TOREX

...Powerfully Small!

Issue **3XTRA**

INCLUDES **6 PAGE** SELECTION GUIDE

World's Smallest 1A Micro DC/DC



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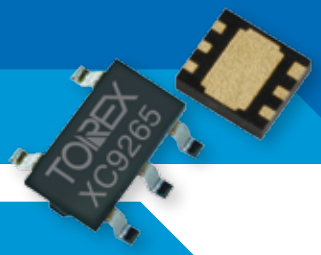
XCL201/02
400mA Step-Down Micro DC/DC with Integrated Coil

XC9266
5.5V 6.0A Hi-SAT Step-Down DC/DC Converter

XCL213/14
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0.9V 800mA SW Step-Up DC/DC Converter

XC9265 Ultra Low Power Step-Down DC/DC Converter



The new XC9265 series consumes only 0.5μA during operation making it ideal for applications that run from batteries for long periods of time. This ultra low quiescent current is achieved by implementing a synchronous PFM architecture to minimize the switching losses during low loads.

Developed using Torex's proprietary CMOS process, the XC9265 integrates a 0.5Ω P-ch driver transistor and a 0.5Ω synchronous N-ch switching transistor to ensure high levels of efficiency and superior performance for demanding **battery powered applications.**

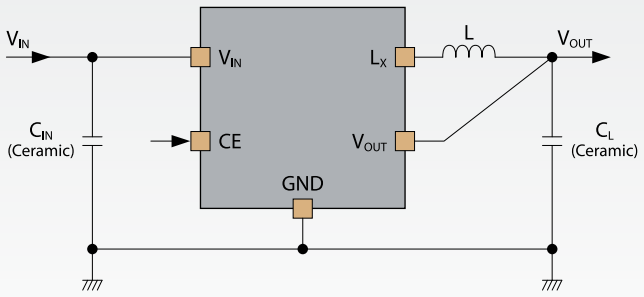
Only an inductor and two ceramic capacitors are needed externally and the XC9265 is able to operate from 6.0V down to inputs as low as 2.0V to help further maximise battery life in portable applications.

The output voltage is set internally between 1.0V to 4.0V (±2%) in 0.1V increments. The XC9265 series also features an enable pin to turn the IC on and off and an optional CL discharge function that can quickly discharge the output capacitor when the IC is turned off. During stand-by, all circuits are shutdown to reduce consumption to less than 0.1μA.

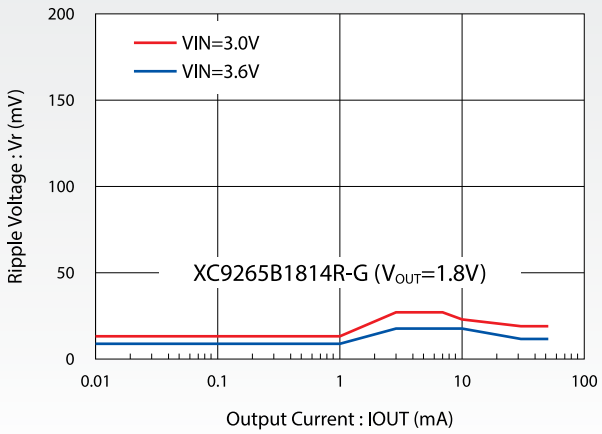
KEY FEATURES

SERIES		XC9265A/C	XC9265B/D
Quiescent Current		0.5μA	
Output Current		200mA	50mA
PFM Switching Current		330mA	180mA
ON Resistance	P-Ch	0.5Ω (typ)	
	N-Ch	0.5Ω (typ)	
Input Voltage Range		2.0V ~ 6.0V	
Output Voltage Range		1.0V ~ 4.0V (0.1V increments)	
Control Method		PFM Only	
Protection Circuits		Current Limit Circuit	
		Short Circuit Protection	
		UVLO	
Additional Features		Optional CL Auto Discharge Low ESR Ceramic Capacitors	
Packages		SOT-25, USP-6EL	

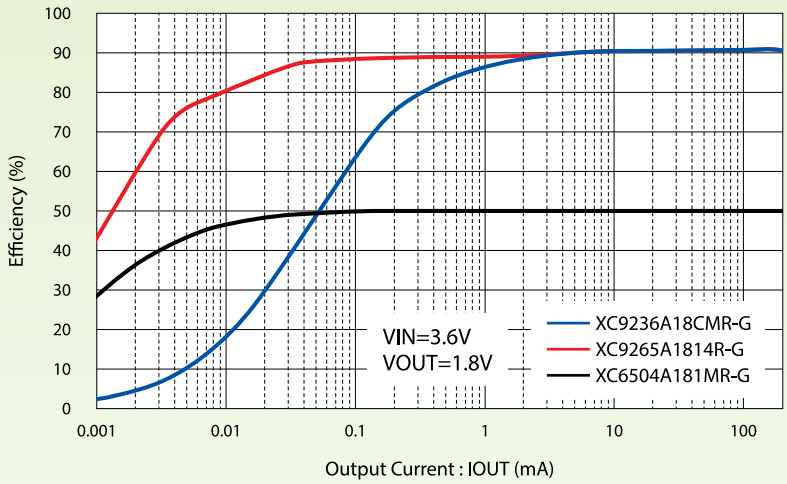
TYPICAL APPLICATION CIRCUIT



OUTPUT RIPPLE VS. OUTPUT CURRENT



MAXIMISE BATTERY LIFE

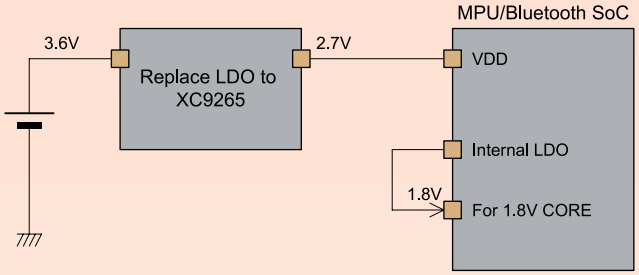


Compared to a traditional DC/DC the XC9265 delivers much higher efficiencies at low loads, allowing designers to significantly extend the battery life for applications that spend long periods in standby or idle mode.

When compared to a low quiescent current Voltage Regulator the benefits are even more evident and this will be especially useful for applications like Water and Gas Meters where long battery life has to be guaranteed by the designer.

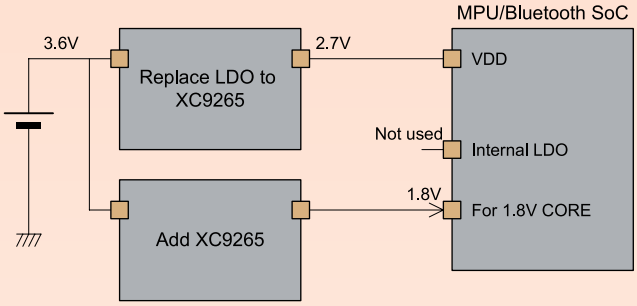
APPLICATION EXAMPLES TO IMPROVE BATTERY LIFE

Replace main LDO to XC9265



Efficiency of LDO for VDD 2.7V line is 2.7V / 3.6V = 75%. Using XC9265, this efficiency rises up to 90% and the efficiency of 1.8V core line goes up from 50% to 60%.

Additional XC9265 for Core



Additional XC9265 realizes up to 90% efficiency for 1.8V core line. Main power consumption of MPU is 1.8V core. So, this solution increases the battery life by 50% to 80%.

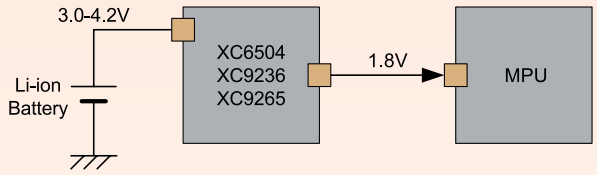
Li-ion Battery > MPU Input

Test Condition

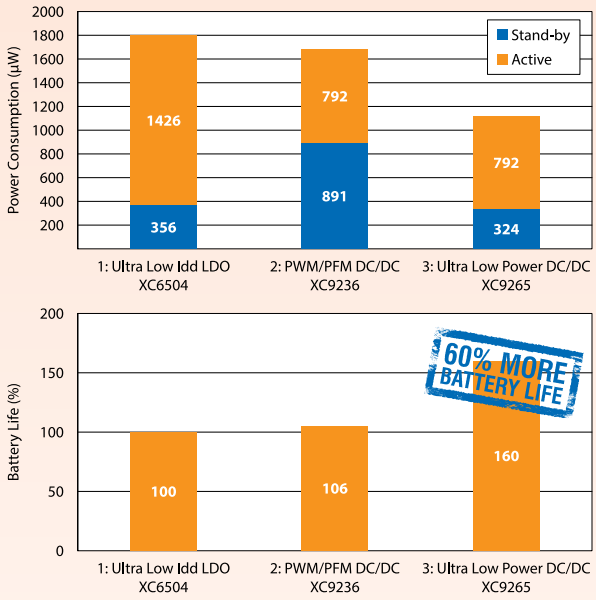
V_{IN}=3.0V~4.2V → V_{OUT} = 1.8V

Active: I_{OUT}=20mA@10ms ⇔ Stand-by: I_{OUT}=50uA@1s

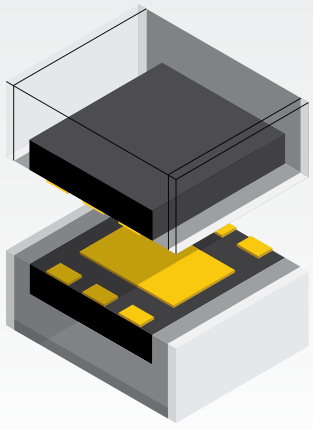
Measurement Circuit



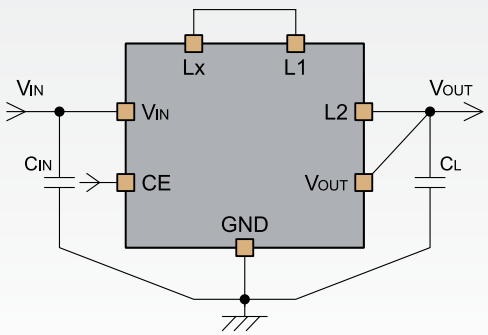
We tested three different parts in the same circuit above. A low quiescent current LDO, a standard PWM/PFM DC/DC and our new XC9265. The charts to the right show the results.



ALSO AVAILABLE WITH INTEGRATED COIL



XCL210 (XC9265 with 10μH Inductor)

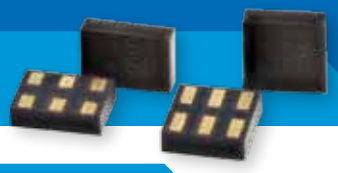


- Output Current: 50mA
- Quiescent Current: 0.5μA
- Ultra Low EMI (Radiated Noise)
- Small PCB Area

Ultra Small Size
2.5 x 2.0 x 1.0mm

PUSH BUTTON RESET CONTROLLER

XC6190 Push Button Reboot Controller



The XC6190 is an ultra low current, push-button reset timer. The XC6190 uses a long timing setup delay to provide the intended system reset, and avoid resets from short push-button closures or key presses. This reset configuration also allows for differentiation between software interrupts and hard system resets.

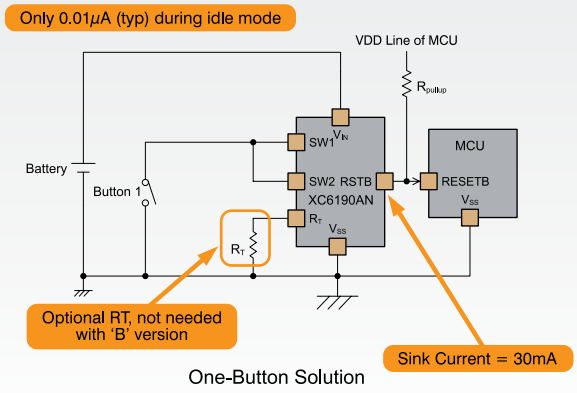
Two versions are available; with the XC6190A the reboot delay time (TDL) can be set as desired by changing the external resistance RT within the range 5s to 20s. The XC6190B has the TDL fixed internally with a choice of two settings. When the TS pin is set to "H" level, the delay time is 12.5s. When the TS pin is set to "L" level, the delay time is 7.5s.

Package	Dimension
USPN-6B01	1.45 x 1.0 x 0.4mm
USPN-6	1.30 x 1.3 x 0.4mm

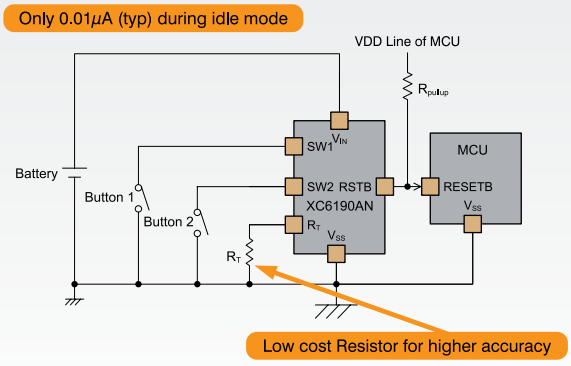
KEY FEATURES

SERIES	XC6190A	XC6190B
Input Voltage Range	1.65V ~ 6.0V	
Re-Boot Delay Time	Adjustable	Fixed
Low power Consumption	0.01uA (typ) / 0.1uA (max)	
RSTB Pin SINK Current (V_{RSTBL}=0.3V)	30mA	
Re-Boot Delay Time (T_{DL})	5s ~ 20s (set by Resistor)	7.5s (V_{TS}=L) 12.5s (V_{TS}=H)
Re-Boot Delay Time Accuracy	±5%	
Re-Boot Time (T_{RSTB})	0.4s±10%	
Output Configuration	Nch-Open Drain or CMOS	
Op. Ambient Temperature	-40°C ~ +85°C	
Packages	USPN-6, USPN-6B01	

TYPICAL APPLICATION CIRCUIT

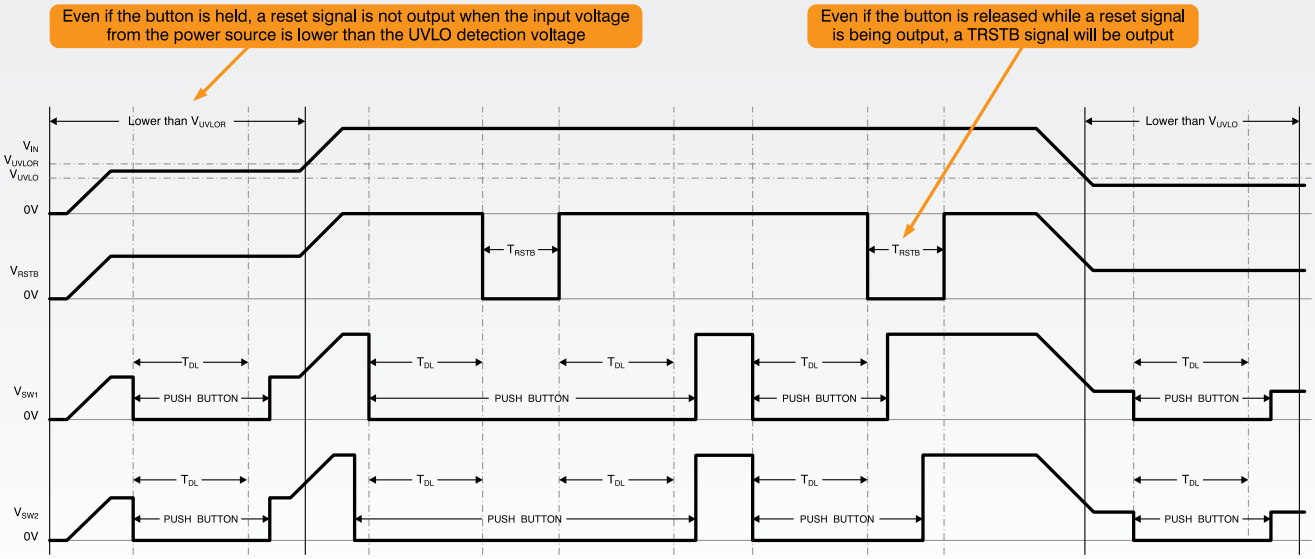


One-Button Solution



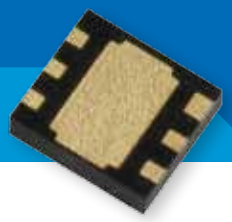
Two-Button Solution

TIMING CHART FOR XC6190



XC6803/04/05

Single Cell Li-Ion / Li-Polymer Charger IC



The XC6803/04/05 are Constant-Voltage (CV) and Constant-Current (CC) type charging IC for linear charging of single-cell Li-ion and Li-polymer batteries. The basic charging cycle consists of trickle charge mode followed by main charge mode.

