



LR9XXYY

Preliminary

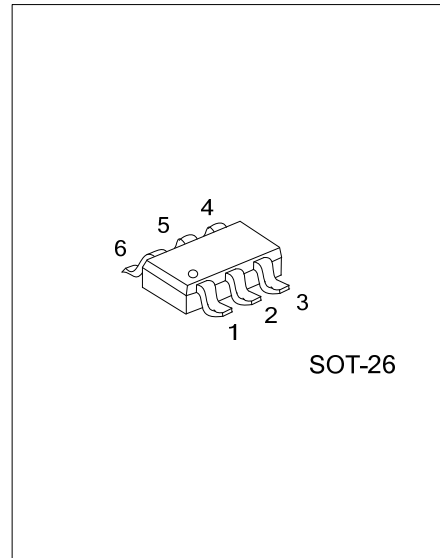
CMOS IC

300mA SMALL DUAL LDO REGULATOR

DESCRIPTION

The UTC **LR9XXYY** Series are a low dropout regulator with high output voltage accuracy, low quiescent current, low dropout, and high ripple rejection. This regulator is based on a CMOS process. Each of these regulator ICs contains dual LDO regulator, both of them includes a voltage reference, an error amplifier, resistors for setting Output Voltage, a current limit circuit, and a chip enable circuit.

The UTC **LR9XXYY** Series exhibit ultra excellent line transient response and load transient response, thus they are very suitable for the power supply for hand-held communication equipment.



FEATURES

- * Supply Current: TYP. 50 μ A \times 2 (VR1&VR2)
- * Standby Current: TYP. 0.1 μ A \times 2 (VR1&VR2)
- * Input Voltage Range: 1.4V~5.25V
- * Output Voltage Range: 0.8V~3.7V (0.1V steps)
(For details, please refer to MARK SPECIFICATION TABLE)
- * Output Voltage Accuracy: \pm 1.0% ($V_{SET}>2.0V$, $T_{OPT}=25^{\circ}C$)
- * Dropout Voltage: TYP. 0.25V ($I_{OUT}=300mA$, $V_{SET}=2.5V$)
- * Ripple Rejection: TYP. 75dB ($f=1kHz$)
- * Line Regulation: TYP. 0.02%/V
- * Built-in Fold Back Protection Circuit: TYP. 60mA
(Current at short mode)
- * Ceramic capacitors are recommended to be used with this IC:
1.0 μ F or more

ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
LR9XXYYBL-AG6-R	LR9XXYYBG-AG6-R	SOT-26	Tape Reel

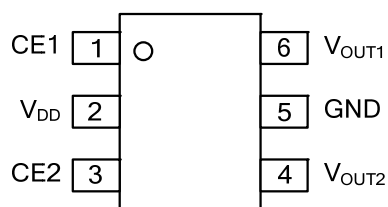
Note: XXYY: Output Voltage, refer to Marking Information.

<p>LR9XXYYBG-AG6-R</p> <p>(1)Packing Type (2)Package Type (3)Green Package (4)Discharge Function (5)Voltage Code at V_{OUT2} (6)Voltage Code at V_{OUT1}</p>	<p>(1) R: Tape Reel (2) AG6: SOT-26 (3) G: Halogen Free and Lead Free, L: Lead Free (4) B: without auto-discharge function at off state (5) YY: refer to Marking Information (6) XX: refer to Marking Information</p>
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MARKING INFORMATIONS

PACKAGE	VOLTAGE CODE				MARKING
	CODE	X	CODE	Y	
SOT-26	1	1.2V	1	1.2V	
	2	1.5V	2	1.5V	
	3	1.8V	3	1.8V	
	4	2.0V	4	2.0V	
	5	2.5V	5	2.5V	
	6	2.8V	6	2.8V	
	7	3.0V	7	3.0V	
	8	3.3V	8	3.3V	
	9	3.6V	9	3.6V	

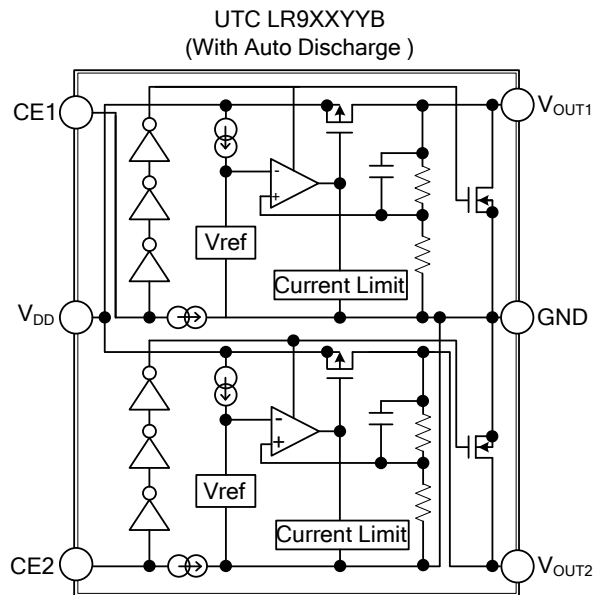
PIN CONFIGURATION



PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	CE1	Chip Enable Pin 1 ("H" Active)
2	V _{DD}	Input Pin
3	CE2	Chip Enable Pin 2 ("H" Active)
4	V _{OUT2}	Output Pin 2
5	GND	Ground Pin
6	V _{OUT1}	Output Pin 1

