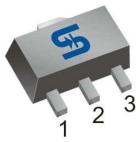
TS9013

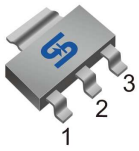
500mA Low Quiescent Current CMOS LDO

SOT-89



Pin Definition:
1. Ground
2. Input
3. Output

SOT-223



Pin Definition:
1. Input
2. Ground
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General Description

TS9013 is a positive voltage regulator developed utilizing CMOS technology featured very low power consumption, low dropout voltage and high output voltage accuracy. Built in low on-resistor provides low dropout voltage and large output current. A 2.2uF or greater can be used as an output capacitor.

TS9013 are prevented device failure under the worst operation condition with both thermal shutdown and current fold-back. These series are recommended for configuring portable devices and large current application, respectively.

Features

- Output current up to 500mA
- Low power consumption, 15uA(typ) @Vo=5V
- Output voltage ±2%
- Internal current limit
- Thermal shutdown protection

Applications

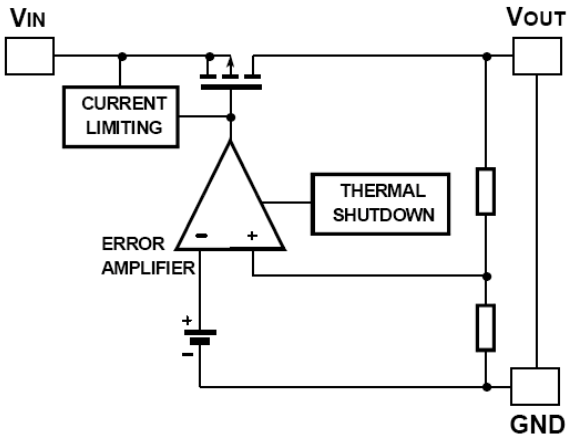
- Palmtops
- Video recorders
- Battery powered equipment
- PC peripherals
- CD-ROM, DVD ROM
- Digital signal camera

Ordering Information

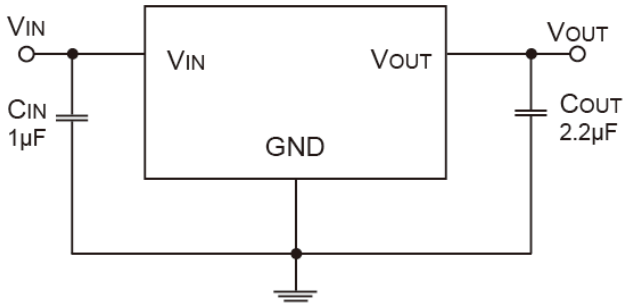
Part No.	Package	Packing
TS9013**x**CW RP	SOT-223	2.5Kpcs / 13” Reel
TS9013**x**CW RPG	SOT-223	2.5Kpcs / 13” Reel
TS9013**x**CY RM	SOT-89	1Kpcs / 7” Reel
TS9013**x**CY RMG	SOT-89	1Kpcs / 7” Reel

Note: Where **x** denotes voltage option, available are
D=1.8V, **K**=2.5V, **S**=3.3V, **5**=5.0V
“G” denotes for Halogen Free

Block Diagram



Typical Application Circuit



TS9013

500mA Low Quiescent Current CMOS LDO

Absolute Maximum Rating

Parameter		Symbol	Limit	Unit
Input Supply Voltage		V_{IN}	6.5	V
Output Current		Io	500	mA
Power Dissipation (without heat sink)	SOT-89	P_D	0.5	W
	SOT-223		0.7	
Operating Junction Temperature Range		Tj	-40 ~ +150	°C
Storage Temperature Range		T_{STG}	-65 ~ +150	°C
Lead Soldering Temperature (260°C)			5	S

Notes: Stress above the listed absolute rating may cause permanent damage to the device.

Electrical Characteristics (Ta = 25°C unless otherwise noted)

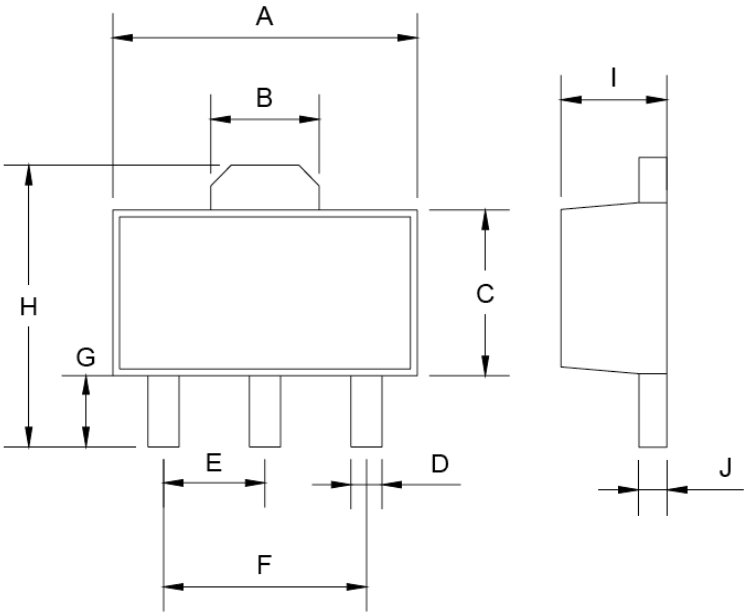
Parameter	Conditions		Min	Typ	Max	Unit
Output Voltage	V_{IN}=Vo + 1V, Io =1mA,	TS90135	4.90	5.0	5.10	V
		TS9013S	3.23	3.3	3.36	
		TS9013K	2.45	2.5	2.55	
		TS9013D	1.76	1.8	1.83	
	V_{IN}=Vo + 1V, Io =1mA ~ 500mA	TS90135	4.85	5.0	5.10	V
		TS9013S	3.20	3.3	3.36	
		TS9013K	2.42	2.5	2.55	
		TS9013D	1.74	1.8	1.83	
Maximum Output Current	V_{IN}=Vo+1V,		500	--	--	mA
Input Stability	V_O+1V ≤ Vin ≤ V_O+2V, Io=1mA		--	0.2	0.3	%
Load Regulation (Note1)	V_{IN}=Vo+1V, 1mA ≤ IL ≤ 500mA	TS90135	--	40	80	mV
		TS9013S				
	V_{IN}=Vo+1V, 1mA ≤ IL ≤ 500mA	TS9013K	--	40	90	
		TS9013D				
Dropout Voltage (Note 2)	Io=300mA	TS90135	--	300	500	mV
		TS9013S				
	Io=500mA	TS90135	--	500	600	
		TS9013S				
	Io=500mA	TS9013K	--	600	850	
		TS9013D				
Quiescent Current	V_{IN}=Vo+1V, Io=0A		--	15	25	uA
Output Current Limit	V_{OUT} < 0.4V		550	--	--	mA
Power Supply Rejection Ratio	At f=100KHz, Io=10mA		--	30	--	dB
Output Voltage Temperature Coefficient (Note 3)			--	100	--	ppm/°C

