



## 79DXXA

## LINEAR INTEGRATED CIRCUIT

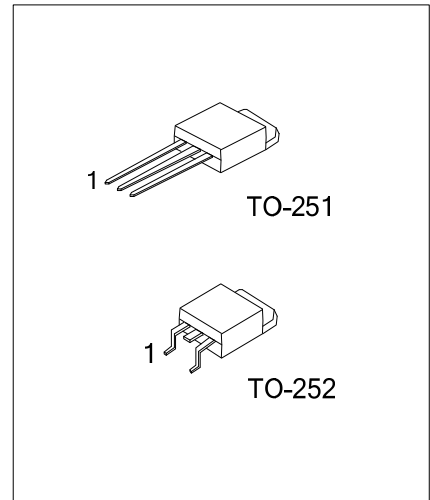
### 3 TERMINAL 1A NEGATIVE VOLTAGE REGULATOR

#### DESCRIPTION

The UTC **79DXXA** series of three-terminal negative regulators is available several fixed output voltage, making them useful in a wide range of application. Each type employs internal current limiting, thermal shut-down, making it essentially indestructible.

#### FEATURES

- \* Output current up to 1A
- \* -5V, -6V, -8V, -9V, -12V, -15V, -18V, -24V output voltage available
- \* Thermal overload protection



#### NORDERING INFORMATIO

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
79DXXAL-TM3-T	79DXXAG-TM3-T	TO-251	G	I	O	Tube
79DXXAL-TN3-T	79DXXAG-TN3-T	TO-252	G	I	O	Tube
79DXXAL-TN3-R	79DXXAG-TN3-R	TO-252	G	I	O	Tape Reel

Note: Pin Assignment : G: GND I: Input O: Output

<p>79DXXAL-TM3-T</p> <p>(1)Packing Type (2)Package Type (3)Lead Plating (4)Output Voltage Code</p>	<p>(1) T: Tube, R: Tape Reel (2) TM3: TO-251, TN3: TO-252 (3) L: Lead Free, G: Halogen Free (4) xx: refer to Marking Information</p>
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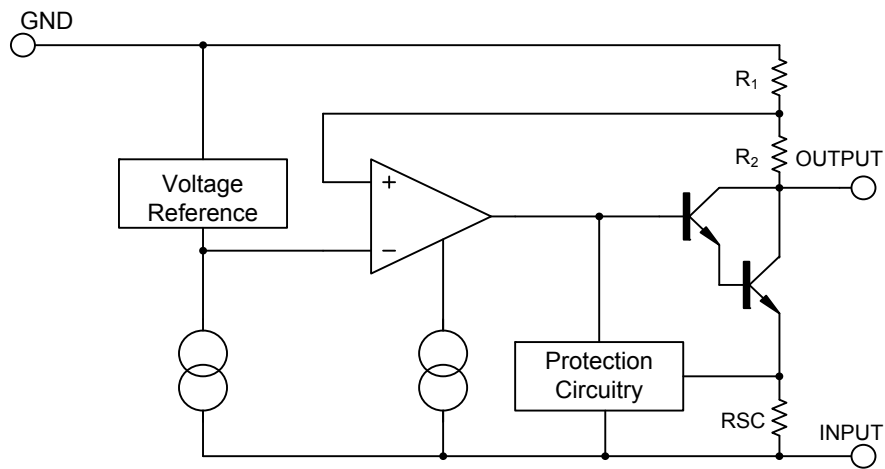
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### MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
TO-251 TO-252	05: -5V	
	06: -6V	
	08: -8V	
	09: -9V	
	12: -12V	
	15: -15V	
	18: -18V	
24: -24V		

### BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25°C)

PARAMETER	SYMBOL	RATING	UNIT
Input Voltage	V <sub>IN</sub>	-35	V
Output Current	I <sub>OUT</sub>	1	A
Power Dissipation	P <sub>D</sub>	Internally Limited	W
Operating Temperature	T <sub>OPR</sub>	0 ~ +125	°C
Storage Temperature	T <sub>STG</sub>	-65 ~ +150	°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.

