



System solution choices for major home appliances

Cooling, heating, cleaning, washing

July, 2020



Agenda

1

What's driving the major home appliance market?

2

Solutions for major home appliances

3

Refrigerators compressor and PFC

4

Residential air conditioner

5

Washing machines

6

Fans and pumps

7

Summary

Agenda

1

What's driving the major home appliance market?

2

Solutions for major home appliances

3

Refrigerators compressor and PFC

4

Residential air conditioner

5

Washing machines

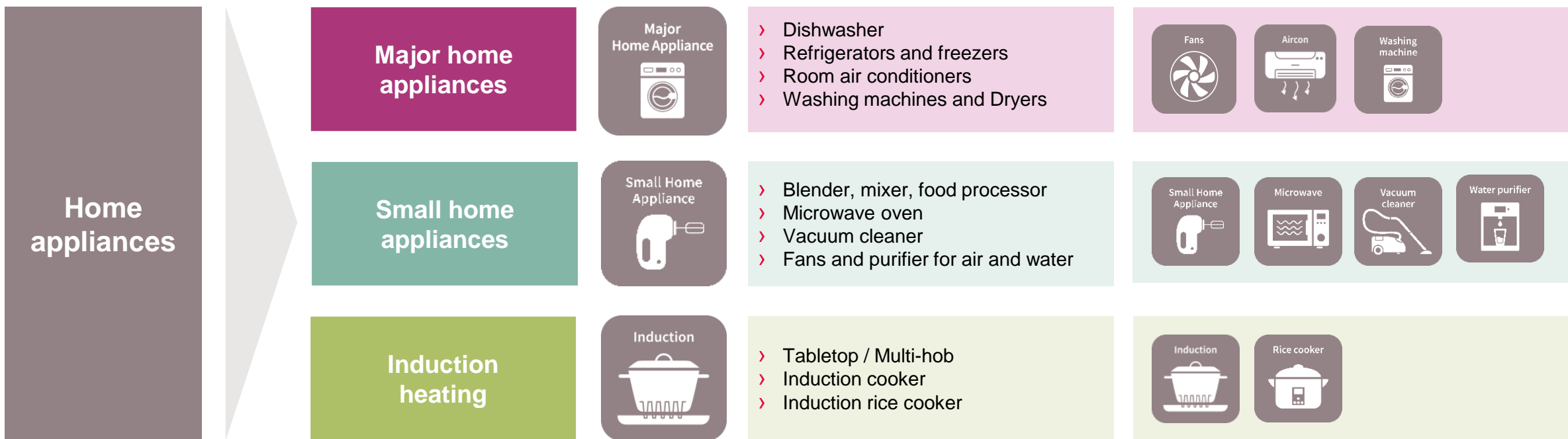
6

Fans and pumps

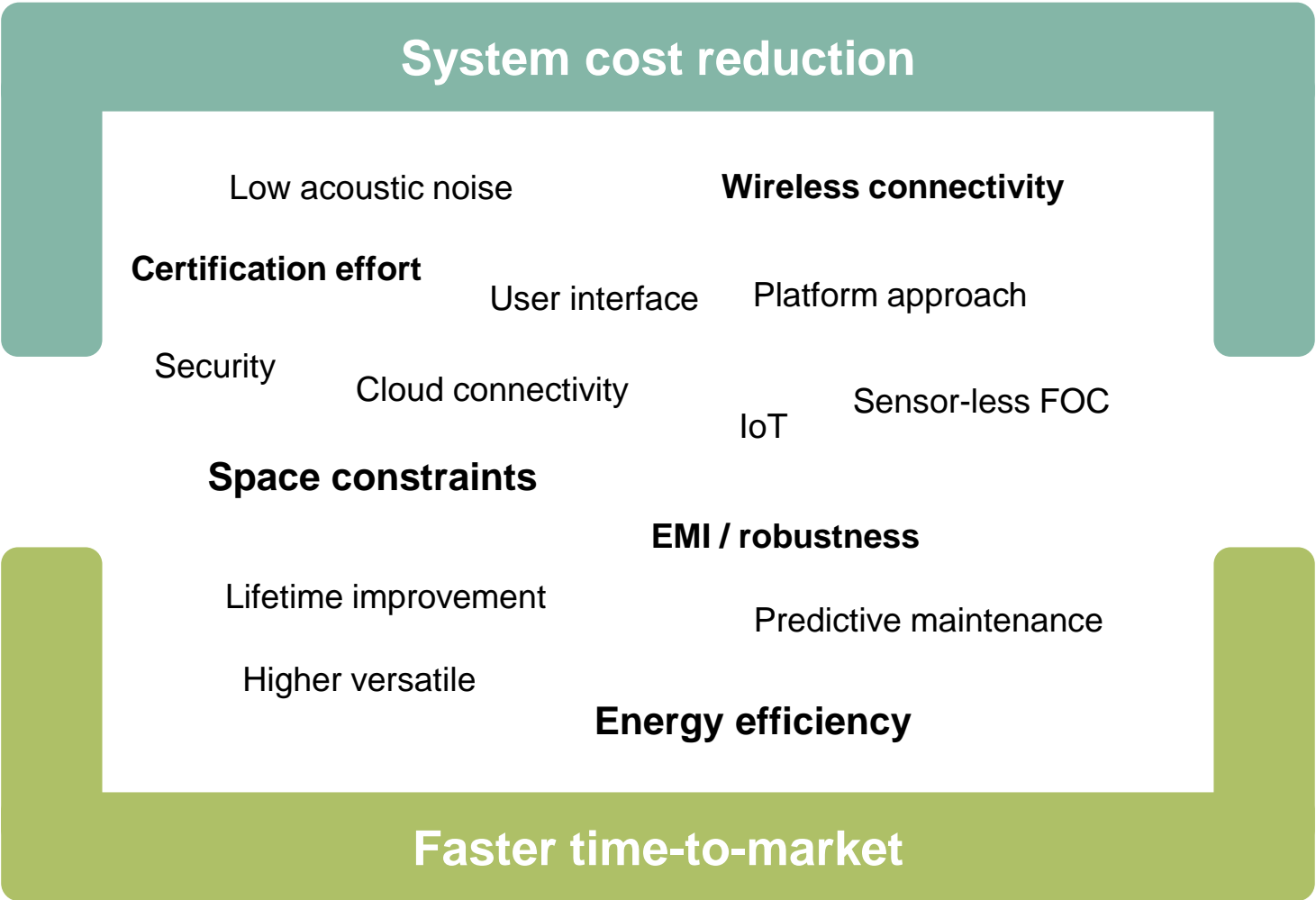
7

Summary

Overview of home appliances



Infineon leads incorporation of market trends in appliances



Agenda

1

What's driving the major home appliance market?

2

Solutions for major home appliances

3

Refrigerators compressor and PFC

4

Residential air conditioner

5

Washing machines

6

Fans and pumps

7

Summary

Motor control: iMOTION™ or Microcontroller?

Does the customer want to write or has motor control code?
Is the customer able to write motor control codes?

