



## LR4XXYY

Preliminary

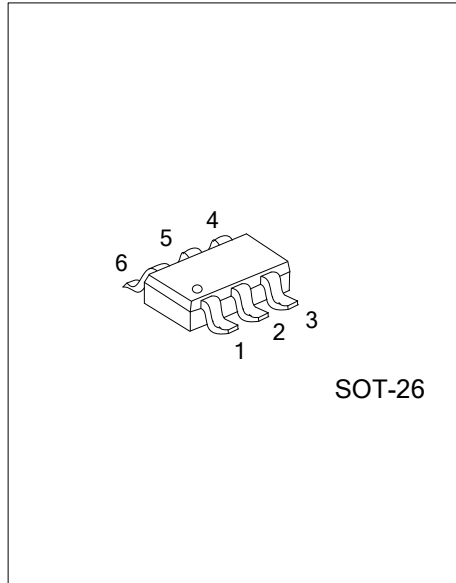
CMOS IC

### Dual, Low-Noise, 200mA LDO REGULATOR

#### DESCRIPTION

The UTC **LR4XXYY** are dual voltage regulator ICs that have high output voltage accuracy, low dropout, low supply current, and high ripple rejection. Every Channel of UTC **LR4XXYY** series consists of a voltage reference unit and over temperature protection, simultaneously; also consists of an error amplifier, a current limit circuit, resistors for setting output voltage, and a chip enable circuit, respectively. The EN1 and EN2 pins control each output respectively. When both outputs shutdown simultaneously, the chip will be turned off and consumes nearly zero operation current which is suitable for battery-power devices.

The load transient response and line transient response of the UTC **LR4XXYY** Series are excellent, so these ICs are suitable for hand-held communication equipment power supply.



#### FEATURES

- \* 200mA Guaranteed Output Current(Each LDO)
- \* Dual Shutdown Pins Control Each Output
- \* 120mV Dropout at 100mA Load
- \* Current Limiting Protection
- \* Thermal Shutdown Protection
- \* Excellent Line/Load Transient
- \* RoHS Compliant and 100% Lead (Pb)-Free

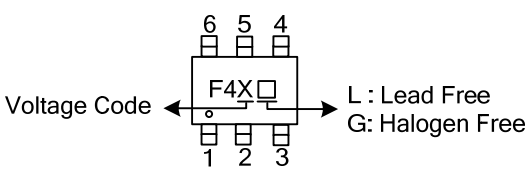
#### ORDERING INFORMATION

Ordering Number		Package Packing	
Lead Free	Halogen Free		
LR4XXYYL-AG6-R	LR4XXYYG-AG6-R	SC59-6	Tape Reel

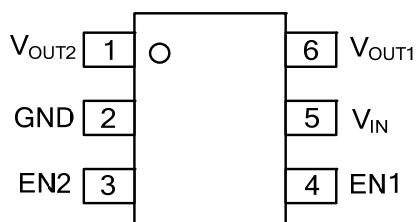
Note: XXYY: Output Voltage, refer to Marking Information.

<p>LR4XXYYL-AG6-R</p>	<p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Lead Free</p> <p>(4) Voltage Code at <math>V_{OUTY}</math></p> <p>(5) Voltage Code at <math>V_{OUTX}</math></p>	<p>(1) R: Tape Reel</p> <p>(2) AG6: SOT-26</p> <p>(3) L: Lead Free, G: Halogen Free</p> <p>(4) YY: refer to Marking Information</p> <p>(5) XX: refer to Marking Information</p>
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### MARKING INFORMATIONS

PACKAGE Code	Code	VOLTAGE CODE		MARKING
		XX	YY	
SOT-26	A	28: 2.8V	28: 2.8V	
	B	30: 3.0V	30: 3.0V	
	C	12: 1.2V	18: 1.8V	
	D	18: 1.8V	28: 2.8V	
	E	18: 1.8V	33: 3.3V	
	F	33: 3.3V	18: 1.8V	

