

Low power consumption, Low ESR Cap.Compatible QN6206 Series

General Description

QN6206 series are highly precise, low power consumption, high voltage, positive voltage regulators manufactured using CMOS and laser trimming technologies. The series provides large currents with a significantly small dropout voltage.

The series is compatible with low ESR ceramic capacitors. The current limiter's foldback circuit also operates as a short protect for the output current limiter and the output pin.

Features

- Maximum Output Current: 300mA
($V_{IN}=4.3V, V_{OUT}=3.3V$)
- Dropout Voltage: 200mV@ $I_{OUT}=100mA$
- Input Voltage Range: up to 6.0V
- Highly Accuracy: $\pm 2\%$
- Low Power Consumption: 8uA (TYP.)
- Excellent Input Stability
- Be available to regulator and reference voltage

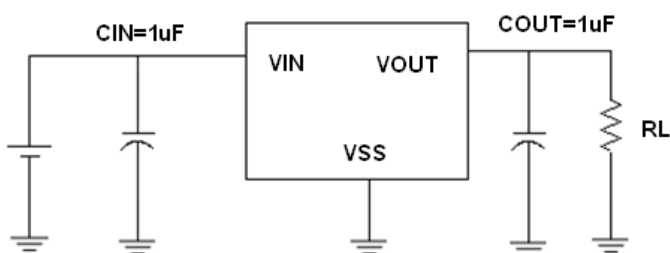
Typical Application

- Mobile phones
- communication equipment
- Portable games
- Cameras, Video systems
- Reference voltage sources
- Battery powered equipment

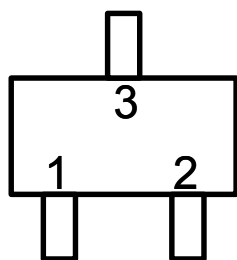
Package

- 3-pin SOT89-3, SOT23-3, TO92, SOT23

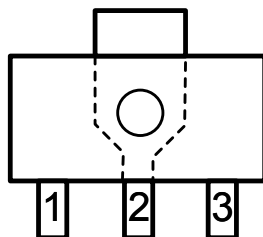
Typical Application Circuit



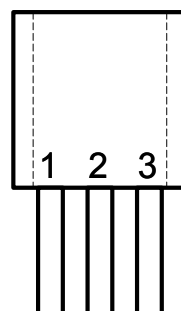
Pin Configuration



SOT23/SOT23-3



SOT89-3



TO92

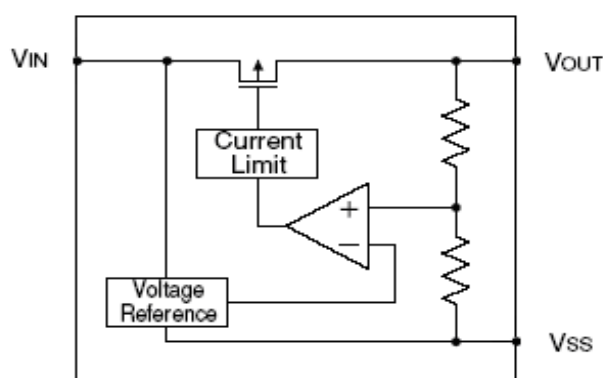
Pin Assignment

QN6206Axx/ QN6206Kxx

Pin					Name	Function
M3	P	P1	X	T		
SOT23-3	SOT89-3	SOT89-3	SOT23	TO-92		
1	1	2	1	1	VSS	Ground
2	3	1	2	3	VOUT	Output
3	2	3	3	2	VIN	Input

The difference of printing on the chip between P and P1 is : P: 6206A P1: 6206A1

Block Diagram



Absolute Maximum Ratings

Parameter		Symbol	Description	Units
Input Voltage		V_{IN}	6.5	V
Output Current		I_{out}	500	mA
Output Voltage		V_{out}	$V_{ss}-0.3 \sim V_{out}+0.3$	V
Power Dissipation	SOT23-3	P_d	300	mW
	SOT89-3	P_d	500	mW
	SOT23	P_d	300	mW
	TO-92	P_d	500	mW
Operating Ambient Temperature		T_{Opr}	-25 ~ +125	°C
Storage Temperature		T_{stg}	-40 ~ +125	°C

QN6206A15

($V_{IN}=V_{out}+1V$, $C_{in}=C_{out}=1\mu F$, $T_a=25^\circ C$ Unless otherwise stated)

PARAMETER	SYMBOL	CONDITION	MIX	TYP	MAX	UNIT
Output Voltage	$V_{OUT}(E)$ (Note 2)	$I_{OUT}=10mA$, $V_{IN}=V_{out}+1V$	X 0.98	$V_{OUT}(T)$ (Note 1)	X 1.02	V
Input Voltage	V_{IN}				6	V
Maximum Output Current	$I_{OUT} (max)$	$V_{IN}=V_{out}+1V$		100		mA
Load Regulation	ΔV_{OUT}	$V_{IN}=V_{out}+1V$, $1mA \leq I_{OUT} \leq 80mA$		10	20	mV
Dropout Voltage (Note 3)	V_{dif1}	$I_{OUT} = 20mA$		180	200	mV
	V_{dif2}	$I_{OUT} = 50mA$		360	380	mV
Supply Current	I_{SS}	$V_{IN}=V_{out}+1V$		7	15	μA
Line Regulations	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	$I_{OUT} = 10mA$ $V_{out}+1V \leq V_{IN} \leq 5V$		0.1	0.2	%/V
Power Supply Ripple Rejection Ratio	PSRR	$V_{in} = [V_{out}+1]V$ +1Vp-pAC $I_{OUT} = 10mA, f=1kHz$		45	47	dB
Short Circuit Current	I_{short}	$V_{in}=V_{out}(T)+1.5V$ $V_{out}=V_{ss}$		20	50	mA
Over Current Protection	I_{limit}			300		mA

QN6206A18

(VIN=Vout+1V, Cin=Cout=1uF, Ta=25°C Unless otherwise stated)

