

30mA High Speed LDO Regulator

■ GENERAL DESCRIPTION

The XC6225 series is a high accuracy, low noise, and low dropout CMOS LDO regulator. The series includes a reference voltage source, an error amplifier, a driver transistor, a current limiter, and a phase compensation circuit.

The CE function enables the entire circuit to be turned off by a low level input signal to the CE pin. In this stand-by state, the XC6225B series can discharge the electric charge stored at the output capacitor through the internal auto-discharge switch, and as a result the V_{OUT} pin quickly returns to the V_{SS} level. The output stabilization capacitor (C_L) is also compatible with low ESR ceramic capacitors. Output voltage is selectable in 0.05V increments within a range of 0.8V~5.0V. The current limit fold-back circuit works as a short circuit protection as well as the output current limiter. The series achieves a fast response with only 25 μA of low power consumption. The current limit is set to 50mA (TYP.) so that the device is optimized to protect the circuit from over-current. It is ideally suited for applications requiring 30 mA or less.

A small USP-4 package makes high density mounting possible.

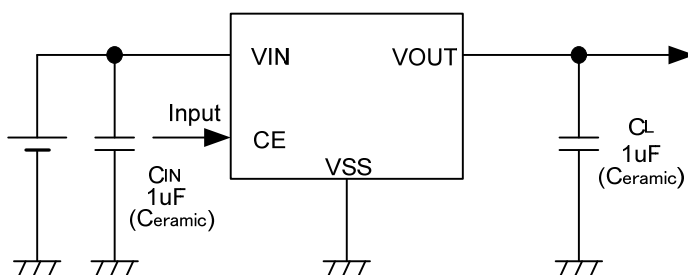
■ APPLICATIONS

- Smart phones / Mobile phones
- Portable games
- Digital still cameras / Camcorders
- Digital audio equipment
- Mobile devices / terminals

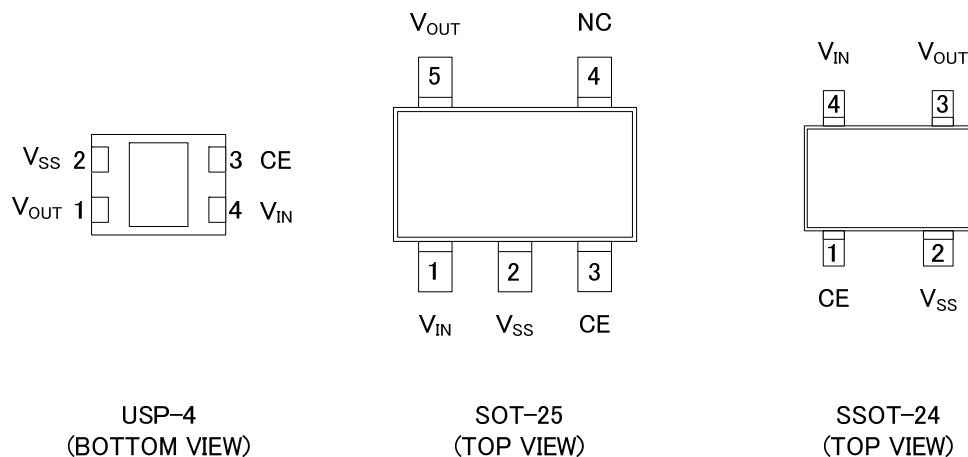
■ FEATURES

Output Current	: 30mA <50mA (TYP.) Limit>
Dropout Voltage	: 70mV@ I _{OUT} =30mA, V _{OUT} =3.2V
Operating Voltage Range	: 2.5V ~ 6.0V
Output Voltage Range	: 0.8V~5.0V (0.05V increments)
Accuracy	: ±2% (V _{OUT} ≥1.5V) ±0.03V (V _{OUT} ≤1.45V)
Low Power Consumption	: 25 μA (TYP.)
Stand-by Current	: Less than 0.1 μA
High Ripple Rejection	: 70dB @ 1kHz
Operating Ambient Temperature	: -40°C~+85°C
Output Capacitor	: 1.0 μF ceramic capacitor
C_L High-Speed Auto-Discharge (XC6225B)	
Low Output Noise	
Packages	: USP-4, SOT-25 SSOT-24
Environmentally Friendly	: EU RoHS Compliant, Pb Free

■ TYPICAL APPLICATION CIRCUIT



PIN CONFIGURATION



*The heat sink pad of the USP-4 is reference to be soldered to enhance the strength. Please refer to the reference mount pattern and metal mask pattern. This pad should be electrically opened or connected to the V_{SS} (No.2) pin.

