



LR1122B

CMOS IC

LOW NOISE 200 mA LDO REGULATOR

DESCRIPTION

The UTC **LR1122B** is a typical LDO (linear regulator) with the features of High output voltage accuracy, low supply current, low ON-resistance, and high ripple rejection.

During operation of the UTC **LR1122B**, the dropout voltage is very low and the response of line transient and load transient are very well.

Internally, there're many functions of UTC **LR1122B** 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 **LR1122B**.

The UTC **LR1122B** can be used as an ideal of the power supply for hand-held communication equipment, such as: power source for portable communication equipment, power source for electrical appliances, for example, cameras, VCRs and camcorders and power source for battery-powered equipment.

FEATURES

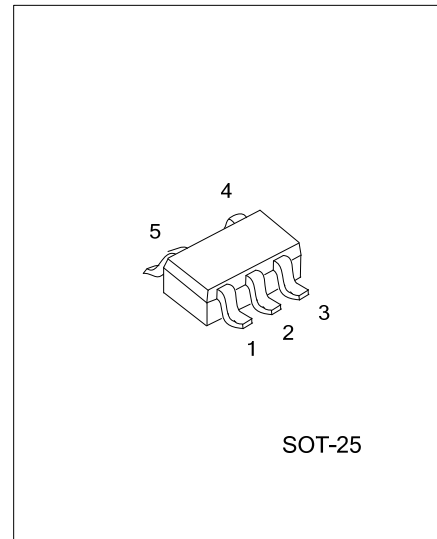
- *Ultra Supply Current: 18 μ A (Typ.)
- *Standby Mode: 0.1 μ A (Typ.)
- *Very Low Dropout Voltage: 0.13V (Typ.) @ $I_{OUT}=150mA, V_{OUT}=2.85V$
- *Ripple Rejection: 75dB (Typ.) @ $f=1kHz, V_{OUT}=2.85V$
- *Temperature-Drift Coefficient of Output Voltage: $\pm 30ppm/^{\circ}C$ (Typ.)
- *Well Line Regulation: 0.02%/V (Typ.)
- *Output Voltage Accuracy: $\pm 0.8\%$ (Typ.)
- *Internal Fold Back Protection Circuit: 40mA (Typ.) @ short mode
- * $C_{IN}=C_{OUT}=1\mu F$ or more (Ceramic capacitors) are Recommended to be used with this IC

ORDERING INFORMATION

Ordering Number	Package	Packing
LR1122BG-xx-AF5-R	SOT-25	Tape Reel

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

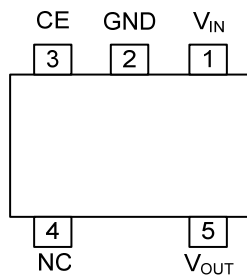
<p>LR1122BG-xx-AF5-R</p>	<p>(1) R: Tape Reel (2) AF5: SOT-25 (3) xx: Refer to Marking Information (4) G: Halogen Free</p>
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■ MARKING

PACKAGE	VOLTAGE CODE	MARKING
SOT-25	16:1.6V 20:2.0V 25:2.5V 2J:2.85V 30:3.0V 33:3.3V	

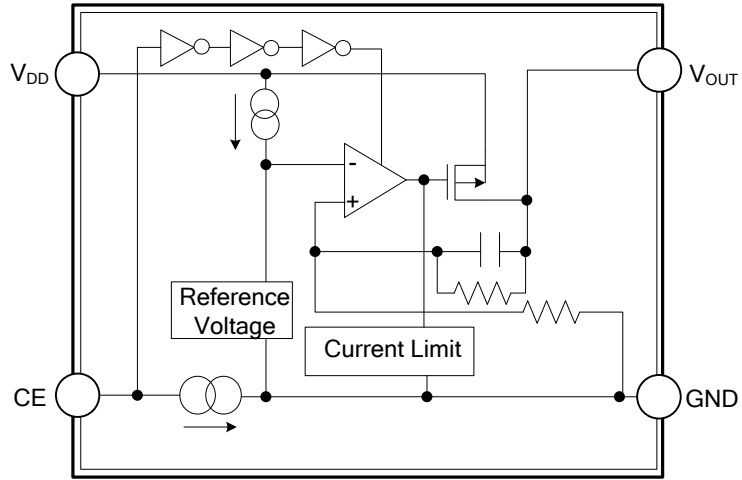
■ PIN CONFIGURATION



■ PIN DESCRIPTIONS

PIN NO.	PIN NAME	DESCRIPTION
1	V _{DD}	Input Pin
2	GND	Ground Pin
3	CE	Chip Enable Pin. Active when this Pin is high.
4	NC	No Connection
5	V _{OUT}	Output Pin

