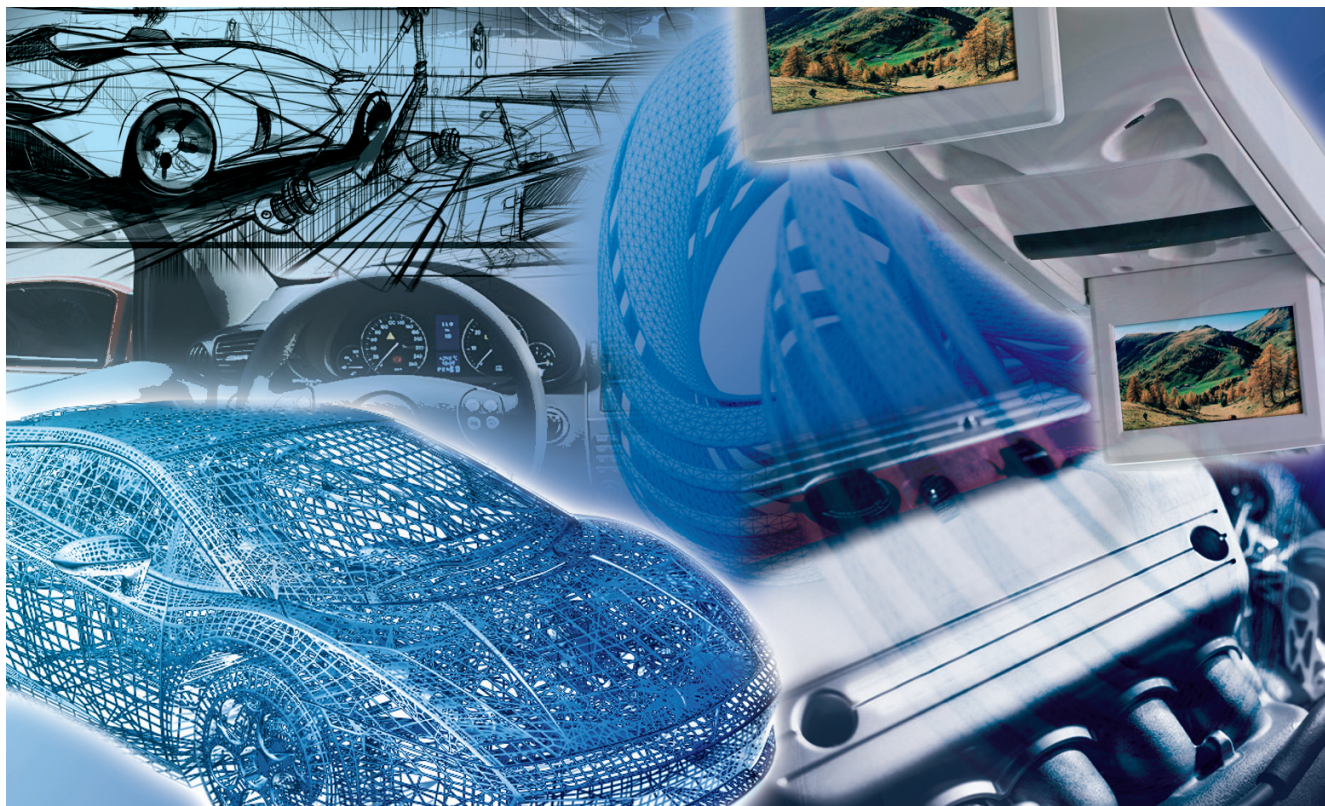


Automotive-grade semiconductor devices

Selection guide



July 2008

Analog
Power
MEMS
Memories
Microcontrollers

www.st.com/automotive



Moving towards a zero-defect capability

STMicroelectronics applies an automotive-grade policy designed to deliver products which meet the specific and rigorous demands of the automotive market. These products comply with the guidelines of the Automotive Electronics Council, and adhere to well-defined design, characterization, qualification and manufacturing processes.

All products conforming to automotive-grade criteria carry specific identification on support documentation and product packing. This improves pipeline visibility and order traceability between customers, car manufacturers and ST. It also ensures effective support of production launches, and develops awareness of application requirements throughout the complete supply chain.

This policy reinforces ST's drive towards a zero-defect capability and establishes the Company as the best-in-class in the automotive industry.

STMicroelectronics combines an unparalleled platform of advanced technologies with a thorough understanding of the automotive market gained through close collaboration with leading customers and an unswerving commitment to quality. As a result, we are able to offer a large product portfolio covering all key application areas in the car: powertrain, safety, car body, infotainment and multimedia systems.

This selection guide focuses on ST's offer in analog and power devices, MEMS, memories and microcontrollers. For a complete view of ST's product portfolio for automotive applications, please refer to www.st.com.

Product identification

Automotive grade products can be identified on ST's website via the product selector, and via clear labeling on the product packing. Customers can also contact the nearest ST sales office for automotive-grade product identification.

Contents

Analog devices	4
Voltage regulators	4
Step-down DC-DC switching converters	4
Linear regulators	5
Multifunctional voltage regulators for car radios	7
Alternator regulators	9
Motor drivers	10
Configurable switches	11
Comparators	11
High-temperature comparators	11
Micropower comparators	12
Operational amplifiers	13
High-speed operational amplifiers	19
Current sensing amplifiers	19
Voltage references	20
Interface ICs	21
Real-time clocks	21
Infrared communication ICs	21
LCD gamma correction	22
SBC - Transceiver and power-management	22
Special devices	22
Power devices	23
Power MOSFETs	23
Power bipolar transistors	26
IGBTs	27
Ultrafast rectifiers	28
Power Schottky rectifiers	30
Protection devices	33
ESD protection	33
LIN bus protection	34
Dataline protection	34
Transil™	35
High-side drivers	37
Smart power high-side switches - single channel	37
Smart power high-side switches - double channel	39
Smart power high-side switches - quad channel	41
Low-side drivers	42
Smart power low-side switches - single channel	42
Smart power low-side switches - double channel	44
Door module drivers	45
Ignition controllers and drivers	46
MEMS	46
Memories	47
Serial EEPROM, I ² C bus, M24	47
Serial EEPROM, Microwire® bus, M93	48
Serial EEPROM, SPI bus, M95	49
Microcontrollers	50
8-, 16- and 32-bit automotive microcontroller families	50
Mature 8-bit automotive microcontroller families	56
Key criteria for automotive grade qualification	58

Analog devices

Voltage regulators - Step-down DC-DC switching converters

Part number	Description	T _{JMAX} (°C)	Operating temperature (°C)		V _{IN} (V)	V _{OUT} (V)	I _{OUT DC} (A)	F _{SW} (kHz)	Package
			min	max					
A5970D	Up to 1 A switch step-down regulator for automotive applications	150	-40	85	4.4 to 36	1.235 to V _{IN}	2	250	HSOP8
A5970AD	Up to 1 A switch step-down regulator for automotive applications	150	-40	85	4.4 to 36	1.235 to V _{IN}	1	500	S0-8
A5972D	Up to 1.5 A switch step-down regulator for automotive applications	150	-40	85	4.4 to 36	1.235 to V _{IN}	1.5	250	S0-8
A5973AD	Up to 1.5 A switch step-down regulator for automotive applications	150	-40	85	4 to 36	1.235 to V _{IN}	1.5	500	HSOP8
A5973D	Up to 2 A switch step-down regulator for automotive applications	150	-40	85	4 to 36	1.235 to V _{IN}	2	250	HSOP8
A6902D	Up to 1 A switch step-down regulator with adjustable current limit for automotive applications	150	-40	85	8 to 36	1.235 to V _{IN}	Adj to 1	250	S0-8
B5973D	Up to 2 A switch step-down regulator for automotive applications	150	-40	125	4 to 36	1.235 to V _{IN}	2	250	HSOP8

Analog devices

Voltage regulators - Linear regulators

Part number	Package	Outputs	Output range V _o (V)	Output current I _{out} (mA)	Accuracy	Drop voltage V _{dp} typ (mV)	Additional functions
L4988D	S0-8	1	5	200	± 2 %	270	Reset, watchdog,
L4988MD	S0-20						watchdog enable
L4947PD	PowerS0-20	1	5	500	± 4 %	400	Reset
L4925PD	PowerS0-20	1	5	500	± 2 %	300	Reset
L4949ED	S0-8	1	5	100	± 1 %	300	Reset, early warning
L4949EP	S0-20						
L4979D	S0-8	1	5	150	± 2 %	200	Reset, enable, watchdog
L4979MD	S0-20						
L4989D	S0-8	1	5	150	± 3 %	180	Reset, watchdog,
L4989MD	S0-20						watchdog enable
L4993D	S0-8	1	5	150	± 2 %	200	Reset, watchdog,
L4993MD	S0-20						watchdog enable
L4995RJ	PowerSS0-12	1	5	500	± 2 %	270	Reset
L4995RK	PowerSS0-24						
L4995AJ	PowerSS0-12	1	5	500	± 2 %	270	Reset, enable
L4995AK	PowerSS0-24						
L4995J	PowerSS0-12	1	5	500	± 2 %	270	Reset, enable, watchdog
L4995K	PowerSS0-24						
L5150BN ⁽¹⁾	S0T-223	1	5	150	± 2 %	270	
L5150CJ ⁽¹⁾	PowerSS0-12	1	5	150	± 2 %	270	Reset ⁽²⁾ , early warning
L5150GJ ⁽¹⁾	PowerSS0-12	1	5	150	± 2 %	270	Reset ⁽²⁾ , enable, early warning
L4938ND	S0-20	2	5	50	± 2 %	300	Reset, enable,
L4938NPD	PowerS0-20		Adjustable	500			early warning
L4938ED	S0-20	2	5	100	± 2 %	300	Reset, enable,
L4938EPD	PowerS0-20		Adjustable	400			early warning
L9777A	PowerSS0-12	2	5 + 5 V tracking	200 + 100	± 2 %	200	Reset, enable, watchdog

(1) Under development - (2) Adjustable threshold

Analog devices

Voltage regulators - Linear regulators (cont'd)

Part number	Package	Outputs	Output range V _o (V)	Output current I _{out} (mA)	Accuracy	Drop voltage V _{dp} typ (mV)	Additional functions
L9777B	PowerSSO-12	2	5 + 5 V tracking	200 + 50	± 2 %	200	Reset, enable, watchdog, short to battery output protection
L4931ABD35-TRY	S0-8	1	3.5	250	1 %	400	Inhibit input pin
L4931CD27-TRY	S0-8	1	2.7	250	2 %	400	Inhibit input pin
L4931CD33-TRY	S0-8	1	3.3	250	2 %	400	Inhibit input pin
LD1085PY ⁽³⁾	TO-220 full pack	1	Adjustable from 1.25	3000	2 %	1300	
LD1086DTTRY	DPAK	1	Adjustable from 1.25	1500	2 %	1300	
LD1086VY	TO-220	1	Adjustable from 1.25	1500	2 %	1300	
LF18CDT-TRY	DPAK	1	1.8	500	2 %	400	
LF25ABDT-TRY	DPAK	1	2.5	500	1 %	400	
LF25CDT-TRY	DPAK	1	2.5	500	2 %	400	
LF33CDT-TRY	DPAK	1	3.3	500	2 %	400	
LF33CPT-TRY	PPAK	1	3.3	500	2 %	400	Inhibit input pin
LF50ABDT-TRY	DPAK	1	5	500	1 %	400	
LF50CDT-TRY	DPAK	1	5	500	2 %	400	
LF50CPT-TRY	PPAK	1	5	500	2 %	400	Inhibit input pin
LF80CDT-TRY	DPAK	1	8	500	2 %	400	
LF85CDT-TRY	DPAK	1	8.5	500	2 %	400	
LF85CPT-TRY	PPAK	1	8.5	500	2 %	400	Inhibit input pin
LD1117DT33TRY ⁽³⁾	DPAK	1	3.3	800	2 %	1000	
ST662ABD-TRY	S0-8	1	12	30	5 %		Inhibit input pin

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

Analog devices

Voltage regulators - Multifunctional voltage regulators for car radios

Part number	Output										High-side driver	Description	Package	Load dump protection
	REG1	REG2	REG3	REG4	REG5	REG6	Vstby1	Vstby2	PWM1	PWM2				
L4953G ⁽⁴⁾	5 V 1 A	9.2 V 500 mA					5 V 100 mA				HSD: 2 A clamped out	Overvoltage/undervoltage/ thermal protection; reverse battery and load dump protection	Multiwatt15	X
L4943 ⁽⁴⁾	3 to 11 V 500 mA	3 to 11 V 500 mA					3 to 7 V 500 mA				HSD: 750 mA	Configurable outputs; load dump and thermal shutdown	Multiwatt15	X
L4901A ⁽⁴⁾	5 V 400 mA	5 V 400 mA										Low quiescent current, overvoltage protection	HW7	X
L4902A ⁽⁴⁾							5 V 300 mA	5 V 300 mA				Reset, ignition buffer, LVW	HW7	X
L4952D ⁽⁴⁾	8.6 V 150 mA	10 V 8 mA										High-side driver with diagnostics	S020	X
L5950 ⁽⁴⁾	10 V 350 mA	8.5 V 175 mA	5 V 350 mA	8/10 V 1 A	5 V 250 mA						HSD1: 2 A HSD2: 0.45 A HSD3: 0.45 A	Very low standby current, I2C interface, overvoltage protection, short-circuit protection, reset	Multiwatt15	X
L5951 ⁽⁴⁾			7.8 V 100 mA				3.3 V 100 mA	5 V 100 mA				Low standby current, output to battery short protection, LVS function, J1850 bus driver	S024	X
L5952 ⁽⁴⁾	5 V 500 mA	8.3 V 250 mA	7.7 to 8.5 V 250 mA	5 to 7.3 V 400 mA	3.3 to 5 V 500 mA						HSD1: 1 A	Linear voltage regulators configurable through I2C, Vsby pin, overcurrent and short- circuit protection, reset	Flexiwatt25	X
L5953 ⁽⁴⁾	1.5/3.3 V 300 mA						3.3/5 V 250 mA		2.5 to 10 V 1 A		HSD1: 500 mA HSD2: 300 mA	Low standby current, Synchronization function, HSD diagnostic SPI interface	PwS036	X

(4) All ICs include load dump protection and are specified over the -40/85 °C operating temperature range.

Analog devices

Voltage regulators - Multifunctional voltage regulators for car radios (cont'd)

Part number	Output										High-side driver	Description	Package	Load dump protection
	REG1	REG2	REG3	REG4	REG5	REG6	Vstby1	Vstby2	PWM1	PWM2				
L5954⁽⁴⁾	10 V 350 mA	8.5 V 175 mA	5 V 350 mA	5 V 250 mA	8/10 V 1 A						HSD1: 2 A HSD2: 0.45 A HSD3: 0.45 A	Short-circuit, overvoltage protection, very low quiescent current	Multiwatt15	X
L5955⁽⁴⁾	10 V 40 mA	8.5 V 200 mA	3.3 V 850 mA	8/10 V 1 A	1.8/3.3/5 V 250 mA	1.8/ 2.5 V 200mA	3.3 V 125 mA	1.5 V 300 mA			HSD1: 2 A HSD2: 0.45 A HSD3: 0.45 A	LVM function, overvoltage shutdown, short-circuit protection, I2C interface	Flexiwatt27	X
L5956⁽⁴⁾	8.5 V 500 mA	5 V 300 mA	5 V 800 mA	3.3 V 800 mA							HSD1: 2 A	Ignition comparator, low quiescent current, overvoltage protection, reset	PwSo20 (su) Multiwatt15	X
L5957⁽⁴⁾	8.5 V 500 mA	5 V 800 mA	3.3 V 800 mA				5 V 300 mA				HSD1: 2 A	Ignition comparator, overvoltage protection, reset	PwSo20 (su) Multiwatt15	X
L5958⁽⁴⁾	8.5 V 200 mA	5 V 300 mA	3.3 V 250 mA	1.8 V 350 mA			3.3 V 100 mA	1.8 V 100 mA			HSD1: 2 A	Ignition comparator, overcurrent limitation, reset, two battery voltage warnings	Flexiwatt27 Flexiwatt27SMD	X
L5959⁽⁴⁾	8.5 V 200 mA	8/10 V 1 A	3.3 V 800 mA				3.3 V 100 mA				HSD1: 100 mA HSD2: 300 mA	Low quiescent current, battery voltage warning, overcurrent	Flexiwatt27SMD Multiwatt15	X
L5960⁽⁴⁾	8.3 to 8.7 V 500 mA	8.7 to 10 V 1 A					3.3 V 700 mA		5 V 2 A (5 A)	5/7 V 2 A	HSD1: 1 A	3 battery detects; +IGN buffer, very low quiescent current, I2C interface	PwSO36 (su)	X
L5962⁽⁴⁾	5/8.5 V 350 mA	3.3/10 V 1 A					3.3/5 V 150 mA		1.2 to 8 V 1.2/2.5 A		HSD1: 500 mA HSD2: 500 mA	Configurable I2C interface, battery detector, sync function, enable pin for switching regulator, Vsby pin	PwrSO36 (su)	X

(4) All ICs include load dump protection and are specified over the -40/85 °C operating temperature range.

