



## LR9280

CMOS IC

### 150mA LDO REGULATOR

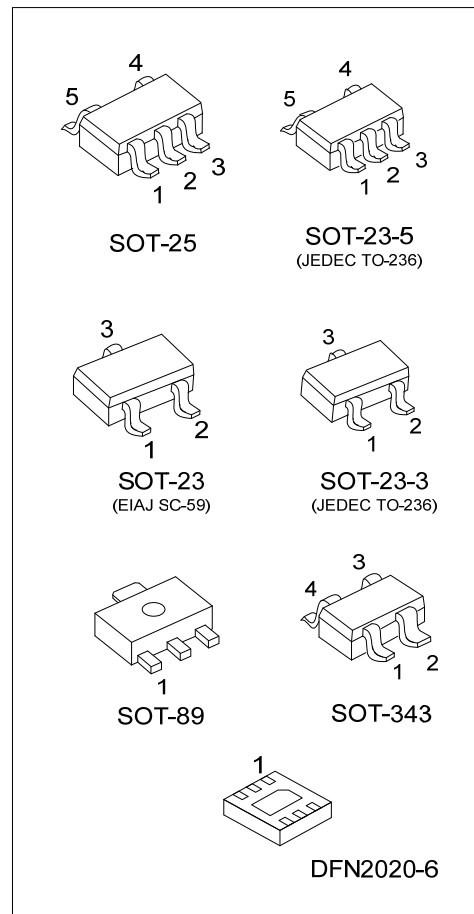
#### DESCRIPTION

The UTC **LR9280** is a typical LDO (linear regulator) with the features of high output voltage accuracy, low supply current, low ON-resistance. Internally, there're many functions of UTC **LR9280** which can be seen in the block figure. There are a voltage reference unit, an error amplifier, resistor-net for voltage setting, a current limit circuit, and a chip enable circuit in each UTC **LR9280**.

The output voltage of these ICs is fixed with high accuracy. B version has a chip enable pin, therefore low consumption current standby mode can be realized with the pin.

#### FEATURES

- \* Output voltage accuracy ( $\pm 2.0\%$ )
- \* Output voltage Range (1.2V~4.0V)
- \* Dropout voltage (TYP=0.25V )(I<sub>OUT</sub>=150mA 3.0V Output type)
- \* Line regulation (TYP=0.05%/V)
- \* Temperature-Drift Coefficient of Output Voltage (TYP= $\pm 100$ ppm/ $^{\circ}$ C)
- \* Ceramic capacitors are recommended to be used with this IC (1 $\mu$ F)



#### ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
LR9280CL-xx-AB3-x-R	LR9280CG-xx-AB3-x-R	SOT-89	Tape Reel
LR9280CL-xx-AE2-R	LR9280CG-xx-AE2-R	SOT-23-3	Tape Reel
LR9280CL-xx-AE3-R	LR9280CG-xx-AE3-R	SOT-23	Tape Reel
LR9280xL-xx-AE5-R	LR9280xG-xx-AE5-R	SOT-23-5	Tape Reel
LR9280xL-xx-AF5-R	LR9280xG-xx-AF5-R	SOT-25	Tape Reel
LR9280BL-xx-AL4-R	LR9280BG-xx-AL4-R	SOT-343	Tape Reel
LR9280BL-xx-K06-2020-R	LR9280BG-xx-K06-2020-R	DFN2020-6	Tape Reel

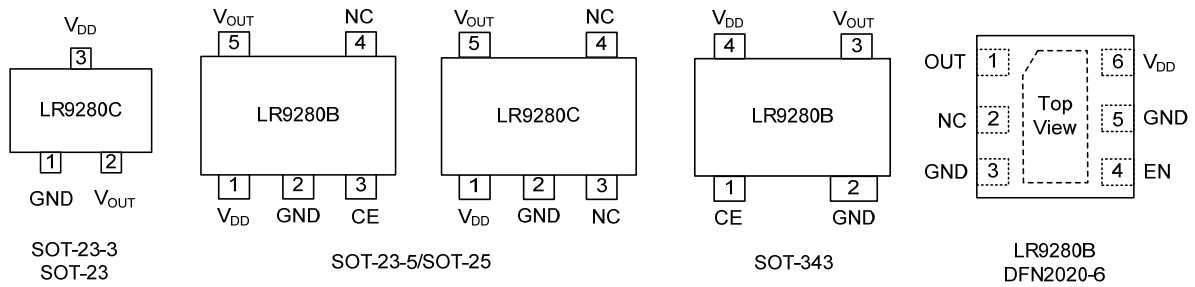
Note: xx: Output Voltage, refer to Marking Information.