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	6.0	V
Input Voltage(CE Pin)	V_{CE}	6.0	V
Output Voltage	V_{OUT}	$-0.3 \sim V_{IN}+0.3$	V
Output Current	I_{OUT}	300	mA
Power Dissipation	P_D	420	mW
Junction Temperature	T_J	+125	°C
Operating Temperature	T_{OPR}	-40~+85	°C
Storage Temperature	T_{STG}	-55~+125	°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

($T_a=25^\circ\text{C}$, $V_{IN}=\text{Set } V_{OUT}+1\text{V}$, $I_{OUT}=1\text{mA}$, $C_i=C_o=1\mu\text{F}$, unless otherwise specified)

LR1122B-1.6V

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN} = \text{Set } V_{OUT}+1\text{V}$	1.587		1.613	V
Input Voltage (Note)	V_{IN}				5.0	V
Load Regulation	$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$	$1\text{mA} \leq I_{OUT} \leq 150\text{mA}$		20	40	mV
Output Current	I_{OUT}		200			mA
Supply Current	I_{SS}	$I_{OUT}=0\text{A}$		18	25	μA
Supply Current (Standby)	I_{ST-BY}	$V_{CE}=0\text{V}$		0.1	2	μA
Short Current Limit	I_{LIMIT}	$V_{OUT}=0\text{V}$		40		mA
CE Pull-down Current	I_{PD}			0.3		μA
CE Input Voltage	High	V_{CEH}	1.5			V
	Low	V_{CEL}			0.3	V
Output Noise	eN	$B_W=10\text{Hz to } 100\text{kHz}$, $I_{OUT}=30\text{mA}$		30		μVrms
Ripple Rejection	RR	$f=1\text{kHz}$, Ripple 0.2V_{P-P} $V_{IN}=\text{Set } V_{OUT}+1\text{V}$, $I_{OUT}=30\text{mA}$ (In case that $V_{OUT}=2.0\text{V}$, $V_{IN}=3\text{V}$)		75		dB
Dropout Voltage	V_D	$I_{OUT}=150\text{mA}$		0.24	0.38	V
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$	Set $V_{OUT}+0.5\text{V} \leq V_{IN} \leq 5\text{V}$		0.02	0.10	%/V
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T}$	$-40^\circ\text{C} \leq T_{OPR} \leq 85^\circ\text{C}$		± 30		ppm/°C

■ ELECTRICAL CHARACTERISTICS(Cont.)

LR1122B-2.0V

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage		V_{OUT}	$V_{IN} = \text{Set } V_{OUT}+1V$	1.984		2.016	V
Input Voltage (Note)		V_{IN}				5.0	V
Load Regulation		$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$	$1mA \leq I_{OUT} \leq 150mA$		20	40	mV
Output Current		I_{OUT}		200			mA
Supply Current		I_{SS}	$I_{OUT}=0A$		18	25	μA
Supply Current (Standby)		I_{ST-BY}	$V_{CE}=0V$		0.1	2	μA
Short Current Limit		I_{LIMIT}	$V_{OUT}=0V$		40		mA
CE Pull-down Current		I_{PD}			0.3		μA
CE Input Voltage	High	V_{CEH}		1.5			V
	Low	V_{CEL}				0.3	V
Output Noise		eN	$B_W=10Hz \text{ to } 100kHz, I_{OUT}=30mA$		30		μV_{rms}
Ripple Rejection		RR	$f=1kHz, \text{Ripple } 0.2V_{P-P}$ $V_{IN}=\text{Set } V_{OUT}+1V, I_{OUT}=30mA$ (In case that $V_{OUT}=2.0V, V_{IN}=3V$)		75		dB
Dropout Voltage		V_D	$I_{OUT}=150mA$		0.17	0.30	V
Line Regulation		$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$	$\text{Set } V_{OUT}+0.5V \leq V_{IN} \leq 5V$		0.02	0.10	%/V
Output Voltage Temperature Coefficient		$\frac{\Delta V_{OUT}}{\Delta T}$	$-40^\circ C \leq T_{OPR} \leq 85^\circ C$		± 30		ppm/ $^\circ C$

