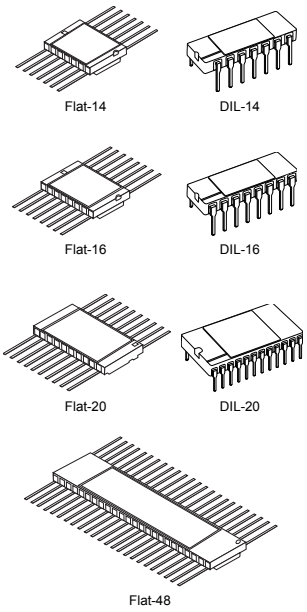
54ACxxxx, 54ACTxxxx

Data brief

Rad-hard advanced high-speed 5 V CMOS logic series



For some of references (see ordering information table) the upper metallic lid is electrically connected to the ground pin

Product status link
54ACxxxx, 54ACTxxxx

Features

- 7 V Absolute maximum ratings
- 2 V to 6 V operating voltage for CMOS 54ACxxx series
- 4.5 V to 5.5 V operating voltage for TTL 54ACTxxx series
- Hermetic packages
- High radiation hardness:
  - TID : 300 krad(Si) RHA
  - SEL immune up to 110 MeV.cm²/mg
  - SEU and SET characterized
- -55 °C to +125 °C temperature range
- QML-V qualified

Description

The 54ACxxxx and 54ACTxxxx series are composed of high-speed CMOS functions, specifically designed to meet the radiation requirements of the aerospace industry. They include a large set of gates, flip-flops, multiplexers, counters, bus interfaces, and several other functions.

All type of the series features a high radiation hardness, in total ionizing dose (TID), in single event latch-up (SEL) and in single event upset (SEU). Housed in ceramic hermetic packages and QML-V qualified, they are ideally suited for use in the most demanding space conditions, as well as in other harsh environmental conditions.

The complete specification of each type is available from the DLA web site https://landandmaritimeapps.dla.mil/programs/smcr/default.aspx2 or directly using the hyperlinks provided in this document.

A dedicated technical note TN1181 provides additional information on the Engineering model quality level.

1 Device summary

All parts have grounded lid versions. Temperature range: -55 to +125 °C.

Table 1. AC Logic series - Device summary

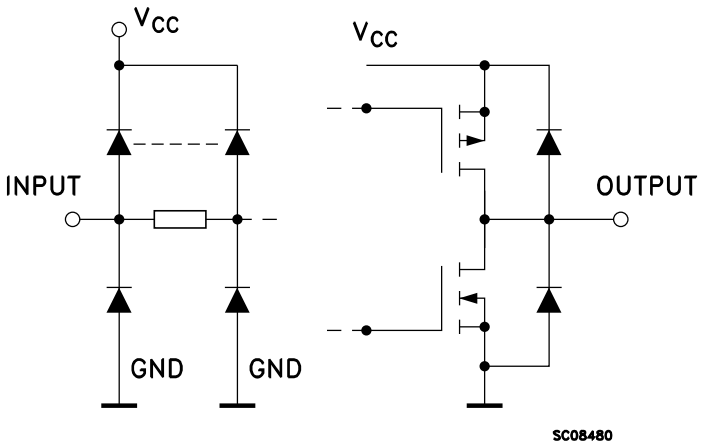
Part number	Description	TID RHA [krad(Si)]	SEL/SET/SEU threshold (1) [MeV.cm2/mg]	QML SMD #	Package (2)
AC Logic					
54AC00	Quad 2-input NAND gate	300	125/17/33 (3)	5962F04213	Flat-14, DIL-14
54AC02	Quad 2-input NOR gate		125/17/33 (3)	5962F87612	Flat-14, DIL-14
54AC04	Hex inverter		125/17/33 (3)	5962F87609	Flat-14, DIL-14
54AC08	Quad 2-input AND gate		125/17/33 (3)	5962F87615	Flat-14, DIL-14
54AC10	Triple 3-input NAND gate		125/17/33 (3)	5962F87610	Flat-14
54AC11	Triple 3-input AND gate		125/17/33 (3)	5962F87611	Flat-14
54AC14	Hex Schmitt inverter		125/17/33 (3)	5962F87624	Flat-14, DIL-14
54AC14A	Hex Schmitt inverter low power		125/17/33 (3)	5962F87624	Flat-14
54AC32	Quad 2-input OR gate		125/17/33 (3)	5962F87614	Flat-14, DIL-14
54AC74	Dual D-type flip-flop with preset and clear		125/8/8	5962F88520	Flat-14, DIL-14
54AC86	Quad exclusive OR		125/17/33 (3)	5962F89550	Flat-14
54AC138	3-to-8 line decoder inverter		125/17/33 (3)	5962F87622	Flat-16, DIL-16
54AC139	Dual 2-to-4 line decoder/demultiplexer		125/17/33 (3)	5962F87623	Flat-16
54AC151	8-channel multiplexer		125/17/33 (3)	5962F87691	Flat-16
54AC157	Quad 2-channel multiplexer		125/17/33 (3)	5962F89539	Flat-16
54AC161	Synchronous binary counter with async. clear		125/8/8	5962F89561	Flat-16
54AC174	Hex D-type flip-flop with clear		125/8/8	5962F87626	Flat-16
54AC191	4 Bit synchronous binary up/down counter		125/8/8	5962F89749	Flat-16
54AC240	Octal bus buffer 3-state inverter		125/33/33 (4)	5962F87550	Flat-20
54AC244	Octal bus buffer 3-state with OE by nimble		125/33/33 (4)	5962F87552	Flat-20
54AC245	Octal bus transceiver 3-state with OE and T/R		125/33/33 (4)	5962F87758	Flat-20
54AC273	Octal D-type flip-flop with clear		125/8/8	5962F87756	Flat-20
54AC373	Octal D-type latch 3-state		125/17/8 (3)	5962F87555	Flat-20
54AC374	Octal D-type flip-flop 3-state		125/17/8 (3)	5962F87694	Flat-20
54AC541	Octal bus buffer 3-state		125/33/33 (4)	5962F88706	Flat-20
54AC574	Octal D-type flip-flop 3-state		125/33/33 (4)	5962F96773	Flat-20
54AC2525	1-to-8 skew clock driver		125/17/33 (3)	5962F92174	Flat-14
54AC16244	16-bit buffer 3-state with OE by nimble		125/33/33 (4)	5962F04210	Flat-48
54AC16245	16-bit transceiver 3-state with OE and DIR by byte		125/33/33 (4)	5962F04211	Flat-48
54AC16373	16-bit D-type latch 3-state		125/17/8 (3)	5962F04212	Flat-48
54AC16374	16-bit D-type flip-flop 3-state		125/17/8 (3)	5962F04213	Flat-48
54AC164245	16-bit 3 to 5 V level shifter transceiver 3-state	100	120/21/-	5962R98580	Flat-48

Part number	Description	TID RHA [krad(Si)]	SEL/SET/SEU threshold (1) [MeV.cm2/mg]	QML SMD #	Package (2)
ACT Logic					
54ACT00	Quad 2-input NAND gate	300	125/17/33 (3)	5962F87699	Flat-14
54ACT02	Quad 2-input NOR gate		125/17/33 (3)	5962F89791	Flat-14
54ACT04	Hex inverter		125/1733 (3)	5962F89734	Flat-14
54ACT08	Quad 2-input AND gate		125/17/33 (3)	5962F89547	Flat-14, DIL-14
54ACT10	Triple 3-input NAND gate		125/17/33 (3)	5962F92182	Flat-14
54ACT11	Triple 3-input AND gate		125/17/33 (3)	5962F90772	Flat-14
54ACT14	Hex Schmitt inverter		125/17/33 (3)	5962F96813	Flat-14
54ACT32	Quad 2-input OR gate		125/17/33 (3)	5962F89736	Flat-14
54ACT74	Dual D-type flip-flop with preset & clear		125/8/8	5962F87525	Flat-14
54ACT86	Quad exclusive OR		125/17/33 (3)	5962F90687	Flat-14
54ACT138	3-to-8 line decoder inverter		125/17/33 (3)	5962F87554	Flat-16
54ACT139	Dual 2-to-4 line decoder/demultiplexer		125/17/33 (3)	5962F87553	Flat-16
54ACT157	Quad 2-channel multiplexer		125/17/33 (3)	5962F89688	Flat-16
54ACT161	Synchronous binary counter with async. clear		125/8/8	5962F91722	Flat-16
54ACT240	Octal bus buffer 3-state inverter		125/33/33 (4)	5962F87759	Flat-20
54ACT244	Octal bus buffer 3-state with OE by nimble		125/33/33 (4)	5962F87760	Flat-20
54ACT245	Octal bus transceiver 3-state with OE and T/R		125/33/33 (4)	5962F87663	Flat-20
54ACT273	Octal D-type flip-flop with clear		125/8/8	5962F01527	Flat-20
54ACT373	Octal D-type latch 3-state		125/17/8 (3)	5962F87556	Flat-20
54ACT374	Octal D-type flip-flop 3-state		125/17/8 (3)	5962F87631	Flat-20
54ACT541	Octal bus buffer 3-state		125/33/33 (4)	5962F89795	Flat-20
54ACT574	Octal D-type flip-flop 3-state		125/17/33 (4)	5962F89601	Flat-20
54ACT16244	16-bit buffer 3-state with OE by nimble		125/33/33 (4)	5962F92022	Flat-48
54ACT16245	16-bit transceiver 3-state with OE and DIR by byte		125/33/33 (4)	5962F92023	Flat-48
54ACT16373	16-bit D-type latch 3-state		125/17/8 (3)	5962F92024	Flat-48
54ACT16374	16-bit D-type flip-flop 3-state		125/17/8 (3)	5962F92025	Flat-48

1. *See datasheet for details on the test conditions and Weibull parameters. The radiation report, available on request, provides the complete characterization.*
2. *Contact ST sales representative for availability of other DIL versions and for in die form versions.*
3. *At 3.0 Volt.*
4. *At 4.5 Volt, outputs activated.*

2 Input and output equivalent circuit diagram

Figure 1. Input and output equivalent circuit diagram



Note: For the RHRAC164245 input equivalent circuit, there is no diode connected to VCC.

