TS9011

250mA CMOS Low Dropout Voltage Regulator

TSC

TO-92   SOT-89   SOT-23

1 2 3

Low Power Consumption 2uA

Low Drop Out Voltage 0.4V

General Description

The TS9011 series 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.

The TS9011 series 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.

This series are offered in 3-pin TO-92, SOT-89 and SOT-23 package.

Features

✧ Dropout voltage typically 0.38V @Io=200mA (Vo=5V)

✧ Output current up to 250mA

✧ Low power consumption, 2uA(typ) @Vo=5V

✧ Output voltage +/-2%

✧ Internal current limit

✧ Thermal shutdown protection

Applications

✧ Palmtops

✧ Video recorders

✧ Battery powered equipment

✧ PC peripherals

✧ CD-ROM

✧ Digital signal camera

Ordering Information

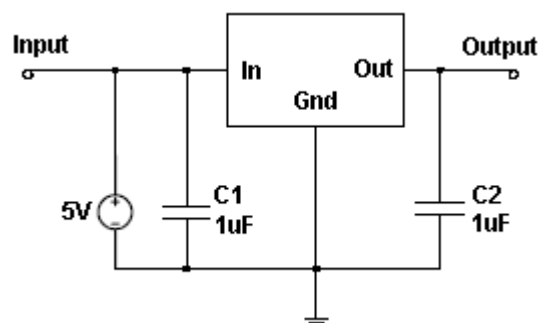| Part No.	Operating Temp. (Ambient)	Package
TS9011**x**CT		TO-92
TS9011**x**CX	-40 ~ +85 ^{o}C	SOT-23
TS9011**x**CY		SOT-89

Note: Where **x** denotes voltage option, available are
D=1.8V,   K=2.5V,   S=3.3V,   5=5.0V.
Contact factory for additional voltage options.

Block Diagram
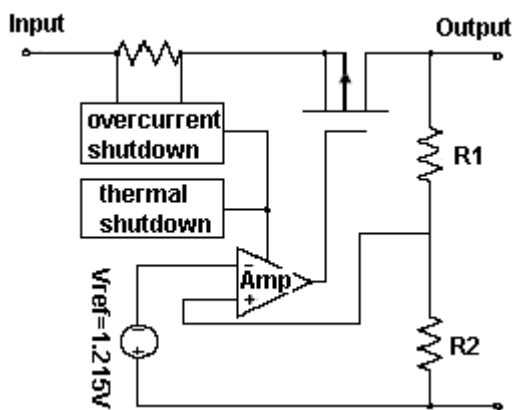
Typical Application Circuit

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Absolute Maximum Rating

Input Supply Voltage		Vin(max.)	+12	V
Input Operating Voltage		Vin(opr.)	+10	
Output Current		Io	P_D / (Vin – Vo)	V
Power Dissipation	SOT-23	P_D	0.15	
	SOT-89		0.50	W
	TO-92		0.65	
Operating Junction Temperature Range		Tj	-40 ~ +125	^{o}C
Storage Temperature Range		T_{STG}	-65 ~ +150	^{o}C
Lead Soldering Temperature (260 ^{o}C)			10	S

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

Electrical Characteristics

Ta = 25 ^{o}C unless otherwise specified.

Parameter	Conditions		Min	Typ	Max	Unit
Output Voltage	Vin=Vo + 1V, Io =40mA,	TS90115	4.900	5.0	5.100	V
		TS9011S	3.234	3.3	3.366	
		TS9011K	2.450	2.5	2.550	
		TS9011D	1.764	1.8	1.836	
Maximum Output Current	Vin=Vo+1V,		250	--	--	mA
Input Stability	Vo+1V ≤ Vin ≤ 10V, Io=5mA		--	0.2	0.3	%
Load Regulation (Note1)	Vin=Vo+1V, 1mA≤I_L≤100mA	TS90115	--	40	80	mV
		TS9011S				
	Vin=Vo+1V, 1mA≤I_L≤80mA	TS9011K	--	40	90	
		TS9011D				
Dropout Voltage (Note 2)	Io=250mA	TS90115	--	400	600	mV
	Io=200mA	TS9011S	--	400	650	
	Io=160mA	TS9011K	--	400	700	
	Io=120mA	TS9011D	--	400	750	
Quiescent Current	Vin=Vo+1V, Io=0A		--	2	5	uA
Output Current Limit	Vout < 0.4V		--	400	--	mA
Power Supply Rejection Ratio	At f=100KHz, Io=10mA,		--	30	--	dB
Output Voltage Temperature Coefficient (Note 3)			--	100	--	ppm/ ^{o}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 Vout inside target value +/-2%.
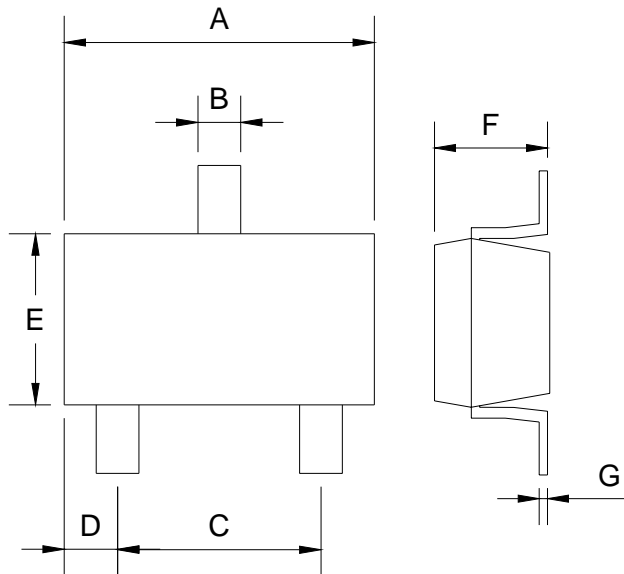3. Guaranteed by design.

