

General Description

The VC5020LXX ultra-low quiescent current regulator features low dropout voltage and low current in the standby mode. With less than 1.5µA quiescent current at no load, the VC5020LXX is ideally suited for standby micro-control-unit systems, especially for always-on applications like E-meters, fire alarms, smoke detectors and other battery operated systems. The VC5020LXX retains all of the features that are common to low dropout regulators including a low dropout PMOS pass device, short circuit protection, and thermal shutdown.

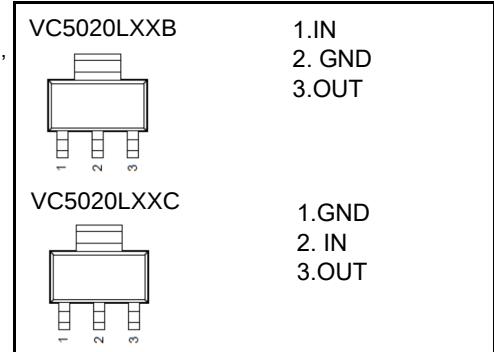
The VC5020LXX has a 40V maximum operating voltage limit, a -40°C to 125°C operating temperature range, and ±1%, ±2% output voltage tolerance over the entire output current, input voltage, and temperature range.

Features

- VIN Range up to 40V
- Output Voltage Tolerance of ±1%, ±2% Over Full Temperature Range
- Output Current: 250 mA
- Ultra Low Quiescent Current (IQ = 1.2 µA)
- Stable with Ceramic Capacitors
- Typical Dropout Voltage: 1200 mV at IOU=250 mA
- Internal Thermal Overload Protection
- Internal Short-Circuit Current Limit

Applications

- E-meters, Water Meters and Gas Meters
- Fire Alarm, Smoke Detector
- Appliances and White Goods



SOT-89-3L

Part Number	Voltage
VC5020L-15	Vout=1.5V
VC5020L-18	Vout=1.8V
VC5020L-25	Vout=2.5V
VC5020L-33	Vout=3.3V
VC5020L-50	Vout=5.0V
VC5020L-XX	Vout can be trimmed from 1.5V to 5.5V, 0.1V/step

Ordering Information

Part No	Marking	Package	Packing	Reel	Box	Carton
VC5020LXX	5020L	SOT-89	Tape&Reel	1,000 PCS	10,000 PCS	40,000 PCS

Absolute Maximum Ratings(Note1)

Symbol	Parameter	Value	Unit
V _{IN}	Input Voltage	-0.3 to +45	V
T _J	Junction temperature	125	°C
P _D	Lead Temperature (Soldering, 10 sec.)	300	°C
T _{stg}	Storage Temperature	-65 to +150	°C

Recommended Operating Conditions

	Parameter	Value	Unit
V _{IN}	Input Voltage	+2.7 to +40	V
T _J	Junction temperature	-40 to 125	°C

ESD Parameters

Parameters	Description	Parameter Range	Units
V _{ESD}	HBM	3.5	KV
	CDM	2	KV

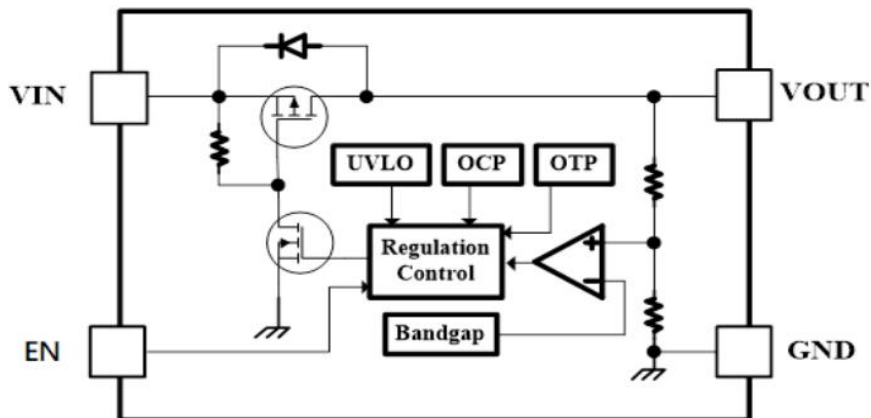
Note: Exceeding the specified absolute maximum ratings may result in permanent damage to the device. Operation outside the rated parameter range is not guaranteed. Exposure to conditions beyond the rated specifications will degrade device reliability.

