乾能惠电子

QIANNENGHUI ELECTRONICS

深圳市乾能惠电子有限公司
http://www.qnhchip.com

乾能惠电子致力于开发电源管理类产品，主要包括LDO DC-DC AC-DC LED DRIVER、锂电充电管理、锂电保护、电压检测、音频功放、数模混合等，并为电子设备的主芯片及相关器件提供优质、稳定的电源解决方案。我们的产品目前已广泛用于家用电器、手机、充电器、适配器、安防监控、智能电网、工控设备等领域。

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1A Adjustable Voltage High Speed LDO Regulators QN6118 Series

General Description

The QN6118 series are highly accurate, low noise, LDO Voltage Regulators that are capable of providing an output current that is in excess of 1A with a maximum dropout voltage of 1.3V at 1A（QN6118A33）.This series contains four fixed output voltages of 1.2V, 1.8V, 2.5V and 3.3V that have no minimum load requirement to maintain regulation. On chip trimming adjusts the reference/output voltage to within ±2% accuracy. Internal protection features consist of output current limiting, safe operating area compensation, and thermal shutdown. The ME6118series can operate with up to 18V input. Devices are available in SOT223.

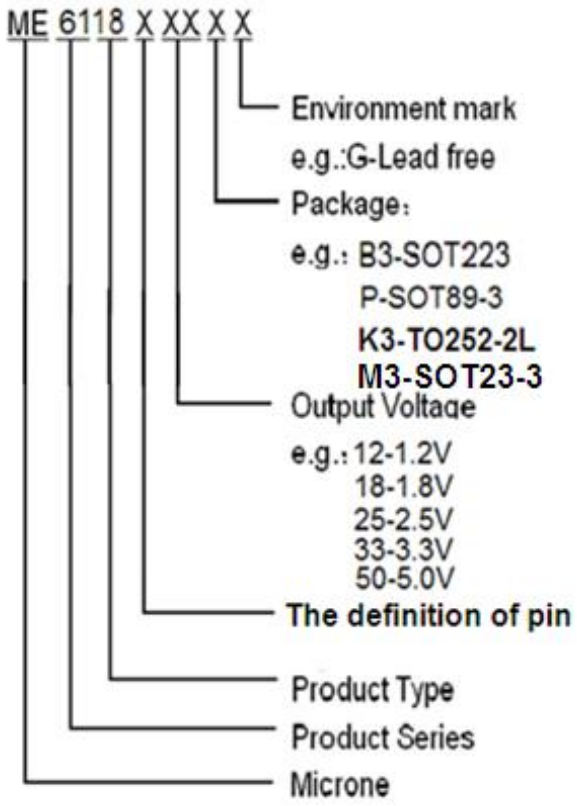
Features

- Output Current in Excess of 1A
- Dropout Voltage:80mV@ I_{OUT} =100mA （QN6118A33）
- Operating Voltage Range: 2.5V～18V
- Highly Accuracy: ±2%
- Adjustable Output Voltage Option
- Standby Current: 52uA（TYP.）
- High Ripple Rejection: 70dB@1KHz（ME6118A33）
- Line Regulation: 2mV（TYP.）
- Temperature Stability≤0.5%
- Thermal Shutdown Protection：160℃
- Packages:SOT223 ,SOT89-3,TO252-2L，SOT23-3

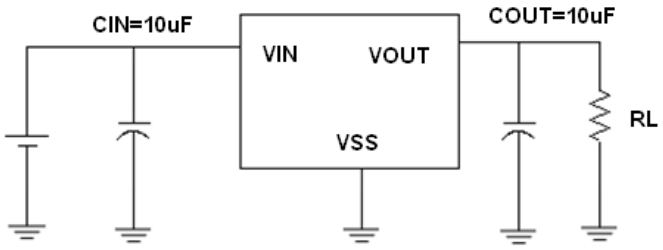
Typical Application

- Consumer and Industrial Equipment Point of Regulation
- Switching Power Supply Post Regulation
- Hard Drive Controllers
- Battery Chargers

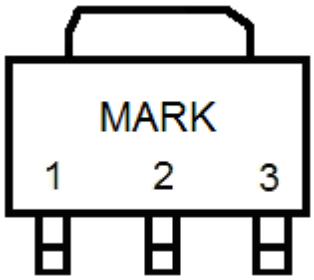
Selection Guide



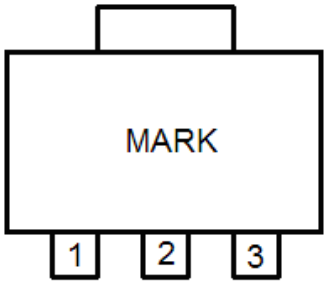
Typical Application Circuit



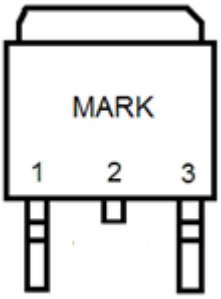
Pin Configuration



SOT223



SOT89-3



TO252-2L

SOT23-3

Pin Assignment

ME6118AXX

Pin Number				Pin Name	Functions
SOT223	SOT89-3	TO252-2L	SOT23-3		
1	1	1	1	GND	Ground
2	3	2	2	V_{OUT}	Output
3	2	3	3	V_{IN}	Power Input

ME6118EXX

Pin Number		Pin Name	Functions
SOT223	TO252-2L		
1	1	GND	Ground
2	2	V_{IN}	Power Input
3	3	V_{OUT}	Output

ME6118HXX

Pin Number		Pin Name	Functions
SOT223	TO252-2L		
1	1	V_{OUT}	Output
2	2	GND	Ground
3	3	V_{IN}	Power Input

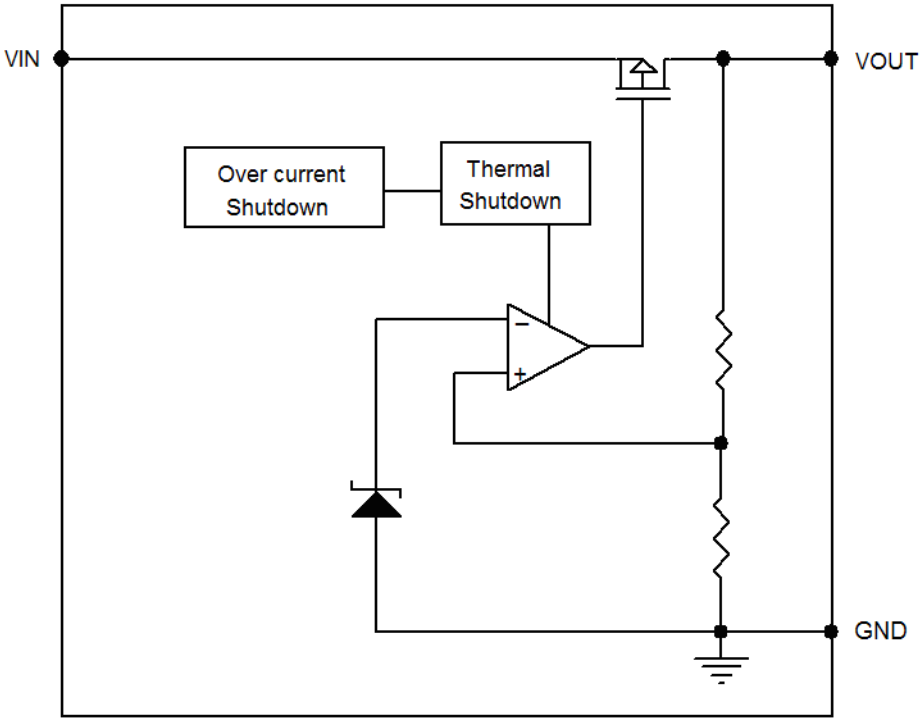
ME6118LXX

Pin Number		Pin Name	Functions
SOT223	TO252-2L		
1	1	V_{IN}	Power Input
2	2	GND	Ground
3	3	V_{OUT}	Output

