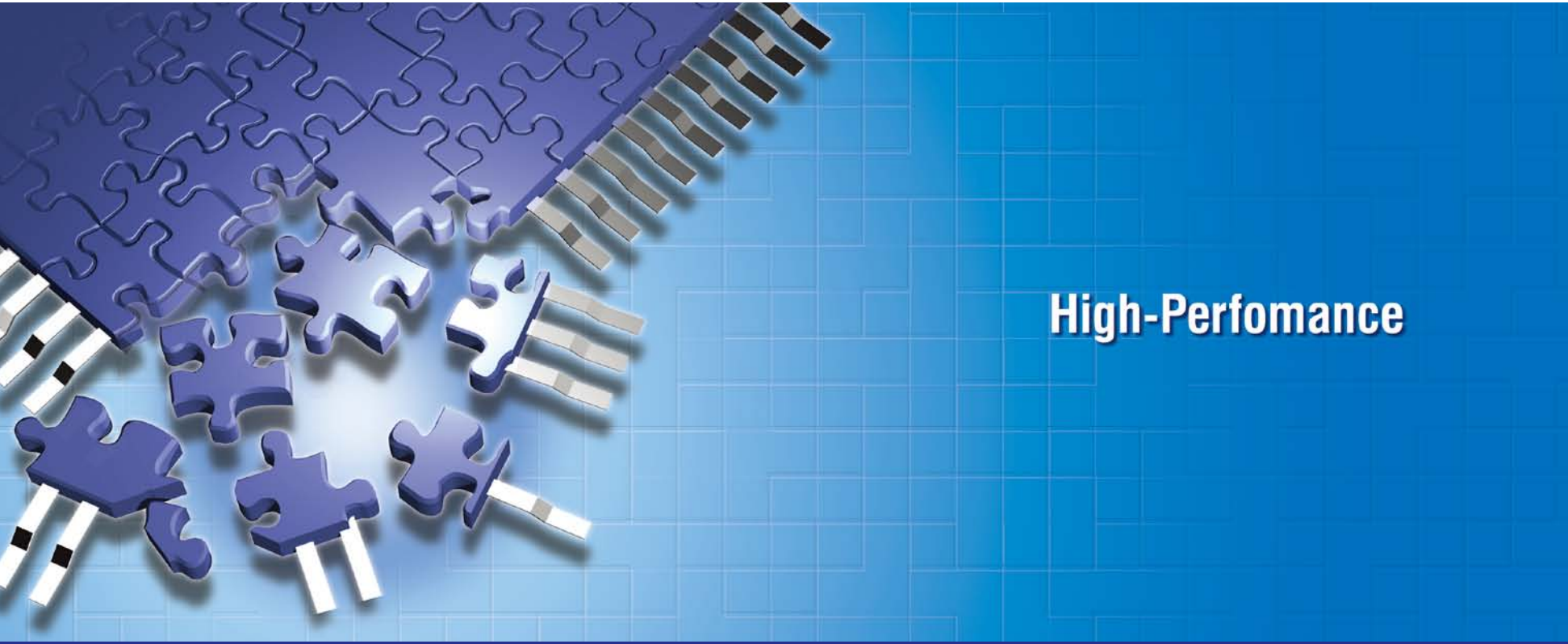
Renesas MPUs & MCUs

V850 MCU Selection Guide



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Device				Memory				Clock			I/O	Bus	Timer						Serial Interface																OCD	Peripheral Functions					Other		
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	16-bit timer	8-bit timer	Other timers	Watch timer	Watchdog timer	PWM output	UART	UART supporting LIN	UART, CSI	UART supporting LIN, CSI	UART, I²C	UART supporting LIN, I²C	UART supporting LIN, CSI, I²C	CSI	CSI, I²C	CSI with automatic transmission/ reception function	I²C	IEBus	CAN	CAN, IEBus	UART supporting LIN, I²C, CAN	On-chip debugging	LCD [segments × commons]	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
All Flash	V850ES	**V850ES/HE3**	μPD70F3747	128	Flash	√	8	32	8 M, 240 k	√	51	−/−	7	−	−	1	1	16 bits × 8 (6 phases, 16 bits × 1)	−	2	−	−	−	−	−	2	−	−	1	−	−	−	−	√	−	−	10	−	POC, LVI, CLM, DMA	3.7 to 5.5	64-LQFP (10 × 10)	E1 QB-V850MINIL (MINICUBE) QB-V850ESFX3 (IECUBE)
		V850ES/HF3	μPD70F3750	256	Flash	√	16	32	8 M, 240 k	√	67	−/−	7	−	−	1	1	16 bits × 8 (6 phases, 16 bits × 1)	−	2	−	−	−	−	−	2	−	−	1	−	−	−	−	√	−	−	12	−	POC, LVI, CLM, DMA	3.7 to 5.5	80-LQFP (12 × 12)	
		V850ES/HG3	μPD70F3752	256	Flash	√	16	32	8 M, 240 k	√	84	−/−	8	−	−	1	1	16 bits × 11 (6 phases, 16 bits × 1)	−	3	−	−	−	−	−	2	−	−	1	−	−	−	−	√	−	−	16	−	POC, LVI, CLM, DMA	3.7 to 5.5	100-LQFP (14 × 14)	
		V850ES/HJ3	μPD70F3755	256	Flash	√	16	32	8 M, 240 k	√	128	16/16	9	−	−	1	1	16 bits × 14 (6 phases, 16 bits × 1)	−	3	−	−	−	−	−	3	−	−	1	−	−	−	−	√	−	−	24	−	POC, LVI, CLM, DMA	3.7 to 5.5	144-LQFP (20 × 20)	
			μPD70F3757	512			32													4 Note		2 Note		1 Note		1			–												

Note Six UART channels are provided in the μPD70F3757.

Remark POC: Power-on clear circuit
LVI: Low-voltage detector
CLM: Clock monitor

Device				Memory				Clock			I/O	Bus	Timer						Serial Interface																				OCD	Peripheral Functions					Other		
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	16-bit timer	8-bit timer	Other timers	Watch timer	Watchdog timer	PWM output	UART	UART supporting LIN	UART, CSI	UART supporting LIN, CSI	UART, I²C	UART supporting LIN, I²C	UART supporting LIN, CSI, I²C	CSI	CSI, I²C	CSI with automatic transmission/ reception function	I²C	IEBus	CAN	CAN, IEBus	UART supporting LIN, I²C, CAN	On-chip debugging	LCD [segments × commons]	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
All Flash	V850ES	**V850ES/IE2**	μPD70F3713	64	Flash	√	6	20	–	–	39	–/–	7	–	–	–	1	16 bits × 6 (6 phases, 16 bits × 1)	2	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	4 + 4	–	POC, LVI, CLM	3.5 to 5.5	64-LQFP (14 × 14)	E1 QB-V850ESIX2 (IECUBE)
			μPD70F3714	128																																							
	V850E1	**V850E/IF3**	μPD70F3451	128	Flash	√	8	64	–	–	48	–/–	13	–	–	–	1	16 bits × 9 (6 phases, 16 bits × 2)	–	–	3	–	1	–	–	–	–	–	–	–	–	–	–	√	–	5 + 5	4	–	POC, LVI, CLM, DMA, operational amplifier × 4, comparator	3.5 to 5.5	80-LQFP (14 × 14)	E1 QB-V850EIX3 (IECUBE)
			μPD70F3452	256			12																																			
		V850E/IG3	μPD70F3453	128	Flash	√	8	64	–	–	64	–/–	13	–	–	–	1	16 bits × 11 (6 phases, 16 bits × 2)	–	–	3	–	1	–	–	–	–	–	–	–	–	–	–	√	–	5 + 5	8	–	POC, LVI, CLM, DMA, operational amplifier × 4, comparator	3.5 to 5.5	100-LQFP (14 × 14) 100-LQFP (14 × 20) Note 2 161-FBGA (10 × 10)	E1 QB-V850MINIL (MINICUBE) QB-V850EIX3 (IECUBE)
			μPD70F3454	256			12					Note 1 16/16																															
		V850E/IG4	μPD70F3913	256	Flash	√	24	100	–	–	67	–/–	13	–	–		1	16 bits × 13 (6 phases, 16 bits × 2)	–	–	3	–	1	–	–	–	–	–	–	–	–	–	–	√	–	4 + 3	12	–	POC, LVI, CLM, DMA, operational amplifier × 6, comparator	1.5/5.0	100-LQFP (14 × 14) 100-LQFP (14 × 20)	E1 QB-V850MINIL (MINICUBE)
			μPD70F3914	384																																						
			μPD70F3915	480																																							
		V850E/IH4	μPD70F3916	256	Flash	√	24	100	–	–	80	–/–	13	–	–	–	1	16 bits × 13 (6 phases, 16 bits × 2)	–	–	3	–	1	–	–	–	–	–	–	–	–	–	–	√	–	4 + 4	12	–	POC, LVI, CLM, DMA, operational amplifier × 6, comparator	1.5/5.0	128-LQFP (14 × 20)	
			μPD70F3917	384																																							
			μPD70F3918	480																																							
		V850E/IG4-H	μPD70F3919	256	Flash	√	24	100	–	–	63	16/16	13	–	–	–	1	16 bits × 10 (6 phases, 16 bits × 1)	–	–	3	–	1	–	–	–	–	–	–	–	–	–	–	√	–	4 + 3	12	–	POC, LVI, CLM, DMA, operational amplifier × 6, comparator, USB 2.0 function	1.5/5.0/3.3	100-LQFP (14 × 14)	
			μPD70F3920	384																																							
			μPD70F3921	480																																							
		V850E/IH4-H	μPD70F3922	256	Flash	√	24	100	–	–	88	16/16	13	–	–	–	1	16 bits × 13 (6 phases, 16 bits × 2)	–	–	3	–	1	–	–	–	–	–	–	–	–	–	–	√	–	4 + 4	12	–	POC, LVI, CLM, DMA, operational amplifier × 6, comparator, USB 2.0 function	1.5/5.0/3.3	128-LQFP (14 × 20)	
			μPD70F3923	384																																							
			μPD70F3924	480																																							

Notes 1. μPD70F3454, 14 × 14 mm and 10 × 10 mm packages only.
2. μPD70F3454 only.

