



Selection guide for major home appliance systems

Designed for your differentiation and energy efficiency needs



Discover Infineon's solutions for home appliances. Our broad portfolio from RC-D/RC-DF discrete IGBTs to CIPOS™ and IRAM IPMs gives you full flexibility for your design.

Content

Solution matrix for home appliance system	4
Air conditioning	5
Washing machine	14
Fan	18
Refrigerator	22
Induction cooking	27
Discrete IGBTs and diodes for drives and PFCs applications	31
Gate driver ICs	34
CIPOS™ Mini	39
IRAM and μIPM™	39
iMOTION™	42
XMC™ – 32-bit industrial microcontroller	44
CoolSET™	45

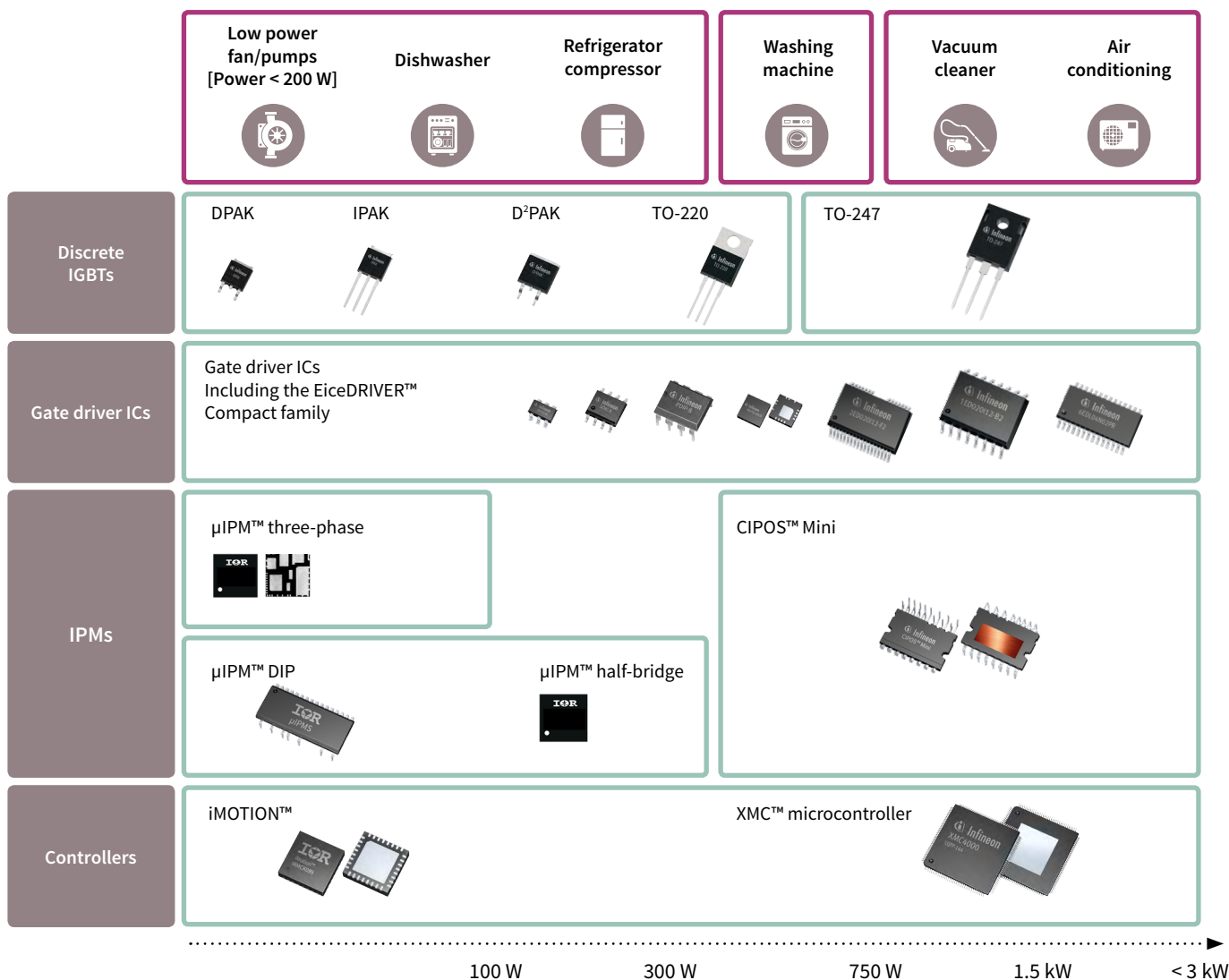
Solution matrix for major home appliance system

High performance products with seamless functionality for your system

For consumers, home appliances perform tasks essential to busy everyday life – be it a washing machine or an air conditioning system. Historically a home appliance has been a big energy consumer. But at an age of heightened awareness for the environment and financial costs, the demand for energy efficient systems is rapidly growing. At the same time, consumers expect the sleekest, quietest, most compact and visually appealing home appliances. Also, connectivity between an increasing number of devices requires a fallback for user privacy.

Product designers are challenged in terms of form and function: they must deliver smaller, smarter secure solutions that are the most powerful – and the most energy-efficient.

Industry-leading technology and manufacturing expertise from Infineon helps you overcome the challenges unique to designing a major home appliance. Our line of innovative components meets and exceeds even the most rigorous requirements for reliability, quality, security and energy efficiency. Explore your application of interest to learn more about innovative design options and to find dedicated solutions.



For complete product portfolio, please check our homepage www.infineon.com/homeappliance

Air conditioning outdoor unit



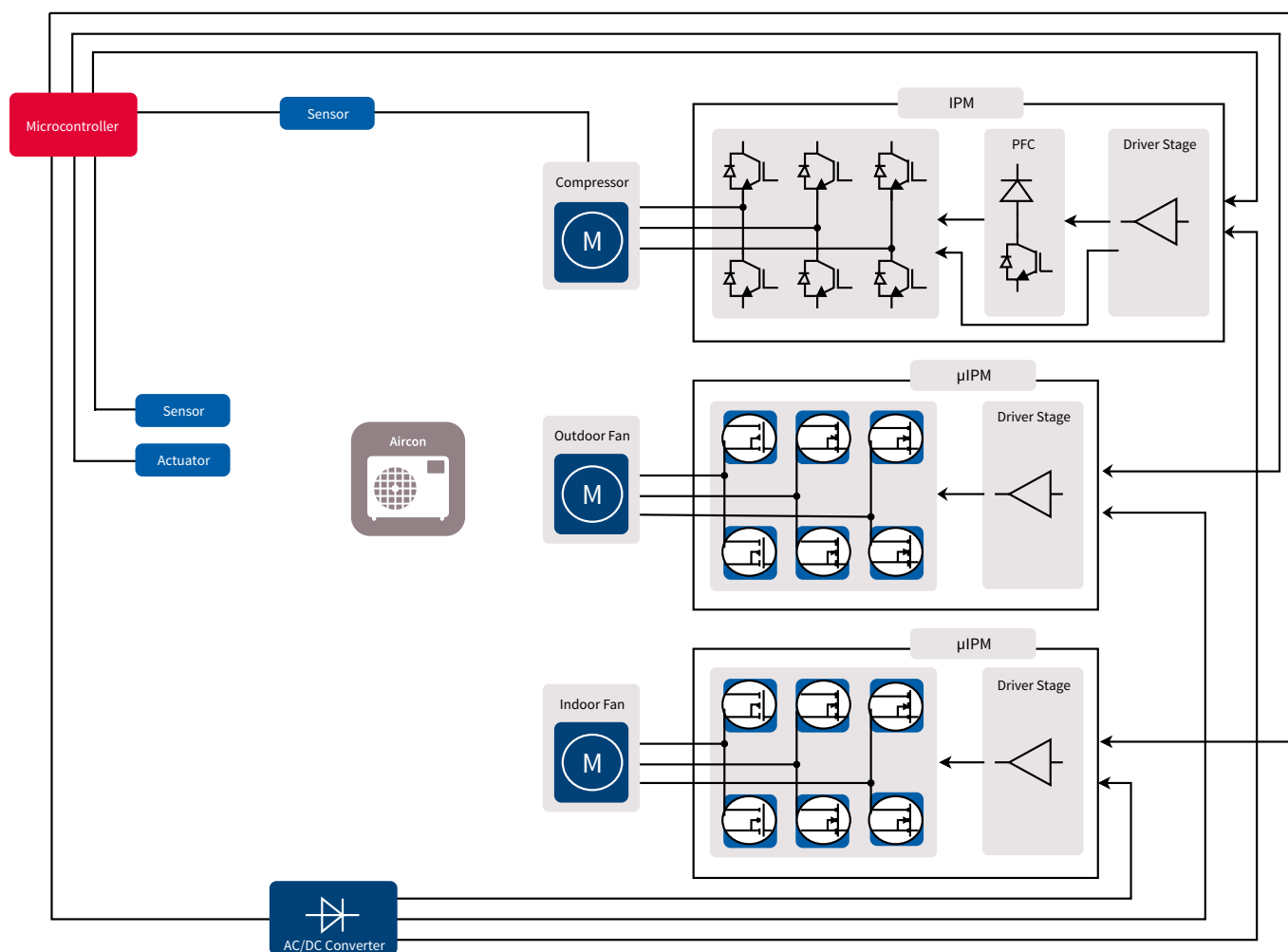
Today's room air conditioning units must fulfill a growing list of demands. Because they are used in private homes, quiet air conditioning systems are highly sought after. Functions such as stable and smooth starting, a wide range of operating speeds and vibration suppression round out the list of must-haves.

Designing room air conditioning units that boast such capabilities requires reliable, energy efficient solutions and new form factors. An excellent price/performance ratio is key, as are new features oriented to the future in smart appliances.

Infiniteon's broad portfolio of top quality semiconductors enables you to meet all the latest demands. Our room air conditioning solutions deliver the reliability and energy efficiency you need to stand out from the competition.

High efficiency – air conditioning systems

For high efficiency room air conditioning designs, discover Infineon IPMs for the compressor, the outdoor and the indoor fan motors, and iMOTION™ controllers to control the whole system.





Portfolio for high efficiency air conditioning

IPMs for compressor

Package	Motor I_{rms} range [A _{rms}]	Topology	Line-up	Product part number	Description	
CIPOS™ Mini DCB	Up to 10	Three-phase inverter + PFC	600 V – 15 A	¹⁾ IFCM15x60GD	Recommended	
CIPOS™ Mini	Up to 13	Three-phase inverter	600 V – 10 A 600 V – 15 A	²⁾ IGCM10F60yA/IKCM10L60GA IGCM15F60GA/IKCM15F60yA IKCM15L60yA	Recommended	
			600 V – 20 A 600 V – 30 A	IGCM20F60GA/IKCM20L60GA IKCM30F60yA		
CIPOS™ Mini DCB	Up to 20	Three-phase inverter	600 V – 15 A 600 V – 20 A 600 V – 30 A	IKCM15L60yD IKCM20L60yD IKCM30F60yD	Available	
	Up to 16		Two-phase interleaved PFC	650 V – 20 A 650 V – 30 A	IFCM20T65GD IFCM30T65GD	Available
	Up to 24		Three-phase interleaved PFC	650 V – 20 A 650 V – 30 A	IFCM20U65GD IFCM30U65GD	Available

1) x = S (20 kHz) x = P (40 kHz)

2) y = G (built in thermistor) y = H (no thermistor)

IPMs for outdoor fan

Package	Motor I_{rms} range [A _{rms}]	Topology	Line-up	Product PN
μIPM™	0.1 – 1.2	Three-phase inverter	500 V MOSFET 1.7 Ω, 2.2 Ω, 4.0 Ω, 6.0 Ω	IRSM836-0x5MA
μIPM™ DIP	0.2 – 0.5 1.5	Three-phase inverter	500 V MOSFET 1.3 Ω, 1.7 Ω, 2.2 Ω, 4 Ω	IRSM5y5-0x5zA
	0.6 2.0	Three-phase inverter	600 V IGBT 4 A	IRSM5y6-076zA

IPMs for indoor fan

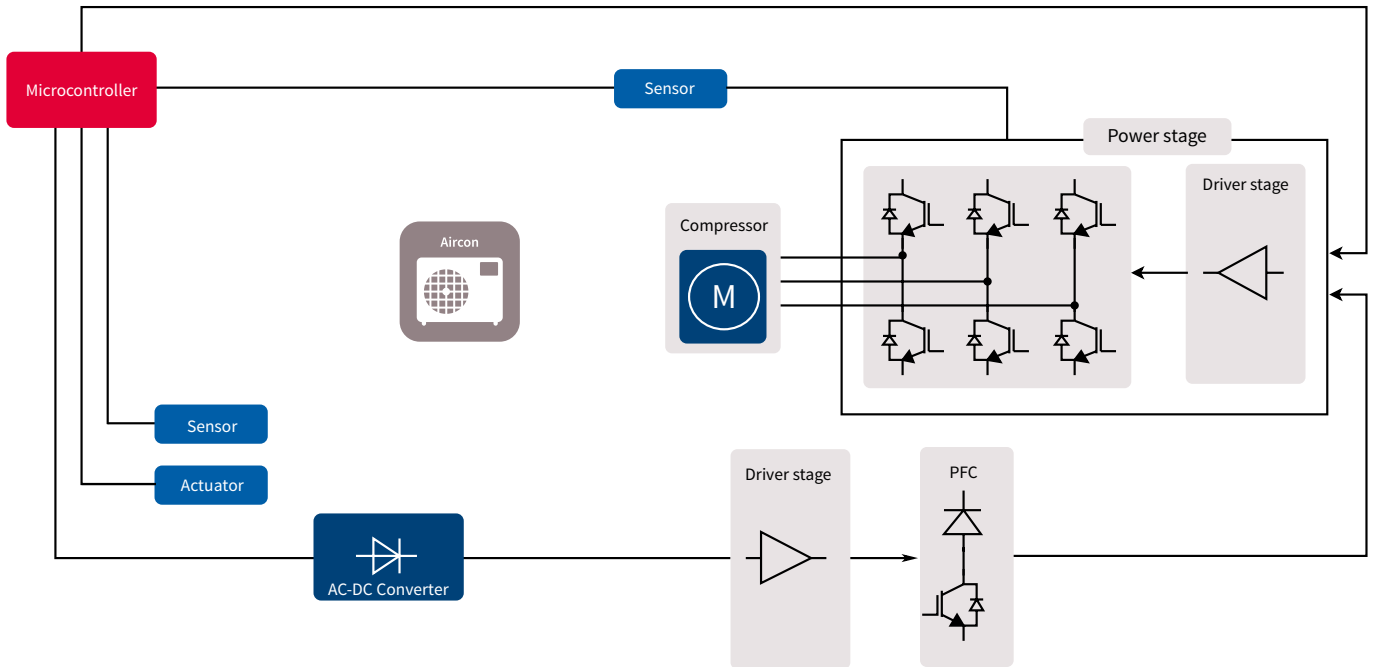
μIPM™s for indoor fan 220 V _{AC}	Package	Motor I_{rms} range [A _{rms}]	Topology	Line-up	Product number
	μIPM™ three-phase	0.1 – 0.5	Three-phase inverter	500 V MOSFET 1.7 Ω, 2.2 Ω, 4.0 Ω, 6.0 Ω,	IRSM836-0x5MA
	μIPM™ half-bridge	0.6	Half-bridge	500 V MOSFET 1.7 Ω	IRSM807-045MH
	μIPM™ DIP	0.2 – 0.5	Three-phase inverter	500 V MOSFET 1.7 Ω, 2.2 Ω, 4.0 Ω, 6.0 Ω	IRSM5y5-0x5zA
	Smart μIPM™	0.2 to 0.3	Three-phase inverter	500 V MOSFET 4 Ω, 6 Ω	IRSM983-025MB IRSM983-035MB

Controller

Features		XMC4400/XMC4500	IRMCF588	IRMCK311	IRMCF188	IRMCK099M
System performance	Core	ARM® Cortex®-M4	Dual MCE™	MCE™	MCE™	MCE™
	CPU frequency	120 MHz	120 MHz	120 MHz	120 MHz	100 MHz
	Co-processor	-	8051	8051	8051	-
	Flash/OTP memory	Up to 1 MB	64 KB	64 kB	64 kB	16 KB OTP
	RAM size	Up to 160 KB	2x12 kB	8 kB	12 kB	12 KB
	Sensorless FOC	-	In-built	In-built	In-built	In-built
	Control configuration	-	2 motor + PFC	2 motor + PFC	1 motor + PFC	1 motor
	Cache	4 KB	-	-	-	-
Timers	POSIF	2x	-	-	-	-
	CCU4 (4 ch)	4x	-	-	-	-
	CCU8 (4 ch)	2x	-	-	-	-
Signal processing	ADC	-	12-bit with S/H			
	ADC 12-bit	4x	-			
	DAC	2x	-			
	Comparator	-	Integrated comparator for over-current protection			
	Op-amps for current sense	-	Single/leg shunt	Single shunt	Single/leg shunt	Single/leg shunt
Communication	IEEE 15BB Ethernet MAC	Yes	-			
	USB	FS OTG	-			
	SDIO/SD/MMC	Yes	-			
	Serial Channels (UART,SPI,I2C,I2S)	6x	-			
	Sigma-Delta Demodulator	4x	-			
	Serial channels	6x	UART/JTAG			
	CAN	3x	-			
Application specific	Air conditioning and fan	-	Full DC air conditioning – one IC to control the compressor motor, outdoor fan and digital PFC		One IC to control a motor and also digital PFC up to 50 KHz	One IC to control motor up to 50 KHz

