

SOT-23



Pin Definition:

1. Ground
2. Output
3. Input

SOT-89



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TO-92



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General Description

TS9011 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 1uF or greater can be used as an output capacitor. TS9011 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

- Dropout Voltage Typically 0.4V@ Io=200mA (Vo=5V)
- Output Current up to 250mA
- Low Power Consumption, 2uA(typ) @ Vo=5V
- Output Voltage $\pm 2\%$
- Internal Current Limit
- Thermal Shutdown Protection

Applications

- Battery-operated systems
- Microprocessor reset circuitry
- Memory battery back-up circuits
- Power-on reset circuits
- Power failure detection
- System battery life and charge voltage monitors

Ordering Information

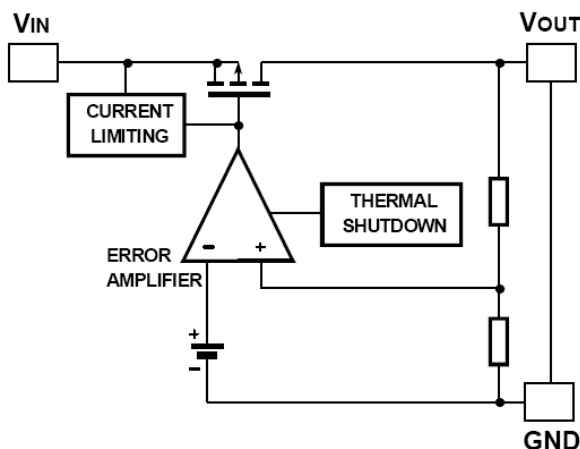
Part No.	Package	Packing
TS9011x _{CX} RF	SOT-23	3Kpcs / 7" Reel
TS9011x _{CY} RM	SOT-89	1Kpcs / 7" Reel
TS9011x _{CT} A3	TO-92	2Kpcs / Ammo
TS9011x _{CT} B0	TO-92	1Kpcs / Bulk

Note: Where **x** denotes voltage option, available are

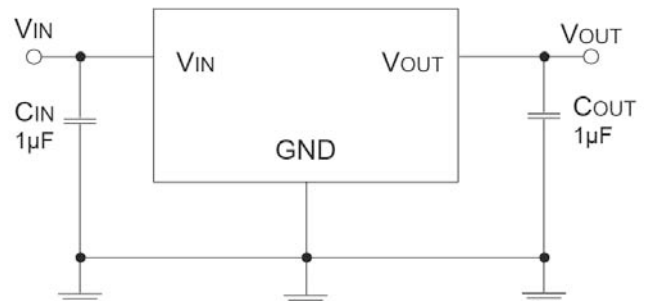
- A**=1.5V
- D**=1.8V
- K**=2.5V
- P**=3.0V
- S**=3.3V
- 5**=5V

Contact factory for additional voltage options.

Block Diagram



Typical Application Circuit



* Tantalum capacitor for Input & Output capacitor are recommended

Absolute Maximum Rating

Parameter	Symbol	Limit	Unit
Input Supply Voltage	V_{IN}	12	V
Output Current	I_O	$P_D / (V_{IN} - V_O)$	V
Power Dissipation	SOT-23	0.30	W
	SOT-89	0.50	
	TO-92	0.625	
Thermal Resistance - Junction to Ambient	SOT-23	333	°C/W
	SOT-89	200	
	TO-92	160	
Operating Ambient Temperature	T_{OPR}	-40 ~ +85	°C
Junction Temperature Range	T_J	-40 ~ +150	°C
Storage Temperature Range	T_{STG}	-65 ~ +150	°C

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	$V_{IN}=V_O + 1V$, $I_O=40mA$,	TS90115	4.90	5.0	5.10	V
		TS9011S	3.23	3.3	3.36	
		TS9011P	2.94	3.0	3.06	
		TS9011K	2.45	2.5	2.55	
		TS9011D	1.76	1.8	1.83	
		TS9011A	1.47	1.5	1.53	
Maximum Output Current	$V_{IN}=V_O+1V$,	250	--	--	mA	
Input Stability	$V_O+1V \leq V_{IN} \leq V_O+2V$, $I_O=1mA$	--	0.2	0.3	%	
Load Regulation (Note1)	$V_{IN}=V_O+1V$, $1mA \leq I_L \leq 100mA$	TS90115	--	40	80	mV
		TS9011S				
	$V_{IN}=V_O+1V$, $1mA \leq I_L \leq 80mA$	TS9011P	--	40	90	
		TS9011K				
		TS9011D				
		TS9011A				
Dropout Voltage (Note 2)	$I_O=250mA$	TS90115	--	400	600	mV
	$I_O=200mA$	TS9011S	--	400	650	
	$I_O=160mA$	TS9011P	--	400	700	
	$I_O=160mA$	TS9011K	--	400	700	
	$I_O=120mA$	TS9011D	--	400	750	
	$I_O=100mA$	TS9011A	--	850	1000	
Quiescent Current	$V_{IN}=V_O+1V$, $I_O=0A$	--	2	5	uA	
Output Current Limit	$V_{OUT} < 0.4V$	--	400	--	mA	
Power Supply Rejection Ratio	At $f=100KHz$, $I_O=10mA$,	--	30	--	dB	
Output Voltage Temperature Coefficient (Note 3)		--	100	--	ppm/°C	

