250mA Low Quiescent Current CMOS LDO

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 1μF 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.

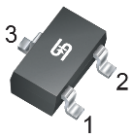
FEATURES

- Dropout voltage 0.4V (typ.) @ Io=250mA
- Output current up to 250mA
- Low power consumption, 2μA (typ.)
- Output voltage ± 2%
- Internal current limit
- Thermal shutdown protection
- RoHS Compliant
- Halogen-Free according to IEC 61249-2-21

APPLICATION

- 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

SOT-23



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

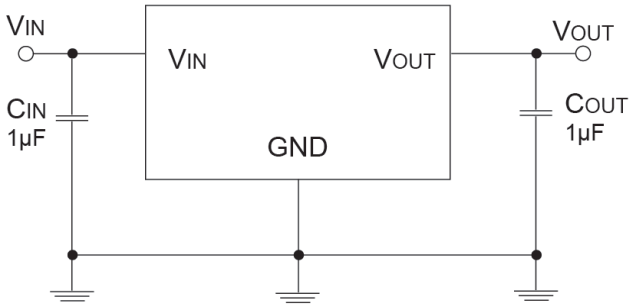
SOT-89



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

Notes: Moisture sensitivity level: level 3. Per J-STD-020

TYPICAL APPLICATION CIRCUIT



*Tantalum capacitor for Input & Output capacitor are recommended.

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise specified) (Note 1)

PARAMETER		SYMBOL	LIMIT	UNIT
Input Supply Voltage		V_{IN}	12	V
Output Current		I_{OUT}	250	mA
Power Dissipation	SOT-23	P_D	0.30	W
	SOT-89		0.50	
Operating Ambient Temperature		T_{OPR}	-40 ~ +85	°C
Junction Temperature Range		T_J	-40 ~ +150	°C
Storage Temperature Range		T_{STG}	-65 ~ +150	°C

THERMAL PERFORMANCE

PARAMETER		SYMBOL	LIMIT	UNIT
Thermal Resistance - Junction to Ambient	SOT-23	$R_{\theta JA}$	333	°C/W
	SOT-89		200	

Note: Measured with FR4 4-layer board having thermal via holes

ELECTRICAL SPECIFICATIONS (T_A = 25°C unless otherwise specified)

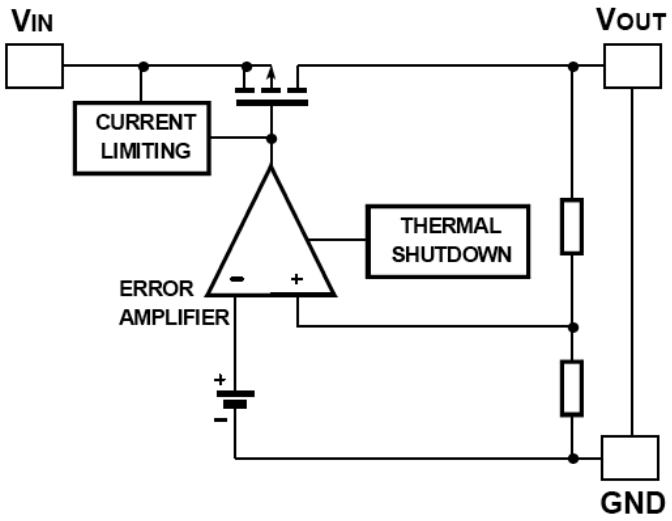
PARAMETER	CONDITION		MIN	TYP	MAX	UNIT
Output Voltage	$V_{IN}=V_O$ + 1V, I_O =40mA,	TS90115	4.90	5.0	5.10	V
		TS9011S	3.23	3.3	3.36	
		TS9011K	2.45	2.5	2.55	
		TS9011D	1.76	1.8	1.83	
Maximum Output Current	$V_{IN}=V_O$+1V,		250	--	--	mA
Input Stability	V_O+1V ≤ V_{IN} ≤ V_O+2V, I_O=1mA		--	0.2	0.3	%
Load Regulation (Note1)	$V_{IN}=V_O$+1V, 1mA≤I_L≤100mA	TS90115	--	40	80	mV
		TS9011S				
	$V_{IN}=V_O$+1V, 1mA≤I_L≤80mA	TS9011K	--	40	90	
		TS9011D				
Dropout Voltage (Note 2)	I_O=250mA	TS90115	--	400	600	mV
	I_O=200mA	TS9011S	--	400	650	
	I_O=160mA	TS9011K	--	400	700	
	I_O=120mA	TS9011D	--	400	750	
Quiescent Current	$V_{IN}=V_O$+1V, I_O=0A		--	2	5	µA
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

