



## High Speed LDO Regulators, High PSRR, Low noise, ME6212 Series

### General Description

The ME6212 series are highly accurate, low noise, CMOS LDO Voltage Regulators. Offering low output noise, high ripple rejection ratio, low dropout and very fast turn-on times, the ME6212 series is ideal for today's cutting edge mobile phone. Internally the ME6212 includes a reference voltage source, error amplifiers, driver transistors, current limiters and phase compensators. The ME6212's current limiters' foldback circuit also operates as a short protect for the output current limiter and the output pin. The ME6212 series is also fully compatible with low ESR ceramic capacitors, reducing cost and improving output stability. This high level of output stability is maintained even during frequent load fluctuations, due to the excellent transient response performance and high PSRR achieved across a broad range of frequencies. The CE function allows the output of regulator to be turned off, resulting in greatly reduced power consumption.

### Package

- 5-pin SOT23-5

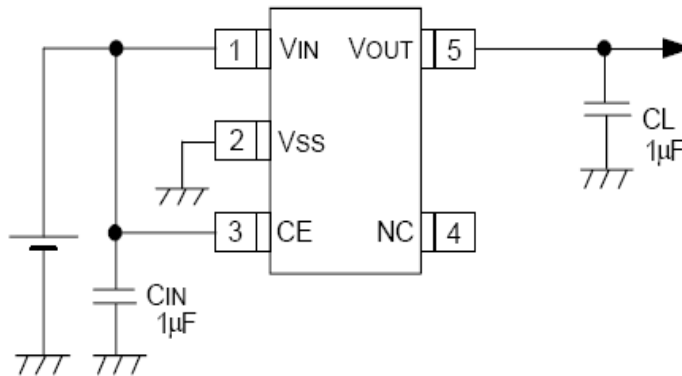
### Features

- Maximum Output Current: 350mA  
( $V_{IN}=4.3V, V_{OUT}=3.3V$ )
- Dropout Voltage: 100mV@  $I_{OUT}=100mA$
- Operating Voltage Range: 2V~6.0V
- Highly Accuracy:  $\pm 2\%$
- Low Power Consumption: 50uA (TYP.)
- Standby Current: 0.1uA (TPY.)
- High Ripple Rejection: 65dB@1KHz  
(ME6212C33)
- Low output noise: 50uVrms
- Line Regulation: 0.05% (TYP.)

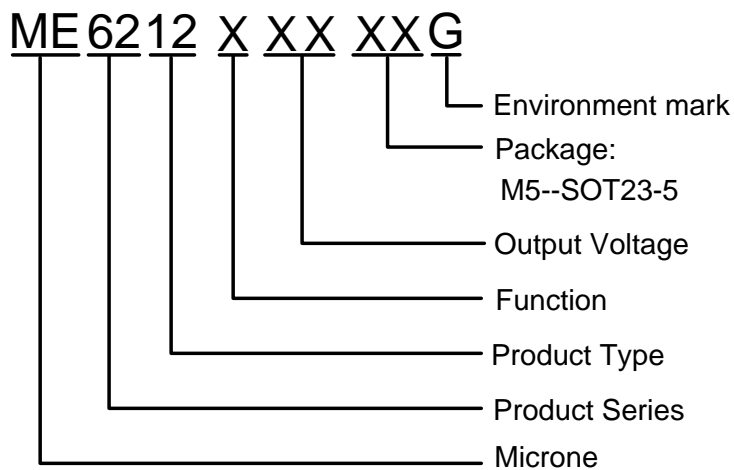
### Typical Application

- Mobile phones
- Cordless phones, radio communication equipment
- Portable games
- Cameras, Video cameras
- Reference voltage sources
- Battery powered equipment

## Typical Application Circuit

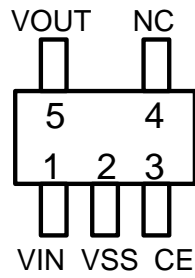


## Selection Guide



product series	Output voltage	Package
ME6212C12M5G	1.2V	SOT23-5
ME6212C15M5G	1.5V	SOT23-5
ME6212C18M5G	1.8V	SOT23-5
ME6212C21M5G	2.1V	SOT23-5
ME6212C25M5G	2.5V	SOT23-5
ME6212C28M5G	2.8V	SOT23-5
ME6212C30M5G	3.0V	SOT23-5
ME6212C33M5G	3.3V	SOT23-5
ME6212C50M5G	5.0V	SOT23-5

