

## 100 mA, High Input Voltage LDO Linear Regulators ME6203 Series

### General Description

ME6203 series are low-dropout linear voltage regulators with a built-in voltage reference module, error correction module and phase compensation module. ME6203 series are based on the CMOS process and allow high voltage input with low quiescent current. This series can deliver 100mA output current and allow an input voltage as high as 40V. This series has the function of internal feedback resistor setting from 2.1V to 12V. The output accuracy is  $\pm 2\%$ .

### Features

- High output accuracy:  $\pm 2\%$
- Input voltage: up to 40 V
- Output voltage: 2.1V ~ 12V
- Ultra-low quiescent current (Typ.= 3  $\mu$  A)
- Output Current:  $I_{OUT} = 100\text{mA}$   
(When  $V_{IN} = 5.5\text{V}$  and  $V_{OUT} = 3.3\text{V}$ )
- Short-circuit Current: (Typ.= 20mA)
- Low temperature coefficient
- Ceramic capacitor can be used

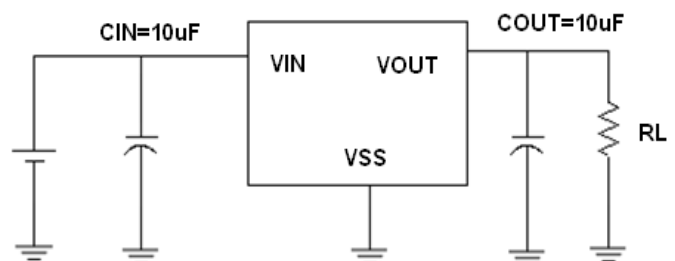
### Typical Application

- Electronic weighbridge
- SCM
- Phones, cordless phones
- Security Products
- Water meters, power meters

### Package

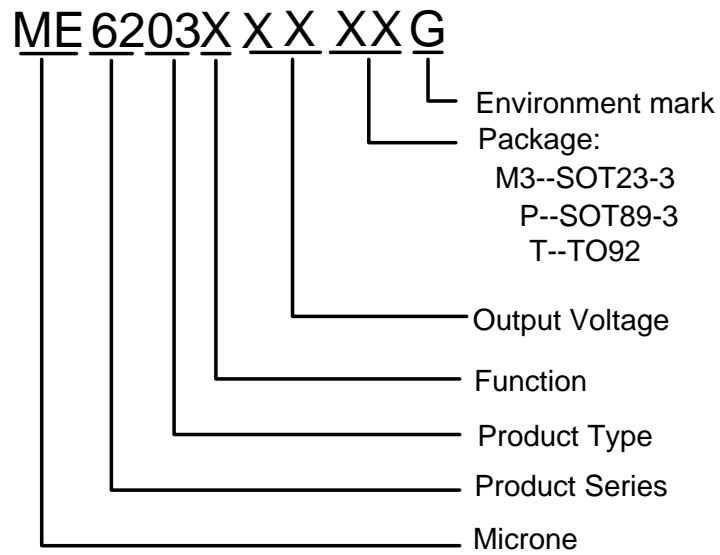
- 3-pin SOT89-3 、 SOT23-3 、 TO92

### Typical Application



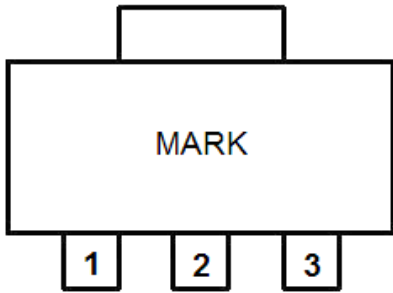
**Suggesting** : The circuit uses the electrolytic capacitors or tantalum capacitors in the best ,when it is applied in the high input voltage.

## Selection Guide

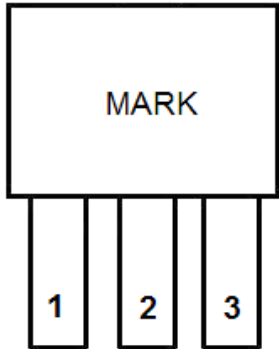


product series	product description
ME6203A18M3G	$V_{OUT} = 1.8V$ ; Package: M3,P,T
ME6203A25M3G	$V_{OUT} = 2.5V$ ; Package: M3,P,T
ME6203A30M3G	$V_{OUT} = 3.0V$ ; Package: M3,P,T
ME6203A33M3G	$V_{OUT} = 3.3V$ ; Package: M3,P,T
ME6203A36M3G	$V_{OUT} = 3.6V$ ; Package: M3,P,T
ME6203A44M3G	$V_{OUT} = 4.4V$ ; Package: M3,P,T
ME6203A50M3G	$V_{OUT} = 5.0V$ ; Package: M3,P,T

