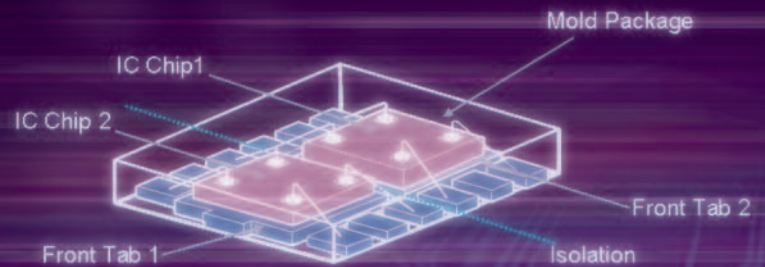


# Power Management Solutions

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XC6120
- **PLL Clock Generator IC**  
XC25BS8



# Multi Chip Module Solutions

**MULTI POWER SUPPLY ICs IN ULTRA SMALL PACKAGES**

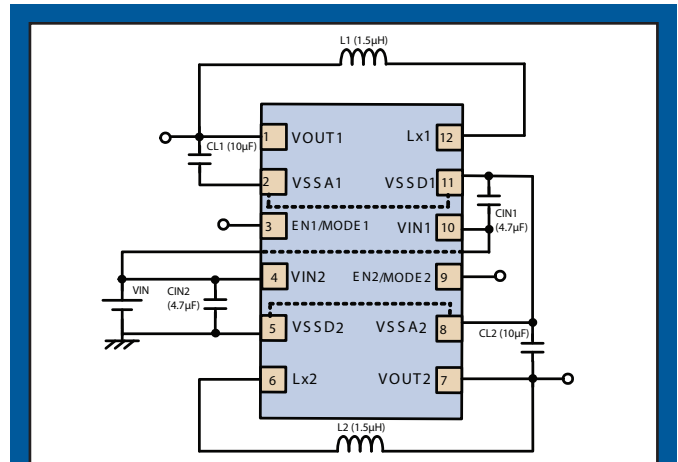
## XCM517 Dual Channel 600mA Synch Step-Down DC/DC Converter

The XCM517 series combines 2 x XC9235/36 synchronous step-down DC/DC converters in one ultra small USP-12B01 package (2.8 x 2.3 x 0.6mm). This new multi chip module IC from Torex is an ideal space saving solution for applications that need a compact and efficient power management solution for powering both the I/O & core voltage rails of the board's CPU.

The XCM517 has an operating voltage range of 2.7V~6.0V and switching frequency can be selected from 1.2MHz and 3MHz.

### Key Features

- Operating Voltage Range: 2.7V ~ 6.0V
- Output Voltage: 0.8V ~ 2.5V
- Output Current: 600mA / Channel
- Switching Frequency: 1.2MHz, 3MHz
- Efficiency: 92%
- Control: PWM or PWM/PFM Auto Switching



Typical Application Circuit  
Component values shown are for 3MHz version

## XCM519 Synch Step-Down DC/DC Converter + Ultra LDO

The XCM519 series combines the low ripple XC9235/36 synchronous step-down DC/DC converter with the ultra low dropout, low input voltage XC6601 linear regulator in one tiny USP-12B01 package (2.8 x 2.3 x 0.6mm).

### Key Features

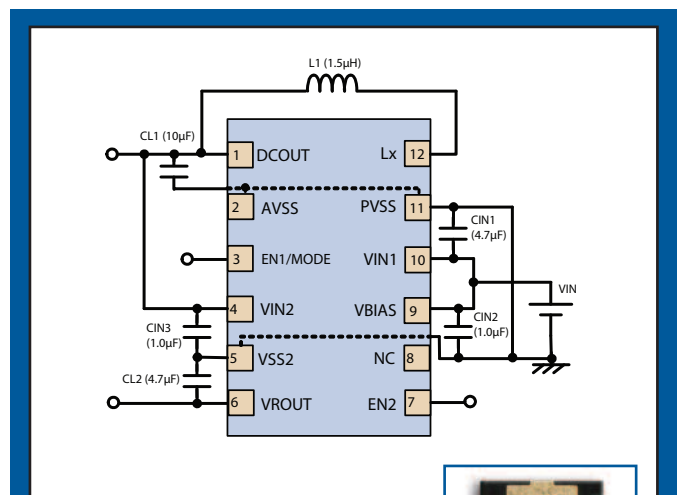
- Operating Voltage Range: 2.5V ~ 6.0V
- Bias Voltage Range: 2.5V ~ 6.0V

### XC9235/36 DC/DC Block

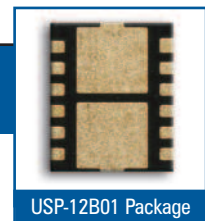
- Output Voltage: 0.8V ~ 2.5V
- Output Current: 600mA
- Switching Frequency: 1.2MHz, 3MHz
- Control: PWM, PWM/PFM Auto
- Soft-Start Circuit Built-in

### XC6601 LDO Block

- Output Voltage: 0.7V ~ 1.8V
- Output Current: >400mA
- Dropout Voltage: 38mV @ 100mA
- Supply Current: 25µA typ.



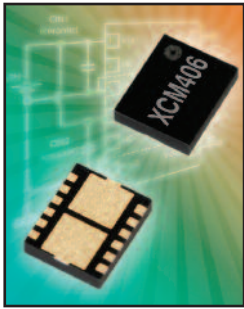
Typical Application Circuit  
DCDC block component values shown are for 3MHz version



# Multi Chip Module Solutions

**NEW SPACE SAVING MCM TECHNOLOGY FROM TOIREX**

## XCM406 Dual Channel High Current Ultra LDO

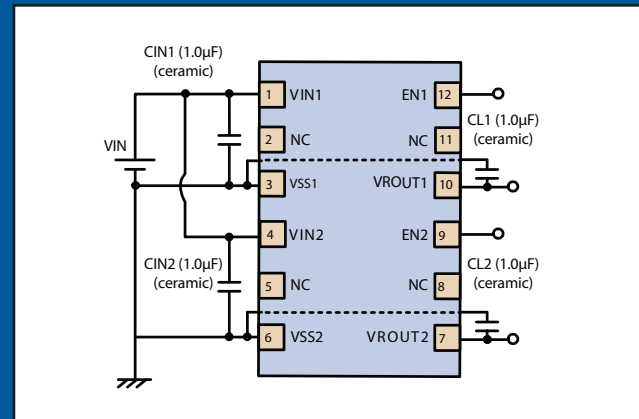


The XCM406 series combines two high current, ultra low dropout XC6210 regulators in one ultra small USP-12B01 package (2.8 x 2.3 x 0.6mm).

The XCM406 has an operating voltage range of 1.5V~6.0V and output voltage is laser trimmed within a range of 0.8V ~ 5.0V / channel in 0.1V selections. Ultra low dropout and supply current make the XCM406 ideally suited to all battery powered applications where board space is at a premium.

### Key Features

- Operating Voltage Range: 1.5V ~ 6.0V
- Output Voltage: 0.8V ~ 5.0V (0.1V steps)
- Output Current: >700mA / Channel
- Dropout Voltage: 50mV @ 100mA
- Supply Current: 35 $\mu$ A typ. / Channel
- CL High Speed Auto Discharge



Typical Application Circuit

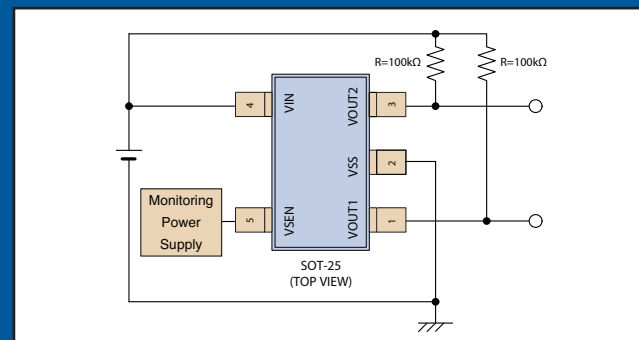
## XCM410 Dual Channel Voltage Detector

The XCM410 series combines the XC6108 & XC6109 voltage detectors into one space saving SOT25 package. With a possible combined supply current figure as low as 1.6 $\mu$ A being achievable, the solution is extremely power efficient.

The XCM410 also includes a separated sense pin (VSEN) on Vout1 that allows for a separate power supply to be monitored. Manufactured using CMOS technology, this new MCM is particularly suitable for applications such as re-setting microprocessors, memory battery back-up switches and power failure detection circuits.