PARAMETER	SYMBOL	CONDITION	MIX	TYP	MAX	UNIT
Output Voltage	V _{OUT} (E) (Note 2)	I _{OUT} =10mA, V _{IN} =Vout+1V	X 0.98	V _{OUT} (T) (Note 1)	X 1.02	V
Input Voltage	V _{IN}				6	V
Maximum Output Current	I _{OUT} (max)	V _{IN} =Vout+1V		120		mA
Load Regulation	ΔV _{OUT}	V _{IN} =Vout+1V, 1mA≤I _{OUT} ≤80mA		12	27	mV
Dropout Voltage (Note 3)	V _{dif1}	I _{OUT} =20mA		180	200	mV
	V _{dif2}	I _{OUT} =50mA		360	380	mV
Supply Current	I _{SS}	V _{IN} =Vout+1V		7	15	μA
Line Regulations	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	I _{OUT} =10mA Vout+1V ≤V _{IN} ≤5V		0.1	0.2	%/V
Power Supply Ripple Rejection Ratio	PSRR	Vin= [Vout+1]V +1Vp-pAC I _{OUT} =10mA, f=1kHz		45	47	dB
Short Circuit Current	I _{short}	Vin=Vout(T)+1.5V Vout=Vss		25	50	mA
Over Current Protection	I _{limit}			400		mA

QN6206A21

(VIN=Vout+1V, Cin=Cout=1uF, Ta=25°C Unless otherwise stated)

PARAMETER	SYMBOL	CONDITION	MIX	TYP	MAX	UNIT
Output Voltage	V _{OUT} (E) (Note 2)	I _{OUT} =10mA, V _{IN} =Vout+1V	X 0.98	V _{OUT} (T) (Note 1)	X 1.02	V
Input Voltage	V _{IN}				6	V
Maximum Output Current	I _{OUT} (max)	V _{IN} =Vout+1V		200		mA
Load Regulation	ΔV _{OUT}	V _{IN} =Vout+1V, 1mA≤I _{OUT} ≤80mA		10	20	mV
Dropout Voltage (Note 3)	V _{dif1}	I _{OUT} =50mA		100	130	mV
	V _{dif2}	I _{OUT} =100mA		200	230	mV
Supply Current	I _{SS}	V _{IN} =Vout+1V		7	15	μA
Line Regulations	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	I _{OUT} =10mA Vout+1V ≤V _{IN} ≤5V		0.1	0.2	%/V
Power Supply Ripple Rejection Ratio	PSRR	Vin= [Vout+1]V +1Vp-pAC I _{OUT} =10mA, f=1kHz		45	47	dB
Short Circuit Current	I _{short}	Vin=Vout(T)+1.5V Vout=Vss		20	50	mA
Over Current Protection	I _{limit}			450		mA

QN6206A28

(VIN=Vout+1V, Cin=Cout=1uF, Ta=25°C Unless otherwise stated)

PARAMETER	SYMBOL	CONDITION	MIX	TYP	MAX	UNIT
Output Voltage	V _{OUT} (E) (Note 2)	I _{OUT} =10mA, V _{IN} =Vout+1V	X 0.98	V _{OUT} (T) (Note 1)	X 1.02	V
Input Voltage	V _{IN}				6	V
Maximum Output Current	I _{OUT} (max)	V _{IN} =Vout+1V		300		mA
Load Regulation	ΔV _{OUT}	V _{IN} =Vout+1V 1mA≤I _{OUT} ≤100mA		14	28	mV
Dropout Voltage (Note 3)	V _{dif1}	I _{OUT} =80mA		180	200	mV
	V _{dif2}	I _{OUT} =200mA		380	400	mV
Supply Current	I _{SS}	V _{IN} =Vout+1V		8	15	μA
Line Regulations	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	I _{OUT} =10mA Vout+1V ≤V _{IN} ≤6V		0.03	0.2	%/V
Power Supply Ripple Rejection Ratio	PSRR	Vin= [Vout+1]V +1Vp-pAC I _{OUT} =10mA, f=1kHz		50	52	dB
Short Circuit Current	I _{short}	Vin=Vout(T)+1.5V Vout=Vss		30	60	mA
Over Current Protection	I _{limit}			500		mA

QN6206A30

(VIN=Vout+1V, Cin=Cout=1uF, Ta=25°C Unless otherwise stated)

PARAMETER	SYMBOL	CONDITION	MIX	TYP	MAX	UNIT
Output Voltage	V _{OUT} (E) (Note 2)	I _{OUT} =10mA, V _{IN} =Vout+1V	X 0.98	V _{OUT} (T) (Note 1)	X 1.02	V
Input Voltage	V _{IN}				6	V
Maximum Output Current	I _{OUT} (max)	V _{IN} =Vout+1V		300		mA
Load Regulation	ΔV _{OUT}	V _{IN} =Vout+1V 1mA≤I _{OUT} ≤100mA		14	28	mV
Dropout Voltage (Note 3)	V _{dif1}	I _{OUT} =80mA		180		mV
	V _{dif2}	I _{OUT} =200mA		380		mV
Supply Current	I _{SS}	V _{IN} =Vout+1V		8	15	μA
Line Regulations	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	I _{OUT} =10mA Vout+1V ≤V _{IN} ≤6V		0.03	0.2	%/V
Power Supply Ripple Rejection Ratio	PSRR	Vin= [Vout+1]V +1Vp-pAC I _{OUT} =10mA, f=1kHz		50	52	dB
Short Circuit Current	I _{short}	Vin=Vout(T)+1.5V Vout=Vss		30	60	mA
Over Current Protection	I _{limit}			500		mA

QN6206A33

(VIN=Vout+1V,Cin=Cout=1uF,Ta=25°C Unless otherwise stated)

PARAMETER	SYMBOL	CONDITION	MIX	TYP	MAX	UNIT
Output Voltage	V _{OUT} (E) (Note 2)	I _{OUT} =10mA, V _{IN} =Vout+1V	X 0.98	V _{OUT} (T) (Note 1)	X 1.02	V
Input Voltage	V _{IN}				6	V
Maximum Output Current	I _{OUT} (max)	V _{IN} =Vout+1V		300		mA
Load Regulation	ΔV _{OUT}	V _{IN} =Vout+1V 1mA≤I _{OUT} ≤100mA		14	28	mV
Dropout Voltage (Note 3)	V _{dif1}	I _{OUT} =80mA		180	200	mV
	V _{dif2}	I _{OUT} =200mA		380	400	mV
Supply Current	I _{SS}	V _{IN} =Vout+1V		9	15	μA
Line Regulations	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	I _{OUT} =10mA Vout+1V ≤V _{IN} ≤6V		0.03	0.2	%/V
Power Supply Ripple Rejection Ratio	PSRR	Vin= [Vout+1]V +1Vp-pAC I _{OUT} =10mA,f=1kHz		50	52	dB
Short Circuit Current	I _{short}	Vin=Vout(T)+1.5V Vout=Vss		30	60	mA
Over Current Protection	I _{limit}			500		mA

