Features

- Low power consumption
- Low voltage drop
- Low temperature coefficient
- High input voltage (up to 15V)
- High output current : 250mA
- Output voltage accuracy: tolerance ±2%
- TO92, SOT89 and SOT23-5 package

Applications

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

General Description

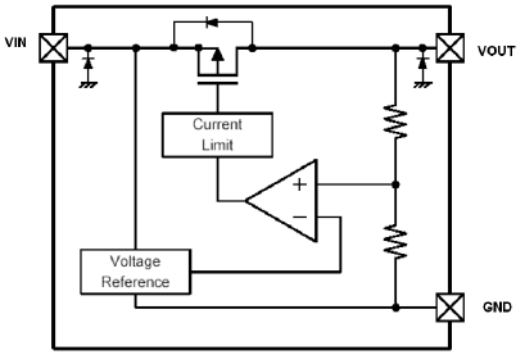
The ASPL73XX series is a set of three-terminal high cur-rent low voltage regulator implemented in CMOS tech-nology. They can deliver 250mA output current and allow an input voltage as high as 15V. They are avail-able with several fixed output voltages ranging 2.5V to 5.0V. CMOS technology ensures low 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

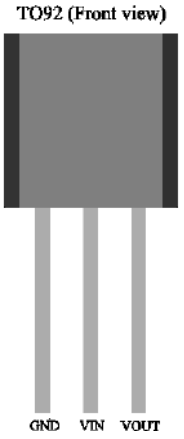
Part No.	Output Voltage	Package
ASPL7325	2.5V	TO92 SOT89 SOT23-3 SOT23
ASPL7328	2.8V	
ASPL7330	3.0V	
ASPL7333	3.3V	
ASPL7336	3.6V	
ASPL7340	4.0V	
ASPL7344	4.4V	
ASPL7350	5.0V	

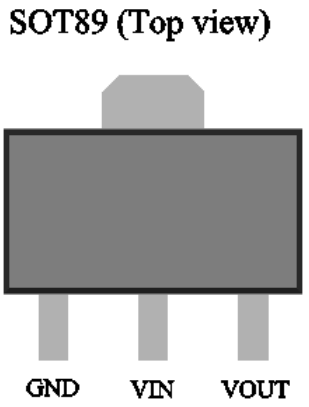
Block Diagram

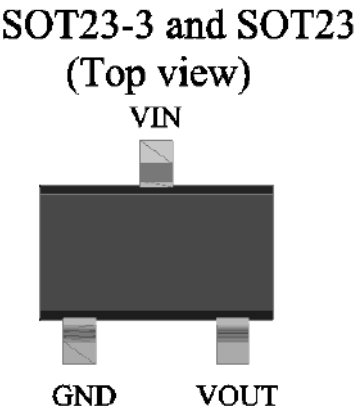


*Diodes inside the circuit are an ESD protection diode and a parasitic diode.

Pin Assignment







Absolute Maximum Ratings

Supply Voltage .....–0.3V to 18V

Storage Temperature .....–50°C to 125°C

Operating Temperature .....–30°C t o 8 5 °C

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 airflow, no heat sink)	SOT23	500	°C/W
		SOT89	200	°C/W
		TO92	200	°C/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°C

Electrical Characteristics

ASPL7325, +2.5V Output Type

Ta=25°C

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	4.5V	I_{OUT}=40mA	2.45	2.500	2.55	V
I_{OUT}	Output Current	4.5V	-	-	250	-	mA
ΔV_{OUT}	Load Regulation	4.5V	1mA≤I_{OUT}≤60mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	100	-	mV
I_{SS}	Current Consumption	4.5V	No load	-	2.0	3.0	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	4.5V	I_{OUT}=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.

ASPL7328, +2.8V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	4.8V	I_{OUT}=10mA	2.744	2.800	2.856	V
I_{OUT}	Output Current	4.8V	-	-	250	-	mA
ΔV_{OUT}	Load Regulation	4.8V	1mA≤I_{OUT}≤60mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	100	-	mV
I_{SS}	Current Consumption	4.8V	No load	-	2.0	3.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	3.8V≤V_{IN}≤12V I_{OUT}=40mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	4.8V	I_{OUT}=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.

