



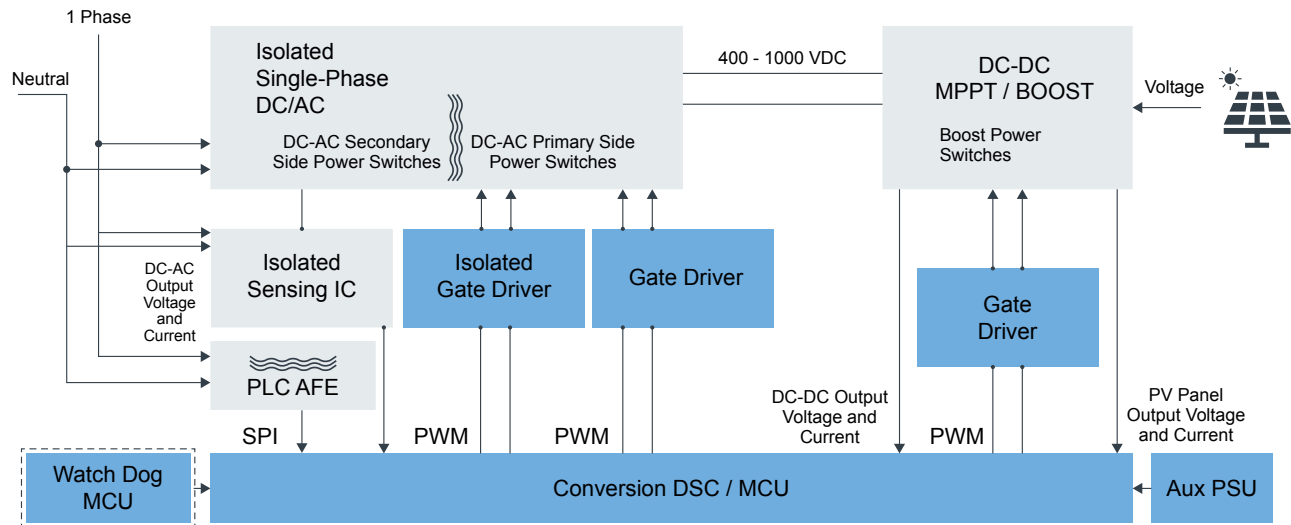
Solar Photovoltaic (PV) Energy Generation

Last Updated: May 16, 2024

NXP offers an array of products for several solar power generation system solutions such as photovoltaic inverters for residential, commercial and utility power generation systems that supply AC power to the grid. NXP solutions enable grid-tied systems (the most common types of photovoltaic systems today) and off-grid solar power systems. Where battery energy storage is desired, the PV inverters could be designed with bi-directional conversion and excess power can also be output to the grid.

Microcontrollers, gate drivers, power management devices and various types of wireless and wired connectivity devices are recommended for string and micro inverters (AC power output) as well as optimizer inverters (DC power output).

Micro Inverter Block Diagram



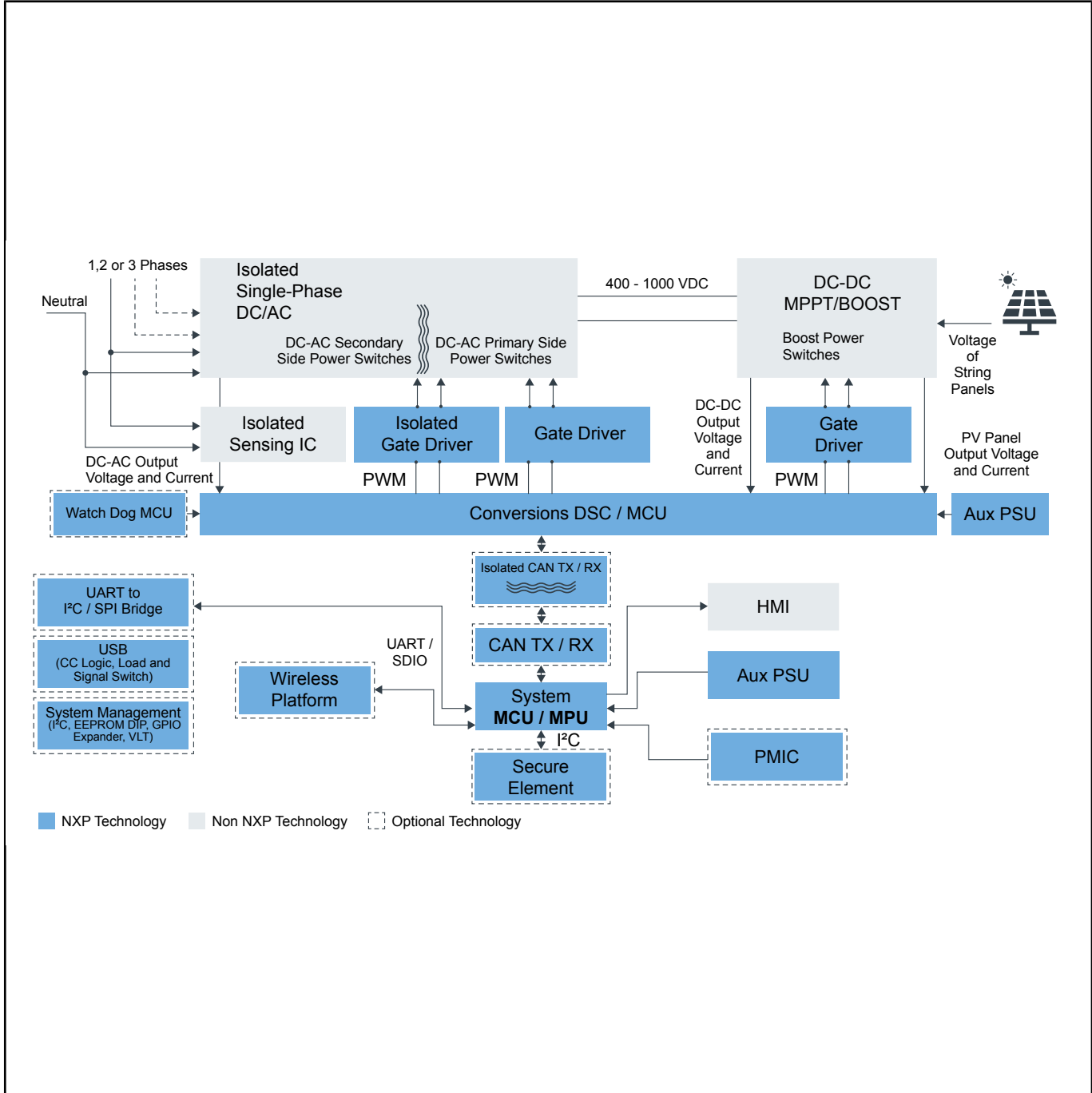
NXP Technology
 Non NXP Technology
 Optional Technology