Yes

No

Microcontroller

Controller

Microcontroller

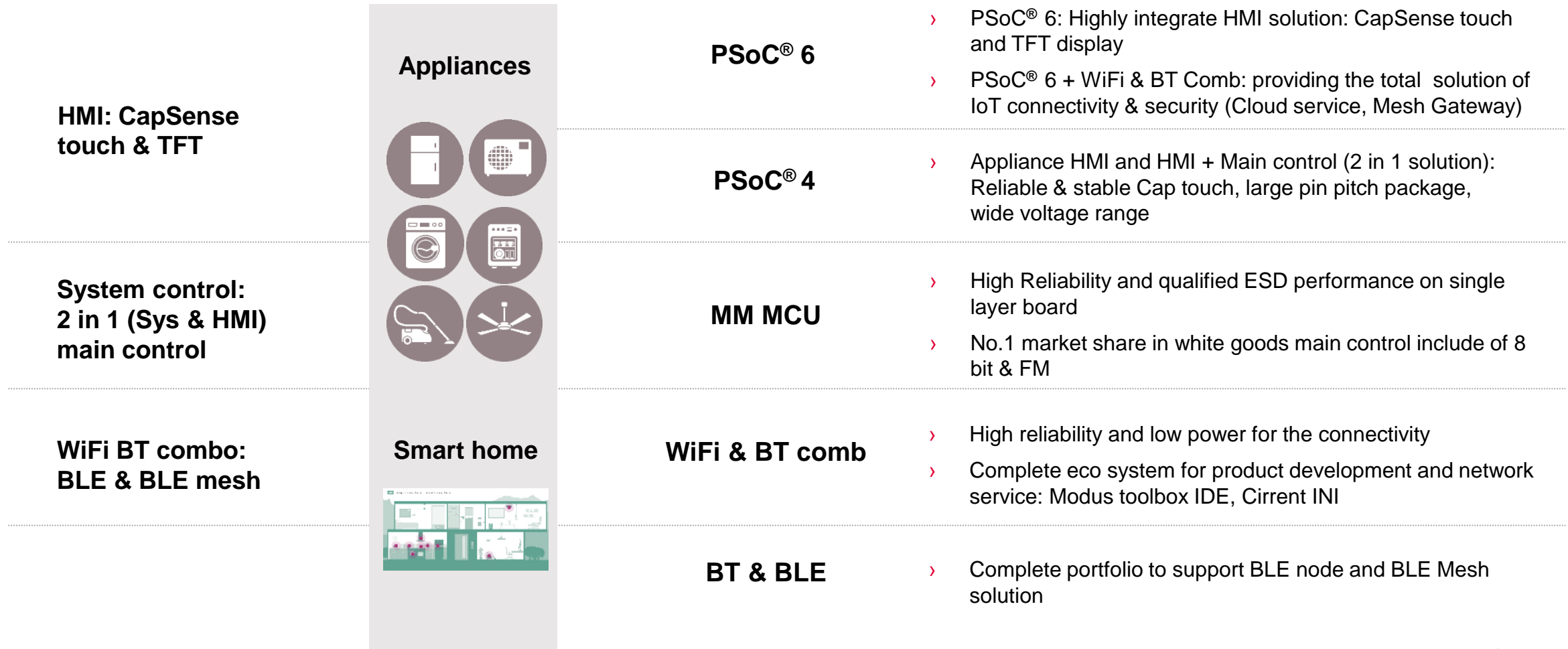
Customer writes his own software with support of advance tools for BLDC, Brushed DC, PMSM and Sensorless FOC

**PSoC® 4/6 / FM4
XMC™**

iMOTION™
Ready-to-use motor control or integrate on hardware level






TurnKey	MCE + Controller	Smart IPM
Motion control engine	Motion control engine	Motion control engine
	Microcontroller	Microcontroller
Ready-to-use Motor controller for variable speed drives	Additional MCU for customer functionality, available with Flash and OTP memory	Driver & power stage
		Fully integrated inverter solution
IRMCK099 IMC100	IMC300	IMM100 / IMD100

Microcontrollers for home appliance applications



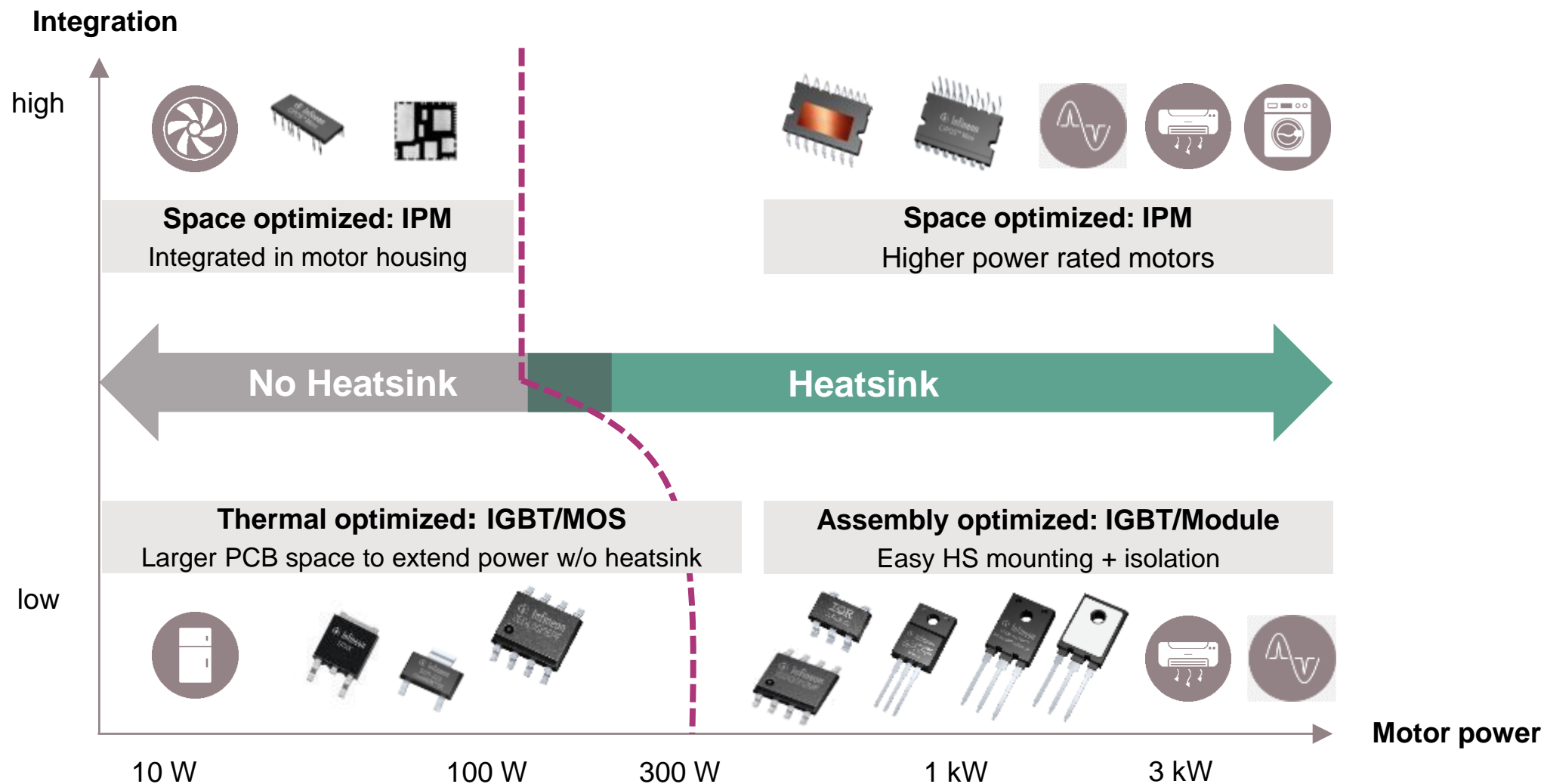
One-stop-shop ICW solutions — HMI, system control and wireless connectivity

