

500mA Low Quiescent Current CMOS LDO

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 2.2 μ F 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, 15 μ A(typ.) @V_O=5V
- Output voltage $\pm 2\%$
- Internal current limit
- Thermal shutdown protection
- Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC.
- Halogen-free according to IEC 61249-2-21

APPLICATION

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



SOT-89



Pin Definition:

1. Ground
2. Input
3. Output

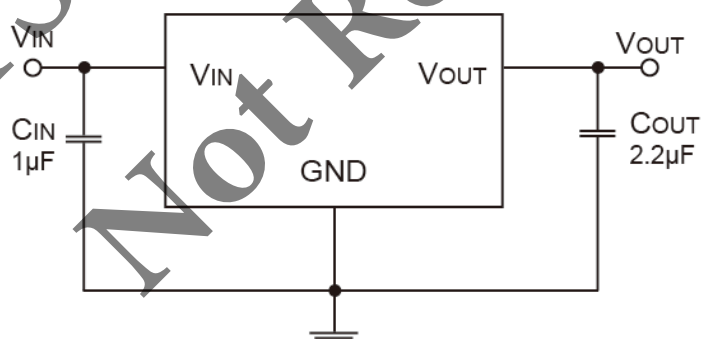
SOT-223



Pin Definition:

1. Input
2. Ground
3. Output

TYPICAL APPLICATION CIRCUIT



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNIT
Input Supply Voltage	V_{IN}	12	V
Recommend Operating Input Voltage	V_{IN}	10	V
Output Current	I_O	500	mA
Power Dissipation (without heat sink)	SOT-89	0.5	W
	SOT-223	0.7	
Operating Junction Temperature Range	T_J	-40 ~ +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-65 ~ +150	$^\circ\text{C}$
Lead Soldering Temperature (260 $^\circ\text{C}$)		5	S

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

ELECTRICAL SPECIFICATIONS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

PARAMETER	CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage	$V_{IN}=V_O+1V$, $I_O=1mA$,	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	
	$V_{IN}=V_O+1V$, $I_O=1mA \sim 500mA$	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	$V_{IN}=V_O+1V$,	500	--	--	mA	
Input Stability	$V_O+1V \leq V_{IN} \leq V_O+2V$, $I_O=1mA$	--	0.2	0.3	%	
Load Regulation (Note1)	$V_{IN}=V_O+1V$, $1mA \leq I_L \leq 500mA$	TS90135	--	40	80	mV
		TS9013S				
	$V_{IN}=V_O+1V$, $1mA \leq I_L \leq 500mA$	TS9013K	--	40	90	
		TS9013D				
Dropout Voltage (Note 2)	$I_O=300mA$	TS90135	--	300	500	mV
		TS9013S				
	$I_O=500mA$	TS90135	--	500	600	
		TS9013S				
	$I_O=500mA$	TS9013K	--	600	850	
		TS9013D				
Quiescent Current	$V_{IN}=V_O+1V$, $I_O=0A$	--	15	25	μA	
Output Current Limit	$V_{OUT} \leq 0.4V$	550	--	--	mA	
Power Supply Rejection Ratio	At $f=100KHz$, $I_O=10mA$	--	30	--	dB	
Output Voltage Temperature Coefficient		--	100	--	ppm/ $^{\circ}C$	

Note:

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

ORDERING INFORMATION

OUTPUT VOLTAGE	PART NO.	PACKAGE	PACKING
1.8V	TS9013DCW RPG	SOT-223	2,500pcs / 13" Reel
	TS9013DCY RMG	SOT-89	1,000pcs / 7" Reel
2.5V	TS9013KCW RPG	SOT-223	2,500pcs / 13" Reel
3.3V	TS9013SCW RPG	SOT-223	2,500pcs / 13" Reel
	TS9013SCY RMG	SOT-89	1,000pcs / 7" Reel
5V	TS90135CW RPG	SOT-223	2,500pcs / 13" Reel