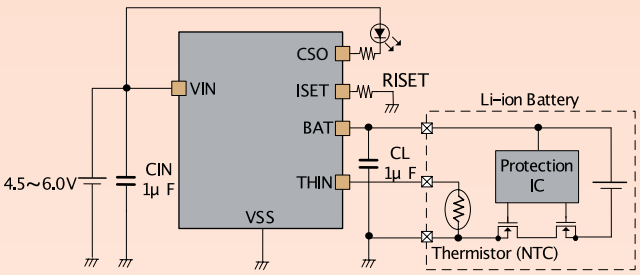
An LED can be connected to the charge status output pin to allow confirmation of charging by LED illumination. The IC is housed in the small USP-6EL package with high heat dissipation, and a charge circuit can be configured using a minimum of external components.

These IC also support **temperature control** based on JEITA, making it possible to safely charge Li-ion batteries by controlling the CV charge voltage and CC charge current according to the temperature.

KEY FEATURES

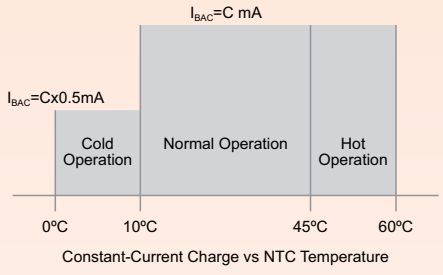
SERIES		XC6803	XC6804	XC6805
Input Voltage			4.5V ~ 6.0V	
Charge Current (Externally Set)		40mA ~ 280mA	200mA ~ 800mA	5mA ~ 40mA
Charge Termination Voltage			4.2V	
Trickle Charge Voltage			2.9V	
Supply Current (Stand-by)			50μA	
Charge Judgment Function				
Trickle Charge Mode		YES	YES	OPTIONAL
Recharge Function		OPTIONAL	OPTIONAL	YES
Battery Temperature Monitor		YES	YES	OPTIONAL
Protection Circuits				
Thermal Shutdown		YES	YES	YES
Dropout Voltage Monitoring		YES	YES	YES
Charging over-Voltage and over-Current monitoring		YES	YES	YES
Safety Timer Function	Main Charge	5hrs	10hrs	3hrs
	Trickle Charge	0.5hrs	2hrs	0.5hrs
Packages		USP-6EL	USP-6EL, SOP-8FD	USP-6EL

XC6803/04/05 TYPICAL APPLICATION CIRCUIT

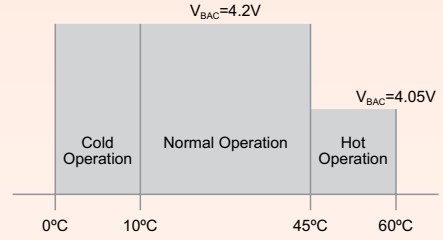


Li-ion battery temperature monitoring function

The IC monitors the Li-ion battery temperature during charging by means of an NTC Thermistor connected to the THIN pin. CC charging and CV charging are controlled based on the Li-ion battery temperature as shown below to enable safe charging.

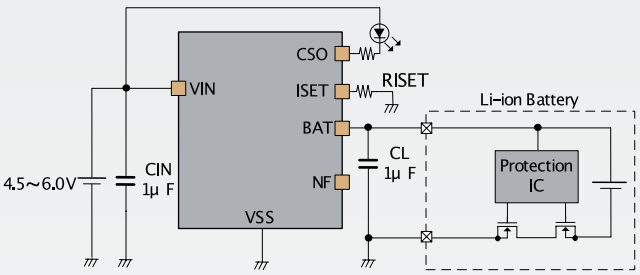


Constant-Current Charge vs NTC Temperature



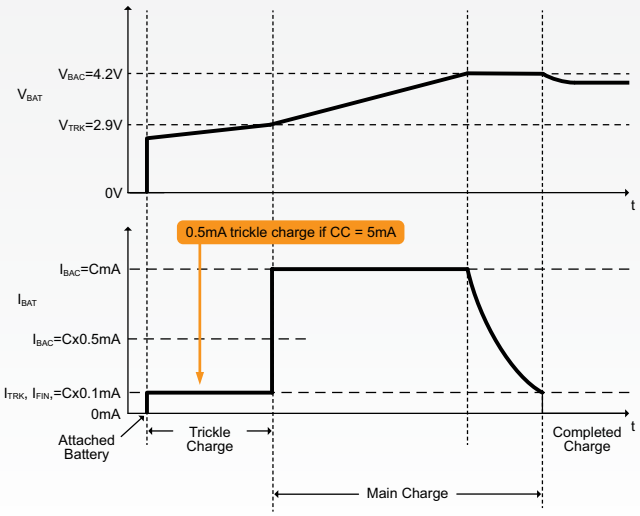
Constant-Current Charge vs NTC Temperature

XC6805xxB TYPICAL APPLICATION CIRCUIT

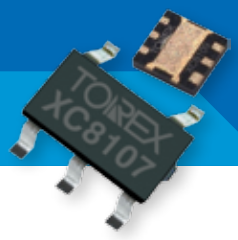


Optimised for Small Batteries

To fit very small batteries, the minimum value of trickle charge current and charge completion current is 0.5mA. This ensures safer charging and longer battery life for small mobile equipment.



XC810x Load Switch and Line Switch



Torex Power Switches can be used to control system power supply rails, by turning them on and off as required.

Sometimes known as Load Switches or Line Switches, they offer many other benefits to the system and can include protection features that are often difficult to implement with discrete components. There are many different applications where load switches can be used including, Power Distribution, Power Sequencing and Inrush Current Control. Torex Load Switches are also commonly used for USB and Hot Plug applications.

Package	Dimension
USP-6C	2.0 x 1.8 x 0.6mm
USP-4	1.2 x 1.6 x 0.6mm
USPN-4	0.9 x 1.2 x 0.4mm

KEY FEATURES

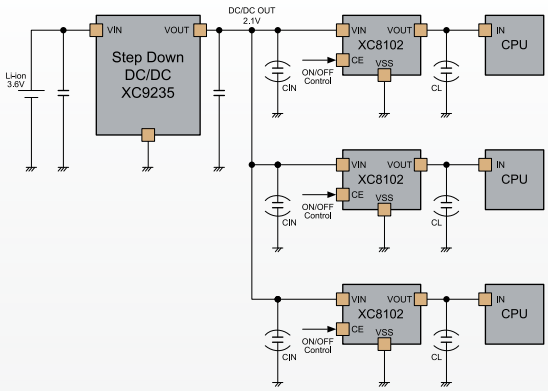
SERIES		XC8102	XC8107	XC8108	XC8109
Input Voltage		1.2V ~ 6.0V	2.5V ~ 5.5V		
Typical Current Limit		480mA	0.5A, 1A, 2A	0.9A ~ 2.4A	0.075A ~ 1.3A
Current Limit Value		Fixed	Fixed	Adjustable	
Current Limit Response			2μS (TYP)		
ON Resistance (@ VIN=5.0V)	TYP	35mΩ	85mΩ		
	MAX	47.5mΩ	100mΩ		
Supply Current		< 4.0μA	40μA		
Stand-by Current (MAX)		0.1μA	0.1μA		
Flag Delay Time (TYP.)		N/A	4ms, 7.5ms		
Protection Circuits		Auto-recovery	Auto-recovery or Latch Off		
Short-circuit Protection		YES	YES		
Reverse Current Prevention		NO	YES		
Thermal Shutdown		NO	YES		
Under Voltage Lockout		NO	YES		
Soft-start		NO	YES		
Flag Output Functions		NO	YES		
CE Pin Input Logic		Active High	Active High or Active Low		
CL High Speed Discharge		YES	YES		
Op. Ambient Temperature		-40°C ~ +85°C	-40°C ~ +105°C		
Packages		SOT25, SSOT24, USP-4, USPN-4	SOT25, USP-6C	USP-6C	

XC8102

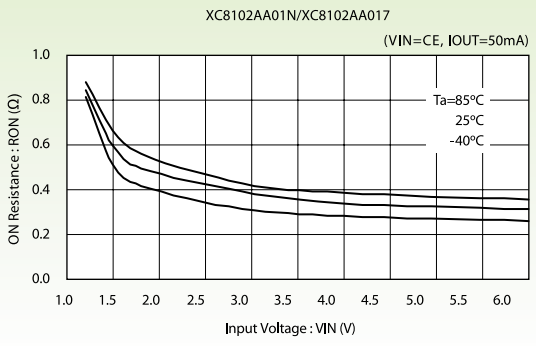


- Low Operating Voltage
- Low Quiescent Current
- Small Size

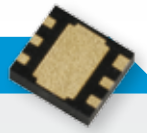
TYPICAL APPLICATION CIRCUIT



ON RESISTANCE VS. INPUT VOLTAGE

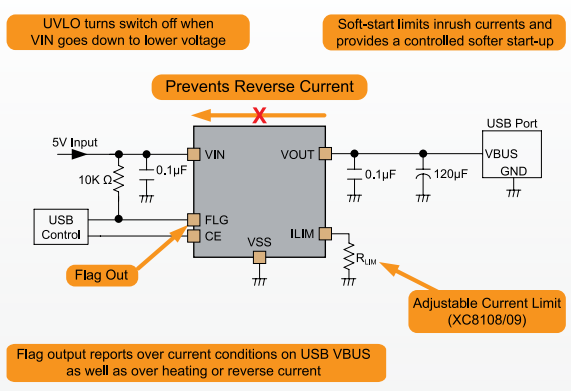


XC8108/09

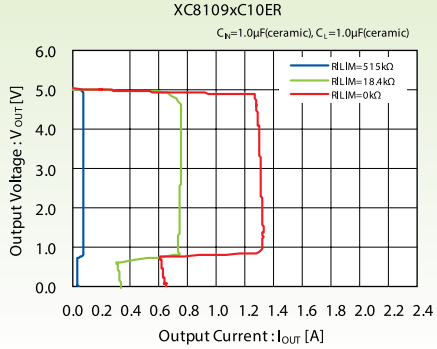


- Optimised for USB Host & Hot-Plug
- Auto Recovery or Latch Type
- Fast Response Time
- High Accuracy

TYPICAL APPLICATION CIRCUIT



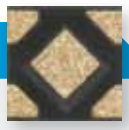
ON RESISTANCE VS. INPUT VOLTAGE



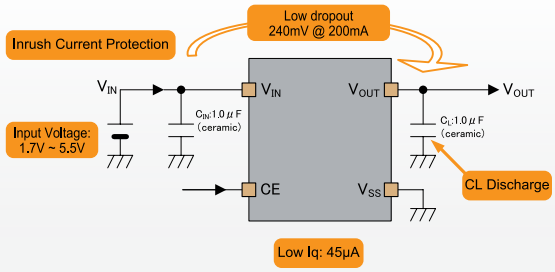
High Performance Linear Voltage Regulators

SERIES	XC6233	XC6223	XC6229	XC6504
Output Current	200mA	300mA	300mA	150mA
Dropout Voltage (V_{OUT}=3.0V)	240mV @ I_{OUT}=200mA	200mV @ I_{OUT}=300mA	160mV @ I_{OUT}=300mA	170mV @ I_{OUT}=50mA
Operating Voltage Range	1.7V ~ 5.5V	1.6V ~ 5.5V	1.6V ~ 5.5V	1.4V ~ 6.0V
Output Voltages	1.2V ~ 3.6V (0.05V steps)	1.2V ~ 4.0V (0.05V steps)	1.2V ~ 4.0V (0.05V steps)	1.1V ~ 5.0V (0.1V steps)
Output Accuracy	±1%	±1%	±1%	±1%
Quiescent Current (TYP)	45μA	100μA	100μA	0.6μA
Stand-by Current (TYP)	0.01μA	0.01μA	0.01μA	0.01μA
Ripple Rejection	75dB	80dB	80dB	–
Current Limit Threshold (TYP)	255mA	400mA	400mA	270mA
Short Circuit Protection (TYP)	60mA	50mA	50mA	80mA
In-Rush Current Protection	YES	YES	YES	–
Thermal Shutdown	–	YES	YES	–
Additional Features	CL Auto Discharge, Low ESR Ceramic capacitors			
SMALLEST PACKAGE SIZES				
1.0 x 1.0 x 0.6mm/0.4mm	USPQ-4B04	USPQ-4B03	–	USPQ-4B04
0.75 x 0.95 x 0.4mm	–	–	–	USPN-4B02
0.75 × 0.75 x 0.3mm	–	–	LGA-4B01	–

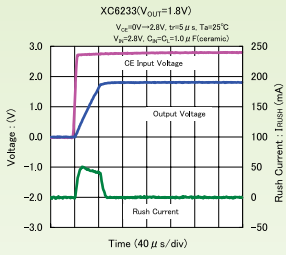
XC6233



TYPICAL APPLICATION CIRCUIT

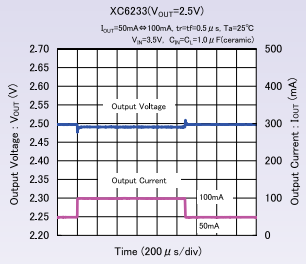


INRUSH CURRENT PROTECTION



The XC6233 has a built-in inrush current protection function which suppresses inrush current spikes at start-up.

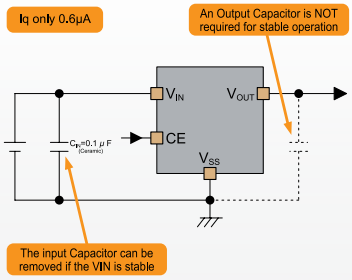
LOAD TRANSIENT RESPONSE



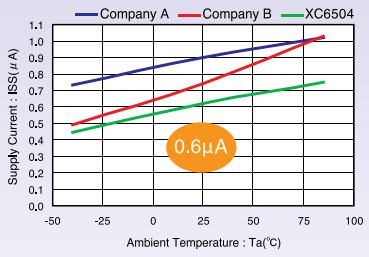
XC6504



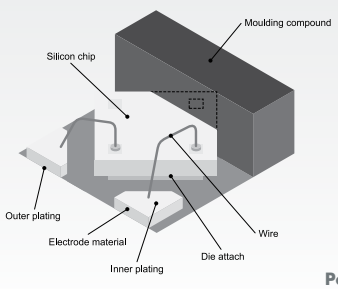
TYPICAL APPLICATION CIRCUIT

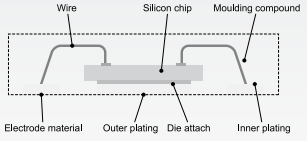


COMPARISON OF SUPPLY CURRENT CHARACTERISTICS



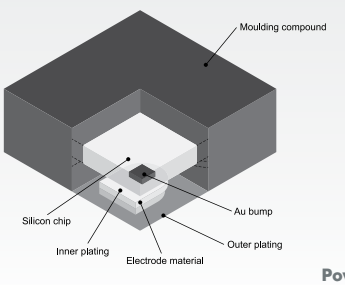
USBQ-4B0x (1.0 x 1.0 x 0.6mm)

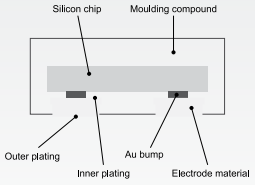




Power Dissipation (Pd) 550mW @ 25°C

LGA-4B01 (0.75 x 0.75 x 0.3mm)





Power Dissipation (Pd) 600mW @ 25°C

XCL219/220

The World's Smallest 1A Micro DC/DC with Integrated Coil



The XCL219/XCL220 is a family of 1A micro DC/DC Step-Down Converter with integrated coil. Measuring only 2.5mm x 2.0mm x 1.0mm, the XCL219/220 series is designed to minimize EMC emissions and maximize efficiency, while delivering a very stable output with low peak to peak ripple Voltage (<10mV).

Utilising Hi-SAT COT, Torex's Constant ON Time architecture gives the XCL219/220 extremely fast load transient response performance in comparison to standard DC/DC solutions. Hi-SAT COT also provides **less fluctuation in oscillation frequency against load and input voltage** when compared to traditional COT control architectures.