LR1122B-2.5V

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage		V_{OUT}	$V_{IN} = \text{Set } V_{OUT}+1V$	2.484		2.516	V
Input Voltage (Note)		V_{IN}				5.0	V
Load Regulation		$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$	$1mA \leq I_{OUT} \leq 150mA$		20	40	mV
Output Current		I_{OUT}		200			mA
Supply Current		I_{SS}	$I_{OUT}=0A$		18	25	μA
Supply Current (Standby)		I_{ST-BY}	$V_{CE}=0V$		0.1	2	μA
Short Current Limit		I_{LIMIT}	$V_{OUT}=0V$		40		mA
CE Pull-down Current		I_{PD}			0.3		μA
CE Input Voltage	High	V_{CEH}		1.5			V
	Low	V_{CEL}				0.3	V
Output Noise		eN	$B_W=10Hz \text{ to } 100kHz, I_{OUT}=30mA$		30		μV_{rms}
Ripple Rejection		RR	$f=1kHz, \text{Ripple } 0.2V_{P-P}$ $V_{IN}=\text{Set } V_{OUT}+1V, I_{OUT}=30mA$ (In case that $V_{OUT}=2.0V, V_{IN}=3V$)		75		dB
Dropout Voltage		V_D	$I_{OUT}=150mA$		0.14	0.25	V
Line Regulation		$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$	$\text{Set } V_{OUT}+0.5V \leq V_{IN} \leq 5V$		0.02	0.10	%/V
Output Voltage Temperature Coefficient		$\frac{\Delta V_{OUT}}{\Delta T}$	$-40^\circ C \leq T_{OPR} \leq 85^\circ C$		± 30		ppm/ $^\circ C$

■ ELECTRICAL CHARACTERISTICS(Cont.)

LR1122B-2.85V

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN} = \text{Set } V_{OUT}+1V$	2.834		2.866	V
Input Voltage (Note)	V_{IN}				5.0	V
Load Regulation	$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$	$1mA \leq I_{OUT} \leq 150mA$		20	40	mV
Output Current	I_{OUT}		200			mA
Supply Current	I_{SS}	$I_{OUT}=0A$		18	25	μA
Supply Current (Standby)	I_{ST-BY}	$V_{CE}=0V$		0.1	2	μA
Short Current Limit	I_{LIMIT}	$V_{OUT}=0V$		40		mA
CE Pull-down Current	I_{PD}			0.3		μA
CE Input Voltage	High	V_{CEH}	1.5			V
	Low	V_{CEL}			0.3	V
Output Noise	eN	$B_W=10\text{Hz to }100\text{kHz}, I_{OUT}=30\text{mA}$		30		μV_{RMS}
Ripple Rejection	RR	$f=1\text{kHz}, \text{Ripple } 0.2V_{P-P}$ $V_{IN}=\text{Set } V_{OUT}+1V, I_{OUT}=30\text{mA}$ (In case that $V_{OUT}=2.0V, V_{IN}=3V$)		75		dB
Dropout Voltage	V_D	$I_{OUT}=150\text{mA}$		0.13	0.23	V
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$	$\text{Set } V_{OUT}+0.5V \leq V_{IN} \leq 5V$		0.02	0.10	%/V
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T}$	$-40^\circ C \leq T_{OPR} \leq 85^\circ C$		± 30		ppm/ $^\circ C$