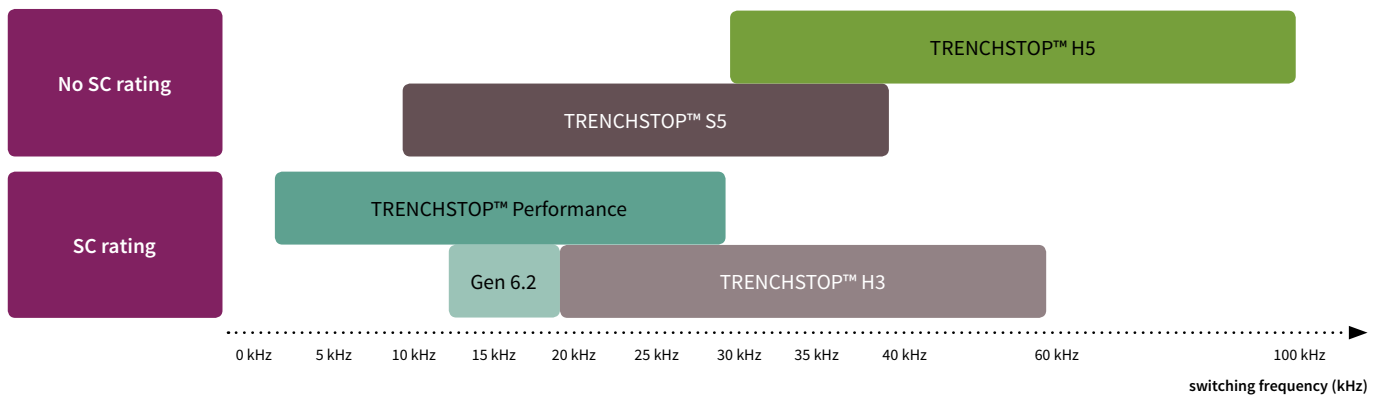
Standard efficiency – air conditioning system

For standard efficiency room air conditioning designs, Infineon offers a wide portfolio of Discrete IGBTs and diodes, drivers, IPMs and controllers to meet and exceeds even the most rigorous requirements for reliability and quality.

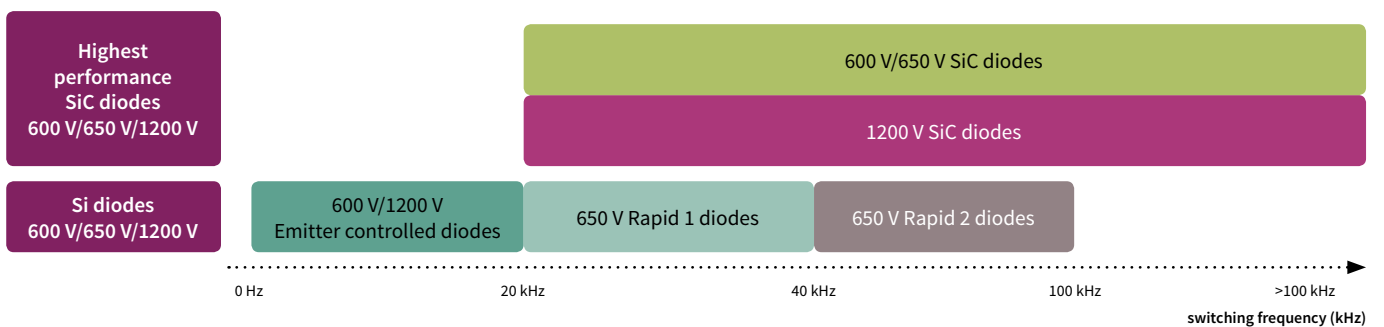


Portfolio for standard efficiency air conditioning

Discrete IGBTs for PFC



Diodes for PFC



www.infineon.com/homeappliance

Discrete IGBT for PFC – no short circuit rating

$V_{CE\ max.}$ [V]	I_c (at 100°C) [A]	Family	Package		f_{sw} [kHz]	
			TO-220	TO-247		
650	21	TRENCHSTOP™ H5	IKP20N65H5		40 – 100	
	35			IKW30N65H5	40 – 100	
			IKP30N65H5		40 – 100	
	46			IKW40N65H5	40 – 100	
			IKP40N65H5		40 – 100	
	50			IKW50N65EH5	40 – 100	
	54			IKZ50N65EH5	40 – 100	
				IKZ50N65NH5	40 – 100	
	56			IKW50N65H5	40 – 100	
				IKZ75N65EH5	40 – 100	
	75		IKZ75N65NH5	40 – 100		
			IKW75N65EH5	40 – 100		
	30		TRENCHSTOP™ S5	IKW30N65ES5		10 – 40
				IKW40N65ES5		10 – 40
IKW50N65ES5					10 – 40	
IKW75N65ES5					10 – 40	

Discrete IGBT for PFC – short circuit rating

$V_{CE\ max.}$ [V]	I_c (at 100°C) [A]	Family	Package		f_{sw} [kHz]	
			TO-247	TO-247 (long lead)		
600	30	TRENCHSTOP™ H3	IKW30N60H3		20 – 100	
	35	Gen 6.2	IRGP4069D	IRGP4069D-E	8 – 30	
			IRGP4650D	IRGP4650D-E	8 – 30	
			IRGP6650D	IRGP6650D-E	8 – 30	
	38	TRENCHSTOP™ Performance	IKW30N60DTP		2 – 30	
	40	TRENCHSTOP™ H3	IKW40N60H3		20 – 100	
	48	TRENCHSTOP™ Performance	IKW40N60DTP			2 – 30
					IRGP4063D-E	8 – 30
	48	Gen 6.2		IRGP4063D1	IRGP4063D1-E	8 – 30
				IRGP4660D	IRGP4660D-E	8 – 30
				IRGP6660D	IRGP6660D-E	8 – 30
				IRGP4063D		8 – 30
				IRGP4068D	IRGP4068D-E	8 – 30
	50	Gen 6.2	IRGP4078D	IRGP4078D-E	8 – 30	
		TRENCHSTOP™ H3	IKW50N60H3		20 – 100	
	60	TRENCHSTOP™ H3	IKW60N60H3		20 – 100	
	61	TRENCHSTOP™ Performance	IKW50N60DTP		2 – 30	
TRENCHSTOP™ H3		IKW75N60H3		20 – 100		
75	Gen 6.2		IRGP4066D	IRGP4066D-E	8 – 30	
			IRGP4690D	IRGP4690D-E	8 – 30	
			IRGP6690D	IRGP6690D-E	8 – 30	
650	35	Gen 6.2	IRGP4750D	IRGP4750D-E	8 – 30	
	48		IRGP4760D	IRGP4760D-E	8 – 30	
	75		IRGP4790D	IRGP4790D-E	8 – 30	

Diodes for PFC

$V_{CE\ max.}$ [V]	I_c at 100°C [A]	Family	Package			f_{sw} [kHz]
			Package TO-220 FullPAK	TO-247	TO-247 common cathode/ anode	
650	20	Rapid 1 diode	IDV20E65D1			18 – 40
	30	Rapid 1 diode		IDW30E65D1	IDW30C65D1	18 – 40
	40	Rapid 1 diode		IDW40E65D1		18 – 40
	75	Rapid 1 diode			IDW75D65D1	18 – 40
	15	Rapid 2 diode		IDW15E65D2		40 – 100
	30	Rapid 2 diode	IDV30E65D2	IDW30E65D2	IDW30C65D2	40 – 100

Drivers for PFC

Single low-side							
Voltage class [V]	I_o^+/I_o^- typ. [mA]	Typ. prop delay: off [ns]	Typ. prop delay: on [ns]	DIP-8	SOT-23 5pin	SOT-23 6pin	WSON-6
25	300/550	50	50		IR44252L		
	1500/1500	50	50		IRS44273L		
	1500/1700	50	50		IR44272L IR44273L		
20	4000/8000	19	19			1EDN7511B 1EDN8511B 1EDN7512B	1EDN7512G
5	1600/3300	200	150	IR2121			

Dual low-side							
Voltage class [V]	I_o^+/I_o^- typ. [mA]	Typ. prop delay: off [ns]	Typ. prop delay: on [ns]	DSO-8	DIP-8	TSSOP-8	WSON-8
25	2300/3300	65	85	IR25600S IR4426S IR4427S	IR25600 IR4426 IRS4427		
		50	50	IRS44262S IRS4426S IRS4427S			
20	5000/5000	19	19	2EDN7524F 2EDN8524F 2EDN7523F 2EDN8523F		2EDN7524R 2EDN8524R 2EDN7523R 2EDN8523R	2EDN7524G 2EDN8524G 2EDN7523G 2EDN8523G

IPMs for compressor

Package	Motor I_{rms} range [A _{rms}]	Topology	Line-up	Product PN
CIPOS™ Mini	Up to 13	Three-phase inverter	600 V – 10 A 600 V – 15 A 600 V – 20 A 600 V – 30 A	²⁾ IGCM10F60yA/IKCM10L60GA IGCM15F60GA/IKCM15F60yA IKCM15L60yA IGCM20F60GA/IKCM20L60GA IKCM30F60yA
CIPOS™ Mini DCB	Up to 20	Three-phase inverter	600 V – 15 A 600 V – 20 A 600 V – 30 A	IKCM15L60yD IKCM20L60yD IKCM30F60yD
	Up to 10	Three-phase inverter + PFC	600 V – 15 A	¹⁾ IFCM15x60GD/IFCM15x60GD

1) x = S (20 kHz) x = P (40 kHz)

2) y = G (built in thermistor) y = H (no thermistor)

Discrete IGBTs for compressor

$V_{CE\ max.}$ [V]	I_c (at 100°C) [A]	Family	Package						f_{sw} [kHz]
			TO-262	D ² PAK	TO-220	TO-220 FullPAK	TO-247	TO-247 (long lead)	
600	8.0	Gen 6.2			IRGB4060D				8-30
						IRGIB4615D			8-30
	8.9	TRENCHSTOP™				IKA15N60T			2-20
	10.0	Gen 6.2		IRGS4615D	IRGB4615D				8-30
				IRGS4064D	IRGB4064D				8-30
	12.0	Gen 6.2		IRGS4620D	IRGB4620D		IRGP4620D	IRGP4620D-E	8-30
				IRGS4056D	IRGB4056D				8-30
						IRGIB4620D			8-30
	18.0	TRENCHSTOP™		IKB10N60T	IKP10N60T				2-20
		Gen 6.2		IRGS4630D	IRGB4630D	IRGIB4630D	IRGP4630D	IRGP4630D-E	8-30
							IRGP6630D	IRGP6630D-E	8-30
					IRGB4061D				8-30
	20.0	TRENCHSTOP™		IKB20N60T					2-20
23.0	TRENCHSTOP™		IKB15N60T					2-20	
				IKP15N60T				2-20	
24.0	Gen 6.2	IRGSL4062D	IRGS4062D	IRGB4062D		IRGP4062D	IRGP4062D-E	8-30	
			IRGS4640D	IRGB4640D	IRGIB4640D			8-30	
						IRGP4640D	IRGP4640D-E	8-30	
						IRGP6640D	IRGP6640D-E	8-30	
650	8.0	Gen 6.2		IRGS4715D	IRGB4715D			8-30	
	24.0	Gen 6.2				IRGP4740D	IRGP4740D-E	8-30	

Drives for discrete IGBTs

High-side and low-side									
Voltage class [V]	I_o^+/I_o^- typ. [mA]	Typ. prop delay: off [ns]	Typ. prop delay: on [ns]	DSO-8	DSO-14	DSO-16	DIP-8	DIP-14	VQFN-14
700	220/350	200	220	IR7106S					
600	200/350	200	220	IR2106S	IR21064S		IR2106	IR2301	IR21064
				IR(S)2301S					
				IR25604S					
	210/360	150	160	IR2101S			IR2101	IR2102	
				IR2102					
	250/500	105	125			IR2112S		IR2112	
	290/600	130	135			IRS2112S		IRS2112	
360/700	400	420	IRS2101S	IRS21064S		IRS2106	IRS21064		
			2EDL05I06BF						
1900/2300	220	180	IR(S)2181S	IR(S)21814S		IR(S)2181	IR(S)21814	IRS21814M	
2500/2500	94	120			IR2113S	IR25607S		IR2113	
4000/4000	170	170	IRS2186S	IRS21864S		IRS2186	IRS21864		

Half-bridge											
Voltage class [V]	I_{o+}/I_{o-} typ [mA]	Typ. prop delay: off [ns]	Typ. prop delay: on [ns]	DSO-8	DSO-14	DSO-18	DIP-8	DIP-14	SSOP-24	VQFN-14	
700	78/169	220	220	IR7304S							
	1900/2300	270	680	IR7184S							
650	1500/2500	85	85			2ED020I06-FI					
600	78/169	220	220	IR2304S IR25601S			IR2304				
	200/350	200	220	IR2108S IR2308S IR25606S	IR21084S		IR2108 IR2308	IR21084			
		200	750	IR2302S IR2109(1)S	IR21094S		IR2109(1) IR2302	IR21094			
	210/360	150	680	IR2103S IR2104S IR25602S			IR2103 IR2104				
	220/480	500	500		IRS2890DS						
	250/500	150	750	IR2111S			IR2111				
	290/600	150	150	IRS2304S			IRS2304				
		150	680	IRS2103S IRS2104S			IRS2103 IRS2104				
		150	750	IRS2111S			IRS2111				
		200	220	IRS2108S IRS2308S	IRS21084S		IRS2108 IRS2308	IRS21084			
		200	750	IRS2109(1)S	IRS21094S		IRS2109(1)	IRS21094			
	360/700	300	310	2EDL05N06PF	2EDL05N06PJ						
		400	420	2EDL05I06PF	2EDL05I06PJ						
	1900/2300	220	180	IR(S)2183S	IR(S)21834S			IR(S)2183	IR(S)21834		
		270	680	IR(S)2184S	IR(S)21844S			IR(S)2184	IR(S)21844		IRS21844M
	2000/3000	440	440							IR2114SS	
2300/2800	300	310			2EDL23N06PJ						
	400	420			2EDL23I06PJ						

Three-phase									
Voltage class [V]	I_{o+}/I_{o-} typ [mA]	Typ. prop delay: off [ns]	Typ. prop delay: on [ns]	DSO-20	DSO-28	DIP-28	LCC-32	VQFN-28	VQFN-34
600	165/375	490	530		6ED003L06-F2 6EDL04I06NT 6EDL04I06PT				
		530	530		6EDL04N06PT				
	200/350	400	425		IR2136S IR21363S IR21365S IR21368S	IR2136	IR2136J IR21363J		
		530	500		IR21364S				
		530	530	IRS2334S	IRS2336(4)DS		IRS2336(4)DJ	IRS2334M	IRS2336(5)DM
	250/500	425	675		IR213(0,2)S	IR2130 IR2132	IR2130J IR2132J		
		600	1300		IR2131S	IR2131	IR2131J		
		700	750		IR2133S IR2135S	IR2133	IR2133J IR2135J		