ASPL7530, +3.0 Output Type

Ta=25°C

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	5V	I_{OUT}=40mA	2.94	3.00	3.06	V
I_{OUT}	Output Current	5V	-	-	250	-	mA
ΔV_{OUT}	Load Regulation	5V	1mA≤I_{OUT}≤80mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	100	-	mV
I_{SS}	Current Consumption	5V	No load	-	2.0	3.0	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	5V	I_{OUT}=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.

ASPL7333, +3.3 Output Type

Ta=25°C

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	5.3V	I_{OUT}=40mA	3.234	3.300	3.366	V
I_{OUT}	Output Current	5.3V	-	-	250	-	mA
ΔV_{OUT}	Load Regulation	5.3V	1mA≤I_{OUT}≤80mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	100	-	mV
I_{SS}	Current Consumption	5.3V	No load	-	2.0	3.0	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	5.3V	I_{OUT}=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.

ASPL7336, +3.6V Output Type

Ta=25°C

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	5.6V	I_{OUT}=40mA	3.528	3.600	3.672	V
I_{OUT}	Output Current	5.6V	-	-	250	-	mA
ΔV_{OUT}	Load Regulation	5.6V	1mA≤I_{OUT}≤80mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	80	-	mV
I_{SS}	Current Consumption	5.6V	No load	-	2.0	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	5.6V	I_{OUT}=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.

ASPL7340, +4.0V Output Type

Ta=25°C

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	6.0V	I_{OUT}=40mA	3.920	4.000	4.080	V
I_{OUT}	Output Current	6.0V	-	-	250	-	mA
ΔV_{OUT}	Load Regulation	6.0V	1mA≤I_{OUT}≤80mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	80	-	mV
I_{SS}	Current Consumption	6.0V	No load	-	2.0	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	6.0V	I_{OUT}=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.

ASPL7344, +4.4V Output Type Ta=25°C

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	6.4V	I_{OUT}=40mA	4.312	4.400	4.488	V
I_{OUT}	Output Current	6.4V	-	-	250	-	mA
ΔV_{OUT}	Load Regulation	6.4V	1mA≤I_{OUT}≤80mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	80	-	mV
I_{SS}	Current Consumption	6.4V	No load	-	2.0	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	6.4V	I_{OUT}=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.