QN6206K33

(VIN=Vout+1V,Cin=Cout=1uF,Ta=25°C Unless otherwise stated)

PARAMETER	SYMBOL	CONDITION	MIX	TYP	MAX	UNIT
Output Voltage	V _{OUT} (E) (Note 2)	I _{OUT} =10mA, V _{IN} =Vout+1V	X 0.98	V _{OUT} (T) (Note 1)	X 1.02	V
Input Voltage	V _{IN}				6	V
Maximum Output Current	I _{OUT} (max)	V _{IN} =Vout+1V		300		mA
Load Regulation	ΔV _{OUT}	V _{IN} =Vout+1V 1mA≤I _{OUT} ≤100mA		14	28	mV
Dropout Voltage (Note 3)	V _{dif1}	I _{OUT} =80mA		180	200	mV
	V _{dif2}	I _{OUT} =200mA		380	400	mV
Supply Current	I _{SS}	V _{IN} =Vout+1V		180	500	μA
Line Regulations	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	I _{OUT} =10mA Vout+1V ≤V _{IN} ≤6V		0.03	0.2	%/V
Power Supply Ripple Rejection Ratio	PSRR	Vin= [Vout+1]V +1Vp-pAC I _{OUT} =10mA,f=1kHz		50	52	dB
Short Circuit Current	I _{short}	Vin=Vout(T)+1.5V Vout=Vss		30	60	mA
Over Current Protection	I _{limit}			500		mA

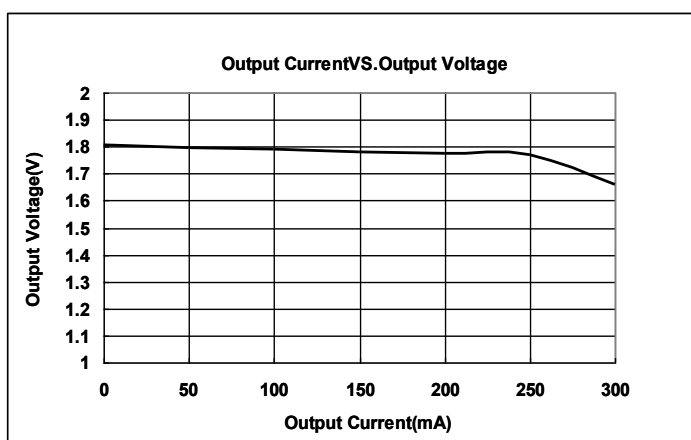
Note :

1. $V_{OUT}(T)$: Specified Output Voltage
2. $V_{OUT}(E)$: Effective Output Voltage (i.e. The output voltage when " $V_{OUT}(T)+1.0V$ " is provided at the Vin pin while maintaining a certain Iout value.)
3. $V_{dif} : V_{IN1} - V_{OUT}(E)'$
 V_{IN1} : The input voltage when $V_{OUT}(E)'$ appears as input voltage is gradually decreased.
 $V_{OUT}(E)'$ = A voltage equal to 98% of the output voltage whenever an amply stabilized Iout { $V_{OUT}(T)+1.0V$ } is input.

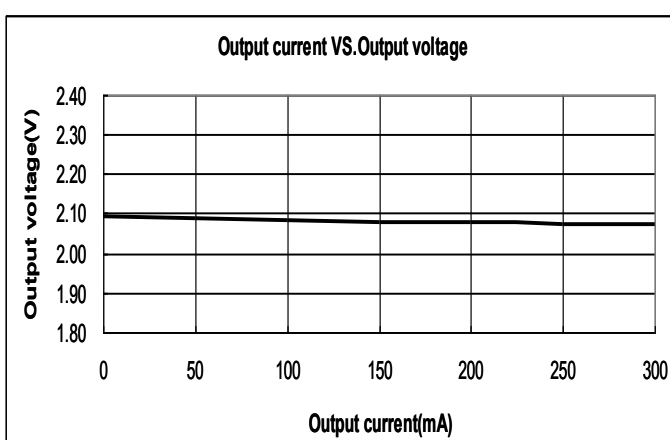
Type Characteristics

(1) Output Current VS. Output Voltage (VIN=Vout+1, Ta = 25 °C)

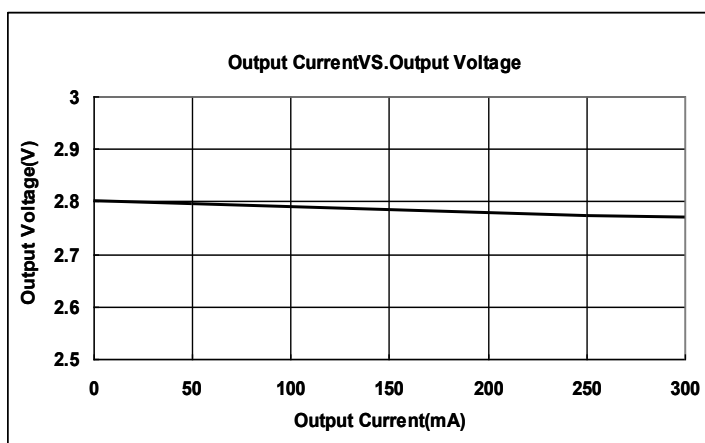
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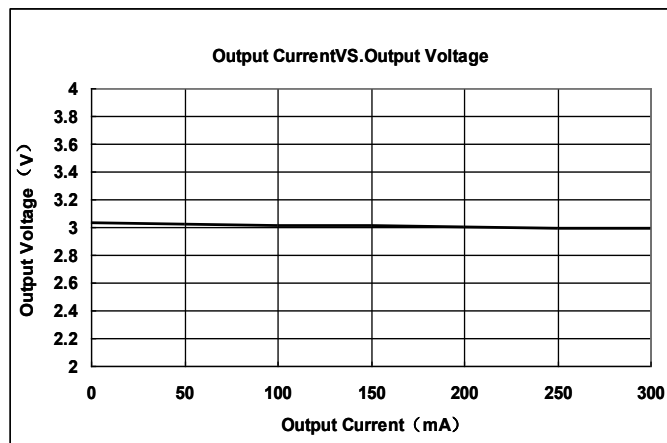
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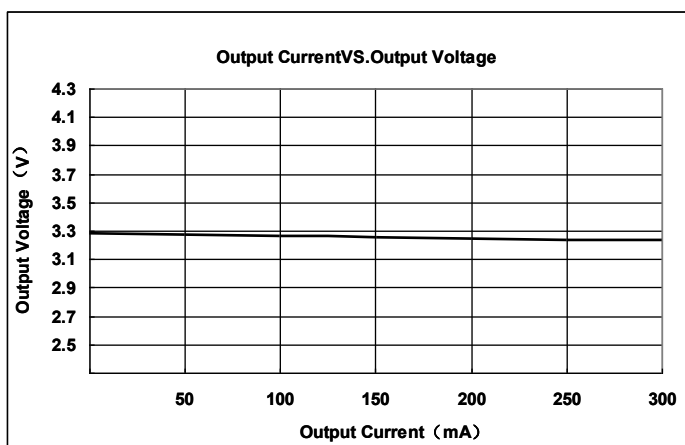
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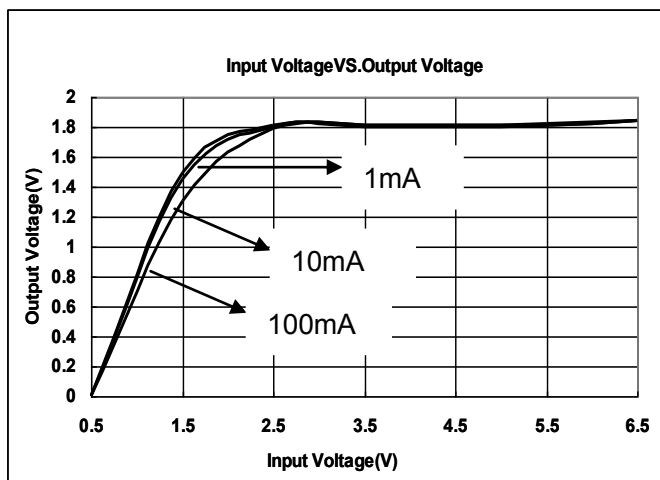