3 Maximum ratings

Table 2. Absolute maximum ratings (1) overview - AC and ACT series

Parameter	Description	Value	Unit
V_{CC} (2)	Supply voltage range	-0.5 dc to +7.0 dc	V
V_{IN} (3)	DC input voltage range	-0.5 dc to V_{CC} + 0.5	V
V_{OUT} (3)	DC output voltage range	-0.5 dc to V_{CC} + 0.5	V
I_{IK}	DC input clamp diode current	±20	mA
I_{OK} (4)	DC output clamp diode current	±20	mA
I_{OUT}	DC output current	Refer to SMD	mA
T_{STG}	Storage temperature range	-65 to +150	°C
P_D (5)	Maximum power dissipation	500	mW
T_L	Lead temperature (soldering, 10 seconds) - Case Outline X (Flat with floating lid) (6) - Case outline Y (Flat with grounded lid) - Other case outlines	260 Refer to SMD	°C
T_J	Junction temperature	175	°C

1. *Selected extracts of the SMDs of the products of the AC series excluding the RHRAC164245. Refer to the SMD of each products for the complete specification, including applicable conditions.*
2. *For RHFAC174 and 191 the AMR of STMicroeletronics products is above the -0.5 V dc to +6.0 V dc stated in the SMD. For RHFAC521 and 540, in absence of other legacy evidences, the -0.5 V dc to +6.0 V dc limits stated in the SMD should apply.*
3. *SMD includes specific notes transposed below as applicable for STMicroelectonics.*

   -For AC14 and AC14A : the value may be exceeded provided the input and output current ratings are observed.

   -For AC574, ACT244, ACT273 : The input negative voltage rating may be exceeded provided that the input clamp current rating is observed

   -For ACT11, ACT14, ACT86, ACT541 : The input and output negative voltage ratings may be exceeded provided that the input and output clamp current ratings are observed

   -For ACT161 : Unless otherwise noted, all voltages are referenced to GND
4. *Except RHFAC16244, RHFACT04, 08, 32, 16244, 16245, 16373, 16374 : 50 mA*
5. *Except RHFACT08 : 440 mW*
6. *Except RHFAC86, 521, 2525 : 300 °C*

Note: Stressing the device above the ratings listed in the "absolute maximum ratings" in Table 2 may cause permanent damage to the device. These are stress ratings only and operation of the device at these or any other conditions above those indicated in Table 4 and Table 5 is not implied. Exposure to absolute maximum rating conditions for more than short periods may affect the device reliability.

Table 3. ESD ratings for AC and ACT series

Symbol	Parameter	Value	Unit
V_{ESD}	Sustainable electrostatic discharge human body model	± 2000	V

Table 4. Recommended operating conditions - AC series

Parameter	Description	Value	Unit
V_{CC}	Supply voltage range	2 to 6	V
V_{IN}	DC input voltage range	0 to V_{CC}	V
V_{OUT}	Output voltage range	0 to V_{CC}	V
T_{OP}	Operation temperature range	-55 to +125	°C
dt/dv	Input transition time (1) at V_{CC} = 3.0 and V_{CC} = 5.5 V	0 to 8	ns/V

1. *30% to 70% or 70% to 30% of V_{CC}. Derates system propagation delays by difference in rise time to switch point for tr or t_f > 1 ns/V*

Table 5. Recommended operating conditions - ACT series

Parameter	Description	Value	Unit
V_{CC}	Supply voltage range	4.5 to 6	V
V_{IN}	DC input voltage range	0 to V_{CC}	V
V_{OUT}	Output voltage range	0 to V_{CC}	V
T_{OP}	Operation temperature range	-55 to +125	°C
dt/dv	Input transition time (1) at V_{CC} = 3.0 and V_{CC} = 5.5 V	0 to 8	ns/V

1. *30% to 70% or 70% to 30% of V_{CC}. Derates system propagation delays by difference in rise time to switch point for tr or t_f > 1 ns/V.*

Table 6. Thermal resistance junction to case

Device	SMD	R_{th-jc} °C/W	Device	SMD	R_{th-jc} °C/W
AC Logic					
54AC00	5962F87549	27.7	54AC174	5962F87626	20.0
54AC02	5962F87612	27.7	54AC191	5962F89749	26.6
54AC04	5962F87609	27.7	54AC240	5962F87550	20.0
54AC08	5962F87615	27.7	54AC244	5962F87552	20.0
54AC10	5962F87610	26.6	54AC245	5962F87758	20.0
54AC11	5962F87611	26.6	54AC273	5962F87756	20.0
54AC14	5962F87624	27.7	54AC373	5962F87555	20.0
54AC14A	5962F87624	27.7	54AC374	5962F87694	20.0
54AC32	5962F87614	27.7	54AC541	5962F88706	20.0
54AC74	5962F88520	27.7	54AC574	5962F96773	20.0
54AC86	5962F89550	27.7	54AC2525	5962F92174	20.0
54AC138	5962F87622	26.6	54AC16244	5962F04210	10.0
54AC139	5962F87623	26.6	54AC16245	5962F04211	10.0
54AC151	5962F87691	26.6	54AC16373	5962F04212	10.0
54AC157	5962F89539	26.6	54AC16374	5962F04213	10.0
54AC161	5962F89561	26.6	54AC164245	5962R98580	8.0
ACT Logic					
54ACT00	5962F87699	27.7	54ACT161	5962F91722	26.6
54ACT02	5962F89791	27.7	54ACT240	5962F87759	20.0
54ACT04	5962F89734	27.7	54ACT244	5962F87760	20.0
54ACT08	5962F89547	27.7	54ACT245	5962F87663	20.0
54ACT10	5962F92182	26.6	54ACT273	5962F01527	20.0
54ACT11	5962F90772	26.6	54ACT373	5962F87556	20.0
54ACT14	5962F96813	27.7	54ACT374	5962F87631	20.0
54ACT32	5962F89736	27.7	54ACT541	5962F89795	20.0
54ACT74	5962F87525	27.7	54ACT574	5962F89601	20.0
54ACT86	5962F90687	27.7	54ACT16244	5962F92022	10.0
54ACT138	5962F87554	26.6	54ACT16245	5962F92023	10.0
54ACT139	5962F87553	26.6	54ACT16373	5962F92024	10.0
54ACT157	5962F89688	26.6	54ACT16374	5962F92025	10.0

Note: The junction to top case thermal resistance refers to the top case of the Flat packaged version of each product. It is an extrapolated value based on the measurement few parts of various size using JESD51 standard Jedec best practice guidelines.

4 Electrical characteristics

The electrical specification of each type is provided in its SMD, which can be directly accessed from Table 1 column QML SMD#.

Unless otherwise specified, the SMD's electrical specification is applicable to all part numbers listed in table 19, ordering infomation, including engineering models.

4.1 Maximum frequency

Some SMDs provide the maximum authorized frequency of the products. Whenever it is not, the maxium frequency can be estimated from the maximum propagation time provided in the SMD of each products. However, the maximum frequency of a gate is also impacted by the transition times and the impedance seen by outputs. In absence of product specific characterization, significant derating must apply to such estimated.

The maximum frequency typically decreases when the temperature increases.

5 Radiation

5.1 Total ionization dose

All the products of the series are RHA guaranteed at 300 krad(Si) as per MIL-STD-883 cond A, i.e for each type, on 10 pieces, 5 biased and 5 unbiased, at high dose rate (200 krad(Si)/hour).

Each wafer lot is in addition submitted to wafer lot qualification on 5 pieces from 3 different wafers in the conditions identified during the qualification as worst case, biased, at the same dose rate and with the same test method. The acceptance criteria is 0 fail.

Unless otherwise specified, the absolute max ratings, the recommended operating conditions and the electrical and timing characteristics provided in each SMD and summarized in Tables 2, 4, and 5 are applicable up to the maximun guaranteed TID level.

5.2 Heavy ions

5.2.1 Test strategy

The 54AC series is characterized under heavy ions through 5 test vehicles covering the whole series by similarity, the 54AC14, 54AC174, 54ACT244, 54AC374 and 54AC164245, using dice from the latest AMK6 6 inches diffusion line. The test results are available upon request.

Table 9 provides a description of the SEE class covered by each test vehicle while table 10 provides the SEE classification of each device of the serie.

5.2.2 SEE test results summary

The Table 7 provides a summary of the SEE test results for the AMK6 wafer fab.

Table 8 gives the test vehicle covering each specific type and Table 9 describes the key features covered by the SEE test of each SEE test vehicle.

