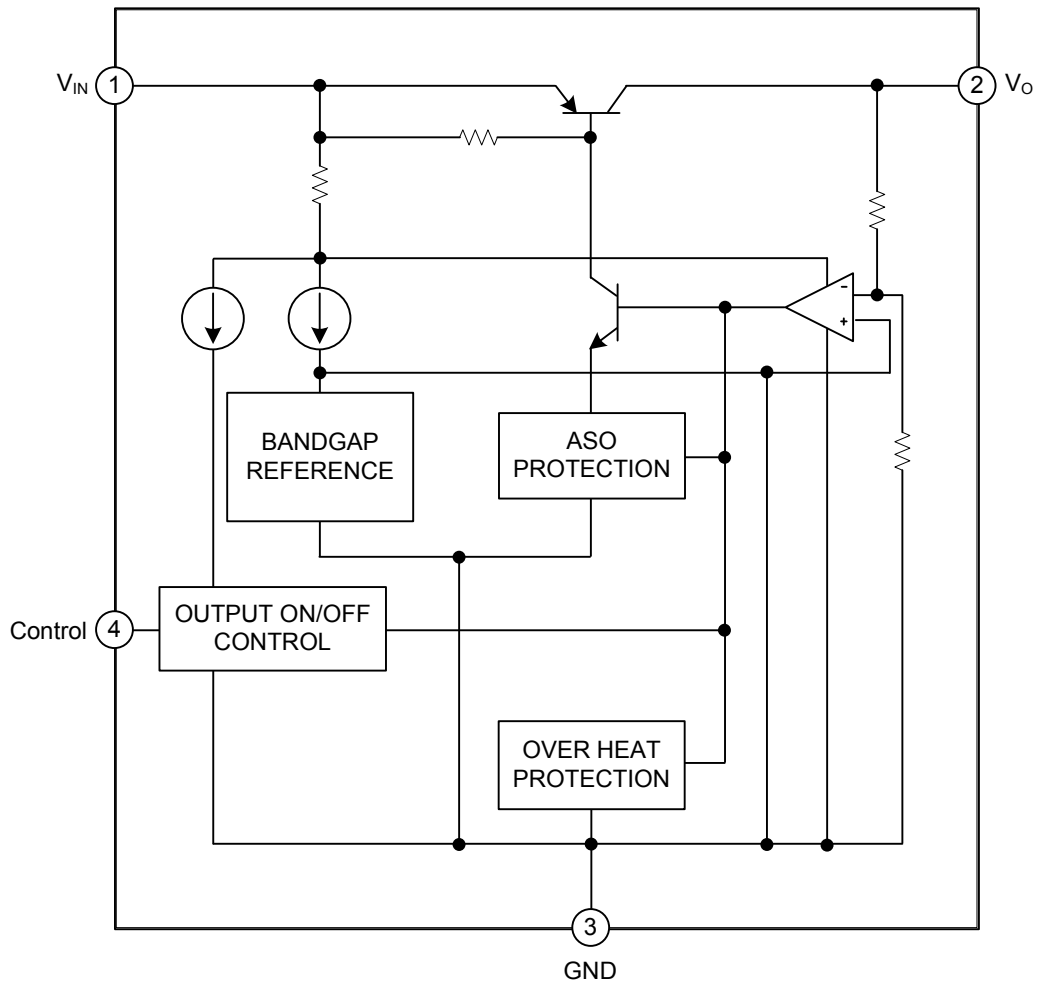
PIN CONFIGURATION



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	REMARK	RATINGS	UNIT
Input Voltage	V_{IN}		35	V
ON/OFF Control Voltage	V_C		35	V
Output Current	I_O		2	A
Power Dissipation 1	P_{D1}	No heatsink	1.5	W
Junction Temperature	T_J		+125	$^{\circ}\text{C}$
Operating Temperature	T_{OPR}		-20 ~ +80	$^{\circ}\text{C}$
Storage Temperature	T_{STG}		-30 ~ +125	$^{\circ}\text{C}$

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

For 278R05 ($V_{IN}=7\text{V}$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_O		4.875	5.0	5.125	V
Load Regulation	Reg Load	$I_O=5\text{mA}\sim 2\text{A}$		0.1	2.0	%
Line Regulation	Reg Line	$V_{IN}=6\sim 12\text{V}$		0.5	2.5	%
Ripple Rejection	$R \cdot R$		45	55		dB
Drop Out Voltage (Note)	V_D	$I_O=2\text{A}$			0.5	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	μA
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 278R08 ($V_{IN}=10\text{V}$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_O		7.800	8.0	8.200	V
Load Regulation	Reg Load	$I_O=5\text{mA}\sim 2\text{A}$		0.1	2.0	%
Line Regulation	Reg Line	$V_{IN}=9\sim 15\text{V}$		0.5	2.5	%
Ripple Rejection	$R \cdot R$		45	55		dB
Drop Out Voltage (Note)	V_D	$I_O=2\text{A}$			0.5	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	μA
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 278R12 ($V_{IN}=18\text{V}$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_O		11.70	12.0	12.30	V
Load Regulation	Reg Load	$I_O=5\text{mA}\sim 2\text{A}$		0.1	2.0	%
Line Regulation	Reg Line	$V_{IN}=13\sim 29\text{V}$		0.5	2.5	%
Ripple Rejection	$R \cdot R$		45	55		dB
Drop Out Voltage (Note)	V_D	$I_O=2\text{A}$			0.5	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	μA
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 278R15 ($V_{IN}=21V$)