Controller

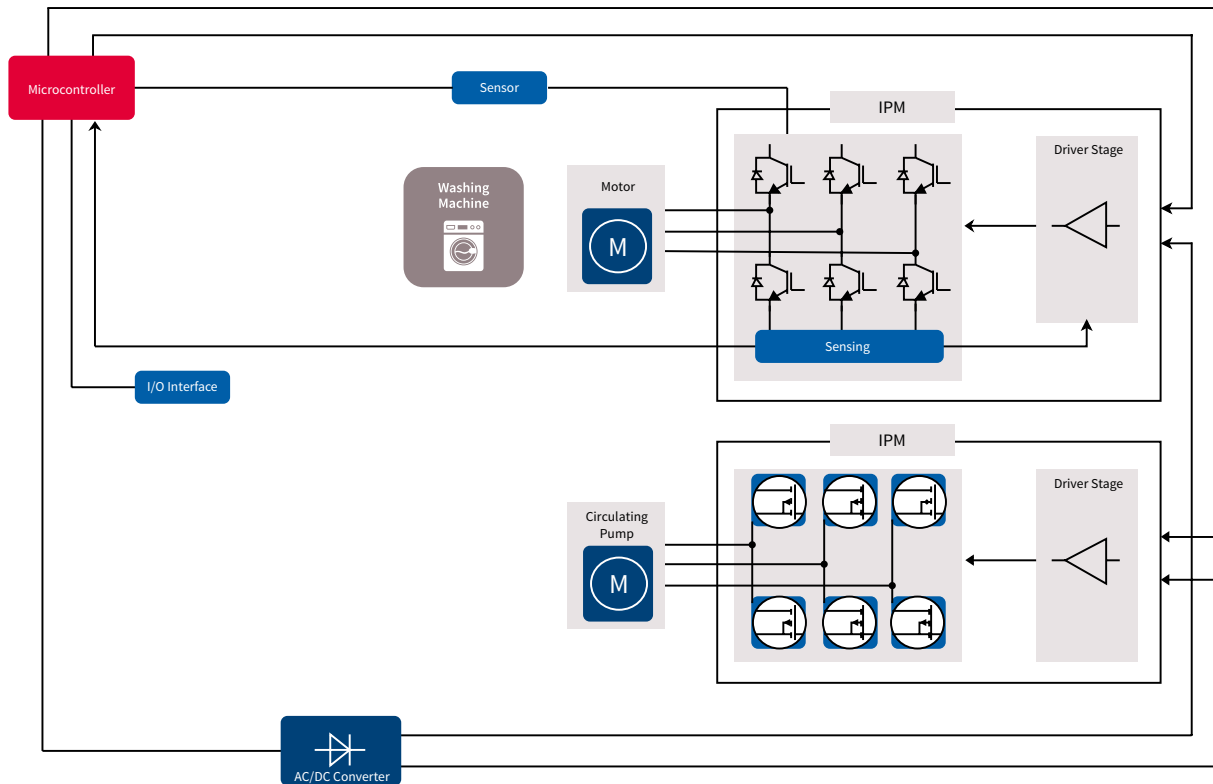
Features		XMC4100/XMC4200	IRMCF188
System performance	Core	ARM® Cortex®-M4	MCE™ + 8051
	CPU frequency	80 MHz	100 MHz
	Co-processor	Floating point unit	CORDIC
	Flash size	256 kB	64 kB
	RAM size	40 kB	12 kB
	Cache	4 kB	-
Timers	POSIF	1x	-
	CCU4 (4 ch)	2x	-
	CCU8 (4 ch)	1x	1x
	High-resolution PWM (150 ps) channels	4x	-
Signal processing	ADC 12-bit	2x	1x (2x S&H)
	Opamps for current sense	-	2x
	DAC	2x	1x
	Comparator	-	1x
Communication	IEEE 15BB Ethernet MAC	-	-
	USB	FS DEV	-
	SDIO/SD/MMC	-	-
	Serial channels (UART,SPI, I ² C, I ² S)	4x	2-channel
	Ethernet memory I/F	-	-
	CAN	2x	-
Application specific	LED dimming and color control	-	-
	In-built sensorless FOC		√

Washing machine



We at Infineon offer a comprehensive portfolio of power management, sensing, control and high voltage semiconductor technologies for modern white goods appliances, allowing you to perfectly fulfill consumer demands. These technologies are included in the iMOTION™ integrated design platform that brings together digital, analog and power building blocks and digital control algorithms to deliver optimized architectures for efficient and accurate motor control.

Our top quality digital motion controller also allows you to include all advantages of inverterization, such as energy efficiency, less noise and longer lifetimes in your design. Turn to Infineon for major appliance design support in the form of application notes, design tips, technical papers and reference designs. And know that with us you can easily differentiate your white goods designs by making them more reliable and energy efficient.



Portfolio for washing machine

IPMs for motor

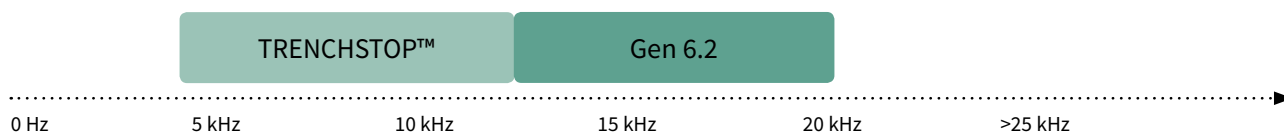
Package	Motor I_{rms} range [A_{rms}]	Topology	Line-up	Product PN
CIPOS™ Mini	up to 11	Three-phase inverter	600 V – 10 A 600 V – 15 A	¹⁾ IGCM10F60GA/IKCM10H60yA IKCM10L60yA IGCM15F60yA/IKCM15H60GA IKCM15L60yA

1) y = G (built in thermistor) y = H (no thermistor)

IPMs for drain pump

μIPM™s for drain pump	Package	Motor I_{rms} range [A _{rms}]	Topology	Line-up	Product number
	μIPM™ three-phase	0.1 – 0.3	Three-phase inverter	500 V MOSFET 2.2 Ω, 4.0 Ω, 6.0 Ω,	IRSM836-0x5MA
	μIPM™ DIP	0.2 – 0.5 1.5*	Three-phase inverter	500 V MOSFET 1.3 Ω, 1.7 Ω, 2.2 Ω, 4.0 Ω, 6.0 Ω	IRSM5y5-0x5zA
0.6 2.0*		Three-phase inverter	600 V IGBT 4 A	IRSM5y6-076zA	

Discrete IGBTs for motor



$V_{CE\ max.}$ [V]	I_c (at 100°C) [A]	Family						f_{sw} [kHz]
			D ² PAK	TO-220	TO-220 FullPAK	TO-247	TO-247 (long lead)	
600	8.0	Gen 6.2		IRGB4060D				8 – 30
					IRGIB4615D			8 – 30
	8.9	TRENCHSTOP™			IKA15N60T			2 – 20
	10.0	Gen 6.2	IRGS4615D	IRGB4615D				8 – 30
			IRGS4064D	IRGB4064D				8 – 30
			IRGS4620D	IRGB4620D		IRGP4620D	IRGP4620D-E	8 – 30
			IRGS4056D	IRGB4056D				8 – 30
	12.0	Gen 6.2			IRGIB4620D			8 – 30
18.0	TRENCHSTOP™	IKB10N60T	IKP10N60T				2 – 20	
		IRGS4630D	IRGB4630D	IRGIB4630D	IRGP4630D	IRGP4630D-E	8 – 30	
	Gen 6.2				IRGP6630D	IRGP6630D-E	8 – 30	
							8 – 30	
650	8.0	Gen 6.2	IRGS4715D	IRGB4715D				8 – 30

Drivers for discrete IGBTs

High-side and low-side									
Voltage class [V]	I_o^+/I_o^- typ. [mA]	Typ. prop delay: off [ns]	Typ. prop delay: on [ns]	DSO-8	DSO-14	DSO-16	DIP-8	DIP-14	VQFN-14
700	220/350	200	220	IR7106S					
600	200/350	200	220	IR2106S	IR21064S		IR2106, IR2301	IR21064	
				IR(S)2301S					
				IR25604S					
	210/360	150	160	IR2101S			IR2101		
				IR2102					
	250/500	105	125			IR2112S		IR2112	
	290/600	130	135			IRS2112S		IRS2112	
360/700	400	420	IRS2101S	IRS21064S		IRS2106	IRS21064		
1900/2300	220	180	2EDL05I06BF						
2500/2500	94	120				IR2113S	IR2113		
4000/4000	120	130				IRS2113S	IRS2113	IRS2113M	
4000/4000	170	170	IRS2186S	IRS21864S		IRS2186	IRS21864		

Half-bridge											
Voltage class [V]	I_{o+}/I_{o-} typ [mA]	Typ. prop delay: off [ns]	Typ. prop delay: on [ns]	DSO-8	DSO-14	DSO-18	DIP-8	DIP-14	SSOP-24	VQFN-14	
700	78/169	220	220	IR7304S							
	1900/2300	270	680	IR7184S							
650	1500/2500	85	85			2ED020I06-FI					
600	78/169	220	220	IR2304S IR25601S				IR2304			
	200/350	200	220	IR2108S IR2308S IR25606S	IR21084S			IR2108 IR2308	IR21084		
		200	750	IR2302S IR2109(1)S	IR21094S			IR2109(1) IR2302	IR21094		
	210/360	150	680	IR2103S IR2104S IR25602S				IR2103 IR2104			
	220/480	500	500		IRS2890DS						
	250/500	150	750	IR2111S				IR2111			
	290/600	150	150	IRS2304S					IRS2304		
		150	680	IRS2103S IRS2104S					IRS2103 IRS2104		
		150	750	IRS2111S					IRS2111		
		200	220	IRS2108S IRS2308S	IRS21084S				IRS2108 IRS2308	IRS21084	
		200	750	IRS2109(1)S	IRS21094S				IRS2109(1)	IRS21094	
	360/700	300	310	2EDL05N06PF	2EDL05N06PJ						
		400	420	2EDL05I06PF	2EDL05I06PJ						
	1900/2300	220	180	IR(S)2183S	IR(S)21834S				IR(S)2183	IR(S)21834	
		270	680	IR(S)2184S	IR(S)21844S				IR(S)2184	IR(S)21844	IRS21844M
2000/3000	440	440							IR2114SS		
2300/2800	300	310		2EDL23N06PJ							
	400	420		2EDL23I06PJ							

Three-phase										
Voltage class [V]	I_{o+}/I_{o-} typ [mA]	Typ. prop delay: off [ns]	Typ. prop delay: on [ns]	DSO-20	DSO-28	DIP-28	LCC-32	VQFN-28	VQFN-34	
600	165/375	490	530		6ED003L06-F2 6EDL04I06NT 6EDL04I06PT					
		530	530		6EDL04N06PT					
	200/350	400	425		IR2136S IR21363S IR21365S IR21368S	IR2136		IR2136J IR21363J		
		530	500		IR21364S					
		530	530	IRS2334S	IRS2336(4)DS			IRS2336(4)DJ	IRS2334M	IRS2336(5)DM
	250/500	425	675		IR213(0,2)S	IR2130 IR2132		IR2130J IR2132J		
		600	1300		IR2131S	IR2131		IR2131J		
		700	750		IR2133S IR2135S	IR2133		IR2133J IR2135J		



Controller

Features		XMC1302	XMC1402/ XMC1404	XMC4100	IRMCK171	IRMCF183
System performance	Core	ARM® Cortex®-M0	ARM® Cortex®-M0	ARM® Cortex®-M4	MCE™ + 8051	MCE™ + 8051
	CPU frequency	32 MHz	48 MHz	80 MHz	100 MHz	100 MHz
	Co-processor	MATH	MATH	Floating point unit	CORDIC	CORDIC
	Flash size	8 kB – 200 kB	32 kB – 200 kB	128 kB	64 kB	64 kB
	RAM size	16 kB	16 kB	20 kB	12 kB	12 kB
	Cache	-	-	4 kB	-	-
Timers	POSIF	1x	Up to 2x	1x	-	-
	CCU4 (4 ch)	1x	2x	2x	-	-
	CCU8 (4 ch)	1x	2x	1x	1x	1x
	High-resolution PWM (150 ps) channels	-	-	4x	-	-
Signal processing	ADC 12-bit	1x (2x S&H)	1x (2x S&H)	2x	1x (2x S&H)	1x (2x S&H)
	Integrated Opamps for current sensing			-	2x	2x
	DAC			2x	1x	1x
	Comparator	3x	4x	-	1x	1x
Communication	IEEE 15BB Ethernet MAC	-	-	-	-	-
	USB	-	-	FS DEV	-	-
	SDIO/SD/MMC	-	-	-	-	-
	Serial channels (UART, SPI, I ² C, I ² S)	2-channel	2-channel	4x	2-channel	2-channel
	Ethernet memory I/F			-	-	-
	CAN		Up to 2x	2x	-	-
Application specific	LED dimming and color control	√	√	-	-	-
	In-built sensorless FOC				√	√

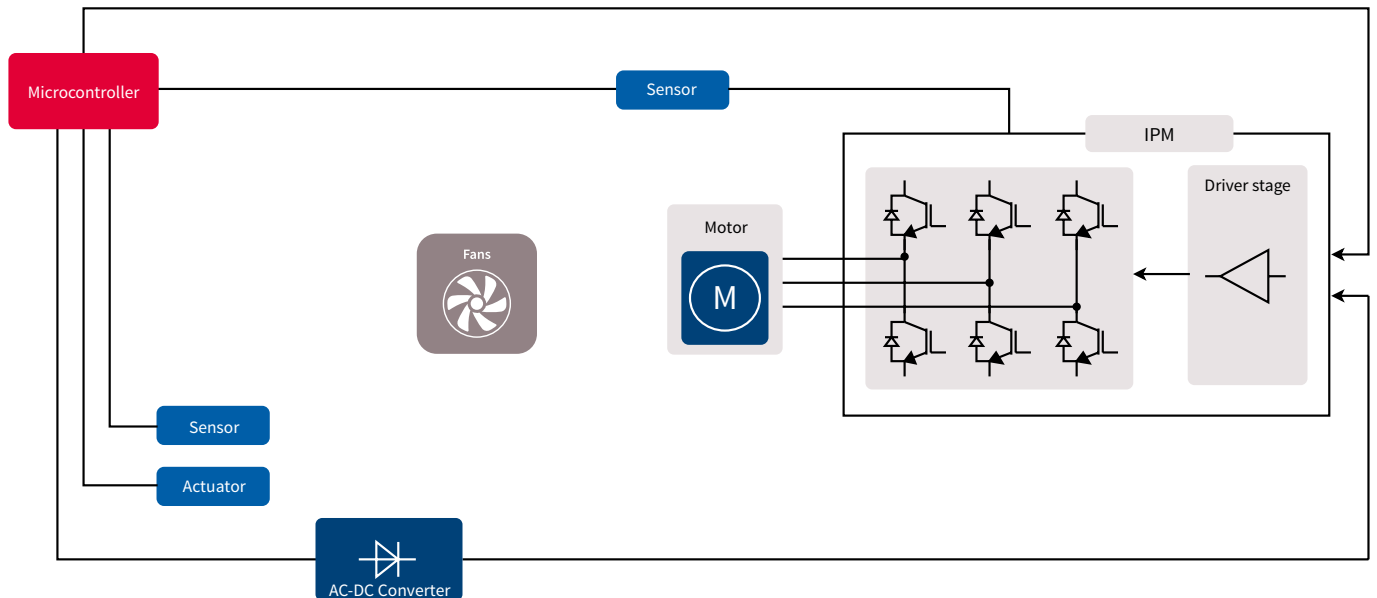
Variable speed fan/pump – power < 200 W



In today's competitive, dynamic environment, there is constant pressure to find new ways to increase energy efficiency. At the same time, software's increasingly important role in systems directly contributes to their complexity – and increases costs.

In the development of variable speed fan and pumps designers have to meet tight specifications, increasingly short design cycles and cost pressure.

Infineon helps designers to meet all these challenges with its broad portfolio of high quality semiconductor solutions and provides them with state-of-the-art power components that fulfill the highest demands in terms of efficiency, power density and reliability with excellent figures of merit, the price point that fits your budget – and cutting-edge software tools that save you time and money.