Recommended Products for Micro Inverter

Conversion DSC / MCU	<ul style="list-style-type: none"> • MCX-A14X-A15X: MCX A14x/15x MCUs with Arm® Cortex® M33, Scalable Device Options, Low Power and Intelligent Peripherals • MCX-N94X-N54X: MCX N94x/54x Highly Integrated Multicore MCUs with On-Chip Accelerators, Intelligent Peripherals and Advanced Security • KV4x: Kinetis KV4x-168 MHz, High Performance Motor / Power Conversion MCUs based on Arm® Cortex®-M4 • MC56F83xxx: Performance Level Digital Signal Controllers, USB FS OTG, CAN FD
Basic System MCU	<ul style="list-style-type: none"> • LPC550x: LPC550x/S0x: Baseline Arm® Cortex®-M33-Based Microcontroller Family • i.MX-RT1170: i.MX RT1170: 1 GHz Crossover MCU with Arm® Cortex® Cores
Isolated Gate Driver	<ul style="list-style-type: none"> • GD3100: Advanced High Voltage Isolated Gate Driver for IGBT and SiC MOSFETs

Aux PSU	<ul style="list-style-type: none"> • TEA1833LTS: GreenChip SMPS Control IC
Gate Driver	<ul style="list-style-type: none"> • GD3100: Advanced High Voltage Isolated Gate Driver for IGBT and SiC MOSFETs
Watch Dog MCU	<ul style="list-style-type: none"> • LPC8N04: Low-Cost Microcontrollers (MCUs) based on Arm® Cortex®-M0+ Core

