Elektronische Bauelemente

SM75Lxx Series
CMOS Voltage Regulator

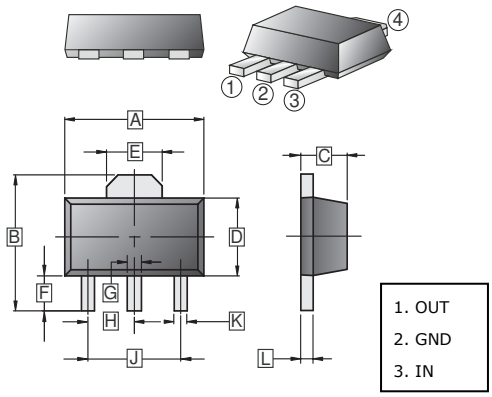
RoHS Compliant Product
A suffix of "-C" specifies halogen or lead -free

DESCRIPTION

The SM75LXX series are a group of positive voltage regulators manufactured by CMOS technologies with low power consumption and low dropout voltage, which provide large output currents even when the difference of the input-output voltage is small.

The SM75LXX series can deliver 250mA output current and allow an input voltage as high as 36V. The series are very suitable for the battery-powered equipment, such as RF applications and other systems requiring a quiet voltage source.

SOT-89



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	4.40	4.60	G	0.40	0.58
B	3.94	4.25	H	1.50 TYP	
C	1.40	1.60	J	3.00 TYP	
D	2.25	2.60	K	0.32	0.52
E	1.50	1.85	L	0.35	0.44
F	0.89	1.20			

FEATURES

- Internal Short-Circuit Current Limiting
- Internal Thermal Overload Protection
- No External Components Required

PACKAGE INFORMATION

Package	MPQ	Leader Size
SOT-89	1K	7 inch

DEFINITION INFORMATION

Part Number	Output Voltage
SM75L33	3.3V
SM75L05	5V
SM75L12	12V

MAXIMUM RATINGS (Unless otherwise specified, T_A=25°C)

Parameter	Symbol	Ratings	Unit
Input Voltage [2]	V_{IN}	-0.3~40	V
Output Voltage [2]	V_{OUT}	-0.3~13	V
Output Current	I_O	250	mA
Power Dissipation	P_D	600	mW
Lead Temperature (Soldering, 10 sec)	T_L	260	°C
Operating Junction Temperature Range [3]	T_J	150	°C
Storage Temperature Range	T_{STG}	-55~150	

Notes:

1. Stresses beyond those listed under absolute maximum ratings may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under recommended operating conditions is not implied. Exposure to absolute-maximum-rated conditions for extended periods my affect device reliability.
2. All voltages are with respect to network ground terminal.
3. This IC includes over temperature protection that is intended to protect the device during momentary overload. Junction temperature will exceed 125°C when over temperature protection is active. Continuous operation above the specified maximum operating junction temperature may impair device reliability.

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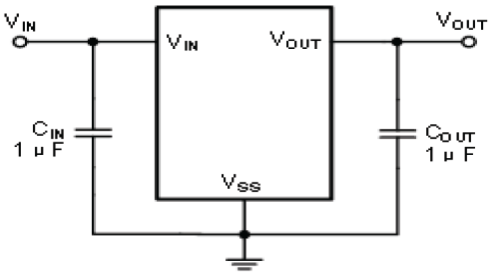
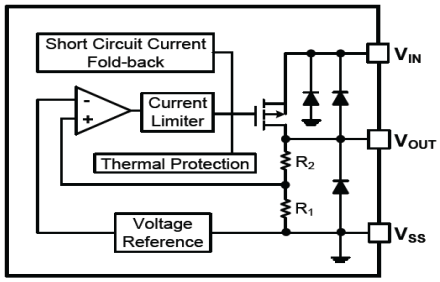
TYPICAL APPLICATION



BLOCK DIAGRAM



RECOMMENDED OPERATING CONDITIONS

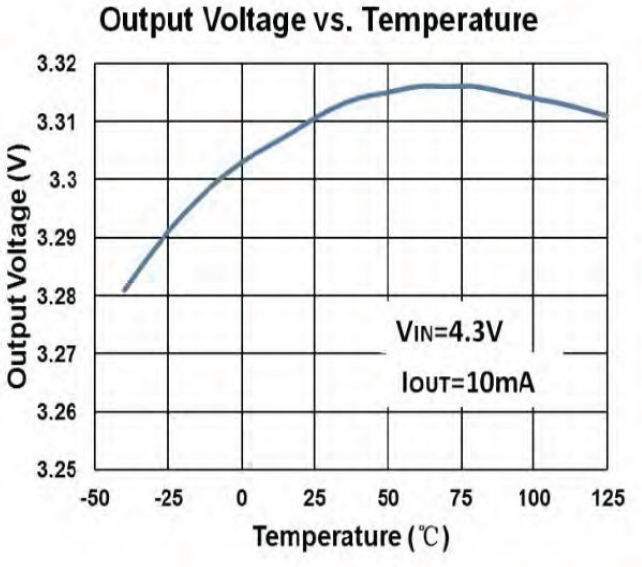
Parameter	Rating	Unit
Supply Voltage @V_{IN}	2.5~36	V
Operating Junction Temperature Range, T_J	-40~125	°C
Operating Free Air Temperature Range, T_A	-40~85	°C