Remark POC: Power-on clear circuit
LVI: Low-voltage detector
CLM: Clock monitor

Device				Memory				Clock			I/O	Bus	Timer						Serial Interface																			OCD	Peripheral Functions					Other		
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	16-bit timer	8-bit timer	Other timers	Watch timer	Watchdog timer	PWM output	UART	UART supporting LIN	UART, CSI	UART supporting LIN, CSI	UART, I²C	UART supporting LIN, I²C	UART supporting LIN, CSI, I²C	CSI	CSI, I²C	CSI with automatic transmission/ reception function	I²C	IEBus	CAN	CAN, IEBus	UART supporting LIN, I²C, CAN	On-chip debugging	LCD [segments × commons]	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
All Flash	V850ES	**V850ES/JC3-L (40-pin)**	μPD70F3797	16	Flash	√	8	20	220 k	√	27	−/−	8	−	−	1	1	16 bits × 5	−	1	−	−	−	1	−	1	1	−	−	−	−	−	−	√	−	−	5	1	LVI, CLM, DMA, CRC	2.2 to 3.6	40-WQFN (6 × 6)	E1 QB-V850MINIL (MINICUBE) QB-V850ESJX3L (IECUBE)
			μPD70F3798	32																																						
			μPD70F3799	64																																							
			μPD70F3800	128																																							
			μPD70F3838	256			16																																				
		V850ES/JC3-L (48-pin)	μPD70F3801	16			8				34									−		1		2			2										6	1			48-LQFP (7 × 7) 48-WQFN (7 × 7)		
			μPD70F3802	32																																							
			μPD70F3803	64																																							
			μPD70F3804	128																																							
			μPD70F3839	256			16																																				
		V850ES/JE3-L	μPD70F3805	16	Flash	√	8	20	220 k	√	50	−/−	8	−	−	1	1	16 bits × 9	−	−	−	1	−	2	−	3	1	−	−	−	−	−	−	√	−	−	10	1	LVI, CLM, DMA, CRC	2.2 to 3.6	64-LQFP (10 × 10) 64-FBGA (5 × 5)	
			μPD70F3806	32																																							
			μPD70F3807	64																																							
			μPD70F3808	128																																							
			μPD70F3840	256			16																																				
		V850ES/JF3-L	μPD70F3735	128	Flash	√	8	20	220 k	√	66	16/18	6	−	−	1	1	16 bits × 7	−	2	−	−	−	1	−	2	1	−	−	−	−	−	−	√	−	−	8	1	LVI, CLM, DMA, CRC	2.2 to 3.6	80-LQFP (12 × 12) 80-LQFP (14 × 14)	
			μPD70F3736	256			16																																				
		V850ES/JG3-L	μPD70F3737	128	Flash	√	8	20	220 k	√	84	16/22	8	−	−	1	1	16 bits × 9	−	−	−	1	−	2	−	3	1	−	−	−	−	−	−	√	−	−	12	2	LVI, CLM, DMA, CRC	2.2 to 3.6	100-LQFP (14 × 14) 100-LQFP (14 × 20) 121-FBGA (8 × 8)	
			μPD70F3738	256			16																																				
			μPD70F3792	384			32				83				Real-time counter					4																					2.0 to 3.6	100-LQFP (14 ×14) 121-FBGA (8 × 8)	
			μPD70F3793	512			40																																				
			μPD70F3841	768			80																																				
			μPD70F3842	1024																																							
			μPD70F3794	256			40				80																													LVI, CLM, DMA, CRC, USB 2.0 function			
			μPD70F3795	384																																							
			μPD70F3796	512																																							
			μPD70F3843	768			80																																				
			μPD70F3844	1024																																							
		V850ES/JG3	μPD70F3739	384	Flash	√	32	32	220 k	√	84	16/22	8	−	−	1	1	16 bits × 9	−	−	−	1	−	2	−	3	1	−	−	−	−	−	−	√	−	−	12	2	LVI, CLM, DMA, CRC	2.85 to 3.6	100-LQFP (14 × 14)	E1 QB-V850MINIL (MINICUBE) QB-V850ESSX2 (IECUBE)
			μPD70F3740	512			40																																				
			μPD70F3741	768			60																																				
			μPD70F3742	1024																																							
		V850ES/JJ3	μPD70F3743	384	Flash	√	32	32	220 k	√	128	16/24	11	−	−	1	1	16 bits × 12	−	1	−	1	−	2	−	4	1	−	−	−	−	−	−	√	−	−	16	2	LVI, CLM, DMA, CRC	2.85 to 3.6	144-LQFP (20 × 20)	
			μPD70F3744	512			40																																				
			μPD70F3745	768			60																																				
			μPD70F3746	1024																																							

Remark LVI: Low-voltage detector, CLM: Clock monitor

Device				Memory				Clock			I/O	Bus	Timer						Serial Interface																OCD	Peripheral Functions					Other		
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	16-bit timer	8-bit timer	Other timers	Watch timer	Watchdog timer	PWM output	UART	UART supporting LIN	UART, CSI	UART supporting LIN, CSI	UART, I^2C	UART supporting LIN, I^2C	UART supporting LIN, CSI, I^2C	CSI	CSI, I^2C	CSI with automatic transmission/reception function	I^2C	IEBus	CAN	CAN, IEBus	UART supporting LIN, I^2C, CAN	On-chip debugging	LCD (segments × commons)	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
All Flash	V850ES	**V850ES/JC3-H (40-pin)**	μPD70F3809	16	Flash	√	8	48	220 k	√	25	−/−	10	−	Real-time counter	−	1	16 bits × 1	−	−	−	2	−	−	1	1	−	−	−	−	−	−	−	−	√	−	−	5	−	LVI, CLM, DMA, CRC, USB 2.0 function	2.85 to 3.6	40-WQFN (6 × 6)	E1 QB-V850MINIL (MINICUBE) QB-V850ESJX3H (IECUBE)
			μPD70F3810	32			16																																			
			μPD70F3811	64			24																																			
			μPD70F3812	128																																						
			μPD70F3813	256																																						
		V850ES/JC3-H (48-pin)	μPD70F3814	16			8				32							16 bits × 2					1														6	1			48-LQFP (7 × 7) 48-WQFN (7 × 7)		
			μPD70F3815	32			16																																			
			μPD70F3816	64			24																																			
			μPD70F3817	128																																						
			μPD70F3818	256																																						
			μPD70F3819	256																				−										1								
		V850ES/JE3-H	μPD70F3820	16	Flash	√	8	48	220 k	√	45	−/−	10	−	Real-time counter	−	1	16 bits × 7 (6 phases, 16 bits × 1)	−	−	−	2	−	1	1	1	−	−	−	−	−	−	−	−	√	−	−	10	1	LVI, CLM, DMA, CRC, USB 2.0 function	2.85 to 3.6	64-LQFP (10 × 10) 64-FBGA[Note 1] (6 × 6) 64-WQFN (9 × 9)	
			μPD70F3821	32			16																																			
			μPD70F3822	64			24																																			
			μPD70F3823	128																																						
			μPD70F3824	256																																						
			μPD70F3825	256																				−										1								
		V850ES/JG3-H	μPD70F3760	256	Flash	√	40[Note 2]	48	220 k	√	77	16/16	13	−	Real-time counter	−	1	16 bits × 12 (6 phases, 16 bits × 1)	−	−	−	2	−	2	1	2	−	−	−	−	−	−	−	−	√	−	−	12	2	LVI, CLM, DMA, CRC, USB 2.0 function	2.85 to 3.6	100-LQFP (14 × 14)	
			μPD70F3761	384			48[Note 2]																																			
			μPD70F3762	512			56[Note 2]																																			
			μPD70F3770	256			40[Note 2]																	1										1								
		V850ES/JH3-H	μPD70F3765	256	Flash	√	40[Note 2]	48	220 k	√	96	16/24	13	−	Real-time counter	−	1	16 bits × 12 (6 phases, 16 bits × 1)	−	−	−	2	−	2	1	2	−	−	−	−	−	−	−	−	√	−	−	12	2	LVI, CLM, DMA, CRC, USB 2.0 function	2.85 to 3.6	128-LQFP (14 × 20)	
			μPD70F3766	384			48[Note 2]																																			
			μPD70F3767	512			56[Note 2]																																			
			μPD70F3771	256			40[Note 2]																	1										1								
		V850ES/JG3-U	μPD70F3763	384	Flash	√	48[Note 2]	48	220 k	√	75	16/16	13	−	Real-time counter	−	1	16 bits × 12 (6 phases, 16 bits × 1)	−	−	−	2	−	2	1	2	−	−	−	−	−	−	−	−	√	−	−	12	2	LVI, CLM, DMA, CRC, USB 2.0 host/function	2.85 to 3.6	100-LQFP (14 × 14)	
			μPD70F3764	512			56[Note 2]																																			
		V850ES/JH3-U	μPD70F3768	384	Flash	√	48[Note 2]	48	220 k	√	96	16/24	13	−	Real-time counter	−	1	16 bits × 12 (6 phases, 16 bits × 1)	−	−	−	2	−	2	1	2	−	−	−	−	−	−	−	−	√	−	−	12	2	LVI, CLM, DMA, CRC, USB 2.0 host/function	2.85 to 3.6	128-LQFP (14 × 20)	
			μPD70F3769	512			56[Note 2]																																			

Notes 1. μPD70F3824 only.
2. Contains an 8 KB area for data use only.