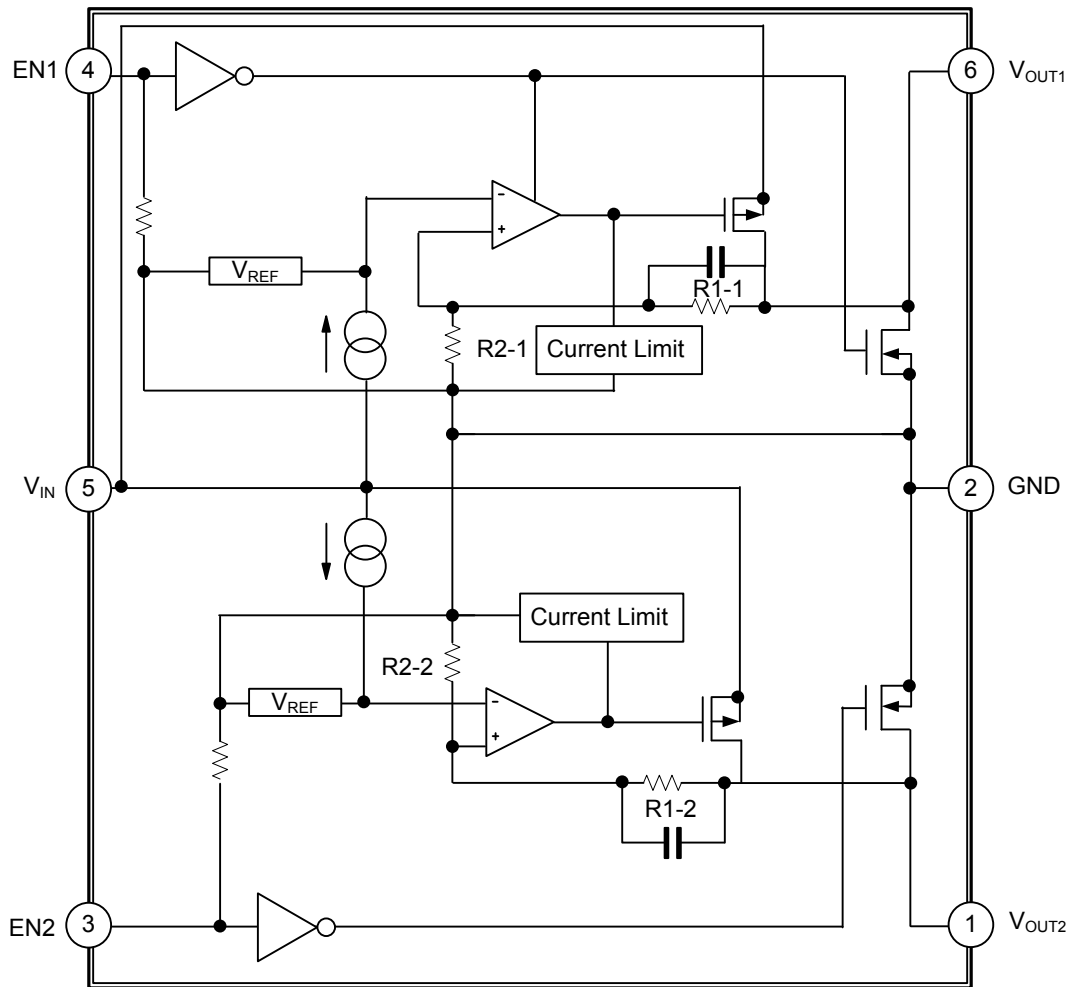
### PIN CONFIGURATIONS



### PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	V <sub>OUT2</sub>	Channel 2's voltage output
2	GND	Ground
3	EN2	Channel 2's output enable control Pin
4	EN1	Channel 1's output enable control Pin
5	V <sub>IN</sub>	Voltage Input pin
6	V <sub>OUT1</sub>	Channel 1's voltage output

