



## 79DXXA

## LINEAR INTEGRATED CIRCUIT

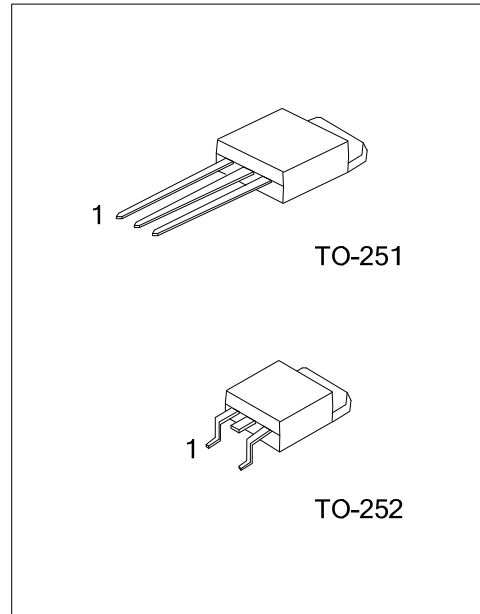
### 3 TERMINAL 1A NEGATIVE VOLTAGE REGULATOR

#### 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, -7V, -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

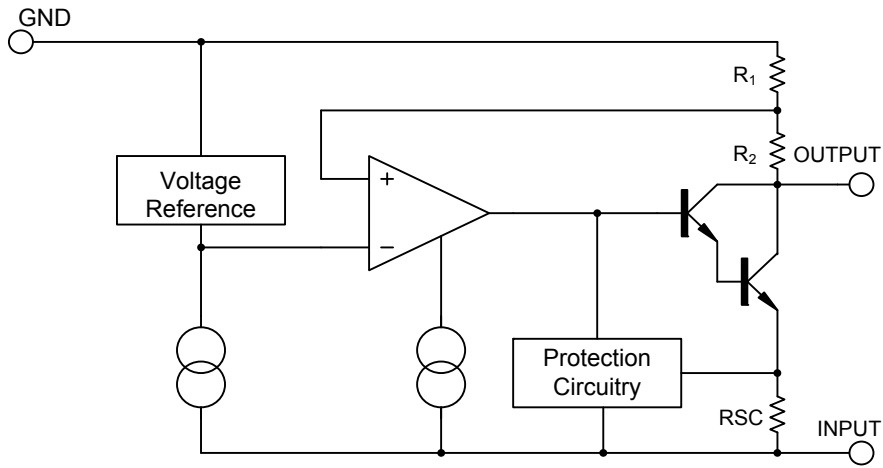
Note: Pin Assignment: G: GND I: Input O: Output

<p>79DXXAG-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) G: Halogen Free and Lead Free, L: Lead Free (4) xx: refer to Marking Information</p>
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## MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
TO-251 TO-252	05: -5V	<p>UTC 7 9 D □ □ A □ Voltage Code ←      → L: Lead Free Lot Code ←      → G: Halogen Free Date Code</p> <p>1</p>
	06: -6V	
	07: -7V	
	08: -8V	
	09: -9V	
	12: -12V	
	15: -15V	
	18: -18V	
24: -24V		

## BLOCK DIAGRAM



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

PARAMETER	SYMBOL	RATING	UNIT
Input Voltage	$V_{IN}$	-35	V
Output Current	$I_{OUT}$	1	A
Power Dissipation	$P_D$	0.89	W
Operating Temperature	$T_{OPR}$	-40 ~ +125	$^{\circ}\text{C}$
Storage Temperature	$T_{STG}$	-65 ~ +150	$^{\circ}\text{C}$

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.

■ THERMAL DATA

PARAMETER	SYMBOL	RATING	UNIT
Junction to Ambient	$\theta_{JA}$	112	$^{\circ}\text{C}/\text{W}$
Junction to Case	$\theta_{JC}$	12.5	$^{\circ}\text{C}/\text{W}$

■ ELECTRICAL CHARACTERISTICS

( $I_{OUT}=0.5\text{A}$ ,  $T_J=0^{\circ}\text{C}\sim 125^{\circ}\text{C}$ ,  $C_I=2.2\mu\text{F}$ ,  $C_O=1\mu\text{F}$ , unless otherwise specified)

