



LR9280

CMOS IC

150mA LDO REGULATOR

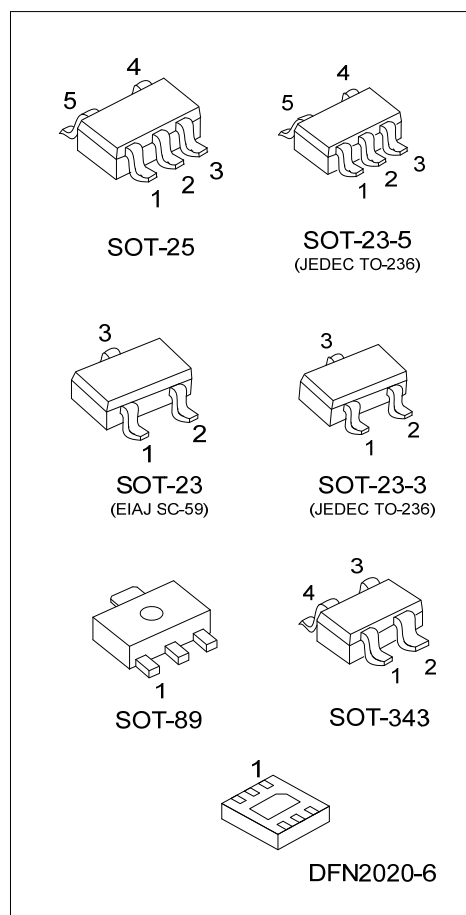
DESCRIPTION

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) ($I_{OUT}=150\text{mA}$ 3.0V Output type)
- * Line regulation (TYP=0.05%/V)
- * Temperature-Drift Coefficient of Output Voltage (TYP= $\pm 100\text{ppm}/^\circ\text{C}$)
- * Ceramic capacitors are recommended to be used with this IC (1 μF)



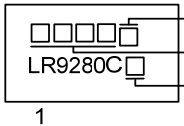
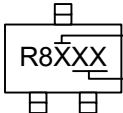
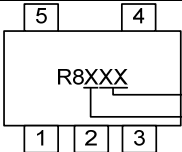
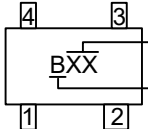
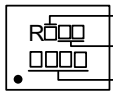
ORDERING INFORMATION

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

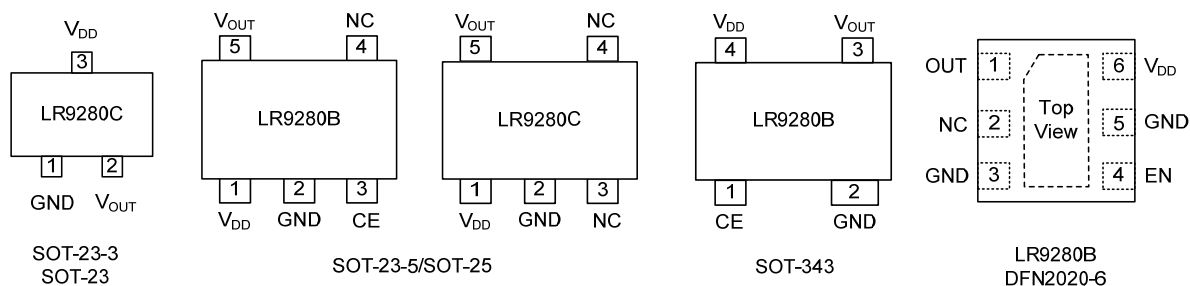
Note: xx: Output Voltage, refer to Marking Information.

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

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	 Pin Code Date Code L: Lead Free G: Halogen Free
SOT-23-3 SOT-23		 B: Active high type C: Without chip enable circuit Voltage Code
SOT-23-5 SOT-25		 Voltage Code B: Active high type C: Without chip enable circuit
SOT-343		 Output Voltage Active high type
DFN2020-6		 B: Active high type Voltage Code Date Code