String Inverter Block Diagram

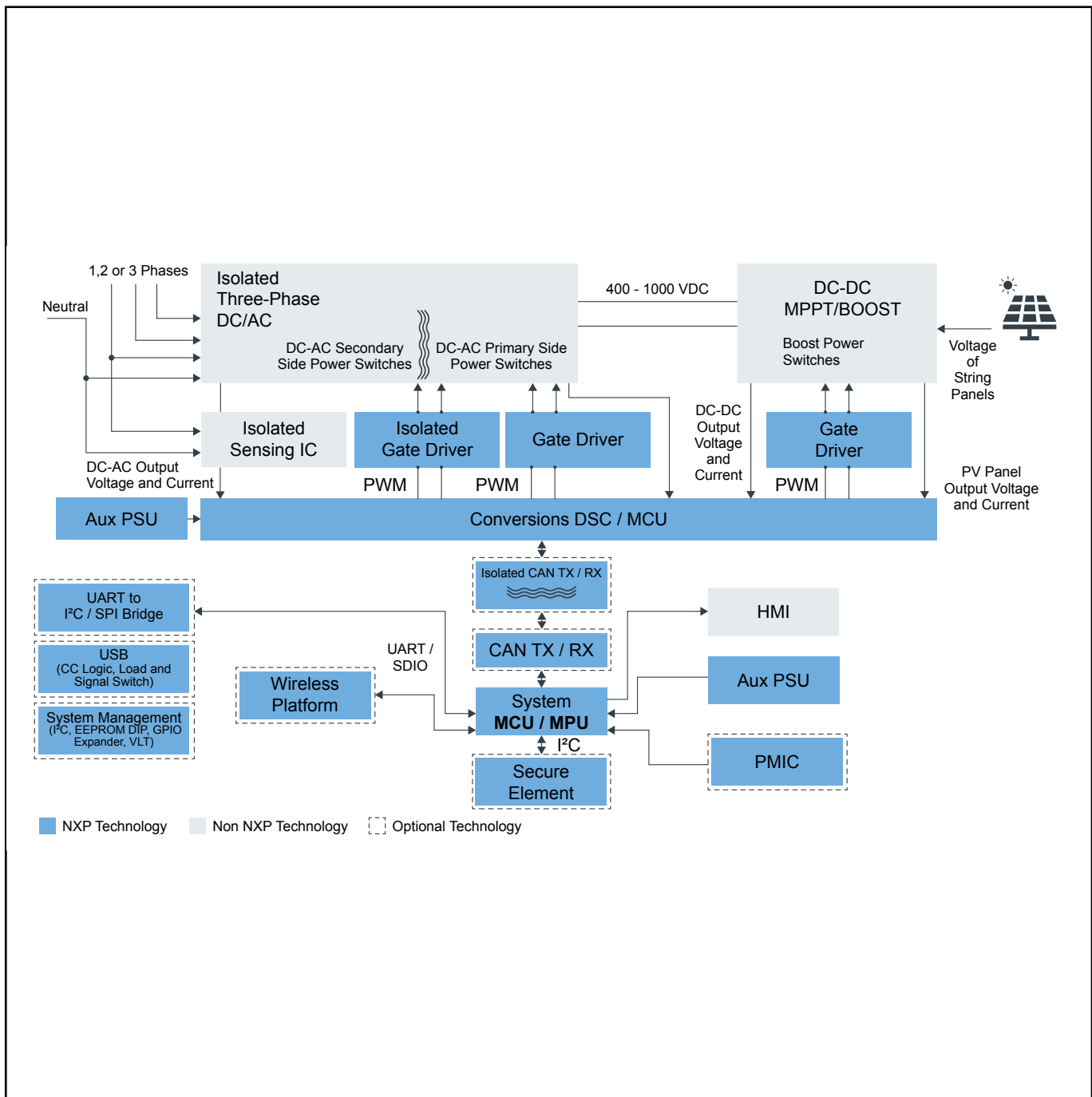


Recommended Products for String Inverter

Conversion DSC / MCU	<ul style="list-style-type: none"> • MCX-A14X-A15X: MCX A14x/15x MCUs with Arm® Cortex® M33, Scalable Device Options, Low Power and Intelligent Peripherals
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	<ul style="list-style-type: none"> • MCX-N94X-N54X: MCX N94x/54x Highly Integrated Multicore MCUs with On-Chip Accelerators, Intelligent Peripherals and Advanced Security • KV4x: Kinetis KV4x-168 MHz, High Performance Motor / Power Conversion MCUs based on Arm® Cortex®-M4 • MC56F83xxx: Performance Level Digital Signal Controllers, USB FS OTG, CAN FD
System MCU / MPU	<ul style="list-style-type: none"> • i.MX-RT1020: i.MX RT1020: Crossover MCU with Arm® Cortex®-M7 • i.MX-RT1060: i.MX RT1060: Crossover MCU with Arm® Cortex®-M7 • i.MX-RT1170: i.MX RT1170: 1 GHz Crossover MCU with Arm® Cortex® Cores • i.MX8: i.MX 8 Family – Arm® Cortex®-A53, Cortex-A72, Virtualization, Vision, 3D Graphics, 4K Video
Isolated Gate Driver	<ul style="list-style-type: none"> • GD3100: Advanced High Voltage Isolated Gate Driver for IGBT and SiC MOSFETs
Wireless Platform	<ul style="list-style-type: none"> • K32W041AM-A: K32W041AM/A: High Performance, Secure and Low-Power MCU for Zigbee®, Thread™ and Bluetooth® LE 5.0 with High Tx Power Option • K32W061_41: K32W061/41: High-Performance, Secure and Ultra-Low-Power MCU for Zigbee®, Thread™, and Bluetooth® LE 5.0 with Built-In NFC Option • IW416: 2.4/5 GHz Dual-Band 1x1 Wi-Fi® 4 (802.11n) + Bluetooth® 5.2 Solution • OL2385AHN: Low-Power Multi-Channel UHF RF Wireless Platform
PMIC	<ul style="list-style-type: none"> • PF5020: Multi-Channel (5) PMIC for Automotive Applications – 4 High Power and 1 Low Power, Fit for ASIL B Safety Level