<p>LR9280CG-xx-AB3-x-R</p> <p>(1) Packing Type (2) Pin Code (3) Package Type (4) Output Voltage Code (5) Green Package (6) Discharge Function</p>	<p>(1) R: Tape Reel (2) refer to Pin Assignment (for SOT-89) (3) AB3: SOT-89, AE2: SOT-23-3, AE3: SOT-23, AE5: SOT-23-5, AF5: SOT-25, AL4: SOT-343 K06-2020: DFN2020-6 (4) xx: refer to Marking Information (5) G: Halogen Free and Lead Free, L: Lead Free (6) B: Active high type, C: Without chip enable circuit</p>
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## MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-89	12: 1.2V 15: 1.5V 18: 1.8V 22: 2.2V 25: 2.5V 28: 2.8V 30: 3.0V 33: 3.3V 36: 3.6V 40: 4.0V	
SOT-23-3 SOT-23		
SOT-23-5 SOT-25		
SOT-343		
DFN2020-6		

## PIN CONFIGURATION



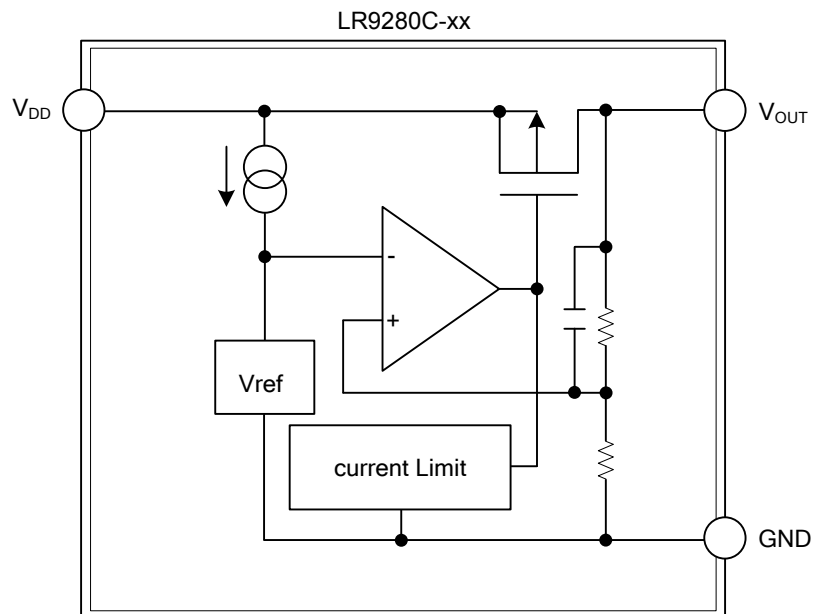
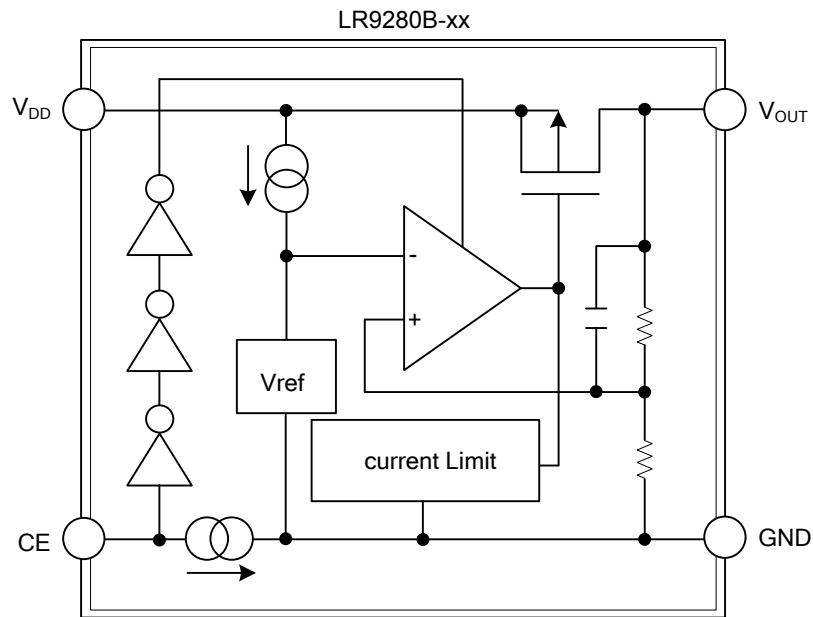
## PIN DESCRIPTION

