XC6406 Series

TOREX

High Current Dual Positive Regulator

■GENERAL DESCRIPTION

The XC6406 series are highly precise, low power consumption, dual positive regulators.   They are fabricated using Torex's CMOS process.   Performance features of the series include high current and low dropout voltage, and the series features a voltage reference, and error amplifier, a current limiter and a phase compensation circuit plus a driver transistor.
Output voltage of each regulator 1 and regulator 2 is selectable in 100mV increments within the range of 1.8V to 6.0V.
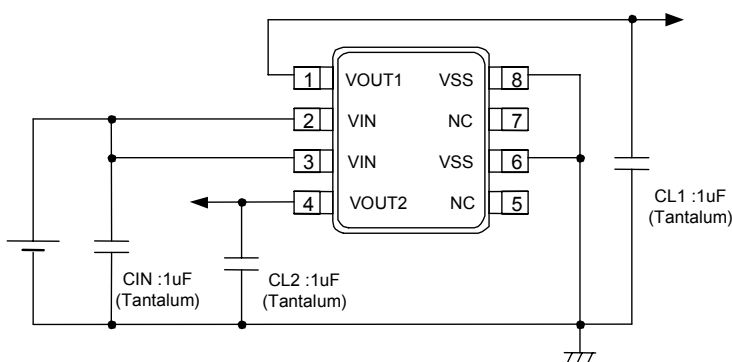The XC6406 series is available in the SOP-8 package.

■APPLICATIONS

- ●CD-ROM, DVD
- ●Battery powered equipment
- ●PDAs
- ●Cameras, Video recorders
- ●Portable AV equipment
- ●Reference voltage

■FEATURES

Maximum Output Current	: 400mA (within the power dissipation)
Maximum Operating Voltage	: 8.0V
Output Setting Voltage Range	: 1.8 ~ 6.0V (100mV increments)
Accuracy	: ±2%
Low Power Consumption	: 20 μ A (TYP.)
Line Regulation	: 0.2% / V (TYP.)
Output Voltage	
Temperature Range	: 100 ppm/℃ (TYP.)
Operating Temperature Range	: - 40℃ ~ 85℃
Dropout Voltage	: 150mV@100mA
	: 300mV@200mA
Small Packages	: SOP-8
	: SOP-8FD (Under development)

■TYPICAL APPLICATION CIRCUIT

1	VOUT1	VSS	8
2	VIN	NC	7
3	VIN	VSS	6
4	VOUT2	NC	5

CL1 :1uF (Tantalum)

CIN :1uF (Tantalum)

CL2 :1uF (Tantalum)
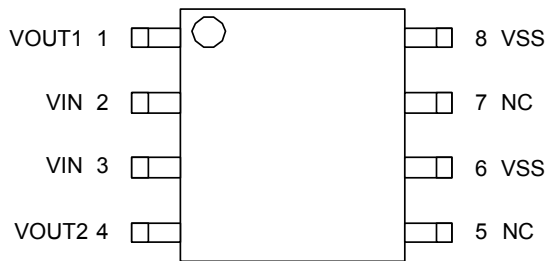
* Please connect the V_{IN} pins No. 2 and No. 3 externally.

**Please connect the V_{SS} pins No. 6 and No. 8 externally.

■PIN CONFIGURATION

SOP-8 & SOP-8FD (TOP VIEW)

* Please connect the V$_{IN}$ pins No. 2 and No. 3 externally.
**Please connect the V$_{SS}$ pins No. 6 and No. 8 externally.

■PIN ASSIGNMENT

PIN NUMBER	PIN NAME	FUNCTION
1	V$_{OUT1}$	Regulator 1 - Output
2	V$_{IN}$	Power Input
3	V$_{IN}$	Power Input
4	V$_{OUT2}$	Regulator 2 - Output
5	NC	No Connection
6	V$_{SS}$	Ground
7	NC	No Connection
8	V$_{SS}$	Ground

■PRODUCT CLASSIFICATION

●Ordering Information

XC6406①②③④⑤⑥

DESIGNATOR	DESCRIPTION	SYMBOL	DESCRIPTION
①	Type of Regulator 1 (VR1)	P	: Short-circuit protection circuit built-in
		E	: No current limiter circuit built-in
②	Type of Regulator 2 (VR2)	P	: Short-circuit protection circuit built-in
		E	: No current limiter circuit built-in
③ ④	Output Voltage of VR1 & VR2	18~ 60	: VR1 setting output voltage range: 1.8V ~ 6.0V VR2 setting output voltage range: 1.8V ~ 6.0V 100mV increments are available.(*1)
⑤	Package	S	: SOP-8
		(T.B.D.*2)	: SOP-8FD
⑥	Device Orientation	R	: Embossed tape, standard feed
		L	: Embossed tape, reverse feed

*1: Output voltage of 50mV steps is applied only for 2.85V type.

