



Product Scout Automotive

PowerMOSFETs

Edition March 2012

Series		V _{DS} [V]	R _{DS(on)} [mΩ]		I _{DD(on)} [A]	P _D @ T _C = 25°C [W]	R _{thJA} [°C/W]	Q _g typ. [nC]	C _{iss} typ. [pF]	Package	Part Number		
			V _{GS} = 10.0 V	V _{GS} = 4.5 V									
N-Channel	ANL2	40	1.05	—	180	348	0.43	200	11500	T0-263-7p	NP180N04TUK		
			1.4	—	110	348	0.43	200	11500	T0-263ZP	NP110N04PUK		
			1.5	—	160	250	0.60	130	7400	T0-263-7p	NP160N04TUK		
			1.75	—	110	250	0.60	130	7400	T0-263ZP	NP109N04PUK		
			2.3	—	100	176	0.85	84	4700	T0-263ZP	NP100N04PUK		
			2.8	—	90	147	1.02	68	3800	T0-252ZP	NP90N04VUK		
			2.85	—	90	176	0.85	84	4700	T0-220M	NP90N04MUK		
			2.9	—	90	176	0.85	84	4700	T0-262N	NP90N04NUK		
			2.95	—	90	147	1.02	68	3800	T0-263ZP	NP89N04PUK		
			3.3	—	90	147	1.02	68	3800	T0-220M	NP89N04MUK		
		3.3	—	90	147	1.02	68	3800	T0-262N	NP89N04NUK			
		3.3	—	75	138	1.09	61	3440	HS0N-8	NP75N04YUK			
		3.85	—	60	105	1.43	42	2350	T0-252ZP	NP60N04VUK			
		4.3	—	60	105	1.43	42	2350	T0-220M	NP60N04MUK			
		4.3	—	60	105	1.43	42	2350	T0-262N	NP60N04NUK			
		4.8	—	50	97	1.55	38	2160	HS0N-8	NP50N04YUK			
		55	1.4	—	180	348	0.43	200	11500	T0-263-7p	NP180N055TUK		
			1.75	—	110	348	0.43	200	11500	T0-263ZP	NP110N055PUK		
			2.1	—	160	250	0.60	130	7400	T0-263-7p	NP160N055TUK		
			2.2	—	110	250	0.60	130	7400	T0-263ZP	NP109N055PUK		
			3.25	—	100	176	0.85	84	4700	T0-263ZP	NP100N055PUK		
			3.8	—	90	176	0.85	84	4700	T0-220M	NP90N055MUK		
			3.8	—	90	176	0.85	84	4700	T0-262N	NP90N055NUK		
			3.85	—	90	147	1.02	68	3800	T0-252ZP	NP90N055VUK		
			4.0	—	90	147	1.02	68	3800	T0-263ZP	NP89N055PUK		
			4.4	—	90	147	1.02	68	3800	T0-220M	NP89N055MUK		
		4.4	—	90	147	1.02	68	3800	T0-262N	NP89N055NUK			
		4.5	—	75	138	1.09	61	3440	HS0N-8	NP75N055YUK			
		5.5	—	60	105	1.43	42	2350	T0-252ZP	NP60N055VUK			
		6.0	—	60	105	1.43	42	2350	T0-220M	NP60N055MUK			
	6.0	—	60	105	1.43	42	2350	T0-262N	NP60N055NUK				
	6.7	—	35	97	1.55	38	2160	HS0N-8	NP35N055YUK				
	S J1	40	1.5	—	180	288	0.43	150	9500	T0-263-7p	NP180N04TUJ		
			1.8	—	110	288	0.52	150	9500	T0-263ZP	NP110N04PUJ		
			2.0	—	160	220	0.60	115	6900	T0-263-7p	NP160N04TUJ		
			2.3	—	110	220	0.68	120	6900	T0-263ZP	NP109N04PUJ		
			3.0	—	100	227	0.66	107	5900	T0-262N	NP100N04NUJ		
			2.1	—	180	288	0.52	150	9500	T0-263-7p	NP180N055TUJ		
			2.4	—	110	288	0.52	150	9500	T0-263ZP	NP110N055PUJ		
			3.0	—	160	220	0.60	115	6900	T0-263-7p	NP160N055TUJ		
			3.2	—	110	220	0.68	120	6900	T0-263ZP	NP109N055PUJ		
			55	1.5	—	110	288	0.52	253	16400	T0-263ZP	NP110N03PUG	
		2.4		—	88	200	0.75	165	9000	T0-263ZK	NP88N03KUG		
		2.4		3.9	88	200	0.75	165	9000	T0-263ZK	NP88N03KDG		
		2.8		—	82	143	1.05	106	6050	T0-263ZP	NP82N03PUG		
		3.2		8.0	90	105	1.43	90	5000	T0-252ZP	NP90N03VLG		
		3.2		—	90	105	1.43	90	5000	T0-252ZP	NP90N03VHG		
		3.2		—	90	105	1.43	90	5000	T0-252ZP	NP90N03VUG		
		4.8		—	60	88	1.70	62	3500	T0-263ZK	NP60N03KUG		
		5.0		—	55	77	1.95	62	3500	T0-252ZK	NP55N03SUG		
		UMOS-4		30	1.5	—	180	288	0.52	260	17100	T0-263-7p	NP180N04TUG