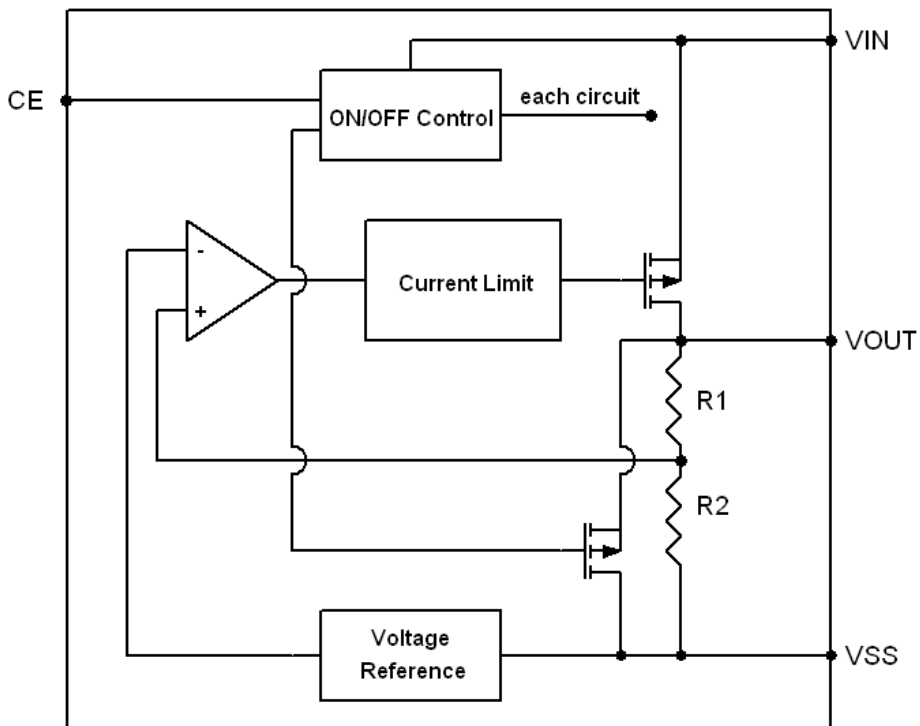
### Pin Configuration (SOT23-5)



### Pin Assignment

Pin Number	Pin Name	Functions
SOT23-5		
1	V <sub>IN</sub>	Power Input
2	V <sub>SS</sub>	Ground
3	CE	ON / OFF Control
4	NC	No Connect
5	V <sub>OUT</sub>	Output

### Block Diagram



## Absolute Maximum Ratings

Parameter	Symbol	Ratings	Units
Input Voltage	$V_{IN}$	6.5	V
Output Current	$I_{OUT}$	500	mA
Output Voltage	$V_{OUT}$	$V_{SS}-0.3 \sim V_{IN} + 0.3$	V
CE Pin Voltage	$V_{CE}$	$V_{SS}-0.3 \sim V_{IN} + 0.3$	V
Power Dissipation	$P_D$	300	mW
SOT23-5			
Operating Temperature Range	$T_{OPR}$	$-40 \sim +150$	$^{\circ}C$
Storage Temperature Range	$T_{STG}$	$-40 \sim +150$	$^{\circ}C$

