

IP Security Camera Solutions



Audio Processing Solutions

Diode Bridges

PoE ICs

PoE Midspans, Hubs and Switches

FPGA-based Video & Motor Control

Power Management

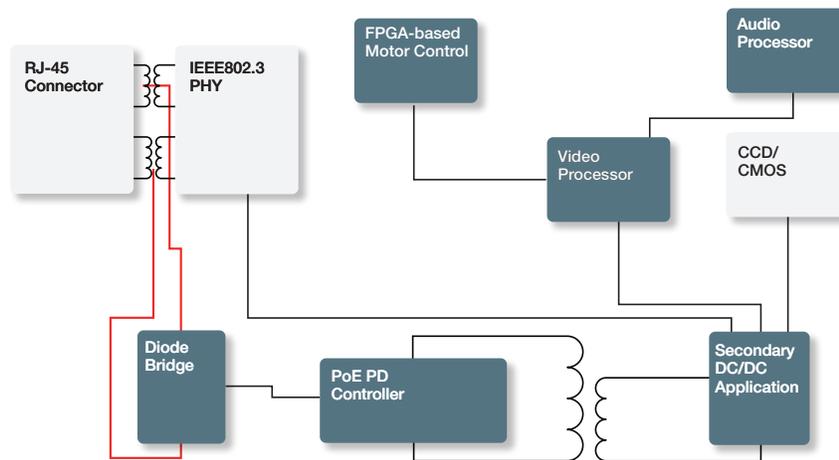
Enabling Security and Surveillance Systems



In an increasingly connected world, physical threats continue to be a major concern for governments, industry and consumers alike. With new video processing, motor control and audio processing capabilities, modern security systems include cameras that need to process a large amount of data and transform it into information that can help us identify threats and prevent them from becoming reality. Modern cameras have IP connectivity, either via wired Ethernet, IEEE802.11 WiFi or HDBaseT, and many need to be deployed in harsh outdoor scenarios, where energy efficiency is of critical importance.

Microsemi has been supplying products for the analog surveillance market since the mid 1970's, and to the IP surveillance market since its inception. Microsemi's comprehensive complete product portfolio for IP Cameras covers both their implementation and their deployment into virtually any field situation.

Microsemi IP Camera Solutions



Color indicates content available from Microsemi



Education



Transportation



Infrastructure



Events



Industry

Microsemi AcuEdge™ Technology

New high-performance audio processors enable the streamlined development of IP cameras and Enterprise hands-free communication. Microsemi's voice processing technology integrates industry leading features and dedicated firmware to deliver high-quality hands-free voice performance while reducing system design complexity.

Microsemi's AcuEdge™ Technology audio processors (i.e. ZL38050) enable the streamlined development of IP cameras for HD Voice capability in 2 way hands-free audio. Microsemi's AcuEdge Technology integrates industry leading features and dedicated firmware to deliver high-quality hands-free voice performance while reducing system design complexity.

