Elektronische Bauelemente

SM6201

CMOS Positive

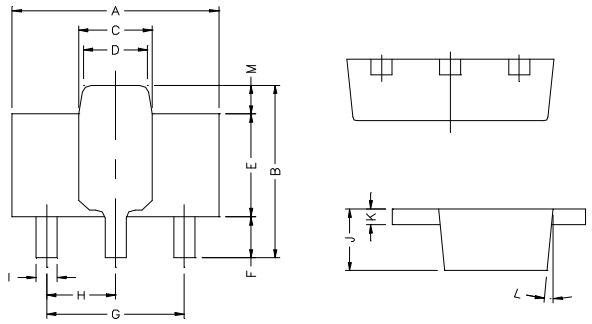
Voltage Regulator

RoHS Compliant Product

Description

The SM6201 series are highly precise, low power consumption, positive voltage regulators manufactured using CMOS and laser trimming technologies. The series provide large currents with a significantly small dropout voltage. The SM6201 consists of a current limiter circuit, a driver transistor, a precision reference voltage and an error amplifier. Output voltage is selectable in 0.1V steps between 1.3~6.0V.

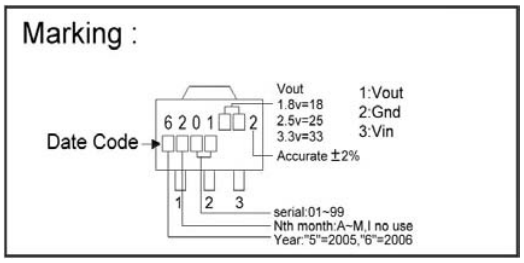
SOT-89



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	4.4	4.6	G	3.00 REF.	
B	4.05	4.25	H	1.50 REF.	
C	1.50	1.70	I	0.40	0.52
D	1.30	1.50	J	1.40	1.60
E	2.40	2.60	K	0.35	0.41
F	0.89	1.20	L	5° TYP.	
			M	0.70 REF.	

Features

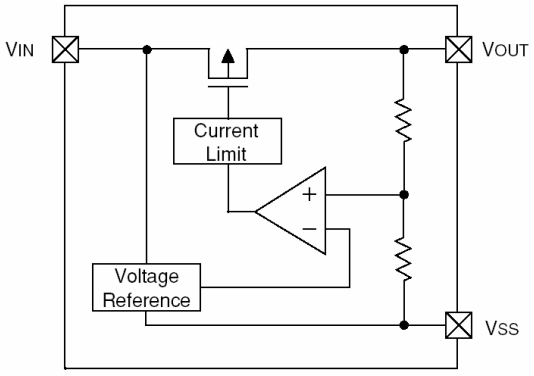
* Max. Operating Voltage: 10V
* Highly Accruate: Output Voltage ± 2%
* Low Power Consumption: Typ. 2uA
* Output Voltage Range: 1.3V~6V (selectable in 0.1V steps)
* Dropout Voltage: 0.16V@I_{OUT}=100mA
* Output Voltage Temperature Characteristics: Typ. ±100ppm/℃
* Max. Output Current: 250mA (Typ.)
* Capacitors Can Be Tantalum Or Ceramic



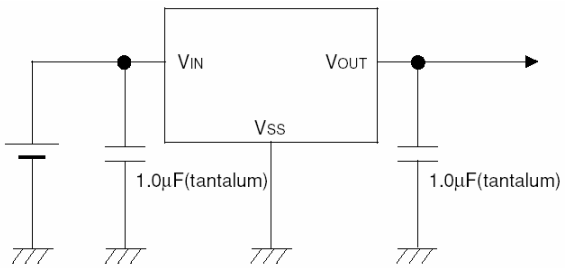
Applications

* Reference Voltage
* Portable Games And AV Equipment
* Battery Powered Equipment
* Cameras, Viedo Recorders
* Mobile Phones And Cordless Phones