Motor control portfolio

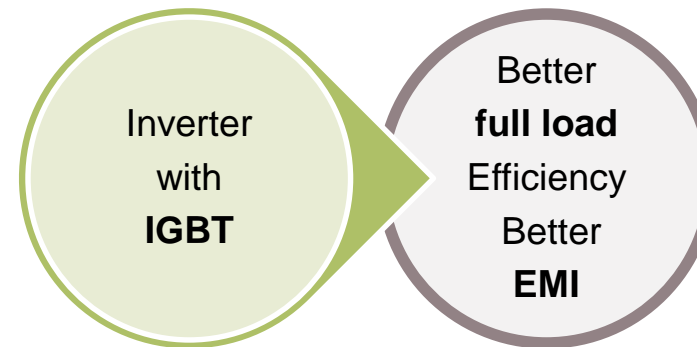
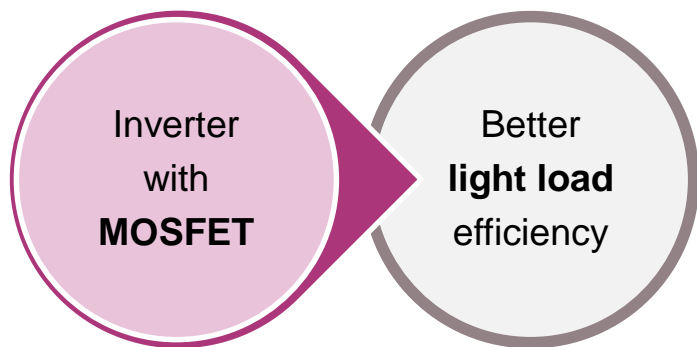
<p>PSoC® 6 256K</p>	<p>Total solution</p> <p>Full design support</p>	 <p>HPFC & Dual motor</p>	<ul style="list-style-type: none"> › MCU: Best cost/performance MCU, Dual core providing flexible Motor SW architecture, Integrated with CMP/OPA › Solution: >40 KHz PFC carry wave, effective BOM cost for the HPFC & Dual motor control
<p>PSoC® 4 S3</p>		 <p>LPFC & Single compressor</p>	<ul style="list-style-type: none"> › 1st win business in Air-con in China market with 48 MHz CM0+ Core through optimized Motor SW algorithm › Integrated with CMP/OPA, saving BOM cost
<p>PSoC® 4 S3</p>		 <p>WM DDM/ BLDC/ DD</p>	<ul style="list-style-type: none"> › Leading technology solution in China WM application: Electrical braking, Electrical weight, OOB, Pulse spin, Un-stop running, Rotor position angle servo control, High frequency injection › HW control DDM/BLDC/DD motor through S/W adjusting
<p>PSoC® 4 S2</p>		 <p>Fridge compressor</p>	<ul style="list-style-type: none"> › Ease of use: Flexible SW benefit the customer individual startup performance and integrated with FOC & square wave compressor control both › Competitive BOM cost with integrated CMP/OPA
<p>PSoC® 4 S2</p>		 <p>Fan control</p>	<ul style="list-style-type: none"> › Control algorithm and solution for the Air-con fan, range hood, air purifier, coil fan › Competitive BOM cost with integrated CMP/OPA, › Small package (QFN32/40) enable us to serve integrated solution inside motor

Production qualified motor control library & Highly integrated motor-specific peripherals

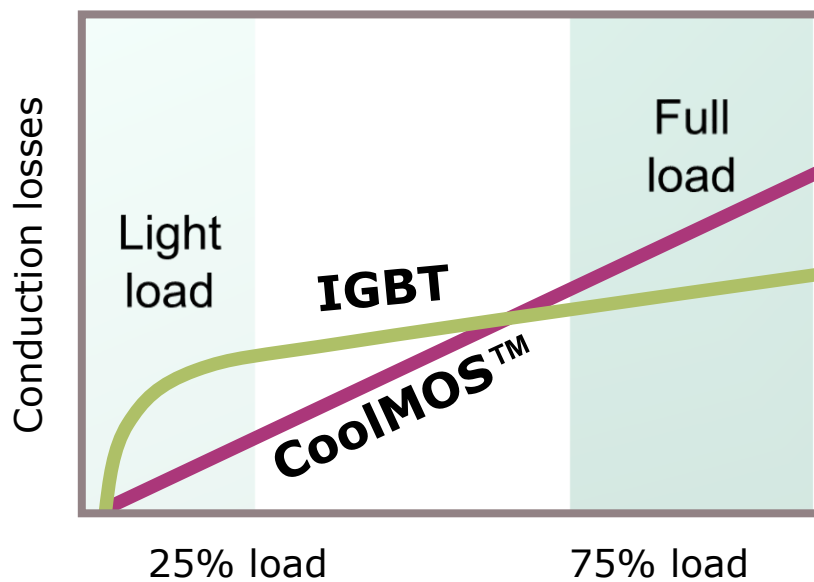
Solutions for consumer motor drives: Discretes or IPM inverters



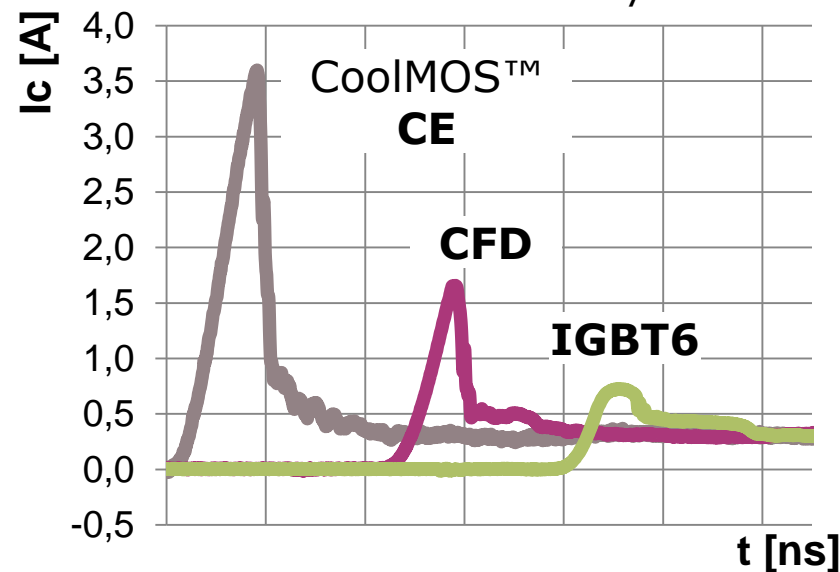
Inverter: MOSFETs or IGBTs?



Output characteristics



Diode rev. recovery



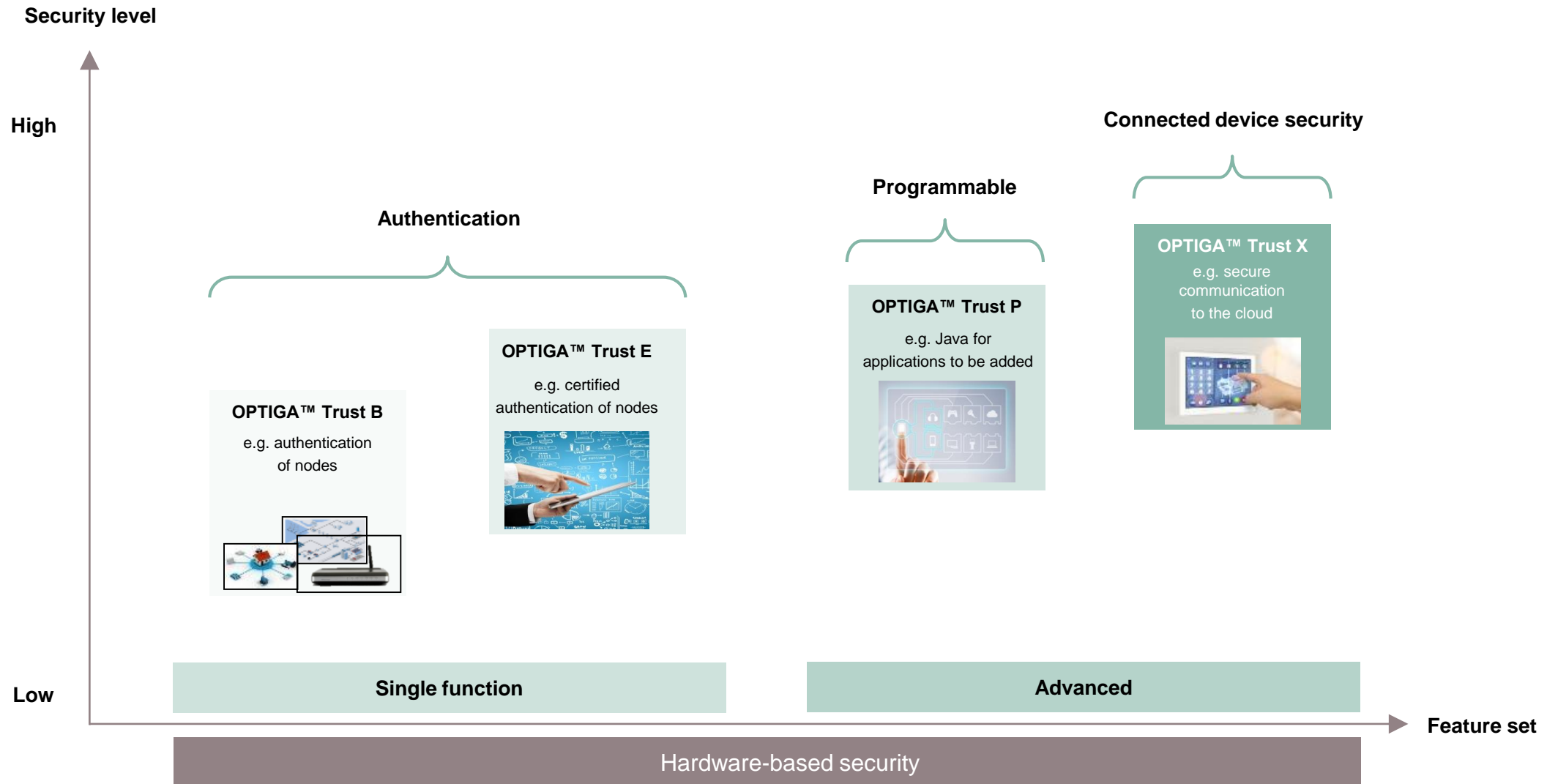
IPM solutions – Product application mapping