Absolute Maximum Ratings

Parameter		Symbol	Ratings	Units
Input Voltage		V_{IN}	18	V
Output Current		I_{OUT}	1.1	A
Output Voltage		V_{OUT}	Vss-0.3～V_{IN} +0.3	V
Power Dissipation	SOT223	P_D	750	mW
	SOT89-3		500	
	TO252-2L		2000	
	SOT23-3		300	
Operating Temperature Range		T_{OPR}	－40～＋125	℃
Storage Temperature Range		T_{STG}	－40～＋150	℃
Lead Temperature			260℃，4sec	

Block Diagram



Electrical Characteristics

QN6118A12/E12/H12/L12 (Packages:SOT223 ， SOT89-3,TO252-2L**)**

(V_{IN}= V_{OUT}+1.3V，C_{IN}=C_L=10uF，Ta=25^{O}C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	V_{OUT}(E) (Note 2)	I_{OUT}=10mA, V_{IN}= V_{OUT}+1.3V	X 0.98	V_{OUT} (T) (Note 1)	X 1.02	V
Maximum Output Current	I_{OUTMAX}	V_{IN}= V_{OUT}+1.3V		800		mA
Load Regulation	ΔV_{OUT}	V_{IN}= V_{OUT}+1.3V , 1mA≤I_{OUT}≤800mA		3		mV
Dropout Voltage (Note 3)	V_{DIF1}	I_{OUT} =100mA		195		mV
	V_{DIF2}	I_{OUT} =400mA		665		mV
	V_{DIF3}	I_{OUT} =800mA		1250		mV
	V_{DIF4}	I_{OUT} =1000mA		1600		mV
Quiescent Current	I_{ss}	V_{IN}= V_{OUT}+1.3V		53		uA
Line Regulation	ΔV_{OUT}	I_{OUT} =0mA V_{OUT}+1.3V ≤V_{IN}≤18V		2		mV
Thermal Shutdown Protection	T_{sd}	I_{OUT}=10mA, V_{IN}= V_{OUT}+1.3V		155		℃
Over Current Protection	I_{limit}	V_{IN}=3V		1.1		A

QN6118A18/E18/H18/L18 (Packages:SOT223 ， SOT89-3,TO252-2L**)**

(V_{IN}= V_{OUT}+1.2V，C_{IN}=C_L=10uF，Ta=25^{O}C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	V_{OUT}(E) (Note 2)	I_{OUT}=10mA V_{IN}= V_{OUT}+1.2V	X 0.98	V_{OUT} (T) (Note 1)	X 1.02	V
Maximum Output Current	I_{OUTMAX}	V_{IN}= V_{OUT}+1.2V		800		mA
Load Regulation	ΔV_{OUT}	V_{IN}= V_{OUT}+1.2V , 1mA≤I_{OUT}≤800mA		5		mV
Dropout Voltage (Note 3)	V_{DIF1}	I_{OUT} =100mA		115		mV
	V_{DIF2}	I_{OUT} =400mA		450		mV
	V_{DIF3}	I_{OUT} =800mA		940		mV
	V_{DIF4}	I_{OUT} =1000mA		1600		mV
Quiescent Current	I_{ss}	V_{IN}= V_{OUT}+1.2V		52		uA
Line Regulation	ΔV_{OUT}	I_{OUT} =0mA V_{OUT}+1.2V ≤V_{IN}≤18V		2		mV
Thermal Shutdown Protection	T_{sd}	I_{OUT}=10mA V_{IN}= V_{OUT}+1.2V		160		℃

Over Current Protection	I_{limit}	V_{IN}=3.5V		1.1		A

QN6118A25/E25/H25/L25 (Packages:SOT223 ， SOT89-3,TO252-2L**)**

(V_{IN}= V_{OUT}+1.2V，C_{IN}=C_L=10uF，Ta=25^{O}C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	V_{OUT}(E) (Note 2)	I_{OUT}=10mA, V_{IN}= V_{OUT}+1.2V	X 0.98	V_{OUT} (T) (Note 1)	X 1.02	V
Maximum Output Current	I_{OUTMAX}	V_{IN}= V_{OUT}+1.2V		800		mA
Load Regulation	ΔV_{OUT}	V_{IN}= V_{OUT}+1.2V , 1mA≤I_{OUT}≤800mA		5		mV
Dropout Voltage (Note 3)	V_{DIF1}	I_{OUT} =100mA		90		mV
	V_{DIF2}	I_{OUT} =500mA		450		mV
	V_{DIF3}	I_{OUT} =800mA		790		mV
	V_{DIF4}	I_{OUT} =1000mA		1300		mV
Quiescent Current	I_{ss}	V_{IN}= V_{OUT}+1.2V		53		uA
Line Regulation	ΔV_{OUT}	I_{OUT} =0mA V_{OUT}+1.2V ≤V_{IN}≤18V		2		mV
Thermal Shutdown Protection	T_{sd}	I_{OUT}=10mA, V_{IN}= V_{OUT}+1.2V		160		℃
Over Current Protection	I_{limit}	V_{IN}=4.0V		1.1		A

QN6118A33/E33/H33/L33 (Packages:SOT223 ， SOT89-3,TO252-2L**)**

(V_{IN}= V_{OUT}+1.2V，C_{IN}=C_L=10uF，Ta=25^{O}C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	V_{OUT}(E) (Note 2)	I_{OUT}=10mA, V_{IN}= V_{OUT}+1.2V	X 0.98	V_{OUT} (T) (Note 1)	X 1.02	V
Maximum Output Current	I_{OUTMAX}	V_{IN}= V_{OUT}+1.2V		800		mA
Load Regulation	ΔV_{OUT}	V_{IN}= V_{OUT}+1.2V , 1mA≤I_{OUT}≤800mA		7		mV
Dropout Voltage (Note 3)	V_{DIF1}	I_{OUT} =100mA		80		mV
	V_{DIF2}	I_{OUT} =500mA		400		mV
	V_{DIF3}	I_{OUT} =800mA		680		mV
	V_{DIF4}	I_{OUT} =1000mA		1300		mV
Quiescent Current	I_{ss}	V_{IN}= V_{OUT}+1.2V		53		uA
Line Regulation	ΔV_{OUT}	I_{OUT} =0mA V_{OUT}+1.2V ≤V_{IN}≤18V		2		mV
Thermal Shutdown	T_{sd}	I_{OUT}=10mA,		160		℃

Protection		V_{IN}= V_{OUT}+1.2V				
Over Current Protection	I_{limit}	V_{IN}=5.0V		1.1		A

