Torex...Powerfully Small!

400nA Ultra Low Iq PWM/PFM Step-up DC/DC Converter

XC9145 Series Product Overview

October 2025

TOREX Semiconductor

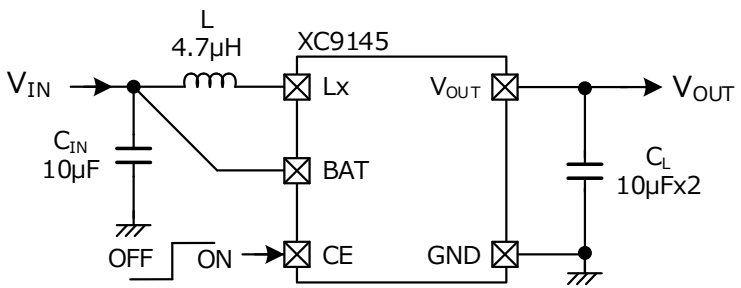
Rev. 1.1

Ultra-Low Iq & High Efficiency / Low Ripple / Longer Battery life

Features

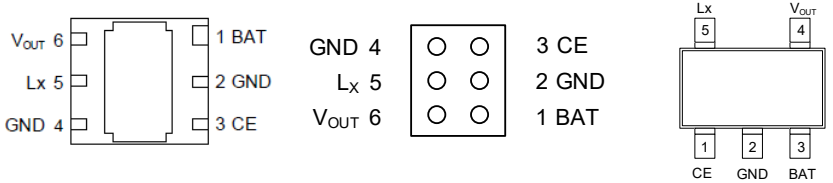
Input Voltage	: 0.65V ~ 5.5V (Absolute Max.: 6.6V)
Operation Start Voltage	: 1.6V
Output Voltage	: 3.0V ~ 5.5V
Oscillation Frequency	: 1.2MHz
Supply Current	: 400nA
Output Current	: 430mA@V_{OUT}=5.0V, V_{BAT}=3.3V 300mA@V_{OUT}=3.3V, V_{BAT}=1.8V
Efficiency	: 89.9% (V_{BAT}=2.4V, V_{OUT}=3.3V, I_{OUT}=10μA) 93.2% (V_{BAT}=2.4V, V_{OUT}=3.3V, I_{OUT}=100mA)
Control Method	: PWM/PFM
Functions	: ON/OFF Load Disconnection Soft-Start
Protection	: Current limit
Packages	: USP-6C, WLP-6-05, SOT-25
Operating Ambient Temp.	: -40℃ ~ 105℃

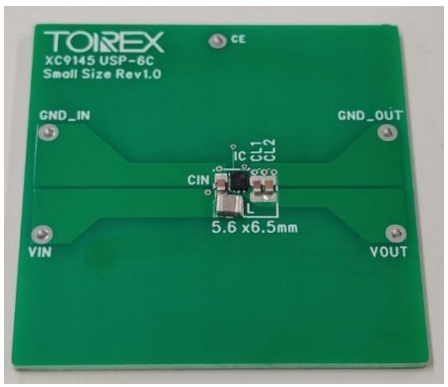
Typical Application Circuit



Packages

USP-6C	WLP-6-05	SOT-25
(1.8x2.0x0.6mm)	(1.28x1.08x0.4mm)	(2.8x2.9x1.3mm)
	TOREX Longevity Program (TLP)	TOREX Longevity Program (TLP)





XC9145 : Overview / Features

■ Step-up DC/DC for low power consumption of MCUs and high performance of IoT devices.

400nA ultra low-Iq Step-up DC/DC XC9145 : PWM/PFM

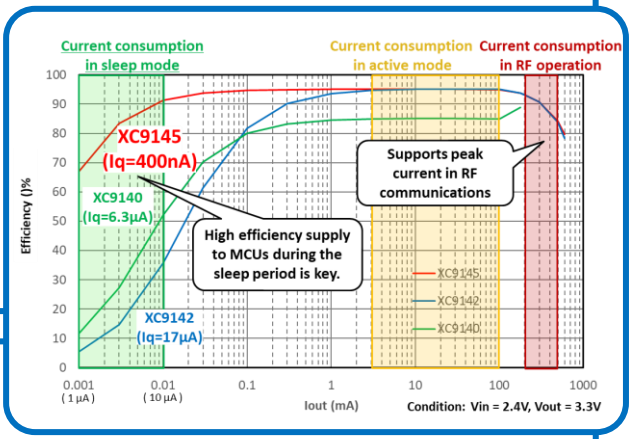
For ultra-low consumption

①

①Further low consumption of MCUs and SoCs

For "**Constant Boosting**" with "**Ultra-low Consumption**".

