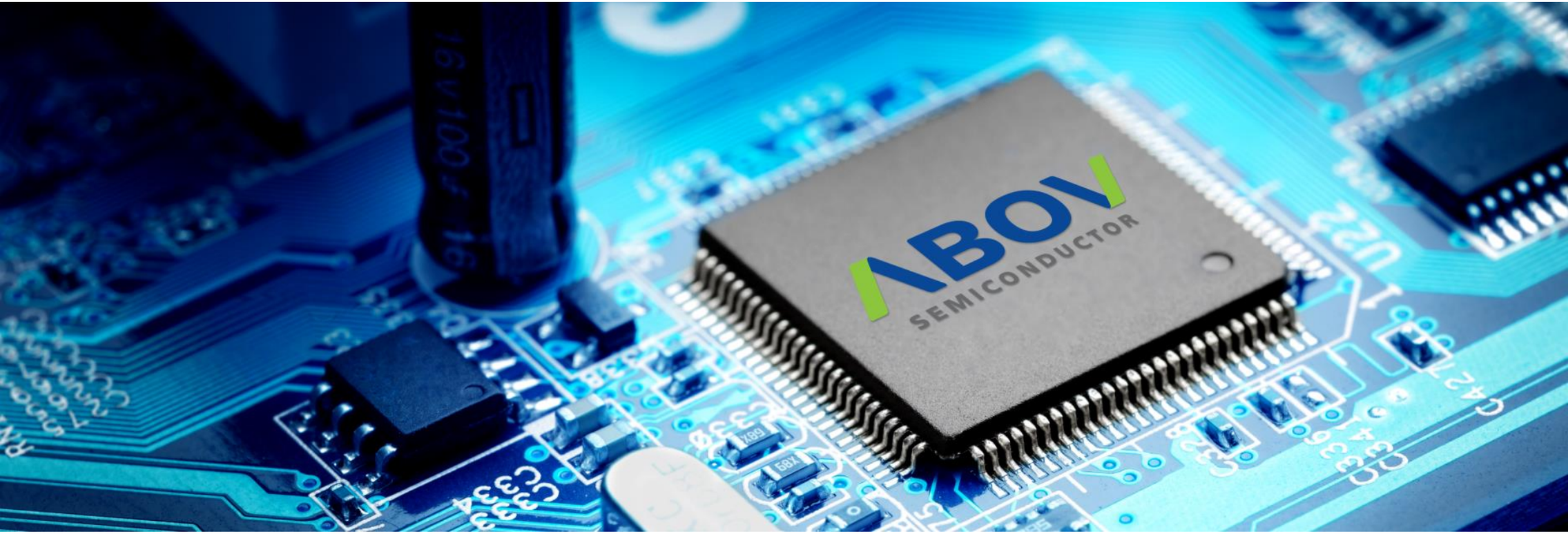
Microcontrollers

Global Top Smart MCU Innovator



July 2019

ABOV
SEMICONDUCTOR

Index

ABOV Introduction

ABOV Semiconductor is the one and only MCU dedicated manufacturer providing total solution with its R&D expertise in the field of microcontrollers, growing continuously and sustainably to address the global market.

VISION	World's Best MCU Innovator				
MISSION	Challenge and Innovate for Customer Satisfaction				
CORE VALUES	Customer First	Best Talent	Best Technology	Passion	Joy

>30 Years of Industry Expertise

2006 ABOV SEMICONDUCTOR

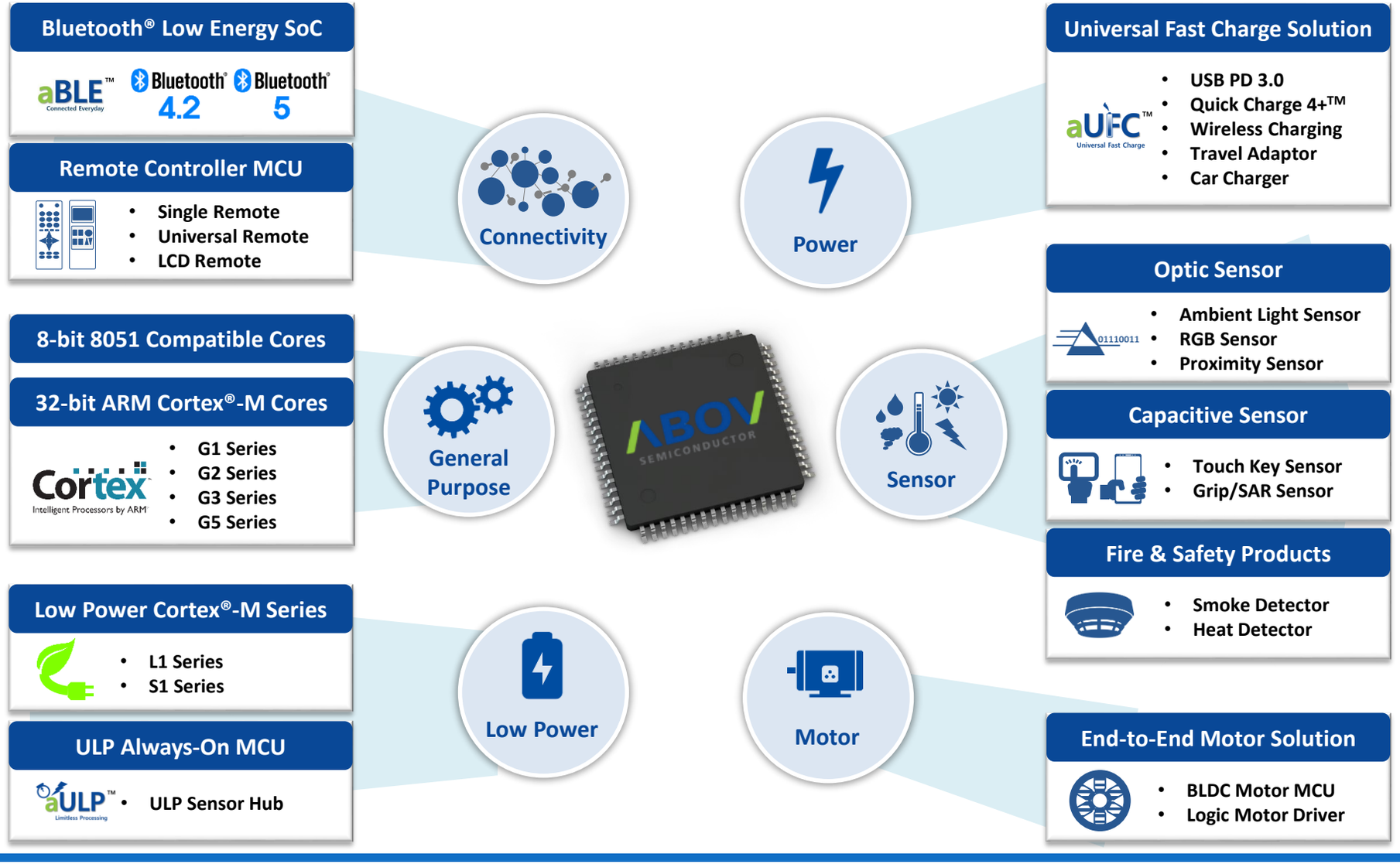
2004 MagnaChip

1999 hynix Semiconductor

LG HYUNDAI

ABOV Product Lineup

ABOV Semiconductor provides a total solution lineup facilitated by in-house analog and digital IPs, along with advanced algorithms to meet every customer's needs in the market.



General Purpose MCU

8-bit (M8051) GP MCU

ABOV Semiconductor's broad range of feature-rich and field proven 8-bit microcontrollers based on M8051 core are bestsellers sold more than 3 billion units up to date. ABOV's extensive experiences in consumer electronics are forged into these 8-bit microcontrollers to provide excellent noise immunity, code optimization and Bill of Materials minimization.

- Excellent Noise Immunity
- Code Optimization
- Bill of Materials Minimization

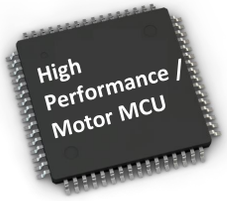
32-bit GP MCU – G1 / G2 / G3 / G5 Series

ABOV Semiconductor's 32-bit general purpose microcontroller covers the widest range of customer applications such as personal healthcare, RC toys, small home appliances, white goods, and even further, industrial applications. G1, G2, and G3 Series are Cortex®-M0+ based microcontrollers with display controllers, capacitive touch key, USB interface, general motor control, and various other features needed by customers. G5 Series products are Cortex®-M3 based microcontrollers equipped with Data Flash for enhanced customer usability with the most optimized features for home appliances.

- Excellent Customer Usability
- Rich, Optimized Features
- Widest Application Coverage

High Performance / Motor MCU

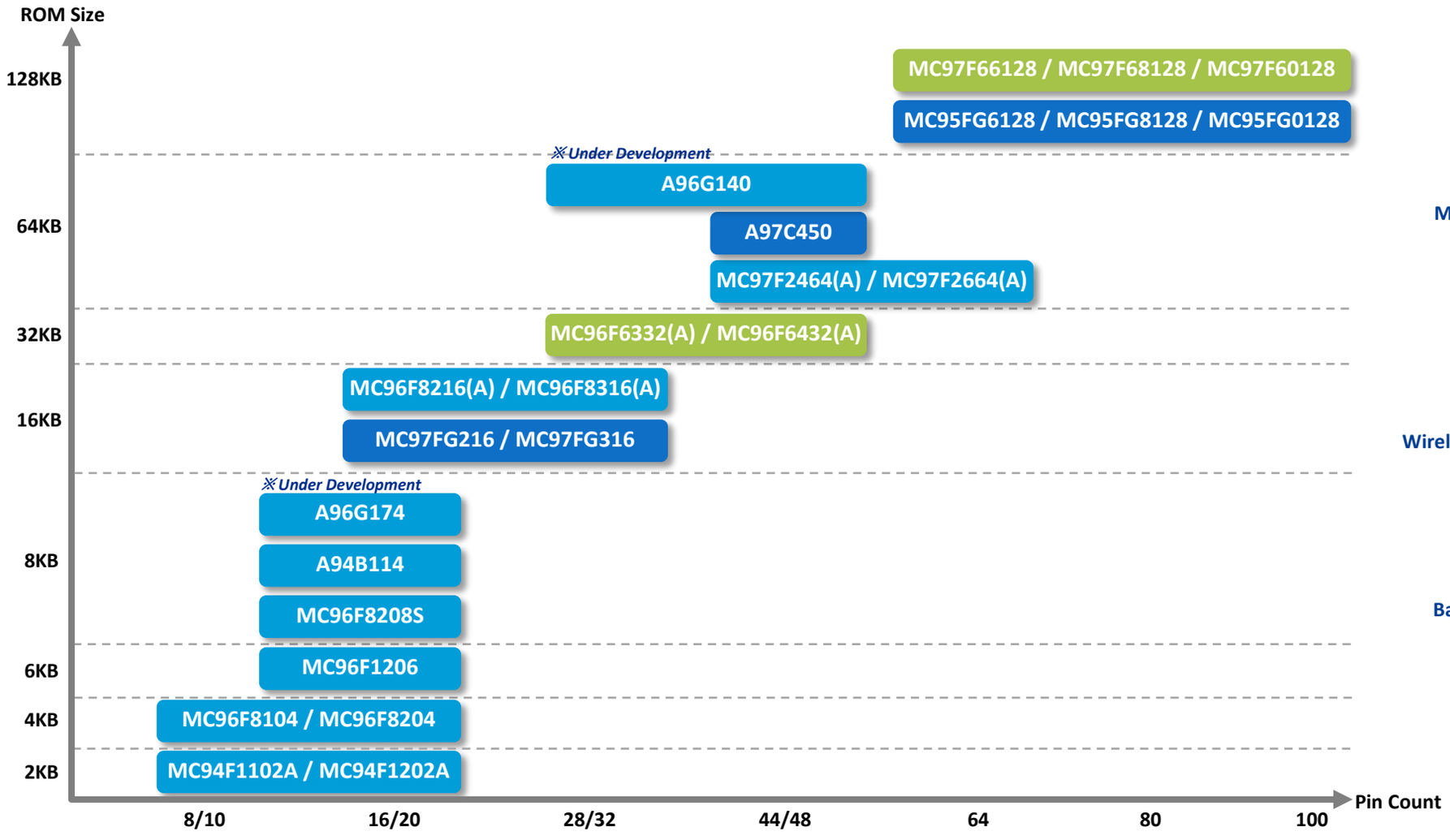
ABOV Semiconductor's High Performance / Motor microcontroller products provide the most advanced features to support the customer's high-end devices. These high performance microcontroller portfolio features high-speed cores, and high performance analog IPs to support BLDC, FoC motor applications from head to toe. ABOV's High Performance microcontrollers cover from 8-bit to Cortex®-M0, Cortex®-M3, and Cortex®-M4F cores with motor functions to serve as a home appliance main controller, but also pack advanced peripherals such as a CAN driver, security engine and more to address even industrial markets and automotive aftermarkets.