Analog devices

Voltage regulators - Alternator regulators

Part number	Description	T _{JMAX} (°C)	Field driver	Voltage set-point (V)	Regulation curve	R _{on} (mΩ)	LRC DIS freq (Hz)	LRC delay/rate (s)	Comm. protocol	Notes	Package
L9465N	Multi-function high-side driver alternator voltage regulator	150	High side	14.2	Flat	170	310	0/2.5	No	Battery sense, field monitor and lamp driver	MW8
L9468N	Multi-function high-side driver alternator voltage regulator	150	High side	14.1	NAO profile	170	310	0/2.5	No	Battery sense, field monitor and lamp driver	MW8
L9407F	Multi-function low-side driver alternator voltage regulator	150	Low side	14.35	2 slopes: flat, -3.5 mV/°C	200	400	0/3	No	Field monitor, lamp driver and relay driver	MW8
L9911F	Multi-function super flexible high-side driver alternator voltage regulator	150	High side	14.4	-3.5 mV/°C	130	300	2/9	No	Field monitor, lamp driver and relay driver	MW8
L9911P				14.4	-3.5 mV/°C	130	300	0/2.5			
L9911I				14.5	-10 mV/°C	130	300	0/9			
L9914B	Multi-function ECU driven high-side alternator voltage regulator	150	High side	13.8 (ECU connection lost)	RVC or flat (no ECU)	140	310	0/5	RVC	Field monitor	MW8

Analog devices

Motor drivers

Part number	Package	Technology	Driver stages	On-state resistance R _{on} (mΩ)	Current limitation I _{lim} typ (A)	Operating range V _{cc} (V)	Max supply voltage V _{cc} max (V)	Highlights
L9997ND	S0-20	BCD	2 half bridges	700	1.6	7 to 16.5	26	Short-circuit and over-temperature protected
VN770K	S0-28	M0-3	2 HSD and 2 LSD	170	9	5.5 to 36	41	Short-circuit and over-temperature protected
VN771K	S0-28	M0-3	2 HSD and 2 LSD	80	9	5.5 to 36	41	Short-circuit and over-temperature protected
VN772K	S0-28	M0-3	2 HSD and 2 LSD	95	9	5.5 to 36	41	Short-circuit and over-temperature protected
VNH2SP30-E	MultiPowerSO-30	M0-4	Full bridge	16	50	5.5 to 16	41	Cross conduction protection, PWM operations up to 20 kHz, current sense
VNH3SP30-E	MultiPowerSO-30	M0-3	Full bridge	35	45	5.5 to 36	40	Cross conduction protection, PWM operations up to 10 kHz, current sense
VNH3ASP30-E	MultiPowerSO-30	M0-4	2 HSD and 2 LSD	35	5	5.5 to 16	41	Cross conduction protection, PWM operations up to 20 kHz, current sense
VN5770AK-E	S0-28	M0-5 M0-3	2 HSD and 2 LSD	280	8.5	4.5 to 36	41	Active <i>power limitation</i> (patent IP) on high side
VN5772AK-E ⁽¹⁾	S0-28	M0-5	Full bridge	100	18	4.5 to 36	41	Active <i>power limitation</i> (patent IP) on both high side and low side
VNH5019A-E ⁽¹⁾	S0-28	M0-5	Full bridge	19	30	4.5 to 24	41	Cross conduction protection, PWM operations up to 20 kHz, current sense
VNH5180 ⁽¹⁾	PowerSSO-36	M0-5	2 HSD and 2 LSD	180	12	5.5 to 18	41	Cross conduction protection, Output protected against short to ground and short to Vcc
L9903	S0-20	BCD3	Full bridge predriver	10000	N/A		22	H-bridge gate driver, K-line, step-up controller
L9904	S0-20	BCD3	Full bridge predriver	10000	N/A		22	H-bridge gate driver, K-line, step-up controller
L9805E	HI-QUAD 64	BCD5	Full bridge	70	8		18	Super integrated monolithic H-bridge driver
L9935	PowerSO-20	BCD3	2 x full bridge	400	Programmable		24	Stepper motor driver
L9942XP	PowerSSO-24	BCD4	2 x full bridge	500	Programmable		28	Stepper motor driver, microstepping, programmable current profile

(1) Under development

Analog devices

Configurable switches

Part number	Package	Technology	Clamping voltage (V)	Driver stages	On-state resistance R_{on} (m Ω)	Current limitation I_{lim} typ (A)	Max supply voltage V_{cc} max (V)	Highlights
L9848	S0-28	BCD3	40	8 x powerMOS	1000	1	16	6 high-/low-side configurable channels + 2 low-side channels
L9733	S0-28 / PowerSS0-28	BCD4	40	8 x powerMOS	700	1	16	8 self-configuring high-/low-side channels

Comparators - High-temperature comparators

Part number	Description	Operating temperature (°C)		Supply current (µA)	Supply voltage		Package
		min	max		V_{cc} min (V)	V_{cc} max (V)	
LM2903HYD ⁽³⁾	Low-power dual voltage comparator	-40	150	200	2	36	S0-8
LM2903HYDT ⁽³⁾	Low-power dual voltage comparator	-40	150	200	2	36	S0-8
LM2901HYD ⁽³⁾	Low-power quad voltage comparator	-40	150	275	2	36	S0 14 .15 TO JEDEC MS-012
LM2901HYDT ⁽³⁾	Low-power quad voltage comparator	-40	150	275	2	36	S0 14 .15 TO JEDEC MS-012

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

Analog devices

Comparators - High-temperature comparators (cont'd)

Part number	Description	Operating temperature (°C)		Supply current (µA)	Supply voltage		Package
		min	max		V _{CC} min (V)	V _{CC} max (V)	
LM2903YD ⁽³⁾	Low-power dual voltage comparator	-40	125	200		36	S0-8
LM2903YDT ⁽³⁾	Low-power dual voltage comparator	-40	125	200		36	S0-8
LM2901YD ⁽³⁾	Low-power quad voltage comparator	-40	125	200		36	S0 14 .15 TO JEDEC MS-012
LM2901YDT ⁽³⁾	Low-power quad voltage comparator	-40	125	275		36	S0 14 .15 TO JEDEC MS-012
LM2901YPT ⁽³⁾	Low-power quad voltage comparator	-40	125	275		36	TSSOP14
LM2903YPT ⁽³⁾	Low-power dual voltage comparator	-40	125	275		36	TSSOP8
TS391IYLT ⁽³⁾	Low-power single voltage comparator	-40	125	200		36	SOT 23-5

Comparators - Micropower comparators

Part number	Description	T _j max (°C)	Supply current (µA)	Supply voltage		Response time (µs)	Package
				V _{CC} min (V)	V _{CC} max (V)		
TS339IYDT ⁽³⁾	Micropower quad CMOS voltage comparator	125	9	2.7	16	1.5	S0 14 .15 TO JEDEC MS-012
TS339IYD ⁽³⁾	Micropower quad CMOS voltage comparator	125	9	2.7	16	1.5	S0 14 .15 TO JEDEC MS-012
TS393IYD ⁽³⁾	Micropower CMOS dual voltage comparator	125	10	2.7	16	1.5	S0-8
TS393IYDT ⁽³⁾	Micropower CMOS dual voltage comparator	125	10	2.7	16	1.5	S0-8

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

Analog devices

Operational amplifiers

Part number	Description	Operating temperature (°C)		Supply current typ/op (µA)	Supply voltage		Input offset voltage max (mV)	GBP typ (MHz)	Package
		min	max		V _{cc} min (V)	V _{cc} max (V)			
LM124AWYD/DT	Low-power quad operational amplifiers	-55	125	350	3	32	2	1.1	S0-14
LM124AWYPT ⁽³⁾	Low-power quad operational amplifiers	-55	125	350	3	32	2	1.1	TSSOP14
LM124WYD/DT	Low-power quad operational amplifiers	-55	125	350	3	32	5	1.1	S0-14
LM124WYPT ⁽³⁾	Low-power quad operational amplifiers	-55	125	350	3	32	5	1.1	TSSOP14
LM158AWYD/DT	Low-power dual operational amplifiers	-55	125	350	3	32	2	1.1	S0-8
LM158AWYPT	Low-power dual operational amplifiers	-55	125	350	3	32	2	1.1	TSSOP8
LM158WYD/DT	Low-power dual operational amplifiers	-55	125	350	3	32	5	1.1	S0-8
LM158WYPT	Low-power dual operational amplifiers	-55	125	350	3	32	5	1.1	TSSOP8
LM224AWYD/DT	Low-power quad operational amplifiers	-40	105	350	3	32	3	1.1	S0-14
LM224AWYPT	Low-power quad operational amplifiers	-40	105	350	3	32	3	1.1	TSSOP14
LM224WYD/DT	Low-power quad operational amplifiers	-40	105	350	3	32	5	1.1	S0-14
LM224WYPT ⁽³⁾	Low-power quad operational amplifiers	-40	105	350	3	32	5	1.1	TSSOP14
LM258AWYD/DT	Low-power dual operational amplifiers	-40	105	350	3	32	3	1.1	S0-8
LM258AWYPT	Low-power dual operational amplifiers	-40	105	350	3	32	3	1.1	TSSOP8
LM258WYD/DT	Low-power dual operational amplifiers	-40	105	350	3	32	5	1.1	S0-8
LM258WYPT	Low-power dual operational amplifiers	-40	105	350	3	32	5	1.1	TSSOP8
LM2902HYD/DT	Low-power quad operational amplifier	-40	150	350	3	30	7	1.1	S0-14
LM2902WYD/DT	Low-power quad operational amplifier	-40	125	350	3	30	7	1.1	S0-14
LM2902WYPT	Low-power quad operational amplifier	-40	125	350	3	30	7	1.1	TSSOP14
LM2902YD/DT	Low-power quad operational amplifier	-40	125	350	3	30	7	1.3	S0-14
LM2902YPT	Low-power quad operational amplifier	-40	125	350	3	30	7	1.3	TSSOP14

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

Analog devices

Operational amplifiers (cont'd)

Part number	Description	Operating temperature (°C)		Supply current typ/op (µA)	Supply voltage		Input offset voltage max (mV)	GBP typ (MHz)	Package
		min	max		V _{cc} min (V)	V _{cc} max (V)			
LM2904WHYD/DT	Dual general-purpose operational amplifier	-40	150	350	3	30	7	1.1	S0-8
LM2904WYD/DT	Low-power dual operational amplifier	-40	125	350	3	30	7	1.1	S0-8
LM2904WYPT	Low-power dual operational amplifier	-40	125	350	3	30	30	1.1	TSSOP8
LM2904YD/DT	Low-power dual bipolar operational amplifier	-40	125	350	3	30	7	1.3	S0-8
LM2904YPT	Low-power dual bipolar operational amplifier	-40	125	350	3	30	7	1.3	TSSOP8
LM2904YST ⁽³⁾	Low-power dual bipolar operational amplifier	-40	125	350	3	30	7	1.3	MINI S0-8
LM324AWYD/DT	Low-power quad operational amplifiers	0	70	350	3	32	3	1.1	S0-14
LM324WYD/DT	Low-power quad operational amplifiers	0	70	350	3	32	7	1.1	S0-14
LM324WYPT ⁽³⁾	Low-power quad operational amplifiers	0	70	350	3	32	7	1.1	TSSOP14
LM358AWYD/DT	Low-power dual operational amplifiers	0	70	350	3	32	3	1.1	S0-8
LM358WYD/DT	Low-power dual operational amplifiers	0	70	350	3	32	7	1.1	S0-8
LM358WYPT	Low-power dual operational amplifiers	0	70	350	3	32	7	1.1	TSSOP8
LM833YD/DT ⁽³⁾	Low-noise dual operational amplifier	-40	105	2000	5	30	5	15	S0-8
LMV321IYLT ⁽³⁾	Low-cost, low-power input/output rail-to-rail operational amplifiers	-40	125	145	2.5	6	3	1	SOT 23-5
LMV324IYD/DT ⁽³⁾	Low-cost, low-power input/output rail-to-rail operational amplifiers	-40	125	145	2.5	6	3	1	S0-14
LMV324IYPT ⁽³⁾	Low-cost, low-power input/output rail-to-rail operational amplifiers	-40	125	145	2.5	6	3	1	TSSOP14
LMV358IYD/DT ⁽³⁾	Low-cost, low-power input/output rail-to-rail operational amplifiers	-40	125	145	2.5	6	3	1	S0-8
LS204IYD/DT ⁽³⁾	High-performance dual operational amplifiers	-40	105	350	6	36	2.5	2.5	S0-8
LS404IYD/DT ⁽³⁾	High-performance dual operational amplifiers	-40	105	325	6	36	2.5	2.5	S0-8

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

Analog devices

Operational amplifiers (cont'd)

Part number	Description	Operating temperature (°C)		Supply current typ/op (µA)	Supply voltage		Input offset voltage max (mV)	GBP typ (MHz)	Package
		min	max		V _{cc} min (V)	V _{cc} max (V)			
MC33078YD/DT ⁽³⁾	Low-noise dual operational amplifier	-40	105	2000	5	30	2	15	S0-8
MC33079YD/DT ⁽³⁾	Low-noise quad operational amplifier	-40	105	2000	5	30	2.5	15	S0-14
TL072IYD/DT ⁽³⁾	Low-noise JFET dual operational amplifiers	-40	105	1400	6	36	10	4	S0-8
TL082IYD/DT ⁽³⁾	General-purpose JFET dual operational amplifiers	-40	105	1400	6	36	10	4	S0-8
TL084IYD/DT ⁽³⁾	General-purpose JFET quad operational amplifiers	-40	105	1400	6	36	10	4	S0-14
TS1871AIYD/DT ⁽³⁾	1.8 V input/output rail-to-rail low-power amplifier	-40	125	400	1.8	6	1	1.6	S0-8
TS1871AIYLT ⁽³⁾	1.8 V input/output rail-to-rail low-power amplifier	-40	125	400	1.8	6	1	1.6	SOT23-5
TS1871IYD/DT ⁽³⁾	1.8 V input/output rail-to-rail low-power amplifier	-40	125	400	1.8	6	3	1.6	S0-8
TS1871IYLT ⁽³⁾	1.8 V input/output rail-to-rail low-power amplifier	-40	125	400	1.8	6	3	1.6	SOT23-5
TS1872AIYD/DT ⁽³⁾	1.8 V input/output rail-to-rail low-power amplifier	-40	125	400	1.8	6	1	1.6	S0-8
TS1872AIYPT ⁽³⁾	1.8 V input/output rail-to-rail low-power amplifier	-40	125	400	1.8	6	1	1.6	TSSOP8
TS1872IYD/DT ⁽³⁾	1.8 V input/output rail-to-rail low-power amplifier	-40	125	400	1.8	6	3	1.6	S0-8
TS1872IYPT ⁽³⁾	1.8 V input/output rail-to-rail low-power amplifier	-40	125	400	1.8	6	3	1.6	TSSOP8
TS1874AIYD/DT ⁽³⁾	1.8 V input/output rail-to-rail low-power amplifier	-40	125	400	1.8	6	1	1.6	S0-14
TS1874AIYPT ⁽³⁾	1.8 V input/output rail-to-rail low-power amplifier	-40	125	400	1.8	6	1	1.6	TSSOP14
TS1874IYD/DT ⁽³⁾	1.8 V input/output rail-to-rail low-power amplifier	-40	125	400	1.8	6	3	1.6	S014
TS1874IYPT ⁽³⁾	1.8 V input/output rail-to-rail low-power amplifier	-40	125	400	1.8	6	3	1.6	TSSOP14
TS321IYLT ⁽³⁾	Single LM324, LM358 enhanced version with lower supply voltage	-40	125	500	3	30	4	0.8	SOT 23-5
TS507IYD/DT ⁽³⁾	Single high-precision operational amplifier	-40	125	850	2.7	5.5	0.1	1.9	S0-8
TS507IYLT ⁽³⁾	Single high-precision operational amplifier	-40	125	850	2.7	5.5	0.1	1.9	SOT 23-5

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

Analog devices

Operational amplifiers (cont'd)

Part number	Description	Operating temperature (°C)		Supply current typ/op (µA)	Supply voltage		Input offset voltage max (mV)	GBP typ (MHz)	Package
		min	max		V _{cc} min (V)	V _{cc} max (V)			
TS512AIYD/DT ⁽³⁾	Precision dual operational amplifier	-40	125	500	6	30	0.5	3	S0-8
TS512IYD/DT ⁽³⁾	Precision dual operational amplifier	-40	125	500	6	30	2.5	3	S0-8
TS514AIYD/DT ⁽³⁾	Precision quad operational amplifier	-40	125	400	6	30	0.5	3	S0-14
TS514IYD/DT ⁽³⁾	Precision quad operational amplifier	-40	125	400	6	30	2.5	3	S0-14
TS912AIYD/DT	Rail-to-rail CMOS dual operational amplifier	-40	125	200	2.7	16	5	1.3	S0-8
TS912IYD/DT	Rail-to-rail CMOS dual operational amplifier	-40	125	200	2.7	16	5	1.3	S0-8
TS914AIYD/DT ⁽³⁾	Rail-to-rail CMOS quad operational amplifier	-40	125	200	2.7	16	5	1.3	S0-14
TS914IYD/DT ⁽³⁾	Rail-to-rail CMOS quad operational amplifier	-40	125	200	2.7	16	5	1.3	S0-14
TS921IYD/DT ⁽³⁾	Rail-to-rail high output current single operational amplifier	-40	125	1000	2.7	12	3	4	S0-8
TS922AIYD/DT	Rail-to-rail high output current dual operational amplifier	-40	125	1000	2.7	12	0.9	4	S0-8
TS922AIYPT	Rail-to-rail high output current dual operational amplifier	-40	125	1000	2.7	12	0.9	4	TSSOP8
TS922IYD/DT	Rail-to-rail high output current dual operational amplifier	-40	125	1000	2.7	12	3	4	S0-8
TS922IYPT	Rail-to-rail high output current dual operational amplifier	-40	125	1000	2.7	12	3	4	TSSOP8
TS924AIYD/DT	Rail-to-rail high output current quad operational amplifier	-40	125	1000	2.7	12	0.9	4	S0-14
TS924AIYPT	Rail-to-rail high output current quad operational amplifier	-40	125	1000	2.7	12	0.9	4	TSSOP14
TS924IYD/DT	Rail-to-rail high output current quad operational amplifier	-40	125	1000	2.7	12	3	4	S0-14
TS924IYPT	Rail-to-rail high output current quad operational amplifier	-40	125	1000	2.7	12	3	4	TSSOP14

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

Analog devices

Operational amplifiers (cont'd)

Part number	Description	Operating temperature (°C)		Supply current typ/op (µA)	Supply voltage		Input offset voltage max (mV)	GBP typ (MHz)	Package
		min	max		V _{CC} min (V)	V _{CC} max (V)			
TS951IYLT ⁽³⁾	Input/output rail-to-rail low-power operational amplifier	-40	125	900	2.7	12	6	3	SOT 23-5
TS952IYD/DT	Input/output rail-to-rail low-power operational amplifier	-40	125	900	2.7	12	6	3	SO-8
TS952IYD/DT	Input/output rail-to-rail low-power operational amplifier	-40	125	900	2.7	12	6	3	SO-8
TS954IYD/DT	Input/output rail-to-rail low-power operational amplifier	-40	125	900	2.7	12	6	3	SO-14
TS954IYPT ⁽³⁾	Input/output rail-to-rail low-power operational amplifier	-40	125	900	2.7	12	6	3	TSSOP14
TS971IYD/DT ⁽³⁾	Output rail-to-rail very low-noise operational amplifier	-40	125	2000	2.7	10	5	12	SO-8
TS971IYLT ⁽³⁾	Output rail-to-rail very low-noise operational amplifier	-40	125	2000	2.7	10	5	12	SOT 23-5
TS972IYD/DT ⁽³⁾	Output rail-to-rail very low-noise operational amplifier	-40	125	2000	2.7	10	5	12	SO-8
TS972IYPT ⁽³⁾	Output rail-to-rail very low-noise operational amplifier	-40	125	2000	2.7	10	5	12	TSSOP8
TS974IYD/DT ⁽³⁾	Output rail-to-rail very low-noise operational amplifier	-40	125	2000	2.7	10	5	12	SO-14
TS974IYPT ⁽³⁾	Output rail-to-rail very low-noise operational amplifier	-40	125	2000	2.7	10	5	12	TSSOP14
TS982IYWD/DT	Wide bandwidth dual bipolar operational amplifier	-40	125	5500	2.5	5.5	5	2	SO-8 EXPOPAD
TSV321IYD/DT ⁽³⁾	General purpose, input/output rail-to-rail low power operational amplifiers	-40	125	400	2.5	6	3	1.4	SOT23-5
TSV324IYD/DT ⁽³⁾	General-purpose, input/output rail-to-rail low-power operational amplifiers	-40	125	400	2.5	6	3	1.4	SO-14
TSV324IYPT ⁽³⁾	General-purpose, input/output rail-to-rail low-power operational amplifiers	-40	125	400	2.5	6	3	1.4	TSSOP14