			1.8		—	160	250	0.60	230	13500	T0-263-7p	NP161N04TUG	
			1.8		3.2	110	288	0.52	230	14500	T0-263ZP	NP110N04PDG	
			1.8		—	110	288	0.52	260	17100	T0-263ZP	NP110N04PUG	
			2.0		5.4	160	220	0.68	180	10500	T0-263-7p	NP160N04TDG	
			2.0		—	160	220	0.68	178	10500	T0-263-7p	NP160N04TUG	
			2.3		—	110	220	0.68	180	11500	T0-263ZP	NP109N04PUG	
			2.9		—	88	200	0.75	165	10000	T0-263ZK	NP88N04KUG	
			3.0		—	90	217	0.69	182	11200	T0-220M	NP90N04MUG	
			3.4		—	88	200	0.75	171	9510	T0-262N	NP88N04NUG	
			3.5		8.0	82	143	1.05	100	6000	T0-263ZP	NP82N04PDG	
			3.5		—	82	143	1.05	106	6500	T0-263ZP	NP82N04PUG	
			4.0		8.6	90	105	1.43	90	4900	T0-252ZP	NP90N04VLG	
			4.0		8.6	90	105	1.43	90	4900	T0-252ZP	NP90N04VDG	
			4.0		—	90	105	1.43	90	5000	T0-252ZP	NP90N04VUG	
			4.2		—	82	143	1.05	106	6500	T0-220M	NP82N04MUG	
			4.2		—	82	143	1.05	106	6500	T0-262N	NP82N04NUG	
			4.2		8.5	82	143	1.05	100	6000	T0-220M	NP82N04MLG	
			4.2		8.5	82	143	1.05	100	6000	T0-262N	NP82N04NLG	
			4.2		8.5	82	143	1.05	100	6000	T0-220M	NP82N04MDG	
			4.2		8.5	82	143	1.05	100	6000	T0-262N	NP82N04NDG	
			4.5		8.7	80	115	1.30	90	4900	T0-263ZP	NP80N04PLG	
			4.5		—	80	115	1.30	90	4900	T0-263ZP	NP80N04PUG	
			4.5		8.7	80	115	1.30	90	4900	T0-263ZP	NP80N04PDG	
			4.8		—	80	115	1.30	90	4900	T0-262N	NP80N04NUG	
			4.8		9.0	80	115	1.30	90	4900	T0-220M	NP80N04MLG	
			4.8		9.0	80	115	1.30	90	4900	T0-262N	NP80N04NLG	
			4.8		9.0	80	115	1.30	90	4900	T0-220M	NP80N04MDG	
			4.8		9.0	80	115	1.30	90	4900	T0-262N	NP80N04NDG	
			5.0		—	70	115	1.30	90	4900	T0-220M	NP70N04MUG	
			4.8	—	75	138	1.09	77	4300	HS0N-8	NP75N04YUG		
			5.5	—	75	120	1.25	64	3620	HS0N-8	NP74N04YUG		
			6.1	—	60	88	1.71	63	3400	T0-263ZK	NP60N04KUG		
			6.3	—	60	88	1.70	60	3200	T0-220M	NP60N04MUG		
			6.5	—	55	77	1.95	63	3400	T0-252ZK	NP55N04SUG		
			6.5	15.0	55	77	1.95	57	2700	T0-252ZK	NP55N04SLG		
			9.7	15.0	35	77	1.95	36	1900	HS0N-8	NP35N04YLK		
			10.0	—	35	77	1.95	34	1900	HS0N-8	NP35N04YUG		
			25.0	—	16	36	4.20	7	315	HS0N-8	NP16N04YUG		
			55	2.4	—	110	288	0.52	251	17100	T0-263ZP	NP110N055PUG	
				3.9	—	88	200	0.75	166	9600	T0-263ZK	NP88N055KUG	
				5.2	—	82	143	1.05	106	6400	T0-263ZP	NP82N055PUG	
				6.0	10.5	90	105	1.43	93	4900	T0-252ZP	NP90N055VDG	
				6.0	—	90	105	1.43	90	5000	T0-252ZP	NP90N055VUG	
				6.0	—	82	143	1.05	105	6400	T0-220M	NP82N055MUG	
				6.0	—	82	143	1.05	105	6400	T0-262N	NP82N055NUG	
				6.6	10.9	80	115	1.30	90	4600	T0-263ZP	NP80N055PDG	
				6.9	11.2	80	115	1.30	90	4600	T0-220M	NP80N055MDG	
				6.9	11.2	80	115	1.30	93	4900	T0-262N	NP80N055NDG	
				9.4	—	60	88	1.70	61	3700	T0-263ZK	NP60N055KUG	
				9.5	12.0	55	77	1.95	64	3200	T0-252ZK	NP55N055SDG	
				10.0	—	55	77	1.95	60	3500	T0-252ZK	NP55N055SUG	
				14.0	—	52	56	2.68	38	2100	T0-252ZK	NP52N055SUG	
				60	6.7	8.5	82	143	1.05	106	5700	T0-263ZP	NP82N06PLG
					6.7	8.5	82	143	1.05	106	5700	T0-263ZP	NP82N06PDG
					7.4	9.7	82	143	1.05	106	5700	T0-220M	NP82N06MLG
					7.4	9.7	82	143	1.05	106	5700	T0-262N	NP82N06NLG
					7.8								