## Electrical Characteristics

**ME6212C12** ( $V_{IN} = V_{OUT} + 1V$ ,  $V_{CE} = V_{IN}$ ,  $C_{IN} = C_L = 1\mu F$ ,  $T_a = 25^{\circ}C$ , unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	$V_{OUT(E)}$ (Note 2)	$I_{OUT} = 30mA$ , $V_{IN} = V_{OUT} + 1V$	X 0.98	$V_{OUT(T)}$ (Note 1)	X 1.02	V
Maximum Output Current	$I_{OUTMAX}$	$V_{IN} = V_{OUT} + 1V$		250		mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN} = V_{OUT} + 1V$ , $1mA \leq I_{OUT} \leq 100mA$		8		mV
Dropout Voltage (Note 1)	$V_{DIF1}$	$I_{OUT} = 100mA$		280		mV
	$V_{DIF2}$	$I_{OUT} = 200mA$		500		mV
Supply Current	$I_{SS}$	$V_{IN} = V_{OUT} + 1V$		50		$\mu A$
Stand-by Current	$I_{CEL}$	$V_{CE} = 0V$		0.1		$\mu A$
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	$I_{OUT} = 40mA$ $V_{OUT} + 1V \leq V_{IN} \leq 6.5V$		0.03		%/V
CE "High" Voltage	$V_{CEH}$	Start up	1.0			V
CE "Low" Voltage	$V_{CEL}$	Shut down			0.5	V
Output noise	EN	$I_{OUT} = 40mA$ , 300Hz~50kHz		50		$\mu V_{rms}$
Ripple Rejection Rate	PSRR	$V_{IN} = [V_{OUT} + 1]V + 1Vp-pAC$	$I_{OUT} = 10mA$ , 1kHz		65	dB
			$I_{OUT} = 100mA$ , 10kHz		57	

**ME6212C18** ( $V_{IN} = V_{OUT} + 1V$ ,  $V_{CE} = V_{IN}$ ,  $C_{IN} = C_L = 1\mu F$ ,  $T_a = 25^{\circ}C$ , unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	$V_{OUT(E)}$ (Note 2)	$I_{OUT} = 30mA$ , $V_{IN} = V_{OUT} + 1V$	X 0.98	$V_{OUT(T)}$ (Note 1)	X 1.02	V
Maximum Output Current	$I_{OUTMAX}$	$V_{IN} = V_{OUT} + 1V$		250		mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN} = V_{OUT} + 1V$ , $1mA \leq I_{OUT} \leq 100mA$		9		mV
Dropout Voltage (Note 1)	$V_{DIF1}$	$I_{OUT} = 100mA$		200		mV
	$V_{DIF2}$	$I_{OUT} = 200mA$		400		mV
Supply Current	$I_{SS}$	$V_{IN} = V_{OUT} + 1V$		40		$\mu A$

Stand-by Current	$I_{CEL}$	$V_{CE}=0V$		0.1		$\mu A$
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	$I_{OUT}=40mA$ $V_{OUT}+1V \leq V_{IN} \leq 6.5V$		0.05		%/V
CE “High” Voltage	$V_{CEH}$	Start up	1.0			V
CE “Low” Voltage	$V_{CEL}$	Shut down			0.5	V
Output noise	EN	$I_{OUT}=40mA$ , 300Hz~50kHz		50		$\mu V_{rms}$
Ripple Rejection Rate	PSRR	$V_{IN} = [V_{OUT} + 1]V + 1V_{p-pAC}$	$I_{OUT}=10mA$ , 1kHz	65		dB
			$I_{OUT}=100mA$ , 10kHz	57		

**ME6212C25** ( $V_{IN}=V_{OUT}+1V$ ,  $V_{CE}=V_{IN}$ ,  $C_{IN}=C_L=1\mu F$ ,  $T_a=25^\circ C$ , unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	$V_{OUT(E)}$ (Note 2)	$I_{OUT}=30mA$ , $V_{IN}=V_{OUT}+1V$	X 0.98	$V_{OUT(T)}$ (Note 1)	X 1.02	V
Maximum Output Current	$I_{OUTMAX}$	$V_{IN}=V_{OUT}+1V$		300		mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN}=V_{OUT}+1V$ , $1mA \leq I_{OUT} \leq 100mA$		9		mV
Dropout Voltage (Note 1)	$V_{DIF1}$	$I_{OUT}=100mA$		110		mV
	$V_{DIF2}$	$I_{OUT}=200mA$		220		mV
Supply Current	$I_{SS}$	$V_{IN}=V_{OUT}+1V$		50		$\mu A$
Stand-by Current	$I_{CEL}$	$V_{CE}=0V$		0		$\mu A$
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	$I_{OUT}=40mA$ $V_{OUT}+1V \leq V_{IN} \leq 6.5V$		0.04		%/V
CE“High”Voltage	$V_{CEH}$	Start up	1.0			V
CE “Low” Voltage	$V_{CEL}$	Shut down			0.5	V
Output noise	EN	$I_{OUT}=40mA$ , 300Hz~50kHz		50		$\mu V_{rms}$
Ripple Rejection Rate	PSRR	$V_{IN}=[V_{OUT}+1]V + 1V_{p-pAC}$	$I_{OUT}=10mA$ , 1kHz	65		dB
			$I_{OUT}=100mA$ , 10kHz	57		
			$I_{OUT}=200mA$ , 10kHz	57		
Short-circuit Current	$I_{SHORT}$	$V_{IN}=V_{OUT}+1V$ , $V_{CE}=V_{IN}$ , $V_{OUT}=0V$		150		mA