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

Analog devices

Operational amplifiers (cont'd)

Part number	Description	Operating temperature (°C)		Supply current typ/op (µA)	Supply voltage		Input offset voltage max (mV)	GBP typ (MHz)	Package
		min	max		V _{cc} min (V)	V _{cc} max (V)			
TSV358IYD/DT ⁽³⁾	General-purpose. input/output rail-to-rail low-power operational amplifiers	-40	125	400	2.5	6	3	1.4	S0-8
TSV358IYPT ⁽³⁾	General-purpose. input/output rail-to-rail low-power operational amplifiers	-40	125	400	2.5	6	3	1.4	TSSOP8
TSV911AIYD/DT ⁽³⁾	Rail-to-rail input/output 8 MHz operational amplifiers	-40	125	800	2.5	5.5	1.5	8	S0-8
TSV911AIYLT ⁽³⁾	Rail-to-rail input/output 8 MHz operational amplifiers	-40	125	800	2.5	5.5	1.5	8	SOT23-5
TSV911IYD/DT ⁽³⁾	Rail-to-rail input/output 8 MHz operational amplifiers	-40	125	800	2.5	5.5	4.5	8	S0-8
TSV911IYLT ⁽³⁾	Rail-to-rail input/output 8 MHz operational amplifiers	-40	125	800	2.5	5.5	4.5	8	SOT23-5
TSV912AIYD/DT ⁽³⁾	Rail-to-rail input/output 8 MHz operational amplifiers	-40	125	800	2.5	5.5	1.5	8	S0-8
TSV912IYD/DT ⁽³⁾	Rail-to-rail input/output 8 MHz operational amplifiers	-40	125	800	2.5	5.5	4.5	8	S0-8
TSV914AIYD/DT ⁽³⁾	Rail-to-rail input/output 8 MHz operational amplifiers	-40	125	800	2.5	5.5	1.5	8	S0-14
TSV914IYD/DT ⁽³⁾	Rail-to-rail input/output 8 MHz operational amplifiers	-40	125	800	2.5	5.5	4.5	8	S0-14
TSV991AIYD/DT ⁽³⁾	Rail-to-rail input/output 20 MHz operational amplifiers		125	800	2.5	5.5	1.5	8	S0-8
TSV991AIYLT ⁽³⁾	Rail-to-rail input/output 20 MHz operational amplifiers	-40	125	800	2.5	5.5	1.5	8	SOT23-5
TSV991IYD/DT ⁽³⁾	Rail-to-rail input/output 20 MHz operational amplifiers		125	800	2.5	5.5	4.5	8	S0-8
TSV991IYLT ⁽³⁾	Rail-to-rail input/output 20 MHz operational amplifiers	-40	125	800	2.5	5.5	4.5	8	SOT23-5
TSV992AIYD/DT ⁽³⁾	Rail-to-rail input/output 20 MHz operational amplifiers	-40	125	800	2.5	5.5	1.5	8	S0-8
TSV992IYD/DT ⁽³⁾	Rail-to-rail input/output 20 MHz operational amplifiers	-40	125	800	2.5	5.5	4.5	8	S0-8
TSV994AIYD/DT ⁽³⁾	Rail-to-rail input/output 20 MHz operational amplifiers	-40	125	800	2.5	5.5	1.5	8	S0-14
TSV994IYD/DT ⁽³⁾	Rail-to-rail input/output 20 MHz operational amplifiers	-40	125	800	2.5	5.5	4.5	8	S0-14

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

Analog devices

High-speed operational amplifiers

Part number	Description	Operating temperature (°C)		Bandwidth (MHz)	Slew rate (V/μs)	Package
		min	max			
TSH80IYD ⁽³⁾	Rail-to-rail video operational amplifier with standby	-40	85			SO-8
TSH80IYDT ⁽³⁾	Rail-to-rail video operational amplifier with standby	-40	85	100	100	SO-8
TSH82IYD ⁽³⁾	Rail-to-rail video operational amplifier	-40	85	100	100	SO-8
TSH82IYDT ⁽³⁾	Rail-to-rail video operational amplifier	-40	85	100	100	SO-8
TSH93IYD ⁽³⁾	Video operational amplifier	-40	125	150	110	SO 14 .15 TO JEDEC MS-012
TSH93IYDT ⁽³⁾	Video operational amplifier	-40	125	150	110	SO 14 .15 TO JEDEC MS-012
TSH80IYLT ⁽³⁾	Rail-to-rail video operational amplifier with standby	-40	85	100	100	SOT 23-5
TSH81IYD ⁽³⁾	Rail-to-rail video operational amplifier with standby	-40	85	100	100	SO-8
TSH81IYDT ⁽³⁾	Rail-to-rail video operational amplifier with standby	-40	85	100	100	SO-8

Current sensing amplifiers

Part number	Description	Tj max (°C)	Operating temperature (°C)		Max supply current Tmin < T < Tmax (μA)	Supply voltage		Common-mode		Max input offset voltage T=25°C (mV)	Max input offset voltage Tmin < T < Tmax (mV)	GBP (MHz)	Package
			min	max		Vcc min (V)	Vcc max (V)	Vicm min (V)	Vicm max (V)				
TSC101AIYLT ⁽³⁾	High-side current-sense amplifier 20 V/V	150	-40	125	300	4	24	2.8	30	1.5	2.3	0.5	SOT23-5
TSC101BIYLT ⁽³⁾	High-side current-sense amplifier 50 V/V	150	-40	125	300	4	24	2.8	30	1.5	2.3	0.67	SOT23-5
TSC101CIYLT ⁽³⁾	High-side current-sense amplifier 100 V/V	150	-40	125	300	4	24	2.8	30	1.5	2.3	0.45	SOT23-5

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

Analog devices
 Voltage references

Part number	Description	Operating temperature (°C)		Precision (%)	Cathode to anode voltage		Package
		min	max		min (V)	max (V)	
TL1431IYD ⁽³⁾	Programmable voltage reference	-40	105	0.25	2.5	36	S0-8
TL1431IYDT ⁽³⁾	Programmable voltage reference	-40	105	0.25	2.5	36	S0-8
TL431AIYD ⁽³⁾	Programmable voltage reference	-40	105	1	2.5	36	S0-8
TL431AIYDT ⁽³⁾	Programmable voltage reference	-40	105	1	2.5	36	S0-8
TL431IYD ⁽³⁾	Programmable voltage reference	-40	105	1	2.5	36	S0-8
TL431IYDT ⁽³⁾	Programmable voltage reference	-40	105	1	2.5	36	S0-8
TL431AIYD/AUT ⁽³⁾	Programmable voltage reference	-40	105	1	2.5	36	S0-8
TL431AIYDT/AU ⁽³⁾	Programmable voltage reference	-40	105	1	2.5	36	S0-8
TS431BIYLT ⁽³⁾	Low-voltage adjustable shunt reference	-40	125	1	1.24	6	SOT 23-5
TS431IYLT ⁽³⁾	Low-voltage adjustable shunt reference	-40	125	1	1.24	6	SOT 23-5
TS4040EYLT-2.5 ⁽³⁾	2.5 V Micropower shunt voltage reference	-40	85	1			SOT23-3L
TS821IYLT ⁽³⁾	1.225 V Micropower shunt voltage reference	-40	85	0.5			SOT23-3L
TS4041EYLT-1.2 ⁽³⁾	1.225 V Micropower shunt voltage reference	-40	85	0.5			SOT23-3L
TS822IYLT ⁽³⁾	2.5 V Micropower shunt voltage reference	-40	85	1			SOT23-3L
TS824IYLT-1.2 ⁽³⁾	High thermal stability micropower shunt voltage reference	-40	85	1			SOT23-3L
TS824IYLT-2.5 ⁽³⁾	High thermal stability micropower shunt voltage reference	-40	85	1			SOT23-3L
TS431AIYLT ⁽³⁾	Low-voltage adjustable shunt reference	-40	125	1	1.24	6	SOT 23-5

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

Analog devices

Interface ICs

Part number	Description	Input voltage (V)	Max output current (A)	Tj max (°C)	Package
ULQ2003D1013TRY	500 mA seven Darlington array	30	0.5	125	S0-16

Real-time clocks

Part number	Memory organization	Input/output interface	Supply voltage (Vcc)		Packing type	Package
			min (V)	max (V)		
M41T94MQ6F	512 b (64 x 8)	SPI (2 MHz)	2.7	5.5	Tape and reel	S0-16
M41T94MQ6E	512 b (64 x 8)	SPI (2 MHz)	2.7	5.5	Tube	S0-16
M41T81M6E	160 b (20 x 8)	I²C (400 kHz)	2	5.5	Tube	S0-8
M41T81M6F	160 b (20 x 8)	I²C (400 kHz)	2	5.5	Tape and reel	S0-8

Infrared communication ICs

Part number	Description	Tj max (°C)	Transmitting frequency (MHz)		Supply voltage	Package
			f min	f max	Vcc min (V)	
TSH512CYFT ⁽³⁾	Hi-fi stereo / mono infrared transmitter and stereo sub-carrier generator	85	0.4	11	2.3	TQFP44 10x10x1.4 1.0

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

Analog devices

LCD gamma correction

Part number	Description	T _J max (°C)	Supply voltage		Supply current (μA)	Package
			V _{CC} min (V)	V _{CC} max (V)		
TSL1014IYPT ⁽³⁾	LCD gamma correction IC with 3 channel buffers + analog switches	85	-22	33	3000	TSSOP20 body 4.4 pitch 0.65

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

SBC - Transceiver and power-management

Part number	Packages	Transceiver		Voltage regulators					Driver stages		On board features	Description
		Transmission rate	Transceiver description	Outputs	Accuracy	Drop voltage VDP typ (mV)	Reset	Watchdog	Outputs	Driver description		
L4969URD L4969UR	SO-20 PowerSO-20	125 kbaud	Fault tolerant low-speed CAN transceiver	5 V @ 180 mA 5 V @ 180 mA	± 2 % ± 4 %	400	•	•				System basic chip
L9952GXP	PowerSSO-36	20 kbaud	LIN transceiver	5 V @ 200 mA	± 2 %	300	•	•	4 1 2	HSD 1 @ 120 mA HSD 1 @ 400 mA Relay drivers (2 Ω)	• 4 wake-up inputs for contact monitoring • Inhibit input for wake up from external CAN • Two op amps for current sense interfacing • Fail-safe output	Companion chip
				5 V @ 50 mA	± 4 %	200						

Special devices

Part number	Packages	Driver stages	Operating range V _{CC} (V)	Max supply voltage V _{CC} max (V)	Highlights	Description
L9700D	SO-8	Six channels limiter	4.75 to 5.25	20	Fast active clamping	Limiter
L9686MD	SO-8	Relay driver for car direction indicator	8 to 18		Lamp failure detection, load dump protected	Indicator driver
L99MC6	PowerSSO-16	Hexa configurable high-side, low-side driver	6 to 28	40	Rds(on) = 0.7 at Tj = 25 °C	Configurable high-side/low-side driver
L99H01XP ⁽¹⁾ L99H01QF ⁽¹⁾	PowerSSO-36 LQFP-32	Motor bridge driver	6 to 28	35	Programmable free wheeling, current sense amplifier / free configurable, sensing circuitry of external MOSFET with embedded thermal sensor	Controller for 4 external N-channel MOSFET in bridge configuration
VN1160 VN1160-1	DPAK IPAK	Power switch for motorbike direction indicator	9 to 16	40	Lamp failure detection, indicator reverse battery protected	Motorbike indicator driver

(1) Under development

Power devices

Power MOSFETs

Part number	Description	T _j max (°C)	V _{DSS} (V)	R _{DS(on)} (mΩ)	I _D (A)	Package
STB100NF03L-03-1	N-channel power MOSFET	175	30	3.2	100	I ² PAK
STB100NF03L-03T4	N-channel power MOSFET	175	30	3.2	100	D ² PAK
STB200NF03T4	N-channel power MOSFET	175	30	3.6	120	D ² PAK
STB80NF03L-04T4	N-channel power MOSFET	175	30	4.0	80	D ² PAK
STB80NF03L-04-1	N-channel power MOSFET	175	30	4.0	80	I ² PAK
STD100N3LF3 ⁽³⁾	N-channel power MOSFET	175	30	5.5	80	DPAK
STD30NF03LT4	N-channel power MOSFET	175	30	25	30	DPAK
STD18NF03L	N-channel power MOSFET	175	30	50	17	DPAK
STB270N4F3 ⁽³⁾	N-channel power MOSFET	175	40	2.5	160	D ² PAK
STP270N4F3 ⁽³⁾	N-channel power MOSFET	175	40	2.9	120	TO-220
STB200NF04L	N-channel power MOSFET	175	40	3.5	120	D ² PAK
STP200NF04L	N-channel power MOSFET	175	40	3.8	120	TO-220
STB200N4F3 ⁽³⁾	N-channel power MOSFET	175	40	4.0	120	D ² PAK
STP100NF04	N-channel power MOSFET	175	40	4.6	120	TO-220
STB100NF04T4	N-channel power MOSFET	175	40	4.6	120	D ² PAK
STP95N4F3 ⁽³⁾	N-channel power MOSFET	175	40	6.5	80	TO-220
STD95N4F3 ⁽³⁾	N-channel power MOSFET	175	40	6.5	80	DPAK
STD30NF04LT	N-channel power MOSFET	175	40	30	30	DPAK
STB185N55F3 ⁽³⁾	N-channel power MOSFET	175	55	3.5	120	D ² PAK
STP185N55F3 ⁽³⁾	N-channel power MOSFET	175	55	3.8	120	TO-220
STB150NF55T4	N-channel power MOSFET	175	55	6.0	120	D ² PAK

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

Power devices

Power MOSFETs (cont'd)

Part number	Description	T _j max (°C)	V _{DSS} (V)	R _{DS(on)} (mΩ)	I _D (A)	Package
STP150NF55	N-channel power MOSFET	175	55	6.0	120	TO-220
STB80NF55-06-1	N-channel power MOSFET	175	55	6.5	80	I ² PAK
STB80NF55-06T	N-channel power MOSFET	175	55	6.5	80	D ² PAK
STB141NF55	N-channel power MOSFET	175	55	8.0	80	D ² PAK
STB141NF55-1	N-channel power MOSFET	175	55	8.0	80	I ² PAK
STP141NF55	N-channel power MOSFET	175	55	8.0	80	TO-220
STB85NF55T4	N-channel power MOSFET	175	55	8.0	80	D ² PAK
STP85NF55	N-channel power MOSFET	175	55	8.0	80	TO-220
STP85NF55L	N-channel power MOSFET	175	55	8.0	80	TO-220
STB85NF55LT4	N-channel power MOSFET	175	55	8.0	80	D2PAK
STD65N55F3	N-channel power MOSFET	175	55	8.5	80	DPAK
STD60NF55LAT4	N-channel power MOSFET	175	55	15	60	DPAK
STD35NF06LT4	N-channel power MOSFET	175	60	17	35	DPAK
STB60NF06T4	N-channel power MOSFET	175	60	16	60	D ² PAK
STB45NF06T4	N-channel power MOSFET	175	60	28	38	D ² PAK
STF40NF06	N-channel power MOSFET	175	60	28	23	TO-220FP
STD30NF06T4	N-channel power MOSFET	175	60	28	28	DPAK
STP36NF06L	N-channel power MOSFET	175	60	40	30	TO-220
STD20NF06LT4	N-channel power MOSFET	175	60	40	24	DPAK
STS5NF60L	N-channel power MOSFET	175	60	55	5	SO-8
STS5DNF60L	N-channel power MOSFET	175	60	55	4	SO-8

Power devices

Power MOSFETs (cont'd)

Part number	Description	T _j max (°C)	V _{DSS} (V)	R _{DS(on)} (mΩ)	I _D (A)	Package
STD12NF06LT4	N-channel power MOSFET	175	60	100	12	DPAK
STN4NF06L	N-channel power MOSFET	175	60	100	4	SOT-223
STP76NF75	N-channel power MOSFET	175	75	11	80	TO-220
STB76NF75	N-channel power MOSFET	175	75	11	80	D ² PAK
STB60NF10-1	N-channel power MOSFET	175	100	23	80	I ² PAK
STP60NF10	N-channel power MOSFET	175	100	23	80	TO-220
STD25NF10LA	N-channel power MOSFET	175	100	35	25	DPAK
STD26NF10	N-channel power MOSFET	175	100	38	25	DPAK
STS4NF100	N-channel power MOSFET	175	100	70	4	SO-8
STD5NM50T4	N-channel power MOSFET	175	500	800	7.5	DPAK
STP90NS04ZC	N-channel power MOSFET	175	33 (clamped)	6	80	TO-220
STB130NS04ZBT4	N-channel power MOSFET	175	33 (clamped)	9	80	D ² PAK
STP130NS04ZB	N-channel power MOSFET	175	33 (clamped)	9	80	TO-220
STB130NS04ZB-1	N-channel power MOSFET	175	33 (clamped)	9	80	I ² PAK
STP70NS04ZC	N-channel power MOSFET	175	33 (clamped)	11	80	TO-220
STP180NS04ZC	N-channel power MOSFET	175	33 (clamped)	4.2	120	TO-220
STP22NM50 ⁽³⁾	N-channel power MOSFET	150	500	250	20	TO-220
STP22NM60D ⁽³⁾	N-channel power MOSFET	150	600	290	20	TO-220
STW46NM60D ⁽³⁾	N-channel power MOSFET	150	600	110	45	TO-247
STP8NM80 ⁽³⁾	N-channel power MOSFET	150	800	1005	6.2	TO-220

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

Power devices

Power bipolar transistors

Part number		V _{CEO} (V)	I _C (A)	h _{FE} @ I _C , V _{CE}				V _{CE(sat)} @ I _C , I _B (V)			Package
NPN	PNP			min	max	(A)	(V)	max	(A)	(mA)	
STD724T4 ⁽³⁾	STD826T4 ⁽³⁾	30	3	120		1	2	0.7	2	100	DPAK
	STT818B-A	30	3	100		2.5	3	0.5	2	20	SOT23-6L
	STD790AT4 ⁽³⁾	30	3	90		3	1	0.7	3	100	DPAK
STD878T4 ⁽³⁾	STD888T4 ⁽³⁾	30	5	70		5	1	0.7	5	250	DPAK
	BD436-A	32	4	50		2	1	0.5	2	200	SOT-32
	2STN2540-A	40	5	200		1	2	0.2	2	200	SOT-223
	BD438-A	45	4	40		2	1	0.6	2	200	SOT-32
BD241A-A		60	3	25		1	4	1.2	3	600	TO-220
MJD360T4-A ⁽³⁾		60	3	30		3	4	0.9	3	150	DPAK
STD1802T4-A		60	3	100		3	2	0.4	3	150	DPAK
STD1805 ⁽³⁾	STD2805 ⁽³⁾	60	5	85		5	2	0.6	5	200	DPAK/IPAK
STN851-A		60	5	90		5	1	0.5	5	200	SOT-223
	TIP105-A	60	8	1000	20000	3	4	2	3	6	TO-220
2STD1665T4 ⁽³⁾		65	6	90		5	1	0.5	5	200	DPAK
	MJD45H11T4-A	80	8	40		4	1	1	8	400	DPAK
STX112-AP-A		100	2	400		2	4	2.5	2	8	TO-92
MJD31CT4-A	MJD32CT4-A	100	3	10	50	3	4	1.2	3	375	DPAK
	TIP32C-A	100	3	10	50	3	4	1.2	3	375	TO-220
TIP122-A	TIP127-A	100	5	1000		3	3	2	3	12	TO-220