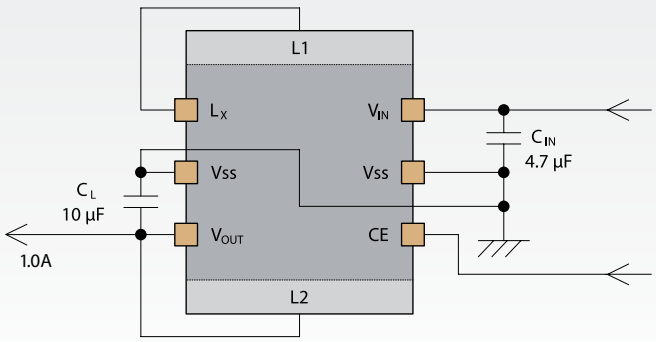
The small size and simple circuit architecture makes the XCL219/220 an ideal replacement for inefficient LDO voltage regulators and by integrating the coil, Torex has simplified the circuit layout for the designer and reduced the number of external components normally needed to implement this type of DC/DC solution. The smaller circuit layout also means less PCB tracking, which helps further reduce the radiated noise.

World's Smallest 1A Micro DC/DC
2.5mm x 2.0 x 1.0mm

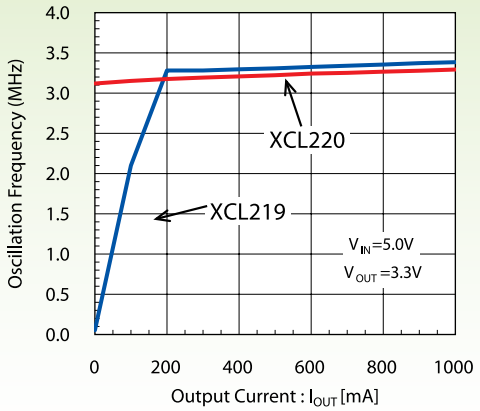
KEY FEATURES

Output Current		1.0A
Control Method		Hi-SAT COT
ON Resistance	P-Ch	0.24Ω (typ)
	N-Ch	0.16Ω (typ)
Input Voltage Range		2.5V ~ 5.5V
Output Voltage Range		0.8V ~ 3.6V ±2% in 0.05V steps
Switching Frequency		3.0MHz
Quiescent Current		25μA
Product Select	**XCL219**	Fixed PWM Control
	XCL220	PWM/PFM Automatic Switching
Max Duty Cycle		100%
Protection Circuits		Current Limit Circuit
		Short Circuit Protection
		Thermal Shutdown
		UVLO (1.6V)
Additional Features		High Speed Soft-start
		Optional CL Discharge
		Low ESR Ceramic capacitors
Op. Ambient Temperature		-40°C ~ +105°C
Package		CL-2025

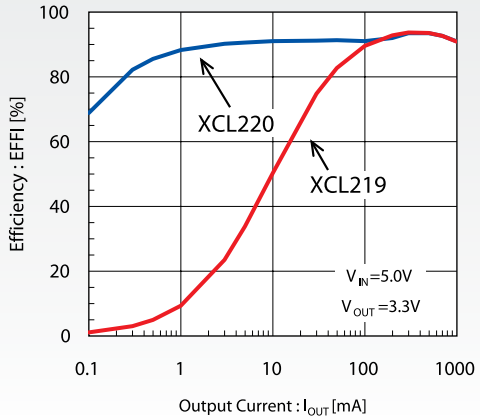
TYPICAL APPLICATION CIRCUIT



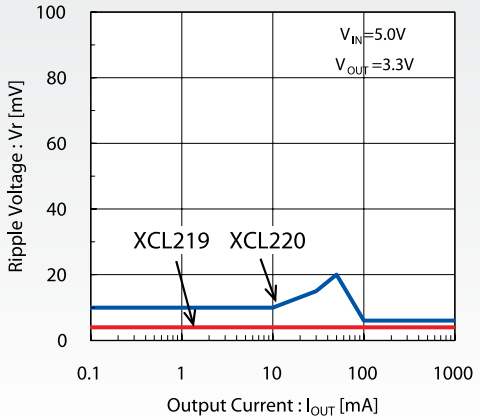
OSCILLATION FREQUENCY VS. OUTPUT CURRENT



EFFICIENCY VS. OUTPUT CURRENT

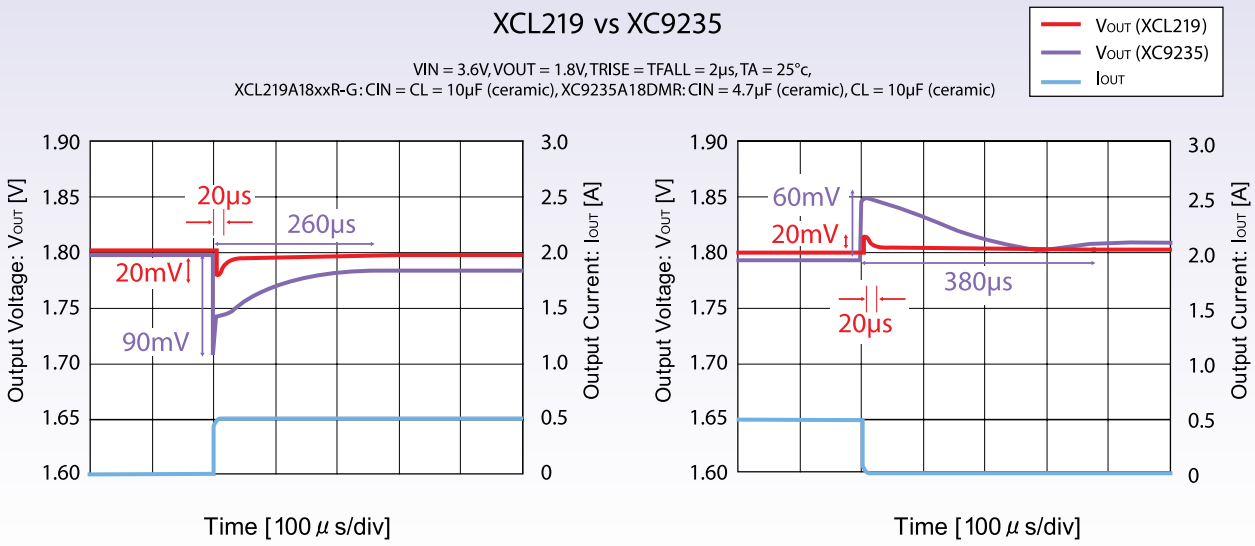


OUTPUT RIPPLE VS. OUTPUT CURRENT



LOAD TRANSIENT RESPONSE

Compared to a DC/DC like our XC9235 that uses a traditional architecture, the new XCL219/20 with Hi-SAT COT control offers ultra fast load transient response as can be seen in the graphs below.



XCL213/14

1.5A, Hi-SAT COT Step-Down Micro DC/DC Converter with Integrated Coil



The XCL213/214 series is a high speed transient response 1.5A synchronous step-down Micro DC/DC converter with integrated inductor which fits in an extremely small 2.5mm x 3.2mm x 1.0mm USP-9B01 package and needs only two capacitors connected externally to generate a stable power supply.

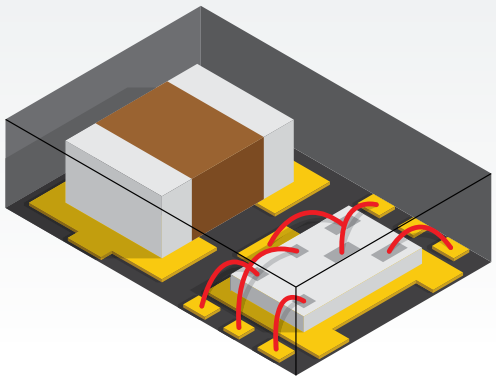
Hi-SAT COT, Torex's Constant ON Time architecture gives the XCL213/214 extremely fast load transient response performance in comparison to standard DC/DC solutions as well as achieving less fluctuation in oscillation frequency against load and input voltage when compared to standard COT control.

The XCL213/214 utilises a 3MHz switching frequency. The XCL213 series offers PWM control, whereas the XCL214 series applies automatic PWM/PFM switching control, providing low ripple, low current consumption (25µA typ.) and high efficiency over the full range of output loads (from light load to heavy load).

KEY FEATURES

Output Current		1.5A
Efficiency		Up to 92%
ON Resistance	P-Ch	0.14Ω (typ)
	N-Ch	0.10Ω (typ)
Input Voltage		2.7V ~ 5.5V
Output Voltage		0.8V ~ 3.6V
Switching Frequency		3.0MHz
Quiescent Current		25µA
Product Select	**XCL213**	Fixed PWM Control
	XCL214	PWM/PFM Automatic Switching
Additional Features: Soft-start, UVLO, CL Auto Discharge & 100% Duty Cycle		
Low ESR Ceramic capacitors		
Package: USP-9B01		

INTERNAL CONSTRUCTION



XCL101

Ultra Low Power, Step-Up, Micro DC/DC Converter with Integrated Coil



The XCL101 series is a step-up micro DC/DC converter with integrated coil in an ultra-small 2.5 x 2.0 x 1.0mm CL-2025 package. A stable and efficient power supply circuit can be configured by simply adding only two ceramic capacitors externally thereby contributing to PCB space saving and the shortening of development time. Integration of the coil simplifies the board layout and minimizes any unwanted radiated noise.

Able to start operation from Input Voltages as low as 0.9V the XCL101 is suitable for use with single alkaline or nickel metal hydride cells. Like all step-up DC/DCs, the output current that the XCL101 can supply will depend on the (VIN, VOUT) conditions, but up to 100mA of output current can be supplied with VIN=1.8V and VOUT=3.3V and with a VIN=0.9V, more than 50mA is possible.

With a quiescent current of only 6.3μA (typ), reducing to 0.1μA (typ) during standby, the XCL101 helps to maximise battery life in portable applications in addition to saving PCB space.

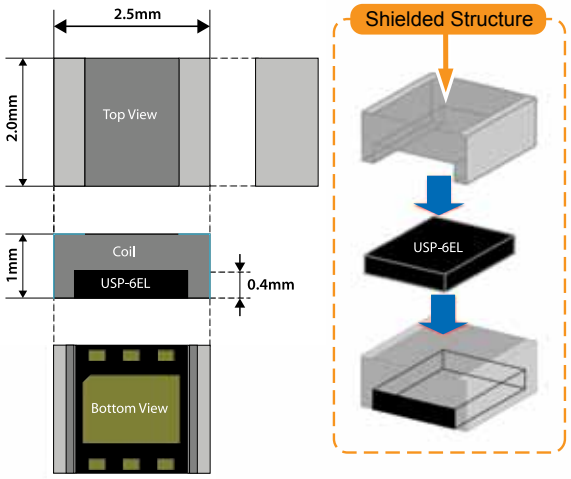
The XCL101 series also features a load disconnect function that prevents the battery charge from leaking to the output while the IC is not operating (XCL101A). An optional CL discharge function can quickly discharge the output capacitor when the IC is turned off and an Input by-pass mode function type is also available to keep the connection between the input and output side during shutdown (XCL101C).

In addition, a built-in inrush current protection circuit suppresses inrush current spikes at start-up which results in a more stable power supply which in turn extends battery life.

Application note available at:
www.torex-europe.com/microdcdc

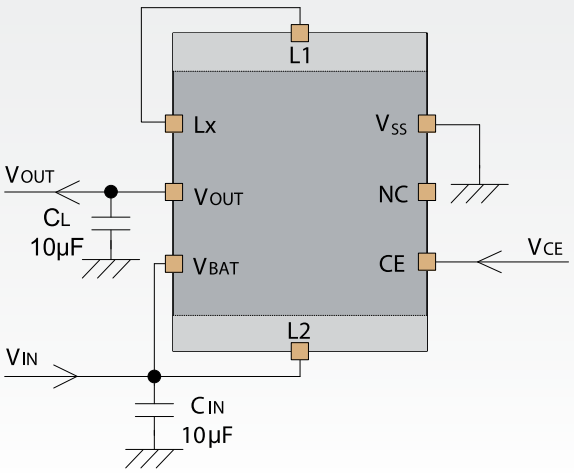
KEY FEATURES

Output Current		More than 100mA
ON Resistance	N-Ch	0.6Ω (typ)
	P-Ch	0.65Ω (typ)
Input Voltage Range		0.9V ~ 5.5V
Operation Hold Voltage		0.7V
Output Voltage		1.8V ~ 5.0V (0.1V increments)
Switching Frequency		1.2MHz
Quiescent Current		6.3μA
Stand-by Current		0.1μA
Product Select	**XCL101A**	Load Disconnection Function
	XCL101C	Input Bypass Function
Additional Features: Soft-start		
Low ESR Ceramic capacitors		
Package: CL-2025		

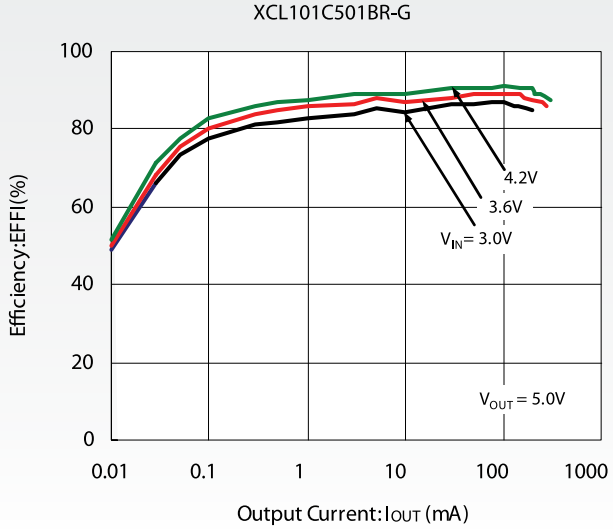


2.5 X 2.0 X 1.0mm

TYPICAL APPLICATION CIRCUIT



EFFICIENCY VS. OUTPUT CURRENT



XCL201/02

400mA Micro DC/DC with Low Noise



The XCL201/202 uses the same innovative construction technique as the original XCL205/06 series, whereby a Synchronous DC/DC Converter IC is embedded within a fully shielded Thin-Film Power Inductor. The simplicity of the XCL construction means that it's also inexpensive to produce, which makes the XCL20x series ideal for cost sensitive applications where PCB space is at a premium.

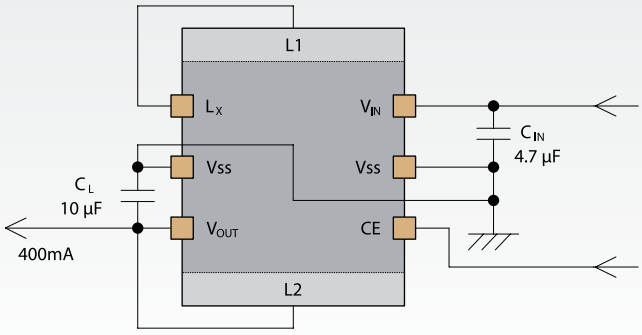
With an integrated fully shielded Inductor, the XCL201/02 family is designed to **minimise EMI emissions and radiated noise,** whilst maximising efficiency. The XCL201/02 also delivers a very stable output with low peak to peak ripple (<10mV), ideal for RF applications.

Ultra Small Size
2.5 x 2.0 x 1.0mm

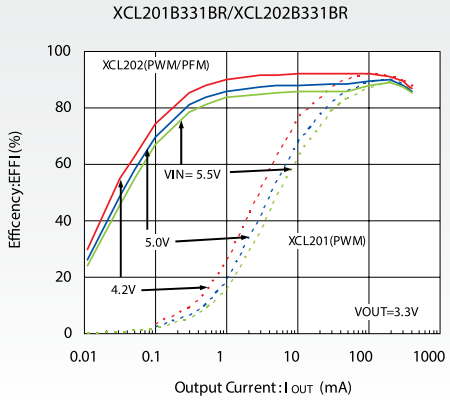
KEY FEATURES

Output Current		400mA
On Resistance	P-Ch	0.42Ω (typ)
	N-Ch	0.52Ω (typ)
Input Voltage Range		1.8V ~ 6.0V
Output Voltage Range		0.8V ~ 4.0V
Switching Frequency		1.2MHz
Quiescent Current		15μA
Product Select	**XCL201**	Fixed PWM Control
	XCL202	PWM/PFM Automatic Switching
Protection Circuits		Current Limiter
		ULVO (1.4V)
Additional Features		High Speed Soft-start
		CL Discharge
		Low ESR Ceramic capacitors
Package		CL-2025

TYPICAL APPLICATION CIRCUIT



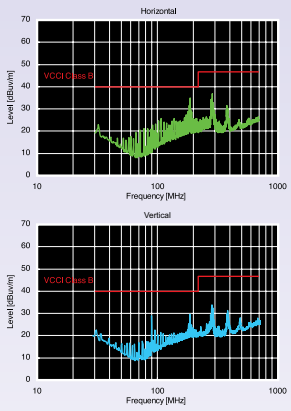
EFFICIENCY VS. OUTPUT CURRENT



As can be seen below, when tested side by side with a conventional Torex step-down DC/DC converter, the XC9236B18DMR with external coil, the noise radiation from the Micro DC/DC families are much smaller making these ideal solutions for noise sensitive applications.