Remark LVI: Low-voltage detector
CLM: Clock monitor

Device				Memory				Clock			I/O	Bus	Timer						Serial Interface																OCD	Peripheral Functions					Other		
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	16-bit timer	8-bit timer	Other timers	Watch timer	Watchdog timer	PWM output	UART	UART supporting LIN	UART, CSI	UART supporting LIN, CSI	UART, I²C	UART supporting LIN, I²C	UART supporting LIN, CSI, I²C	CSI	CSI, I²C	CSI with automatic transmission/reception function	I²C	IEBus	CAN	CAN, IEBus	UART supporting LIN, I²C, CAN	On-chip debugging	LCD (segments × commons)	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
All Flash	V850ES	**V850ES/JE3-E**	μPD70F3826 *	64	Flash	√	32[Note 1]	50	220 k	√	26	−/−	11	−	Real-time counter	−	1	16 bits × 6	−	−	−	1	−	1	1	−	−	−	−	−	−	−	−	√	−	−	10	−	LVI, CLM, DMA, CRC, USB 2.0 function, Ethernet controller	2.85 to 3.6	64-LQFP (10 × 10) 64-WQFN (9 × 9)	E1 QB-V850MINIL (MINICUBE) QB-V850ESJX3E (IECUBE)
			μPD70F3827 *	128			48[Note 1]																	−									1								
			μPD70F3828 *	256			64[Note 1]																																			
			μPD70F3829 *																					−										1								
		V850ES/JF3-E	μPD70F3830 *	64	Flash	√	32[Note 1]	50	220 k	√	42	−/−	11	−	Real-time counter	−	1	16 bits × 7 (6 phases, 16 bits × 1)	−	−	−	1	−	1	2	−	−	−	−	−	−	−	−	√	−	−	10	−	LVI, CLM, DMA, CRC, USB 2.0 function, Ethernet controller	2.85 to 3.6	80-LQFP (12 × 12)	
			μPD70F3831 *	128			48[Note 1]																																			
			μPD70F3832 *	256			64[Note 1]																																			
			μPD70F3833 *																					−										1								
		V850ES/JG3-E	μPD70F3834 *	64	Flash	√	32[Note 1]	50	220 k	√	62	−/−	11	−	Real-time counter	−	1	16 bits × 8 (6 phases, 16 bits × 1)	−	−	−	1	−	1	2	2	−	−	−	−	−	−	−	−	√	−	−	10	−	LVI, CLM, DMA, CRC, USB 2.0 function, Ethernet controller	2.85 to 3.6	100-LQFP (14 × 14) 121-FBGA (8 × 8)[Note 3]	
			μPD70F3835 *	128			48[Note 1]																																			
			μPD70F3836 *	256			64[Note 1]																																			
			μPD70F3837 *																					−										1								
		V850ES/JH3-E	μPD70F3778	256	Flash	√	76[Note 1]	50	220 k	√	84	16/22	13	−	Real-time counter	−	1	16 bits × 12 (6 phases, 16 bits × 1)	−	−	2	2	−	1	3	1	−	−	−	−	−	−	−	−	√	−	−	10	−	LVI, CLM, DMA, CRC, USB 2.0 function, Ethernet controller	2.85 to 3.6	128-LQFP (14 × 20)	
			μPD70F3779	384																																					
			μPD70F3780	512																																					
			μPD70F3781	384			124[Note 2]																																			
			μPD70F3782	512																																					
			μPD70F3783																					−										1								
		V850ES/JJ3-E	μPD70F3784	512	Flash	√	76[Note 1]	50	220 k	√	100	16/24	13	−	Real-time counter	−	1	16 bits × 13 (6 phases, 16 bits × 1)	−	−	2	4	−	1	3	1	−	−	1	−	−	−	−	−	√	−	−	12	−	LVI, CLM, DMA, CRC, USB 2.0 function, Ethernet controller	2.85 to 3.6	144-LQFP (20 × 20)	
			μPD70F3785				124[Note 2]																																			
			μPD70F3786																					−										1								

Notes **1.** Contains a 16 KB area for data use only.
2. Contains a 64 KB area for data use only.
3. μPD70F3837 only.

* Under development

Remark LVI: Low-voltage detector
CLM: Clock monitor

Device				Memory				Clock			I/O	Bus	Timer					Serial Interface							OCD	Peripheral Functions			Other		
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	32-bit timer	16-bit timer	16-bit encoder timer	OS timer	Watchdog timer	UART supporting LIN	UART supporting FIFO	CSI	CSI supporting FIFO	I^2C	IEBus	CAN	On-chip debugging	12-bit A/D converter	10-bit A/D converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
All Flash	V850E2M	**V850E2/MN4**	μPD70F3510	1024	Flash	√	64	200	–	–	188	32/26	4 ch × 1 unit	16 ch × 4 units	2	1	1	6	4	6	4	6	–	–	√	12[Note 1]	12[Note 2]	DMA, USB 2.0 host/function, H-bus shared memory: 64 KB; H-bus memory side cache: 16 KB; DMA dedicated to secondary memory controller, inverter timer support, boundary scan	1.1 to 1.3 (internal) 3.0 to 3.6 (external) 3.0 to 3.6 or 4.5 to 5.5 (analog system)	304-FBGA (19 × 19)	QB-V850MINIL (MINICUBE)
			μPD70F3512																					2				DMA, USB 2.0 host/function, Ethernet controller, H-bus shared memory: 64 KB; H-bus memory side cache: 16 KB; DMA dedicated to secondary memory controller, inverter timer support, boundary scan			
			μPD70F3514				64 × 2									2	2														
			μPD70F3515	2048																											
		V850E2/ML4	μPD70F4021 *	768			64				120		4 ch × 1 unit	16 ch × 2 units		1	1	2	2	2	2	2	–	1	√	12[Note 1]	12[Note 2]	DMA, USB 2.0 host/function, H-bus shared memory: 64 KB; Ethernet controller, inverter timer support, boundary scan	1.1 to 1.3 (internal) 3.0 to 3.6 (external) 3.0 to 3.6 or 4.5 to 5.5 (analog system)	216-LQFP (24 × 24)	QB-V850MINIL (MINICUBE)
			μPD70F4022 *	1024			64																								

Notes **1.** Only when 5 V analog power supply is used.
2. Only when 3.3 V analog power supply is used.

* Under development

Device				Memory				Clock			I/O	Bus	Timer					Serial Interface															OCD	Peripheral Functions					Other		
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	16-bit timer	8-bit timer	Other timers	Watch timer	Watchdog timer	PWM output	UART	UART supporting LIN	UART, CSI	UART supporting LIN, CSI	UART, I^2C	UART supporting LIN, I^2C	UART supporting LIN, CSI, I^2C	CSI	CSI, I^2C	CSI with automatic transmission/ reception function	I^2C	IEBus	CAN	CAN, IEBus	UART supporting LIN, I^2C, CAN	On-chip debugging	LCD [segments × commons]	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
General Purpose (High End)	V850E2	**V850E2/ME3**	μPD703500	168	RAM	–	32	200	–	–	78	32/26	12	–	–	–	–	16 bits × 8	1	–	1	–	–	–	–	1	–	–	–	–	–	–	–	√	–	–	8	–	8 KB instruction cache, 8 KB data cache, USB, DMA	1.4 to 1.65 3.0 to 3.6	176-QFP (24 × 24)	QB-V850MINIL (MINICUBE)
	V850E1	**V850E/ME2**	μPD703111B-06	128	RAM	–	16	66	–	–	78	32/26	12	–	–	–	–	16 bits × 8	1	–	1	–	–	–	–	1	–	–	–	–	–	–	–	√	–	–	8	–	8 KB instruction cache, USB, DMA	1.35 to 1.65 3.0 to 3.6	176-LQFP (24 × 24)	QB-V850MINIL (MINICUBE)
			μPD703111B-10					100																																	
			μPD703111B-13					133																																	
			μPD703111B-15					150																																1.4 to 1.65 3.0 to 3.6		
		V850E/MA3	μPD703136BY	256	Mask	–	8	80	–	–	112	16/26	9	–	–	–	1	16 bits × 6 (6 phases, 16 bits × 1)	–	–	3	–	–	–	–	–	–	–	–	–	–	–	–	√	–	–	8	–	DMA, ROMC	2.3 to 2.7 3.0 to 3.6	144-LQFP (20 × 20) 161-FBGA (13 × 13)	E1 QB-V850MINIL (MINICUBE) QB-V850EMA3 (IECUBE)
			μPD703131BY				16																																		
			μPD703132BY				32																																		
			μPD703133BY	512			16																																		
			μPD703134BY				32																																		
			μPD70F3134BY		Flash	√																																			