Secure Element	<ul style="list-style-type: none"> • SE050: EdgeLock® SE050: Plug and Trust Secure Element Family – Enhanced IoT security with high flexibility
Aux PSU	<ul style="list-style-type: none"> • TEA1833LTS: GreenChip SMPS Control IC
Watch Dog MCU	<ul style="list-style-type: none"> • KL0x: Kinetis® KL0x-48 MHz, Entry-Level Ultra-Low Power Microcontrollers (MCUs) based on Arm® Cortex®-M0+ Core • LPC8N04: Low-Cost Microcontrollers (MCUs) based on Arm® Cortex®-M0+ Core
Gate Driver	<ul style="list-style-type: none"> • GD3100: Advanced High Voltage Isolated Gate Driver for IGBT and SiC MOSFETs
UART to I2C /SPI Bridge	<ul style="list-style-type: none"> • SC18IM704: UART to I²C-Bus Bridge • SC18IS606: I²C-Bus to SPI Bridge • SC18IS604: SPI to I²C-Bus Bridge
USB (CC Logic, Load and Signal Switch)	<ul style="list-style-type: none"> • NX5P3090UK: USB PD and Type-C Current-Limited Power Switch • NX3P1108UK: Logic-Controlled High-Side Power Switch • NX20P0477: USB Type-C CC Smart Protection • NX3DV221: High-Speed USB 2.0 Switch with Enable • NX3DV642GU: Three-Lane High-Speed MIPI-Compatible Switch • NX5L2750CGU: Analog Switch with Negative Swing Audio Capability • PTN5150: CC Logic for USB Type-C Applications
System Management	<ul style="list-style-type: none"> • PCA9555A: Low-Voltage 16-Bit I²C-Bus I/O Port with Interrupt and Weak Pull-Up • PCAL6408A: Low-Voltage Translating, 8-Bit I²C-Bus/SMBus I/O Expander • PCAL6416A: Low-Voltage Translating 16-Bit I²C-Bus/SMBus I/O Expander • NTS0104: Dual-Supply Translating Transceiver (Open-Drain, Auto-Direction Sensing) • NTB0104: Dual-Supply Translating Transceiver (Auto-Direction Sensing, Three-State) • PCA9306: Dual Bidirectional I²C-Bus and SMBus Voltage-Level Translator • PCA9561: Quad 6-Bit Multiplexed I²C-Bus EEPROM DIP Switch
CAN TX/RX	<ul style="list-style-type: none"> • TJA1152: Secure HS-CAN Transceiver with Standby Mode