Notes:

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 +/-2%.
3. Guaranteed by design.

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

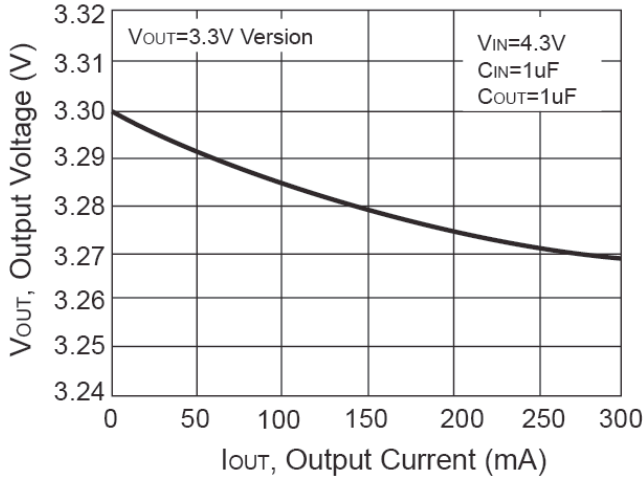


Figure 1. Output Voltage vs. Output Current

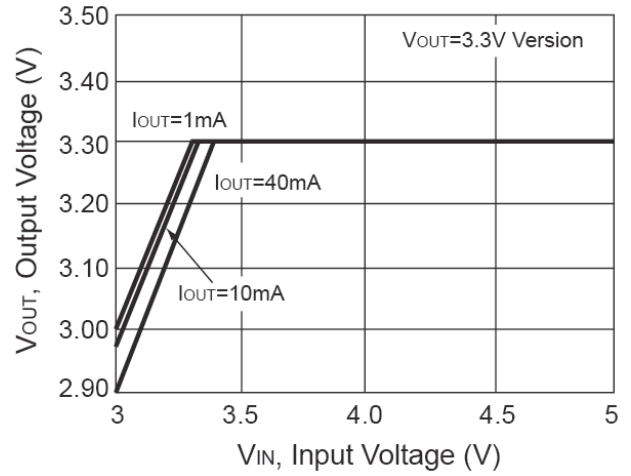


Figure 2. Output Voltage vs. Input Voltage

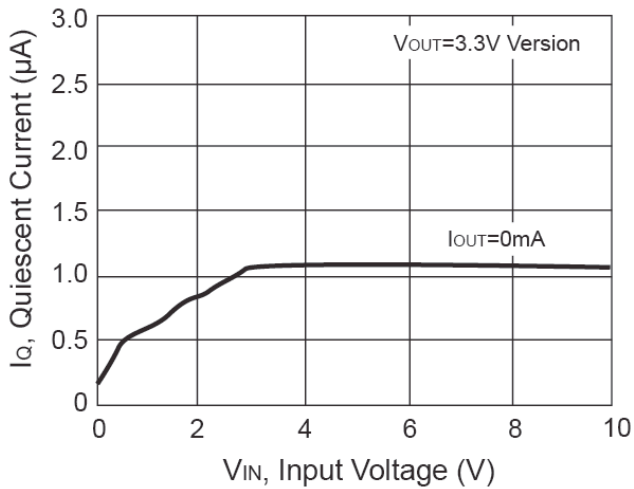


Figure 3. Quiescent Current vs. Input Voltage

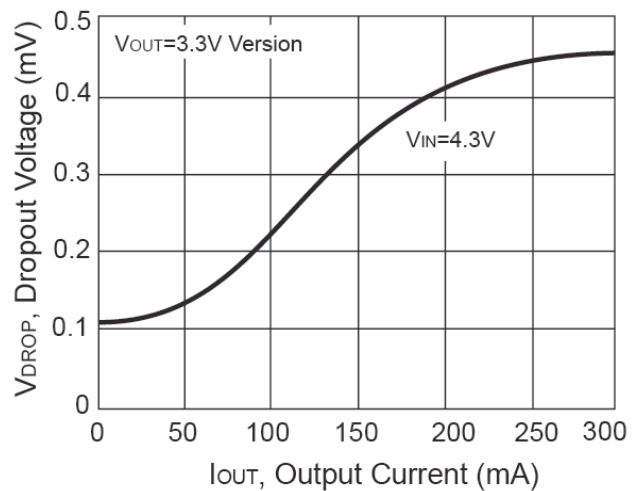
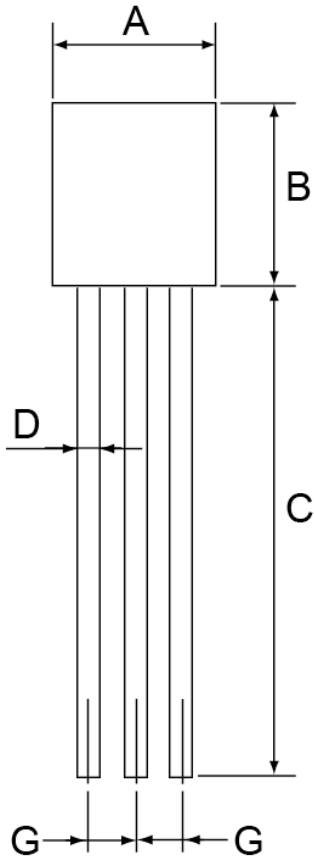
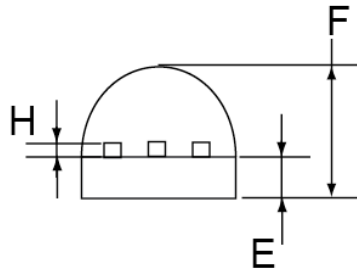


Figure 4. Short Circuit Current vs. Input Voltage

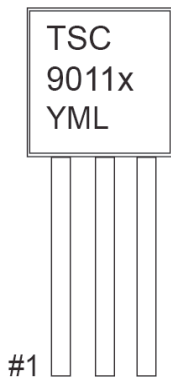