- High-side drivers designed for car lighting, fitting all types of grounded load
- Overcurrent and overtemperature protected

Notes:

All devices are qualified according to AEC-Q100 and AEC-Q100-012 flow.
All devices are RoHS compliant.

Part numbering system for NP-Series PowerMOSFETs



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Other features:		DRO		LCD		PDC		SRC	
BUR	Backup RAM	DTC	Direct RAM Output	LBI	LCD bus interface	RIF	Power-On Clear	VR3	Sample Rate Converter
BVS	Battery Voltage Supervision	ENC	Data transfer controller	LTR	LIN Transceiver	RTC	Resistive interface	VR5	Voltage Regulator 2.5 V
CMP	Comparator(s)	FXF	Encoder timer for rotary switch	LVL	Low-voltage indicator	SMC	Real-Time Clock	WDT	Voltage Regulator 5.0 V
DIV	Hardware divider	GFS	20/30 graphics engine	MCT	Motor control timer	SND	Stepper motor controller	XIP	Window Watchdog Timer
DMA	Direct memory access	IMR	GPS baseband controller	MUL	Hardware multiplier	SPF	Sound generator		Execute in Place from serial flash
DRI	Direct RAM Input		Image renderer				System protection function		

Automotive Microcontrollers

Edition March 2012

Series	Nickname/ Group	Part number	Flash size [B]	RAM [B]	Data flash [B]	Core	FPU	I/O lines	CS/UART (LIN)	CAN	PC	External bus	Other interfaces	Time channels [8-/16-/32-bit]	PWMs	Clock speed [MHz]	Internal oscillator(s)	Subclock [32 kHz]	A/D converter/ D/A converter	Supply voltage (VDD) [V]	Pins	Packages	T _{max} [°C]	Other features
S Series	V850E2/SG4-H	μPD70F4013 μPD70F4014	1 M 1.5 M	96 K 128 K	32 K	V850E2	✓	56	4/5(S)	1	4	✓	4 I ² S, PCM, MLB, IEBUS	~16/4	18	160	240 kHz & 8 MHz	✓	4 x 10-bit/-	3.0...3.6	100	LQFP	85, 105	BUR, SPF, DMA, RTC, ENC, POC
	V850E2/SJ4-H	μPD70F4015 μPD70F4016	1 M 1.5 M	96 K 128 K	32 K	V850E2	✓	98	5/5(S)	2	4	✓	4 I ² S, 2 PCM, MLB, IEBUS	~16/4	18	160	240 kHz & 8 MHz	✓	14 x 10-bit/-	3.0...3.6	144	LQFP	85, 105	BUR, SPF, DMA, RTC, ENC, POC
	V850E2/SK4-H	μPD70F4017 μPD70F4018	1.5 M 2 M	128 K 192 K	32 K	V850E2	✓	127	5/5(S)	2	4	✓	6 I ² S, 2 PCM, MLB, IEBUS, MII	~32/4	33	160	240 kHz & 8 MHz	✓	16 x 10-bit/-	3.0...3.6	176	LQFP	85, 105	BUR, SPF, DMA, RTC, ENC, POC
SH-2A	SH726A	RSS726A0 RSS726A1 RSS726A2 RSS726A3	-	1.25 M	-	SH-2A	✓	57	3/5 (O)	2	4	✓	4 I ² S, MMC, SD, SPDIF, 2 SRC, USB FS	~7/-	5	216	-	✓	6 x 10-bit/-	3.0...3.6	120	PLQFP120KB-A PLQFP120LA-A	85	CDROM dec, DMA, RTC, SRC, WDT, XIP