Applications		Current rating	CIPOS™ Nano	CIPOS™ Micro	CIPOS™ Mini	
Home appliances	Refrigerator	Fan	1-3 A (500 V) 2-4 A (250 V)	IRSM836-0x5MA IRSM836-0x4MA	IRSM5y5-0x5zA, IM240 IRSM5y5-0x4zA	
		Compressor (small fridge)	1-3 A (500 V)	IRSM836-084MA	IRSM5y5-084zA, IM240	
			2-4 A (250 V)	IRSM807-105MH	IRSM5y6-076zA	
			4 A (600 V)	IRSM808-204MH	IM231	
		Compressor	4-8 A		IM231	IGCM04F60yA IGCM06F60yA
	Washing machine	Drain pump	1-6 A (500 V)	IRSM836-0x5MA	IRSM5y5-0x5zA, IM240	
		Drum motor	8-15 A			IKCM10H60yA IKCM15H60yA
	Air conditioner	Indoor unit fan	1-3 A (500 V)	IRSM836-0x5MA IRSM807-045MH	IRSM5y5-0x5zA, IM240	
			2-8 A (250 V)	IRSM836-0x4MA	IRSM5y5-0x4zA	
		Outdoor unit fan	4-10 A (500 V)	IRSM807-04(10)5MH	IRSM5y5-0x5zA, IM231	
			4-8 A (250 V)	IRSM808-204MH	IRSM5y6-076zA	
		Compressor	15-30 A			IKCM15L60yA IKCM20L60yD IKCM30F60yD
			PFC	20-30 A		
		PFC + Compressor	10 A, 15 A, 20 A			IFCM10S60GD IFCM10P60GD IFCM15S60GD IFCM15P60GD IM564
		Fan	Ceiling & upright fans	1-3 A (500 V)	IRSM836-0x5MA IRSM807-045MH	IRSM5y5-0x5zA, IM240
2-8 A (250 V)				IRSM836-0x4MA	IRSM5y5-0x4zA	
Circulation pump	Motor	1-3 A (500 V)	IRSM807-045MH, IMM100	IRSM5y5-0x5zA, IM240		
		3-7 A (500 V)	IRSM836-0x5MA	IM231		
		4-8 A (250 V)	IRSM836-0x4MA	IRSM5y5-0x4zA		
					IKCM20L60zu	
Fan pump GPI		4-30 A			IKCM30F60zu IKCM10L60yA IKCM15L60zu IM564 (PFC+INV)	
Ventilation	Bathroom fan	1-5 A (500 V)	IRSM836-0x5MA IRSM807-045MH IMM100	IRSM5y5-0x5zA, IM240		
		2-8 A (250 V)	IRSM836-0x4MA	IRSM5y5-0x4zA		

Discrete solutions – Product application mapping

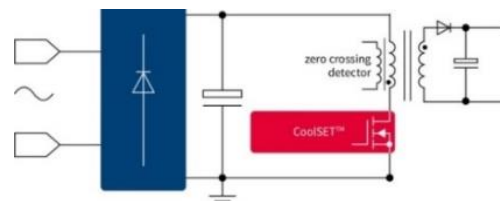
Applications		Current rating	IGBT & MOSFET	Gate driver	Controller	
Home appliances	Refrigerator	Fan	1-3 A (600 V)	IKD03N60RF, <i>IPN/D60R2KOCE</i>	2ED2304S06F, 6EDL04x06, 2EDL05	IRMCF171 IRMCF183M
		Compressor (small fridge)	1-10 A (600 V - 650 V)	IKD03N60RF, IKD04N60RF, IKD04N60RF, IKA08N65ET6, IKA10N65ET6, IKA15N65ET6, <i>IPD60R1K5CE, IPD65R420CFD</i>	2ED2304S06F, 6EDL04x06, 2EDL05 2ED2106(4) / 8(4) / 9(4)S06F(J) 2ED2181(4) / 2(4)/3(4) / 4(4)S06F(J)	IRMCF171 IRMCF183M
	Washing machine	Drain pump	1-6 A (600 V)	IKD03N60RF, IKD04N60RF, IKD06N60RF, <i>IPN/D60R2KOCE, IPN/D60R1K4CE</i>	6EDL04x06, 2ED2304S06F, 2EDL05	IRMCF171 IRMCF183M
		Drum motor	10-20 A (600 V)	IKD10N60RF, IKD15N60RF, IKB10N60T, IKB15N60T, IKB20N60T, IKP10N60T, IKP15N60T, IKP20N60T	6EDL04I06PT, 2EDL23x06J 2ED2181(4) / 2(4) / 3(4) / 4(4)S06F(J)	IRMCF171 IRMCF183M XMC4400-F100
	Air conditioner	Indoor unit fan	1-6 A (600 V - 650 V)	IKD03N60RF, IKD04N60RF, IKB06N60T, IKP06N60T, IKA06N65ET6, <i>IPN/D60R2KOCE, IPN/D60R1K4CE</i>	6EDL04x06, 2EDL05, 2ED2304S06F, 2ED2106(4) / 8(4) / 9(4)S06F(J)	IRMCF171 IRMCF183M XMC1000
		Outdoor unit fan	4-10 A (600 V - 650 V)	IKD03N60RF, IKD04N60RF, IKD10N60RF, IKB06N60T, IKP06N60T, IKP10N60T, <i>IPD60R1K5CE, IPD65R420CFD</i>		IRMCF171 IRMCF183M XMC1000
		Compressor	10-20 A (600 V - 650 V)	IKP10N60T, IKP15N60T, IKP20N60T, IKA08N65ET6, IKA10N65ET6, IKA15N65ET6	2EDL23x06, 2ED2181(4) / 2(4) / 3(4) / 4(4)S06F(J)	IRMCF171 IRMCF183M XMC4400-F100
		PFC	10-30 A (600 V - 650 V)	IKW40N65WR5, IKFW40N60DH3E, <i>IPB60R280P7</i>	1ED44175N01B, 1ED44173N01B, 1ED44176N01F, IRS44273L, IRS4427S, 2EDL23I06PJ, 2ED2181 / 2 / 3 / 4S06F	ICE3PCS01G
	Dish washer	Circulation pump	4-8 A (600 V - 650 V)	IKD04N60RF, IKD04N60RF, IKB06N60T, IKP06N60T, IKA08N65ET6, <i>IPD60R1K5CE, IPD65R420CFD</i>	6EDL04x06, 2EDL05, 2ED2304S06F, 2ED2106(4) / 8(4) / 9(4)S06F(J)	IRMCF171 IRMCF183M XMC1000
		Drain pump	1-6 A (600 V)	IKD03N60RF, IKD04N60RF, IKD04N60RF, IKD06N65ET6, IKB06N60T, IKP06N60T, IKA06N60FP, <i>IPN/D60R2KOCE, IPN/D60R1K4CE</i>		IRMCF171 IRMCF183M XMC1000
Fan	Ceiling & upright fans, Bathroom fan, Ventilation	1-10 A (600 V - 650 V)	IKD03N60RF, IKD04N60RF, IKD06N60RF, IKD10N60RF, IKB06N60T, IKP06N60T, IKA08N65ET6, IKA10N65ET6, IKP10N60T, <i>IPD60R1K5CE, IPD65R420CFD</i>	2EDL23x06, 2ED2181(4) / 2(4) / 3(4) / 4(4)S06F(J)	IRMCF171 IRMCF183M XMC1000	
Pump	Heating pump, pool pumps	1-20 A (600 V - 650 V)	IKD03N60RF, IKD04N60RF, IKD04N60RF, IKB06N60T, IKP06N60T, IKD10N60R, IKD15N60R, IKD10N60RF, IKD15N60RF, IKB10N60T, IKB15N60T, IKB20N60T, IKP10N60T, IKP15N60T, IKP20N60T, IKA08N65ET6, IKA10N65ET6, IKA15N65ET6, <i>IPN/D60R2KOCE, IPN/D60R1K4CE</i>		IRMCF171 IRMCF183M XMC1000 XMC4400-F100	