Block Diagram



Typical Application Circuit



Absolute Maximum Ratings Ta=25°C

Parameter	Symbol	Ratings	Unit
Input Voltage	V_{IN}	12	V
Output Current	I_{OUT}	500	mA
Output Voltage	V_{OUT}	V_{SS}-0.3~V_{IN}+0.3	V
Operating Ambient Temperature	Topr	-40~+85	°C
Storage Temperature	Tstg	-55~+125	°C
Continuous Total Power Dissipation	P_D	500	mW

Electrical Characteristics Ta=25℃

SM6201-50 V_{OUT} (T) =5.0V (Note1)

Parameter	Symbol	Condition	Min	TYP	Max	Unit
Output Voltage	V_{OUT}(E) (Note2)	V_{IN}=6.0V, I_{OUT}=40mA	4.900	5.000	5.100	V
Max. Output Current	$I_{OUT\ max}$	V_{IN}=6V, V_{OUT}(E)≥4.5V	200	-	-	mA
Load Regulation	$\triangle V_{OUT}$	V_{IN}=6V, I_{OUT}=1mA to 100mA	-	30	70	mV
Dropout Voltage (Note3)	V_{dif1}	I_{OUT}=100mA	-	160	340	mV
	V_{dif2}	I_{OUT}=200mA	-	400	600	
Supply Current	I_{SS}	V_{IN}=6V	-	2.0	6.0	μA
Input Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \cdot V_{OUT}}$	I_{OUT}=40mA V_{IN}=6V to 10V	-	0.2	0.3	%/V
Input Voltage	V_{IN}		1.8	-	10	V
Output Voltage Temperature Characteristics	$\frac{\triangle V_{OUT}}{\triangle Topr \cdot V_{OUT}}$	I_{OUT}=40mA -40℃≤ Topr ≤ 85℃	-	±100	-	ppm/℃

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 while maintaining a certain I_{OUT} value).

3: Vdif ={V_{IN1} (Note5) -V_{OUT1} (Note4)}

4: V_{OUT1} =A voltage equal to 98% of the output voltage when a stabilized (V_{OUT} (T) + 1.0V) is output.

5: V_{IN1} =The input voltage at the time V_{OUT1} is output (input voltage has been gradually reduced).

SM6201-33 V_{OUT} (T) =3.3V (Note1)

Parameter	Symbol	Condition	Min	TYP	Max	Unit
Output Voltage	V_{OUT}(E) (Note2)	V_{IN}=4.3V, I_{OUT}=40mA	3.234	3.300	3.366	V
Max. Output Current	$I_{OUT\ max}$	V_{IN}=4.3V, V_{OUT}(E)≥2.97V	150	-	-	mA
Load Regulation	$\triangle V_{OUT}$	V_{IN}=4.3V, I_{OUT}=1mA to 80mA	-	20	50	mV
Dropout Voltage (Note3)	V_{dif1}	I_{OUT}=80mA	-	200	360	mV
	V_{dif2}	I_{OUT}=160mA	-	450	700	
Supply Current	I_{SS}	V_{IN}=4.3V	-	2.0	5.0	μA
Input Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \cdot V_{OUT}}$	I_{OUT}=40mA V_{IN}=4.3V to 10V	-	0.2	0.3	%/V
Input Voltage	V_{IN}		1.8	-	10	V
Output Voltage Temperature Characteristics	$\frac{\triangle V_{OUT}}{\triangle Topr \cdot V_{OUT}}$	I_{OUT}=40mA -40℃≤ Topr ≤ 85℃	-	±100	-	ppm/℃

SM6201-27 V_{OUT} (T) =2.7V (Note1)