TO-92 Mechanical Drawing



TO-92 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.30	4.70	0.169	0.185
B	4.30	4.70	0.169	0.185
C	13.53 (typ)		0.532 (typ)	
D	0.39	0.49	0.015	0.019
E	1.18	1.28	0.046	0.050
F	3.30	3.70	0.130	0.146
G	1.27	1.31	0.050	0.051
H	0.33	0.43	0.013	0.017

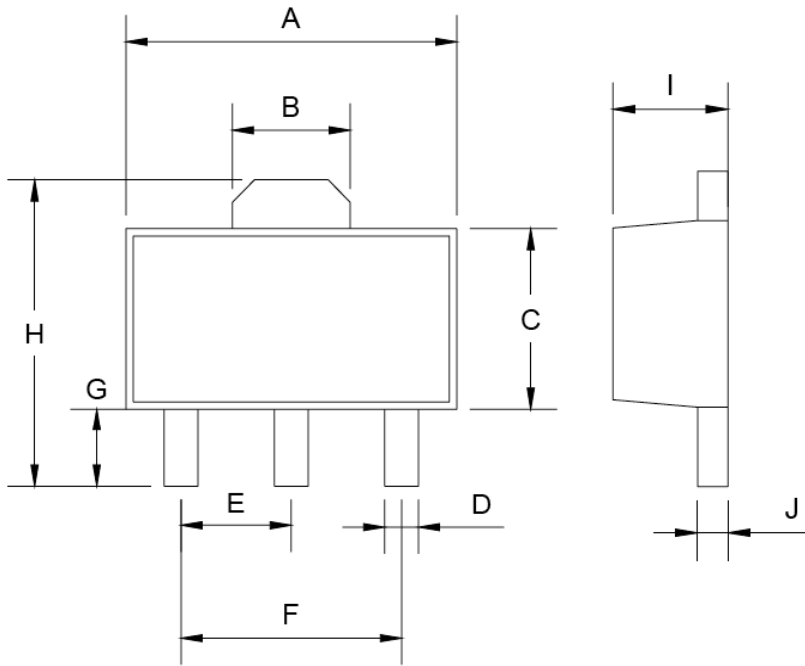


Marking Diagram



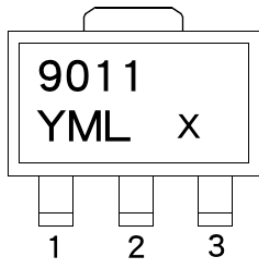
- Y** = Year Code
- M** = Month Code
(A=Jan, B=Feb, C=Mar, D=Apl, E=May, F=Jun, G=Jul, H=Aug, I=Sep, J=Oct, K=Nov, L=Dec)
- L** = Lot Code
- X** = Fixed Output Voltage Code
A=1.5V, D=1.8V, K=2.5V, P=3.0V, S=3.3V, 5=5.0V.