The right security for connected home appliances: OPTIGA™ product portfolio



5th generation CoolSET™ for auxiliary SMPS

Auxiliary SMPS in Flyback topology to perform AC/DC power conversion to power the various system blocks in home appliances.



Broad portfolio

- › Choice of fixed- frequency or quasi-resonant switching scheme
- › Highest power delivery up to 43 W
- › Available in DIP-7 or SMD DSO-12 package

Ease of design

- › Numerous design examples covering both indoor and outdoor aircon
- › Design tools, guide and application note
- › Reference designs

Robustness

- › Integrated 700 V or 800 V superjunction MOSFET
- › Comprehensive protection features
- › Auto-restart scheme to minimize interruption

More information → <http://www.infineon.com/CoolSET>

iMOTION™ solution platform dedicated to motor & PFC control

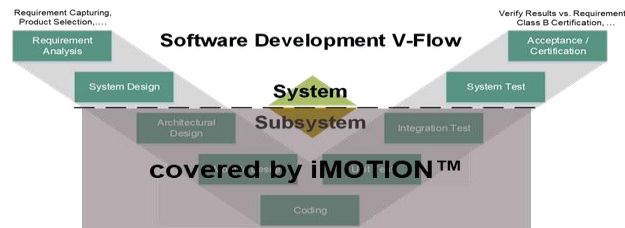
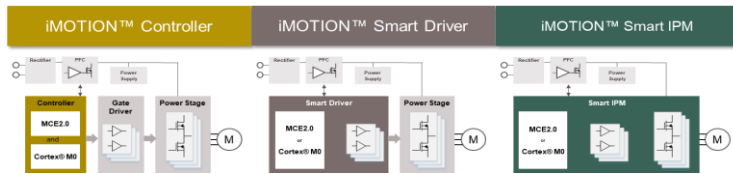
Right-fit products and highest functional integration

Hardware integration

From controller to full inverter in one package

Motion Control Engine

MCE - Ready-2-use motor and PFC control algorithm



- + Less components
- + Reduced PCB space

- + Minimized SW coding/test
- + Less certification effort

System cost reduction

Time to market

Less R&D spending

Markets



Major & small home appliances

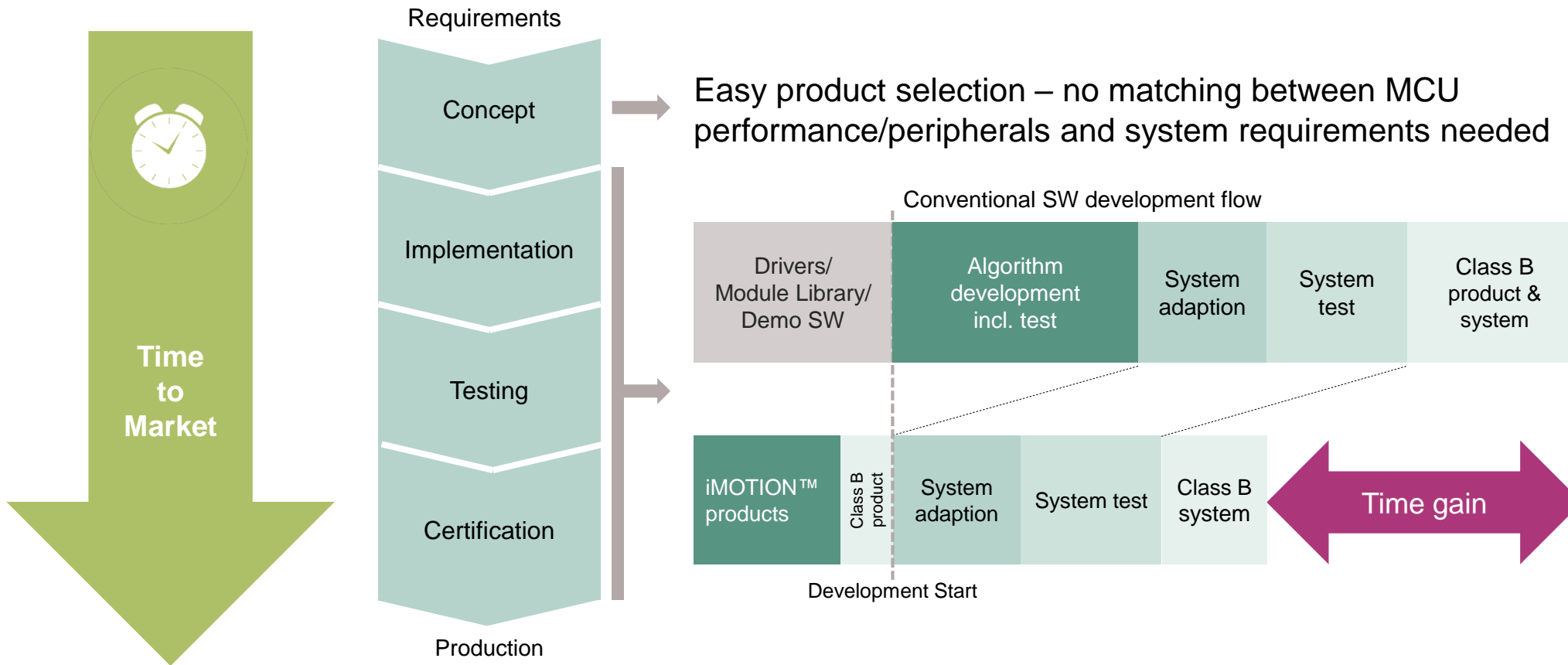


Industrial pumps & fans



Motion for building automation

iMOTION™ reduces significantly time & resource needs in the overall motor & PFC software development cycle



Major benefits – Significant time to market improvement

- > Simplified product selection
- > State of the art algorithms – production ready & UL/ClassB pre-certified
- > RnD cost savings of ~\$180k (Assumption: 12 MM a \$15k)



Agenda

1

What's driving the major home appliance market?

