

## Low Dropout CMOS Voltage Regulators

# LM1114

### Features

- Maximum output current 250mA
- Highly accurate : output voltage $\pm 2\%$
- Low power consumption : typ.  $2\mu A$
- Small input/output differential:  
 0.4V at 160mA( $V_{out}=2.5V, 3.0V, 3.3V, 3.6V$ )  
 0.12V at 100mA( $V_{out}=5V$ )

### Applications

- Battery powered equipment
- Palmtops
- Portable cameras and video recorders
- Reference voltage sources

### Product Description

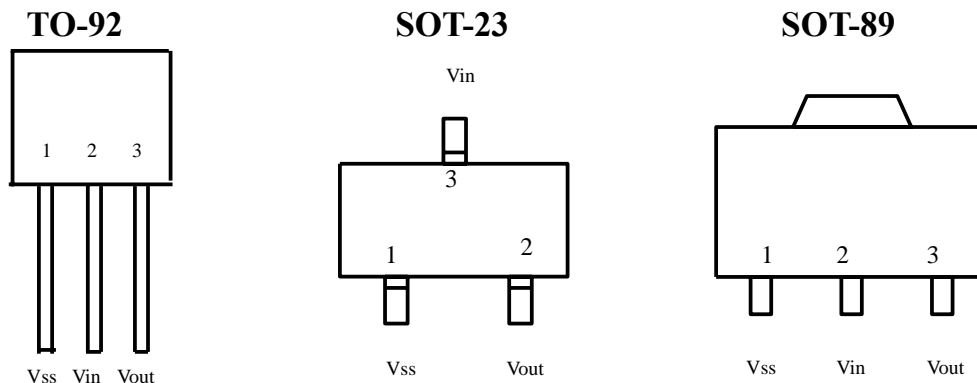
The LM1114 series is a group of positive voltage output, three-pin regulators, that provide a high current even when the input/output voltage differential is small. Low power consumption and high accuracy is achieved through CMOS and programmable fuse technologies. Output voltage: 2V to 6V in 0.1V increments.

The LM1114 consists of a high-precision voltage reference, an error correction circuit, and a current limited output driver. Transient response to load variations is improved in comparison to the existing ones.

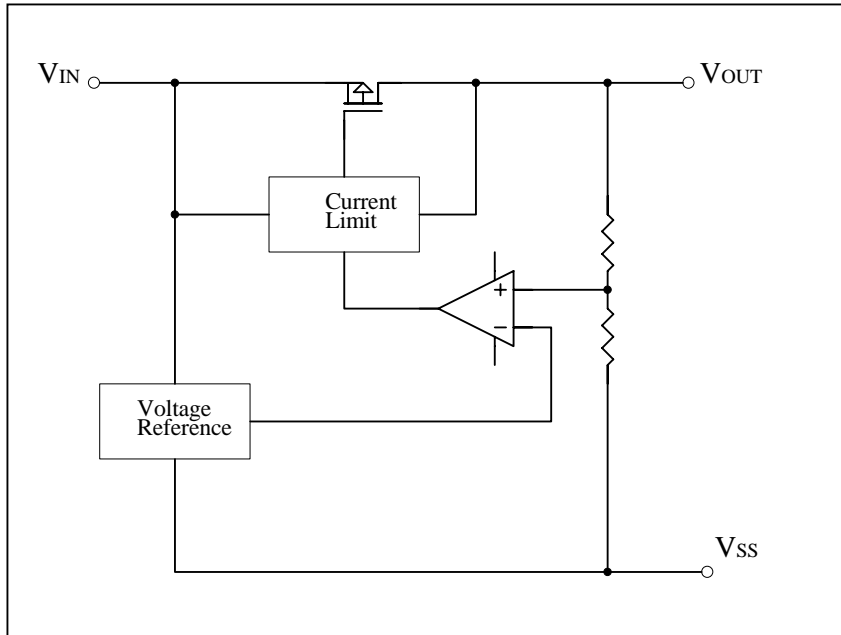
### Absolute Maximum Ratings

Parameter	Symbol	Ratings	Units
Input Voltage	$V_{in}$	12	V
Output Current	$I_{out}$	500	mA
Output Voltage	$V_{out}$	$V_{ss}-0.3 \sim V_{in}+0.3$	V
Continuous Total Power Dissipation	$P_D$	TO-92	500
		SOT-23	150
		SOT-89	500
Operating Ambient Temperature	$T_{opr}$	$-40 \sim +85$	$^{\circ}C$
Storage Temperature	$T_{stg}$	$-40 \sim +125$	$^{\circ}C$