■ THERMAL DATA

PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	θ <sub>JA</sub>	112	°C/W
Junction to Case	θ <sub>JC</sub>	12.5	°C/W

■ ELECTRICAL CHARACTERISTICS

(I<sub>OUT</sub>=0.5A, T<sub>J</sub>=0°C~125°C, C<sub>I</sub>=2.2μF, C<sub>O</sub>=1μF, unless otherwise specified)

For UTC 79D05A (V<sub>IN</sub>=-10V)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V <sub>OUT</sub>	T <sub>J</sub> =25°C	-4.80	-5.0	-5.20	V
		V <sub>IN</sub> =-7V~-20V I <sub>OUT</sub> =5mA~1A, P <sub>D</sub> ≤ 15W	-4.75		-5.25	V
Dropout Voltage	V <sub>D</sub>	I <sub>OUT</sub> =1A T <sub>J</sub> =25°C		2		V
Line Regulation	ΔV <sub>OUT</sub>	V <sub>IN</sub> =-7V~-25V T <sub>J</sub> =25°C		10	100	mV
		V <sub>IN</sub> =-8V~-12V T <sub>J</sub> =25°C		5	60	mV
Load Regulation	ΔV <sub>OUT</sub>	I <sub>OUT</sub> =5mA~1A T <sub>J</sub> =25°C		10	100	mV
		I <sub>OUT</sub> =250mA~750mA T <sub>J</sub> =25°C		3	50	mV
Quiescent Current	I <sub>Q</sub>	T <sub>J</sub> =25°C		3	6	mA
Quiescent Current Change	ΔI <sub>Q</sub>	I <sub>OUT</sub> =5mA~1A		0.05	0.5	mA
		V <sub>IN</sub> =-7V~-25V		0.1	1.3	mA
Output Noise Voltage	eN	f=10Hz~100kHz T <sub>A</sub> =25°C		100		μV
Output Voltage Drift	ΔV <sub>OUT</sub> /ΔT	I <sub>OUT</sub> =5mA		-0.4		mV/°C
Ripple Rejection	RR	V <sub>IN</sub> =-8V~-18V, f=120Hz	54	60		dB
Peak Current	I <sub>PEAK</sub>	T <sub>J</sub> =25°C		2.2		A

For UTC 79D06A (V<sub>IN</sub>=-11V)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V <sub>OUT</sub>	T <sub>J</sub> =25°C	-5.76	-6.00	-6.24	V
		V <sub>IN</sub> =-8V~-21V, I <sub>OUT</sub> =5mA~1A, P <sub>D</sub> ≤ 15W	-5.70		-6.30	V
Dropout Voltage	V <sub>D</sub>	I <sub>OUT</sub> =1.0A T <sub>J</sub> =25°C		2		V
Line Regulation	ΔV <sub>OUT</sub>	V <sub>IN</sub> =-8V~-25V T <sub>J</sub> =25°C		10	120	mV
		V <sub>IN</sub> =-9V~-13V T <sub>J</sub> =25°C		5	60	mV
Load Regulation	ΔV <sub>OUT</sub>	I <sub>OUT</sub> =5mA~1A T <sub>J</sub> =25°C		10	120	mV
		I <sub>OUT</sub> =250mA~750mA T <sub>J</sub> =25°C		3	60	mV
Quiescent Current	I <sub>Q</sub>	T <sub>J</sub> =25°C		3	6	mA
Quiescent Current Change	ΔI <sub>Q</sub>	I <sub>OUT</sub> =5mA~1A		0.05	0.5	mA
		V <sub>IN</sub> =-8V~-25V		0.1	1.3	mA
Output Noise Voltage	eN	f=10Hz~100kHz T <sub>A</sub> =25°C		130		μV

## ■ ELECTRICAL CHARACTERISTICS(Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage Drift	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5mA$		-0.5		mV/°C
Ripple Rejection	RR	$V_{IN}=-9V\sim-19V$ , $f=120Hz$	54	60		dB
Peak Current	$I_{PEAK}$	$T_J=25^\circ C$		2.2		A