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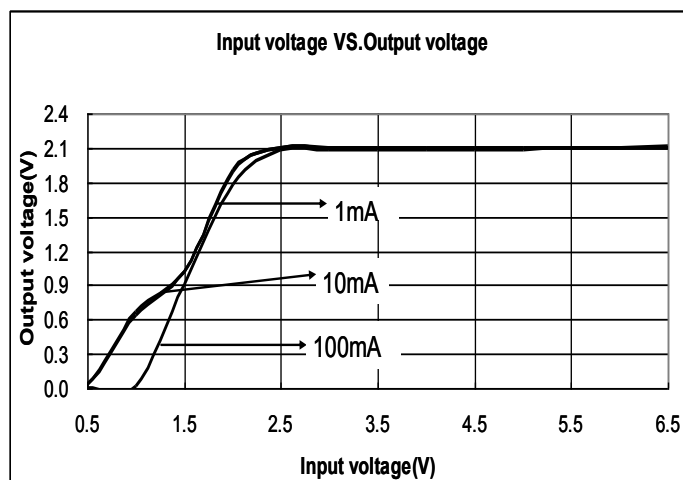


(2) Input Voltage VS. Output Voltage ($T_a = 25^\circ\text{C}$)

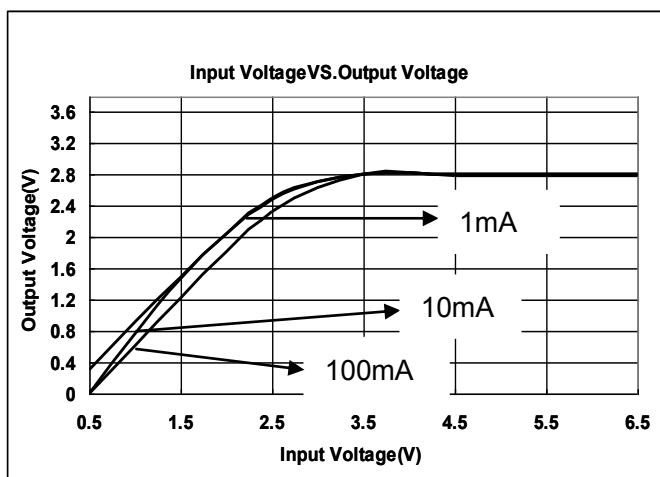
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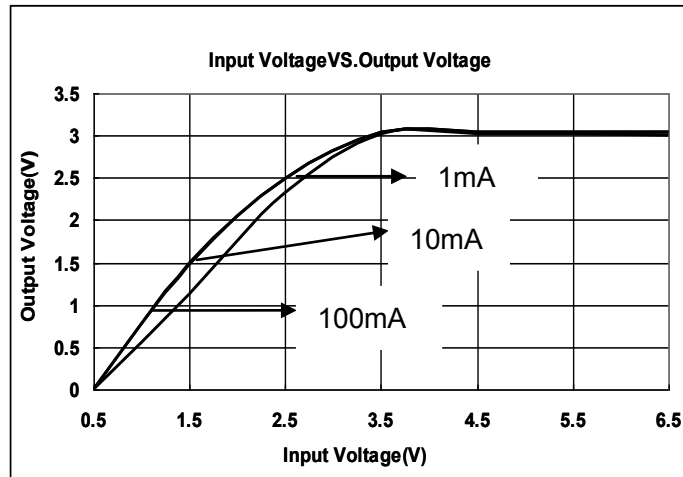
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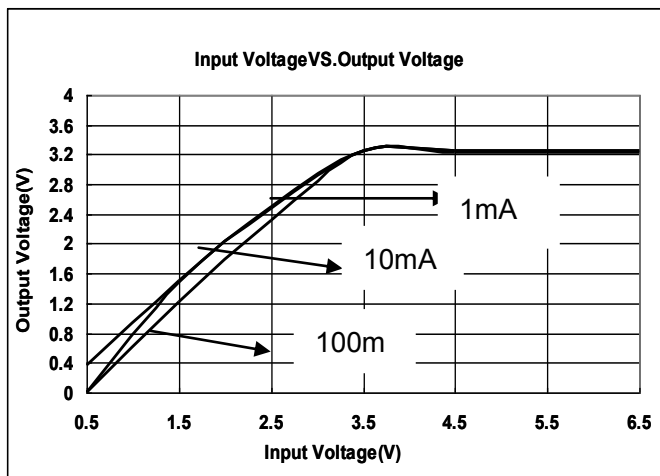
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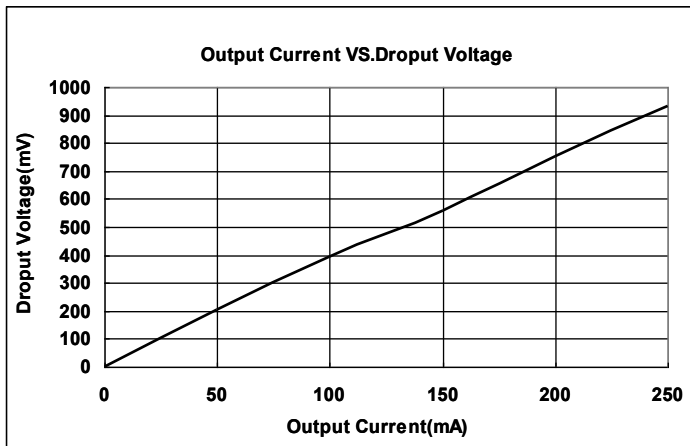