Remark ROMC: ROM correction

Device				Memory				Clock			I/O	Bus	Timer						Serial Interface															OCD	Peripheral Functions					Other		
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	16-bit timer	8-bit timer	Other timers	Watch timer	Watchdog timer	PWM output	UART	UART supporting LIN	UART, CSI	UART supporting LIN, CSI	UART, I^2C	UART supporting LIN, I^2C	UART supporting LIN, CSI, I^2C	CSI	CSI, I^2C	CSI with automatic transmission/ reception function	I^2C	IEBus	CAN	CAN, IEBus	UART supporting LIN, I^2C, CAN	On-chip debugging	LCD (segments × commons)	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
Inverter Control	V850E1	**V850E/IA3**	μPD703183	128	Mask	–	6	64	–	–	50	–/–	8	–	–	–	1	16 bits × 5 (6 phases, 16 bits × 1)	1	–	1	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	12		DMA, ROMC, operational amplifier × 5, comparator	2.3 to 2.7 4.0 to 5.5	80-QFP (14 × 14)	E1 QB-V850EIA4 (IECUBE)
			μPD70F3184	256	Flash	√	12																																		
		V850E/IA4	μPD703185	128	Mask	–	6	64	–	–	64	–/–	9	–	–	–	1	16 bits × 6 (6 phases, 16 bits × 2)	1	–	1	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	16	–	DMA, ROMC, operational amplifier × 6, comparator	2.3 to 2.7 4.0 to 5.5	100-LQFP (14 × 14) 100-QFP (14 × 20)	E1 QB-V850MINIL (MINICUBE) QB-V850EIA4 (IECUBE)
			μPD703186	256			12																																		
			μPD70F3186		Flash	√																												√								
	V850ES	**V850ES/IK1**	μPD703327	64	Mask	–	4	32	–	–	39	–/–	7	–	–	–	1	16 bits × 6 (6 phases, 16 bits × 1)	2	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	8	–	POC, LVI, ROMC	3.5 to 5.5	64-LQFP (14 × 14)	E1 QB-V850EIA4 (IECUBE)
			μPD703329	128			6																																		
			μPD70F3329		Flash	√																																				

Remark POC: Power-on clear circuit
LVI: Low-voltage detector
ROMC: ROM correction

Device				Memory				Clock			I/O	Bus	Timer					Serial Inetrface							OCD	Peripheral Functions			Other		
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	32-bit timer	16-bit timer	16-bit encoder timer	OS timer	Watchdog timer	UART supporting LIN	UART supporting FIFO	CSI	CSI supporting FIFO	I^2C	IEBus	CAN	On-chip debugging	12-bit A/D converter	10-bit A/D converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
Car Electronics Car Multimedia (All Flash)	V850E2M	**V850E2/SG4-H**	μPD70F4013 *	1024 KB	Flash	√	96	160	8 M, 240 k	√	58	16/20	4 ch × 1 unit	16 ch × 1 unit	–	1	2	4	–	2	2	4	1	1	√	–	8	DMA, real-time clock, multiplexed SRAM interface (8/16 bits), IISA interface: 4 ch; PCM interface: 1 ch; MLB: 1 ch; POC (available in M1 products, not available in M2 products), CLM, data CRC, LVI, HBUS-RAM: 32 KB; Data flash: 32 KB; backup RAM: 32 KB; instruction cache: 8 KB/2-way associative (4 KB/way)	1.1 to 1.3 (supplied internally) 3.0 to 3.6 (supplied from I/O)	100-LQFP (14 × 14)	E1 QB-V850MINIL (MINICUBE) QB-V850E2 (IECUBE2)
			μPD70F4014 *	1536 KB			128																								
		V850E2/SJ4-H	μPD70F4015 *	1024 KB	Flash	√	96	160	8 M, 240 k	√	100	16/24	4 ch × 1 unit	16 ch × 1 unit	–	1	2	5	–	2	3	4	1	2	√	–	16	DMA, real-time clock, SDRAM interface, multiplexed/separate SRAM interface (8/16 bits), IISA interface: 4 ch; PCM interface: 2 ch; MLB: 1 ch; POC (available in M1 products, not available in M2 products), CLM, data CRC, LVI, KR, HBUS-RAM: 32 KB; Data flash: 32 KB; backup RAM: 32 KB; instruction cache: 8 KB/2-way associative (4 KB/way)	1.1 to 1.3 (supplied internally) 3.0 to 3.6 (supplied from I/O)	144-LQFP (20 × 20)	
			μPD70F4016 *	1536 KB			128																								
		V850E2/SK4-H	μPD70F4017	1536 KB	Flash	√	128	160	8 M, 240 k	√	127	32/24	4 ch × 1 unit	16 ch × 2 units	2	1	2	5	–	2	3	4	1	2	√	–	16	DMA, real-time clock, SDRAM interface, multiplexed/separate SRAM interface (8/16/32 bits), IISA interface: 6 ch; PCM interface: 2 ch; MLB: 1 ch; POC (available in M1 products, not available in M2 products), CLM, data CRC, LVI, KR, HBUS-RAM: 32 KB; Data flash: 32 KB; backup RAM: 32 KB; instruction cache: 8 KB/2-way associative (4 KB/way) Ethernet controller	1.1 to 1.3 (supplied internally) 3.0 to 3.6 (supplied from I/O)	176-LQFP (24 × 24)	
			μPD70F4018	2048 KB			192																								

Note This is the size of the code flash.

* Under development

Remark POC: Power-on clear circuit
LVI: Low-voltage detector
CLM: Clock monitor

Device				Memory				Clock			I/O	Bus	Timer						Serial Interface															OCD	Peripheral Functions					Other		
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	16-bit timer	8-bit timer	Other timers	Watch timer	Watchdog timer	PWM output	UART	UART supporting LIN	UART, CSI	UART supporting LIN, CSI	UART, I^2C	UART supporting LIN, I^2C	UART supporting LIN, CSI, I^2C	CSI	CSI, I^2C	CSI with automatic transmission/ reception function	I^2C	IEBus	CAN	CAN, IEBus	UART supporting LIN, I^2C, CAN	On-chip debugging	LCD (segments × commons)	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
Car Electronics Car Multimedia (On-Chip IEBus) (All Flash)	V850E1	**V850E/SJ3-H**	μPD70F3931B	512	Flash	√	60	48	220 k	√	128	16/24	13	–	Real-time counter	1	1	16 bits × 12	2	1	–	1	–	2	–	3	1	–	1	1	–	–	–	–	√	–	–	16	2	LVI, CLM, DMA, ROMC, CRC	2.85 to 3.6	144-LQFP (20 × 20)	E1 QB-V850MINIL (MINICUBE) QB-V850ESX3H (IECUBE)
			μPD70F3934B	768			76															2			1															
			μPD70F3937B	1024																																					
			μPD70F3474A	1280			92																																		
			μPD70F3477A	1536																																					
		V850E/SK3-H	μPD70F3925A	1024	Flash	√	76	48	220 k	√	156	16/24	13	–	Real-time counter	1	1	16 bits × 12	2	1	–	2	–	2	1	3	1	1	2	1	–	–	–	√	–	–	16	2	LVI, CLM, DMA, ROMC, CRC	2.85 to 3.6	176-LQFP (24 × 24)	
			μPD70F3486A	1280			92																																	
			μPD70F3480A	1536																																					

Remark LVI: Low-voltage detector
CLM: Clock monitor
ROMC: ROM correction

Device				Memory				Clock			I/O	Bus	Timer						Serial Interface															OCD	Peripheral Functions					Other		
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	16-bit timer	8-bit timer	Other timers	Watch timer	Watchdog timer	PWM output	UART	UART supporting LIN	UART, CSI	UART supporting LIN, CSI	UART, I^2C	UART supporting LIN, I^2C	UART supporting LIN, CSI, I^2C	CSI	CSI, I^2C	CSI with automatic transmission/ reception function	I^2C	IEBus	CAN	CAN, IEBus	UART supporting LIN, I^2C, CAN	On-chip debugging	LCD [segments × commons]	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
Car Electronics Car Multimedia (On-Chip IEBus) (All Flash)	V850ES	**V850ES/SG3**	μPD70F3333	256	Flash	√	24	32	220 k	√	84	16/22	8	–	–	1	1	16 bits × 9	–	–	–	1	–	2	–	3	1	–	–	1	–	–	–	√	–	–	12	2	LVI, CLM, DMA, ROMC, CRC	2.85 to 3.6	100-LQFP (14 × 14)	E1 QB-V850MINIL (MINICUBE) QB-V850ESSX2 (IECUBE)
			μPD70F3334	384			32																																	
			μPD70F3340	512			40																																	
			μPD70F3341	640			48																																	
			μPD70F3342	768			60																																	
			μPD70F3343	1024																																				
		V850ES/SJ3	μPD70F3344	384	Flash	√	32	32	220 k	√	128	16/24	11	–	–	1	1	16 bits × 12	–	1	–	1	–	2	–	4	1	–	–	1	–	–	–	√	–	–	16	2	LVI, CLM, DMA, ROMC, CRC	2.85 to 3.6	144-LQFP (20 × 20)	
			μPD70F3345	512			40																																	
			μPD70F3346	640			48																																	
			μPD70F3347	768			60																																	
			μPD70F3348	1024																																				