QN6118A33 (Package: SOT23-3 **)**

(V_{IN}= V_{OUT}+1.2V，C_{IN}=C_L=10uF，Ta=25^{O}C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	V_{OUT}(E) (Note 2)	I_{OUT}=10mA, V_{IN}= V_{OUT}+1.2V	X 0.98	V_{OUT} (T) (Note 1)	X 1.02	V
Maximum Output Current	I_{OUTMAX}	V_{IN}= V_{OUT}+1.2V		500	600	mA
Load Regulation	ΔV_{OUT}	V_{IN}= V_{OUT}+1.2V , 1mA≤I_{OUT}≤500mA		10		mV
Dropout Voltage (Note 3)	V_{DIF1}	I_{OUT} =100mA		70		mV
	V_{DIF2}	I_{OUT} =300mA		220		mV
	V_{DIF3}	I_{OUT} =500mA		385		mV
Quiescent Current	I_{ss}	V_{IN}= V_{OUT}+1.2V		53		uA
Line Regulation	ΔV_{OUT}	I_{OUT} =0mA V_{OUT}+1.2V ≤V_{IN}≤18V		2		mV
Thermal Shutdown Protection	T_{sd}	I_{OUT}=10mA, V_{IN}= V_{OUT}+1.2V		160		℃
Over Current Protection	I_{limit}	V_{IN}=5.0V		1.1		A

QN6118A50/E50/H50/L50 (Packages:SOT223 ， SOT89-3,TO252-2L**)**

(V_{IN}= V_{OUT}+1.2V，C_{IN}=C_L=10uF，Ta=25^{O}C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	V_{OUT}(E) (Note 2)	I_{OUT}=10mA, V_{IN}= V_{OUT}+1.2V	X 0.98	V_{OUT} (T) (Note 1)	X 1.02	V
Maximum Output Current	I_{OUTMAX}	V_{IN}= V_{OUT}+1.2V		800		mA
Load Regulation	ΔV_{OUT}	V_{IN}= V_{OUT}+1.2V , 1mA≤I_{OUT}≤800mA		8		mV
Dropout Voltage (Note 3)	V_{DIF1}	I_{OUT} =100mA		60		mV
	V_{DIF2}	I_{OUT} =500mA		300		mV
	V_{DIF3}	I_{OUT} =800mA		500		mV
	V_{DIF4}	I_{OUT} =1000mA		900		mV
Quiescent Current	I_{ss}	V_{IN}= V_{OUT}+1.2V		53		uA
Line Regulation	ΔV_{OUT}	I_{OUT} =0mA V_{OUT}+1.2V ≤V_{IN}≤18V		2		mV
Thermal Shutdown	T_{sd}	I_{OUT}=10mA,		160		℃

Protection		V_{IN}= V_{OUT}+1.2V				
Over Current Protection	I_{limit}	V_{IN}=6.5V		1.1		A

Note ：

1. V_{OUT} (T) ： Specified Output Voltage

2.V_{OUT} (E) ： Effective Output Voltage (ie. The output voltage when “V_{OUT} (T)+1.2V”is provided at the Vin pin while maintaining a certain Iout value.)

3.V_{DIF}： V_{IN1} –V_{OUT} (E)’

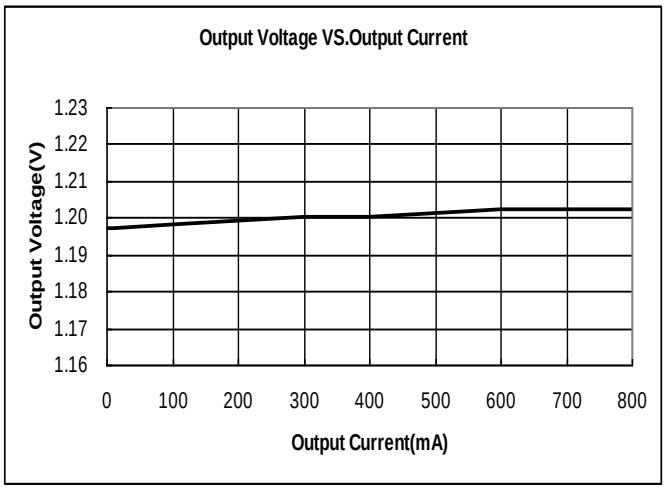
V_{IN1} ： The input voltage when V_{OUT}(E)’ appears as input voltage is gradually decreased.

V_{OUT} (E)’=A voltage equal to 98% of the output voltage whenever an amply stabilized Iout and {V_{OUT} (T)+1.2V} is input.

Type Characteristics

（1） Output Voltage VS. Output Current

QN6118A12B3G（VIN=V_{OUT}+1.3V）



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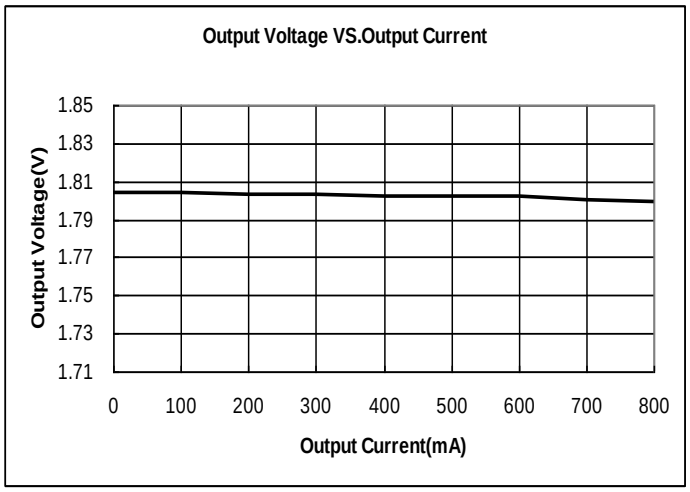

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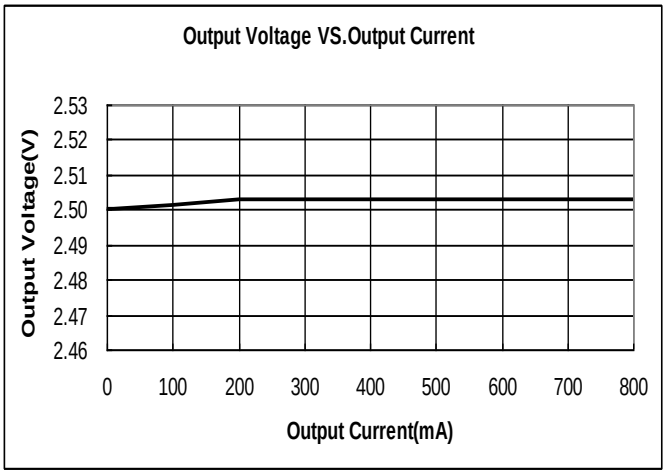
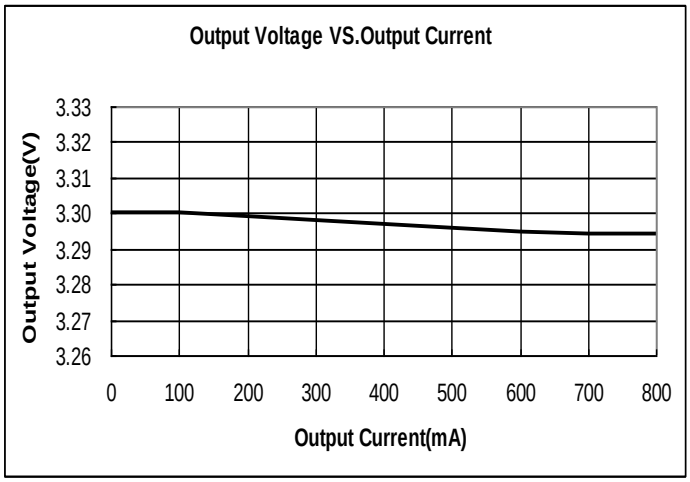
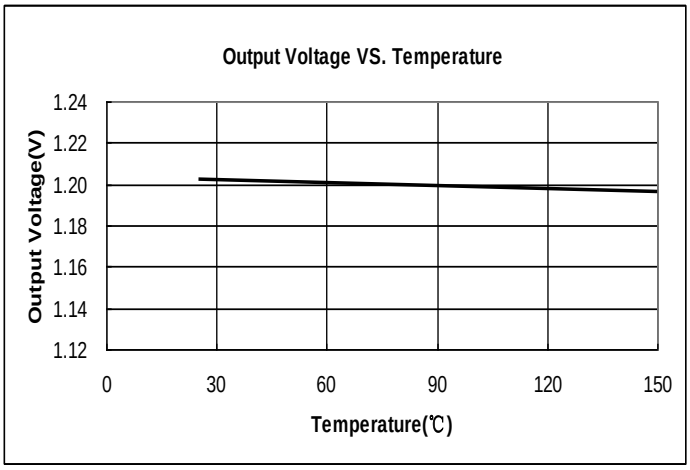