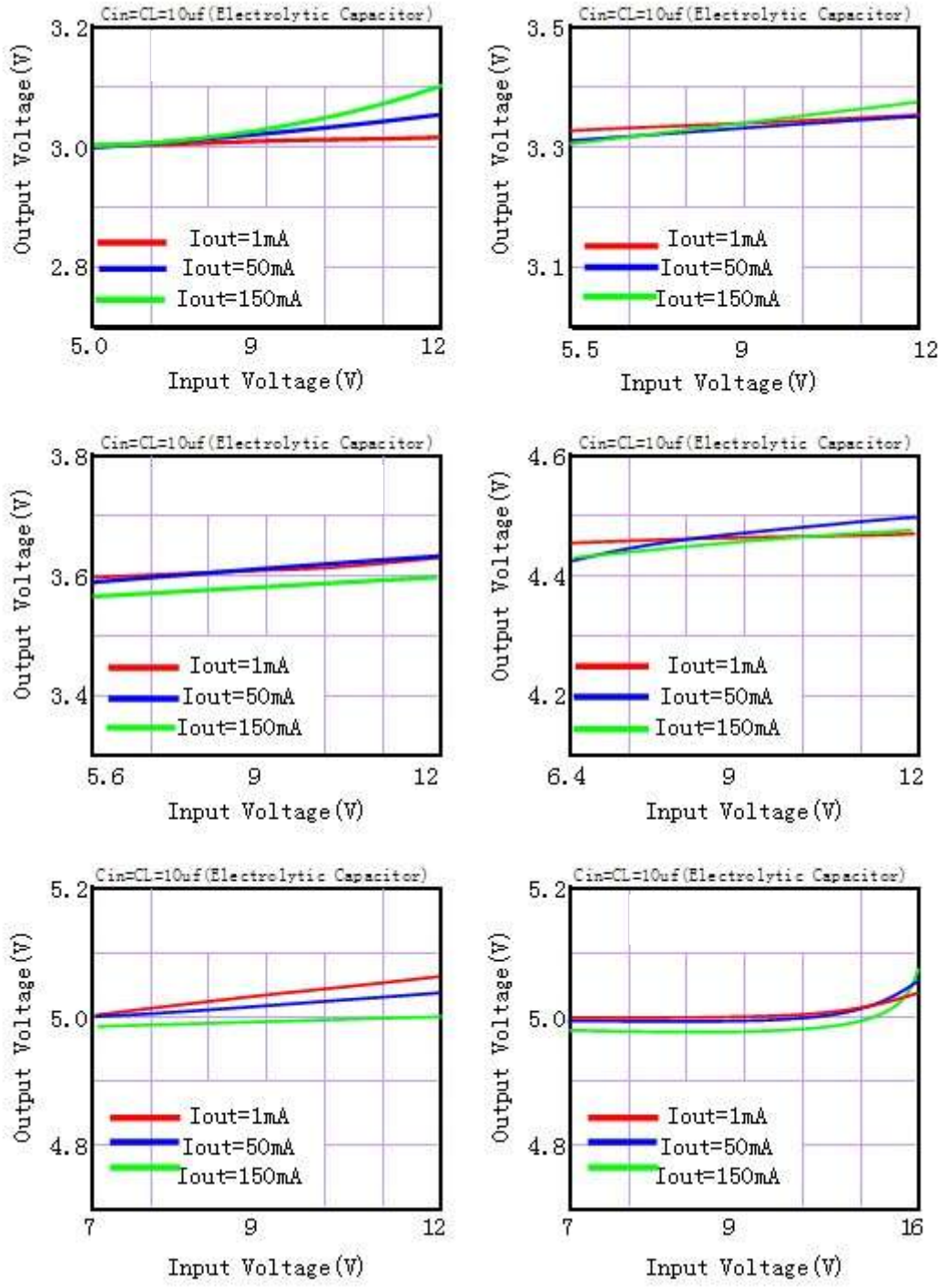
ASPL7350, +5.0V Output Type Ta=25°C

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	7V	I_{OUT}=40mA	4.9	5.00	5.1	V
I_{OUT}	Output Current	7V	-	-	250	-	mA
ΔV_{OUT}	Load Regulation	7V	1mA≤I_{OUT}≤80mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	80	-	mV
I_{SS}	Current Consumption	7V	No load	-	2.0	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	7V	I_{OUT}=40mA -40℃<Ta<85℃	-	±0.5	-	mV/℃