Remark LVI: Low-voltage detector
CLM: Clock monitor
ROMC: ROM correction

Device				Memory				Clock			I/O	Bus	Timer					Serial Interface																	OCD	Peripheral Functions					Other		
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	16-bit timer	8-bit timer	Other timers	Watch timer	Watchdog timer	PWM output	UART	UART supporting LIN	UART, CSI	UART supporting LIN, CSI	UART, I²C	UART supporting LIN, I²C	UART supporting LIN, CSI, I²C	CSI	CSI, I²C	CSI with automatic transmission/ reception function	I²C	IEBus	CAN	CAN, IEBus	UART supporting LIN, I²C, CAN	On-chip debugging	LCD [segments × commons]	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
Car Electronics Car Multimedia (On-Chip CAN) (All Flash)	V850ES	**V850ES/SG3**	μPD70F3335	256	Flash	√	24	32	220 k	√	84	16/22	8	–	–	1	1	16 bits × 9	–	–	–	1	–	2	–	3	1	–	–	–	–	1	–	√	–	–	12	2	LVI, CLM, DMA, ROMC, CRC	2.85 to 3.6	100-LQFP (14 × 14)	E1 QB-V850MINIL (MINICUBE) QB-V850ESSX2 (IECUBE)
			μPD70F3336	384			32																																		
			μPD70F3350	512			40																																		
			μPD70F3351	640			48																																		
			μPD70F3352	768			60																																		
			μPD70F3353	1024																																					
		V850ES/SJ3	μPD70F3354	384	Flash	√	32	32	220 k	√	128	16/24	11	–	–	1	1	16 bits × 12	–	1	–	1	–	2	–	4	1	–	–	–	–	1	–	√	–	–	16	2	LVI, CLM, DMA, ROMC, CRC	2.85 to 3.6	144-LQFP (20 × 20)	
			μPD70F3355	512			40																																		
			μPD70F3356	640			48																																		
			μPD70F3357	768			60																																		
			μPD70F3358	1024																																					
			μPD70F3364	384			32																									1									
			μPD70F3365	512			40																																		
			μPD70F3366	640			48																																		
			μPD70F3367	768			60																																		
			μPD70F3368	1024																																					
	V850E1	**V850E/SJ3-H**	μPD70F3932B	512	Flash	√	60	48	220 k	√	128	16/24	13	–	Real-time counter	1	1	16 bits × 12	2	1	–	1	–	2	–	3	1	–	1	–	–	1	–	√	–	–	16	2	LVI, CLM, DMA, ROMC, CRC	2.85 to 3.6	144-LQFP (20 × 20)	E1 QB-V850MINIL (MINICUBE) QB-V850ESX3H (IECUBE)
			μPD70F3933B																												1									
			μPD70F3935B	768			76															2				1				1	2	–									
			μPD70F3936B																												1									
			μPD70F3938B	1024																												–									
			μPD70F3939B																												1									
			μPD70F3475A	1280			92																									–									
			μPD70F3476A																												1									
			μPD70F3478A	1536																												–									
			μPD70F3479A																												1									
		V850E/SK3-H	μPD70F3926A	1024	Flash	√	76	48	220 k	√	156	16/24	13	–	Real-time counter	1	1	16 bits × 12	2	1	–	2	–	2	1	3	1	1	2	1	1	–	–	√	–	–	16	2	LVI, CLM, DMA, ROMC, CRC	2.85 to 3.6	176-LQFP (24 × 24)	
			μPD70F3927A																												2									
			μPD70F3487A	1280			92																									1									
			μPD70F3488A																												2									
			μPD70F3481A	1536																												1									
			μPD70F3482A																												2									

Remark LVI: Low-voltage detector
CLM: Clock monitor
ROMC: ROM correction

Device				Memory				Clock			I/O	Bus	Timer					Serial Interface							OCD	Peripheral Functions			Other		
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	32-bit timer	16-bit timer	16-bit encoder timer	OS timer	Watchdog timer	UART supporting LIN	UART supporting FIFO	CSI	CSI supporting FIFO	I²C	IEBus	CAN	On-chip debugging	12-bit A/D converter	10-bit A/D converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
Car Electronics Body Control (All Flash)	V850E2M	**V850E2/FG4**	μPD70F3548 *	512	Flash	√	48	80	8 M, 240 k	–	66	–	4 ch × 2 units	16 ch × 2 units	1	1	1	5	–	2	1	1	–	2	√	20	–	Data flash: 32 KB Backup RAM: 4 KB/8 KB Instruction cache: 8 KB/2-way associative (4 KB/way) DMA, motor control, POC, voltage comparator, CLM, RNG, data CRC, boundary scan	3.0 to 5.5	100-LQFP (14 × 14)	E1 QB-V850E2 (IECUBE2) QB-MINI2 (MINICUBE2)
			μPD70F3549 *	768			64																							
			μPD70F3550 *	1024			80																							
			μPD70F4000Note *	512			48																							
			μPD70F4001Note *	768			64																							
			μPD70F4002Note *	1024			80																							
		V850E2/FJ4	μPD70F3551 *	512	Flash	√	48	80	8 M, 240 k	√	103	–	4 ch × 2 units	16 ch × 6 units	1	1	2	6	–	2	2	1	–	3	√	24	–	Data flash: 32 KB/64 KB Backup RAM: 4 KB/8 KB/16 KB Instruction cache: 8 KB/2-way associative (4 KB/way) FPU (μPD70F3554, 70F4006 only) DMA, motor control, POC, PMC, DLY, voltage comparator, CLM, RNG, data CRC, boundary scan	3.0 to 5.5	144-HLQFP (20 × 20)	E1 QB-V850E2 (IECUBE2) QB-MINI2 (MINICUBE2)
			μPD70F3552 *	768			64																							
			μPD70F3553 *	1024			80																							
			μPD70F3554 *	1536			112																							
			μPD70F4003Note *	512			48																							
			μPD70F4004Note *	768			64																							
			μPD70F4005Note *	1024			80																							
			μPD70F4006Note *	1536			112																							
		V850E2/FK4	μPD70F3555 *	768	Flash	√	64	80	8 M, 240 k	√	128	16/22	4 ch × 2 units	16 ch × 7 units	1	1	2	8	–	2	3	1	–	4	√	40	–	Data flash: 32 KB/64 KB Backup RAM: 8 KB/16 KB Instruction cache: 8 KB/2-way associative (4 KB/way) FPU (μPD70F3557, 70F3558, 70F4009, 70F4010 only) MEMC, DMA, motor control, PMC, DLY, POC, voltage comparator, CLM, RNG, data CRC, boundary scan	3.0 to 5.5	176-HLQFP (24 × 24)	E1 QB-V850E2 (IECUBE2) QB-MINI2 (MINICUBE2)
			μPD70F3556 *	1024			80																							
			μPD70F3557 *	1536			112																							
			μPD70F3558 *	2048			144																							
			μPD70F4007Note *	768			64																							
			μPD70F4008Note *	1024			80																							
			μPD70F4009Note *	1536			112																							
			μPD70F4010Note *	2048			144																							
		V850E2/FL4	μPD70F3559 *	1536	Flash	√	112	80	8 M, 240 k	√	158	16/22	4 ch × 2 units	16 ch × 8 units	1	1	2	12	–	2	3	1	–	4	√	48	–	Data flash: 64 KB Backup RAM: 16 KB Instruction cache: 8 KB/2-way associative (4 KB/way) FPU, MEMC, DMA, motor control, PMC, DLY, POC, voltage comparator, CLM, RNG, data CRC, boundary scan	3.0 to 5.5	208-QFP (28 × 28), 256-BGA (21 × 21)	E1 QB-V850E2 (IECUBE2) QB-MINI2 (MINICUBE2)
			μPD70F3560 *	2048			144																							
			μPD70F4011Note *	1536			112																							
			μPD70F4012Note *	2048			144																							

Note Contains a FlexRay controller.

* Under development

Remark POC: Power-on clear circuit; CLM: Clock monitor; FLX: FLexRay controller; MEMC: External memory interface; PMC: PWM diagnostic module; DLY: PWM delay unit; RNG: Random number generator

Device				Memory				Clock			I/O	Bus	Timer					Serial Interface							OCD	Peripheral Functions			Other		
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	32-bit timer	16-bit timer	16-bit encoder timer	OS timer	Watchdog timer	UART supporting LIN	UART supporting FIFO	CSI	CSI supporting FIFO	I^2C	IEBus	CAN	On-chip debugging	12-bit A/D converter	10-bit A/D converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
Car Electronics Body Control, Low Power (All Flash)	V850E2S	**V850E2/FE4-L**	μPD70F3570 *	256	Flash	√	24	48	8 M, 240 k	–	45	–	4 ch × 1 unit	16 ch × 1 unit	–	1	2	2	–	2	–	1	–	1	√	–	12	Data flash: 32 KB Backup RAM: 4 KB DMA, POC, CLM, boundary scan	3.0 to 5.5	64-LQFP (10 × 10)	E1 QB-V850E2 (IECUBE2) QB-MINI2 (MINICUBE2)
			μPD70F3571 *	384			28																							
			μPD70F3572 *	512			32																							
		V850E2/FF4-L	μPD70F3573 *	256	Flash	√	24	48	8 M, 240 k	–	61	–	4 ch × 1 unit	16 ch × 1 unit	–	1	2	2	–	2	–	1	–	1	√	–	14	Data flash: 32 KB Backup RAM: 4 KB DMA, POC, CLM, boundary scan	3.0 to 5.5	80-LQFP (12 × 12)	E1 QB-V850E2 (IECUBE2) QB-MINI2 (MINICUBE2)
			μPD70F3574 *	384			28																							
			μPD70F3575 *	512			32																							
		V850E2/FG4-L	μPD70F3576 *	256	Flash	√	24	48	8 M, 240 k	–	76	–	4 ch × 1 unit	16 ch × 1 unit	–	1	2	3	–	3	–	1	–	2	√	–	20	Data flash: 32 KB Backup RAM: 4 KB/8 KB DMA, POC, CLM, boundary scan	3.0 to 5.5	100-LQFP (14 × 14)	E1 QB-V850E2 (IECUBE2) QB-MINI2 (MINICUBE2)
			μPD70F3577 *	384			28																							
			μPD70F3578 *	512			32																							
			μPD70F3579 *	768			48	64																						
			μPD70F3580 *	1024			64																							
		V850E2/FJ4-L	μPD70F3582 *	384	Flash	√	28	48	8 M, 240 k	–	116	–	4 ch × 1 unit	16 ch × 2 units	–	1	2	3	–	3	–	1	–	2	√	–	24	Data flash: 32 KB Backup RAM: 4 KB/8 KB DMA, POC, CLM, boundary scan	3.0 to 5.5	144-LQFP (20 × 20)	E1 QB-V850E2 (IECUBE2) QB-MINI2 (MINICUBE2)
			μPD70F3583 *	512			32											5												
			μPD70F3584 *	768			48	64																						
			μPD70F3585 *	1024			64																							