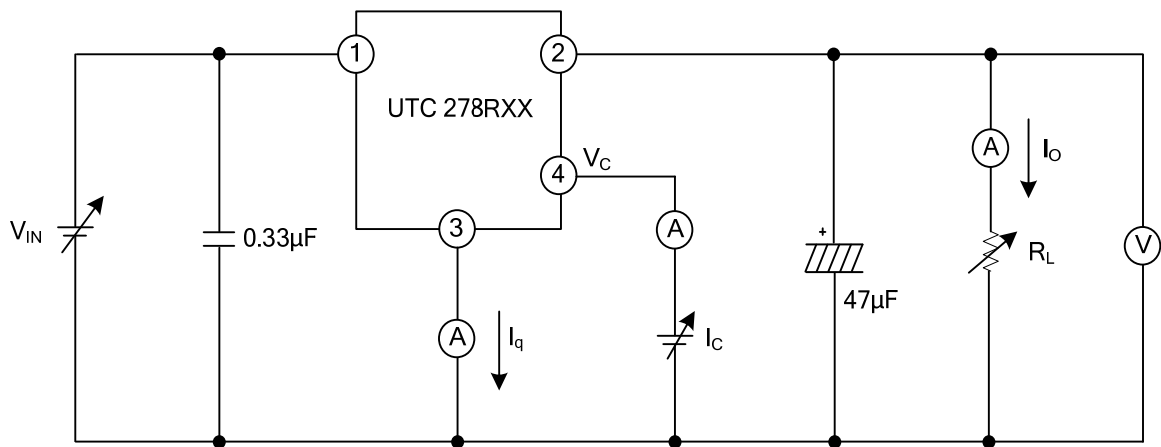
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_O		14.70	15.0	15.30	V
Load Regulation	Reg Load	$I_O=5mA\sim 2A$		0.1	2.0	%
Line Regulation	Reg Line	$V_{IN}=16\sim 32V$		0.5	2.5	%
Ripple Rejection	$R \cdot R$		45	55		dB
Drop Out Voltage (Note)	V_D	$I_O=2A$			0.8	V
Output ON State for Control Voltage	$V_{C(ON)}$		2.0			V
Output ON State for Control Current	$I_{C(ON)}$	$V_C=2.7V$			20	μA
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 278R33 ($V_{IN}=5V$)

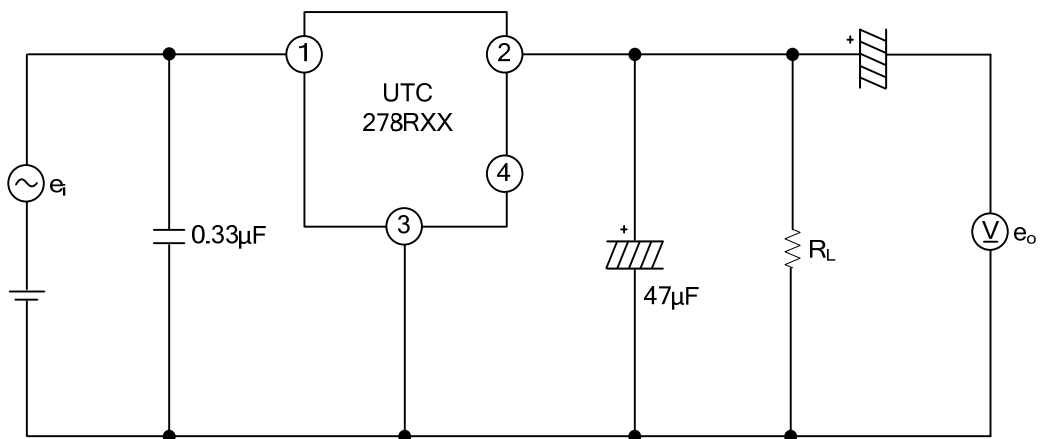
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_O		3.218	3.3	3.383	V
Load Regulation	Reg Load	$I_O=5mA\sim 2A$		0.1	2.0	%
Line Regulation	Reg Line	$V_{IN}=6\sim 12V$		0.5	2.5	%
Ripple Rejection	$R \cdot R$		45	55		dB
Drop Out Voltage (Note)	V_D	$I_O=2A$			0.5	V
Output ON State for Control Voltage	$V_{C(ON)}$		2.0			V
Output ON State for Control Current	$I_{C(ON)}$	$V_C=2.7V$			20	μA
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