**ME6212C28** ( $V_{IN}=V_{OUT}+1V$ ,  $V_{CE}=V_{IN}$ ,  $C_{IN}=C_L=1\mu F$ ,  $T_a=25^\circ C$ , unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	$V_{OUT(E)}$ (Note 2)	$I_{OUT}=30mA$ , $V_{IN}=V_{OUT}+1V$	X 0.98	$V_{OUT(T)}$ (Note 1)	X 1.02	V
Maximum Output Current	$I_{OUTMAX}$	$V_{IN}=V_{OUT}+1V$		350		mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN}=V_{OUT}+1V$ , $1mA \leq I_{OUT} \leq 100mA$		7		mV
Dropout Voltage	$V_{DIF1}$	$I_{OUT}=100mA$		110		mV

(Note 1)	$V_{DIF2}$	$I_{OUT} = 200mA$		220		mV
Supply Current	$I_{SS}$	$V_{IN} = V_{OUT} + 1V$		60		$\mu A$
Stand-by Current	$I_{CEL}$	$V_{CE} = 0V$		0		$\mu A$
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	$I_{OUT} = 40mA$ $V_{OUT} + 1V \leq V_{IN} \leq 6.5V$		0.04		%/V
CE "High" Voltage	$V_{CEH}$	Start up	1.0			V
CE "Low" Voltage	$V_{CEL}$	Shut down			0.5	V
Output noise	EN	$I_{OUT} = 40mA$ , 300Hz~50kHz		50		$\mu V_{rms}$
Ripple Rejection Rate	PSRR	$V_{IN} = [V_{OUT} + 1]V$ $+1V_{p-pAC}$	$I_{OUT} = 10mA$ , 1kHz		65	dB
			$I_{OUT} = 100mA$ , 10kHz		57	
			$I_{OUT} = 200mA$ , 10kHz		57	
Short-circuit Current	$I_{SHORT}$	$V_{IN} = V_{OUT} + 1V$ , $V_{CE} = V_{IN}$ , $V_{OUT} = 0V$		120		mA

**ME6212C30** ( $V_{IN} = V_{OUT} + 1V$ ,  $V_{CE} = V_{IN}$ ,  $C_{IN} = C_L = 1\mu F$ ,  $T_a = 25^\circ C$ , unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	$V_{OUT(E)}$ (Note 2)	$I_{OUT} = 30mA$ , $V_{IN} = V_{OUT} + 1V$	X 0.98	$V_{OUT(T)}$ (Note 1)	X 1.02	V
Maximum Output Current	$I_{OUTMAX}$	$V_{IN} = V_{OUT} + 1V$		350		mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN} = V_{OUT} + 1V$ , $1mA \leq I_{OUT} \leq 100mA$		8		mV
Dropout Voltage (Note 1)	$V_{DIF1}$	$I_{OUT} = 100mA$		100		mV
	$V_{DIF2}$	$I_{OUT} = 200mA$		210		mV
Supply Current	$I_{SS}$	$V_{IN} = V_{OUT} + 1V$		60		$\mu A$
Stand-by Current	$I_{CEL}$	$V_{CE} = 0V$		0		$\mu A$
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	$I_{OUT} = 40mA$ $V_{OUT} + 1V \leq V_{IN} \leq 6.5V$		0.05		%/V
CE "High" Voltage	$V_{CEH}$	Start up	1.0			V
CE "Low" Voltage	$V_{CEL}$	Shut down			0.5	V
Output noise	EN	$I_{OUT} = 40mA$ , 300Hz~50kHz		50		$\mu V_{rms}$
Ripple Rejection Rate	PSRR	$V_{IN} = [V_{OUT} + 1]V$ $+1V_{p-pAC}$	$I_{OUT} = 10mA$ , 1kHz		65	dB
			$I_{OUT} = 100mA$ , 10kHz		57	
			$I_{OUT} = 200mA$ , 10kHz		57	
Short-circuit Current	$I_{SHORT}$	$V_{IN} = V_{OUT} + 1V$ , $V_{CE} = V_{IN}$ , $V_{OUT} = 0V$		150		mA