*2: T.B.D.: To be determined

■ABSOLUTE MAXIMUM RATINGS

Ta = 25℃

PARAMETER		SYMBOL	RATINGS	UNITS
Input Voltage		V_{IN}	10	V
Output Current		$I_{OUT1} + I_{OUT2}$	600	mA
Output Voltage		$V_{OUT1/2}$	$V_{SS} – 0.3 \sim V_{IN} + 0.3$	V
EN Pin Voltage		$V_{EN1/2}$	$V_{SS} – 0.3 \sim V_{IN} + 0.3$	V
Power Dissipation	SOP-8	Pd	300	mW
	SOP-8FD		300	
Operating Temperature Range		Topr	- 40 ~ + 85	℃
Storage Temperature Range		Tstg	- 55 ~ + 125	℃

■ELECTRICAL CHARACTERISTICS

XC6406EExx

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Supply Current	I_{DD}	V_{IN} =7V	-	20	40	μA
Input Voltage	V_{IN}		-	-	8.0	V

* Please connect the V_{IN} pins No. 2 and No. 3 externally.
** Please connect the V_{SS} pins No. 6 and No. 8 externally.

$V_{OUT(T)}$ = 1.8V

Ta=25℃

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Output Voltage (*2)	$V_{OUT(E)}$	V_{IN}=2.8V, I_{OUT}=40mA	1.764	1.800 $V_{OUT(T)}$	1.836	V
Maximum Output Current	I_{OUTMAX}	V_{IN}=2.8V, $V_{OUT} \geqq V_{OUT(E)}$ x 0.9	400	-	-	mA
Load Regulation	$\triangle V_{OUT}$	V_{IN}=2.8V, 1mA$\leqq I_{OUT} \leqq$200mA	-	40	100	mV
Dropout Voltage (*3)	Vdif1	I_{OUT}=100mA	-	200	300	mV
	Vdif2	I_{OUT}=200mA	-	400	600	MV
Line Regulation	$\dfrac{\triangle V_{OUT}}{\triangle V_{IN} \cdot V_{OUT}}$	2.8V$\leqq V_{IN} \leqq$8.0V, I_{OUT}=40mA	-	0.2	0.3	% / V
Output Voltage Temperature Range	$\dfrac{\triangle V_{OUT}}{\triangle Topr \cdot V_{OUT}}$	I_{OUT}=40mA, -40℃$\leqq$Topr$\leqq$85℃	-	$\pm$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 at the V_{IN} pin while maintaining a certain I_{OUT}.)
　　　*3: Vdif={V_{IN1}[*5] - V_{OUT1}[*4] }
　　　*4: V_{OUT1}: A voltage equal to 98% of the output voltage whenever an amply stabilized $V_{OUT1}=I_{OUT}$\{$V_{OUT(T)}$+1.0V\} is input.
　　　*5: V_{IN1}=The input voltage when V_{OUT1} appears as input voltage is gradually decreased.

■ELECTRICAL CHARACTERISTICS (Continued)

XC6406EExx (Continued)

$V_{OUT(T)}$ = 2.5V   Ta=25℃

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Output Voltage (*2)	$V_{OUT(E)}$	V_{IN}=3.5V, I_{OUT}=40mA	2.450	2.500 $V_{OUT(T)}$	2.550	V
Maximum Output Current	I_{OUTMAX}	V_{IN}=3.5V, V_{OUT}≧$V_{OUT(E)}$ x 0.93	400	-	-	mA
Load Regulation	△V_{OUT}	V_{IN}=3.5V, 1mA≦I_{OUT}≦200mA	-	40	100	mV
Dropout Voltage (*3)	Vdif1	I_{OUT}=100mA	-	170	250	mV
	Vdif2	I_{OUT}=200mA	-	320	500	mV
Line Regulation	$\frac{△V_{OUT}}{△V_{IN} \cdot V_{OUT}}$	3.5V≦V_{IN}≦8.0V, I_{OUT}=40mA	-	0.2	0.3	% / V
Output Voltage Temperature Range	$\frac{△V_{OUT}}{△Topr \cdot V_{OUT}}$	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 at the V_{IN} pin while maintaining a certain I_{OUT}.)
 *3: Vdif={V_{IN1}[*5] - V_{OUT1}[*4] }
 *4: V_{OUT1}: A voltage equal to 98% of the output voltage whenever an amply stabilized V_{OUT1}=I_{OUT}{$V_{OUT(T)}$+1.0V} is input.
 *5: V_{IN1}=The input voltage when V_{OUT1} appears as input voltage is gradually decreased.