### Key Features

- Operating Voltage Range: 1.0V ~ 6.0V
- Detect Voltage: 0.8V ~ 5.0V (Vout1)  
1.1V ~ 5.0V (Vout2)
- Output Configuration: N-channel open drain
- Supply Current: 1.6 $\mu$ A typ.
- Separated Sense Pin (Vout1)



Typical Application Circuit

# LDO Voltage Regulators

## XC6701 28V High Speed CMOS LDO Regulator



Following in the footsteps of Torex's first 28V LDO, the XC6216 that was introduced in 2007, the new XC6701 is a high speed (50dB @ 1kHz ripple rejection), 28V linear LDO voltage regulator ideally suited to 24V systems and many industrial applications. Even in full operation, the XC6701 only consumes 50 $\mu$ A of current and this

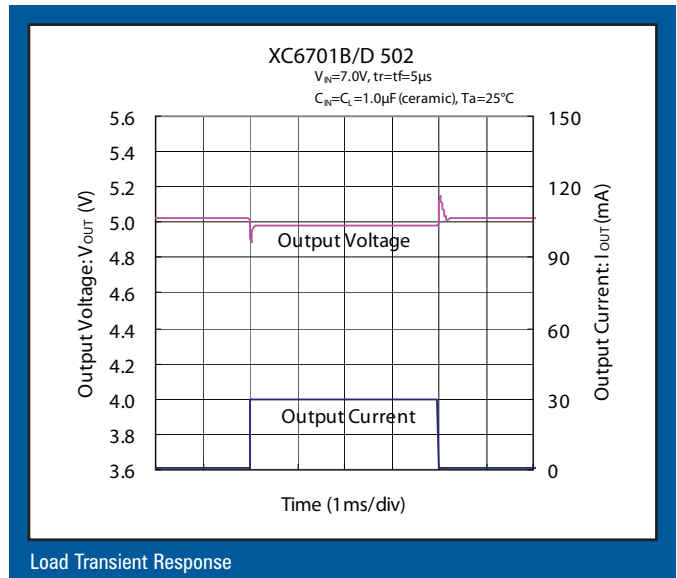
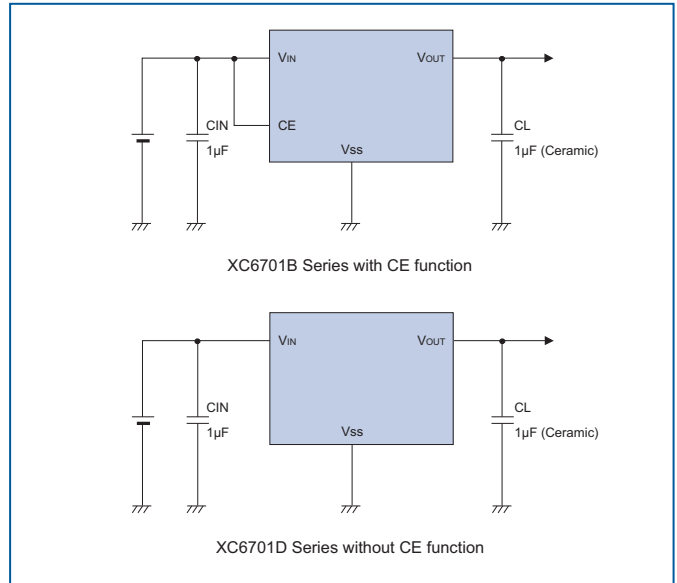
can be greatly reduced via the IC's chip enable (CE) pin to less than 0.1 $\mu$ A in stand-by.

Output voltage is selectable in 100mV steps within the range of 1.8V to 18V. The series is compatible with ceramic caps for added stability and the series also includes built-in over current protection and thermal shutdown circuits.

### Key Features

- Input Voltage: 2.0V~28.0V
- Output Voltage: 1.8V~18.0V (100mV increments)
- Maximum Output Current: 200mA
- Dropout Voltage: 300mV@ I<sub>OUT</sub>=20mA
- High Accuracy:  $\pm$ 2%
- Low Power Consumption: 50 $\mu$ A (V<sub>OUT</sub>( $\tau$ ) = 5.0V)
- Stand-by Current: <0.1 $\mu$ A
- Ripple Rejection: 50dB @ 1kHz
- Packages: SOT-25, SOT-89, SOT-89-5, USP-6C, SOT-223, TO-252

### Typical Application Circuits



# LDO Voltage Regulators

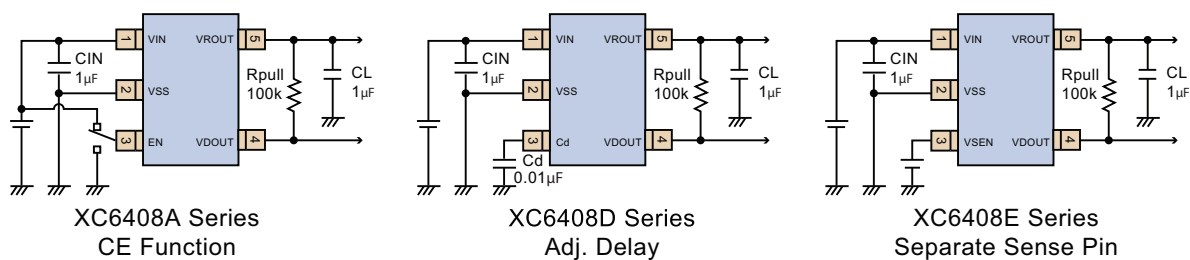
**Under Development**

## XC6408 25V High Speed CMOS LDO Regulator + Detector

The new XC6408 series combines the high input voltage and low current consumption performance of the XC6701 LDO regulator with an on board voltage supervisor that can detect high or low and which can be set to monitor either VIN, VOUT or a separate power source using the VSEN pin option.

The regulator is a high speed (40dB @ 1kHz ripple rejection), 25V linear LDO with outputs selectable in 0.1V steps within a range of 2.0V~12.0V.

### Typical Application Circuits



### Key Features

- Input Voltage: 2.0V~25.0V
- VR Output Voltage: 2.0V~12.0V (100mV increments)
- Detect Voltage : 2.0V ~ 11.0V (100mV increments)
- Maximum Output Current: 200mA
- Dropout Voltage: 300mV@ IOUT=20mA
- Low Power Consumption: 8µA
- Ripple Rejection: 40dB @ 1kHz
- Packages: SOT-25, SOT-89-5, USP-6C

## XC6220 "Green Operation" Ultra LDO Regulator

**Under Development**

The XC6220 is a 1A, 6V input high speed, low noise ultra LDO with excellent load transient performance and green operation which means that the regulator will automatically enter into "power save" mode when the demand for load current drops, thereby reducing power consumption from an already low 50uA down to only 8uA ! The drop-out voltage is an unbelievable 20mV @ 100mA which really is market leading for a linear CMOS regulator.

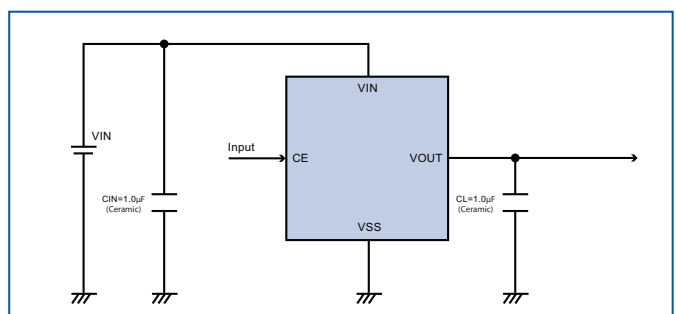
Output voltages are selectable in the range of 0.8V~5.0V in 50mV steps.

### Key Features

- Input Voltage : 1.6V to 6.0V
- Output Voltage : 0.8V to 5.0V
- Output Current : 1A
- Dropout Voltage : 20mV@100mA

- Quiescent Current : 50uA (High Speed Mode)  
8uA (Power Save Mode)
- Ripple Rejection : 55dB @ 1kHz
- CL Auto Discharge
- Thermal Shutdown
- Package : USP-6C, SOT25, SOT89-5

### Typical Application Circuit



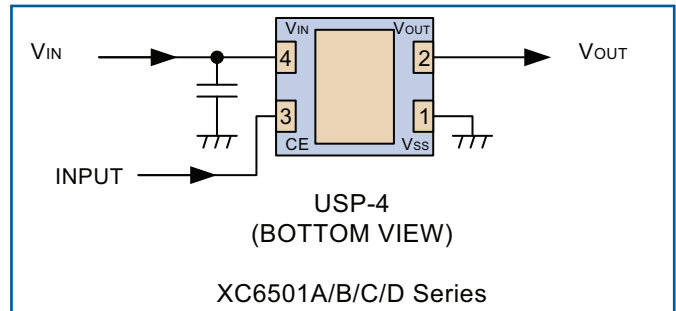
# LDO Voltage Regulators

## XC6501 No "CL Cap" LDO Regulator

The XC6501 is a 6V high speed, low noise CMOS LDO regulator that can provide stable output voltages within a range of 1.2V ~ 5.0V (100mV steps) even without a load capacitor (CL)! This is possible because phase compensation is carried out internally unlike other LDOs where it is done externally.

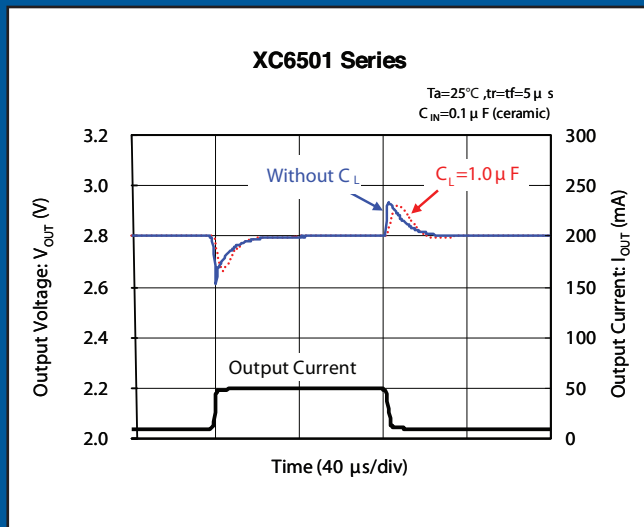
The series only consumes 10 $\mu$ A in operation which can be reduced down to less than 0.1 $\mu$ A in stand-by via the CE pin with the A,B,C & D versions.

### Typical Application Circuit



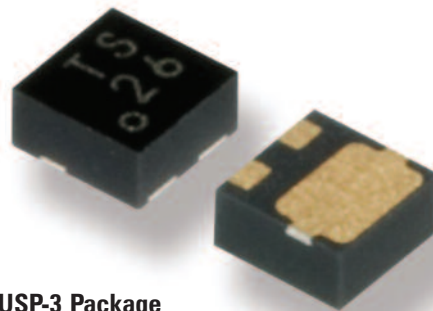
### Load Transient Response

Performance is just as good without a CL capacitor (blue line) as with (red dotted line) as can be seen in the graph below.



Should a CL capacitor be used, another feature of the XC6501 is a CL discharge function that is available with the B & D versions. This feature enables the charge at the CL capacitor to be quickly discharged when a low signal is sent to the CE pin.

