Features

- Low power consumption
- Low voltage drop
- Low temperature coefficient
- Ultra low quiescent current: 2μA(typ.)
- High input voltage (up to 15V)
- Maximum output current: 250mA
- Output voltage accuracy: tolerance ±2%
- TO92, SOT89 and SOT23 package

Applications

- Battery-powered equipment
- Communication equipment
- Audio/Video equipment

General Description

The 73XX series is a set of three-terminal low power high voltage regulators implemented in CMOS technology. They allow input voltages as high as 15V. The series features extremely low quiescent current which is typically 2μA. They are available with several fixed output voltages ranging from 2.1V to 5.0V. CMOS technology ensures low voltage drop and low quiescent current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain variable voltages and currents.

Selection Table

Part No.	Output Voltage	Package	Marking
7325-A	2.5V	TO92 SOT89 SOT23	73XX-A(for TO92) 73XX-A#(for SOT89) 3XXA#(for SOT23)
7327-A	2.7V		
7330-A	3.0V		
7333-A	3.3V		
7336-A	3.6V		
7340-A	4.0V		
7344-A	4.4V		
7350-A	5.0V		

Note:"XX" stands for output voltages.

SOT89 & SOT23 packages will add a "#" mark at the end of the marking.

Order Information

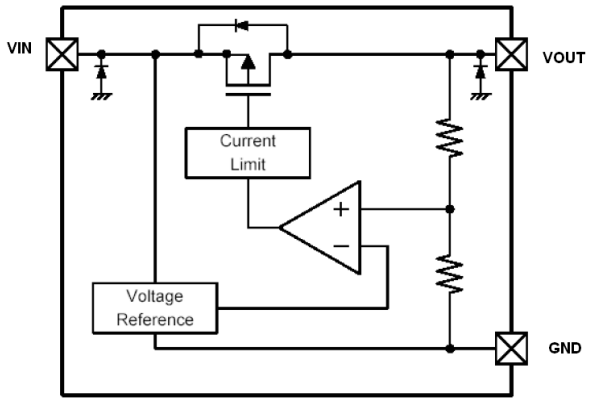
73①②③④⑤

Designator	Symbol	Description
① ②	Integer	Output Voltage(2.5~5.0V)
③	M	Standard
④	T	Package:TO-92
	P	Package:SOT89
	M	Package:SOT23
⑤	R	RoHS / Pb Free
	G	Halogen Free

Block Diagram

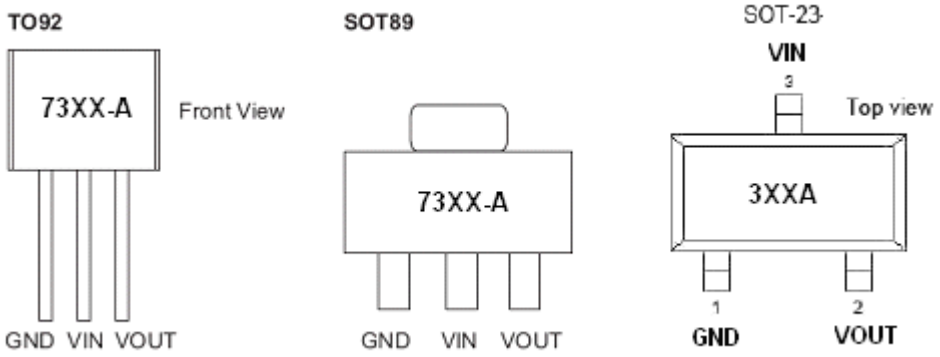
④	T	Package:TO-92
	P	Package:SOT89
	M	Package:SOT23
⑤	R	RoHS / Pb Free
	G	Halogen Free

Block Diagram



*Diodes inside the circuit are an ESD protection diode and a parasitic diode.

Pin Assignment



Absolute Maximum Ratings

Supply Voltage .....-0.3V to 18V

Operating Temperature .....-40℃ to 85℃

Storage Temperature .....-50℃ to 125℃

Note: These are stress ratings only. Stresses exceeding the range specified under “Absolute Maximum Ratings” may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

Thermal Information

Symbol	Parameter	Package	Max.	Unit
θ_{JA}	Thermal Resistance (Junction to Ambient) (Assume no ambient	SOT23	500	℃/W
		SOT89	200	℃/W

	airflow, no heat sink)	TO92	200	℃/W
P_D	Power Dissipation	SOT23	0.20	W
		SOT89	0.50	W
		TO92	0.50	W

Note: P_D is measured at Ta= 25℃

Electrical Characteristics

7325-A, +2.5V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	3.5V	I_{OUT}=40mA	2.45	2.500	2.55	V
I_{OUT}	Output Current	3.5V	-	180	250	-	mA
ΔV_{OUT}	Load Regulation	3.5V	1mA≤I_{OUT}≤60mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	100	-	mV
ISS	Current Consumption	3.5V	No load	-	2.5	3	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	3.5V≤V_{IN}≤12V I_{OUT}=40mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	3.5V	IOUT=40mA -40℃<Ta<85℃	-	±0.5	-	mV/℃

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+1V with a fixed load.