2

Solutions for major home appliances

3

Refrigerators compressor and PFC

4

Residential air conditioner

5

Washing machines








6

Fans and pumps

7

Summary

Infineon solution overview for refrigerator

		Refrigerator		
		100 W	200 W	300 W
 Inverter switches		TRENCHSTOP™ IGBT6 / RCD2 IGBTs		
		CoolMOS™ PFD7		
 PFC switches		TRENCHSTOP™ / High Speed 3 IGBT		
		CoolMOS™ P7		
 Gate driver ICs		650 V SOI Level shift gate driver ICs		
		600 V JI Level shift gate driver ICs		
 IPM		CIPOS™ Nano/ Micro / Mini		
 Microcontrollers		iMOTION™/ PSoC® 4/6 / XMC™		
 Driver for PFC & aux supply		Integrated power stage – CoolSET™ Linear voltage and DC/DC switching regulators		
 M. sensors		XENSIV™ Hall Switches and angle sensors		
C. sensors		XENSIV™ - high-precision coreless current sensors for industrial applications		
Security		OPTIGA™ Trust product family		

Microcontroller portfolio for refrigerators

User Case	System Controller	UI 2-in-1	Capsense only	VF compressor
Cypress part numbers	CY8C4126/S2 CY8C4127/S3 P4S4 (NPP)	CY8C4025/S1 CY8C4126/S2	CY8C4014/S0	C: CY8C4146 / P4S2 C+HPFC: P4MC (NPP)
Product characteristics	Flash: 48K~128K SRAM: 2K~32K GPIO: 36~80 UART: 2~5 ADC: 8CH	Flash: 32K~64K SRAM: 4~8K GPIO: 25~36 UART: 1~3 Capsense: 4~8	Capsense: 4-8 UART or I2C interface	BLDC & PMSM motor, SPWM, FOC, 1 Shunt, Full Protection, internal AMP/OPA,
Key features	5V power supply, Support OTA, 32bit M0 core	Good Capsense performance Enable LCD 5V Power supply	Good Capsense performance Ease use turnkey 5V Power supply	32bit M core, Turn-key solution, CY AE support

Low power drives offerings by market segments: High-end

"Premium" differentiated products
LCD display, multiple cooling segments, highest efficiency

Selection table focusing on system control
—
Connectivity and user interface require separate subsystems

Premium: High-end segment			
Inverter	Topology	Package	Product
TRENCHSTOP™ IGBTs		DPAK	IKD06N60RF
CoolMOS™		Dpak	IPD65R420CFD, IPD65R310CFD
IPMs w/integrated Driver	Half bridge 3-phase 2/3-phase	CIPOS™ Nano CIPOS™ Micro CIPOS™ Mini	IGCM04F60yA, IGCM06F60yA, IM513, IM512
PFC	Topology	Package	Product
TRENCHSTOP™ IGBTs	Single boost	D2PAK	IGB15N60H5, IGB10N60T
CoolMOS™	Single boost	D2PAK	IPB60R280P7
Driver	Topology	Package	Product
PFC Driver	1ch low side	SOT23	1ED44175, 1ED44173, IRS44273
	2ch low side	DSO-8	IRS4427
High voltage Level shift	Three phase	PG-DSO-28	6EDL04I06, 6EDL04N06
	Half bridge	PG-DSO-8	2EDL05I06PF, 2ED2304S06F 2ED2106/8/9/91S06F series 2ED2181/2/3/4S06F series
		PG-DSO-14	IRS2890D 2ED21064/84/94S06J series 2ED21814/24/34/44S06F series
CPU			Product
iMOTION™	Single motor control	TSSOP-38	IMC101T-F038
	Motor control + PFC	LQFP-64	IMC102T-F064
PSoC® 4	Single / Dual Motor	TQFP48	CY8C4146AZI
FM4	Dual Motor and PFC	LQFP or BGA	S6E2H14
XMC™	MCU with PFC	16-64 pins 48-196 Pins	XMC1300 (Cortex M0) XMC1400 (Cortex M0) XMC4000 (Cortex M4F)

50 W

150 W

300 W

Inverter output power

Agenda

1

What's driving the major home appliance market?