QN6118A33B3G（VIN=V_{OUT}+1.2V）



（2） Output Voltage VS. Temperature

QN6118A12B3G（VIN=V_{OUT}+1.3V , I_{OUT}=10mA）



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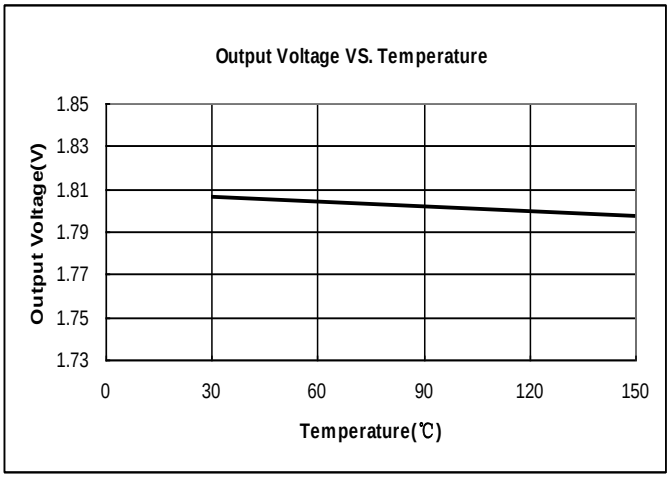
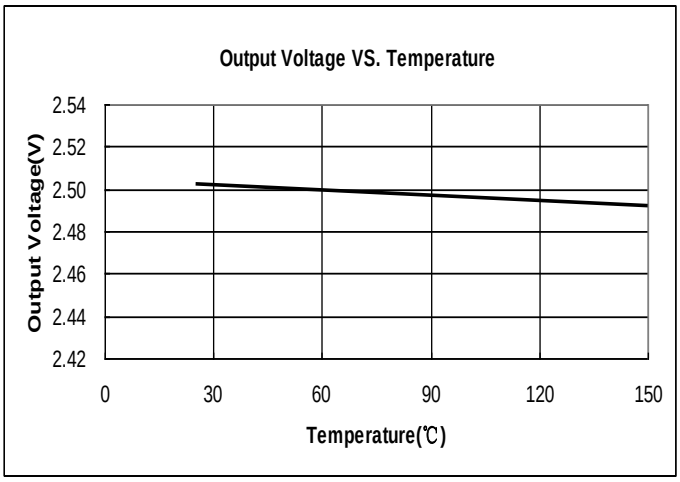
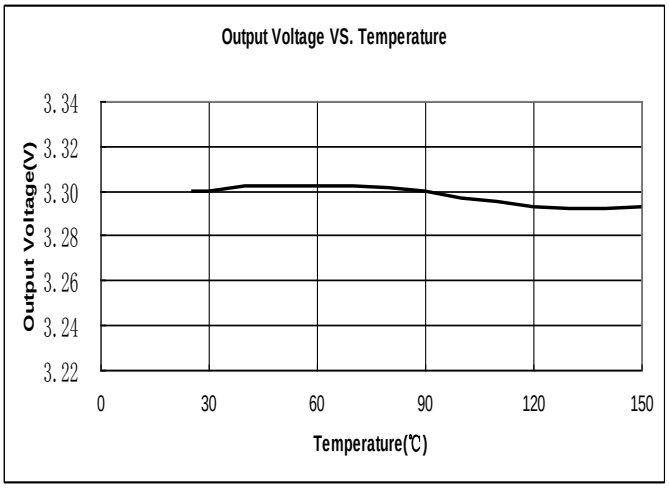


QN6118A25B3G（VIN=V_{OUT}+1.2V , I_{OUT}=10mA）



QN6118A33B3G（VIN=V_{OUT}+1.2V , I_{OUT}=10mA）



（3）Dropout Voltage VS. Output Current（Ta = 25 °C）

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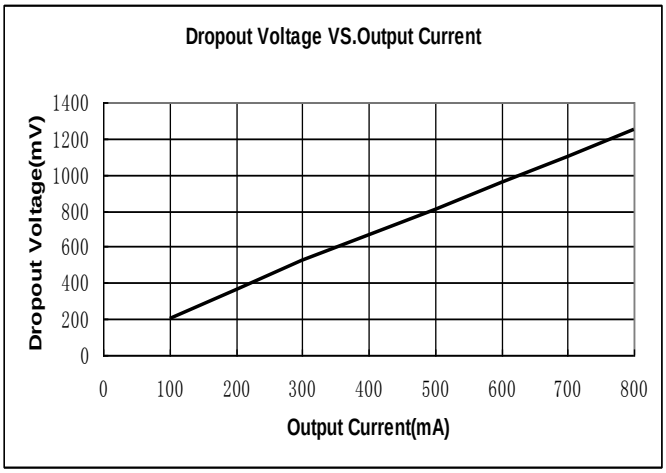

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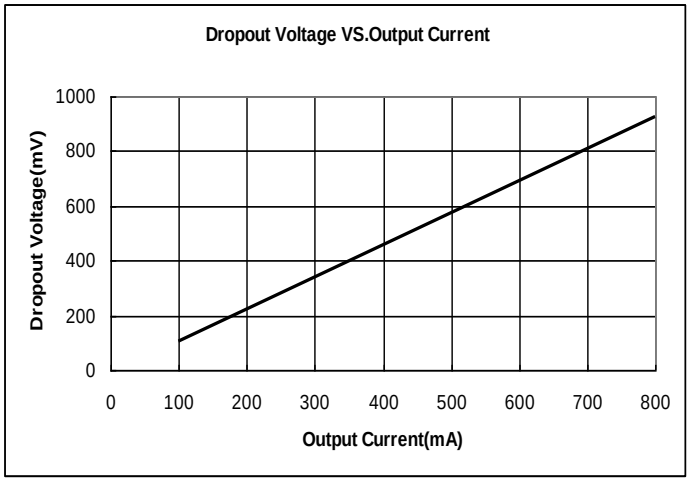