		RSS726B0 RSS726B1	-	1.25 M	-	SH-2A	✓	74	4/5 (O)	-	4	✓	4 I ² S, MMC, SD, SPDIF, 2 SRC, USB FS	~7/-	5	216	-	✓	8 x 10-bit/-	3.0...3.6	144	PLQFP144KA-A	85	CDROM dec, DMA, RTC, SRC, WDT, XIP
		RSS72660 RSS72661	-	1.5 M	-	SH-2A	✓	80	1/5 (O)	-	3	✓	Display Unit, 3 I ² S, SD, SPDIF, 2 SRC, USB HS	~7/-	7	144	-	✓	6 x 10-bit/-	3.0...3.6	144	PLQFP144KA-A	85	CDROM dec, RTC, 2 SRC, WDT
		RSS72670 RSS72671	-	1.5 M	-	SH-2A	✓	104	2/8 (O)	-	3	✓	Display Unit, 4 I ² S, SD, SPDIF, 2 SRC, USB HS	~7/-	7	144	-	✓	6 x 10-bit/-	3.0...3.6	176	PLQFP176KB-A	85	CDROM dec, RTC, 2 SRC, WDT
	SH726B	RSS72680 RSS72681	-	2.5 M	-	SH-2A	✓	111	4/5 (O)	-	3	✓	Display Unit, 4 I ² S, MMC, USB HS, SD, SPDIF, 3 SRC	~7/-	7	266	-	✓	6 x 10-bit/-	3.0...3.6	208	PLQFP208KB-A	85	CDROM dec, DMA, GFX, IMR, JPEG dec, RTC, 3 SRC, video dec, WDT, XIP
		RSS72690 RSS72691	-	2.5 M	-	SH-2A	✓	148	4/8 (O)	-	3	✓	Display Unit, 6 I ² S, MMC, 2 SD, SPDIF, 3 SRC, USB HS	~7/-	7	266	-	✓	8 x 10-bit/-	3.0...3.6	256, 272	PLQFP256LB-A PLQFP272GB-A	85	CDROM dec, DMA, GFX, IMR, JPEG dec, RTC, 3 SRC, video dec, WDT, XIP
	R-CAR L1	tbd	-	-	-	Cortex A9	✓	tbd	3/8 (O)	2	4	✓	Display Unit, 16-bit DDR3, 8 I ² S, MLB, 3 SD, 2 USB HS	~-/-/9	4	400	-	-	2 x 12-bit/-	3.0...3.6	429	FPBGA (18x18 mm ² , 0.8 mm p.p.)	85	DMA, SGX531
	R-CAR E1	μPD35004	-	128 K	-	Cortex A9	✓	tbd	3/8 (O)	2	4	✓	16-bit DDR2/DDR3, Ethernet MAC, 8 I ² S, MLB, MMC, PATA, 3 SD, 2 USB HS	~-/-/9	4	533	-	-	2 x 12-bit/-	3.0...3.6	429	FPBGA (21x21 mm ² , 0.8 mm p.p.)	85	DMA, GPS, SGX531, video dec
	R-CAR M1S	R8A77780	-	512 K	-	SH-4A	✓	155	3/8 (O)	2	4	✓	32-bit DDR2/DDR3, Display Unit, Ethernet MAC, 9 I ² S, MLB, MMC, PATA, 3 SD, 2 USB HS	~-/-/9	7	800	-	-	-	3.0...3.6	496	FPBGA (21x21 mm ² , 0.8 mm p.p.)	85	DMA, GPS, Media Engine, secure/crypt engine, SGX540, SRC
	R-CAR M1A	R8A77781	-	512 K	-	Cortex A9	✓	155	3/8 (O)	2	4	✓	32-bit DDR2/DDR3, Display Unit, Ethernet MAC, 9 I ² S, MLB, MMC, PATA, 3 SD, 2 USB HS	~-/-/9	7	800	-	-	-	3.0...3.6	496	FPBGA (27x27 mm ² , 0.8 mm p.p.)	85	DMA, GPS, Media Engine, secure/crypt engine, SGX540, SRC
	R-CAR H1	R8A77790	-	768 K	-	4 x Cortex A9	✓	201	3/8 (O)	2	4	✓	2 x 32-bit DDR3, Display Unit, Ethernet MAC, 10 I ² S, MLB, MMC, PATA, PCIe, SATA, 4 SD, 3 USB HS	~-/-/9	7	1000	-	-	-	3.0...3.6	832	FPBGA (27x27 mm ² , 0.8 mm p.p.)	85	DMA, GPS, Media Engine, secure/crypt engine, SGX540MP2, SRC