Electrical Characteristics

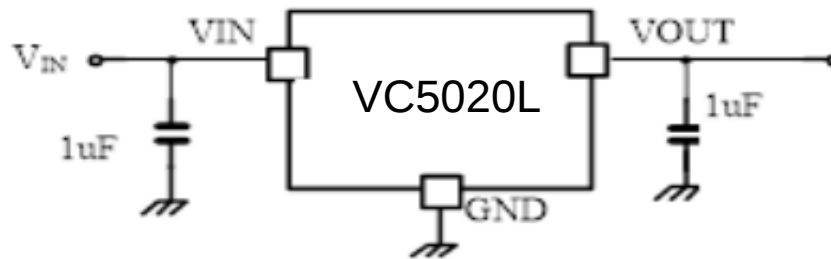
$V_{IN}=V_{OUT} + 1V$, $I_{OUT}=1mA$, $C_{IN}=C_{OUT}=2.2\mu F$, $T_J=25^{\circ}C$, unless otherwise specified

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Output Voltage Range	V_{OUT}		1.5		5.5	V
Output Voltage Accuracy	ΔV_{OUT}		-1		1	%
Line Regulation	ΔV_{LINE}	$V_{IN} = V_{OUT} + 1V$ to 40V		2	12	mV
Load Regulation	ΔV_{LOAD}	$I_{OUT} = 1mA$ to 100mA		3	15	mV
		$I_{OUT} = 1mA$ to 250mA		15	30	
Dropout Voltage	V_{DROP}	$I_{OUT} = 100mA$		400		mV
		$I_{OUT} = 250mA$		1200		mV
Quiescent Current	I_Q	$T_J = 25^{\circ}C$		1.2	2.5	uA
Current Limit	I_{CL}		270	300		
Short Circuit Current	I_{SHORT}	Short-circuit Current to GND		320	380	mA
Enable high level	V_{ENHI}		0.9			V
Enable low level	V_{ENLO}				0.4	V
Enable pin pull high current	I_{EN}			0.3		uA
Power-supply rejectionratio	PSRR	$f = 1kHz$		80		dB
		$f = 10kHz$		60		dB