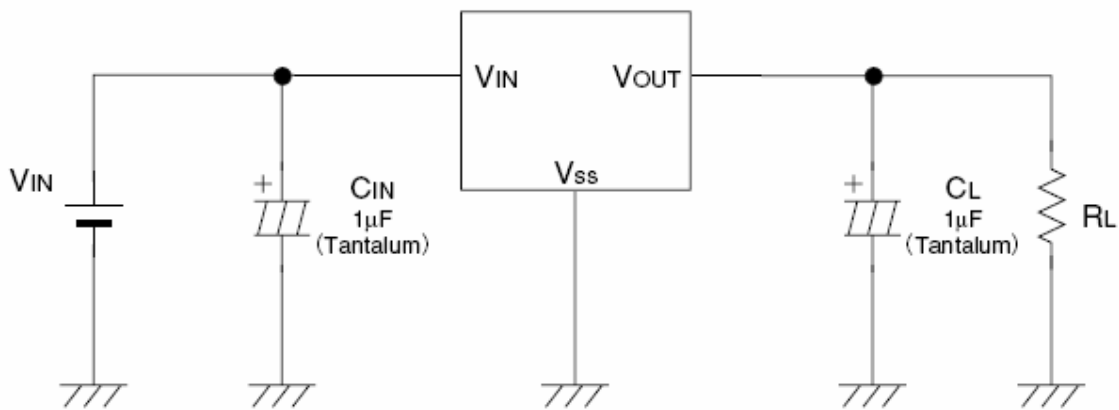
### Pin Configuration



**Block Diagram**



**Typical Application Circuit**





**Ordering Information**

Device	Output Voltage	Package	Shipping
LM1114-2.5 A3	2.5V	TO-92	Tape & Box / 2K
LM1114-2.5 N3	2.5V	SOT-23	Tape & Reel / 3K
LM1114-2.5 M3	2.5V	SOT-89	Tape & Reel / 1K
LM1114-3.0 A3	3.0V	TO-92	Tape & Box / 2K
LM1114-3.0 N3	3.0V	SOT-23	Tape & Reel / 3K
LM1114-3.0 M3	3.0V	SOT-89	Tape & Reel / 1K
LM1114-3.3 A3	3.3V	TO-92	Tape & Box / 2K
LM1114-3.3 N3	3.3V	SOT-23	Tape & Reel / 3K
LM1114-3.3 M3	3.3V	SOT-89	Tape & Reel / 1K
LM1114-3.6A3	3.6V	TO-92	Tape & Box / 2K
LM1114-3.6N3	3.6V	SOT-23	Tape & Reel / 3K
LM1114-3.6M3	3.6V	SOT-89	Tape & Reel / 1K
LM1114-5.0 A3	5.0V	TO-92	Tape & Box / 2K
LM1114-5.0 N3	5.0V	SOT-23	Tape & Reel / 3K
LM1114-5.0 M3	5.0V	SOT-89	Tape & Reel / 1K

**Electrical Characteristics @VIN=5V, Ta=25°C, CIN=1μF(tantalum),  
 COUT=1μF(tantalum), unless otherwise noted**

**LM1114-2.5**

Parameter	Conditions	Min	Typ	Max	Units	Circuit
Output Voltage	Io=40mA, Vin=4V	2.450	2.500	2.550	V	1
Line Regulation $\Delta V_{out}/\Delta V_{in}$	Io=40mA, 4V<Vin<10V	-	0.2	0.3	%/V	1
Load Regulation	Vin=4V, 1mA<Io<80mA	-	45	90	mV	1
Current Consumption	Vin=4V	-	2.0	4.5	μA	2
Dropout Voltage	Io=80mA	-	0.18	0.36	V	1
	Io=160mA	-	0.4	0.7	V	1