- ✓ High efficiency at any output current.
- ✓ Therefore, long battery life.
- ✓ Enabling smaller battery capacity / size through improved battery life.



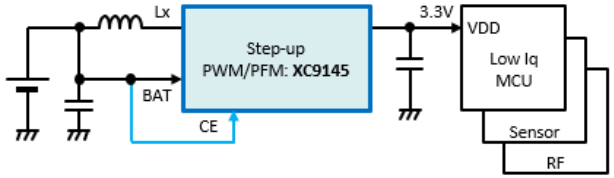
②

Sufficient Current capability

② Higher performance of IoT devices

With "**Sufficient Output Current**" & "**105°C operation compatible**".

- ✓ Peak current support for radio and analog circuits.
- ✓ Wider operating temperature range.



Low power consumption contributes to **Longer Battery Life / Miniaturization**

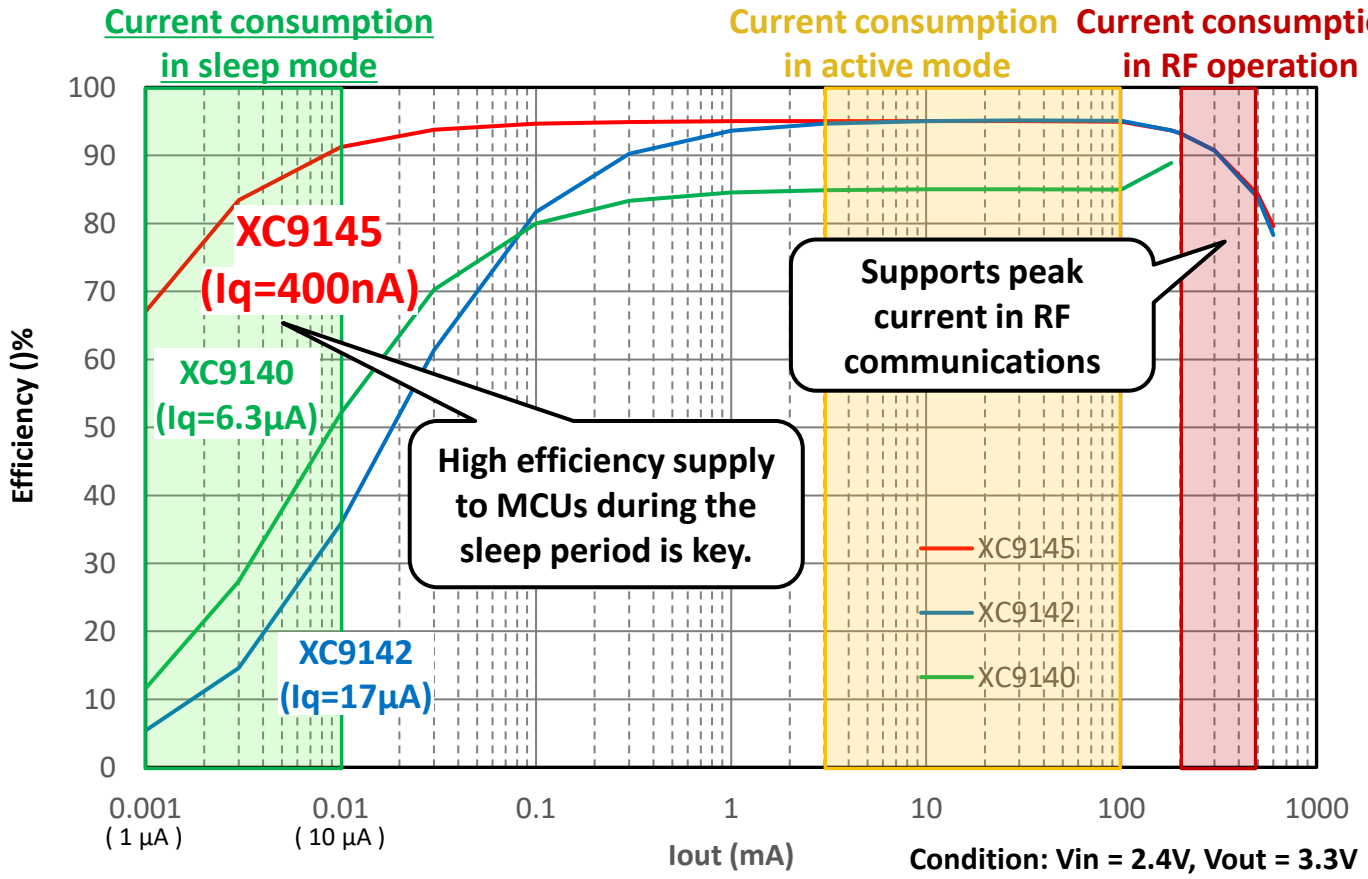
- ➢ Battery-powered IoT / Sensors / Security
- ➢ Handhelds / Wearables & Healthcare

In addition, **+105°C operation** and **Peak Current Capability to RF communications**

- ➢ **Compatible with various Smart Factory sensors**

XC9145 : High efficiency from 1 µA to heavy loads

1. **High efficiency at very light loads:**
   Significantly reduces battery consumption when the MCU is in sleep mode (1 µA to 10 µA).
2. **Current capability for communications:**
   Capable of handling load currents of several hundred mA required for RF communications.