Portfolio for variable speed fan/pump

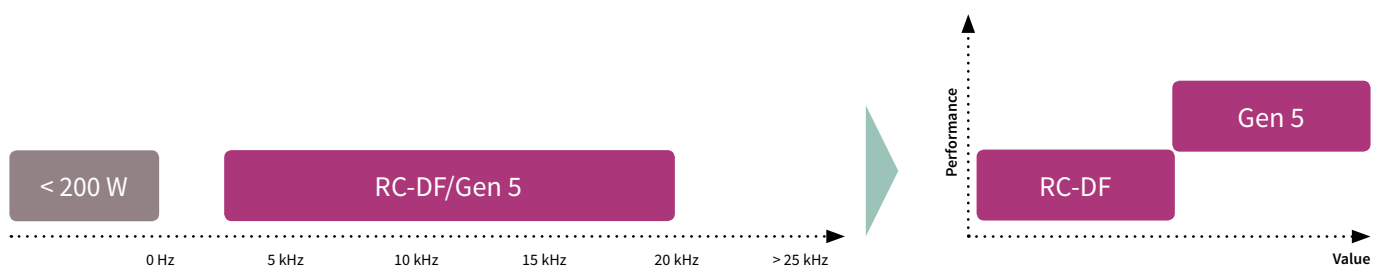
IPMs for fan motor

Package	Motor I_{rms} range [A_{rms}]	Topology	Line-up	Product PN
μ IPM™	0.1 – 1.2	Three-phase inverter	500 V MOSFET 2.2 Ω , 4.0 Ω , 6.0 Ω	IRSM836-015MA IRSM836-025MA IRSM836-035MA
μ IPM™ DIP	0.1 – 2.0	Three-phase inverter	500 V MOSFET 1.3 Ω , 1.7 Ω , 2.2 Ω , 4.0 Ω , 6.0 Ω	IRSM505-044DA/PA IRSM505-055DA/PA IRSM505-065DA/PA
CIPOS™ Mini	Up to 6	Three-phase inverter	600 V – 4 A 600 V – 6 A	IGCM4F60GA/IGCM4G60GA IGCM4B60GA/IGCM6F60GA/ IGCM6G60GA/IGCM6B60GA

www.infineon.com/homeappliance



Discrete IGBTs for fan motor



V _{CE max.} [V]	I _c (at 100°C) [A]	Family	Package					f _{sw} [kHz]
			TO-262	DPAK	D ² PAK	TO-220	TO-220 FullPAK	
600	2.0	Gen 5		IRGR2B60KD				8-30
	2.5	RC-DF		IKD03N60RF				4-30
	4.0	RC-DF		IKD04N60RF				4-30
		Gen 5	IRGSL4B60KD1		IRGS4B60KD1	IRGB4B60KD1		8-30
	6.0	RC-DF		IKD06N60RF				4-30
	7.0	Gen 5			IRGS6B60K			8-30
IRGSL6B60KD				IRGS6B60KD	IRGB6B60KD	IRGIB6B60KD	8-30	

Drivers for discrete IGBTs

High-side and low-side									
Voltage class [V]	I _{o+} /I _{o-} typ. [mA]	Typ. prop delay: off [ns]	Typ. prop delay: on [ns]	DSO-8	DSO-14	DSO-16	DIP-8	DIP-14	VQFN-14
700	220/350	200	220	IR7106S					
600	200/350	200	220	IR2106S	IR21064S		IR2106, IR2301	IR21064	
				IR(S)2301S					
				IR25604S					
	210/360	150	160	IR2101S			IR2101	IR2102	
				IR2102					
	250/500	105	125			IR2112S		IR2112	
	290/600	130	135			IRS2112S		IRS2112	
	360/700	150	160	IRS2101S			IRS2101		IRS21064
1900/2300	400	420	2EDL05I06BF			IRS2106	IRS21064		
2500/2500	220	180	IR(S)2181S	IR(S)21814S		IR(S)2181	IR(S)21814	IRS21814M	
4000/4000	94	120				IR2113S	IR25607S	IR2113	
	120	130				IRS2113S		IRS2113	IRS2113M
	170	170	IRS2186S	IRS21864S		IRS2186	IRS21864		

Half-bridge											
Voltage class [V]	I_{o+}/I_{o-} typ [mA]	Typ. prop delay: off [ns]	Typ. prop delay: on [ns]	DSO-8	DSO-14	DSO-18	DIP-8	DIP-14	SSOP-24	VQFN-14	
700	78/169	220	220	IR7304S							
	1900/2300	270	680	IR7184S							
650	1500/2500	85	85			2ED020I06-FI					
600	78/169	220	220	IR2304S IR25601S			IR2304				
	200/350	200	220	IR2108S IR2308S IR25606S	IR21084S		IR2108 IR2308	IR21084			
		200	750	IR2302S IR2109(1)S	IR21094S		IR2109(1) IR2302	IR21094			
	210/360	150	680	IR2103S IR2104S IR25602S			IR2103 IR2104				
	220/480	500	500		IRS2890DS						
	250/500	150	750	IR2111S			IR2111				
	290/600	150	150	IRS2304S			IRS2304				
		150	680	IRS2103S IRS2104S			IRS2103 IRS2104				
		150	750	IRS2111S			IRS2111				
		200	220	IRS2108S IRS2308S	IRS21084S		IRS2108 IRS2308	IRS21084			
		200	750	IRS2109(1)S	IRS21094S		IRS2109(1)	IRS21094			
	360/700	300	310	2EDL05N06PF	2EDL05N06PJ						
		400	420	2EDL05I06PF	2EDL05I06PJ						
	1900/2300	220	180	IR(S)2183S	IR(S)21834S		IR(S)2183	IR(S)21834			
		270	680	IR(S)2184S	IR(S)21844S		IR(S)2184	IR(S)21844			IRS21844M
	2000/3000	440	440							IR2114SS	
2300/2800	300	310			2EDL23N06PJ						
	400	420			2EDL23I06PJ						

Three-phase									
Voltage class [V]	I_{o+}/I_{o-} typ [mA]	Typ. prop delay: off [ns]	Typ. prop delay: on [ns]	DSO-20	DSO-28	DIP-28	LCC-32	VQFN-28	VQFN-34
600	165/375	490	530		6ED003L06-F2 6EDL04I06NT 6EDL04I06PT				
		530	530		6EDL04N06PT				
	200/350	400	425		IR2136S IR21363S IR21365S IR21368S	IR2136	IR2136J IR21363J		
		530	500		IR21364S				
		530	530	IRS2334S	IRS2336(4)DS		IRS2336(4)DJ	IRS2334M	IRS2336(5)DM
	250/500	425	675		IR213(0,2)S	IR2130 IR2132	IR2130J IR2132J		
		600	1300		IR2131S	IR2131	IR2131J		
		700	750		IR2133S IR2135S	IR2133	IR2133J IR2135J		

Controller

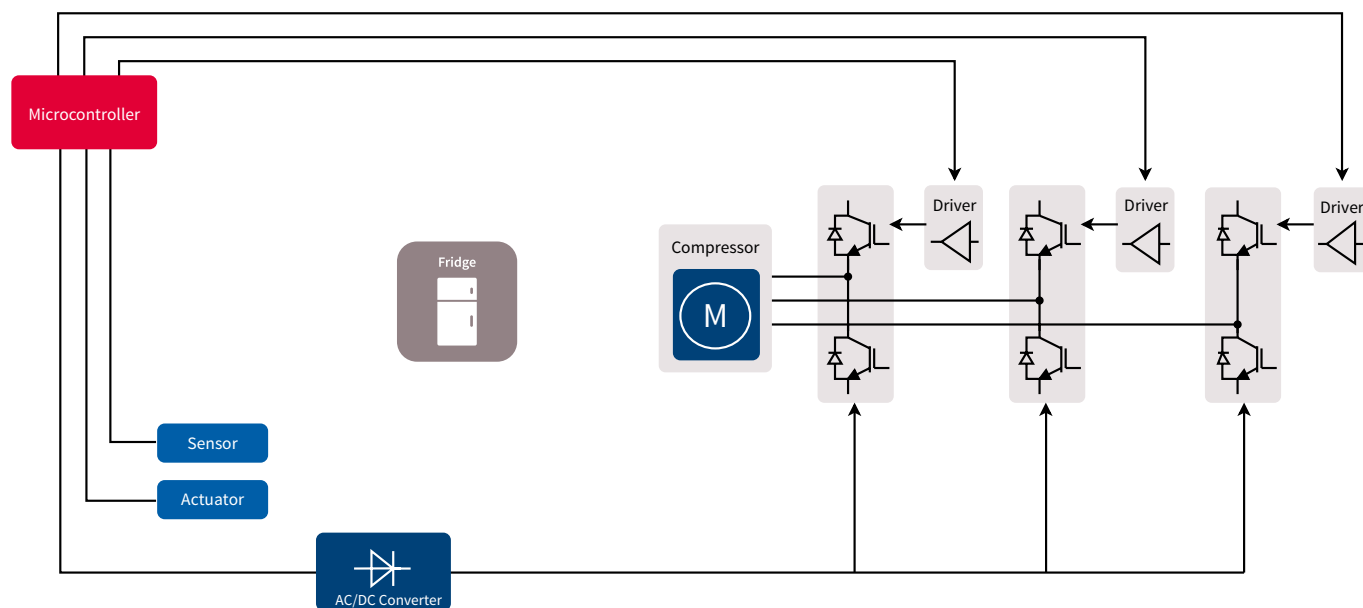
Features		XMC1302	IRMCF171	IRMCK099
System performance	Core	ARM® Cortex®-M0	MCE™ + 8051	MCE™
	CPU frequency	32 MHz	100 MHz	100 MHz
	Co-processor	MATH	CORDIC	CORDIC
	Flash size	8 kB – 200 kB	64 kB	16 kB
	RAM size	16 kB	12 kB	12 kB
	Cache	-	-	4 kB
Timers	POSIF	1x	-	-
	CCU4 (4 ch)	1x	-	-
	CCU8 (4 ch)	1x	1x	1x
	High-resolution PWM (150 ps) channels	-	-	-
Signal processing	ADC 12-bit	1x (2x S&H)	1x (2x S&H)	1x (2x S&H)
	Integrated Opamps for current sensing		2x	2x
	DAC		1x	1x
	Comparator	3x	1x	1x
Communication	IEEE 15BB Ethernet MAC	-	-	-
	USB	-	-	-
	SDIO/SD/MMC	-	-	-
	Serial channels (UART,SPI, I ² C, I ² S)	2-channel	2-channel	2-channel
	Ethernet memory I/F	-	-	-
	CAN	-	-	-
Application specific	LED dimming and color control	√	-	-
	In-built sensorless FOC	-	√	√

Variable speed refrigerator



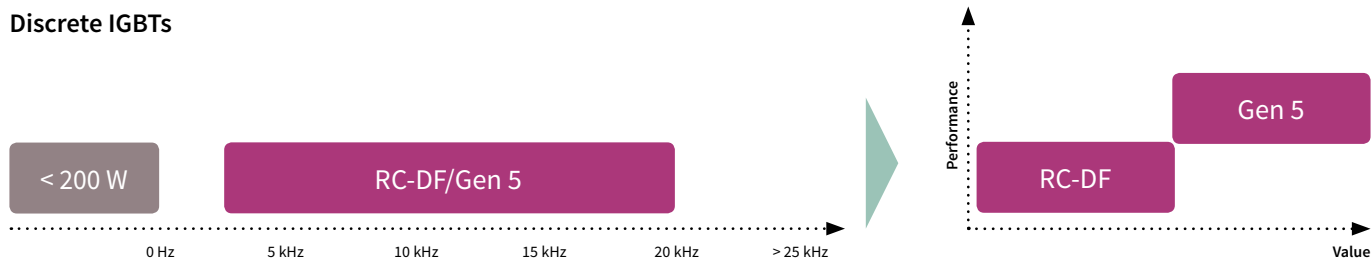
In the era of high competition it is essential to propose to consumers superlative quality and innovative solutions. Moreover, customer requirements for more energy efficiency, and reduction or even suppression of audible noise should be addressed. Infineon's products and expertise will allow you to embed all these customers' expectations into the design of your variable speed fridge. You will be able to present to the consumer advanced technical solution reaching at the same time your target cost.

Variable speed refrigerator – discrete solution



Portfolio for variable speed refrigerator – discrete solution

Discrete IGBTs



Discrete IGBTs for compressor

$V_{CE\ max.}$ [V]	I_c (at 100°C) [A]	Family	Package					f_{sw} [kHz]
			TO-262	DPAK	D ² PAK	TO-220	TO-220 FullPAK	
600	2.0	Gen 5		IRGR2B60KD				8 – 30
	2.5	RC-DF		IKD03N60RF				4 – 30
	4.0	RC-DF		IKD04N60RF				4 – 30
		Gen 5	IRGSL4B60KD1		IRGS4B60KD1	IRGB4B60KD1		8 – 30
	6.0	RC-DF		IKD06N60RF				4 – 30
	7.0	Gen 5			IRGS6B60K			8 – 30
IRGSL6B60KD				IRGS6B60KD	IRGB6B60KD	IRIB6B60KD	8 – 30	

www.infineon.com/homeappliance

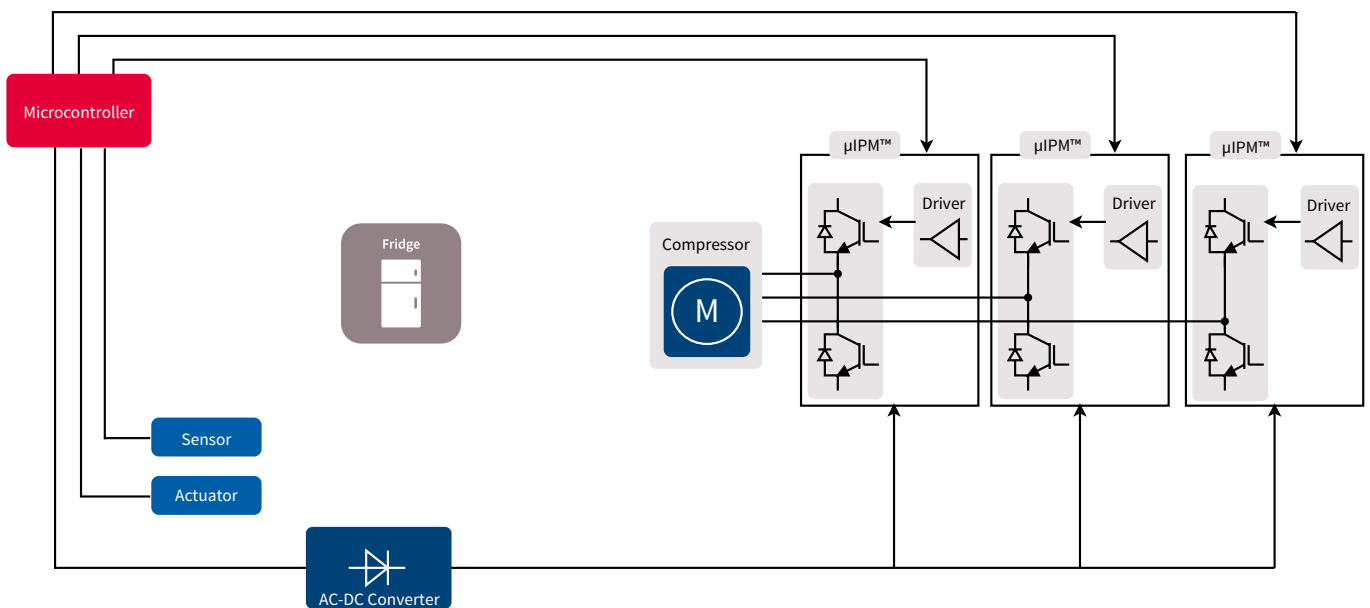
Drivers for discrete IGBTs

High-side and low-side										
Voltage class [V]	I_{o+}/I_{o-} typ. [mA]	Typ. prop delay: off [ns]	Typ. prop delay: on [ns]	DSO-8	DSO-14	DSO-16	DIP-8	DIP-14	VQFN-14	
700	220/350	200	220	IR7106S						
600	200/350	200	220	IR2106S IR(S)2301S IR25604S	IR21064S		IR2106 IR2301	IR21064		
	210/360	150	160	IR2101S IR2102			IR2101 IR2102			
	250/500	105	125			IR2112S		IR2112		
	290/600		130	135			IRS2112S		IRS2112	
			150	160	IRS2101S			IRS2101		
			200	220	IRS2106S	IRS21064S		IRS2106	IRS21064	
	360/700	400	420	2EDL05I06BF						
	1900/2300	220	180	IR(S)2181S	IR(S)21814S		IR(S)2181	IR(S)21814	IRS21814M	
	2500/2500		94	120			IR2113S IR25607S		IR2113	
			120	130			IRS2113S		IRS2113	IRS2113M
4000/4000	170	170	IRS2186S	IRS21864S		IRS2186	IRS21864			

Half-bridge											
Voltage class [V]	I_{o+}/I_{o-} typ [mA]	Typ. prop delay: off [ns]	Typ. prop delay: on [ns]	DSO-8	DSO-14	DSO-18	DIP-8	DIP-14	SSOP-24	VQFN-14	
700	78/169	220	220	IR7304S							
	1900/2300	270	680	IR7184S							
650	1500/2500	85	85			2ED020I06-FI					
600	78/169	220	220	IR2304S IR25601S				IR2304			
	200/350		200	220	IR2108S IR2308S IR25606S	IR21084S		IR2108 IR2308	IR21084		
			200	750	IR2302S IR2109(1)S	IR21094S		IR2109(1) IR2302	IR21094		
	210/360	150	680	IR2103S IR2104S IR25602S			IR2103 IR2104				
	220/480	500	500		IRS2890DS						
	250/500	150	750	IR2111S			IR2111				
	290/600		150	150	IRS2304S			IRS2304			
			150	680	IRS2103S IRS2104S			IRS2103 IRS2104			
			150	750	IRS2111S			IRS2111			
			200	220	IRS2108S IRS2308S	IRS21084S		IRS2108 IRS2308	IRS21084		
			200	750	IRS2109(1)S	IRS21094S		IRS2109(1)	IRS21094		
	360/700		300	310	2EDL05N06PF	2EDL05N06PJ					
			400	420	2EDL05I06PF	2EDL05I06PJ					
	1900/2300		220	180	IR(S)2183S	IR(S)21834S		IR(S)2183	IR(S)21834		
			270	680	IR(S)2184S	IR(S)21844S		IR(S)2184	IR(S)21844		IRS21844M
	2000/3000	440	440						IR2114SS		
2300/2800		300	310		2EDL23N06PJ						
		400	420		2EDL23I06PJ						