**ME6212C33** ( $V_{IN}=V_{OUT}+1V$ ,  $V_{CE}=V_{IN}$ ,  $C_{IN}=C_L=1\mu F$ ,  $T_a=25^{\circ}C$ , unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	$V_{OUT(E)}$ (Note 2)	$I_{OUT}=30mA$ , $V_{IN}=V_{OUT}+1V$	X 0.98	$V_{OUT(T)}$ (Note 1)	X 1.02	V
Maximum Output Current	$I_{OUTMAX}$	$V_{IN}=V_{OUT}+1V$		350		mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN}=V_{OUT}+1V$ , $1mA \leq I_{OUT} \leq 100mA$		9		mV
Dropout Voltage (Note 1)	$V_{DIF1}$	$I_{OUT}=100mA$		120		mV
	$V_{DIF2}$	$I_{OUT}=200mA$		260		mV
Supply Current	$I_{SS}$	$V_{IN}=V_{OUT}+1V$		60		$\mu A$
Stand-by Current	$I_{CEL}$	$V_{CE}=0V$		0.1		$\mu A$
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	$I_{OUT}=40mA$ $V_{OUT}+1V \leq V_{IN} \leq 6.5V$		0.05		%/V
CE "High" Voltage	VCEH	Start up	1.0			V
CE "Low" Voltage	VCEL	Shut down			0.5	V
Output noise	EN	$I_{OUT}=40mA$ , 300Hz~50kHz		50		$\mu V_{rms}$
Ripple Rejection Rate	PSRR	$V_{IN}=[V_{OUT}+1]V$ $+1V_{p-pAC}$	$I_{OUT}=10mA$ , 1kHz	65		dB
			$I_{OUT}=100mA$ , 10kHz	57		
			$I_{OUT}=200mA$ , 10kHz	57		
Short-circuit Current	$I_{SHORT}$	$V_{IN}=V_{OUT}+1V$ , $V_{CE}=V_{IN}$ , $V_{OUT}=0V$		180		mA

**ME6212C50** ( $V_{IN}=V_{OUT}+1V$ ,  $V_{CE}=V_{IN}$ ,  $C_{IN}=C_L=1\mu F$ ,  $T_a=25^{\circ}C$ , unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	$V_{OUT(E)}$ (Note 2)	$I_{OUT}=30mA$ , $V_{IN}=V_{OUT}+1V$	X 0.98	$V_{OUT(T)}$ (Note 1)	X 1.02	V
Maximum Output Current	$I_{OUTMAX}$	$V_{IN}=V_{OUT}+1V$		350		mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN}=V_{OUT}+1V$ , $1mA \leq I_{OUT} \leq 100mA$		8		mV
Dropout Voltage (Note 1)	$V_{DIF1}$	$I_{OUT}=100mA$		100		mV
	$V_{DIF2}$	$I_{OUT}=200mA$		200		mV
Supply Current	$I_{SS}$	$V_{IN}=V_{OUT}+1V$		50		$\mu A$
Stand-by Current	$I_{CEL}$	$V_{CE}=0V$		0		$\mu A$
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	$I_{OUT}=40mA$ $V_{OUT}+1V \leq V_{IN} \leq 6.5V$		0.05		%/V
CE "High" Voltage	VCEH	Start up	1.0			V
CE "Low" Voltage	VCEL	Shut down			0.7	V
Output noise	EN	$I_{OUT}=40mA$ , 300Hz~50kHz		50		$\mu V_{rms}$
Ripple Rejection Rate	PSRR	$V_{IN}=[V_{OUT}+1]V$ $+1V_{p-pAC}$	$I_{OUT}=10mA$ , 1kHz	65		dB
			$I_{OUT}=100mA$ , 10kHz	57		