Remark POC: Power-on clear circuit
CLM: Clock monitor

* Under development

Device				Memory				Clock			I/O	Bus	Timer					Serial Interface						OCD	Peripheral Functions			Other		
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	32-bit timer	16-bit timer	16-bit encoder timer	OS timer	Watchdog timer	UART supporting LIN	UART supporting FIFO	CSI	CSI supporting FIFO	I^2C	IEBus	CAN	On-chip debugging	12-bit A/D converter	10-bit A/D converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
Car Electronics Body Control, Advanced Function (All Flash)	V850E2M	**V850E2/FK4-H**	μPD70F3561 *	2048	Flash	√	144	160	8 M, 240 k	√	131	16/22	4 ch × 2 units	16 ch × 7 units	√	1	2	12	–	2	3	1	–	4	√	40	–	Data flash: 64 KB Backup RAM: 16 KB Instruction cache: 8 KB/2-way associative (4 KB/way) FPU, MEMC, DMA, DCAN, motor control, ETH, PMC, DLY, POC, voltage comparator, CLM, RNG, data CRC, boundary scan, FLX	3.0 to 5.5	176-HLQFP (24 × 24)	E1 QB-V850E2 (IECUBE2) QB-MINI2 (MINICUBE2)
		V850E2/FL4-H	μPD70F3564 *	2048	Flash	√	144	160	8 M, 240 k	√	161	16/22	4 ch × 2 units	16 ch × 8 units	√	1	2	12	–	3	3	1	–	5	√	48	–	Data flash: 64 KB Backup RAM: 16 KB Instruction cache: 8 KB/2-way associative (4 KB/way) FPU, MEMC, DMA, DCAN, motor control, ETH, PMC, DLY, POC, voltage comparator, CLM, RNG, data CRC, boundary scan, FLX	3.0 to 5.5	208-QFP (28 × 28), 272-BGA (21 × 21)	E1 QB-V850E2 (IECUBE2) QB-MINI2 (MINICUBE2)
Body Control, Motor Control (All Flash)		**V850E2/FF4-M**	μPD70F3543 *	256	Flash	√	32	80	8 M, 240 k	–	49	–	4 ch × 1 unit	16 ch × 2 units	1	1	2	3	–	2	–	1	–	1	√	12	–	Data flash: 32 KB Backup RAM: 4 KB Instruction cache: 8 KB/2-way associative (4 KB/way) FPU, DMA, motor control, POC, voltage comparator, CLM, RNG, data CRC, boundary scan	3.0 to 5.5	80-LQFP (12 × 12)	E1 QB-V850E2 (IECUBE2) QB-MINI2 (MINICUBE2)
			μPD70F3544 *	384			40																								
			μPD70F3545 *	512			48																								
Body Control (All Flash)		**V850E2/FK4-G**	μPD70F3592 *	1024	Flash	√	128	80	8 M, 240 k	√	136	–	4 ch × 2 units	16 ch × 2 units	–	1	2	5	–	2	1	1	–	6	√	24 + 12	–	Data flash: 32 KB Backup RAM: 8 KB Instruction cache: 8 KB/2-way associative (4 KB/way) DMA, POC, voltage comparator, CLM, RNG, data CRC, boundary scan, FLX	3.0 to 5.5	176-HLQFP (24 × 24)	E1 QB-V850E2 (IECUBE2) QB-MINI2 (MINICUBE2)

Remark POC: Power-on clear circuit; CLM: Clock monitor; FLX: FLexRay controller; MEMC: External memory interface; DCAN: Diagnostic CAN; PMC: PWM diagnostic module; ETH: Ethernet controller; DLY: PWM delay unit; RNG: Random number generator

* Under development

Device				Memory				Clock			I/O	Bus	Timer						Serial Interface															OCD	Peripheral Functions					Other		
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	16-bit timer	8-bit timer	Other timers	Watch timer	Watchdog timer	PWM output	UART	UART supporting LIN	UART, CSI	UART supporting LIN, CSI	UART, I²C	UART supporting LIN, I²C	UART supporting LIN, CSI, I²C	CSI	CSI, I²C	CSI with automatic transmission/ reception function	I²C	IEBus	CAN	CAN, IEBus	UART supporting LIN, I²C, CAN	On-chip debugging	LCD [segments × commons]	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
Car Electronics Body Control (All Flash)	V850ES	**V850ES/FE3**	μPD70F3370A	128	Flash	√	8	32	8 M, 240 k	√	51	−/−	7	−	−	1	1	16 bits × 8 (6 phases, 16 bits × 1)	−	2	−	−	−	−	−	2	−	−	1	−	1	−	−	√	−	−	10	−	POC, LVI, CLM, DMA	3.3 to 5.5	64-LQFP (10 × 10)	E1 QB-V850MINIL (MINICUBE) QB-V850ESFX3 (IECUBE)
			μPD70F3371	256			16																																		
		V850ES/FF3	μPD70F3372	128	Flash	√	8	32	8 M, 240 k	√	67	−/−	7	−	−	1	1	16 bits × 8 (6 phases, 16 bits × 1)	−	2	−	−	−	−	−	2	−	−	1	−	1	−	−	√	−	−	12	−	POC, LVI, CLM, DMA	3.3 to 5.5	80-LQFP (12 × 12)	
			μPD70F3373	256			16																																		
		V850ES/FG3	μPD70F3374	128	Flash	√	8	32	8 M, 240 k	√	84	−/−	8	−	−	1	1	16 bits × 11 (6 phases, 16 bits × 1)	−	3	−	−	−	−	−	2	−	−	1	−	2	−	−	√	−	−	16	−	POC, LVI, CLM, DMA	3.3 to 5.5	100-LQFP (14 × 14)	
			μPD70F3375	256			16																																		
			μPD70F3376A	384			24	48												5																					
			μPD70F3377A	512			32																																		
		V850ES/FJ3	μPD70F3378	256	Flash	√	16	32	8 M, 240 k	√	128	−/−	9	−	−	1	1	16 bits × 14 (6 phases, 16 bits × 1)	−	3	−	−	−	−	−	3	−	−	1	−	3	−	−	√	−	−	24	−	POC, LVI, CLM, DMA	3.3 to 5.5	144-LQFP (20 × 20)	
			μPD70F3379	384			24	48												6											4									
			μPD70F3380	512			32																																		
			μPD70F3381	768			40																				4														
			μPD70F3382	1024			48																																		
		V850ES/FK3	μPD70F3383	512	Flash	√	32	48	8 M, 240 k	√	152	−/−	12	−	−	1	1	16 bits × 17 (6 phases, 16 bits × 1)	−	8	−	−	−	−	−	4	−	−	1	−	5	−	−	√	−	−	24+16	−	POC, LVI, CLM, DMA	3.3 to 5.5	176-LQFP (24 × 24)	
			μPD70F3384	768			48																																		
			μPD70F3385	1024			60																																		
		V850ES/FE3-L	μPD70F3610	64	Flash	√	6	20	8 M, 240 k	√	51	−/−	6	−	−	1	1	16 bits × 5	−	2	−	−	−	−	−	2	−	−	1	−	1	−	−	√	−	−	10	−	POC, LVI, CLM	3.3 to 5.5	64-LQFP (10 × 10)	
			μPD70F3611	96																																					
			μPD70F3612	128			8																																		
			μPD70F3613	192			12																																		
			μPD70F3614	256			16																																		
		V850ES/FF3-L	μPD70F3615	64	Flash	√	6	20	8 M, 240 k	√	67	−/−	6	−	−	1	1	16 bits × 5	−	2	−	−	−	−	−	2	−	−	1	−	1	−	−	√	−	−	12	−	POC, LVI, CLM	3.3 to 5.5	80-LQFP (12 × 12)	
			μPD70F3616	96																																					
			μPD70F3617	128			8																																		
			μPD70F3618	192			12																																		
			μPD70F3619	256			16																																		
		V850ES/FG3-L	μPD70F3620	128	Flash	√	8	20	8 M, 240 k	√	84	−/−	6	−	−	1	1	16 bits × 5	−	3	−	−	−	−	−	2	−	−	1	−	1	−	−	√	−	−	16	−	POC, LVI, CLM	3.3 to 5.5	100-LQFP (14 × 14)	
			μPD70F3621	192			12																																		
			μPD70F3622	256			16																																		