For UTC 79D08A ( $V_{IN}=-14V$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	$T_J=25^\circ C$	-7.68	-8.0	-8.32	V
		$V_{IN}=-10.5V\sim-23V$ , $I_{OUT}=5mA\sim 1A$ , $P_D \leq 15W$	-7.60		-8.40	V
Dropout Voltage	$V_D$	$I_{OUT}=1A$ , $T_J=25^\circ C$		2		V
Line Regulation	$\Delta V_{OUT}$	$V_{IN}=-10.5V\sim-25V$ , $T_J=25^\circ C$		10	160	mV
		$V_{IN}=-11.5V\sim-17V$ , $T_J=25^\circ C$		5	80	mV
Load Regulation	$\Delta V_{OUT}$	$I_{OUT}=5mA\sim 1A$ , $T_J=25^\circ C$		12	160	mV
		$I_{OUT}=250mA\sim 750mA$ , $T_J=25^\circ C$		4	80	mV
Quiescent Current	$I_Q$	$T_J=25^\circ C$		3	6	mA
Quiescent Current Change	$\Delta I_Q$	$I_{OUT}=5mA\sim 1A$		0.05	0.5	mA
		$V_{IN}=-11.5V\sim-25V$		0.1	1.0	mA
Output Noise Voltage	eN	$f=10Hz\sim 100kHz$ , $T_A=25^\circ C$		175		$\mu V$
Output Voltage Drift	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5mA$		-0.6		mV/°C
Ripple Rejection	RR	$V_{IN}=-11.5V\sim-21.5V$ , $f=120Hz$	54	60		dB
Peak Current	$I_{PEAK}$	$T_J=25^\circ C$		2.2		A

For UTC 79D09A ( $V_{IN}=-15V$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	$T_J=25^\circ C$	-8.64	-9.0	-9.36	V
		$V_{IN}=-11.5V\sim-23V$ , $I_{OUT}=5mA\sim 1A$ , $P_D \leq 15W$	-8.55		-9.45	V
Dropout Voltage	$V_D$	$I_{OUT}=1A$ , $T_J=25^\circ C$		2.0		V
Line Regulation	$\Delta V_{OUT}$	$V_{IN}=-11.5V\sim-26V$ , $T_J=25^\circ C$		10	180	mV
		$V_{IN}=-12V\sim-18V$ , $T_J=25^\circ C$		5	90	mV
Load Regulation	$\Delta V_{OUT}$	$I_{OUT}=5mA\sim 1A$ , $T_J=25^\circ C$		12	180	mV
		$I_{OUT}=250mA\sim 750mA$ , $T_J=25^\circ C$		4	90	mV
Quiescent Current	$I_Q$	$T_J=25^\circ C$		3	6	mA
Quiescent Current Change	$\Delta I_Q$	$I_{OUT}=5mA\sim 1A$		0.05	0.5	mA
		$V_{IN}=-11.5V\sim-26V$		0.1	1.0	mA
Output Noise Voltage	eN	$f=10Hz\sim 100kHz$ , $T_a=25^\circ C$		175		$\mu V$
Output Voltage Drift	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5mA$		-0.6		mV/°C
Ripple Rejection	RR	$V_{IN}=-12.5V\sim-22.5V$ , $f=120Hz$	54	60		dB
Peak Current	$I_{PEAK}$	$T_J=25^\circ C$		2.2		A

■ ELECTRICAL CHARACTERISTICS(Cont.)

For UTC 79D12A ( $V_{IN}=-18V$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	$T_J=25^{\circ}C$	-11.52	-12.0	-12.48	V
		$V_{IN}=-14.5V\sim-27V$ , $I_{OUT}=5mA\sim 1A$ , $P_D\leq 15W$	-11.40		-12.60	V
Dropout Voltage	$V_D$	$I_{OUT}=1A$ , $T_J=25^{\circ}C$		2		V
Line Regulation	$\Delta V_{OUT}$	$V_{IN}=-14.5V\sim-30V$ , $T_J=25^{\circ}C$		12	240	mV
		$V_{IN}=-16V\sim-22V$ , $T_J=25^{\circ}C$		6	120	mV
Load Regulation	$\Delta V_{OUT}$	$I_{OUT}=5mA\sim 1A$ , $T_J=25^{\circ}C$		12	240	mV
		$I_{OUT}=250mA\sim 750mA$ , $T_J=25^{\circ}C$		4	120	mV
Quiescent Current	$I_Q$	$T_J=25^{\circ}C$		3	6	mA
Quiescent Current Change	$\Delta I_Q$	$I_{OUT}=5mA\sim 1A$		0.05	0.5	mA
		$V_{IN}=-14.5V\sim-30V$		0.1	1.0	mA
Output Noise Voltage	eN	$f=10Hz\sim 100kHz$ , $T_a=25^{\circ}C$		200		$\mu V$
Output Voltage Drift	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5mA$		-0.8		$mV/^{\circ}C$
Ripple Rejection	RR	$V_{IN}=-15V\sim-25V$ , $f=120Hz$	54	60		dB
Peak Current	$I_{PEAK}$	$T_J=25^{\circ}C$		2.2		A