For applications for which 10 $\mu$ A is low enough, a 3 pin always on XC6501P version is available in an ultra small USP-3 package measuring just 1.2mm x 1.2mm and a profile of only 0.6mm!!



### USP-3 Package

#### Key Features

- Operating Voltage Range: 1.4V ~ 6.0V
- Output Voltage: 2.0V ~ 5.0V ( $\pm$ 1% accuracy)  
1.2V ~ 1.9V ( $\pm$ 0.02V accuracy)
- Dropout Voltage: 140mV@ 100mA (V<sub>OUT</sub>=2.8V)
- Output Current: 200mA (300mA current limit)
- Power Consumption: 10 $\mu$ A (V<sub>OUT</sub>=2.8V)
- Ripple Rejection: 50dB @ 1kHz (V<sub>OUT</sub>=2.8V)
- CL High Speed Auto Discharge (if CL cap used)
- Packages: USP-3, USP-4, SSOT-24 & SOT-25

# LDO Voltage Regulators

## XC6416 “Green Operation” Dual LDO Regulator

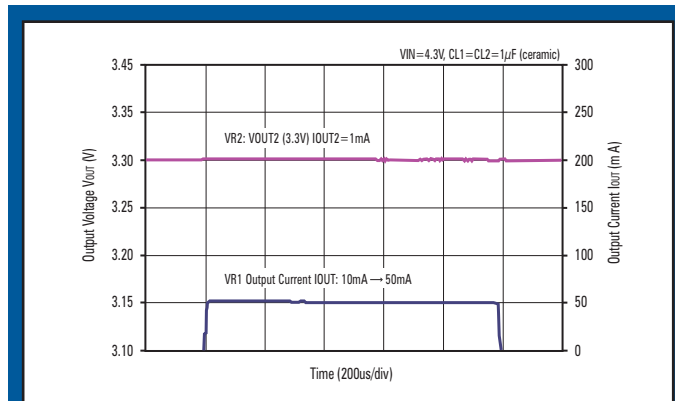
With output voltages independently selectable in the range of 0.8V~4.0V and minimal cross talk, the new XC6416 is an ideal solution for space sensitive applications. Not only that, but with Torex’s innovative green operation function, power consumption can be greatly reduced as the IC automatically switches from high speed mode to power save mode when load current is small (1.5mA or less). The IC quickly returns to high speed mode once again as the load current demand reaches 4mA and above. In addition, in the USP-6C package, the operation mode becomes user selectable via the package’s GO pin so that the IC can operate in either green operation mode or can be forced into a constant high speed operation mode thereby giving the user all the benefits associated with high speed operation.

An auto CL discharge function is also available.

### Key Features

- Output Voltage: 0.8V to 4.0V
- Input Voltage: 1.5V to 6.0V

- Output Current: 200mA (300mA Limiter) / Ch
- Dropout Voltage: 95mV@100mA
- Quiescent Current: 28 $\mu$ A / Ch (High Speed Mode)  
5 $\mu$ A / Ch (Power Save Mode)
- Ripple Rejection: 65dB @ 1kHz
- Auto CL Discharge Option
- Packages: USP-6C, SOT26



Cross Talk

## XC6419 300mA/100mA Dual LDO Regulator

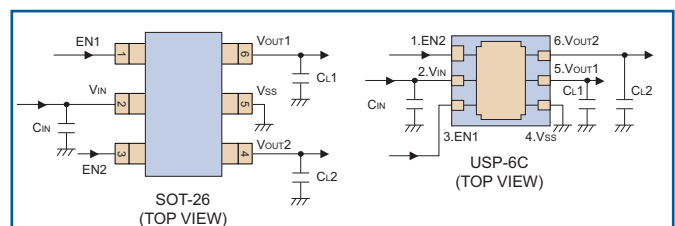
The XC6419 series is a dual CMOS LDO regulator. Each output voltage is set independently by laser trimming and selectable in 0.05V increments within a range of 0.8 to 5.0V. Output current is 300mA for Vout1 and 100mA for Vout2. The EN function turns each output of the two regulators off independently. In this state, the electric charge at the output capacitor (CL) is discharged via the internal auto-discharge switch, and as a result the Vout voltage quickly returns to the VSS level. A high level of output stability is maintained even during frequent load fluctuations, due to the excellent transient response performance. VR1 and VR2 are completely isolated so that a cross talk during load fluctuations is minimized.

### Key Features

- Output Voltage: 0.8V to 5.0V
- Input Voltage: 1.5V to 6.0V

- Output Current: 300mA Ch1 / 100mA Ch2
- Dropout Voltage: 120mV@200mA Ch1  
120mV@50mA Ch2
- Quiescent Current: 30 $\mu$ A Ch1 / 25 $\mu$ A Ch2
- Ripple Rejection: 65dB @ 1kHz
- Auto CL Discharge Option
- Packages: USP-6C, SOT26

### Typical Application Circuits



# LDO Voltage Regulators

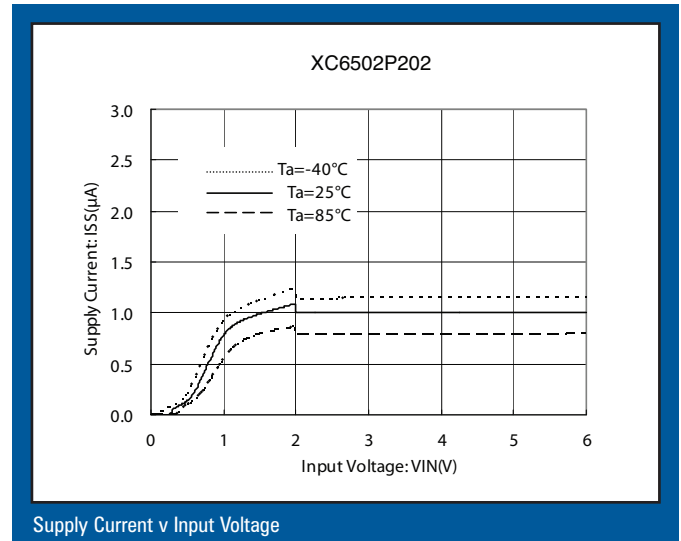
## XC6502 1 $\mu$ A Iq LDO Regulator

The XC6502 is a 1 $\mu$ A supply current 3-pin LDO available in SOT-23 & SOT-89 packages and with output voltages selectable in 100mV steps within a range of 0.9V ~ 4.0V.

The series is compatible with low ESR ceramic capacitors which give added output stability. In addition, the current limiter's fold-back circuit also operates as a short circuit protection.

### Key Features

- Maximum Output Current: 200mA (300mA limit Typ)
- Dropout Voltage: 200mV@100mA
- Operating Voltage Range: 1.5V ~ 6.0V
- Output Voltage: 0.9V ~ 4.0V (100mV increments)
- Low Power Consumption: 1.0 $\mu$ A (typ.)
- Low ESR Capacitor - Ceramic capacitor compatible
- Small Packages: SOT-23 & SOT-89



**Under Development**

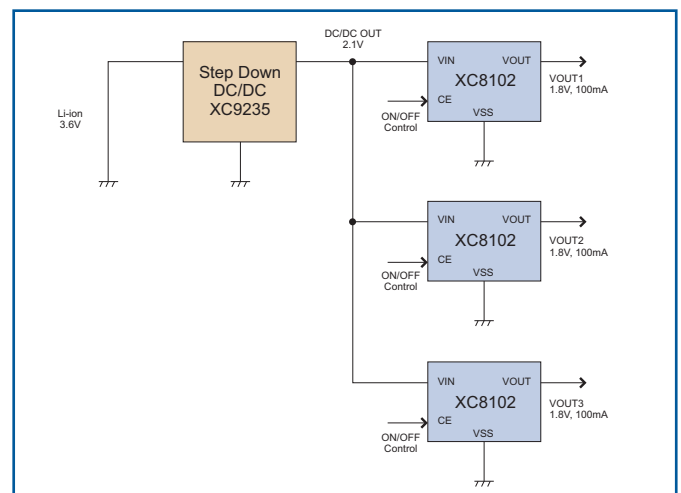
## XC8102 400mA High Side Switch

The XC8102 is a low voltage P-Channel MOSFET power switch for high load switching applications. The XC8102 has ON/OFF control and is a perfect solution when you need to provide a series of stable voltage outputs. By connecting, for example, the XC8102's VIN pin to the output pin of a step-down DC/DC converter such as the XC9235, the line switcher can be used to provide a number of accurate & efficient output rails. The XC8102's CE pin controls the ON/OFF for each switcher to deliver power as and when needed thereby maximizing overall efficiency. No external capacitors are needed so the XC8102 is also a space saving solution where board space is at a premium.

### Key Features

- Input Voltage Range: 1.2V ~ 6.0V
- ON Resistance: 0.45 $\Omega$  @ VIN=2.9V  
0.60 $\Omega$  @ VIN=1.8V
- Power Consumption: 3 $\mu$ A (VIN=1.5V)
- Stand-by Current: 0.1 $\mu$ A

### Typical Application Circuit



- Output Current: 400mA
- Packages: USP-4, SC-82, SOT-25
- High Speed Discharge Function

# Battery Charger IC

## XC6802 Li-ion Battery Charger IC

The XC6802 series is constant-current / constant voltage linear charger IC for single cell lithium-ion batteries and includes a reference voltage source, a battery voltage monitor, a driver transistor, a constant-current / constant voltage charge circuit, an overheat protection circuit and a phase compensation circuit.