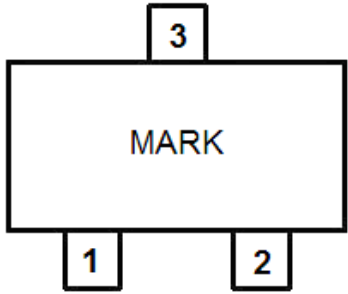
Pin Configuration



SOT89-3



TO92

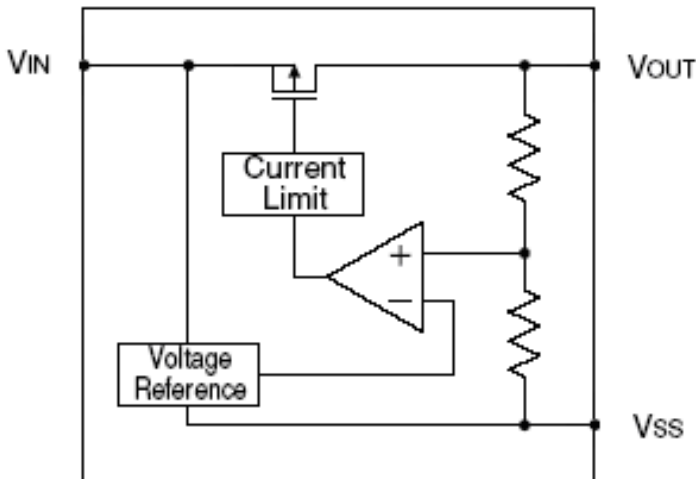


SOT23-3

Pin Assignment

Pin Number		Pin Name	Functions
SOT89-3 / TO92	SOT23-3		
1	1	$V_{SS}$	Ground
2	3	$V_{IN}$	Power Input
3	2	$V_{OUT}$	Output

Block Diagram



## Absolute Maximum Ratings

Parameter	Symbol	Ratings	Units
Input Voltage	$V_{IN}$	40	V
Output Current	$I_{OUT}$	150	mA
Output Voltage	$V_{OUT}$	$V_{SS}-0.3 \sim V_{IN} + 0.3$	V
Power Dissipation	SOT89-3	500	mW
	TO92	500	
	SOT23-3	300	
Operating Junction Temperature Range	$T_J$	$-45 \sim +150$	$^{\circ}C$
Storage Temperature Range	$T_{STG}$	$-55 \sim +150$	$^{\circ}C$
Lead Temperature		$260^{\circ}C, 10sec$	

## Electrical Characteristics

### ME6203A18

( $V_{IN} = V_{OUT} + 2.0V$ ,  $C_{IN} = C_L = 10\mu F$ ,  $T_a = 25^{\circ}C$ , unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	$V_{OUT(E)}$ (Note 2)	$I_{OUT} = 10mA$	X 0.98	$V_{OUT(T)}$ (Note 1)	X 1.02	V
Input Voltage	$V_{IN}$		3.0		40	V
Maximum Output Current	$I_{OUT\_max}$	$V_{IN} = V_{OUT} + 3.7V$		100		mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN} = V_{OUT} + 3.7V$ , $1mA \leq I_{OUT} \leq 100mA$		30	60	mV
Dropout Voltage (Note 3)	$V_{DIF}$	$I_{OUT} = 100mA$		3.7		V
Supply Current	$I_{SS}$	$V_{IN} = V_{OUT} + 2V$		2.0	4	$\mu A$
Line Regulations	$\frac{\Delta V_{OUT}}{\Delta V_{IN}} \times V_{OUT}$	$I_{OUT} = 1mA$ $V_{OUT} + 1V \leq V_{IN} \leq 40V$		0.03	0.1	%/V
Short-circuit Current	$I_{SHORT}$	$V_{OUT} = 0V$		20	40	mA
Temperature Coefficient	$\frac{\Delta V_{OUT}}{V_{OUT} \times \Delta T_a}$	$I_{OUT} = 10mA$ $-40^{\circ}C \leq T_a \leq 85^{\circ}C$		80		ppm/ $^{\circ}C$