LR1122B-3.0V

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN} = \text{Set } V_{OUT}+1V$	2.984		3.016	V
Input Voltage (Note)	V_{IN}				5.0	V
Load Regulation	$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$	$1mA \leq I_{OUT} \leq 150mA$		20	40	mV
Output Current	I_{OUT}		200			mA
Supply Current	I_{SS}	$I_{OUT}=0A$		18	25	μA
Supply Current (Standby)	I_{ST-BY}	$V_{CE}=0V$		0.1	2	μA
Short Current Limit	I_{LIMIT}	$V_{OUT}=0V$		40		mA
CE Pull-down Current	I_{PD}			0.3		μA
CE Input Voltage	High	V_{CEH}	1.5			V
	Low	V_{CEL}			0.3	V
Output Noise	eN	$B_W=10\text{Hz to }100\text{kHz}, I_{OUT}=30\text{mA}$		30		μV_{RMS}
Ripple Rejection	RR	$f=1\text{kHz}, \text{Ripple } 0.2V_{P-P}$ $V_{IN}=\text{Set } V_{OUT}+1V, I_{OUT}=30\text{mA}$ (In case that $V_{OUT}=2.0V, V_{IN}=3V$)		75		dB
Dropout Voltage	V_D	$I_{OUT}=150\text{mA}$		0.13	0.23	V
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$	$\text{Set } V_{OUT}+0.5V \leq V_{IN} \leq 5V$		0.02	0.10	%/V
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T}$	$-40^\circ C \leq T_{OPR} \leq 85^\circ C$		± 30		ppm/ $^\circ C$

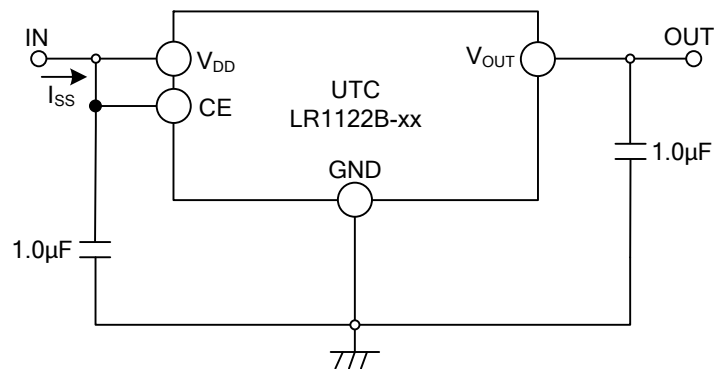
■ ELECTRICAL CHARACTERISTICS(Cont.)

LR1122B-3.3V

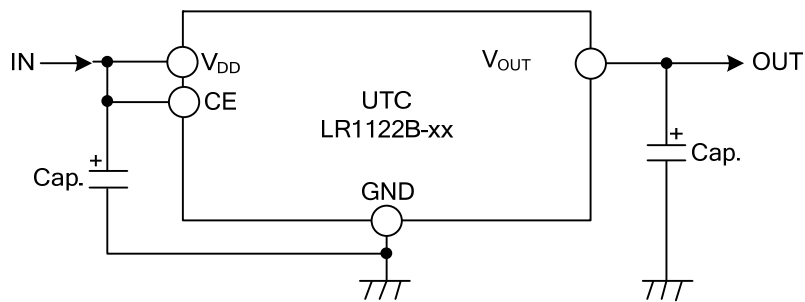
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN} = \text{Set } V_{OUT} + 1V$	3.284		3.316	V
Input Voltage (Note)	V_{IN}				5.0	V
Load Regulation	$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$	$1mA \leq I_{OUT} \leq 150mA$		20	40	mV
Output Current	I_{OUT}		200			mA
Supply Current	I_{SS}	$I_{OUT} = 0A$		18	25	μA
Supply Current (Standby)	I_{ST-BY}	$V_{CE} = 0V$		0.1	2	μA
Short Current Limit	I_{LIMIT}	$V_{OUT} = 0V$		40		mA
CE Pull-down Current	I_{PD}			0.3		μA
CE Input Voltage	High	V_{CEH}	1.5			V
	Low	V_{CEL}			0.3	V
Output Noise	eN	$B_W = 10\text{Hz to } 100\text{kHz}, I_{OUT} = 30\text{mA}$		30		μV_{rms}
Ripple Rejection	RR	$f = 1\text{kHz}, \text{Ripple } 0.2V_{P-P}$ $V_{IN} = \text{Set } V_{OUT} + 1V, I_{OUT} = 30\text{mA}$ (In case that $V_{OUT} = 2.0V, V_{IN} = 3V$)		75		dB
Dropout Voltage	V_D	$I_{OUT} = 150\text{mA}$		0.13	0.23	V
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$	Set $V_{OUT} + 0.5V \leq V_{IN} \leq 5V$		0.02	0.10	%/V
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T}$	$-40^\circ C \leq T_{OPR} \leq 85^\circ C$		± 30		ppm/ $^\circ C$