PIN ASSIGNMENT

PIN NUMBER			PIN NAME	FUNCTIONS
USP-4	SOT-25	SSOT-24		
4	1	4	V_{IN}	Power Input
1	5	3	V_{OUT}	Output
2	2	2	V_{SS}	Ground
3	3	1	CE	ON/OFF Control
-	4	-	NC	No Connection

PIN FUNCTION ASSIGNMENT

PIN NAME	SIGNAL	STATUS
CE	L	Operation OFF
	H	Operation ON
	OPEN	Undefined state

*CE pin should not be left open. Each should have a certain voltage.

■ PRODUCT CLASSIFICATION

● Ordering Information

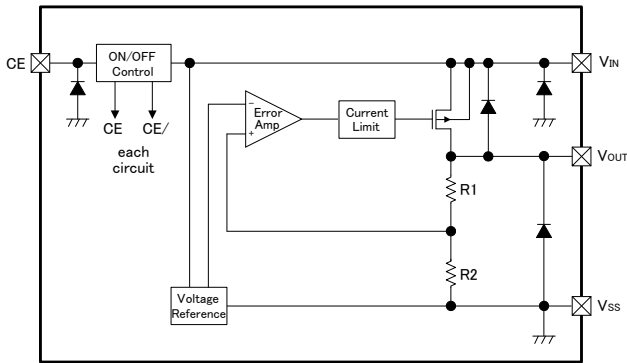
XC6225①②③④⑤⑥-⑦^(*)

DESIGNATOR	ITEM	SYMBOL	DESCRIPTION
①	Type of Regulator	A	CE High Active, Without C _L discharge function
		B	CE High Active, With C _L discharge function
② ③	Output Voltage	08~50	e.g. 3.0V → ①=3, ②=0
④	Output Voltage Accuracy	2	Output voltage is { x.x0V } (the 2 nd decimal place is "0") 2% (V _{OUT(T)} ≥ 1.5V), Within ±0.03V (V _{OUT(T)} ≤ 1.40V)
		A	Output voltage is { x.x5V } (the 2 nd decimal place is "5") ±2% (V _{OUT} ≥ 1.55V), Within ±0.03V (V _{OUT} ≤ 1.45V)
⑤⑥-⑦	Packages (Order Unit)	GR-G	USP-4 (3,000/Reel)
		MR-G	SOT-25 (3,000/Reel)
		NR-G	SSOT-24 (3,000/Reel)

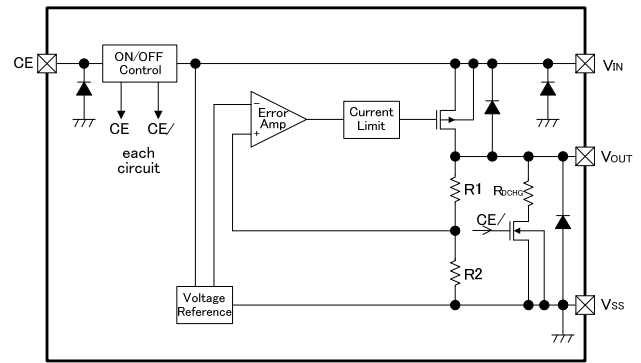
^(*) The "-G" suffix denotes Halogen and Antimony free as well as being fully EU RoHS compliant.

■ BLOCK DIAGRAMS

●XC6225 Series TypeA



●XC6225 Series TypeB



*Diodes inside the circuit are an ESD protection diode and a parasitic diode.

■ ABSOLUTE MAXIMUM RATINGS

Ta=25°C

PARAMETER	SYMBOL	RATINGS	UNITS
Input Voltage	V _{IN}	V _{SS} -0.3~V _{SS} +6.5	V
Output Current	I _{OUT}	400 ^(*)	mA
Output Voltage	V _{OUT}	V _{SS} -0.3~V _{IN} +0.3	V
CE Input Voltage	V _{CE}	V _{SS} -0.3~V _{SS} +6.5	V
Power Dissipation	USP-4	120	mW
	SOT-25	250	
	SSOT-24	150	
Operating Ambient Temperature	Topr	-40~+85	°C
Storage Temperature	Tstg	-55~+125	°C

(*) I_{OUT} ≦ Pd / (V_{IN}-V_{OUT})