Parameter	Symbol	Condition	Min	TYP	Max	Unit
Output Voltage	$V_{OUT}(E)$ (Note2)	V_{IN}=3.7V, I_{OUT}=40mA	2.646	2.700	2.754	V
Max. Output Current	$I_{OUT\ max}$	V_{IN}=3.7V, $V_{OUT}(E)$≥2.43V	100	-	-	mA
Load Regulation	$\triangle V_{OUT}$	V_{IN}=3.7V, I_{OUT}=1mA to 60mA	-	15	40	mV
Dropout Voltage (Note3)	V_{dif1}	I_{OUT}=60mA	-	200	370	mV
	V_{dif2}	I_{OUT}=120mA	-	450	710	
Supply Current	I_{SS}	V_{IN}=3.7V	-	2.0	5.0	μA
Input Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \cdot V_{OUT}}$	I_{OUT}=40mA V_{IN}=3.7V to 10V	-	0.2	0.3	%/V
Input Voltage	V_{IN}		1.8	-	10	V
Output Voltage Temperature Characteristics	$\frac{\triangle V_{OUT}}{\triangle Topr \cdot V_{OUT}}$	I_{OUT}=40mA -40℃≤ Topr ≤ 85℃	-	±100	-	ppm/℃

SM6201-18 V_{OUT} (T) =1.8V (Note1)

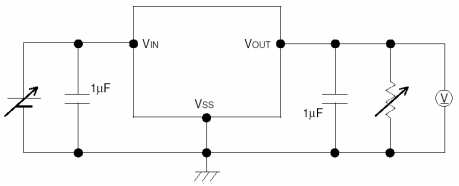
Parameter	Symbol	Condition	Min	TYP	Max	Unit
Output Voltage	$V_{OUT}(E)$ (Note2)	V_{IN}=2.8V, I_{OUT}=40mA	1.764	1.800	1.836	V
Max. Output Current	$I_{OUT\ max}$	V_{IN}=2.8V, $V_{OUT}(E)$≥1.62V	80	-	-	mA
Load Regulation	$\triangle V_{OUT}$	V_{IN}=2.8V, I_{OUT}=1mA to 60mA	-	10	30	mV
Dropout Voltage (Note3)	V_{dif1}	I_{OUT}=40mA	-	200	370	mV
	V_{dif2}	I_{OUT}=80mA	-	450	710	
Supply Current	I_{SS}	V_{IN}=2.8V	-	3.0	5.0	μA
Input Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \cdot V_{OUT}}$	I_{OUT}=40mA V_{IN}=2.8V to 10V	-	0.2	0.3	%/V
Input Voltage	V_{IN}		1.8	-	10	V
Output Voltage Temperature Characteristics	$\frac{\triangle V_{OUT}}{\triangle Topr \cdot V_{OUT}}$	I_{OUT}=40mA -40℃≤ Topr ≤ 85℃	-	±100	-	ppm/℃

SM6201-13 V_{OUT} (T) =1.3V (Note1)

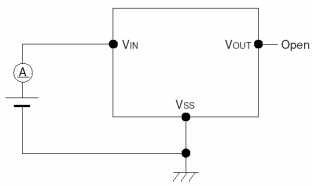
Parameter	Symbol	Condition	Min	TYP	Max	Unit
Output Voltage	$V_{OUT}(E)$ (Note2)	V_{IN}=2.3V, I_{OUT}=40mA	1.274	1.300	1.326	V
Max. Output Current	$I_{OUT\ max}$	V_{IN}=2.3V, $V_{OUT}(E)$≥1.17V	60	-	-	mA
Load Regulation	$\triangle V_{OUT}$	V_{IN}=2.3V, I_{OUT}=1mA to 30mA	-	10	30	mV
Dropout Voltage (Note3)	V_{dif1}	I_{OUT}=30mA	-	200	600	mV
	V_{dif2}	I_{OUT}=60mA	-	500	810	
Supply Current	I_{SS}	V_{IN}=2.3V	-	3.0	5.0	μA
Input Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \cdot V_{OUT}}$	I_{OUT}=40mA V_{IN}=2.3V to 10V	-	0.2	0.3	%/V
Input Voltage	V_{IN}		1.8	-	10	V
Output Voltage Temperature Characteristics	$\frac{\triangle V_{OUT}}{\triangle Topr \cdot V_{OUT}}$	I_{OUT}=40mA -40℃≤ Topr ≤ 85℃	-	±100	-	ppm/℃

