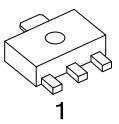
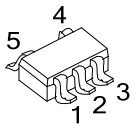
LR9200

CMOS IC

LOW NOISE 200mA LDO REGULATOR



SOT-89



SOT-25

■ DESCRIPTION

The UTC **LR9200** is a typical LDO with the features of high output voltage accuracy, low supply current, low ON-resistance, and high ripple rejection.

During operation of the UTC **LR9200**, 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 **LR9200** 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 **LR9200**.

The UTC **LR9200** 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: 20μA (Typ.)
* Standby Mode: 0.1μA (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: ±30ppm/°C (Typ.)
* Well Line Regulation: 0.02%/ V (Typ.)
* Output Voltage Accuracy: ±0.8% (Typ.)
* Internal Fold Back Protection Circuit: 40mA (Typ.) @ short mode
* C_{IN}=C_{OUT}=1μF or more (Ceramic capacitors) are recommended to be used with this IC

■ ORDERING INFORMATION

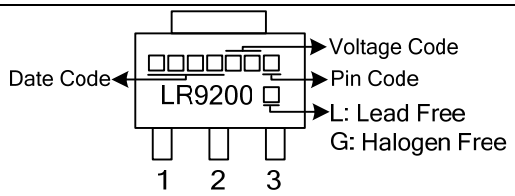
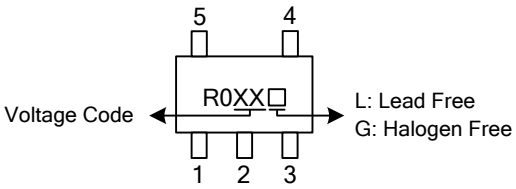
Ordering Number		Package	Pin Assignment					Packing
Lead Free	Halogen Free		1	2	3	4	5	
LR9200L-xx-AF5-R	LR9200G-xx-AF5-R	SOT-25	V_{IN}	G	CE	NC	O	Tape Reel
LR9200L-xx-AB3-C-R	LR9200G-xx-AB3-C-R	SOT-89	G	I	O	-	-	Tape Reel

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

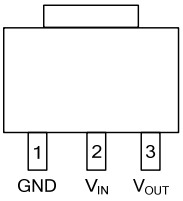
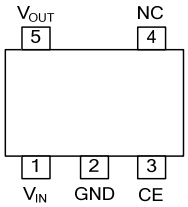
LR9200L-xx-AF5-x-R
(1)Packing Type
(2)Pin Assignment
(3)Package Type
(4)Output Voltage Code
(5)Lead Free

(1) R: Tape Reel
(2) refer to Pin Assignment
(3) AF5: SOT-25, AB3: SOT-89
(4) xx: Refer to Marking Information
(5) L: Lead Free, G: Halogen Free

■ MARKING

PACKAGE	VOLTAGE CODE	MARKING
SOT-89	12:1.2V 15:1.5V 16:1.6V 18:1.8V 20:2.0V 25:2.5V 2J:2.85V 30:3.0V 33:3.3V 50:5.0V	
SOT-25		