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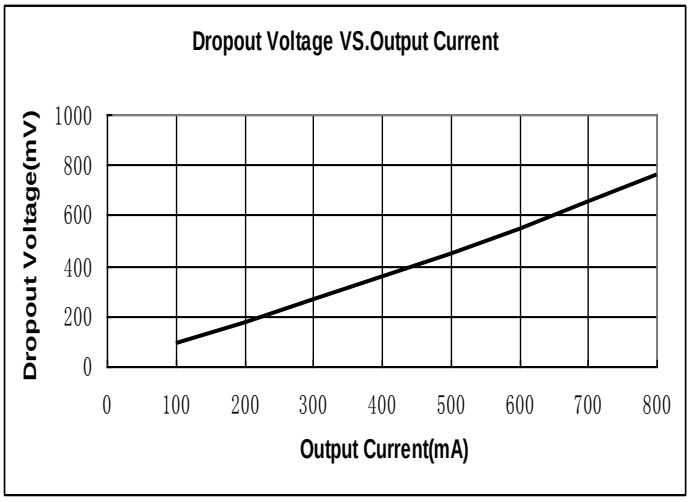

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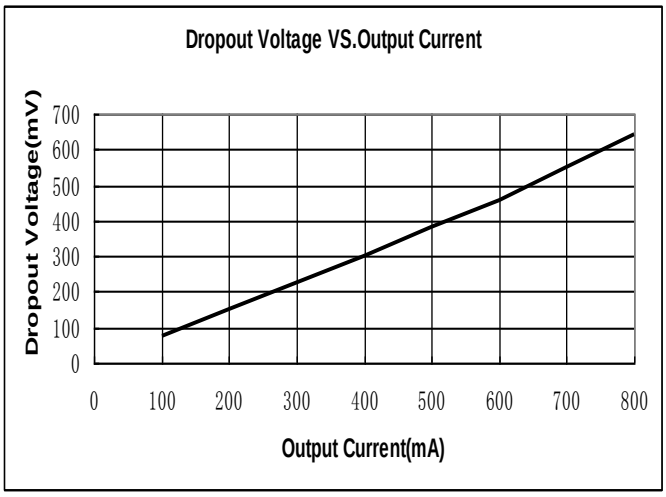

（4）Output Voltage VS. Input Voltage（Ta = 25 °C）

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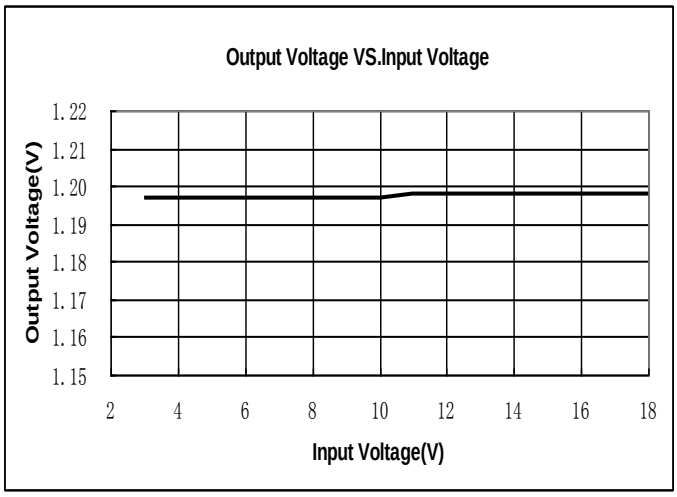

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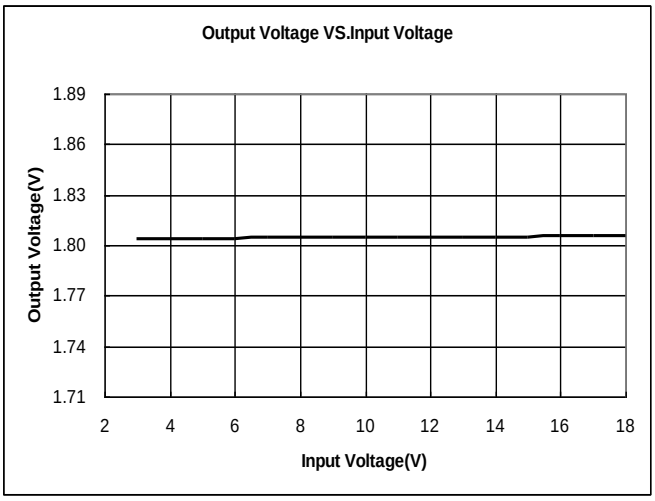

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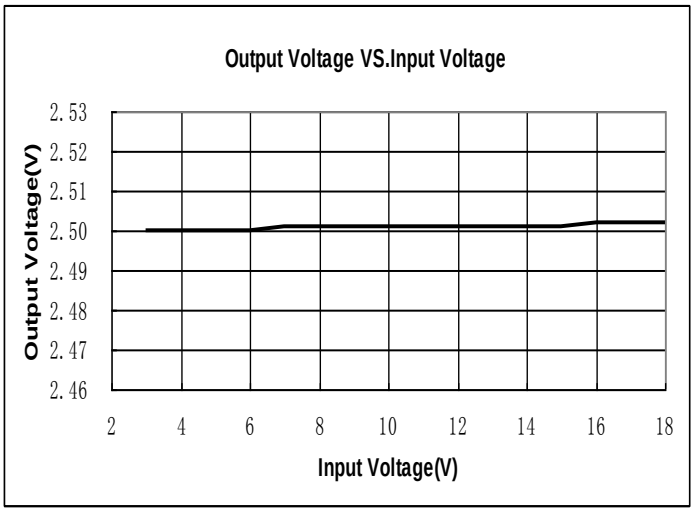

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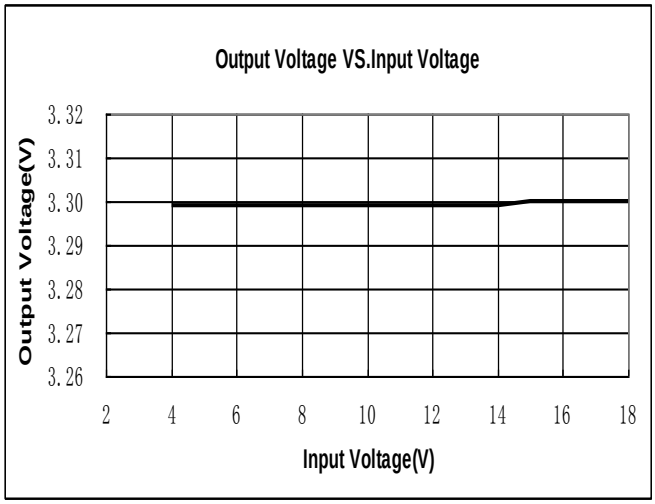
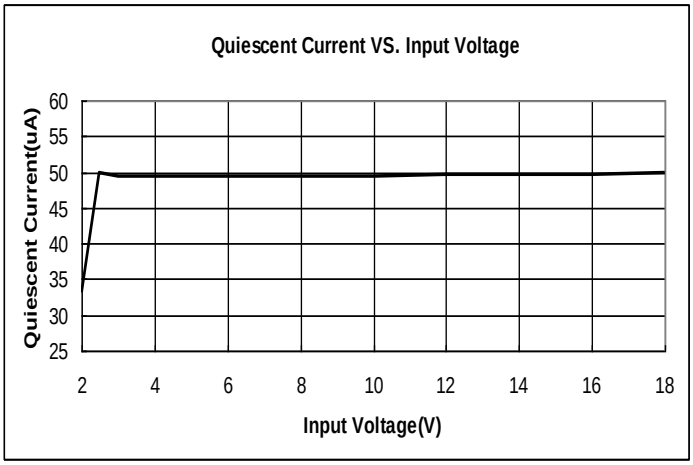