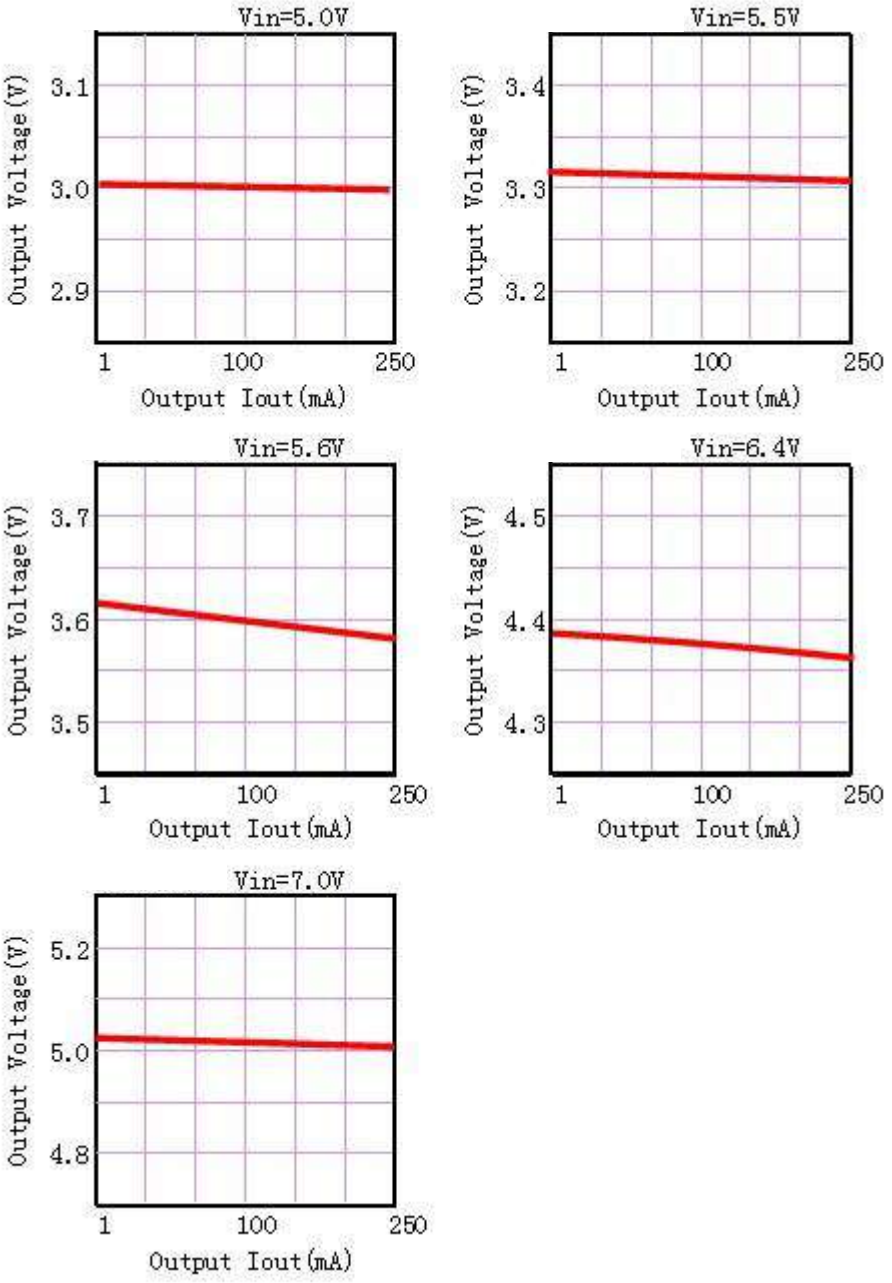
Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+1V with a fixed load.

