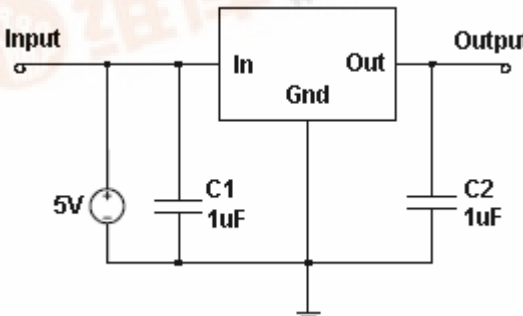
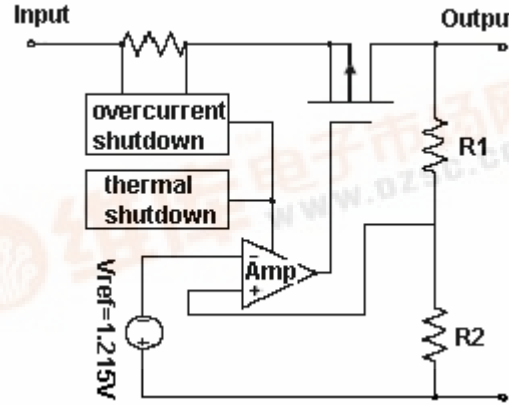


	TS9013 500mA CMOS Low Dropout Voltage Regulator									
 SOT-89 1 2 3  SOT-223 1 2 3 <u>Pin assignment</u> SOT-89 1. Gnd 2. Input 3. Output SOT-223 1. Input 2. Gnd 3. Output		Low Power Consumption 2uA(typ) Low Drop Out Voltage 0.6V								
General Description The TS9013 series is a positive voltage 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 TS9013 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 SOT-89 and SOT-223 package.										
Features ✧ Dropout voltage typically 0.4V @Io=500mA (Vo=5V) ✧ Output current up to 500mA ✧ Low power consumption, 2uA(typ) @Vo=5V ✧ Output voltage +/-2% ✧ Internal current limit ✧ Thermal shutdown protection		Ordering Information <table><tr><th>Part No.</th><th>Operating Temp. (Ambient)</th><th>Package</th></tr><tr><td>TS9013x<u>C</u>W</td><td rowspan="2">-20 ~ +85 °C</td><td>SOT-223</td></tr><tr><td>TS9013x<u>C</u>Y</td><td>SOT-89</td></tr></table> Note: Where <u>x</u> denotes voltage option, available are A=1.5V, D=1.8V, K=2.5V, S=3.3V, 5=5.0V. Contact factory for additional voltage options.	Part No.	Operating Temp. (Ambient)	Package	TS9013x <u>C</u> W	-20 ~ +85 °C	SOT-223	TS9013x <u>C</u> Y	SOT-89
Part No.	Operating Temp. (Ambient)	Package								
TS9013x <u>C</u> W	-20 ~ +85 °C	SOT-223								
TS9013x <u>C</u> Y		SOT-89								
Applications ✧ Palmtops ✧ Video recorders ✧ Battery powered equipment ✧ PC peripherals ✧ CD-ROM, DVD ROM ✧ Digital signal camera		Typical Application Circuit 								
Block Diagram 										



Absolute Maximum Rating				
Input Supply Voltage		V _{in(max.)}	+12	V
Input Operating Voltage		V _{in(opr. Typ.)}	+10	
Output Current		I _o	P _D / (V _{in} – V _o)	V
Power Dissipation (without heat sink)	SOT-89	P _D	0.55	W
	SOT-223		0.625	
Thermal Resistance	SOT-89	R θ _{ja}	180	°C/W
	SOT-223		160	
Thermal Resistance	SOT-89	R θ _{jc}	18	°C/W
	SOT-223		15	
Operating Junction Temperature Range		T _j	-40 ~ +125	°C
Storage Temperature Range		T _{STG}	-65 ~ +150	°C
Lead Soldering Temperature (260 °C)			10	S

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

Electrical Characteristics

T_a = 25 °C unless otherwise specified.