PIN CONFIGURATION



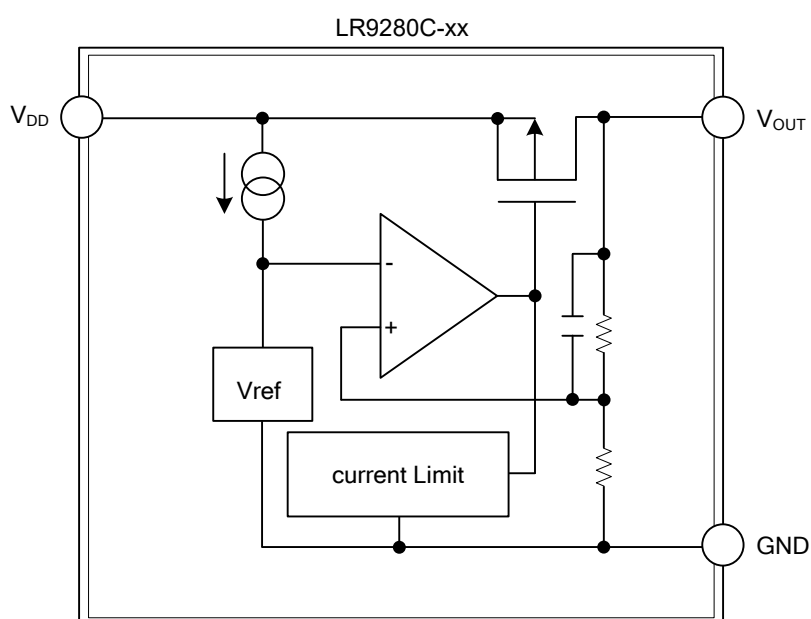
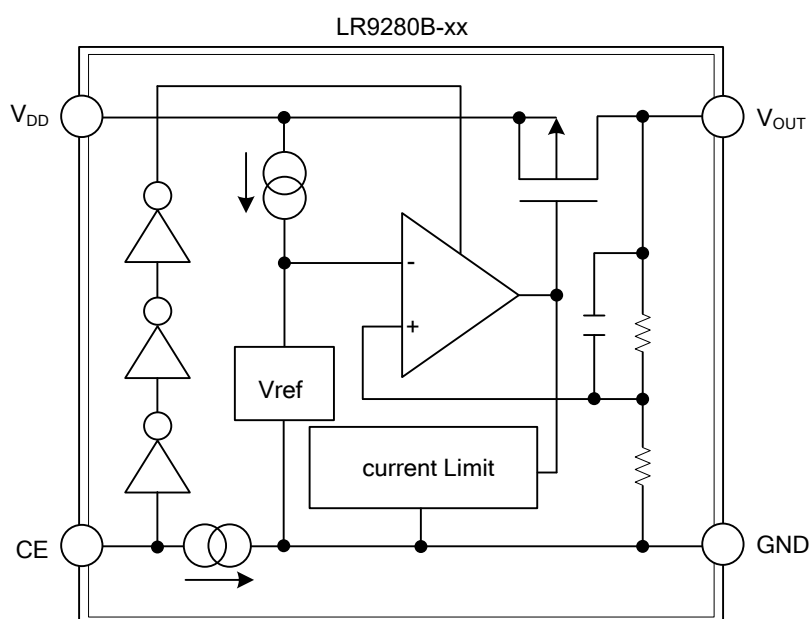
PIN DESCRIPTION

PIN NO.			PIN NAME	DESCRIPTION
SOT-23-3	SOT-89			
SOT-23	B	C		
1	2	1	GND	Ground pin
2	1	3	V_{OUT}	Output pin
3	3	2	V_{DD}	Input pin

PIN NO.		PIN NAME	DESCRIPTION
SOT-23-5/SOT-25			
LR9280B	LR9280C		
1	1	V_{DD}	Input pin
2	2	GND	Ground pin
3	-	CE	Chip Enable Pin
4	3, 4	NC	No Connection
5	5	V_{OUT}	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_{OUT}	Output pin
4	6	V_{DD}	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
			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.

