



## LR2125

## LINEAR INTEGRATED CIRCUIT

### 300mA SELECTABLE FIXED/ADJUSTABLE LOW DROPOUT LINEAR REGULATOR

#### DESCRIPTION

As a low dropout linear regulator, the UTC **LR2125** only needs low input voltage (2.8~6V) and can deliver current to 300mA for setting the output voltage.

The UTC **LR2125** is an ideal for being used in such battery-powered equipments notebook, personal computer and cellular phone. Its typical dropout voltage is 230mV at loading current 300mA.

For setting the output voltage, the UTC **LR2125** has two output voltage operation modes: fixed mode senses the output voltage on  $V_{OUT}$ , ADJ mode needs two resistors as a voltage divider.

To protect itself against current over-loads and over temperature, the **LR2125** has current limit and thermal shutdown functions.

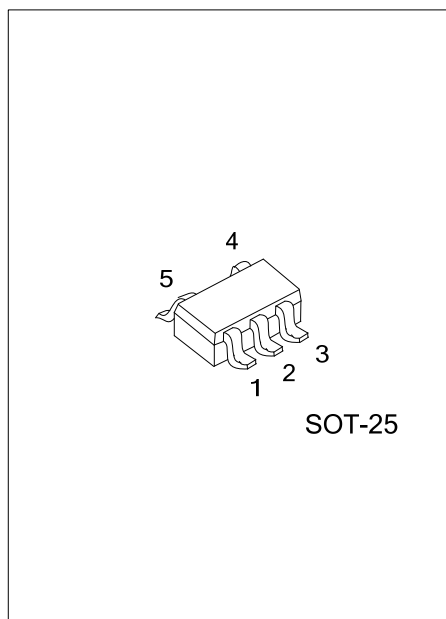
#### FEATURES

- \* Operating Voltage: 2.8~6V
- \* Low Voltage Dropout
- \* Output Current Guaranteed 300mA
- \* For Setting Output Voltage Two Modes
  - Fixed mode :Fixed Output Voltage 1~5V
  - ADJ mode: Adjustable Output Voltage 0.8~5.5V
- \* Internal Current Limit Protection
- \* With Soft-Start
- \* Internal thermal Protection
- \* Work stably with Low ESR Ceramics Capacitor

#### ORDERING INFORMATION

Ordering Number	Package	Packing
LR2125G-xx-AF5-R	SOT-25	Tape Reel

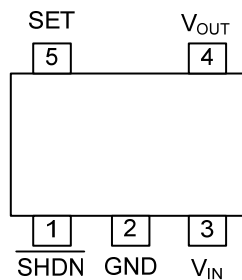
LR2125G-xx-AF5-R	(1)Packing Type	(1) R: Tape Reel
	(2)Package Type	(2) AF5: SOT-25
	(3)Output Voltage Code	(3) xx: Refer to Marking Information
	(4)Green Package	(4) G: Halogen Free and Lead Free



### MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-25	12: 1.2V 18: 1.8V 25: 2.5V 33: 3.3V AD: ADJ	

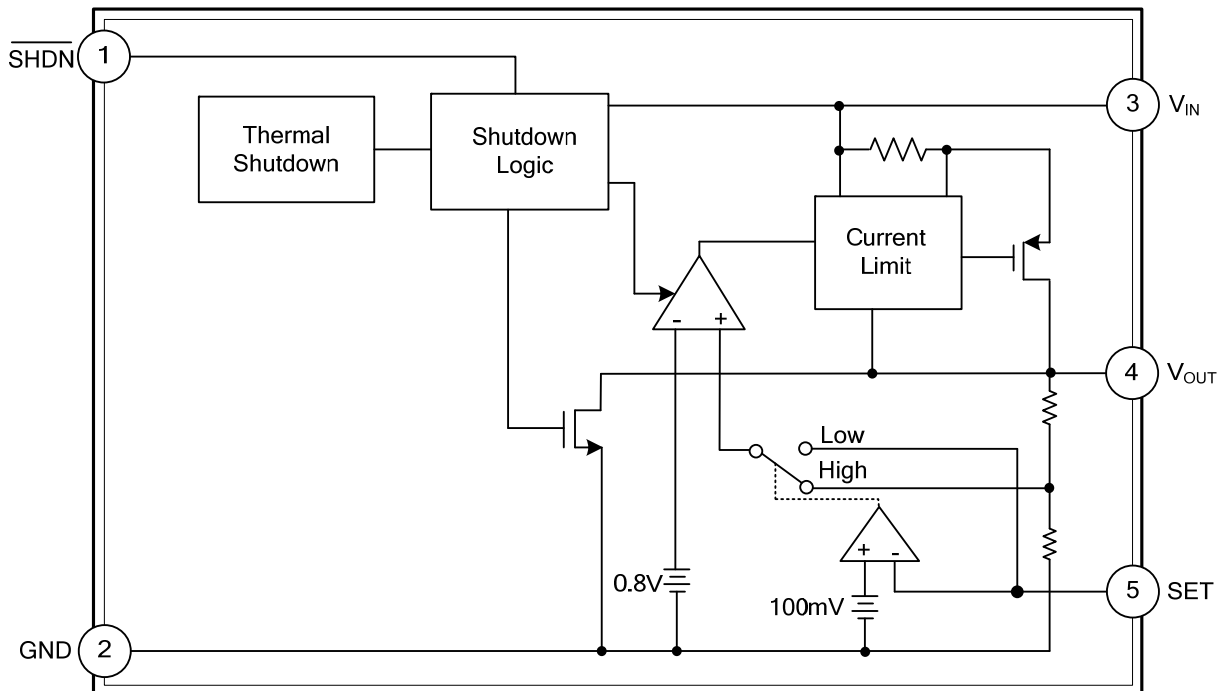
### PIN CONFIGURATION



### PIN DESCRIPTION

PIN NO	PIN NAME	DESCRIPTION
1	$\overline{\text{SHDN}}$	Control pin for shutdown
		Logic High: enable
		Logic Low: shutdown
2	GND	Ground
3	$V_{\text{IN}}$	Voltage supply
4	$V_{\text{OUT}}$	Output pin
5	SET	When this pin is connected to ground, turns to fixed output voltage operation. When this pin is connected to an external resistor divider, turns to adjustable output voltage mode operation.

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING ( $T_A = 25^\circ\text{C}$ , Unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
$V_{IN}$ Supply Voltage ( $V_{IN}$ to GND)	$V_{IN}$	-0.3 ~ +6.5	V
SHDN Input Voltage (SHDN to GND)	$V_{SHDN}$	-0.3 ~ +6.5	V
Power Dissipation	$P_D$	380	mW
Junction Temperature	$T_J$	-40 ~ +125	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-65 ~ +150	$^\circ\text{C}$

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.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	RATINGS	UNIT
$V_{IN}$ Supply Voltage	$V_{IN}$	2.8 ~ 6	V
Output Voltage	$V_{OUT}$	0.8 ~ 5.5	V
$V_{OUT}$ Output Current	$I_{OUT}$	0 ~ 300	mA
Input Capacitor	$C_{IN}$	0.22 ~ 100	$\mu\text{F}$
Output Capacitor	$C_{OUT}$	1.5 ~ 33	$\mu\text{F}$
Junction Temperature	$T_{OPR}$	-40 ~ +85	$^\circ\text{C}$