Table 7. AC series SEE test summary

Device type	SEL @ 6V	Voltage	SET		SEU	
			LETth [MeV.cm²/mg]	σ	LETth [MeV.cm²/mg]	σ
54AC14	Free up to 125 MeV.cm²/mg	1V8	> 8.7	$1.7x10^{-4}$	> 17	$1.8x10^{-6}$
		3V	> 17	$1.8x10^{-4}$	> 33	$1.5x10^{-6}$
		4V5	> 33	$4x10^{-6}$	> 66	-
54AC174		1V8	> 8.7	$3.2x10^{-6}$	8	$1.2x10^{-5}$
		3V	> 8.7	$8x10^{-7}$	> 8.7	$3.2x10^{-6}$
		4V5	> 17	$5x10^{-7}$	> 17	$1.9x10^{-6}$
54ACT244		4V5 outputs activated	> 33	$3.3x10^{-6}$	> 33	$1.1x10^{-4}$
		4V5 outputs high-Z	8	$1.5x10^{-3}$	Not applicable	
54AC374		1V8	>8.7	$1.6x10^{-5}$	8	$3.6x10^{-5}$
		3V	>17	$7x10^{-6}$	>8.7	$1.5x10^{-5}$
		4V5	16	$3x10^{-6}$	>17	$9.8x10^{-6}$
54AC164245		3V	1	$7.3x10^{-5}$	Not applicable	

Table 8. Radiation test vehicle coverage by product type

Device	SMD	Class	Test Vehicle	Device	SMD	Class	Test Vehicle
54AC00	5962F87549	1	54AC14	**54ACT174**	5962F87757	2	54AC174
54ACT00	5962F87699	1	54AC14	**54AC191**	5962F89749	2	54AC174
54AC02	5962F87612	1	54AC14	**54ACT191**	5962F04228	2	54AC174
54ACT02	5962F89791	1	54AC14	**54AC240**	5962F87550	3	54ACT244
54AC04	5962F87609	1	54AC14	**54ACT240**	5962F87759	3	54ACT244
54ACT04	5962F89734	1	54AC14	**54AC244**	5962F87552	3	54ACT244
54AC08	5962F87615	1	54AC14	**54ACT244**	**5962F87760**	3	**54ACT244**
54ACT08	5962F89547	1	54AC14	**54AC245**	5962F87758	3	54ACT244
54AC10	5962F87610	1	54AC14	**54ACT245**	5962F87663	3	54ACT244
54ACT10	5962F92182	1	54AC14	**54AC273**	5962F87756	2	54AC174
54AC11	5962F87611	1	54AC14	**54ACT273**	5962F01527	2	54AC174
54ACT11	5962F90772	1	54AC14	**54AC373**	5962F87555	4	54AC374
54AC14	**5962F87624**	1	**54AC14**	**54ACT373**	5962F87556	4	54AC374
54AC14A	5962F87624	1	54AC14	**54AC374**	**5962F87694**	4	**54AC374**
54ACT14	5962F96813	1	54AC14	**54ACT374**	5962F87631	4	54AC374
54AC32	5962F87614	1	54AC14	**54AC521**	5962F90985	1	54AC14
54ACT32	5962F89736	1	54AC14	**54AC540**	5962F87695	3	54ACT244
54AC74	5962F88520	2	54AC174	**54AC541**	5962F88706	3	54ACT244
54ACT74	5962F87525	2	54AC174	**54ACT541**	5962F89795	3	54ACT244
54AC86	5962F89550	1	54AC14	**54AC574**	5962F96773	4	54AC374
54ACT86	5962F90687	1	54AC14	**54ACT574**	5962F89601	4	54AC374
54AC138	5962F87622	1	54AC14	**54AC2525**	5962F92174	1	54AC14
54ACT138	5962F87554	1	54AC14	**54AC16244**	5962F04210	3	54ACT244
54AC139	5962F87623	1	54AC14	**54ACT16244**	5962F92022	3	54ACT244
54ACT139	5962F87553	1	54AC14	**54AC16245**	5962F04211	3	54ACT244
54AC151	5962F87691	1	54AC14	**54ACT16245**	5962F92023	3	54ACT244
54ACT151	5962F88756	1	54AC14	**54AC16373**	5962F04212	4	54AC374
54AC157	5962F89539	1	54AC14	**54ACT16373**	5962F92024	4	54AC374
54ACT157	5962F89688	1	54AC14	**54AC16374**	5962F04213	4	54AC374
54AC161	5962F89561	2	54AC174	**54ACT16374**	5962F92025	4	54AC374
54ACT161	5962F91722	2	54AC174	**54AC164245**	**5962R98580**	5	**54AC164245**
54AC174	**5962F87626**	2	**54AC174**				

Table 9. Radiation test vehicles classes

Test vehicle	Class
54AC14	1 - Basic gates and Schmitt trigger
54AC174	2 - Basic gates and Flip-flops
54ACT244	3 - Basic gates with tri-state outputs
54AC374	4 - Basic gate, flip-flops and tri-state
54AC164245	5 - Basic gates and cold spare

6 Package information

To meet environmental requirements, ST offers these devices in different grades of ECOPACK packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions, and product status are available at: www.st.com. ECOPACK is an ST trademark.

6.1 Ceramic Flat-14 package information

Figure 2. Ceramic Flat-14 package outline

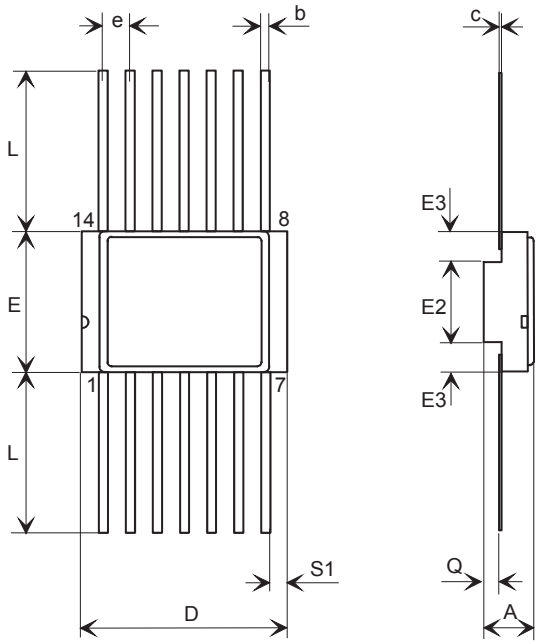


Table 10. Ceramic Flat-14 mechanical data

Symbol	Dimensions (mm)			Dimensions (inches)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.31		2.72	0.091		0.107
b	0.38		0.48	0.015		0.019
c	0.10		0.18	0.004		0.007
D	9.27		9.73	0.365		0.383
E	6.19		6.50	0.244		0.256
E2		3.68			0.145	
E3	0.76			0.030		
e		1.27			0.050	
L	6.86		7.62	0.250		0.300
Q	0.66		1.14	0.026		0.045
S1	0.13			0.005		

6.2 Ceramic Flat-16 package information

Figure 3. **Ceramic Flat-16 package outline**

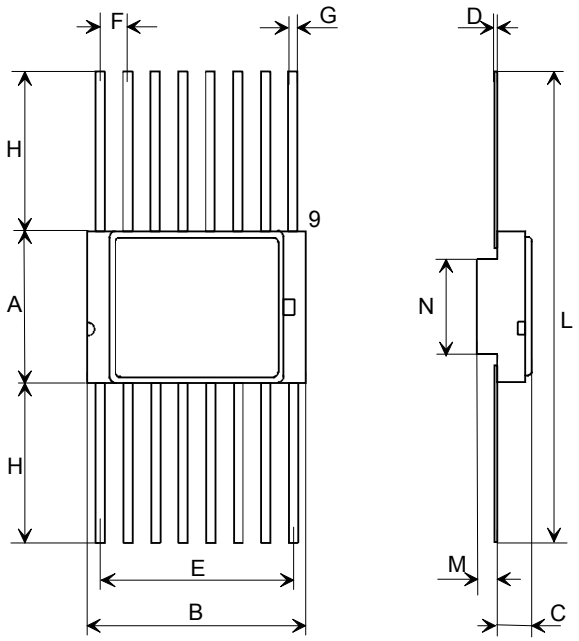


Table 11. **Ceramic Flat-16 package mechanical data**

Symbol	Dimensions (mm)			Dimensions (inches)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.75	6.91	7.06	0.266	0.272	0.278
B	9.76	9.94	10.14	0.384	0.391	0.399
C	1.49		1.95	0.059		0.077
D	0.102	0.127	0.152	0.004	0.005	0.006
E	8.76	8.89	9.01	0.345	0.350	0.355
F		1.27			0.050	
G	0.38	0.43	0.48	0.015	0.017	0.019
H	6.0			0.236		
L	18.75		22.0	0.738		0.866
M	0.33	0.38	0.43	0.013	0.015	0.017
N		4.31			0.170	

6.3 Ceramic Flat-20 package information

Figure 4. **Ceramic Flat-20 package outline**

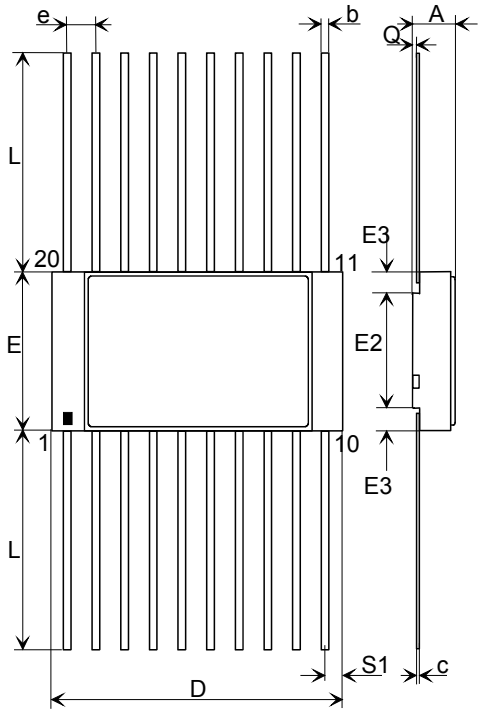


Table 12. **Ceramic Flat-20 package mechanical data**

Symbol	Dimensions (mm)			Dimensions (inches)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	1.91		2.21	0.075		0.087
b	0.38		0.48	0.015		0.019
c	0.076		0.152	0.003		0.006
D	12.83		13.08	0.505		0.515
E	6.99		7.24	0.275		0.285
E2	5.05	5.21	5.36	0.199	0.205	0.211
E3		0.95			0.037	
e	1.14		1.40	0.045		0.055
L	6.35		9.39	0.250		0.370
Q	0.25			0.010		
S1		0.55			0.022	