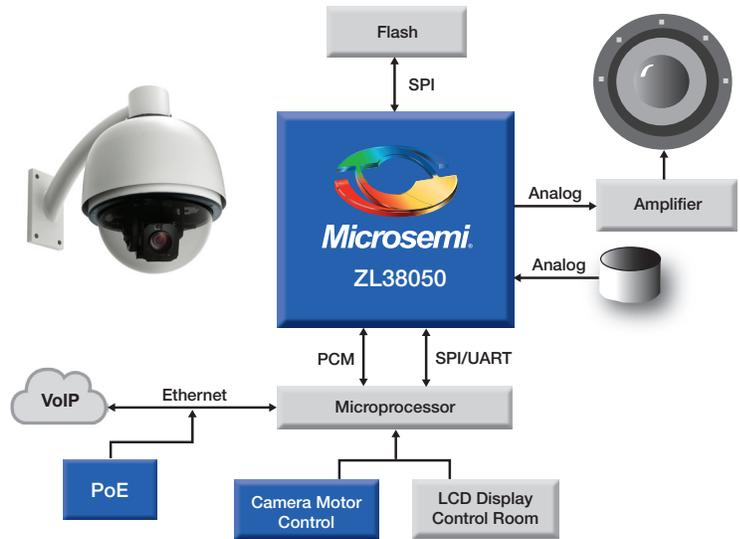
Hands-Free Advantages

In complex noise environments such as large conference rooms and building lobbies, Microsemi's AcuEdge Technology cancels echo, maintains a constant ambient noise (comfort noise) and converges during double-talk situations. While most solutions deliver only half-duplex operation, Microsemi's proprietary algorithm is able to continuously converge and track changes in the echo path to support full duplex operation.

DVR, NVR or security camera users have difficulty trying to monitor a large number of video feeds for certain incidents, crimes or events. By adding audio to the surveillance camera, it will enable security personal at the control room to make judgement calls on security concerns.

Microsemi AcuEdge Technology will provide audio enhancement to allow more accurate monitoring.

Microsemi Audio Processors complement SoC's that process video in IP cameras, by adding enhancement features such as Beam Forming, Sound Locator, Far field microphone pick up (up to 20m), Automatic Speech Recognition and Sound Classification.



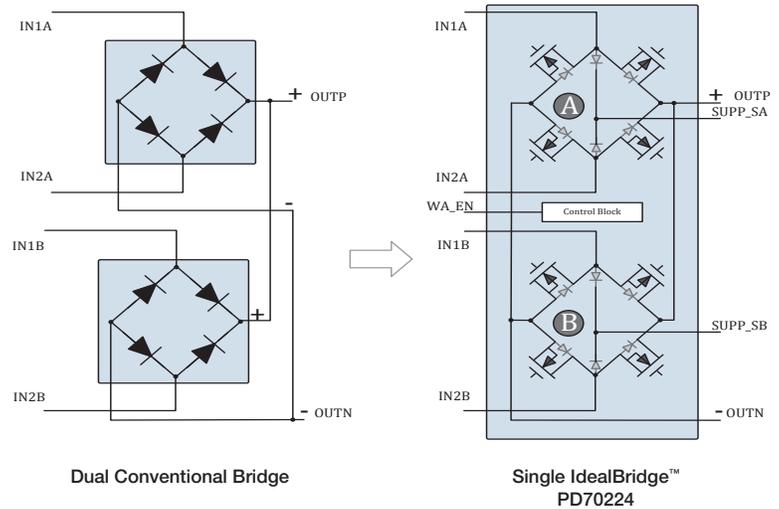
ZL38050 Hardware	ZLS38050 Firmware
Wideband/Narrowband Processing	Wideband/ Narrowband AEC
Host Interface: SPI, UART, I2C	Stationary NR
Standalone (controllerless) auto-boot from Flash	Dynamic Range Compression
TDM port configurable as PCM or I2S	G.722 wide band coding
14 GPIO	Howling Cancellation
Crystal-less operation (via TDM clock)	Equalizer
Digital microphone interface	AGC/ALC
16-bit DAC	Initial Convergence Conditioning
	½ duplex mode
	Switched attenuation mode
	GPIO control mode
	Dynamic EQ mode

Diode Bridges

Every PoE PD device requires Diode Bridges at its input. Diode bridges are used to deal with different cable polarities, with power coming from either wires 1,2,3,6 or wires 4,5,7,8 in the Ethernet cable, and in 4-pairs implementations, from both. Microsemi offers reliable regular diode bridges, as well as high efficiency, low footprint dual ideal diode bridges for PoE applications. Easy to add to a design, Microsemi's PD70224 Ideal Dual Diode Bridge allows a designer to have the same layout supporting regular, Schottky and ideal diodes, making it easy to fit into the different PoE Class power budgets without knowing the exact power consumption of the application.