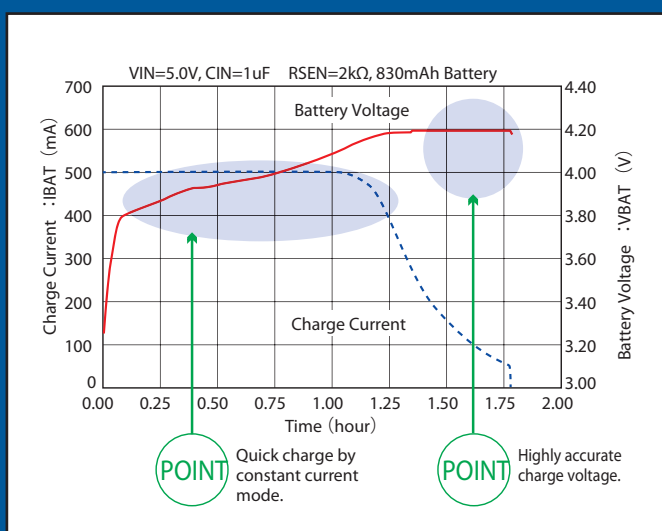
The battery charge termination voltage is internally set to 4.2V +/- 0.7% and the trickle charge voltage is 2.9V +/-3%. In trickle charge mode, the battery can be safely charged as only around one tenth of the charge current is used.

By connecting the XC6802's charge status output pin (/CHG) to an external LED it is also possible to check the IC's charging state.

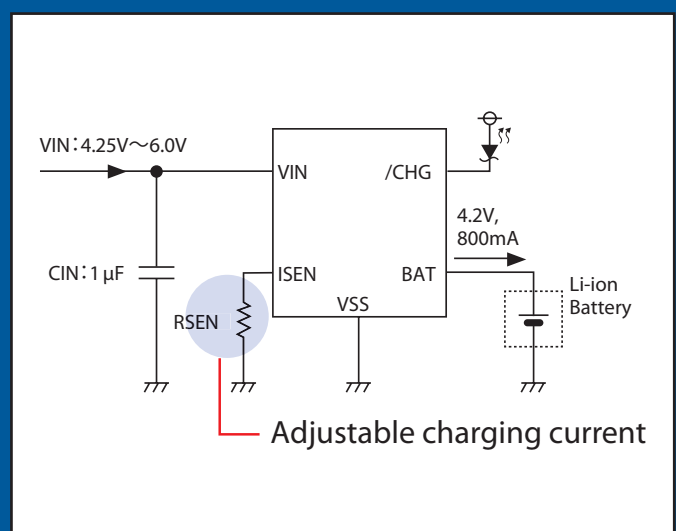
By using an external RSEN resistor the charge current can be set freely up to 800mA making the series ideal for various battery charge applications.

### Key Features

- Operating Voltage: 4.25V ~ 6.0V
- Charge Current: up to 800mA (externally set)
- Charge Termination Voltage: 4.2V +/- 0.7% (0.0294V)
- Trickle Charge Voltage: 2.9V +/-3%
- Supply Current: 15μA (typ)
- Constant Current/Constant Voltage Operation with Thermal Shutdown
- Automatic Recharge
- Charge Status Output Pin
- Soft-Start Function (Inrush Current Limit)
- Packages : SOT-25, SOT-89-5, USP-6C



Li-ion Battery Charge Cycle



Typical Application Circuit

# Voltage Detector/ PLL Clock Generator IC

## XC6120 0.6μA Voltage Detector

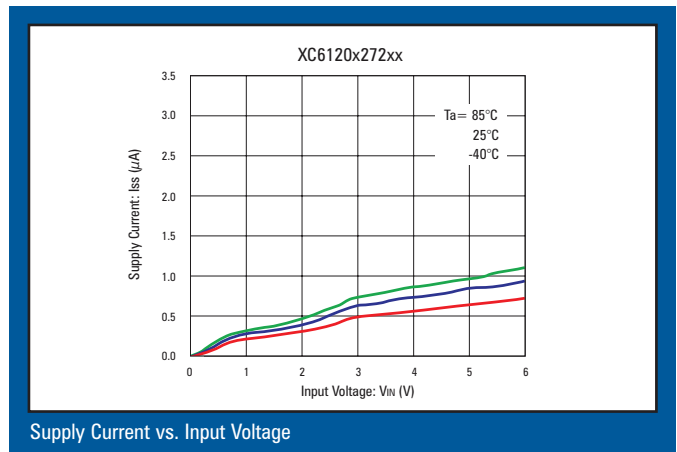
The XC6120 is a highly precise, ultra low power consumption voltage detector in USP-3 & SC-82 which is available with either CMOS or N-channel open drain output configurations.

Detect voltage is selectable within the range of 1.0V to 5.0V (100mV increments) and can operate from voltages as low as 0.7V making the series ideal for use with applications powered by single battery cells.

### Key Features

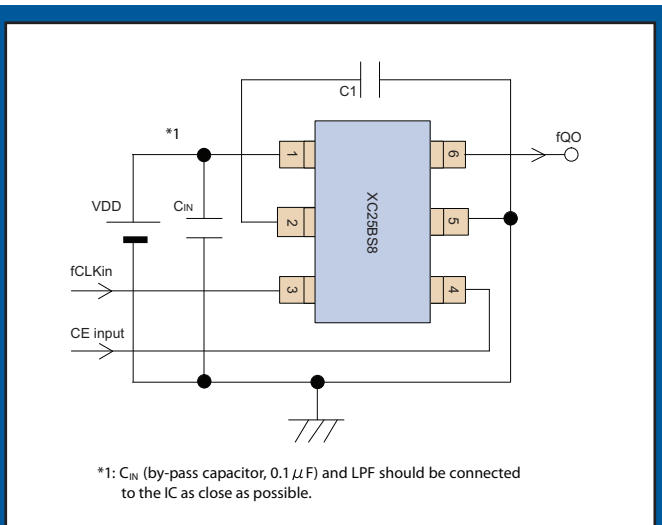
- Operating Voltage: 0.7V~6.0V
- Detect Voltage: 1.0V~5.0V (100mV increments)
- Low Power Consumption: 0.6μA ( $V_{DF(T)}=2.7V$ ,  $V_{IN}=2.97V$  typ)
- High Accuracy:  $\pm 2\%$  ( $V_{DF(T)} > 1.5V$ )  
 $\pm 30mV$  ( $V_{DF(T)} < 1.5V$ )
- Detect Voltage Temp. Characteristics:  $\pm 100ppm/^{\circ}C$  (typ)

- Stand-by Current:  $< 0.1\mu A$
- Output Configuration: CMOS, N-channel Open Drain
- Packages: USP-3, SC-82

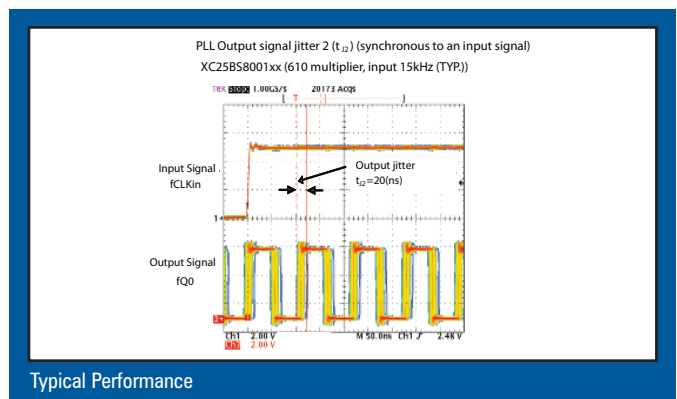


## XC25BS8 PLL Clock Generator IC

The XC25BS8 is a new clock generator IC with built-in divider & multiplier circuits. A wide range of accurate output frequencies within a range of 1MHz ~ 100MHz can be generated from standard clock signals.



Typical Application Circuit



### Key Features

- Input Frequency : 8kHz ~ 36MHz
- Output Frequency : 1MHz ~ 100MHz ( $f_{Q0}=f_{CLKin} \times N/M$ )
- Operating Voltage Range : 2.5V ~ 5.5V
- Output Divider (N) Range : 1~4095
- Input Divider (M) Range : 1~2047
- Low Power Consumption : 10μA (max.) in stand-by mode
- Packages: SOT-26W & USP-6C

# Selection Guide

## Voltage Detectors / Voltage Regulators with Voltage Detectors

### Voltage Detectors

	Type	Detect Voltage	Accuracy	Operating Voltage	Power Consumption	Output Configuration	On-chip delay circuit	Comments	Package	
	XC61C Series	Low Supply Current	0.8V ~ 6.0V	+/-2% (1%)	0.7V ~ 10V	Typ. 0.7µA	N-Channel Open Drain or CMOS	n/a	1% parts for output voltages between 2.6V~5.0V only	SC-82 SOT23 / 25 SOT89 TO92
	XE61C Series	Low Supply Current	0.8V ~ 6.0V	+/-2% (1%)	0.7V ~ 10V	Typ. 0.7µA	N-Channel Open Drain or CMOS	n/a	Over Temperature Specs: -40°C to +85°C	SOT23 SOT89
	XC61F Series	Built in Delay Circuit	1.6V ~ 6.0V	+/-2%	0.7V ~ 10V	Typ. 1.0µA	N-Channel Open Drain or CMOS	1ms to 50ms <b>50ms to 200ms (std)</b> 80ms to 400ms		SOT23 SOT89 TO92
	XC61G Series	Small Package	0.8V ~ 6.0V	+/-2%	0.7V ~ 10V	Typ. 0.7µA	N-Channel Open Drain or CMOS	n/a	1.2mm x 1.2mm x 0.6mm pkg	USP-3
	XC6101-17 Series	Watchdog Timer & MR	1.6V~5.0V	+/-2%	1.0V~6.0V	Typ. 5.0µA	N-Channel Open Drain or CMOS	User Selectable	Hysteresis selectable from 2~8% & 0~1%	SOT25 USP-6C
	XC6108 Series	External Delay & VSEN Pin	0.8V~5.0V	+/-2%	1.0V~6.0V	Typ. 0.8µA	N-Channel Open Drain or CMOS	Yes	External power supply monitoring	SOT25 USP-4
	XC6109 Series	External Delay	0.8V~5.0V	+/-2%	0.7V~6.0V	Typ. 0.9µA	N-Channel Open Drain or CMOS	Yes	Cd pin for setting delay time	SC-82
	XC6120 Series	Ultra Low Supply Current	1.0V ~ 5.0V	+/-2%	0.7V ~ 6.0V	Typ. 0.6µA	N-Channel Open Drain or CMOS	n/a		USP-3 SC-82
	XC6121-24 Series	Watchdog Timer	1.6V ~ 5.0V	+/-2%	1.0V ~ 6.0V	Typ. 5.0µA	N-Channel Open Drain	User Selectable from 100, 200 or 400ms	WD timeout period selectable from 100ms, 400ms, 1.6s	SOT25 USP-6C
EOI	XC612 Series	For new designs we recommend the <b>XC6140 Series</b>								
NEW!	XC6140 Series	Dual Channel	0.8V ~ 5.0V	+/-2%	1.0V ~ 6.0V	Typ. 1.7µA	N-Channel Open Drain	n/a	XC6108 + XC6109 Multi Chip Module	SOT25