PIN NO.			PIN NAME	DESCRIPTION
SOT-23-3	SOT-89			
SOT-23	B	C		
1	2	1	GND	Ground pin
2	1	3	V <sub>OUT</sub>	Output pin
3	3	2	V <sub>DD</sub>	Input pin

PIN NO.		PIN NAME	DESCRIPTION
SOT-23-5/SOT-25			
LR9280B	LR9280C		
1	1	V <sub>DD</sub>	Input pin
2	2	GND	Ground pin
3	-	CE	Chip Enable Pin
4	3, 4	NC	No Connection
5	5	V <sub>OUT</sub>	Output pin

PIN NO.		PIN NAME	DESCRIPTION
SOT-343	DFN2020-6		
1	4	CE	Chip Enable Pin
2	3, 5	GND	Ground pin
3	1	V <sub>OUT</sub>	Output pin
4	6	V <sub>DD</sub>	Input pin
-	2	NC	No Connection

■ BLOCK DIAGRAM



### ■ ABSOLUTE MAXIMUM RATING

PARAMETER		SYMBOL	RATINGS	UNIT
Input Voltage		$V_{IN}$	6.5	V
Input Voltage(CE Pin)		$V_{CE}$	6.5	V
Output Voltage		$V_{OUT}$	-0.3 ~ $V_{IN}+0.3$	V
Output Current		$I_{OUT}$	150	mA
Power Dissipation	SOT-23-3	$P_D$	300	mW
	SOT-23			
	SOT-23-5		380	mW
	SOT-25			
	SOT-89		500	mW
	SOT-343		250	mW
	DFN2020-6		950 (Note 2)	mW
Operating Temperature		$T_{OPR}$	-40 ~ +125	°C
Storage Temperature		$T_{STG}$	-55 ~ +125	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

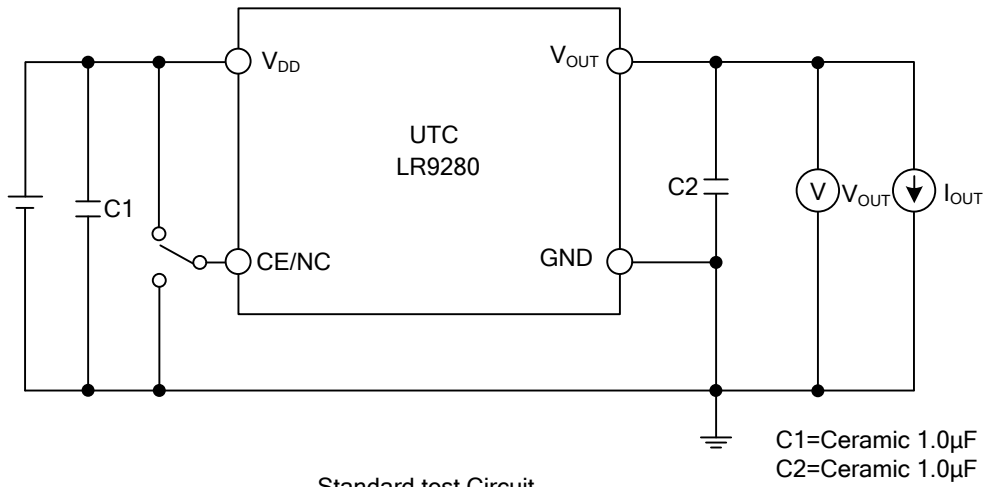
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. The data tested by surface mounted on a 2 inch2 FR-4 board with 2OZ copper.