Typical Performance Characteristics

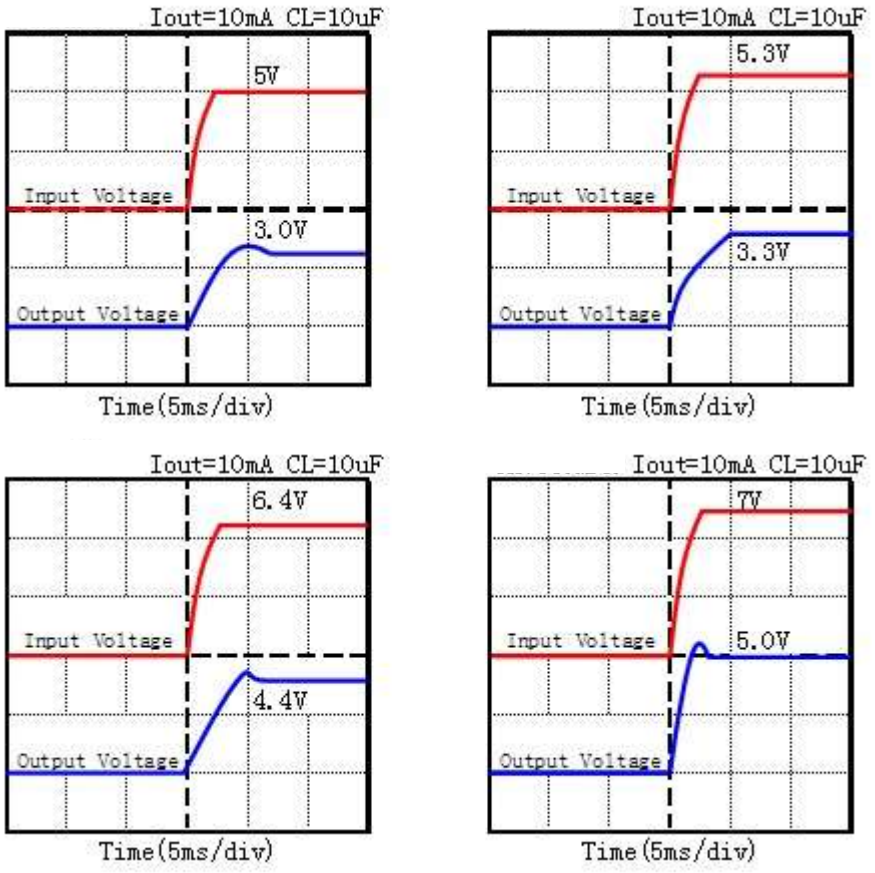
(1) Output Voltage vs Input voltage



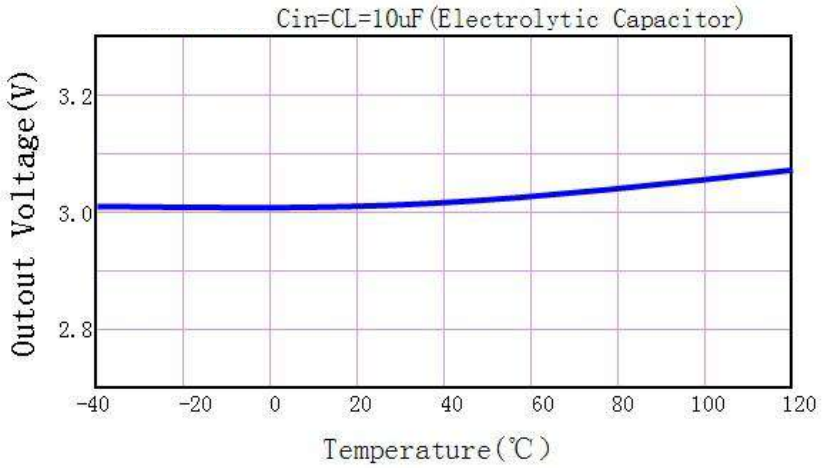
(2) Output Voltage vs.Output Current



(3) Input Transient Response



(4) Output Voltage vs.Ambient Temperature



(5) MAX Output Current Vs. Input Voltage

ASPL7330

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

ASPL7333

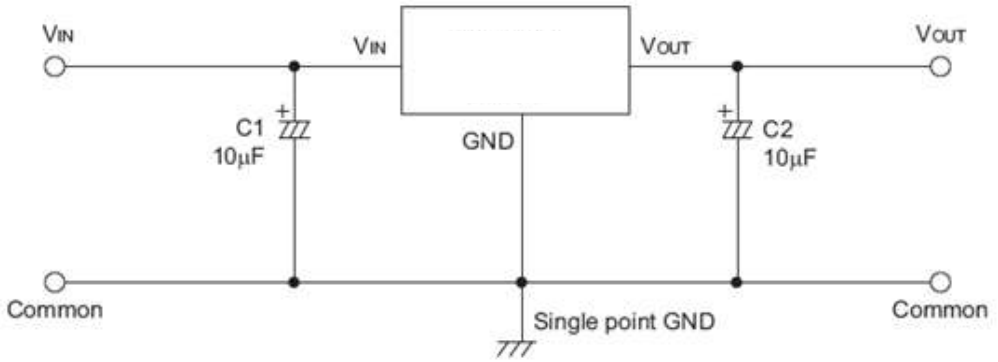
Input Voltage	Max Output Current
5.3V	250mA
9V	200mA
12V	150mA
15V	100mA

ASPL7350

Input Voltage	Max Output Current
7V	250mA
9V	200mA
12V	150mA
15V	100mA

Application Circuits

Basic Circuits

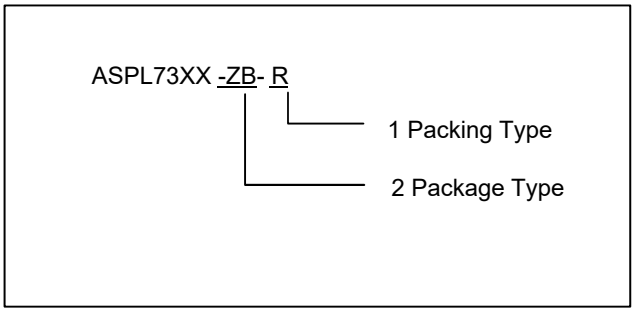


Ordering and Marking Information

Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
ASPL73XXLP	73XX	TO-92	Bag	1000	-	-
ASPL73XXZB	3XX	SOT23-3	REEL	3000	-	-
ASPL73XXDI	73XX	SOT89-3	REEL	3000	-	-
ASPL73XXZA	3XX	SOT23	REEL	3000	-	-