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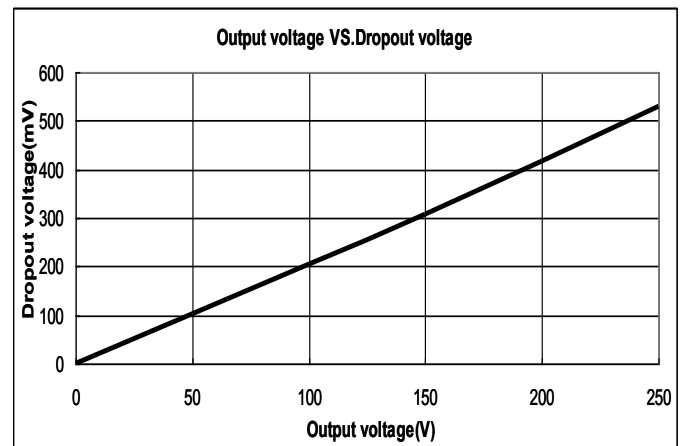


(3) Output Current VS. Dropout Voltage ($V_{IN}=V_{out}+1V, T_a = 25^\circ C$)

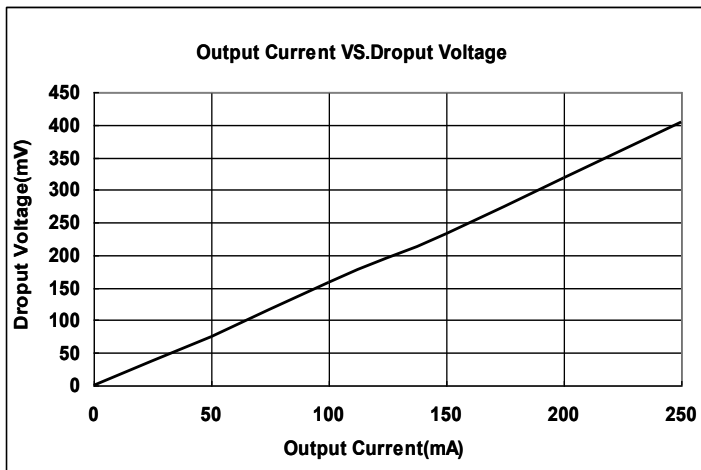
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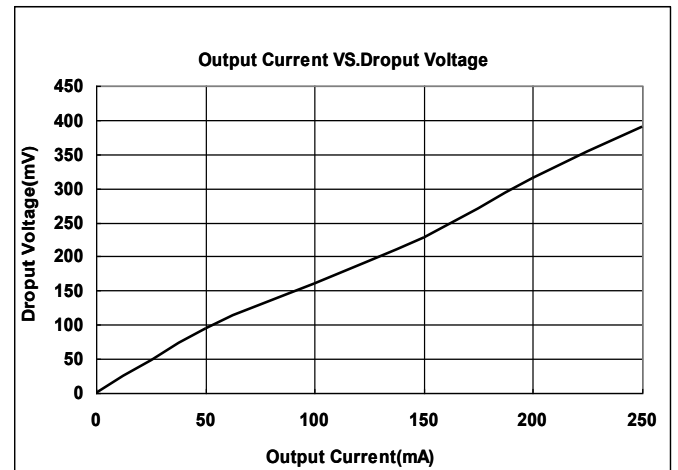
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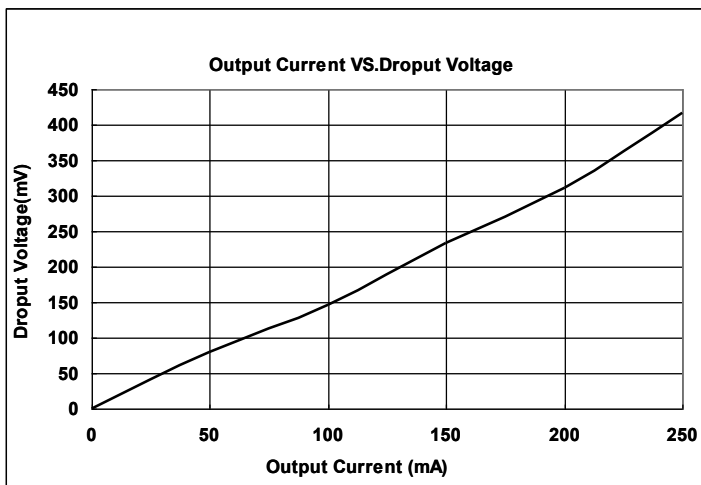
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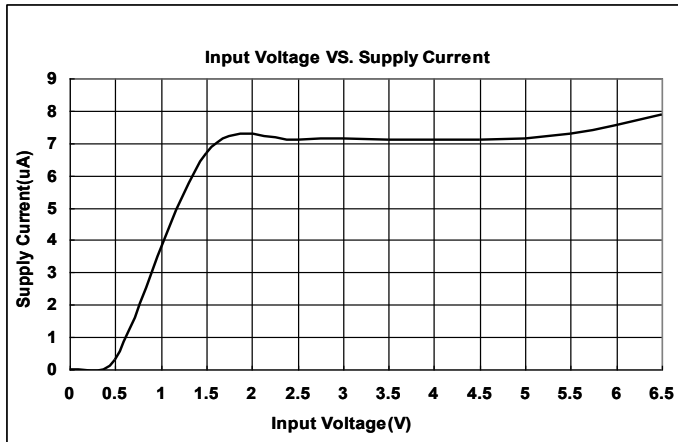