- High Performance Cores & IPs
- Total Solution for Motor
- Industrial Grade Functions

8-bit (M8051) GP MCU

Product Lineup



Multimedia Sub Controller

Wireless Charger / SHA Controller

Battery/Charger Controller

Personal Healthcare

- General Purpose MCU (Code Flash + Data E²PROM)
- General Purpose MCU
- General Purpose MCU (LCD Segment)

※ All 'S' and 'A' versions do not have OCD function
(except MC94F1x02A, MC97F2x64A)

8-bit (M8051) GP MCU

Selection Guide

▪ General Purpose 8-bit Flash MCU

Product	Core	ROM	E2P	RAM	I/O	Package	Timer / Counter	PWM	ADC Bit	ADC ch	LCD	USI* [ch]	UART [ch]	USART *[ch]	SPI [ch]	I2C [ch]	Internal OSC Freq. [MHz]	Internal OSC Err. [%]	Sub. X-tal	Ext. X-tal [MHz]	Op. Volt. [V]	Op. Temp. [˚C]	Remarks	Avail.
MC94F1102A MC94F1202A	cm8051	2KB	-	256B iRAM	6 8 14	8 SOP 10 SSOP 16 SOPN/QFN	8-bit x 1 16-bit x 2	16-bit x 2	12	6 8 14	-	-	-	-	-	-	32	±3.0	-	-	2.2 to 5.5	-40 to 85	POR, BOD, LVR/LVI	Now
MC96F8104 MC96F8204	M8051	4KB	-	256B iRAM	6 8 14 18	8 SOP 10 SSOP 16 SOPN/QFN 20 SOP/TSSOP	8-bit x 1 16-bit x 2	16-bit x 2	12	6 8 8 8	-	-	-	1	-	1	8	±4.0	Y	0.4 to 12.0	1.8 to 5.5	-40 to 85	POR, LVR/LVI, WT 200kHz IRC (±3% at -20~85˚C)	Now
MC96F1206	M8051	6KB	-	256B iRAM	14 18	16 SOPN 20 TSSOP/QFN	16-bit x 2	16-bit x 2	12	13 15	-	-	-	-	-	-	32	±5.0	-	-	2.2 to 5.5	-40 to 85	POR, BOD, LVR ADC w/ Internal 2.5V(2%) LDO, Matrix PWM	Now
MC96F8208S	M8051	8KB	-	256B iRAM 256B xRAM	14 18	16 SOP 20 SOP/PDIP/QFN/TSSOP	8-bit x 1 16-bit x 2	8-bit x 1 16-bit x 2	12	8 10	-	-	1	-	1	1	16	±3.5	Y	0.4 to 12.0	1.8 to 5.5	-40 to 85	POR, LVR/LVI, Buzzer	Now
A94B114	cm8051	8KB	-	256B iRAM 256B xRAM	14 18	16 SOPN 20 TSSOP/SOP	8-bit x 1 16-bit x 2	16-bit x 2 (1-ch Complementary PWM)	12	8 10	-	-	-	1	-	1	32	±3.0	-	1.0 to 16.0	2.0 to 5.5	-40 to 85	Analog Comparator 256kHz internal LFO POR, LVR, CRC, ADC w/ 2.5V LDO	Now
A96G174	M8051	8KB	-	256B iRAM 256B xRAM	14 18	16 SOPN 20 TSSOP/QFN/SOP	8-bit x 1 16-bit x 2	16-bit x 2 (1-ch Complementary PWM) 8-bit x 1	12	13 15	-	-	-	1	-	1	32	±1.5	-	-	1.8 to 5.5	-40 to 85/105	USART w/ Auto BAUD, Window WDT, 128kHz IRC (±20%)	Q3 '19
MC97FG216 MC97FG316	M8051	16KB	512B	256B iRAM 768B xRAM	18 26 30	20 TSSOP 28 TSSOP 32 LQFP/QFN	8-bit x 4 16-bit x 3	10-bit MPWM* 10-bit x 1	12	10 12 15	-	-	-	2	1	1	16	±3.0	Y	1.0 to 16.0	1.8 to 5.5	-40 to 85	128MHz PLL, Comparator	Now
MC96F8216 MC96F8316	M8051	16KB	-	256B iRAM 512B xRAM	18 22 26 30	20 SOP/PDIP 24 QFN 28 SOP/TSSOP/SKDIP 32 SOP/QFN/LQFP	8-bit x 1 16-bit x 2	8-bit x 1 16-bit x 2	12	8 11 12 15	-	-	-	1	-	1	16	±3.0	Y	0.4 to 12.0	1.8 to 5.5	-40 to 85	POR, LVR/LVI, Buzzer, I_{OL} 160mA Port 6ea "S" Version Available	Now
MC96F8216A MC96F8316A	M8051	16KB	-	256B iRAM 512B xRAM	18 26 30	20 SOP 28 SOP 32 SOP/LQFP	8-bit x 1 16-bit x 2	8-bit x 1 16-bit x 2	12	8 12 15	-	-	-	1	-	1	16	±3.5	Y	0.4 to 12.0	2.2 to 5.5	-40 to 85	POR, LVR/LVI, Buzzer, I_{OL} 160mA Port 6ea	Now
MC96F6332 MC96F6432	M8051	32KB	-	256B iRAM 768B xRAM	26 30 42 46	28 SOP 32 SOP/LQFP 44 MQFP 48 LQFP	8-bit x 1 16-bit x 3 (8-bit x 2)	8-bit x 1 16-bit x 2 10-bit MPWM	12	11 12 16 16	10 x 4 14 x 4 21 x 8 21 x 8	2	-	-	1	-	16	±3.0	Y	0.4 to 12.0	1.8 to 5.5	-40 to 85	POR, LVR/LVI, Buzzer, HS 8-bit PWM 6, "S" Version Available	Now

* USI : (UART mode or SPI mode or I2C mode)
* USART : (UART mode or SPI mode)
* MPWM : (Motor PWM)

8-bit (M8051) GP MCU

Selection Guide

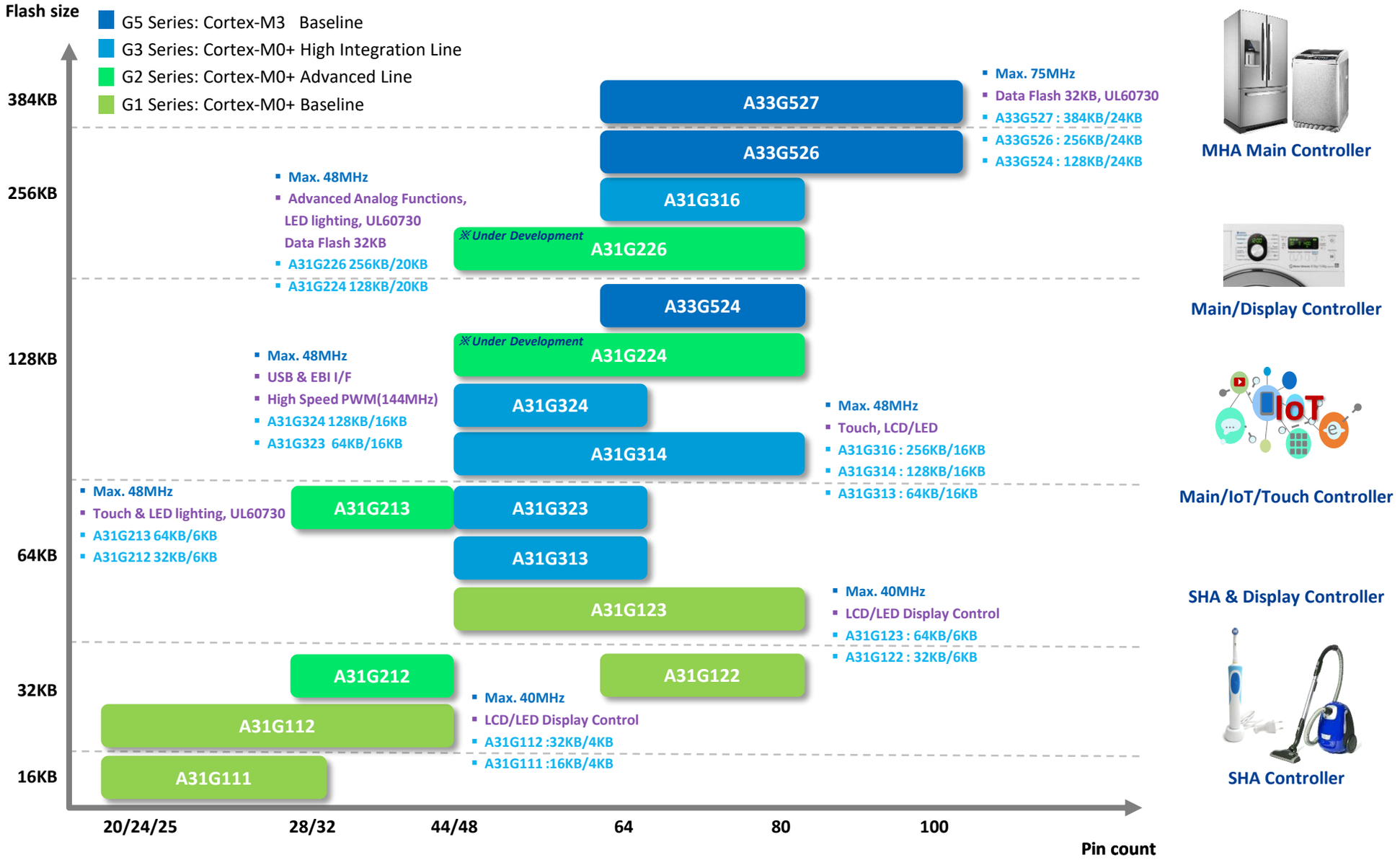
▪ General Purpose 8-bit Flash MCU

Product	Core	ROM	E2P	RAM		I/O	Package		Timer / Counter	PWM	ADC		LCD	USI* [ch]	UART [ch]	USART *[ch]	SPI [ch]	I2C [ch]	Internal OSC		Sub. X-tal	Ext. X-tal [MHz]	Op. Volt. [V]	Op. Temp. [˚C]	Remarks	Avail.
											Bit	ch							Freq. [MHz]	Err. [%]						
MC96F6332A MC96F6432A	M8051	32KB	-	256B 768B	iRAM xRAM	26 30 42 46	28 32 44 48	SOP SOP/LQFP MQFP QFP	8-bit x 1 16-bit x 3 (8-bit x 2)	8-bit x 1 16-bit x 2 10-bit MPWM	12	11 12 16 16	10 x 4 14 x 4 21 x 8 21 x 8	2	-	-	1	-	16	±3.5	Y	0.4 to 8.5	2.2 to 5.5	-40 to 85	POR, LVR/LVI, Buzzer, HS 8-bit PWM 6	Now
MC97F2464 MC97F2664	M8051	64KB	-	256B 4KB	iRAM xRAM	41 61	44 64	MQFP LQFP10/14, QFN	8-bit x 4 16-bit x 6	8-bit x 4 16-bit x 1	12	10 15	-	2	2 3	-	1 2	-	16	±3.5	Y	0.4 To 16.0	1.8 to 5.5	-40 to 85	POR, LVR/LVI, Buzzer	Now
MC97F2464A MC97F2664A	M8051	64KB	-	256B 4KB	iRAM xRAM	41 61	44 64	MQFP LQFP10/14, QFN	8-bit x 4 16-bit x 6	8-bit x 4 16-bit x 1	12	10 15	-	2	2 3	-	1 2	-	16	±3.5	Y	0.4 To 16.0	1.8 to 5.5	-40 to 85	POR, LVR/LVI, Buzzer	Now
A97C450	M8051	64KB	2KB	256B 4KB	iRAM xRAM	46	48	LQFP	8-bit x 2 16-bit x 5	8-bit x 2 16-bit x 5	12	10	-	-	-	2	2	2	16	±3.5	Y	0.4 to 12.0	2.7 to 5.5	-40 to 85	POR, LVR/LVI, H/W CEC, H/W IR Receiver, RTC (100y), CMP 2-ch, Boot Swap	Now
A96G140	M8051	64KB	-	256B 2,304B	iRAM xRAM	26 30 42 46	28 32 44 48	SOP/TSSOP LQFP MQFP LQFP	8-bit x 1 16-bit x 5	8-bit x 1 16-bit x 5	12	16	-	2	-	1	-	-	32	±1.5	Y	0.4 to 12.0	1.8 to 5.5	-40 to 85/105	POR, LVR/LVI, Buzzer, WT	Q4' 19
MC95FG6128 MC95FG8128 MC95FG0128	M8051	128KB	4KB	256B 8KB	iRAM xRAM	52 66 86	64 80 100	LQFP MQFP/LQFP LQFP	16-bit x 5 (8-bit x2)	10-bit x 1 16-bit x 4	12	15	-	-		3 3 4	2	1	8	±5.0	Y	1.0 to 10.0	2.7 to 5.5	-40 to 85	POR,BOD,BUZZER, 16 x 16 Multiplier, 32 / 16 Divider, On Chip PLL	Now
MC97F66128 MC97F68128 MC97F60128	M8051	128KB	-	256B 8KB	iRAM xRAM	54 70 88	64 80 100	LQFP14 LQFP12/LQFP14 LQFP14	8-bit x 3 16-bit x 5 (8-bit x 2)	8-bit x 3 16-bit x 4 10-bit MPWM	12	10 12 15	35 x 8 47 x 8 60 x 8	2 2 2	3 3 3	-	0 2 2	-	16	±3.5	Y	0.4 to 12.0	1.8 to 5.5	-40 to 85	POR, LVR/LVI, Buzzer, 16MHz PLL, LCD Contrast, Flash Parity Bit, ADPCM, 12-bit DAC	Now

* USI : (UART mode or SPI mode or I2C mode)
* USART : (UART mode or SPI mode)
* MPWM : (Motor PWM)