PD70224 Features:

- Active circuit with low forward-drop to replace dissipative passive diode bridges
- Self-contained drive circuitry for MOSFETs
- Designed to support IEEE802.3af/at, UPOE and Power over HDBase-T (PoH)
- Integrated 0.160ohm N-Channel MOSFETs for 0.320ohm total path resistance
- "Power present" indicator signals for identifying 4-pair bridge power
- Low leakage, < 12µA during detection
- Wide operating voltage range up to 57V
- -40°C to +85°C ambient
- Available in 40 pin package
- RoHS Compliant



Dual Conventional Bridge

Single IdealBridge™ PD70224

	Power (W)	Current (A)	Power Dissipation (W)		
			PD70224 Ideal Dual Diode Bridge	Schottky Bridge	SDB207 Standard Bridge
Class 1	3.84	0.09	0.003	0.10	0.13
Class 2	6.50	0.16	0.009	0.09	0.22
Class 3	12.95	0.35	0.04	0.44	0.49
Class 4 (2-pairs)	25.50	0.60	0.13	0.83	0.84
PoH (2-pairs)	47.50	0.95	0.32	1.42	1.33
Class 4 (4-pairs)	51.00	0.60	0.26	1.66	1.68
PoH (4-pairs)	95.00	0.95	0.65	2.83	4.18

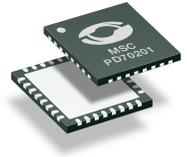
SDB207 Parameters

Electrical Rating	Symbol	Typ	Max	Unit
Forward Current (Surge Peak, per leg)	IFSM / Leg	2.00	60.00	A
Forward Voltage per Leg	V _F /leg		1.10	V
Reverse Voltage per Leg	V _R / Leg	1000.00	1100.00	V

PoE PSE and PD ICs

PoE PD Front End

Microsemi has the broadest PoE product line in the industry, including PoE PD IC's, PoE PSE IC's, Midspans and Test Equipment. The PD chip product line includes PD chips with and without integrated PWM controllers, which can be used as a compact way to convert PoE input power to one or more output voltages in a Powered Device.



PoE PD IC Selection Guide

P/N	Standards	Max Power (W)	FET RdsOn (ohm)	Freq. (kHz)	Current Sense (mV)
PD70100	802.3af 802.3at Type 1	13	0.6	Per External PWM	
PD70101	802.3af 802.3at Type 1	13	0.6	100 to 500	200
PD70200	802.3af 802.3at Type 1 802.3at Type 2 PoH Twin Type 2	51	0.6	Per External PWM	
PD70201	802.3af 802.3at Type 1 802.3at Type 2 PoH Twin Type 2	51	0.6	100 to 500	200
PD70210A	802.3af 802.3at Type 1, 802.3at Type 2 PoH Twin Type 2 PoH Type 3 PoH Twin Type 3	95	0.3	Per External PWM	
PD70211	802.3af 802.3at Type 1, 802.3at Type 2 PoH Twin Type 2 PoH Type 3 PoH Twin Type 3	95	0.3	100 to 500	200

PoE PSE Managers

IP Cameras and Video Servers have in many cases embedded PoE switches, which can be used to power additional cameras. Microsemi's has the industry broadest portfolio of PoE PSE IC's, with 1, 4, 8 and 12-port solutions.

PoE PSE IC Selection Guide

P/N	Ports	FETs	Sense Resistor	MCU Options	Host I/F Options	LED Driving Options	Standards Supported	Max PM System
PD69208	8	Internal	Internal	SmartFusion PD69200	I2C UART SPI	CPLD Host	802.3af 15.4W 802.3at 30W 802.3at 60W PoH 95W	96 ports
PD69104B1	4	Internal 0.3ohm	External 0.36ohm	Auto Mode	I2C UART	Direct Host	802.3af 15.4W 802.3at 30W 802.3at 60W PoH 95W	4 ports
PD69101	1	Internal 0.3ohm	External 0.5ohm	Auto Mode	SPI	Direct Host	802.3af 15.4W 802.3at 30W 802.3at 60W	2 ports
PD69012	12	External 0.1ohm	External 0.5ohm	PD69000 Marvell ISSR Auto Mode	I2C UART SPI	CPLD Host	802.3af 15.4W 802.3at 30W 802.3at 60W	96 ports

PoE Midspans, Hubs and Switches

Deploying IP cameras, whether indoor or outdoor, requires Power over Ethernet. Microsemi offers PoE Midspans for indoor IP camera installations and PoE Midspans, Hubs and Managed Switches for Outdoor installations, with a vast portfolio that helps deployment into new locations, as well as easy upgrade of analog CCTV to IP cameras, using existing 24VAC or DC power infrastructure.