7327-A, +2.7V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	3.7V	I_{OUT}=10mA	2.646	2.700	2.754	V
I_{OUT}	Output Current	3.7V	-	200	250	-	mA
ΔV_{OUT}	Load Regulation	3.7V	1mA≤I_{OUT}≤60mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	100	-	mV
ISS	Current Consumption	3.7V	No load	-	2.5	3	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	3.7V≤V_{IN}≤12V I_{OUT}=40mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	3.7V	IOUT=10mA -40℃<Ta<85℃	-	±0.5	-	mV/℃

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+1V with a fixed load.

7330-A, +3.0V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	4V	I_{OUT}=40mA	2.94	3.00	2.06	V
I_{OUT}	Output Current	4V	-	250	-	-	mA
ΔV_{OUT}	Load Regulation	4V	1mA≤I_{OUT}≤80mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	100	-	mV
ISS	Current Consumption	4V	No load	-	2.5	3	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	4V≤V_{IN}≤12V I_{OUT}=40mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	4V	IOUT=40mA -40℃<Ta<85℃	-	±0.5	-	mV/℃

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+1V with a fixed load.

7333-A, +3.3V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	4.3V	I_{OUT}=40mA	3.234	3.300	3.366	V
I_{OUT}	Output Current	4.3V	-	250	-	-	mA
ΔV_{OUT}	Load Regulation	4.3V	1mA≤I_{OUT}≤80mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	100	-	mV
ISS	Current Consumption	4.3V	No load	-	2.5	3	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	4.3V≤V_{IN}≤12V I_{OUT}=40mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V

$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	4.3V	IOUT=40mA -40℃<Ta<85℃	-	±0.5	-	mV/℃

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at $V_{IN} = V_{OUT}+1V$ with a fixed load.

7336-A, +3.6V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	4.6V	I_{OUT}=40mA	3.528	3.600	3.672	V
I_{OUT}	Output Current	4.6V	-	250	-	-	mA
ΔV_{OUT}	Load Regulation	4.6V	1mA≤I_{OUT}≤80mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	80	-	mV
ISS	Current Consumption	4.6V	No load	-	2.5	3.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	4.6V≤V_{IN}≤12V I_{OUT}=40mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	4.6V	IOUT=40mA -40℃<Ta<85℃	-	±0.5	-	mV/℃

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at $V_{IN} = V_{OUT}+1V$ with a fixed load.

7340-A, +4.0V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	5.0V	I_{OUT}=40mA	3.920	4.000	4.080	V
I_{OUT}	Output Current	5.0V	-	250	-	-	mA
ΔV_{OUT}	Load Regulation	5.0V	1mA≤I_{OUT}≤80mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	80	-	mV
ISS	Current Consumption	5.0V	No load	-	2.5	3.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	5V≤V_{IN}≤12V I_{OUT}=40mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	5.0V	IOUT=40mA -40℃<Ta<85℃	-	±0.5	-	mV/℃

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at $V_{IN} = V_{OUT}+1V$ with a fixed load.

7344-A, +4.4V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	5.4V	I_{OUT}=40mA	4.312	4.400	4.488	V
I_{OUT}	Output Current	5.4V	-	250	-	-	mA
ΔV_{OUT}	Load Regulation	5.4V	1mA≤I_{OUT}≤80mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	80	-	mV
ISS	Current Consumption	5.4V	No load	-	2.5	3.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	5.4V≤V_{IN}≤12V I_{OUT}=40mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	5.4V	IOUT=40mA -40℃<Ta<85℃	-	±0.5	-	mV/℃

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at $V_{IN} = V_{OUT}+1V$ with a fixed load.