■ BLOCK DIAGRAM



### ■ ABSOLUTE MAXIMUM RATINGS (Note 1)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Input Voltage(Operating)	V <sub>IN</sub>	2.5 ~ 5.5	V
Supply Input Voltage(Survival)		-0.3 ~ +6.5	
Enable Input Voltage	V <sub>EN</sub>	0 ~ 5.5	V
Lead Temperature (Soldering, 10 sec.)		+260	°C
ESD Rating (Note 2)		2	kV
Junction Temperature	T <sub>J</sub>	-40 ~ +125	°C
Storage Temperature Range	T <sub>STG</sub>	-65 ~ +150	°C
Operation Temperature Range	T <sub>OPR</sub>	-40 ~ +85	°C

### ■ ELECTRICAL CHARACTERISTICS

(V<sub>IN</sub> = V<sub>OUT</sub>+0.5V or 2.5V, C<sub>IN</sub> = C<sub>OUT</sub> = 2.2μF, EN1=EN2=V<sub>IN</sub>, T<sub>A</sub>= 25°C, for each LDO unless otherwise specified)

PARAMETER SYMBOL		TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage Accuracy (Load Regulation)	ΔV <sub>OUT</sub>	I <sub>OUT</sub> =1mA to 200mA	-2		+2	%
Maximum Output Current	I <sub>MAX</sub>	Continuous	200			mA
Current Limit	I <sub>LIM</sub>	R <sub>LOAD</sub> =1Ω	500		1000	mA
Quiescent Current	I <sub>G</sub>	No Load		165	260	μA
		I <sub>OUT</sub> =100mA(Both LDOs)		165	260	μA
Dropout Voltage(Note3)	V <sub>DROP</sub>	I <sub>OUT</sub> = 1mA	20			mV
		I <sub>OUT</sub> = 100mA	120			mV
		I <sub>OUT</sub> = 200mA	255			mV
Line Regulation	ΔV <sub>LINE</sub>	V <sub>IN</sub> =(V <sub>out</sub> +0.5V or 2.5V) to 5.5V I <sub>OUT</sub> =1mA	-0.2		+0.2	%/V
En Input High Threshold	V <sub>IH</sub>	V <sub>IN</sub> =2.5V to 5.5V	1.6			V
En Input Low Threshold	V <sub>IL</sub>	V <sub>IN</sub> =2.5V to 5.5V			0.4	V
En Input Bias Current	I <sub>SD</sub>	EN=GND or V <sub>IN</sub>			100	nA
Shutdown Supply Current	I <sub>GSD</sub>	EN1=EN2=GND		0.01	2	μA
Thermal Shutdown Temperature	T <sub>SD</sub>			140		°C
Thermal Shutdown Hysteresis	ΔT <sub>SD</sub>			10		°C
Output Voltage Noise	e <sub>NO</sub>	10~100kHz, C <sub>OUT</sub> =4.7μF, I <sub>LOAD</sub> =1mA	124			μV <sub>RMS</sub>
Output Voltage AC PSRR	PSRR	100Hz, C <sub>OUT</sub> =4.7μF I <sub>LOAD</sub> =100mA	62			dB

Notes: 1. Limits beyond which damage to the device may occur is indicated by absolute maximum ratings. Conditions for which the device is intended to be functional is indicated by operating ratings, but specific performance limits isn't be guaranteed. Only for the test conditions listed the guaranteed specifications can be applied. When the device is not operated under the listed test conditions some performance characteristics may degrade.

2. Which discharged through a 1.5kΩ resistor into each pin is a 100pF capacitor in the human body model.
3. The dropout voltage is defined as V<sub>IN</sub> - V<sub>OUT</sub>, which is measured when V<sub>OUT</sub> is V<sub>OUT(NORMAL)</sub> - 100mV.