Central inverter Block Diagram

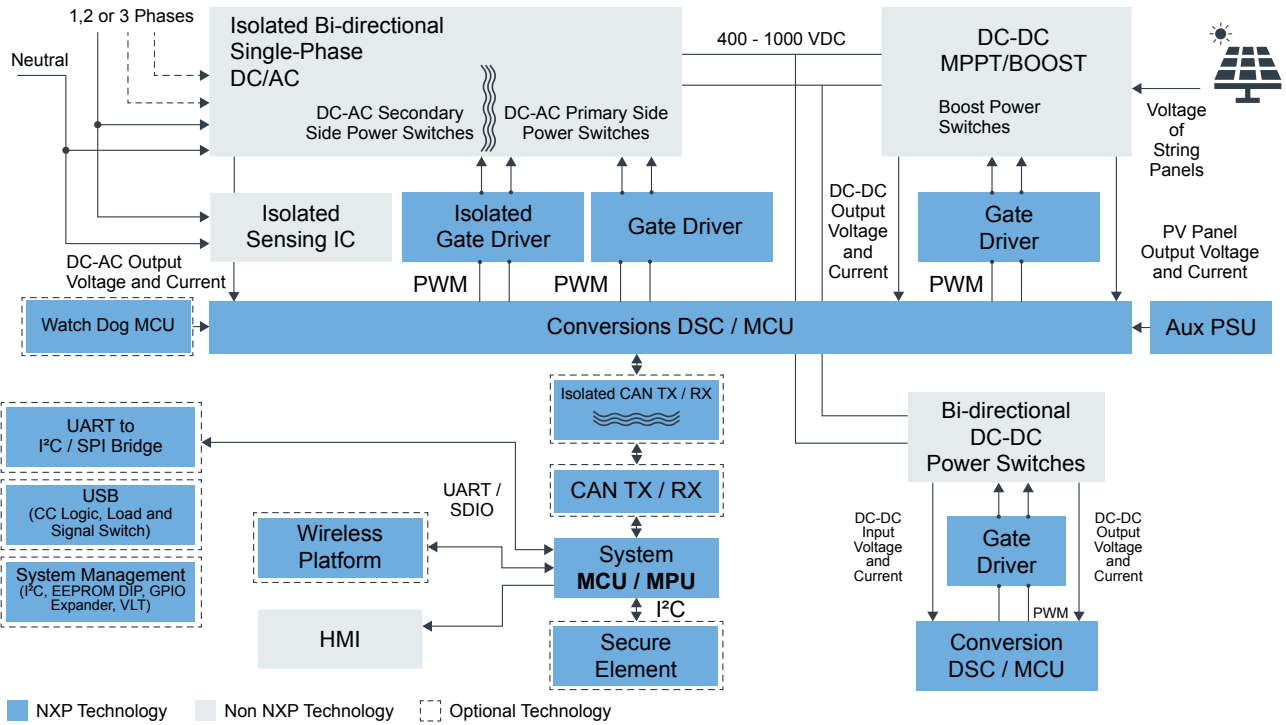


Recommended Products for Central inverter

<p>Conversion DSC / MCU</p>	<ul style="list-style-type: none"> • MCX-A14X-A15X: MCX A14x/15x MCUs with Arm[®] Cortex[®] M33, Scalable Device Options, Low Power and Intelligent Peripherals • MCX-N94X-N54X: MCX N94x/54x Highly Integrated Multicore MCUs with On-Chip Accelerators, Intelligent Peripherals and Advanced Security • KV4x: Kinetis KV4x-168 MHz, High Performance Motor / Power Conversion MCUs based on Arm[®] Cortex[®]-M4 • MC56F83xxx: Performance Level Digital Signal Controllers, USB FS OTG, CAN FD
<p>System MCU / MPU</p>	<ul style="list-style-type: none"> • i.MX-RT1020: i.MX RT1020: Crossover MCU with Arm[®] Cortex[®]-M7 • i.MX-RT1060: i.MX RT1060: Crossover MCU with Arm[®] Cortex[®]-M7 • i.MX-RT1170: i.MX RT1170: 1 GHz Crossover MCU with Arm[®] Cortex[®] Cores • i.MX8: i.MX 8 Family – Arm[®] Cortex[®]-A53, Cortex-A72, Virtualization, Vision, 3D Graphics, 4K Video

Isolated Gate Driver	<ul style="list-style-type: none"> • GD3100: Advanced High Voltage Isolated Gate Driver for IGBT and SiC MOSFETs
Wireless Platform	<ul style="list-style-type: none"> • K32W041AM-A: K32W041AM/A: High Performance, Secure and Low-Power MCU for Zigbee[®], Thread[™] and Bluetooth[®] LE 5.0 with High Tx Power Option • K32W061_41: K32W061/41: High-Performance, Secure and Ultra-Low-Power MCU for Zigbee[®], Thread[™], and Bluetooth[®] LE 5.0 with Built-In NFC Option • IW416: 2.4/5 GHz Dual-Band 1x1 Wi-Fi[®] 4 (802.11n) + Bluetooth[®] 5.2 Solution • OL2385AHN: Low-Power Multi-Channel UHF RF Wireless Platform
PMIC	<ul style="list-style-type: none"> • PF5020: Multi-Channel (5) PMIC for Automotive Applications – 4 High Power and 1 Low Power, Fit for ASIL B Safety Level
Secure Element	<ul style="list-style-type: none"> • SE050: EdgeLock[®] SE050: Plug and Trust Secure Element Family – Enhanced IoT security with high flexibility
Aux PSU	<ul style="list-style-type: none"> • TEA1833LTS: GreenChip SMPS Control IC
UART to I2C/SPI Bridge	<ul style="list-style-type: none"> • SC18IM704: UART to I²C-Bus Bridge • SC18IS606: I²C-Bus to SPI Bridge • SC18IS604: SPI to I²C-Bus Bridge
USB	<ul style="list-style-type: none"> • NX5P3090UK: USB PD and Type-C Current-Limited Power Switch • NX3P1108UK: Logic-Controlled High-Side Power Switch • NX20P0477: USB Type-C CC Smart Protection • NX3DV221: High-Speed USB 2.0 Switch with Enable • NX3DV642GU: Three-Lane High-Speed MIPI-Compatible Switch • NX5L2750CGU: Analog Switch with Negative Swing Audio Capability • PTN5150: CC Logic for USB Type-C Applications
System Management	<ul style="list-style-type: none"> • PCA9555A: Low-Voltage 16-Bit I²C-Bus I/O Port with Interrupt and Weak Pull-Up • PCAL6408A: Low-Voltage Translating, 8-Bit I²C-Bus/SMBus I/O Expander • PCAL6416A: Low-Voltage Translating 16-Bit I²C-Bus/SMBus I/O Expander • NTS0104: Dual-Supply Translating Transceiver (Open-Drain, Auto-Direction Sensing) • NTB0104: Dual-Supply Translating Transceiver (Auto-Direction Sensing, Three-State) • PCA9306: Dual Bidirectional I²C-Bus and SMBus Voltage-Level Translator • PCA9561: Quad 6-Bit Multiplexed I²C-Bus EEPROM DIP Switch
Gate Driver	<ul style="list-style-type: none"> • GD3100: Advanced High Voltage Isolated Gate Driver for IGBT and SiC MOSFETs