			$I_{OUT}=200mA,$ $10kHz$		57	
Short-circuit Current	$I_{SHORT}$	$V_{IN}=V_{OUT}+1V, V_{CE}=V_{IN}, V_{OUT}$ $=0V$			130	mA

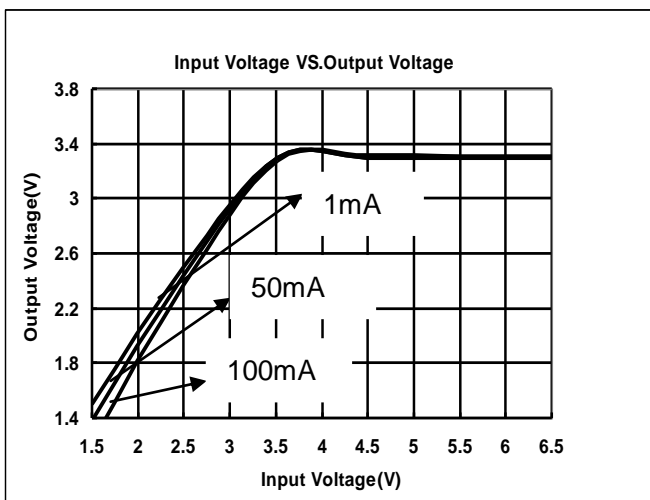
Note :

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  $V_{in}$  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  $I_{out}$  { $V_{OUT}(T)+1.0V$ } is input.

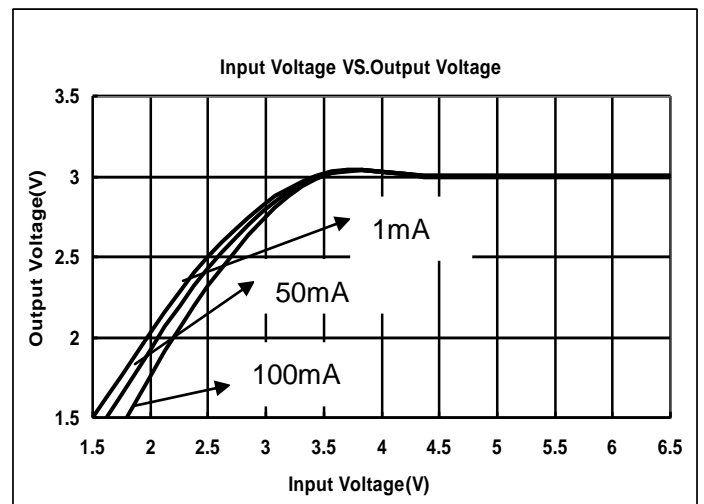
## Type Characteristics

(1)) Input Voltage VS. Output Voltage ( $T_a = 25^\circ C$ )