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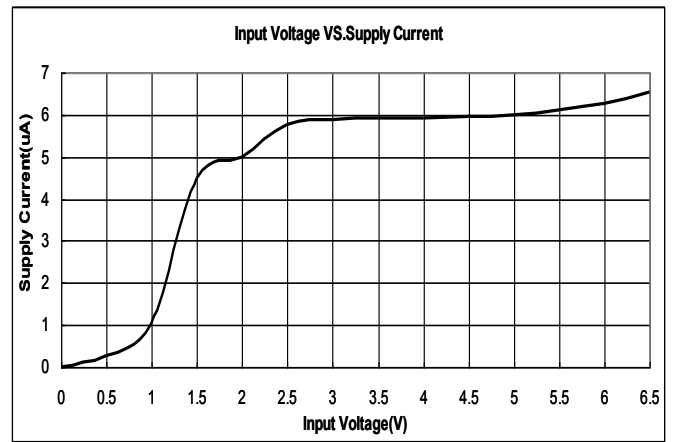


(4) Input Voltage VS. Supply Current ($T_a = 25^\circ\text{C}$)

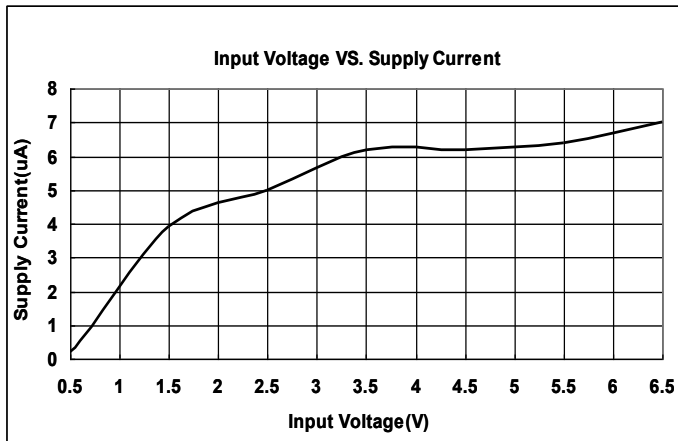
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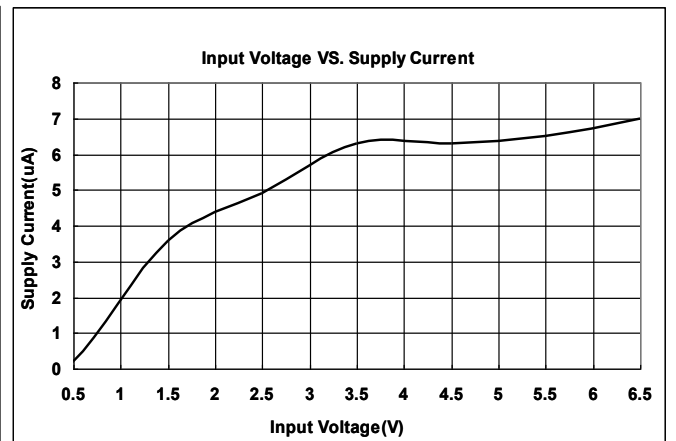
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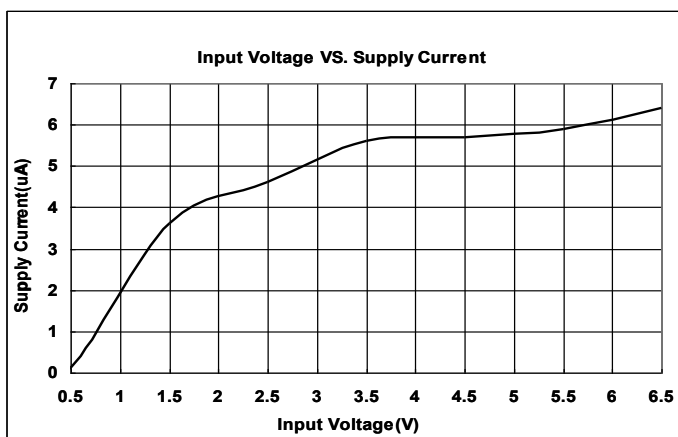
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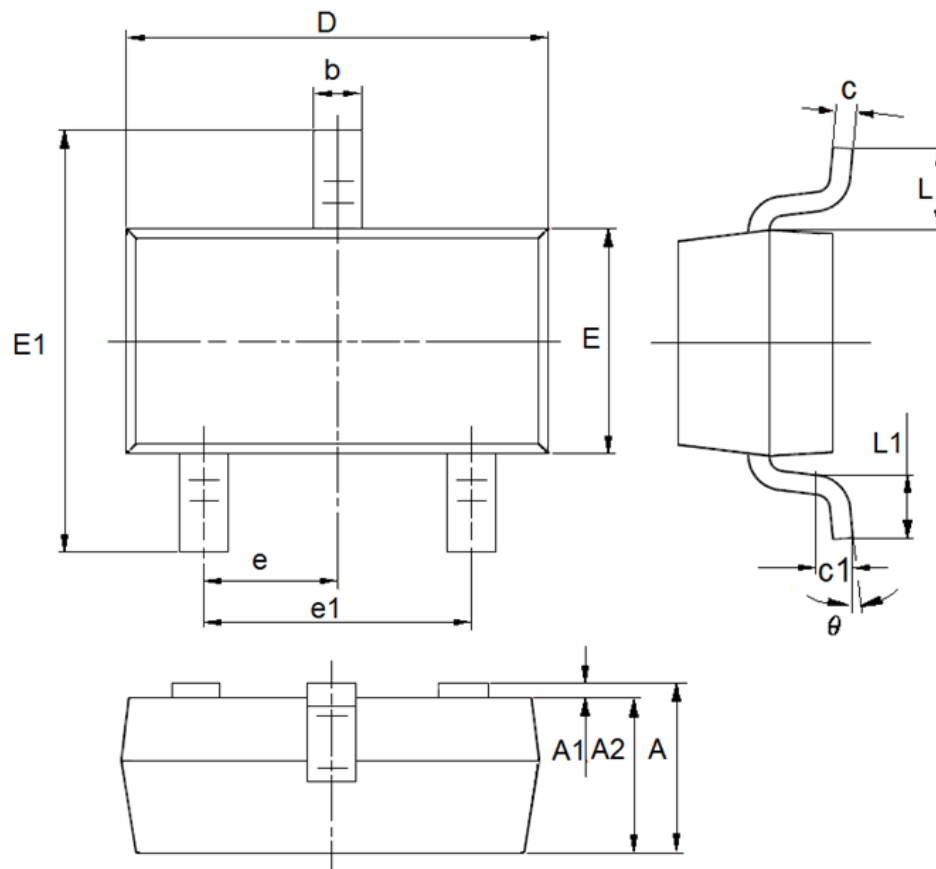
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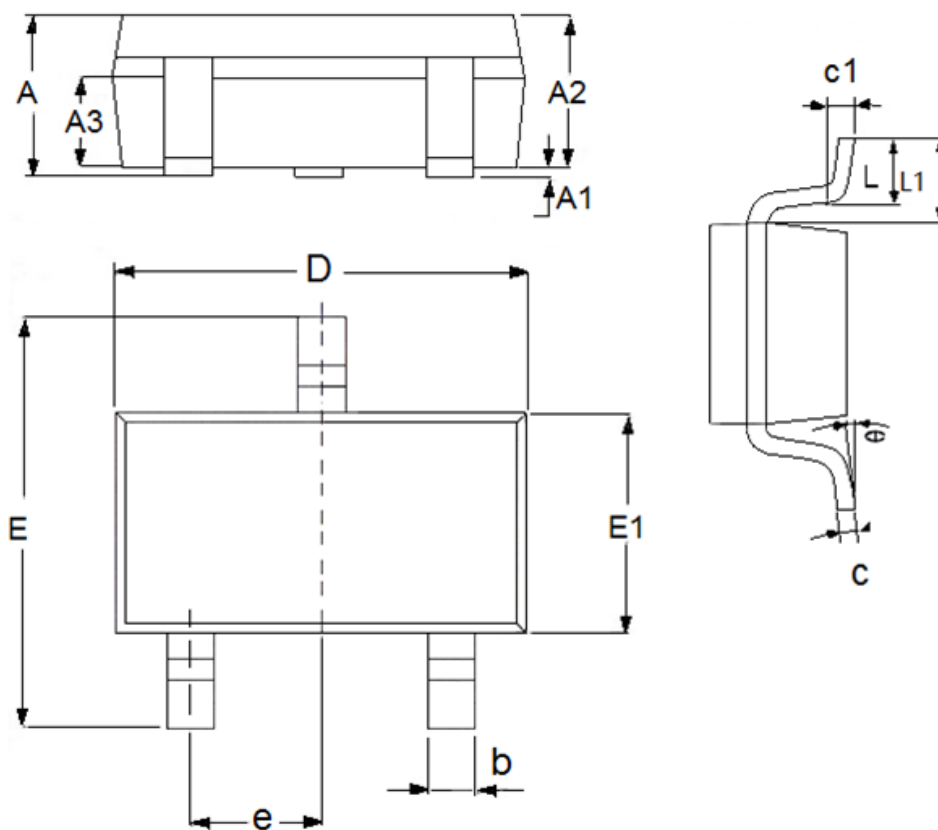
● SOT23