SOT-89 Mechanical Drawing
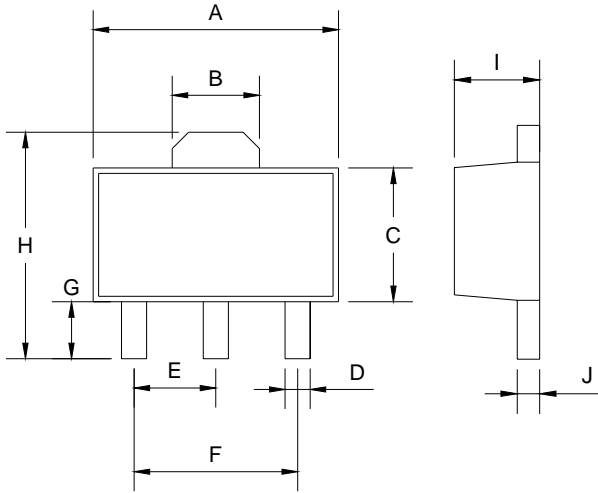
SOT-89 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.40	4.60	0.173	0.181
B	1.50	1.7	0.059	0.070
C	2.30	2.60	0.090	0.102
D	0.40	0.52	0.016	0.020
E	1.50	1.50	0.059	0.059
F	3.00	3.00	0.118	0.118
G	0.89	1.20	0.035	0.047
H	4.05	4.25	0.159	0.167
I	1.4	1.6	0.055	0.068
J	0.35	0.44	0.014	0.017

SOT-23 Mechanical Drawing

SOT-23 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.88	2.91	0.113	0.115
B	0.39	0.42	0.015	0.017
C	1.78	2.03	0.070	0.080
D	0.51	0.61	0.020	0.024
E	1.59	1.66	0.063	0.065
F	1.04	1.08	0.041	0.043
G	0.07	0.09	0.003	0.004

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TO-92 Mechanical Drawing
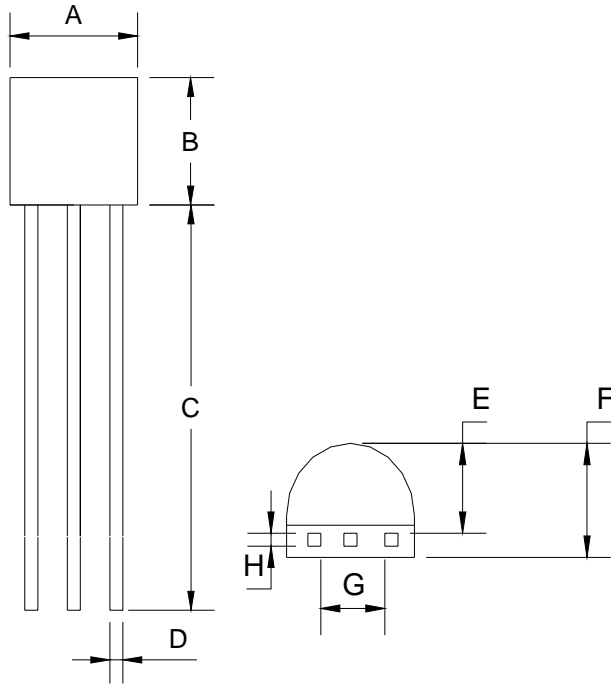
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.30	4.70	0.169	0.185
B	4.30	4.70	0.169	0.185
C	14.30(typ)		0.563(typ)	
D	0.43	0.49	0.017	0.019
E	2.19	2.81	0.086	0.111
F	3.30	3.70	0.130	0.146
G	2.42	2.66	0.095	0.105
H	0.37	0.43	0.015	0.017

TO-92 DIMENSION