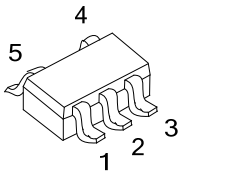
300mA SELECTABLE FIXED/ADJUSTABLE LOW DROPOUT LINEAR REGULATOR



SOT-25

■ 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

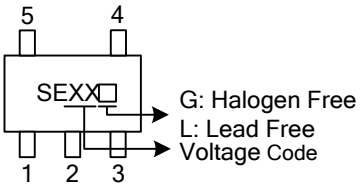
* Operating Voltage: 2.8~6V
* Low Voltage Dropout
* Output Current Guaranteed 300mA
* For Setting Output Voltage Two Modes
  – Fixed mode :Fixed Output Voltage 1~5V
  – ADJ mode: Adjustable Output Voltage 0.8~5.5V
* Internal Current Limit Protection
* With Soft-Start
* Internal thermal Protection
* Work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

■ ORDERING INFORMATION

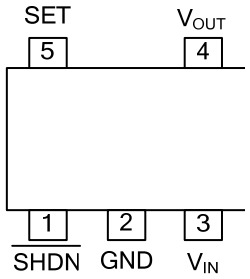
Ordering Number		Package	Packing
Lead Free	Halogen Free		
LR2125L-xx-AF5-R	LR2125G-xx-AF5-R	SOT-25	Tape Reel

LR2125L-xx-AF5-R (1)Packing Type (2)Package Type (3)Output Voltage Code (4)Lead Free	(1) R: Tape Reel (2) AF5: SOT-25 (3) xx: Refer to Marking Information (4) G: Halogen Free, L: Lead Free

■ MARKING INFORMATION

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

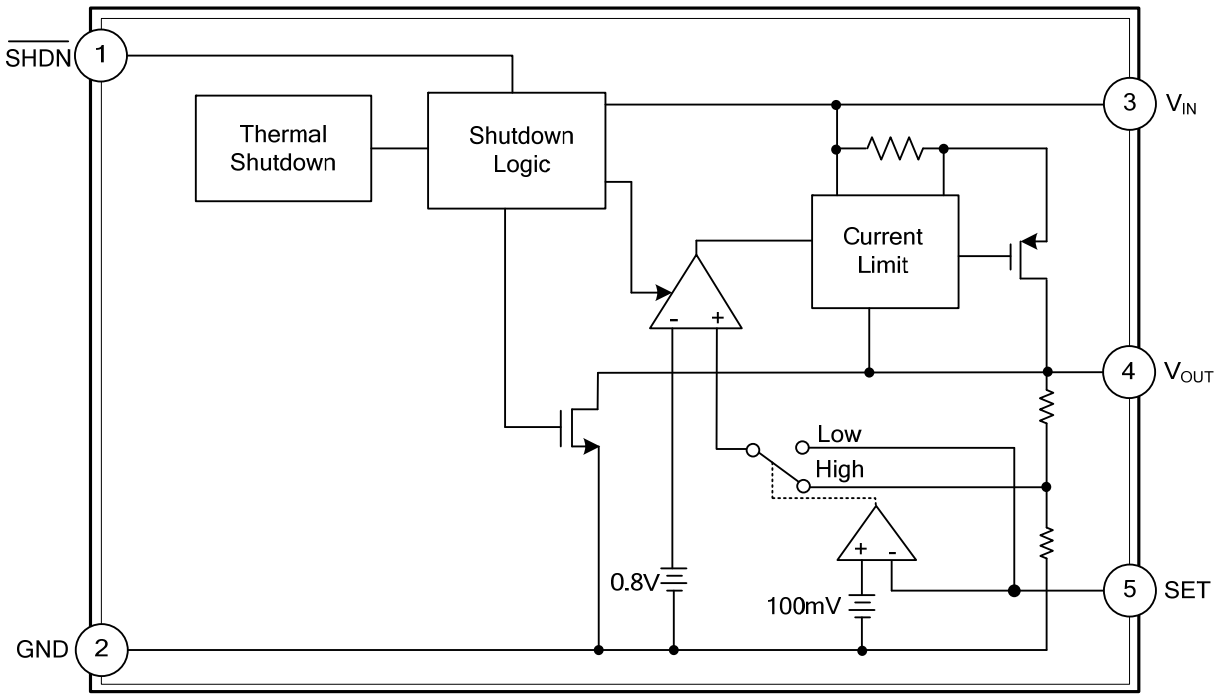
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO	PIN NAME	DESCRIPTION
1	$\overline{SHDN}$	Control pin for shutdown Logic High: enable Logic Low: shutdown
2	GND	Ground
3	V_{IN}	Voltage supply
4	V_{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°C, Unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
V_{IN} Supply Voltage (V_{IN} to GND)	V_{IN}	-0.3 ~ +6.5	V
$\overline{SHDN}$ Input Voltage ($\overline{SHDN}$ to GND)	$V_{\overline{SHDN}}$	-0.3 ~ +6.5	V
Power Dissipation	P_D	380	mW
Junction Temperature	T_J	-40~ +125	°C
Storage Temperature	T_{STG}	-65 ~ +150	°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	μF
Output Capacitor	C_{OUT}	1.5 ~ 33	μF
Junction Temperature	T_{OPR}	-40 ~ +85	°C