**LM1114-3.0**

Parameter	Conditions	Min	Typ	Max	Units	Circuit
Output Voltage	Io=40mA, Vin=4.0V	2.940	3.000	3.060	V	1
Line Regulation $\Delta V_{out}/\Delta V_{in}$	Io=40mA, 4.0V<Vin<10V	-	0.2	0.3	%/V	1
Load Regulation	Vin=6V, 1mA<Io<80mA	-	45	90	mV	1
Current Consumption	Vin=4.0V	-	1.0	2.9	μA	2
Dropout Voltage	Io=80mA	-	0.18	0.36	V	1
	Io=160mA	-	0.4	0.7	V	1

**LM1114-3.3**

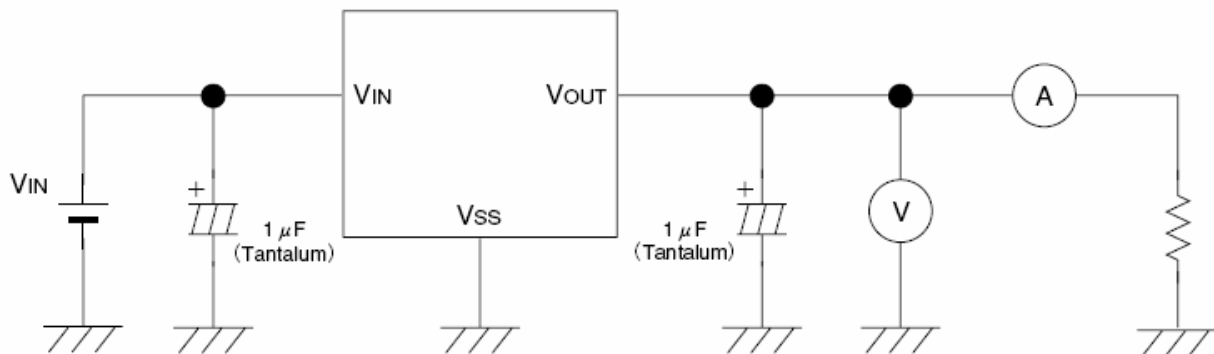
Parameter	Conditions	Min	Typ	Max	Units	Circuit
Output Voltage	$I_o=40\text{mA}, V_{in}=4.3\text{V}$	3.234	3.300	3.366	V	1
Line Regulation $\Delta V_{out}/\Delta V_{in}$	$I_o=40\text{mA}, 4.3\text{V}<V_{in}<10\text{V}$	-	0.2	0.3	%/V	1
Load Regulation	$V_{in}=6\text{V}, 1\text{mA}<I_o<80\text{mA}$	-	45	90	mV	1
Current Consumption	$V_{in}=4.3\text{V}$	-	1.0	2.9	$\mu\text{A}$	2
Dropout Voltage	$I_o=80\text{mA}$	-	0.18	0.36	V	1
	$I_o=160\text{mA}$	-	0.4	0.7	V	1