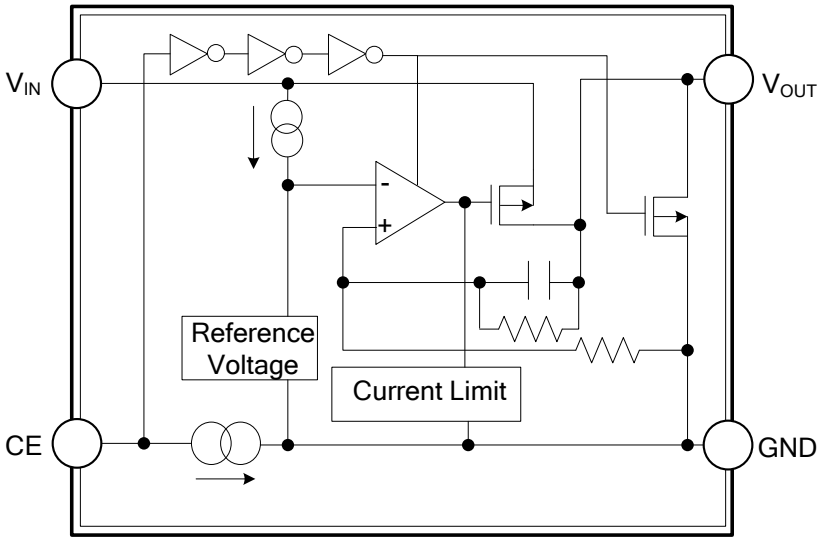
■ PIN CONFIGURATION

SOT-89	SOT-25
 PIN CODE: C	

■ PIN DESCRIPTIONS

PIN NAME	DESCRIPTION
V_{IN}	Input Pin
GND	Ground Pin
CE	Chip Enable Pin. Active when this Pin is high.
NC	No Connection
V_{OUT}	Output Pin

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER		SYMBOL	RATINGS	UNIT
Input Voltage		V_{IN}	9	V
Input Voltage(CE Pin)		V_{CE}	8.5	V
Output Voltage		V_{OUT}	-0.3~ V_{IN}+0.3	V
Output Current		I_{OUT}	300	mA
Power Dissipation	SOT-25	P_D	420	mW
	SOT-89		550	
Junction Temperature		T_J	+125	°C
Operating Temperature		T_{OPR}	-40~+85	°C
Storage Temperature		T_{STG}	-55~+125	°C

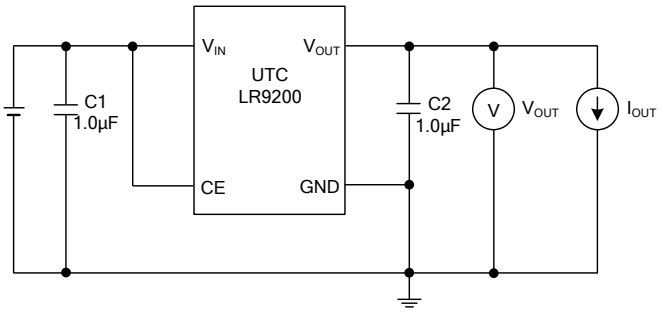
Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ ELECTRICAL CHARACTERISTICS

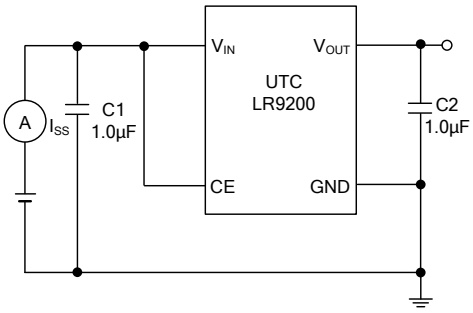
(T_A=25°C, V_{IN}=Set V_{OUT}+1V, I_{OUT}=1mA, C_I =C_O=1μF, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage		V_{OUT}	V_{IN} = Set V_{OUT}+1V	V_{OUT} > 2.0V	×0.992		×1.008	V
				V_{OUT} ≤ 2.0V	-16		+16	mV
Input Voltage		V_{IN}					7.5	V
Load Regulation		ΔV_{OUT}	1mA≤I_{OUT}≤150mA			20	40	mV
Output Current		I_{OUT}			200			mA
Supply Current		I_{SS}	I_{OUT}=0A			20	40	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 to 100kHz, I_{OUT} =30mA			30		μVrms
Ripple Rejection		RR	f=1kHz, Ripple 0.2V_{P-P} V_{IN}=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	1.2V≤V_{OUT}＜1.5V		0.40	0.50	V
				1.5V≤V_{OUT}＜1.7V		0.24	0.38	
				1.7V≤V_{OUT}＜2.0V		0.21	0.34	
				2.0V≤V_{OUT}＜2.5V		0.17	0.30	
				2.5V≤V_{OUT}＜2.8V		0.14	0.25	
				2.8V≤V_{OUT}≤5.0V		0.13	0.23	
Line Regulation		$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$	1.2V≤V_{OUT}≤4.0V, V_{SET}+0.5V≤V_{IN}≤5V			0.02	0.10	%/V
			4.0V<V_{OUT}≤5.0V, V_{SET}+0.5V≤V_{IN}≤6.5V					
Output Voltage Temperature Coefficient		$\frac{\Delta V_{OUT}}{\Delta T}$	-40°C≤T_{OPR}≤85°C			±30		ppm/°C
Low Output Nch Tr. ON Resistance		R_{LOW}	V_{IN}=4.0,V_{CE}=0V			70		Ω