■ ELECTRICAL CHARACTERISTICS

( $V_{IN} = V_{OUT} + 1\text{V}$  (min  $V_{IN} = 2.8\text{V}$ ),  $I_{OUT} = 0 \sim 300\text{mA}$ ,  $C_{IN} = 1\mu\text{F}$ ,  $C_{OUT} = 2.2\mu\text{F}$ ,  $T_A = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$		0.8		5.5	V
Input Voltage	$V_{IN}$		2.8		6	V
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$\Delta V_{OUT}\% / \Delta V_{IN}$ , $I_{OUT} = 10\text{mA}$	-0.07		+0.07	%/V
Load Regulation	$\frac{\Delta V_{OUT}}{\Delta I_{OUT} \times V_{OUT}}$	$\Delta V_{OUT}\% / \Delta I_{OUT}$	-0.4		+0.4	%/A
Output Voltage Accuracy		Fixed output voltage, $I_{OUT} = 10\text{mA}$	-2		+2	%
Reference Voltage	$V_{REF}$	Measured on SET, $V_{IN} = 2.8\text{V}$ , $I_{OUT} = 10\text{mA}$	0.784	0.8	0.816	V
Quiescent Current	$I_Q$	$I_{OUT} = 10\text{mA} \sim 300\text{mA}$		135	160	$\mu\text{A}$
Dropout Voltage	$V_D$	$V_{OUT} = 2.5\text{V}$ , $I_{OUT} = 300\text{mA}$		230	360	mV
		$V_{OUT} = 3.3\text{V}$ , $I_{OUT} = 300\text{mA}$		170	300	mV
Power Supply Ripple Rejection Ratio	PSRR	$f = 10\text{kHz}$ , $I_{OUT} = 300\text{mA}$		45		dB
Output Voltage Noise	eN	$f = 80\text{Hz} \sim 100\text{kHz}$ , $I_{OUT} = 300\text{mA}$		160		$\mu\text{V}_{RMS}$
Current Limit	$I_{LIMIT}$		400	500	650	mA
Shutdown Threshold	$V_{IH}$		1.6			V
	$V_{IL}$				0.4	V
Shutdown Supply Current	$I_{OFF}$	$\overline{\text{SHDN}} = \text{Low}$ , $V_{IN} = 6\text{V}$		0.1	1	$\mu\text{A}$
$V_{OUT}$ Discharge MOSFET $R_{DS(ON)}$		$\overline{\text{SHDN}} = \text{Low}$		60		$\Omega$
Thermal Shutdown Temperature	$T_{SHDN}$			160		$^\circ\text{C}$
Thermal Shutdown Hysteresis	$DT_{SHDN}$			40		$^\circ\text{C}$
SET Input Threshold for Fixed/Adjustable Output Voltage Mode				100		mV
SET Input Bias Current			-100		100	nA
Soft-Start Interval	$T_{SS}$			60		$\mu\text{s}$

## ■ APPLICATION INFORMATION

### Input Capacitor

Value :

Larger than 1 $\mu$ F, at least a 1 $\mu$ F ceramic capacitor

Place :

Be placed near the  $V_{IN}$  very closely

Purpose and Advantage Description :

To prevent the input rail from dropping, this capacitor can provide surge current as while as the circuit's stepping load transients.

### Output Capacitor

Value :

Larger than 2.2 $\mu$ F

Place :

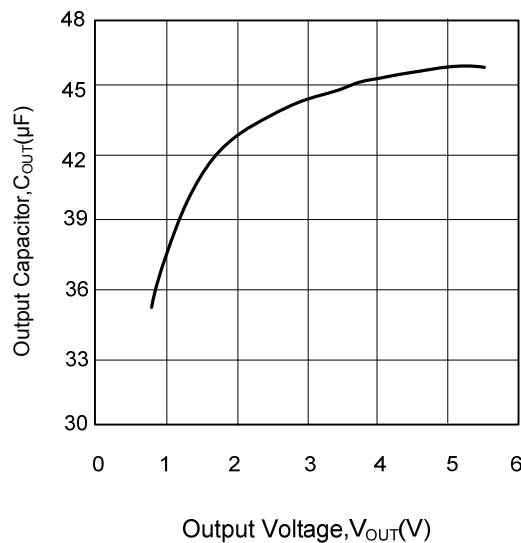
Be placed at the load and near the GND pin very closely.

Purpose and Advantage Description :

Mainly make sure the circuit's operating stability. And the large value capacitor also can reduce noise and improve transient response. Additionally, it can affect power on issue.

$$C_{OUT(max)} = 87 \times \left( 0.55 - \frac{0.1155}{V_{OUT}} \right)$$

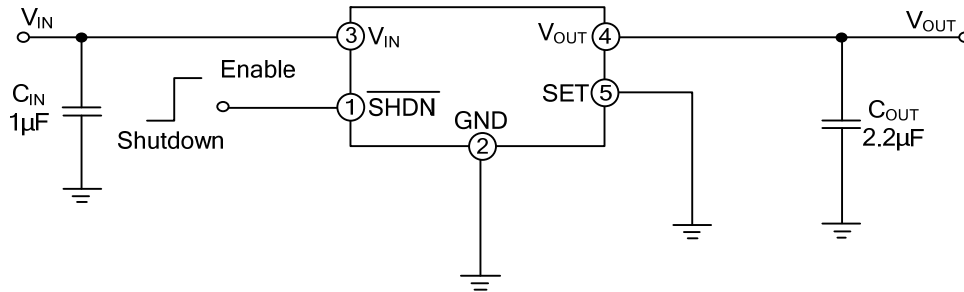
Maximum Output Capacitor's Value ( $\mu$ F) and the Output Voltage (V)'s Value's Relationship