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

ORDERING INFORMATION

OUTPUT VOLTAGE	PART NO.	PACKAGE	PACKING
1.8V	TS9011DCX RFG	SOT-23	3,000pcs / 7” Reel
	TS9011DCY RMG	SOT-89	1,000pcs / 7” Reel
2.5V	TS9011KCX RFG	SOT-23	3,000pcs / 7” Reel
	TS9011KCY RMG	SOT-89	1,000pcs / 7” Reel
3.3V	TS9011SCX RFG	SOT-23	3,000pcs / 7” Reel
	TS9011SCY RMG	SOT-89	1,000pcs / 7” Reel
5V	TS90115CX RFG	SOT-23	3,000pcs / 7” Reel
	TS90115CY RMG	SOT-89	1,000pcs / 7” Reel

FUNCTION BLOCK DIAGRAM



ELECTRICAL CHARACTERICS CURVES (T_A=25°C, unless otherwise noted)

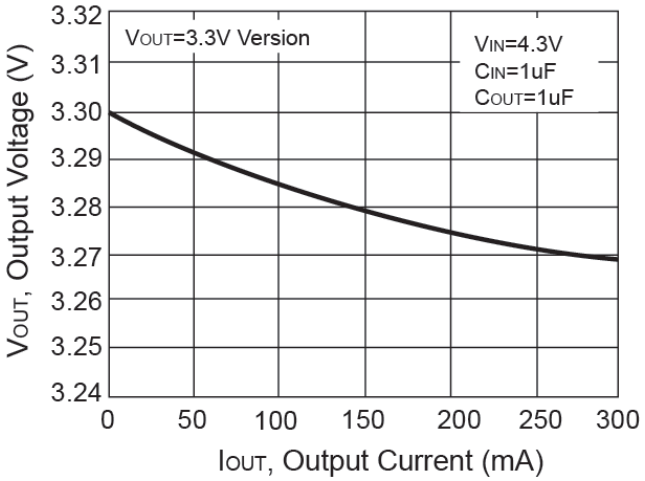


Figure 1. Output Voltage vs. Output Current

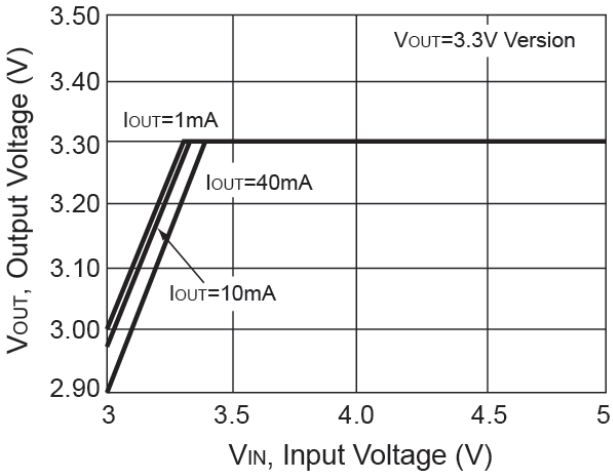


Figure 2. Output Voltage vs. Input Voltage

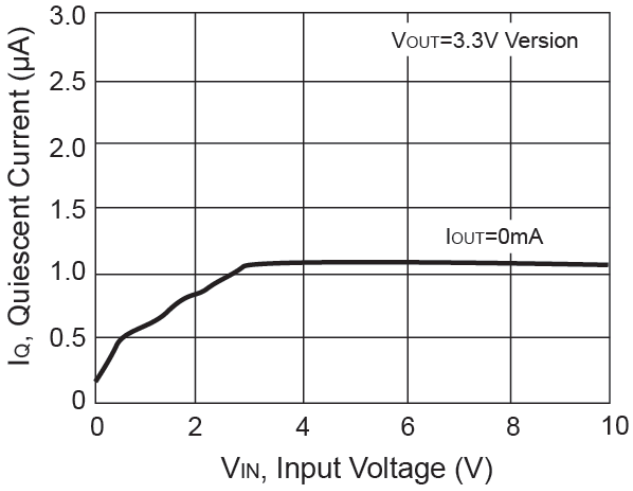