■ ELECTRICAL CHARACTERISTICS

●XC6225 Series

Ta=25°C

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS	CIRCUIT
Output Voltage	$V_{OUT(E)}^{(*2)}$	$V_{OUT(T)} \geq 1.50V$ $V_{CE}=V_{IN}, I_{OUT}=10mA$	$V_{OUT(T)}$ $\times 0.980$	$V_{OUT(T)}$ $^{(*3)}$	$V_{OUT(T)}$ $\times 1.020$	V	①
		$V_{OUT(T)} \leq 1.45V$ $V_{CE}=V_{IN}, I_{OUT}=10mA$	$V_{OUT(T)}$ -0.030		$V_{OUT(T)}$ $+0.030$		
Output Current	I_{OUTMAX}	$V_{CE}=V_{IN}$ $V_{IN}=V_{OUT(T)}+1.0V$ $1.5V \leq V_{OUT(T)} \leq 5.0V$	30	50	-	mA	①
		$V_{CE}=V_{IN}$ $V_{IN}=2.5V$ $0.8V \leq V_{OUT(T)} \leq 1.45V$					
Load Regulation	ΔV_{OUT}	$V_{CE}=V_{IN}$ $0.1mA \leq I_{OUT} \leq 30mA$	-	5	12	mV	①
Dropout Voltage ^(*4)	Vdif	$I_{OUT}=30mA, V_{CE}=V_{IN}$	[E-2]			mV	①
Supply Current	I_{SS}	$V_{IN}=V_{OUT(T)}+1.0V, I_{OUT}=0mA$	-	25	50	μA	②
Stand-by Current	I_{STB}	$V_{IN}=6.0V, V_{CE}=V_{SS}$	-	0.01	0.1	μA	②
Line Regulation	$\frac{\Delta V_{OUT}}{(\Delta V_{IN} \cdot V_{OUT})}$	$V_{OUT(T)}+0.5V \leq V_{IN} \leq 6.0V$ $V_{OUT(T)} \geq 2.0V,$ $V_{CE}=V_{IN}, I_{OUT}=10mA$	-	0.01	0.20	%V	①
		$2.5V \leq V_{IN} \leq 6.0V$ $V_{OUT(T)} \leq 1.95V$ $V_{CE}=V_{IN}, I_{OUT}=10mA$					
Input Voltage	V_{IN}		2.5	-	6.0	V	①
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{(\Delta T_{opr} \cdot V_{OUT})}$	$V_{CE}=V_{IN}, I_{OUT}=30mA$ $-40^\circ C \leq T_{opr} \leq 85^\circ C$	-	± 100	-	ppm/°C	①

ELECTRICAL CHARACTERISTICS (Continued)

●XC6225 Series (Continued)

Ta=25°C

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS	CIRCUIT
Ripple Rejection Ratio	PSRR	$V_{IN}=5.75V_{DC}+0.5V_{p-pAC}$ $5.0V \geq V_{OUT(T)} \geq 4.8V$ $V_{CE}=V_{IN}, I_{OUT}=30mA, f=1kHz$	-	60	-	dB	③
		$V_{IN}=\{V_{OUT(T)}+1.0\}V_{DC}+0.5V_{p-pAC}$ $4.75V \geq V_{OUT(T)} \geq 4.05V$ $V_{CE}=V_{IN}, I_{OUT}=30mA, f=1kHz$					
		$V_{IN}=\{V_{OUT(T)}+1.0\}V_{DC}+0.5V_{p-pAC}$ $4.0V \geq V_{OUT(T)} \geq 1.75V$ $V_{CE}=V_{IN}, I_{OUT}=30mA, f=1kHz$	-	70	-		
		$V_{IN}=2.75V_{DC}+0.5V_{p-pAC}$ $1.7V \geq V_{OUT(T)} \geq 0.8V$ $V_{CE}=V_{IN}, I_{OUT}=30mA, f=1kHz$					
Limit Current1 ^(*)8)	I_{LIM1}	$V_{IN}=6.0V, V_{CE}=V_{IN}$ $5.0V \geq V_{OUT(T)} \geq 0.8V$	30	50	70	mA	①
Limit Current2 ^(*)8) ^(*)9)	I_{LIM2}	$V_{IN}=V_{OUT(T)}+1.0V, V_{CE}=V_{IN}$ $5.0V \geq V_{OUT(T)} \geq 1.55V$	30	50	70		
		$V_{IN}=2.5V$ $1.50V \geq V_{OUT(T)} \geq 0.8V$					
Limit Current3 ^(*)8) ^(*)9)	I_{LIM3}	$V_{IN}=V_{OUT(T)}+0.1V$ $5.0V \geq V_{OUT(T)} \geq 2.4V$	-	50	70		
		$V_{IN}=2.5V$ $2.35V \geq V_{OUT(T)} \geq 1.55V$					
Short Current	I_{SHORT}	$V_{CE}=V_{IN}$ V_{OUT} is short-circuited at the V_{SS} level	-	15	-	mA	①
CE High Level Voltage	V_{CEH}		1.2	-	6.0	V	④
CE Low Level Voltage	V_{CEL}		-	-	0.3	V	④
CE High Level Current	I_{CEH}	$V_{CE}=V_{IN}$	-0.1	-	0.1	μA	④
CE Low Level Current	I_{CEL}	$V_{CE}=V_{SS}$	-0.1	-	0.1	μA	④
C_L Auto-Discharge Resistance ^(*)7)	R_{DCHG}	$V_{IN}=6.0V, V_{OUT}=4.0V, V_{CE}=V_{SS}$	-	780	-	Ω	①