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

Power devices

Power bipolar transistors (cont'd)

Part number		V _{CEO} (V)	I _C (A)	h _{FE} @ I _C , V _{CE}				V _{CE(sat)} @ I _C , I _B (V)			Package
NPN	PNP			min	max	(A)	(V)	max	(A)	(mA)	
	TIP42A-A	100	6	15	75	3	4	1.5	6	600	TO-220
TIP102-A		100	8	1000	20000	3	4	2	3	6	TO-220
BDW93C-A		100	12	160	400	1	2	0.3	2	0.1	TO-220
	ST26025A	100	20	750	18000	10	3	2	10	40	TO-3
STD901T		350	4	1800	3800	2	2	2.0	2	20	DPAK
STD37N05T2T4		370	5	7000		1	5	4.0	3	3	DPAK

IGBTs

Part number	Description	I _C @ 100°C (A)	V _{CEs} (V)	T _J max (°C)	Package
STGB7NB40LZ	Logic level, fully clamped	14	clamped @ 400	175	D ² PAK
STGB10NB37LZ	Logic level, fully clamped	20	clamped @ 370	175	D ² PAK
STGP10NB37LZ	Logic level, fully clamped	20	clamped @ 370	175	TO-220
STGB10NB40LZ	Logic level, fully clamped	20	clamped @ 400	175	D ² PAK
STGB20NB32LZ	Logic level, fully clamped	30	clamped @ 350	175	D ² PAK
STGB20NB32LZ-1	Logic level, fully clamped	30	clamped @ 350	175	I ² PAK
STGB20NB37LZ	Logic level, fully clamped	30	clamped @ 400	175	D ² PAK
STGB20NB41LZ	Logic level, fully clamped	30	clamped @ 410	175	D ² PAK

Power devices

IGBTs (cont'd)

Part number	Description	IC @ 100°C (A)	V _{CES} (V)	T _J max (°C)	Package
STGB3NB60SD	Logic level, monolithic free-wheeling diode	3	600	175	D ² PAK
STGD3NB60SD	Logic level, monolithic free-wheeling diode	3	600	175	DPAK
STGD3NB60SD-1	Logic level, monolithic free-wheeling diode	3	600	175	IPAK
STGD18N40LZ	Logic level, fully clamped	20	clamped @ 400	175	DPAK
STGD18N40LZ-1	Logic level, fully clamped	20	clamped @ 400	175	IPAK
STGB18N40LZ	Logic level, fully clamped	20	clamped @ 400	175	D ² PAK
STGB18N40LZ-1	Logic level, fully clamped	20	clamped @ 400	175	I ² PAK
STGB35N35LZ ⁽³⁾	Logic level, fully clamped	30	clamped @ 350	175	D ² PAK
STGB35N35LZ-1 ⁽³⁾	Logic level, fully clamped	30	clamped @ 350	175	I ² PAK

Ultrafast rectifiers

Part number	Description	T _J max (°C)	Voltage max (V)	Current (A)	V _F max @rated current (V)	T _{rr} max (ns)	Package
STTH102A ⁽³⁾	High-efficiency ultrafast diode	175	200	1	0.78	20	SMA
STTH2R02U ⁽³⁾	High-efficiency ultrafast diode	175	200	2	0.8	20	SMB
STTH4R02B-TR ⁽³⁾	High-efficiency ultrafast diode	175	200	4	0.83	20	DPAK
STTH4R02S ⁽³⁾	High-efficiency ultrafast diode	175	200	4	0.83	20	SMC
STTH802CB-TR ⁽³⁾	High-efficiency ultrafast diode	175	200	2 x 4	0.95	20	DPAK
STTH1002CB-TR ⁽³⁾	High-efficiency ultrafast diode	175	200	2 x 5	0.89	25	DPAK

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Power devices

Ultrafast rectifiers (cont'd)

Part number	Description	T _j max (°C)	Voltage max (V)	Current (A)	V _F max @rated current (V)	T _{rr} max (ns)	Package
STTH1002CG-TR ⁽³⁾	High-efficiency ultrafast diode	175	200	2 x 5	0.89	25	D ² PAK
STTH1302CG-TR ⁽³⁾	High-efficiency ultrafast diode	175	200	2 x 6.5	0.95	25	D ² PAK
STTH1602CG-TR ⁽³⁾	High-efficiency ultrafast diode	175	200	2 x 8	0.89	26	D ² PAK
STTH2002CG-TR ⁽³⁾	High-efficiency ultrafast diode	175	200	2 x 10	0.89	27	D ² PAK
STTH3002CG-TR ⁽³⁾	High-efficiency ultrafast diode	175	200	2 x 15	0.84	27	D ² PAK
STTH1L06A ⁽³⁾	Turbo 2 ultrafast high voltage rectifier	175	600	1	1.05	80	SMA
STTH1L06U ⁽³⁾	Turbo 2 ultrafast high voltage rectifier	175	600	1	1.05	80	SMB
STTH1R06A ⁽³⁾	Turbo 2 ultrafast high voltage rectifier	175	600	1	1.25	25	SMA
STTH1R06U ⁽³⁾	Turbo 2 ultrafast high voltage rectifier	175	600	1	1.25	25	SMB
STTH3L06S ⁽³⁾	Turbo 2 ultrafast high voltage rectifier	175	600	3	1.05	85	SMC
STTH506B-TR ⁽³⁾	Turbo 2 ultrafast high voltage rectifier	175	600	5	1.4	30	DPAK
STTH5L06B-TR ⁽³⁾	Turbo 2 ultrafast high voltage rectifier	175	600	5	1.05	95	DPAK
STTH5R06B-TR ⁽³⁾	Turbo 2 ultrafast high voltage rectifier	175	600	5	1.8	40	DPAK
STTH8L06G-TR ⁽³⁾	Turbo 2 ultrafast high voltage rectifier	175	600	8	1.05	105	D ² PAK
STTH8R06G-TR ⁽³⁾	Turbo 2 ultrafast high voltage rectifier	175	600	8	1.8	45	D ² PAK
STTH15L06G-TR ⁽³⁾	Turbo 2 ultrafast high voltage rectifier	175	600	15	1.2	85	D ² PAK
STTH16L06CG-TR ⁽³⁾	Turbo 2 ultrafast high voltage rectifier	175	600	2 x 8	1.35	55	D ² PAK
STTH30L06CG-TR ⁽³⁾	Turbo 2 ultrafast high voltage rectifier	175	600	2 x 15	1.25	90	D ² PAK
STTH108A ⁽³⁾	High voltage ultrafast rectifier diode	175	800	1	1.25	75	SMA
STTH110A ⁽³⁾	High voltage ultrafast rectifier diode	175	1000	1	1.42	75	SMA
STTH112A ⁽³⁾	High voltage ultrafast rectifier diode	175	1200	1	1.65	75	SMA

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

Power devices

Power Schottky rectifiers

Part number	Description	T _j max (°C)	Voltage max (V)	Current (A)	V _F max @ I _F		Package
					(V)	(A)	
STPS2L25U ⁽³⁾	Low-drop power Schottky rectifier	150	25	2	0.38	2	SMB
STPS5L25B-TR ⁽³⁾	Low-drop power Schottky rectifier	150	25	5	0.35	5	DPAK
STPS10L25G-TR ⁽³⁾	Low-drop power Schottky rectifier	150	25	10	0.35	10	D ² PAK
STPS20L25CG-TR ⁽³⁾	Low-drop power Schottky rectifier	150	25	2 x 10	0.35	10	D ² PAK
STPS20L25CT ⁽³⁾	Low-drop power Schottky rectifier	150	25	2 x 10	0.35	10	TO-220AB
STPS0530Z ⁽³⁾	Power Schottky rectifier	150	30	0.5	0.33	0.5	SOD-123
STPS130A ⁽³⁾	Power Schottky rectifier	150	30	1	0.46	1	SMA
STPS130U ⁽³⁾	Power Schottky rectifier	150	30	1	0.46	1	SMB
STPS8L30B-TR ⁽³⁾	Low-drop power Schottky rectifier	150	30	8	0.4	8	DPAK
STPS15L30CB-TR ⁽³⁾	Low-drop power Schottky rectifier	150	30	2 x 7.5	0.39	7.5	DPAK
STPS3030CG-TR ⁽³⁾	Power Schottky rectifier	150	30	2 x 15	0.42	15	D ² PAK
STPS30L30CG-TR ⁽³⁾	Low-drop power Schottky rectifier	150	30	2 x 15	0.37	15	D ² PAK
STPS30L30CT ⁽³⁾	Low-drop power Schottky rectifier	150	30	2 x 15	0.37	15	TO-220AB
STPS41L30CG-TR ⁽³⁾	Low-drop power Schottky rectifier	150	40	2 x 20	0.38	20	D ² PAK
STPS0540Z ⁽³⁾	Power Schottky rectifier	150	40	0.5	0.4	0.5	SOD-123
STPS140Z ⁽³⁾	Power Schottky rectifier	150	40	1	0.51	1	SOD-123
STPS140A ⁽³⁾	Power Schottky rectifier	150	40	1	0.5	1	SMA
STPS140U ⁽³⁾	Power Schottky rectifier	150	40	1	0.5	1	SMB
STPS1L40A ⁽³⁾	Low-drop power Schottky rectifier	150	40	1	0.42	1	SMA
STPS1L40U ⁽³⁾	Low-drop power Schottky rectifier	150	40	1	0.42	1	SMB

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

Power devices

Power Schottky rectifiers (cont'd)

Part number	Description	T _j max (°C)	Voltage max (V)	Current (A)	V _F max @ I _F		Package
					(V)	(A)	
STPS2L40U ⁽³⁾	Low-drop power Schottky rectifier	150	40	2	0.34	2	SMB
STPS340S ⁽³⁾	Power Schottky rectifier	150	40	3	0.57	3	SMC
STPS340B-TR ⁽³⁾	Power Schottky rectifier	150	40	3	0.57	3	DPAK
STPS340U ⁽³⁾	Power Schottky rectifier	150	40	3	0.57	3	SMB
STPS3L40S ⁽³⁾	Low-drop power Schottky rectifier	150	40	3	0.44	3	SMC
STPS640CB-TR ⁽³⁾	Power Schottky rectifier	150	40	2 x 3	0.57	3	DPAK
STPS10L45CG-TR ⁽³⁾	Low-drop power Schottky rectifier	150	40	2 x 5	0.46	5	DPAK
STPS745G-TR ⁽³⁾	Power Schottky rectifier	175	45	7.5	0.57	7.5	D ² PAK
STPS1045B-TR ⁽³⁾	Power Schottky rectifier	175	45	10	0.57	10	DPAK
STPS10L45CG-TR ⁽³⁾	Low-drop power Schottky rectifier	150	45	2 x 5	0.46	5	D ² PAK
STPS1545CG-TR ⁽³⁾	Power Schottky rectifier	175	45	2 x 7.5	0.57	7.5	D ² PAK
STPS1545CR ⁽³⁾	Power Schottky rectifier	175	45	2 x 7.5	0.57	7.5	I ² PAK
STPS1545G-TR ⁽³⁾	Power Schottky rectifier	175	45	2 x 7.5	0.57	7.5	D ² PAK
STPS15L45CB-TR ⁽³⁾	Low-drop power Schottky rectifier	150	45	2 x 7.5	0.46	7.5	DPAK
STPS1645D ⁽³⁾	Power Schottky rectifier	175	45	16	0.57	16	TO-220AC
STPS2045CFP ⁽³⁾	Power Schottky rectifier	175	45	2 x 10	0.57	10	TO-220FPAB
STPS2045CG-TR ⁽³⁾	Power Schottky rectifier	175	45	2 x 10	0.57	10	D ² PAK
STPS2045CR ⁽³⁾	Power Schottky rectifier	175	45	2 x 10	0.57	10	I ² PAK
STPS20L45CG-TR ⁽³⁾	Power Schottky rectifier	175	45	2 x 10	0.5	10	D ² PAK
STPS20L45CT ⁽³⁾	Low-drop power Schottky rectifier	175	45	2 x 10	0.5	10	TO-220AB

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Power devices

Power Schottky rectifiers (cont'd)

Part number	Description	T _j max (°C)	Voltage max (V)	Current (A)	V _F max @ I _F		Package
					(V)	(A)	
STPS3045CG-TR ⁽³⁾	Power Schottky rectifier	175	45	2 x 15	0.57	15	D ² PAK
STPS3045CT ⁽³⁾	Power Schottky rectifier	175	45	2 x 15	0.57	15	TO-220AB
STPS30L45CG-TR ⁽³⁾	Low-drop power Schottky rectifier	175	45	2 x 15	0.5	15	D ² PAK
STPS30L45CT ⁽³⁾	Low-drop power Schottky rectifier	175	45	2 x 15	0.5	15	TO-220AB
STPS0560Z ⁽³⁾	Power Schottky rectifier	150	60	0.5	0.5	0.5	SOD-123
STPS160A ⁽³⁾	Power Schottky rectifier	150	60	1	0.57	1	SMA
STPS160U ⁽³⁾	Power Schottky rectifier	150	60	1	0.57	1	SMB
STPS1L60A ⁽³⁾	Low-drop power Schottky rectifier	150	60	1	0.56	1	SMA
STPS2L60A ⁽³⁾	Low-drop power Schottky rectifier	150	60	2	0.55	2	SMA
STPS3L60S ⁽³⁾	Low-drop power Schottky rectifier	150	60	3	0.61	3	SMC
STPS3L60U ⁽³⁾	Low-drop power Schottky rectifier	150	60	3	0.61	3	SMB
STPS660CB-TR ⁽³⁾	Power Schottky rectifier	150	60	2 x 3	0.59	3	DPAK
STPS15L60CB-TR ⁽³⁾	Low-drop power Schottky rectifier	150	60	2 x 7.5	0.52	7.5	DPAK
STPS20L60CG-TR ⁽³⁾	Low-drop power Schottky rectifier	150	60	2 x 10	0.56	10	D ² PAK
STPS1H100A ⁽³⁾	High-voltage power Schottky rectifier	175	100	1	0.62	1	SMA
STPS1H100U ⁽³⁾	High-voltage power Schottky rectifier	175	100	1	0.62	1	SMB
STPS2H100A ⁽³⁾	High-voltage power Schottky rectifier	175	100	2	0.65	2	SMA
STPS2H100U ⁽³⁾	High-voltage power Schottky rectifier	175	100	2	0.65	2	SMB
STPS5H100B-TR ⁽³⁾	High-voltage power Schottky rectifier	175	100	5	0.61	5	DPAK
STPS8H100G-TR ⁽³⁾	High-voltage power Schottky rectifier	175	100	8	0.58	8	D ² PAK

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

Power devices

Power Schottky rectifiers (cont'd)

Part number	Description	T _j max (°C)	Voltage max (V)	Current (A)	V _F max @ I _F		Package
					(V)	(A)	
STPS15H100CB-TR ⁽³⁾	High-voltage power Schottky rectifier	175	100	2 x 7.5	0.67	7.5	DPAK
STPS16H100CG-TR ⁽³⁾	High-voltage power Schottky rectifier	175	100	2 x 8	0.64	8	D ² PAK
STPS20H100CG-TR ⁽³⁾	High-voltage power Schottky rectifier	175	100	2 x 10	0.64	10	D ² PAK
STPS41H100CG-TR ⁽³⁾	High-voltage power Schottky rectifier	175	100	2 x 20	0.67	20	D ² PAK
STPS1150A ⁽³⁾	High-voltage power Schottky rectifier	175	150	1	0.67	1	SMA
STPS2150A ⁽³⁾	High-voltage power Schottky rectifier	175	150	2	0.67	2	SMA
STPS3150U ⁽³⁾	High-voltage power Schottky rectifier	175	150	3	0.67	3	SMB
STPS10150CG-TR ⁽³⁾	High-voltage power Schottky rectifier	175	150	2 x 5	0.75	5	D ² PAK
STPS20150CG-TR ⁽³⁾	High-voltage power Schottky rectifier	175	150	2 x 10	0.75	10	D ² PAK
STPS30150CG-TR ⁽³⁾	High-voltage power Schottky rectifier	175	150	2 x 15	0.75	15	D ² PAK

Protection devices - ESD protection

Part number	Description	T _j max (°C)	No. of lines	V _{DR} min @ I _R		C typ. @ 0 V bias (pf)	Package
				(V)	(mA)		
ESDA14V2L ⁽³⁾	Dual Transil array for ESD protection	125	2	14.2	1	90	SOT-23
ESDA25W ⁽³⁾	Transil array for data protection	125	2	25	1	65	SOT323-3L
ESDA14V2SC5 ⁽³⁾	Transil array for data protection	125	4	14.2	1	100	SOT23-5L
ESDA14V2SC6 ⁽³⁾	Transil array for data protection	125	4	14.2	1	100	SOT23-6L
ESDA25SC6 ⁽³⁾	Transil array for data protection	125	4	25	1	60	SOT23-6L

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Power devices

Protection devices - ESD protection (cont'd)

Part number	Description	T _J max (°C)	No. of lines	V _{BR} min @ I _R		C typ. @ 0 V bias (pf)	Package
				(V)	(mA)		
ESDA6V1SC6 ⁽³⁾	Quad Transil array for ESD protection	125	4	6.1	1	190	SOT23-6L
ESDA25L ⁽³⁾	Quad Transil array for ESD protection	125	2	25	1	50	SOT-23
ESDA6V1-5W6 ⁽³⁾	Transil array for data protection	125	5	6.1	1	50	SOT323-6L

Protection devices - LIN bus protection

Part number	Description	T _J max (°C)	No. of lines	V _{BR} min @ I _R		C typ. @ 0 V bias (pf)	Package
				(V)	(mA)		
ESDLIN1524BJ	Transil diode for LIN transceiver ESD protection	150	1	17.1 @ 15 V 25.4 @ 24 V	5	16	SOD-323

Protection devices - Dataline protection

Part number	Description	T _J max (°C)	No. of lines	V _{RRM} (V)	I _R max (µA)	C max. @ 5 V (pf)	Package
DA108S1RL ⁽³⁾	4-line diode array	150	4	18	2 µA @ 15 V	35	S0-8
DALC208SC6 ⁽³⁾	4-line low capacitance diode array	150	4	9	1 µA @ 5 V	7	SOT23-6L