Indoor Family Features

- PowerView Pro Web-based Power Management
- 1, 4, 6, 12 or 24 1000BaseT-capable ports
- PoE, PoE+, 4-pairs PoE+ (UPoE) or PoH
- Up to 15.4W, 30W, 60W or 95W per port
- EEPoE on PD-5524G, PD95xxG family and PD-9606G
- Energy Efficient PoE saves up to 3W per port
- 100W, 200W, 400W, 450W or 1000W total device output
- DC Input on select models
- 450W or 900W EPS
- Redundant or Additive power
- 1U rack mountable
- 16-years limited lifetime warranty

Indoor Midspan Selection Guide

Watts per Port	Product Number	Number of Ports	Remotely Managed	Gigabit	Input	Warranty	Total Power
15.4W	PD-3501G	1		X	AC	1-year	
15.4W	PD-3504G	4		X	AC	1-year	
15.4W	PD-6500G	6, 12, 24	X	X	AC	Limited lifetime	Full power up to 400W
27W	PD-5524G ACDC/M	24	X	X	AC & DC	Limited lifetime	Full power up to 450W
30W	PD-9001GR/AC	1		X	AC	1-year	
30W	PD-9004G/AC	4		X	AC	1-year	
30W	PD-9000 Family	6, 12, 24	X	X	AC & DC	Limited lifetime	Full power up to 1000W
60W	PD-9501G/AC	1		X	AC	1-year	
60W	PD-9500 Family	6, 12, 24	X	X	AC & DC	Limited lifetime	
95W	PD-9606 Midspan	6	X	X	AC & DC	Limited lifetime	

Switches, Hubs and Midspans for Outdoor Installations

Watts Per Port	Type	Product Number	Number of Ports	Remotely Managed	Gigabit	Input	Warranty
30W	Switch	PDS-102GO/AC	2	x	X	AC & DC	1-year
30W	Hub	PD-9002GHO/AC	2		X	AC & DC	1-year
30W	Midspan	PD-9001GO/AC	1		X	AC & DC	1-year
40W	Midspan	PD-9001G-40/SP/AC	1		X	AC	1-year
60W	Midspan	PD-9501GO/AC	1		X	AC & DC	1-year



1-port Indoor Midspan



4-port Indoor Midspan



6, 12, 24-port Indoor Midspans



Outdoor Switch with 2 PoE ports



Outdoor Hub with 2 PoE ports



1-port Outdoor Midspan

PowerView Pro Power Management Software

PowerView Pro is an advanced power management system that enables the enterprise to monitor power consumption and remotely control power on-off. PowerView Pro prevents intrusion into the data and power networks. It is essential that data and power control functions be secured against unauthorized personnel.

PowerView Pro Features:

- SNMPv3 IPv4 & IPv6
- Remotely reboot PD's
- Port Scheduling (Turn on/off, saves energy, prevents intrusion)
- Prioritize ports to increase UPS life
- Set traps, alerts and monitor power consumption, and more
- PowerViewPro Live demo 24/7 at: <http://193.47.248.10/INDEX.HTM>

The image displays two screenshots of the PowerView Pro web interface. The left screenshot shows the 'View - Status' page for 'Room 3 Midspan Number 5'. It features a power meter with 21 ports, a table of power consumption, and a summary table.