■ ELECTRICAL CHARACTERISTICS

(V_{IN} = V_{OUT}+1V (min V_{IN}=2.8V), I_{OUT}=0~300mA, C_{IN} = 1μF, C_{OUT} = 2.2μF, T_A = 25°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	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$\triangle V_{OUT}$%/$\triangle V_{IN}$, I_{OUT}=10mA	-0.06		+0.06	%/V
Load Regulation	$\frac{\Delta V_{OUT}}{\Delta I_{OUT} \times V_{OUT}}$	$\triangle V_{OUT}$%/$\triangle I_{OUT}$	-0.2		+0.2	%/A
Output Voltage Accuracy		Fixed output voltage, I_{OUT}=10mA	-2		+2	%
Reference Voltage	V_{REF}	Measured on SET, V_{IN}=2.8V, I_{OUT}=10mA	0.784	0.8	0.816	V
Quiescent Current	I_Q	I_{OUT} =10mA ~300mA		135	160	μA
Dropout Voltage	V_D	V_{OUT} = 2.5V, I_{OUT} = 300mA		230	360	mV
		V_{OUT} = 3.3V, I_{OUT} = 300mA		170	300	mV
Power Supply Ripple Rejection Ratio	PSRR	f = 10kHz, I_{OUT} = 300mA		45		dB
Output Voltage Noise	eN	f = 80Hz ~ 100KHz, I_{OUT} = 300mA		160		μV_{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}	$\overline{SHDN}$ = Low, V_{IN} = 6V		0.1	1	μA
V_{OUT} Discharge MOSFET $R_{DS(ON)}$		$\overline{SHDN}$ = Low		60		Ω
Thermal Shutdown Temperature	T_{SHDN}			160		°C
Thermal Shutdown Hysteresis	DT_{SHDN}			40		°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		μs

■ APPLICATION INFORMATION

Input Capacitor

Value：
Larger than 1μF, at least a 1μF ceramic capacitor

Place：
Be placed near the VIN 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

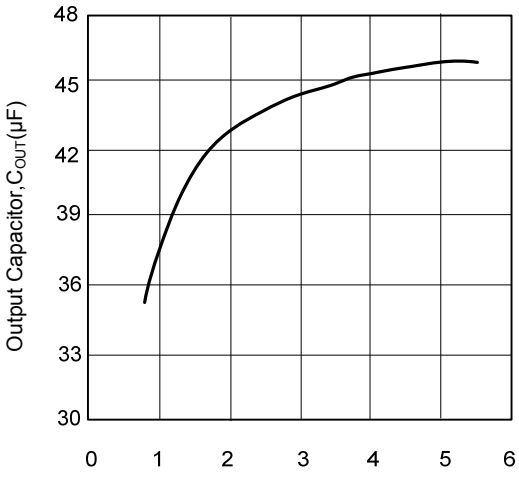
Value：
Larger than 2.2μF

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.