NOTE:

- * 1: Unless otherwise stated regarding input voltage conditions, $1.5V \leq V_{OUT(T)} \leq 5.0V$ is $V_{IN}=V_{OUT(T)}+1.0V$, and $0.8V \leq V_{OUT(T)} \leq 1.45V$ is $V_{IN}=2.5V$.
- * 2: $V_{OUT(E)}$ = Effective output voltage (Refer to the voltage chart)
(I.e. the output voltage when stabilized " $V_{OUT(T)}+1.0V$ " is provided at the V_{IN} pin while maintaining a certain I_{OUT} value.)
- * 3: $V_{OUT(T)}$ = Nominal output voltage
- * 4: $V_{dif} = \{V_{IN1}^{(*)6)} - V_{OUT1}^{(*)5)}\}$
- * 5: V_{OUT1} = A voltage equal to 98% of the output voltage when an amply stabilized $\{V_{OUT(T)}+1.0V\}$ is input.
- * 6: V_{IN1} = The input voltage when V_{OUT1} appears at the V_{OUT} pin while input voltage is gradually decreased.
- * 7: For the XC6225 series type B only. The XC6225 series type A discharges by using the two resistors R1 and R2 shown in the block diagram.
- * 8: Limit current is defined as the output current when $V_{OUT(E)} \times 0.95$ is impressed at the V_{OUT} pin.
- * 9: The device may not satisfy the specification values when it is used with the input voltages lower than the conditions of I_{LIM3} .

■ OUTPUT VOLTAGE CHART

● Voltage Table1

Ta=25°C

SYMBOL	E-1		E-2	
	OUTPUT VOLTAGE(V)		DROPOUT VOLTAGE I _{OUT} =30mA (mV)	
	V _{OUT(E)}		V _{dif}	
V _{OUT(T)}	MIN.	MAX.	TYP.	MAX.
0.80	0.7700	0.8300	325	1700
0.85	0.8200	0.8800		1650
0.90	0.8700	0.9300	235	1600
0.95	0.9200	0.9800		1550
1.00	0.9700	1.0300	160	1500
1.05	1.0200	1.0800		1450
1.10	1.0700	1.1300	115	1400
1.15	1.1200	1.1800		1350
1.20	1.1700	1.2300	85	1300
1.25	1.2200	1.2800		1250
1.30	1.2700	1.3300		1200
1.35	1.3200	1.3800		1150
1.40	1.3700	1.4300		1100
1.45	1.4200	1.4800		1050
1.50	1.4700	1.5300		50
1.55	1.5190	1.5810	950	
1.60	1.5680	1.6320	900	
1.65	1.6170	1.6830	850	
1.70	1.6660	1.7340	800	
1.75	1.7150	1.7850	750	
1.80	1.7640	1.8360	40	
1.85	1.8130	1.8870		650
1.90	1.8620	1.9380		600
1.95	1.9110	1.9890		550
2.00	1.9600	2.0400		500
2.05	2.0090	2.0910		450
2.10	2.0580	2.1420		400
2.15	2.1070	2.1930		350
2.20	2.1560	2.2440		300
2.25	2.2050	2.2950		250
2.30	2.2540	2.3460		200
2.35	2.3030	2.3970		150
2.40	2.3520	2.4480		70
2.45	2.4010	2.4990		
2.50	2.4500	2.5500		
2.55	2.4990	2.6010		
2.60	2.5480	2.6520		
2.65	2.5970	2.7030		
2.70	2.6460	2.7540		
2.75	2.6950	2.8050		
2.80	2.7440	2.8560		
2.85	2.7930	2.9070		
2.90	2.8420	2.9580		
2.95	2.8910	3.0090		

OUTPUT VOLTAGE CHART (Continued)