#	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Power (W)	15.04	16.03	15.04	15.04	15.04	15.04	15.04	15.04	15.04	15.04	15.04	15.04	15.04	15.04	15.04	15.04	15.04	15.04	15.04	15.04	15.04
Description																					

Midspan Status	Local	External	Total
Total Power Consumption (Watt)	75	150	225
Maximum available Power (Watt)	200	230	430
System Voltage (Volt)	48.6	-	-
Temperature (F)	53.2	-	-
PD Detection Method	IEEE802.3af IEEE802.3at Legacy	-	-
Midspan Status	Active	-	-

The right screenshot shows the 'View - Configuration Summary' page, detailing network settings, remote access, and advanced features.

Outdoor Management Screen

The image shows the 'Outdoor Management Screen' with three device status cards: UPLINK, DATA & PWR. 2, and DATA & PWR. 1. Below are tables for Unit Status and Ports Status/Reset.

Unit Status	Status
Uplink Ethernet	1000 Mbps
Total Power Usage	42W (70% out of 60W)

Ports Status/Reset	Port #1	Port #2
Ethernet Link	1000 Mbps	Off
PoE Port Status	Delivering Power	Disable
Power Usage	19.2W (out of 30W)	---
Power Reset	<input type="button" value="Reset"/>	<input type="button" value="Reset"/>

FPGA-based Video Processing

Microsemi SmartFusion2 SoC and Igloo2 FPGA device families enable IP camera manufacturers to design reliable, low power, video co-processing or single-chip video processing platforms that can:

- Quickly adapt to the market dynamics while maintaining system reliability, safety, and security by reprogramming with IP protection and secure boot features to support evolving video sensor interfaces, video processing requirements, and new/evolving networking standards.
- Increase design integration with intellectual property (IP) and embedded processors to reduce component count/board space/power and therefore enhance system reliability and streamline the supply chain.
- Scale system performance with the addition of embedded processors and IP hardware accelerators.
- Lower total cost of ownership (TCO) with long FPGA life cycles and faster time to market to enable a single SoC/FPGA-based platform for multiple products.



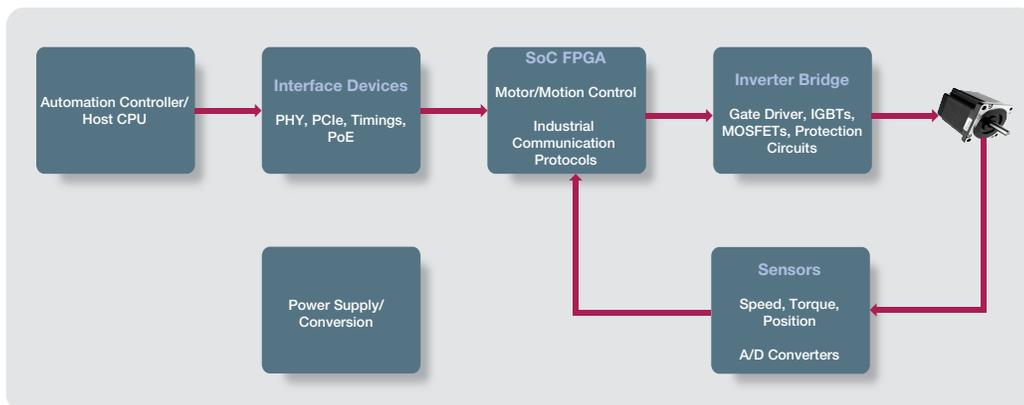
Function	Microsemi FPGA Value Proposition
1. Sensor Interfacing	Programmable I/O interfaces (LVDS, HiSpi, parallel I/O) to disparate camera sensors
2. Image Signal Processing (ISP)	Design flexible ISP algorithms with programmable SoC FPGAs to achieve higher performance, integration and scalability compared to MCU/DSP and ASIC/ASSP
3/4. Video Interfacing and DVR with Analytics	Output desired protocols (PCIe, Ethernet, SDI, USB, MMC) with dedicated I/O and support video storage with dedicated high performance memory subsystem
All With Industry's Smallest Footprints, Lowest Power, Highest Reliability and Best Security in Cost Optimized Architecture	

FPGA-based Motor Control

The parallel processing nature of FPGAs also enables the FPGA sub-system to control the camera motors for motion-based IP security cameras. Microsemi motor control solutions are designed specially to meet the challenging industrial requirements of performance, reliability, and safety in an easy-to-use environment. The solution is compliant with industry coding standards such as MISRA C-2004 for developing safe and reliable software for embedded applications. Microsemi offers a modular intellectual property (IP) portfolio, tools, reference designs, kits, and software for motors such as permanent-magnet synchronous motor (PMSM)/brushless DC (BLDC) and stepper motors.