**LM1114-3.6**

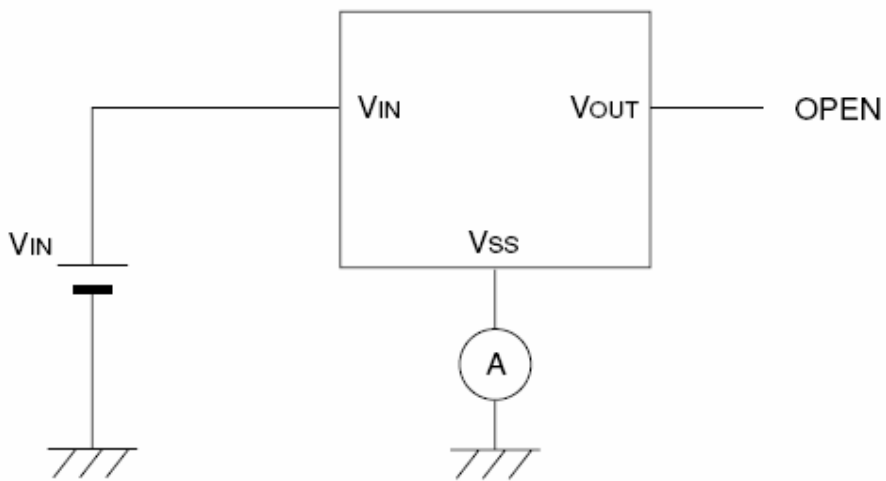
Parameter	Conditions	Min	Typ	Max	Units	Circuit
Output Voltage	$I_o=40\text{mA}, V_{in}=4.6\text{V}$	3.522	3.600	3.672	V	1
Line Regulation $\Delta V_{out}/\Delta V_{in}$	$I_o=40\text{mA}, 4.6\text{V}<V_{in}<10\text{V}$	-	0.2	0.3	%/V	1
Load Regulation	$V_{in}=6\text{V}, 1\text{mA}<I_o<80\text{mA}$	-	45	90	mV	1
Current Consumption	$V_{in}=4.6\text{V}$	-	1.0	2.9	$\mu\text{A}$	2
Dropout Voltage	$I_o=80\text{mA}$	-	0.18	0.36	V	1
	$I_o=160\text{mA}$	-	0.4	0.7	V	1

**LM1114-5.0**

Parameter	Conditions	Min	Typ	Max	Units	Circuit
Output Voltage	$I_o=40\text{mA}, V_{in}=6.0\text{V}$	4.900	5.000	5.100	V	1
Line Regulation $\Delta V_{out}/\Delta V_{in}$	$I_o=40\text{mA}, 6.0\text{V}<V_{in}<10\text{V}$	-	0.2	0.3	%/V	1
Load Regulation	$V_{in}=6\text{V}, 1\text{mA}<I_o<100\text{mA}$	-	40	80	mV	1
Current Consumption	$V_{in}=6.0\text{V}$	-	2.0	4.5	$\mu\text{A}$	2
Dropout Voltage	$I_o=100\text{mA}$	-	0.12	0.3	V	1
	$I_o=200\text{mA}$	-	0.38	0.6	V	1

**Test Circuits**  
**Circuit 1**


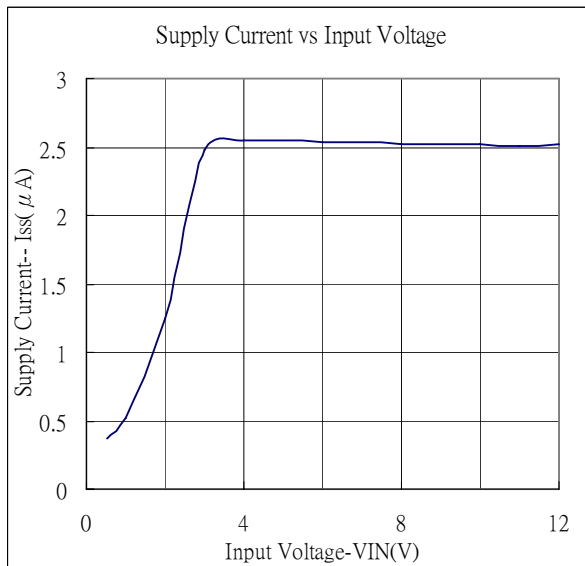
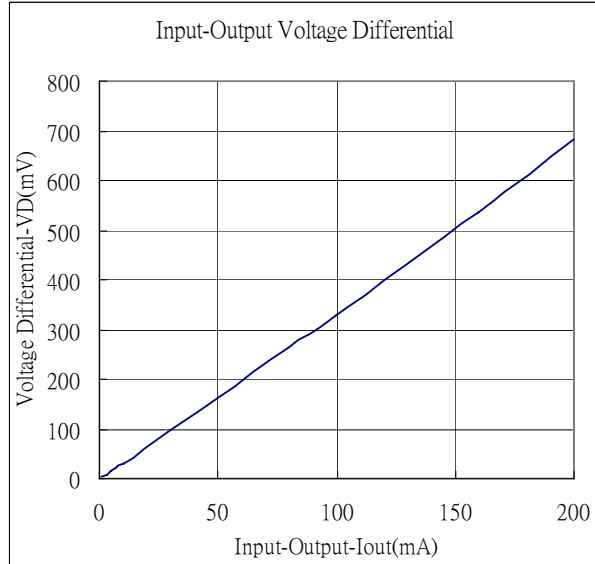
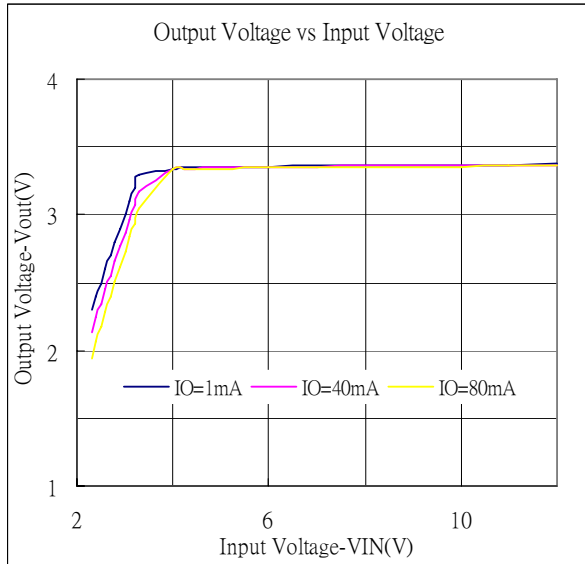
**Circuit 2**