For UTC 79D05A ( $V_{IN}=-10\text{V}$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	$T_J=25^{\circ}\text{C}$	-4.80	-5.0	-5.20	V
		$V_{IN}=-7\text{V}\sim -20\text{V}$ , $I_{OUT}=5\text{mA}\sim 1\text{A}$	-4.75		-5.25	V
Dropout Voltage	$V_D$	$I_{OUT}=1\text{A}$ , $T_J=25^{\circ}\text{C}$		2		V
Line Regulation	$\Delta V_{OUT}$	$V_{IN}=-7\text{V}\sim -25\text{V}$ , $T_J=25^{\circ}\text{C}$		10	100	mV
		$V_{IN}=-8\text{V}\sim -12\text{V}$ , $T_J=25^{\circ}\text{C}$		5	60	mV
Load Regulation	$\Delta V_{OUT}$	$I_{OUT}=5\text{mA}\sim 1\text{A}$ , $T_J=25^{\circ}\text{C}$		10	100	mV
		$I_{OUT}=250\text{mA}\sim 750\text{mA}$ , $T_J=25^{\circ}\text{C}$		3	50	mV
Quiescent Current	$I_Q$	$T_J=25^{\circ}\text{C}$		3	6	mA
Quiescent Current Change	$\Delta I_Q$	$I_{OUT}=5\text{mA}\sim 1\text{A}$		0.05	0.5	mA
		$V_{IN}=-7\text{V}\sim -25\text{V}$		0.1	1.3	mA
Output Noise Voltage	eN	$f=10\text{Hz}\sim 100\text{kHz}$ , $T_A=25^{\circ}\text{C}$		100		$\mu\text{V}$
Output Voltage Drift	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5\text{mA}$		-0.4		$\text{mV}/^{\circ}\text{C}$
Ripple Rejection	RR	$V_{IN}=-8\text{V}\sim -18\text{V}$ , $f=120\text{Hz}$	54	60		dB
Peak Current	$I_{PEAK}$	$T_J=25^{\circ}\text{C}$		2.2		A

For UTC 79D06A ( $V_{IN}=-11\text{V}$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	$T_J=25^{\circ}\text{C}$	-5.76	-6.00	-6.24	V
		$V_{IN}=-8\text{V}\sim -21\text{V}$ , $I_{OUT}=5\text{mA}\sim 1\text{A}$	-5.70		-6.30	V
Dropout Voltage	$V_D$	$I_{OUT}=1.0\text{A}$ , $T_J=25^{\circ}\text{C}$		2		V
Line Regulation	$\Delta V_{OUT}$	$V_{IN}=-8\text{V}\sim -25\text{V}$ , $T_J=25^{\circ}\text{C}$		10	120	mV
		$V_{IN}=-9\text{V}\sim -13\text{V}$ , $T_J=25^{\circ}\text{C}$		5	60	mV
Load Regulation	$\Delta V_{OUT}$	$I_{OUT}=5\text{mA}\sim 1\text{A}$ , $T_J=25^{\circ}\text{C}$		10	120	mV
		$I_{OUT}=250\text{mA}\sim 750\text{mA}$ , $T_J=25^{\circ}\text{C}$		3	60	mV
Quiescent Current	$I_Q$	$T_J=25^{\circ}\text{C}$		3	6	mA
Quiescent Current Change	$\Delta I_Q$	$I_{OUT}=5\text{mA}\sim 1\text{A}$		0.05	0.5	mA
		$V_{IN}=-8\text{V}\sim -25\text{V}$		0.1	1.3	mA
Output Noise Voltage	eN	$f=10\text{Hz}\sim 100\text{kHz}$ , $T_A=25^{\circ}\text{C}$		130		$\mu\text{V}$
Output Voltage Drift	$\Delta V_{OUT}/\Delta T$	$I_{OUT}=5\text{mA}$		-0.5		$\text{mV}/^{\circ}\text{C}$
Ripple Rejection	RR	$V_{IN}=-9\text{V}\sim -19\text{V}$ , $f=120\text{Hz}$	54	60		dB
Peak Current	$I_{PEAK}$	$T_J=25^{\circ}\text{C}$		2.2		A

■ ELECTRICAL CHARACTERISTICS(Cont.)

For UTC 79D07A ( $V_{IN}=-13V$ )

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	$T_J=25^{\circ}C$	-6.72	-7.0	-7.28	V
		$V_{IN}=-10.5V\sim-23V, I_{OUT}=5mA\sim 1A$	-6.65		-7.35	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	140	mV
		$V_{IN}=-11.5V\sim-17V, T_J=25^{\circ}C$		5	70	mV
Load Regulation	$\Delta V_{OUT}$	$I_{OUT}=5mA\sim 1A, T_J=25^{\circ}C$		12		mV
		$I_{OUT}=250mA\sim 750mA, T_J=25^{\circ}C$		4		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	1.3	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		$mV/^{\circ}C$
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 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
		$V_{IN}=-10.5V\sim-23V, I_{OUT}=5mA\sim 1A$	-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		$mV/^{\circ}C$
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
		$V_{IN}=-11.5V\sim-23V, I_{OUT}=5mA\sim 1A$	-8.55		-9.45	V
Dropout Voltage	$V_D$	$I_{OUT}=1A, T_J=25^{\circ}C$		2		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		$mV/^{\circ}C$
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
		$V_{IN}=-14.5V\sim-27V, I_{OUT}=5mA\sim 1A$	-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
		$V_{IN}=-17.5V\sim-30V, I_{OUT}=5mA\sim 1A$	-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
		$V_{IN}=-21V\sim-33V, I_{OUT}=5mA\sim 1A$	-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
		$V_{IN}=-27V\sim-38V, I_{OUT}=5mA\sim 1A$	-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

Note: 1. Thermal resistance test board.

