

Preliminary

August 12, 2003 V2

■ Input Voltage Range	2.0 ~ 6.0V
■ Output Voltage Range	2.2 ~ 5.0V
■ Output Current	Up to 100mA
■ Low ESR Capacitor Compatible	
■ Ultra Small Packages	SSOT-24, SOT-25

■ APPLICATIONS

- Mobile phones (PDC, GSM, CDMA, IMT2000 etc.)
- Cordless phones, wireless communication equipment
- Portable games
- Cameras, Video recorders
- Portable AV equipment
- PDAs

■ GENERAL DESCRIPTION

The XC6213 series are highly precise, low noise, positive voltage LDO regulators manufactured using CMOS processes. The series achieves high ripple rejection and low dropout and consists of a voltage reference, an error amplifier, a current limiter and a phase compensation circuit plus a driver transistor.

Output voltage is selectable in 100mV increments within a range of 2.2V ~ 5.0V.

The series is also compatible with low ESR ceramic capacitors, which give added output stability.

The current limiter's foldback circuit also operates as a short protect for the output current limiter and the output pin.

The CE function enables the output to be turned off, resulting in greatly reduced power consumption.

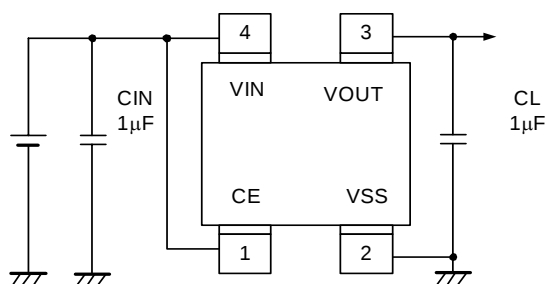
Ultra small package, SSOT-24 and SOT-25, are available.

■ FEATURES

Maximum Output Current	100mA
Dropout Voltage	400mV @ IOUT = 100mA
Operating Input Voltage Range	2.0 ~ 6.0V
Output Voltage Range	2.2 ~ 5.0V (100mV Step)
Highly Accurate	±2%
Low Power Consumption	35μA (TYP.)
Stand-by Current	Less than 0.1μA
High Ripple Rejection	60dB @ 10kHz
Operating Temperature Range	-40°C ~ 85°C
Low ESR Capacitor Compatible	Ceramic capacitor
Ultra Small Packages	SSOT-24, SOT-25

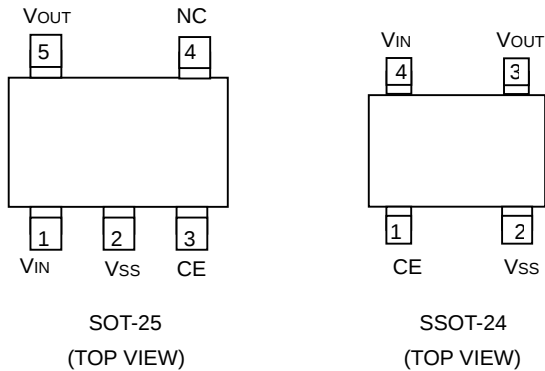
■ TYPICAL APPLICATION CIRCUIT

○ SSOT-24 package



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PIN CONFIGURATION

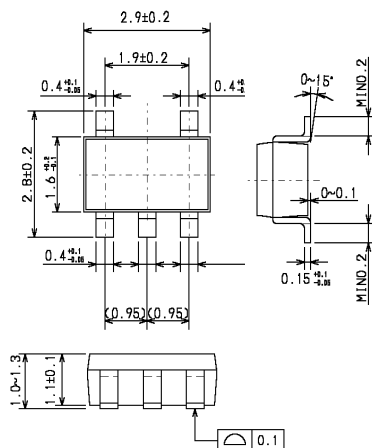


PIN ASSIGNMENT

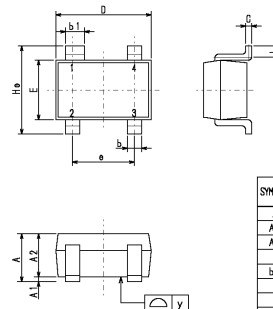
PIN NUMBER		PIN NAME	FUNCTIONS
SSOT-24	SOT-25		
1	3	CE	ON/OFF Switch
2	2	VSS	Ground
3	5	VOUT	Output
4	1	VIN	Power Supply
-	4	NC	No Connection

PACKAGING INFORMATION

○ SOT-25 (SOT-23-5)

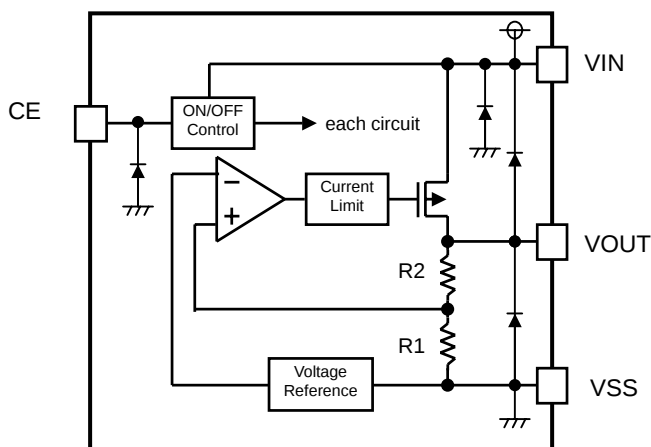


○ SSOT-24



SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	0.80	—	1.10
A1	0.00	—	0.10
A2	0.80	—	1.00
b	0.15	0.25	0.30
b1	0.25	0.35	0.40
C	0.075	0.125	0.225
D	1.80	2.00	2.20
E	1.15	1.25	1.45
H _ø	1.80	2.10	2.40
e	1.10	1.30	1.50
L	0.10	0.30	—
y	—	—	0.10