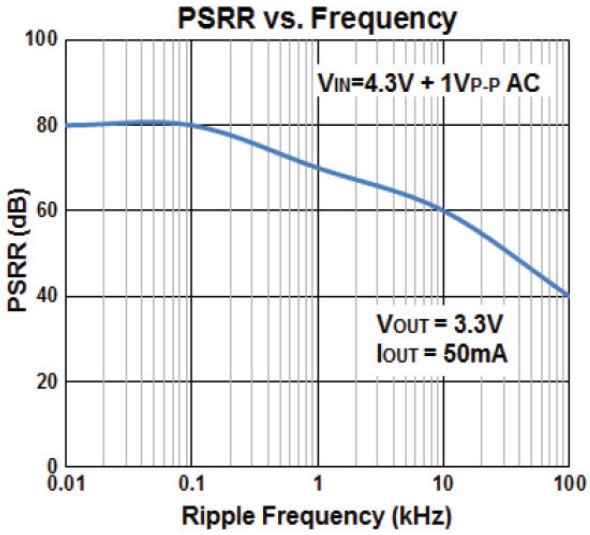
ELECTRICAL CHARACTERISTICS

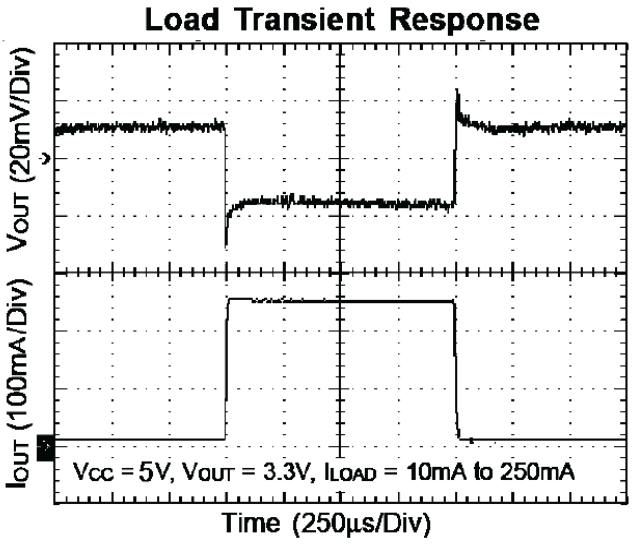
Parameter	Symbol	Test Condition		Min.	Typ.[1]	Max.	Unit
Input Voltage	V_{IN}			2.5	-	36	V
Output Voltage Range	V_{OUT}			2.1	-	12	V
DC Output Accuracy		I_{OUT}=10mA		-2	-	2	%
				-1	-	1	
Dropout Voltage [2]	V_{dif}	I_{OUT}=100mA, V_{OUT}=3.3V		-	400	-	mV
Supply Current	I_{SS}	I_{OUT}=0A		-	2	5	uA
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT} \times \Delta V_{IN}}$	I_{OUT}=10mA V_{OUT} 1V≤V_{IN}≤36V		-	0.01	0.3	%/V
Load Regulation	ΔV_{OUT}	V_{IN}=V_{OUT} 2V, 1mA≤I_{OUT}≤100mA		-	10	-	mV
Temperature Coefficient	$\frac{\Delta V_{OUT}}{V_{OUT} \times \Delta T_A}$	I_{OUT}=40mA, -40°C<T_A<85°C		-	50	-	ppm
Output Current Limit	I_{LIM}	V_{OUT}=0.5*$V_{OUT(Normal)}$		-	350	-	mA
Short Current	I_{SHORT}	V_{OUT}=V_{SS}		-	25	-	mA
Power Supply Rejection Ratio	PSRR	I_{OUT}=50mA	100Hz	-	80	-	dB
			1kHz	-	70	-	
			10kHz	-	60	-	
			100kHz	-	50	-	
Output Noise Voltage	V_{ON}	BW=10Hz~100kHz		-	27* V_{OUT}	-	uV_{RMS}
Thermal Shutdown Temperature	T_{SD}	I_{LOAD}=30mA		-	160	-	°C
Thermal Shutdown Hysteresis	$\triangle T_{SD}$			-	20	-	°C