## ME6203A25

( $V_{IN} = V_{OUT} + 2.0V$ ,  $C_{IN} = C_L = 10\mu F$ ,  $T_a = 25^\circ C$ , unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	$V_{OUT(E)}$ (Note 2)	$I_{OUT} = 10mA$	X 0.98	$V_{OUT(T)}$ (Note 1)	X 1.02	V
Input Voltage	$V_{IN}$		3.0		40	V
Maximum Output Current	$I_{OUT\_max}$	$V_{IN} = V_{OUT} + 3.0V$		100		mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN} = V_{OUT} + 3.0V$ , $1mA \leq I_{OUT} \leq 100mA$		32	60	mV
Dropout Voltage (Note 3)	$V_{DIF}$	$I_{OUT} = 100mA$		2.91		V
Supply Current	$I_{SS}$	$V_{IN} = V_{OUT} + 2V$		2.5	4	$\mu A$
Line Regulations	$\frac{\Delta V_{OUT}}{\Delta V_{IN}} \times V_{OUT}$	$I_{OUT} = 1mA$ $V_{OUT} + 1V \leq V_{IN} \leq 40V$		0.02	0.1	%/V
Short-circuit Current	$I_{SHORT}$	$V_{OUT} = 0V$		20	40	mA
Temperature Coefficient	$\frac{\Delta V_{OUT}}{V_{OUT} \times \Delta T_a}$	$I_{OUT} = 10mA$ $-40^\circ C \leq T_a \leq 85^\circ C$		80		ppm/ $^\circ C$

## ME6203A30

( $V_{IN} = V_{OUT} + 2.0V$ ,  $C_{IN} = C_L = 10\mu F$ ,  $T_a = 25^\circ C$ , unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	$V_{OUT(E)}$ (Note 2)	$I_{OUT} = 10mA$	X 0.98	$V_{OUT(T)}$ (Note 1)	X 1.02	V
Input Voltage	$V_{IN}$		3.0		40	V
Maximum Output Current	$I_{OUT\_max}$	$V_{IN} = V_{OUT} + 2.5V$		100	120	mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN} = V_{OUT} + 2.5V$ , $1mA \leq I_{OUT} \leq 100mA$		30	60	mV
Dropout Voltage (Note 3)	$V_{DIF}$	$I_{OUT} = 10mA$		0.25		V
		$I_{OUT} = 50mA$		1.2		V
Supply Current	$I_{SS}$	$V_{IN} = V_{OUT} + 2V$		3	4	$\mu A$
Line Regulations	$\frac{\Delta V_{OUT}}{\Delta V_{IN}} \times V_{OUT}$	$I_{OUT} = 1mA$ $V_{OUT} + 1V \leq V_{IN} \leq 40V$		0.02	0.1	%/V
Short-circuit Current	$I_{SHORT}$	$V_{OUT} = 0V$		20	40	mA
Temperature Coefficient	$\frac{\Delta V_{OUT}}{V_{OUT} \times \Delta T_a}$	$I_{OUT} = 10mA$ $-40^\circ C \leq T_a \leq 85^\circ C$		80		ppm/ $^\circ C$

## ME6203A33

( $V_{IN} = V_{OUT} + 2.0V$ ,  $C_{IN} = C_L = 10\mu F$ ,  $T_a = 25^\circ C$ , unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	$V_{OUT(E)}$ (Note 2)	$I_{OUT} = 10mA$	X 0.98	$V_{OUT(T)}$ (Note 1)	X 1.02	V
Input Voltage	$V_{IN}$		3.3		40	V
Maximum Output Current	$I_{OUT\_max}$	$V_{IN} = V_{OUT} + 2.2V$		100	120	mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN} = V_{OUT} + 2.2V$ , $1mA \leq I_{OUT} \leq 100mA$		30	60	mV
Dropout Voltage (Note 3)	$V_{DIF}$	$I_{OUT} = 10mA$		0.22		V
		$I_{OUT} = 50mA$		1.1		V
Supply Current	$I_{SS}$	$V_{IN} = V_{OUT} + 2V$		3	4	$\mu A$
Line Regulations	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$I_{OUT} = 1mA$ $V_{OUT} + 1V \leq V_{IN} \leq 40V$		0.04	0.1	%/V
Short-circuit Current	$I_{SHORT}$	$V_{OUT} = 0V$		20	40	mA
Temperature Coefficient	$\frac{\Delta V_{OUT}}{V_{OUT} \times \Delta T_a}$	$I_{OUT} = 10mA$ $-40^\circ C \leq T_a \leq 85^\circ C$		80		ppm/ $^\circ C$