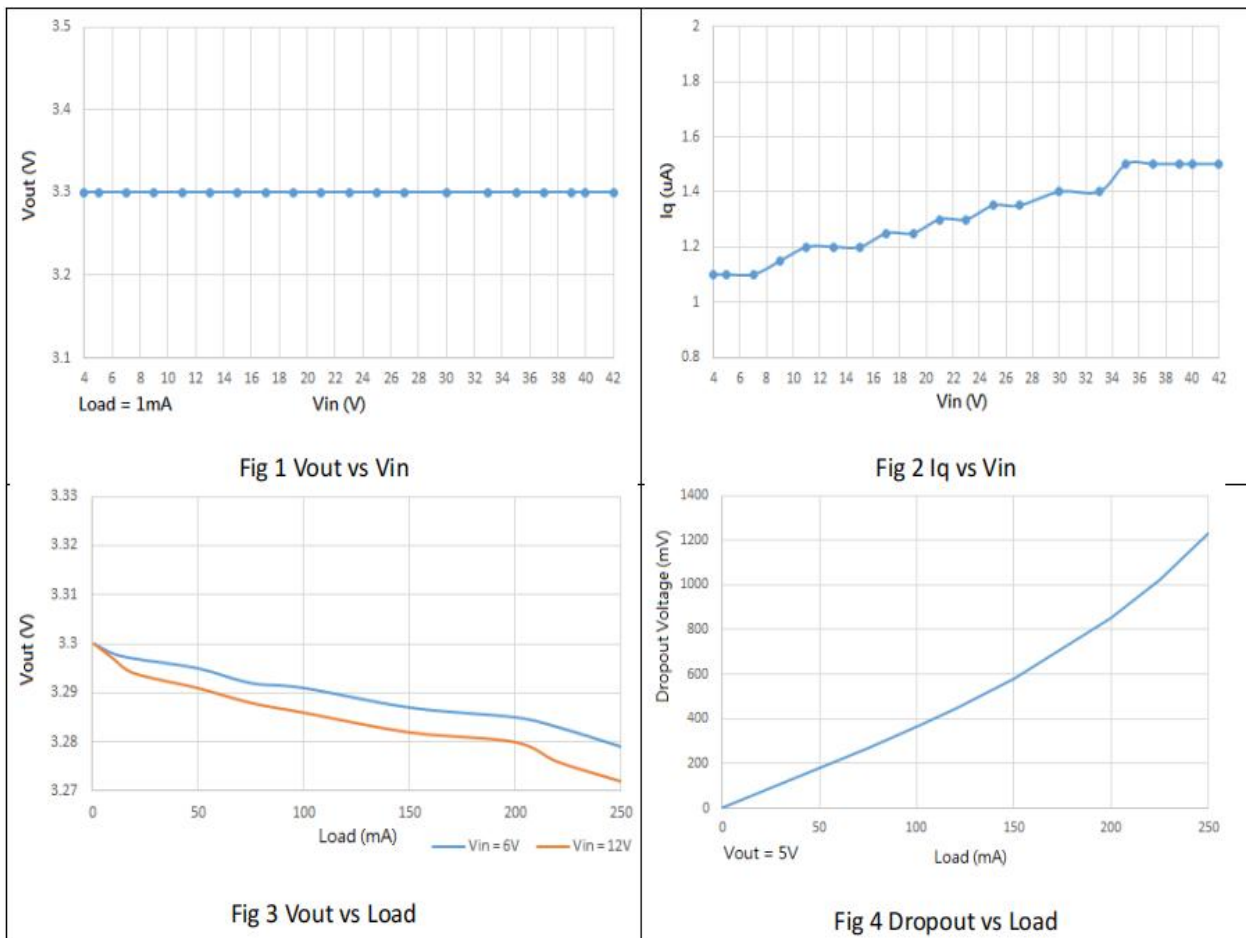
Function Block Diagram



Typical Application Circuit



Typical Characteristics @ $V_{IN}=V_{OUT} + 1V$, $I_{OUT}=1mA$, $C_{IN}=C_{OUT}=2.2\mu F$, $T_J=25^{\circ}C$, unless otherwise specified



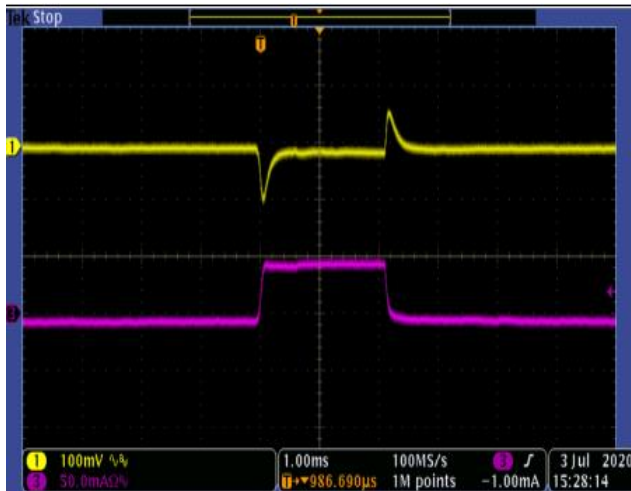


Fig 5 Vout Load Transient (0 to 50mA)