IP Modules	Fully Modular IP Suite
<p>IP blocks are offered for the FPGA fabric and software libraries for the ARM® Cortex™-M3 processor</p> <ul style="list-style-type: none"> • Clarke and inverse clarke transformations • Park and inverse park transformations • Proportional integral (PI) controller • Space vector pulse-width modulation (SVPWM) • Ramp profile • Angle estimation • Speed calculation • Current measurement • 3-Phase PWM generation 	<ul style="list-style-type: none"> • Quick plug-and-play approach to implement algorithms • Easy porting and customization through block- based approach • Precise algorithm for angle estimation in sensorless FOC • PWM with dead time protection and delay time insertion • IP blocks are coded for efficient use of FPGA resources • Almost 100% code coverage achieved for individual IPs • IP block tested in simulations and on actual hardware • IPs available as MATLAB, VHDL code for FPGA, and C APIs

Microsemi Systems Solutions for Motor Control



FPGA Selection Guides

SmartFusion2

SmartFusion2	Features	M2S005	M2S010	M2S025	M2S050	M2S090	M2S100	M2S150
Logic/DSP	Maximum Logic Elements (4LUT + DFF)*	6,060	12,084	27,696	56,340	86,316	99,512	146,124
	Math Blocks (18x18)	11	22	34	72	84	160	240
	PLLs and CCCs	2		6			8	
Security	AES256, SHA256, RNG	1 Each				1 Each		
	ECC, PUF	—				1 Each		
MMS	Cortex-M3 + instruction Cache	Yes						
	eNVM (K Bytes)	128	256			512		
	eSRAM (K Bytes)	64						
	eSRAM (K Bytes) Non-SECDED	80						
	CAN, 10/100/1000 Ethernet, HS USB	1 Each						
	Multi-Mode UART, SPI, I2C, Timer	2 Each						
Fabric Memory	LSRAM 18K Blocks	10	21	31	69	109	160	236
	uSRAM 1K Blocks	11	22	34	72	112	160	240
	Total RAM (K bits)	191	400	592	1,314	2,074	3,040	4,488
High Speed	DDR Controllers (count x width)	1x18			2x36	1x18	2x36	
	SERDES Lanes	0	4		8	4	8	16
	PCIe End Points	0	1		2			4
User I/O	MSIO (3.3V)	115	123	157	139	306	292	292
	MSIOD (2.5V)	28	40	40	62	40	106	106
	DDRIO (2.5V)	66	70	70	176	66	176	176
	Total User I/Os	209	233	267	377	412	574	574

Note:
* Total logic may vary based on utilization of DSP and memories in your design. Please see the SmartFusion2 Fabric UG for details.

IGLOO2

	Features	M2GL005	M2GL010	M2GL025	M2GL050	M2GL090	M2GL100	M2GL150
Logic/DSP	Maximum Logic Elements* (4LUT + DFF)	6,060	12,084	27,696	56,340	86,316	99,512	146,124
	Math Blocks (18x18)	11	22	34	72	84	160	240
	PLLs and CCCs	2		6			8	
	SPI/HPDMA/PDMA	1						
	Security	AES256, SHA256, RNG				AES256, SHA256, RNG, ECC, PUF		
Memory	eNVM (K Bytes)	128	256			512		
	LSRAM 18 K Blocks	10	21	31	69	109	160	236
	uSRAM 1 K Blocks	11	22	34	72	112	160	240
	eSRAM (K Bytes)	64						
	Total RAM (K bits)	703	912	1104	1826	2586	3552	5000
High Speed	DDR Controllers (count x width)	1x18			2x36	1x18	2x36	
	SERDES Lanes	0	4		8	4	8	16
	PCIe Endpoints	0	1		2			4
User I/O	MSIO (3.3 V)	115	123	157	139	306	292	292
	MSIOD (2.5 V)	28	40	40	62	40	106	106
	DDRIO (2.5 V)	66	70	70	176	66	176	176
	Total User I/Os	209	233	267	377	412	574	574

Note:
* Total logic may vary based on utilization of DSP and memories in your design. Please see the IGLOO2 FPGA Fabric UG for details.