For UTC 79D15A ( $V_{IN}=-23V$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	$T_J=25^{\circ}C$	-14.40	-15.0	-15.60	V
		$V_{IN}=-17.5V\sim-30V$ , $I_{OUT}=5mA\sim 1A$ , $P_D\leq 15W$	-14.25		-15.75	V
Dropout Voltage	$V_D$	$I_{OUT}=1A$ , $T_J=25^{\circ}C$		2		V
Line Regulation	$\Delta V_{OUT}$	$V_{IN}=-17.5V\sim-30V$ , $T_J=25^{\circ}C$		12	300	mV
		$V_{IN}=-20V\sim-26V$ , $T_J=25^{\circ}C$		6	150	mV
Load Regulation	$\Delta V_{OUT}$	$I_{OUT}=5mA\sim 1A$ , $T_J=25^{\circ}C$		12	300	mV
		$I_{OUT}=250mA\sim 750mA$ , $T_J=25^{\circ}C$		4	150	mV
Quiescent Current	$I_Q$	$T_J=25^{\circ}C$		3	6	mA
Quiescent Current Change	$\Delta I_Q$	$I_{OUT}=5mA\sim 1A$		0.05	0.5	mA
		$V_{IN}=-17.5V\sim-30.5V$		0.1	1.0	mA
Output Noise Voltage	eN	$f=10Hz\sim 100kHz$ , $T_a=25^{\circ}C$		250		$\mu V$
Output Voltage Drift	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5mA$		-0.9		$mV/^{\circ}C$
Ripple Rejection	RR	$V_{IN}=-18.5V\sim-28.5V$ , $f=120Hz$	54	60		dB
Peak Current	$I_{PEAK}$	$T_J=25^{\circ}C$		2.2		A

■ ELECTRICAL CHARACTERISTICS(Cont.)

For UTC 79D18A ( $V_{IN}=-27V$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	$T_J=25^{\circ}C$	-17.28	-18.0	-18.72	V
		$V_{IN}=-21V\sim-33V$ $I_{OUT}=5mA\sim 1A, P_D \leq 15W$	-17.10		-18.90	V
Dropout Voltage	$V_D$	$I_{OUT}=1A$ $T_J=25^{\circ}C$		2		V
Line Regulation	$\Delta V_{OUT}$	$V_{IN}=-21V\sim-33V$ $T_J=25^{\circ}C$		15	360	mV
		$V_{IN}=-24V\sim-30V$ $T_J=25^{\circ}C$		8	180	mV
Load Regulation	$\Delta V_{OUT}$	$I_{OUT}=5mA\sim 1A$ $T_J=25^{\circ}C$		15	360	mV
		$I_{OUT}=250mA\sim 750mA$ $T_J=25^{\circ}C$		5.0	180	mV
Quiescent Current	$I_Q$	$T_J=25^{\circ}C$		3	6	mA
Quiescent Current Change	$\Delta I_Q$	$I_{OUT}=5mA\sim 1A$		0.05	0.5	mA
		$V_{IN}=-21V\sim-32V$		0.1	1.0	mA
Output Noise Voltage	eN	$f=10Hz\sim 100kHz$ $T_a=25^{\circ}C$		300		$\mu V$
Output Voltage Drift	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5mA$		-1		mV/ $^{\circ}C$
Ripple Rejection	RR	$V_{IN}=-22V\sim-32V, f=120Hz$	54	60		dB
Peak Current	$I_{PEAK}$	$T_J=25^{\circ}C$		2.2		A

For UTC 79D24A ( $V_{IN}=-33V$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	$T_J=25^{\circ}C$	-23.04	-24	-24.96	V
		$V_{IN}=-27V\sim-38V$ $I_{OUT}=5mA\sim 1A, P_D \leq 15W$	-22.80		-25.20	V
Dropout Voltage	$V_D$	$I_{OUT}=1.0A$ $T_J=25^{\circ}C$		2		V
Line Regulation	$\Delta V_{OUT}$	$V_{IN}=-27V\sim-38V$ $T_J=25^{\circ}C$		15	480	mV
		$V_{IN}=-30V\sim-36V$ $T_J=25^{\circ}C$		8	240	mV
Load Regulation	$\Delta V_{OUT}$	$I_{OUT}=5mA\sim 1A$ $T_J=25^{\circ}C$		15	480	mV
		$I_{OUT}=250mA\sim 750mA$ $T_J=25^{\circ}C$		5.0	240	mV
Quiescent Current	$I_Q$	$T_J=25^{\circ}C$		3	6	mA
Quiescent Current Change	$\Delta I_Q$	$I_{OUT}=5mA\sim 1A$		0.05	0.5	mA
		$V_{IN}=-27V\sim-38V$		0.1	1.0	mA
Output Noise Voltage	eN	$f=10Hz\sim 100kHz$ $T_a=25^{\circ}C$		400		$\mu V$
Output Voltage Drift	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5mA$		-1		mV/ $^{\circ}C$
Ripple Rejection	RR	$V_{IN}=-28V\sim-38V, f=120Hz$	54	60		dB
Peak Current	$I_{PEAK}$	$T_J=25^{\circ}C$		2.2		A