■ TEST CIRCUITS

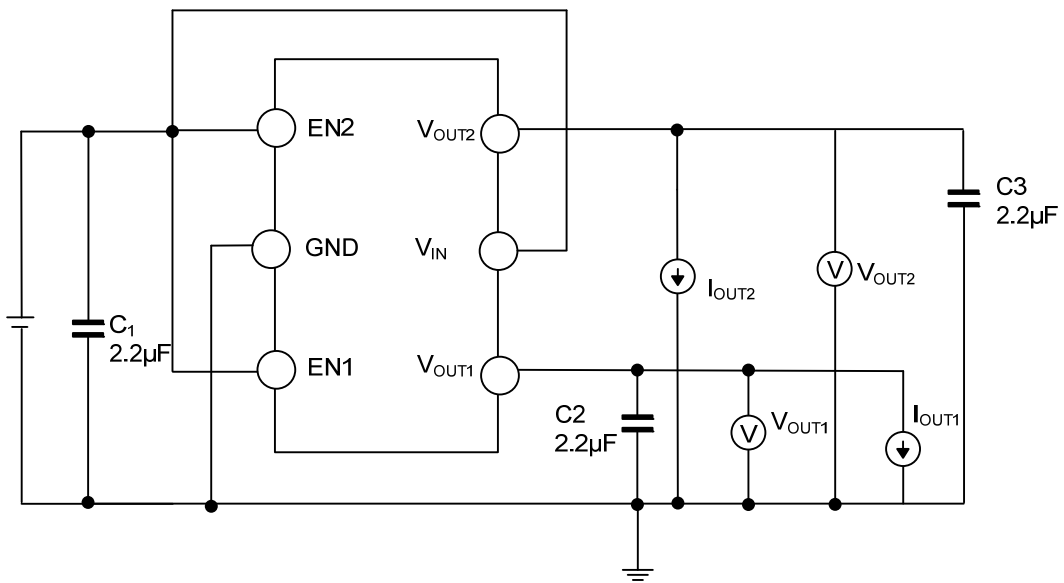


Fig.1 Standard Test Circuit

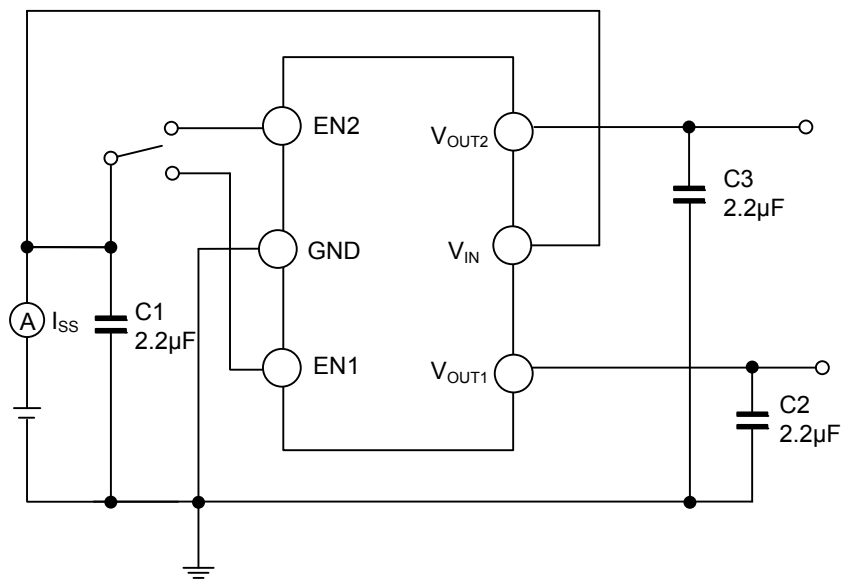


Fig.2 Supply Current Test Circuit

■ TEST CIRCUITS(Cont.)