Test Circuit

Circuit1

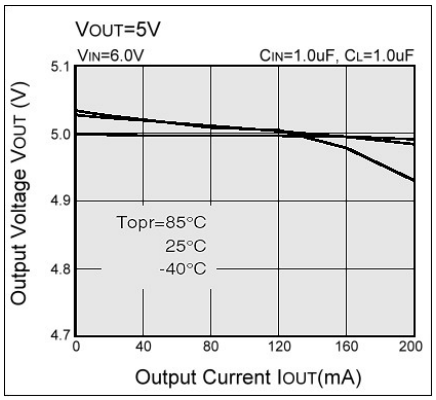


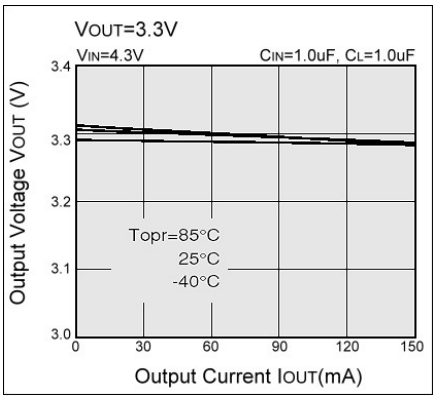
Circuit2

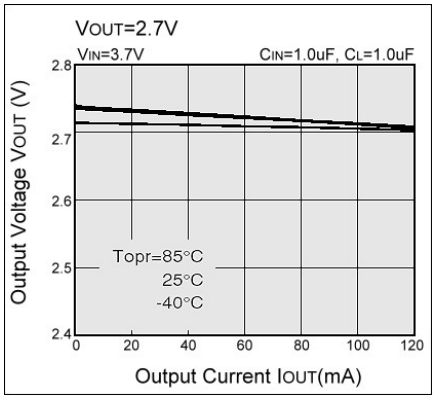


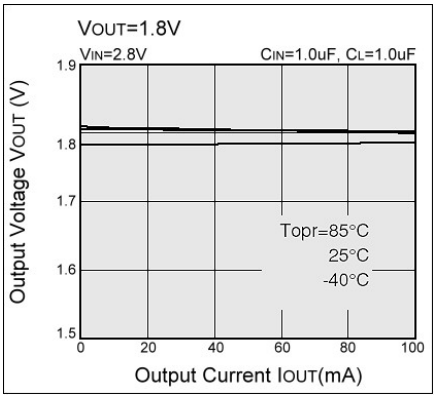
Characteristics Curve

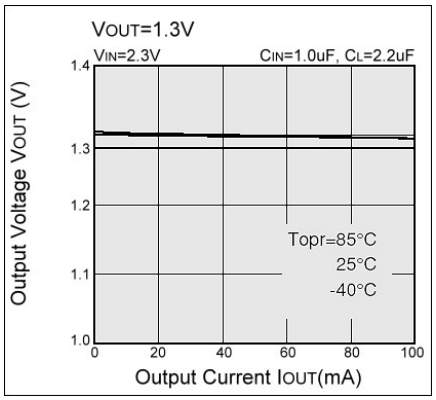
(1) Output Voltage vs. Output Current



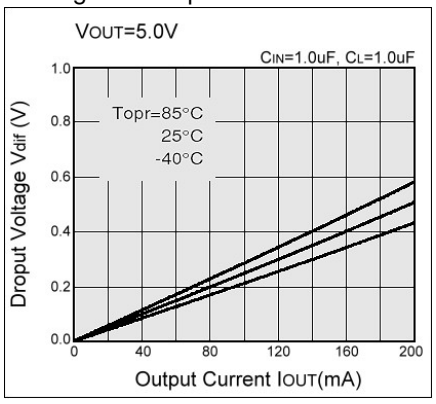