Remark POC: Power-on clear circuit
LVI: Low-voltage detector
CLM: Clock monitor

Device				Memory				Clock			I/O	Bus	Timer						Serial Interface																OCD	Peripheral Functions					Other		
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	16-bit timer	8-bit timer	Other timers	Watch timer	Watchdog timer	PWM output	UART	UART supporting LIN	UART, CSI	UART supporting LIN, CSI	UART, I^2C	UART supporting LIN, I^2C	UART supporting LIN, CSI, I^2C	CSI	CSI, I^2C	CSI with automatic transmission/ reception function	I^2C	IEBus	CAN	CAN, IEBus	UART supporting LIN, I^2C, CAN	On-chip debugging	LCD [segments × commons]	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
Car Electronics Dashboard Control (All Flash)	V850E1	**V850E/DG3**	μPD70F3416	128	Flash	√	6	24	240 k	√	80	−/−	12	−	−	1	1	16 bits × 3	−	2	−	−	−	−	−	2	−	−	1	−	1	−	−	√	40 × 4	−	8	−	Meter driver × 4, POC, CLM, ROMC, sound generator	3.5 to 5.5	100-LQFP (14 × 14)	QB-V850MINIL (MINICUBE) QB-703427 (IECUBE)
			μPD70F3417	256			12																																			
		V850E/DJ3	μPD70F3421	256	Flash	√	12	32	240 k	√	114	−/−	27	−	−	1	1	16 bits × 11	−	2	−	−	−	−	−	2	−	−	2	−	3	−	−	√	40 × 4	−	12	−	Meter driver × 6, POC, CLM, DMA, ROMC, voltage comparator, sound generator, LCD bus interface	3.5 to 5.5	144-LQFP (20 × 20)	QB-V850MINIL (MINICUBE) QB-703427 QB-703426 (IECUBE)
			μPD70F3422	384			20																																			
			μPD70F3423	512			20																																			
			μPD70F3424				24	64					31													3										–		16					
			μPD70F3425	1024			32																																			
			μPD70F3426A	2048			84																								2											
		V850E/DL3	μPD70F3427	1024	Flash	√	60	64	240 k	√	117	32/24	31	−	−	1	1	16 bits × 11	−	2	−	−	−	−	−	3	−	−	2	−	3	−	−	√	−	−	16	−	Meter driver × 6, POC, CLM, DMA, ROMC, voltage comparator, sound generator, LCD bus interface	3.5 to 5.5	208-LQFP (28 × 28)	QB-V850MINIL (MINICUBE) QB-703427 (IECUBE)

Remark POC: Power-on clear circuit
CLM: Clock monitor
ROMC: ROM correction

Device				Memory				Clock			I/O	Bus	Timer					Serial Interface									OCD	Peripheral Functions				Other		
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	32-bit timer	16-bit timer	16-bit timer encoder timer	OS timer	Watchdog timer	UART supporting LIN	UART supporting FIFO	CSI	CSI supporting FIFO	I^2C	I^2S	CAN	FlexRay	On-chip debugging	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
Car Electronics Instrument Cluster Control	V850E2	**V850E2/DJ4**	μ PD70F3522	256	Flash	√	24	80	8 M/ 240 k	√	105	−/−	4 ch × 3 units	16 ch × 5 units	−	1	2	2	−	3	−	2	−	3	−	√	16	−	−	Data flash: 32 KB Backup RAM: 16 KB Real-time clock FPU, instruction cache, DMA LCD bus interface, POC, CLM, boundary scan LCD [segments x commons] 69 × 6	2.7 to 5.5	144-LQFP (20 x 20)	E1 QB-V850E2 (IECUBE)
			μ PD70F3523	512			48																										
			μ PD70F3524	1024			96																										
			μ PD70F3525	2048			192	120													1		1									144-LQFP (20 x 20) 144-HLQFP (20 x 20)	
			μ PD70F3526	3072			256																										

Remark FPU: Floating-point unit
POC: Power-on clear circuit
LVI: Low-voltage detector

Device				Memory				Clock			I/O	Bus	Timer					Serial Interface								OCD	Peripheral Functions				Other		
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	32-bit timer	16-bit timer	16-bit timer encoder timer	OS timer	Watchdog timer	UART supporting LIN	UART supporting FIFO	CSI	CSI supporting FIFO	I^2C	I^2S	CAN	FlexRay	On-chip debugging	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
Car Electronics Instrument cluster Control	V850E2	**V850E2/DK4-H**	μ PD70F3529	2048	Flash	√	96	80	8 M, 240 k	√	127	–	4 ch × 1 unit	16 ch × 3 units	–	1	2	2	–	2	–	2	1	3	–	√	12	–	–	Data flash: 32 KB Backup RAM: 8 KB/16 KB Video RAM: 592 K/8 MB FPU, instruction cache, DMA LCD bus interface, 2D graphics functions, POC, CLM, boundary scan HFSI: 1 ch to 2 ch	2.7 to 5.5	176-HLQFP (24 x 24)	E1 QB-V850E2 (IECUBE)
		V850E2/DN4-H	μ PD70F3532	3072			256	160			165	32/24	4 ch × 3 units	16 ch × 5 units				4		3					1		16				1.1 to 1.3 (internal) 2.7 to 5.5 and 3.0 to 3.6 (external)	352-PBGA (23 x 23)	
		V850E2/DP4-H	μ PD70F3535	3072			256					–																				408-PBGA (27 x 27)	
			μ PD70F3536																														
			μ PD70F3537																														

Remark FPU: Floating-point unit
POC: Power-on clear circuit
LVI: Low-voltage detector

Device				Memory				Clock			I/O	Bus	Timer			Serial Interface								OCD	Peripheral Functions				Other		
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	24-bit timer	16-bit timer	16-bit timer encoder timer	OS timer	Watchdog timer	UART supporting LIN	UART supporting FIFO	CSI	CSI supporting FIFO	I^2C	I^2S	CAN	FlexRay	On-chip debugging	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
Car Electronics Body Control	V850E1	**V850E/PG2**	μ PD70F3413	240	Flash	√	12	64	–	–	49	–/–	1 + 5 units	2 units	6 units	–	–	3	–	2	–	–	–	1	–	–	22	–	–	Tuning RAM: 2 KB DMA, motor control, LVI, NBD	4.0 to 5.5 (external) 1.35 to 1.65 (internal)	100-QFP (14 x 14)	E1 QB-V850E2 (IECUBE) QB-MINI2 (MINICUBE2)
			μ PD70F3414	496			32																	2									

Remark NBD: Non-break debug
LVI: Low-voltage detector

Device				Memory				Clock			I/O	Bus	Timer					Serial Interface								OCD	Peripheral Functions				Other		
Applications	CPU core	Commercial name	Product name	ROM size [KB]	ROM type	Single voltage flash	RAM size [KB]	Maximum operating frequency [MHz]	On-chip oscillator [Hz]	Subclock (32.768 kHz)	I/O ports	External bus (data/address)	32-bit timer	16-bit timer	16-bit timer encoder timer	OS timer	Watchdog timer	UART supporting LIN	UART supporting FIFO	CSI	CSI supporting FIFO	I^2C	I^2S	CAN	FlexRay	On-chip debugging	12-bit A/D converter	10-bit A/D converter	8-bit D/A converter	Other functions	Power supply voltage [V]	Package (size [mm])	In-circuit emulator Emulation board
Car Electronics Body Control	V850E2	**V850E2/PJ4**	μ PD70F3506*	512	Flash	√	40	80	–	–	73	–/–	4 ch × 2 units	16 ch × 2 units	2 units	2	1	3	–	3	2	–	–	2	1	√	22	–	–	Data flash: 32 KB FPU, motor control, data CRC, POF, LVI, CLM, DMA	3.0 to 3.6 (external) 1.1 to 1.3 (internal)	144-HLQFP (20 x 20)	E1 QB-V850MINIL (MINICUBE)
			μ PD70F3507*																												4.5 to 5.5 (external) 1.1 to 1.3 (internal)		
			μ PD70F3508*	1024			80	160																						3.0 to 3.6 (external) 1.1 to 1.3 (internal)		
			μ PD70F3509*																												4.5 to 5.5 (external) 1.1 to 1.3 (internal)		
		V850E2/PG4-L	μ PD70F4154*	384	Flash	√	24	80	–	–	46	–/–	4 ch × 1 unit	16 ch × 1 unit	1 unit	2	1	2	–	2	–	–	–	2	–	√	18	–	–	Data flash: 16 KB motor control, data CRC, POF, LVI, CLM, DMA	3.0 to 5.5	100-LQFP (14 x 14)	E1 QB-V850MINIL (MINICUBE)
			μ PD70F4155*																														