6.4 Ceramic Flat-48 package information

Figure 5. **Ceramic Flat-48 package outline**

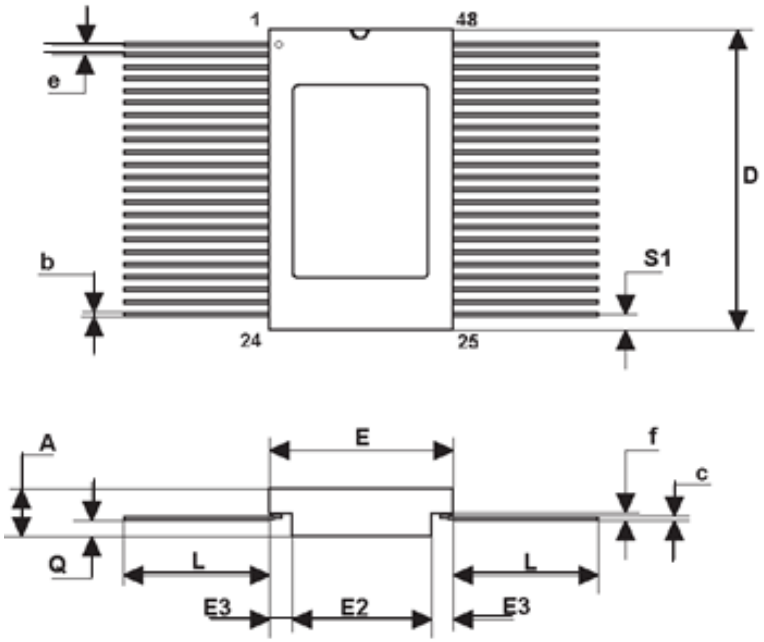


Table 13. **Ceramic Flat-48 package mechanical data**

Symbol	Dimensions (mm)			Dimensions (inches)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.18	2.47	2.72	0.086	0.097	0.107
b	0.20	0.254	0.30	0.008	0.010	0.012
c	0.12	0.15	0.18	0.005	0.006	0.007
D	15.57	15.75	15.92	0.613	0.620	0.627
E	9.52	9.65	9.78	0.375	0.380	0.385
E2	6.22	6.35	6.48	0.245	0.250	0.255
E3	1.52	1.65	1.78	0.060	0.065	0.070
e		0.635			0.025	
f		0.20			0.008	
L	6.85	8.38	9.40	0.270	0.330	0.370
Q	0.66	0.79	0.92	0.026	0.031	0.036
S1	0.25	0.43	0.61	0.010	0.017	0.024

6.5 Ceramic DIL-14 package information

Figure 6. **Ceramic DIL-14 package outline**

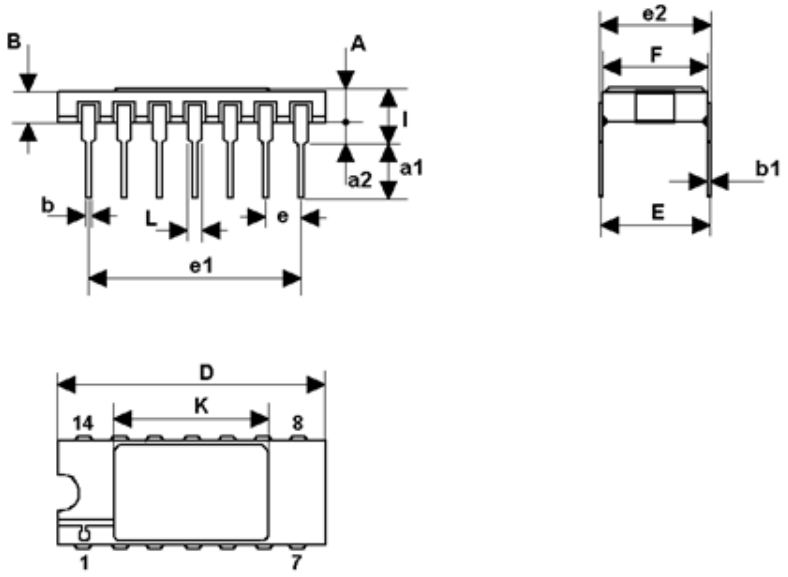


Table 14. **Ceramic DIL-14 package mechanical data**

Symbol	Dimensions (mm)			Dimensions (inches)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.1		2.54	0.083		0.100
a1	3.00		3.70	0.118		0.146
a2	0.63	0.88	1.14	0.025	0.035	0.045
B	1.82	2.03	2.39	0.072	0.080	0.094
b	0.40	0.45	0.50	0.016	0.018	0.020
b1	0.20	0.254	0.30	0.008	0.010	0.012
D	18.79	19.00	19.20	0.740	0.748	0.756
E	7.36	7.62	7.87	0.290	0.300	0.310
e		2.54			0.100	
e1	15.11	15.24	15.37	0.595	0.600	0.605
e2	7.62	7.87	8.12	0.300	0.310	0.320
F	7.11		7.75	0.280		0.305
I			3.70			0.146
K	10.90		12.1	0.429		0.476
L	1.14	1.27	1.5	0.045	0.050	0.059

6.6 Ceramic DIL-16 package information

Figure 7. **Ceramic DIL-16 package outline**

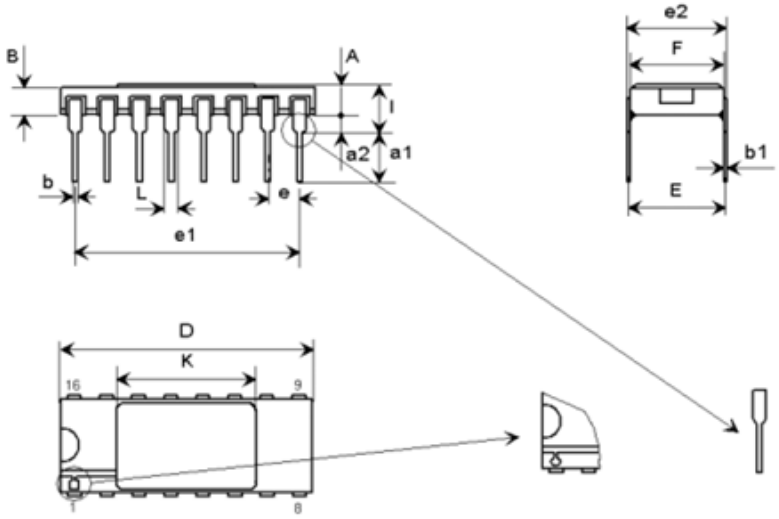


Table 15. **Ceramic DIL-16 package mechanical data**

Symbol	Dimensions(mm)			Dimensions (inches)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.71	0.083		0.107
a1	3.00		3.70	0.118		0.146
a2	0.63	0.88	1.14	0.025	0.035	0.045
B	1.82		2.39	0.072		0.094
b	0.40	0.45	0.50	0.016	0.018	0.020
b1	0.20	0.254	0.30	0.008	0.010	0.012
D	20.06	20.32	20.58	0.790	0.800	0.810
E	7.36	7.62	7.87	0.290	0.300	0.310
e		2.54			0.100	
e1	17.65	17.78	17.90	0.695	0.700	0.705
e2	7.62	7.87	8.12	0.300	0.310	0.320
F	7.29	7.49	7.70	0.287	0.295	0.303
I			3.83			0.151
K	10.90		12.10	0.429		0.476
L	1.14		1.50	0.045		0.059

6.7 Ceramic DIL-20 package information

Figure 8. **Ceramic DIL-20 package outline**

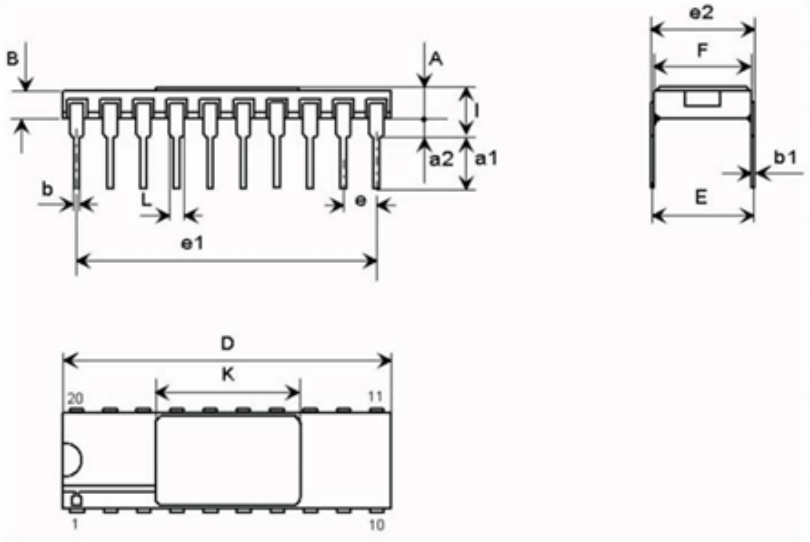


Table 16. **Ceramic DIL-20 package mechanical data**

Symbol	Dimensions (mm)			Dimensions (inches)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.1		2.72	0.083		0.107
a1	3		3.7	0.118		0.146
a2	0.63	0.88	1.14	0.025	0.035	0.045
B	1.93	2.03	2.23	0.076	0.080	0.088
b	0.4	0.45	0.5	0.016	0.018	0.020
b1	0.2	0.254	0.3	0.008	0.010	0.012
D	25.14	25.4	25.65	0.990	1.000	1.010
E	7.36	7.62	7.87	0.290	0.300	0.310
e		2.54			0.100	
e1	22.73	22.86	22.99	0.895	0.900	0.905
e2	7.62	7.87	8.12	0.300	0.310	0.320
F	7.29	7.49	7.62	0.287	0.295	0.300
I			3.86			0.152
K	11.3		11.56	0.445		0.455
L	1.14	1.27	1.4	0.045	0.050	0.055