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	6.0	V
Input Voltage (CE Pin)	V_{CE}	-0.3 ~ 6.0	V
Output Voltage	V_{OUT1}, V_{OUT2}	-0.3 ~ $V_{IN}+0.3$	V
Output Current	I_{OUT1}, I_{OUT2}	400	mA
Power Dissipation	P_D	400	mW
Operating Temperature Range	T_{OPR}	-40 ~ +85	°C
Storage Temperature Range	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

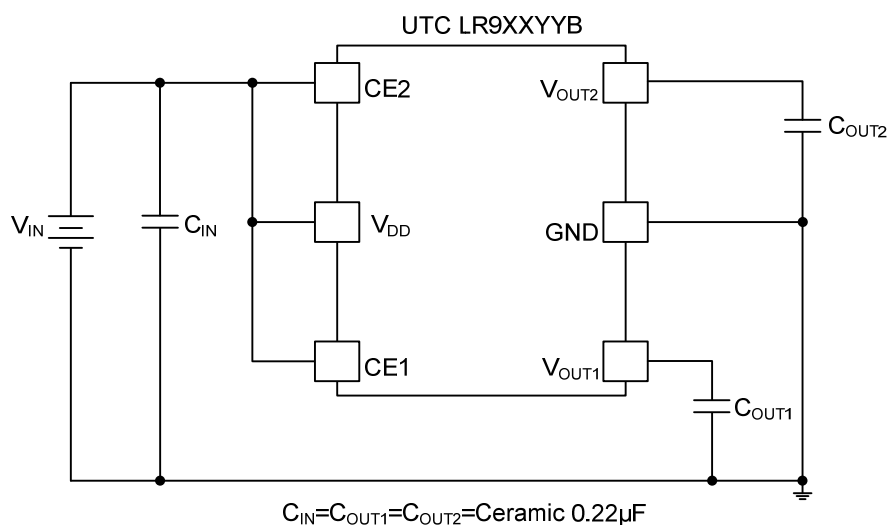
($V_{IN}=\text{Set } V_{OUT}+1.0\text{V}$ for V_{OUT} options greater than 1.5V, $V_{IN}=2.5\text{V}$ for $V_{OUT}\leq 1.5\text{V}$, $I_{OUT}=1\text{mA}$, $C_{IN}=C_{OUT}=0.22\mu\text{F}$ unless otherwise noted. Values surrounded by **boldface** indicate the values under all temperature range, or $-40^\circ\text{C}\leq T_A\leq 85^\circ\text{C}$ ($T_A=25^\circ\text{C}$))

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Output Voltage	V_{OUT}	$V_{SET}>2.0\text{V}$	x 0.99		x 1.01	V	
		$V_{SET}\leq 2.0\text{V}$	-20		+20	mV	
Output Current	I_{OUT}		300			mA	
Load Regulation	$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$	$1\text{mA}\leq I_{OUT}\leq 300\text{mA}$		15	40	mV	
Dropout Voltage	V_{DIF}	$I_{OUT}=300\text{mA}$	$V_{OUT}=0.8\text{V}$		0.56	0.72	V
			$V_{OUT}=0.9\text{V}$		0.51	0.65	
			$1.0\text{V}\leq V_{OUT}<1.2\text{V}$		0.46	0.59	
			$1.2\text{V}\leq V_{OUT}<1.4\text{V}$		0.39	0.50	
			$1.4\text{V}\leq V_{OUT}<1.7\text{V}$		0.35	0.44	
			$1.7\text{V}\leq V_{OUT}<2.1\text{V}$		0.30	0.39	
			$2.1\text{V}\leq V_{OUT}<2.5\text{V}$		0.26	0.34	
			$2.5\text{V}\leq V_{OUT}<3.0\text{V}$		0.25	0.30	
$3.0\text{V}\leq V_{OUT}\leq 3.6\text{V}$		0.22	0.29				
Supply Current	I_{SS}	$I_{OUT}=0\text{mA}$		150	200	μA	
Supply Current (Standby)	$I_{STANDBY}$	$V_{CE}=0\text{V}$		0.1	1.0	μA	
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$	$V_{SET}+0.5\text{V}\leq V_{IN}\leq 5.25\text{V}$ ($V_{IN}\geq 1.4\text{V}$)		0.02	0.10	%/V	
Ripple Rejection	RR	f=1kHz, Ripple 0.2Vp-p $V_{IN}=V_{SET}+1\text{V}$, $I_{OUT}=30\text{mA}$ (In case that $V_{SET}\leq 2.0\text{V}$, $V_{IN}=3\text{V}$)		75		dB	
Input Voltage (Note 1)	V_{IN}		1.40		5.25	V	
Short Current Limit	I_{SC}	$V_{OUT}=0\text{V}$		60		mA	
CE Pull-down Current	I_{PD}			0.3	0.6	μA	
CE Input Voltage "H"	V_{CEH}		1.0			V	
CE Input Voltage "L"	V_{CEL}				0.4	V	
Low Output Nch Tr. ON Resistance (of B version)	R_{LOW}	$V_{IN}=4.0\text{V}$, $V_{CE}=0\text{V}$		50		Ω	

Notes: 1. The maximum Input Voltage of the ELECTRICAL CHARACTERISTICS is 5.25V. In case of exceeding this specification, the IC must be operated on condition that the Input Voltage is up to 5.5V and the total operating time is within 500hrs.

2. All of unit are tested and specified under load conditions such that $T_J\approx T_{OPT}=25^\circ\text{C}$ except for Output Noise, Ripple Rejection, Output Voltage Temperature Coefficient and Thermal Shutdown.

■ TYPICAL APPLICATION CIRCUIT



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