Note: Max. Input Voltage is 5.5V during 500hours

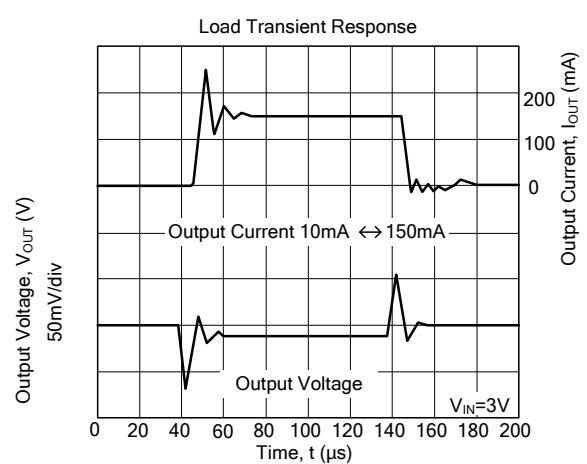
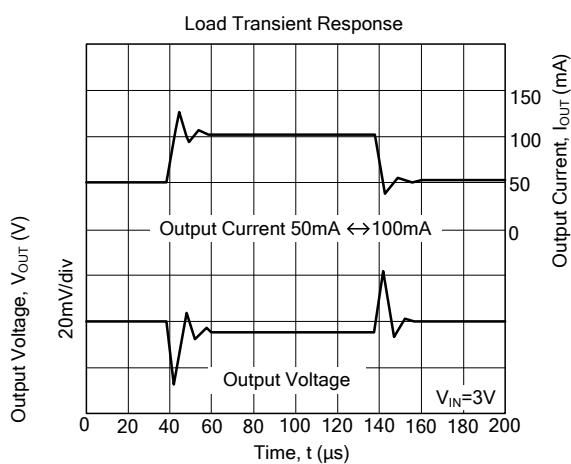
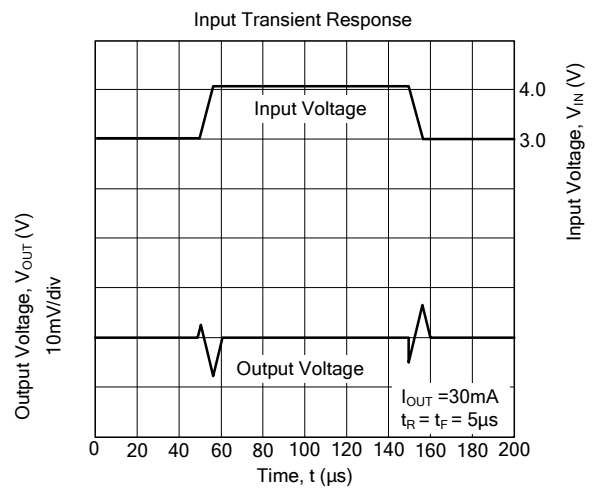
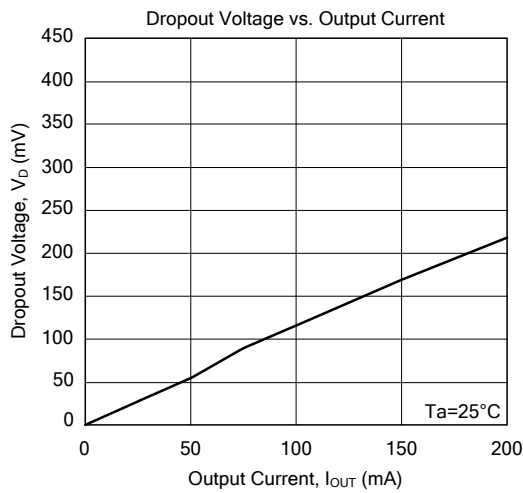
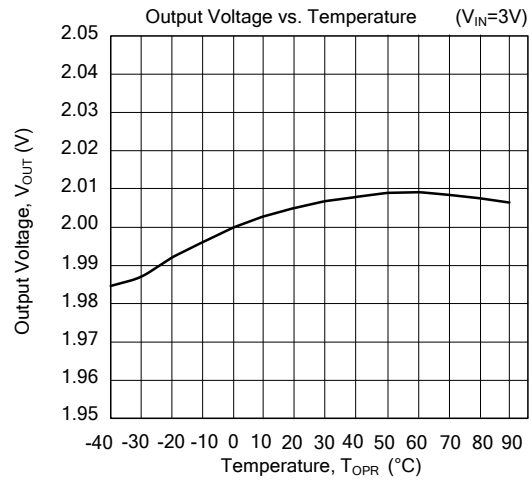
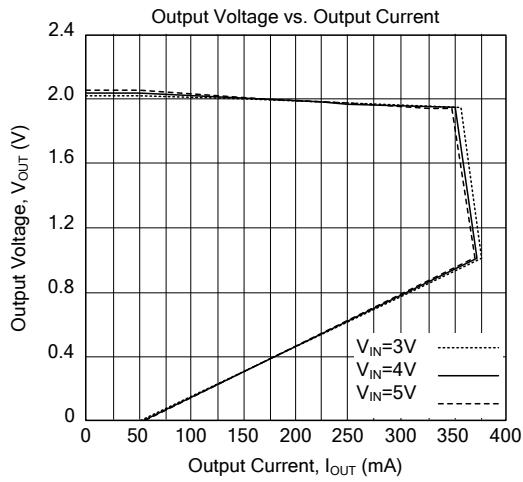
■ TEST CIRCUIT