Notes:

a. Regulation is measured at constant junction temperature, using pulsed ON time.

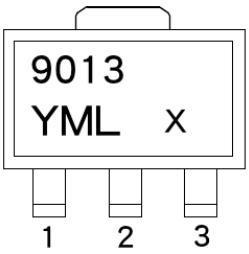
b. Dropout is measured at constant junction temperature, using pulsed ON time, and the criterion is V_{OUT} inside target value +/-3%.

SOT-89 Mechanical Drawing



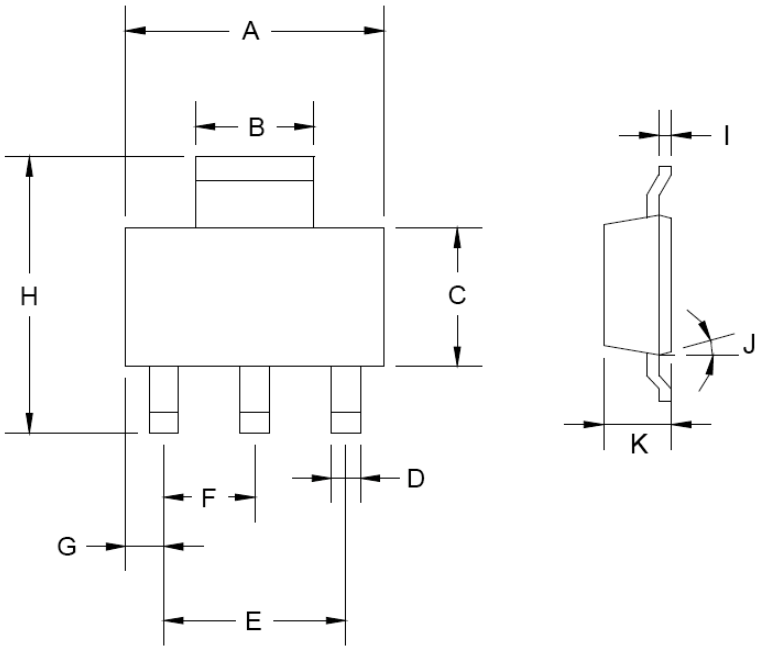
SOT-89 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.40	4.60	0.173	0.181
B	1.40	1.75	0.055	0.069
C	2.40	2.60	0.094	0.102
D	0.36	0.48	0.014	0.018
E	1.40	1.60	0.054	0.063
F	2.90	3.10	0.114	0.122
G	0.89	1.20	0.035	0.047
H	--	4.25	--	0.167
I	1.40	1.60	0.055	0.068
J	0.38	0.43	0.014	0.017

Marking Diagram



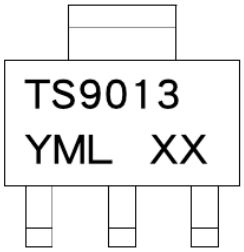
Y = Year Code
M = Month Code
(**A**=Jan, **B**=Feb, **C**=Mar, **D**=Apl, **E**=May, **F**=Jun, **G**=Jul, **H**=Aug, **I**=Sep, **J**=Oct, **K**=Nov, **L**=Dec)
L = Lot Code
X = Fixed Output Voltage Code
D=1.8V, **K**=2.5V, **S**=3.3V, **5**=5.0V.

SOT-223 Mechanical Drawing



SOT-223 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.350	6.850	0.250	0.270
B	2.900	3.100	0.114	0.122
C	3.450	3.750	0.136	0.148
D	0.595	0.635	0.023	0.025
E	4.550	4.650	0.179	0.183
F	2.250	2.350	0.088	0.093
G	0.835	1.035	0.032	0.041
H	6.700	7.300	0.263	0.287
I	0.250	0.355	0.010	0.014
J	10°	16°	10°	16°
K	1.550	1.800	0.061	0.071

Marking Diagram



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L = Lot Code
X = Fixed Output Voltage Code
18=1.8V, **25**=2.5V, **33**=3.3V, **50**=5.0V.

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