Hybrid String Inverter Block Diagram

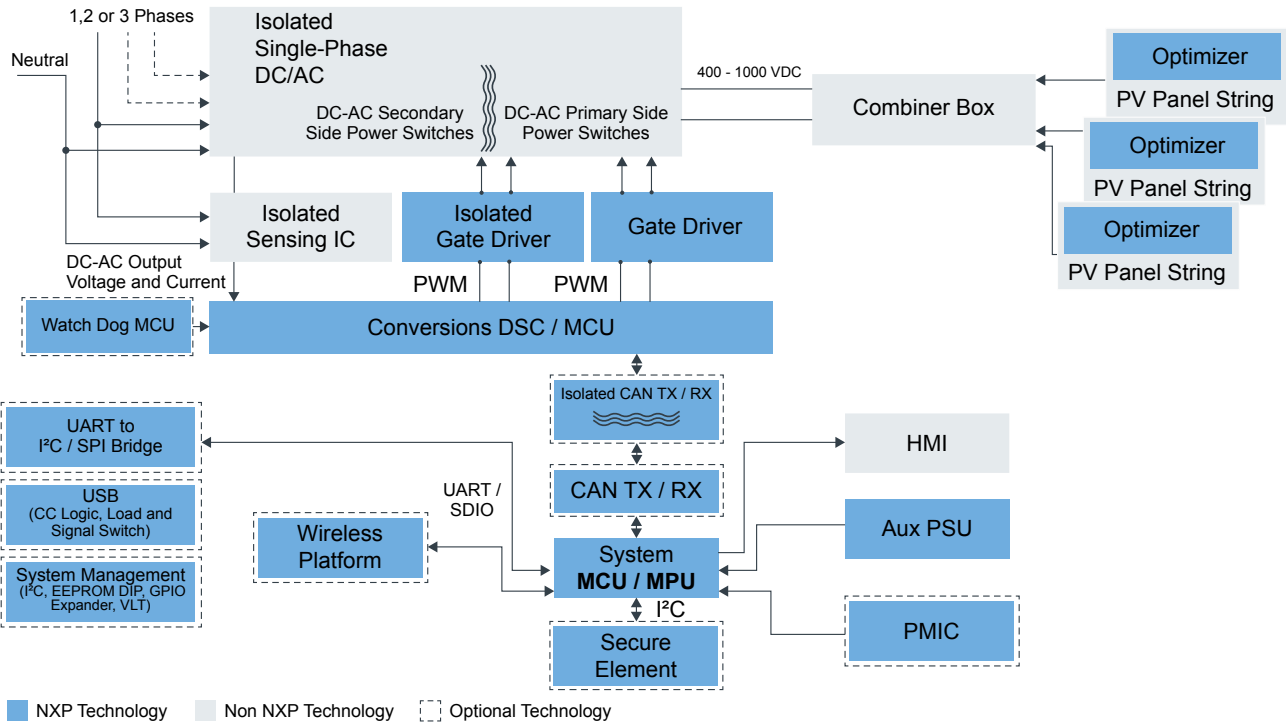


Recommended Products for Hybrid String Inverter

<p>Conversion DSC / MCU</p>	<ul style="list-style-type: none"> • MCX-A14X-A15X: MCX A14x/15x MCUs with Arm® Cortex® M33, Scalable Device Options, Low Power and Intelligent Peripherals • MCX-N94X-N54X: MCX N94x/54x Highly Integrated Multicore MCUs with On-Chip Accelerators, Intelligent Peripherals and Advanced Security • KV4x: Kinetis KV4x-168 MHz, High Performance Motor / Power Conversion MCUs based on Arm® Cortex®-M4 • MC56F83xxx: Performance Level Digital Signal Controllers, USB FS OTG, CAN FD
<p>System MCU / MPU</p>	<ul style="list-style-type: none"> • i.MX-RT1020: i.MX RT1020: Crossover MCU with Arm® Cortex®-M7 • i.MX-RT1060: i.MX RT1060: Crossover MCU with Arm® Cortex®-M7 • i.MX-RT1170: i.MX RT1170: 1 GHz Crossover MCU with Arm® Cortex® Cores • i.MX8: i.MX 8 Family – Arm® Cortex®-A53, Cortex-A72, Virtualization, Vision, 3D Graphics, 4K Video