7350-A, +5.0V Output Type

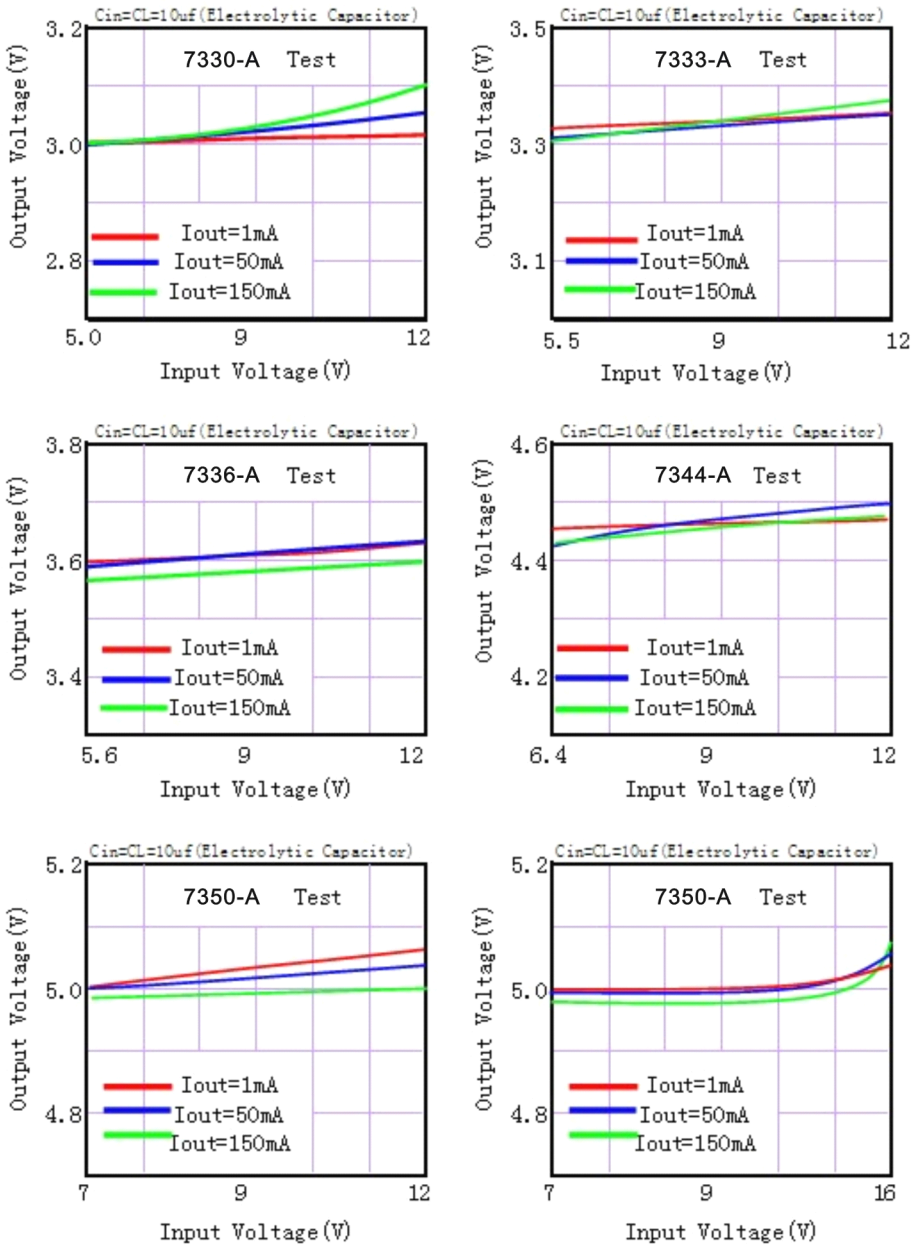
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	6V	I_{OUT}=40mA	4.9	5.00	5.1	V
I_{OUT}	Output Current	6V	-	250	-	-	mA
ΔV_{OUT}	Load Regulation	6V	1mA≤I_{OUT}≤80mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	80	-	mV
ISS	Current Consumption	6V	No load	-	2.5	3.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	6V≤V_{IN}≤12V I_{OUT}=40mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V

$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	6V	IOUT=40mA -40℃<Ta<85℃	-	±0.5	-	mV/℃

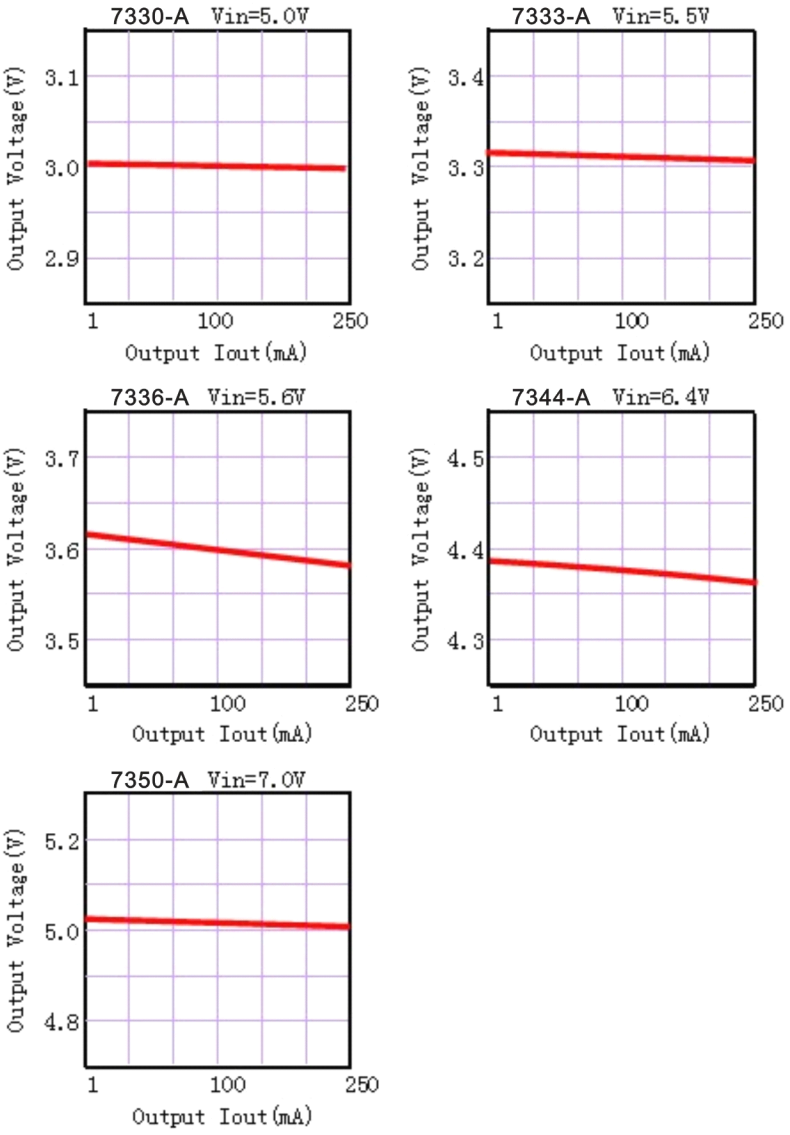
Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+1V with a fixed load.