32-bit GP MCU

Product Lineup



MHA Main Controller

Main/Display Controller

Main/IoT/Touch Controller

SHA & Display Controller

SHA Controller

32-bit GP MCU

Selection Guide

▪ G1/G2/G3 Series

Product	Core	Op. Freq. [MHz]	ROM	RAM	I/O	Package		Timer /Counter	3-phase PWM	ADC		ADC Speed	LCD (Max.)	*USART (SPI) [ch]	UART [ch]	I2C [ch]	Internal OSC		Sub. X-tal	Ext. X-tal [MHz]	Op. Volt. [V]	Op. Temp. [˚C]	Remarks	Avail.
										Bit	ch						Freq. [MHz]	Err. [%]						
A31G111	Cortex-M0+	40	16KB	4KB	21 25 29	24 28 32	QFN TSSOP LQFP/QFN	16-bit x 3 32-bit x 2	16-bit x 1	12	4 5 5	50ksps	20x4 16x8	1 1 2	1 1 2	2	40	±4.5	Y	2.0 to 16.0	1.8 to 5.5	-40 to 105	POR, LVR, High current Port, CRC16, SWD	Now
A31G112	Cortex-M0+	40	32KB	4KB	21 25 29 41 45	24 28 32 44 48	QFN TSSOP LQFP/QFN MQFP LQFP	16-bit x 3 32-bit x 2	16-bit x 1	12	4 5 5 9 11	50ksps	27x4 23x8	1 1 2 2 2	1 1 2 2 2	2	40	±4.5	Y	2.0 to 16.0	1.8 to 5.5	-40 to 105	POR, LVR, High current Port, CRC16, SWD	Now
A31G122	Cortex-M0+	40	32KB	6KB	61 77	64 80	LQFP10/12 LQFP12/14	16-bit x 7 32-bit x 2	16-bit x 1	12	14	50ksps	43x4 39x8	3 4	2	3	40	±4.5	Y	2.0 to 16.0	1.8 to 5.5	-40 to 105	POR, LVR, High current Port, CRC16, SWD	Now
A31G123	Cortex-M0+	40	64KB	6KB	41 45 61 77	44 48 64 80	MQFP LQFP LQFP10/12 LQFP12/14	16-bit x 7 32-bit x 2	16-bit x 1	12	9 11 14 14	50ksps	43x4 39x8	2 2 3 4	2	3	40	±4.5	Y	2.0 to 16.0	1.8 to 5.5	-40 to 105	POR, LVR, High current Port, CRC16, SWD	Now
A31G212	Cortex-M0+	48	32KB	6KB	24 28 40 44	28 32 44 48	TSSOP LQFP MQFP LQFP	16-bit x 4 32-bit x 2	16-bit x 1	12	6 8 12 14	150ksps	-	1 2 2 2	2	2	32	±1.5	Y	2.0 to 16.0	1.8 to 5.5	-40 to 105	POR, LVR, 11~24-ch Cap. Touch High Current Port, SWD, PLL	Now
A31G213	Cortex-M0+	48	64KB	6KB	24 28 40 44	28 32 44 48	TSSOP LQFP MQFP LQFP	16-bit x 4 32-bit x 2	16-bit x 1	12	6 8 12 14	150ksps	-	1 2 2 2	2	2	32	±1.5	Y	2.0 to 16.0	1.8 to 5.5	-40 to 105	POR, LVR, 11~24-ch Cap. Touch High Current Port, SWD, PLL	Now
A31G313	Cortex-M0+	48	64KB	16KB	39 43 58	44 48 64	LQFP LQFP/QFN LQFP10/12	16-bit x 7 32-bit x 2	16-bit x 1	12	9 11 14	150ksps	46x4 42x8	2 2 3	2	2 2 3	48	±3.5	Y	2.0 to 16.0	1.8 to 5.5	-40 to 85	POR, LVR, LED Driver, SWD, PLL, 11~20-ch Cap. Touch, 12-bit DAC	Now
A31G314	Cortex-M0+	48	128KB	16KB	39 43 58 74	44 48 64 80	LQFP LQFP/QFN LQFP10/12 LQFP12/14	16-bit x 7 32-bit x 2	16-bit x 1	12	9 11 14 14	150ksps	46x4 42x8	2 2 3 4	2	2 2 3 3	48	±3.5	Y	2.0 to 16.0	1.8 to 5.5	-40 to 85	POR, LVR, LED Driver, SWD, PLL, 11~24-ch Cap. Touch, 12-bit DAC	Now
A31G316	Cortex-M0+	48	256KB	16KB	58 74	64 80	LQFP10/12 LQFP12/14	16-bit x 7 32-bit x 2	16-bit x 1	12	14	150ksps	46x4 42x8	3 4	2	3	48	±3.5	Y	2.0 to 16.0	1.8 to 5.5	-40 to 85	POR, LVR, LED Driver, SWD, PLL, 20~24-ch Cap. Touch, 12-bit DAC	Now
A31G323	Cortex-M0+	48	64KB	16KB	37 51	48 64	LQFP LQFP10	16-bit x 5 32-bit x 2	16-bit x 1	12	10 16	1Msps	-	4 (2)	-	2 2	48	±3	Y	2.0 to 16.0	1.8 to 5.5	-40 to 85	POR, LVR, USB2.0 FS Device, High-Speed PLL(144MHz), VBAT Mode, SWD	Q4 '19
A31G324	Cortex-M0+	48	128KB	16KB	37 51	48 64	LQFP/QFN LQFP10	16-bit x 5 32-bit x 2	16-bit x 1	12	10 16	1Msps	-	4 (2)	-	2 2	48	±3	Y	2.0 to 16.0	1.8 to 5.5	-40 to 85	POR, LVR, USB2.0 FS Device, High-Speed PLL(144MHz), VBAT Mode, SWD	Q4 '19

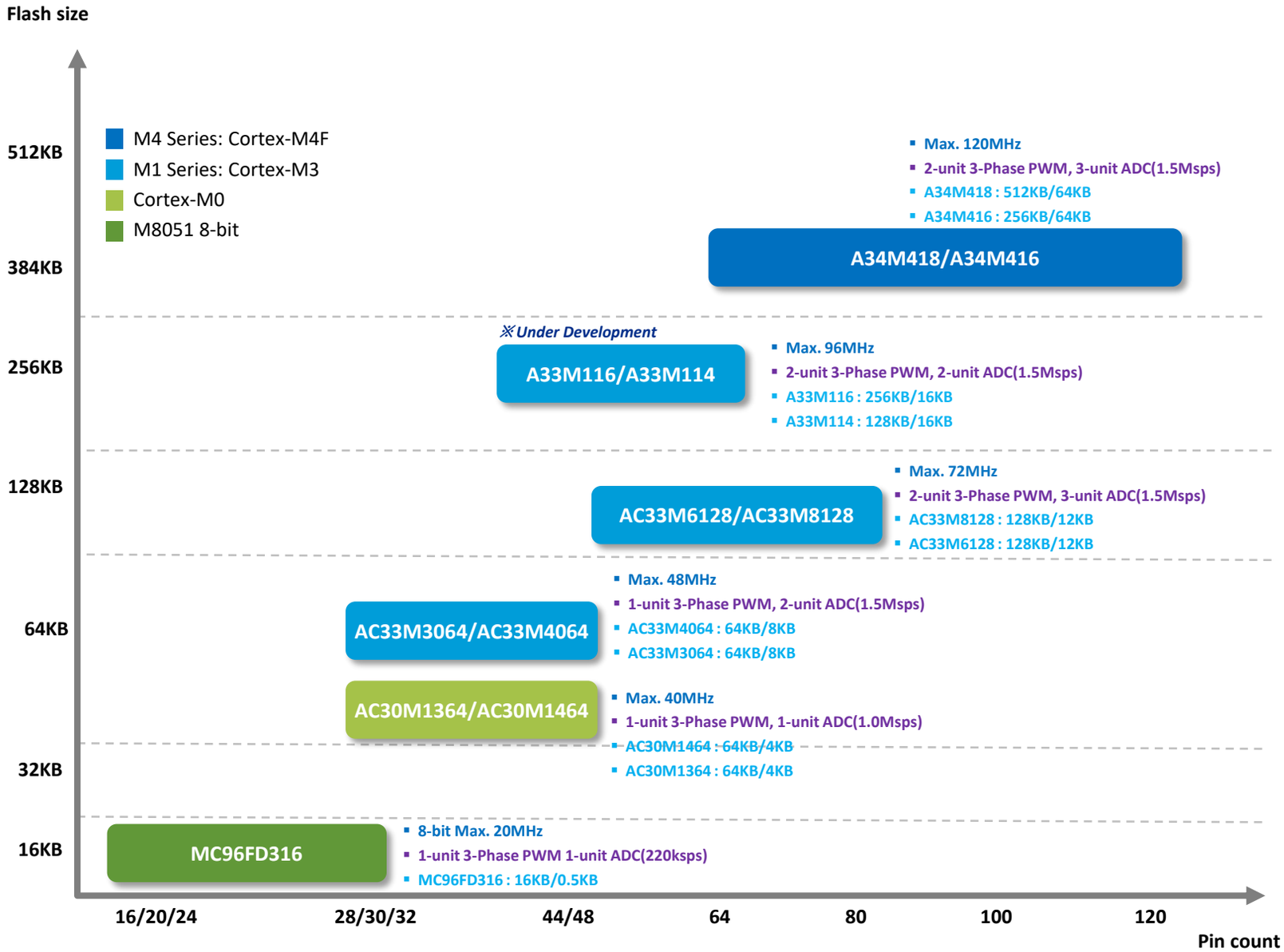
* USART : (UART mode or SPI mode)

G5 Series

Product	Core	Op. Freq. [MHz]	Code Flash	Data Flash	RAM	I/O	Package		Timer /Counter	FRT	PWM	ADC		ADC Speed	UART [ch]	SPI [ch]	I2C [ch]	Internal OSC		Sub. X-tal	Ext. X-tal [MHz]	Op. Volt. [V]	Op. Temp. [°C]	Remarks	Avail.
												Bit	ch					Freq. [MHz]	Err. [%]						
A33G524	Cortex-M3	75	128KB	32KB	24KB	60 71	64 80	LQFP10/LQFP12 LQFP12/LQFP14	16-bit x 10	Y	8	12	10	70ksps	4	2	2	16	±4	Y	4.0 to 10.0	3.0 to 5.5	-40 to 85	POR, LVR, PLL, 1MHz Ring-OSC JTAG/SWD	Now
A33G526	Cortex-M3	75	256KB	32KB	24KB	60 71 90	64 80 100	LQFP10/LQFP12 LQFP12/LQFP14 LQFP14/MQFP	16-bit x 10	Y	8	12	10 10 16	70ksps	4	2	2	16	±4	Y	4.0 to 10.0	3.0 to 5.5	-40 to 85	POR, LVR, PLL, 1MHz Ring-OSC JTAG/SWD	Now
A33G527	Cortex-M3	75	384KB	32KB	24KB	60 90	64 100	LQFP12 LQFP14/MQFP	16-bit x 10	Y	8	12	10 16	70ksps	4	2	2	16	±4	Y	4.0 to 10.0	3.0 to 5.5	-40 to 85	POR, LVR, PLL, 1MHz Ring-OSC JTAG/SWD	Now

High Performance / Motor MCU

Product Lineup



Laundry Machine
Inverter Controller

Air Conditioner Inverter Controller

Refrigerator Inverter Controller

BLDC Fan

Fan Controller

High Performance / Motor MCU

Selection Guide

- **High Performance / Motor MCU**

Product	Core	Op. Freq. [MHz]	Code Flash	Data Flash	RAM	I/O	Package		Timer /Counter	3-phase PWM	ADC		ADC Speed	UART [ch]	SPI [ch]	I2C [ch]	CAN [ch]	Internal OSC		Sub. X-tal	Ext. X-tal [MHz]	Op. Volt. [V]	Op. Temp. [˚C]	Remarks	Avail.
											Bit x Unit	ch						Freq. [MHz]	Err. [%]						
MC96FD316	M8051	20	16KB	-	512B	20 24 28 28	24 28 32 32	SSOP TSSOP LQFP QFN	16-bit x 3 8-bit x 1	16-bit x 1	10 x 1	7 9 11 11	220ksps	1	1	-	-	20	±3	-	0.4 To 16.0	2.0 to 5.5	-40 to 105	Analog Comparator 4ea, OP-AMP 1ea, POR, BOD	Now
AC30M1364 AC30M1464	Cortex-M0	40	64KB	-	4KB	30 30 44	32 32 48	QFN LQFP LQFP	16-bit x 4 32-bit FRT	16-bit x 1	12 x 1	8 8 12	1.0Msps	2	1	1	-	40	±3	Y	4.0 to 16.0	2.2 to 5.5	-40 to 105	POR, BOD, Adaptive IRC, CRC16, LSI 40kHz	Now
AC33M3064 AC33M4064	Cortex-M3	48	64KB	-	8KB	28 44	32 48	LQFP LQFP	16-bit x 6	16-bit x 1	12 x 2	7 11	1.5Msps	2	1	1	-	-	-	-	4.0 to 8.0	3.0 to 5.5	-40 to 85	POR, BOD, PLL, CRC16, 1MHz Ring-OSC	Now
AC33M6128 AC33M8128	Cortex-M3	72	128KB	-	12KB	48 64	64 80	LQFP LQFP	16-bit x 6	16-bit x 2	12 x 3	16	1.5Msps	2 4	2	1 2	-	20	±3	-	4.0 to 8.0	3.0 to 5.5	-40 to 85	Analog Comparator 4ea, OP-AMP 4ea, POR, BOD, PLL, 1MHz Ring-OSC	Now
A33M114	Cortex-M3	96	128KB	32KB	16KB	up to 56	44 48 64	MQFP LQFP LQFP	16-bit x 8 32-bit FRT	16-bit x 2	12 x 2	18 20 16	1.5Msps	4	2	2	-	32	±3	Y	4.0 to 16.0	2.2 to 5.5	-40 to 105	Analog Comparator 4ea, OP-AMP 3ea, Data Flash 32KB, POR, BOD, PLL	Q4 ’19
A33M116	Cortex-M3	96	256KB	32KB	16KB	up to 56	44 48 64	MQFP LQFP LQFP	16-bit x 8 32-bit FRT	16-bit x 2	12 x 2	18 20 16	1.5Msps	4	2	2	-	32	±3	Y	4.0 to 16.0	2.2 to 5.5	-40 to 105	Analog Comparator 4ea, OP-AMP 3ea, Data Flash 32KB, POR, BOD, PLL	Q4 ’19
A34M416	Cortex-M4F	120	256KB	32KB	64KB	51 89 107	64 100 120	LQFP	16-bit x 10 32-bit FRT	16-bit x 2	12 x 2	16 24 24	1.5Msps	6 6 3	1 2 3	1 2 2	1	32	±3	Y	4.0 to 16.0	2.7 to 5.5	-40 to 85	Analog Comparator 4ea, PGA 3-ch, Data Flash 32KB, POR, BOD, PLL, CRC16, 500kHz Ring-OSC	Now
A34M418	Cortex-M4F	120	512KB	32KB	64KB	51 89 107	64 100 120	LQFP	16-bit x 10 32-bit FRT	16-bit x 2	12 x 3	16 24 24	1.5Msps	6 6 3	1 2 3	1 2 2	1	32	±3	Y	4.0 to 16.0	2.7 to 5.5	-40 to 85	Analog Comparator 4ea, PGA 3-ch, Data Flash 32KB, POR, BOD, PLL, CRC16, 500kHz Ring-OSC	Now

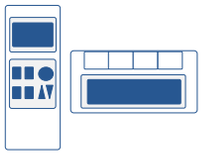
Application Specific Standard Products (ASSP)

Single & Universal Remote Control MCU

ABOV single and universal remote controller products are cost-effective 4/8-bit core MCUs suitable for low-power remote controllers with user-friendly ecosystem. Especially, ABOV universal remote MCU embeds a world-class learning amplifier to retrieve any IR control signal for IoT control.