● Voltage Table2

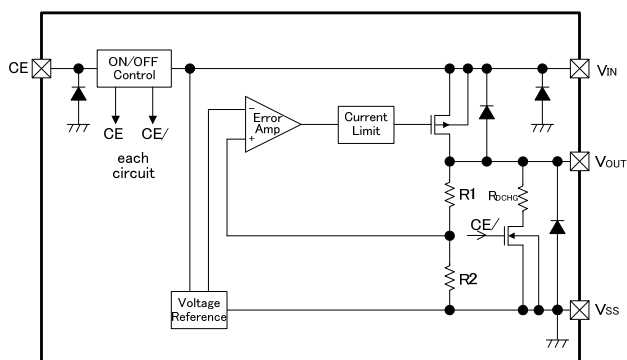
Ta=25°C

SYMBOL	E-1		E-2	
	OUTPUT VOLTAGE(V)		DROPOUT VOLTAGE I _{OUT} =30mA (mV)	
	V _{OUT(E)}		V _{dif}	
V _{OUT(T)}	MIN.	MAX.	TYP.	MAX.
3.00	2.9400	3.0600	70	120
3.05	2.9890	3.1110		
3.10	3.0380	3.1620		
3.15	3.0870	3.2130		
3.20	3.1360	3.2640		
3.25	3.1850	3.3150	95	170
3.30	3.2340	3.3660		
3.35	3.2830	3.4170		
3.40	3.3320	3.4680		
3.45	3.3810	3.5190		
3.50	3.4300	3.5700		
3.55	3.4790	3.6210		
3.60	3.5280	3.6720		
3.65	3.5770	3.7230		
3.70	3.6260	3.7740		
3.75	3.6750	3.8250		
3.80	3.7240	3.8760		
3.85	3.7730	3.9270		
3.90	3.8220	3.9780		
3.95	3.8710	4.0290		
4.00	3.9200	4.0800		
4.05	3.9690	4.1310		
4.10	4.0180	4.1820		
4.15	4.0670	4.2330		
4.20	4.1160	4.2840		
4.25	4.1650	4.3350		
4.30	4.2140	4.3860		
4.35	4.2630	4.4370		
4.40	4.3120	4.4880		
4.45	4.3610	4.5390		
4.50	4.4100	4.5900		
4.55	4.4590	4.6410		
4.60	4.5080	4.6920		
4.65	4.5570	4.7430		
4.70	4.6060	4.7940		
4.75	4.6550	4.8450		
4.80	4.7040	4.8960		
4.85	4.7530	4.9470		
4.90	4.8020	4.9980		
4.95	4.8510	5.0490		
5.00	4.9000	5.1000		

■ OPERATIONAL EXPLANATION

The voltage divided by resistors R1 & R2 is compared with the internal reference voltage by the error amplifier. The P-channel MOSFET connected to the V_{OUT} pin, is then driven by the subsequent control signal. The output voltage at the V_{OUT} pin is controlled and stabilized by a system of negative feedback. The current limit circuit and short-circuit protection circuit operate in relation to the level of output current. Further, the IC's entire circuitry is turned off by the input signal to the CE pin.

● BLOCK DIAGRAM



<Input and Output Capacitors>

The XC6225 needs an output capacitor C_L for phase compensation. Values required for the phase compensation are shown in the chart below. If a loss of the capacitance happens, the stable phase compensation may not be obtained. Please ensure to use a capacitor which does not depend on bias or temperature too much. For a stable power input, please connect an input capacitor C_{IN} of 1.0 μF between the V_{IN} pin and the V_{SS} pin.

OUTPUT VOLTAGE	OUTPUT CAPACITOR
0.8V~1.15V	More than C _L =4.7 μF
1.2V~1.35V	More than C _L =2.2 μF
1.4V~4.0V	More than C _L =1.0 μF
4.05V~5.0V	More than C _L =2.2 μF

<C_L Auto-Discharge Function>

XC6225 series Type B can discharge the electric charge in the output capacitor (C_L), when a low signal to the CE pin, which enables the whole IC circuit to be turned off, is inputted via the N-channel transistor and C_L discharge resistance (R_{DCHG}) located between the V_{OUT} pin and the V_{SS} pin (refer to BLOCK DIAGRAM). The C_L auto-discharge resistance value is set at 780 Ω (V_{OUT}=4.0V @ V_{IN}=6.0V at TYP.). The discharge time of the output capacitor (C_L) is set by the C_L auto-discharge resistance (R_{DCHG}) and the output capacitor (C_L). By setting the time constant of the C_L auto-discharge resistance (R_{DCHG}) value [R_{DCHG}] and the output capacitor value (C_L) as τ (τ = C × R_{DCHG}), the output voltage after discharge via is calculated by the following formula.

$$V = V_{OUT(E)} \times e^{-t/\tau} \quad \text{or} \quad t = \tau \ln(V / V_{OUT(E)})$$

Where

V: Output voltage after discharge

V_{OUT(E)}: Output voltage

t: Discharge time,

τ: C_L auto-discharge resistance R_{DCHG} × Output capacitor (C_L) value C

■ OPERATIONAL EXPLANATION (Continued)

<Current Limiter, Short-Circuit Protection>

The XC6225 series' fold-back circuit operates as an output current limiter and a short protection circuit for the output pin. When the load current reaches the current limit level, the fixed current limiter circuit operates and output voltage drops. When the output pin is short-circuited to the V_{SS} pin, the current falls and reaches about 15mA.

<CE Pin>

The IC's internal circuitry can be shutdown via the signal from the CE pin with the XC6225 series. In the shutdown state, output at the V_{OUT} pin will be pulled down to the V_{SS} level via R1 & R2. However, with the XC6225 series type B, the C_L auto-discharge (R_{DCHG}) N-channel transistor switch is connected in parallel to R1 and R2 while the power supply is applied to the V_{IN} pin.