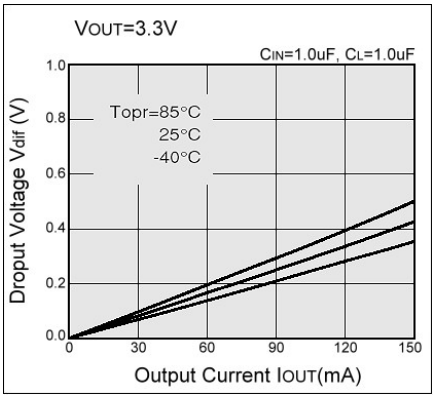




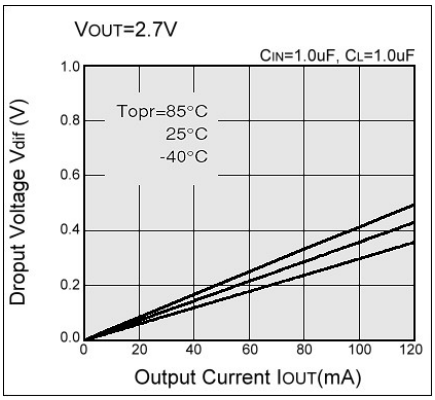


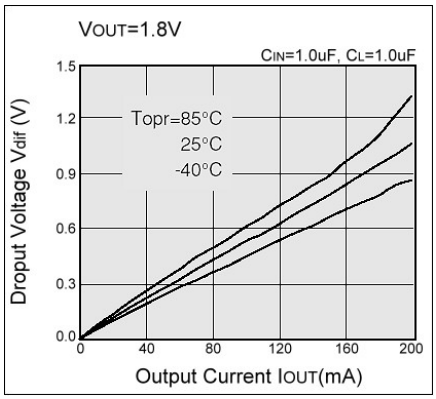
(2) Dropout Voltage vs. Output Current

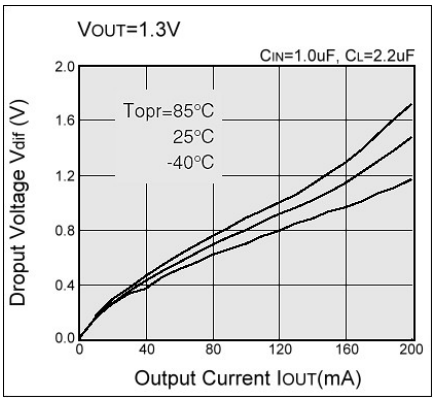




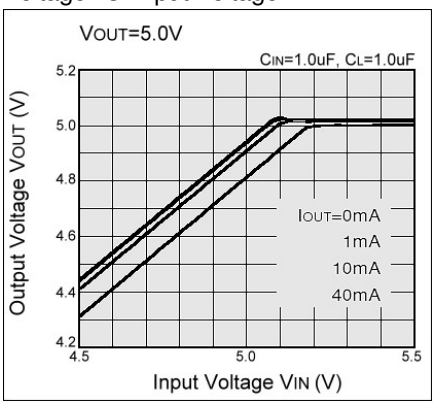
(2) Dropout Voltage vs. Output Current

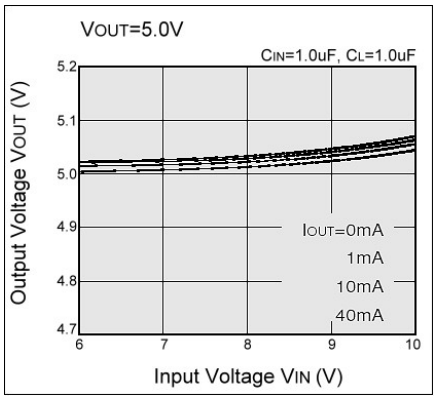