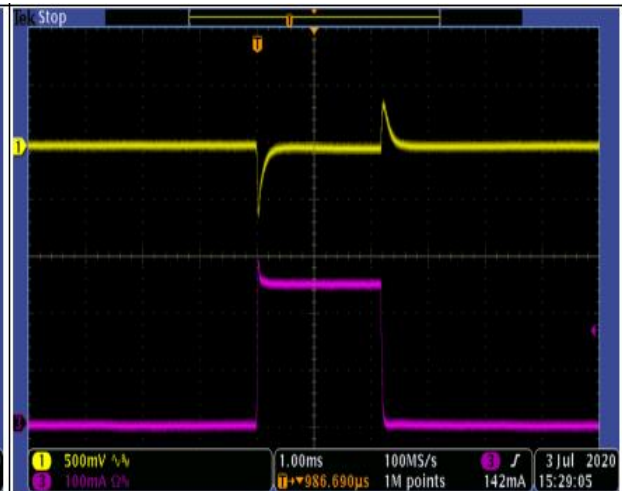


Fig 6 Vout Load Transient (1 to 250mA)

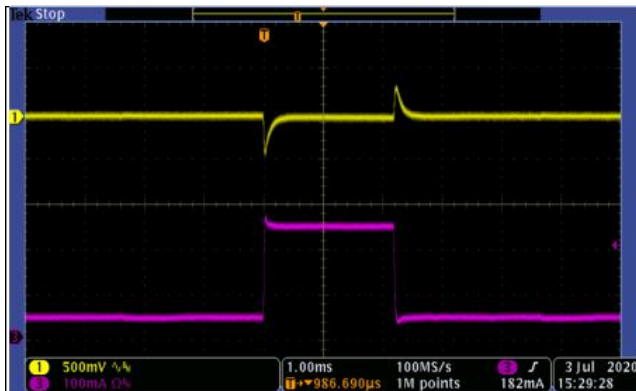


Fig 7 Vout Load Transient (50 to 250mA)

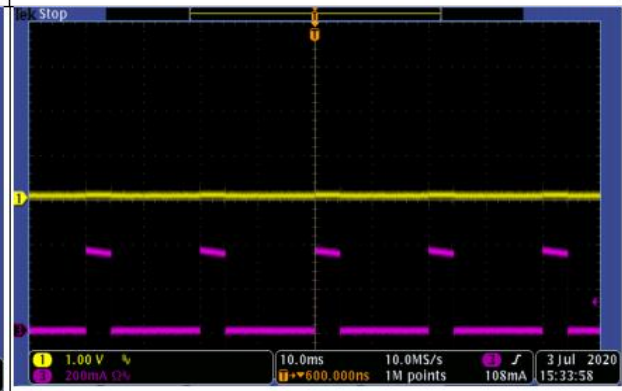
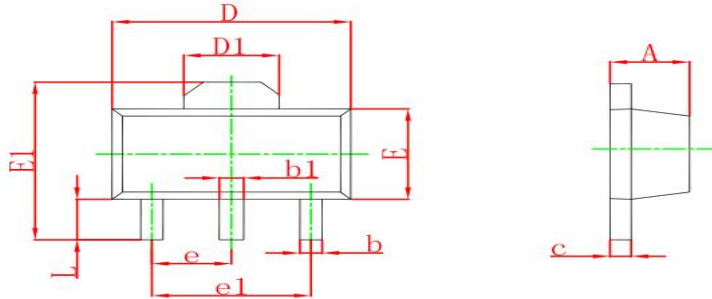