Three-phase									
Voltage class [V]	I _{o+} /I _{o-} typ [mA]	Typ. prop delay: off [ns]	Typ. prop delay: on [ns]	DSO-20	DSO-28	DIP-28	LCC-32	VQFN-28	VQFN-34
600	165/375	490	530		6ED003L06-F2 6EDL04I06NT 6EDL04I06PT				
		530	530		6EDL04N06PT				
	200/350	400	425		IR2136S IR21363S IR21365S IR21368S	IR2136	IR2136J IR21363J		
		530	500		IR21364S				
		530	530	IRS2334S	IRS2336(4)DS		IRS2336(4)DJ	IRS2334M	IRS2336(5)DM
	250/500	425	675		IR213(0,2)S	IR2130 IR2132	IR2130J IR2132J		
		600	1300		IR2131S	IR2131	IR2131J		
		700	750		IR2133S IR2135S	IR2133	IR2133J IR2135J		

Variable speed refrigerator – half-bridge IPM solution

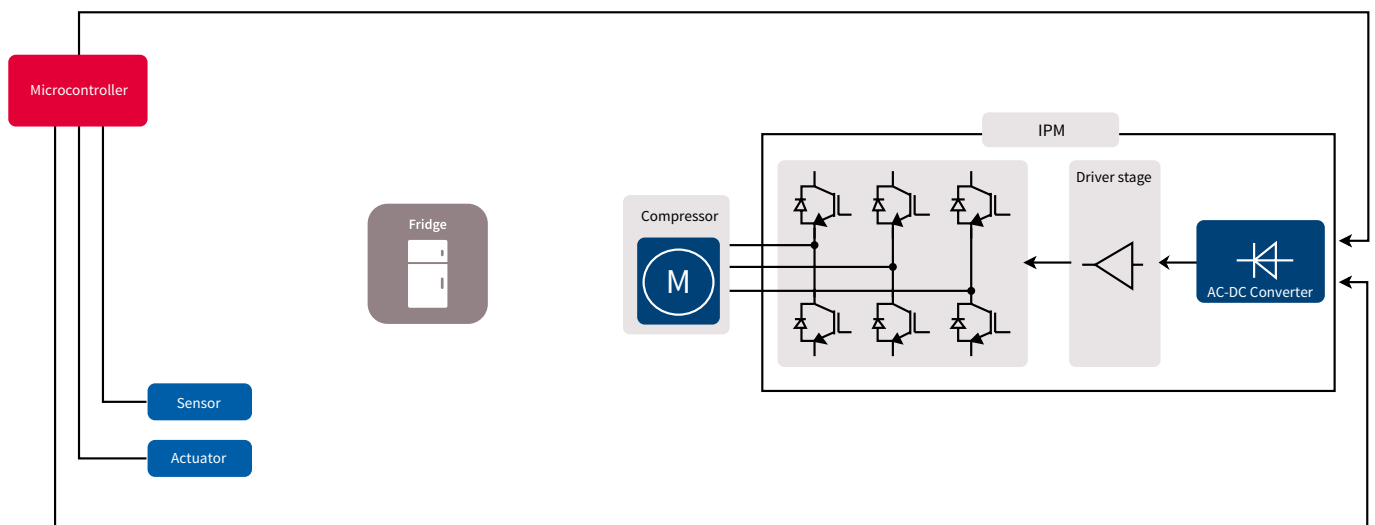


Portfolio for variable speed refrigerator – half-bridge IPM solution

Package	Motor I _{rms} range [A _{rms}]	Topology	Line-up	Product PN
μIPM™	0.4 – 2.0	Half-bridge	500 V MOSFET 0.8 Ω, 1.7 Ω	IRSM807-045MH IRSM807-105MH



Variable speed refrigerator – full inverter IPM solution



Portfolio for variable speed refrigerator – full inverter IPM solution

Package	Motor I_{rms} range [A_{rms}]	Topology	Line-up	Product PN
CIPOS™ Mini	up to 6	Three-phase inverter	600 V – 4 A 600 V – 6 A	IGCM4F60GA/IGCM4B60GA IGCM6F60GA/IGCM6B60GA

Controller

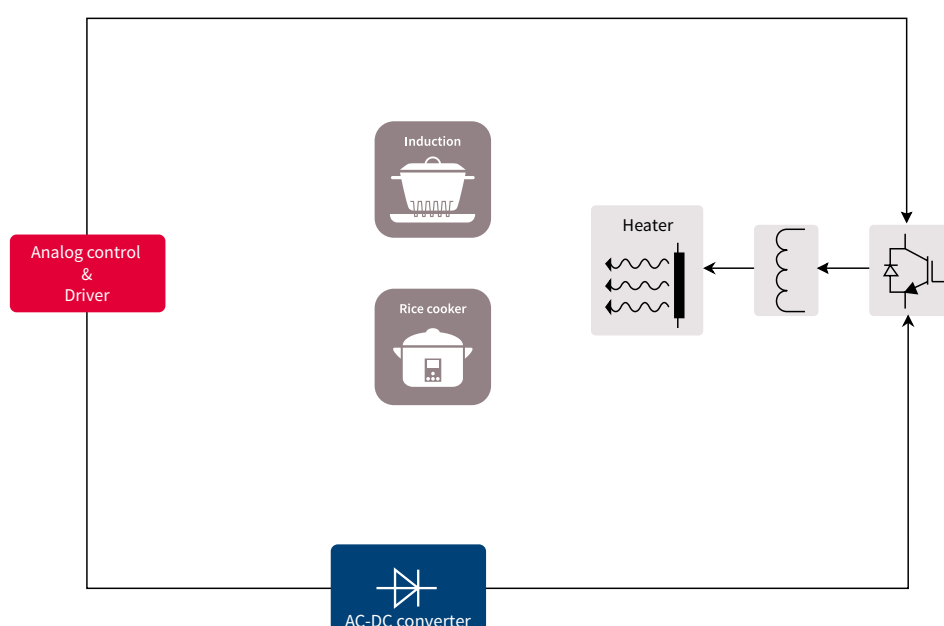
Features		XMC1302	XMC1402/ XMC1404	XMC4100	IRMCK171	IRMCF183
System performance	Core	ARM® Cortex®-M0	ARM® Cortex®-M0	ARM® Cortex®-M4	MCE™ + 8051	MCE™ + 8051
	CPU frequency	32 MHz	48 MHz	80 MHz	100 MHz	100 MHz
	Co-processor	MATH	MATH	Floating point unit	CORDIC	CORDIC
	Flash size	8 kB – 200 kB	32 kB – 200 kB	128 kB	64 kB	64 kB
	RAM size	16 kB	16 kB	20 kB	12 kB	12 kB
	Cache	-	-	4 kB	-	-
Timers	POSIF	1x	Up to 2x	1x	-	-
	CCU4 (4 ch)	1x	2x	2x	-	-
	CCU8 (4 ch)	1x	2x	1x	1x	1x
	High-resolution PWM (150 ps) channels	-	-	4x	-	-
Signal processing	ADC 12-bit	1x (2x S&H)	1x (2x S&H)	2x	1x (2x S&H)	1x (2x S&H)
	Integrated Opamps for current sensing			-	2x	2x
	DAC			2x	1x	1x
	Comparator	3x	4x	-	1x	1x
Communication	IEEE 15BB Ethernet MAC	-	-	-	-	-
	USB	-	-	FS DEV	-	-
	SDIO/SD/MMC	-	-	-	-	-
	Serial channels (UART,SPI, I ² C, I ² S)	2-channel	2-channel	4x	2-channel	2-channel
	Ethernet memory I/F			-	-	-
	CAN		Up to 2x	2x	-	-
Application specific	LED dimming and color control	√	√	-	-	-
	In-built sensorless FOC				√	√

Induction cooking



Quicker, more consistent heating and better energy efficiency have made induction cooking a growing consumer trend. But designing an induction cooking system is not without its challenges. Designers often face the problem of high field failure rates caused by grid disturbances. Replacement and service costs for cookers can be very high, but competitive cost pressure also limits the use of protective features. Since these applications operate at high power, there can be immense stress on the components. The net effect: powerful semiconductors are subject to high electrical and thermal stress. Infineon offers a robust portfolio of proven devices.

1200 V + single-switch topology

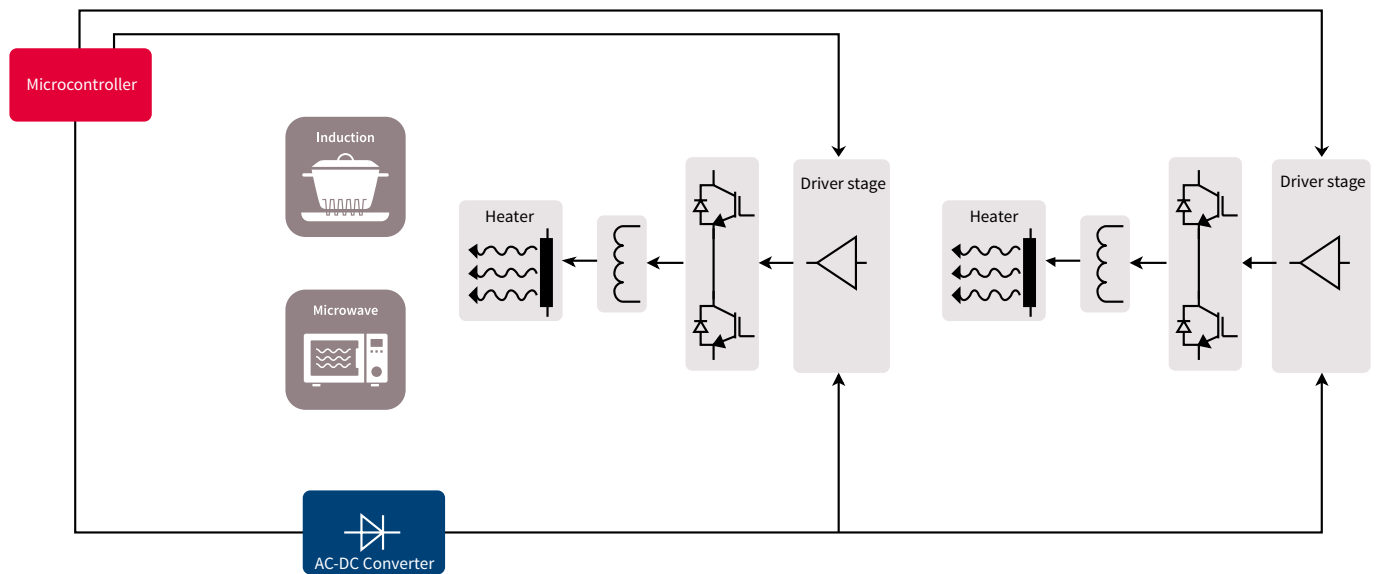


Portfolio for induction cooking – 1200 V + single-switch topology

Discrete IGBTs

$V_{CE\ max.}$ [V]	I_c (at 100°C) [A]	Family	Package	f_{sw} [kHz]
			TO-247	
1100	30	RC-H3	IHW30N110R3	8 – 60
1200	15	RC-E	IHW15N120E1	18 – 40
		RC-H3	IHW15N120R3	8 – 60
1200	20	RC-H5	IHW20N120R5	8 – 60
1200	25	RC-E	IHW25N120E1	18 – 40
		RC-H2	IHW25N120R2	8 – 60
1200	30	RC-H3	IHW30N120R3	8 – 60
1200	40	RC-H3	IHW40N120R3	8 – 60
1350	20	RC-H5	IHW20N135R5	8 – 60
1350	30	RC-H3	IHW30N135R3	8 – 60
1350	40	RC-H3	IHW40N135R3	8 – 60
1600	30	RC-H2	IHW30N160R2	8 – 60

650 V half-bridge topology



Portfolio for induction cooking – 650 V half-bridge topology

Discrete IGBTs

$V_{CE \text{ max.}}$ [V]	I_c (at 100°C) [A]	Family	Package	f_{sw} [kHz]
			TO-247	
650	20	RC-H5	IHW20N65R5	20 – 150
	30	RC-H5	IHW30N65R5	20 – 150
	40	RC-H5	IHW40N65R5	20 – 150
	50	RC-H5	IHW50N65R5	20 – 150

Drivers

Half-bridge											
Voltage class [V]	I _{o+} /I _{o-} typ [mA]	Typ. prop delay: off [ns]	Typ. prop delay: on [ns]	DSO-8	DSO-14	DSO-18	DIP-8	DIP-14	SSOP-24	VQFN-14	
700	78/169	220	220	IR7304S							
	1900/2300	270	680	IR7184S							
650	1500/2500	85	85			2ED020I06-FI					
600	78/169	220	220	IR2304S IR25601S			IR2304				
	200/350	200	220	IR2108S IR2308S IR25606S	IR21084S		IR2108 IR2308	IR21084			
		200	750	IR2302S IR2109(1)S	IR21094S		IR2109(1) IR2302	IR21094			
	210/360	150	680	IR2103S IR2104S IR25602S			IR2103 IR2104				
	220/480	500	500		IRS2890DS						
	250/500	150	750	IR2111S			IR2111				
	290/600	150	150	IRS2304S				IRS2304			
		150	680	IRS2103S IRS2104S				IRS2103 IRS2104			
		150	750	IRS2111S				IRS2111			
		200	220	IRS2108S IRS2308S	IRS21084S			IRS2108 IRS2308	IRS21084		
		200	750	IRS2109(1)S	IRS21094S			IRS2109(1)	IRS21094		
	360/700	300	310	2EDL05N06PF	2EDL05N06PJ						
		400	420	2EDL05I06PF	2EDL05I06PJ						
	1900/2300	220	180	IR(S)2183S	IR(S)21834S			IR(S)2183	IR(S)21834		
		270	680	IR(S)2184S	IR(S)21844S			IR(S)2184	IR(S)21844		IRS21844M
	2000/3000	440	440							IR2114SS	
	2300/2800	300	310		2EDL23N06PJ						
		400	420		2EDL23I06PJ						

INDUCTION

Controller

Features		XMC1302
System performance	Core	ARM® Cortex®-M0
	CPU frequency	32 MHz
	Co-processor	MATH
	Flash size	8 kB – 200 kB
	RAM size	16 kB
	Cache	-
Timers	POSIF	1x
	CCU4 (4 ch)	1x
	CCU8 (4 ch)	1x
	High-resolution PWM (150 ps) channels	-
Signal processing	ADC 12-bit	1x (2x S&H)
	$\Delta\Sigma$ Demodulator	
	DAC	
	Comparator	3x
Communication	IEEE 15BB Ethernet MAC	-
	USB	-
	SDIO/SD/MMC	-
	Serial channels (UART,SPI, I ² C, I ² S)	2-channel
	Ethernet memory I/F	
	CAN	
Application specific	LED dimming and color control	√
	In-built sensorless FOC	



Discrete IGBTs and diodes for drives and PFCs applications

TRENCHSTOP™

Infineon TRENCHSTOP™ IGBT technology due to combination of trench top-cell and filed stop concept leads to significant improvement of static as well as dynamic performance of the device. Combination of IGBT with soft recovery emitter-controlled diode further minimizes the turn-on losses. The highest efficiency is reached due to the best compromise between switching and conduction losses.

HighSpeed 3

HighSpeed 3 Discrete IGBT shows the lowest losses and highest reliability for switching more than 20 kHz. Infineon's high speed devices are used to reduce the size of the active components (25 kHz → 70 kHz). Infineon's HighSpeed 3 Discrete IGBT family provides the best compromise between switching and conduction losses. The key feature of this family is a MOSFET-like turn-off switching behavior, leading to low turn-off losses (25 percent less than the closest competitor). Furthermore, up to 15 percent efficiency improvement can be achieved by implementing this technology in your design.

TRENCHSTOP™ 5

Infineon's 650 V TRENCHSTOP™ 5 IGBT technology redefines “best-in-class” IGBT by providing unmatched performance in terms of efficiency for hard switching applications such as UPS, PV, energy storage and welding. 650 V TRENCHSTOP™ 5 H5 is the high speed variant. It is designed for ultimate efficiency for applications switching greater than 30 kHz.

TRENCHSTOP™ IGBTs

- › Lowest $V_{CE(sat)}$ drop for lower conduction losses
- › Low switching losses
- › Easy parallel switching capability due to positive temperature coefficient in $V_{CE(sat)}$
- › High ruggedness, temperature-stable behavior
- › Low EMI emissions
- › Low gate charge
- › Very tight parameter distribution

HighSpeed 3

- › Best-in-class switching performance for switching frequencies > 20 kHz
- › Very low $V_{CE(sat)}$ for low conduction losses
- › Positive $V_{CE(sat)}$ temperature coefficient meaning thermal runaway is not an issue and paralleling is easy
- › 5 μ s short circuit rating

TRENCHSTOP™ 5

- › 650 V breakdown voltage
- › Compared to Infineon's best-in-class HighSpeed 3 family:
 - Factor 2.5 lower Q_G
 - Factor 2 reduction in switching losses
 - 200 mV reduction in $V_{CE(sat)}$
- › Low C_{oss}/E_{oss}

Reverse Conducting Drives Fast

- > Optimized E_{on} , E_{off} and Q_{rr} for up to 20 percent lower switching losses
- > Operating range up to 30 kHz
- > Max. Junction temperature 175°C
- > Short circuit capability of 5 μ s
- > Very tight parameter distribution
- > Best-in-class current versus package size performance
- > Smooth switching performance leading to low EMI levels
- > Complete product portfolio and PSpice models on the internet

Reverse conducting IGBTs

- > Switching losses reduced by 30%
- > Very low conduction losses
- > $T_{j(max)} = 175^{\circ}\text{C}$
- > Soft current turn-off waveforms for low EMI
- > Higher blocking voltage $V_{BR(min)} = 1350\text{ V}$

Reverse Conducting Drives Fast

Infineon's RC-DF IGBT was developed specifically for low power motor drive consumer market: the IGBT and diode losses are optimized to reduce the inverter losses at switching frequencies of 18 kHz ~ 30 kHz. RC-Drives Fast enables high efficiency designs for inverters above 16 kHz to reduce the audible noise to absolutely silent level.