Typical Performance Characteristics

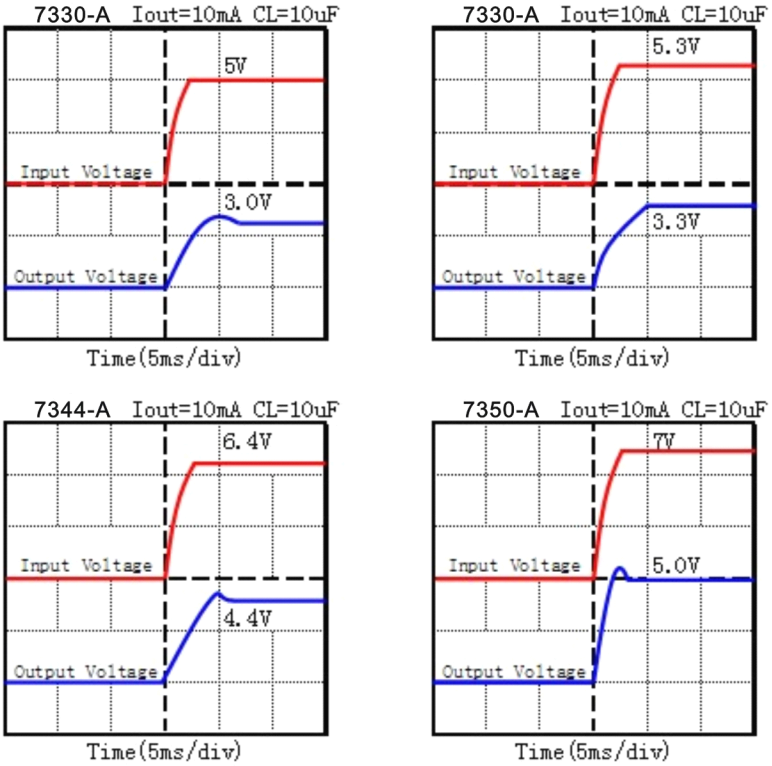
(1) Output Voltage vs Input voltage



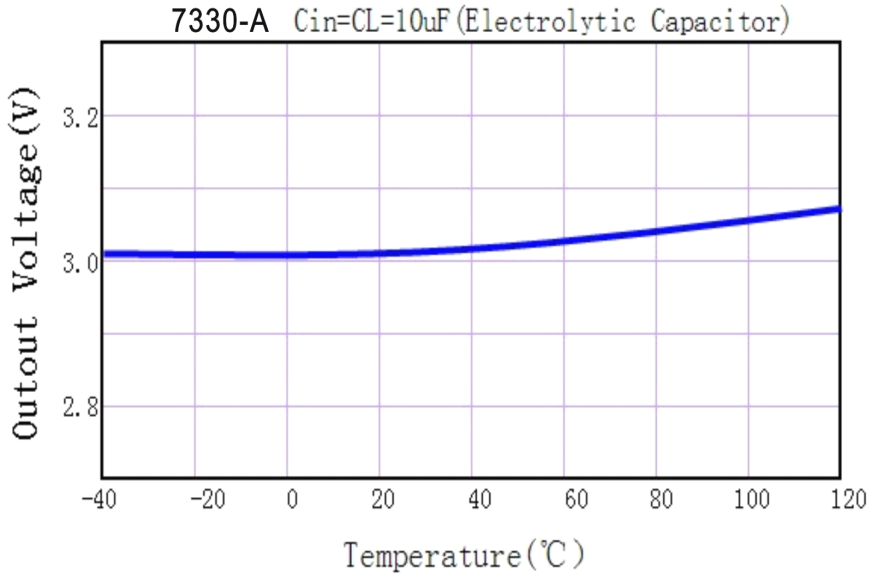
(2) Output Voltage vs.Output Current



(3) Input Transient Response



(4) Output Voltage vs.Ambient Temperature



(5) MAX Output Current Vs. Input Voltage

7330-A

Input Voltage	Max Output Current
5V	250mA
9V	200mA
12V	150mA
15V	100mA

7333-A

Input Voltage	Max Output Current
5.3V	250mA
9V	200mA