7 Ordering information

Table 17. **Ordering information**

ST part number (1)	SMD Pin	Quality level	Other features	Package	Finishing	Packing	Mass
AC Logic							
RHFAC00K1	-	EM		Flat-14	Gold	Strip Pack	0.53
RHFAC00K01V	5962F8754901VXC	QML-V		Flat-14	Gold		0.53
RHFAC00K02V	5962F8754901VXA	QML-V		Flat-14	Solder Dip		0.53
RHFAC00K03V	5962F8754901VYC	QML-V	Grounded lid	Flat-14	Gold		0.53
RHFAC00K04V	5962F8754901VYA	QML-V	Grounded lid	Flat-14	Solder Dip		0.53
RHFAC00D03V	5962F8754901VCC	QML-V		DIL-14	Gold		2.20
RHFAC02K1	-	EM		Flat-14	Gold		0.53
RHFAC02K01V	5962F8761201VXC	QML-V		Flat-14	Gold		0.53
RHFAC02K02V	5962F8761201VXA	QML-V		Flat-14	Solder Dip		0.53
RHFAC02K03V	5962F8761201VYC	QML-V	Grounded lid	Flat-14	Gold		0.53
RHFAC02K04V	5962F8761201VYA	QML-V	Grounded lid	Flat-14	Solder Dip		0.53
RHFAC02D03V	5962F8761201VCC	QML-V		DIL-14	Gold		2.20
RHFAC04K1	-	EM		Flat-14	Gold		0.53
RHFAC04K01V	5962F8760901VXC	QML-V		Flat-14	Gold		0.53
RHFAC04K02V	5962F8760901VXA	QML-V		Flat-14	Solder Dip		0.53
RHFAC04K03V	5962F8760901VYC	QML-V	Grounded lid	Flat-14	Gold		0.53
RHFAC04K04V	5962F8760901VYA	QML-V	Grounded lid	Flat-14	Solder Dip		0.53
RHFAC04D03V	5962F8760901VCC	QML-V		DIL-14	Gold		2.20
RHFAC08K1	-	EM		Flat-14	Gold		0.53
RHFAC08K01V	5962F8761501VXC	QML-V		Flat-14	Gold		0.53
RHFAC08K02V	5962F8761501VXA	QML-V		Flat-14	Solder Dip		0.53
RHFAC08K03V	5962F8761501VYC	QML-V	Grounded lid	Flat-14	Gold		0.53
RHFAC08K04V	5962F8761501VYA	QML-V	Grounded lid	Flat-14	Solder Dip		0.53
RHFAC08D03V	5962F8761501VCC	QML-V		DIL-14	Gold		2.20
RHFAC10K1	-	EM		Flat-14	Gold		0.53
RHFAC10K01V	5962F8761001VXC	QML-V		Flat-14	Gold		0.53
RHFAC10K02V	5962F8761001VXA	QML-V		Flat-14	Solder Dip		0.53
RHFAC10K03V	5962F8761001VYC	QML-V	Grounded lid	Flat-14	Gold		0.53
RHFAC10K04V	5962F8761001VYA	QML-V	Grounded lid	Flat-14	Solder Dip		0.53
RHFAC11K1	-	EM		Flat-14	Gold		0.53
RHFAC11K01V	5962F8761101VXC	QML-V		Flat-14	Gold		0.53
RHFAC11K02V	5962F8761101VXA	QML-V		Flat-14	Solder Dip		0.53
RHFAC11K03V	5962F8761101VYC	QML-V	Grounded lid	Flat-14	Gold		0.53
RHFAC11K04V	5962F8761101VYA	QML-V	Grounded lid	Flat-14	Solder Dip		0.53
RHFAC14K1	-	EM	Type 01	Flat-14	Gold		0.53
RHFAC14K01V	5962F8762401VXC	QML-V	Type 01	Flat-14	Gold		0.53

ST part number (1)	SMD Pin	Quality level	Other features	Package	Finishing	Packing	Mass
RHFAC14K02V	5962F8762401VXA	QML-V	Type 01	Flat-14	Solder Dip		0.53
RHFAC14K03V	5962F8762401VYC	QML-V	Type 01; Grounded lid	Flat-14	Gold		0.53
RHFAC14K04V	5962F8762401VYA	QML-V	Type 01; Grounded lid	Flat-14	Solder Dip		0.53
RHFAC14D03V	5962F8762401VCC	QML-V	Type 01	DIL-14	Gold		2.20
RHFAC14AK1	-	EM	Type 02 Low current	Flat-14	Gold		0.53
RHFAC14AK01V	5962F8762403VXC	QML-V	Type 02 Low current	Flat-14	Gold		0.53
RHFAC14AK02V	5962F8762403VXA	QML-V	Type 02 Low current	Flat-14	Solder Dip		0.53
RHFAC14AK03V	5962F8762403VYC	QML-V	Type 02; Grounded lid	Flat-14	Gold		0.53
RHFAC14AK04V	5962F8762403VYA	QML-V	Type 02; Grounded lid	Flat-14	Solder Dip		0.53
RHFAC32K1	-	EM		Flat-14	Gold		0.53
RHFAC32K01V	5962F8761401VXC	QML-V		Flat-14	Gold		0.53
RHFAC32K02V	5962F8761401VXA	QML-V		Flat-14	Solder Dip		0.53
RHFAC32K03V	5962F8761401VYC	QML-V	Grounded lid	Flat-14	Gold		0.53
RHFAC32K04V	5962F8761401VYA	QML-V	Grounded lid	Flat-14	Solder Dip		0.53
RHFAC32D03V	5962F8761401VCC	QML-V		DIL-14	Gold		2.20
RHFAC74K1	-	EM		Flat-14	Gold		0.53
RHFAC74K01V	5962F8852003VXC	QML-V		Flat-14	Gold		0.53
RHFAC74K02V	5962F8852003VXA	QML-V		Flat-14	Solder Dip		0.53
RHFAC74K03V	5962F8852003VYC	QML-V	Grounded lid	Flat-14	Gold		0.53
RHFAC74K04V	5962F8852003VYA	QML-V	Grounded lid	Flat-14	Solder Dip		0.53
RHFAC74D03V	5962F8852003VCC	QML-V		DIL-14	Gold	Strip Pack	2.20
RHFAC86K1	-	EM		Flat-14	Gold		0.53
RHFAC86K01V	5962F8955001VXC	QML-V		Flat-14	Gold		0.53
RHFAC86K02V	5962F8955001VXA	QML-V		Flat-14	Solder Dip		0.53
RHFAC86K03V	5962F8955001VYC	QML-V	Grounded lid	Flat-14	Gold		0.53
RHFAC86K04V	5962F8955001VYA	QML-V	Grounded lid	Flat-14	Solder Dip		0.53
RHFAC138K1	-	EM		Flat-16	Gold		0.65
RHFAC138K01V	5962F8762201VXC	QML-V		Flat-16	Gold		0.65
RHFAC138K02V	5962F8762201VXA	QML-V		Flat-16	Solder Dip		0.65
RHFAC138K03V	5962F8762201VYC	QML-V	Grounded lid	Flat-16	Gold		0.65
RHFAC138K04V	5962F8762201VYA	QML-V	Grounded lid	Flat-16	Solder Dip		0.65
RHFAC138D03V	5962F8762201VEC	QML-V		DIL-16	Gold		2.20
RHFAC139K1	-	EM		Flat-16	Gold		0.65
RHFAC139K01V	5962F8762301VXC	QML-V		Flat-16	Gold		0.65
RHFAC139K02V	5962F8762301VXA	QML-V		Flat-16	Solder Dip		0.65
RHFAC139K03V	5962F8762301VYC	QML-V	Grounded lid	Flat-16	Gold		0.65
RHFAC139K04V	5962F8762301VYA	QML-V	Grounded lid	Flat-16	Solder Dip		0.65
RHFAC151K1	-	EM		Flat-16	Gold		0.65
RHFAC151K01V	5962F8769102VXC	QML-V		Flat-16	Gold		0.65
RHFAC151K02V	5962F8769102VXA	QML-V		Flat-16	Solder Dip		0.65
RHFAC151K03V	5962F8769102VYC	QML-V	Grounded lid	Flat-16	Gold		0.65

ST part number (1)	SMD Pin	Quality level	Other features	Package	Finishing	Packing	Mass
RHFAC151K04V	5962F8769102VYA	QML-V	Grounded lid	Flat-16	Solder Dip		0.65
RHFAC157K1	-	EM		Flat-16	Gold		0.65
RHFAC157K01V	5962F8953901VXC	QML-V		Flat-16	Gold		0.65
RHFAC157K02V	5962F8953901VXA	QML-V		Flat-16	Solder Dip		0.65
RHFAC157K03V	5962F8953901VYC	QML-V	Grounded lid	Flat-16	Gold		0.65
RHFAC157K04V	5962F8953901VYA	QML-V	Grounded lid	Flat-16	Solder Dip		0.65
RHFAC161K1	-	EM		Flat-16	Gold		0.65
RHFAC161K01V	5962F8956101VXC	QML-V		Flat-16	Gold		0.65
RHFAC161K02V	5962F8956101VXA	QML-V		Flat-16	Solder Dip		0.65
RHFAC161K03V	5962F8956101VYC	QML-V	Grounded lid	Flat-16	Gold		0.65
RHFAC161K04V	5962F8956101VYA	QML-V	Grounded lid	Flat-16	Solder Dip		0.65
RHFAC174K1	-	EM		Flat-16	Gold		0.65
RHFAC174K01V	5962F8762602VXC	QML-V		Flat-16	Gold		0.65
RHFAC174K02V	5962F8762602VXA	QML-V		Flat-16	Solder Dip		0.65
RHFAC174K03V	5962F8762602VYC	QML-V	Grounded lid	Flat-16	Gold		0.65
RHFAC174K04V	5962F8762602VYA	QML-V	Grounded lid	Flat-16	Solder Dip		0.65
RHFAC191K1	-	EM		Flat-16	Gold		0.65
RHFAC191K01V	5962F8974902VXC	QML-V		Flat-16	Gold		0.65
RHFAC191K02V	5962F8974902VXA	QML-V		Flat-16	Solder Dip		0.65
RHFAC191K03V	5962F8974902VYC	QML-V	Grounded lid	Flat-16	Gold		0.65
RHFAC191K04V	5962F8974902VYA	QML-V	Grounded lid	Flat-16	Solder Dip	Strip Pack	0.65
RHFAC191D03V	5962F8974902VEC	QML-V		DIL-16	Gold		2.20
RHFAC240K1	-	EM		Flat-20	Gold		0.66
RHFAC240K01V	5962F8755001VXC	QML-V		Flat-20	Gold		0.66
RHFAC240K02V	5962F8755001VXA	QML-V		Flat-20	Solder Dip		0.66
RHFAC240K03V	5962F8755001VYC	QML-V	Grounded lid	Flat-20	Gold		0.66
RHFAC240K04V	5962F8755001VYA	QML-V	Grounded lid	Flat-20	Solder Dip		0.66
RHFAC244K1	-	EM		Flat-20	Gold		0.66
RHFAC244K01V	5962F8755201VXC	QML-V		Flat-20	Gold		0.66
RHFAC244K02V	5962F8755201VXA	QML-V		Flat-20	Solder Dip		0.66
RHFAC244K03V	5962F8755201VYC	QML-V	Grounded lid	Flat-20	Gold		0.66
RHFAC244K04V	5962F8755201VYA	QML-V	Grounded lid	Flat-20	Solder Dip		0.66
RHFAC245K1	-	EM		Flat-20	Gold		0.66
RHFAC245K01V	5962F8775802VXC	QML-V		Flat-20	Gold		0.66
RHFAC245K02V	5962F8775802VXA	QML-V		Flat-20	Solder Dip		0.66
RHFAC245K03V	5962F8775802VYC	QML-V	Grounded lid	Flat-20	Gold		0.66
RHFAC245K04V	5962F8775802VYA	QML-V	Grounded lid	Flat-20	Solder Dip		0.66
RHFAC273K1	-	EM		Flat-20	Gold		0.66
RHFAC273K01V	5962F8775601VXC	QML-V		Flat-20	Gold		0.66
RHFAC273K02V	5962F8775601VXA	QML-V		Flat-20	Solder Dip		0.66
RHFAC273K03V	5962F8775601VYC	QML-V	Grounded lid	Flat-20	Gold		0.66