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

Power devices

Protection devices - Transil™

Part number	Description	T _J max (°C)	Power (W)	VRM (V)	IRM max @V _{rm} (µA)	V _{BR} min @ I _R		Package
						(V)	(mA)	
SMAJ15A-TR ⁽³⁾	Transil standard 400 W unidirectional	150	400	15	1	16.7	1	SMA
SMAJ15CA-TR ⁽³⁾	Transil standard 400 W bidirectional	150	400	15	1	16.7	1	SMA
SMAJ24A-TR ⁽³⁾	Transil standard 400 W unidirectional	150	400	24	1	26.7	1	SMA
SMAJ24CA-TR ⁽³⁾	Transil standard 400 W bidirectional	150	400	24	1	26.7	1	SMA
SMAJ26A-TR ⁽³⁾	Transil standard 400 W unidirectional	150	400	26	1	28.9	1	SMA
SMAJ28A-TR ⁽³⁾	Transil standard 400 W unidirectional	150	400	28	1	31.1	1	SMA
SMAJ28CA-TR ⁽³⁾	Transil standard 400 W bidirectional	150	400	28	1	31.1	1	SMA
SMAJ33A-TR ⁽³⁾	Transil standard 400 W unidirectional	150	400	33	1	36.7	1	SMA
SMAJ33CA-TR ⁽³⁾	Transil standard 400 W bidirectional	150	400	33	1	36.7	1	SMA
SMAJ40A-TR ⁽³⁾	Transil standard 400 W unidirectional	150	400	40	1	44.4	1	SMA
SMAJ40CA-TR ⁽³⁾	Transil standard 400 W bidirectional	150	400	40	1	44.4	1	SMA
SMAJ188A-TR ⁽³⁾	Transil standard 400 W unidirectional	150	400	188	1	209	1	SMA
SMAJ188CA-TR ⁽³⁾	Transil standard 400 W bidirectional	150	400	188	1	209	1	SMA
SM6HT24A	Transil standard 600 W unidirectional	175	600	20.5	2	22.8	1	SMB
SM6HT27A	Transil standard 600 W unidirectional	175	600	23.1	2	25.7	1	SMB
SM6HT30A	Transil standard 600 W unidirectional	175	600	25.6	2	28.5	1	SMB
SM6HT36A	Transil standard 600 W unidirectional	175	600	30.8	2	34.2	1	SMB
SM6HT39A	Transil standard 600 W unidirectional	175	600	33.3	2	37.1	1	SMB
SM6HT43A	Transil standard 600 W unidirectional	175	600	36.8	2	40.9	1	SMB
SM6T18A ⁽³⁾	Transil standard 600 W unidirectional	150	600	15.3	5	17.1	1	SMB

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

Power devices

Protection devices - Transil™ (cont'd)

Part number	Description	T _J max (°C)	Power (W)	VRM (V)	IRM max @V _{rm} (µA)	V _{BR} min @ I _R		Package
						(V)	(mA)	
SM6T18CA ⁽³⁾	Transil standard 600 W bidirectional	150	600	15.3	5	17.1	1	SMB
SM6T22A ⁽³⁾	Transil standard 600 W unidirectional	150	600	18.8	5	20.9	1	SMB
SM6T22CA ⁽³⁾	Transil standard 600 W bidirectional	150	600	18.8	5	20.9	1	SMB
SM6T24A ⁽³⁾	Transil standard 600 W unidirectional	150	600	20.5	5	22.8	1	SMB
SM6T24CA ⁽³⁾	Transil standard 600 W bidirectional	150	600	20.5	5	22.8	1	SMB
SM6T27AY	Transil standard 600 W unidirectional	150	600	23.1	5	25.7	1	SMB
SM6T27CA ⁽³⁾	Transil standard 600 W bidirectional	150	600	23.1	5	25.7	1	SMB
SM6T30A ⁽³⁾	Transil standard 600 W unidirectional	150	600	25.6	5	28.5	1	SMB
SM6T30CA ⁽³⁾	Transil standard 600 W bidirectional	150	600	25.6	5	28.5	1	SMB
SM6T33A ⁽³⁾	Transil standard 600 W unidirectional	150	600	28.2	5	31.4	1	SMB
SM6T33CA ⁽³⁾	Transil standard 600 W bidirectional	150	600	28.2	5	31.4	1	SMB
SM6T36AY	Transil standard 600 W unidirectional	150	600	30.8	5	34.2	1	SMB
SM6T36CA ⁽³⁾	Transil standard 600 W bidirectional	150	600	30.8	5	34.2	1	SMB
SM6T39AY	Transil standard 600 W unidirectional	150	600	33.3	5	37.1	1	SMB
SM6T39CA ⁽³⁾	Transil standard 600 W bidirectional	150	600	33.3	5	37.1	1	SMB
SM6T200A ⁽³⁾	Transil standard 600 W unidirectional	150	600	171	5	190	1	SMB
SM6T200CA ⁽³⁾	Transil standard 600 W bidirectional	150	600	171	5	190	1	SMB
SM15T18A ⁽³⁾	Transil standard 1500 W unidirectional	150	1500	15.3	5	17.1	1	SMC
SM15T18CA ⁽³⁾	Transil standard 1500 W bidirectional	150	1500	15.3	5	17.1	1	SMC
SM15T22A ⁽³⁾	Transil standard 1500 W unidirectional	150	1500	18.8	5	20.9	1	SMC

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

Power devices

Protection devices - Transil™ (cont'd)

Part number	Description	T _J max (°C)	Power (W)	VRM (V)	IRM max @V _{rm} (µA)	V _{BR} min @ I _R		Package
						(V)	(mA)	
SM15T22CA ⁽³⁾	Transil standard 1500 W bidirectional	150	1500	18.8	5	20.9	1	SMC
SM15T24A ⁽³⁾	Transil standard 1500 W unidirectional	150	1500	20.5	5	22.8	1	SMC
SM15T24CA ⁽³⁾	Transil standard 1500 W bidirectional	150	1500	20.5	5	22.8	1	SMC
SM15T27A ⁽³⁾	Transil standard 1500 W unidirectional	150	1500	23.1	5	25.7	1	SMC
SM15T30A ⁽³⁾	Transil standard 1500 W unidirectional	150	1500	25.6	5	28.5	1	SMC
SM15T30CA ⁽³⁾	Transil standard 1500 W bidirectional	150	1500	25.6	5	28.5	1	SMC
SM15T36A ⁽³⁾	Transil standard 1500 W unidirectional	150	1500	30.8	5	34.2	1	SMC
SM15T36CA ⁽³⁾	Transil standard 1500 W bidirectional	150	1500	30.8	5	34.2	1	SMC
SM15T39A ⁽³⁾	Transil standard 1500 W unidirectional	150	1500	33.3	5	37.1	1	SMC
SM15T39CA ⁽³⁾	Transil standard 1500 W bidirectional	150	1500	33.3	5	37.1	1	SMC
SM15T68A ⁽³⁾	Transil standard 1500 W unidirectional	150	1500	58.1	5	64.6	1	SMC
SM15T68CA ⁽³⁾	Transil standard 1500 W bidirectional	150	1500	58.1	5	64.6	1	SMC

High-side drivers - Smart power high-side switches, single channel

Part number	Packages	Technology	Operating range V _{cc} (V)	Max supply voltage V _{cc} max (V)	Max on-state resistance R _{DS(on)} max (mΩ)	Current limitation I _{lim} typ (A)	Digital status	Current sense
VN03	PENTAWATT	MO-1	5.5 to 36	60	500	4	•	
VN03SP	PowerSO-10	MO-1	5.5 to 36	60	500	4	•	
VN02H	PENTAWATT	MO-1	5.5 to 36	60	400	6	•	

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

Power devices

High-side drivers - Smart power high-side switches, single channel (cont'd)

Part number	Packages	Technology	Operating range V _{cc} (V)	Max supply voltage V _{cc} max (V)	Max on-state resistance R _{DS(on)} max (mΩ)	Current limitation I _{lim} typ (A)	Digital status	Current sense
VN02HSP	PowerSO-10	M0-1	5.5 to 36	60	400	6	•	
VN02N	PENTAWATT	M0-1	7 to 36	60	400	6	•	
VN02NSP	PowerSO-10	M0-1	7 to 36	60	400	6	•	
VN06	PENTAWATT	M0-1	5.5 to 36	60	360	9	•	
VN05N	PENTAWATT	M0-1	7 to 36	60	180	13	•	
VN06SP	PowerSO-10	M0-1	5.5 to 36	60	180	9	•	
VN800PT	PPAK	M0-3	5.5 to 36	41	135	1.3	•	
VN800S	SO 8	M0-3	5.5 to 36	41	135	1.3	•	
VN16B	PENTAWATT	M0-2	6 to 36	40	60	20	•	
VN16BSP	PowerSO-10	M0-2	6 to 36	40	60	20	•	
VN750	PENTAWATT	M0-3	5.5 to 36	41	60	9	•	
VN750-B5	P ² PAK	M0-3	5.5 to 36	41	60	9	•	
VN750LS	SO-8	M0-3	5.5 to 36	41	60	16	•	
VN750S	SO-8	M0-3	5.5 to 36	41	60	9	•	
VN750PT	PPAK	M0-3	5.5 to 36	41	60	9	•	
VN750PEP-E	PowerSSO-12	M0-3	5.5 to 36	41	60	9	•	
VN750SM	SO-8	M0-3	5.5 to 36	41	55	9	•	
VN21	PENTAWATT	M0-1	5.5 to 36	60	50	23	•	
VN820	PENTAWATT	M0-3	5.5 to 36	41	40	13	•	
VN820SP	PowerSO-10	M0-3	5.5 to 36	41	40	13	•	
VN820-B5	P ² PAK	M0-3	5.5 to 36	41	40	13	•	
VN820PT	PPAK	M0-3	5.5 to 36	41	40	13	•	
VN820SO	SO-16L	M0-3	5.5 to 36	41	40	13	•	
VN31	PENTAWATT	M0-2	5.5 to 36	60	30	31	•	
VN31SP	PowerSO-10	M0-2	5.5 to 36	60	30	31	•	
VN460SP	PowerSO-10	M0-2	5.5 to 36	45	20	25	•	
VN920D-B5	P ² PAK	M0-3	5.5 to 36	41	18	45	•	
VN920DSO	SO-16L	M0-3	5.5 to 36	41	18	45	•	
VN920	PENTAWATT	M0-3	5.5 to 36	41	16	45		•
VN920-B5	P ² PAK	M0-3	5.5 to 36	41	16	45		•
VN920SP	PowerSO-10	M0-3	5.5 to 36	41	16	45		•
VN920SO	SO-16L	M0-3	5.5 to 36	41	16	45		•
VN920DSP	PowerSO-10	M0-3	5.5 to 36	41	16	45	•	
VN920PEP-E	PowerSO-10	M0-3	5.5 to 36	41	10	75	•	

Power devices

High-side drivers - Smart power high-side switches, single channel (cont'd)

Part number	Packages	Technology	Operating range V _{cc} (V)	Max supply voltage V _{cc} max (V)	Max on-state resistance R _{DS(on)} max (mΩ)	Current limitation I _{lim} typ (A)	Digital status	Current sense
VN610SP	PowerSO-10	M0-3	5.5 to 36	41	10	75		•
VN5160S-E	S0-8	M0-5	4.5 to 36	41	160	5	•	
VN5E160AS-E ⁽¹⁾	S0-8	M0-5	4.5 to 28	41	160	10		•
VN5E160S-E	S0-8	M0-5	4.5 to 28	41	160	10	•	
VN5050J-E	PowerSSO-12	M0-5	4.5 to 36	41	50	18	•	
VN5E050J-E	PowerSSO-12	M0-5	4.5 to 28	41	50	27	•	
VN5050AJ-E	PowerSSO-12	M0-5	4.5 to 36	41	50	18		•
VN5E050AJ-E	PowerSSO-12	M0-5	4.5 to 28	41	50	27		•
VN5025AJ-E	PowerSSO-12	M0-5	4.5 to 36	41	25	40		•
VN5E025AJ-E	PowerSSO-12	M0-5	4.5 to 28	41	25	65		•
VN5016AJ-E	PowerSSO-12	M0-5	4.5 to 36	41	16	60		•
VN5E016AH ⁽¹⁾	HPAK	M0-5	4.5 to 28	41	16	73		•
VN5012AK-E	PowerSSO-24	M0-5	4.5 to 36	41	12	65		•
VN5010AK-E	PowerSSO-24	M0-5	4.5 to 36	41	10	65		•
VN5E010AH ⁽¹⁾	HPAK	M0-5	4.5 to 28	41	10	85		•

High-side drivers - Smart power high-side switches, double channel

Part number	Packages	Technology	Operating range V _{cc} (V)	Max supply voltage V _{cc} max (V)	Max on-state resistance R _{DS(on)} max (mΩ)	Current limitation I _{lim} typ (A)	Digital status	Current sense
VND05B	HEPTAWATT	M0-2	6 to 36	40	200	9	•	
VND05BSP	PowerSO-10	M0-2	6 to 36	40	200	9	•	
VND810SP	PowerSO-10	M0-3	5.5 to 36	41	160	5	•	
VND810	S0-16	M0-3	5.5 to 36	41	160	5	•	
VND810PEP-E	PowerSSO-12	M0-3	5.5 to 36	41	160	5	•	
VND810MSP ⁽⁵⁾	PowerSO-10	M0-3	5.5 to 36	41	150			
VND10B ⁽⁵⁾	HEPTAWATT	M0-2	6 to 36	40	100	14	•	

(1) Under development - (5) For lead-free version, add the E suffix to the part number (where not indicated)

Power devices

High-side drivers - Smart power high-side switches, double channel (cont'd)

Part number	Packages	Technology	Operating range V _{cc} (V)	Max supply voltage V _{cc} max (V)	Max on-state resistance R _{DS(on)} max (mΩ)	Current limitation I _{lim} typ (A)	Digital status	Current sense
VND10BSP ⁽⁵⁾	PowerSO-10	M0-2	6 to 36	40	100	14	•	
VND830 ⁽⁵⁾	S0-16L	M0-3	5.5 to 36	41	60	9	•	
VND830MSP ⁽⁵⁾	PowerSO-10	M0-3	5.5 to 36	41	60	9	•	
VND830SP ⁽⁵⁾	PowerSO-10	M0-3	5.5 to 36	41	60	9	•	
VND830ASP ⁽⁵⁾	PowerSO-10	M0-3	5.5 to 36	41	60	9		•
VND830LSP ⁽⁵⁾	PowerSO-10	M0-3	5.5 to 36	41	60	23	•	
VND830PEP-E ⁽⁵⁾	PowerSS0-24	M0-3	5.5 to 36	41	60	9	•	
VND830AEP-E ⁽⁵⁾	PowerSS0-24	M0-3	5.5 to 36	41	60	9		•
VND600 ⁽⁵⁾	S0-16L	M0-3	5.5 to 36	41	35	40	•	
VND600SP ⁽⁵⁾	PowerSO-10	M0-3	5.5 to 36	41	30	40	•	
VND670SP ⁽⁵⁾	PowerSO-10	M0-3	5.5 to 36	40	30	45	•	
VND600PEP-E ⁽⁵⁾	PowerSS0-24	M0-3	5.5 to 36	41	30	40		•
VND920 ⁽⁵⁾	S0-28	M0-3	5.5 to 36	41	16	45		•
VND5160J-E ⁽⁵⁾	PowerSS0-12	M0-5	4.5 to 36	41	160	5	•	
VND5E160J-E ⁽⁵⁾	PowerSS0-12	M0-5	4.5 to 28	41	160	10	•	
VND5160AJ-E ⁽⁵⁾	PowerSS0-12	M0-5	4.5 to 36	41	160	5		•
VND5E160AJ-E ⁽⁵⁾	PowerSS0-12	M0-5	4.5 to 28	41	160	10		•
VND5050J-E ⁽⁵⁾	PowerSS0-12	M0-5	4.5 to 36	41	50	18	•	
VND5E050J-E ⁽⁵⁾	PowerSS0-12	M0-5	4.5 to 28	41	50	27	•	
VND5050K-E ⁽⁵⁾	PowerSS0-24	M0-5	4.5 to 36	41	50	18	•	
VND5E050K-E ⁽⁵⁾	PowerSS0-24	M0-5	4.5 to 28	41	50	27	•	
VND5050AJ-E ⁽⁵⁾	PowerSS0-12	M0-5	4.5 to 36	41	50	18		•
VND5E050AJ-E ⁽⁵⁾	PowerSS0-12	M0-5	4.5 to 28	41	50	27		•
VND5050AK-E ⁽⁵⁾	PowerSS0-24	M0-5	4.5 to 36	41	50	18		•
VND5E050AK-E ⁽⁵⁾	PowerSS0-24	M0-5	4.5 to 28	41	50	27		•
VND5025AK-E ⁽⁵⁾	PowerSS0-24	M0-5	4.5 to 36	41	25	40		•
VND5E025AK-E ⁽⁵⁾	PowerSS0-24	M0-5	4.5 to 28	41	25	60		•
VND5012AK-E ⁽⁵⁾	PowerSS0-24	M0-5	4.5 to 36	41	12	60		•
VND5E012AY-E ^{(1) (5)}	PowerSS0-36D	M0-5	4.5 to 28	41	12	74		•
VND5E008AY ^{(1) (5)}	PowerSS0-36D	M0-5	4.5 to 28	41	8	85		•
VND5E006ASP ^{(1) (5)}	PowerSO-16	M0-5	4.5 to 28	41	6	100		•

(1) Under development - (5) For lead-free version, add the E suffix to the part number (where not indicated)

Power devices

High-side drivers - Smart power high-side switches, double channel (cont'd)

Part number	Packages	Technology	Operating range V _{cc} (V)	Max supply voltage V _{cc} max (V)	Max on-state resistance R _{DS(on)} max (mΩ)	Current limitation I _{lim} typ (A)	Digital status	Current sense
VND5004BSP30-E ⁽⁵⁾	PowerSO-30	M0-5	4.5 to 28	41	4	100		•
VND5004B-E ⁽⁵⁾	PowerQFN	M0-5	4.5 to 28	41	4	100		•

High-side drivers - Smart power high-side switches, quad channel

Part number	Packages	Technology	Operating range V _{cc} (V)	Max supply voltage V _{cc} max (V)	Max on-state resistance R _{DS(on)} max (mΩ)	Current limitation I _{lim} typ (A)	Digital status	Current sense
VNQ500PEP-E	PowerSS0-12	M0-3	5.5 to 36	41	500	0.5	•	
VNQ810	S0-28	M0-3	5.5 to 36	41	160	5	•	
VNQ810PEP-E	PowerSS0-24	M0-3	5.5 to 36	41	160	7.5	•	
VNQ810M	S0-28	M0-3	5.5 to 36	41	150	0.9	•	
VNQ05XSP16	PowerSO-16	M0-3	5.5 to 36	41	110	7.5		•
VNQ690SP	PowerSO-10	M0-3	6 to 36	41	90	14	•	
VNQ830	S0-28	M0-3	5.5 to 36	41	65	9	•	
VNQ830A	S0-28	M0-3	5.5 to 36	41	65	9		•
VNQ830M	S0-28	M0-3	5.5 to 36	41	60	9	•	
VNQ830PEP-E	PowerSS0-24	M0-3	5.5 to 36	41	60	18	•	
VNQ660SP	PowerSO-10	M0-3	5.5 to 36	41	50	10	•	
VNQ600A	S0-28	M0-3	5.5 to 36	41	35	40		•
VNQ600	S0-28	M0-3	5.5 to 36	41	35	40	•	
VNQ600AP	S0-28	M0-3	5.5 to 36	41	35	40		•
VNQ5E250AJ-E	PowerSS0-16	M0-5	4.5 to 28	41	250	5		•
VNQ5160K-E	PowerSS0-24	M0-5	4.5 to 36	41	160	5	•	
VNQ5E160K-E	PowerSS0-24	M0-5	4.5 to 28	41	160	10	•	
VNQ5E160AK-E	PowerSS0-24	M0-5	4.5 to 28	41	160	10		•
VNQ5050K-E	PowerSS0-24	M0-5	4.5 to 36	41	50	18	•	