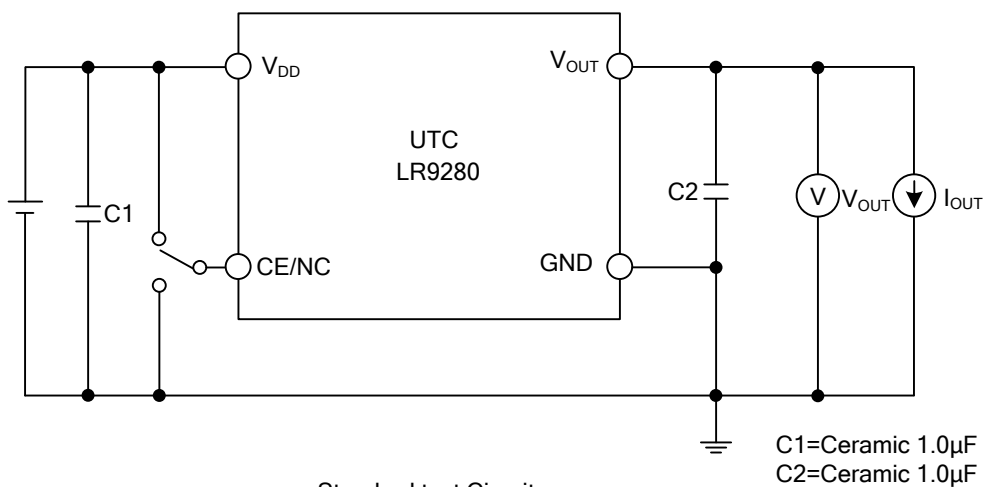
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

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

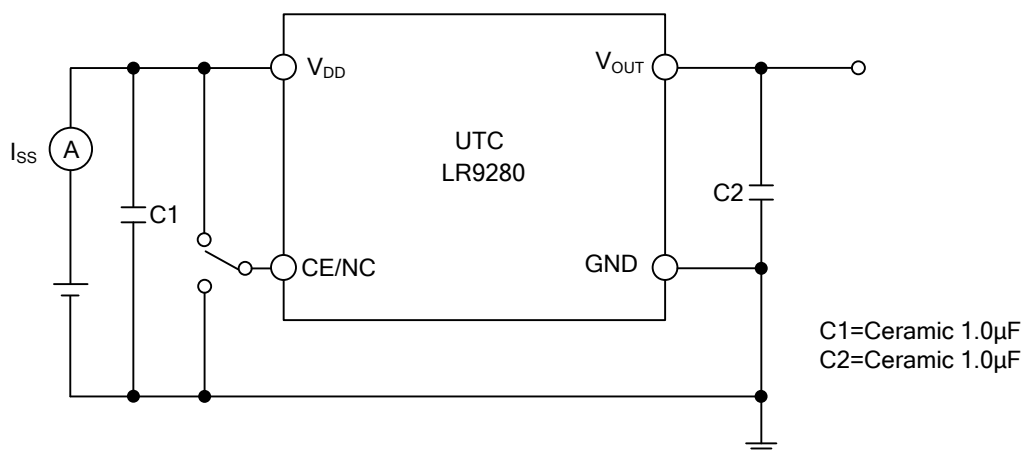
■ ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$, unless otherwise noted)

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	μA
Standby Current	I_{STB}	$V_{IN}-V_{OUT}=1.0\text{V}, V_{CE}=\text{GND}$		0.1	1.0	μA
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	$\Delta V_{OUT}/\Delta T_{OPT}$	$I_{OUT}=30\text{mA}, -40^{\circ}\text{C}\leq T_{OPT}\leq 85^{\circ}\text{C}$		± 100		ppm/°C
Power Supply Rejection Ratio	PSRR	$V_{IN}=V_{OUT}+1.0\text{V}, I_{OUT}=30\text{mA},$ $f=120\text{Hz}, C_{OUT}=1\mu\text{F}, V_{OUT}=1.8\text{V}$		48		dB
Short Current Limit	I_{SC}	$V_{OUT}=0\text{V}$		50		mA
CE Pull-down Constant Current	I_{PD}	LR9280B		0.35		μA
CE Input Voltage "H"	V_{CEH}	LR9280B	1.2		6.0	V
CE Input Voltage "L"	V_{CEL}	LR9280B	0.0		0.3	V