ST part number [1]	SMD Pin	Quality level	Other features	Package	Finishing	Packing	Mass
RHFAC273K04V	5962F8775601VYA	QML-V	Grounded lid	Flat-20	Solder Dip	Strip Pack	0.66
RHFAC373K1	-	EM		Flat-20	Gold		0.66
RHFAC373K01V	5962F8755501VXC	QML-V		Flat-20	Gold		0.66
RHFAC373K02V	5962F8755501VXA	QML-V		Flat-20	Solder Dip		0.66
RHFAC373K03V	5962F8755501VYC	QML-V	Grounded lid	Flat-20	Gold		0.66
RHFAC373K04V	5962F8755501VYA	QML-V	Grounded lid	Flat-20	Solder Dip		0.66
RHFAC374K1	-	EM		Flat-20	Gold		0.66
RHFAC374K01V	5962F8769401VXC	QML-V		Flat-20	Gold		0.66
RHFAC374K02V	5962F8769401VXA	QML-V		Flat-20	Solder Dip		0.66
RHFAC374K03V	5962F8769401VYC	QML-V	Grounded lid	Flat-20	Gold		0.66
RHFAC374K04V	5962F8769401VYA	QML-V	Grounded lid	Flat-20	Solder Dip		0.66
RHFAC521K1	-	EM		Flat-20	Gold		0.66
RHFAC521K01V	5962F9098503VXC	QML-V		Flat-20	Gold		0.66
RHFAC521K02V	5962F9098503VXA	QML-V		Flat-20	Solder Dip		0.66
RHFAC521K03V	5962F9098503VYC	QML-V	Grounded lid	Flat-20	Gold		0.66
RHFAC521K04V	5962F9098503VYA	QML-V	Grounded lid	Flat-20	Solder Dip		0.66
RHFAC540K1	-	EM		Flat-20	Gold		0.66
RHFAC540K01V	5962F8769502VXC	QML-V		Flat-20	Gold		0.66
RHFAC540K02V	5962F8769502VXA	QML-V		Flat-20	Solder Dip		0.66
RHFAC540K03V	5962F8769502VYC	QML-V	Grounded lid	Flat-20	Gold		0.66
RHFAC540K04V	5962F8769502VYA	QML-V	Grounded lid	Flat-20	Solder Dip		0.66
RHFAC541K1	-	EM		Flat-20	Gold		0.66
RHFAC541K01V	5962F8870601VXC	QML-V		Flat-20	Gold		0.66
RHFAC541K02V	5962F8870601VXA	QML-V		Flat-20	Solder Dip		0.66
RHFAC541K03V	5962F8870601VYC	QML-V	Grounded lid	Flat-20	Gold		0.66
RHFAC541K04V	5962F8870601VYA	QML-V	Grounded lid	Flat-20	Solder Dip		0.66
RHFAC541K05V	5962F8870602VYC	QML-V	Grounded lid; Type 2 [2]	Flat-20	Gold		0.66
RHFAC541K06V	5962F8870602VYA	QML-V	Grounded lid; Type 2 [2]	Flat-20	Solder Dip		0.66
RHFAC574K1	-	EM		Flat-20	Gold		0.66
RHFAC574K01V	5962F9677302VXC	QML-V		Flat-20	Gold		0.66
RHFAC574K02V	5962F9677302VXA	QML-V		Flat-20	Solder Dip		0.66
RHFAC574K03V	5962F9677302VYC	QML-V	Grounded lid	Flat-20	Gold		0.66
RHFAC574K04V	5962F9677302VYA	QML-V	Grounded lid	Flat-20	Solder Dip		0.66
RHFAC2525K1	-	EM		Flat-14	Gold		0.53
RHFAC2525K01V	5962F9217402VXC	QML-V		Flat-14	Gold		0.53
RHFAC2525K02V	5962F9217402VXA	QML-V		Flat-14	Solder Dip		0.53
RHFAC2525K03V	5962F9217402VYC	QML-V	Grounded lid	Flat-14	Gold		0.53
RHFAC2525K04V	5962F9217402VYA	QML-V	Grounded lid	Flat-14	Solder Dip		0.53
RHFAC16244K1	-	EM		Flat-48	Gold		1.22

ST part number [1]	SMD Pin	Quality level	Other features	Package	Finishing	Packing	Mass
RHFAC16244K01V	5962F0421001VXC	QML-V		Flat-48	Gold	Strip Pack	1.22
RHFAC16244K02V	5962F0421001VXA	QML-V		Flat-48	Solder Dip		1.22
RHFAC16244K03V	5962F0421001VYC	QML-V	Grounded lid	Flat-48	Gold		1.22
RHFAC16244K04V	5962F0421001VYA	QML-V	Grounded lid	Flat-48	Solder Dip		1.22
RHFAC16245K1	-	EM		Flat-48	Gold		1.22
RHFAC16245K01V	5962F0421101VXC	QML-V		Flat-48	Gold		1.22
RHFAC16245K02V	5962F0421101VXA	QML-V		Flat-48	Solder Dip		1.22
RHFAC16245K03V	5962F0421101VYC	QML-V	Grounded lid	Flat-48	Gold		1.22
RHFAC16245K04V	5962F0421101VYA	QML-V	Grounded lid	Flat-48	Solder Dip		1.22
RHFAC16373K1	-	EM		Flat-48	Gold		1.22
RHFAC16373K01V	5962F0421201VXC	QML-V		Flat-48	Gold		1.22
RHFAC16373K02V	5962F0421201VXA	QML-V		Flat-48	Solder Dip		1.22
RHFAC16373K03V	5962F0421201VYC	QML-V	Grounded lid	Flat-48	Gold		1.22
RHFAC16373K04V	5962F0421201VYA	QML-V	Grounded lid	Flat-48	Solder Dip		1.22
RHFAC16374K1	-	EM		Flat-48	Gold		1.22
RHFAC16374K01V	5962F0421301VXC	QML-V		Flat-48	Gold		1.22
RHFAC16374K02V	5962F0421301VXA	QML-V		Flat-48	Solder Dip		1.22
RHFAC16374K03V	5962F0421301VYC	QML-V	Grounded lid	Flat-48	Gold		1.22
RHFAC16374K04V	5962F0421301VYA	QML-V	Grounded lid	Flat-48	Solder Dip		1.22
RHRAC164245K1	-	EM		Flat-48	Gold		1.22
RHRAC164245K01V	5962R9858008VYC	QML-V	100 krad(Si)	Flat-48			1.22
RHRAC164245K03V	5962R9858008VZC	QML-V	100 krad(Si) - Grounded lid	Flat-48			1.22
ACT Logic							
RHFACT00K1	-	EM		Flat-14	Gold	Strip Pack	0.53
RHFACT00K01V	5962F8769903VXC	QML-V		Flat-14	Gold		0.53
RHFACT00K02V	5962F8769903VXA	QML-V		Flat-14	Solder Dip		0.53
RHFACT00K03V	5962F8769903VYC	QML-V	Grounded lid	Flat-14	Gold		0.53
RHFACT00K04V	5962F8769903VYA	QML-V	Grounded lid	Flat-14	Solder Dip		0.53
RHFACT02K1	-	EM		Flat-14	Gold		0.53
RHFACT02K01V	5962F8979101VXC	QML-V		Flat-14	Gold		0.53
RHFACT02K02V	5962F8979101VXA	QML-V		Flat-14	Solder Dip		0.53
RHFACT02K03V	5962F8979101VYC	QML-V	Grounded lid	Flat-14	Gold		0.53
RHFACT02K04V	5962F8979101VYA	QML-V	Grounded lid	Flat-14	Solder Dip		0.53
RHFACT04K1	-	EM		Flat-14	Gold		0.53
RHFACT04K01V	5962F8973403VXC	QML-V		Flat-14	Gold		0.53
RHFACT04K02V	5962F8973403VXA	QML-V		Flat-14	Solder Dip		0.53
RHFACT04K03V	5962F8973403VYC	QML-V	Grounded lid	Flat-14	Gold		0.53
RHFACT04K04V	5962F8973403VYA	QML-V	Grounded lid	Flat-14	Solder Dip		0.53
RHFACT08K1	-	EM		Flat-14	Gold		0.53
RHFACT08K01V	5962F8954703VXC	QML-V		Flat-14	Gold		0.53