## ME6203A36

( $V_{IN} = V_{OUT} + 2.0V$ ,  $C_{IN} = C_L = 10\mu F$ ,  $T_a = 25^\circ C$ , unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	$V_{OUT(E)}$ (Note 2)	$I_{OUT} = 10mA$	X 0.98	$V_{OUT(T)}$ (Note 1)	X 1.02	V
Input Voltage	$V_{IN}$		3.6		40	V
Maximum Output Current	$I_{OUT\_max}$	$V_{IN} = V_{OUT} + 2.2V$		100	120	mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN} = V_{OUT} + 2.2V$ , $1mA \leq I_{OUT} \leq 100mA$		30	60	mV
Dropout Voltage (Note 3)	$V_{DIF}$	$I_{OUT} = 10mA$		0.20		V
		$I_{OUT} = 50mA$		1.0		V
Supply Current	$I_{SS}$	$V_{IN} = V_{OUT} + 2V$		3	4	$\mu A$
Line Regulations	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$I_{OUT} = 1mA$ $V_{OUT} + 1V \leq V_{IN} \leq 40V$		0.02	0.1	%/V
Short-circuit Current	$I_{SHORT}$	$V_{OUT} = 0V$		20	40	mA
Temperature Coefficient	$\frac{\Delta V_{OUT}}{V_{OUT} \times \Delta T_a}$	$I_{OUT} = 10mA$ $-40^\circ C \leq T_a \leq 85^\circ C$		80		ppm/ $^\circ C$

## ME6203A44

( $V_{IN} = V_{OUT} + 2.0V$ ,  $C_{IN} = C_L = 10\mu F$ ,  $T_a = 25^\circ C$ , unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	$V_{OUT(E)}$ (Note 2)	$I_{OUT} = 10mA$	X 0.98	$V_{OUT(T)}$ (Note 1)	X 1.02	V
Input Voltage	$V_{IN}$		3.0		40	V
Maximum Output Current	$I_{OUT\_max}$	$V_{IN} = V_{OUT} + 2.0V$		100		mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN} = V_{OUT} + 2.0V$ , $1mA \leq I_{OUT} \leq 100mA$		31	60	mV
Dropout Voltage (Note 3)	$V_{DIF}$	$I_{OUT} = 10mA$		0.17		V
		$I_{OUT} = 50mA$		0.82		V
Supply Current	$I_{SS}$	$V_{IN} = V_{OUT} + 2V$		3	4	$\mu A$
Line Regulations	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$I_{OUT} = 1mA$ $V_{OUT} + 1V \leq V_{IN} \leq 40V$		0.02	0.1	%/V
Short-circuit Current	$I_{SHORT}$	$V_{OUT} = 0V$		20	40	mA
Temperature Coefficient	$\frac{\Delta V_{OUT}}{V_{OUT} \times \Delta T_a}$	$I_{OUT} = 10mA$ $-40^\circ C \leq T_a \leq 85^\circ C$		80		ppm/ $^\circ C$

## ME6203A50

( $V_{IN} = V_{OUT} + 2.0V$ ,  $C_{IN} = C_L = 10\mu F$ ,  $T_a = 25^\circ C$ , unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	$V_{OUT(E)}$ (Note 2)	$I_{OUT} = 10mA$	X 0.98	$V_{OUT(T)}$ (Note 1)	X 1.02	V
Input Voltage	$V_{IN}$		5.0		40	V
Maximum Output Current	$I_{OUT\_max}$	$V_{IN} = V_{OUT} + 2.0V$		150	180	mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN} = V_{OUT} + 2.0V$ , $1mA \leq I_{OUT} \leq 100mA$		33	60	mV
Dropout Voltage (Note 3)	$V_{DIF}$	$I_{OUT} = 10mA$		0.13		V
		$I_{OUT} = 50mA$		0.68		V
Supply Current	$I_{SS}$	$V_{IN} = V_{OUT} + 2V$		3.3	4.5	$\mu A$
Line Regulations	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$I_{OUT} = 1mA$ $V_{OUT} + 1V \leq V_{IN} \leq 40V$		0.03	0.1	%/V
Short-circuit Current	$I_{SHORT}$	$V_{OUT} = 0V$		25	40	mA
Temperature Coefficient	$\frac{\Delta V_{OUT}}{V_{OUT} \times \Delta T_a}$	$I_{OUT} = 10mA$ $-40^\circ C \leq T_a \leq 85^\circ C$		80		ppm/ $^\circ C$