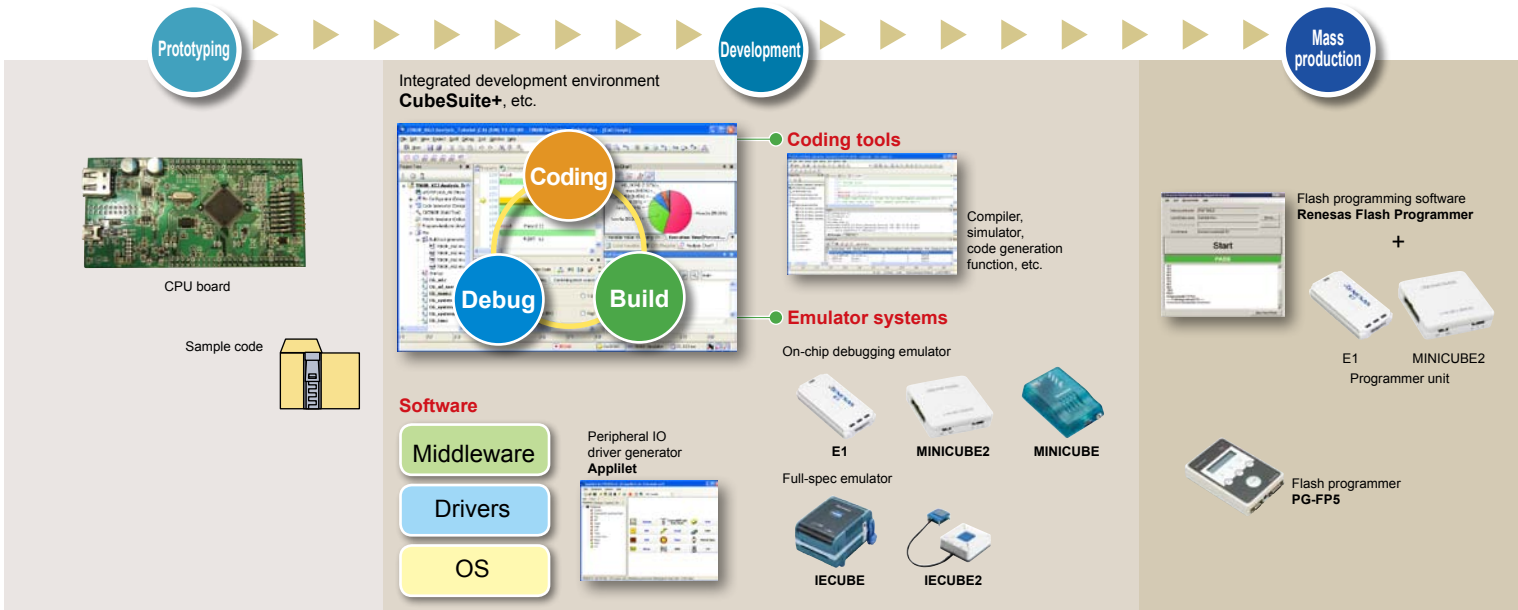
Remark FPU: Floating-point unit
POF: Power-on flag
LVI: Low-voltage detector
CLM: Clock monitor

* Under development

Memo

Tool Chain Overview

http://www.renesas.com/v850_tools



* A free evaluation version is also available for the coding tools and flash programming software (Renesas Flash Programmer).

■ V850 Development Tool Lineup

MCU	Real-time OS	Software Tools	Emulators		Programming Tools
			On-chip debugging emulator	Full-spec emulator	Programmer [5]
V850	RI850V4 [1] RI850MP (V850E2M Dual Core)	Integrated Development Environment CubeSuite+ for V850 (includes integrated development environment [2], compiler, simulator, and emulator debugger) Software Package for V850 [SP850] (includes integrated development environment [3], compiler, simulator, and emulator debugger)	E1 [4] MINICUBE2 MINICUBE (JTAG emulator for V850)	IECUBE IECUBE2	PG-FP5 [6] E1 [4,7] MINICUBE2 [7,8]

Notes:
1. Some MCUs support the RX850V4 real-time OS instead.
2. The integrated development environment is CubeSuite+.
3. The integrated development environment is the project manager PM+.
4. The E20 emulator may be used as well, but the supported debugging functions are equivalent to those of the E1.
5. This is a programmer for flash MCUs from Renesas. For details about which programmers can be used with each MCU and the programmer specifications, see the Renesas website (http://www.renesas.com/programmer).
6. Used together with a programming GUI (provided free of charge).
7. Used together with the programming software Renesas Flash Programmer (a free evaluation version is available).
8. Used together with the programming software QB-Programmer (provided free of charge).

* CubeSuite+ is not generally promoted to the U.S. and European customers. Customers in the U.S. and Europe who are interested in CubeSuite+ are requested to contact our regional marketing departments for details.
* For details about which emulators can be used with each MCU and emulator specifications, see the Renesas website (http://www.renesas.com/emulation_debugging). The emulator that can be used might differ depending on the MCU part number.

CPU Board

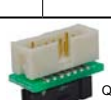
This CPU board is used to evaluate the operation of a V850 MCU by using the on-chip debugging emulator E1 or MINICUBE2 (each sold separately). By using this board, you can evaluate a series of development processes from program development to actual operation.
All MCU pins are assigned to peripheral board connectors, letting you create evaluation circuits using a commercially available universal board.


QB-V850ESJG3L-TB


QB-V850ESJG3U-TB

Target Device		Product Name	Emulator (sold separately)
Core	Group		
V850E2	V850E2/MN4	QB-V850E2MN4DUAL-TB *	E1
	V850E2/ML4	QB-V850E2ML4-TB	E1
V850E	V850E/IF3 V850E/IG3	QB-V850EIG3-TB *	E1 or MINICUBE2
	V850E/IH4-H	QB-V850EIH4H-TB *	E1 or MINICUBE2
V850ES	V850ES/HE2 V850ES/HF2 V850ES/HG2 V850ES/HJ2	QB-V850ESHG2-TB *	E1 or MINICUBE2
	V850ES/HE3 V850ES/HF3 V850ES/HG3 V850ES/HJ3	QB-V850ESHG3-TB *	E1 or MINICUBE2
	V850ES/IE2	QB-V850ESIE2-TB *	E1 or MINICUBE2
	V850ES/JG2 V850ES/JJ2	QB-V850ESJG2-TB *	E1 or MINICUBE2
	V850ES/JF3-L V850ES/JG3-L	QB-V850ESJG3L-TB *	E1 or MINICUBE2
	V850ES/JC3-L V850ES/JE3-L V850ES/JF3-L V850ES/JG3-L	QB-V850ESJG3LUSB-TB *	E1 or MINICUBE2
	V850ES/JG3-U V850ES/JH3-U	QB-V850ESJG3U-TB *	E1 or MINICUBE2
	V850ES/JE3-E V850ES/JF3-E V850ES/JG3-E V850ES/JH3-E V850ES/JJ3-E	QB-V850ESJJ3E-TB *	E1 or MINICUBE2
	V850ES/JG3 V850ES/JJ3	QB-V850ESJJ3-TB *	E1 or MINICUBE2
	V850ES/KE2 V850ES/KF2 V850ES/KG2 V850ES/KJ2	QB-V850ESKG2-TB *	E1 or MINICUBE2

* A 14-/16-pin conversion adapter QB-F14T16-01 (sold separately) is required when connecting an E1 emulator to a CPU board that has a connector for the MINICUBE2 emulator.


QB-F14T16-01

Extensive Renesas Development Ecosystem

A wide variety of products for the V850 family, such as compilers and programmers, are available from partner tool vendors. These products enable the V850 family to be used in an even broader range of applications.

■ **IDE/Compilers/Code generators**
- Accurate Technologies
- CATS CO.,LTD.
- CriticalBlue
- dSPACE GmbH
- Gaio Technology Co., Ltd.
- Green Hills Software
- IAR Systems
- MathWorks
- Red Hat, Inc.
- Ubiquitous Corporation
- Vector Informatik GmbH

■ **Co-verification**
- Accurate Technologies
- ETAS GmbH
- Gaio Technology Co., Ltd.
- IAR Systems
- Synopsys
- Vector Informatik GmbH
- Yokogawa Digital Computer Corporation

■ **OS**
- EB (Elektrobit)
- ETAS GmbH
- Green Hills Software
- SEGGER Microcontroller
- Vector Informatik GmbH

■ **Middleware/Drivers/Software IP**
- Aplix Corporation
- E-Globaledge Corporation
- eSOL Co., Ltd.
- Kyoto Software Research, Inc.
- Mentor Graphics Corporation
- Ubiquitous Corporation
- Vector Informatik GmbH

■ **Emulators and related emulation tools**
- Accurate Technologies
- Computex Co., Ltd.
- ETAS GmbH
- Green Hills Software
- iSYSTEM AG
- Kyoto Microcomputer Co., Ltd.
- Lauterbach
- Tokyo Eletech Corporation
- Yokogawa Digital Computer Corporation

■ **Starter kits/Evaluation boards/Platforms**
- Sophia Systems Co., Ltd.
- Vector Informatik GmbH
- Yokogawa Digital Computer Corporation

■ **Programmers**
- Flash Support Group, Inc.
- Hokuto Denshi Co.,Ltd.
- Tokyo Eletech Corporation
- Vector Informatik GmbH
- WaveTechnology Co., Ltd.
- Yokogawa Digital Computer Corporation

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Renesas MPUs & MCUs V850 MCU Selection Guide

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Renesas Electronics America Inc.
2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A.
Tel: +1-408-588-6000, Fax: +1-408-588-6130

Renesas Electronics Canada Limited
1101 Nicholson Road, Newmarket, Ontario L3Y 9C3, Canada
Tel: +1-905-898-5441, Fax: +1-905-898-3220

Renesas Electronics Europe Limited
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K
Tel: +44-1628-651-700, Fax: +44-1628-651-804

Renesas Electronics Europe GmbH
Arcadiastrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-65030, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.
7th Floor, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100083, P.R.China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.
Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd., Pudong District, Shanghai 200120, China
Tel: +86-21-5877-1818, Fax: +86-21-6887-7858 / -7898

Renesas Electronics Hong Kong Limited
Unit 1601-1613, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2886-9318, Fax: +852 2886-9022/9044

Renesas Electronics Taiwan Co., Ltd.
13F, No. 363, Fu Shing North Road, Taipei, Taiwan
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

Renesas Electronics Singapore Pte. Ltd.
80 Bendemeer Road, Unit #06-02 Hyflux Innovation Centre Singapore 339949
Tel: +65-6213-0200, Fax: +65-6213-0300

Renesas Electronics Malaysia Sdn.Bhd.
Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

Renesas Electronics Korea Co., Ltd.
11F., Samik Lavied' or Bldg., 720-2 Yeoksam-Dong, Kangnam-Ku, Seoul 135-080, Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5141

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