

### 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)

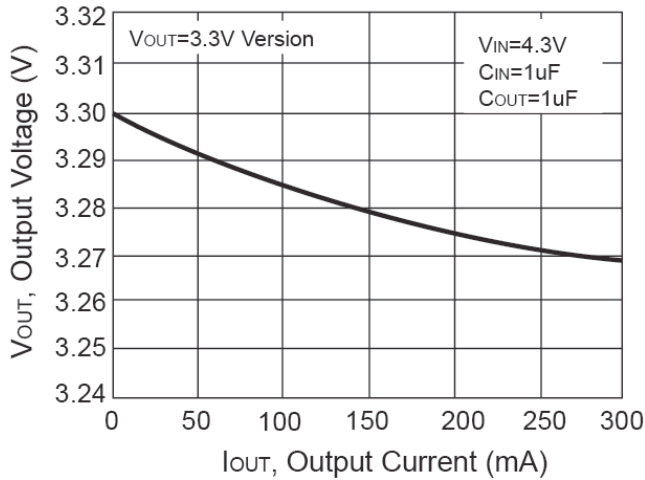


Figure 1. Output Voltage vs. Output Current

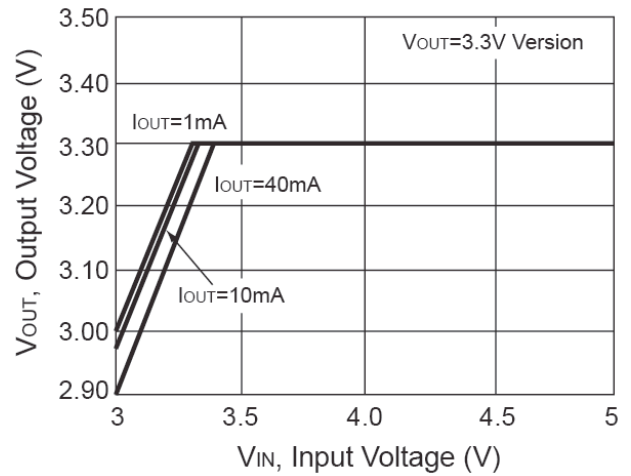


Figure 2. Output Voltage vs. Input Voltage

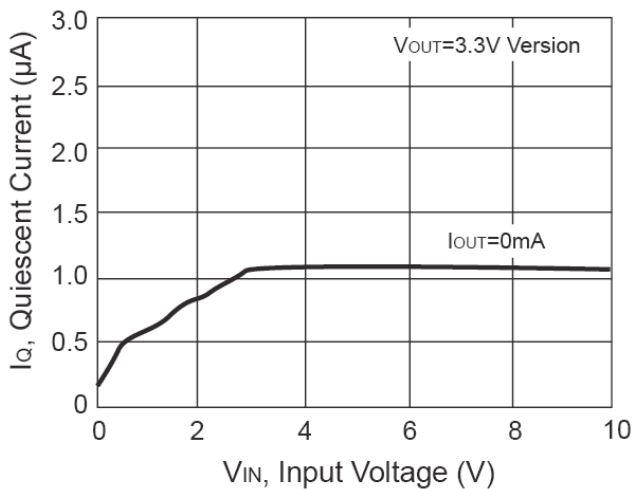


Figure 3. Quiescent Current vs. Input Voltage

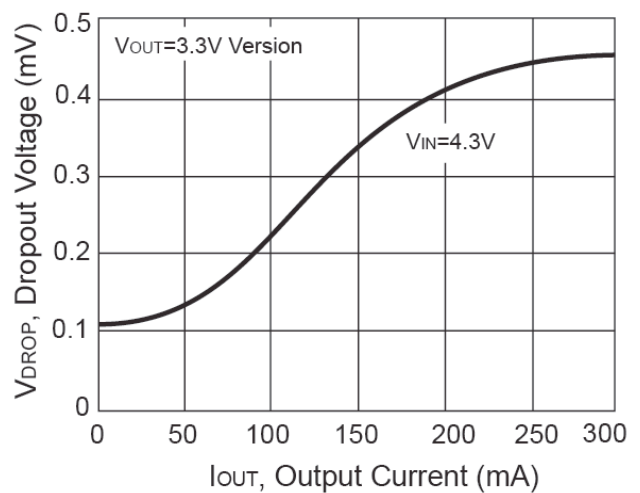
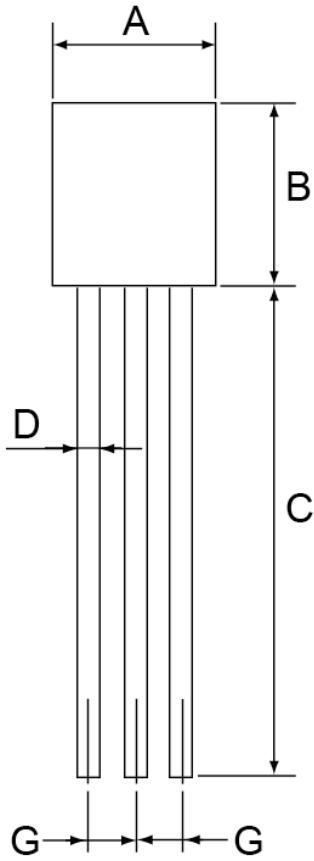
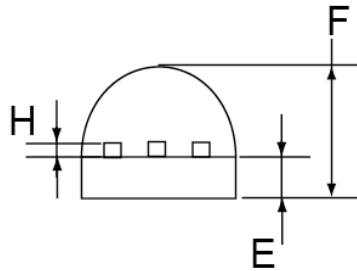