12V	150mA
15V	100mA

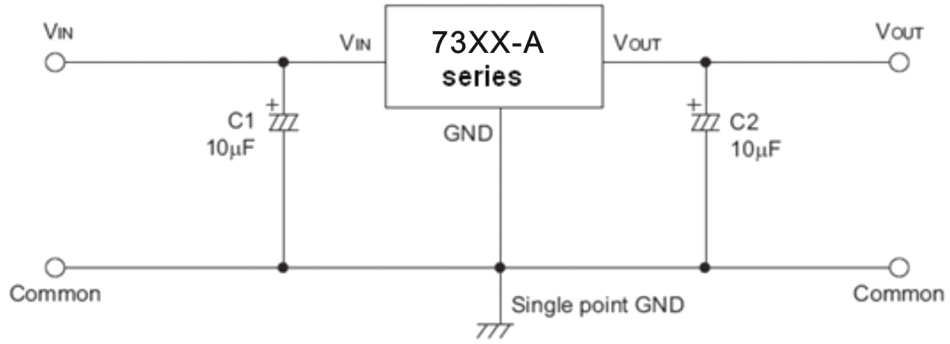
7350-A

Input Voltage	Max Output Current
7V	250mA
9V	200mA
12V	150mA

15V	100mA

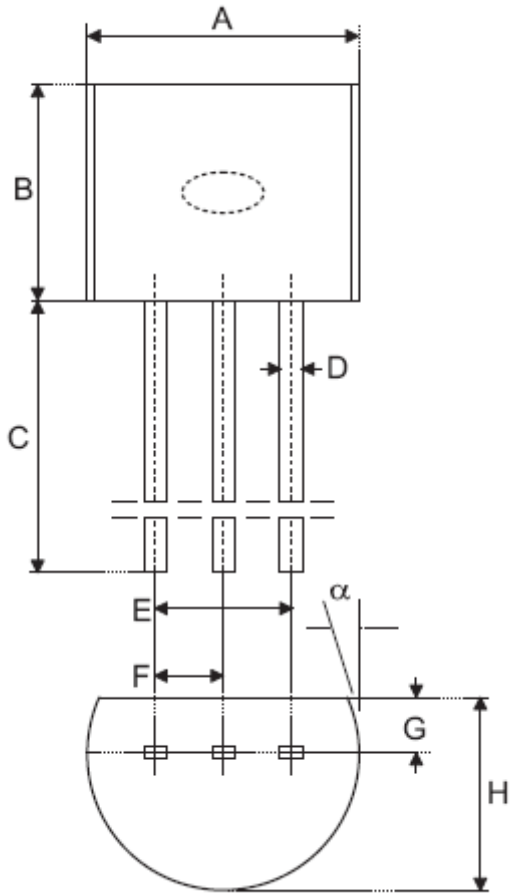
Application Circuits

Basic Circuits



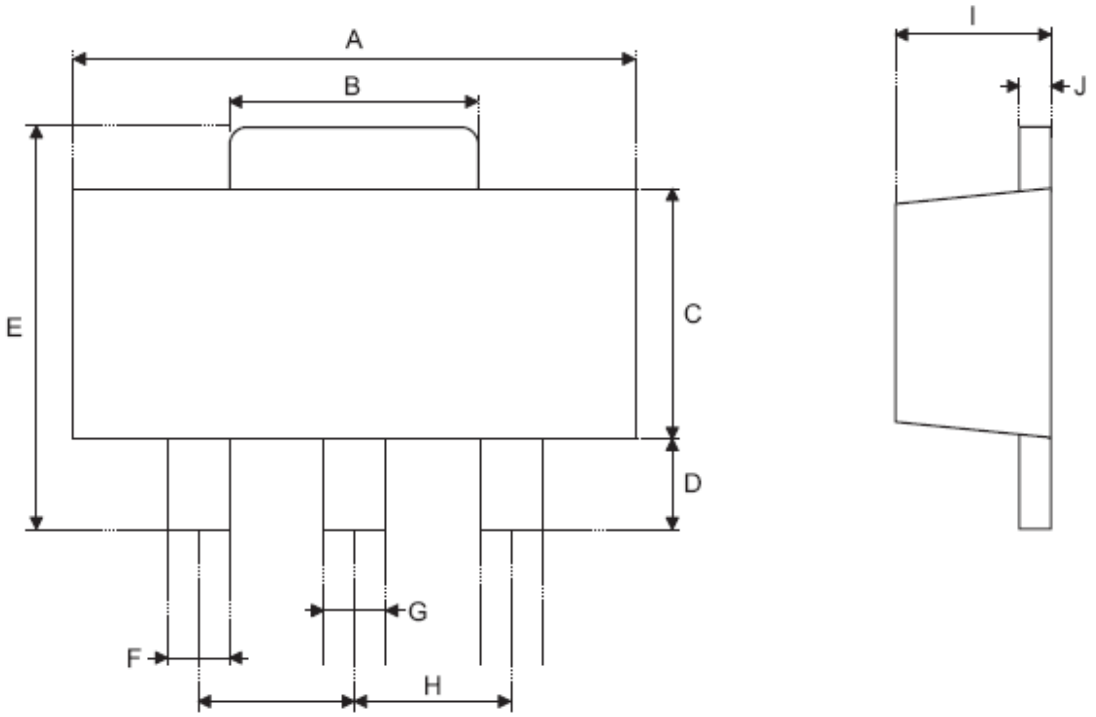
Package Information

3-pin TO92 Outline Dimensions



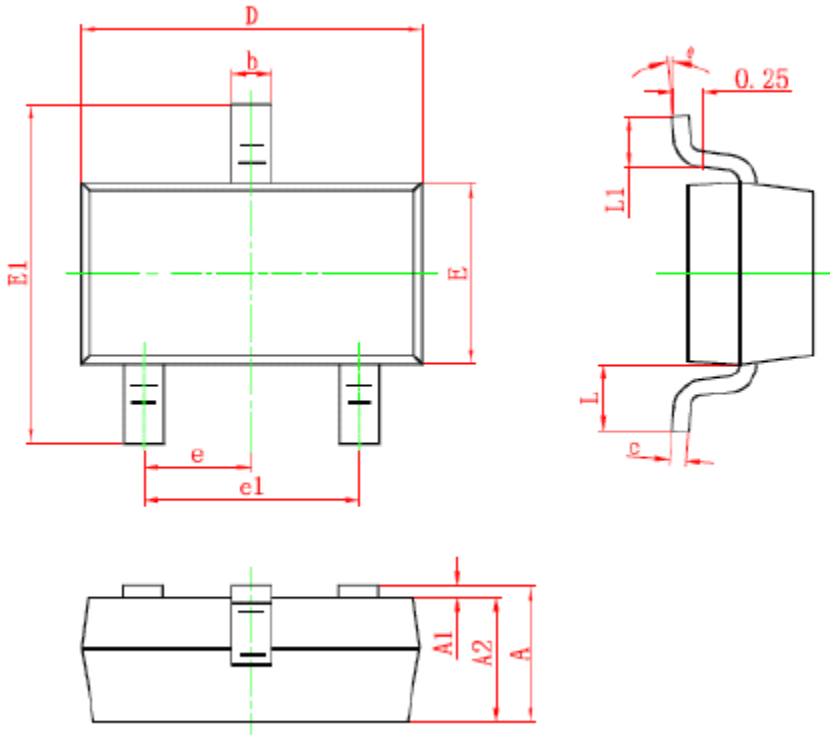
Symbol	Dimensions in mil		
	Min.	Nom.	Max.
A	170	—	200
B	170	—	200
C	500	—	—
D	11	—	20