Other features:	BUR Backup RAM BVS Battery Voltage Supervisor CMP Comparator(s) DIP Hardware divider DMA Direct memory access DRI Direct RAM input	DRO DTC Data transfer controller ENC Encoder timer for rotary switch GFX 2D/3D graphics engine GPS GPS baseband controller IMR Image renderer	Direct RAM Output Data transfer controller Encoder timer for rotary switch 2D/3D graphics engine GPS baseband controller Image renderer	LCD LBI LCD bus interface LTV Low-voltage indicator MCT Motor control timer MUL Hardware multiplier	LCD controller/driver LIN LIN transceiver LTV Low-voltage indicator MCT Motor control timer MUL Hardware multiplier	POC Power-On Clear RIF Resistor interface RTC Real-Time Clock SMC Stepper motor controller SND Sound generator SPF System protection function	Power-On Clear Resistor interface Real-Time Clock Stepper motor controller Sound generator System protection function	SRC Sample Rate Converter VR3 Voltage Regulator 3.3 V VR5 Voltage Regulator 5.0 V WDT Window Watchdog Timer XIP Execute in Place from serial flash
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Tools

Software Tools

IAR Embedded Workbench (78K, R8C, RL78, V850 & SH)

- Integrated development environment for C/C++
- Package includes project manager, editor, compiler, assembler, linker, simulator and C-Spy debugger
- Supports ELF/DWARF debugging format
- Different license options: locked to PC, dongled (USB), floating
- Order code depends on target platform and license type



Green Hills Multi (V850 & SH)

- Integrated development environment for C/C++
- Package includes project manager, editor, compiler, assembler, linker, simulator and debugger
- Supports ELF/DWARF debugging format
- Different license options: locked to PC, dongled (USB), floating
- Order code depends on target platform and license type



Renesas C/C++ Compiler Package (SH)

- Integrated development environment for C/C++
- Package includes high-performance Embedded Workshop (HEW), compiler, assembler, linker, simulator and debugger
- Supports ELF/DWARF debugging format
- Different license options: locked to PC, dongled (USB), floating
- Order code depends on license type



AUTOSAR

AUTOSAR R3.x/4.0 MCAL software drivers are available for most 32-bit devices. The Renesas MCAL software drivers can be obtained as a stand alone software package or integrated in a complete basic software stack in cooperation with the leading software vendors. Renesas AUTOSAR software is used in mass production at all major OEMs.



Renesas Graphics Library (RGL)

Renesas provides the RGL (Renesas Graphics Library) as a simple Graphics Processing Unit (GPU) programming interface. It is available for all V850E2/Dx4 devices with a graphics sub-system incl. 2D and 3D drawing engine support.