Figure 3. Quiescent Current vs. Input Voltage

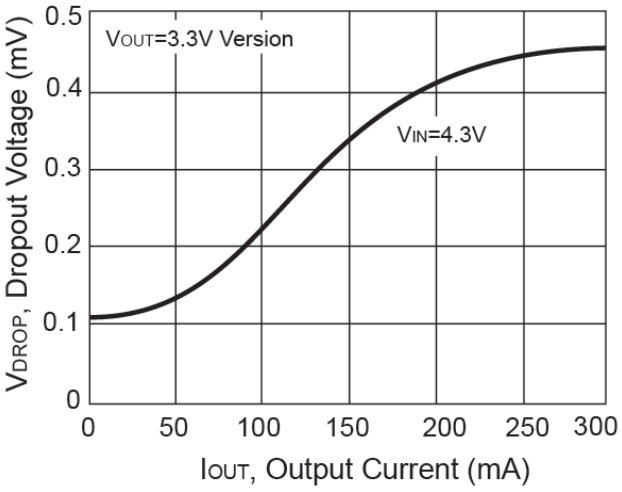
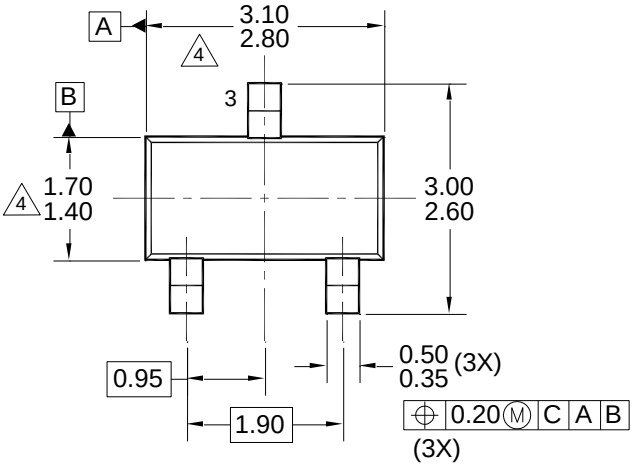
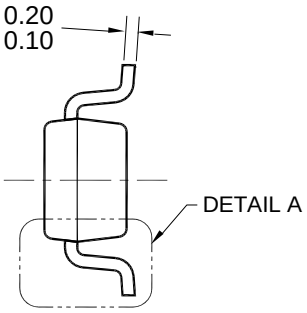


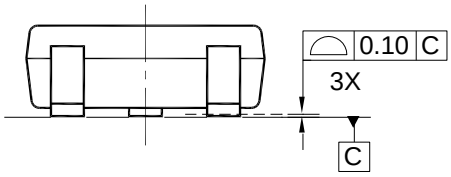
Figure 4. Short Circuit Current vs. Input Voltage

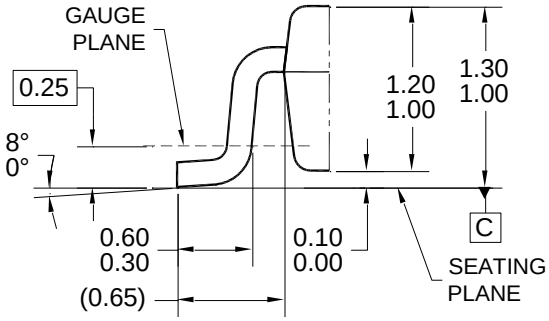
PACKAGE OUTLINE DIMENSIONS

SOT-23

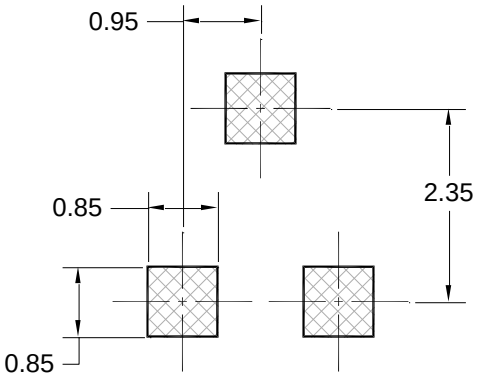




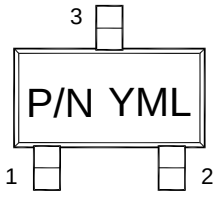




DETAIL A, ROTATED -90°
(SCALE 2:1)



SUGGESTED PAD LAYOUT



MARKING DIAGRAM

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
3. PACKAGE OUTLINE REFERENCE: EIAJ ED-7500A, SC-59.
4. MOLDED PLASTIC BODY DIMENSIONS DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
5. DWG NO. REF: HQ2SD07-SOT23IC-104 REV A.