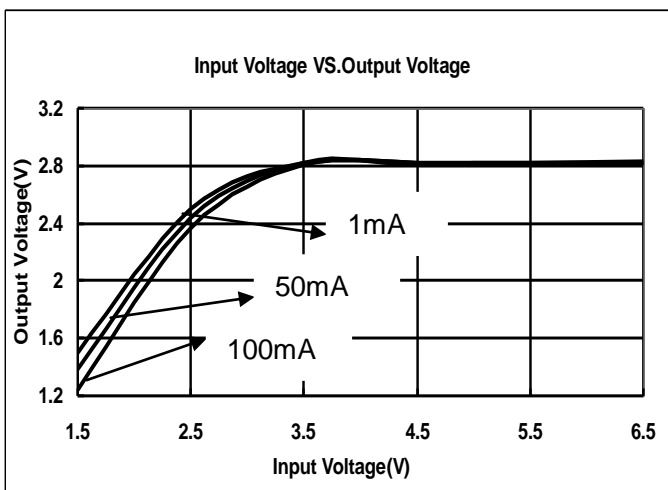
ME6212C33M5G



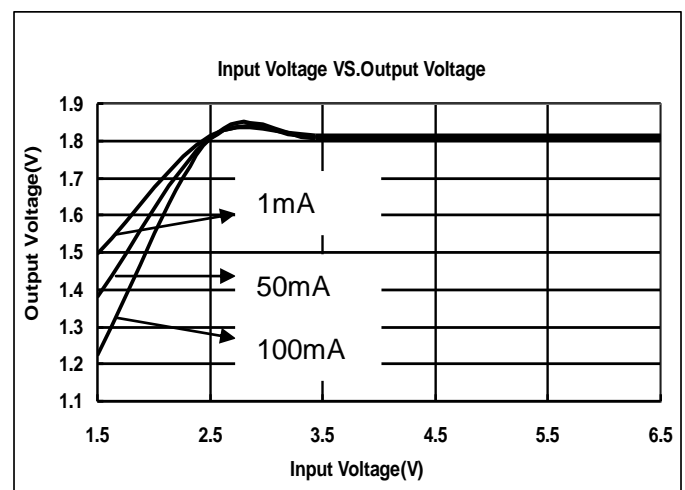
ME6212C30M5G



ME6212C28M5G



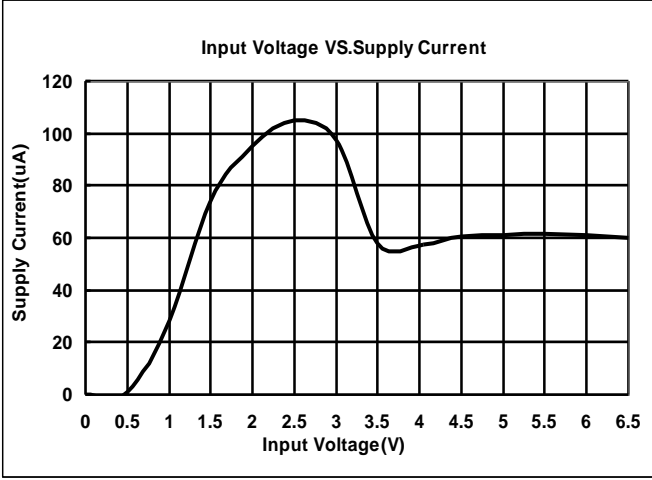
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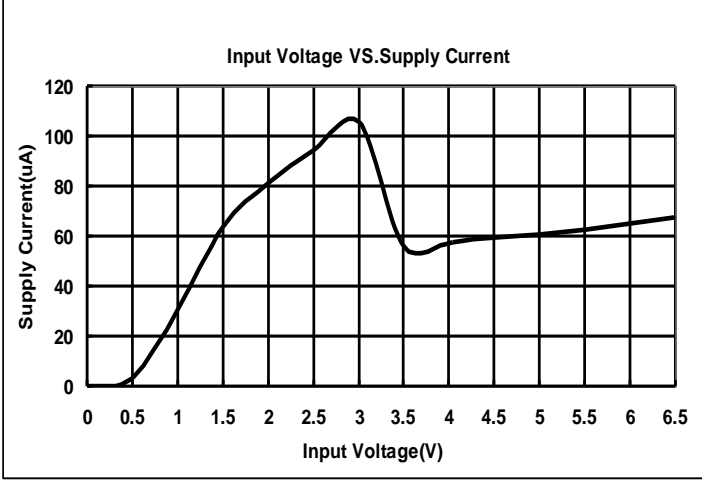


(2) Input Voltage VS. Supply Current (Ta = 25 °C)