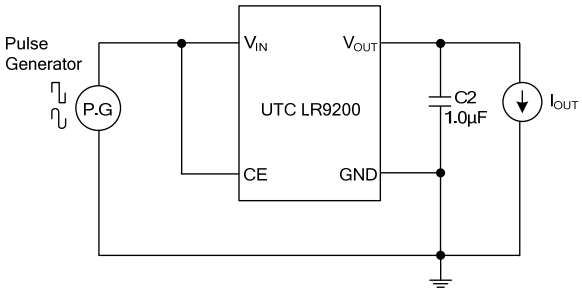
■ TEST CIRCUIT



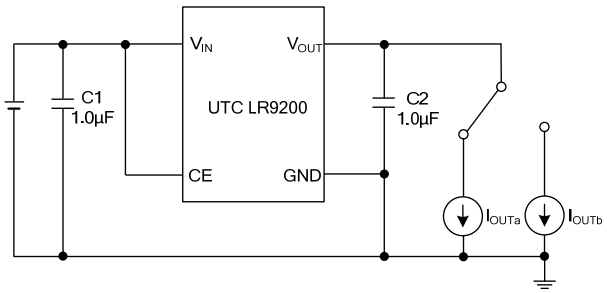
Basic Test Circuit



Test Circuit for Supply Current

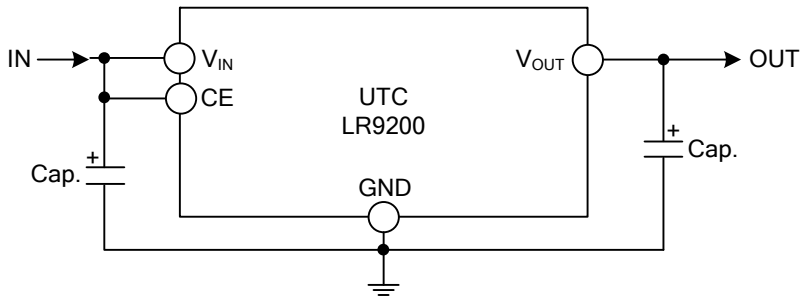


Test Circuit for Ripple Rejection

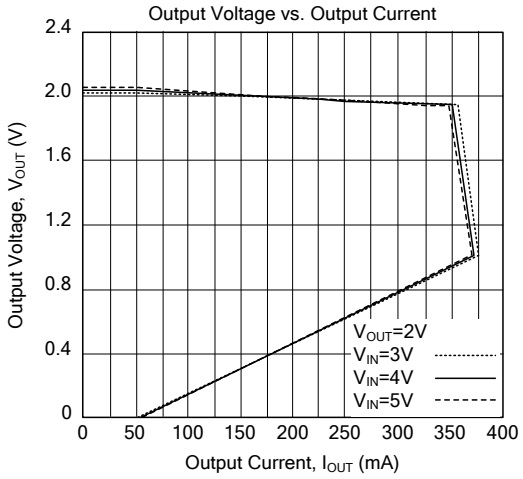


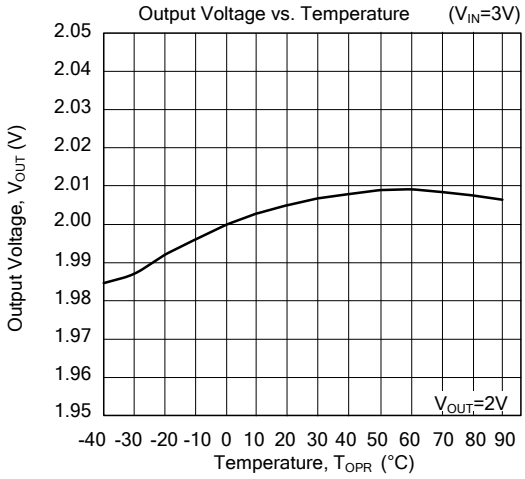
Test Circuit for Load Transient Response