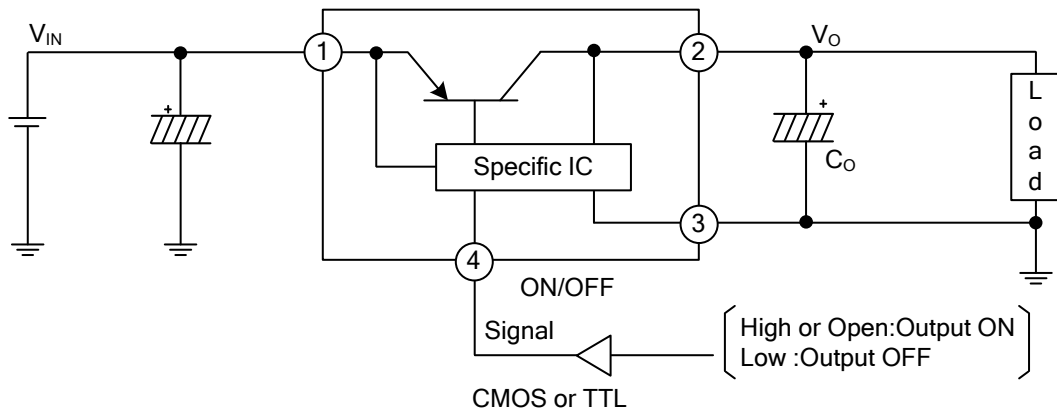
Standard Test Circuit



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

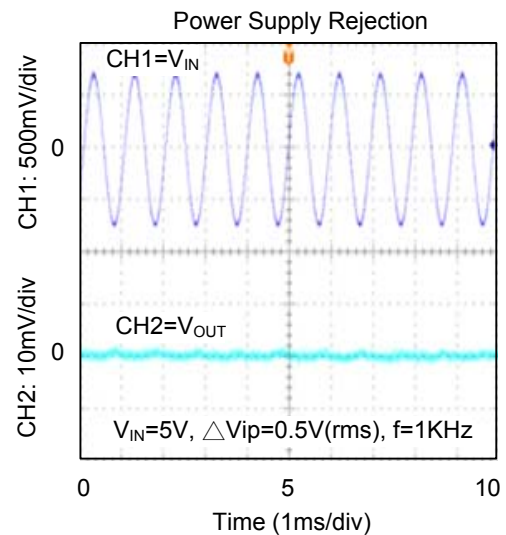
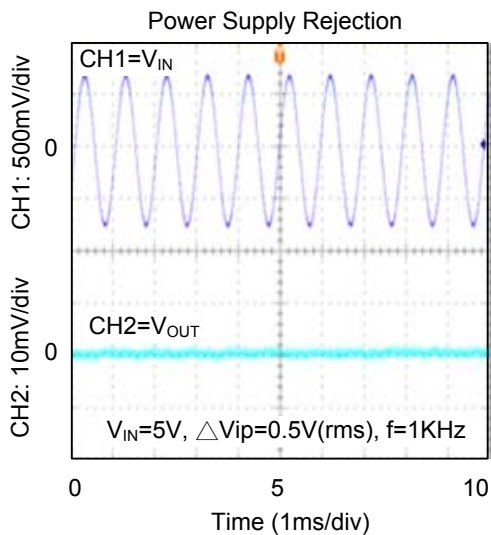
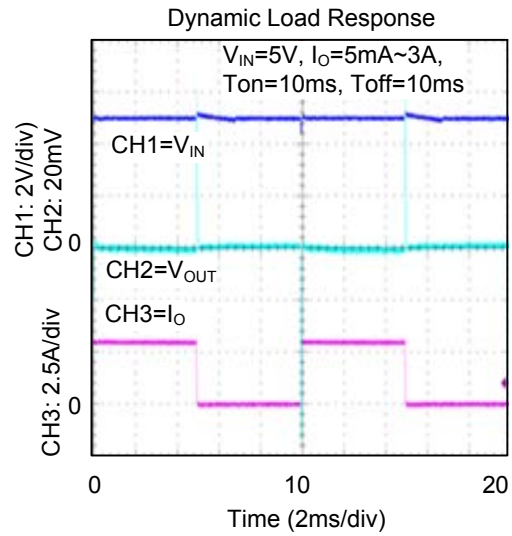
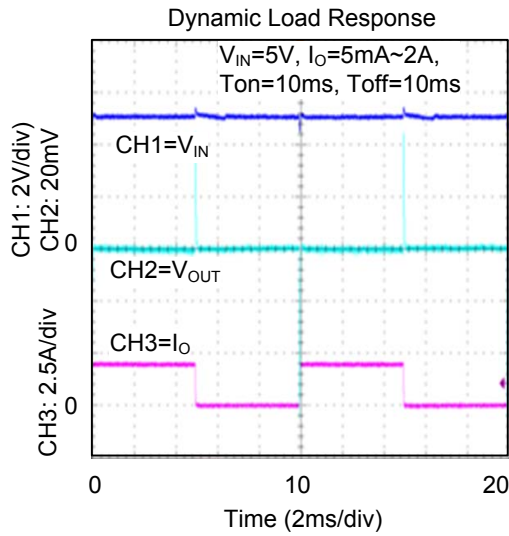
Ripple Rejection Test Circuit

■ TYPICAL APPLICATION CIRCUIT



Application Circuit Standard

■ TYPICAL CHARACTERISTICS



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