(5) For lead-free version, add the E suffix to the part number (where not indicated)

Power devices

High-side drivers - Smart power high-side switches, quad channel (cont'd)

Part number	Packages	Technology	Operating range V _{cc} (V)	Max supply voltage V _{cc} max (V)	Max on-state resistance R _{DS(on)} max (mΩ)	Current limitation I _{lim} typ (A)	Digital status	Current sense
VNQ5E050AK-E ⁽⁵⁾	PowerSS0-24	M0-5	4.5 to 28	41	50	27		•
VNQ5050AK-E ⁽⁵⁾	PowerSS0-24	M0-5	4.5 to 36	41	50	18		•
VNQ5E050K-E ⁽⁵⁾	PowerSS0-24	M0-5	4.5 to 28	41	27	27	•	
VNQ5027AK-E ⁽⁵⁾	PowerSS0-24	M0-5	4.5 to 36	41	25	40		•

Low-side drivers - Smart power low-side switches, single channel

Part number	Packages	Technology	Voltage clamp V _{clamp} typ (V)	Current limitation I _{lim} typ (A)	Max on-state resistance R _{DS(on)} max (mΩ)
VND10N06 ⁽⁵⁾	DPAK	M0-2	60	10	300
VND10N06-1 ⁽⁵⁾	IPAK	M0-2	60	10	300
VND1NV04 ⁽⁵⁾	DPAK	M0-3	45	2.6	250
VNN1NV04 ⁽⁵⁾	SOT-223	M0-3	45	2.6	250
VNS1NV04 ⁽⁵⁾	S0-8	M0-3	45	2.6	250
VND1NV04-1 ⁽⁵⁾	IPAK	M0-3	45	2.6	250
VND5N07 ⁽⁵⁾	DPAK	M0-2	70	5	200
VND5N07-1 ⁽⁵⁾	IPAK	M0-2	70	5	200
VNP5N07 ⁽⁵⁾	TO-220	M0-2	70	5	200
VVNB10N07 ⁽⁵⁾	D ² PAK	M0-2	70	10	140
VND7N04 ⁽⁵⁾	DPAK	M0-2	42	7	140
VNP7N04 ⁽⁵⁾	TO-220	M0-2	42	7	140
VNV10N07 ⁽⁵⁾	PowerSO-10	M0-2	70	10	140
VND7N04-1 ⁽⁵⁾	IPAK	M0-2	42	7	140
VNP10N07 ⁽⁵⁾	TO-220	M0-2	70	10	140
VND3NV04 ⁽⁵⁾	DPAK	M0-3	45	5	120
VND3NV04-1 ⁽⁵⁾	IPAK	M0-3	45	5	120
VNN3NV04 ⁽⁵⁾	SOT-223	M0-3	45	5	120

(5) For lead-free version, add the E suffix to the part number (where not indicated)

Power devices

Low-side drivers - Smart power low-side switches, single channel (cont'd)

Part number	Packages	Technology	Voltage clamp V _{clamp} typ (V)	Current limitation I _{lim} typ (A)	Max on-state resistance R _{DS(on)} max (mΩ)
VNS3NV04 ⁽⁵⁾	SO-8	M0-3	45	5	120
VNP10N06 ⁽⁵⁾	TO-220	M0-2	60	10	300
VNB14N04 ⁽⁵⁾	D ² PAK	M0-2	42	14	70
VNP14N04 ⁽⁵⁾	TO-220	M0-2	42	14	70
VNV14N04 ⁽⁵⁾	PowerSO-10	M0-2	42	14	70
VND7NV04 ⁽⁵⁾	DPAK	M0-3	45	9	60
VNN7NV04 ⁽⁵⁾	SOT-223	M0-3	45	9	60
VNS7NV04 ⁽⁵⁾	SO-8	M0-3	45	9	60
VND7NV04-1 ⁽⁵⁾	IPAK	M0-3	45	9	60
VNB20N07 ⁽⁵⁾	D ² PAK	M0-2	70	20	50
VNP20N07 ⁽⁵⁾	TO-220	M0-2	70	20	50
VNV20N07 ⁽⁵⁾	PowerSO-10	M0-2	70	20	50
VNB49N04 ⁽⁵⁾	D ² PAK	M0-2	42	49	40
VNV49N04 ⁽⁵⁾	PowerSO-10	M0-2	42	49	40
VNP49N04 ⁽⁵⁾	TO-220	M0-2	42	49	40
VNB28N04 ⁽⁵⁾	D ² PAK	M0-2	42	28	35
VND14NV04 ⁽⁵⁾	DPAK	M0-3	45	18	35
VNP14NV04 ⁽⁵⁾	TO-220	M0-3	45	18	35
VNP28N04 ⁽⁵⁾	TO-220	M0-2	42	28	35
VNS14NV04 ⁽⁵⁾	SO-8	M0-3	45	18	35
VNV28N04 ⁽⁵⁾	PowerSO-10	M0-2	42	28	35
VND14NV04-1 ⁽⁵⁾	IPAK	M0-3	45	18	35
VNB14NV04 ⁽⁵⁾	D ² PAK	M0-3	45	18	35
VNB35N07 ⁽⁵⁾	D ² PAK	M0-2	70	35	28
VNV35N07 ⁽⁵⁾	PowerSO-10	M0-2	70	35	28
VNP35N07 ⁽⁵⁾	TO-220	M0-2	70	35	28
VNB35NV04 ⁽⁵⁾	D ² PAK	M0-3	45	45	10
VNP35NV04 ⁽⁵⁾	TO-220	M0-3	45	45	10
VNV35NV04 ⁽⁵⁾	PowerSO-10	M0-3	45	45	10
VNL5160N3-E ⁽¹⁾ (5)	SOT-223	M0-5	46	5	160
VNL5160S5-E ⁽¹⁾ (5) (6)	SO-8	M0-5	46	5	160

1) Under development - (5) For lead-free version, add the E suffix to the part number (where not indicated) - (6) Digital status

Power devices

Low-side drivers - Smart power low-side switches, single channel (cont'd)

Part number	Packages	Technology	Voltage clamp V _{clamp} typ (V)	Current limitation I _{lim} typ (A)	Max on-state resistance R _{DS(on)} max (mΩ)
VNL5050N3-E ⁽¹⁾ (5)	SOT-223	M0-5	46	27	50
VNL5050SS-E ⁽¹⁾ (5) (6)	S0-8	M0-5	46	27	50

Low-side drivers - Smart power low-side switches, double channel

Part number	Packages	Technology	Voltage clamp V _{clamp} typ (V)	Current limitation I _{lim} typ (A)	Max on-state resistance R _{DS(on)} max (mΩ)
VNS1NV04D ⁽⁵⁾	S0-8	M0-3	45	2.6	250
VNS3NV04D ⁽⁵⁾	S0-8	M0-3	45	5	120

1) Under development - (5) For lead-free version, add the E suffix to the part number (where not indicated) - (6) Digital status

Power devices

Door module drivers

Part number	Packages	Driver stages	On-state resistance R _{DS(on)} (mΩ)	Current limitation I _{lim} min (A)	Operating range V _S (V)	PWM control	Short circuit protection	Current monitoring output	Over temperature protection	Charge pump (reverse battery protection)	Diagnostic and programming	Description
L9949	PowerSO-20	1 full bridge	150	6	7 to 28		•	•	•		SPI	Mid-end front door module
		3 half bridges	800	1.6								
		1 high-side switch	100	6								
L9950 L9950XP	PowerSO-36 PowerSSO-36	2 half bridges	300	3	7 to 28	•	•	•	•	•	SPI	High-end front door module
		2 half bridges	800	1.5								
		1 full bridge	150	6								
		4 high-side switches	800	1.5								
L9951 L9951XP	PowerSO-36 PowerSSO-36	1 high-side switch	100	6	7 to 28	•	•	•	•	•	SPI	Rear door module
		1 half bridge	150	7.4								
		2 half bridges	200	5								
		2 high-side switches	800	1.25								
L9953 L9953XP	PowerSO-36 PowerSSO-36	3 half bridges	800	1.5	7 to 28	•	•	•	•	•	SPI	Mid-end front door module
		1 full bridge	150	6								
		2 high-side switches	500	1.5								
		1 high-side switch	100	6								
L9954 L9954XP	PowerSO-36 PowerSSO-36	3 half bridges	800	1.5	7 to 28	•	•	•	•	•	SPI	Mid-end front door module without door-lock
		2 high-side switches	500	1.5								
		1 high-side switch	100	6								
		1 full bridge	150	6								
L99DZ70XP	PowerSSO-36	2 half bridges	300	3	7 to 28	•	•	•	•	•	SPI	High-end front door module compatible with bulbs/LEDs. Control circuitry for electrochromic mirror glass.
		2 half bridges	1600	0,75								
		1 high-side switch	90	6								
		2 configurable high-side switches	500/1800	1.5/0.4								
		2 high-side switches	1600	0,5								

Power devices

Ignition controllers and drivers

Part number	Packages	Technolgy	High-voltage clamp V _{CLAMP} typ (V)	Coil current limit I _{CL} max (A)	Power stage saturation voltage V _{CE SAT} max (V)	Operating range V _{CC} (V)	Supply current (on state) I _{CC} max (mA)	Description
VB325SP	PowerSO-10	M1	380	11	2 @ 6 A	4.5 to 5.5	40	Quasi proportional current driving, current flag
VB326SP	PowerSO-10	M1	360	11	2 @ 6 A	4.5 to 5.5	40	Quasi proportional current driving, current flag
VB125ASP6	PowerSO-10	M1	370	11	2 @ 6 A	6 to 24	200	Temperature compensated high-voltage flag, current flag, voltage regulator not required
VB025SP6	PowerSO-10	M1	380	10	2 @ 6.5 A	4.5 to 5.5	40	Quasi proportional current driving. Current flag
VB027SP6	PowerSO-10	M1	360	9	2 @ 6 A	4.5 to 5.5	130	Quasi proportional current driving, current flag
VBG15NB22T5SP	PENTAWATT	Smart IGBT	250	25	2.5 @ 15 A	5.2 to 24	10	Max D-Well protection, voltage regulator not required

MEMS

Part number	Description	Range (g)	Output	Resolution (bit)	Operating temperature range (°C)		Package	Packing
					min	max		
AIS326DQ ⁽¹⁾	High-resolution 3-axis accelerometer	± 2, ± 6	Digital SPI	12	-40	105	QFPN 7x7	Tray
AIS326DQ-TR ⁽¹⁾	High-resolution 3-axis accelerometer	± 2, ± 6	Digital SPI	12	-40	105	QFPN 7x7	Tape and reel

(1) Under development

Memories

Serial EEPROM, I²C bus, M24

Part number	Packages	Size (KB)	Supply voltage (V _{cc})		Write cycle time (t _{WC}) (ms)	Operating ambient temperature (T _a)		Number of erase/write cycles (N _W) (Kcycles)	Data retention min (yr)	Clock frequency (f _{SCL}) max (MHz)
			min (V)	max (V)		min (°C)	max (°C)			
M24128-BW	SO-8; TSSOP8	128	2.5	5.5	5	-40	125	1000	40	0.4
M24256-BW ⁽³⁾	SO-8; TSSOP8	256	2.5	5.5	5	-40	85	1000	40	0.4
M24512-W ⁽³⁾	SO-8; TSSOP8	512	2.5	5.5	5	-40	85	1000	40	0.4
M24CD2-W	PDIP8; SO-8; TSSOP8	2	2.5	5.5	5	-40	125	1000	40	0.4
M24CD4-W	PDIP8; SO-8; TSSOP8	4	2.5	5.5	5	-40	125	1000	40	0.4
M24CD8-W	PDIP8; SO-8; TSSOP8	8	2.5	5.5	5	-40	125	1000	40	0.4
M24C16-W	PDIP8; SO-8; TSSOP8	16	2.5	5.5	5	-40	125	1000	40	0.4
M24C32-W	PDIP8; SO-8; TSSOP8	32	2.5	5.5	5	-40	125	1000	40	0.4
M24C64-W	PDIP8; SO-8; TSSOP8	64	2.5	5.5	5	-40	125	1000	40	0.4
M24M01-R ⁽³⁾	SO-8	1024	1.8	5.5	5	-40	85	1000	40	0.4

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

Memories

Serial EEPROM, Microwire® bus, M93

Part number	Packages	Size (KB)	Supply voltage (V _{cc})		Write cycle time (t _{WC}) (ms)	Operating ambient temperature (T _a)		Number of erase/write cycles(NW) (Kcycles)	Data retention min (yr)	Clock frequency (fSCL) max (MHz)
			min (V)	max (V)		min (°C)	max (°C)			
M93C46	PDIP8; SO-8	1	4.5	5.5	5	-40	125	1000	40	2
M93C46-W	PDIP8; SO-8; TSSOP8	1	2.5	5.5	5	-40	125	1000	40	2
M93C56	SO-8	2	4.5	5.5	5	-40	125	1000	40	2
M93C56-W	SO-8	2	2.5	5.5	5	-40	125	1000	40	2
M93C66	SO-8	4	4.5	5.5	5	-40	125	1000	40	2
M93C66-W	SO-8; TSSOP8	4	2.5	5.5	5	-40	125	1000	40	2
M93C76	SO-8	8	4.5	5.5	5	-40	125	1000	40	2
M93C76-W	SO-8	8	2.5	5.5	5	-40	125	1000	40	2
M93C86	SO-8	16	4.5	5.5	5	-40	125	1000	40	2
M93C86-W	SO-8	16	2.5	5.5	5	-40	125	1000	40	2
M93S46	SO-8	1	4.5	5.5	5	-40	125	1000	40	2
M93S46-W	SO-8	1	2.5	5.5	5	-40	125	1000	40	2
M93S56	SO-8	2	4.5	5.5	5	-40	125	1000	40	2
M93S56-W	SO-8	2	2.5	5.5	5	-40	125	1000	40	2
M93S66	SO-8	4	4.5	5.5	5	-40	125	1000	40	2
M93S66-W	SO-8	4	2.5	5.5	5	-40	125	1000	40	2

Memories

Serial EEPROM, SPI bus, M95

Part number	Packages	Size (KB)	Supply voltage (V _{cc})		Write cycle time (t _{WC}) (ms)	Operating ambient temperature (T _a)		Number of erase/write cycles(NW) (Kcycles)	Data retention min (yr)	Clock frequency (fSCL) max (MHz)
			min (V)	max (V)		min (°C)	max (°C)			
M95040	S0-8	4	4.5	5.5	5	-40	125	1000	40	5
M95040-W	S-08; TSSOP8	4	2.5	5.5	5	-40	125	1000	40	5
M95080	S-08	8	4.5	5.5	5	-40	125	1000	40	5
M95080-W	S-08; TSSOP8	8	2.5	5.5	5	-40	125	1000	40	5
M95128	S-08	128	4.5	5.5	5	-40	125	1000	40	10
M95128-W	S0-8; TSSOP8	128	2.5	5.5	5	-40	125	1000	40	5
M95160	S0-8	16	4.5	5.5	5	-40	125	1000	40	5
M95160-W	S0-8; TSSOP8	16	2.5	5.5	5	-40	125	1000	40	5
M95256	S0-8	256	4.5	5.5	5	-40	125	1000	40	5
M95256-W	S0-8; TSSOP8	256	2.5	5.5	5	-40	125	1000	40	5
M95320	S0-8	32	4.5	5.5	5	-40	125	1000	40	10
M95320-W	S0-8; TSSOP8	32	2.5	5.5	5	-40	125	1000	40	10
M95512-W	S0-8; TSSOP8	512	2.5	5.5	5	-40	125	1000	40	5
M95640	S0-8	64	2.5	5.5	5	-40	125	1000	40	10
M95640-W	S0-8; TSSOP8	64	2.5	5.5	5	-40	125	1000	40	10
M95M01-R ⁽³⁾	S0-8	1024	1.8	5.5	5	-40	85	1000	40	5

(3) ST is prepared to qualify eligible products to automotive grade based on customer requests and commitment.