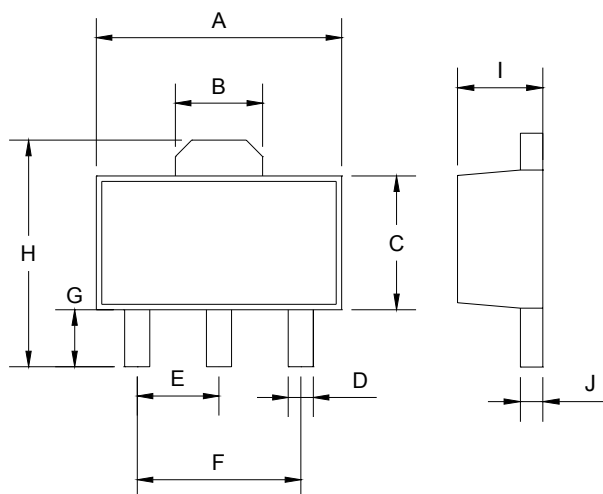
Parameter	Conditions		Min	Typ	Max	Unit
Output Voltage	Vin=Vo + 1V, Io =10mA,	TS90135	4.900	5.0	5.100	V
		TS9013S	3.234	3.3	3.366	
		TS9013K	2.450	2.5	2.550	
		TS9013D	1.764	1.8	1.836	
		TS9013A	1.47	1.5	1.575	
Maximum Output Current	Vin=Vo+1V,		500	--	--	mA
Input Stability	Vo+1V ≤ Vin ≤ Vo+2V, Io=1mA		--	0.2	0.3	%
Load Regulation (Note1)	Vin=Vo+1V, 1mA≤IL≤500mA	TS90135	--	40	80	mV
		TS9013S				
	Vin=Vo+1V, 1mA≤IL≤400mA	TS9013K	--	40	90	
		TS9013D				
		TS9013A				
Dropout Voltage (Note 2)	Io=500mA	TS90135	--	600	750	mV
		TS9013S	--	600	750	
	Io=400mA	TS9013K	--	600	850	
		TS9013D	--	600	850	
		TS9013A	--	850	1100	
Quiescent Current	Vin=Vo+1V, Io=0A		--	2	5	uA
Output Current Limit	Vout < 0.4V		--	550	--	mA
Power Supply Rejection Ratio	At f=100KHz, Io=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%.

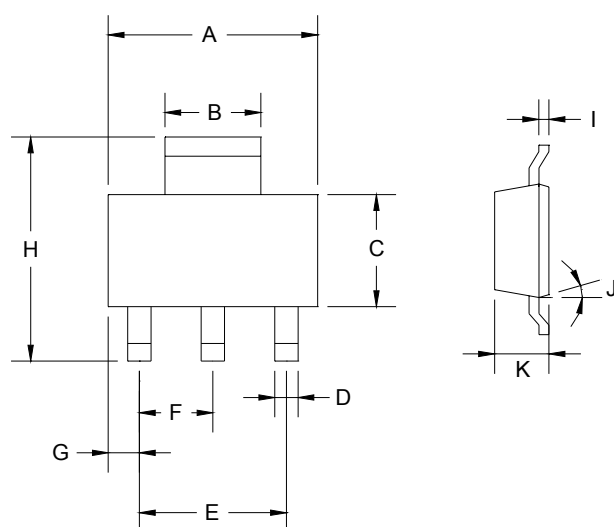
3. Guaranteed by design.

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-223 Mechanical Drawing



SOT-223 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.350	6.850	0.250	0.270
B	2.900	3.100	0.114	0.122
C	3.450	3.750	0.136	0.148
D	0.595	0.635	0.023	0.025
E	4.550	4.650	0.179	0.183
F	2.250	2.350	0.088	0.093
G	0.835	1.035	0.032	0.041
H	6.700	7.300	0.263	0.287
I	0.250	0.355	0.010	0.014
J	10°	16°	10°	16°
K	1.550	1.800	0.061	0.071