PACKAGE	MARKING
SOT23 SOT23-3 SOT89-3 TO-92	正面丝印

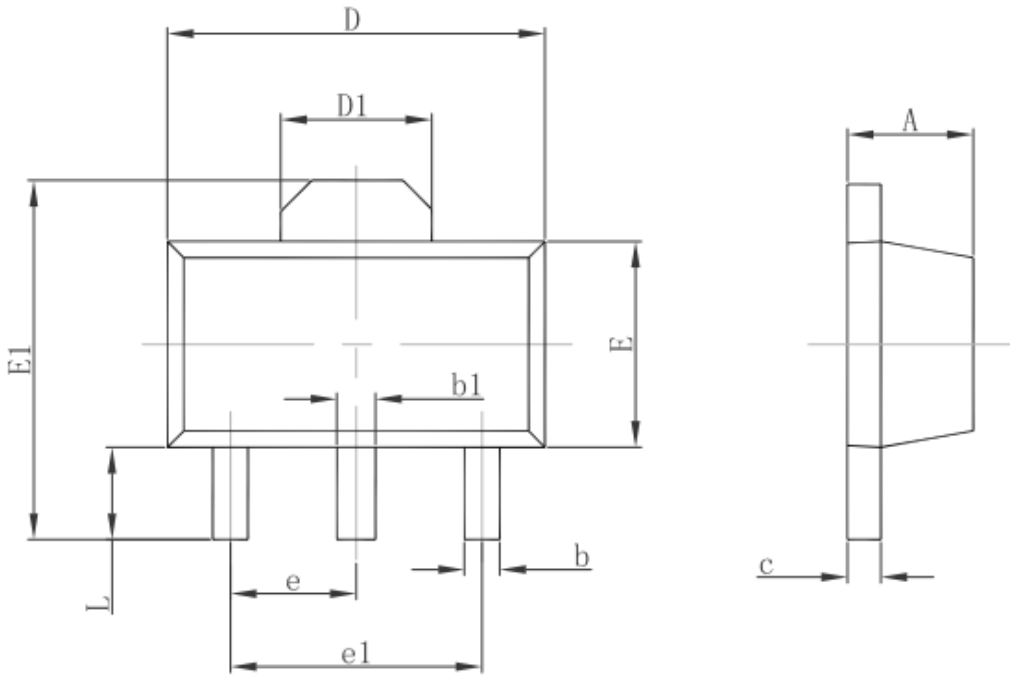
Ordering Number		Package
Lead Free	Halogen Free	
ASPL73XX-TP-B	ASPL73XXG-TP-B	TO-92
ASPL73XX-ZB-R	ASPL73XXG-ZB-R	SOT23-3
ASPL73XX-DI-R	ASPL73XXG-DI-R	SOT89-3
ASPL73XX-ZA-R	ASPL73XXG-DI-R	SOT23