Applinet

- Peripheral driver code generator for 78K and R8C devices
- Based on graphical user interface settings the peripheral driver initialization and API function code will be generated



On-Chip Debugging

E1 On-Chip Debugger (78K, R8C, RL78, V850)

- Supports all 78K, R8C, RL78 and V850 target interfaces (JTAG, UART, N-Wire, Single-Pin etc.)
- Fast in-circuit flash programming
- Supports power supply to target
- Package includes IAR Embedded Workbench (size limited), USB interface cable and 14-pin target cable
- Order code: YR0E000010KCE0-A



E10A-USB On-Chip Debugger (SH)

- Supports two target interfaces:
 - 14-pin for basic on-chip debugging without tracing (H-UDI)
 - 38-pin for advanced debugging including tracing (AUD)
- Fast in-circuit flash programming
- Package includes High-performance Embedded Workshop (HEW), USB interface cable and target cables
- Order codes: HS0005KCU01H (H-UDI only) HS0005KCU02H (H-UDI and AUD) HS0005ECK01H (optional cable to connect the HS0005KCU02H to 38-pin Micror connector)



Exchange Adapter for On-Chip Debugger

- 20-pin Exchange Adapter for E1 Debugger
 - To connect E1 debugger to 20-pin MiniCube connector
 - Order code: YADAPTER-F14T20
- 16-pin Exchange Adapter for E1 Debugger
 - To connect E1 debugger to 16-pin MiniCube connector
 - Order code: QB-F14T16-01
- 14-pin Exchange Adapter for MINICUBE Debugger
 - To connect MiniCube debugger to 14-pin E1 connector
 - Order code: YADAPTER-F20T14



In-Circuit Emulation

IECUBE2 In-Circuit Emulator (V850E2 only)

- For V850E2 devices
- Universal main unit, device-dependent emulation probe
- Package includes
 - IAR Embedded Workbench (size limited)
 - USB cable, power supply
- Order code: R0E521300MCU00 (main unit)



IECUBE In-Circuit Emulator (78K, RL78, V850)

- For 78K, RL78 and V850 devices
- Package includes
 - IAR Embedded Workbench (size limited)
 - USB cable, power supply
- Order code depends on target device

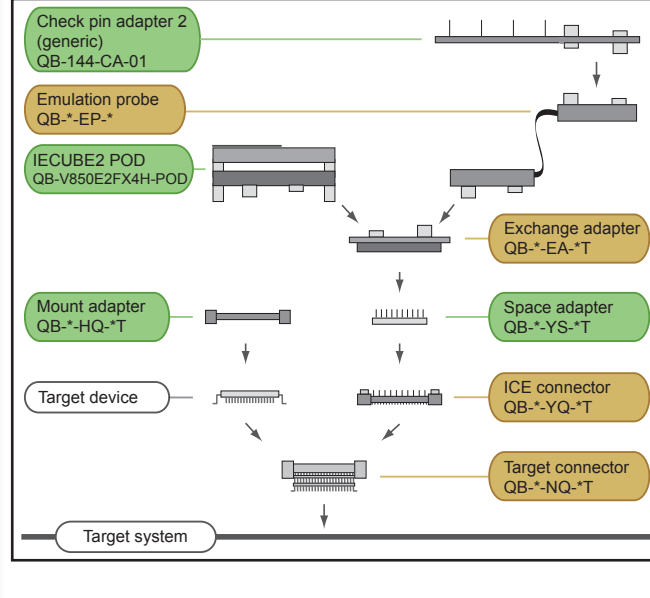


E100 In-Circuit Emulator (R8C)

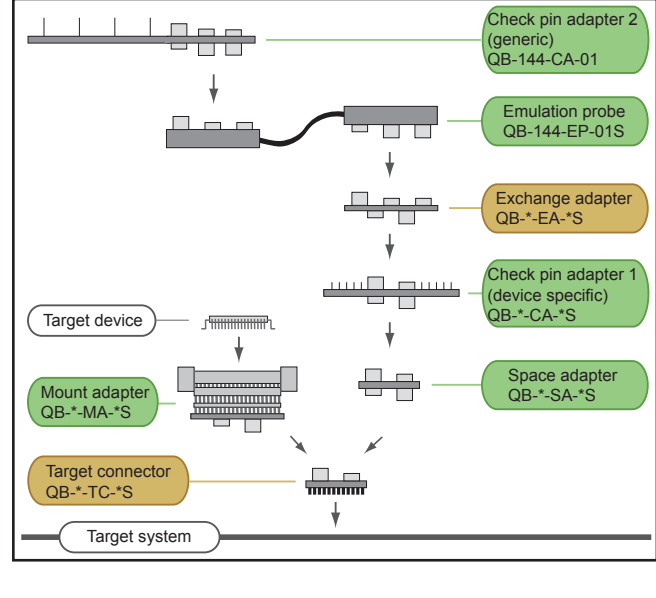
- For R8C devices
- Universal main unit, device-dependent emulation probe
- Package includes
 - High-performance Embedded Workshop (HEW)
 - USB cable, power supply
- Order code: R0E521300MCU00 (main unit) R0E521300MCU00 (R8C/x emulation probe)