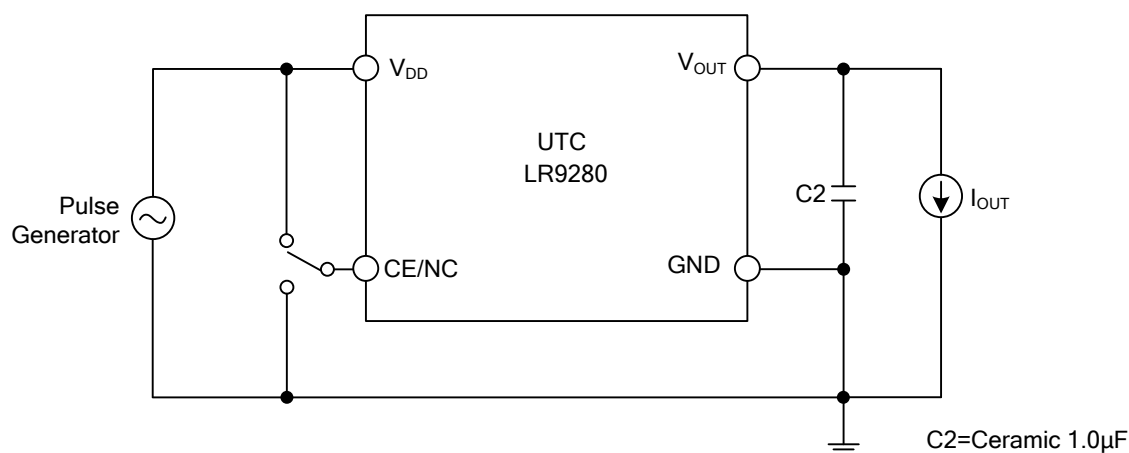
■ TEST CIRCUITS



Standard test Circuit

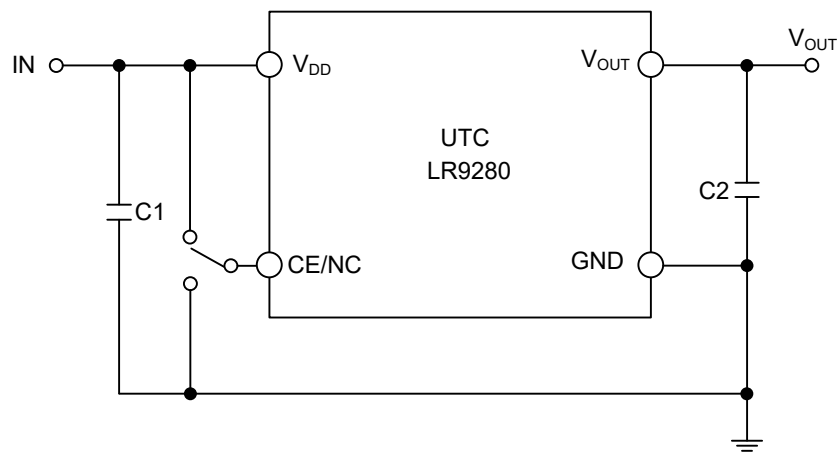


Supply Current Test Circuit



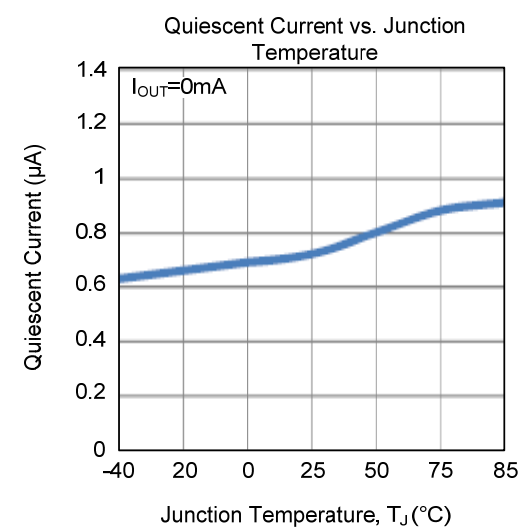
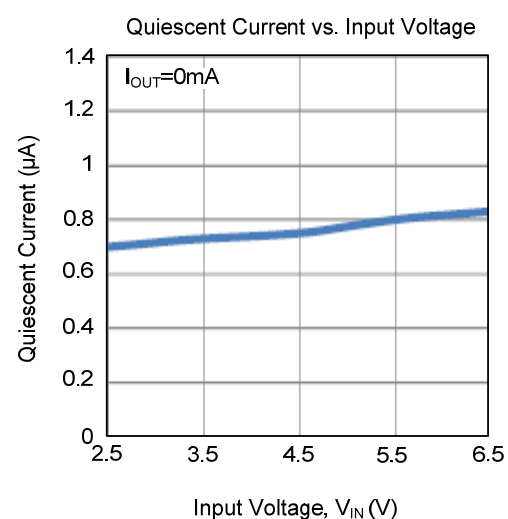
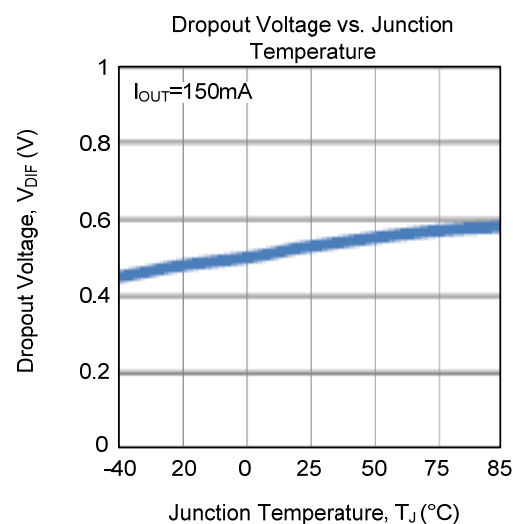
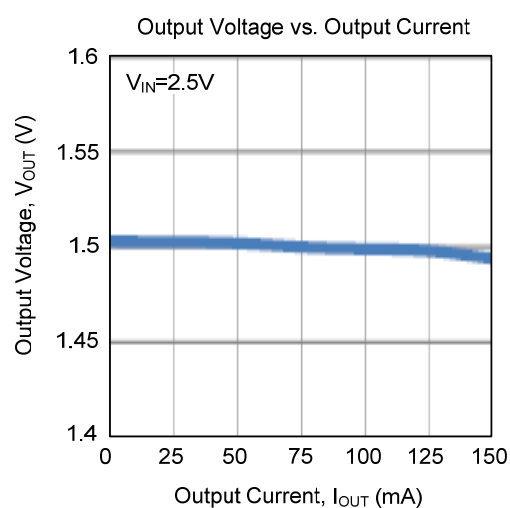