E	90	—	110
F	45	—	55
G	45	—	65
H	130	—	160
I	8	—	18
α	4°	—	6°

3-pin SOT89 Outline Dimensions



Symbol	Dimensions in mil		
	Min.	Nom.	Max.
A	173	—	181
B	59	—	72
C	90	—	102
D	35	—	47
E	155	—	167
F	14	—	19
G	17	—	22
H	—	59	—
I	55	—	63
J	14	—	17

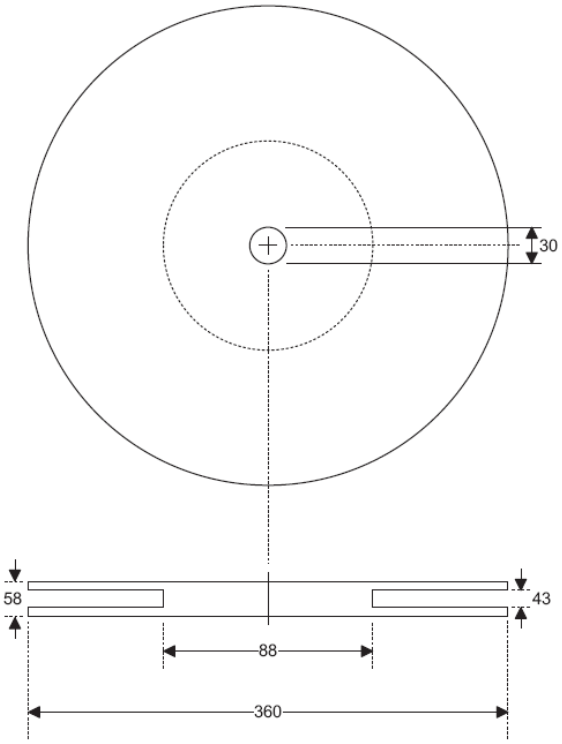
3-pin SOT23 Outline Dimensions

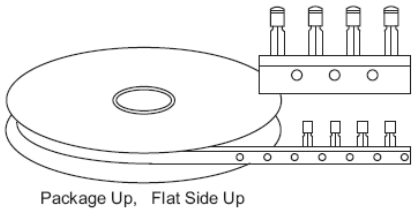


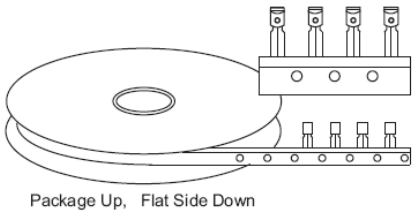
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	6°