## ■ APPLICATION CIRCUITS

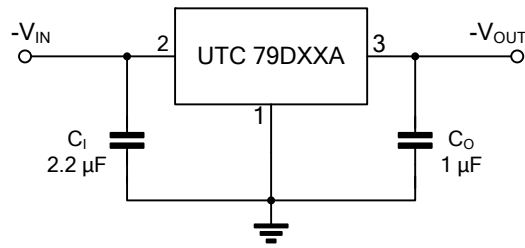


Fig.1 Fixed output regulator

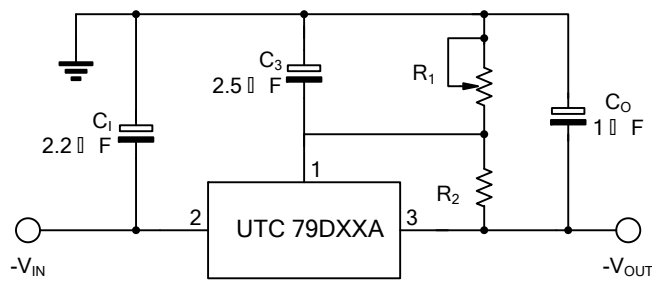
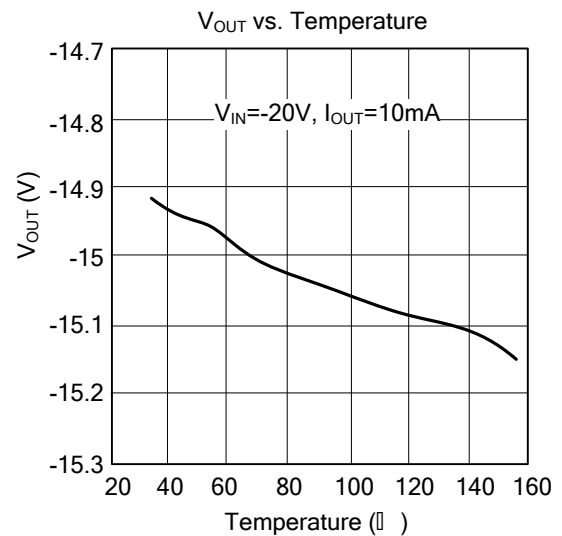
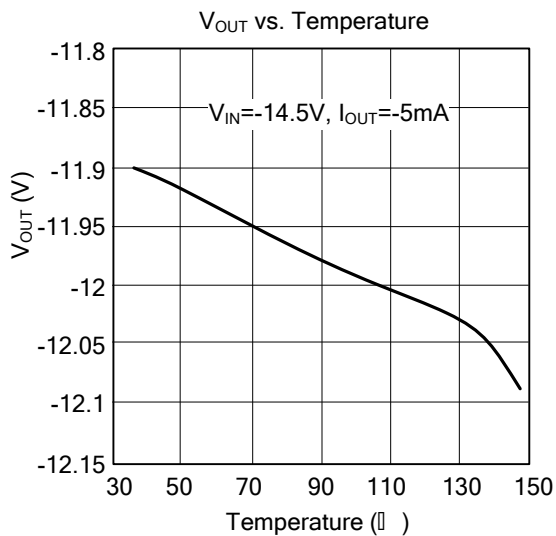
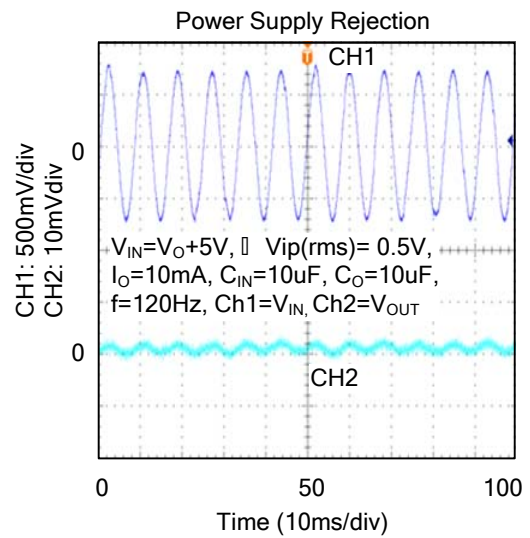
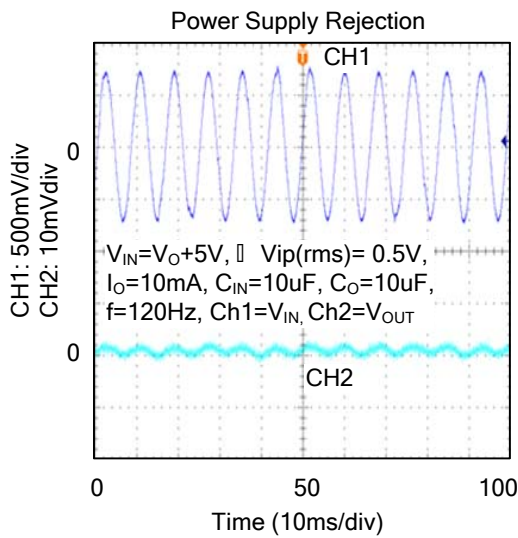