### Positive Voltage Regulators with built in Voltage Detector Function

Part Number	Type	Input Voltage Range	Output Voltage	Max Output Current	Accuracy	Power Consumption		Dropout Voltage	Detect Voltage Range	Detector Output	Package
						Typical	Standby				
XC6402 Series	Low V-Drop	1.5V ~ 6.0V	0.8V ~ 5.0V	> 700mA	+/-2%	35µA	n/a	50mV @ 100mA	0.8V ~ 5.0V	N-ch open drain	USP-6B SOT25 SOT89-5
XC6403 Series	Semi-custom	2.0V ~ 6.0V	0.9V ~ 5.6V	> 300mA			0.1µA	200mV @ 100mA	0.9V~5.5V		
XC6404 Series	Delay circuit external		0.9V~5.1V	> 500mA			0.1µA				
XC6405 Series	Delay circuit external	2.0V ~ 25V	2.0V ~ 12V	> 150mA		90µA	0.1µA	300mV @ 20mA	2.0V~11V		SOT25 SOT89-5
NEW! XC6408 Series	High Input Voltage					8µA	0.1µA				USP-6C SOT25 SOT89-5
XC6413 Series	Semi-custom	2.0V ~ 10V	0.9V~5.5V	> 300mA		35µA	0.1µA	200mV @ 100mA	0.9V~6.0V		USP-6B SOT25 SOT89-5
XC6414 Series				> 500mA							

# Selection Guide

## CMOS LDO Voltage Regulators

### Positive Voltage Regulators

	Type	Input Voltage Range	Output Voltage	Max Output Current	Accuracy	Power Consumption		Dropout Voltage	Comments	Package
						Typical	Standby			
XB1085 Series	High Current	12V max	1.5V, 1.8V, 2.5V, 3.3V, 5.0V, & Adj.	3A	+/-1%	5mA	n/a	1.3V @ 3A	Thermal Protection Built-In	TO-252
XB1086 Series	High Current	15V max	1.5V, 1.8V, 2.5V, 3.3V, 5.0V & Adj.	1.5A	+/-1%	5mA		1.3V @ 1.5A	Thermal Protection Built-In	TO-252
XB1117 Series	High Current	10V max*	1.8V, 2.5V, 3.3V, 5.0V & Adj.	1A	+/-1%	6mA		1.2V @ 1A	Bi-Polar	SOT223
<b>ED</b> XC62FP Series	For new designs we recommend the <b>XC6201 Series</b> (10V input) or the <b>XC6206 Series</b> (6V input)									
<b>ED</b> XC62RP Series	For new designs we recommend the <b>XC6206 Series</b>									
XC6201 Series	Low ESR Caps	10V max	1.3V ~ 6.0V	>250mA	+/-2% (1%)	2.0µA	n/a	160mV @ 100mA	Low ESR Ceramics Capacitors	SOT25 SOT89 USP-6B TO92
XC6202 Series	High Input Voltage	20V max	1.8V ~ 18V	>150mA	+/-2%	10.0µA		200mV @ 30mA		SOT23 SOT89 SOT223 USP-6B TO92
XC6203 Series	High Output Current	8V max	1.8V ~ 6.0V	>400mA		8.0µA		150mV @ 100mA 300mV @ 200mA	SOT23 SOT89 SOT223 TO92	
XC6206 Series	Low Quiescent Current	6V max	1.2V ~ 5.0V	>250mA		1.0µA		160mV @ 100mA 400mV @ 200mA	Low ESR Ceramics Capacitors	SOT23 SOT89 USP-6B TO92
XC6214 Series	High Output Current	6V max	1.5V ~ 5.0V	>500mA		8.0µA		100mV @ 100mA 500mV @ 500mA	1.2V, 1.5V, 1.8V 2.5V, 3.0V, 3.3V Standard	SOT89 TO-252
XC6218 Series	Low Quiescent Current	6V max	0.9V ~ 4.0V	200mA		1.0µA		200mV @ 100mA	VOUT down to 0.9V	USP-3 SC-82
<b>NEW!</b> XC6502 Series	Low Quiescent Current	6V max	0.9V~4.0V	200mA		1.0µA		200mV @ 100mA	VOUT down to 0.9V	SOT23 SOT89

\* Please note that 10V max only applies to the 5V output version. For all other versions the maximum input voltage is 7V

### Negative Voltage Regulators

Part Number	Type	Input Voltage Range	Output Voltage	Max Output Current	Accuracy	Power Consumption		Dropout Voltage	Comments	Package
						Typical	Standby			
XC62KN Series	General Purpose	-10V max	-2.1V to -6.0V	100mA	+/-2% (1%)	3.0µA	n/a	120mV @ 50mA 380mV @ 100mA		SOT23 SOT89 TO92

# Selection Guide

## Positive Voltage Regulators with Output On/Off Control

Part Number	Type	Input Voltage Range	Output Voltage	Max Output Current	Accuracy	Power Consumption		Dropout Voltage	Comments	Package	
						Typical	Standby				
XC6204 Series	Low Noise / High Speed	10V max	1.8V~6.0V	ABCD > 150mA EFGH > 300mA	+/-2% (1%*)	70µA	0.1µA	60mV @ 30mA 200mV @ 100mA	Low ESR Caps Noise 30µVrms typ PSRR > 70dB Fast turn-on time	SOT25 USP-6B SOT89-5	
XC6205 Series	Low Noise / High Speed		0.9V~1.75V	> 150mA						SOT25 USP-6B	
XC6207 Series	Green Operation	6V max	1.2V~5.0V	> 300mA	+/-2%	50µA (5.5µA)		40mV @ 30mA 120mV @ 100mA	Only 5.5µA quiescent current in power save mode	SOT25 USP-6C SOT89-5	
XC6209 Series	Low Noise / High Speed	10V max	0.9V~6.0V	ABCD > 150mA EFGH > 300mA	+/-2% (1%*)	25µA		60mV @ 30mA 200mV @ 100mA	Noise 30µVrms typ PSRR > 70dB	SOT25 USP-6B SOT89-5	
XC6210 Series	High Current	6V max	0.8V~5.0V	> 700mA	+/-2%	35µA		50mV @ 100mA 100mV @ 200mA	Ultra Low Dropout	SOT25 SOT89-5 USP-6B	
XC6211 Series	Low Noise/ High Speed	6V max	0.9V~5.0V	~300mA		25µA		60mV @ 30mA 200mV @ 100mA	Noise 30µVrms typ PSRR > 70dB	SOT25	
XC6212 Series	TK112 pin-out compatible	10V max	0.9V~6.0V	~300mA	+/-2%	35µA	0.1µA	60mV @ 30mA 200mV @ 100mA	Noise 30µVrms typ PSRR > 70dB	SOT25	
XC6213 Series	Low Noise / High Speed	6V max	1.2V~5.0V	~150mA					400mV @ 100mA	V.small pkgs	SC-82 SOT25 USP-4
XC6215 Series	Ultra Low Iq		0.9V~5.0V	~200mA				0.8µA	320mV @ 100mA	Only 0.8µA Quiescent Current	SC-82 USP-4, USP-3 SOT25
XC6216 Series	High Voltage	28V max	2.0V~23V	~200mA		5µA		300mV @ 20mA	Fixed or Adjustable Outputs. XE6216 available with over temperature specs: -40°C to +80°C	TO-252 SOT223 SOT89 SOT89-5 SOT25 USP-6C	
XC6217 Series	Green Operation	6V max	0.8V~4.0V	~200mA	+/-2% (1%)	25µA (4.5µA)		80mV @ 100mA	Only 4.5µA quiescent current in power save mode	SOT25 SC-82 USP-4D	
XC6219 Series	Low Noise / High Speed		0.9V~5.0V	~300mA		25µA	60mV @ 30mA 200mV @ 100mA	Low Cost	USP-6B SOT25 SOT89-5		
XC6220 Series	High Current		0.8V~5.0V	1A		50µA (8.0µA)	20mV @ 100mA	Ultra Low Dropout	USP-6C SOT25 SOT89-5		
XC6221 Series	Low Noise / High Speed		0.8V~4.0V	~200mA		25µA	80mV @ 100mA	CL Auto Discharge	SOT25 SC-82 USP-4		
XC6501 Series	No CL Cap		6V max	1.2V ~ 5.0V		300mA	10µA		140mV @ 100mA	No CL Load Cap Required	USP-3 USP-4 SC-82 SOT25
XC6601 Series	Ultra Low Dropout	3V max	0.7V ~ 1.8V	400mA		25µA		38mV @ 100mA	Low voltage input operation down to 1V	USP-6C SOT25 SOT89-5	
XC6701 Series	High Voltage / High Speed	28V max	1.8V ~ 18V	~ 200mA	+/-2%	50µA		300mV @ 20mA	28V input high speed CMOS LDO PSRR: 50dB @ 1kHz	TO-252 SOT223 SOT89 SOT89-5 SOT25 USP-6C	
XC62E Series	Boosting	10V max	1.5V ~ 6.0V	> 1000mA		50µA	0.2µA	100mV @ 100mA < 400mV @ 1A	Ext. Transistor required	SOT25	