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

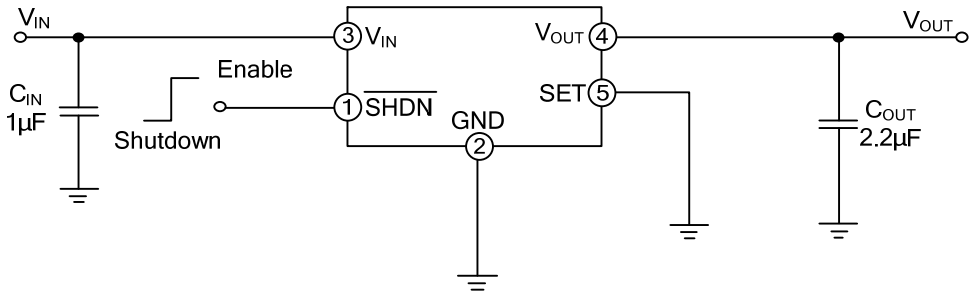
Maximum Output Capacitor's Value (μF) and the Output Voltage (V)'s Value's Relationship



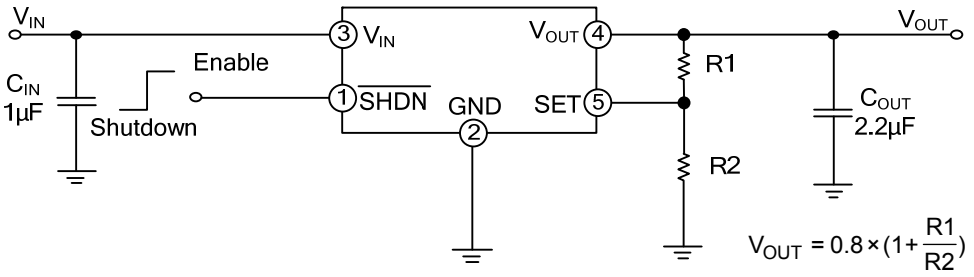
Maximum Output Capacitor's Changing Over V_{OUT}.