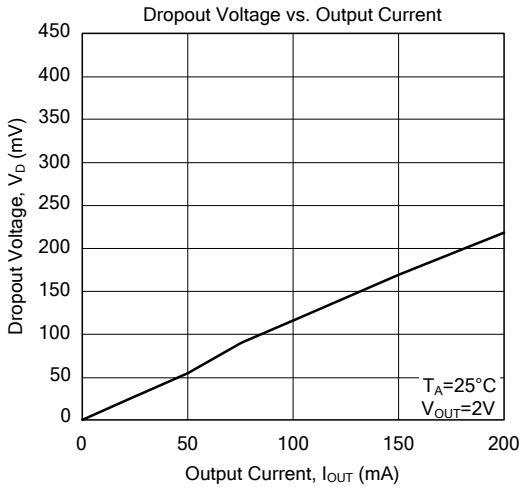
■ TYPICAL APPLICATION CIRCUIT

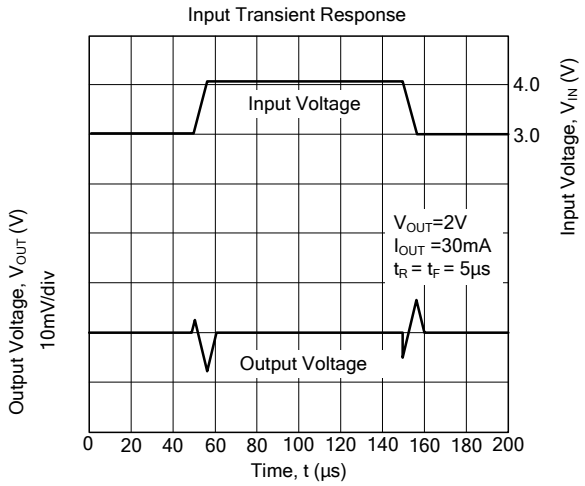


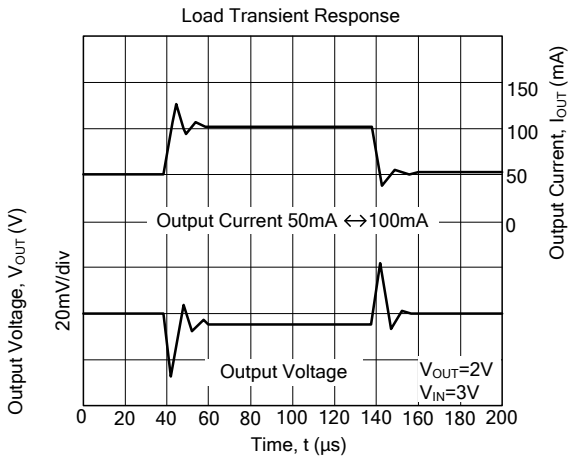
■ TYPICAL CHARACTERISTICS

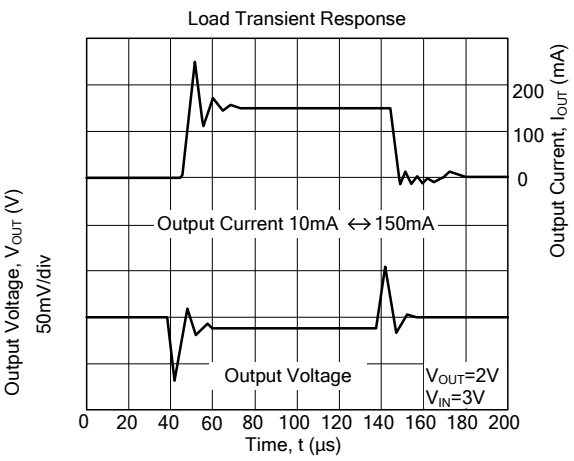












■ TYPICAL CHARACTERISTICS(Cont.)