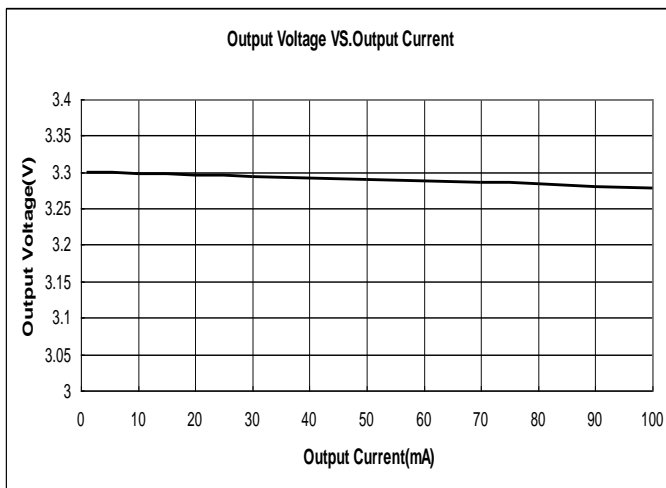
**Note :**

1.  $V_{OUT}(T)$  : Specified Output Voltage
2.  $V_{OUT}(E)$  : Effective Output Voltage ( ie. The output voltage when " $V_{OUT}(T)+ 2.0V$ " is provided at the  $V_{IN}$  pin while maintaining a certain  $I_{OUT}$  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  $I_{OUT}$  and  $\{V_{OUT}(T)+2.2V\}$  is input.

## Type Characteristics

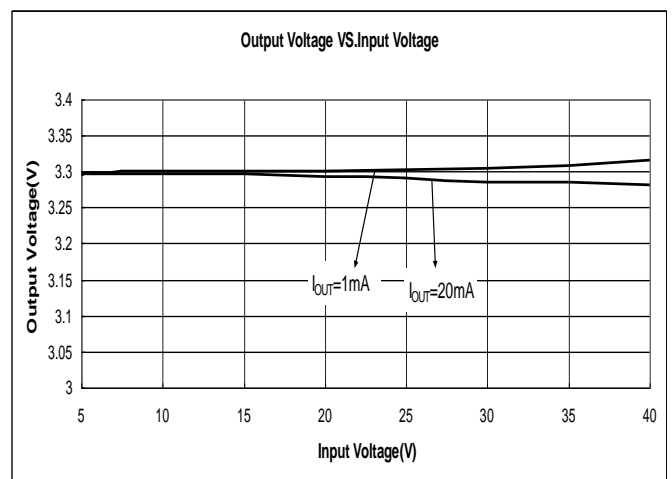
(1) Output Voltage VS. Output Current (  $T_a = 25\text{ }^\circ\text{C}$  )

**ME6203A33** ( $V_{IN}=V_{OUT}+2.2V$ )



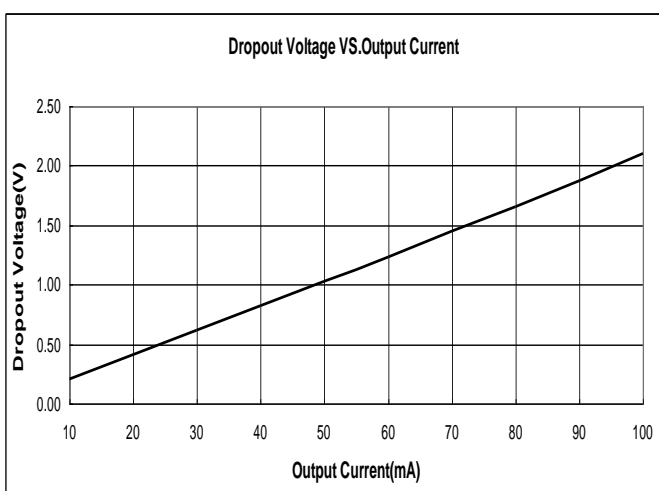
(2) Output Voltage VS. Input Voltage (  $T_a = 25\text{ }^\circ\text{C}$  )