\*The XC6204 & XC6209 series is only available with a 1% output accuracy for voltages between 3.0V~6.0V

# Selection Guide

## Dual-Channel Positive Voltage Regulators

Part Number	Type	Input Voltage Range	Output Voltage	Max Output Current	Accuracy	Power Consumption		Dropout Voltage	Comments	Package
						Typical	Standby			
XC6401 Series	Dual Channel Low Noise / High Speed	6V max	0.8V~5.0V	>150mA/ch	+/-2%	25µA/ch	0.1µA	100mV @ 100mA	Low ESR Caps PSRR > 70dB Power Saving mode	USP-6B USP-6C SOT26W
XC6406 Series	Dual Current High Current	10V max	1.8V ~ 6.0V	>400mA/ch		20µA/ch	n/a	150mV @ 100mA 300mV @ 200mA		SOP8 SOP8FD
XC6411 Series	Dual Channel Low Noise / High Speed	6V max	0.9V~5.0V	~ 300mA/ch		0.8µA/ch	0.1µA	320mV @ 100mA	Dual LDO with dual input	SOT25
XC6412 Series	Dual Channel Low Noise / High Speed					Single input with EN pin on VR2			SOT26	
XC6415 Series	Dual Channel Low Noise / High Speed		0.8V ~ 5.0V	~ 200mA/ch		28µA/ch		90mV @ 100mA	Low ESR Caps PSRR 65db CL Auto Discharge	USP-6C SOT26
<b>NEW!</b> XC6416 Series	Dual Channel Green Operation		0.8V ~ 4.0V	~ 200mA/ch		28µA/ch (5µA/ch)		95mV @ 100mA	Only 5µA/ch quiescent current in power save mode	USP-6C SOT26
<b>NEW!</b> XC6419 Series	Dual Channel Low Noise / High Speed		0.8V ~ 5.0V	300mA ch1 100mA ch2		30µA/ch1 25µA/ch2		120mV @ 200mA ch1 120mV @ 50mA ch2	CL Auto Discharge	USP-6C SOT26
<b>NEW!</b> XCM406 Series	Dual Channel, High Current		0.8V ~ 5.0V	> 700mA/ch		25µA/ch		50mV @ 100mA	XC6210 x 2 Multi Chip Module	USP-12B01

## Hide Side Switch

Part Number	Type	Input Voltage Range	ON Resistance	Max Output Current	Accuracy	Power Consumption		ON/OFF Function	Comments	Package
						Typical	Standby			
XC8101 Series	High Side Line Switch	1.8V ~ 6V	0.75Ω (VIN=2.9V)	200mA	+/-2%	3µA	0.1µA	High Active	Output Discharge Function	USP-4 SC-82 SOT25
<b>NEW!</b> XC8102 Series	High Side Line Switch	1.2V ~ 6V	0.45Ω (VIN=2.9V)	400mA	+/-2%	3µA	0.1µA	High Active	Output Discharge Function	USP-4 SC-82 SOT25

## Battery Charger IC

Part Number	Type	Input Voltage Range	Charge Current	Trickle Charge Voltage	Accuracy	Charge Termination Voltage	Standby Current	Comments	Package
<b>NEW!</b> XC6802 Series	Lithium Ion Battery Charger	4.25V ~ 6V	800mA	2.9V	+/-3%	4.2V +/-0.7% (0.0294V)	15µA		USP-6C SOT25 SOT89-5

# Selection Guide

## DC/DC Converters & Controllers

### Step-up DC/DC Converters

Part Number	Type	Efficiency	Operating Voltage Range	Output Voltage Range	High Accuracy	Max. Oscillator Frequency	Comments	Package
XC6371 Series	PWM	Typ. 85%	0.9V ~ 10V	2.0V ~ 7.0V	+/-2.5%	50kHz, 100kHz & 180kHz (+/-15%)	Low Cost	SOT89 & SOT89-5
XC6372 Series	PFM / PWM					30kHz	Low Noise	
XC6373 Series	PWM	Typ. 82%						
XC9110 Series	PFM	87%	0.9V ~ 10V	1.5V ~ 7.0V	+/-2.5%	100kHz (+/-15%)	Fixed Duty Ratio	SOT25 USP-6C
XC9111 Series							Switchable Duty Ratio	
XC9116 Series	PWM	88%	2.5V ~ 6.0V	17.5V max	+/-5%	1MHz	Backlight LED Driver	SOT25 USP-6B
XC9119 Series	PWM	> 80%	2.5V ~ 6.0V	18.0V max	+/-2%	1MHz	High Switching Frequency	SOT25 USP-6C
<b>NEW!</b> XC9128 Series	Synchronous PWM PFM/PWM	93%	0.8V ~ 6.0V	1.8V ~ 5.3V	+/-2.2%	1.2MHz (+/-15%)	Thermal Shutdown, Over Current Limit, 5ms Soft-Start Time	MSOP-10 USP-10B
XC9129 Series								SOP-8

### Step-up DC/DC Controllers

Part Number	Type	Efficiency	Operating Voltage Range	Output Voltage Range	High Accuracy	Max. Oscillator Frequency	Comments	Package
XC6367 Series	PWM	Typ. 84%	0.9V ~ 10V	1.5V ~ 30V (fixed or adjustable)	+/-2.5%	100kHz, 180kHz, 300kHz, 500kHz	Output > 500mA Standby Current 0.5µA Max	SOT25
XC6368 Series	PFM/PWM			1.5V ~ 30V (fixed or adjustable)		100kHz ~ 600kHz (user selectable)	Outputs upto 1.5A Low ESR ceramic caps	MSOP-8A
XC9101 Series	PWM	Typ. 85%	2.5V ~ 20V	1.5V ~ 30V (fixed or adjustable)	+/-2.5%	100kHz, 180kHz, 300kHz, 500kHz	Auto PFM / PWM Manual Switching Mode	SOT25 USP-6B
XC9103 Series	PWM	Typ. 85%	0.9V ~ 10V	1.5V ~ 30V (externally adjustable)	+/-2.5%	100kHz, 300kHz, 500kHz	V-Ref input, adj. Vout LCD application	SOT25 USP-6C
XC9104 Series	PFM / PWM							
XC9105 Series	PFM / PWM							
XC9106 Series	PWM							
XC9107 Series	PFM / PWM					100kHz, 300kHz,		
XC9120 Series	PWM	Typ. 85%	0.9V ~ 6.0V	1.5V ~ 30V (externally adjustable)	+/-2%	100kHz	Max Duty 93%	SOT25 USP-6C
XC9121 Series	PFM / PWM						Auto PFM/PWM	
XC9122 Series	PFM / PWM						Manual Switching Mode	

### Step-down DC/DC Converters

Part Number	Type	Efficiency	Operating Voltage Range	Output Voltage Range	High Accuracy	Max. Oscillator Frequency	Comments	Package
XC9215 Series	Synchronous PWM	Typ. 92%	2.0V ~ 6.0V	0.9V ~ 4.0V	+/-2%	600kHz or 1.2MHz	Outputs upto 500mA Low ESR ceramic caps	USP-6B SOT25
XC9216 Series	Synchronous PFM / PWM							
XC9217 Series	Synchronous PWM or PFM / PWM							
XC9223 Series	Synchronous PWM or PFM / PWM	Typ. 92%	2.2V ~ 6.0V	0.8V ~ VIN	+/-2%	1MHz, 2MHz	Outputs upto 1A Voltage Detector Option Low ESR ceramic caps	MSOP-10 USP-10B SOP-8
XC9224 Series								
XC9225 Series	Synchronous PWM	Typ. 92%	2.0V ~ 6.0V	0.9V ~ 4.0V	+/-2%	600kHz, 1.2MHz	Only 15µA Quiescent Current, Outputs up to 500mA	USP-6B SOT25
XC9226 Series	Synchronous PFM / PWM							
XC9227 Series	Synchronous PWM or PFM / PWM							
XC9228 Series	Synchronous PWM or PFM / PWM	Typ. 92%	2.0V ~ 6.0V	0.7V ~ 6.0V Vref	+/-2%	600kHz, 1.2MHz	Dynamic Output Voltage Outputs up to 500mA	USP-6B SOT25
XC9229 Series								
XC9235 Series	Synchronous PWM	Typ. 92%	1.8V ~ 6.0V	0.8V ~ 4.0V	+/-2%	1.2MHz, 3.0MHz	Outputs up to 600mA, Soft-Start Circuit Built-In	USP-6C SOT25
XC9236 Series	Synchronous PFM/PWM							
XC9237 Series	Synchronous PWM or PFM / PWM							
<b>NEW!</b> XC9515 Series	Synchronous Dual Channel	Typ. 95%	5.0V (+/-10%)	Vout1: 1.2, 1.5, 1.8V Vout2: 3.3V	+/-2%	1MHz	800mA / Channel Voltage Detector Built-In	QFN-20
<b>NEW!</b> XCM517 Series	Synchronous Dual Channel	Typ. 92%	2.7V ~ 6.0V	0.8V ~ 2.5V	+/-2%	1.2MHz, 3.0MHz	600mA / Channel Multi Chip Module	USP-12B01

The XC9225/26/27 series is also available with a 600mA output current option for output voltages between 3.0V ~ 4.0V (VIN range = 4.5V ~ 5.5V)

The XC9235/36/37 series is also now available with a shorter soft-start time option, an auto CL discharge function option & an externally set VOUT option