Product Tape and Reel Specifications

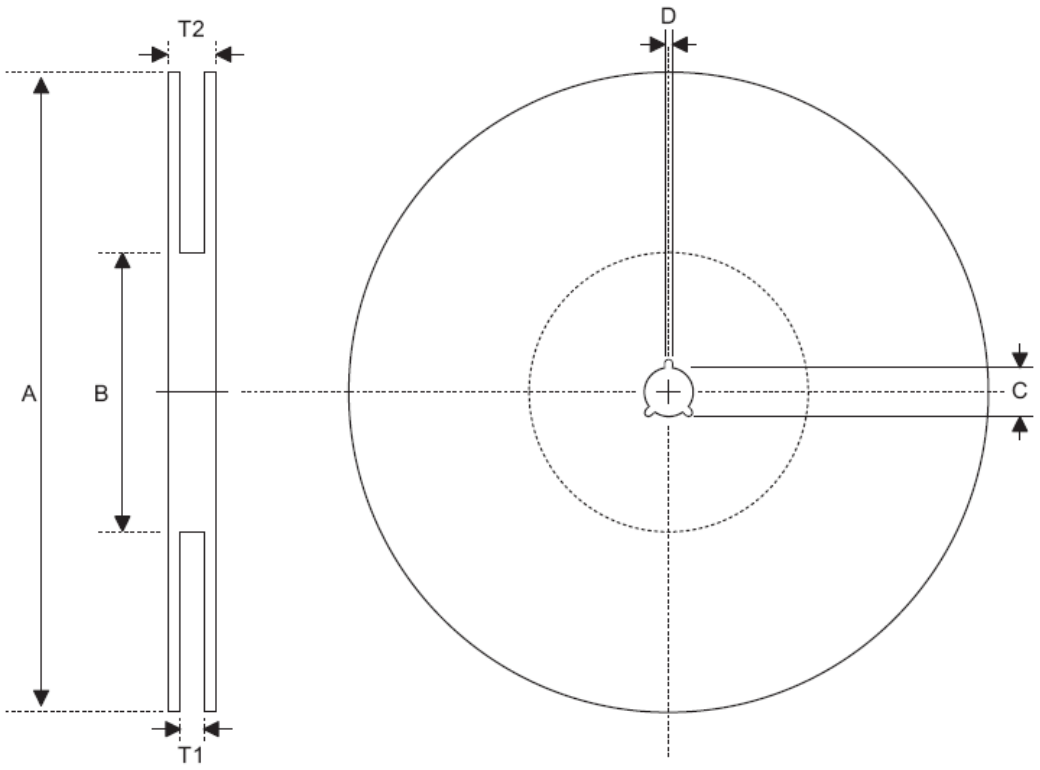
3-pin TO92 Reel Dimensions (Unit: mm)







Reel Dimensions



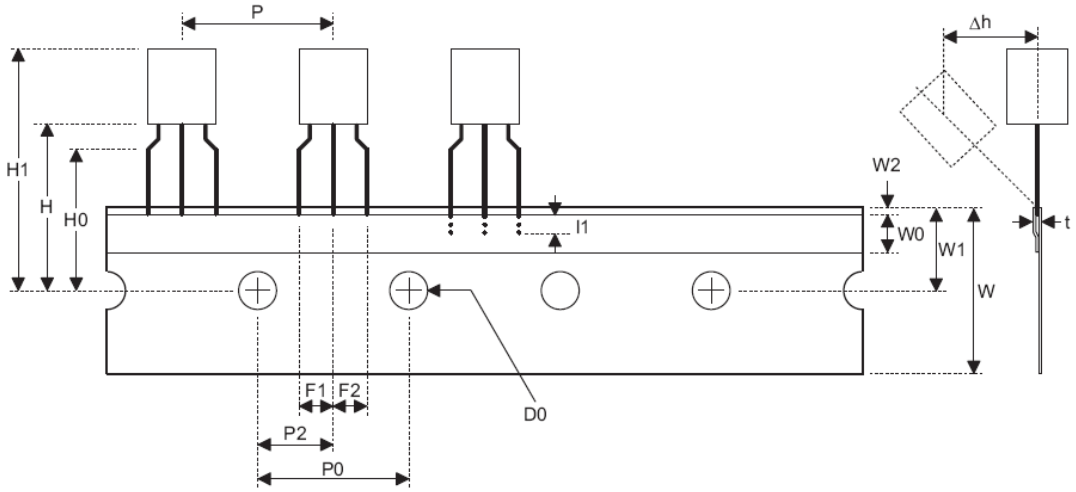
SOT89

Symbol	Description	Dimensions in mm
A	Reel Outer Diameter	180.0±1.0
B	Reel Inner Diameter	62.0±1.5
C	Spindle Hole Diameter	$12.75^{+0.15/-0.00}$
D	Key Slit Width	1.90±0.15
T1	Space Between Flange	$12.4^{+0.2/-0.00}$
T2	Reel Thickness	$17.0^{+0.0/-0.4}$