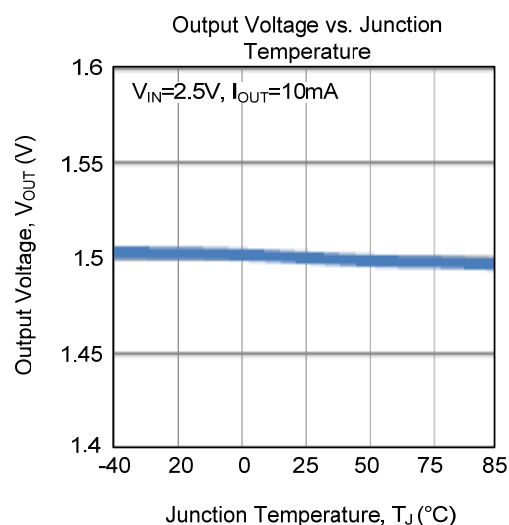
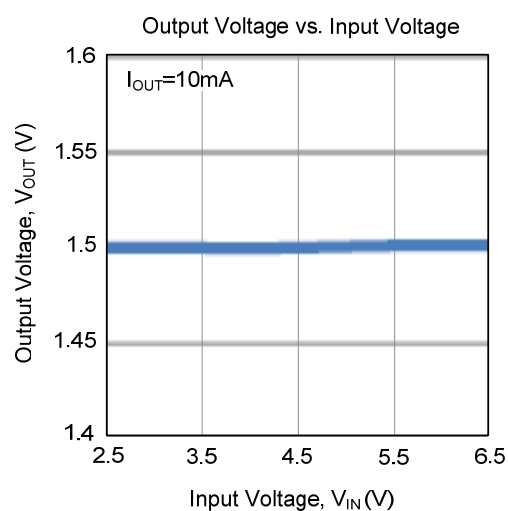
Ripple Rejection, Line Transient Response Test Circuit

■ TYPICAL APPLICATION CIRCUIT



(External Components)
Output Capacitor
Ceramic Capacitor 1 μ F

TYPICAL CHARACTERISTICS



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