Microcontrollers

8-, 16- and 32-bit automotive microcontroller families

Part number		Program memory type		Prog. (Kbytes)	RAM (bytes)	Data E ² PROM (bytes)	A/D inputs	Timer functions			Serial interface	LVD levels	I/Os (high current ⁽¹⁰⁾)	Packages	Supply voltage	Special features					
		Flash	ROM					12 or 16-bit (IC/OC/ PWM)	8-bit (IC/OC/ PWM)	Others											
STM8A: next generation 8-bit automotive fast core microcontrollers																					
STM8A with CAN																					
32 pins	STM8AF5166	● ⁽¹⁾ (14)		32	2 K	1 K	7x10-bit	3(8/8/8)	1(0/0/0)	WDG, WWDG, AWU	CAN/LIN-UART/ SPI/I ² C	1	25(9)	LQFP32	3.0 to 5.5 V	STM8 CPU, single-wire ICP/ICD interface, nested interrupts, program memory ROP, WDG with independent clock, internal user trimmable RC oscillator 16 MHz, low-power internal RC oscillator 128 kHz, POR, BOR, CSS					
	STM8AF5176	● ⁽¹⁾ (14)		48	3 K	1.5 K															
	STM8AF5186	● ⁽¹⁾ (14)		64	4 K	1.5 K															
48 pins	STM8AF5168	● ⁽¹⁴⁾		32	2 K	1 K	10x10-bit	3(9/9/9)	1(0/0/0)												
	STM8AF5178	● ⁽¹⁴⁾		48	3 K	1.5 K															
	STM8AF5188	● ⁽¹⁴⁾		64	4 K	1.5 K															
	STM8AF5198	● ⁽¹⁴⁾		96	6 K	2 K															
64 pins	STM8AF51A8	● ⁽¹⁴⁾		128	6 K	2 K	16x10-bit	3(9/9/9)	1(0/0/0)												
	STM8AF5169	● ⁽¹⁴⁾		32	2 K	1 K															
	STM8AF5179	● ⁽¹⁴⁾		48	3 K	1.5 K															
	STM8AF5189	● ⁽¹⁴⁾		64	4 K	1.5 K															
	STM8AF5199	● ⁽¹⁴⁾		96	6 K	2 K															
80 pins	STM8AF51A9	● ⁽¹⁴⁾		128	6 K	2 K	16x10-bit	3(9/9/9)	1(0/0/0)												
	STM8AF519A	● ⁽¹⁴⁾		96	6 K	2 K															
	STM8AF51AA	● ⁽¹⁴⁾		128	6 K	2 K															
	STM8AF51BA	● ⁽¹⁾ (14)		256	12 K	4 K															
100 pins	STM8AF51AB	● ⁽¹⁾ (14)		128	6 K	2 K	28x10-bit	4(12/12/12)	1(0/0/0)												
	STM8AF51BB	● ⁽¹⁾ (14)		256	12 K	4 K															
128 pins	STM8AF51BC	● ⁽¹⁾ (14)		256	12 K	4 K	28x10-bit	4(12/12/12)	1(0/0/0)			CAN/LIN-UART/ 2xSPI/2xI ² C/2xUSART	1	120(9)			LQFP128				

(1) Under development - (10) Number of high current pins included in the number of I/O pins - (14) FASTROM service available for pre-programmed devices in production quantities

Microcontrollers

8-, 16- and 32-bit automotive microcontroller families (cont'd)

Part number	Program memory type		Prog. (Kbytes)	RAM (bytes)	Data E ² PROM (bytes)	A/D inputs	Timer functions			Serial interface	LVD levels	I/Os (high current ⁽¹⁰⁾)	Packages	Supply voltage	Special features						
	Flash	ROM					12 or 16-bit (IC/OC/ PWM)	8-bit (IC/OC/ PWM)	Others												
STM8A: next generation 8-bit automotive fast core microcontrollers																					
STM8A without CAN																					
32 pins	STM8AF6146	● ⁽¹⁾ (14)	16	2 K	0.5 K	7x10-bit	2(6/6/6)	1(0/0/0)	WDG, WWDG, AWU	LIN-UART/SPI	1	25(9)	LQFP32	3.0 to 5.5 V	STM8 CPU, single-wire ICP/ICD interface, nested interrupts, program memory ROP, WDG with independent clock, internal user trimmable RC						
	STM8AF6166	● ⁽¹⁴⁾	32	2 K	1 K		3(8/8/8)	1(0/0/0)		LIN-UART/ SPI/I ² C											
	STM8AF6176	● ⁽¹⁴⁾	48	3 K	1.5 K					LIN-UART/											
	STM8AF6186	● ⁽¹⁴⁾	64	4 K	1.5 K																
48 pins	STM8AF6148	● ⁽¹⁴⁾	16	2 K	0.5 K	10x10-bit	3(9/9/9)	1(0/0/0)			1	40(9)	LQFP48			oscillator 16 MHz, low-power internal RC oscillator 128 kHz, POR, BOR, CSS					
	STM8AF6168	● ⁽¹⁴⁾	32	2 K	1 K																
	STM8AF6178	● ⁽¹⁴⁾	48	3 K	1.5 K																
	STM8AF6188	● ⁽¹⁴⁾	64	4 K	1.5 K																
64 pins	STM8AF6198	● ⁽¹⁴⁾	96	6 K	2 K	16x10-bit	1(0/0/0)	1(0/0/0)		SPI/I ² C/USART	1	56(9)	LQFP64		oscillator 16 MHz, low-power internal RC oscillator 128 kHz, POR, BOR, CSS						
	STM8AF61A8	● ⁽¹⁴⁾	128	6 K	2 K																
	STM8AF6169	● ⁽¹⁴⁾	32	2 K	1 K																
	STM8AF6179	● ⁽¹⁴⁾	48	3 K	1.5 K																
80 pins	STM8AF6189	● ⁽¹⁴⁾	64	4 K	1.5 K	28x10-bit	4(12/12/12)	1(0/0/0)		LIN-UART/ 2xSPI/2xI ² C /2xUSART	1	92(9)	LQFP100				oscillator 16 MHz, low-power internal RC oscillator 128 kHz, POR, BOR, CSS				
	STM8AF6199	● ⁽¹⁴⁾	96	6 K	2 K																
	STM8AF61A9	● ⁽¹⁴⁾	128	6 K	2 K																
	STM8AF619A	● ⁽¹⁴⁾	96	6 K	2 K																
100 pins	STM8AF61AA	● ⁽¹⁴⁾	128	6 K	2 K	28x10-bit	4(12/12/12)	1(0/0/0)		LIN-UART/ 2xSPI/2xI ² C /2xUSART	1	120(9)	LQFP128			oscillator 16 MHz, low-power internal RC oscillator 128 kHz, POR, BOR, CSS					
	STM8AF61BA	● ⁽¹⁾ (14)	256	12 K	4 K																
	STM8AF61AB	● ⁽¹⁾ (14)	128	6 K	2 K																
	STM8AF61BB	● ⁽¹⁾ (14)	256	12 K	4 K																
128 pins	STM8AF61BC	● ⁽¹⁾ (14)	256	12 K	4 K																

(1) Under development - (10) Number of high current pins included in the number of I/O pins - (14) FASTROM service available for pre-programmed devices in production quantities

Microcontrollers

8-, 16- and 32-bit automotive microcontroller families (cont'd)

Part number		Program memory type		Prog. (Kbytes)	RAM (bytes)	Data E ² PROM (bytes)	A/D inputs	Timer functions			Serial interface	LVD levels	I/Os (high current ⁽¹⁰⁾)	Packages	Supply voltage	Special features	
		Flash	ROM					12 or 16-bit (IC/OC/ PWM)	8-bit (IC/OC/ PWM)	Others							
ST7: 8-bit industry standard fast core architecture with innovative peripherals (up to 64 Kbytes address space)																	
ST7Lxx family																	
8 pins 16 pins 20 pins	ST7LUS5 ⁽⁷⁾	● ⁽¹⁴⁾	●	1	128		5x10-bit	1(0/1/1)3	1(1/0/0)	WDG, RTC	SPI	1	6 (5)	S08	3.0 to 5.5 V	Internal RC oscillator, PLL, ROP, ICP, IAP	
	ST7LU05 ⁽⁷⁾	● ⁽¹⁴⁾	●	2	128							1	6 (5)	S08			
	ST7LU09 ⁽⁷⁾	● ⁽¹⁴⁾	●	2	128	128						1	6 (5)	S08			
	ST7LO5 ⁽⁷⁾	● ⁽¹⁴⁾	●	1.5	128							-	13 (6)	S016			
	ST7LO9 ⁽⁷⁾	● ⁽¹⁴⁾	●	1.5	128	128	5x8-bit	2(1/4/4)3	2(1/0/0)		SPI	-	13 (6)	S016	3.0 to 5.5 V	Internal RC oscillator, PLL, auto wake-up from HALT, ROP, ICP, IAP, debug module	
	ST7L15 ^{(7) (9)}	● ⁽¹⁴⁾	●	4	256							1	15 (7)	S020			
	ST7L19 ^{(7) (9)}	● ⁽¹⁴⁾	●	4	256	128						1	15 (7)	S020			
	ST7L34 ^{(7) (9)}	● ⁽¹⁴⁾	●	8	384							1	15 (7)	S020			
	ST7L35 ^{(7) (9)}	● ⁽¹⁴⁾	●	8	384						SPI, LINSPI	1	15 (7)	S020			
	ST7L38 ^{(7) (9)}	● ⁽¹⁴⁾	●	8	384	256						1	15 (7)	S020			
	ST7L39 ^{(7) (9)}	● ⁽¹⁴⁾	●	8	384	256						SPI, LINSPI	1	15 (7)			S020
ST7 mid-range																	
32 pins	ST7232AK1-Auto ^{(7) (9)}	● ⁽¹⁴⁾	●	4	384		8x10-bit	2(3/3/2)	WDG, RTC	SPI/SCI	3	24 (10)	LQFP32	3.8 to 5.5 V	ICP, IAP, nested interrupts, TLI, ROP, beep		
	ST7232AK2-Auto ^{(7) (9)}	● ⁽¹⁴⁾	●	8	384						3	24 (10)	LQFP32				
	ST72324BK2-Auto ^{(7) (9)}	● ⁽¹⁴⁾	●	8	384						3	24 (10)	LQFP32				
	ST72324BK4-Auto ^{(7) (9)}	● ⁽¹⁴⁾	●	16	512						3	24 (10)	LQFP32				
	ST72324BK6-Auto ^{(7) (9)}	● ⁽¹⁴⁾	●	32	1 K						3	24 (10)	LQFP32				
	ST723248LK6-Auto ^{(7) (9)}	● ⁽¹⁴⁾	●	32	1 K							24 (10)	LQFP32			2.85 to 3.6 V	
	ST72325K4-Auto ^{(7) (9)}	● ⁽¹⁴⁾	●	16	512		6x10-bit	1(2/2/1)	1(1/1/3)	ART, WDG, RTC	SPI/SCI/I ² C	3	32 (12)	LQFP32	3.8 to 5.5 V	CSS, ICP, IAP, nested interrupts, TLI, ROP, beep	
	ST72325K6-Auto ^{(7) (9)}	● ⁽¹⁴⁾	●	32	1 K							3	32 (12)	LQFP32			
	ST72361K4-Auto ^{(7) (9)}	● ⁽¹⁴⁾	●	16	512						SPI/2xSCI	1	24 (5)	LQFP32	4.5 to 5.5 V		ICP, IAP, nested interrupts, TLI, ROP, beep
	ST72361K6-Auto ^{(7) (9)}	● ⁽¹⁴⁾	●	32	1 K							1	24 (5)	LQFP32			
	ST72361K7-Auto ^{(7) (9)}	● ⁽¹⁴⁾	●	48	1.5 K							1	24 (5)	LQFP32			
	ST72361K9-Auto ^{(7) (9)}	● ⁽¹⁴⁾	●	60	2 K							1	24 (5)	LQFP32			
ST7232AJ1-Auto ^{(7) (9)}			4	384		12x10-bit	2(3/3/2)		WDG, RTC	SPI/SCI	3	32 (12)	LQFP44	3.8 to 5.5 V			

(7) All products are available also in their lead free version - the E suffix is added to the part number in case of LF package - (9) Exists also in OTP and EEPROM version - (10) Number of high current pins included in the number of I/O pins
(14) FASTROM service available for pre-programmed devices in production quantities

Microcontrollers

8-, 16- and 32-bit automotive microcontroller families (cont'd)

Part number	Program memory type		Prog. (Kbytes)	RAM (bytes)	Data E ² PROM (bytes)	A/D inputs	Timer functions			Serial interface	LVD levels	I/Os (high current ⁽¹⁰⁾)	Packages	Supply voltage	Special features		
	Flash	ROM					12 or 16-bit (IC/OC/ PWM)	8-bit (IC/OC/ PWM)	Others								
ST7 mid-range																	
44 pins	ST7232AJ2-Auto	● ⁽¹⁴⁾	●	8	384		12x10-bit	2(3/3/2)		WDG, RTC	SPI/SCI	3	32 (12)	LQFP44	3.8 to 5.5 V	ICP, IAP, nested interrupts, TLI, ROP, beep	
	ST72324BJ2-Auto	● ⁽¹⁴⁾	●	8	384		12x10-bit	2(3/3/2)				3	32 (12)	LQFP44			
	ST72324BJ4-Auto	● ⁽¹⁴⁾	●	16	512		12x10-bit	2(3/3/2)				3	32 (12)	LQFP44			
	ST72324BJ6-Auto	● ⁽¹⁴⁾	●	32	1K		12x10-bit	2(3/3/2)				3	32 (12)	LQFP44			
	ST72324BLJ6-Auto	● ⁽¹⁴⁾	●	32	1K		12x10-bit	2(3/3/2)			32 (12)	LQFP44	2.85 to 3.6 V				
	ST72321BJ6-Auto	● ⁽¹⁴⁾	●	32	1K		12x10-bit	2(3/3/2)	1(0/4/4)	3	32 (12)	LQFP44					
	ST72321BLJ6-Auto	● ⁽¹⁴⁾	●	32	1K		12x10-bit	2(3/3/2)	1(0/4/4)	3	32 (12)	LQFP44					
	ST72321BJ7-Auto	● ⁽¹⁴⁾	●	48	1.5K		12x10-bit	2(3/3/2)	1(0/4/4)	3	32 (12)	LQFP44					
	ST72321BJ9-Auto	● ⁽¹⁴⁾	●	60	2K		12x10-bit	2(3/3/2)	1(0/4/4)	3	32 (12)	LQFP44	3.8 to 5.5 V				
	ST72325J4-Auto	● ⁽¹⁴⁾	●	16	512		12x10-bit	2(3/3/2)	1(0/4/4)	3	32 (12)	LQFP44					
	ST72325J6-Auto	● ⁽¹⁴⁾	●	32	1K		12x10-bit	2(3/3/2)	1(0/4/4)	3	32 (12)	LQFP44					
	ST72325J7-Auto	● ⁽¹⁴⁾	●	48	1.5K		12x10-bit	2(3/3/2)	1(0/4/4)	3	32 (12)	LQFP44					
	ST72325J9-Auto	● ⁽¹⁴⁾	●	60	2K		12x10-bit	2(3/3/2)	1(0/4/4)	3	32 (12)	LQFP44	CSS, ICP, IAP, nested interrupts, TLI, ROP, beep				
	ST72361J4-Auto	● ⁽¹⁴⁾	●	16	512		11x10-bit	1(2/2/1)	1(2/1/5)	1	34 (6)	LQFP44					
ST72361J6-Auto	● ⁽¹⁴⁾	●	32	1K		11x10-bit	1(2/2/1)	1(2/1/5)	1	34 (6)	LQFP44						
ST72361J7-Auto	● ⁽¹⁴⁾	●	48	1.5K		11x10-bit	1(2/2/1)	1(2/1/5)	1	34 (6)	LQFP44						
ST72361J9-Auto	● ⁽¹⁴⁾	●	60	2K		11x10-bit	1(2/2/1)	1(2/1/5)	1	34 (6)	LQFP44	4.5 to 5.5 V	ICP, IAP, nested interrupts, TLI, ROP, beep				
64 pins	ST72321BAR6-Auto	● ⁽¹⁴⁾	●	32	1K		16x10-bit	2(4/4/2)	1(2/4/4)		3			48 (16)	LQFP64 (10x10)	3.8 to 5.5 V	ICP, IAP, nested interrupts, TLI, ROP, beep
	ST72321BR6-Auto	● ⁽¹⁴⁾	●	32	1K		16x10-bit	2(4/4/2)	1(2/4/4)		3			48 (16)	LQFP64 (14x14)		
	ST72321BAR7-Auto	● ⁽¹⁴⁾	●	48	1.5K		16x10-bit	2(4/4/2)	1(2/4/4)		3			48 (16)	LQFP64 (10x10)		
	ST72321BR7-Auto	● ⁽¹⁴⁾	●	48	1.5K		16x10-bit	2(4/4/2)	1(2/4/4)		3	48 (16)	LQFP64 (14x14)				
	ST72321BAR9-Auto	● ⁽¹⁴⁾	●	60	2K		16x10-bit	2(4/4/2)	1(2/4/4)		3	48 (16)	LQFP64 (10x10)				
	ST72321BR9-Auto	● ⁽¹⁴⁾	●	60	2K		16x10-bit	2(4/4/2)	1(2/4/4)		3	48 (16)	LQFP64 (14x14)				
	ST72325AR6-Auto	● ⁽¹⁴⁾	●	32	1K		16x10-bit	2(4/4/2)	1(2/4/4)		3	48 (16)	LQFP64 (10x10)				
	ST72325R6-Auto	● ⁽¹⁴⁾	●	32	1K		16x10-bit	2(4/4/2)	1(2/4/4)		3	48 (16)	LQFP64 (14x14)				
	ST72325AR7-Auto	● ⁽¹⁴⁾	●	48	1.5K		16x10-bit	2(4/4/2)	1(2/4/4)		3	48 (16)	LQFP64 (10x10)	CSS, ICP, IAP, nested interrupts, TLI, ROP, beep			
	ST72325R7-Auto	● ⁽¹⁴⁾	●	48	1.5K		16x10-bit	2(4/4/2)	1(2/4/4)		3	48 (16)	LQFP64 (14x14)				
	ST72325AR9-Auto	● ⁽¹⁴⁾	●	60	2K		16x10-bit	2(4/4/2)	1(2/4/4)		3	48 (16)	LQFP64 (10x10)				
	ST72325R9-Auto	● ⁽¹⁴⁾	●	60	2K		16x10-bit	2(4/4/2)	1(2/4/4)		3	48 (16)	LQFP64 (10x10)				

(10) Number of high current pins included in the number of I/O pins - (14) FASTROM service available for pre-programmed devices in production quantities

Microcontrollers

8-, 16- and 32-bit automotive microcontroller families (cont'd)