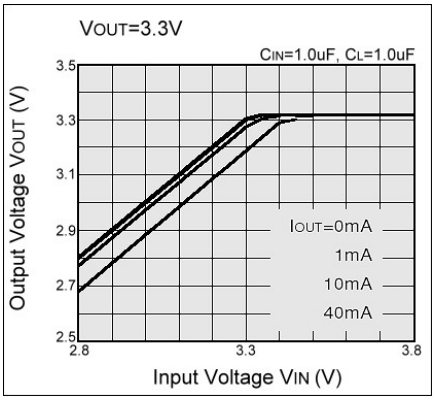


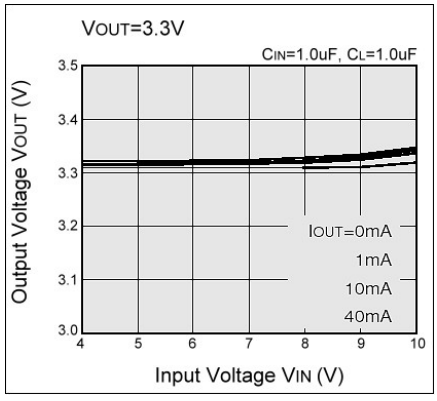


(3) Output Voltage vs. Input Voltage

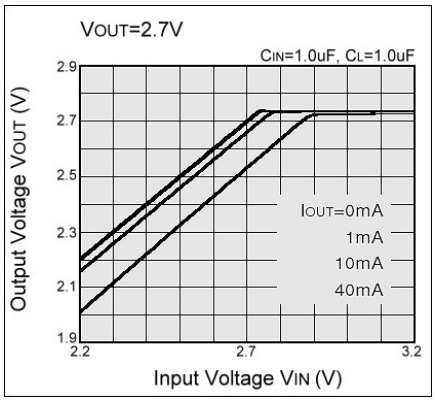


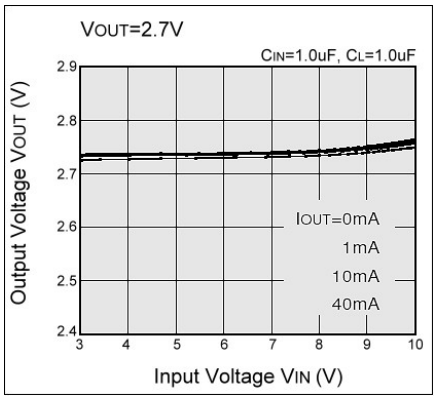


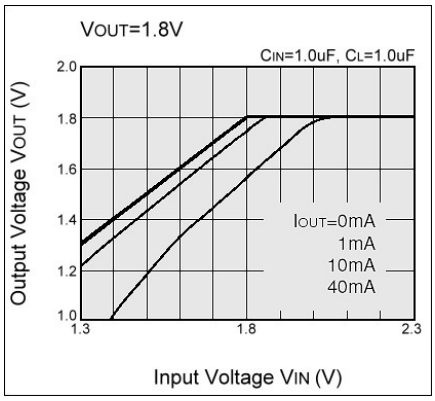


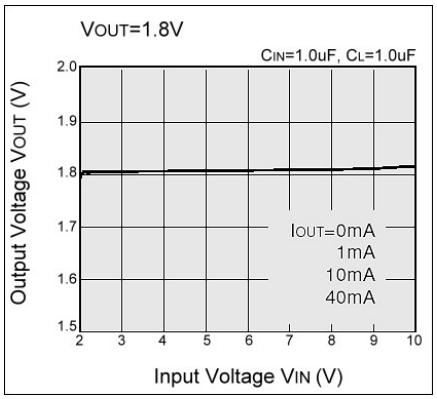


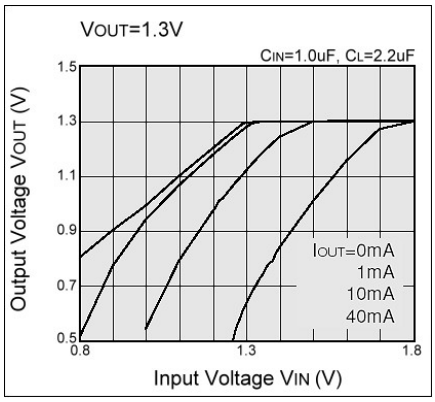
(3) Output Voltage vs. Input Voltage