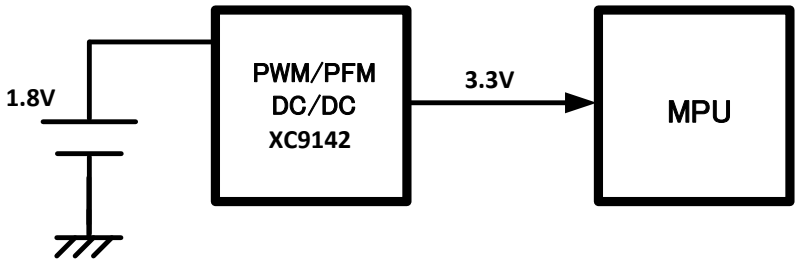
Always highly efficient power supply, from system sleep to peak current for RF communications.

XC9145 : Power Loss / Battery life comparison

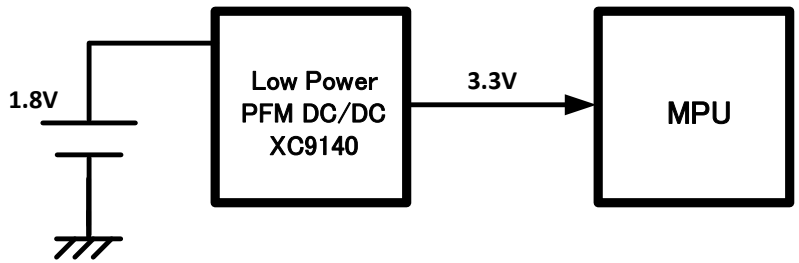
Power Loss Comparison with other products