Boost LCD MCU for GP and Remote Control

ABOV boost LCD MCU products support capacitor-biased LCD for crystal clear LCD display and its variant of LCD Remote Control MCUs integrate additional IR LED Drivers to better serve remote controller needs with minimized Bill of Materials.



Capacitive Touch Solution

ABOV capacitive touch sensor provides the most flexible and field proven solution boasting high sensitivity, along with CS 10V tolerance for the new products to provide a robust touch sensing performance for use in the most extreme environments for customer applications.

Sensor: Optic Sensor

ABOV optic sensor products consist of color, and ambient light sensors that are widely used for TVs, monitors, laptops, mobile devices, and lighting devices, with sophisticated light sensitive photodiodes and highly precise low-noise readout circuitry embedded within the chip.

Sensor: Fire & Safety Products

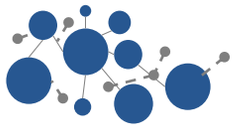
ABOV fire & safety product lineup addresses the entire spectrum of the low- to high-end markets. Integrating a high precision analog front-end circuitry and line interface for Tx/Rx, these MCUs and ICs provide the most optimized solution for smoke detectors and heat detectors.

Power Solution

ABOV Semiconductor's power products offer not only support for the standard USB Power Delivery specifications, but also flexibility to support and customized fast charging specifications for various customers.

Connectivity Solution

ABOV connectivity solution has a lineup of Bluetooth Low Energy 4.2 SoCs, powered by ABOV's in-house BLE 4.2 stack and RF IPs optimized to provide the most user-friendly development ecosystem and ultra low power performance all at the same time.



Tailor-Made MCU

ABOV Tailor-Made MCUs are custom products serving customer's special applications. Voice MCU features audio codecs, an MCU system, and a DSP to generate audible sound from pure digital data. PPG MCU provides hardware programmable pulse generator ideal for IH Cookers.

Single Remote Control MCU

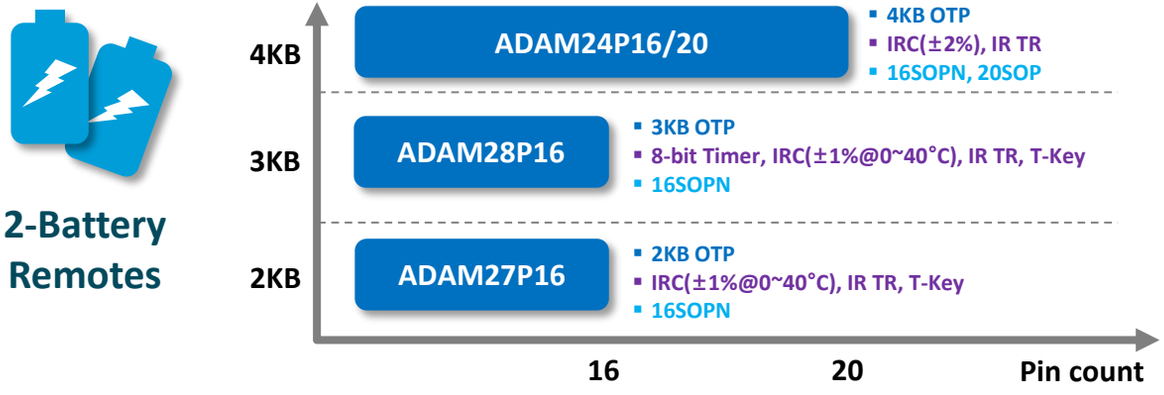
Product Lineup / Selection Guide

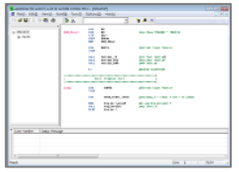
Single Remote Control MCU Solution

ABOV Single Remote Control MCU provides the most cost-effective solution to build simple IR-based remote controllers to control various household electronics. Designed to minimize customer expenditure in every way possible, ABOV SR MCU products require the least number of external components to minimize Bill of Materials, and also provide all the user-friendly development tools to ease customer development process.

ABOV SR Benefits

- **Lowest Cost and Easy Development**
  - **Minimized External Components**
  - **Integrated High Precision RC Oscillator**
  - **Integrated IR LED Driver**
  - **T-Key Support for Maximized Remote Keys**
  - **In-house Assembler, Simulator Tools**





SR Magic Assembler

- Supported product : G400
- Generates hexadecimal file
- Manages project & library
- IDE environment

ADAM2 Series Simulator

- Supported product : ADAM2X
- Simulates in various run modes
- Variable key matrices
- Real-time tracing

- **Single Remote Control MCU**

Product	Core	Op. Freq. [MHz]	Mem. Type	ROM	RAM	Timer /Counter	I/O	Input	Output	Package		T-Key	WDT	ISP	POR	LVD	Internal OSC		IOSC Condition		Tr	Fosc	Op. Volt. [V]	Op. Temp [°C]	Remarks	Avail.
																	Freq. [MHz]	Err. [%]	Volt. [V]	Temp. [°C]						
ADAM24P16 ADAM24P20	4-bit	3.64	OTP	4KB	32 x 4-bit	-	2 2	4 6	8 10	16 20	SOPN SOP/TSSOP	-	Y	Y	Y	Y	3.64	±2.0	-	-	Y	Fosc/48	1.8 to 3.6	-20 to 70	Fosc/64,88,92,96 MTP Support	Now
ADAM27P16	4-bit	3.64	OTP	2KB	32 x 4-bit	-	13	-	1	16	SOPN/TSSOP	Y	Y	Y	Y	Y	3.64	±1.0 ±1.5 ±2.0	2.0 ~ 3.6 2.0 ~ 3.6 1.8 ~ 3.6	0 ~ 40 -20 ~ 70 -20 ~70	Y	Fosc/48	1.8 to 3.6	-20 to 70	Fosc/64,88,91,96,101 MTP Support	Now
ADAM28P16	4-bit	3.64	OTP	3KB	32 x 4-bit	1ea	13	-	1	16	SOPN	Y	Y	Y	Y	Y	3.64	±1.0 ±1.0	1.8 ~ 3.6 1.8 ~ 3.6	-10 ~ 50 -20 ~ 70	Y	Fosc/48	1.8 to 3.6	-20 to 70	MTP Support Carrier Freq. Gen.	Now

Universal Remote Control MCU

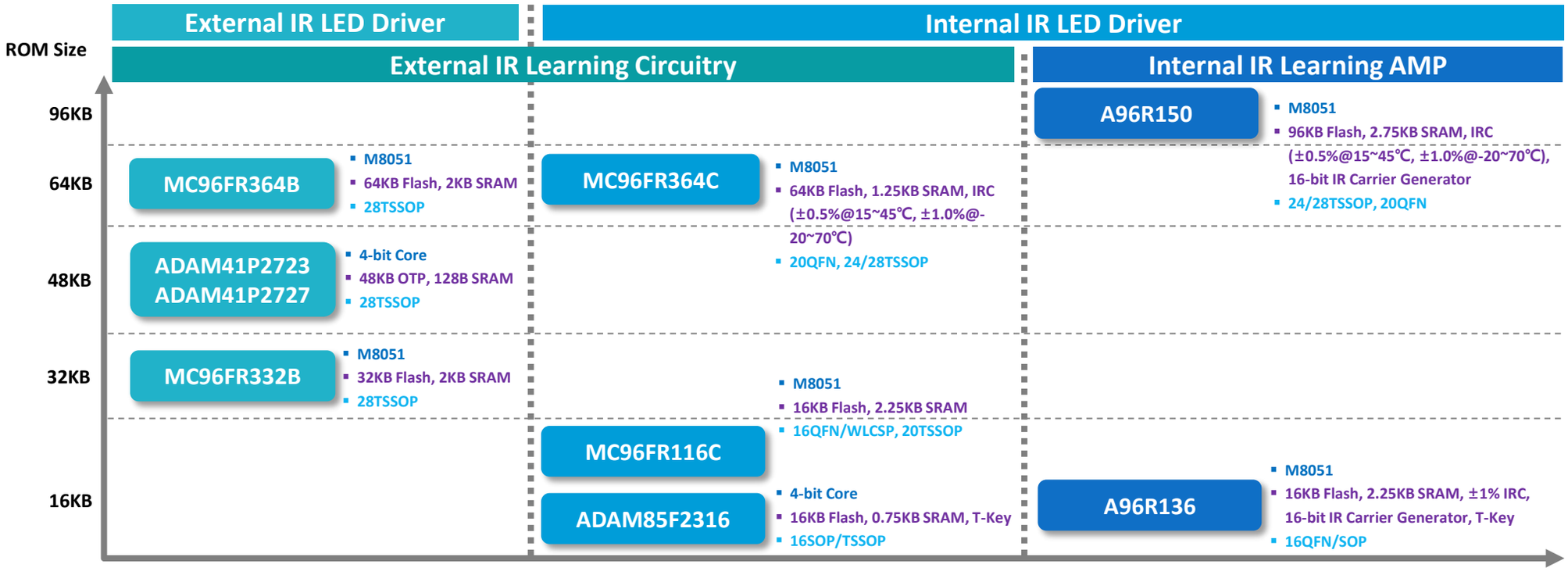
Product Lineup

Universal Remote Control MCU Solution

ABOV Universal Remote Control MCU products are 4/8-bit MCUs optimized for remote controller applications, especially for multi-purpose remote controllers commonly used by TVs and set-top boxes that need to control various different devices with a single controller. ABOV UR MCUs cover the entire spectrum of universal remote requirements with memories ranging from 16KB to 96KB, and integrate state-of-the-art IR learning amplifier circuit within the chip to acquire IR signals from numerous different controllers to support true universal remote control through a single device. These MCUs can learn IR from half a meter away, making them ideal for IoT hub devices such as AI Speakers or Smart IR Hub devices.

ABOV UR Benefits

- **World Best Learning Performance**
  - **Extended IR Learning Distance**
  - **Expanded Frequency Range**
- **Built-in Constant Current IR Driver Tr.**
  - **Constant Range @ Low Battery**
- **Excellent Technical Support**



Universal Remote Control MCU

Selection Guide

▪ Universal Remote Control MCU

Product	Core	Op. Freq. [MHz]	Mem. Type	ROM	RAM		Timer /Counter	I/O	Input	Output	Package		T-Key	WDT	USART [ch]	I2C [ch]	ISP	IAP	LVD	LVI [Lv.]	Internal OSC		IOSC Condition [˚C]	Tr	Op. Volt. [V]	Op. Temp [˚C]	Remarks	Avail.
																					Freq. [MHz]	Err. [%]						
ADAM41P2723 ADAM41P2727	4-bit	4.0	OTP	48KB	256 x 4-bit		8-bit x 2	8	4	10 14	24 28	SOP	-	Y	-	-	Y	-	Y	2	4	±2	-20 ~ 70	Y	1.8 to 3.6	-20 to 70	MTP Support	Now
ADAM85F2316	8-bit	4.0 to 16.0	Flash	16KB	768B		16-bit x 2	13	-	1	16	SOP/TSSOP	Y	Y	-	-	Y	-	Y	4	16	±2	-20 ~ 70	Y	1.8 to 3.6	-20 to 70	Supports IR Learning	Now
A96R136	M8051	1.0 to 12.0	Flash	16KB	256B 2KB	iRAM XRAM	8-bit x 2 16-bit x 2	13	-	-	16	QFN SOP	Y	Y	1	1	Y	Y	Y	5	12	±1	-20 ~ 70	Y	1.71 To 3.6	-20 To 70	Integrated IR Learning AMP, Supports Boot Lock Mask	Now
MC96FR116C	M8051	1.0 to 12.0	Flash	16KB	256B 2KB	iRAM xRAM	8-bit x 2 16-bit x 2	9 9 16	-	-	16 16 20	QFN WLCSP TSSOP	-	Y	1	1	Y	Y	Y	4	12	±2	-20 ~ 70	Y	1.8 to 3.6	-20 to 70	Supports IR Learning, Supports Boot Lock Mask	Now
MC96FR332B	M8051	1.0 to 12.0	Flash	32KB	256B 1.75KB	iRAM xRAM	8-bit x 2 16-bit x 2	23	-	-	28	TSSOP	-	Y	2	1	Y	Y	Y	4	-	-	-	-	1.7 to 3.6	-20 to 70	Supports IR Learning, Supports Boot Lock Mask	Now
MC96FR364B	M8051	1.0 to 12.0	Flash	64KB	256B 1.75KB	iRAM xRAM	8-bit x 2 16-bit x 2	23	-	-	28	TSSOP	-	Y	2	1	Y	Y	Y	4	-	-	-	-	1.7 to 3.6	-20 to 70	Supports IR Learning, Supports Boot Lock Mask	Now
MC96FR364C	M8051	1.0 to 12.0	Flash	64KB	256B 1KB	iRAM xRAM	8-bit x 2 16-bit x 2	17 25	-	-	20 28	QFN TSSOP	-	Y	1	1	Y	Y	Y	6	12	±1	-20 ~ 70	Y	1.6 to 3.6	-20 to 70	Supports IR Learning, Supports Boot Lock Mask	Now
A96R150	M8051	1.0 to 12.0	Flash	96KB	256B 2.5KB	iRAM xRAM	8-bit x 2 16-bit x 2	17 21 25	-	-	20 24 28	QFN TSSOP TSSOP	-	Y	1	1	Y	Y	Y	3	12	±1 ±2	-20 ~ 70 -25 ~ 85	Y	1.71 to 3.6	-25 to 85	Integrated IR Learning AMP, Supports Boot Lock Mask	Now