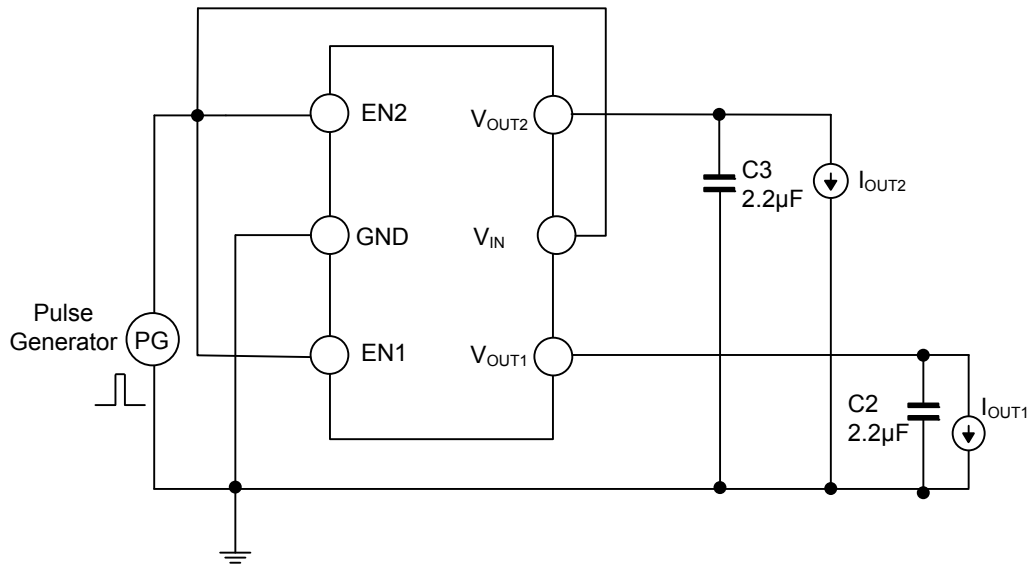


Fig.3 Ripple Rejection, Line Transient Response Test Circuit

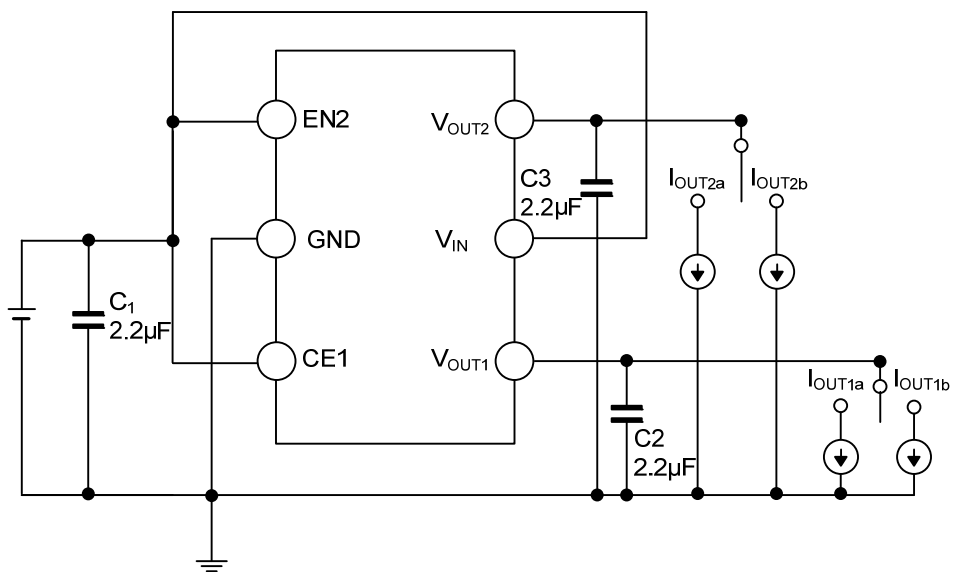
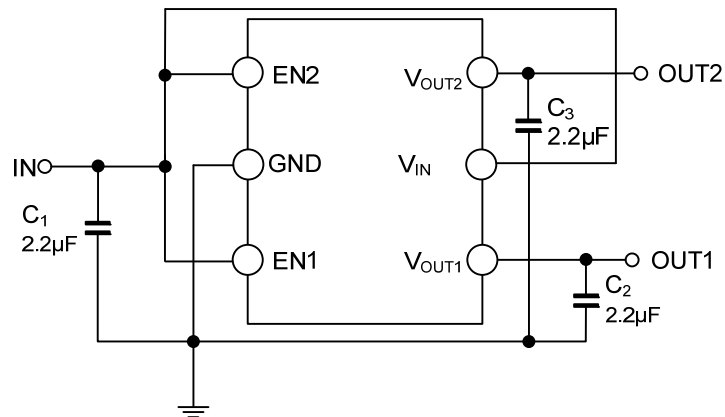


Fig.4 Load Transient Response Test Circuit

## ■ TYPICAL APPLICATION CIRCUIT



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