<Condition> Vin=1.8V → Vout = 3.3V
Active: Iout=10mA@10ms ⇔ Sleep : Iout=5μA@10s

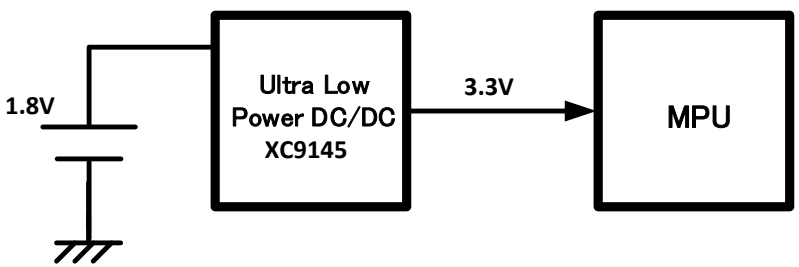
① Conventional PWM/PFM DC/DC : XC9142



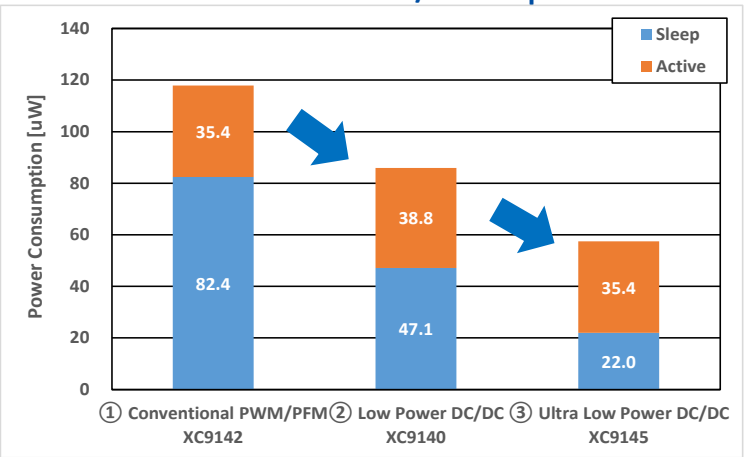
② Low Power PFM DC/DC : XC9140



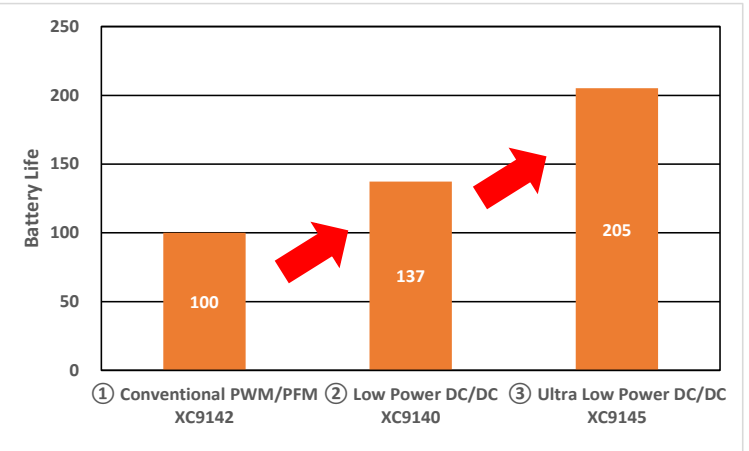
③ Ultra Low Power PFM DC/DC : XC9145



Power Losses at Active / Sleep



Battery life (Comparison with ① as 100)

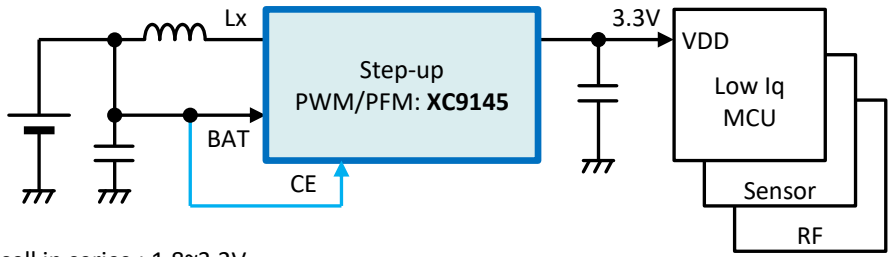


Significant reduction in power consumption
due to reduced losses during sleep.
Enables longer operation and lower capacity of batteries.

XC9145 : Application circuits

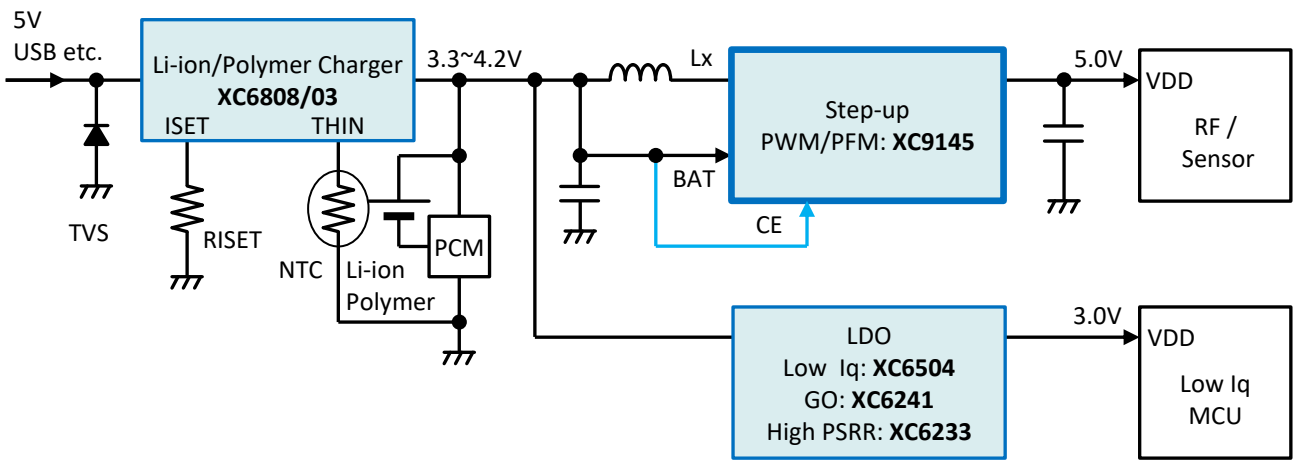
Examples of typical circuits with batteries

1. Products requiring always 3.3 V from a small primary battery.



2-dry cell in series : 1.8~3.2V
Li Primary (MnO_2) : 1.8~3.2V
($SOCl_2$) : 2.4~3.6V

2. Products requiring always 5 V from a Li-ion rechargeable battery.



Application

IoT / Wearable

- Low power IoT modules
- Wearables / Tracker devices
  (Health monitoring, Fitness devices)
- Healthcare / Wearable medical, Nursing care monitors

Consumer products

- Remote controls
- Primary battery portable systems

Various Monitors / Sensors

- Home Security / Home Automation
- Metering devices / Smart meters
- FA equipment / Factory sensors

Step-up from Energy Harvest