Part number	Program memory type		Prog. (Kbytes)	RAM (bytes)	Data E ² PROM (bytes)	A/D inputs	Timer functions			Serial interface	LVD levels	I/Os (high current ⁽¹⁾⁽⁰⁾)	Packages	Supply voltage	Special features
	Flash	ROM					12 or 16-bit (IC/OC/ PWM)	8-bit (IC/OC/ PWM)	Others						
ST72325R9-Auto	• ⁽¹⁴⁾	•	60	2K		16x10-bit	2(4/4/2)	1(2/4/4)	ART, WWDG, RTC	SPI/2xSCI/CAN	3	48 (16)	LQFP64 (14x14)	4.5 to 5.5 V	ICP, IAP, nested interrupts, TLI, ROP, beep
ST72361AR4-Auto	• ⁽¹⁴⁾	•	16	512		16x10-bit	1(2/2/1)	2(4/2/5)			1	48 (6)	LQFP64 (10x10)		
ST72361AR6-Auto	• ⁽¹⁴⁾	•	32	1K		16x10-bit	1(2/2/1)	2(4/2/5)			1	48 (6)	LQFP64 (10x10)		
ST72361AR7-Auto	• ⁽¹⁴⁾	•	48	1.5K		16x10-bit	1(2/2/1)	2(4/2/5)			1	48 (6)	LQFP64 (10x10)		
ST72361AR9-Auto	• ⁽¹⁴⁾	•	60	2K		16x10-bit	1(2/2/1)	2(4/2/5)			1	48 (6)	LQFP64 (10x10)		
ST7 application specific															
Low end car audio	ST7FAUDIOJ6-Auto	• ⁽¹⁴⁾	32	1K		12x10-bit	2(3/3/2)	1(0/4/4)	ART, WWDG, RTC	SPI/SCI/I ² C	3	32 (12)	LQFP44	3.8 to 5.5 V	ICP, IAP, nested interrupts, TLI, ROP
	ST7FAUDIOJ7-Auto	• ⁽¹⁴⁾	48	1.5K		12x10-bit	2(3/3/2)	1(0/4/4)			3	32 (12)	LQFP44		
	ST7FAUDIOJ9-Auto	• ⁽¹⁴⁾	60	2K		12x10-bit	2(3/3/2)	1(0/4/4)			3	32 (12)	LQFP44		
	ST7FAUDIOAR6-Auto	• ⁽¹⁴⁾	32	1K		16x10-bit	2(4/4/2)	1(2/4/4)			3	48 (16)	LQFP64 (10x10)		
	ST7FAUDIOAR6-Auto	• ⁽¹⁴⁾	32	1K		16x10-bit	2(4/4/2)	1(2/4/4)			3	48 (16)	LQFP64 (14x14)		
	ST7FAUDIOAR7-Auto	• ⁽¹⁴⁾	48	1.5K		16x10-bit	2(4/4/2)	1(2/4/4)			3	48 (16)	LQFP64 (10x10)		
	ST7FAUDIOAR7-Auto	• ⁽¹⁴⁾	48	1.5K		16x10-bit	2(4/4/2)	1(2/4/4)			3	48 (16)	LQFP64 (14x14)		
	ST7FAUDIOAR9-Auto	• ⁽¹⁴⁾	60	2K		16x10-bit	2(4/4/2)	1(2/4/4)			3	48 (16)	LQFP64 (10x10)		
CAN	ST7FAUDIOAR9-Auto	• ⁽¹⁴⁾	60	2K		16x10-bit	2(4/4/2)	1(2/4/4)			3	48 (16)	LQFP64 (14x14)		
	ST72521AR6-Auto	• ⁽¹⁴⁾	•	32	1K	16x10-bit	2(4/4/2)	1(2/4/4)	ART, WWDG, RTC	SPI/SCI/I ² C/CAN	3	48 (16)	LQFP64 (10x10)	4.5 to 5.5 V	Nested interrupts, TLI, ROP, beep, CAN (2.0B passive)
	ST72521R6-Auto	• ⁽¹⁴⁾	•	32	1K	16x10-bit	2(4/4/2)	1(2/4/4)			3	48 (16)	LQFP64 (14x14)		
	ST72561J6-Auto	• ⁽¹⁴⁾	•	32	1K	11x10-bit	1(2/2/1)	1(2/1/5)			1	34 (6)	LQFP44		
	ST72561K6-Auto	• ⁽¹⁴⁾	•	32	1K	6x10-bit	1(2/2/1)	1(1/1/3)			1	24 (5)	LQFP32		
	ST72561AR6-Auto	• ⁽¹⁴⁾	•	32	1K	16x10-bit	1(2/2/1)	2(4/2/5)	ART, WWDG, RTC	SPI/2xSCI/CAN	1	48 (6)	LQFP64 (10x10)	4.5 to 5.5 V	Nested Interrupts, TLI, ROP, SCIs with LIN features (LINSCI), CAN 2.0B active, window watchdog, auto wake up
	ST72561R6-Auto	• ⁽¹⁴⁾	•	32	1K	16x10-bit	1(2/2/1)	2(4/2/5)			1	48 (6)	LQFP64 (14x14)		
	ST72521AR9-Auto	• ⁽¹⁴⁾	•	60	2K	16x10-bit	2(4/4/2)	1(2/4/4)			3	48 (16)	LQFP64 (10x10)		
	ST72521R9-Auto	• ⁽¹⁴⁾	•	60	2K	16x10-bit	2(4/4/2)	1(2/4/4)			3	48 (16)	LQFP64 (14x14)	3.8 to 5.5 V	Nested interrupts, TLI, ROP, beep, CAN (2.0B passive)
	ST72521M9-Auto	• ⁽¹⁴⁾	•	60	2K	16x10-bit	2(4/4/2)	1(2/4/4)	ART, WWDG, RTC	SPI/SCI/I ² C/CAN	3	64 (16)	LQFP80		
	ST72561J9-Auto	• ⁽¹⁴⁾	•	60	2K	11x10-bit	1(2/2/1)	1(2/1/5)			1	34 (6)	LQFP44		
	ST72561K9-Auto	• ⁽¹⁴⁾	•	60	2K	6x10-bit	1(2/2/1)	1(1/1/3)			1	24 (5)	LQFP32		
	ST72561AR9-Auto	• ⁽¹⁴⁾	•	60	2K	16x10-bit	1(2/2/1)	2(4/2/5)			1	48 (6)	LQFP64 (10x10)	4.5 to 5.5 V	Nested Interrupts, TLI, ROP, SCIs with LIN features (LINSCI), CAN 2.0B active, window watchdog, auto wake up
	ST72561R9-Auto	• ⁽¹⁴⁾	•	60	2K	16x10-bit	1(2/2/1)	2(4/2/5)			1	48 (6)	LQFP64 (14x14)		

(1) Under development - (10) Number of high current pins included in the number of I/O pins - (14) FASTROM service available for pre-programmed devices in production quantities

Microcontrollers

8-, 16- and 32-bit automotive microcontroller families (cont'd)

Part number		Program memory type		Prog. (Kbytes)	RAM (bytes)	Data E ² PROM (bytes)	A/D inputs	Timer functions			Serial interface	LVD levels	I/Os (high current ⁽¹⁰⁾)	Packages	Supply voltage	Special features
		Flash	ROM					12 or 16-bit (IC/OC/ PWM)	8-bit (IC/OC/ PWM)	Others						
Motor control	ST7MC1K2-Auto ⁽⁷⁾	● ⁽¹⁴⁾	•	8	384		8x10-bit	1(2/2/1)	1(1/0/1)	ART, WWDG, RTC	LINSCI	1	17 (3)	LQFP32	4.5 to 5.5 V	Sensorless brushless motor control cell, SCIs with LIN features (LINSCI), ICD, ICP, IAP, LVD, CSS/PLL, ROP, RTC, nested interrupts
	ST7MC1K6-Auto ⁽⁷⁾	● ⁽¹⁴⁾		32	384		8x10-bit	1(2/2/1)	1(1/0/1)			1	17 (3)	LQFP32		
	ST7MC2S4-Auto ⁽⁷⁾	● ⁽¹⁴⁾	•	16	768		11x10-bit	2(2/2/1)	1(1/0/1)			1	26 (6)	LQFP44		
	ST7MC2S6-Auto ⁽⁷⁾	● ⁽¹⁴⁾		32	1024		11x10-bit	2(2/2/1)	1(1/0/1)		LINSCI/SPI	1	26 (6)	LQFP44		

Part number		Program memory type		Prog. (Kbytes)	RAM (bytes)	Data E ² PROM (bytes)	A/D inputs	Timer functions			Serial interface	LVD levels	I/Os (high current ⁽¹⁰⁾)	Packages	Supply voltage	Special features
		Flash	ROM					12 or 16-bit (IC/OC/ PWM)	8-bit (IC/OC/ PWM)	Others						
ST9: 8/16-bit high-performance core for fast real-time management (up to 4 Mbytes address space)																
CAN	ST92F150CR9T-Auto ⁽⁷⁾	•		64	2 K	1 K	16x10-bit	5(8/6/5)		WDG	SPI/SCI/I ² C/CAN	48	LQFP64	4.5 to 5.5 V	CAN 2.0B active, PLL clock, low-power, LIN master	
	ST92F150CV9T-Auto ⁽⁷⁾	•		64	2 K	1 K	16x10-bit	5(8/8/7)			SPI/2xSCI/I ² C/CAN	77	LQFP100			
	ST92F150CR1T-Auto ⁽⁷⁾	•		128	4 K	1 K	16x10-bit	3(4/4/5)			SPI/SCI/I ² C/CAN	48	LQFP64			
	ST92F150CV1T-Auto ⁽⁷⁾	•		128	4 K	1 K	16x10-bit	5(8/8/7)			SPI/2xSCI/I ² C/CAN	77	LQFP100			
	ST92F150JDV1T-Auto ⁽⁷⁾	•		128	6 K	1 K	16x10-bit	5(8/8/7)			SPI/2xSCI/I ² C/2xCAN/J1850	77	LQFP100			
CAN-Less	ST92F250CV2T-Auto ⁽⁷⁾	•		256	8 K	1 K	16x10-bit	5(8/8/7)			SPI/2xSCI/2xI ² C/CAN	80	LQFP100	4.5 to 5.5 V	CAN 2.0B active, PLL clock, LIN master	
	ST92F124R9T-Auto ⁽⁷⁾	•		64	2 K	1 K	16x10-bit	5(8/6/5)			SPI/SCI/I ² C	48	LQFP100			
	ST92F124V1T-Auto ⁽⁷⁾	•		128	4 K	1 K	16x10-bit	5(8/8/7)			SPI/2xSCI/I ² C	80	LQFP100			

(7) All products are available also in their lead free version - the E suffix is added to the part number in case of LF package - (8) Exists also in OTP version - (10) Number of high current pins included in the number of I/O pins
(14) FASTROM service available for pre-programmed devices in production quantities

Microcontrollers

Mature 8-bit automotive microcontroller families

Part number		Program memory type		Prog. (Kbytes)	RAM (bytes)	Data E ² PROM (bytes)	A/D inputs	Timer functions			Serial interface	LVD levels	I/Os (high current ⁽¹⁰⁾)	Packages	Supply voltage	Special features	
		Flash	ROM					12 or 16-bit (IC/OC/PWM)	8-bit (IC/OC/PWM)	Others							
ST6: 8-bit general-purpose control applications (up to 8 Kbytes address space)																	
16 pins	ST6200CM-Auto ⁽⁸⁾		● ⁽¹⁴⁾	1	64		4x8-bit		1(0/0/0)	WDG		1	9 (3)	S016	3.0 to 6 V	RC oscillator, OSG, ROP	
	ST6201CM-Auto ⁽⁹⁾		● ⁽¹⁴⁾	2	64		4x8-bit		1(0/0/0)	WDG		1	9 (3)	S016	3.0 to 6 V		
	ST6203CM-Auto ⁽⁸⁾		● ⁽¹⁴⁾	1	64				1(0/0/0)	WDG		1	9 (3)	S016	3.0 to 6 V		
	ST62T52CM-Auto ⁽⁸⁾		(14)	2	128		4x8-bit		1+1(1/1/1)	WDG		1	9 (5)	S016	3.0 to 6 V		
	ST62T62CM-Auto ⁽⁹⁾		(14)	2	128	64	4x8-bit		1+1(1/1/1)	WDG		1	9 (5)	S016	3.0 to 6 V		
20 pins	ST6208CM-Auto ⁽⁸⁾		● ⁽¹⁴⁾	1	64				1(0/0/0)	WDG		1	12 (4)	S020	3.0 to 6 V		
	ST6209CM-Auto ⁽⁸⁾		● ⁽¹⁴⁾	1	64		4x8-bit		1(0/0/0)	WDG		1	12 (4)	S020	3.0 to 6 V		
	ST6210CM-Auto ⁽⁸⁾		● ⁽¹⁴⁾	2	64		8x8-bit		1(0/0/0)	WDG		1	12 (4)	S020	3.0 to 6 V		
	ST6220CM-Auto ⁽⁹⁾		● ⁽¹⁴⁾	4	64		8x8-bit		1(0/0/0)	WDG		1	12 (4)	S020	3.0 to 6 V		
	ST6215CM-Auto ⁽⁹⁾		● ⁽¹⁴⁾	2	64		16x8-bit		1(0/0/0)	WDG		1	20 (4)	S028	3.0 to 6 V		
28 pins	ST6225CM-Auto ⁽⁹⁾		● ⁽¹⁴⁾	4	64		16x8-bit		1(0/0/0)	WDG		1	20 (4)	S028	3.0 to 6 V		
	ST62T55CM-Auto ⁽⁸⁾		(14)	4	128		13x8-bit		1+1(1/1/1)	WDG		1	20 (4)	S028	3.0 to 6 V		
	ST62T65CM-Auto ⁽⁹⁾		(14)	4	128	128	13x8-bit		1+1(1/1/1)	WDG		1	20 (4)	S028	3.0 to 6 V		
ST7: 8-bit industry-standard fast-core architecture with innovative peripherals (up to 64 Kbytes address space)																	
ST7 baseline																	
28 pins	ST72104G1-Auto	•	•	4	256			1(2/2/1)		WDG	SPI	3	22 (8)	S028	3.2 to 5.5 V	RC oscillator, clock security system, ISP, ROP	
	ST72216G1-Auto	•	•	4	256		6x8-bit	1(2/2/1)		WDG	SPI	3	22 (8)	S028	3.2 to 5.5 V		
	ST72254G1-Auto	•	•	4	256		6x8-bit	2(4/4/2)		WDG	SPI/I ² C	3	22 (8)	S028	3.2 to 5.5 V		
	ST72104G2-Auto	•	•	8	256			1(2/2/1)		WDG	SPI	3	22 (8)	S028	3.2 to 5.5 V		
	ST72215G2-Auto	•	•	8	256		6x8-bit	2(4/4/2)		WDG	SPI	3	22 (8)	S028	3.2 to 5.5 V		
	ST72254G2-Auto	•	•	8	256		6x8-bit	2(4/4/2)		WDG	SPI/I ² C	3	22 (8)	S028	3.2 to 5.5 V		
44 pins	ST72124J2-Auto	•	•	8	384			2(3/3/2)		WDG, RTC	SPI/SCI	3	32 (4)	LQFP44	3.2 to 5.5 V	RC oscillator, clock security system, ISP, ROP, beep	
	ST72314J2-Auto	•	•	8	384		6x8-bit	2(3/3/2)		WDG, RTC	SPI/SCI	3	32 (4)	LQFP44	3.2 to 5.5 V		
	ST72334J2-Auto	•	•	8	384	256	6x8-bit	2(3/3/2)		WDG, RTC	SPI/SCI	3	32 (4)	LQFP44	3.2 to 5.5 V		
	ST72314J4-Auto	•	•	16	512		6x8-bit	2(3/3/2)		WDG, RTC	SPI/SCI	3	32 (4)	LQFP44	3.2 to 5.5 V		
	ST72334J4-Auto	•	•	16	512	256	6x8-bit	2(3/3/2)		WDG, RTC	SPI/SCI	3	32 (4)	LQFP44	3.2 to 5.5 V		
64 pins	ST72314N4-Auto	•	•	16	512		8x8-bit	2(3/3/2)		WDG, RTC	SPI/SCI	3	44 (8)	LQFP64	3.2 to 5.5 V		
	ST72334N4-Auto	•	•	16	512	256	8x8-bit	2(3/3/2)		WDG, RTC	SPI/SCI	3	44 (8)	LQFP64	3.2 to 5.5 V		

(8) Exists also in OTP version - (9) Exists also in OTP and EEPROM version - (10) Number of high current pins included in the number of I/O pins - (14) FASTROM service available for pre-programmed devices in production quantities

Microcontrollers

Mature 8-bit automotive microcontroller families (cont'd)

Part number		Program memory type		Prog. (Kbytes)	RAM (bytes)	Data EEPROM (bytes)	A/D inputs	Timer functions			Serial interface	LVD levels	I/Os (high current ⁽¹⁰⁾)	Packages	Supply voltage	Special features
		Flash	ROM					12 or 16-bit (IC/OC/PWM)	8-bit (IC/OC/PWM)	Others						
ST7 application specific																
MC	ST72141K2-Auto ^{(7) (9)}			8	256		8x8-bit	2(4/4/2)		WDG	SPI	1	26 (3)	S034	4.0 to 5.5 V	Sensorless brushless permanent magnet DC motor controller

(7) All products are available also in their lead free version - the E suffix is added to the part number in case of LF package - (9) Exists also in OTP and EEPROM version - (10) Number of high current pins included in the number of I/O pins

Abbreviations

- ADC : Analog-to-digital converter
- ART : Auto-reload timer
- AWU : Auto wake-up from HALT
- BOR : Brown-out reset
- CAN : Controller area network
- CSS : Clock security system
- IAP : In-application programming
- IC/OC : Input capture/output compare ICP programming
- ICD : In-circuit debugger
- ICP : In-circuit programming
- ISP : In-situ programming
- I²C : Inter-integrated circuit
- LIN : Local interconnect network

- LVD : Low voltage detection
- MC : Motor control
- PLL : Phase locked loop
- POR : Power-on reset
- PWM : Pulse width modulation
- ROP : Readout protection
- RTC : Real-time clock timer
- SCI : Serial communication interface
- SPI : Serial peripheral interface
- UART : Universal asynchronous receiver transmitter
- WDG : Watchdog timer
- WWDG : Window watchdog timer

Packages

- PQFP : Plastic quad flat package
- S0 : Small outline
- LQFP : Low-profile quad flat package

Key criteria for automotive grade qualification

- Compliance with AEC Q100 guidelines for ICs and Q101 guidelines for discrete products
- Compliance with AEC Q003 guidelines for product characterization (ICs only)
- Compliance with safe production parts approval process (PPAP)
- Compliance with AEC Q001 and Q002 guidelines for statistical yield analysis (SYA) and part average testing (PAT) at electrical wafers sort (EWS)
- Implementation of specific screening and test methods during manufacturing process

AEC Q100 and Q101 guidelines for product qualification

ST has its own internal qualification procedures and checks to ensure that quality and reliability of products meet the test conditions defined in AEC Q100 and Q101 guidelines. For older products already qualified, ST uses customer, field and generic data to ensure that the products meet the quality and reliability standards.

AEC Q003 guidelines for product characterization

Characterization is extremely important during the development of a new IC or the modification of an existing IC. ST has its own internal characterization procedures following AEC Q003 guidelines for the characterization procedure. For older products already qualified, ST uses generic characterization data to ensure that the products fulfil the characterization standards.

Safe production parts approval process (PPAP)

ST guarantees the availability of all documents related to the qualification and manufacturing of its products. These PPAP documents are available to support the customer production approval process and the associated risk assessment.

Statistical yield analysis (SYA) and part average testing (PAT) at electrical wafers sort (EWS)

For automotive grade products, ST has introduced specific methods to eliminate abnormal lots and outlier products. In the AEC Q002 guidelines, SYA is divided into statistical yield limits (SYL) and statistical bin limit, (SBL). These methods allow the detection of abnormal lots of material, ensuring quality and reliability of final products. In the AEC Q001 guidelines, it is recommended that PAT is applied to product testing. PAT is a statistical method for detecting semiconductor parts with abnormal characteristics (outliers), thus ensuring quality and reliability of products. ST implements both guidelines for automotive grade products and applies not only static PAT as required in the Q001 but also dynamic PAT and geographic PAT.

Product screening methods

For automotive grade products, ST has introduced improved stress testing and screening methodologies, using the screening results for product improvement actions targeting a zero defect level for our automotive grade products. These methods are intended to eliminate products, considered good by the standard production test, but presenting a risk of failure induced by the specific conditions of automotive applications. For optimum effectiveness, these methods are product-family and technology dependent. A matrix relating methods to product families and technologies is available on the ST website.

Automotive grade qualification

Automotive grade products comply with all automotive grade qualification criteria and meet the automotive industry requirements. A product is not automotive grade simply because its functionality fits with a customer's automotive application. Automotive grade products must be validated and qualified for the application, according to the specification defined by the customers.

A clear roadmap for automotive grade qualification

If a product has been developed for, or adapted to, automotive applications, but has not yet achieved automotive grade qualification, advance documentation will specify ST plans to ensure that such products meet automotive grade criteria within a clearly defined timeframe. The local STMicroelectronics sales office is available for information on the qualification processes.

If a product developed by ST for non-automotive applications is of interest to the automotive market, a request for automotive grade qualification can be made to the local STMicroelectronics sales office. If the product is able to meet automotive grade criteria, it could qualify as an automotive grade product and could be supplied with in a specific lead-time.



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