Power Management

Microsemi secondary side DC/DC power management products offer ultra-fast regulation, high efficiency, and small footprint for IP camera applications. With currents as high as 12 amps and for input voltages from 3.3V, 5V, or 12V nominal voltage supplies, Microsemi has the regulators and power modules for your IP camera loads. Microsemi's Hysteretic Control Step-Down Switching Regulators provide best-in-class transient performance, which allows small, resilient and low cost power supply designs.

Regulators and Power Modules, 12V Input Voltage

P/N	Iout (A)	Vin (V)	Fsw (MHz)	PSM	Pgood	Package	Comment
LX7104	1.5	4.5-18	1.4	No	No	SOT23-6	Current Mode
NX7101	2	4.75-18	0.34	No	No	SOIC-8	Current Mode
NX7102	3	4.75-18	0.34	No	No	SOIC-8	Current Mode
NX9415	5	8-22	0-1	No	No	MCM-24 4x4	Voltage Mode
NX9548	9	4.5-20	0.2-1	Yes	Yes	MCM-32 5x5	COT
LX9610	12	8-22	0.6-1	No	No	QFN-EP 15x15	Power Module w/Inductor

LDOs and Regulators 3.3V and 5V Input

P/N	Iout	Vin Max	Vin Min	Freq	Vout	Package	Control Mode	PSM	Features
LX8213	0.3A	6V	2.5V	LDO	0.8V-5V	SOT23-5L	Linear	N/A	Enable
LX8240	0.8A	5.5V	1V	LDO	0.5V-2V	DFN 3x2	Linear	N/A	High PSRR
LX7186A	1A	5.5V	2.8V	1MHz	0.6V-5.5V	SOT23-5L	Current	No	Enable, Power Good
LX7188	1.A	5.5V	2.5V	1.4MHz	0.6V-5.5V	DFN 2x2	Current	Yes	Enable
LX7167A	2.4A	5.5V	3V	3MHz	0.6V-5.5V	DFN 2x2	Hysteretic	Yes	Enable, Power Good
LX7169	3A	5.5V	3V	3MHz	0.8V-5.5V	DFN 3x3.5	Hysteretic	No	Enable, Power Good, External Sync
LX7175	3A	5.5V	3V	1.4MHz	0.8-5.5V	DFN 3x3	Hysteretic	Yes	Enable, Power Good
LX7176A	4A	5.5V	3V	1.875MHz	0.6V-5.5V	DFN 2x2	Hysteretic	Yes	Enable, Power Good
LX7180A	4A	5.5	3V	1.9MHz	0.9-5.5V	DFN 2x2	Hysteretic	Yes	I2C Control, Enable, Power Good
LX7165	5A	5.5V	3V	1.875MHz	0.6V-5.5V	WLCSP 1.8x2	Hysteretic	Yes	I2C Control, Enable, Power Good





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Microsemi Corporation (Nasdaq: MSCC) offers a comprehensive portfolio of semiconductor and system solutions for communications, defense & security, aerospace and industrial markets. Products include high-performance and radiation-hardened analog mixed-signal integrated circuits, FPGAs, SoCs and ASICs; power management products; timing and synchronization devices and precise time solutions, setting the world's standard for time; voice processing devices; RF solutions; discrete components; security technologies and scalable anti-tamper products; Power-over-Ethernet ICs and midspans; as well as custom design capabilities and services. Microsemi is headquartered in Aliso Viejo, Calif., and has approximately 3,400 employees globally. Learn more at www.microsemi.com.

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