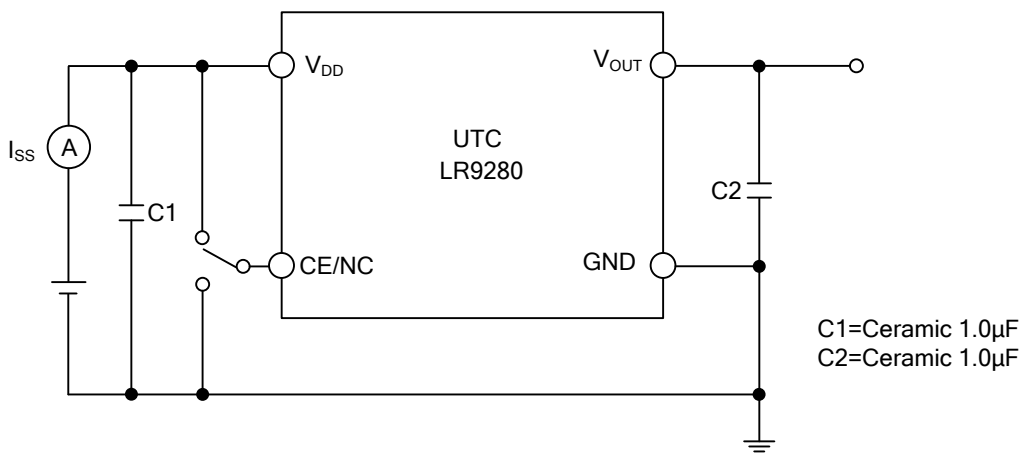
### ■ ELECTRICAL CHARACTERISTICS ( $T_A=25^{\circ}\text{C}$ , unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	$V_{IN}=\text{Set } V_{OUT}+1\text{V}, I_{OUT}\leq 30\text{mA}$	x0.980		x1.020	V
Dropout Voltage	$V_{DIF}$	$I_{OUT}=150\text{mA}$	$1.2\leq V_{OUT}<1.3$	0.85	1.20	V
			$1.3\leq V_{OUT}<1.4$	0.75	1.10	V
			$1.4\leq V_{OUT}<1.5$	0.65	1.00	V
			$1.5\leq V_{OUT}<1.7$	0.60	0.90	V
			$1.7\leq V_{OUT}<1.9$	0.50	0.75	V
			$1.9\leq V_{OUT}<2.1$	0.40	0.65	V
			$2.1\leq V_{OUT}<2.8$	0.35	0.55	V
			$2.8\leq V_{OUT}\leq 3.6$	0.25	0.40	V
		$3.6\leq V_{OUT}\leq 4.0$	0.20	0.35	V	
Input Voltage	$V_{IN}$				6.0	V
Supply Current	$I_{SS}$	$V_{IN}-V_{OUT}=1.0\text{V}, I_{OUT}=0\text{mA}$		0.7	1.5	$\mu\text{A}$
Standby Current	$I_{STB}$	$V_{IN}-V_{OUT}=1.0\text{V}, V_{CE}=\text{GND}$		0.1	1.0	$\mu\text{A}$
Load Regulation	$\Delta V_{OUT}/\Delta I_{OUT}$	$V_{IN}-V_{OUT}=1.0\text{V}(V_{OUT}\geq 1.5\text{V})$ $V_{IN}=2.4\text{V}(V_{OUT}<1.5\text{V})$ $1\mu\text{A}\leq I_{OUT}\leq 150\text{mA}$		20	40	mV
Line Regulation	$\Delta V_{OUT}/\Delta V_{IN}$	$I_{OUT}=30\text{mA}$ $V_{OUT}+0.5\text{V}\leq V_{IN}\leq 6.0\text{V}$ $(V_{OUT}\geq 1.5\text{V}), 2.0\text{V}\leq V_{IN}\leq 6.0\text{V}$ $(1.2\text{V}\leq V_{OUT}\leq 1.4\text{V})$		0.05	0.20	%/V
Output Voltage Temperature Coefficient	$\Delta V_{OUT}/\Delta T_{OPT}$	$I_{OUT}=30\text{mA}, -40^{\circ}\text{C}\leq T_{OPT}\leq 85^{\circ}\text{C}$		$\pm 100$		ppm/°C
Short Current Limit	$I_{SC}$	$V_{OUT}=0\text{V}$		50		mA
CE Pull-down Constant Current	$I_{PD}$	LR9280B		0.35		$\mu\text{A}$
CE Input Voltage "H"	$V_{CEH}$	LR9280B	1.2		6.0	V
CE Input Voltage "L"	$V_{CEL}$	LR9280B	0.0		0.3	V