BLOCK DIAGRAM



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■ PRODUCT CLASSIFICATION

○ Ordering Information **XC6213 ①②③④⑤⑥**

DESIGNATOR	SYMBOL	DESCRIPTION
①	B	'H' Active with no pull-down resistor (standard)
② ③	Integer Number	Output Voltage : ex.) 3.0V ⇒ ② =3, ③ = 0
④	2	Output Voltage : 100mV increments, ±2% accuracy ex.) 2.80V ⇒ ② =2, ③ = 8, ④ = 2
⑤	M	SOT-25 (SOT-23-5)
	N	SSOT-24
⑥	R	Embossed Tape : Standard Feed
	L	Embossed Tape : Reverse Feed

■ MAXIMUM ABSOLUTE RATINGS

Ta = 25°C

PARAMETER		SYMBOL	RATINGS	UNITS
Input Voltage		VIN	7.0	V
Output Current		IOUT	500	mA
Output Voltage		VOUT	VSS – 0.3 ~ VIN + 0.3	V
CE Input Voltage		VCE	VSS – 0.3 ~ VIN + 0.3	V
Continuous Power Dissipation	SOT-25	Pd	250	mW
	SSOT-24		150	
Operating Temperature Range		Topr	- 40 ~ + 85	°C
Storage Temperature Range		Tstg	- 55 ~ + 125	°C

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■ ELECTRICAL CHARACTERISTICS

Specified specifications for 2.8V, 3.0V, 3.1V products

Ta = 25°C

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT	CIRCUITS
Output Voltage (2.8V) (3.0V) (3.1V)	VOUT (E)	IOUT=30mA	2.744 2.940 3.038	2.800 3.000 3.100	2.856 3.060 3.162	V	①

Common specifications for 2.8V, 3.0V, 3.1V products

Ta = 25°C

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT	CIRCUITS
Maximum Output Current	IOUTMAX			100		mA	①
Load Regulation	ΔV_{OUT}	$I_{mA} \leq I_{OUT} \leq 100mA$		15		mV	①
Dropout Voltage	Vdif1	IOUT = 30mA		120		mV	①
	Vdif2	IOUT = 100mA		400		mV	①
Supply Current	IDD	VCE = VIN		35		μA	②
Stand-by Current	Istby	VCE = VSS		0.01		μA	②
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	$V_{OUT}(T) + 1.0V \leq V_{IN} \leq 6V$ IOUT = 30mA		0.01		%/V	①
Input Voltage	VIN		2.0		6.0	V	-
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta T_{opr} \cdot V_{OUT}}$	IOUT = 30mA - 40°C ≤ Topr ≤ 85°C		100		ppm / °C	①
Ripple Rejection Rate	PSRR	IOUT = 50mA, f = 10kHz		60		dB	③
Short Circuit Current	Ishort			50		mA	①
CE 'H' Level Voltage	VCEH		1.6			V	①
CE 'L' Level Voltage	VCEL				0.25	V	②
CE 'H' Level Current	ICEH	VCE = VIN	- 0.1		0.1	μA	②
CE 'L' Level Current	ICEL	VCE = VSS	- 0.1		0.1	μA	②

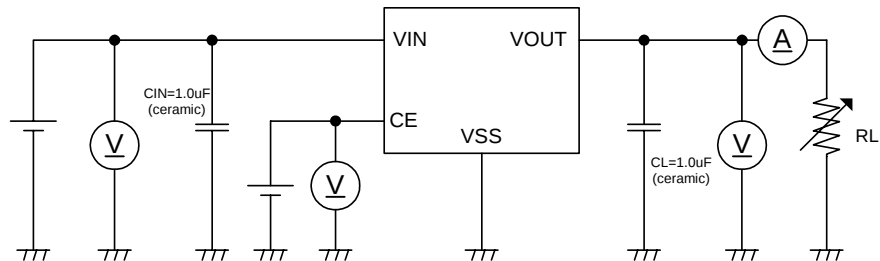
Note:

- (NOTE1) VOUT(E) = Effective Output Voltage
(i.e. the output voltage when "VOUT(T) + 1.0V" is provided at the VIN pin while maintaining a certain IOUT value).
- (NOTE2) $V_{dif} = \{ V_{IN1}^{(NOTE4)} - V_{OUT1}^{(NOTE3)} \}$
- (NOTE3) VOUT1 = A voltage equal to 98% of the output voltage whenever an amply stabilized IOUT { VOUT(T) + 1.0V } is input.
- (NOTE4) VIN1 = The input voltage when VOUT1 appears as input voltage is gradually decreased.
- (NOTE5) Unless otherwise stated, (VIN = VOUT(T) + 1.0V).

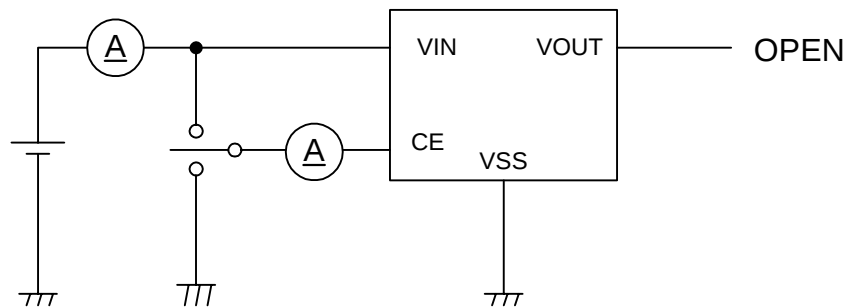
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■ TEST CIRCUITS

○ Circuit ①



○ Circuit ②



○ Circuit ③