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	0.9	1.15	0.0354	0.0453
A1	0	0.14	0	0.0055
A2	0.9	1.05	0.0354	0.0413
b	0.28	0.52	0.011	0.0205
c	0.07	0.23	0.0028	0.0091
D	2.8	3	0.1102	0.1181
e1	1.8	2	0.0709	0.0787
E	1.2	1.4	0.0472	0.0551
E1	2.25	2.55	0.0886	0.1004
e	0.95(TYP)		0.0374(TYP)	
L	0.55(TYP)		0.0217(TYP)	
L1	0.25	0.55	0.0098	0.0217
θ	0	8°	0	8°
c1	0.25(TYP)		0.0098(TYP)	

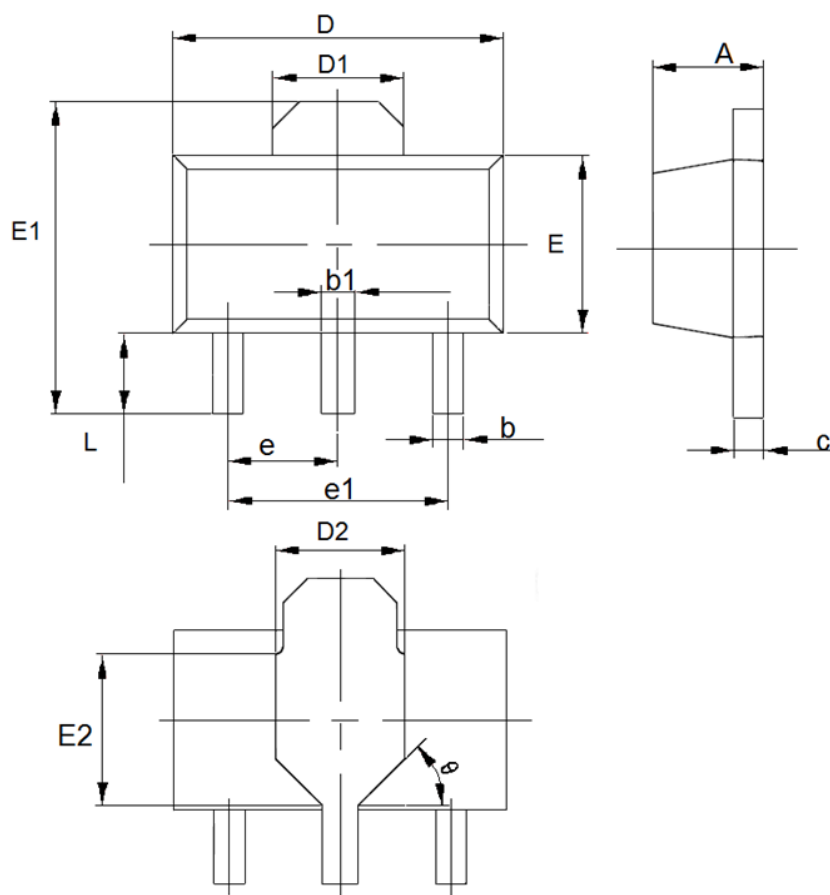
Packaging Information

● SOT23-3



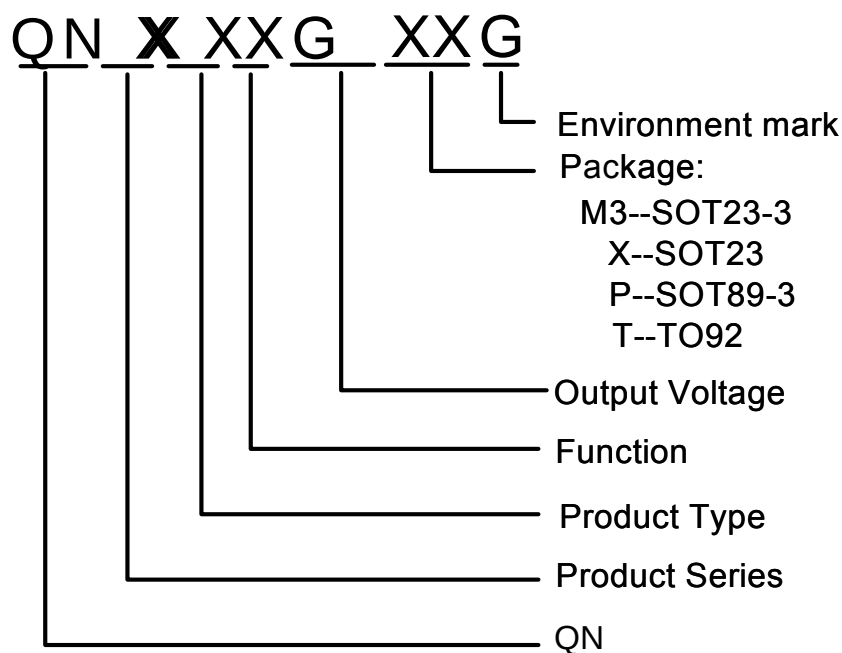
DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	1	1.5	0.0394	0.0591
A1	0	0.15	0	0.0059
A2	0.9	1.3	0.0354	0.0512
A3	0.6	0.7	0.0236	0.0276
b	0.25	0.5	0.0098	0.0197
c	0.1	0.25	0.0039	0.0098
D	2.8	3.1	0.1102	0.122
E	2.6	3.1	0.1023	0.122
E1	1.5	1.8	0.0591	0.0709
e	0.95(TYP)		0.0374(TYP)	
L	0.25	0.6	0.0098	0.0236
L1	0.59(TYP)		0.0232(TYP)	
θ	0	8°	0	8°
c1	0.2(TYP)		0.0079(TYP)	

● SOT89-3



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	1.4	1.6	0.0551	0.063
b	0.32	0.52	0.0126	0.0205
b1	0.4	0.58	0.0157	0.0228
c	0.35	0.45	0.0138	0.01772
D	4.4	4.6	0.1732	0.1811