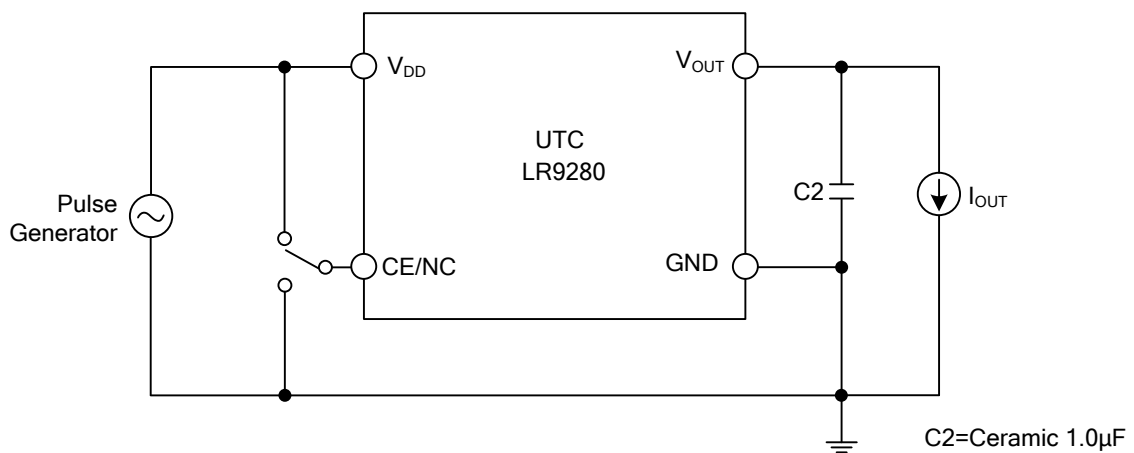
■ TEST CIRCUITS



Standard test Circuit

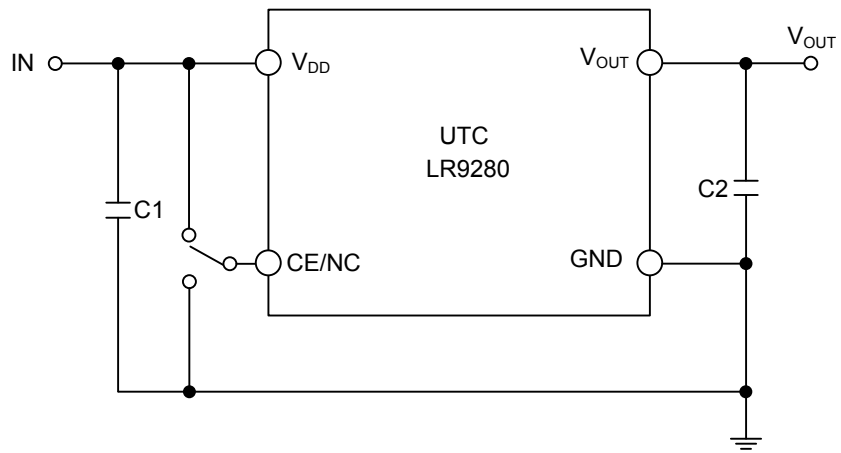


Supply Current Test Circuit



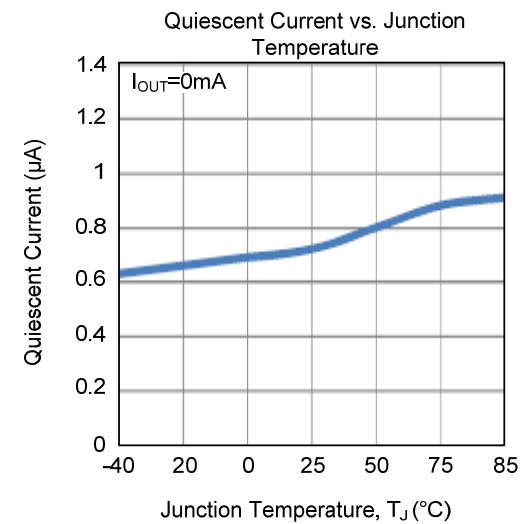
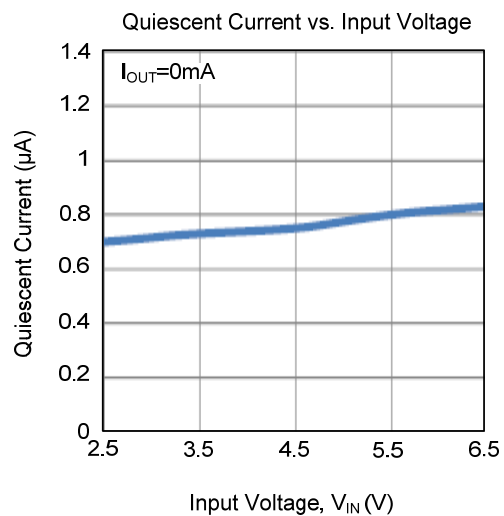
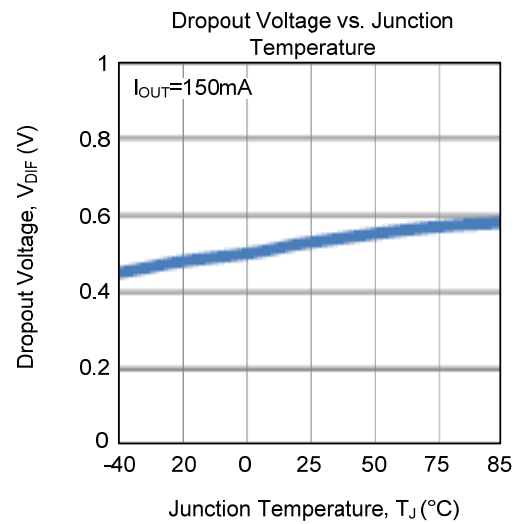
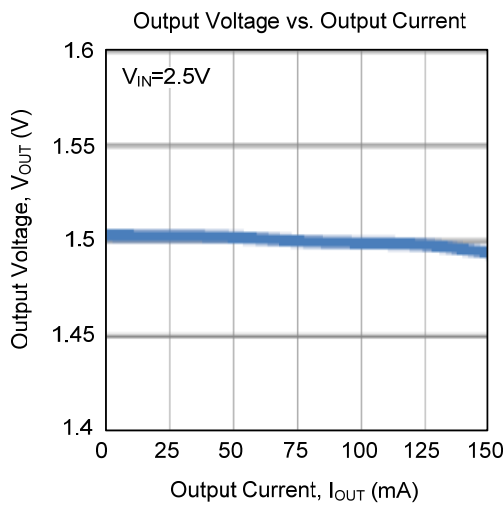