ST part number (1)	SMD Pin	Quality level	Other features	Package	Finishing	Packing	Mass
RHFACT08K02V	5962F8954703VXA	QML-V		Flat-14	Solder Dip		0.53
RHFACT08K03V	5962F8954703VYC	QML-V	Grounded lid	Flat-14	Gold		0.53
RHFACT08K04V	5962F8954703VYA	QML-V	Grounded lid	Flat-14	Solder Dip		0.53
RHFACT08D03V	5962F8954703VCC	QML-V		DIL-14	Gold		#N/A
RHFACT10K1	-	EM		Flat-14	Gold		0.53
RHFACT10K01V	5962F9218202VXC	QML-V		Flat-14	Gold		0.53
RHFACT10K02V	5962F9218202VXA	QML-V		Flat-14	Solder Dip		0.53
RHFACT10K03V	5962F9218202VYC	QML-V	Grounded lid	Flat-14	Gold		0.53
RHFACT10K04V	5962F9218202VYA	QML-V	Grounded lid	Flat-14	Solder Dip		0.53
RHFACT11K1	-	EM		Flat-14	Gold		0.53
RHFACT11K01V	5962F9077202VXC	QML-V		Flat-14	Gold		0.53
RHFACT11K02V	5962F9077202VXA	QML-V		Flat-14	Solder Dip		0.53
RHFACT11K03V	5962F9077202VYC	QML-V	Grounded lid	Flat-14	Gold		0.53
RHFACT11K04V	5962F9077202VYA	QML-V	Grounded lid	Flat-14	Solder Dip		0.53
RHFACT14K1	-	EM		Flat-14	Gold		0.53
RHFACT14K01V	5962F9681301VXC	QML-V		Flat-14	Gold		0.53
RHFACT14K02V	5962F9681301VXA	QML-V		Flat-14	Solder Dip		0.53
RHFACT14K03V	5962F9681301VYC	QML-V	Grounded lid	Flat-14	Gold		0.53
RHFACT14K04V	5962F9681301VYA	QML-V	Grounded lid	Flat-14	Solder Dip		0.53
RHFACT32K1	-	EM		Flat-14	Gold		0.53
RHFACT32K01V	5962F8973603VXC	QML-V		Flat-14	Gold	Strip Pack	0.53
RHFACT32K02V	5962F8973603VXA	QML-V		Flat-14	Solder Dip		0.53
RHFACT32K03V	5962F8973603VYC	QML-V	Grounded lid	Flat-14	Gold		0.53
RHFACT32K04V	5962F8973603VYA	QML-V	Grounded lid	Flat-14	Solder Dip		0.53
RHFACT74K1	-	EM		Flat-14	Gold		0.53
RHFACT74K01V	5962F8752503VXC	QML-V		Flat-14	Gold		0.53
RHFACT74K02V	5962F8752503VXA	QML-V		Flat-14	Solder Dip		0.53
RHFACT74K03V	5962F8752503VYC	QML-V	Grounded lid	Flat-14	Gold		0.53
RHFACT74K04V	5962F8752503VYA	QML-V	Grounded lid	Flat-14	Solder Dip		0.53
RHFACT86K1	-	EM		Flat-14	Gold		0.53
RHFACT86K01V	5962F9068702VXC	QML-V		Flat-14	Gold		0.53
RHFACT86K02V	5962F9068702VXA	QML-V		Flat-14	Solder Dip		0.53
RHFACT86K03V	5962F9068702VYC	QML-V	Grounded lid	Flat-14	Gold		0.53
RHFACT86K04V	5962F9068702VYA	QML-V	Grounded lid	Flat-14	Solder Dip		0.53
RHFACT138K1	-	EM		Flat-16	Gold		0.65
RHFACT138K01V	5962F8755403VXC	QML-V		Flat-16	Gold		0.65
RHFACT138K02V	5962F8755403VXA	QML-V		Flat-16	Solder Dip		0.65
RHFACT138K03V	5962F8755403VYC	QML-V	Grounded lid	Flat-16	Gold		0.65
RHFACT138K04V	5962F8755403VYA	QML-V	Grounded lid	Flat-16	Solder Dip		0.65
RHFACT139K1	-	EM		Flat-16	Gold		0.65
RHFACT139K01V	5962F8755302VXC	QML-V		Flat-16	Gold		0.65

ST part number (1)	SMD Pin	Quality level	Other features	Package	Finishing	Packing	Mass
RHFACT139K02V	5962F8755302VXA	QML-V		Flat-16	Solder Dip		0.65
RHFACT139K03V	5962F8755302VYC	QML-V	Grounded lid	Flat-16	Gold		0.65
RHFACT139K04V	5962F8755302VYA	QML-V	Grounded lid	Flat-16	Solder Dip		0.65
RHFACT151K1	-	EM		Flat-16	Gold		0.65
RHFACT151K01V	5962F8875602VXC	QML-V		Flat-16	Gold		0.65
RHFACT151K02V	5962F8875602VXA	QML-V		Flat-16	Solder Dip		0.65
RHFACT151K03V	5962F8875602VYC	QML-V	Grounded lid	Flat-16	Gold		0.65
RHFACT151K04V	5962F8875602VYA	QML-V	Grounded lid	Flat-16	Solder Dip		0.65
RHFACT157K1	-	EM		Flat-16	Gold		0.65
RHFACT157K01V	5962F8968802VXC	QML-V		Flat-16	Gold		0.65
RHFACT157K02V	5962F8968802VXA	QML-V		Flat-16	Solder Dip		0.65
RHFACT157K03V	5962F8968802VYC	QML-V	Grounded lid	Flat-16	Gold		0.65
RHFACT157K04V	5962F8968802VYA	QML-V	Grounded lid	Flat-16	Solder Dip		0.65
RHFACT161K1	-	EM		Flat-16	Gold		0.65
RHFACT161K01V	5962F9172202VXC	QML-V		Flat-16	Gold		0.65
RHFACT161K02V	5962F9172202VXA	QML-V		Flat-16	Solder Dip		0.65
RHFACT161K03V	5962F9172202VYC	QML-V	Grounded lid	Flat-16	Gold		0.65
RHFACT161K04V	5962F9172202VYA	QML-V	Grounded lid	Flat-16	Solder Dip		0.65
RHFACT174K1	-	EM		Flat-16	Gold		0.65
RHFACT174K01V	5962F8775702VXC	QML-V		Flat-16	Gold		0.65
RHFACT174K02V	5962F8775702VXA	QML-V		Flat-16	Solder Dip	Strip Pack	0.65
RHFACT174K03V	5962F8775702VYC	QML-V	Grounded lid	Flat-16	Gold		0.65
RHFACT174K04V	5962F8775702VYA	QML-V	Grounded lid	Flat-16	Solder Dip		0.65
RHFACT191K1	-	EM		Flat-16	Gold		0.65
RHFACT191K01V	5962F0422801VXC	QML-V		Flat-16	Gold		0.65
RHFACT191K02V	5962F0422801VXA	QML-V		Flat-16	Solder Dip		0.65
RHFACT191K03V	5962F0422801VYC	QML-V	Grounded lid	Flat-16	Gold		0.65
RHFACT191K04V	5962F0422801VYA	QML-V	Grounded lid	Flat-16	Solder Dip		0.65
RHFACT240K1	-	EM		Flat-20	Gold		0.66
RHFACT240K01V	5962F8775903VXC	QML-V		Flat-20	Gold		0.66
RHFACT240K02V	5962F8775903VXA	QML-V		Flat-20	Solder Dip		0.66
RHFACT240K03V	5962F8775903VYC	QML-V	Grounded lid	Flat-20	Gold		0.66
RHFACT240K04V	5962F8775903VYA	QML-V	Grounded lid	Flat-20	Solder Dip		0.66
RHFACT244K1	-	EM		Flat-20	Gold		0.66
RHFACT244K01V	5962F8776003VXC	QML-V		Flat-20	Gold		0.66
RHFACT244K02V	5962F8776003VXA	QML-V		Flat-20	Solder Dip		0.66
RHFACT244K03V	5962F8776003VYC	QML-V	Grounded lid	Flat-20	Gold		0.66
RHFACT244K04V	5962F8776003VYA	QML-V	Grounded lid	Flat-20	Solder Dip		0.66
RHFACT245K1	-	EM		Flat-20	Gold		0.66
RHFACT245K01V	5962F8766303VXC	QML-V		Flat-20	Gold		0.66
RHFACT245K02V	5962F8766303VXA	QML-V		Flat-20	Solder Dip		0.66