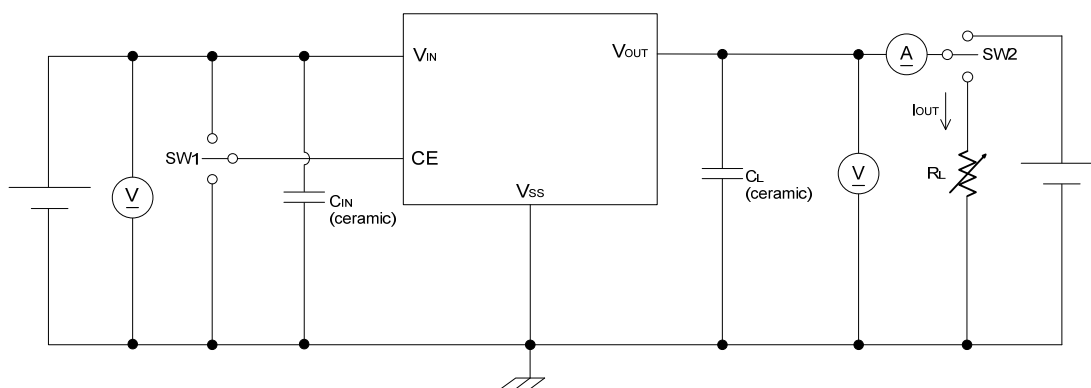
The output voltage is in an undefined state when the CE pin is left open. If this IC is used with the correct voltage for the CE pin, the logic is fixed and the IC will operate normally. However, the supply current may increase as a result of shoot-through current in the IC's internal circuitry when a medium voltage is input.

■ NOTES ON USE

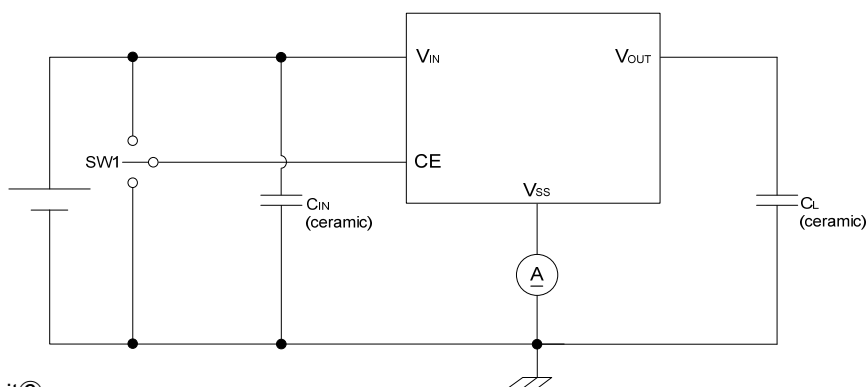
1. For temporary, transitional voltage drop or voltage rising phenomenon, the IC is liable to malfunction should the ratings be exceeded.
2. Where wiring impedance is high, operations may become unstable due to noise and/or phase lag depending on output current. Please strengthen V_{IN} and V_{SS} wiring in particular
3. Please wire the input capacitor (C_{IN}) and the output capacitor (C_L) as close to the IC as possible.
4. Capacitances of these capacitors (C_{IN}, C_L) are decreased by the influences of bias voltage and ambient temperature. Care shall be taken for capacitor selection to ensure stability of phase compensation from the point of ESR influence.
5. When it is used in a quite small input / output dropout voltage, output may go into unstable operation. Please test it thoroughly before using it in production.
6. Torex places an importance on improving our products and their reliability. We request that users incorporate fail-safe designs and post-aging protection treatment when using Torex products in their systems.