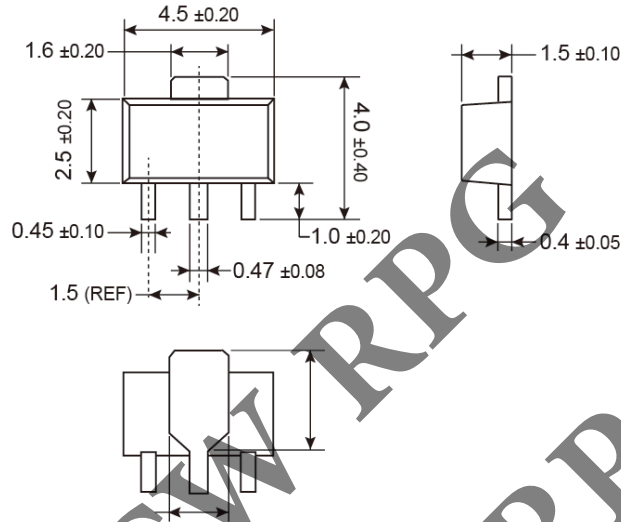
TS90135CW RPG

TS9013SCW RPG

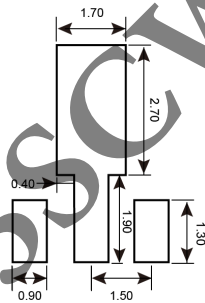
Not Recommended

PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

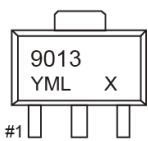
SOT-89



SUGGESTED PAD LAYOUT (Unit: Millimeters)



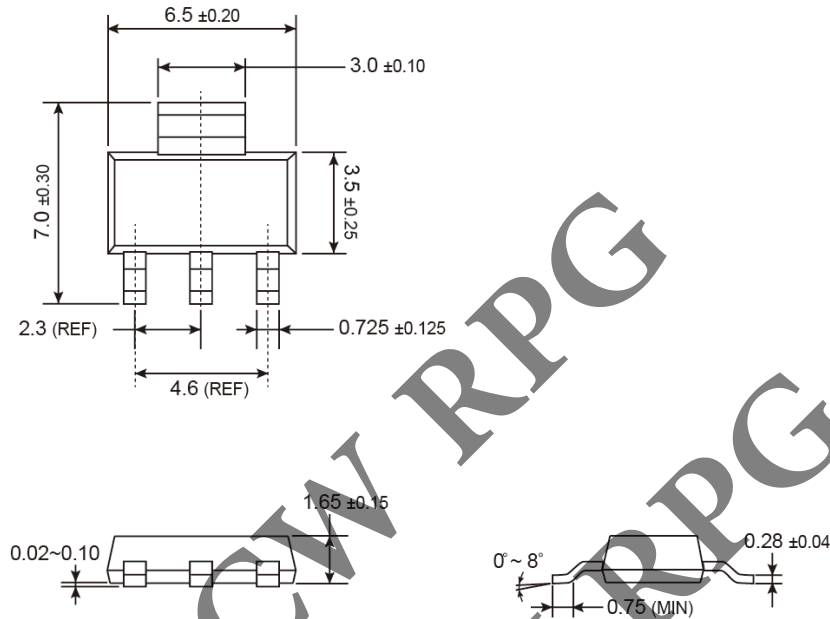
MARKING DIAGRAM



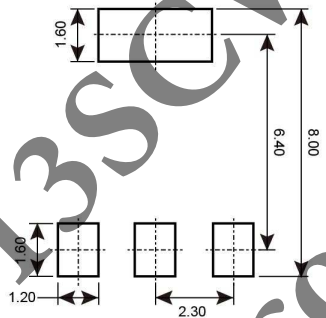
Y = Year Code
M = Month Code for Halogen Free Product
O =Jan P =Feb Q =Mar R =Apr
S =May T =Jun U =Jul V =Aug
W =Sep X =Oct Y =Nov Z =Dec
L = Lot Code (1~9, A~Z)
X = Fixed Output Voltage Code
18=1.8V, 33=3.3V, 50=5.0V..

PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

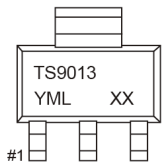
SOT-223



SUGGESTED PAD LAYOUT (Unit: Millimeters)



MARKING DIAGRAM



Y = Year Code

M = Month Code for Halogen Free Product

O =Jan **P** =Feb **Q** =Mar **R** =Apr

S =May **T** =Jun **U** =Jul **V** =Aug

W =Sep **X** =Oct **Y** =Nov **Z** =Dec

L = Lot Code (1~9, A~Z)

X = Fixed Output Voltage Code

18=1.8V, **25**=3.3V, **33**=3.3V, **50**=5.0V..

TS90135CW RPG
TS9013SCW RPG
Not Recommended

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