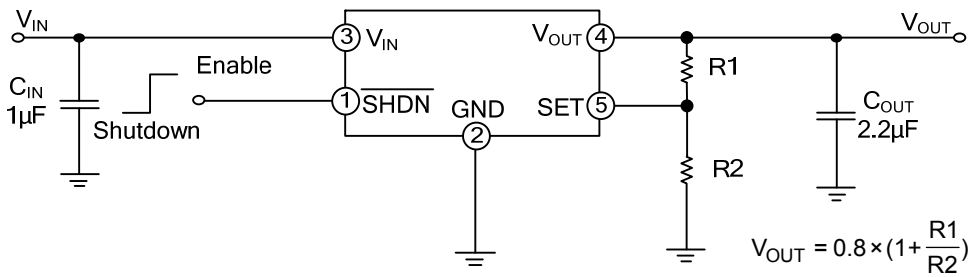
Maximum Output Capacitor's Changing Over  $V_{OUT}$ .

## ■ TYPICAL APPLICATION CIRCUITS

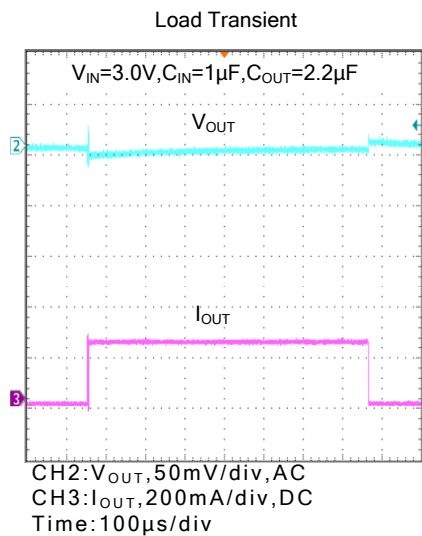
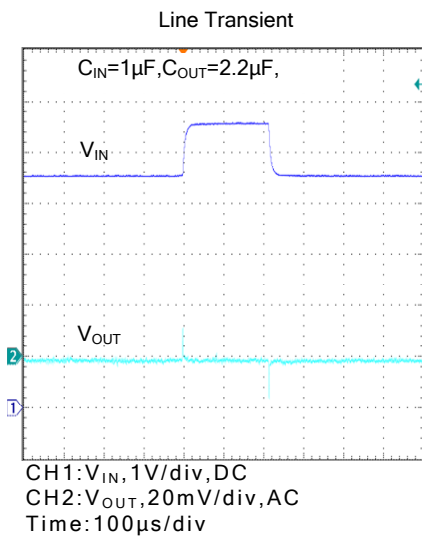
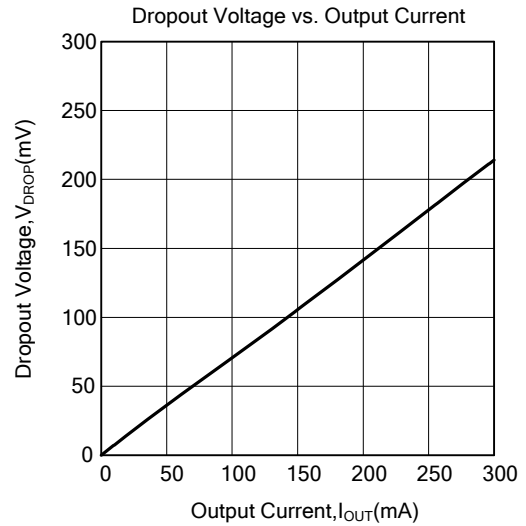
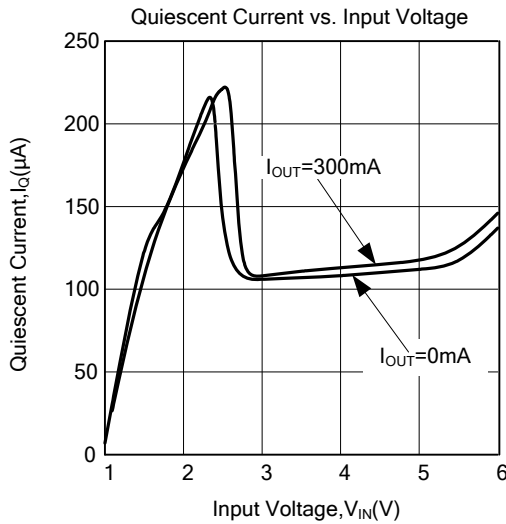
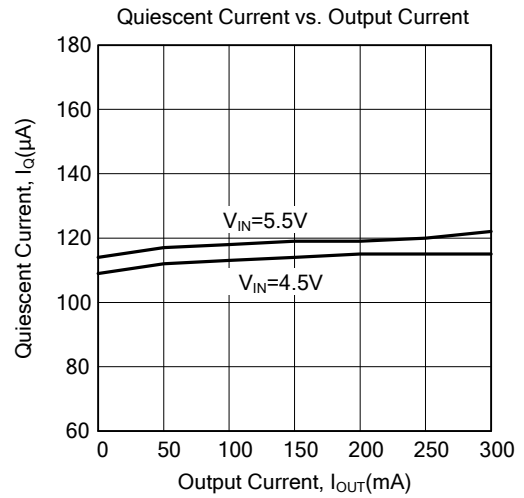
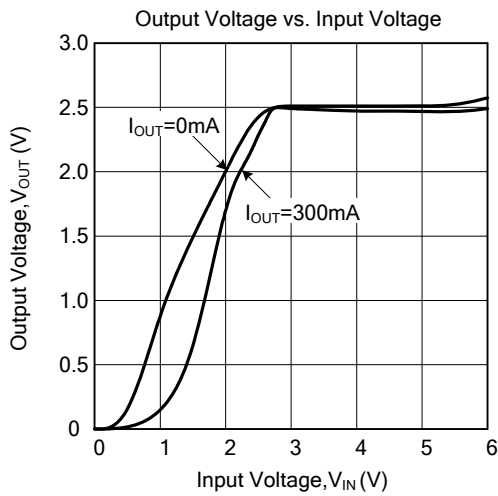
### For Fixed Output Voltage Mode