ST part number [1]	SMD Pin	Quality level	Other features	Package	Finishing	Packing	Mass
RHFACT245K03V	5962F8766303VYC	QML-V	Grounded lid	Flat-20	Gold		0.66
RHFACT245K04V	5962F8766303VYA	QML-V	Grounded lid	Flat-20	Solder Dip		0.66
RHFACT273K1	-	EM		Flat-20	Gold		0.66
RHFACT273K01V	5962F0152701VXC	QML-V		Flat-20	Gold		0.66
RHFACT273K02V	5962F0152701VXA	QML-V		Flat-20	Solder Dip		0.66
RHFACT273K03V	5962F0152701VYC	QML-V	Grounded lid	Flat-20	Gold		0.66
RHFACT273K04V	5962F0152701VYA	QML-V	Grounded lid	Flat-20	Solder Dip		0.66
RHFACT373K1	-	EM		Flat-20	Gold		0.66
RHFACT373K01V	5962F8755603VXC	QML-V		Flat-20	Gold		0.66
RHFACT373K02V	5962F8755603VXA	QML-V		Flat-20	Solder Dip		0.66
RHFACT373K03V	5962F8755603VYC	QML-V	Grounded lid	Flat-20	Gold		0.66
RHFACT373K04V	5962F8755603VYA	QML-V	Grounded lid	Flat-20	Solder Dip		0.66
RHFACT373K05V	5962F8755604VYC	QML-V	Grounded lid, Type 04	Flat-20	Gold		0.66
RHFACT373K06V	5962F8755604VYA	QML-V	Grounded lid, Type 04	Flat-20	Solder Dip		0.66
RHFACT374K1	-	EM		Flat-20	Gold		0.66
RHFACT374K01V	5962F8763103VXC	QML-V		Flat-20	Gold		0.66
RHFACT374K02V	5962F8763103VXA	QML-V		Flat-20	Solder Dip		0.66
RHFACT374K03V	5962F8763103VYC	QML-V	Grounded lid	Flat-20	Gold		0.66
RHFACT374K04V	5962F8763103VYA	QML-V	Grounded lid	Flat-20	Solder Dip		0.66
RHFACT541K1	-	EM		Flat-20	Gold		0.66
RHFACT541K01V	5962F8979502VXC	QML-V		Flat-20	Gold	Strip Pack	0.66
RHFACT541K02V	5962F8979502VXA	QML-V		Flat-20	Solder Dip		0.66
RHFACT541K03V	5962F8979502VYC	QML-V	Grounded lid	Flat-20	Gold		0.66
RHFACT541K04V	5962F8979502VYA	QML-V	Grounded lid	Flat-20	Solder Dip		0.66
RHFACT574K1	-	EM		Flat-20	Gold		0.66
RHFACT574K01V	5962F8960102VXC	QML-V		Flat-20	Gold		0.66
RHFACT574K02V	5962F8960102VXA	QML-V		Flat-20	Solder Dip		0.66
RHFACT574K03V	5962F8960102VYC	QML-V	Grounded lid	Flat-20	Gold		0.66
RHFACT574K04V	5962F8960102VYA	QML-V	Grounded lid	Flat-20	Solder Dip		0.66
RHFACT16244K1	-	EM		Flat-48	Gold		1.22
RHFACT16244K01V	5962F9202202VYC	QML-V		Flat-48	Gold		1.22
RHFACT16244K02V	5962F9202202VYA	QML-V		Flat-48	Solder Dip		1.22
RHFACT16244K03V	5962F9202202VZC	QML-V	Grounded lid	Flat-48	Gold		1.22
RHFACT16244K04V	5962F9202202VZA	QML-V	Grounded lid	Flat-48	Solder Dip		1.22
RHFACT16245K1	-	EM		Flat-48	Gold		1.22
RHFACT16245K01V	5962F9202302VYC	QML-V		Flat-48	Gold		1.22
RHFACT16245K02V	5962F9202302VYA	QML-V		Flat-48	Solder Dip		1.22
RHFACT16245K03V	5962F9202302VZC	QML-V	Grounded lid	Flat-48	Gold		1.22
RHFACT16245K04V	5962F9202302VZA	QML-V	Grounded lid	Flat-48	Solder Dip		1.22
RHFACT16373K1	-	EM		Flat-48	Gold		1.22
RHFACT16373K01V	5962F9202402VYC	QML-V		Flat-48	Gold		1.22

ST part number [1]	SMD Pin	Quality level	Other features	Package	Finishing	Packing	Mass
RHFACT16373K02V	5962F9202402VYA	QML-V		Flat-48	Solder Dip	Strip Pack	1.22
RHFACT16373K03V	5962F9202402VZC	QML-V	Grounded lid	Flat-48	Gold		1.22
RHFACT16373K04V	5962F9202402VZA	QML-V	Grounded lid	Flat-48	Solder Dip		1.22
RHFACT16374K1	-	EM		Flat-48	Gold		1.22
RHFACT16374K01V	5962F9202502VYC	QML-V		Flat-48	Gold		1.22
RHFACT16374K02V	5962F9202502VYA	QML-V		Flat-48	Solder Dip		1.22
RHFACT16374K03V	5962F9202502VZC	QML-V	Grounded lid	Flat-48	Gold		1.22
RHFACT16374K04V	5962F9202502VZA	QML-V	Grounded lid	Flat-48	Solder Dip		1.22

1. *Contact your ST representative for information about availability and specific conditions for other versions and for products in die form transient.*
2. *Type 02 uses a dedicated die optimized to limit the peak current during transients.*

8 Other information

8.1 Product marking

The marking of the parts is described in table 18 and figures 9 for flight model and figure 10 for engineering model

Figure 9. Product marking outline, flight model

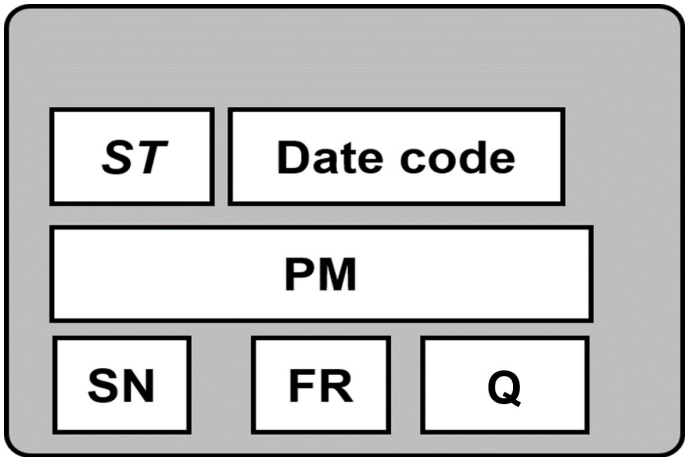


Figure 10. Product marking outline, engineering model

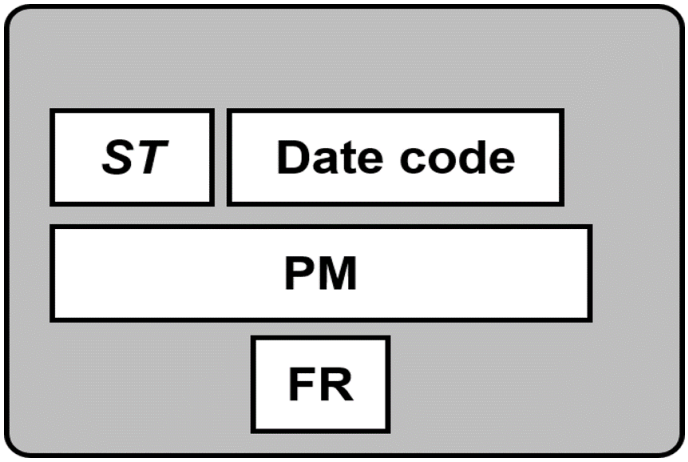


Table 18. Product marking

Field	Description
ST	ST logo
Date code	YYWWA format: - YY : year's last 2 digits - WW : week of the year - A : lot in the week
PM	Specific product marking (EM : ST part number - FM : SMD PIN)
SN	Serial number
FR	Country of origin (France)
Q	QML-V logo

8.2 Product documentation

Products are delivered with their default documentation and possibly separately ordered optional documentation. The documentation is provided by default on a CD-ROM shipped in an envelope placed in the shipment box of the parts. An additional paper copy of the certificate of conformance is provided in the envelope.

Note: Contact your ST representative for information about secured ftp transfer.

The documentation, depends on the quality level of the parts, as described in the table below:

Table 19. Default documentation by quality level

Quality level	Item
Engineering Model	Certificate of conformance including: • Customer name • Customer purchase order number • ST sales order number & item • ST part number • Quantity delivered • Date code • Reference to ST datasheet reference to TN1181 on engineering models • ST Rennes assembly lot ID
QML-V Flight	Certificate of conformance including: • Customer name • Customer purchase order number • ST sales order number & item • ST part number • Quantity delivered • Date code • Serial numbers • Group C reference • Group D reference • Reference to the applicable • SMD ST Rennes assemblyy lot ID Quality Control Inspection (groups A, B, C, D, E) Screening electrical data Precap report PIND (1) test SEM (2) inspection report X-Ray Report

1. *PIND : Particle Impact Noise Detection.*
2. *SEM : Scanning Electronic Microscope.*

Revision history

Table 20. **Document revision history**

Date	Version	Changes
06-Apr-2010	1	Initial release.
02-Aug-2011	2	Added Note: on page 11, Note: on page 12, Note: on page 13, Note: on page 14, Note: on page 15, Note: on page 15, Note: on page 17 and in the “Pin connections” diagram on the cover page
23-Apr-2012	3	Updated drawing Flat-20 on the cover page, added list of tables and figures, updated title of Table 4 and Table 5, reformatted Section 4: Package mechanical data and updated titles of Figure 2 to 8 and titles and headers of Table 6 to 12, updated data of Table 10 and Table 12, minor text corrections throughout document.
23-May-2013	4	Updated operating voltage in Features. Updated Table 1: Device summary, Table 6, Table 7, Table 8, Table 9, Table 10, Table 11, Table 12, and Table 13: Ordering information. Added Section 6: Other information
09-Apr-2014	5	Updated ceramic Flat-14 package in Figure 2 and Table 6 Specified MIL-STD-1835 for Flat 14 (Table 6), DIL 14 (Table 7), Flat 16 (Table 8), DIL 16 (Table 9) and DIL 20 (Table 11) packages Removed “DSCC” from ceramic Flat-20 package (Figure 6 and Figure 10) Replaced “ESCC” with “QML-V” in title of Table 14
18-Jan-2017	6	Features: removed “Power-down input protection” Table 1: Device summary: removed footnote 1 from 54AC521 and 54AC540, added footnote 2, and updated general note below table. Table 2: Absolute maximum ratings - 54AC series: updated value of VI parameter. Table 3: Absolute maximum ratings - 54ACT series: added footnote 1; updated values of VCC and VI parameters. Section 4: Package information: updated layout of this section and removed superfluous information. Table 13: Ordering information: updated marking of order code RHRAC164245K1, added footnote 2, and updated general note below table. Table 14: Documentation provided for QML-V flight: updated documentation information for engineering model.
13-Dec-2018	7	Added: feature on the cover page, ESD parameter in Table 2: Absolute maximum ratings - 54AC series, Table 3: Absolute maximum ratings - 54ACT series and new Section 4: Radiations. Updated: Description on the cover page, Table 13: Ordering information and Section 7: Other information.
18-Apr-2019	8	Updated Table 13: Ordering information.
20-Nov-2019	9	Updated Table 13: Ordering information.
18-Nov-2020	10	Updated features, Section 1 Input and output equivalent circuit diagram and Ordering information. Removed "Maximum ratings" section.
15-Sep-2021	11	Updated Section 2 Radiations and Section 3 Ordering information.
04-Oct-2021	12	Updated Section 3 Ordering information.
01-Aug-2025	13	Updated features and description on the cover page, Section 5: Radiation, Section 7: Ordering information and Section 8: Other information. Added: new sections Section 1: Device summary, Section 3: Maximum ratings and Section 8.1: Product marking.

Contents

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