D1	1.55(TYP)		0.061(TYP)	
D2	1.75(TYP)		0.0689(TYP)	
e1	3(TYP)		0.1181(TYP)	
E	2.3	2.6	0.0906	0.1023
E1	3.94	4.4	0.1551	0.1732
E2	1.9(TYP)		0.0748(TYP)	
e	1.5(TYP)		0.0591(TYP)	
L	0.8	1.2	0.0315	0.0472
θ	45°		45°	

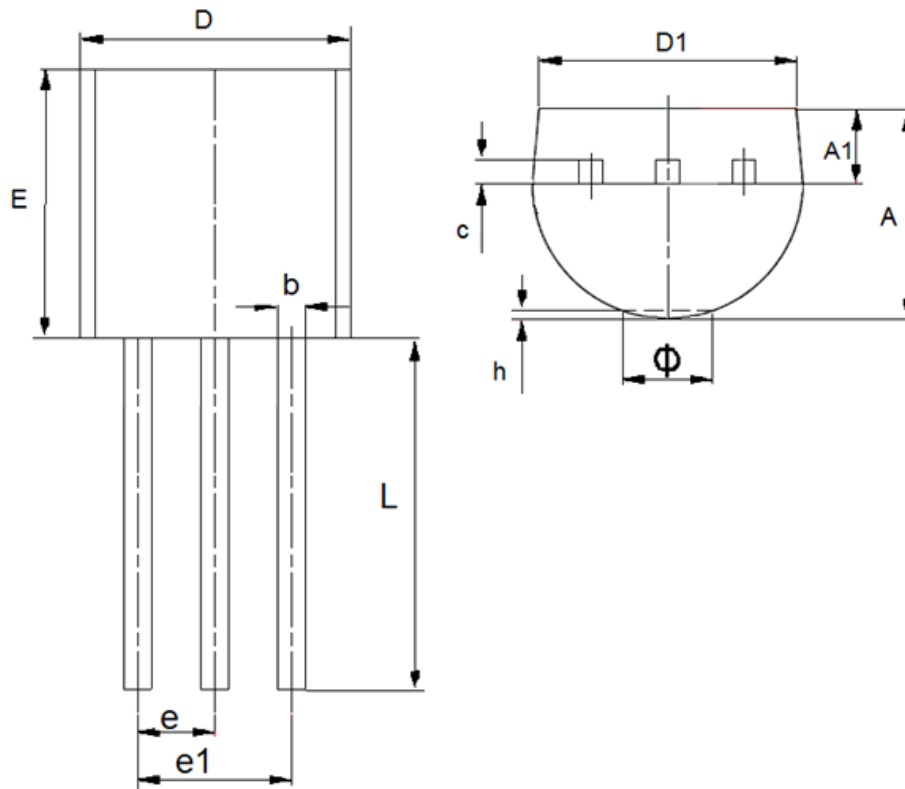
Selection Guide



product series	Output voltage	Supply Current	Package
QN6206A15PG	1.5V	8uA	SOT89-3
QN6206A15M3G	1.5V	8uA	SOT23-3
QN6206A15XG	1.5V	8uA	SOT23
QN6206A33TG	3.3V	8uA	TO92
QN6206A33M3G	3.3V	8uA	SOT23-3
QN6206K33M3G	3.3V	180uA	SOT23-3

NOTE: At present ,there are ten kinds of voltage value:
 1.5V、1.8V、2.0V、2.1V、2.5V、2.7V、2.8V、3.0V、3.3V、3.6V。
 If you need other voltage and package, please contact our sales staff.

● TO92



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	3.3	3.7	0.1299	0.1457
A1	1.1	1.4	0.0433	0.0551
b	0.38	0.55	0.015	0.0217
c	0.36	0.51	0.0142	0.0201
D	4.3	4.7	0.1693	0.185
D1	3.43	—	0.135	—
E	4.3	4.7	0.1693	0.185
e	1.27		0.05	
e1	2.44	2.64	0.0961	0.1039
L	14.1	14.5	0.5551	0.5709
h	0	0.38	0	0.015
Φ	—	1.6	—	0.063

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