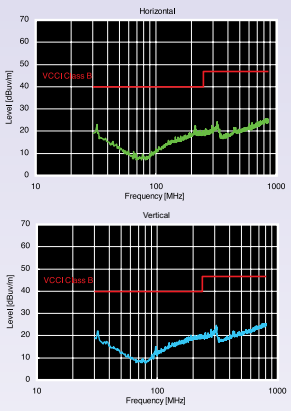
MICRO DC/DC NOISE RADIATION COMPARISON

XC9236B18DMR



fosc: 3MHz DC/DC (External Coil)

XCL202B181BR

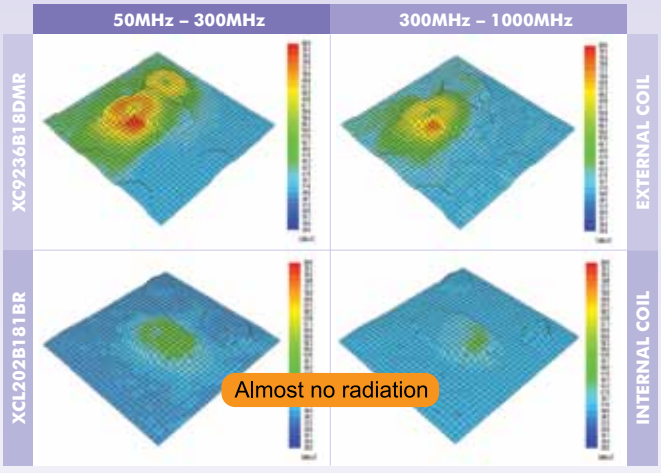


fosc: 1.2MHz Micro DC/DC (Internal Shielded Coil)

Larger — Smaller

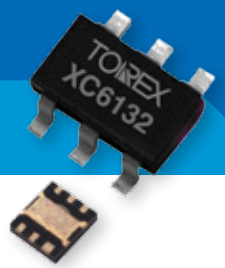
EMI Noise Radiation

FREQUENCY RANGE



Near Magnetic Field

XC6132/33/34 High Performance Voltage Detectors



The XC6132/33/34 series are ultra-small voltage detectors that have high accuracy and sense pin for monitoring a rail other than VIN. High accuracy and a low supply current are achieved by means of a CMOS process, a high-accuracy reference power supply, and laser trimming technology.

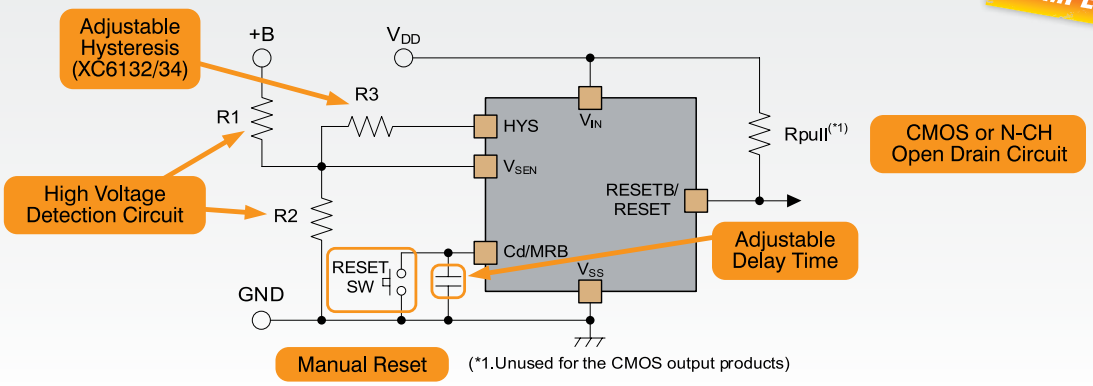
The sense pin is isolated from the power input pin to enable monitoring of the voltage of another power supply. Output can be maintained in the detection state even if the voltage of the power supply that is monitored drops to 0V. The sense pin is also suitable for detecting high voltages, and the detection and release voltage can be set as desired using an external resistance.

KEY FEATURES

SERIES	XC6132	XC6133	XC6134
Operating Voltage Range	1.6V ~ 6.0V	1.6V ~ 6.0V	1.6V ~ 6.0V
Detect Voltage Range	0.8V ~ 2.0V	1.0V ~ 5.0V	0.8V ~ 5.0V
Detect Voltage Accuracy	±1.2% (≥1.5V) ±18mV (<1.5V)	±1.5% (≥3.1V) ±1.2% (≥1.5V) ±18mV (<1.5V)	
Temp Characteristics	±50ppm/°C (typ)		
Output Configuration	CMOS or N-Channel Open Drain		
Output Logic	H level or L level at detection		
Power Consumption	1.28μA (VIN=1.6V) 1.36μA (VIN=6.0V)		
Hysteresis width	VDF×0.1% (typ)	VDF×5% (typ)	VDF×0.1% (typ)
Additional Features	ADJ Hysteresis Width	–	ADJ Hysteresis Width
	Manual RESET		
	Delay Capacitance Pin		
	Release delay/detection delay can be set 5 times ratio patterns		
	Sense Pin with Surge Voltage Protection	Sense Pin	
Op. Ambient Temperature	-40°C ~ +125°C		
Packages	USP-6C, SOT26		

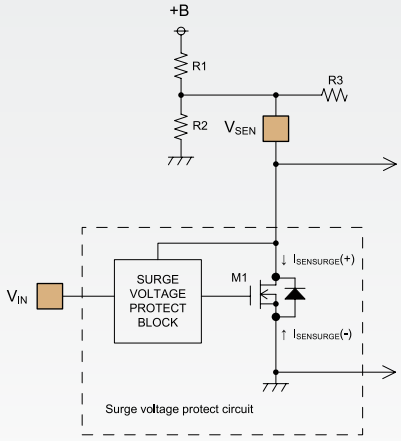
TYPICAL APPLICATION CIRCUIT

HIGH OPERATING TEMPERATURE



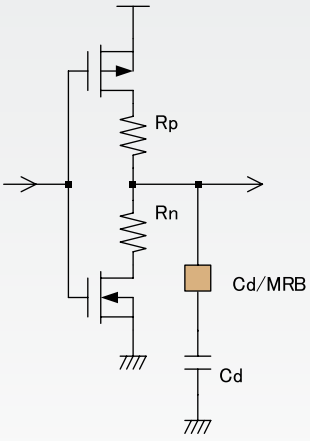
NEW FEATURES

XC6132 SURGE VOLTAGE PROTECTION



Even if 100V Load dump surge comes to +B, the internal surge voltage protection circuit protects the VSEN pin. When the surge comes and the VSEN voltage rises, the "SURGE VOLTAGE PROTECT BLOCK" detects it and turns on M1 which sinks 2.5mA and this current causes a voltage drop on R1 to keep VSEN safe.

RELEASE DELAY AND DETECTION DELAY COMBINATION



DELAY (Rp:Rn)	
1 : 0	144kΩ : 0Ω
1 : 0125	144kΩ : 18kΩ
1 : 1	144kΩ : 144kΩ
2 : 1	288kΩ : 144kΩ
0.076 : 1	11kΩ : 144kΩ

The release delay is set by Rp and Cd and the detect delay time is set by Rn and Cd. The release delay allows you to start up correctly and the detect delay avoids any mis-detection due to noise and spikes. The XC6132/33/34 has five (5) different ratio configurations of Rp and Rn to fit any requirement.

Automotive product qualification in accordance with AEC-Q100 (Grade 1)

XC6130/31 Voltage Detectors with Watchdog



HIGH OPERATING TEMPERATURE

The XC6130/XC6131 series are voltage detectors with a watchdog function. The watchdog timeout time and release delay time can be set as desired using a single external capacitor.

These voltage detectors are used for microprocessor monitoring and when the power voltage reaches the detect voltage, or an L→H pulse is not input to the watchdog pin within the watchdog timeout time, an L level signal is output from the RESETB pin.

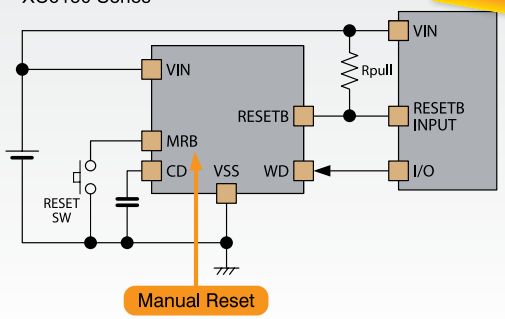
KEY FEATURES

SERIES	XC6130	XC6131
Operating Voltage Range	1.5V ~ 6.0V	
Detect Voltage Range	1.6V ~ 5.0V	
Detect Voltage Accuracy	±1.0%	
Temp Characteristics	±50ppm/°C (typ)	
Output Configuration	N-Channel Open Drain	
Output Logic	L level at detection	
Power Consumption	8.1μA	
Hysteresis width	VDF×5% (typ)	
Additional Features	Manual RESET	–
	Delay Capacitance Pin	
	Watchdog Output	Watchdog Output
	–	Watchdog Enable
Op. Ambient Temperature	-40°C ~ 125°C	
Packages	SOT26	SOT26

Automotive product qualification in accordance with AEC-Q100 (Grade 1)

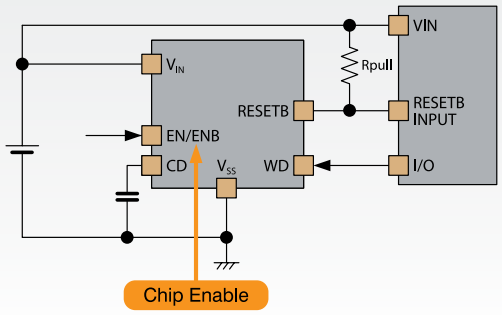
TYPICAL APPLICATION CIRCUIT

XC6130 Series

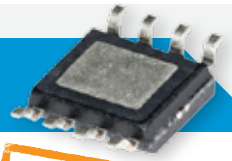


TYPICAL APPLICATION CIRCUIT

XC6131 Series



XC6702 36V 300mA Low Power High Speed Voltage Regulator

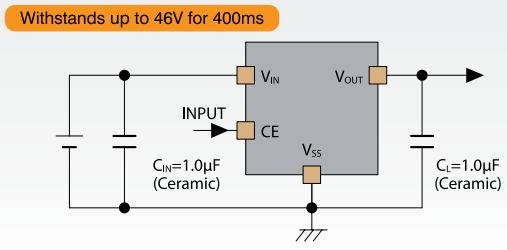


COMING SOON

This 36V CMOS high speed voltage regulator offers the designer low quiescent current plus high power supply ripple rejection.

The over-current protection circuit and overheat protection circuit are built-in, and when the output current reaches the current limit or the junction temperature reaches the temperature limit, the corresponding circuit activates. The soft start circuit limits the rush current that flows from VIN to VOUT when the IC starts, enabling a stable start-up sequence.

TYPICAL APPLICATION CIRCUIT



KEY FEATURES

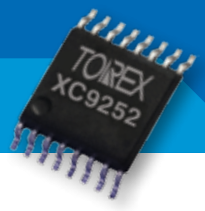
Output Current	300mA
Dropout Voltage	450mV @ IOUT =100mA
Operating Voltage Range	4.5V to 36.0V
Surge Voltage Capability	Up to 46V for 400ms
Output Voltage Range	1.8V ~ 18.0V
Output Accuracy	±1%
Low Power Consumption	40μA
Stand-by Current	< 0.1μA
Ripple Rejection	65dB @ 1kHz
Protection Circuits	Thermal Shutdown
	Current Limit (420mA)
Additional Features	Soft-start
	Optional CL Discharge
	Low ESR Ceramic capacitors
Op. Ambient Temperature	-40°C ~ +105°C
Packages	SOP-8FD, SOT-89-5, USP-6C

Automotive product qualification in accordance with AEC-Q100 (Grade 2)

60V Version under development (XC6703)

XC9252

30V, Low Power Step-Down DC/DC Controller



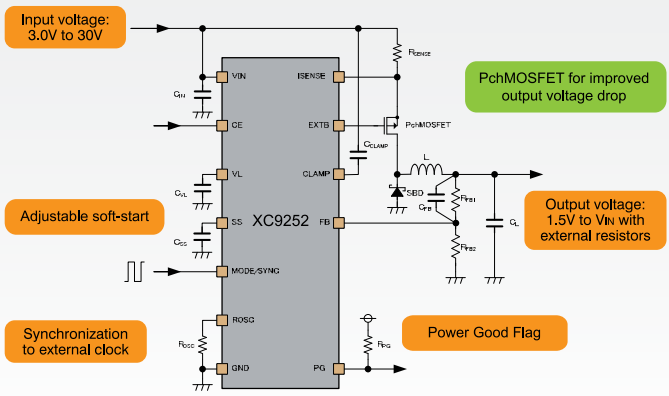
Able to operate from inputs up to 30V and able to withstand surge Voltages up to 46V for 400ms, the XC9252 is a step-down DC/DC controller IC designed specifically for applications that require high efficiency and low power consumption. Power consumption is increasingly critical for many applications and the XC9252 requires only 30μA when operating in PFM mode under no load conditions.

The internal switching frequency can be externally set-up between 280kHz to 550kHz by connecting a resistor to the ROSC pin and the designers can also opt to synchronize the switching frequency of the DC/DC with an external CLK signal (within ±25% of the nominal frequency). The XC9252 includes over current and short circuit protection. The current limit threshold can be set externally with RSENSE resistor and the designer can select either a Latch or Auto-restart configuration.

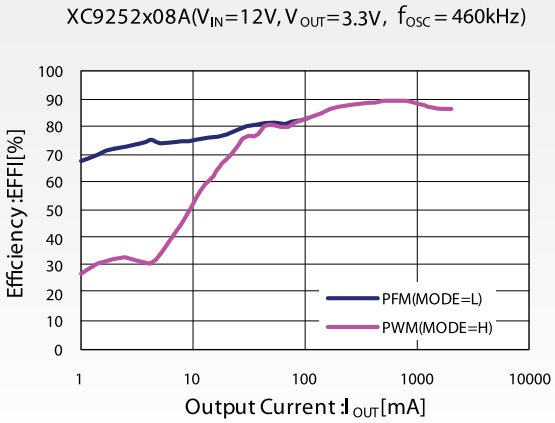
KEY FEATURES

Input Voltage		3.0V ~ 30V
Surge Voltage		Up to 46V for 400ms
Output Voltage		1.5V ~ V_{IN}
Switching Frequency		280kHz ~ 550kHz
Quiescent Current		30μA
Protection Circuits		Thermal Shutdown
		Current Limit
		Short Circuit Protection
Control Method	**PWM**	MODE/SYNC pin high
	PWM/PFM	MODE/SYNC pin low
Op. Ambient Temperature		-40°C ~ +105°C
Additional Features: Adjustable Soft-start, UVLO, External Clock Synchronization & Power Good Flag		
Low ESR Ceramic capacitors		
Packages: USP-10B, TSSOP-16		

TYPICAL APPLICATION CIRCUIT



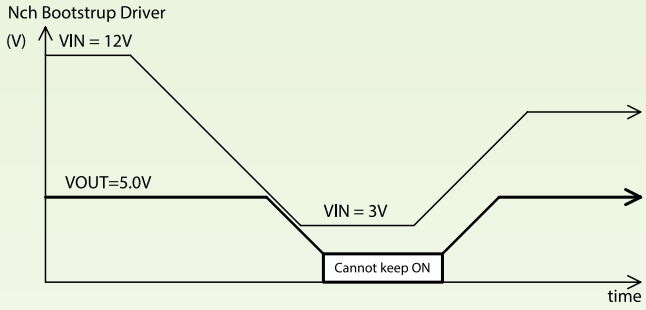
EFFICIENCY VS. OUTPUT CURRENT



STABLE OPERATION FROM LOWER INPUT VOLTAGES

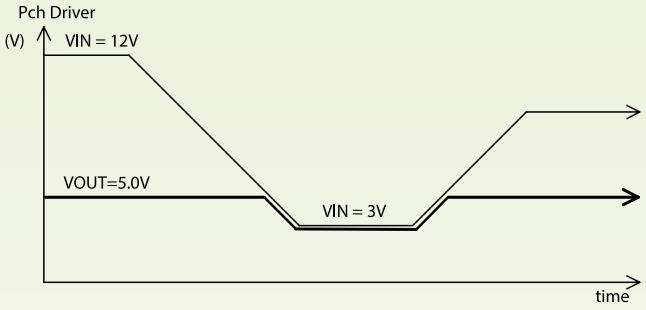
Many traditional mid-voltage DC/DC converters use an Nch MOSFET for the High Side switch. Whilst an Nch FET is excellent for high speed switching it normally needs a special bootstrap circuit to drive it.