# Selection Guide

## Step-down DC/DC Controllers

	Type	Efficiency	Operating Voltage Range	Output Voltage Range	High Accuracy	Max. Oscillator Frequency	Comments	Package
XC6365 Series	PWM	Typ. 92%	2.2V ~ 10V	1.5V ~ 6.0V (fixed or adjustable)	+/-2%	180kHz, 300kHz, 500kHz	Output Current > 1A Standby Current 0.5µA Max	SOT25
XC6366 Series	PFM / PWM							
XC9201 Series	PWM	Typ. 93%	2.5V ~ 20V	1.2V ~ 16V (fixed or adjustable)	+/-2.5%	100kHz ~ 600kHz (user selectable)	Outputs upto 3A Low ESR ceramic caps	MSOP-8A
XC9210 Series	Synchronous PFM/PWM	Typ. 90%	2.0V ~ 10V	0.9V ~ 6.0V	+/-2%	300kHz (+/-15%)	Outputs > 2A CE pin & internal soft-start	MSOP-8A
XC9213 Series	Synchronous PFM/PWM	Typ. 93%	4V ~ 25V	1.5V ~ 15V	+/-2%	300kHz (+/-15%)	Outputs > 5A Boot strap method	TSSOP-16
XC9220 Series	PWM	Typ. 93%	2.8V ~ 16V	1.2V~	+/-1.5%	300kHz, 500kHz, 1MHz	Outputs up to 3A Low ESR ceramic caps	SOT25 USP-6C
XC9221 Series	PFM/PWM							

## Step-up & down DC/DC Controllers

Part Number	Type	Efficiency	Operating Voltage Range	Output Voltage Range	High Accuracy	Max. Oscillator Frequency	Comments	Package
XC9301 Series	PWM	Typ. 80%	2.0V ~ 10V	2.4V ~ 6.0V	+/-2.5%	180kHz, 300kHz (+/-15%)	Outputs > 250mA CE pin & internal soft-start	SOT25
XC9302 Series	PFM/PWM							
XC9303 Series	Synchronous PFM/PWM	Typ. 84%	2.0V ~ 10V	2.0V ~ 6.0V	+/-2%	300kHz (+/-15%)	Outputs > 800mA CE pin & internal softstart	MSOP-8A

## Dual Channel DC/DC Controllers

Part Number	Type	Efficiency	Operating Voltage Range	Output Voltage Range	High Accuracy	Max. Oscillator Frequency	Comments	Package
XC9501 Series	Dual Step-up	Typ. 83%	0.9V ~ 10V	1.5V ~ 30V	+/-2%	180kHz (+/-15%) 100kHz, 300kHz, 500kHz (custom)	Switching Mode Pin: PWM or PFM/PWM Low ESR Ceramic Caps 3.0µA in Standby	MSOP-10 USP-10
XC9502 Series	Step-up + Step-down	Typ. 83% Typ. 92%	2.0V ~ 10V	1.5V ~ 30V 0.9V ~ 6.0V		180kHz (+/-15%) 300kHz, 500kHz (custom)		
XC9503 Series	Dual Step-down	Typ. 92%		0.9V ~ 6.0V		300kHz (+/-15%) 180kHz, 500kHz (custom)		
XC9504 Series	Step-up + Inverting	Typ. 83% Typ. 76%		1.5V ~ 30V 30V ~ 0.0V		180kHz (+/-15%) 300kHz, 500kHz (custom)		
XC9505 Series	Step-down + Inverting	Typ. 92% Typ. 76%		0.9V ~ 6.0V -30V ~ 0.0V				

## Multi Power Supplies

Part Number	Type	Efficiency	Operating Voltage Range	Output Voltage/ Detect Range	High Accuracy	Max. Oscillator Frequency	Comments	Package
XC9508 Series	Step-down DC/DC + VR + VD	Typ. 94%	2.4V ~ 6.0V	DC/DC: 1.6V~4.0V VR: 0.9V~4.0V VD: 0.9V~5.0V	+/-2%	300kHz, 600kHz, 1.2MHz	DC/DC Iout > 600mA VR Iout > 300mA	MSOP-10 USP-10
XC9509 Series				DC/DC: 0.9V~4.0V VR: 0.9V~4.0V VD: 0.9V~5.0V				
XC9510 Series				DC/DC: 1.6V~4.0V VR: 0.9V~4.0V VD: 0.9V~5.0V			DC/DC Iout > 800mA VR Iout > 400mA	
XC9511 Series				DC/DC: 0.9V~4.0V VR: 0.9V~4.0V VD: 0.9V~5.0V				
<b>NEW</b> XC519 Series	Step-down DC/DC + VR Multi Chip Module	Typ. 92%	2.5V ~ 6.0V	DC/DC: 0.8V ~ 2.5V VR: 0.7V ~ 1.8V	+/-2%	1.2MHz, 3MHz	DC/DC Iout 600mA VR Iout > 400mA	USP-12B01

# Selection Guide

## Charge Pump Converters

Part Number	Type	Efficiency	Operating Voltage Range	Output Voltage Range	No Load Current	Max. Oscillator Frequency	Comments	Package
XC6351A120MR	Inverting	Typ. 90%	1.2V ~ 5.0V	-1.2V to - 5.0V	310µA typ.	120kHz	Standby current 2.0µA	SOT26
XC9801/02 Series	Doubler / Regulated Step-up	Typ. 80%	1.8V ~ 5.5V	2.5V ~ 5.2V	80µA	300kHz	Standby current 2.0µA	USP-8 MSOP-8

## Schottky Barrier Diodes

Part Number	IF	VR	VF1	VF2	IR	Package
XBS013S15R	0.1A	30V	0.31V @ 1mA	0.71V @ 100mA	2µA @ VR = 25V	SOD-523
XBS013S16R	0.1A	30V	0.31V @ 1mA	0.71V @ 100mA	2µA @ VR = 25V	SOD-723
XBS024S15R	0.2A	40V	0.33V @ 10mA	0.53 @ 200mA	2µA @ VR = 40V	SOD-523
XBS053V13R	0.5A	30V	0.28V @ 100mA	0.40V @ 500mA	100µA @ VR = 20V	SOD-323A
XBS053V15R	0.5A	30V	0.28V @ 100mA	0.40V @ 500mA	100µA @ VR = 20V	SOD-523
XBS104S13R	1A	40V	0.34V @ 100mA	0.49V @ 1A	200µA @ VR = 40V	SOD-323A
XBS104S14R	1A	40V	0.34V @ 100mA	0.49V @ 1A	200µA @ VR = 40V	SOD-123A
XBS104V13R	1A	40V	0.23V @ 100mA	0.30V @ 500mA	250µA @ VR = 40V	SOD-123A
XBS203V17R	2A	30V	0.28V @ 500mA	0.305V @ 1A	350µA @ VR = 30V	SMA
XBS204S17R	2A	40V	0.15V @ 200µA	0.485V @ 2A	6µA @ VR = 40V	SMA
XBS206S17R	2A	60V	0.15V @ 200µA	0.615V @ 2A	10µA @ VR = 60V	SMA
XBS303V17R	3A	30V	0.265V @ 500mA	0.295V @ 1A	350µA @ VR = 30V	SMA
XBS304S17R	3A	40V	0.135V @ 200µA	0.465V @ 3A	15µA @ VR = 40V	SMA
XBS306S17R	3A	60V	0.145V @ 200µA	0.59V @ 3A	9µA @ VR = 60V	SMA

# Selection Guide

## Power MOSFETs

### N-Channel

Type Number	Absolute Max. Rating			Electrical Characteristic										Driving Voltage (V)	Package	
	Vdss (V)	Vgss (V)	Id (A)	Rds(ON) (Ω)								Vgs (off) (V)				Ciss (pF)
				Vgs = 1.5V		Vgs = 2.5V		Vgs = 4.5V		Vgs = 10V		MIN	MAX			
				TYP	MAX	TYP	MAX	TYP	MAX	TYP	MAX					
XP131A1145SR	30	±20	7	-	-	-	-	0.035	0.045	0.025	0.03	1.0	2.5	620	4.5	SOP-8 (Single)
XP131A1235SR	20	±12	7	-	-	0.035	0.048	0.025	0.035	-	-	0.5	1.2	760	2.5	
XP131A1330SR	20	±8	8	0.045	0.07	0.03	0.04	0.025	0.03	-	-	0.5	1.2	950	1.5	
XP131A1520SR	30	±20	10	-	-	-	-	0.016	0.02	0.012	0.015	1.0	2.5	1370	4.5	
XP131A1617SR	20	±12	10	-	-	0.013	0.019	0.01	0.014	-	-	0.7	1.4	1650	2.5	
XP131A1715SR	20	±8	10	0.017	0.025	0.011	0.015	0.009	0.012	-	-	0.5	1.2	2000	1.5	SOP-8 (Dual)
XP133A1145SR	30	±20	6	-	-	-	-	0.035	0.045	0.026	0.033	1.0	2.5	620	4.5	
XP133A1235SR	20	±12	6	-	-	0.035	0.048	0.026	0.035	-	-	0.5	1.2	760	2.5	
XP133A1330SR	20	±8	6	0.045	0.07	0.03	0.04	0.025	0.03	-	-	0.5	1.2	950	1.5	SOT-23 (Single)
XP151A11B0MR	30	±20	1	-	-	-	-	0.13	0.17	0.09	0.12	1.0	3.0	150	4.5	
XP151A12A2MR	20	±12	1	-	-	0.12	0.16	0.075	0.10	-	-	0.7	1.4	180	2.5	
XP151A13A0MR	20	±8	1	0.17	0.25	0.10	0.14	0.075	0.10	-	-	0.5	1.2	220	1.5	SOT-89 (Single)
XP161A11A1PR	30	±20	4	-	-	-	-	0.075	0.105	0.05	0.065	1.0	2.5	270	4.5	
XP161A1265PR	20	±12	4	-	-	0.07	0.095	0.042	0.055	-	-	0.7	1.4	320	2.5	
XP161A1355PR	20	±8	4	0.10	0.15	0.05	0.07	0.037	0.05	-	-	0.5	1.2	390	1.5	