2

Solutions for major home appliances

3

Refrigerators compressor and PFC

4

Residential air conditioner

5

Washing machines

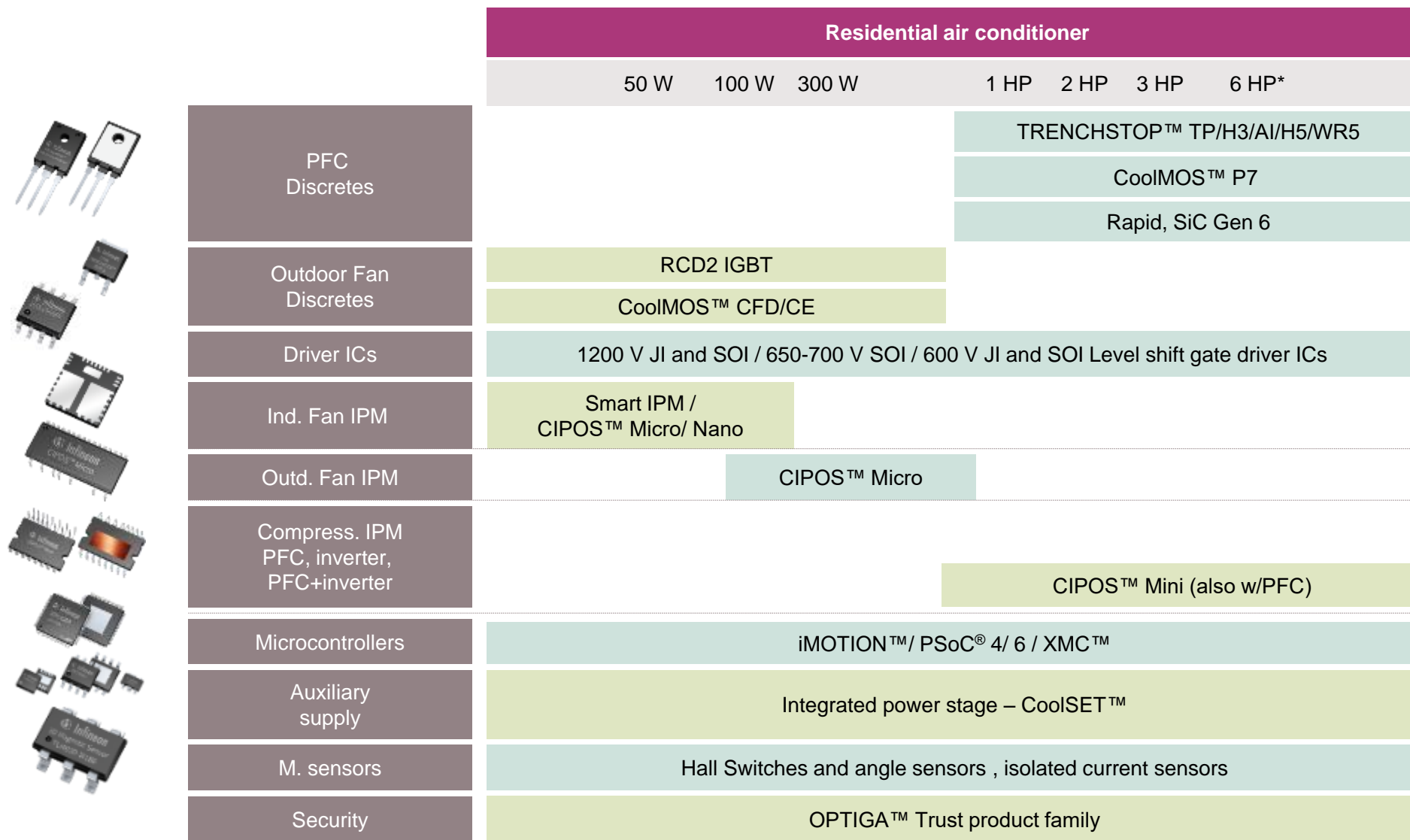
6

Fans and pumps

7

Summary

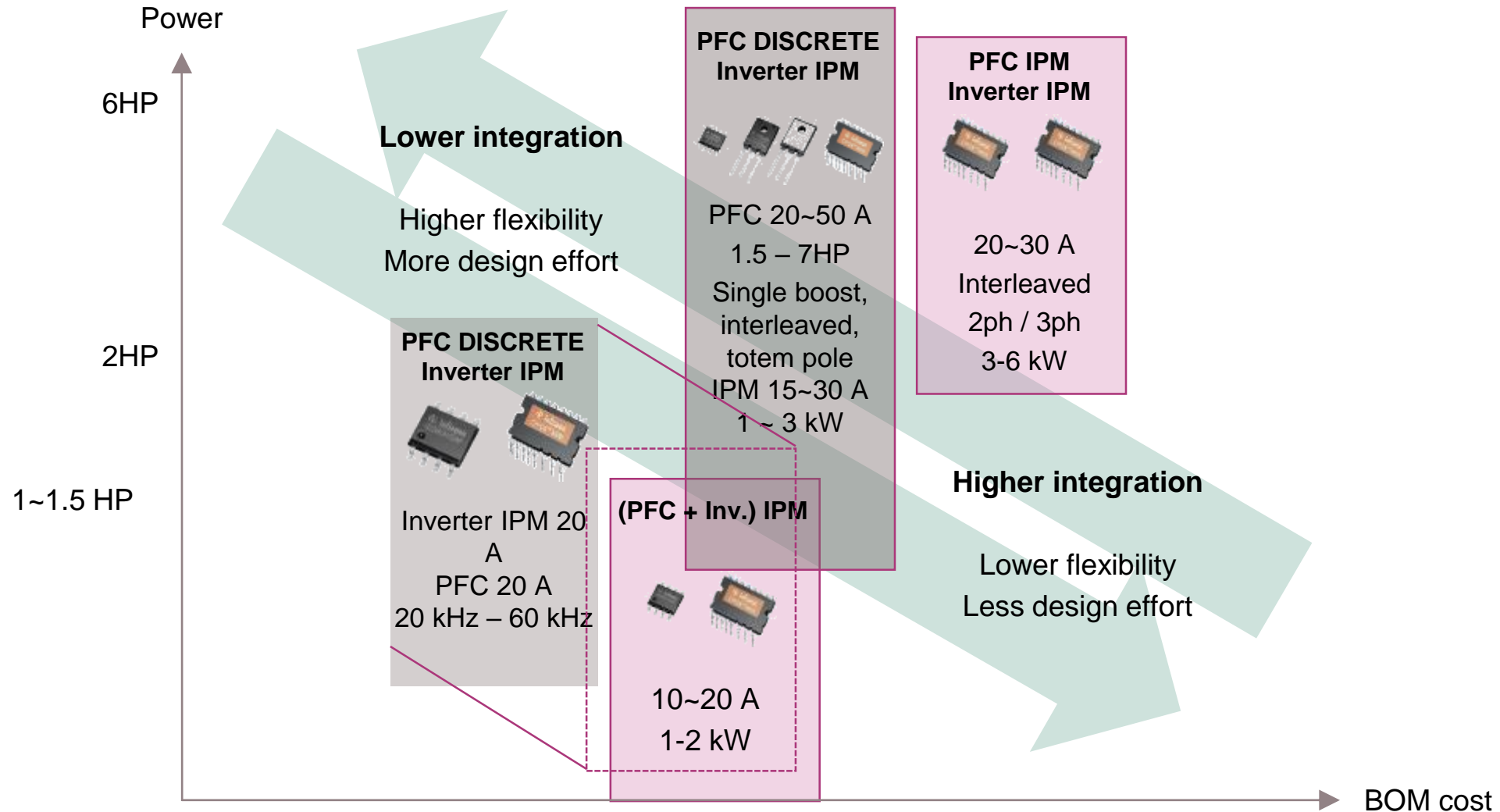
Infineon solution tree for residential air conditioner



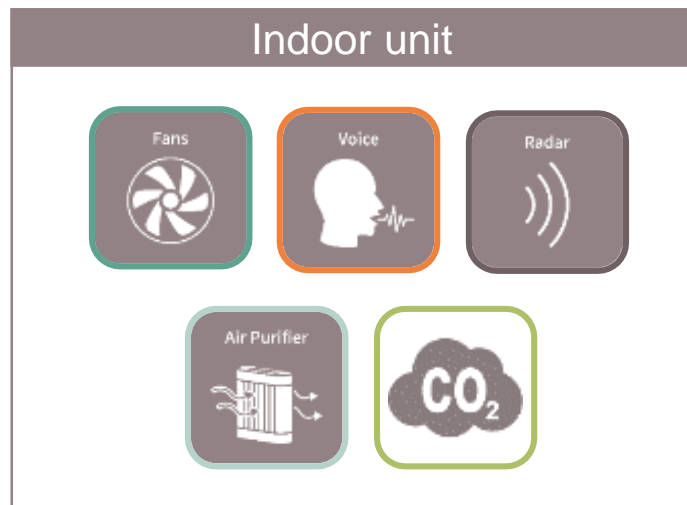
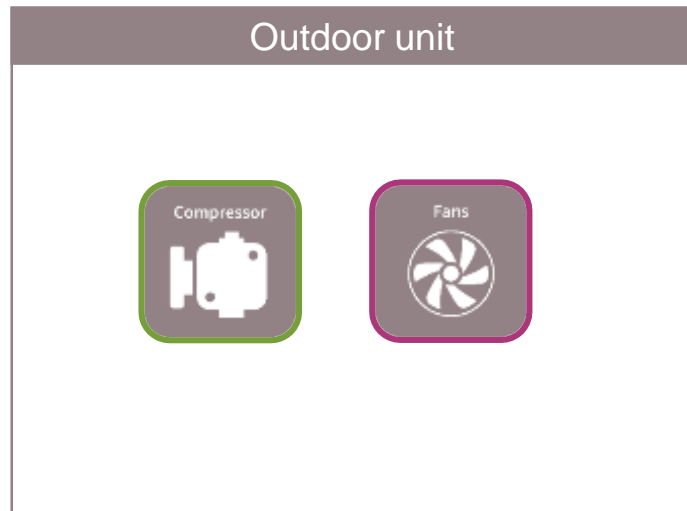
Microcontroller portfolio for air conditioner

User Case	Split type IDU	Standing type IDU			ODU		IDU&ODU
	System Controller	System Controller	UI with Capsense	Capsense only	Compressor +System	3-in-1	Fan Control
Cypress part numbers	CY8C4126/S2 CY8C4127/S3	CY8C4126/S2 CY8C4127/S3	CY8C4127/S3	CY8C4014/S0	Compressor: CY8C4547/S3 C+HPFC: P4-MC(NPP)	P6-MC(NPP)	CY8C4145/S2
Product characteristics	Flash: 32K~128K SRAM: 2K~16K GPIO: 27~55 ADC: 8CH UART: 2~4	Flash: 32K ~ 128K SRAM: 2K ~ 16K GPIO: 27~48 ADC: 8CH UART: 2~4	Flash: 64K ~ 128K SRAM: 8K~16K GPIO: 27~55 UART: 1~3	Capsense: 4-12 UART or I2C interface	Position observer, 1 shunt, HF carry wave, field weaken, torque compensation, over modulation	Compressor feature + Fan feature	SPWM, FOC, Fast, Anti-Wind Start up, Fast Reversal Self-Adjusting Carry Frequency (Norse) Full Promotion
Key features	5V power supply, 32bit M core	5V power supply, 32bit M core	Good Capsense performance Ease use turnkey 5V Power supply	Good Capsense performance Ease use turnkey 5V Power supply	32bit M core, Turn-key solution, CY AE support	M4/M0 2 cores CY AE support	32bit M core, Turn-key solution, CY AE support

Total solutions for air conditioner compressors (PFC + inverter)



Residential air conditioner – outlook for smart solutions



Compressor

- › Main MCU: PSoC® 6/ PSoC® 4/ XMC™ series
- › Inverter: IPM/ CIPOS™ Mini
- › PFC: IGBT/ H5 series, Diode/ Rapid diodes, Gate IC/1ED44176, IRS44273, IPM/ CIPOS™ Mini
- › Precise and quick cooling: Pressure & temperature sensor combo/ DPS422
- › SMPS: CoolSET/ 5QR series

Outdoor fan

- › Inverter: IPM/CIPOS™ Micro

Indoor fan

- › Inverter: IPM/Smart IPM
- › Inverter: IPM/CIPOS™ Nano, Micro

HMI & connectivity

- › System host and HMI: PSoC® 6
- › Bluetooth / WiFi connectivity
- › Voice assistant: MEMS microphone
- › Secured comm / firmware update: OPTIGA™ Trust X

Human detection

- › People presence detection, counting, tracking: Radar sensor / BTG24xTRxx
- › Algorithm / IP protection: OPTIGA™ Trust B

HEPA filter

- › Authentication of filter / accessories: OPTIGA™ Trust B/X

Gas sensor

- › CO₂ sensor: PAS CO₂ sensor / real PAS CO₂ sensor module – XMC™, MOSFET, PAS sensor

Agenda

1

What's driving the major home appliance market?