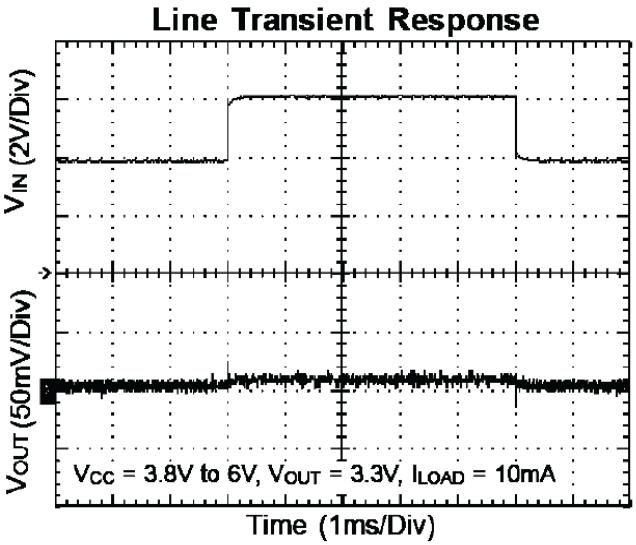
Notes:
1. Typical numbers are at 25°C and represent the most likely norm.
2. V_{dif}: The difference of output voltage and input voltage when input voltage is decreased gradually till output voltage equals to 98% of V_{out}.

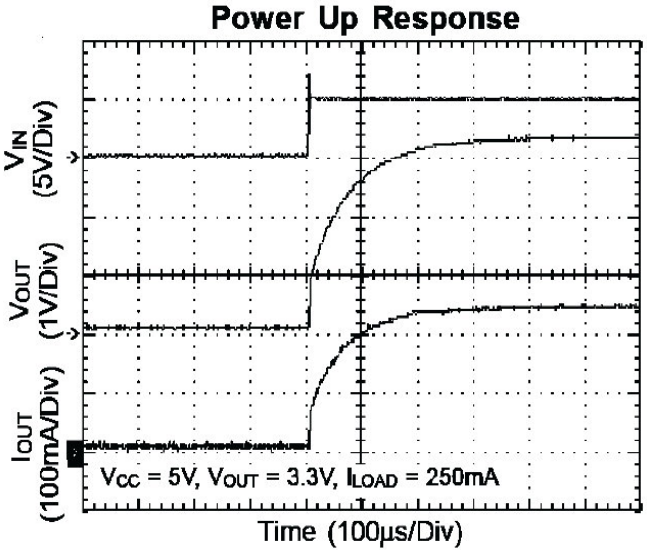
CHARACTERISTICS CURVE

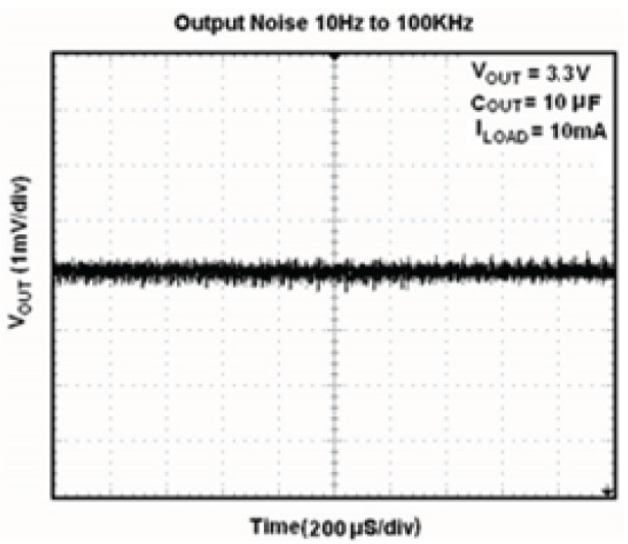












APPLICATION INFORMATION

Selection of Input/ Output Capacitors

In general, all the capacitors need to be low leakage. Any leakage the capacitors have will reduce efficiency, increase the quiescent current. A recent trend in the design of portable devices has been to use ceramic capacitors to filter DC-DC converter inputs. Ceramic capacitors are often chosen because of their small size, low equivalent series resistance (ESR) and high RMS current capability. Also, recently, designers have been looking to ceramic capacitors due to shortages of tantalum capacitors.

Unfortunately, using ceramic capacitors for input filtering can cause problems. Applying a voltage step to a ceramic capacitor causes a large current surge that stores energy in the inductances of thepower leads. A large voltage spike is created when the stored energy is transferred from these inductances into the ceramic capacitor. These voltage spikes can easily be twice the amplitude of the input voltage step.

Many types of capacitors can be used for input bypassing, however, caution must be exercised when using multilayer ceramic capacitors (MLCC). Because of the self-resonant and high Q characteristics of some types of ceramic capacitors, high voltage transients can be generated under some start-up conditions, such as connecting the LDO input to a live power source. Adding a 3Ω re s istor in series with an X5R ceramic capacitor will minimize start-up voltage transients.

The LDO also requires an output capacitor for loop stability. Connect a 1μF tantalum capacitor from OUT to GND close to the pins. For improved transient response, this output capacitor may be ceramic.