A bootstrap circuit has the advantage of being simple and low cost, but it also has limitations. The Duty-cycle and on time is limited by the requirement to refresh the charge in the bootstrap capacitor, which means the maximum duty ratio can never be 100% and this has implications when the input Voltage goes below VOUT as shown in the diagram below.



The XC9252 uses a Pch MOSFET for the High Side Switch that does not need a bootstrap circuit, so the maximum duty ratio can be 100%. This means that the output remains stable even when the input drops beneath VOUT as shown in the diagram below:

The XC9252 output follows the input when it goes below VOUT and this can be important for automotive 'cold crank' applications or for when the VIN source has a high impedance (for example from a long cable).



XC9263/64

18V 500mA Step-Down DC/DC Converter

COMING SOON



The XC9263/64 is a synchronous step-down DC/DC with P-Ch High Side Switch to ensure low Voltage operation with 100% max duty ratio. It can operate from 3.0V~18.0V and deliver loads up to 500mA making it an ideal replacement for inefficient Linear Regulators used in many industrial applications.

Designed for very **high efficiencies at low output loads,** with low quiescent current and automatic PFM/PWM mode. The XC9263/64 also works with Low ESR ceramic capacitors and comes with a choice of three switching frequencies, adjustable soft start and a power good output.

Available in the ultra small USP-6C package, measuring only 2.0 x 1.8 x 0.6mm an extremely small DC/DC circuit can be implemented with a minimal number of external components.

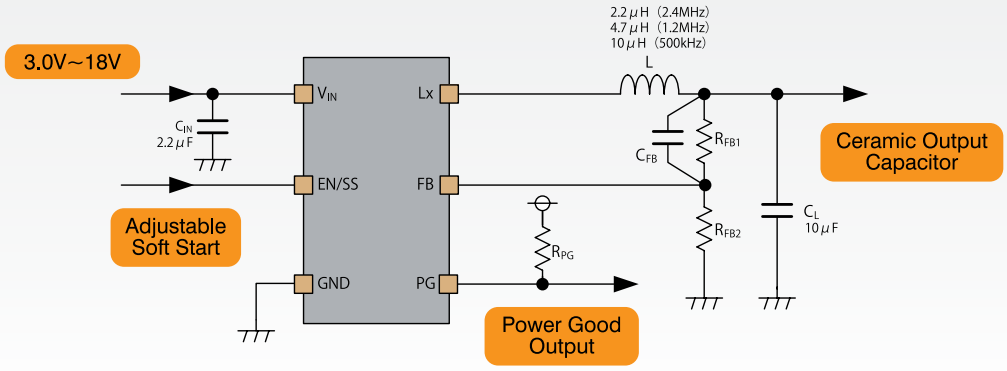
The XC9263/64 includes Over Current and VOUT short-circuit protection circuits, the designer can select either a Latch or Auto-restart configuration depending on the application requirements.

KEY FEATURES

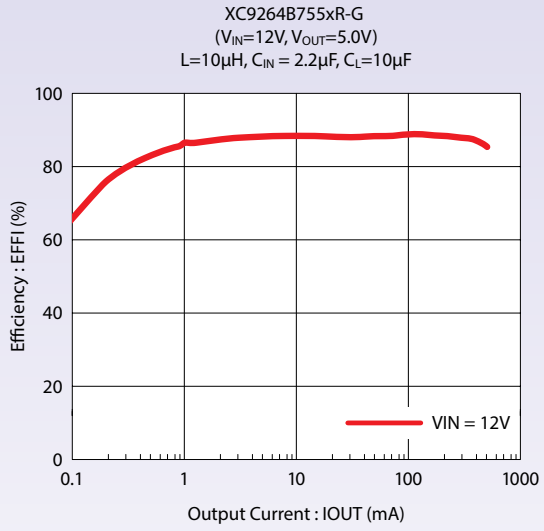
Output Current		500mA
ON Resistance (V_{IN} – 12v)	P-Ch	0.99Ω (typ)
	N-Ch	0.64Ω (typ)
Input Voltage Range		3.0V ~ 18V (Ab. Max 20V)
FB Voltage		0.75V±1.5%
Output Voltage Range		1.0V ~ 15.0V
Switching Frequency		500kHz, 1.2MHz, 2.4MHz
Quiescent Current		12μA
Product Select	**XC9263**	Fixed PWM Control
	XC9264	PWM/PFM Automatic Switching
Max Duty Cycle		100%
Protection Circuits		Current Limit Circuit
		Short Circuit Protection
		UVLO (2.7V)
		Thermal Shutdown
Additional Features: Adjustable Soft-start, Power Good Output, Optional CL Discharge, Low ESR Ceramic capacitors		
Op. Ambient Temperature		-40°C ~ +105°C
Packages		USP-6C, SOT25

TYPICAL APPLICATION CIRCUIT

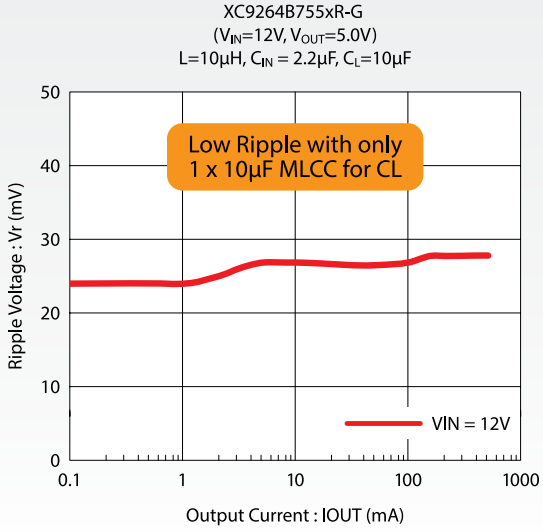
P-Ch High Side switch for low Voltage operation and 100% duty ratio



EFFICIENCY VS. OUTPUT CURRENT



OUTPUT RIPPLE VS. OUTPUT CURRENT



XC9266 5.5V 6.0A Hi-SAT Step-Down DC/DC Converter

COMING SOON



The XC9266 incorporates Hi-SAT COT, Torex's own Constant On-Time architecture, to deliver extremely fast transient response performance and high efficiency.

With Hi-SAT the XC9266 only needs one low cost 47µF ceramic capacitor at the output side, whilst competitors often need multiple capacitors to achieve similar levels of performance.

With a 0.6V reference voltage source the output voltage can be set freely from 0.8V using external resistors. Furthermore it is possible to control the output voltage dynamically using an external digital-to-analog converter (DAC).

The XC9266 also allows the engineer to select different features using the MODE pins. Using a High or Low signal the engineer can select PWM control or PWM/PFM auto switching control (MODE1), Short Protection with latch or hiccup mode (MODE2) and optional CL discharge with soft OFF (MODE3).

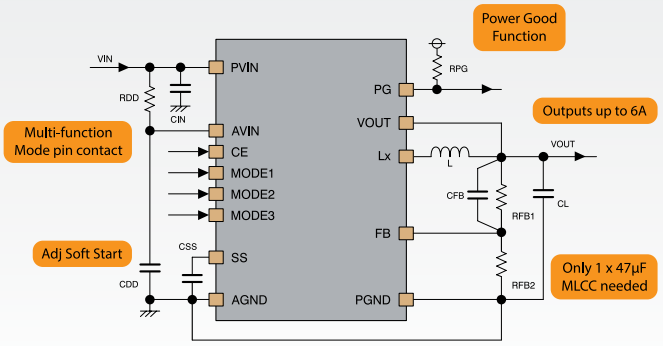
The integral soft start time can be adjusted with an external capacitor (CSS) and a Power Good feature is also included to help with system power-up sequencing.

Hi-SAT COT
For Fast Transient Response

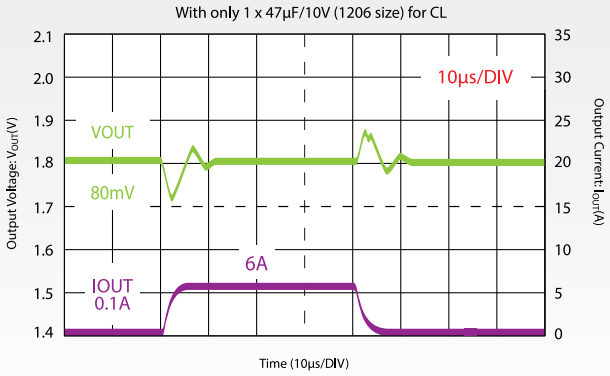
KEY FEATURES

Control Method		Hi-SAT COT
Output Current		6.0A
ON Resistance	P-Ch	0.032Ω (typ)
	N-Ch	0.025Ω (typ)
Input Voltage Range		2.7V ~ 5.5V
FB Voltage		0.6V ±1%
Output Voltage Range		0.8V ~ 3.6V
Switching Frequency		1.2MHz or 3.0MHz
Mode Select		PWM or PWM/PFM Auto Switching
Max Duty Cycle		100%
Protection Circuits		Current Limit (Hiccup or Latch)
		Thermal Shutdown
		Short Circuit Protection
		UVLO
Additional Features		Adjustable Soft-start
		CL Discharge with Soft Off
		Low ESR Ceramic capacitors
Op. Ambient Temperature		-40°C ~ +105°C
Package		QFN-24(4x4)

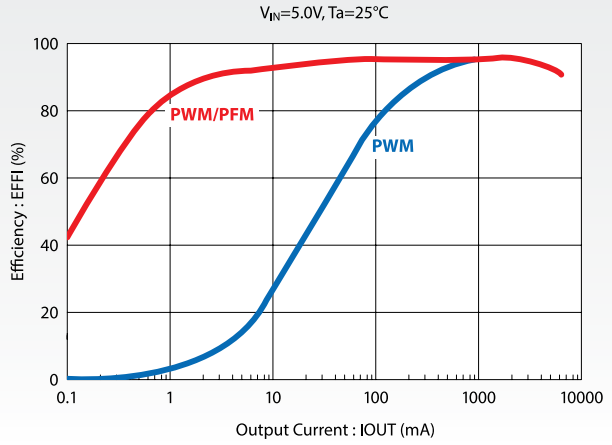
TYPICAL APPLICATION CIRCUIT



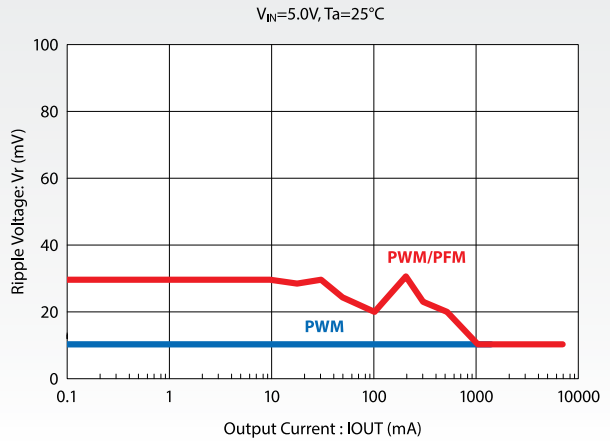
FAST TRANSIENT RESPONSE WITH HI-SAT COT



EFFICIENCY VS. OUTPUT CURRENT

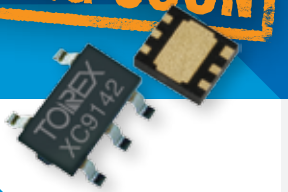


OUTPUT RIPPLE VS. OUTPUT CURRENT



XC9141/42 0.9V 800mA SW Step-Up DC/DC Converter

COMING SOON



The new XC9141/42 series is a synchronous boost converter optimised to provide high efficiencies under all load conditions. This DC/DC integrates a 0.3Ω Nch driver transistor and a 0.4Ω synchronous Pch switching transistor and it will be readily available with either a 1.2MHz or 3.0MHz switching frequency. Output currents up to 500mA can be realised with only two low cost ceramic capacitors and an Inductor placed externally.

The internal circuit can start operation from Input Voltages as low as 0.85V and once started will continue to operate until the input goes below 0.65V. This series also features an optional load disconnect

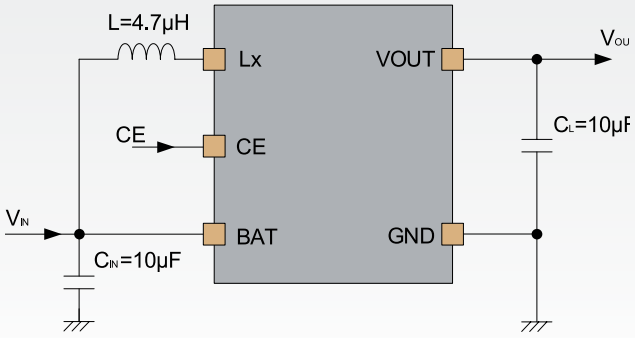
function that prevents the battery charge from leaking to the output while the IC is not operating or an Input bypass mode function to keep the connection between the input and output side during shutdown.

The XC9141/42 is available in the USP-6C package for applications that require a small form factor or in the industry standard SOT-25 package.