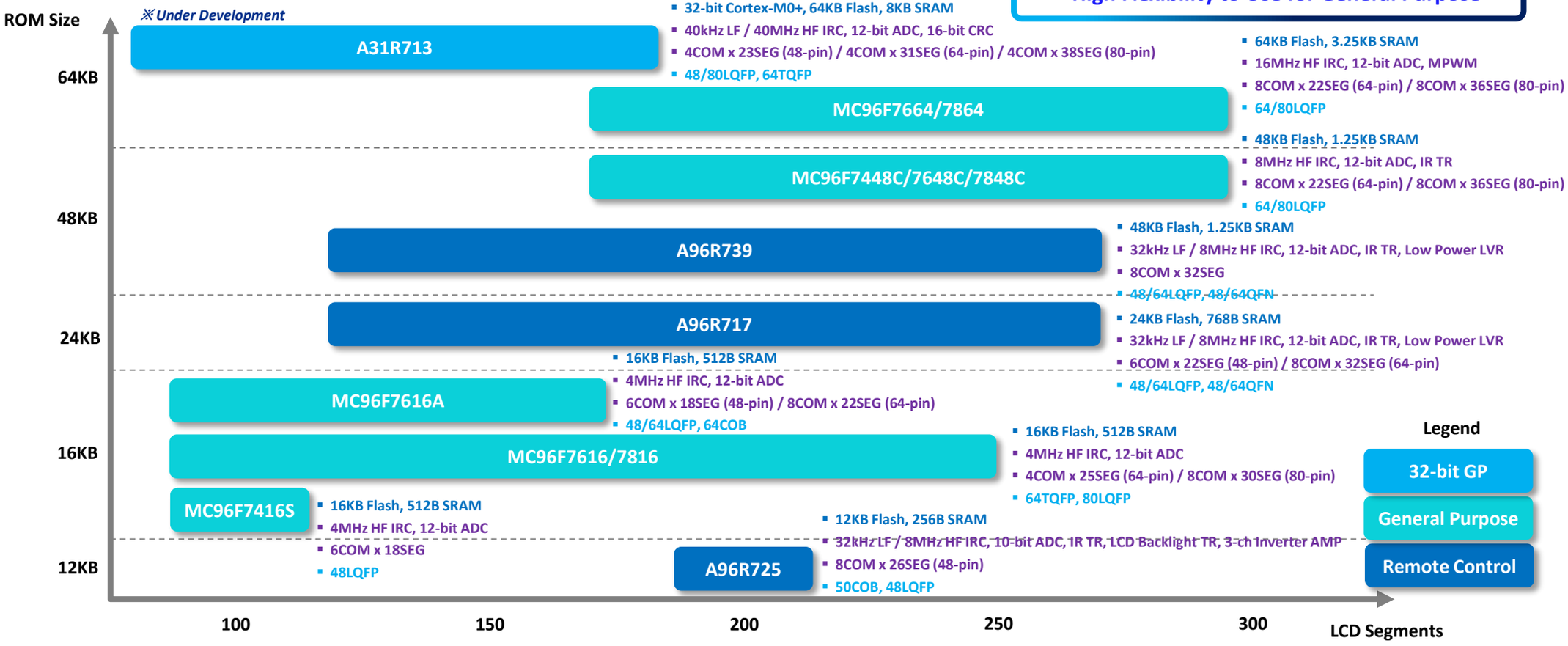
Boost LCD MCU

Boost LCD MCU Solution

ABOV Boost LCD MCU products are equipped with capacitor-biased boost circuitry within the chip to provide a crystal clear LCD display VLC precision within 7%. A96R7xx Series is specially engineered to integrated all necessary functions for LCD remote controllers, while MC96F7xxx Series, and the new A31R713, a 32-bit Cortex®-M0+ MCU, are built for general purpose devices requiring LCD displays.

ABOV LCD MCU Benefits

- **Reduced Bill of Materials**
  - ±1% Precision IRC
  - Integrated IR LED Driver for A96R7xx Series
- **Maximized LCD Performance**
  - Crystal Clear LCD with VLC Precision ±7%
- **High Flexibility to Use for General Purpose**



Boost LCD MCU

Selection Guide

▪ Boost LCD MCU for General Purpose

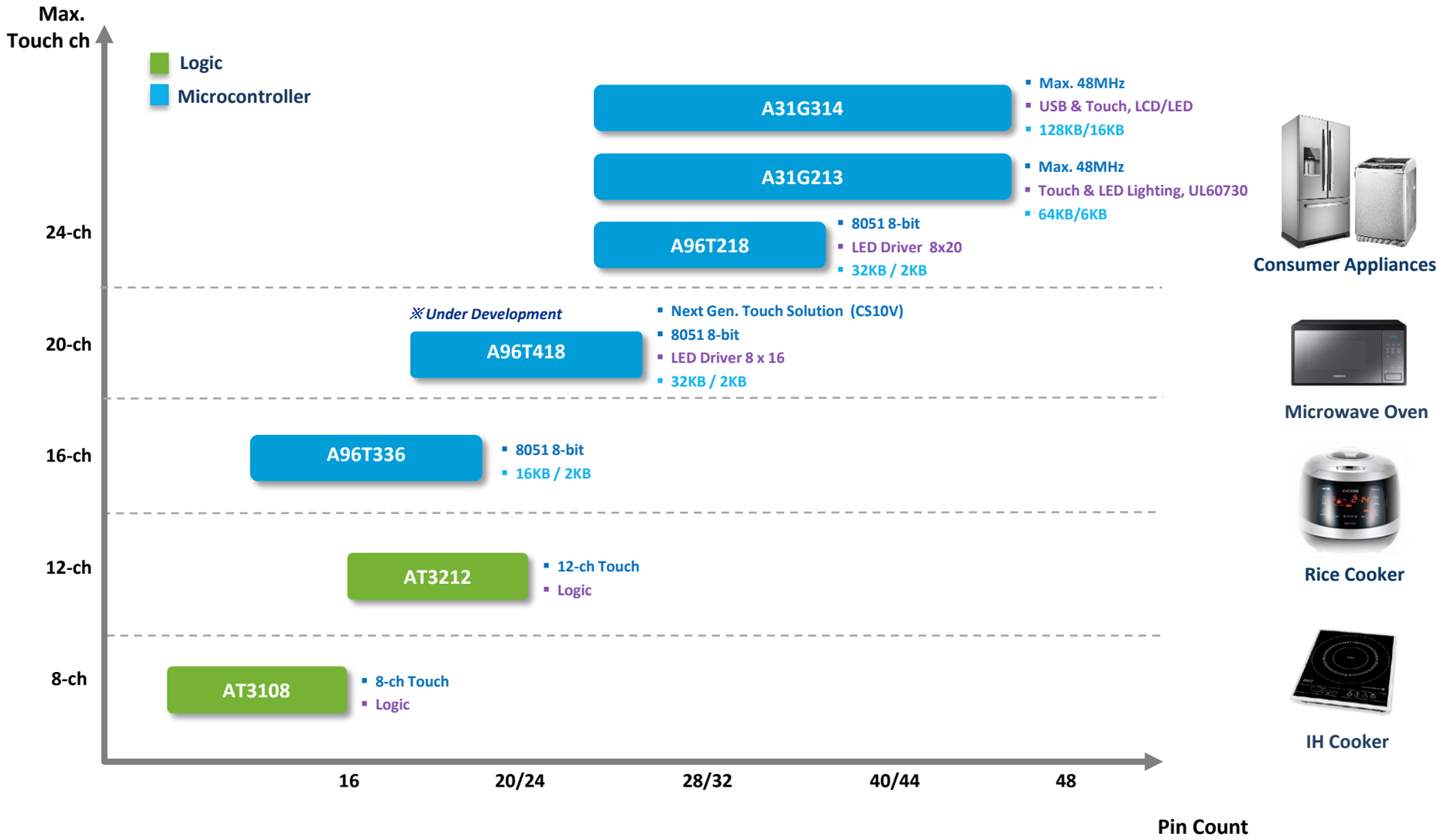
Product	Core	ROM	RAM		I/O	Package		Timer / Counter	PWM	ADC		LCD	USI* [ch]	UART [ch]	SIO [ch]	USART (SPI) [ch]	I2C [ch]	Internal OSC		Sub. X-tal	Ext. X-tal [MHz]	Op. Volt. [V]	Op. Temp. [°C]	Remarks	Avail.
										Bit	ch							Freq. [MHz]	Err. [%]						
MC96F7416S MC96F7616A	M8051	16KB	256B 256B	iRAM xRAM	41 57	48 64	LQFP07 LQFP10	8-bit x 2 16-bit x 2	- 8-bit x 1	12	4 8	18 x 6 22 x 8	-	1	-	-	-	4	±3.5	Y	0.4 to 12.0	1.8 to 5.5	-40 to 85	POR, LVR/LVI, Buzzer (64-pin), 8MHz FLL (MC96F7416S)	Now
MC96F7616 MC96F7816	M8051	16KB	256B 256B	iRAM xRAM	55 71	64 80	TQFP LQFP	8-bit x 2 16-bit x 2	8-bit x 1	12	8	25 x 4 30 x 8	-	1	1	-	-	4	±3.5	Y	0.4 to 12.0	1.8 to 5.5	-40 to 85	POR, LVR/LVI, Buzzer	Now
MC96F7448C MC96F7648C MC96F7848C	M8051	48KB	256B 1KB	iRAM xRAM	43 58 74	48 64 80	LQFP LQFP LQFP12/14	8-bit x 2 16-bit x 4	8-bit x 1 16-bit x 4	12	3 5 8	23 x 4 33 x 4 36 x 8	2	1	1	-	-	8	±4.0	Y	0.4 to 12.0	1.8 to 5.5	-40 to 85	POR, LVR/LVI, Buzzer, 8MHz FLL	Now
MC96F7664 MC96F7864	M8051	64KB	256B 3KB	iRAM xRAM	55 71	64 80	LQFP MQFP/LQFP	8-bit x 5 16-bit x 4	8-bit x 3 16-bit x 4 10-bit Motor PWM	12	10 12	22 x 8 36 x 8	2	3	-	2	-	16	±3.5	Y	0.4 to 12.0	1.8 to 5.5	-40 to 85	POR, LVR/LVI, Buzzer, 16MHz PLL, Flash Parity Bit	Now
A31R713	Cortex-M0+	64KB	8KB	SRAM	45 61 73	48 64 80	LQFP TQFP LQFP	16-bit x 6 32-bit x 2	8-bit x 1 16-bit x 2	12	8 11 11	23 x 4 31 x 4 38 x 4	-	1	-	2	1	40 40kHz	±1 ±10	Y	2.0 to 40.0	1.8 to 5.5	-40 to 85	POR, LVR/LVI, LDO, CRC/Checksum, 24-bit WDT, 24-bit SysTick	Q4 '19

▪ Boost LCD MCU for Remote Controller

Product	Core	ROM	RAM		I/O	Package		Timer / Counter	PWM	ADC		LCD	USI* [ch]	UART [ch]	SIO [ch]	USART (SPI) [ch]	I2C [ch]	Internal OSC		Sub. X-tal	Ext. X-tal [MHz]	Op. Volt. [V]	Op. Temp. [°C]	Remarks	Avail.
										Bit	ch							Freq. [MHz]	Err. [%]						
A96R725	M8051	12KB	256B	iRAM	43	48 50	LQFP Pellet	8-bit x 2 16-bit x 2	16-bit x 2	10	8	26 x 8	-	-	-	-	-	8 32kHz	±1 ±10	Y	0.4 To 12.0	1.8 to 3.6	-40 To 85	POR, LVR/LVI, Buzzer, CRC/Checksum, Inverter Amplifier 3-ch, LCD Backlight Driver 2-ch	Now
A96R717	M8051	24KB	256B 512B	iRAM xRAM	43 59	48 64	LQFP LQFP/TQFP	8-bit x 2 16-bit x 2	8-bit x 1 16-bit x 2	12	2 5	22 x 6 32 x 8	-	1	-	-	-	8 32kHz	±1 ±5	Y	0.4 to 12.0	1.8 to 5.5	-40 to 85	POR, LVR/LVI, Buzzer, Low Power LVR (0.9uA), CRC/Checksum	Now
A96R739	M8051	48KB	256B 1KB	iRAM xRAM	43 59	48 64	LQFP/QFN LQFP/QFN	8-bit x 2 16-bit x 2	8-bit x 1 16-bit x 2	12	5	22 x 6 32 x 8	-	1	-	-	-	8 32kHz	±1 ±5	Y	0.4 to 12.0	1.8 to 5.5	-40 to 85	POR, LVR/LVI, Buzzer, Low Power LVR (0.9uA), CRC/Checksum	Now