Figure 4. Short Circuit Current vs. Input Voltage

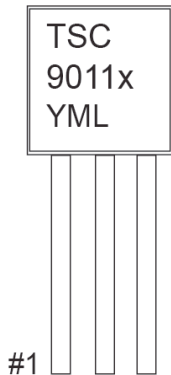
**TO-92 Mechanical Drawing**



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

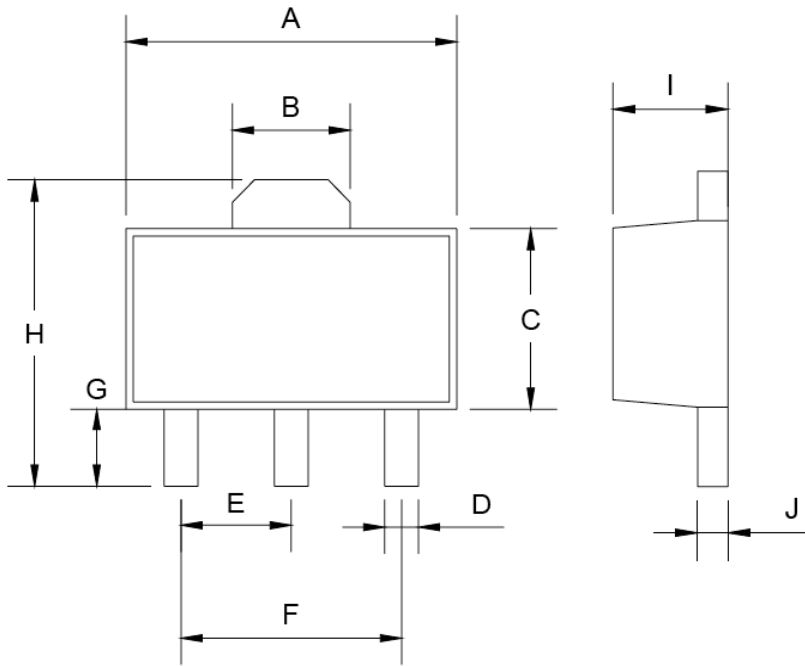


**Marking Diagram**



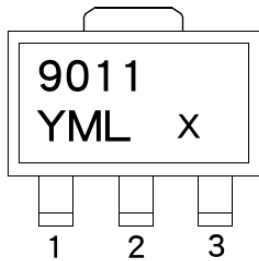
- Y** = Year Code
- M** = Month Code  
(A=Jan, B=Feb, C=Mar, D=Apl, E=May, F=Jun, G=Jul, H=Aug, I=Sep, J=Oct, K=Nov, L=Dec)
- L** = Lot Code
- X** = Fixed Output Voltage Code  
A=1.5V, D=1.8V, K=2.5V, P=3.0V, S=3.3V, 5=5.0V.

**SOT-89 Mechanical Drawing**



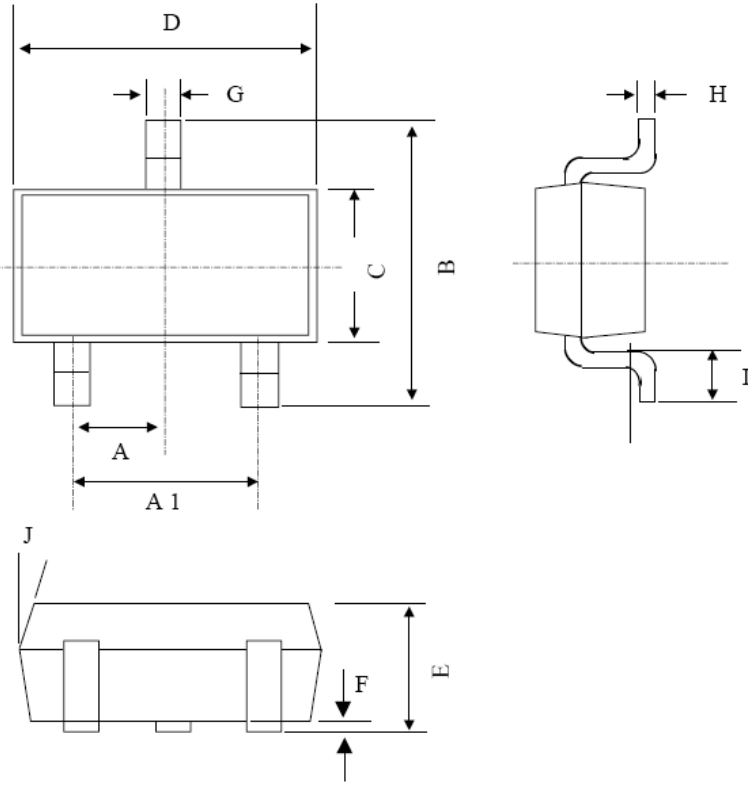
SOT-89 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.40	4.60	0.173	0.181
B	1.40	1.75	0.055	0.069
C	2.40	2.60	0.094	0.102
D	0.36	0.48	0.014	0.018
E	1.40	1.60	0.054	0.063
F	2.90	3.10	0.114	0.122
G	0.89	1.20	0.035	0.047
H	--	4.25	--	0.167
I	1.40	1.60	0.055	0.068
J	0.38	0.43	0.014	0.017

**Marking Diagram**



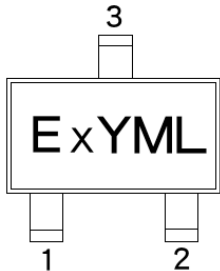
- Y** = Year Code
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(A=Jan, B=Feb, C=Mar, D=Apl, E=May, F=Jun, G=Jul, H=Aug, I=Sep, J=Oct, K=Nov, L=Dec)
- L** = Lot Code
- X** = Fixed Output Voltage Code  
A=1.5V, D=1.8V, K=2.5V, P=3.0V, S=3.3V, 5=5.0V.

**SOT-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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