Reverse conducting IGBTs are optimized for the demanding requirements of Induction cooking applications

The new **650 V RC-H5** devices have been optimized for the lowest $V_{CE(sat)}$ for best efficiency and thermal performance, as well as lower E_{off} for the improved performance in designs with higher switching frequencies.

Infineon's third generation Reverse Conducting IGBT responds to the growing demand for devices with higher breakthrough voltage and current withstand capabilities. The new products are optimized for lower switching and conduction losses and provide best-in-class efficiency in 1200 V and 1350 V voltage classes.

Gen 6.2

Infineon's Gen 6.2 is a 600 V Trench Field-Stop IGBT technology that is optimized for motor drive, UPS, welding and other applications requiring robust device performance, with high efficiency and low-loss switching in a range of frequencies between 8 kHz and 30 kHz. The Gen 6.2 IGBT technology was optimized to give best-in-class conduction efficiency with very low switching losses. It has up to 5 microseconds of short circuit capability to protect the device in instances of reverse conduction. This generation provides a best-in-class trade-off between conduction and switching for highly efficient operation and extremely low power dissipation. Since the optimal switching speed is in the 15 kHz – 30 kHz range audible noise is significantly reduced and the result is motors that run close to silent, which is an absolute necessity for today's appliances. Gen 6.2 also offers a highly versatile design option for many major home appliance applications and offers designers a cost-effective and high performance switch for their board designs.

www.infineon.com/igbt

www.infineon.com/trenchstop5

www.irf.com/product/IGBTs-Co-Pack-IGBTs

Gen 5

Infineon's Gen 5 is ideal for robust industrial applications where motors are run at full load in harsh operating environments. With up to 10 microseconds of short-circuit protection and excellent thermal performance, the Gen 5 technology has highly stable switching performance, low switching losses and is an excellent choice for home appliance motor drive systems. The K series has been primarily designed for motor drive applications and switches in the range of 8 kHz – 30 kHz with very low losses in the optimum range of 15 kHz – 20 kHz, which is perfect for small drives. These switching characteristics also reduce the audible noise down to almost imperceptible levels. Additionally, the Gen 5 IGBT technology is highly efficient and offers a good trade-off between switching and conduction losses, but with the added benefit of robust and stable operation for dynamic motor drive applications.

Rapid 1 and Rapid 2 diodes

Infineon's new Rapid 1 and Rapid 2 power Silicon diodes complement the existing high power 600 V/650 V diodes, filling the gap between the SiC diodes and emitter controlled diodes.

Infineon's Rapid 1 Diode family, with 1.35 V temperature-stable forward voltage (V_F), ensures the lowest conduction losses and by means of soft recovery keeps EMI emissions to a minimum.

The Rapid 2 diode family is designed for applications switching between 40 kHz and 100 kHz by offering low reverse recovery charge (Q_{rr}) and time (t_{rr}) to minimize the reverse conduction times attributed to the power switch turn-on losses and thus providing maximum efficiency.

Rapid 1 diode

- > Temperature-stable forward voltage (V_F) of 1.35 V
- > 650 V breakdown voltage
- > Low reverse recovery current (I_{rrm})
- > Soft reverse recovery for outstanding EMI behavior
- > $t_{rr} < 50$ ns

Rapid 2 diode

- > Temperature-stable forward voltage (V_F) of 1.6 V
- > $t_{rr} < 20$ ns
- > Soft reverse recovery for outstanding EMI behavior
- > Excellent cost-optimized alternative to Silicon Carbide (SiC) diodes

Infineon gate driver ICs

The expert's choice

Infineon's gate driver ICs utilize level-shifting silicon-on-insulator technology (LS-SOI), and level-shifting junction-isolation technology (LS-JI) to meet the high performance requirements in major home appliance applications. We offer a comprehensive portfolio with a variety of configurations, voltage classes, isolation levels, protection features, and package options. Infineon's powerful gate driver IC and switch combinations provide the necessary power, efficiency and protection for many home appliance applications such as air conditioning, washing machines, fans, refrigerators, and induction cookers.

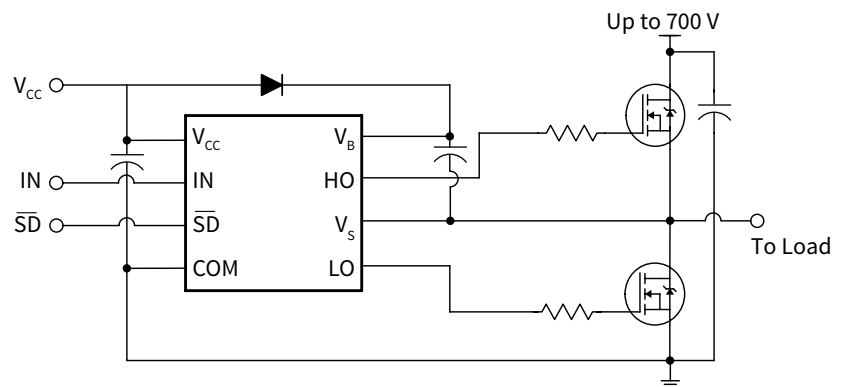


IR7xxxS features

- > 700 V half-bridge and high-and low-side drivers
- > DSO-8 package
- > Utilizes level-shifting junction isolation IC technology and latch immune CMOS technology to realize a rugged monolithic structure
- > Tolerant to negative transient voltages, dV/dt immune
- > Low quiescent currents (IR7304S, IR7106S)
- > Protection functions
 - Interlock (IR7304S, IR7184S)
 - Under voltage lockout
 - Fixed dead time
 - Shutdown function (IR7184S)

700 V gate driver ICs

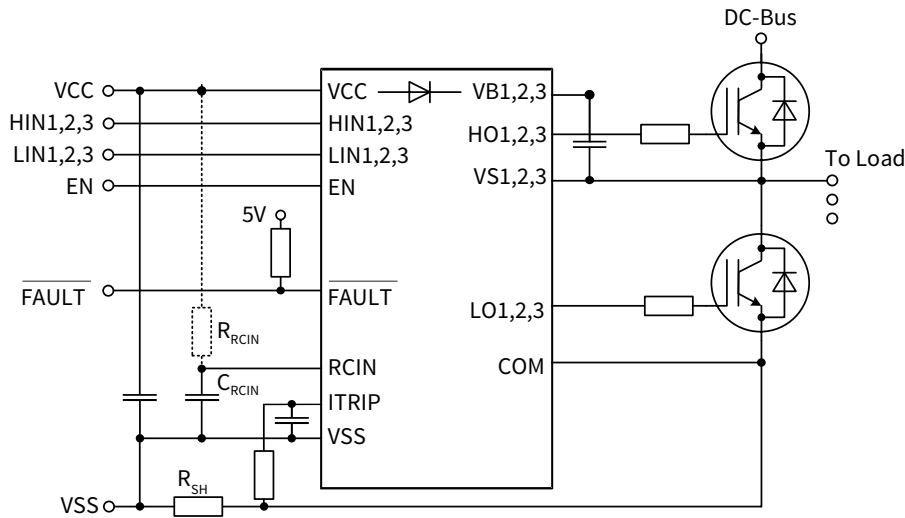
IR7xxxS 700 V HVIC family





600 V gate driver ICs

6EDL EiceDRIVER™ Compact family



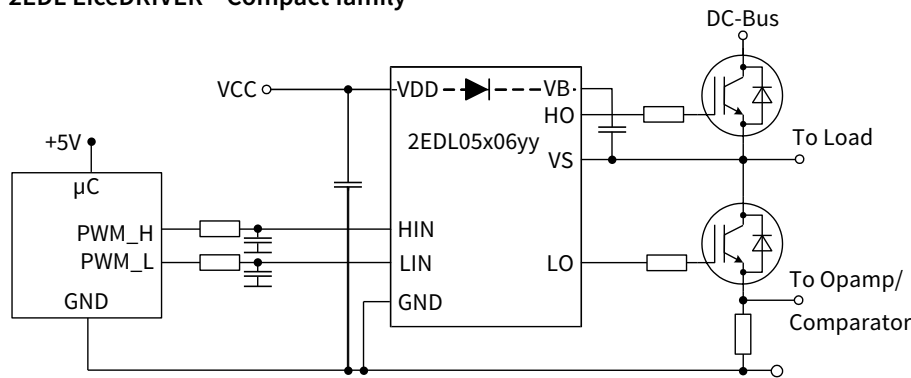
6EDL EiceDRIVER™ Compact features

- > 600 V three-phase drivers
- > DSO-28 300-mil package
- > Utilizes silicon-on-insulator (SOI) technology to provide superior ruggedness against negative voltage spikes and noise
- > Ultra-fast, low ohmic (40 Ω) integrated bootstrap diode
- > Fully functional at negative transient voltages down to -50 V (500 ns)
- > Programmable restart after over current protection
- > Shutdown of all outputs in case of UVLO or OCP
- > Protection functions
 - Over current protection (OCP)
 - Over current shutdown (ITRIP)
 - Interlock
 - Under voltage lockout (UVLO)
 - Fixed dead time
 - Enable function

www.infineon.com/eicedriver-compact



2EDL EiceDRIVER™ Compact family



2EDL EiceDRIVER™ Compact features

- > 600 V half-bridge drivers
- > DSO-8 and DSO-14 packages
- > Utilizes silicon-on-insulator (SOI) technology to provide superior ruggedness against negative voltage spikes and noise
- > Ultra-fast integrated bootstrap diode (40 Ω)
- > Fully functional at negative transient voltages down to -50 V (500 ns)
- > Fault indication (2EDL23x only)
- > Protection functions
 - Over current protection (2EDL23x only)
 - Interlocked variants
 - Active shut down
 - Under voltage lockout (UVLO)
 - Fixed dead time optional
 - Enable function (2EDL23x only)

www.infineon.com/eicedriver-compact



Upcoming

IRS2890DS features

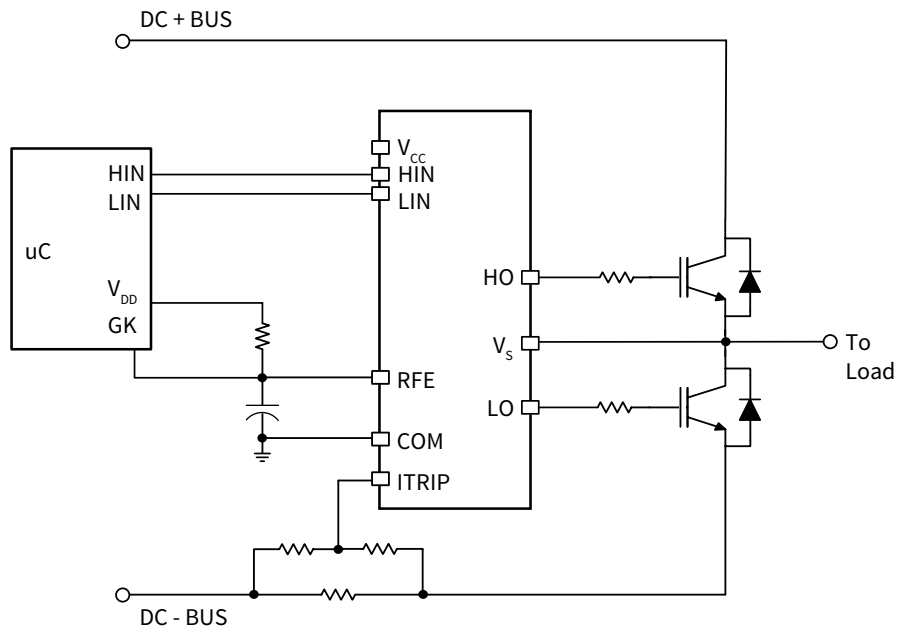
- > 600 V half-bridge driver
- > DSO-14 package
- > Utilizes level-shifting junction isolation IC technology and latch immune CMOS technology to realize a rugged monolithic structure
- > Integrated bootstrap Mosfet
- > Tolerant to negative transient voltages, dV/dt immune
- > Operational for transient negative VS -50 V with a 50 ns pulse width
- > Protection functions
 - Overcurrent protection
 - Shutdown and fault reporting with adjustable fault clearing time
 - Interlock
 - Under voltage lockout
 - Fixed dead time



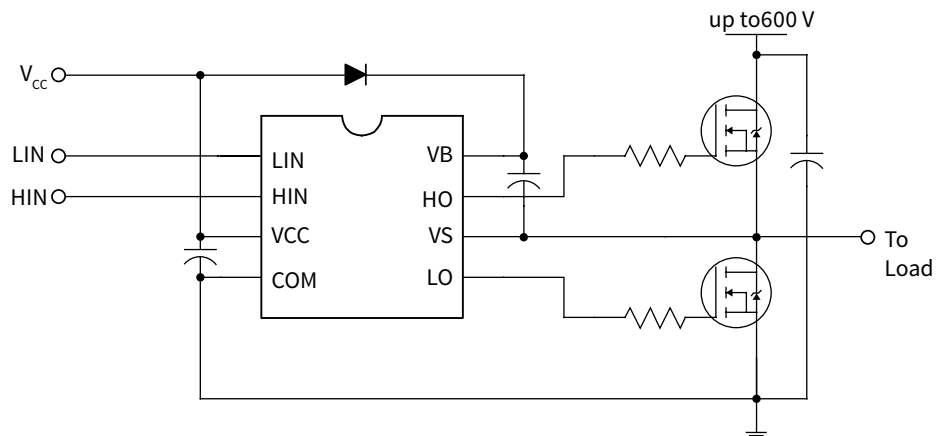
IRS2304 features

- > 600 V half-bridge and high- and low-side drivers
- > DSO-8 and DIP-8 package
- > Utilizes level-shifting junction isolation IC technology and latch immune CMOS technology to realize a rugged monolithic structure
- > Tolerant to negative transient voltages, dV/dt immune
- > Protection functions
 - Interlock
 - Under voltage lockout
 - Fixed dead time

IRS2890DS 600 V half-bridge gate driver IC

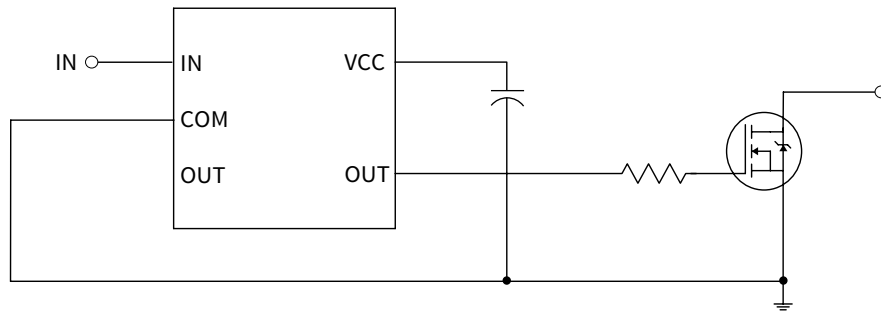


IRS2304 600 V half-bridge gate driver IC



Gate driver ICs for PFC

µHVIC™ Single low-side gate driver IC- IRS44273L

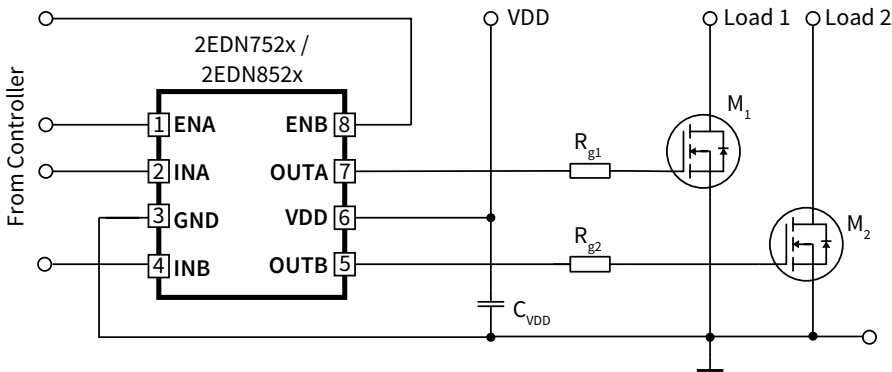


IRS44273L features

- > Single channel low-side driver
- > Utilizes Infineon's advanced technology to realize a rugged monolithic structure in a tiny SOT23 package
- > Dual output pins for easy layout
- > Protection functions
 - Under voltage lockout (UVLO)

www.infineon.com/microHVIC

2EDN EiceDRIVER™ family



2EDN EiceDRIVER™ features

- > Dual channel low-side drivers
- > DSO-8, TSSOP-8, and WSON-8 package options
- > 5 A driver capability
- > Fast Miller plateau transition and precise timing for high power efficiency
- > Low power dissipation
- > Fast and reliable turn-off
- > Increased GDN-bounce robustness
- > Protection functions
 - Under voltage lockout (UVLO)
 - Enable function

www.infineon.com/2EDN

Infineon offers over 150+ gate driver ICs

To simplify the gate driver selection process, Infineon provides an online easy-to-use **Gate Driver Selection Tool**. By choosing a few key parameters, the tool quickly guides you in finding the right driver for your application.