Fig 8 Vout Short to GND



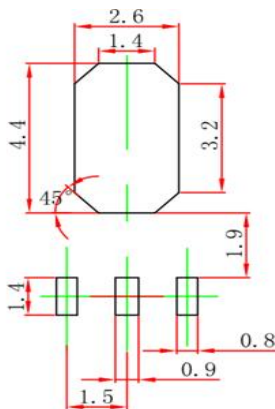
Fig 9 Vin Start up

Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047

Suggested Pad Layout



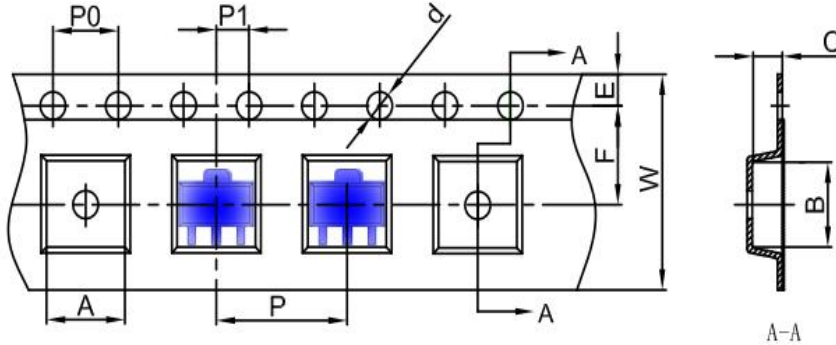
Note: 1.The Pad Layout is for reference purposes only.
 2.All Dimensions are in mm.
 3.General tolerance:±0.05 mm.

Notice

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SOT-89-3L Tape and Reel

SOT-89-3L Embossed Carrier Tape

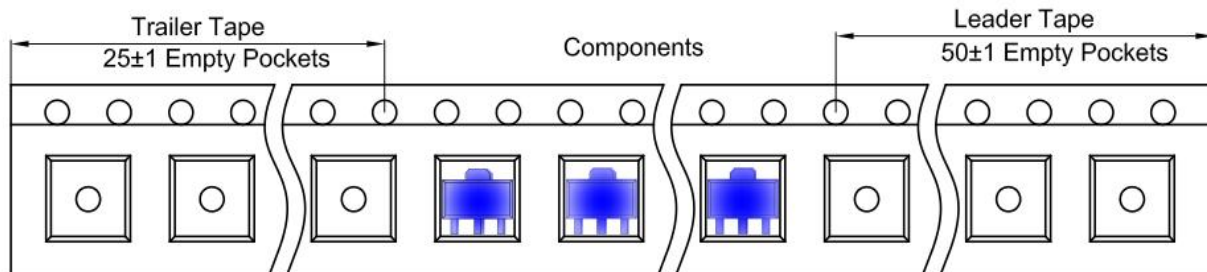


Packaging Description:

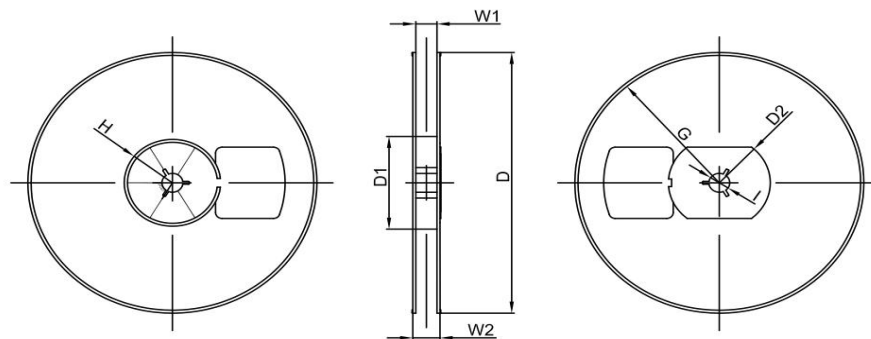
SOT-89-3L parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 1,000 units per 7" or 18.0cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
SOT-89-3L	4.85	4.45	1.85	Ø1.50	1.75	5.50	4.00	8.00	2.00	12.00

SOT-89-3L Tape Leader and Trailer



SOT-89-3L Reel



Dimensions are in millimeter								
Reel Option	D	D1	D2	G	H	I	W1	W2
7"Dia	Ø180.00	60.00	R32.00	R86.50	R30.00	Ø13.00	13.20	16.50

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
1000 pcs	7 inch	10,000 pcs	203×203×195	40,000 pcs	438×438×220	