## ■ APPLICATION CIRCUITS

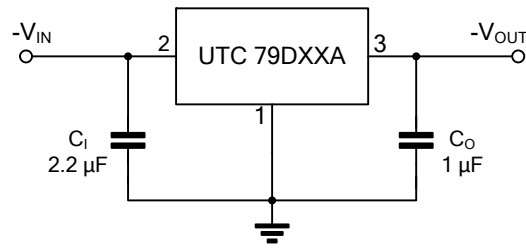


Fig.1 Fixed output regulator

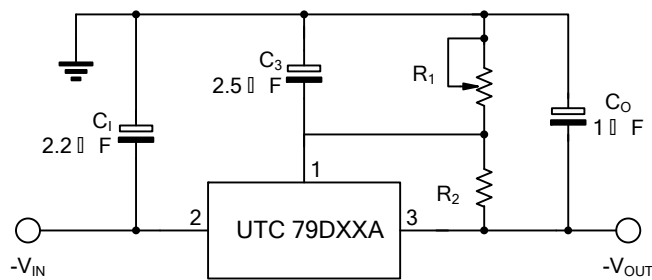
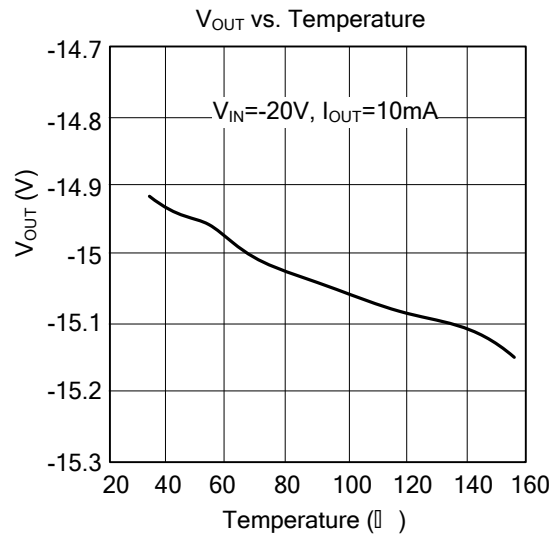
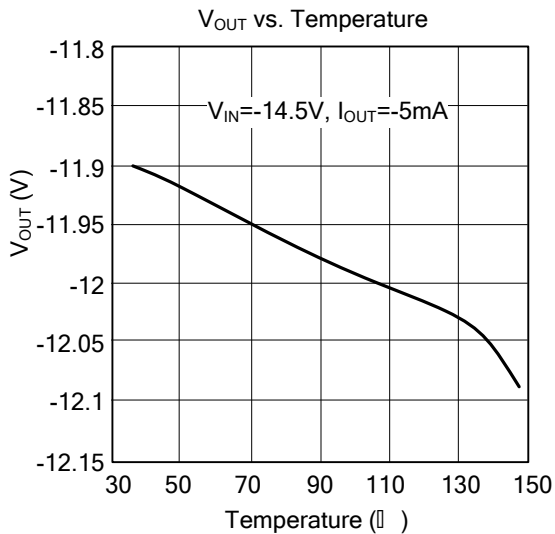
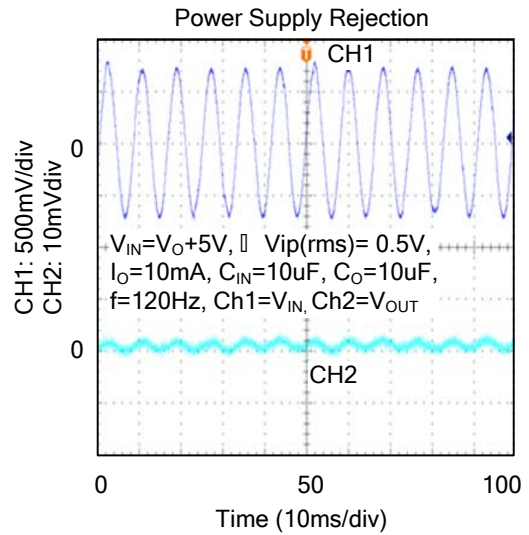
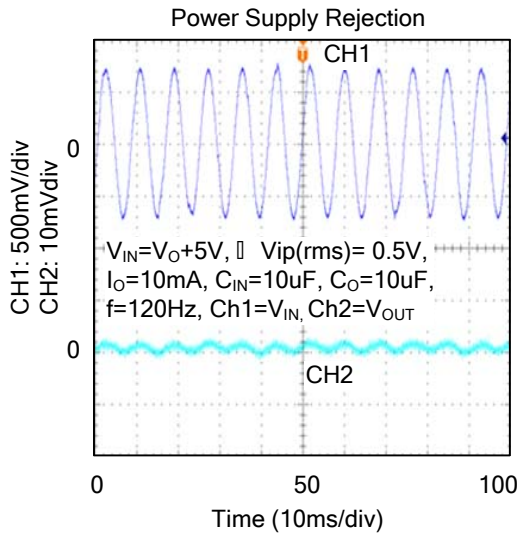
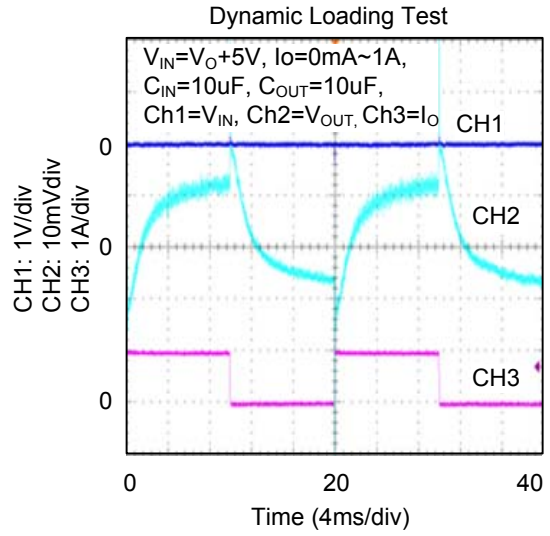
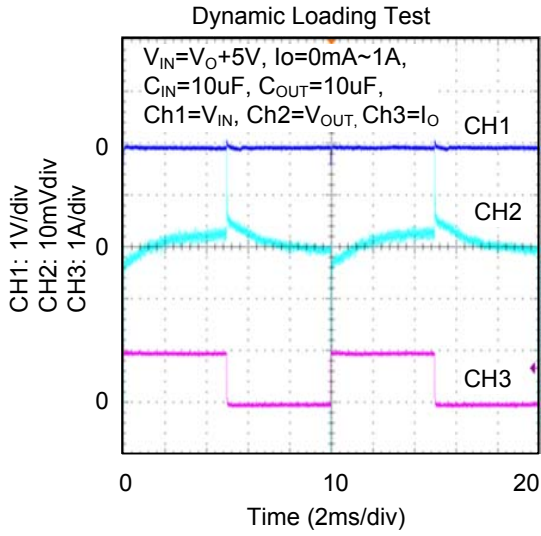