1 T:Tube,R:Tape Reel

2 ZB: SOT23-3 TP: TO-92 DI:SOT89-3 ZA:SOT23

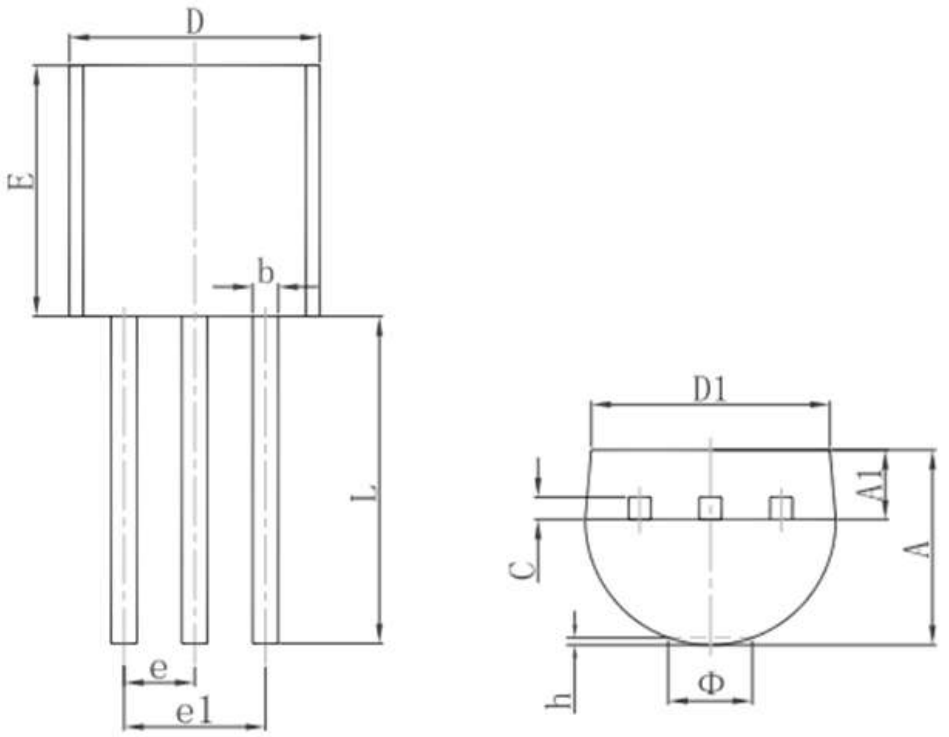
3-pin SOT89 Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047