Isolated Gate Driver	<ul style="list-style-type: none"> • GD3100: Advanced High Voltage Isolated Gate Driver for IGBT and SiC MOSFETs
Wireless Platform	<ul style="list-style-type: none"> • K32W041AM-A: K32W041AM/A: High Performance, Secure and Low-Power MCU for Zigbee[®], Thread[™] and Bluetooth[®] LE 5.0 with High Tx Power Option • K32W061_41: K32W061/41: High-Performance, Secure and Ultra-Low-Power MCU for Zigbee[®], Thread[™], and Bluetooth[®] LE 5.0 with Built-In NFC Option • IW416: 2.4/5 GHz Dual-Band 1x1 Wi-Fi[®] 4 (802.11n) + Bluetooth[®] 5.2 Solution • OL2385AHN: Low-Power Multi-Channel UHF RF Wireless Platform
PMIC	<ul style="list-style-type: none"> • PF5020: Multi-Channel (5) PMIC for Automotive Applications – 4 High Power and 1 Low Power, Fit for ASIL B Safety Level
Secure Element	<ul style="list-style-type: none"> • SE050: EdgeLock[®] SE050: Plug and Trust Secure Element Family – Enhanced IoT security with high flexibility
Aux PSU	<ul style="list-style-type: none"> • TEA1833LTS: GreenChip SMPS Control IC
Watch Dog MCU	<ul style="list-style-type: none"> • KL0x: Kinetis[®] KL0x-48 MHz, Entry-Level Ultra-Low Power Microcontrollers (MCUs) based on Arm[®] Cortex[®]-M0+ Core • LPC8N04: Low-Cost Microcontrollers (MCUs) based on Arm[®] Cortex[®]-M0+ Core
UART to I2C/SPI Bridge	<ul style="list-style-type: none"> • SC18IM704: UART to I²C-Bus Bridge • SC18IS606: I²C-Bus to SPI Bridge • SC18IS604: SPI to I²C-Bus Bridge
USB	<ul style="list-style-type: none"> • NX5P3090UK: USB PD and Type-C Current-Limited Power Switch • NX3P1108UK: Logic-Controlled High-Side Power Switch • NX20P0477: USB Type-C CC Smart Protection • NX3DV221: High-Speed USB 2.0 Switch with Enable • NX3DV642GU: Three-Lane High-Speed MIPI-Compatible Switch • NX5L2750CGU: Analog Switch with Negative Swing Audio Capability • PTN5150: CC Logic for USB Type-C Applications
System Management	<ul style="list-style-type: none"> • PCA9555A: Low-Voltage 16-Bit I²C-Bus I/O Port with Interrupt and Weak Pull-Up • PCAL6408A: Low-Voltage Translating, 8-Bit I²C-Bus/SMBus I/O Expander • PCAL6416A: Low-Voltage Translating 16-Bit I²C-Bus/SMBus I/O Expander • NTS0104: Dual-Supply Translating Transceiver (Open-Drain, Auto-Direction Sensing) • NTB0104: Dual-Supply Translating Transceiver (Auto-Direction Sensing, Three-State) • PCA9306: Dual Bidirectional I²C-Bus and SMBus Voltage-Level Translator • PCA9561: Quad 6-Bit Multiplexed I²C-Bus EEPROM DIP Switch
Gate Driver	<ul style="list-style-type: none"> • GD3100: Advanced High Voltage Isolated Gate Driver for IGBT and SiC MOSFETs

Distributed String Inverter Block Diagram

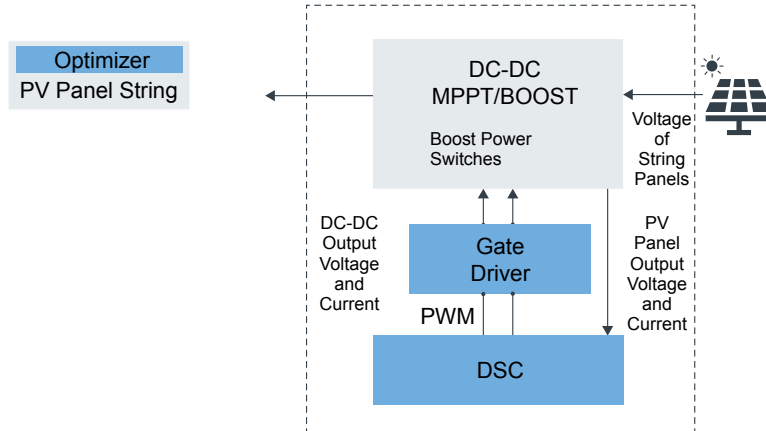


Recommended Products for Distributed String Inverter

Conversion DSC / MCU	<ul style="list-style-type: none"> • MCX-A14X-A15X: MCX A14x/15x MCUs with Arm® Cortex® M33, Scalable Device Options, Low Power and Intelligent Peripherals • MCX-N94X-N54X: MCX N94x/54x Highly Integrated Multicore MCUs with On-Chip Accelerators, Intelligent Peripherals and Advanced Security • i.MX-RT1170: i.MX RT1170: 1 GHz Crossover MCU with Arm® Cortex® Cores
Optimizer DCS	<ul style="list-style-type: none"> • MC56F80xxx: DSCs with Integrated FPU and Trigonometric Math Engine with OPAMP and Quadrature Decoder • LPC8N04: Low-Cost Microcontrollers (MCUs) based on Arm® Cortex®-M0+ Core
System MCU/MPU	<ul style="list-style-type: none"> • i.MX8: i.MX 8 Family – Arm® Cortex®-A53, Cortex-A72, Virtualization, Vision, 3D Graphics, 4K Video • i.MX93: i.MX 93 Applications Processor Family – Arm® Cortex®-A55, ML Acceleration, Power Efficient MPU • i.MX-RT1170: i.MX RT1170: 1 GHz Crossover MCU with Arm® Cortex® Cores • i.MX-RT1060: i.MX RT1060: Crossover MCU with Arm® Cortex®-M7