Gate Driver Finder

Simple Driver Parameter

Select Voltage Class (V_{C_{sw}}) ▼

Driver Current (I_{d,rv}) > A

Topology

Select Topology ▼

Switch Type

MOSFET JFET

IGBT IGBT/MOSFET

Product Status

Active

Active and preferred

Coming soon

In Development

Not for new design

Discontinued

Qualification

Industrial Automotive Any

Isolation

No Isolation

Functional levelshift

Functional galvanic

Basic galvanic

Reinforced

Part Number Total Matched 460	Product Status	Switch Type	Voltage Class	Topology	Channels	Source Current (A)	Sink Current (A)	Package	Features
1EBN1001AE	Active and preferred	IGBT	40	Booster	1	15.00	15.00	PG-DSO-14	
1ED020112-B2	Active and preferred	IGBT	1200	Single high side	1	2.00	2.00	PG-DSO-16	DESAT,SPLGND
1ED020112-BT	Active and preferred	IGBT	1200	Single high side	1	2.00	2.00	PG-DSO-16	DESAT,SPLGND
1ED020112-F2	Active and preferred	IGBT	1200	Single high side	1	2.00	2.00	PG-DSO-16	DESAT,SPLGND
1ED020112-FT	Active and preferred	IGBT	1200	Single high side	1	2.00	2.00	PG-DSO-16	DESAT,SPLGND
1ED020112FA2	Active and preferred	IGBT	1200	Single high side	1	2.10	2.10	PG-DSO-20	Interlock,DESAT
1ED020112FTA	Active and preferred	IGBT	1200	Single high side	1	2.00	2.00	PG-DSO-20	Interlock,DESAT
1EDI05112AF	Active and preferred	IGBT	1200	Single high side	1	1.30	0.90	PG-DSO-8	SPLGND
1EDI10112MF	Active and preferred	IGBT	1200	Single high side	1	2.20	2.30	PG-DSO-8	SPLGND
1EDI2001AS	Active and preferred	IGBT	1200	Single high side	1	1.00	1.00	PG-DSO-36	OC,Interlock,DESAT,SPLGND
1EDI2002AS	Active and preferred	IGBT	1200	Single high side	1	1.00	1.00	PG-DSO-36	OC,Interlock,DESAT,SPLGND
1EDI2010AS	Coming soon	IGBT	1200	Single high side	1	1.00	1.00	PG-DSO-36	OC,Interlock,DESAT,SPLGND
1EDI2015AS	Coming soon	IGBT	1200	Single high side	1	1.00	1.00	PG-DSO-36	OC,Interlock,DESAT,SPLGND
1EDI20112AF	Active and preferred	IGBT	1200	Single high side	1	4.00	3.50	PG-DSO-8	SPLGND
1EDI20112MF	Active and preferred	IGBT	1200	Single high side	1	4.00	3.50	PG-DSO-8	SPLGND
1EDI20N12AF	Active and preferred	MOSFET	1200	Single high side	1	4.00	3.50	PG-DSO-8	SPLGND
1EDI30112MF	Active and preferred	IGBT	1200	Single high side	1	5.90	6.20	PG-DSO-8	SPLGND

Start exploring today!

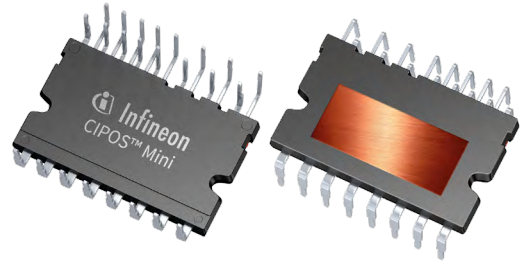
Visit www.infineon.com/gatedriver

www.infineon.com/gatedriver

www.infineon.com/eicedriver

CIPOS™ Mini

Intelligent power modules (IPM) 600 V / 4 A–30 A



The energy efficient CIPOS™ module integrates various power and control components to increase reliability, and to optimize PCB size and system costs. This simplifies the power design and reduces significantly the time-to-market.

The CIPOS™ module is designed to control AC motors in variable speed drives for applications from 4 A to up 30 A such as air conditioning, washing machines, refrigerators, vacuum cleaners, compressors and industrial drives up to 3 kW.

The package concept is specially adapted to power applications that need good thermal conduction and electrical isolation, but also EMI-safe control, innovative FAULT indication and overload protection. The feature of Infineon reverse conducting IGBTs or TRENCHSTOP™ IGBT is used with a new optimized Infineon SOI Gate Driver for excellent electrical performance.

CIPOS™ Mini

- > Application-specific performance
- > Very low thermal resistance due to DCB
- > Concerted power system from one source
- > Fully isolated dual in-line molded module
- > Reverse conducting IGBTs with low $V_{CE(sat)}$ and optimal anti-parallel Diode for low EMI
- > TRENCHSTOP™ IGBTs with low $V_{CE(sat)}$
- > Rugged three-phase SOI gate driver technology with stability against transient and negative voltage
- > Single-phase diode bridge rectifier (optional)
- > Matched propagation delay for all channels
- > Fast switching capability: $f_{sw} \leq 20$ kHz
- > Fully compliant to 3.3 V and 5 V Microcontrollers
- > Temperature sense (optional)
- > Accessible FAULT pin
- > Undervoltage lockout at all channels
- > Cross-conduction prevention
- > Low-side emitter pins accessible for all phase current monitoring (open emitter)
- > Lead-free terminal plating, RoHS compliant
- > Qualified according to JEDEC

IRAM and μ IPM™

High voltage half-bridge or three-phase driver with IGBTs or MOSFETs

IRAM – The energy high voltage three-phase driver with IGBTs

The IRAM family of intelligent power modules shrinks and simplifies the design of appliance motor drive applications including air conditioners, fans, compressors and washing machines from 400 W up to 3 kW motors. IRAM products integrate the inverter drive and protection circuitry in a single package utilizing IGBTs, ultra-soft recovery diodes and rugged gate driver HVIC. The IRAM family feature state-of-the-art thermo-mechanical technology to further improve thermal performance and system efficiency by delivering increased power density and enhanced system ruggedness and reliability.

IRAM family

- > Integrated gate drivers and bootstrap diodes
- > Temperature monitor
- > Protection shutdown pin
- > Low $V_{CE(on)}$ Trench IGBT technology
- > Undervoltage lockout for all channels
- > Matched propagation delay for all channels
- > 3.3 V Schmitt-triggered input logic
- > Cross-conduction prevention logic
- > Motor power range 0.25 kW~0.75 kW/
85 V_{ac} ~ 253 V_{ac}
- > Isolation 2000 VRMS min. and CTI > 600
- > High operating case temperature,
 $T_{C\ max.} = 125^{\circ}C$

μIPM™ application mapping

	Package	Motor I_{rms} range [A _{rms}]	Topology	Line-up	Product number
μIPM™s for outdoor fan	μIPM™ three-phase	0.5	Three-phase inverter	500 V MOSFET 1.7 Ω	IRSM836-045MA
	μIPM™ half-bridge	0.6	Half-bridge	500 V MOSFET 1.7 Ω	IRSM807-045MH
	μIPM™ DIP	0.2 – 0.5 1.5*	Three-phase inverter	500 V MOSFET 1.3 Ω, 1.7 Ω, 2.2 Ω, 4 Ω	IRSM5y5-0x5zA
		0.6 2.0*	Three-phase inverter	600 V IGBT 4 A	IRSM5y6-076zA

	Package	Motor I_{rms} range [A _{rms}]	Topology	Line-up	Product number
μIPM™s for indoor fan 220 V _{AC}	μIPM™ three-phase	0.1 – 0.5	Three-phase inverter	500 V MOSFET 1.7 Ω, 2.2 Ω, 4.0 Ω, 6.0 Ω	IRSM836-0x5MA
	μIPM™ half-bridge	0.6	Half-bridge	500 V MOSFET 1.7 Ω	IRSM807-045MH
	μIPM™ DIP	0.2 – 0.5	Three-phase inverter	500 V MOSFET 1.7 Ω, 2.2 Ω, 4.0 Ω, 6.0 Ω	IRSM5y5-0x5zA
	Smart μIPM™	0.2 to 0.3	Three-phase inverter	500 V MOSFET 4 Ω, 6 Ω	IRSM983-025MB IRSM983-035MB

	Package	Motor I_{rms} range [A _{rms}]	Topology	Line-up	Product number
μIPM™s for drain pump	μIPM™ three-phase	0.1 – 0.3	Three-phase inverter	500 V MOSFET 2.2 Ω, 4.0 Ω, 6.0 Ω	IRSM836-0x5MA
	μIPM™ DIP	0.2 – 0.5 1.5*	Three-phase inverter	500 V MOSFET 1.3 Ω, 1.7 Ω, 2.2 Ω, 4.0 Ω, 6.0 Ω	IRSM5y5-0x5zA
		0.6 2.0*	Three-phase inverter	600 V IGBT 4 A	IRSM5y6-076zA

	Package	Motor I_{rms} range [A _{rms}]	Topology	Line-up	Product number
μIPM™s fan/pump inverter stage 220 V _{AC}	μIPM™ three-phase	0.1 – 0.5	Three-phase inverter	500 V MOSFET 1.7 Ω, 2.2 Ω, 4.0 Ω, 6.0 Ω	IRSM836-0x5MA
	μIPM™ DIP	0.2 – 0.5 1.5*	Three-phase inverter	500 V MOSFET 1.7 Ω, 2.2 Ω, 4.0 Ω, 6.0 Ω	IRSM5y5-0x5zA
		0.6 2.0*	Three-phase inverter	600 V IGBT, 4 A	IRSM5y6-076zA

	Package	Motor I_{rms} range [A _{rms}]	Topology	Line-up	Product number
μIPM™s for outdoor fan 100 V _{AC}	μIPM™ three-phase	0.2 – 1.0	Three-phase inverter	250 V MOSFET 0.45 Ω, 1.0 Ω, 2.4 Ω	IRSM836-0x4MA
	μIPM™ half-bridge	2.0	Half-bridge	250 V MOSFET 0.15 Ω	IRSM808-204MH
	μIPM™ DIP	0.2 – 1.1 1.5 – 2.5*	Three-phase inverter	250 V MOSFET 0.45 Ω, 1.0 Ω, 2.3 Ω	IRSM5y5-0x4zA

	Package	Motor I_{rms} range [A _{rms}]	Topology	Line-up	Product number
μIPM™s for indoor fan 100 V _{AC}	μIPM™ three-phase	0.2 – 1.0	Three-phase inverter	250 V MOSFET 0.45 Ω, 1.0 Ω, 2.4 Ω	IRSM836-0x4MA
	μIPM™ half-bridge	2.0	Half-bridge	250 V MOSFET 0.15 Ω	IRSM808-204MH
	μIPM™ DIP	0.2 – 1.1	Three-phase inverter	250 V MOSFET 0.45 Ω, 1.0 Ω, 2.3 Ω	IRSM5y5-0x4zA

* With heatsink

μIPM™ DIP – three-phase bridge driver with MOSFETs

The μIPM™ DIP is family of compact integrated power modules (IPM) for low power motor drive applications including fans, pumps, air purifiers and refrigerator compressor drives.

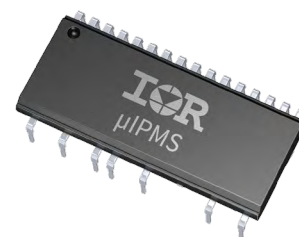
Available in a compact 12 x 29 mm² SOP/DIP package the μIPM™ DIP product family offers a cost effective power solution by leveraging industry standard footprints and processes compatible with various PCB substrates. The family features rugged and efficient high voltage FREDFET MOSFETs specifically optimized for variable frequency drives with voltage ratings of 250 V, 500 V and 600 V IGBTs. These devices are paired with the most advanced high voltage Driver IC tuned to achieve optimal balance between EMI and switching losses. The μIPM™ DIP family offers DC current ratings ranging up to 4.6 A to drive motors up to 90 W without heatsink and up to 250 W with heatsink, and are available in both through-hole and surface mount package options.

μIPM™ – three-phase or half-bridge driver with MOSFETs

The μIPM™ is a family of highly integrated, ultra-compact, patent pending, power modules for high efficiency appliance and light industrial applications including compressor drives for refrigeration, pumps for heating and water circulation, air-conditioning fans, dishwashers, and automation systems. By utilizing an innovative packaging solution, the μIPM™ family delivers a new benchmark in device size, offering up to a 60 percent smaller footprint than existing three-phase motor control power IC.

Three-phase μIPM™s are available in an ultra-compact 12.0 x 12.0 x 0.9 mm³ PQFN package, half-bridge in 8.0 x 9.0 x 0.9 mm³ and 7.0 x 8.0 x 0.9 mm³, the μIPM™ family comprises a series of fully integrated three-phase or half-bridge surface-mount motor control circuit solutions. The new alternative approach utilizes PCB copper traces to dissipate heat from the module, providing cost savings through a smaller package design and even eliminating the need for an external heat sink. By using standard packaging QFN technology, assembly is simplified by eliminating through-hole second pass assembly and improving thermal performance compared to traditional dual-in-line module solutions.

The iMOTION™ modules integrate digital, analog and power technologies together in a flexible, mixed signal chipset to simplify motor control designs and bring energy-efficient, cost-effective solutions to market faster.



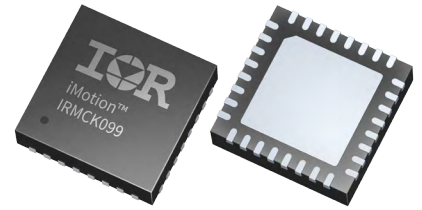
μIPM™ DIP

- > 250 V, 500 V, 600 V three-phase inverter including high voltage gate drivers
- > Integrated bootstrap functionality
- > 1.3 Ω to 6 Ohm 500 V max. $R_{DS(on)}$ at 25°C
0.45 Ω to 2.3 Ω at 250 V
- > Under-voltage lockout for all channels
- > Matched propagation delay for all channels
- > Optimized dV/dt for I_{oss} and EMI trade offs
- > Open-source for single and leg-shunt current sensing
- > 3.3 V logic compatible and advanced input filter
- > Driver tolerant to negative transient voltage (-Vs)
- > Isolation 1900 VRMS, 1 minute.

μIPM™

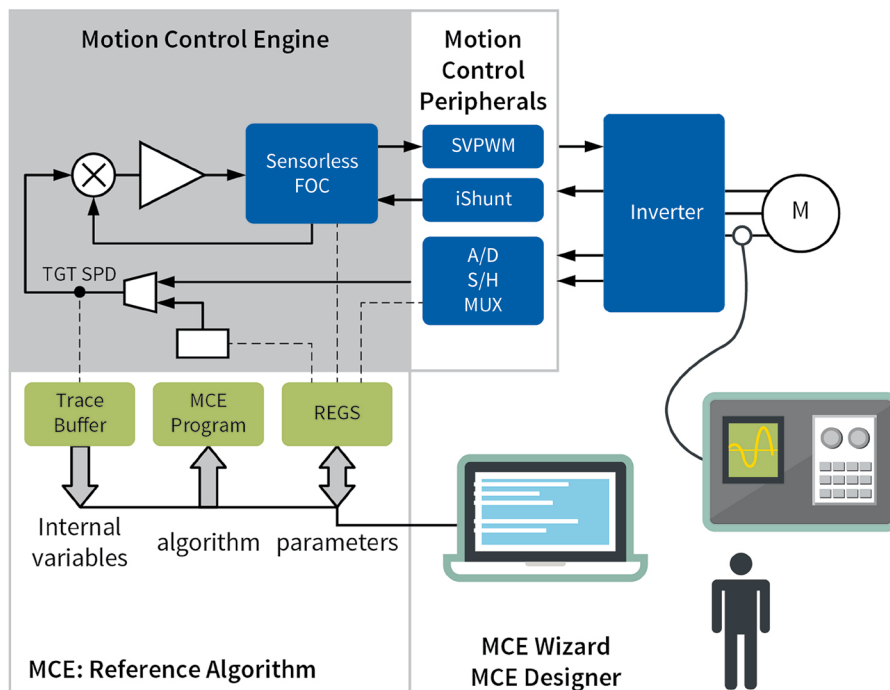
- > Integrated gate drivers and bootstrap functionality
- > Suitable for sinusoidal or trapezoidal modulation
- > Low $R_{DS(on)}$ Trench FREDFET
- > Under-voltage lockout for both channels
- > Matched propagation delay for all channels
- > Optimized dV/dt for loss and EMI trade offs
- > 3.3 V input logic compatible
- > Active high HIN and LIN
- > Isolation 1500 VRMS, 1 minute.