（5）Quiescent Current VS. Input Voltage

QN6118A12B3G



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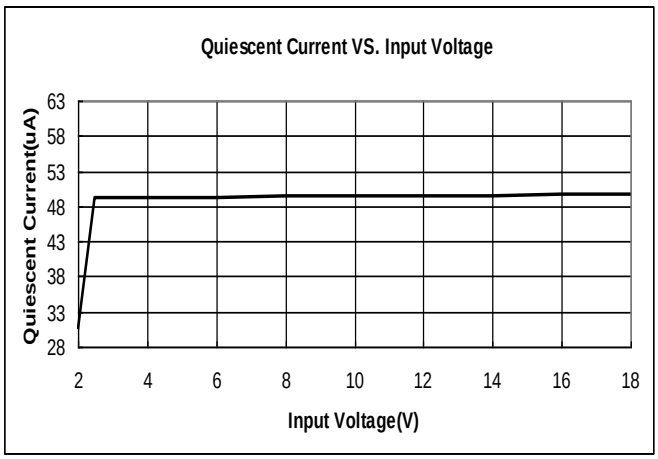

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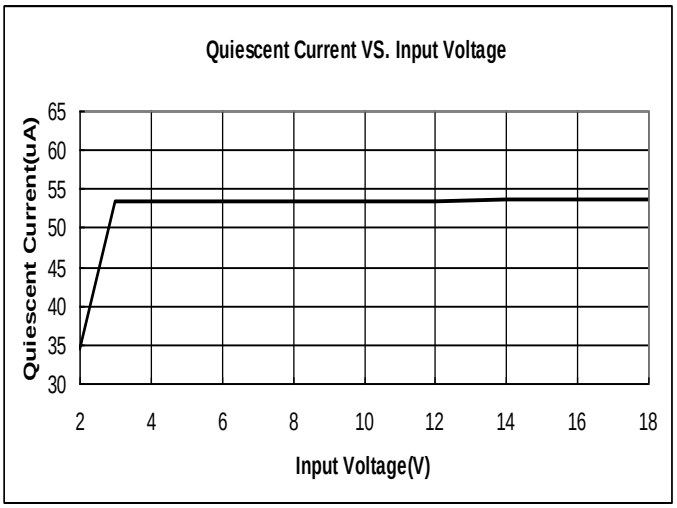

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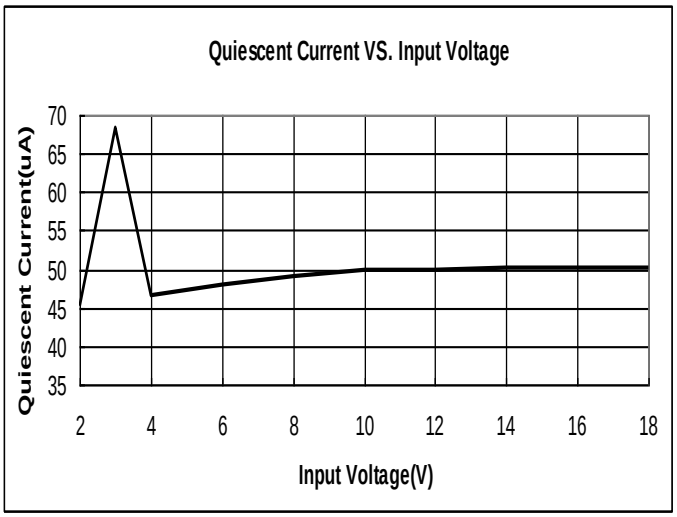


Applications Information

1. **Input Bypass Capacitor**

   An input capacitor is recommended. A 10uF tantalum on the input is a suitable input bypassing for almost all applications.

2. **Output Capacitor**

   The output capacitor is critical in maintaining regulator stability, and must meet the required conditions for both minimum amount of capacitance and ESR (Equivalent Series Resistance).The minimum output capacitance required by the ME6118 is 10μF,if a tantalum capacitor is used. Any increase of the output capacitance will merely improve the loop stability and transient response. The ESR of the output capacitor should be less than 0.5Ω .

3. **Load Regulation**

   The ME6118 regulates the voltage that appears between its output and ground pins, or between its output and adjust pins. In some cases, line resistances can introduce errors to the voltage across the load. To obtain the best load regulation, a few precautions are needed. Figure1, shows a typical application using a fixed output regulator. The Rt1 and Rt2 are the line resistances. It is obvious that the V_{LOAD} is less than the V_{OUT} by the sum of the voltage drops along the line resistances. In this case, the load regulation seen at the R_{LOAD} would be degraded from the datasheet specification. To improve this , the load should be tied directly to the output terminal on the positive side and directly tied to the ground terminal on the negative side.

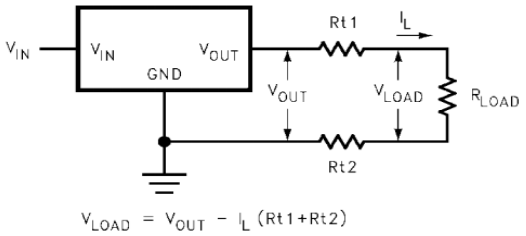
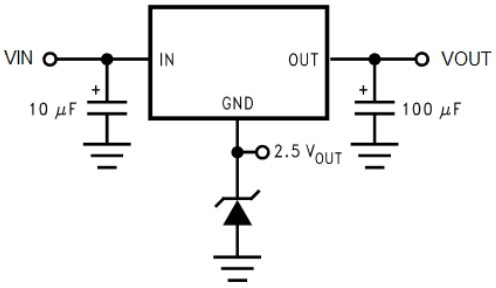


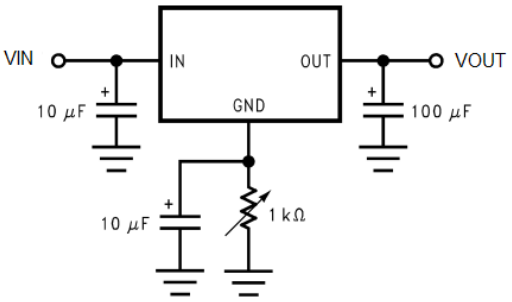
FIGURE 1. Typical Application using Fixed Output Regulator