**ME6203A33**



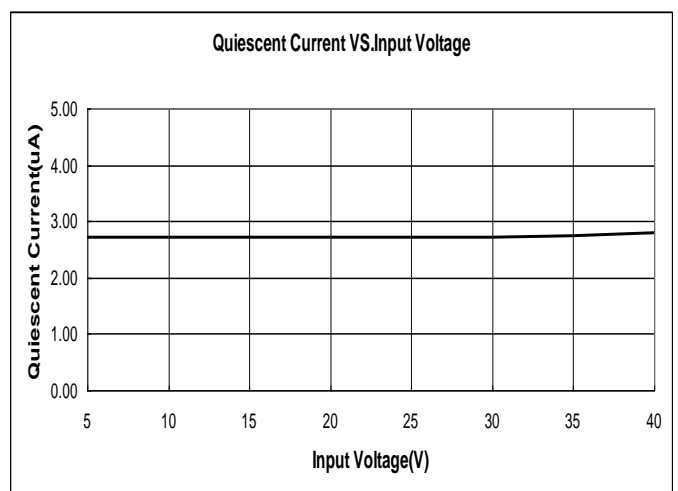
(3) Dropout Voltage VS. Output Current (  $T_a = 25\text{ }^\circ\text{C}$  )

**ME6203A33**



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

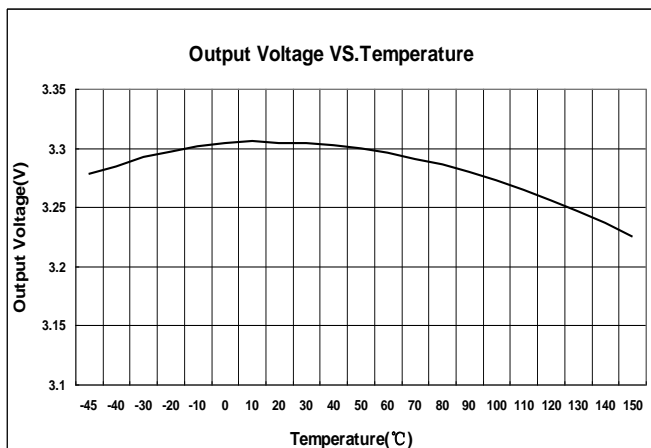
**ME6203A33**





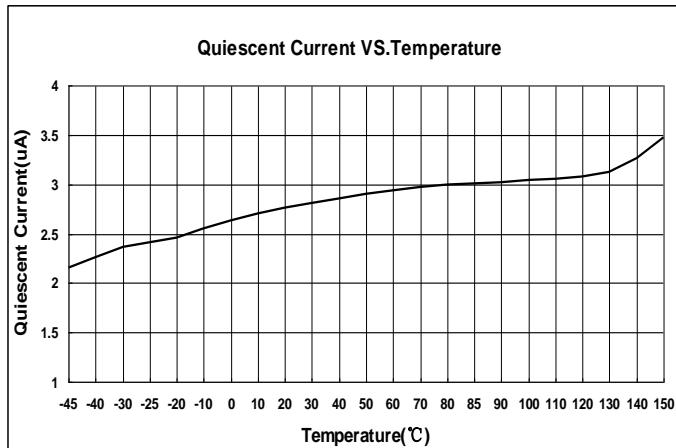
(5) Output Voltage VS. Temperature

**ME6203A33** ( $I_{OUT}=10mA$ )



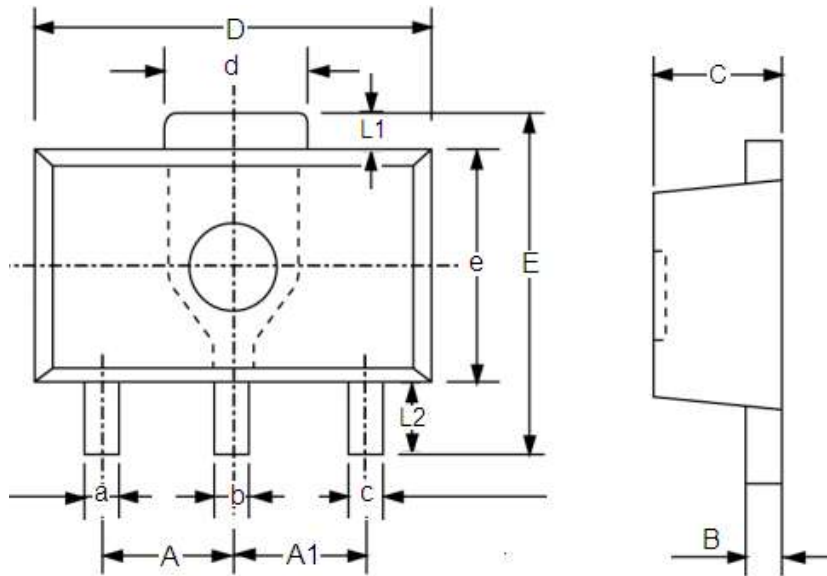
(6) Quiescent Current VS. Temperature

**ME6203A33** ( $V_{IN}=V_{OUT}+2.2V$ )



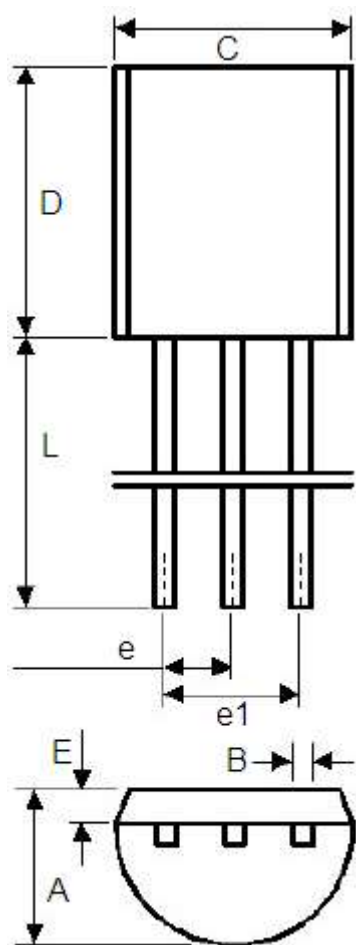
## Packaging Information

- Packaging Type: SOT89-3



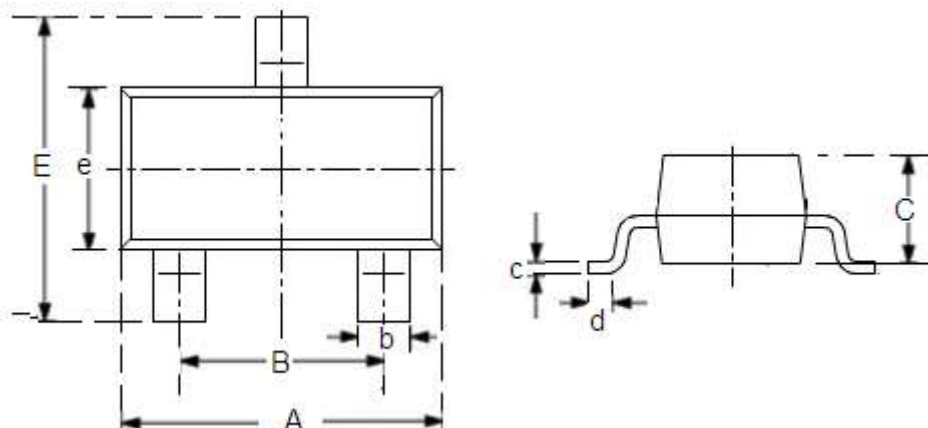
DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	1.4	1.6	0.0551	0.0630
A1	1.4	1.6	0.0551	0.0630
a	0.36	0.48	0.0142	0.0189
b	0.41	0.53	0.0161	0.0209
c	0.36	0.48	0.0142	0.0189
d	1.4	1.75	0.0551	0.0689
B	0.38	0.43	0.015	0.0169
C	1.4	1.6	0.0551	0.0630
D	4.4	4.6	0.1732	0.181
E	-	4.25	-	0.1673
e	2.4	2.6	0.0945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

● Packaging Type: TO92



	Min	Max	Min	Max
A	3.4	3.8	0.13386	0.1496
B	0.3	0.5	0.0118	0.0197
C	4.4	4.8	0.1732	0.189
D	4.4	4.8	0.1732	0.189
E	0.9	1.5	0.0354	0.059
e	1.17	1.37	0.046	0.0539
e1	2.39	2.69	0.094	0.1059
L	12	16	0.4724	0.6299

● Packaging Type: 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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