■ TYPICAL APPLICATION CIRCUITS

For Fixed Output Voltage Mode

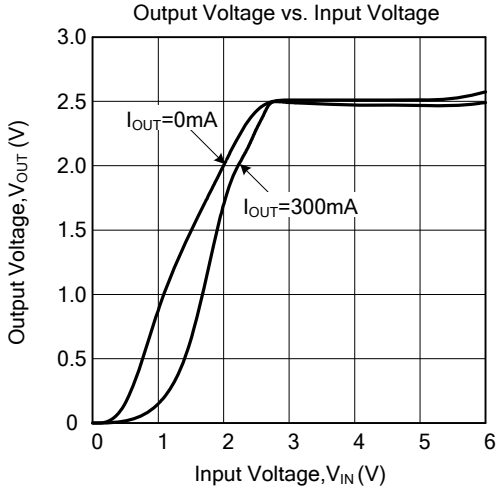


For Adjustable Output Voltage Mode

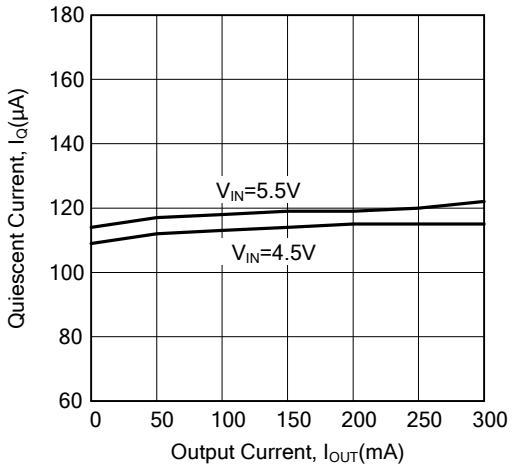


■ TYPICAL CHARACTERISTICS

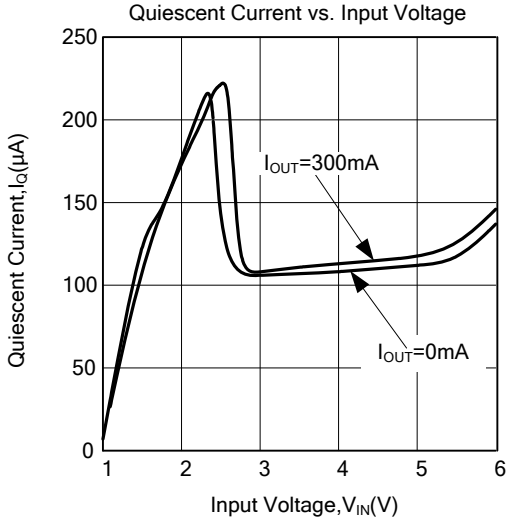
Output Voltage vs. Input Voltage



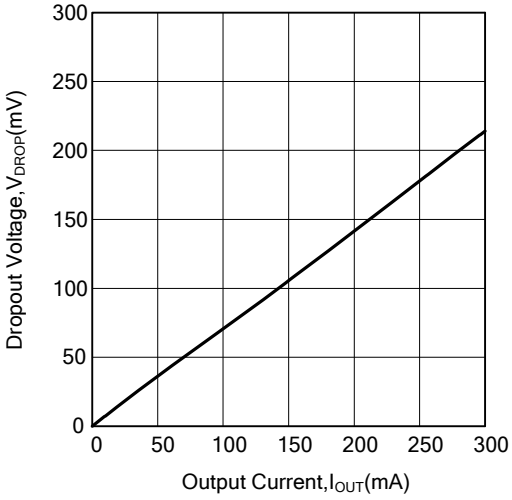
Quiescent Current vs. Output Current



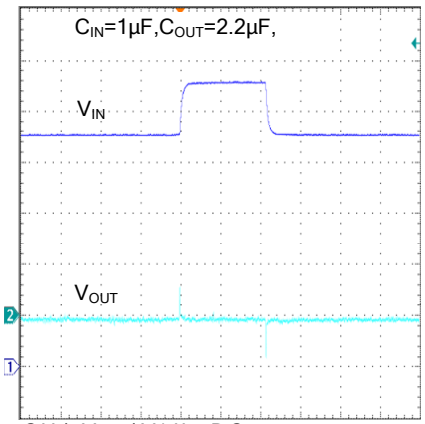
Quiescent Current vs. Input Voltage



Dropout Voltage vs. Output Current

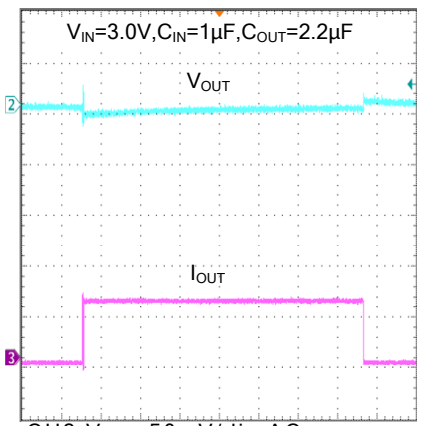


Line Transient



CH1:V_{IN},1V/div,DC
CH2:V_{OUT},20mV/div,AC
Time:100μs/div

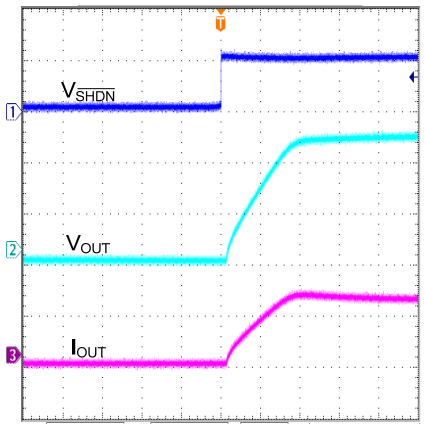
Load Transient



CH2:V_{OUT},50mV/div,AC
CH3:I_{OUT},200mA/div,DC
Time:100μs/div

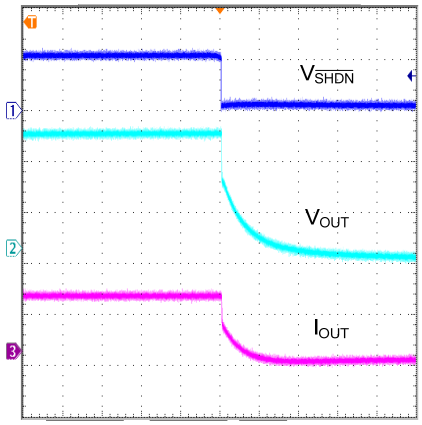
■ TYPICAL CHARACTERISTICS(Cont.)

Enable



CH1:$V_{\overline{SHDN}}$,5V/div
CH2:V_{OUT},1V/div
CH3:I_{OUT},200mA/div
Time:40μs/div

Shutdown



CH1:$V_{\overline{SHDN}}$,5V/div
CH2:V_{OUT},1V/div
CH3:I_{OUT},200mA/div
Time:40μs/div