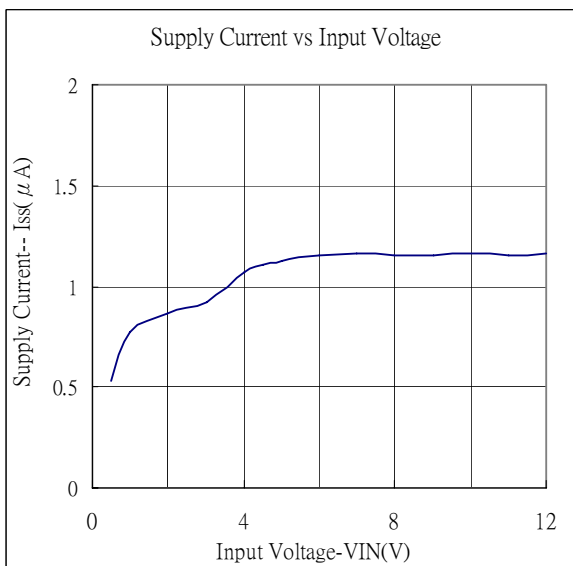
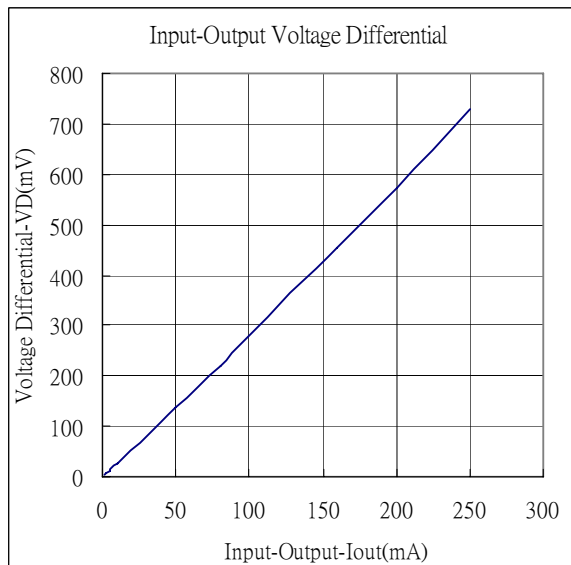
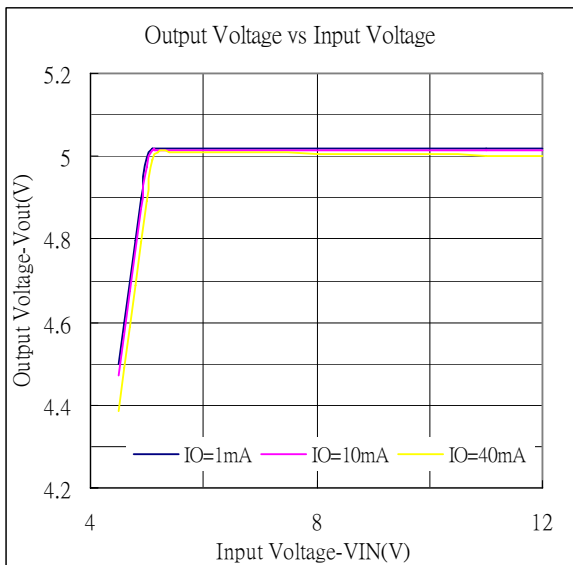
Characteristic Curves @ $C_{IN}=1\mu F(\text{tantalum})$ ,  $C_{OUT}=1\mu F(\text{tantalum})$