	<ul style="list-style-type: none"> • i.MX-RT1020: i.MX RT1020: Crossover MCU with Arm[®] Cortex[®]-M7
Isolated Gate Driver	<ul style="list-style-type: none"> • GD3100: Advanced High Voltage Isolated Gate Driver for IGBT and SiC MOSFETs
Wireless Platform	<ul style="list-style-type: none"> • OL2385AHN: Low-Power Multi-Channel UHF RF Wireless Platform • IW416: 2.4/5 GHz Dual-Band 1x1 Wi-Fi[®] 4 (802.11n) + Bluetooth[®] 5.2 Solution • K32W061_41: K32W061/41: High-Performance, Secure and Ultra-Low-Power MCU for Zigbee[®], Thread[™], and Bluetooth[®] LE 5.0 with Built-In NFC Option • K32W041AM-A: K32W041AM/A: High Performance, Secure and Low-Power MCU for Zigbee[®], Thread[™] and Bluetooth[®] LE 5.0 with High Tx Power Option
PMIC	<ul style="list-style-type: none"> • PF5020: Multi-Channel (5) PMIC for Automotive Applications – 4 High Power and 1 Low Power, Fit for ASIL B Safety Level
Secure Element	<ul style="list-style-type: none"> • SE050: EdgeLock[®] SE050: Plug and Trust Secure Element Family – Enhanced IoT security with high flexibility • EDGELOCK-A5000: EdgeLock[®] A5000 Plug and Trust Secure Authenticator: Authentication Made Secure, Scalable and Easy
Watch Dog MCU	<ul style="list-style-type: none"> • KL0x: Kinetis[®] KL0x-48 MHz, Entry-Level Ultra-Low Power Microcontrollers (MCUs) based on Arm[®] Cortex[®]-M0+ Core • LPC8N04: Low-Cost Microcontrollers (MCUs) based on Arm[®] Cortex[®]-M0+ Core
UART to I2C/SPI Bridge	<ul style="list-style-type: none"> • SC18IM704: UART to I²C-Bus Bridge • SC18IS606: I²C-Bus to SPI Bridge • SC18IS604: SPI to I²C-Bus Bridge
USB (CC Logic, Load and Signal Switch)	<ul style="list-style-type: none"> • NX5P3090UK: USB PD and Type-C Current-Limited Power Switch • NX3P1108UK: Logic-Controlled High-Side Power Switch • NX20P0477: USB Type-C CC Smart Protection • NX3DV221: High-Speed USB 2.0 Switch with Enable • NX3DV642GU: Three-Lane High-Speed MIPI-Compatible Switch • NX5L2750CGU: Analog Switch with Negative Swing Audio Capability • PTN5150: CC Logic for USB Type-C Applications
System Management	<ul style="list-style-type: none"> • PCA9555A: Low-Voltage 16-Bit I²C-Bus I/O Port with Interrupt and Weak Pull-Up • PCAL6408A: Low-Voltage Translating, 8-Bit I²C-Bus/SMBus I/O Expander • PCAL6416A: Low-Voltage Translating 16-Bit I²C-Bus/SMBus I/O Expander • NTS0104: Dual-Supply Translating Transceiver (Open-Drain, Auto-Direction Sensing) • NTB0104: Dual-Supply Translating Transceiver (Auto-Direction Sensing, Three-State) • PCA9306: Dual Bidirectional I²C-Bus and SMBus Voltage-Level Translator • PCA9561: Quad 6-Bit Multiplexed I²C-Bus EEPROM DIP Switch
Gate Driver	<ul style="list-style-type: none"> • GD3100: Advanced High Voltage Isolated Gate Driver for IGBT and SiC MOSFETs
Aux PSU	<ul style="list-style-type: none"> • TEA2208T: Full Wave Active Bridge Rectifier Controller • TEA2209T: Active Bridge Rectifier Controller • TEA2206T: Active Bridge Rectifier Controller • TEA1708T: GreenChip X Capacitor Discharge IC • TEA19361T: GreenChip SMPS Primary Side Control IC with QR/DCM Operation • TEA19362T: GreenChip SMPS Primary Side Control IC with Fixed Frequency Operation • TEA19363LT: GreenChip SMPS Primary Side Control IC with QR/DCM Operation and Active x-Capacitor Discharge • TEA19363T: GreenChip SMPS Primary Side Control IC with QR/DCM Operation and X-Capacitor Discharge
Isolated CAN TX/RX	<ul style="list-style-type: none"> • TJA1052IT: Galvanically-Isolated High-Speed CAN Transceiver • TJF1052IT: Galvanically-Isolated High-Speed CAN Transceiver
CAN TX/RX	<ul style="list-style-type: none"> • TJA1052IT: Galvanically-Isolated High-Speed CAN Transceiver

Optimizer Block Diagram



■ NXP Technology ■ Non NXP Technology □ Optional Technology

Recommended Products for Optimizer

Optimizer DCS	<ul style="list-style-type: none"> • MC56F80xxx: DSCs with Integrated FPU and Trigonometric Math Engine with OPAMP and Quadrature Decoder • LPC8N04: Low-Cost Microcontrollers (MCUs) based on Arm® Cortex®-M0+ Core
Gate Driver	<ul style="list-style-type: none"> • GD3100: Advanced High Voltage Isolated Gate Driver for IGBT and SiC MOSFETs

View our complete solution for [Solar Photovoltaic \(PV\) Energy Generation](#).

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