P/N = PRODUCT DEVICE CODE
Y = YEAR CODE
M = MONTH CODE FOR HALOGEN FREE PRODUCT

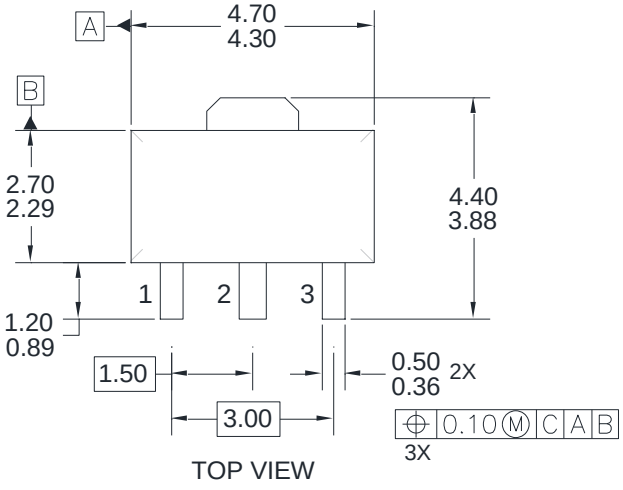
O =JAN	P =FEB	Q=MAR	R = APR
S =MAY	T =JUN	U=JUL	V = AUG
W =SEP	X =OCT	Y=NOV	Z = DEC

L = LOT CODE

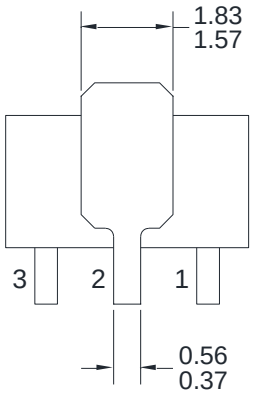
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Voltage code: D (1.8V), K (2.5V), S (3.3V), 5 (5V)

PACKAGE OUTLINE DIMENSIONS

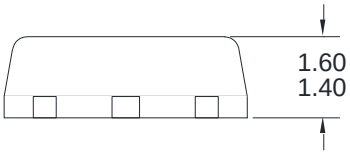
SOT-89



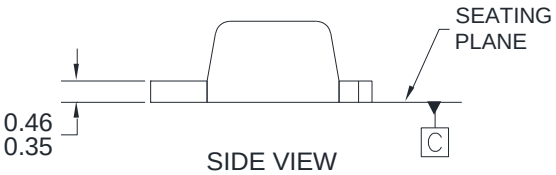
TOP VIEW



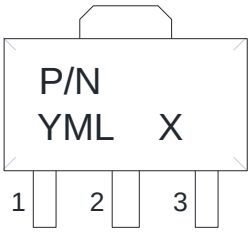
BACK VIEW



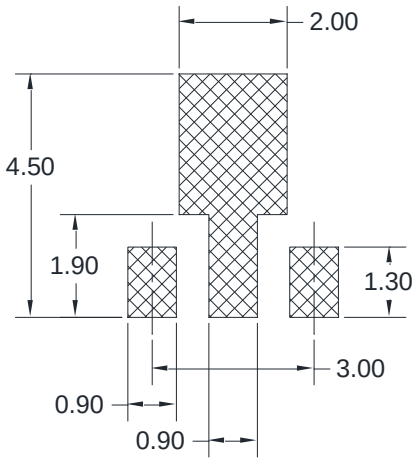
FRONT VIEW



SIDE VIEW



MARKING DIAGRAM



SUGGESTED PAD LAYOUT

P/N = Product device code
Device code = 9011
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
X = VOLTAGE CODE
Voltage Code = D (1.8V), K (2.5V), S (3.3V), 5 (5V)

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS ARE IN MILLIMETERS.
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3. PACKAGE OUTLINE REFERENCE: JEDEC TO-243, ISSUE C, VARIATION AA.
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5. DWG NO REF: HQ2SD07-SOT89-024 REV A.

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