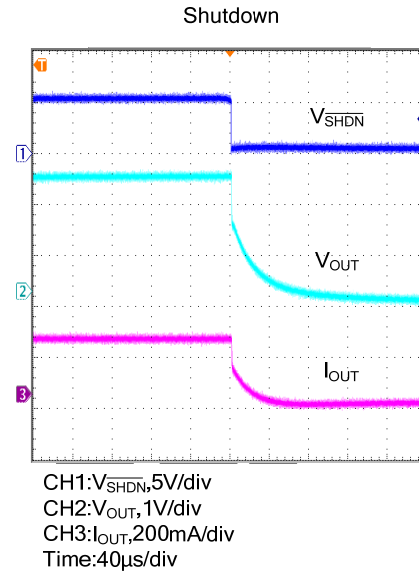
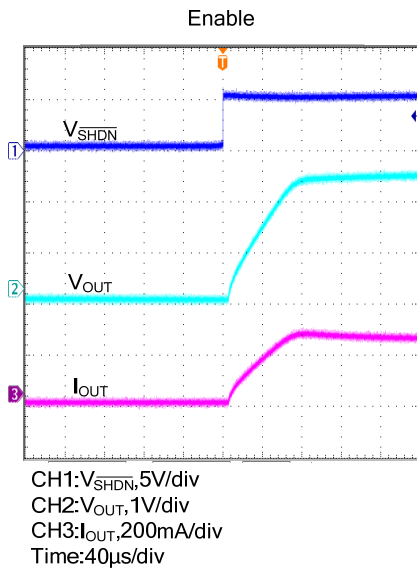
### For Adjustable Output Voltage Mode



## TYPICAL CHARACTERISTICS



## ■ TYPICAL CHARACTERISTICS(Cont.)



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