Application Circuit

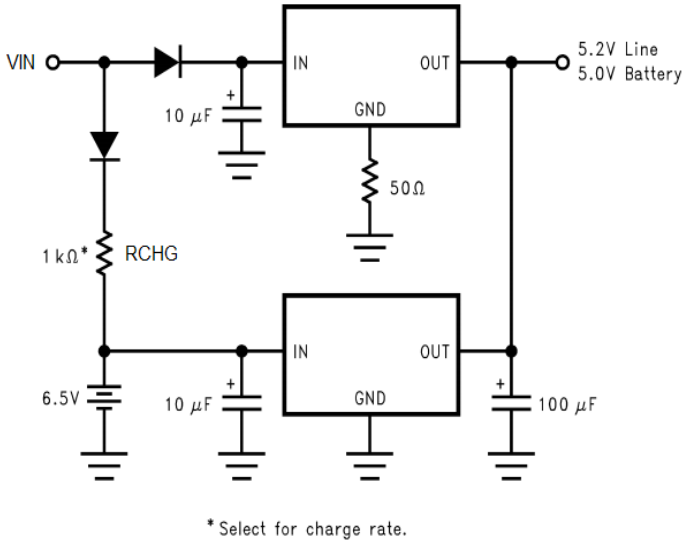
（1）Regulator with Reference



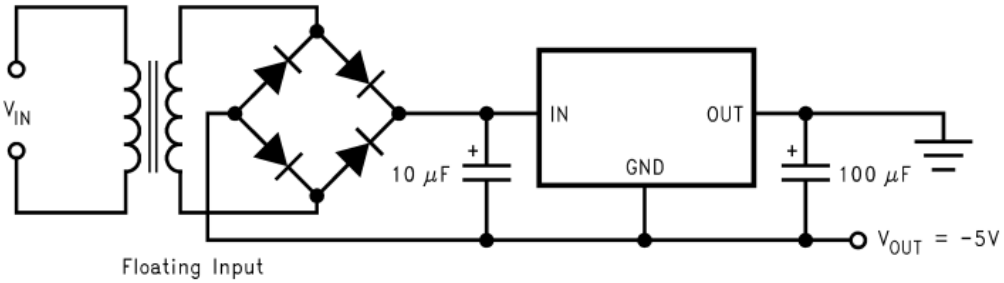
（2）Adjusting Output of Fixed Voltage Regulators