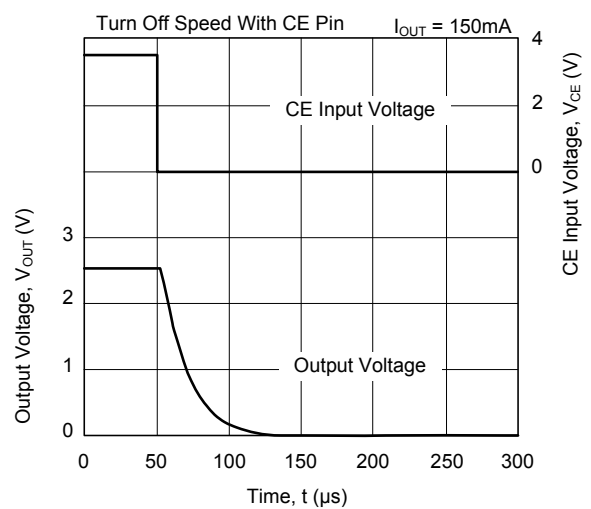
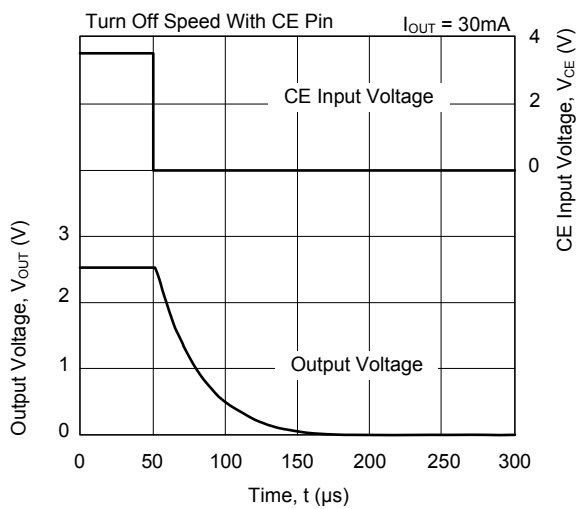
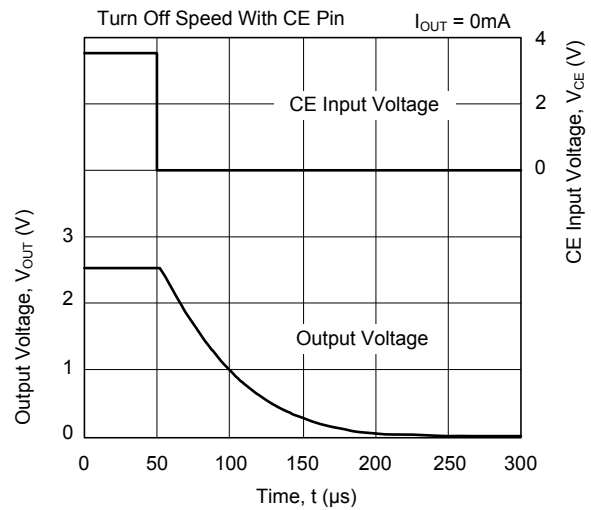
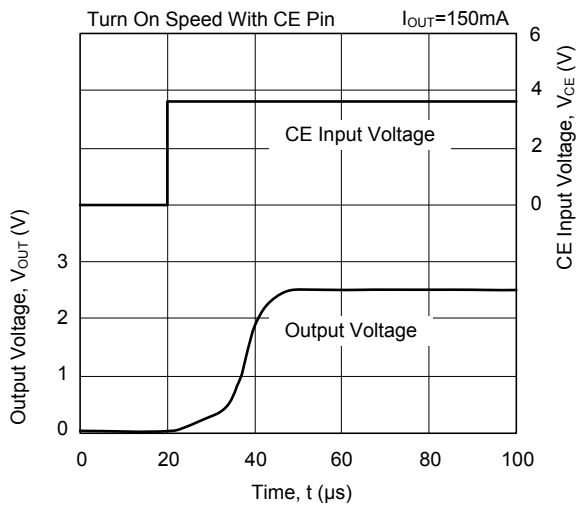
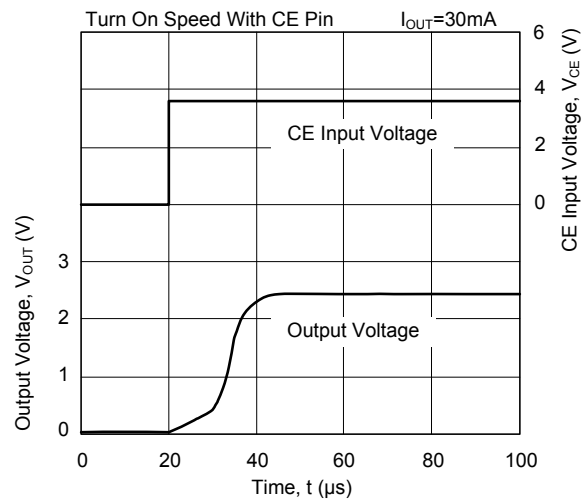
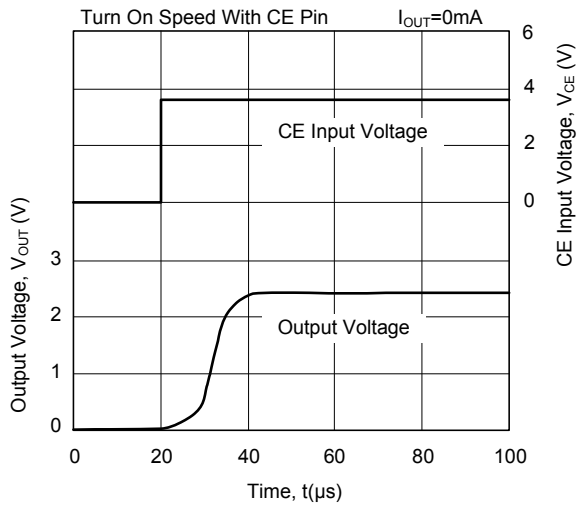
■ TYPICAL APPLICATION CIRCUIT



TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS(Cont.)



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