Capacitive Touch Solution

Product Lineup



Capacitive Touch Solution

Selection Guide

▪ Capacitive Touch Solution

Product	Touch Key Only	Touch Key + MCU	Touch + LED Func.	Core	ROM	RAM	I/O	Package	Timer /Counter	DAC	Comparator	ADC		USART [ch]	UART [ch]	I2C [ch]	IAP	Internal OSC		Ext. X-tal [kHz]	Op. Freq.	Op. Volt. [V]	Op. Temp [˚C]	Remarks	Avail.
												Bit	ch					Freq. [MHz]	Err. [%]						
A96T336	-	8-ch 16-ch	-	M8051	16KB Flash	2KB	14 22	16 QFN 24 QFN	16-bit x 2	-	-	10	8 16	1	-	1	Y	16	±3	-	16MHz	2.7 to 5.5	-40 to 85	-	Now
A96T218	-	20-ch 24-ch 24-ch	o	M8051	32KB Flash	2KB	26 30 34	28 SOP 32 SOP 40 QFN	16-bit x 3	-	-	12	8	2	-	1	Y	16	±3	32.768	16MHz	2.7 to 5.5	-40 to 85	LED Driver 20SEG x 8COM (40-QFN) 18SEG x 8COM (32-SOP) 14SEG x 8COM (28-SOP)	Now
A96T418	-	13-ch 17-ch 20-ch	o	M8051	32KB Flash	2KB	17 21 25	20 SOP 24 SOP 28 SOP	16-bit x 3	-	-	12	8	2	-	1	Y	16	±2	32.768	16MHz	2.7 to 5.5	-40 to 85	LED Driver 16SEG x 8COM CS 10V	Q4 ‘19
A31G213	-	11-ch 13-ch 21-ch 24-ch	o	Cortex-M0+	64KB Flash	6KB	24 28 40 44	28 TSSOP 32 LQFP 44 MQFP 48 LQFP	16-bit x 4 32-bit x 2	5-bit	1-ch	12	6 8 12 14	1 2 2 2	2	2	Y	48	±1	32.768	500kHz to 48MHz	1.8 to 5.5	-40 to 105	LED Driver 10SEG x 16COM DMA 4-ch	Now
A31G314	-	24-ch	o	Cortex-M0+	128KB Flash	16KB	44	80 LQFP14	16-bit x 7 32-bit x 2	12-bit	1-ch	12	14	4	2	3	Y	48	±3.5	32.768	500kHz to 48MHz	1.8 to 5.5	-40 to 85	LCD Driver 42SEG x 8COM LED Driver 11SEG x 27COM DMA 4-ch	Now
AT3108	8-ch	-	-	-	-	-	1	16 QFN/SOPN	-	-	-	-	-	-	-	1	-	-	-	-	-	2.7 to 5.5	-40 to 85	Logic Touch IC Sleep current 20uA at 300ms Scan	Now
AT3212	12-ch	-	-	-	-	-	4	24 SOP/QFN	-	-	-	-	-	-	-	1	-	-	-	-	-	2.7 to 5.5	-40 to 85	Logic Touch IC Sleep current 20uA at 300ms Scan	Now

▪ Optic Sensor

Product	Tech	PD structure	ADC	Peak Wavelength	Memory for Trim	Trim usage	Auto Flicker Cancellation	I2C	Operating Voltage [V]	Operating Temperature [˚C]	Power Consumption	Package		Avail.
MC8121C	CMOS	2 channels (W, IR)	16-bit	550nm@CH0 850nm@CH1	-	-	O	O (max. 400kHz)	2.4 ~ 3.6V	-40 ~ 85°C	Max. 120uA	Die or	2-in-1 PKG by ABOV Partner	Now
MCRS8841C	CMOS	4x4 Bayer R/G/B/W/IR	16-bit	460 ~ 800nm covered by every channel	Fuse (53bits)	One Time Trim @ PKG	O	O (max. 400kHz)	1.7 ~ 3.6V	-20 ~ 85°C	Max. 360uA	Die or	2-in-1 or 3-in-1 PKG by ABOV Partner	Now
MCRS8841RG	CMOS	4x4 Bayer R/G/B/IR	16-bit	460 ~ 800nm covered by every channel	Fuse (122bits)	One Time Trim @ PKG 3 Times Trim @ Module	O	O (max. 400kHz)	2.4 ~ 3.6V	-20 ~ 85°C	Max. 800uA	Die or	2-in-1 PKG by ABOV Partner	Now

▪ Fire & Safety Products

Product	Core	Flash SRAM	EEPROM / DataFlash	Timer	PWM	I2C [ch]	ISP	USART [ch]	GPIO	Constant Current Driving	OP AMP	ADC		Internal OSC		LVR	Operating Temperature [˚C]	Operating Voltage [V]	Package		Remarks	Avail.
												Bit	ch	Freq. [MHz]	Err. [%]							
A96L302	M8051	4KB 256B	128B (EEPROM)	16-bit x 2 8-bit BIT x 1 8-bit WDT x 1	16-bit x 2	-	Y	-	14	-	-	10	9	1	±3%	Y	-40 ~ +85℃	2.0V ~ 5.5V	16	SOPN	Line Interface	Now
A96L322	M8051	4KB 256B	128B (EEPROM)	16-bit x 2 8-bit BIT x 1 8-bit WDT x 1	16-bit x 2	-	Y	1	14	2-ch (max 290mA, 16 steps)	2-ch	10	9	1	±3%	Y	-40 ~ +85℃	2.0V ~ 3.6V	16	SOPN	Line Interface, SIREN	Q3' 19
A96L414	M8051	8KB 1KB	256B (Data Flash)	16-bit x 3 8-bit BIT x 1 8-bit WDT x 1	16-bit x 3	1	Y	1	18	2-ch (max 290mA, 16 steps)	2-ch	10	7	HFIRC:4MHz LFIRC:32kHz	±3% ±10%	Y	-40 ~ +85℃	1.8V ~ 3.6V	16 20	SOPN TSSOP	-	Q4' 19
A96L416	M8051	16KB 1KB	256B (Data Flash)	16-bit x 3 8-bit BIT x 1 8-bit WDT x 1	16-bit x 3	1	Y	1	18	2-ch (max 290mA, 16 steps)	2-ch	10	7	HFIRC:4MHz LFIRC:32kHz	±3% ±10%	Y	-40 ~ +85℃	1.8V ~ 3.6V	16 20	SOPN TSSOP	-	Q4' 19
A96L523	M8051	4KB 256B	128B (EEPROM)	16-bit x 2 8-bit BIT x 1 8-bit WDT x 1	16-bit x 2	-	Y	1	14	2-ch (max 290mA, 16 steps)	2-ch	10	9	1	±3%	Y	-40 ~ +85℃	2.0V ~ 3.6V	24	TSSOP	Line Interface TRx, LDO	Q3' 19

Product	Supply Voltage	LDO Output Voltage	LDO Output Current	LDO Output Tolerance	Tx Circuit	Rx Circuit	TRx Current	VIN Input Voltage for TRx High	VOUT–VIN Voltage for TRx High	Static Current	Package		Remarks	Avail.
AL1113	8.5V~42V	3.0V	Max: 20mA	25℃±1%, - 10℃~60℃±3%	Y	Y	Min 60mA	Min: 7.0V~, Typ: 7.5V~, Max: 8.0V	Min: 4.0V~, Typ: 5.0V, Max: 6.0V	Typ 60uA	8	SOP	Line Interface TRx IC	Q3' 19

Power Solution

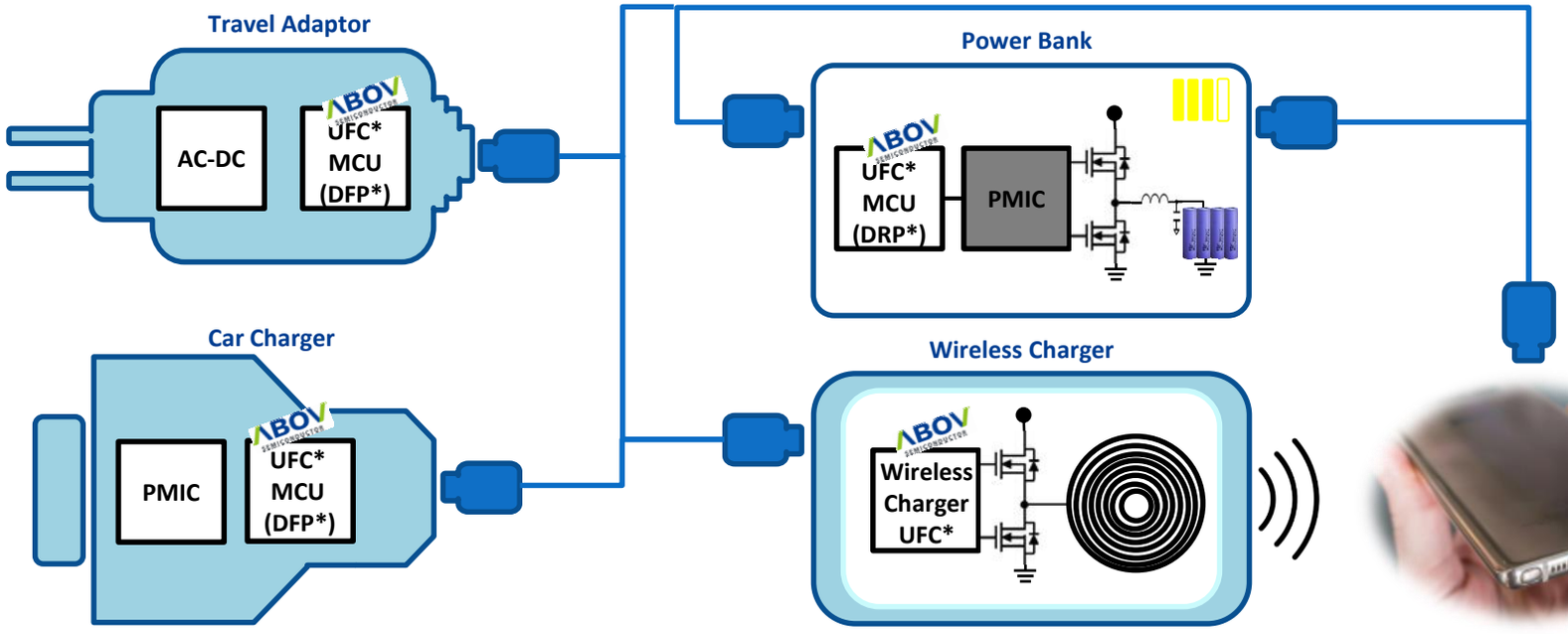
Product Feature

A94Bxxx Universal Fast Charge Solution

Demand for various fast charging methods is increasing in the market. As a standard option for ports using USB, USB-IF has set specifications for USB Power Delivery standard. ABOV Semiconductor's power products offer not only support for the standard USB Power Delivery specifications, but also flexibility to support customized fast charging specifications for various customers.

aUFC Value Proposition

- **World-wide proven solutions in the market**
  - **USB Power Delivery 3.0 PPS support (TID 877, Certified: 15th Feb 2019)**
- **Wide range and precise control IP of UFC™**
  - **Provides UFC™ IP adjusting wide range voltage and current level for USB PD and various proprietary fast charging methods by perfectly controlling the IP as the code-base / firmware**



aUFC™
Universal Fast Charge

- PD3.0 PPS*, QC4+*, AFC*, BC1.2*, and other fast charging methods on the IP
- UFC2.0 PD: 2.8V ~ 21V

Sink Board for
USB Power Delivery

A94B438 EVK for
Travel Adaptor

* UFC : Universal Fast Charge™
* PPS : Programmable Power Supply
* DRP : Dual Role Port
* DFP : Downstream Facing Port (Source only)
* PD : USB-IF Power Delivery™
* QC4+ : Qualcomm Quick Charge 4+™
* AFC : Samsung Adaptive Fast Charging™
* BC: USB-IF Battery Charging™

▪ USB PD3.0 PPS MCU Products

Product	Core	ROM	RAM		I/O	Package		Timer /Counter	PWM	ADC		I2C [ch]	IAP	UFC*				Internal OSC		Op. Volt. [V]	Op. Temp. [˚C]	Specific Function	Remarks	Avail.
										Bit	ch			PD*	QC4+*	AFC*	ch	Freq. [MHz]	Err. [%]					
A94B438	cm8051	32KB	256B 1024B	iRAM xRAM	23 15	32 24	OFN QFN	16-bit x 4 8-bit x 1	16-bit x 3 (5ns unit)	12	16 16	1	o	3.0 PPS* DRP*	o	o	CC1/2 x 1 DP/DM x 3	16	±3.0	2.2 ~ 5.5 (MCU) 3.3 ~ 5.5 (PD)	-40 To 85	CC1/2 & DP/DM: up to 24V, Line Short Protection	Power Bank, Laptop, etc.	Now
A94B337	cm8051	24KB	256B 1024B	iRAM xRAM	14	20	OFN	16-bit x 4 8-bit x 1	16-bit x 3 (5ns unit)	12	9	1	o	3.0 PPS DFP*	o	o	CC1/2 x 1 DP/DM x 1	16	±3.0	2.2 ~ 5.5 (MCU) 3.3 ~ 5.5 (PD)	-40 To 105	VCONN, CC1/2 & DP/DM: up to 24V, Line Short Protection, Dynamic Temperature Manager	Charger, etc.	Now
A94B336	cm8051	16KB	256B 1024B	iRAM xRAM	14	20	OFN	16-bit x 4 8-bit x 1	16-bit x 3 (5ns unit)	12	9	1	o	3.0 PPS DFP*	o	o	CC1/2 x 1 DP/DM x 1	16	±3.0	2.2 ~ 5.5 (MCU) 3.3 ~ 5.5 (PD)	-40 To 105	VCONN, CC1/2 & DP/DM: up to 24V, Line Short Protection	Charger, etc.	Now
A94B316	cm8051	16KB	256B 1024B	iRAM xRAM	14	20	OFN	16-bit x 1 8-bit x 3	-	10	1	-	o	3.0 DFP	-	o	CC1/2 x 1 DP/DM x 1	16	±3.0	4.5 ~ 15	-30 To 105	Line Short Protection, SR* Gate Controller, NMOS Load Switch Controller, Hiccup, CCCV	Charger, etc.	Now

▪ Wireless Charger MCU with USB PD3.0 Products

Product	Core	DSP	ROM	RAM		I/O	Package		Half-bridge Gate Driver	PLL [MHz]	CS Amp	ADC		I2C [ch]	IAP	UFC*				Voltage/Current Demodulator	Op. Volt. [V]	Op. Temp. [˚C]	Specific Function	Remarks	Avail.
												Bit	ch			PD*	QC4+*	AFC*	ch						
A94B517	cm8051	o	24KB	256B 1024B	iRAM xRAM	14	32	OF N	2-Ch (V_{GS} = 20V)	128	1-Ch (x80)	12	3	1	o	3.0 PPS* DRP*	o	o	CC1/2 x 1 DP/DM x 1	o	4.25 ~ 21	-40 To 85	CC1/2 & DP/DM: up to 24V, Line Short Protection	Wireless Charger	4Q'19