（3）Battery Backed-Up Power Supply

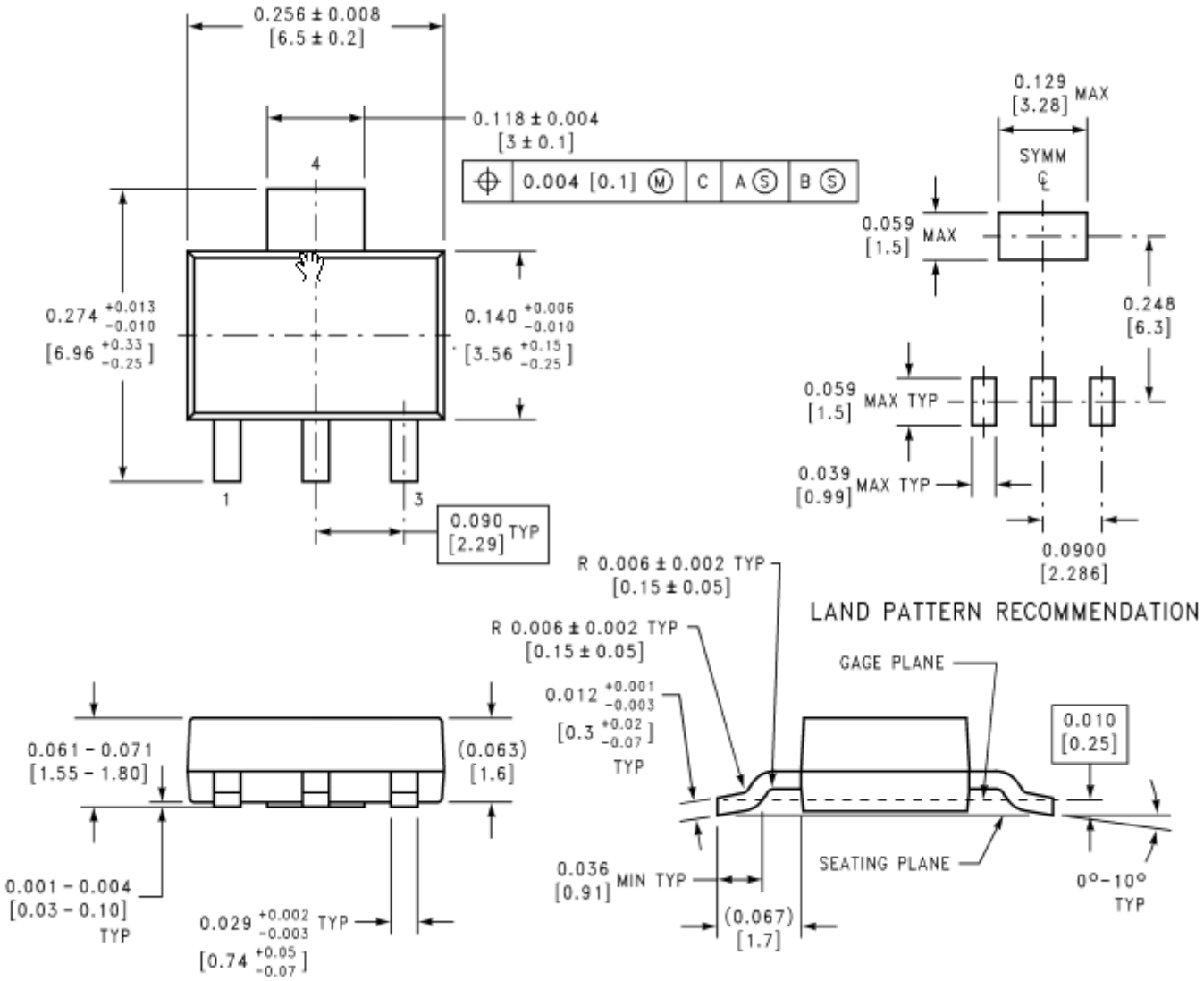


（4）Low Dropout Negative Supply

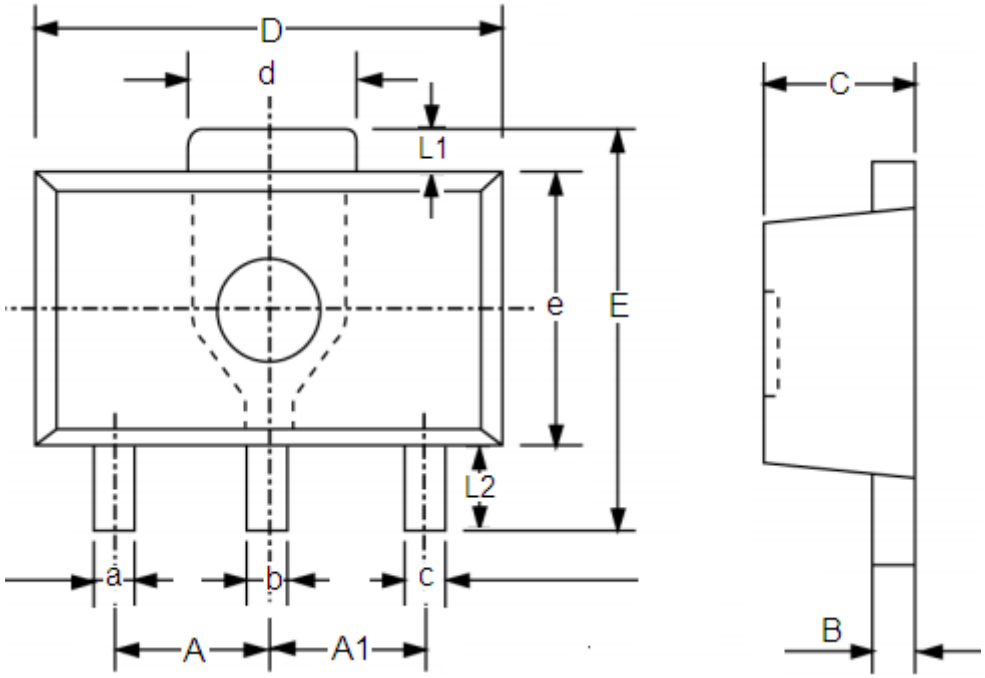


Packaging Information

- SOT223

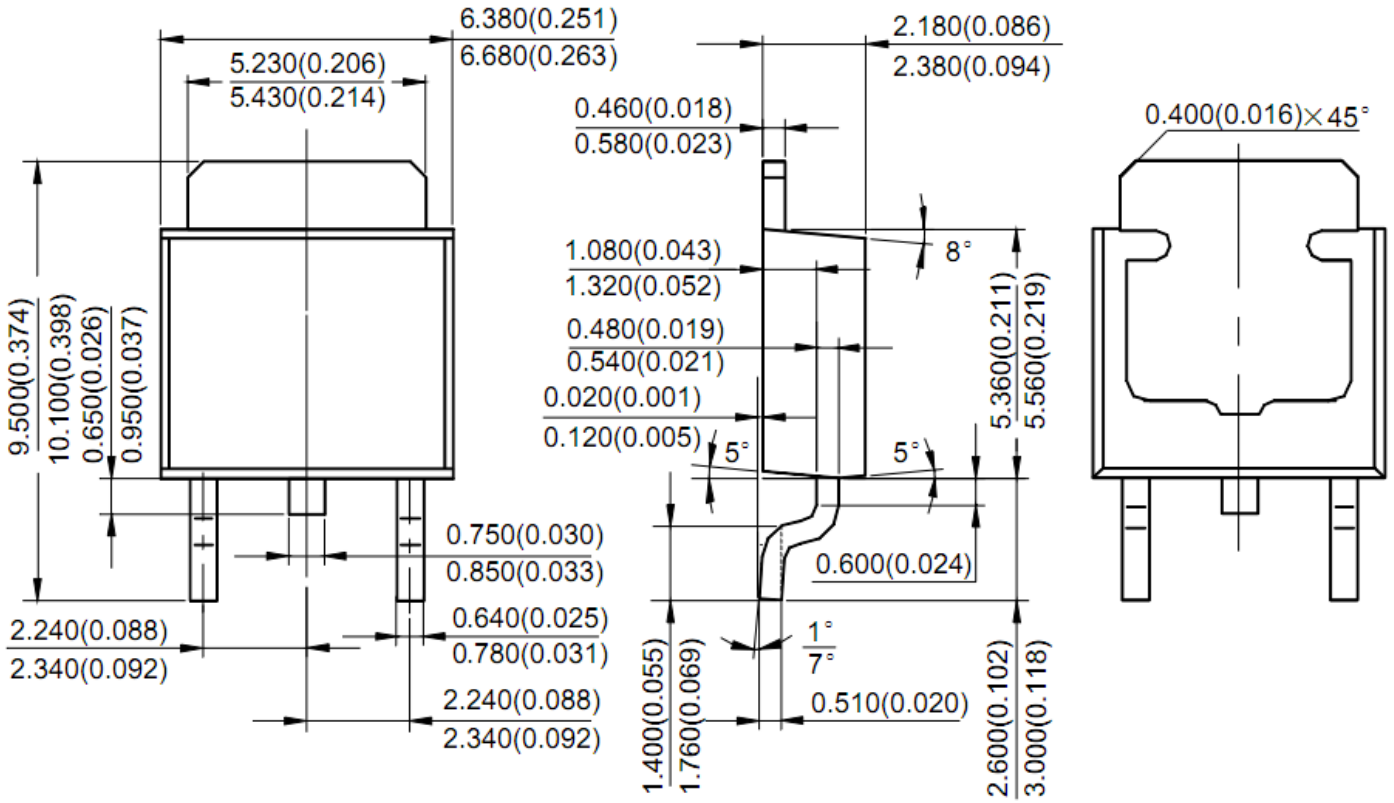


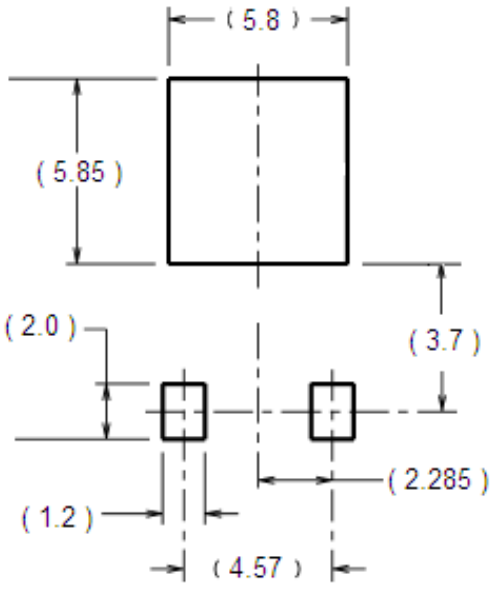
● SOT89-3



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	1.4	1.6	0.0551	0.0630
A1	1.4	1.6	0.0551	0.0630
a	0.36	0.48	0.0142	0.0189
b	0.41	0.53	0.0161	0.0209
c	0.36	0.48	0.0142	0.0189
d	1.4	1.75	0.0551	0.0689
B	0.38	0.43	0.015	0.0169
C	1.4	1.6	0.0551	0.0630
D	4.4	4.6	0.1732	0.181
E	-	4.25	-	0.1673
e	2.4	2.6	0.0945	0.1023
L1	0.4	-	0.0157	-
L2	0.8	-	0.0315	-

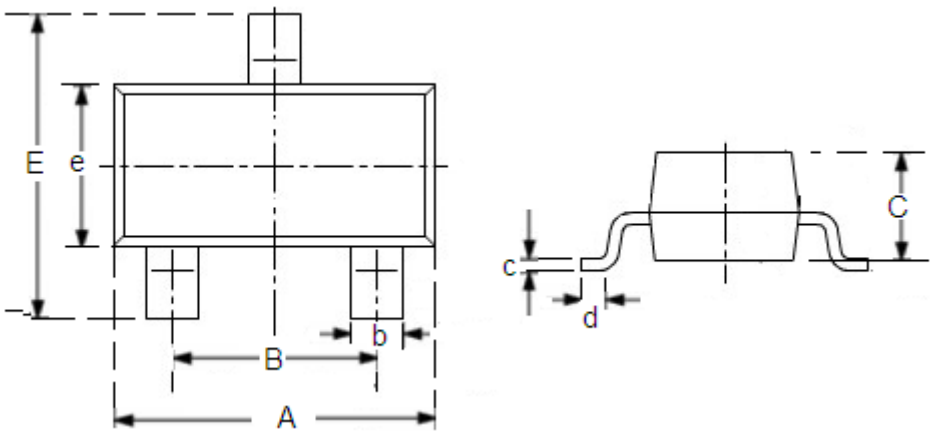
● TO252-2L





LAND PATTERN RECOMMENDATION

● SOT23-3



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	2.7	3.1	0.1063	0.122
B	1.7	2.1	0.0669	0.0827
b	0.35	0.5	0.0138	0.0197
C	1.0	1.2	0.0394	0.0472
c	0.1	0.25	0.0039	0.0098
d	0.2	-	0.0079	-
E	2.6	3.0	0.1023	0.1181
e	1.5	1.8	0.059	0.0708

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