Digital motor controller – iMOTION™



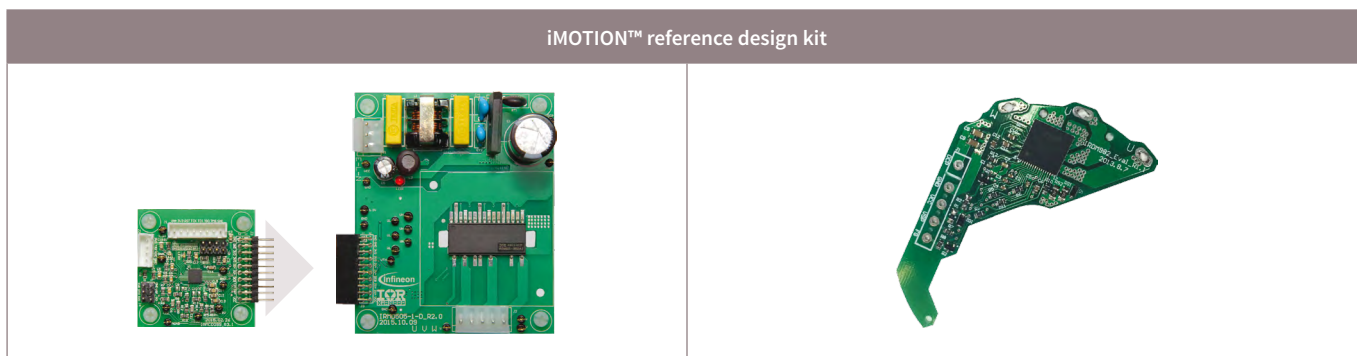
iMOTION™ Integrated Design Platform delivers everything needed to design a complete variable speed motor controller subsystem. From the front panel and power entry to the motor terminals, iMOTION™ brings powerful digital, analog and power silicon together with algorithms, development software and design tools.

The high-performance iMOTION™ digital controller IC integrates all the control and analog interface functions required for sensorless speed control of PM motors using DC link or Leg shunt current measurements. The digital control IC features International Rectifier's patented motor control engine (MCE™) that eliminates software coding from the motor control algorithm development process. A co-integrated 60 MIPS, 8-bit, 8051 microcontroller enables application layer software development, operating almost independently of the MCE™ and does not compete for system resources such as interrupts or internal registers. The embedded analog signal engine (ASE) integrates all the signal conditioning and conversion circuits required for single/leg current shunt, sensorless control of a PM motor.



Products	Package	Control option	Application	Features
IRMCK099	32pin	1 motor	Fan Pump Multicopter	Programmable MCE only Single or leg shunt current sensing Zero speed sensorless control* 12-bit A/D with S/H
IRMCF171/IRMCK171 IRMCK172	48pin	1 motor	Air conditioning compressor Fridge compressor	Programmable MCE 8051 8-bit μ P Single or leg shunt current sensing Zero speed sensorless control* 12-bit A/D with S/H
IRMCF588	100pin	2 motor + PFC	Washer	
IRMCF188	64pin	1 motor + PFC	Fan	
IRMCF143	64pin	1 motor, Servo	Pump	
IRMCK182	32pin	1 motor		
IRMCF183	32pin	1 motor		
IRMCF371/IRMCK371	48pin	1 motor	Air conditioning compressor	
IRMCF341/IRMCK341	64pin	1 motor	Fridge compressor	Configurable MCE 8051 8-bit μ P Single shunt current sensing 12-bit A/D with S/H
IRMCF343/IRMCK343	64pin	1 motor + PFC	Washer	
IRMCF311/IRMCK311	64pin	2 motor + PFC	Fan	
IRMCF312/IRMCK312	100pin	2 motor + PFC	Pump	

iMOTION™ reference design kit

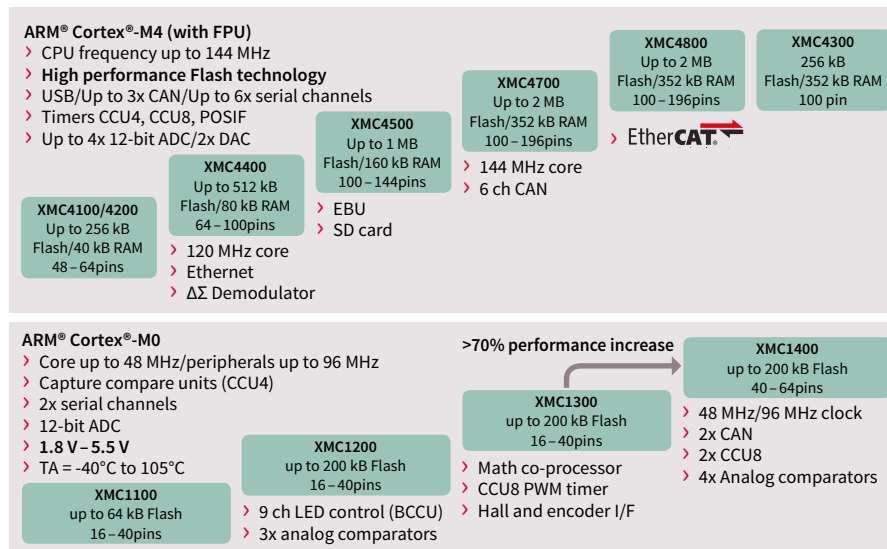


XMC™ – 32-bit industrial microcontroller

More than 100 devices arranged in a portfolio optimized for industrial applications



New ARM® Cortex® based microcontroller family



XMC1000 family

- > Up to 48 MHz ARM® Cortex®-M0
- > Up to 96 MHz Math Co-Processor (CORDIC)
- > 8 kB to 200 kB Flash
- > 16 kB SRAM
- > Up to 55 general purpose IOs (GPIOs)
- > Rich analog-mixed signal (ADC, CMP)
- > Precision Timing/PWM (up to 96 MHz)
- > Configurable communication interfaces
- > Application specific peripherals
- > Brightness Color Control Unit (BCCU)
- > LED Matrix and Touch (LEDTS)
- > Position Interface (POSIF)
- > CAN interface

Operating conditions

- > Temperature: -40°C to 105°C T_{AMBIENT}
- > Voltage: 1.8 V to 5.5 V

XMC™ MCUs are designed for embedded industrial applications and characterize by

- > Application specific feature – Delta-Sigma-(ΔΣ)-demodulator (DSD)
- > High resolution PWM, brightness color control unit
- > Precision and control – timer/PWM (CCU) can run up to 120 MHz
- > Up to 64-bit width offering fault inputs and binary/floating clock prescaler
- > Real-time and process parallelization – module interconnect matrix
- > Interaction between peripherals to offload CPU
- > Quality and robustness – error code correction (ECC), margin check, operating
- > Temperature up to 125°C T_{AMBIENT} >= 20 years data, retention
- > Built-in safety feature (Window Watchdog, Broken Wire Detection) and
- > Free IEC60730 Class B library

Ecosystem

- > The wide ARM® Ecosystem (Atollic, IAR, Keil MDK, Rowley, TASKING and others)
- > Free Infineon DAVE™
- > Eclipse CDT based IDE
- > ARM® GNU compiler
- > Free debugger and Flash loader
- > Data visualization tool called xSPY
- > Providing a resource solver
- > DAVE™ Apps – a tailored and object-oriented software library of 170 Apps to efficiently use the innovative set of peripherals of the XMC™ MCUs

www.infineon.com/XMC

www.infineon.com/DAVE

www.infineon.com/IEC60730

XMC4000 family

- > Up to 144 MHz ARM® Cortex®-M4
- > DSP, FPU, DMA and MPU
- > 64 kB to 2 MB Flash with ECC
- > 20 kB to 352 kB SRAM with up to 4 kB cache
- > Up to 155 general purpose IOs (GPIOs)
- > Rich analog-mixed signal (ADC, DAC)
- > Precision timing/PWM (up to 144 MHz)
- > Configurable communication interfaces
- > Application specific peripherals
- > Delta-Sigma-(ΔΣ)-demodulator
- > High resolution PMW (150 ps, HRPWM)
- > POSIF, EBU, USB, SD/MMC, Ethernet, CAN and EtherCAT®

Operating conditions

- > Temperature: -40°C to 125°C T_{AMBIENT}
- > Voltage: 3.13 V to 3.63 V

CoolSET™ and Flyback PWM IC for auxiliary power supply

- › Integrated CoolMOS™ with startup cell
- › Quasi-resonant operation with digital frequency reduction
- › High average efficiency over wide load range
- › Stable operation without jittering/audible noise problem
- › Active burst mode operation for very low standby losses (to achieve standby power < 50 mW)
- › Auto restart mode for V_{CC} under-voltage/over-voltage protection
- › Auto restart mode for open-loop and output overload protection
- › Auto restart mode for over-temperature protection
- › Latch-off mode for output over-voltage, short-winding
- › BiCMOS technology (controller) for wide V_{CC} operation and low IC power consumption
- › Peak power limitation with input voltage compensation
- › Minimum switching frequency limitation (no audible noise on power units on/off)
- › DIP and DSO package (for controllers and CoolSET™)

Quasi-resonant PWM IC and 650 V CoolSET™

$P_{out}^{(1)}$ 85 V_{AC} ... 265 V_{AC}		14 W ~ 15 W	23 W ~ 26 W	34 W	38 W ~ 42 W
$R_{DS(on)}$		4.7 Ω	1.7 Ω	1.0 Ω	0.6 Ω
Package	PWM Only	650 V depletion CoolMOS™			
DIP-7		ICE2QR4765Z	ICE2QR1765Z	ICE2QR1065Z	ICE2QR0665Z
DIP-8		ICE2QR4765	ICE2QR1765		ICE2QR0665
DSO-8	ICE2QS02G ICE2QS03G				
DSO-12		ICE2QR4765G	ICE2QR1765G		ICE2QR0665G

Quasi-resonant CoolSET™ 800 V

$P_{out}^{(1)}$ 85 V_{AC} ... 265 V_{AC}		18 W	24 W	37 W	47 W
$R_{DS(on)}$		4.7 Ω	2.2 Ω	1.0 Ω	0.6 Ω
Package		800 V depletion CoolMOS™			
DIP-7		ICE2QR4780Z	ICE2QR2280Z ICE2QR2280Z-1		ICE2QR0680Z
DSO-12		ICE2QR4780G	ICE2QR2280G ICE2QR2280G-1	ICE2QR1080G	

⁽¹⁾ Output power assume 78 ~ 83% efficiency. $T_a=50^\circ\text{C}$, $T_j=125^\circ\text{C}$ and no copper area for 650 V device and 232 mm² copper area for 800 V device.

Fixed frequency PWM IC and CoolSET™ features

- › Active burst mode to achieve the lowest standby power requirements < 50 mW
- › Optional latched off mode (L) to increase robustness and safety of the system
- › Adjustable blanking window for high load jumps to increase reliability
- › DCM, CCM
- › Startup cell switched off after start-up
- › 65 kHz/100 kHz/130 kHz internally fixed switching frequency
- › Over-temperature, over-voltage, short-winding, overload and open-loop, V_{CC} under-voltage, brown-out protections, fast AC reset, input over-voltage protection
- › Fixed softstart time
- › Overall tolerance of current limiting < $\pm 5\%$
- › Internal leading edge blanking time
- › Max. duty cycle 72%
- › DIP, DSO and FullPAK packages

Fixed frequency PWM IC and CoolSET™ 650 V

$P_{out}^{(2)}$ 85 V _{AC} ... 265 V _{AC}		11 W ~ 12 W	13 W ~ 14 W	18 W	24 W ~ 25 W	34 W	39 W ~ 40 W
$R_{DS(on)}$		6.5 Ω	4.7 Ω	3.0 Ω	1.7 Ω	1.0 Ω	0.6 Ω
Package	PWM only	650 V depletion CoolMOS™					
DIP-7			ICE3RBR4765JZ		ICE3RBR1765JZ		ICE3RBR0665JZ
DIP-8		ICE3B0365J	ICE3BR4765J	ICE3A1065ELJ	ICE3BR1765J	ICE3A2065ELJ ICE3BR1065J	ICE3BR0665J
DSO-8	ICE3AS03LJG ICE3BS03LJG ICE3GS03LJG						
DSO-12			ICE3BR4765JG ICE3RBR4765JG		ICE3RBR1765JG		ICE3RBR0665JG

Fixed frequency PWM IC and CoolSET™ 800 V

$P_{out}^{(2)}$ 85 V _{AC} ... 265 V _{AC}		11 W	16 W	22 W	30 W	37 W	43 W
$R_{DS(on)}$		10.0 Ω	4.7 Ω	2.2 Ω	1.5 Ω	1.0 Ω	0.6 Ω
Package		800 V depletion CoolMOS™					
DIP-7	ICE3AR10080JZ ICE3AR10080CJZ	ICE3AR4780JZ ICE3AR4780VJZ ICE3AR4780CJZ	ICE3AR2280JZ ICE3AR2280JZ-T ICE3AR2280CJZ ICE3AR2280VJZ ICE3BR2280JZ		ICE3AR1580VJZ	ICE3AR1080VJZ	ICE3AR0680JZ ICE3AR0680VJZ ICE3BR0680JZ
DSO-12		ICE3AR4780JG	ICE3AR2280JG			ICE3AR1080JG	

²⁾ Output power assume 76 ~ 83% efficiency. $T_s=50^\circ\text{C}$, $T_j=125^\circ\text{C}$ and no copper area.



Infineon's powerful support

Useful links and helpful information

General support

www.infineon.com/support
www.infineon.com/wheretobuy
www.infineon.com/quality
www.infineon.com/packages
www.infineon.com/green
www.infineon.com/opn

Request reliability (FIT) data

http://infineon-community.com/FIT_1

Tools and desks

www.infineon.com/solutionfinder
www.infineon.com/lightdesk

Register for the Newsletter4Engineers

<http://infineon-community.com/Newsletter4Engineers>



Where to buy

Infiniteon distribution partners and sales offices:

www.infineon.com/WhereToBuy

Service hotline

Infiniteon offers its toll-free 0800/4001 service hotline as one central number, available 24/7 in English, Mandarin and German.

- > Germany 0800 951 951 951 (German/English)
- > China, mainland 4001 200 951 (Mandarin/English)
- > India 000 800 4402 951 (English)
- > USA 1-866 951 9519 (English/German)
- > Other countries 00* 800 951 951 951 (English/German)
- > Direct access +49 89 234-0 (interconnection fee, German/English)

*Please note: Some countries may require you to dial a code other than "00" to access this international number.
Please visit www.infineon.com/service for your country!



Mobile product catalog

Mobile app for iOS and Android.

www.infineon.com

Published by
Infineon Technologies Austria AG
9500 Villach, Austria

© 2016 Infineon Technologies AG.
All rights reserved.

Order number: B114-I0292-V2-7600-EU-EC-P
Date: 10 / 2016

Please note!

THIS DOCUMENT IS FOR INFORMATION PURPOSES ONLY AND ANY INFORMATION GIVEN HEREIN SHALL IN NO EVENT BE REGARDED AS A WARRANTY, GUARANTEE OR DESCRIPTION OF ANY FUNCTIONALITY, CONDITIONS AND/OR QUALITY OF OUR PRODUCTS OR ANY SUITABILITY FOR A PARTICULAR PURPOSE. WITH REGARD TO THE TECHNICAL SPECIFICATIONS OF OUR PRODUCTS, WE KINDLY ASK YOU TO REFER TO THE RELEVANT PRODUCT DATA SHEETS PROVIDED BY US. OUR CUSTOMERS AND THEIR TECHNICAL DEPARTMENTS ARE REQUIRED TO EVALUATE THE SUITABILITY OF OUR PRODUCTS FOR THE INTENDED APPLICATION.

WE RESERVE THE RIGHT TO CHANGE THIS DOCUMENT AND/OR THE INFORMATION GIVEN HEREIN AT ANY TIME.

Additional information

For further information on technologies, our products, the application of our products, delivery terms and conditions and/or prices, please contact your nearest Infineon Technologies office (www.infineon.com).

Warnings

Due to technical requirements, our products may contain dangerous substances. For information on the types in question, please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by us in a written document signed by authorized representatives of Infineon Technologies, our products may not be used in any life-endangering applications, including but not limited to medical, nuclear, military, life-critical or any other applications where a failure of the product or any consequences of the use thereof can result in personal injury.