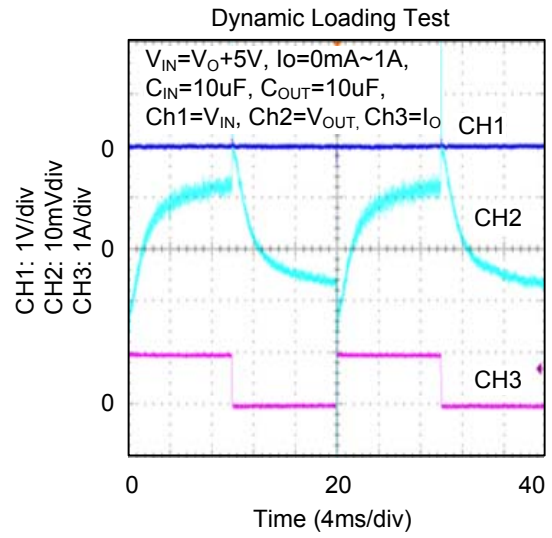
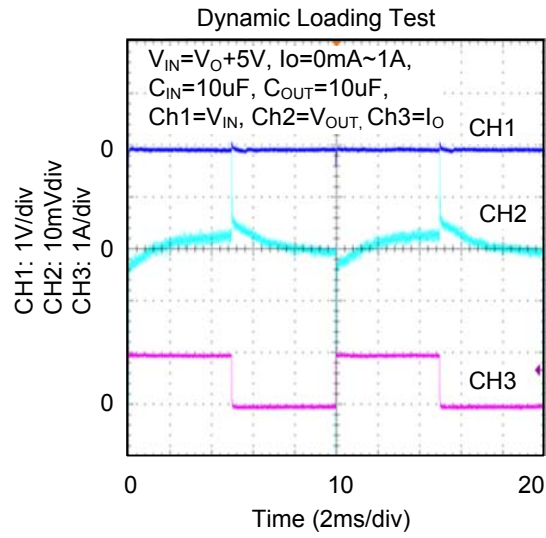


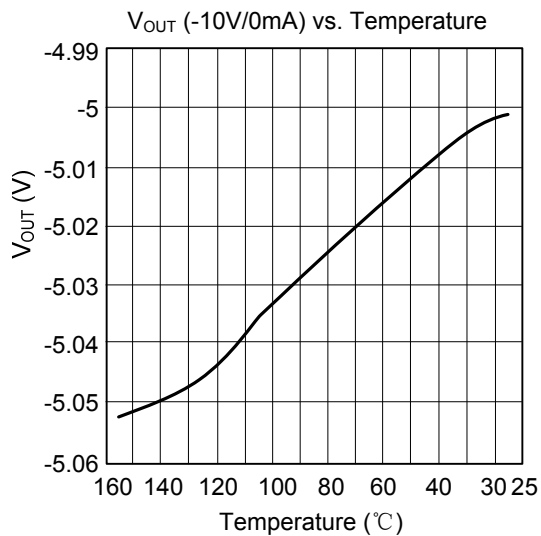
Fig.2 Circuit for increasing output voltage

## ■ TYPICAL CHARACTERISTICS





## ■ TYPICAL CHARACTERISTICS



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