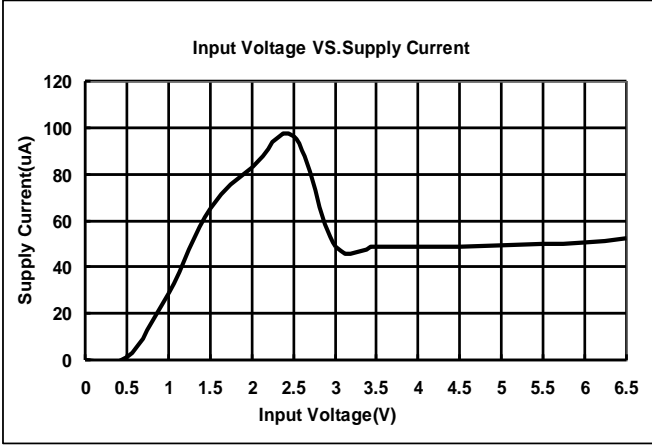
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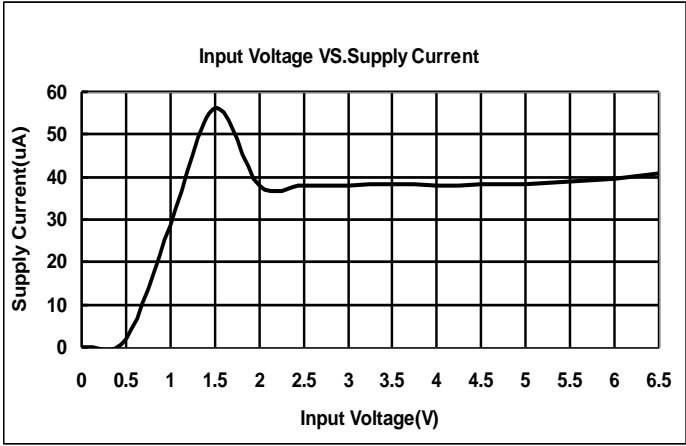
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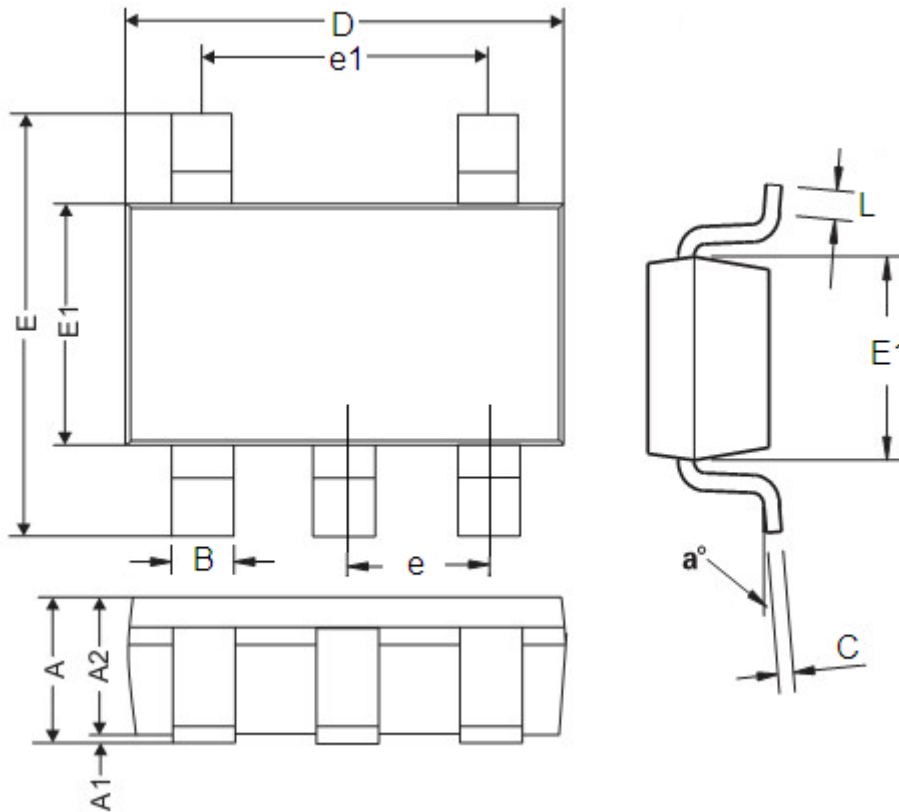


ME6212C18M5G



## Packaging Information

● SOT23-5



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	0.9	1.45	0.0354	0.0570
A1	0	0.15	0	0.0059
A2	0.9	1.3	0.0354	0.0511
B	0.2	0.5	0.0078	0.0196
C	0.09	0.26	0.0035	0.0102
D	2.7	3.10	0.1062	0.1220
E	2.2	3.2	0.0866	0.1181
E1	1.30	1.80	0.0511	0.0708
e	0.95REF		0.0374REF	
e1	1.90REF		0.0748REF	
L	0.10	0.60	0.0039	0.0236
a°	0°	30°	0°	30°

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