$V_{OUT(T)}$ = 3.3V   Ta=25℃

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Output Voltage (*2)	$V_{OUT(E)}$	V_{IN}=4.3V, I_{OUT}=40mA	3.234	3.300 $V_{OUT(T)}$	3.366	V
Maximum Output Current	I_{OUTMAX}	V_{IN}=4.3V, V_{OUT}≧$V_{OUT(E)}$ x 0.93	400	-	-	mA
Load Regulation	△V_{OUT}	V_{IN}=4.3V, 1mA≦I_{OUT}≦200mA	-	40	100	mV
Dropout Voltage (*3)	Vdif1	I_{OUT}=100mA	-	150	220	mV
	Vdif2	I_{OUT}=200mA	-	300	420	mV
Line Regulation	$\frac{△V_{OUT}}{△V_{IN} \cdot V_{OUT}}$	3.5V≦V_{IN}≦8.0V, I_{OUT}=40mA		0.2	0.3	% / V
Output Voltage Temperature Range	$\frac{△V_{OUT}}{△Topr \cdot V_{OUT}}$	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 at the V_{IN} pin while maintaining a certain I_{OUT}.)
 *3: Vdif={V_{IN1}[*5] - V_{OUT1}[*4] }
 *4: V_{OUT1}: A voltage equal to 98% of the output voltage whenever an amply stabilized V_{OUT1}=I_{OUT}{$V_{OUT(T)}$+1.0V} is input.
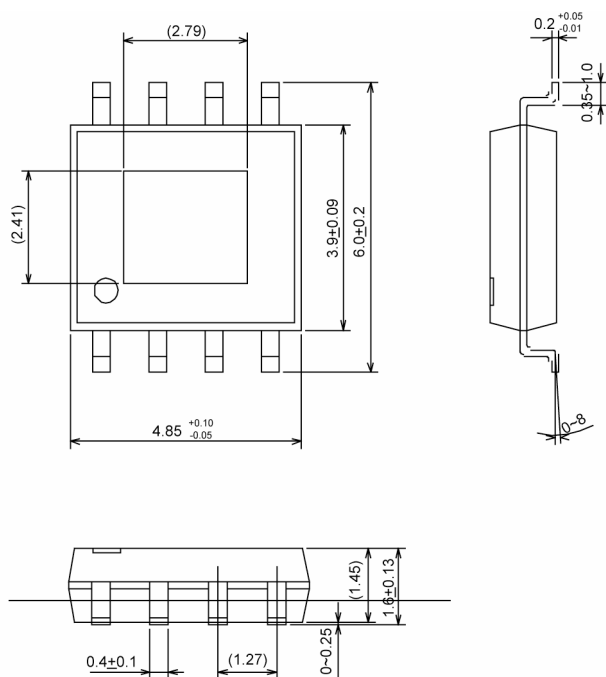 *5: V_{IN1}=The input voltage when V_{OUT1} appears as input voltage is gradually decreased.
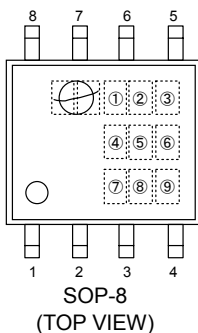
■PACKAGING INFORMATION

●SOP-8
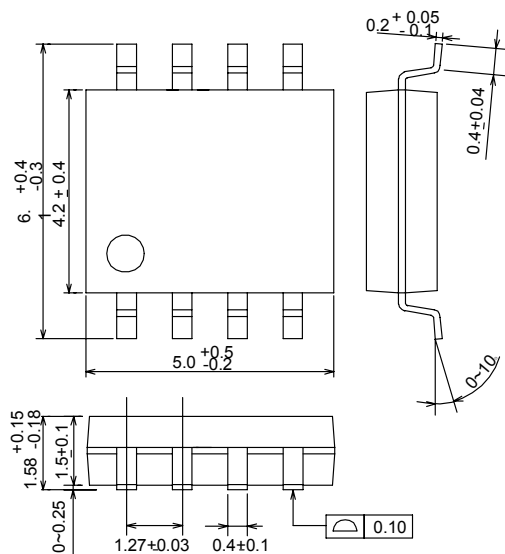
●SOP-8FD

■MARKING RULE

● SOP-8

SOP-8
(TOP VIEW)

①②Represents product series

MARK		PRODUCT SERIES
①	②	
0	6	XC6406xxxxSx

③Represents type of VR1 regulator

MARK	VR1 REGULATOR TYPE	PRODUCT SERIES
P	Short-Circuit Protection Circuit Built-In	XC6406PxxxSx
E	No Current Limiter Circuit Built-In	XC6406ExxxSx

④Represents type of VR2 regulator

MARK	VR2 REGULATOR TYPE	PRODUCT SERIES
P	Short-Circuit Protection Circuit Built-In	XC6406PxxxSx
E	No Current Limiter Circuit Built-In	XC6406ExxxSx

⑤⑥Represents VR output voltage
ex)

MARK		VOLTAGE (V)		PRODUCT SERIES
⑤	⑥	VR1	VR2	
0	1	3.3	2.5	XC6406xx01Sx

⑦Represents a least significant digit of production year (ex)

MARK	PRODUCTION YEAR
3	2003
4	2004

⑧⑨Represents production lot number (ex)
　　0 to 9, A to Z repeated (G, I, J, O, Q, W excepted).
　　Note: No character inversion used.

MARK		PRODUCTION LOT NUMBER
⑧	⑨	
-	3	03
0	1	1A