* UFC : Universal Fast Charge™
* PD : USB-IF Power Delivery™
* PPS : Programmable Power Supply
* QC4+ : Qualcomm Quick Charge 4+™
* DRP : Dual Role Port
* AFC : Samsung Adaptive Fast Charging™
* DFP : Downstream Facing Port (Source only)

ABOV Bluetooth® Low Energy SoC

Product Feature / Selection Guide

A31R11x Bluetooth® Low Energy 4.2 SoC

Powered by ABOV Semiconductor's in-house Bluetooth® Low Energy 4.2 Stack optimized to provide the most user-friendly development ecosystem, ABOV aBLE provides an optimal solution for IoT, wearables, beacons, remote controllers and any system requiring value addition with connectivity. aBLE provides an outstanding BLE experience through its low power consumption, hardened security, and end-to-end technical support to bring every developer's dream come true.

aBLE™ Connected Everyday

Bluetooth® 4.2

aBLE Value Proposition

- **Tier 1 Performance**
  - **Ultra Low Sleep, Stop Current**
  - **Lasts ~380 days on a 3V coin battery @ Active BLE RF Advertisement Mode**
- **Excellent Technical Support**
  - **Tier 1 Level Software Development Kit, Documentations, Local Technical Support, and Real-time Support System**

Product	BLE Ver.	Hard-Wired BLE Stack	Core	Op. Freq. [MHz]	ROM (User App)	RAM	ADC	Peak Tx / Rx Current [mA]	Deep Sleep [nA]	Stop [nA]	Sensitivity [dBm]	Output Power [dBm]	Additional Features	Package	Op. Temp. (℃)
A31R112	4.2	Internal ROM (128KB)	Cortex-M0+	32	32KB OTP	48KB	12-bit 4-ch VBAT 1-ch	7.0 / 7.0	1,100	300	-94	+0	AES-128, TRNG, Digital MIC I/F, Keyscan	48QFN (6x6mm)	-20 ~ 70
A31R118	4.2	Internal ROM (128KB)	Cortex-M0+	32	512KB Flash	48KB	12-bit 4-ch VBAT 1-ch	7.0 / 7.0	1,100	300	-94	+0	AES-128, TRNG, Digital MIC I/F, Keyscan	48QFN (6x6mm)	-20 ~ 70
A31R114	4.2	Internal ROM (128KB)	Cortex-M0+	32	128KB Flash	48KB	12-bit 4-ch VBAT 1-ch 14-bit ADC 1-ch	7.0 / 7.0	1,100	300	-94	+0	AES-128, TRNG, Analog MIC I/F, Keyscan, MICBIAS, PGA, IR Tr., IR Learning AMP	56QFN (7x7mm)	-20 ~ 70

Tailor-Made MCU

Selection Guide

▪ Voice MCU

Product	Core	Output	Decoder	Memory Type	Interface	Operating Voltage [V]	Operating Temperature [˚C]	Package	Avail.
MC93CV402	M8051 + DSP	15-bit DAC + Digital AMP (PWM) 240mA at 8Ω (≒0.8W)	SPEEX (1.5-bit/sample) ADPCM (4-bit/sample)	External Serial Flash (SPI)	SPI	2.7 to 3.6	-40 to 85	20 SOP 28 QFN 44 MQFP	Now

Product	Core	ROM	E2P	RAM		I/O	Package		Timer / Counter	PWM	ADC		LCD	USI* [ch]	UART [ch]	USART *[ch]	SPI [ch]	I2C [ch]	Internal OSC		Sub. X-tal	Ext. X-tal [MHz]	Op. Volt. [V]	Op. Temp. [˚C]	Remarks	Avail.
											Bit	ch							Freq. [MHz]	Err. [%]						
MC97F66128 MC97F68128 MC97F60128	M8051	128KB	-	256B 8KB	iRAM xRAM	54 70 88	64 80 100	LQFP14 LQFP12/LQFP14 LQFP14	8-bit x 3 16-bit x 5	8-bit x 3 16-bit x 4 10-bit MPWM	12	12	33 x 8 47 x 8 60 x 8	2 2 3	3 3 3	-	1 2 2	-	16	±4.0	Y	0.4 to 12.0	1.8 to 5.5	-40 to 85	POR, LVR/LVI, Buzzer, OCD2 Debugger, 16MHz PLL, LCD Contrast, Flash Parity Bit, ADPCM, 12-bit DAC	Now

▪ PPG MCU

Product	Core	ROM	RAM		I/O	Package		Timer /Counter	PWM	ADC		USI* [ch]	UART [ch]	SPI [ch]	SIO [ch]	I2C [ch]	IAP	Internal OSC		Ext. OSC [MHz]	Sub. X-tal	Op. Volt. [V]	Op. Temp. [˚C]	Specific Function	Remarks	Avail.
										Bit	ch							Freq. [MHz]	Err. [%]							
MC97F6108A	M8051	8KB	256B 256B	iRAM xRAM	14 18	16 20	SOP SOP/TSSOP	16-bit x 4	16-bit x 4	12	8	-	1	-	-	1	Y	16	±3	-	-	2.7 to 5.5	-40 to 85	IH Cooker Features: Zero-cross Detection and OVP/OCP, 2-stage OPAMP, Analog Comparator 5-ch, 16-bit PPG Timer 1-ch	POR, LVR, BOD, Buzzer,8-bit WDT, OCDII Debugger	Now
MC97F6208	M8051	8KB	256B 256B	iRAM xRAM	14 18 22 22	16 20 24 24	SOP SOP SOP/SSOP SKDIP	16-bit x 4	16-bit x 4	12	1 3 6 6	-	1	-	-	1	Y	16	±3	-	-	2.7 to 5.5	-40 to 85	IH Cooker Features: Zero-cross Detection and OVP/OCP, 2-stage OPAMP x2, Analog Comparator 8-ch, 16-bit PPG Timer 1-ch	POR, LVR, BOD, Buzzer, 8-bit WDT, OCDII Debugger	Now

Segment LED Driver IC

Product	LED driving (Segment x Grid)	Key scan	Dimmer [Step]	Driving Type	SIO	Operating Voltage [V]	Operating Temperature [˚C]	Package	Remarks	Avail.
MC2002	6 x 7 ~ 9 x 4	6 x 1	8	Common cathode	Y	2.7 to 5.5	-40 to 85	20 TSSOP	-	Now
MC2003	8 x 5 ~ 9 x 4	8 x 2	8	Common cathode	Y	2.7 to 5.5	-40 to 85	20 SOP	-	Now
MC2102	10 x 7 ~ 13 x 4	10 x 2	8	Common cathode	Y	2.7 to 5.5	-40 to 85	24 SOP	-	Now
MC2202	11 x 7 ~ 14 x 4	11 x 3	8	Common cathode	Y	2.7 to 5.5	-40 to 85	28 SOP	-	Now
MC2204	10 x 7 ~ 13 x 4	10 x 2	8	Common cathode	Y	2.7 to 5.5	-40 to 85	28 SOP	-	Now
MC2302	11 x 7 ~ 14 x 4	11 x 3	8	Common cathode	Y	2.7 to 5.5	-40 to 85	32 SOP	-	Now
MC2701	8 x 7	8 x 2	8	Common anode	Y	4.5 to 5.5	-40 to 85	24 SOP	Interrupt Generator, Segment Current Control	Now

Segment LCD Driver IC

Product	Display (Segment x COM)	Operating Voltage [V]	Operating Temperature [˚C]	Package	Remarks	Avail.
MC5502	52 x 3 ~ 51 x 4	3.0 to 5.5	-40 to 85	64 LQFP	Power Saving Mode, Segment OFF Function	Now
MC5601	60 x 8 ~ 58 x 10	3.0 to 5.5	-40 to 85	80 LQFP 80 MQFP	Internal 5 x 9 x 240-bit Character ROM Supports 12 (5 x 7 dots) Characters or Supports 11 (5 x 8 dots, 5 x 9 dots) Characters	Now
MC5701	105 x 4 ~ 106 x 3	3.0 to 5.5	-40 to 85	COB/COG	Built-in Display Contrast Adjustment Circuit, Serial Interface for Clock, Data I/O Strobe Pins, Low-Power Consumption	Now

Segment VFD Driver IC

Product	Display (Segment x COM)	Key scan	Dimmer [Step]	Operating Voltage [V]	Operating Temperature [˚C]	Package	Remarks	Avail.
MC3401A	16 x 12 (24 x 4)	2 x 16	8	2.7 to 5.5	-40 to 85	44 LQFP	Serial interface for clock Data I/O, Strobe pins Low power consumption	Now
MC3501A	24 x 16 (24 x 8)	2 x 16	8	2.7 to 5.5	-40 to 85	52 LQFP	8-Step Dimming Circuitry Serial Interface for Clock Data I/O, Strobe Pins Low Power Consumption	Now

I/O Expander

Product	GPIO	Operating Voltage [V]	Operating Temperature [˚C]	Package	Remarks	Avail.
AL5524	16-GPIO (RA Port 8, RB Port 8)	2.0 to 5.5	-40 to 85	16 SOPN 24 TSSOP	I2C Interface I/O Expander	Now

Development Ecosystem

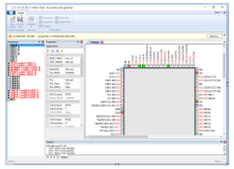
Software Tools

ABOV's software tools can help users generate right results to match target applications. From user-friendly code generators specialized for ABOV devices, and standardized commercial IDEs and compilers, to ABOV's own free OCD tool based on Eclipse open source IDE, ABOV supports the entire development ecosystem of the customers.

Code Generator

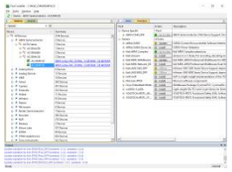
CodeGen8

- Code generator for M8051 MCU
- Automatically generates C-based frame source program
- Very user-friendly UI



CodeGen32

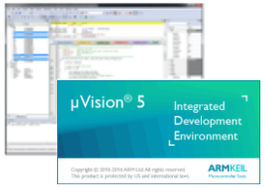
- Code generator for ARM Cortex series
- Automatically generates C-base frame source program
- Very user-friendly UI



KEIL MDK5 S/W Pack for 32-bit ARM

- Additional software components and support for ABOV 32-bit devices
- Source code, header files, and software libraries
- Documentation and source code templates
- Device parameters along with startup code and programming algorithms
- Board descriptions and support files
- Example projects

Compiler

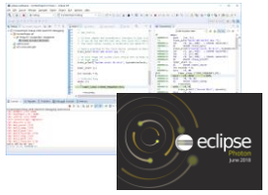


KEIL uVision (3rd party)

- M8051 / ARM compiler
- Project management
- Includes Editor, Assembler, Compiler, Linker, Debugger

IAR EWARM (3rd party)

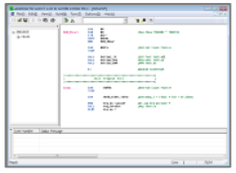
- M8051 / ARM compiler
- Project management
- Includes Editor, Assembler, Compiler, Linker, Debugger



ABOV OpenOCD (Open Source)

- Eclipse-based IDE
- GCC-based compiler
- Project management
- Includes Editor, Assembler, Compiler, Linker, Debugger

Legacy

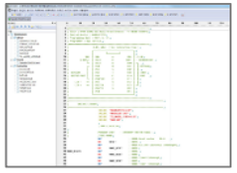


SR Magic Assembler

- Supported product : G400
- Generates hexadecimal file
- Manages project & library
- IDE environment

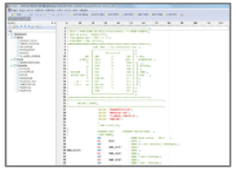
ADAM2 Series Simulator

- Supported product : ADAM2X
- Simulates in various run modes
- Variable key matrices
- Real-time tracing



ADAM4 Assembler/Linker

- Supported product : ADAM4x
- Supports local label in MACRO
- Standalone execution file
- Uses structured command



ADAM8 Assembler/Linker

- Supported product : ADAM8x
- Supports local label in MACRO
- Standalone execution file
- Uses structured command

Development Ecosystem

Debugger / Debugger Dongles

ABOV's debugger is IDEs (Integrated Development Environment) for ABOV'S 8-bit and 32-bit microcontroller products. The debugger IDEs provide project & text editors for code entry, accurate cycle simulation, and OCD (On Chip Debugger), supporting Windows OS. Also, ABOV provides in-house debugger dongles for easy development.

OCD/II (On Chip Debugger)

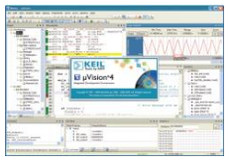
- Supported product : M8051
- OCD ISP function included
- 2-pin interface : OCD clock & data
- Real-time emulation & debugging

A-Link (CMSIS-DAP)

- Supported product : ARM Cortex series
- Uses SWD interface
- Real-time emulation & debugging
- Works with KEIL, IAR GUI

3rd party tools

- All CMSIS-DAP dongles can support our ARM devices
- KEIL(ULINK), IAR(I-JET), SEGGER(J-Link), etc.



OCD/II (KEIL debugging DLL)

- Supports KEIL M8051 environment
- All-in-one : Compiler, Editor, Debugger
- Full symbolic debugging

A-Link Pro (CMSIS-DAP)

- Includes all features of A-Link
- Supports Standalone programming without host PC
- OLED display to show status

Programmers

ABOV's programmer supports dual environments — PC mode for development and standalone mode for production. It is easy to use, setup and update with user downloadable software available on ABOV's website. All of our programmers operate on PC-based hardware with a USB connector.