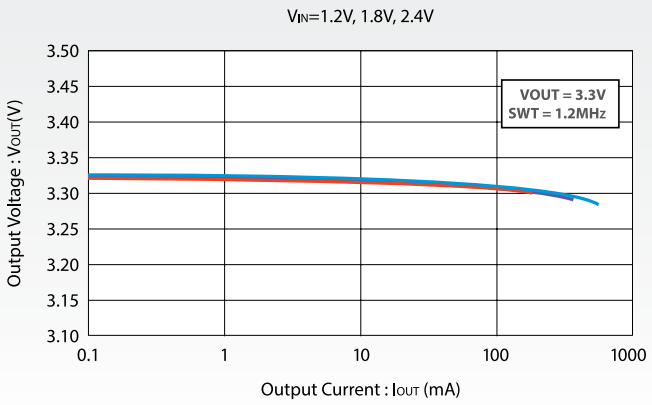
KEY FEATURES

Input Current		800mA
ON Resistance	N-Ch	0.3Ω (typ)
	P-Ch	0.4Ω (typ)
Input Voltage Range		0.65V ~ 6.0V
Output Voltage Range		1.8V ~ 5.5V (0.1V steps)
Switching Frequency		1.2MHz, 3.0MHz (±15%)
Quiescent Current		19μA
Product Select	**XC9141**	Fixed PWM Control
	XC9142	PWM/PFM Automatic Switching
Max Duty Cycle		93% (typ)
Protection Circuits		Current Limit
		Short Circuit
Additional Features		Soft Start
		Load Disconnect (A Type)
		Bypass Switch (B Type)
		Low ESR Ceramic Capacitors
Op. Ambient Temperature		-40°C ~ +105°C
Packages		SOT-25, USP-6C

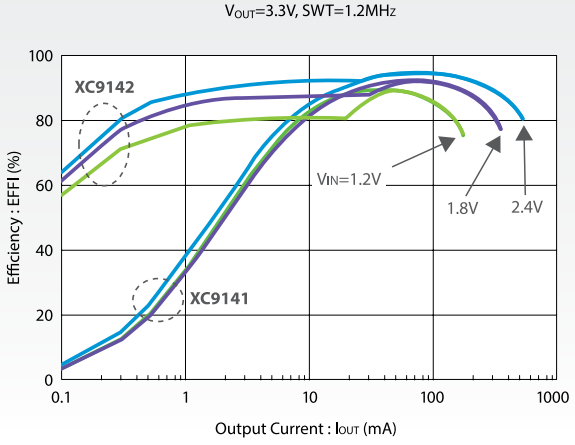
TYPICAL APPLICATION CIRCUIT

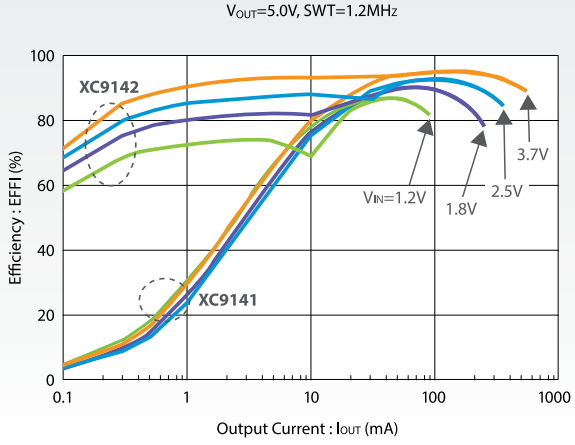


OUTPUT VOLTAGE VS. OUTPUT CURRENT



EFFICIENCY VS. OUTPUT CURRENT





INDUCTOR BUILT-IN MICRO DC/DC CONVERTERS

SERIES	TYPE	CONTROL	EFFICIENCY	INPUT VOLTAGE	OUTPUT VOLTAGE	ACCURACY	OSCILLATION FREQUENCY	OUTPUT CURRENT	PACKAGE
XCL101	Inductor Built-in	PFM	90%	0.9 ~ 5.5V	1.8 ~ 5.0V	±2.0%	1.2MHz	100mA	CL-2025
XCL201	Inductor Built-in	PWM	92%	2.0 ~ 6.0V	0.8 ~ 4.0V	±2.0%	1.2MHz	400mA	CL-2025
XCL202		PWM/PFM							
XCL205	Inductor Built-in	PWM	85%	2.0 ~ 6.0V	0.8 ~ 4.0V	±2.0%	3MHz	600mA	CL-2025
XCL206		PWM/PFM							
XCL207		PWM/PFM Manual							
XCL208	Inductor Built-in	PWM	90%	1.8 ~ 6.0V (F Type) 2.0 ~ 6.0V (A/B Type)	0.8 ~ 4.0V	±2.0%	3MHz	400mA	USP-10B03
XCL209		PWM/PFM							
XCL210	Inductor Built-in	PFM	93%	2.0 ~ 6.0V	1.0 ~ 4.0V	±2.0%	-	50mA	CL2025-02
XCL211	Inductor Built-in	PWM	94%	2.7 ~ 6.0V	0.9 ~ Vin	±2.0%	2.4MHz	2000mA	USP-11B01
XCL212	Inductor Built-in	PWM/PFM	94%	2.7 ~ 6.0V	0.9 ~ Vin	±2.0%	2.4MHz	2000mA	USP-11B01
XCL213	Inductor Built-in	HiSat-COT+PWM	92%	2.7 ~ 5.5V	0.8 ~ 3.6V	±2.0%	3MHz	1500mA	USP-9B01
XCL214	Inductor Built-in	HiSat-COT+PWM/PFM	92%	2.7 ~ 5.5V	0.8 ~ 3.6V	±2.0%	3MHz	1500mA	USP-9B01
XCL219	Inductor Built-in	HiSat-COT+PWM	92%	2.5 ~ 5.5V	0.8 ~ 3.6V	±2.0%	3MHz	1000mA	CL-2025
XCL220	Inductor Built-in	HiSat-COT+PWM/PFM	92%	2.5 ~ 5.5V	0.8 ~ 3.6V	±2.0%	3MHz	1000mA	CL-2025

STEP UP DC/DC CONVERTERS & CONTROLLERS

SERIES	CONTROL	EFFICIENCY	INPUT VOLTAGE	OUTPUT VOLTAGE	ACCURACY	OSCILLATION FREQUENCY	FUNCTIONS	PACKAGE
XC6371	PWM	85%	0.9 ~ 10V	2.0 ~ 7.0V	±2.5%	50kHz 100kHz 180kHz	100mA (V_{IN}=3.0V, V_{OUT}=5.0V)	SOT-89, SOT-89-5, USP-6B
XC6372	PWM/PFM							
XC9103	PWM	85%	0.9 ~ 10V	1.5 ~ 30V ADJ=0.9V	±2.0%	100kHz , 180kHz 300kHz , 500kHz	400mA (V_{IN}=1.8V, V_{OUT}=3.3V) FB=0.9V (1.5 ~ 30V)	SOT-25, USP-6B
XC9104	PWM/PFM							
XC9105	PWM/PFM Manual							
XC9106	PWM	85%	0.9 ~ 10V	ADJ=Variable	±2.0%	100kHz 300kHz	Variable Output Voltage 30mA (V_{IN}=3.3V, V_{OUT}=20V)	SOT-25, USP-6B
XC9107	PWM/PFM							
XC9110	PFM	87%	0.9 ~ 10V	1.5 ~ 7.0V	±2.5%	100kHz	200mA (V_{IN}=2.4V, V_{OUT}=3.3V)	SOT-23, SOT-25, SOT-89, USP-6C
XC9111								
XC9119	PWM	86%	2.5 ~ 6.0V	ADJ=1.0V	±2.0%	1MHz	50mA (V_{IN}=3.6V, V_{OUT}=15V) FB=1.0V (2.5 ~ 19.5V)	SOT-25, USP-6C
XC9120	PWM	85%	0.9 ~ 6.0V	1.5 ~ 3.0V ADJ=0.9V	±2.0%	100kHz	80mA (V_{IN}=3.6V, V_{OUT}=15V) FB=0.9V (1.5 ~ 30V)	SOT-25, USP-6C
XC9121	PWM/PFM							
XC9122	PWM/PFM Manual							
XC9128	PWM/PFM Manual	93%	0.8 ~ 6.0V	ADJ=0.45V	0.45V±10mV	1.2MHz	700mA (V_{OUT}=5.0V,V_{IN}=3.7V) With Adapter Enable FB=0.45V (1.8 ~ 5.3V)	MSOP-10, USP-10B
XC9129	PWM/PFM Manual	93%	0.8 ~ 6.0V	ADJ=0.45V	0.45V±10mV	1.2MHz	Without Adapter Enable FB=0.45V (1.8 ~ 5.3V)	USP-10B
XC9131	PWM PWM/PFM	93%	0.65 ~ 5.5V	1.8 ~ 5.0V	±10mV	1.2MHz	500mA@V_{OUT}=3.3V, V_{IN}=1.8V(TYP.) 100mV, V_{OUT}=3.3V, V_{IN}=1.8V, I_{OUT}=1mA 200mA	USP-10B
XC9133	PWM	85%	2.5 ~ 6.0V	2.5 ~ 17.5V ADJ=0.2V	0.2V±5.0%	1MHz	3 white LEDs in series V_{IN}=3.6V, I_{LED}=20mA	SOT-25 USP-6C
XC9135	PWM PWM/PFM	93%	0.65 ~ 5.5V	1.8 ~ 5.0V	±10mV	1.2MHz	500mA@V_{OUT}=3.3V, V_{IN}=1.8V(TYP.) 100mV V_{OUT}=3.3V, V_{IN}=1.8V, I_{OUT}=1mA 200mA	USP-10B
XC9136								
XC9140	PFM	90%	0.9 ~ 5.5V	1.8 ~ 5.0V	±2.0%	1.2MHz	100mA (VIN=1.8V, VOUT=3.3V Load Disconnect or Input Bypass Quiescent Current 6.3μA	USP-6EL, SOT-25

STEP-DOWN DC/DC CONVERTERS & CONTROLLERS

SERIES	CONTROL	EFFICIENCY	OPERATING VOLTAGE	OUTPUT VOLTAGE	ACCURACY	OUTPUT CURRENT	OSCILLATION FREQUENCY	SUPPLY CURRENT	PACKAGE
XC9213	PWM/PFM Manual	93%	4.0 ~ 25V	ADJ=1.0V	±1.5%	5A	300kHz	450μA	TSSOP-16
XC9220	PWM	92%	2.8 ~ 16.0V	ADJ=0.9V	±1.5%	3A	300kHz 500kHz 1MHz	25μA	SOT-25, USP-6C
XC9221	PWM/PFM								
XC9223 XC9224	PWM/PFM Manual	95%	2.5 ~ 6.0V	ADJ=0.8V	±2.5%	1A	1MHz 2MHz	30μA	MSOP-10, USP-10B
XC9235	PWM	92%	1.8 ~ 6.0V	0.8 ~ 4.0V	±2%	600mA	1.2MHz 3MHz	15μA	SOT-25, USP-6C, USP-6EL, WLP-5-03
XC9236	PWM/PFM								
XC9237	PWM/PFM Manual								

SERIES	CONTROL	EFFICIENCY	OPERATING VOLTAGE	OUTPUT VOLTAGE	ACCURACY	OUTPUT CURRENT	OSCILLATION FREQUENCY	SUPPLY CURRENT	PACKAGE
XC9242	PWM	95%	2.7 ~ 6.0V	0.9 ~ 6.0V	±2%	2A	1.2MHz 2.4MHz	41μA	USP-10B, SOP-8FD
XC9243	PWM/PFM								
XC9244	PWM	90%	2.3 ~ 6.0V	0.8 ~ 4.0V	±2%	400mA	1.2MHz	18μA	USPN-6
XC9245	PWM/PFM								
XC9246	PWM	90%	4.5 ~ 16.0V	1.2 ~ 5.5V	±2%	1A	1.2MHz	100μA	USP-6C, SOT-26W
XC9247	PWM/PFM								
XC9248	PWM	93.8%	4.5 ~ 18.0V	1 ~ 12V	±1.5%	2.2A	500kHz	800μA	SOP-8FD
XC9252	PWM/PFM	90%	3.0 ~ 30V	1.5 ~ Vin V	±2%	3A	280kHz, 550kHz	30μA	TSSOP-16, USP-10B
XC9260	HiSAT COT	90%	2.7 ~ 5.5V	0.8 ~ 3.6V	±2%	1.5A	1.2MHz, 3MHz	250μA	SOT-89-5, USP-6C
XC9261	HiSAT COT	90%	2.7 ~ 5.5V	0.8 ~ 3.6V	±2%	1.5A	1.2MHz, 3MHz	15μA	SOT-89-5, USP-6C
XC9262	HiSAT COT	92%	2.5 ~ 5.5V	0.8 ~ 3.6V	±2%	1.5A	1.2MHz, 3MHz	250μA	LGA-8B0L
XC9263	PWM	90%	3.0 ~ 18.0V	1.0 ~ 15.0V	±1.5%	0.5A	500kHz, 1.2MHz, 2.4MHz	12μA	USP-6C
XC9264	PWM/PFM	90%	3.0 ~ 18.0V	1.0 ~ 15.0V	±1.5%	0.5A	500kHz, 1.2MHz, 2.4MHz	12μA	USP-6C
XC9265	PFM	90%	2.0 ~ 6.0V	1.0 ~ 4.0V	±2%	0.2A	-	0.5μA	SOT-25, USP-6EL
XC9266	PWM, PWM/PFM	93%	2.7~5.5V	0.8~3.6V	±1%	6A	1.2MHz, 3MHz	40μA	QFN-24
XC9270	PWM	91%	7.0 ~ 30V	1.2 ~ 12V	±2%	2A	300kHz, 500kHz	200μA	SOP-8FD
XC9271	PWM/PFM	91%	7.0 ~ 30V	1.2 ~ 12V	±2%	2A	300kHz, 500kHz	200μA	SOP-8FD

STEP-UP/DOWN DC/DC CONVERTERS & CONTROLLERS

SERIES	CONTROL	EFFICIENCY	OPERATING VOLTAGE	OUTPUT VOLTAGE	ACCURACY	OSCILLATION FREQUENCY	OUTPUT CURRENT	PACKAGE
XC9303	PWM/PFM Manual	84%	2.0 ~ 10V	ADJ=0.9V	±2%	300kHz	800mA (V_{IN}=2.7V, V_{OUT}=3.3V)	MSOP-8A
XC9306	PWM/PFM	92%	2.5~5.5V	0.8~5.0V	±2%	6MHz	800mA (VIN=3.1V, VOUT=4.5V)	WLP-20

MULTI CHANNEL DC/DC CONVERTERS & CONTROLLERS

SERIES	TYPE	CONTROL	EFFICIENCY	OPERATING VOLTAGE	OUTPUT VOLTAGE	ACCURACY	OSCILLATION FREQUENCY	OUTPUT CURRENT	PACKAGE
XC9501	Step-up + Step-up	PWM/PFM Manual	83%	0.9 ~ 10V	ADJ=0.9V	±2.0%	100kHz , 180kHz 300kHz , 500kHz	I_{OUT}= ~ 200mA (I_{IN}=1.8V, V_{OUT}=3.3V)	MSOP-10, USP-10
XC9502	Step-up	PWM/PFM Manual	83%	2.0 ~ 10V	ADJ=0.9V	±2.0%	180kHz , 300kHz , 500kHz	I_{OUT}= ~ 300mA (I_{IN}=1.8V, V_{OUT}=3.3V)	MSOP-10, USP-10
	Step-down	PWM/PFM Manual	92%		ADJ=0.9V	±2.0%	180kHz , 300kHz , 500kHz	I_{OUT}= ~ 1000mA (I_{IN}=3.3V, V_{OUT}=1.8V)	
XC9503	Step-down + Step-down	PWM/PFM Manual	92%	2.0 ~ 10V	ADJ=0.9V	±2.0%	180kHz , 300kHz , 500kHz	I_{OUT}= ~ 1000mA (I_{IN}=5.0V, V_{OUT}=3.3V)	MSOP-10, USP-10
XC9504	Step-up		83%	2.0 ~ 10V	ADJ=0.9V		180kHz , 300kHz , 500kHz	I_{OUT}= ~ 20mA (I_{IN}=3.3V, V_{OUT}=15V)	MSOP-10, USP-10
	Inverting		76%		ADJ=0.9V			I_{OUT}= ~ -20mA (I_{IN}=3.3V, V_{OUT}=-7.0V)	
XC9505	Step-down	PWM/PFM Manual	92%	2.0 ~ 10V	ADJ=0.9V	±2.0%	180kHz , 300kHz , 500kHz	I_{OUT}= ~ 1000mA (V_{IN}=5.0V, V_{OUT}=3.3V)	MSOP-10, USP-10
	Inverting	PWM/PFM Manual	76%		ADJ=0.9V	±2.0%		I_{OUT}= ~ -200mA (V_{IN}=5.0V, V_{OUT}=-3.3V)	
XC9509	Step-down DC/DC + LDO + VD	PWM/PFM Manual	90%	2.4 ~ 6.0V	DC/DC 0.9 ~ 4.0V VR 0.9 ~ 4.0V	±2.0%	300kHz , 600kHz , 1.2MHz	DCDC 600mA[MSOP10] 400mA[USP-10] VR 300mA	MSOP-10, USP-10
XC9515	Step-down+ Step-down + VD	PWM	95%	2.5 ~ 5.5V	V_{OUT}1=1.2 ~ 4.0V V_{OUT}2=1.2 ~ 4.0V	±2.0%	1MHz	800mA	QFN-20
XC9516	Step-up + Positive and Negative Charge Pump	-	95%	2.5 ~ 5.5V	19V (Step-up DC/DC)	±1.5%	300kHz ~ 1.2MHz	500mA (V_{IN}=5.0V, V_{OUT}=9.0V)	QFN-20
XC9519	Step-up	PWM PWM/PFM	83%	2.7 ~ 5.5V	4.0~18.0V(Step-up) 15.0~-4.0V(Inverting)	±1.5%	1.2MHz	500mA@V_{IN}=3.7V, (V_{OUTP}=5.0V, V_{OUTN}=-5.0V)	QFN-24
	Inverting								

CHARGE PUMPS

SERIES	TYPE	EFFICIENCY	OPERATING VOLTAGE	OUTPUT VOLTAGE	SUPPLY CURRENT	OSCILLATION FREQUENCY	OUTPUT CURRENT	PACKAGE
XC6351A	Inverter	90%	-1.2 ~ 5.0V	Inverting	310μA	120kHz	10mA	SOT-26, USP-6B
					100μA	35kHz		
XC9801 XC9802	Step-up Doubler	69%	1.8 ~ 5.5V	2.5 ~ 6.0V	80μA	300kHz	80mA (V_{IN}=3.6V, V_{OUT}=5.0V)	MSOP-8A, USP-8