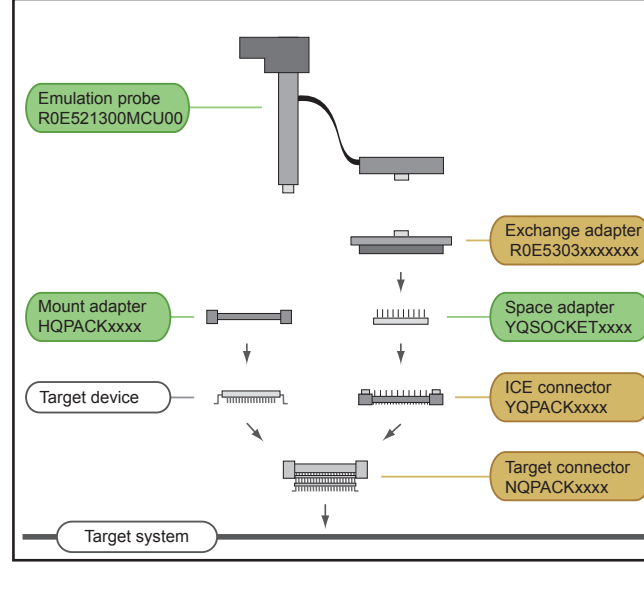
Socket System I (78K and V850E2)



Socket System II (V850 only)



Socket System III (R8C)



Please visit www.renesas.eu/products/mpumcu for socket references and additional tool information.

3rd Party Emulators

iSYSTEM

- Universal emulator and debugger system:
 - On-chip debugging for 78K, V850 and SuperH
 - In-circuit emulation of 78K, R8C and V850
- For more information visit www.isystem.com



Lauterbach

- Universal debugger system TRACE32®
- For 78KOR, RL78 and V850 debugging
- For SuperH debugging incl. tracing
- For more information visit www.lauterbach.com



Flash Programmers

Flash Programmer PG-FP5

- Supports 78K, R8C, RL78, V850 and SH flash microcontrollers
- On-chip debugging for 78K, V850 and SuperH
- Development, prototyping and mass production
- Windows™ and terminal interface
- Host-controlled and stand-alone operation
- 16 MB internal memory for up to 8 program codes incl. setup data
- USB2.0 and RS-232 interface
- Self-test function
- Order code: PG-FP5-EE



Renesas Flash Programming Software (RFP) for Microsoft Windows™

- Supports 78K, RL78 and V850 flash microcontrollers
- For development and prototyping
- Works with E1 debugger and direct RS-232/UART connection
- Graphical user interface
- Available for free at <http://www.renesas.eu/updates?id=596>

Flash Development Toolkit (FDT) for Microsoft Windows™

- Supports R8C and SH flash microcontrollers
- For development and prototyping
- Works with E1/E8A debugger and direct RS-232/UART connection
- Available for free at <http://www.renesas.eu/fdt>

Starter Kits

V850E2/Fx4-L Starter Kit

- Equipped with
 - V850E2/FG4-L device (μPD70F3580)
 - 2 CAN, 1 LIN interfaces
 - E1 debugging and programming interface
 - High brightness LED, RGB LED
- Package includes
 - GHS Multi 90-Day Evaluation License
 - KickStart Edition of IAR EW (64 KB)
 - E1 debugger
- No separate power supply necessary
- Order code: Y-ASK-V850E2/FG4-L



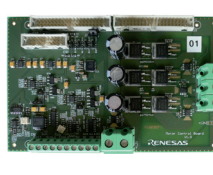
V850E2/Px4 Starter Kit

- Equipped with
 - V850E2/PJ4 device (μPD70F3506)
 - FlexRay, 2 CAN, 1 LIN interfaces
 - E1 debugging and programming interface
 - LCD module
- Package includes
 - GHS Multi 90-Day Evaluation License
 - KickStart Edition of IAR EW (64 KB)
 - E1 debugger
 - Multi-region 12V power supply
- Order code: YASK-V850E2-PX4