2

Solutions for major home appliances

3

Refrigerators compressor and PFC

4

Residential air conditioner

5

Washing machines







6

Fans and pumps

7

Summary

Infineon solution overview for washing machine

		Washing machine		
		600 W	1000 W	1.5 kW
	Switches	TRENCHSTOP™ IGBT / RCD2 IGBT / IGBT 3 / IGBT6		
	Gate driver ICs	650 V SOI Level shift gate driver ICs		
		600 V JI Level shift gate driver ICs		
	IPM	Drum: CIPOS™ Tiny, Mini; Pump: CIPOS™ Micro, Nano		
	Microcontrollers	iMOTION™/ PSoC® 4/ 6/ XMC™		
	Auxiliary supply	Integrated power stage – CoolSET™		
	M. sensors	Hall Switches and angle sensors		
	Security	OPTIGA™ Trust product family		

Microcontroller portfolio for washing machines

User Case	Front loading		Top loading		Motor Control
	System Controller	UI 2-in-1	System Control wi/wo Capsense	Drive Controller	
Part numbers	CY8C4127/S3 P4S4(NPP)	CY8C4025/S1 CY8C4126/S2	CY8C4126/S2 CY8C4127/S3	CY8C4126/S2	CY8C4146/S3
Product characteristics	Flash: 128K ~ 256K SRAM: 16K~32K GPIO: 27~55 UART: 2~4 ADC: 8CH	Flash: 32K ~ 64K SRAM: 4K~8K UART: 1~2 Capsense: 8~20 Support slides & wheels	Flash: 32K ~ 128K SRAM: 4K~32K GPIO: 27~55 UART: 2~4 ADC: 8CH Capsense: 8~30 Support slides & wheels	Flash: 16K ~ 32K SRAM: 1K~2K GPIO: 12~27 UART: 1~2 ADC: 8 CH	BLDC motor, SPWM, FOC, OOB, electronics weight Motor identification and auto- tuning, multi-mode startup
Key features	5V power supply, 32bit M core	Good capsense performance Ease use turnkey 5V Power supply	Good Capsense performance Ease use turnkey 5V Power supply	5V power supply, 32bit M core	32bit M core, Turn-key solution, CY AE support, Lead tech for the sensorless inverter

Washing machine drive (600 W – 1.5 kW)

Inverter	Topology	Package	Product
Discrete IGBTs	Switch + Anti-parallel Diode	DPAK	IKD10N60R, IKD15N60R, IKD10N60RF, IKD15N60RF
		D2PAK	IKB10N60T, IKB15N60T, IKB20N60T
		TO220	IKP10N60T, IKP15N60T, IKP20N60T
IPMs with integrated driver	Three phase	Mini	IKCM10/15H
Driver	Topology	Package	Product
SOI	Three phase	PG-DSO-28	6EDL04I06PT, 6EDL04N06PT
	Half bridge	PG-DSO-8	2EDL05I06PF 2ED2304S06F 2ED2106/8/9/91S06F series 2ED2181/2/3/4S06F series
		PG-DSO-14	2EDL05I06PJ; 2EDL23x06PJ 2ED21064/84/94S06J series 2ED21814/24/34/44S06J series
Junction isolated	Three phase	DSO-28	IR2136S, IR2133S
	Half bridge	DSO-14	IRS2890DS
CPU			Product
iMOTION™		LQFP-64	IMC101T, IMC102T
XMC™		PG-LQFP-100	XMC4400-F100

Strong focus on the washing program – process control is enabled by inverterized motors



Space saving

- › Reduce size while maximizing drum volume
- › Multiple drums
- › Washing and drying



Energy & time saving

- › Multitude of optimized washing programs
- › High energy efficiency motors (BLDC)
- › Low noise for washing e.g. at night



Connected (IoT)

- › Easy remote control and information about the status
- › Remote monitoring and maintenance
- › Software updates

Agenda

1

What's driving the major home appliance market?

2

Solutions for major home appliances

3

Refrigerators compressor and PFC

4

Residential air conditioner

5

Washing machines

6

Fans and pumps

7

Summary

Infineon solution overview for Fans and Pumps

		Fans and pumps		
		100 W	200 W	300 W
 Switches		TRENCHSTOP™ IGBT6 / RCD2 IGBT		
		CoolMOS™ PFD7		
 Gate driver ICs		650 V SOI Level shift gate driver ICs		
		600 V JI Level shift gate driver ICs		
 IPM		Drum: CIPOS™ Tiny, Mini; Pump: CIPOS™ Micro, Nano		
 Microcontrollers		iMOTION™ / PSoC® 4/ 6 / XMC™		
 Driver & PFC supply		Integrated power stage – CoolSET™ Linear voltage and DC/DC switching regulators		
 M. sensors		XENSIV™ Hall Switches and angle sensors		
 Security		OPTIGA™ Trust product family		

Microcontroller portfolio for Fans and Pumps

User Case	100 W - 400 W	Circulation pump	Small pump	Fan
Part numbers	CY8C4025/S1 CY8C4126/S2	CY8C4014/S0 CY8C4025/S1 CY8C4126/S2	CY8C4025/S1 CY8C4126/S2 CY8C4127/S3	CY8C4014/S0 CY8C4147/S3
Product characteristics	Flash: 32K~64K SRAM: 4K~8 UART: 2~4 Capsense: 6~12 Support slides ADC: 3	Flash: 16K ~ 64K SRAM: 2K~8K UART: 1~3 Capsense: 4~8 ADC: 4	Flash: 32K ~ 128K SRAM: 4K~32K UART: 2 Capsense: 4~6	Flash: 16K, 128K SRAM: 2K, 16K GPIO: 12~55 UART: 1~4 Capsense: 4~8
Key features	Good capsense performance Ease use turnkey Support OTA, 5V power supply, 32bit M core	Good capsense performance Ease use turnkey Enable LCD 5V Power supply	Good Capsense performance Ease use turnkey Support OTA, 5V Power supply	Good Capsense performance, Support OTA, 5V power supply, 32bit M core

Fans & pumps – product selection tree

Regular: Mid-range segment

Inverter	Topology	Package	Product
Discrete IGBTs	Three phase	DPAK TO-220FP	IKDxxN60R, IKDxxN60RF IKAxN65ET6
IPMs with integrated driver	Half bridge 3-phase	CIPOS™ Nano CIPOS™ Micro CIPOS™ Tiny	IRSM83x, IM231, IM393
Driver	Topology	Package	Product
High voltage level shift	Three phase	PG-DSO-28	6EDL04I06 / 6EDL04N06
	Half bridge	PG-DSO-8	2ED2304S06F, 2EDL05I06PF 2ED2106/8/9/91S06F series 2ED2181/2/3/4S06F series
		PG-DSO-14	IRS2890DS 2EDL05I06PJ, 2EDL23I06 2ED21064/84/94S06J series 2ED21814/24/34/44S06J
Controller	Functionality	Package	Product
iMOTION™	Single motor control	TSSOP-38	IMC101T-T038
	Motor control + PFC	LQFP-64	IMC102T-F064
	Smart IPM	PQFN	IMM101T, IMM100A
XMC™	Standard MCU	16-64 pins	XMC1300 (Cortex M0) XMC1400 (Cortex M0)

Agenda

1

What's driving the major home appliance market?

2

Solutions for major home appliances

3

Refrigerators compressor and PFC

4

Residential air conditioner

5

Washing machines

6

Fans and pumps

7

Summary

Conclusion and take-aways



- Infineon has the most comprehensive portfolio among competitors: One-stop-shop.
- Infineon offers energy efficient solutions, with different levels of integration to meet any customer needs.
- We can offer a competitive and complete system solution for traditional and new consumer drive applications.
- Smart functionality is offered beyond energy efficiency.
- Add hardware-based security already at product design and benefit from Infineon's support for an easy and fast integration.
- We are working together with our customers to grow into the future!**



Part of your life. Part of tomorrow.