LM1114-3.3

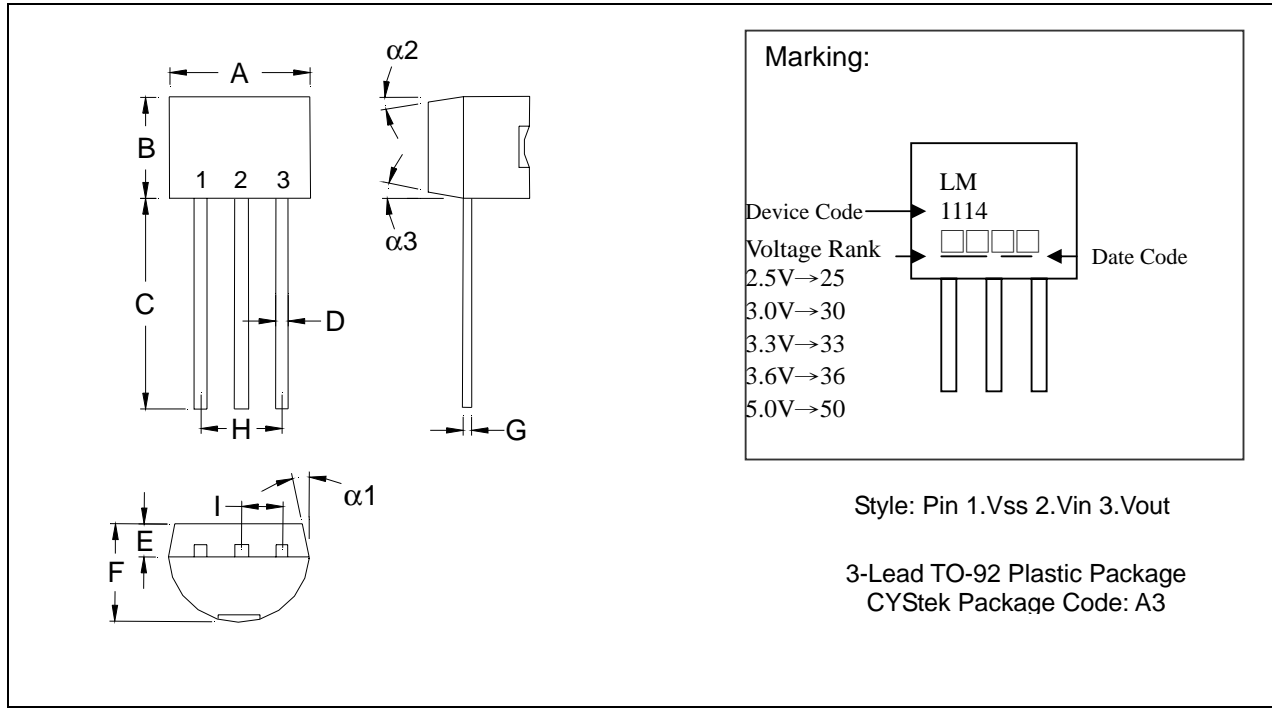




LM1114-5.0



**TO-92 Dimension**



\*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1704	0.1902	4.33	4.83	G	0.0142	0.0220	0.36	0.56
B	0.1704	0.1902	4.33	4.83	H	-	*0.1000	-	*2.54
C	0.5000	-	12.70	-	I	-	*0.0500	-	*1.27
D	0.0142	0.0220	0.36	0.56	$\alpha 1$	-	*5°	-	*5°
E	-	*0.0500	-	*1.27	$\alpha 2$	-	*2°	-	*2°
F	0.1323	0.1480	3.36	3.76	$\alpha 3$	-	*2°	-	*2°