### P-Channel

Type Number	Absolute Max. Rating			Electrical Characteristic										Driving Voltage (V)	Package	
	Vdss (V)	Vgss (V)	Id (A)	Rds(ON) (Ω)								Vgs (off) (V)				Ciss (pF)
				Vgs = -2.5V		Vgs = -4.5V		Vgs = -5.0V		Vgs = -10V		MIN	MAX			
				TYP	MAX	TYP	MAX	TYP	MAX	TYP	MAX					
XP132A11A1SR	-30	±20	-5	-	-	0.095	0.11	-	-	0.055	0.065	-1.0	-2.5	680	-4.5	SOP-8 (Single)
XP132A1275SR	-20	±12	-5	0.092	0.115	0.05	0.075	-	-	-	-	-0.5	-1.2	770	-2.5	
XP132A1545SR	-30	±20	-8	-	-	0.038	0.045	-	-	0.025	0.03	-1.0	-2.5	1500	-4.5	
XP132A1635SR	-20	±12	-8	0.04	0.055	0.025	0.033	-	-	-	-	-0.5	-1.2	1700	-2.5	SOP-8 (Dual)
XP134A11A1SR	-30	±20	-4	-	-	0.09	0.11	-	-	0.055	0.065	-1.0	-2.5	680	-4.5	
XP134A1275SR	-20	±12	-4.5	0.095	0.115	0.062	0.075	-	-	-	-	-0.5	-1.2	770	-2.5	
XP152A11E5MR	-30	±20	-0.7	-	-	0.35	0.45	-	-	0.2	0.25	-1.0	-3.0	160	-4.5	SOT-23 (Single)
XP152A12C0MR	-20	±12	-0.7	0.37	0.5	0.23	0.3	-	-	-	-	-0.5	-1.2	180	-2.5	SOT-89 (Single)
XP162A11C0PR	-30	±20	-2.5	-	-	0.2	0.28	-	-	0.11	0.15	-1.0	-2.5	280	-4.5	
XP162A12A6PR	-20	±12	-2.5	0.22	0.3	0.13	0.17	-	-	-	-	-0.5	-1.2	310	-2.5	

\*1) : @ Vgs = -5.5V

### N-Channel & P-Channel (Complementary)

Type Number	Absolute Max. Rating			Electrical Characteristic										Driving Voltage (V)	Package	
	Vdss (V)	Vgss (V)	Id (A)	Rds(ON) (Ω)								Vgs (off) (V)				Ciss (pF)
				Vgs = ±1.5V		Vgs = ±2.5V		Vgs = ±4.5V		Vgs = ±10V		MIN	MAX			
				TYP	MAX	TYP	MAX	TYP	MAX	TYP	MAX					
XP135A1145SR	30	±20	5	-	-	-	-	-	0.045	-	0.03	1	2.5	520	4.5	
	-30	±20	-3.5	-	-	-	-	-	0.11	-	0.065	-1	-2.5	600	-4.5	

# Selection Guide

## CMOS Mini-Logics

Part Number	Type	Operating Voltage Range	Input Voltage Range	Speed (tpd)	Power Consumption	Package
XC74UL Series	Single Logic Gate	2.0V ~ 5.5V	0.0V ~ 5.5V	4~8ns typ.	1.0µA Max	SSOT25
XC74WL Series	Dual / Triple Logic Gate	2.0V ~ 5.5V	0.0V ~ 5.5V	3~8.7ns typ.	1~2µA Max	MSOP-8

## Operational Amplifiers

Part Number	Description	Gain Margin	Slew Rate	Power Consumption	Operating Voltage	Package
XC221A1100MR	Rail to Rail CMOS Op Amp	210kHz	0.07V/µS	15µA typ.	1.2V ~ 10V (single cell) +/-0.6V ~ 5V (+ve/-ve supply)	SOT25
XC221A1200MR	Rail to Rail CMOS Op Amp	550kHz	0.5V/µS	100µA typ.	1.2V ~ 10V (single cell) +/-0.6V ~ 5V (+ve/-ve supply)	SOT25

## Analog Temperature Sensor

Part Number	Type	Temp. Range	Input Voltage Range	Output Voltage Range	Accuracy	Power Consumption		Output Voltage Temp. Coefficient	Package
						Typical	Standby		
XC31B Series	Bandgap Sensor	-30°C to +80°C	3.0V ~ 10V	2.0V ~ 6.0V	+/-3%	7µA	0.1µA	-3900ppm/°C typ.	SOT25

## Oscillator IC's and PLL Clock Generator ICs

Part Number	Description	Oscillator Freq.	Op. Volt.	Divider Ratio	Multiplier Ratio	Output	Comments	Package
XC2163 Series	Divider / Buffer	20MHz ~ 125MHz	3.3V / 5.0V	f0/1, f0/2, f0/4, f0/8	n/a	3 state	3rd Overtone	SOT26
XC2164 Series	Divider / Buffer	4MHz ~ 125MHz	3.3V / 5.0V	f0/1, f0/2, f0/4, f0/8	n/a	3 state	Fundamental 3rd Overtone	SOT26 DIE
XC2165 Series	Divider / Buffer	8MHz ~ 120MHz	1.5V ~ 3.6V	f0/1, f0/2, f0/4, f0/8	n/a	3 state	Fundamental	SOT26 DIE
XC2173 Series	PLL	10MHz ~ 25MHz	3.3V / 5.0V	f0/2, f0/4, f0/8	f0 x 5,6,7,8	3 state	50~160MHz Output	SOT26
XC2300 Series	Tri-State Buffer	70MHz (max)	3.3V / 5.0V	f0/1	n/a	3 state		SOT26
XC2301 Series	Tri-State Buffer	160MHz (max)	3.3V	f0/1, f0/2, f0/4, f0/8	n/a	3 state		SOT26
XC2311 Series	VCXO with built-in variable capacitor diode	16MHz~50MHz	2.6V~3.6V	n/a	n/a	n/a		SOT26 USP-6C SOP-8
XC25BS3 Series	PLL	14kHz ~ 35MHz	2.97V~5.5V	1~2047	20~2047	3 state	9MHz ~ 80MHz Output	SOT26 USP-6B
XC25BS5 Series	PLL	12KHz ~ 35MHz	2.97V~5.5V	1~2047	6~2047	3 state	3MHz ~ 30MHz Output	SOT26 USP-6B
XC25BS6 Series	Divider	2MHz ~ 36MHz	2.3V~4.0V	f0/1024, f0/512, f0/256, f0/128	n/a	3 state	CE Pin	SOT26
XC25BS7 Series	PLL	32kHz ~ 36MHz	2.5 ~ 5.5V	1 ~ 256	1 ~ 256	n/a	1MHz ~ 100MHz Output	SOT25 USP-6C
<b>NEW!</b> XC25BS8 Series	PLL	8kHz ~ 36MHz	2.5 ~ 5.5V	1 ~ 4095	1 ~ 2047	n/a	1MHz ~ 100MHz Output	SOT26W USP-6C

With the XC25BS3 & XC25BS5, the second output (Q1) is selectable from reference oscillation, PLL output freq/2, comparative freq/2 or GND

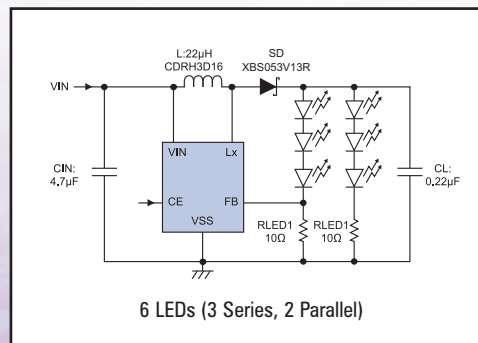
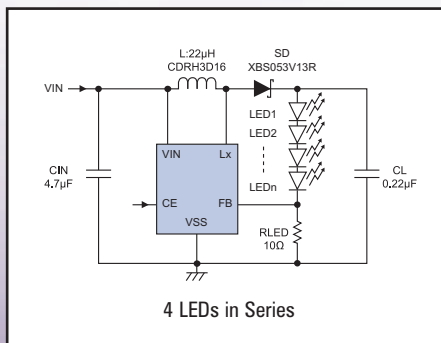
COMING SOON

## White LED Driver Solutions

### XC9133 White LED Driver Step-Up DC/DC Converter

The **XC9133 Series** is a step-up DC/DC converter for driving white LEDs.

Available in SOT25 and USP-6C packages.



#### Key Features

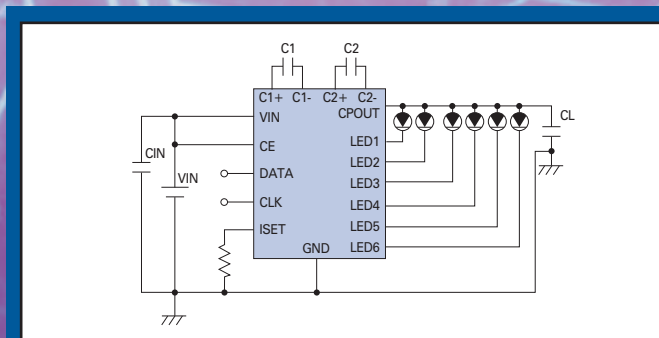
- Input Voltage Range: 2.5V ~ 6.0V
- Output Voltage: ~17.5V
- Switching Frequency: 1MHz
- LED Brightness Control via PWM Signal

### XC9803 Charge Pump for White LEDs

The **XC9803 Series** is a new 6 channel driver charge pump IC for white LED backlight applications. Available in a tiny QFN-20 package for driving up to 6 LEDs with a regulated constant current.

#### Key Features

- Input Voltage Range: 2.7V ~ 5.5V
- Switching Frequency: 1MHz
- LED Brightness Control via I2C Interface
- Output Current: 140mA LED Constant Current



Typical Application Circuit

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