TEST CIRCUITS

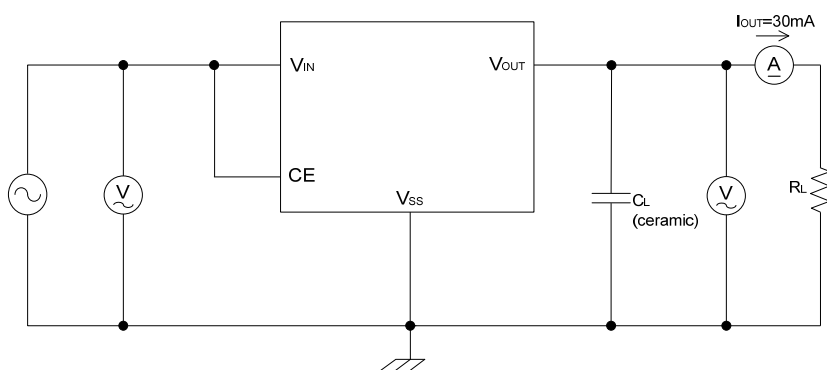
1) Circuit①



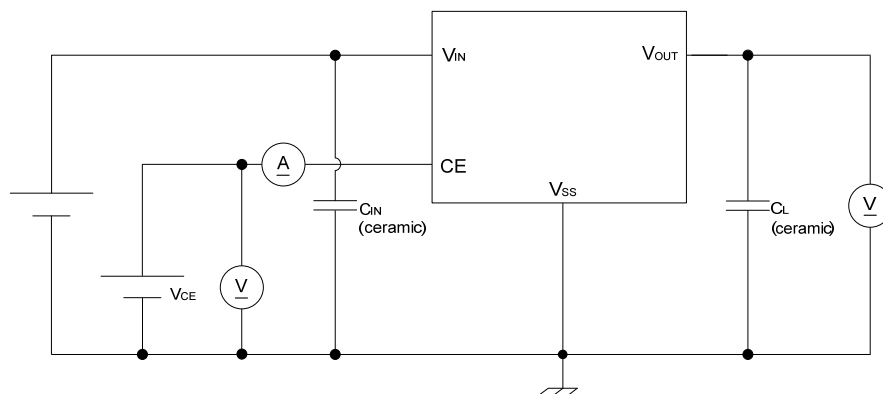
2) Circuit②



3) Circuit③

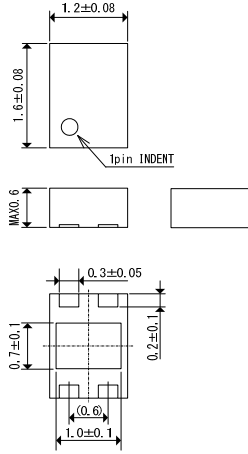


4) Circuit④



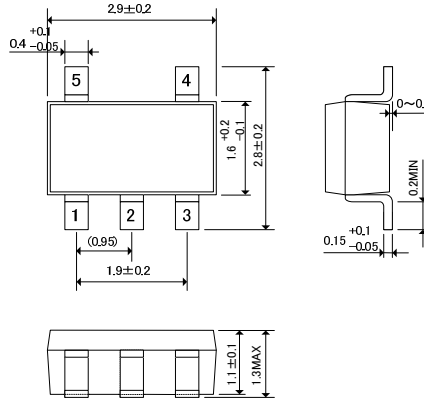
PACKAGING INFORMATION

● USP-4 (unit: mm)

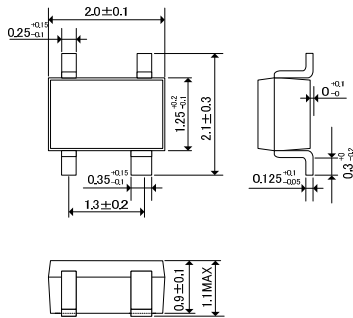


USP-4 Package

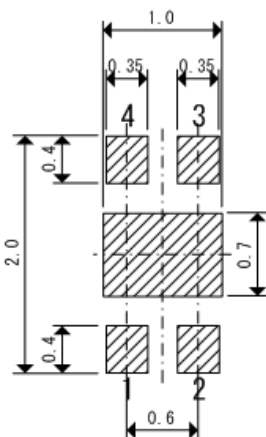
● SOT-25 (unit: mm)



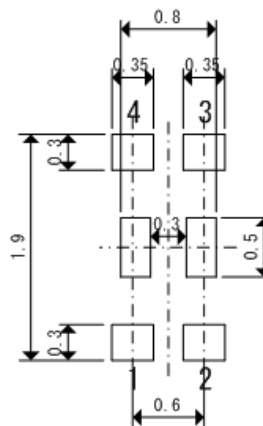
● SSOT-24 (unit: mm)



● USP-4 Reference Pattern Layout

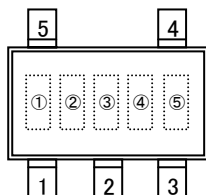


● USP-4 Reference Metal Mask Design

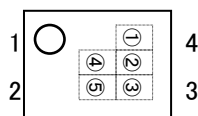


MARKING RULE

● SOT-25, USP-4



SOT-25
(TOP VIEW)



USP-4
(TOP VIEW)

① represents product number

MARK	PRODUCT SERIES
F	XC6225*****-G

② represents type of regulator

MARK				PRODUCT SERIES
100mV increments		50mV increments		
OUTPUT VOLTAGE =0.8~3.5V	OUTPUT VOLTAGE =3.6~5.0V	OUTPUT VOLTAGE =0.85~3.55V	OUTPUT VOLTAGE =3.65~4.95V	
V	A	E	L	XC6225A*****-G
X	B	F	M	XC6225B*****-G