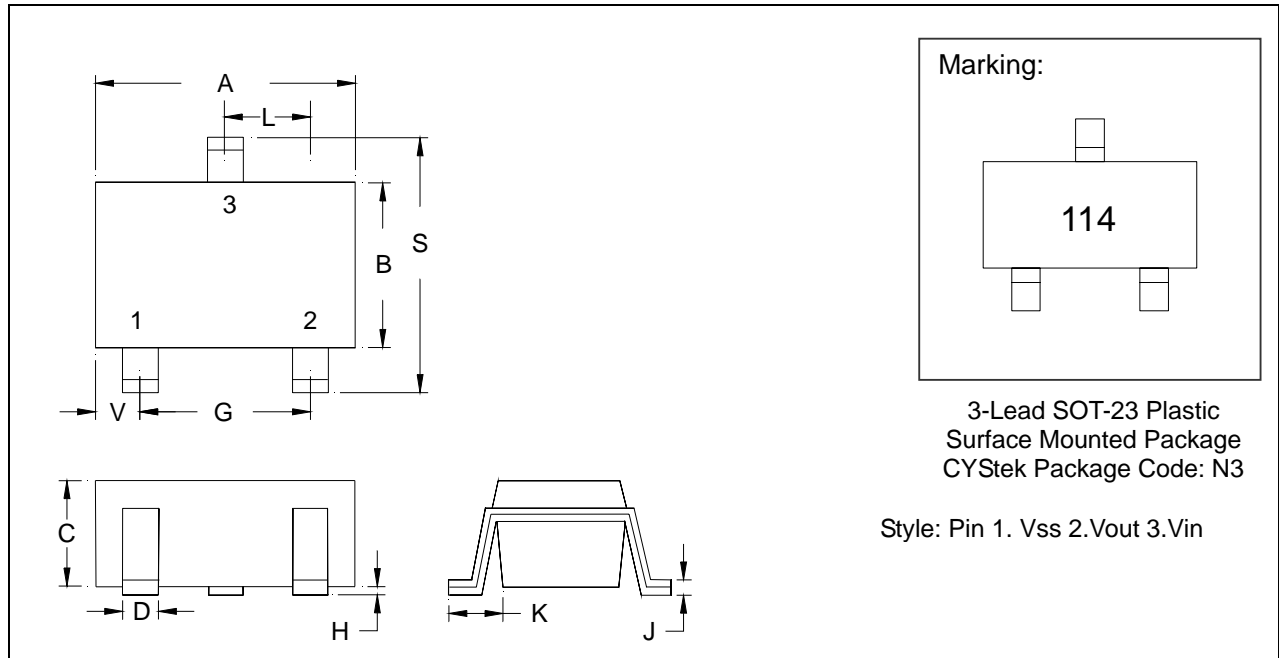
**Notes:** 1.Dimension and tolerance based on our Spec. dated Apr. 18,2002.  
 2.Controlling dimension: millimeters.  
 3.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.  
 4.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

**Material:**

- Lead: 42 Alloy ; solder plating
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0