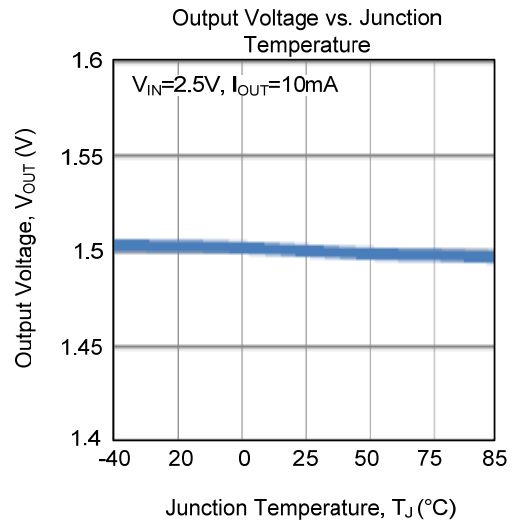
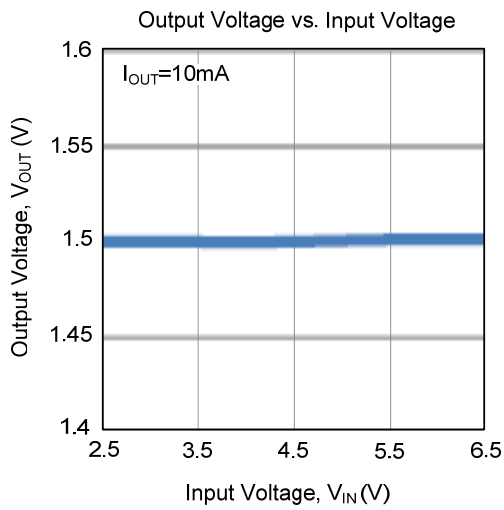
Ripple Rejection, Line Transient Response Test Circuit

## ■ TYPICAL APPLICATION CIRCUIT



(External Components)  
Output Capacitor  
Ceramic Capacitor 1 $\mu$ F

■ TYPICAL CHARACTERISTICS





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