VOLTAGE REGULATORS

SERIES	TYPE	INPUT VOLTAGE	OUTPUT VOLTAGE	ACCURACY	MAX. OUTPUT CURRENT	SUPPLY CURRENT	DROPOUT VOLTAGE@100mA	OUTPUT CAPACITOR	PACKAGE
XB1085	Bipolar 3A	~ 12V	1.5V,1.8V, 2.5V, 3.3V, 5.0V,ADJ	±1%	3000mA	5000μA	1.3V@3A		TO-252
XB1086	Bipolar 1.5A	~ 15V	1.5V,1.8V, 2.5V, 3.3V, 5.0V,ADJ	±1%	1500mA	5000μA	1.3V@1.5A		TO-252
XB1117	Bipolar1A	~ 7V	1.8V, 2.5V, 3.3V, ADJ	±1%	1000mA	6000μA	1.2V@1A		SOT-223
		~ 10V	5.0V						
XC6201	Low Power	2.0 ~ 10V	1.3 ~ 6.0V	±2%(1%)	250mA	2μA	160mV	Ceramic	SOT-25, SOT-89, TO-92, USP-6B
XC6203	Large Current	2.0 ~ 8.0V	1.8 ~ 6.0V	±2%(1%)	400mA	8μA	150mV		SOT-89, SOT-223, TO-92, SOT-23
XC6204	High Speed	2.0 ~ 10.0V	1.8 ~ 6.0V	±2%(1%)	300mA	70μA	200mV	Ceramic	SOT-25, USP-6B, SOT-89-5
XC6205	High Speed	2.0 ~ 10.0V	0.9 ~ 1.75V		150mA				
XC6206	Low Power	1.8 ~ 6.0V	1.2 ~ 5.0V	±2%(1%)	250mA	1μA	160mV	Ceramic	SOT-23, SOT-89, TO-92, USP-6B
XC6209	High Speed	2.0 ~ 10.0V	0.9 ~ 6.0V	±2%	300mA	25μA	200mV	Ceramic	SOT-25, USP-6B, SOT-89-5
XC6210	High Speed Large Current	1.5 ~ 6.0V	0.8 ~ 1.5V	±2%	500mA	35μA	50mV	Ceramic	SOT-25, USP-6B, SOT-89-5
			1.6 ~ 5.0V		700mA				
XC6213	High Speed	2.0 ~ 6.0V	1.2 ~ 5.0V	±2%	150mA	35μA	400mV	Ceramic	SSOT-24, SOT-25, USP-4, USPN-4
XC6214	Large Current	1.8 ~ 6.0V	1.2, 1.5, 1.8, 2.5, 3.0, 3.3V	±2%	500mA	8μA	100mV	Ceramic	SOT-89, TO-252
XC6215	Low Power CE Pin	1.5 ~ 6.0V	0.9 ~ 5.0V	±2%	200mA	0.8μA	320mV	Ceramic	USP-4, SSOT-24, USP-3, SOT-25, USPN-4
XC6216 XE6216	28V Input Low Power Consumption	2.0 ~ 28.0V	2.0 ~ 12.0V ADJ	±2%(1%)	150mA	5μA	1500mV	Ceramic	SOT-25, SOT-89-5, USP-6C, SOT-223, TO-252, SOT-89
XC6217	High Speed "GreenOperation"	1.6 ~ 6.0V	0.8 ~ 4.0V	±2%	200mA	4.5μA	80mV	Ceramic	USP-4D, SOT-25, SSOT-24, USPN-4
XC6218	Positive Voltage	1.5 ~ 6.0V	0.9 ~ 4.0V	±2%	200mA	1μA	200mV	Ceramic	USP-3, SSOT-24
XC6219	High Speed	2.0 ~ 6.0V	0.9 ~ 5.0V	±2%(1%)	300mA	25μA	200mV	Ceramic	SOT-25, USP-6B, SOT-89-5
XC6220	1A LDO	1.6 ~ 6.0V	0.8 ~ 5.0V	±1%	1000mA	8μA	20mV	Ceramic	USP-6C, SOT-25, SOT-89-5, SOP-8FD
XC6221	High Speed	1.6 ~ 6.0V	0.8 ~ 5.0V	±2%(1%)	200mA	25μA	80mV	Ceramic	USPN-4, USP-4, SOT-25, SSOT-24
XC6222	High Speed	1.7 ~ 6.0V	0.8 ~ 5.0V	±1%	700mA	100μA	40mV	Ceramic	USP-6C, SOT-25, SOT-89-5
XC6223	High Speed	1.6 ~ 5.5V	1.0 ~ 4.0V	±1%	300mA	100μA	70mV	Ceramic	USPQ-4B03, SSOT-24, SOT-25, SOT-89-5, USP-4
XC6224	Low Power High Speed	1.2 ~ 3.6V	0.8 ~ 3.0V	±1.5%	150mA	33μA	210mV	Ceramic	USPN-4B02, SOT-25
XC6225	High Speed	2.5 ~ 6.0V	0.8 ~ 5.0V	±2%	30mA	25μA	70mV	Ceramic	USP-4, SOT-25, SSOT-24
XC6227	High Speed Reverse Current Protection	1.7 ~ 6.0V	0.8 ~ 5.0V	±1%	700mA	100μA	40mV	Ceramic	USP-6C, SOT-25, SOT-89-5
XC6229	Ultra Small Inrush Current Protection	1.6 ~ 5.5V	1.2 ~ 4.0V	±1%	300mA	100μA	60mV	Ceramic	LGA-4B01
XC6231	High Speed	2.0 ~ 10V	0.9 ~ 5.5V	±2%	500mA	35μA	200mV	Ceramic	SOT-89-5
XC6233	High Speed Inrush Current Protection	1.7 ~ 5.5V	1.2 ~ 3.6V	±1%	200mA	45μA	140mV	Ceramic	USP-4, SSOT-24, SOT-25, USPQ-4B04
XC6501	C_L Capacitor-Less	1.4 ~ 6.0V	1.2 ~ 5.0V	±1%	200mA	13μA	150mV	-	USP-3, USP-4, USPN-4, SSOT-24, SOT-25
XC6503	C_L Capacitor-Less High Speed	1.7 ~ 6.0V	1.2 ~ 5.0V	±1%	500mA	15μA	60mV	-	USP-4, SOT-25, SOT-89-5, SOT-89
XC6504	C_L Capacitor-Less Ultra Low IQ	1.4 ~ 6.0V	1.1 ~ 5.0V	±1%	150mA	0.6μA	340mV	-	USPN-4B02, SSOT-24, SOT-25, USPQ-4B04
XC6505	10.5V Operation High Speed	1.7 ~ 10.5V	1.5 ~ 8.0V	±1%	200mA	5.5μA	190mV	Ceramic	USP-6C, SOT-25, SOT-89-5
XC6601	N Channel Driver Low Voltage	1.0 ~ 3.0V	0.7 ~ 1.8V	±20mV	400mA	25μA	38mV	Ceramic	USP-6C, SOT-25, SOT-89-5
XC6602	N Channel Driver Low Voltage 1A	0.5 ~ 3.0V	0.5 ~ 1.8V	±15mV V_{OU}<1.2V ±20mV V_{OUT}≥1.2V	1A	100μA	15mV	Ceramic	USP-6C, SOT-26W, SOT-89-5, WLP-5-02
XC6603	Low Input Voltage (Adjustable Soft-start time with an external component)	0.5 ~ 3.0V	0.5 ~ 1.8V	±0.015V ±0.020V	1A	100μA	15mV	Ceramic	USP-6C, SOT-26W
XC6604	Low Input Voltage (Adjustable Current Limit with an external component)	0.5 ~ 3.0V	0.5 ~ 1.8V	±0.015V ±0.020V	1A	100μA	15mV	Ceramic	USP-6C, SOT-26W
XC6701	28V Operation High Speed	2 ~ 28V	1.8 ~ 18.0V	±2%	150mA	50μA	1300mV	Ceramic	SOT-25, SOT-89, SOT-89-5, USP-6C, SOT-223, TO-252
XC6702	36V Operation High Speed	4.5V ~ 36V	1.8V ~ 18.0V	±1%	300mA	40μA	450mV	Ceramic	SOP-8FD , SOT-89-5 , USP-6C
XC62FJ	Low Power	1.8 ~ 10V	1.7 ~ 6.0V	±2%	200mA	2μA	160mV	Ceramic	SOT-89
XC62KN	Negative Voltage	-2.1 ~ -10V	-2.1 ~ -6.0V	±2%(1%)	100mA	3μA	380mV		SOT-23, SOT-89, TO-92, USP-6B
XC6901	Negative Voltage	-2.4 ~ -12.4V	-0.9 ~ -12.0V	±1.5%	200mA	100μA	400mV	Ceramic	SOT-25, SOT-89-5, USP-6C
XC6902	Negative Voltage	-2.4 ~ -16.0V	-0.9 ~ -12.0V	±1.5%	200mA	100μA	400mV	Ceramic	SOT-23, SOT-89, USP-6C

DUAL CHANNEL VOLTAGE REGULATORS

SERIES	TYPE	INPUT VOLTAGE	OUTPUT VOLTAGE	ACCURACY	MAX. OUTPUT CURRENT	SUPPLY CURRENT	DROPOUT VOLTAGE@100mA	OUTPUT CAPACITOR	PACKAGE
XC6415	High Speed Dual	1.5 ~ 6.0V	0.8 ~ 5.0V	±1%	200mA	28μA	95mV	Ceramic	SOT-26, USPN-6, USP-6C
XC6416	Dual	1.5 ~ 6.0V	0.8 ~ 4.0V	±1%	200mA	10μA	95mV	Ceramic	USP-6C, SOT-26
XC6419	ON/OFF 2ch	1.5 ~ 6.0V	0.8 ~ 5.0V	±2%(1%)	300mA (ch1) 100mA (ch2)	28μA (ch1) 23μA (ch2)	60mV(ch1) 230mV (ch2)	Ceramic	USP-6C, SOT-26
XC6420	Small 150mA High Speed	1.6 ~ 5.5V	1.2 ~ 3.6V	±1.5%	150mA	55μA	130mV	Ceramic	SOT-26, USPN-6, USP-6B04
XC6421	Inrush Current Protection 300mA	1.6 ~ 5.5V	1.2 ~ 3.6V	±1%	300mA	90μA	70mV	Ceramic	USP-6C
XC6423	300mA High Speed Dual	1.6 ~ 5.5V	1.2 ~ 3.6V	±1%	300mA	90μA	95mV	Ceramic	LGA-6A01

VOLTAGE REGULATORS WITH BUILT-IN DETECTOR

SERIES	TYPE	INPUT VOLTAGE	OUTPUT VOLTAGE	ACCURACY	MAX. OUTPUT CURRENT	SUPPLY CURRENT	DROPOUT VOLTAGE@100mA	OUTPUT CAPACITOR	PACKAGE
XC6402	700mA LDO with VD	1.5 ~ 6.0V	0.8 ~ 5.0V	±2%	700mA	35μA	50mV	Ceramic	SOT-25, SOT-89-5, USP-6B
XC6403	300mA LDO with VD	2.0 ~ 6.0V	0.9 ~ 5.6V	±2%	300mA	35μA	200mV	Ceramic	SOT-25, SOT-89-5, USP-6B
XC6404	500mA LDO with VD	2.0 ~ 6.0V	0.9 ~ 5.1V	±2%	500mA	35μA	200mV	Ceramic	SOT-25, SOT-89-5, USP-6B
XC6405	500mA LDO with VD	2.0 ~ 6.0V	0.9 ~ 5.1V	±2%	500mA	90μA	200mV	Ceramic	SOT-25, SOT-89-5
XC6408	Large Current	2.0 ~ 28.0V	2.0 ~ 18.0V	±1%	150mA	8μA	1100mV	Ceramic	SOT-89-5, SOT-25, USP-6C
XC6413	10V Input LDO with VD	2.0 ~ 10V	0.9 ~ 5.5V	±2%	300mA	35μA	200mV	Ceramic	SOT-25, SOT-89-5, USP-6B
XC6414	10V Input LDO with VD	2.0 ~ 10V	0.9 ~ 5.5V	±2%	500mA	35μA	200mV	Ceramic	SOT-25, SOT-89-5, USP-6B

POWER SWITCHES

SERIES	TYPE	INPUT VOLTAGE	OUTPUT CURRENT	SUPPLY CURRENT	ON RESISTANCE	PACKAGE
XC8102	Low On-Resistance	1.2 ~ 6.0V	0.4A	3μA	0.28V@V_{IN}=6.0V	USPN-4, USP-4, SOT-25, SSOT-24
XC8107	Low On-Resistance	2.5 ~ 5.5V	0.5A , 1A, 1.5A, 2A	40μA	0.085V	USP-6C, SOT25
XC8108	Low On-Resistance	2.5 ~ 5.5V	0.9A~2A	40μA	0.085V	USP-6C
XC8109	Low On-Resistance	2.5 ~ 5.5V	0.075A~0.9A	40μA	0.085V	USP-6C

BATTERY CHARGER ICs

SERIES	TYPE	OPERATING VOLATGE RANGE		CHARGE TERMINATION VOLTAGE	CHARGE CURRENT	SUPPLY CURRENT	PACKAGE
		TYP.	MAX.				
XC6801	1Cell+Li-ion	4.25V	6.0V	4.2V±0.7%	500mA	12μA	SOT-89-5 SOT-25, USP-6C
XC6802	1Cell+Li-ion	4.25V	6.0V	4.2V±0.7%	800mA	15μA	SOT-89-5, SOT-25, USP-6C, USP-6EL
XC6803	1Cell+Li-ion	4.5V	6.0V	4.2V±0.7%	40 ~ 280mA	50μA	USP-6EL
XC6804	1Cell+Li-ion	4.5V	6.0V	4.2V±0.7%	200 ~ 800mA	50μA	USP-6EL, SOP-8FD
XC6805	1Cell+Li-ion	4.5V	6.0V	4.2V±0.7%	5 ~ 40mA	50μA	USP-6EL

MULTI CHIP MODULES

SERIES	TYPE	INPUT VOLTAGE	OUTPUT VOLTAGE	ACCURACY	MAX. OUTPUT CURRENT	SUPPLY CURRENT	DROPOUT VOLTAGE @100mA	OUTPUT CAPACITOR	PACKAGE
XCM406	2 Channel Voltage Regulator	1.5 ~ 6.0V	0.8 ~ 5.0V	±1%	700mA	35μA	50mV	Ceramic	USP-12B01

SERIES	TYPE	CONTROL	EFFICIENCY	OPERATING VOLTAGE	OUTPUT VOLTAGE	ACCURACY	OSCILLATION FREQUENCY	OUTPUT CURRENT	PACKAGE
XCM517	2 Channel Step-down DC/DC	PWM PWM/PFM	92%	2.7 ~ 6.0V	0.8 ~ 4.0V	±2%	1.2MHz 3MHz	600mA	USP-12B01
XCM519	Step-down DC/DC + LDO	PWM/PFM	92%	2.7 ~ 6.0V	0.8 ~ 4.0V	±2%	1.2MHz 3MHz	600mA	USP-12B01
				2.5 ~ 6.0V	0.7 ~ 1.8V	±0.02V	-	400mA	
XCM526	Step-down DC/DC	PWM PWM/PFM	92%	4.0 ~ 16.0V	1.2V ~ Externally Set	±2%	1MHz 500kHz	3A	USP-12B01