**SOT-23 Dimension**



\*: Typical

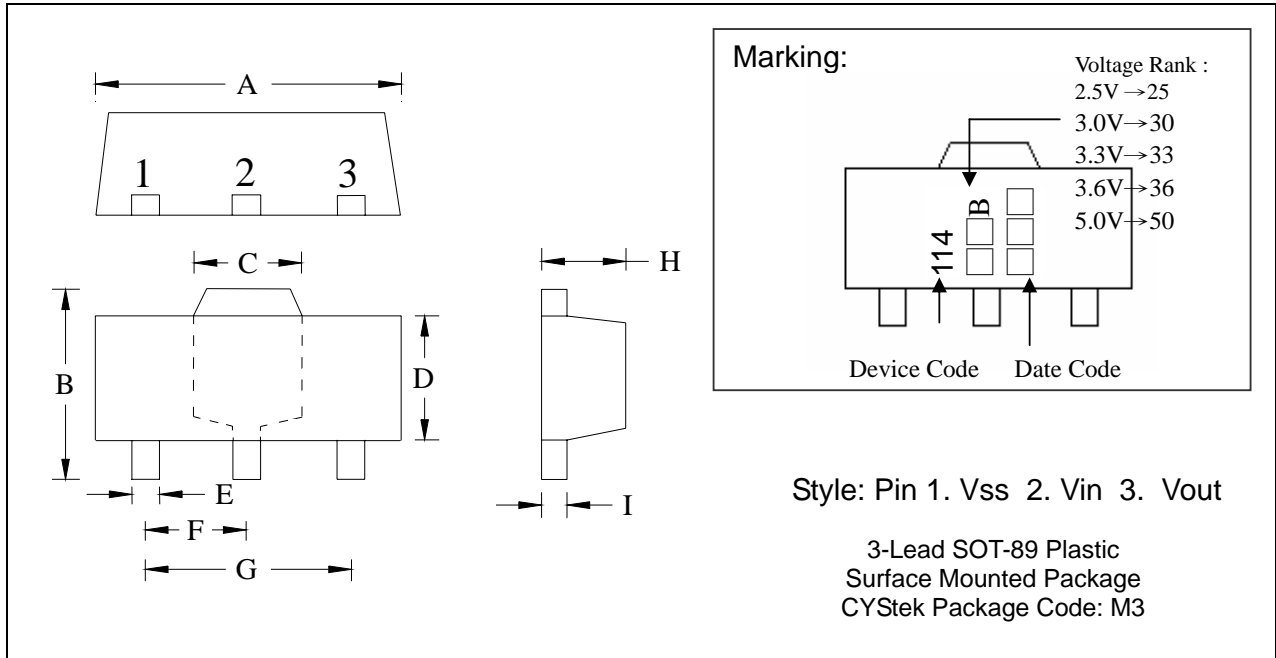
DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1102	0.1204	2.80	3.04	J	0.0034	0.0070	0.085	0.177
B	0.0472	0.0630	1.20	1.60	K	0.0128	0.0266	0.32	0.67
C	0.0335	0.0512	0.89	1.30	L	0.0335	0.0453	0.85	1.15
D	0.0118	0.0197	0.30	0.50	S	0.0830	0.1083	2.10	2.75
G	0.0669	0.0910	1.70	2.30	V	0.0098	0.0256	0.25	0.65
H	0.0005	0.0040	0.013	0.10					

**Notes:** 1.Dimension and tolerance based on our Spec. dated Feb. 18,2002.  
 2.Controlling dimension: millimeters.  
 3.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.  
 4.If there is any question with packing specification or packing method, please contact your local CYCtek sales office.

**Material:**

- Lead: 42 Alloy; solder plating
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

**SOT-89 Dimension**



\*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1732	0.1811	4.40	4.60	F	0.0583	0.0598	1.48	1.527
B	0.1594	0.1673	4.05	4.25	G	0.1165	0.1197	2.96	3.04
C	0.0591	0.0663	1.50	1.70	H	0.0551	0.0630	1.40	1.60
D	0.0945	0.1024	2.40	2.60	I	0.0138	0.0161	0.35	0.41
E	0.01417	0.0201	0.36	0.51					

**Notes:** 1.Controlling dimension: millimeters.  
 2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.  
 3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

**Material:**

- Lead: 42 Alloy ; solder plating
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

**Important Notice:**

- All rights are reserved. Reproduction in whole or in part is prohibited without the prior written approval of CYStek.
- CYStek reserves the right to make changes to its products without notice.
- CYStek **semiconductor products are not warranted to be suitable for use in Life-Support Applications, or systems.**
- CYStek assumes no liability for any consequence of customer product design, infringement of patents, or application assistance.