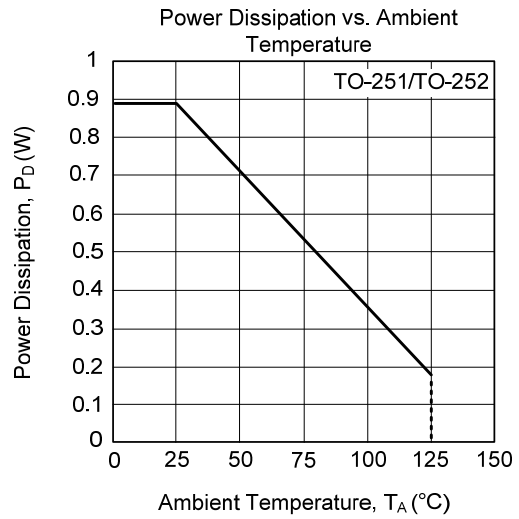
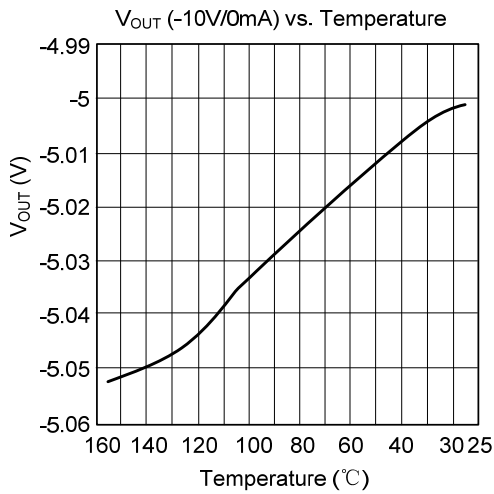
Fig.2 Circuit for increasing output voltage

## ■ TYPICAL CHARACTERISTICS





### ■ TYPICAL CHARACTERISTICS



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