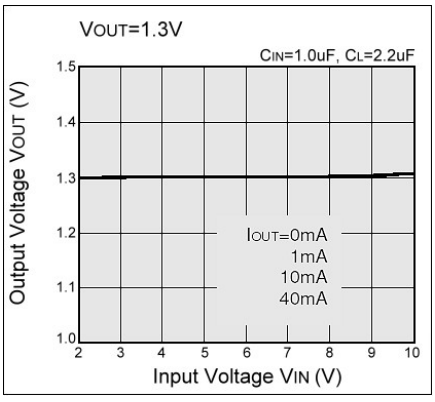




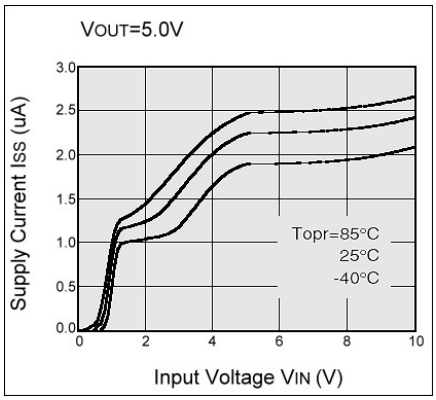


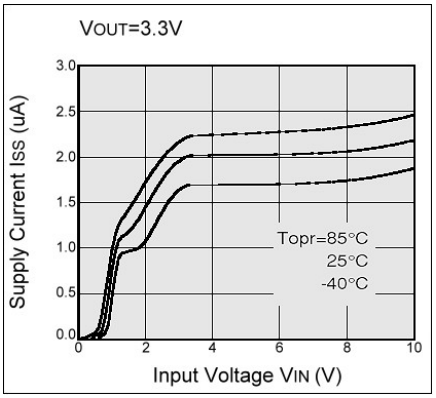


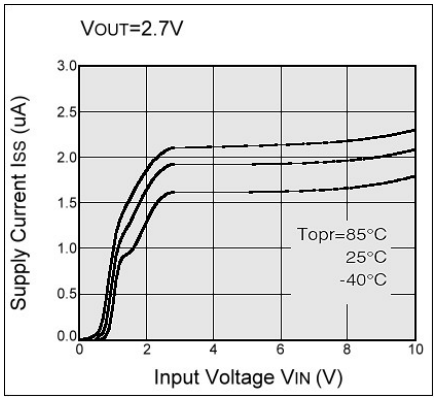


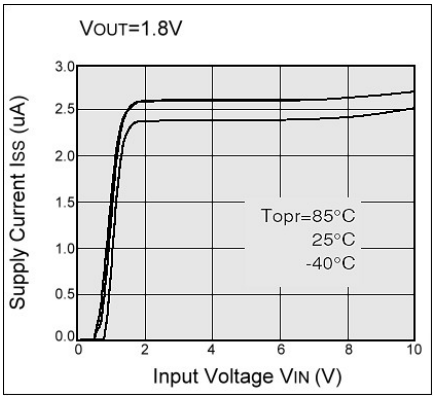


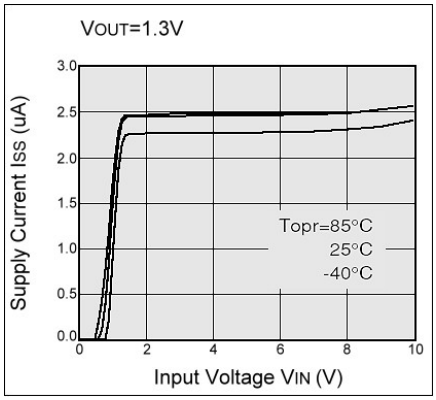
(4) Supply Current vs. Input Voltage











(5) Output Voltage vs. Ambient Temperature