VOLTAGE DETECTORS

SERIES	TYPE	DETECT VOLTAGE	ACCURACY	OPERATING VOLTAGE	SUPPLY CURRENT	OUTPUT	PACKAGE
XC61C	Standard	0.8 ~ 1.5V	±2%	0.7 ~ 6.0V	0.7μA (VIN=1.5V)	Open Drain CMOS	SSOT-24, SOT-23, SOT-89
XE61C		1.6 ~ 6.0V	±2% (±1%)	0.7 ~ 10V			
XC61F	Delay Built-in	1.6 ~ 6.0V	±2%	0.7 ~ 10V	1.0μA (VIN=2V)	Open Drain CMOS	SOT-23 SOT-89
XC61G	Small Package	0.8 ~ 1.5V	±2%	0.7 ~ 6.0V	0.7μA (VIN=1.5V)	Open Drain CMOS	USP-3
		1.6 ~ 6.0V	±2%	0.7 ~ 10V			
XC61H	Delay Circuit Built-in	1.6 ~ 6.0V	±2%	0.7 ~ 10V	1.0μA(TYP.)(VIN=2.0V)	Open Drain CMOS	SOT-23
XC6101~6103	Watchdog & Manual Reset	1.6 ~ 5.0V	±2%	1.0 ~ 6.0V	5μA (TYP.)	Open Drain CMOS	SOT-25, USP-6C
XC6111~6113	Watchdog & Manual Reset	1.6 ~ 5.0V	±2%	1.0 ~ 6.0V	5μA (TYP.)	Open Drain CMOS	SOT-25, USP-6C
XC6104~6105	Watchdog	1.6 ~ 5.0V	±2%	1.0 ~ 6.0V	5μA (TYP.)	Open Drain CMOS	SOT-25, USP-6C
XC6114~6115	Watchdog	1.6 ~ 5.0V	±2%	1.0 ~ 6.0V	5μA (TYP.)	Open Drain CMOS	SOT-25, USP-6C
XC6118	Separated Sense Pin	0.8 ~ 5.0V	±2%	1.0 ~ 6.0V	0.8μA (VIN=2.0V)	Open Drain CMOS	USP-4, SOT-25
XC6119	External Delay Capacitor	0.8 ~ 5.0V	±2%	0.7 ~ 6.0V	0.9μA (VIN=2.0V)	Open Drain CMOS	USPN-4, SSOT-24
XC6120	Super Small, Low Supply	1.0 ~ 5.0V	±2%	0.7 ~ 6.0V	0.6μA (VIN=2.0V)	Open Drain CMOS	USP-3, SSOT-24
XC6121~24	Watchdog, ON/OFF	1.6 ~ 5.0V	±2%	1.0 ~ 6.0V	5μA (VIN=VDF×0.9) 10μA (VIN=VDF×1.1)	Open Drain CMOS	SOT-25, USP-6C
XC6126	Ultra Small High Accuracy	1.5 ~ 5.5V	±0.8%	0.7 ~ 6.0V	0.6μA(TYP.)(VIN=1.62V)	Open Drain CMOS	USPN-4B0, SSOT-24
XC6127	Manual Reset Function High Accuracy	1.5 ~ 5.5V	±0.8%	0.7 ~ 6.0V	0.6μA(TYP.)(VIN=1.62V)	Open Drain CMOS	USPN-4, SSOT-24, SOT-25
XC6130~31	Watchdog ON/OFF	1.6 ~ 5.0V	±1%	1.5 ~ 6.0V	8.1μA (VIN=VDF×0.9) 9.8μA (VIN=VDF×1.1)	Open Drain	SOT-26
XC6132	Separated Sense Pin	0.8 ~ 2.0V	±1.2%	1.6 ~ 6.0V	1.28μA	Open Drain CMOS	USP-6C, SOT26
XC6133	Separated Sense Pin	1.0 ~ 5.0V	±1.2%	1.6 ~ 6.0V	1.28μA	Open Drain CMOS	USP-6C, SOT26
XC6134	Separated Sense Pin	0.8 ~ 5.0V	±1.2%	1.6 ~ 6.0V	1.28μA	Open Drain CMOS	USP-6C, SOT26

PUSH BUTTON REBOOT CONTROLLER

SERIES	INPUT VOLTAGE RANGE	LOW POWER CONSUMPTION		RE-BOOT DELAY TIME ACCURACY	RE-BOOT TIME	PACKAGE
XC6190	1.65 ~ 6.0V	0.01μA (typ.)	0.1μA (max)	±5%	0.4s±10%	USPN-6, USPN-6B01

TEMPERATURE SENSOR

SERIES	TYPE	TEMPERATURE COEFFICIENTS	DETECTABLE TEMPERATURE RANGE	INPUT VOLTAGE	OUTPUT VOLTAGE	ACCURACY	SUPPLY CURRENT	PACKAGE
XC3101	Analog Output	-11.77mV/°C	-40°C ~ +100°C	2.7 ~ 5.5V	1.6V@25°C	±3.5°C	3.5μA	USPN-4 SSOT-24

HALL IC (MAGNETIC SENSOR)

SERIES	TYPE	OPERATING VOLTAGE		AVERAGE SUPPLY CURRENT	OPERATING MAGNETIC FLUX DENSITY	HYSTERISIS WIDTH	PACKAGE
		(TYP.)	(MAX.)				
XC3202B	Low power consumption	2.4V	5.5V	8μA	3mT	1mT	SOT-23D, QFN-0601

POWER MOSFETS

SERIES	CHANNEL	Vdss (MAX.)	Vgss (MAX.)	Id (MAX.)	Rds_ON (MAX.)	DRIVING VOLTAGE (MIN.)	PACKAGE
XP151	Nch (Single)	20 ~ 30V	±8 ~ 20V	0.8 ~ 1A	0.1 ~ 0.33Ω	1.5 ~ 4.5V	SOT-23
XP152	Pch (Single)	-20 ~ -30V	±12 ~ 20V	-0.5 ~ -0.7A	0.3 ~ 0.48Ω	-2.5 ~ -4.5V	SOT-23
XP202A0003MR-G	P-ch (Single)	-30V	±20v	-3A	0.067Ω	-4.0V	SOT23
XP161	Nch (Single)	20 ~ 30V	±8 ~ 20V	3 ~ 4A	0.05 ~ 0.18Ω	1.5 ~ 4.5V	SOT-89
XP162	Pch (Single)	-20 ~ -30V	±12 ~ 20V	-1.5 ~ -2.5A	0.17 ~ 0.45Ω	-2.5 ~ -4.5V	SOT-89
XP202A0003PR-G	P-ch (Single)	-30V	±20v	-5A	0.07Ω	-4.0V	SOT-89

OSCILLATOR ICs

SERIES	TYPE	OSCILLATION FREQUENCY	OPERATING VOLTAGE RANGE	SUPPLY CURRENT	PACKAGE
XC2163	Overtone crystal oscillator	20M ~ 125MHz	3.3V(±10%) 5.0V(±10%)	15mA(fOSC=120MHz)	SOT-26
XC2164	Fundamental crystal oscillator	4M ~ 30MHz	3.3V(±10%) 5.0V(±10%)	5mA(fOSC =30MHz)	SOT-26
	Overtone crystal oscillator	20M ~ 125MHz		10.5mA(fOSC=125MHz)	
XC2165	Fundamental crystal oscillator with low voltage operation	8M ~ 120MHz	1.5 ~ 3.6V	5mA(fOSC=70MHz)	SOT-26
XC2301	Tri-State Buffer IC	160MHz	3.3V±10%	13mA(fIN=fOUT=160MHz)	SOT-26

PLL CLOCK GENERATOR ICs

SERIES	TYPE	INPUT FREQUENCY	OUTPUT FREQUENCY	OPERATING VOLTAGE RANGE	PACKAGE
XC2173	Fundamental Crystal Oscillator with PLL Circuit	10 ~ 25MHz (OSCILLATION FREQUENCY)	50 ~ 125MHz(V_{DD}=3.3V), 80 ~ 160MHz(V_{DD}=5.0V)	3.3V(±10%) 5.0V(±10%)	SOT-26
XC25BS7	Low voltage PLL clock generator	32kHz ~ 30MHz	1 ~ 100MHz	2.5 ~ 5.5V	SOT-25, USP-6C
XC25BS8	Low Voltage PLL clock generator	8kHz ~ 36MHz	1 ~ 100MHz	2.5 ~ 5.5V	SOT-26W, USP-6C

SCHOTTKY BARRIER DIODES

SERIES	VR(V)	IF(A)	VF(TYP.)	IR(MAX.)	CT@VR=10V,F=1MHZ	PACKAGE
XBS013R1DR-G	30	0.1	0.46V@10mA (MAX.)	0.3μA@VR=10V	2pF	USP-2B01
XBS013S15R-G	30	0.1	0.71V@100mA	2μA@VR=25V	6pF	SOD-523
XBS013S16R-G	30	0.1	0.71V@100mA	2μA@VR=25V	6pF	SOD-723
XBS013S1CR-G	30	0.1	0.71V@100mA	2μA@VR=25V	2pF	USP-2B02
XBS013V1DR-G	30	0.1	0.37V@10mA (MAX.)	7μA@VR=10V	2pF	USP-2B01
XBS024S15R-G	40	0.2	0.53V@200mA	2μA@VR=40V	5pF	SOD-523
XBS053V13R-G	30	0.5	0.40V@500mA	100μA@VR=20V	12pF	SOD-323A
XBS053V15R-G	30	0.5	0.40V@500mA	100μA@VR=20V	12pF	SOD-523
XBS104P11R-G	40	1	0.56V@1A	500μA@VR=40V	230pF	SOD-123P
XBS104S13R-G	40	1	0.49V@1A	200μA@VR=40V	35pF	SOD-323A
XBS104S14R-G	40	1	0.49V@1A	200μA@VR=40V	35pF	SOD-123A
XBS104V14R-G	40	1	0.365V@1A	2mA@VR=40V	150pF	SOD-123A
XBS203V19R-G	30	2	0.35V@2A	3mA@VR=30V	110pF	SMA-XG
XBS204V19R-G	40	2	0.46V@2A	0.1mA@VR=40V	75pF	SMA-XG
XBS303V19R-G	30	3	0.355V@3A	3mA@VR=30V	385pF	SMA-XG
XBS303V29R-G	30	3	0.39V@3A	0.9mA@VR=30V	190pF	SMA-XG
XBS304F11R-G	40	3	0.45V@3A	1mA@VR=20V	120pF	SMA-PG
XBS304S19R-G	40	3	0.465V@3A	300μA@VR=40V	180pF	SMA-XG
XBS306P11R-G	60	3	0.75V@3A	100μA@VR=60V	80pF	SMA-PG
XBS306S19R-G	60	3	0.5V@3A	300μA@VR=60V	75pF	SMA-XG

TRANSIENT VOLTAGE SUPPRESSORS (TVS)

SERIES	BREAKDOWN VOLTAGE (MIN)	LEAKAGE CURRENT (MAX)	INTER-TERMINAL CAPACITY	ESD DURABILITY	NUMBER OF ELEMENTS	PACKAGE
XBP06V4E4GR-R	6.4V	1.0V	40pF	30kV	4	USP-4
XBP06V4E2HR-G	6.4V	1.0V	40pF	30kV	2	USP-3
XBP06V1E4MR-G	6.1V	2.5V	170pF	30kV	4	SOT-25
XBP1001-G	6.2V	1.0V	1.2pF	8kV	5	SOT-563
XBP1004-G	6.2V	1.0V	1.2pF	8kV	5	SOT-543
XBP1006-G	6.0V	1.2V	1pF	8kV	4	SOT-23P
XBP1007-G	27.27V	1.0V	3pF	8kV	3	SOD-323P
XBP1008-G	6.0V	20V	1pF	8kV	4	SOT-23P
XBP1009-G	6.0V	1.0V	0.35pF	25kV	2	DFN2L
XBP1010-G	6.2V	1.0V	35pF	8kV	1	SOD-923
XBP1011-G	6.0V	5.0V	110pF	25kV	1	SOD-523P
XBP1012-G	13.3V	1.0V	100pF	8kV	2	SOD-323P
XBP1013-G	6.0V	10V	300pF	25kV	1	SOD-323P

SINGLE PHASE BRIDGE RECTIFIERS

SERIES	IF (AV)	VRRM	VF(MAX)	CJ(TYP)	PACKAGE
XBR11A	1A	100 ~ 1000V	1.0V	10pF	MDIP
XBR12A	1.5A	50 ~ 1000V	1.1V	25pF	SDIP

* Values shown in the chart can be changed without any prior notice.

XC6230

2A High Speed LDO with Reverse Current Protection

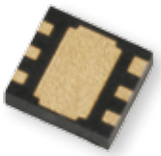
COMING SOON

KEY FEATURES

Output Current	2.0A
Adjustable Current Limit	0.3A ~ 2.6A
On Resistance	0.18Ω @ 3.3V / 1A
Dropout Voltage	0.15V @1.0A
Input Voltage	1.7V ~ 6.0V
Output Voltage	1.2V ~ 5.0V
Quiescent Current	45μA
Reverse Current Protection	YES
Inrush Current Prevention	YES
CL High Speed Discharge	YES
Thermal shutdown	YES
Op. Ambient Temperature	-40°C ~ +105°C

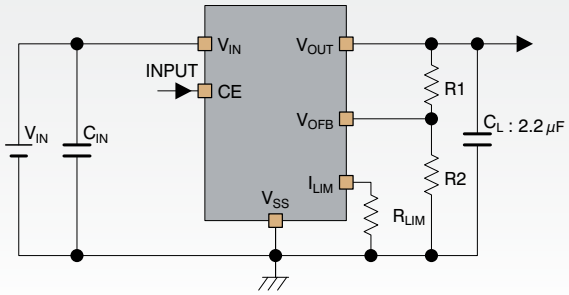


SOP-8FD
(6.0 x 4.9 x 1.55mm)

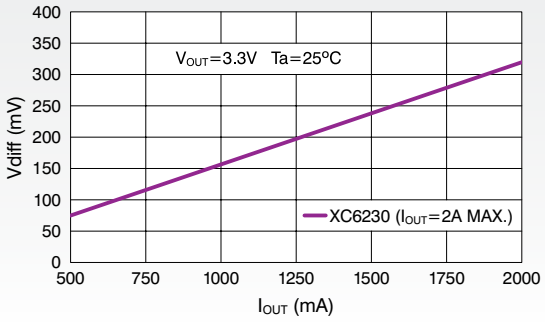


USP-6C
(2.0 x 1.8 x 0.6mm)

TYPICAL APPLICATION CIRCUIT



ULTRA LOW VOLTAGE DROP

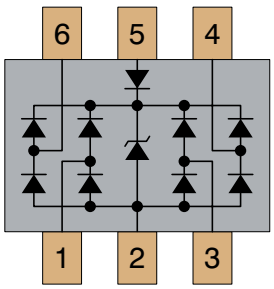


XBP15SRV05W-G

Low Capacitance TVS Diode Array

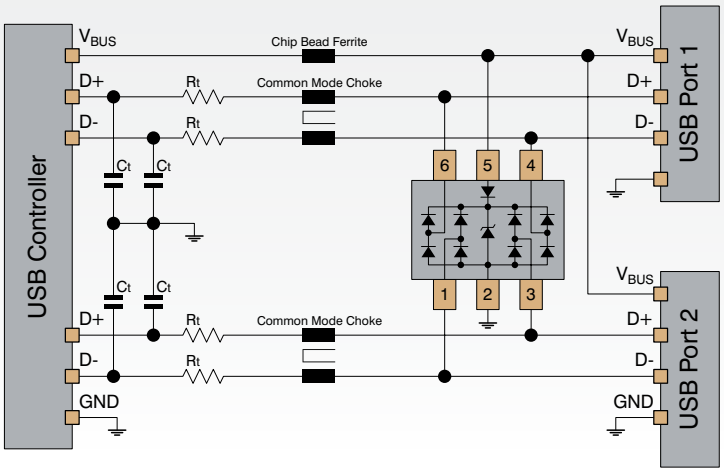
COMING SOON

- IEC61000-4-2 (ESD) Air ±15 kV
- IEC61000-4-2 (ESD) Contact ±10 kV



SOT26P
(2.9 x 2.8 x 1.45mm)

TYPICAL APPLICATION CIRCUIT



ELECTRICAL CHARACTERISTICS

Ta=25°C

PARAMETER	SYMBOL	TEST CONDITIONS	LIMITS MIN.	LIMITS TYP.	LIMITS MAX.	UNIT
Stand-Off Voltage	VRWM		-	-	5	V
Breakdown Voltage	VBR	IR=1mA, Pin5 to Pin2	6	-	9	V
Leakage Current	IR	VR=5V, Pin5 to Pin2	-	-	5	μA
Clamping Voltage (8/20μs)	VC	IPP=5A, I/O pin to Pin2	-	-	10	V
Terminal Capacitance	Ct	VR=0V, f=1MHz Between I/O pin and Pin2	-	1.0	1.2	pF
	Ct	VR=0V, f=1MHz Between I/O pins	-	0.5	0.6	pF

TOREX

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