E-PGM+

- PC / Standalone type
- 65k color TFT-LCD (320 x 240)
- PC interface : USB

E-GANG4

- PC / Standalone type
- E-PGM+ array x4
- Same usage as E-PGM+
- PC interface : USB

E-GANG6

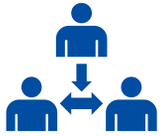
- PC / Standalone type
- E-PGM+ array x6
- Same usage as E-PGM+
- PC interface : USB

PGMPlusLC-II

- IDE environment
- Supports high voltage up to 18V
- Transmission speed : 64KB/s
- PC interface : USB

Hand Writer

- Standalone type programmer
- Supports PC host mode
- Battery operated



3rd party tools

- Xeltek, Elnec, DediProg, etc.

Development Ecosystem

Starter Kit Development Environment

ABOV Starter Kit is a development hardware kit that can boost customer's development time. ABOV currently provides Starter Kits for 32-bit General Purpose MCU and Motor MCU products and will also expand the Starter Kit availability to further cover new product lineups such as Low Power L1, S1 Series in the near future.

Embedded Software : CMSIS Library

Software Tool : Partner IDEs / Code Generator

ABOV Starter Kit

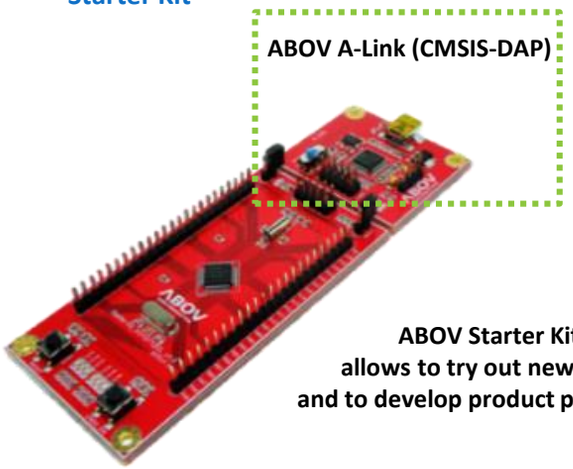
CMSIS Library Support
- **KEIL Library / IAR Library**

Free IDE Support
- **G5 Series OpenOCD for Eclipse**

Starter Kit Configuration

Starter Kit provides an In-Circuit Debugger Interface on the development board directly (CMSIS-DAP + Board).

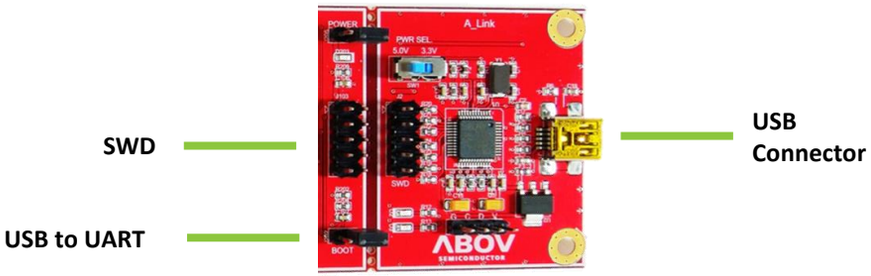
- **Starter Kit**



ABOV Starter Kit
allows to try out new ideas
and to develop product prototypes

- **A-Link (CMSIS-DAP/UART)**

ABOV A-Link supports SWD debugging interface, which makes programming and debugging easy.



Design Houses & Online Marketplace

Partnership

Design Houses

WATLOGIC
1511, 96 Gamasan-ro, Geumcheon-gu, Seoul, Korea
Tel : +82-2-3281-8848 Fax : +82-2-3281-8857
http://www.watlogic.co.kr

Genoss Electronics
#D-808, IT Valley, 40, Imi-ro, Uiwang-si, Gyeonggi-do, Korea
Tel : +82-31-8084-3581 Fax : +82-31-8084-3585
http://www,genosselec.com

uMS
488-16, Bisan-dong, Dongan-gu, Anyang-si, Gyeonggi-do, Korea
Tel : +82-10-8652-4169 Fax : +82-2-6008-4169

GS Trading
#301, Sangbo Bldg, 9-64, Sindorim-ro 11-gil, Guro-gu, Korea
Tel : +82-2-858-1255 Fax : +82-2-858-1257
http://www.ictotal.com

Online Marketplace

IDEA INC
www.ideainc.co.kr

Distributors

Domestic

Finechips
(16827) A-401 767, Sinsu-ro, Suji-gu, Yongin-si, Gyeonggi-do, Korea
Tel : +82-31-702-1558 Fax : +82-31-702-3057
http://www.finechips.com

SEIL Technology Co., Ltd.
102/1203, 166 Gosan-ro, Gunpo-si, Gyeonggi-do, Korea
Tel : +82-31-349-4396 Fax : +82-31-349-4395
http://www.seiltnn.com

Greenchips Co., Ltd.
(463-400) 4F,24,Pangyo-ro 255beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do, Korea
Tel : +82-2-573-0061 Fax : +82-2-573-0067
http://www.greenchips.co.kr

SILICONGEAR Co., Ltd.
(13595) Rm205, Owners Tower, 28, Hwangsaeul-ro 200th, Bundang-gu, Seongnam-si, Gyeonggi-do, Korea
Tel : 031-753-2931 Fax : 031-753-2930
http://www.silicongear.co.kr

SJ Solution
(609-858) 201ho, Techno Tower, 66-47, Bansong-ro 513beon-gil, Haeundae-gu, Busan, Gyeongsangnam-do, Korea
Tel : +82-51-807-1727 Fax : +82-51-807-6657
http://www.sjsolution.co.kr

SAEMICHIPS Co., Ltd.
(153-786) #C-1505, Woolim Lion's Valley, 168, Gasan-digital-1ro, Geumcheon-gu, Seoul, Korea
Tel : +82-2-2026-5001 Fax : +82-2-2026-5140
http://www.saemitech.com

FST
15-23, Dongtansandan 6-gil, Dongtan-myeon, Hwaseong-si, Gyeonggi-do, Korea
Tel : +82-31-370-0900 Fax : +82-31-371-2401
http://www.fstc.co.kr

IDEA INC
604, Riverhill, 110, Achasan-ro 78-gil, Gwangjin-gu, Seoul, Korea
Tel : +82-2-456-9242 Fax : +82-2-456-9243
http://www.ideainc.co.kr

Distributors

Global

Mikasa Shoji Co., Ltd.

Sales Promotion Dept., 2-4-12, Shimamachi, Chuo-ku,
Osaka, 540-0034, Japan
Tel : +81-6-6946-3781 Fax : +81-6-6946-3753
http://www.mikasa.co.jp

ChipsWork

31F, No. 29-3, Sec. 2, Zhongzheng E. Rd., Tamsui Dist.,
New Taipei City 251, Taiwan (R.O.C.)
Tel : +886-2-7703-0168 Fax : -886-2-2698-9681
http://www.chipswork.com.tw

SHINDEN HIGHTEX Corporation

KDX Ginza East Building 6F, 3-7-2 Irifune, Chuo-ku,
Tokyo, 104-0042, Japan
Tel : +81-3-3537-0101 Fax : +81-3-3537-0202
http://www.shinden.co.jp

AwesomeTEK Co., Ltd

ADD:17F.-11,No.79,Sec.1,Xintai 5th Rd.,Xizhi Dist.,
New Taipei City 221,Taiwan (R.O.C)
Tel : +886-2-7703-0168 Fax : -886-2-2698-9681
http://www.awesometek.com.tw

ADVENT Electronics Global, Pte Ltd.

Shree Ashirwad Lane 6 Hagwane Nagar, Near, VIIt college, Kondhwa,
Pune, Maharashtra 411048, India
Tel : +91-65-6547-2988 Fax : +91-65-6547-4474
http://www.adventelectronics.com

Selmag Enterprise Co., Ltd.

4F., No.10 Alley 8 Lane 45, Pao Shin Road, Hsin-Tien District,
New Taipei City 23145, Taiwan (R.O.C.)
Tel : +886-2-2918-9913 Fax : +86-2-2918-7731
http://www.selmag.com.tw

SEMICONIC Devices, Pvt. Ltd.

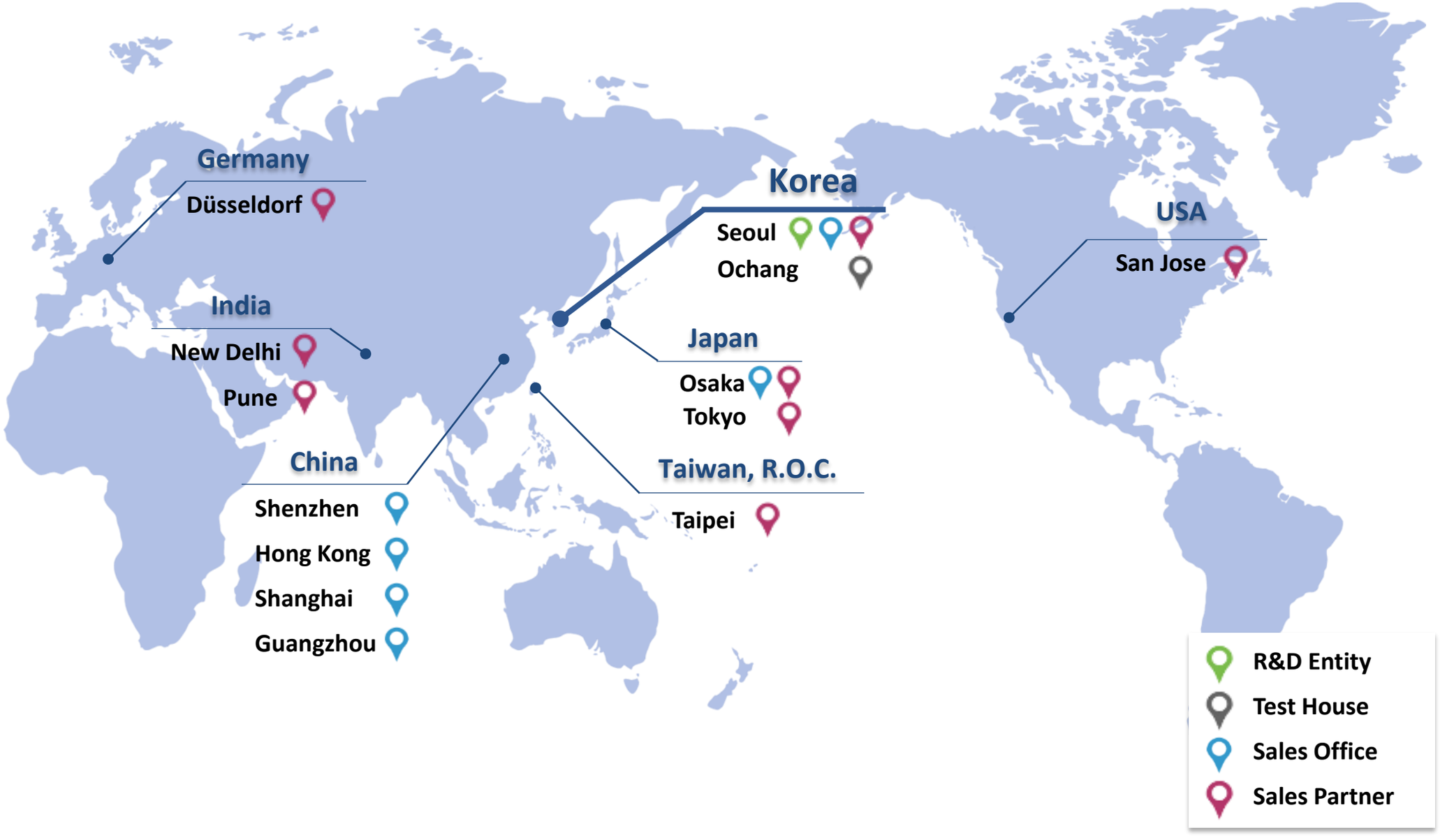
C-2, Opposite Reliance Mall, Vikaspuri, New Delhi-110018, India
Tel : +91-11-4551-3599 E-Mail : info@semiconic.com
http://www.semiconic.com

CS&S Electronic GmbH

Luisenstrasse, 74 47799 Krefeld, Germany
Tel:+49-215-1649-1256
http://www.csselectronic.com

Office Locations

ABOV Network



Contact Information

ABOV Network

Korea Sales

Taeyong (Ted) Kim

Tel : +82-2-2193-2206

taeyong.kim@abov.co.kr

China Sales

Ann An

Tel : +86-755-8287-2205

yanhai.an@abov.co.kr

Global Sales

Brian Song

Tel : +82-2-2193-2281

eunseok.song@abov.co.kr

HQ & Korea Office

Seoul Office / R&D / Marketing & Sales

8Fl., 330, Yeongdong-daero, Gangnam-gu, Seoul, 135-851, Korea

Tel : +82-2-2193-2200

Ochang HQ / R&D / QA / Test Center

93, Gangni 1-gil, Ochang-eup, Cheongwon-gun, Chungcheongbuk-do, 363-885, Korea

Tel : +82-43-219-5200

Japan Office

Osaka Office

Room 613, 1-18-24, Nishi-Miyahara, Yodogawa, Osaka, Japan

Tel : +81-6-7878-5971

China & Hong Kong Office

Hong Kong Office

Room 25B, 25/Fl., 235 Wing Lok Street, Trade Centre, Sheung Wan, Hong Kong

Tel : +852-2581-0033

Shenzhen Office

Room 1401, Youse Building, No.6013 ShenNan Road, Shenzhen, China

Tel : +86-755-8287-2205~2207

Shunde Office

Room 307, 1 Building, Ramada Plaza, 6 LinShang Road, BeiJiao Town, ShunDe District, FoShan, China

Tel : +86-757-2211-0526
+86-757-2210-1874~5

Shanghai Office

Room 203-1, No. 1905 Hongmei Road, Much Research Floor, Shanghai, China

Tel : +86-21-5490-2396

Chengdu Office

Great Long

Email: xiuwei.long@abov.co.kr

Qingdao Office

Leevid Bi

Email: longtao.bi@abov.co.kr

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For more information, visit www.abovsemi.com

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