Motor Control Application Board 1

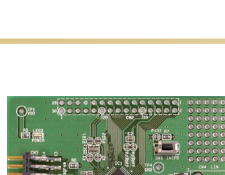
- To be used in combination with the V850E2/Px4 Starter Kit
- Designed to drive 12 V three-phase, permanent magnet synchronous machines (PMSM), such as BLDC and PMAC up to 30 A phase current
- Equipped with
 - Gate driver unit ELMO5 910.87
 - Three-phase inverter
- Supports resolver, hall sensor and encoder (resolver-to-digital converter with SPI output, level shifters for hall sensor and encoder signals)
- Current converter for current measurements
- 2 NTC temperature sensors
- Order code: Y-AB-MC1-V1



Evaluation Boards

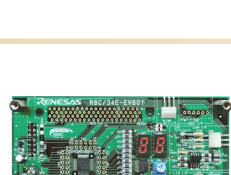
RL78/F12 Target Board

- For RL78/F12 evaluation
- Equipped with
 - 48-pin RL78/F12 device (RSF109GEAFB)
 - E1 debugging and programming interface
 - LIN transceiver circuit
 - One switch, two LEDs, breadboard area
- Board dimensions: 70 mm x 55 mm
- Order code: QB-RSFI09GE-TB



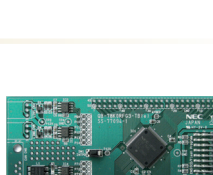
R8C/3x Application Board

- For R8C/3x evaluation
- Equipped with
 - R8C/3x device
 - CAN, LIN interface
 - two 7-segment LEDs, switches
 - analogue input, I/O expansion headers
 - E1 debug connector
- Board dimensions: 120 mm x 80 mm
- Order code depends on target device



78KOR/Fx3 Target Board

- For 78KOR/Fx3 evaluation
- Equipped with
 - 100-pin 78KOR/FG3 device (μPD70F1845)
 - 2 CAN, 2 LIN interfaces
 - one switch, two LEDs, breadboard area
 - I/O expansion headers
 - 16-pin debug connector
- Board dimensions: 109 mm x 55 mm
- Order code: QB-78KORFG3-TB



V850E2/Fx4 Application Board

- For V850E2/Fx4(H) evaluation and programming
- Equipped with
 - 208-pin V850E2/FL4 device (μPD70F4012)
 - FlexRay, CAN, UART interface
 - 20-pin JTAG debug connector
 - PG-FP5 connector
- Board dimensions: 300 mm x 205 mm
- Package includes quick-start guide
- Order code: AB-050-FX4-MB-L-Q-DEV-V2



SH72546 Development Board

- For SH72546 evaluation
- Equipped with
 - SH72546 device (RSF72546RKBG or RSE72546RKBG)
 - 3 CAN, RS232C interface
 - LCD module, switches, LEDs,
 - analogue input
 - I/O expansion headers
 - E10A-USB debug connector
- Board dimensions: 180 mm x 150 mm
- Package includes
 - power supply, serial cable (null modem)
 - CD with documentation and information
- Order code: YASKSH72546R-WS (RSF72546RKBG) YASKSH72546RFFC-ES (RSE72546RKBG)



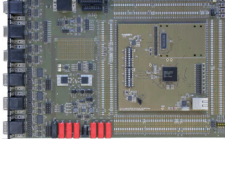
SH745x Development Board

- For SH74504/SH74552 evaluation
- Equipped with
 - SH74504 or SH74552 device
 - 2 FlexRay, 5/4 CAN interfaces
 - RS-232C, UART connector
 - switches, LEDs, 2 analogue inputs
 - I/O expansion headers
 - E10A USB debug connector
- Board dimensions:
 - 200 mm x 150 mm (for SH74504)
 - 180 mm x 120 mm (for SH74552)
- Package includes CD with user's manual and sample software
- Order code: R0K474552S000BR#ES (for SH74504) R0K474552S000BR#ES (for SH74552)



V850E2/Dx4 Application Board

- For the first steps to the V850E2/Dx4 devices.
- Perfect for early development of 2D graphics applications
- Must be used in combination with a device specific adapter board containing the MCU
- Equipped with
 - FlexRay, CAN, LIN, MLB interfaces
 - LCD interface, video in, video out
 - various controls
- 20-pin JTAG debug and PG-FP5 connector
- Board dimensions: 300 mm x 225 mm
- Package includes quick-start guide
- Order code: AB-V850E2-Dx4-(adapter board)



V850E2

Renesas Europe Homepage



www.renesas.eu

Online technical community



Think it. Build it. Post it.

www.renesasrulz.com

3rd Party network



www.renesas.eu/alliance

Personalised news & services



www.renesas.eu/myrenesas

Online technical training



www.renesasinteractive.com

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