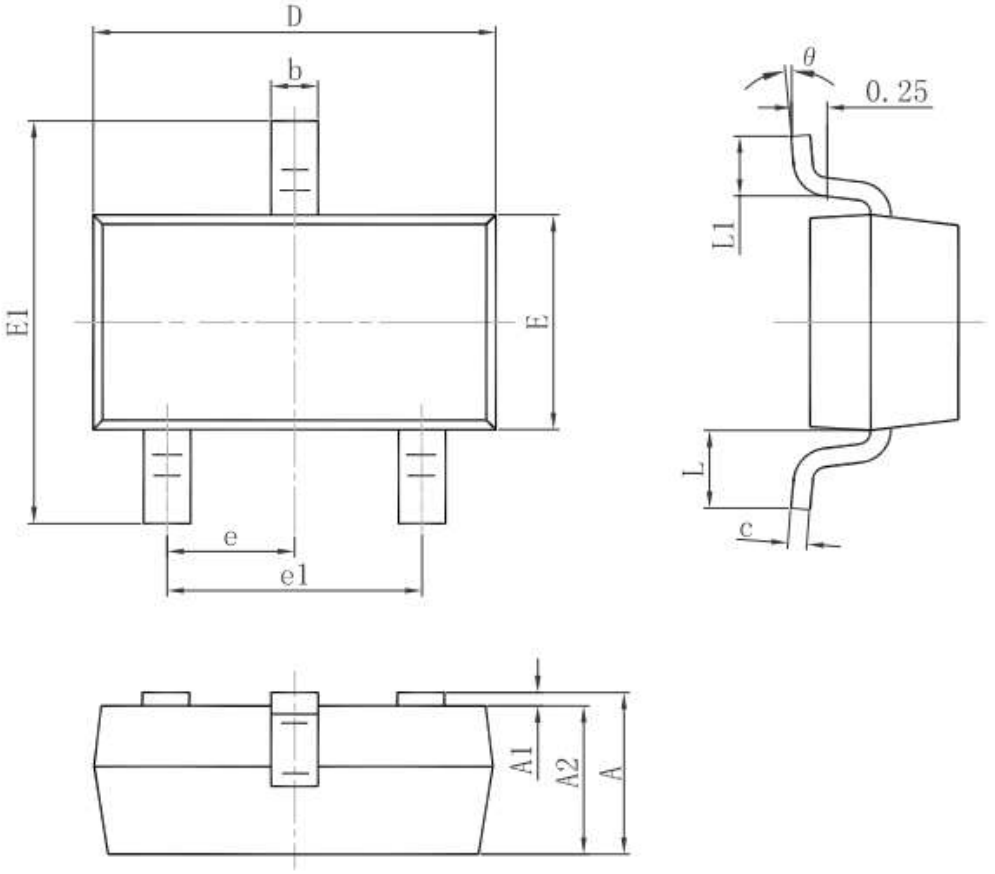
Package Information

3-pin TO92 Outline Dimensions



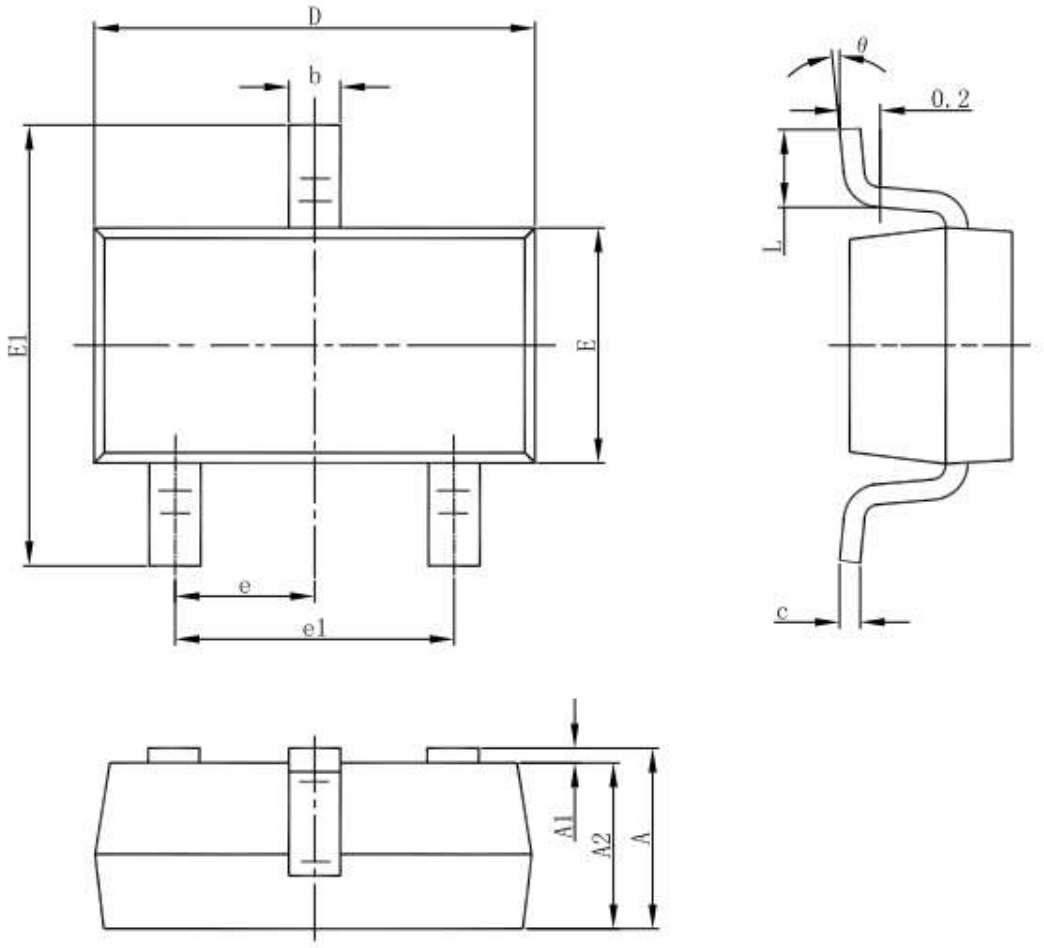
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	3.300	3.700	0.130	0.146
A1	1.100	1.400	0.043	0.055
b	0.380	0.550	0.015	0.022
c	0.360	0.510	0.014	0.020
D	4.300	4.700	0.169	0.185
D1	3.430		0.135	
E	4.300	4.700	0.169	0.185
e	1.270 TYP.		0.050 TYP.	
e1	2.440	2.640	0.096	0.104
L	14.100	14.500	0.555	0.571
Φ		1.600		0.063
h	0.000	0.380	0.000	0.015

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°	8°

3-pin SOT23-3 Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

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