SOT23-5

Symbol	Description	Dimensions in mm
A	Reel Outer Diameter	178.0±1.0
B	Reel Inner Diameter	62.0±1.0
C	Spindle Hole Diameter	13.0±0.2
D	Key Slit Width	2.50±0.25
T1	Space Between Flange	$8.4^{+1.5/-0.0}$
T2	Reel Thickness	$11.4^{+1.5/-0.0}$

Carrier Tape Dimensions



TO92

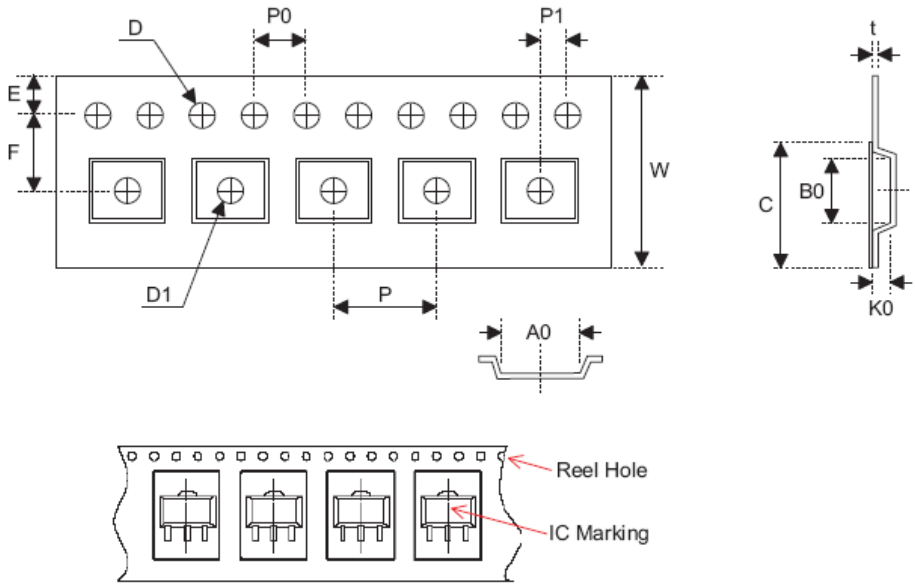
Symbol	Description	Dimensions in mm
I1	Taped Lead Length	(2.5)
P	Component Pitch	12.7±1.0
P_0	Perforation Pitch	12.7±0.3
P_2	Component to Perforation (Length Direction)	6.35±0.40
F_1	Lead Spread	$2.5^{+0.4/-0.1}$
F_2	Lead Spread	$2.5^{+0.4/-0.1}$
Δh	Component Alignment	0.0±0.1
W	Carrier Tape Width	$18.0^{+1.0/-0.5}$
W_0	Hold-down Tape Width	6.0±0.5
W_1	Perforation Position	9.0±0.5
W_2	Hold-down Tape Position	(0.5)
H_0	Lead Clinch Height	16.0±0.5
H_1	Component Height	Less than 24.7
D_0	Perforation Diameter	4.0±0.2
t	Taped Lead Thickness	0.7±0.2
H	Component Base Height	19.0±0.5

Note: Thickness less than 0.38_0.05mm~0.5mm

P0 Accumulated pitch tolerance: _1mm/20pitches.

( ) Bracketed figures are for consultation only

Carrier Tape Dimensions



SOT89

Symbol	Description	Dimensions in mm
W	Carrier Tape Width	$12.0^{+0.3/-0.1}$
P	Cavity Pitch	8.0±0.1
E	Perforation Position	1.75±0.10
F	Cavity to Perforation (Width Direction)	5.50±0.05
D	Perforation Diameter	$1.5^{+0.1/-0.0}$
D1	Cavity Hole Diameter	$1.5^{+0.1/-0.0}$
P0	Perforation Pitch	4.0±0.1
P1	Cavity to Perforation (Length Direction)	2.0±0.1
A0	Cavity Length	4.8±0.1
B0	Cavity Width	4.5±0.1
K0	Cavity Depth	1.8±0.1
t	Carrier Tape Thickness	0.300±0.013
C	Cover Tape Width	9.3±0.1

SOT23-5

Symbol	Description	Dimensions in mm
W	Carrier Tape Width	8.0±0.3
P	Cavity Pitch	4.0±0.1
E	Perforation Position	1.75±0.10
F	Cavity to Perforation (Width Direction)	3.50±0.05
D	Perforation Diameter	$1.5^{+0.1/-0.0}$
D1	Cavity Hole Diameter	$1.5^{+0.1/-0.0}$
P0	Perforation Pitch	4.0±0.1
P1	Cavity to Perforation (Length Direction)	2.00±0.05
A0	Cavity Length	3.15±0.10
B0	Cavity Width	3.2±0.1
K0	Cavity Depth	1.4±0.1
t	Carrier Tape Thickness	0.20±0.03
C	Cover Tape Width	5.3±0.1