SOT-89 Mechanical Drawing



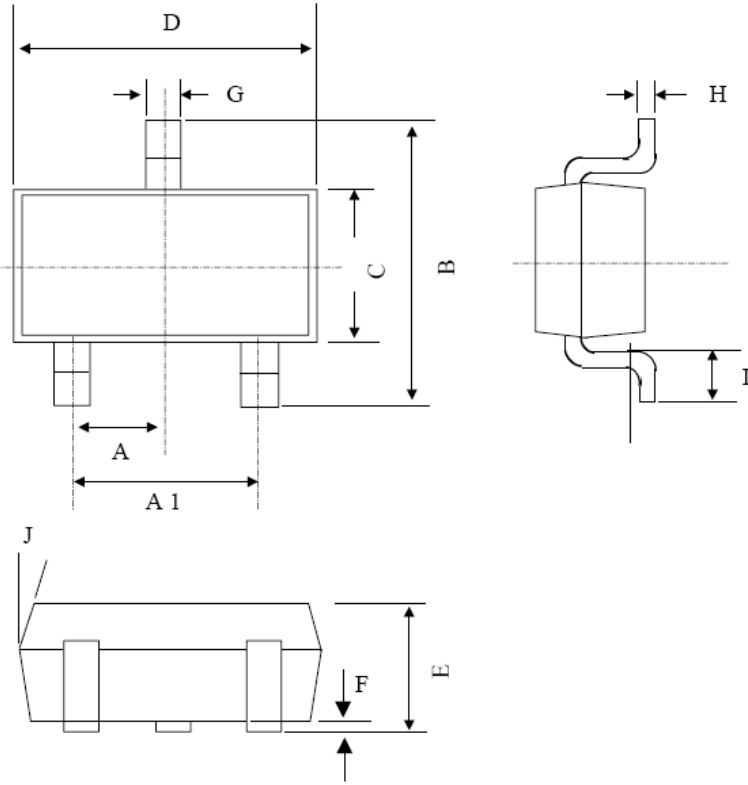
SOT-89 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.40	4.60	0.173	0.181
B	1.40	1.75	0.055	0.069
C	2.40	2.60	0.094	0.102
D	0.36	0.48	0.014	0.018
E	1.40	1.60	0.054	0.063
F	2.90	3.10	0.114	0.122
G	0.89	1.20	0.035	0.047
H	--	4.25	--	0.167
I	1.40	1.60	0.055	0.068
J	0.38	0.43	0.014	0.017

Marking Diagram



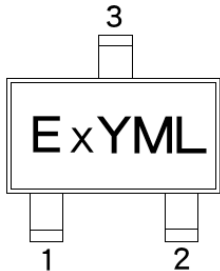
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A=1.5V, D=1.8V, K=2.5V, P=3.0V, S=3.3V, 5=5.0V.

SOT-23 Mechanical Drawing



DIM	SOT-23 DIMENSION			
	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX.
A	0.95 BSC		0.037 BSC	
A1	1.9 BSC		0.074 BSC	
B	2.60	3.00	0.102	0.118
C	1.40	1.70	0.055	0.067
D	2.80	3.10	0.110	0.122
E	1.00	1.30	0.039	0.051
F	0.00	0.10	0.000	0.004
G	0.35	0.50	0.014	0.020
H	0.10	0.20	0.004	0.008
I	0.30	0.60	0.012	0.024
J	5°	10°	5°	10°

Marking Diagram



- E** = Product Code
- Y** = Year Code
- M** = Month Code
(**A**=Jan, **B**=Feb, **C**=Mar, **D**=Apr, **E**=May, **F**=Jun, **G**=Jul, **H**=Aug, **I**=Sep, **J**=Oct, **K**=Nov, **L**=Dec)
- L** = Lot Code
- X** = Fixed Output Voltage Code
A=1.5V, **D**=1.8V, **K**=2.5V, **P**=3.0V, **S**=3.3V, **5**=5.0V.

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