③ represents output voltage

MARK	OUTPUT VOLTAGE(V)				MARK	OUTPUT VOLTAGE(V)			
0	-	3.6	-	3.65	F	2.1	-	2.15	-
1	-	3.7	-	3.75	H	2.2	-	2.25	-
2	0.8	3.8	0.85	3.85	K	2.3	-	2.35	-
3	0.9	3.9	0.95	3.95	L	2.4	-	2.45	-
4	1.0	4.0	1.05	4.05	M	2.5	-	2.55	-
5	1.1	4.1	1.15	4.15	N	2.6	-	2.65	-
6	1.2	4.2	1.25	4.25	P	2.7	-	2.75	-
7	1.3	4.3	1.35	4.35	R	2.8	-	2.85	-
8	1.4	4.4	1.45	4.45	S	2.9	-	2.95	-
9	1.5	4.5	1.55	4.55	T	3.0	-	3.05	-
A	1.6	4.6	1.65	4.65	U	3.1	-	3.15	-
B	1.7	4.7	1.75	4.75	V	3.2	-	3.25	-
C	1.8	4.8	1.85	4.85	X	3.3	-	3.35	-
D	1.9	4.9	1.95	4.95	Y	3.4	-	3.45	-
E	2.0	5.0	2.05	-	Z	3.5	-	3.55	-

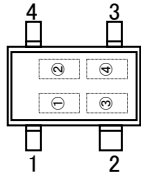
④⑤ represents production lot number

01 to 09, 0A to 0Z, 11 to 9Z, A1 to A9, AA to Z9, ZA to ZZ in order.

(G, I, J, O, Q, W excluded. No character inversion used.)

MARKING RULE (Continued)

SSOT-24



SSOT-24
(TOP VIEW)

① represents type of regulator and output voltage range

MARK					PRODUCT SERIES
OUTPUT VOLTAGE =0.8~1.2V	OUTPUT VOLTAGE =1.25~1.7V	OUTPUT VOLTAGE =1.75~2.2V	OUTPUT VOLTAGE =2.25~2.7V	OUTPUT VOLTAGE =2.75~3.2V	
L	0	M	T	V	XC6225A****-G
N	K	S	U	X	XC6225B****-G
MARK					PRODUCT SERIES
OUTPUT VOLTAGE =3.25~3.7V	OUTPUT VOLTAGE =3.75~4.05V	OUTPUT VOLTAGE =4.1~4.4V	OUTPUT VOLTAGE =4.45~4.75V	OUTPUT VOLTAGE =4.8~5.0V	
Y	1	3	9	B	XC6225A****-G
Z	2	4	A	C	XC6225B****-G

② represents output voltage

MARK	OUTPUT VOLTAGE (V)
P	0.8
R	0.85
S	0.9
T	0.95
U	1.0
V	1.05
X	1.1
Y	1.15
Z	1.2

MARK	OUTPUT VOLTAGE (V)				
0	1.25	1.75	2.25	2.75	3.25
1	1.3	1.8	2.3	2.8	3.3
2	1.35	1.85	2.35	2.85	3.35
3	1.4	1.9	2.4	2.9	3.4
4	1.45	1.95	2.45	2.95	3.45
5	1.5	2.0	2.5	3.0	3.5
6	1.55	2.05	2.55	3.05	3.55
7	1.6	2.1	2.6	3.1	3.6
8	1.65	2.15	2.65	3.15	3.65
9	1.7	2.2	2.7	3.2	3.7

MARK	OUTPUT VOLTAGE (V)			
0	3.75	4.1	4.45	4.8
1	3.8	4.15	4.5	4.85
2	3.85	4.2	4.55	4.9
3	3.9	4.25	4.6	4.95
4	3.95	4.3	4.65	5.0
5	4.0	4.35	4.7	-
6	4.05	4.4	4.75	-

③④ represents production lot number

01 to 09, 0A to 0Z, 11 to 9Z, A1 to A9, AA to Z9, ZA to ZZ in order.

(G, I, J, O, Q, W excluded. No character inversion used.)

1. The products and product specifications contained herein are subject to change without notice to improve performance characteristics. Consult us, or our representatives before use, to confirm that the information in this datasheet is up to date.
2. We assume no responsibility for any infringement of patents, patent rights, or other rights arising from the use of any information and circuitry in this datasheet.
3. Please ensure suitable shipping controls (including fail-safe designs and aging protection) are in force for equipment employing products listed in this datasheet.
4. The products in this datasheet are not developed, designed, or approved for use with such equipment whose failure or malfunction can be reasonably expected to directly endanger the life of, or cause significant injury to, the user.
(e.g. Atomic energy; aerospace; transport; combustion and associated safety equipment thereof.)
5. Please use the products listed in this datasheet within the specified ranges.
Should you wish to use the products under conditions exceeding the specifications, please consult us or our representatives.
6. We assume no responsibility for damage or loss due to abnormal use.
7. All rights reserved. No part of this datasheet may be copied or reproduced without the prior permission of TOREX SEMICONDUCTOR LTD.

TOREX SEMICONDUCTOR LTD.