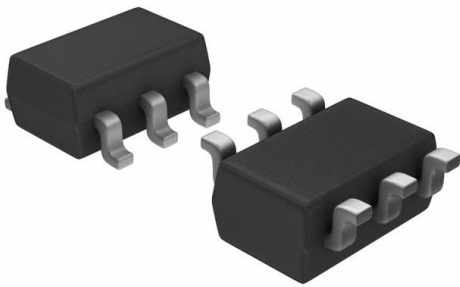


# STM6719TWWB6F Datasheet

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DiGi Electronics Part Number	STM6719TWWB6F-DG
Manufacturer	<a href="#">STMicroelectronics</a>
Manufacturer Product Number	STM6719TWWB6F
Description	IC SUPERVISOR 3 CHANNEL SOT23-6
Detailed Description	Supervisor Open Drain or Open Collector 3 Channel SOT-23-6

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## Purchase and inquiry

Manufacturer Product Number:

STM6719TWWB6F

Series:

-

DiGi-Electronics Programmable:

Not Verified

Number of Voltages Monitored:

3

Output:

Open Drain or Open Collector

Reset Timeout:

140ms Minimum

Mounting Type:

Surface Mount

Supplier Device Package:

SOT-23-6

Manufacturer:

STMicroelectronics

Product Status:

Active

Type:

Multi-Voltage Supervisor

Voltage - Threshold:

1.665V, 3.075V, Adj

Reset:

Active Low

Operating Temperature:

-40°C ~ 85°C (TA)

Package / Case:

SOT-23-6

Base Product Number:

STM6719

## Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8542.39.0001

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

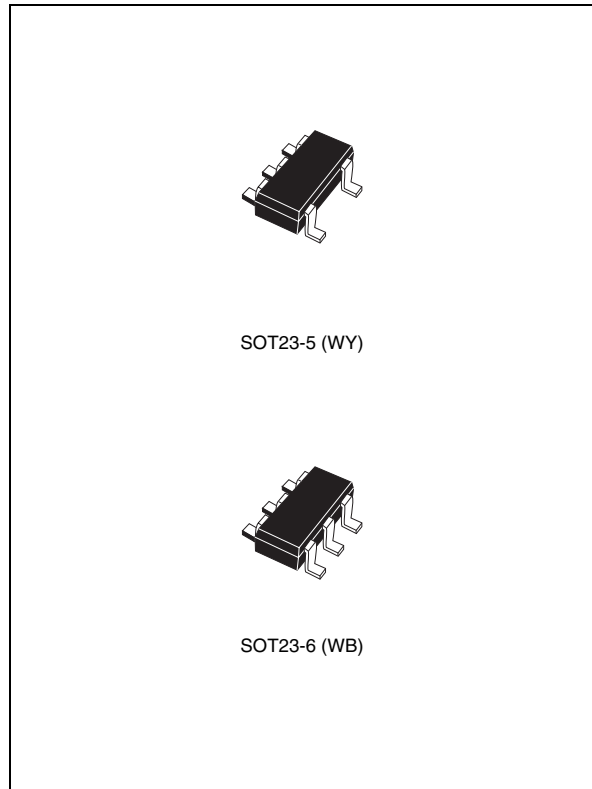


# STM6717/6718/6719/6720 STM6777/6778/6779/6780

Dual/triple ultra-low voltage supervisors  
with push-button reset (with delay option)

## Features

- Primary supply ( $V_{CC1}$ ) monitor.  
Fixed (factory-programmed) reset thresholds:  
4.63 V to 1.58 V
- Secondary supply ( $V_{CC2}$ ) monitor  
(STM6717/18/19/20/77/78)
- Fixed (factory-programmed) reset thresholds:  
3.08 V to 0.79 V
- Tertiary supply monitor (using externally  
adjustable RSTIN): 0.626 V internal reference
- $\overline{RST}$  outputs (push-pull or open drain); state  
guaranteed if  $V_{CC1}$  or  $V_{CC2} \geq 0.8$  V
- Reset delay time ( $t_{rec}$ ) on power-up: 13.2 ms,  
210 ms, 900 ms (typ)
- Manual reset input ( $\overline{MR}$ )
- Optional delayed manual reset input (MRC)  
with external capacitor (STM6777/78/79/80)
- Low supply current - 11  $\mu$ A (typ),  
 $V_{CC1} = V_{CC2} = 3.6$  V
- Operating temperature:  $-40$  °C to  $85$  °C  
(industrial grade)



**Table 1. Device summary**

Part number	Monitored voltages			Manual reset input ( $\overline{MR}$ )	Delayed $\overline{MR}$ pin (MRC)	Reset output ( $\overline{RST}$ )		Package
	$V_{CC1}$	$V_{CC2}$	RSTIN			Active-low (push-pull)	Active-low (open drain)	
STM6717	✓	✓		✓			✓	WY
STM6718	✓	✓		✓		✓		WY
STM6719	✓	✓	✓	✓			✓	WB
STM6720	✓	✓	✓	✓		✓		WB
STM6777	✓	✓		✓	✓		✓	WB
STM6778	✓	✓		✓	✓	✓		WB
STM6779	✓		✓	✓	✓		✓	WB
STM6780	✓		✓	✓	✓	✓		WB

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# 1 Description

The STM6717/18/19/20 and STM6777/78/79/80 supervisors are a family of low-voltage/low-supply current processor (micro or DSP) supervisors, designed to monitor two (or three) system power supply voltages. They are targeted at applications such as set-top boxes (STBs), portable, battery-powered systems, networking, and communication systems.

All device options have a push-button-type manual reset input ( $\overline{\text{MR}}$ ). The STM6777/78/79/80 also includes an option which enables the user to delay the start of the manual reset process from 6  $\mu\text{s}$  (MRC pin left open) or more with external capacitor. The delay is implemented by connecting the appropriately sized capacitor between the MRC pin and  $V_{\text{SS}}$  (typical 4 s delay with a 3.3  $\mu\text{F}$  capacitor, see [Table 7 on page 21](#)).

Two of the three supplies monitored ( $V_{\text{CC1}}$  and  $V_{\text{CC2}}$ ) have fixed (customer-selectable, factory-trimmed) thresholds ( $V_{\text{RST1}}$  and  $V_{\text{RST2}}$ ). The third voltage is monitored using an externally adjustable RSTIN threshold (0.626 V internal reference).

If any of the three monitored voltages drop below its factory-trimmed or adjustable thresholds, or if  $\overline{\text{MR}}$  is asserted to logic low, a  $\overline{\text{RST}}$  is asserted (driven low). Once asserted,  $\overline{\text{RST}}$  is maintained at low for a minimum delay period ( $t_{\text{rec}}$ ) after ALL supplies rise above their respective thresholds and  $\overline{\text{MR}}$  returns to high. These devices are guaranteed to be in the correct reset output logic state when  $V_{\text{CC1}}$  and/or  $V_{\text{CC2}}$  is greater than 0.8 V.

These devices are available in standard 5-pin or 6-pin SOT23 packages (see [Table 1 on page 1](#)).

## Description

## STM6717/6718/6719/6720/STM6777/6778/6779/6780

Figure 1. Logic diagram (STM6717/18)

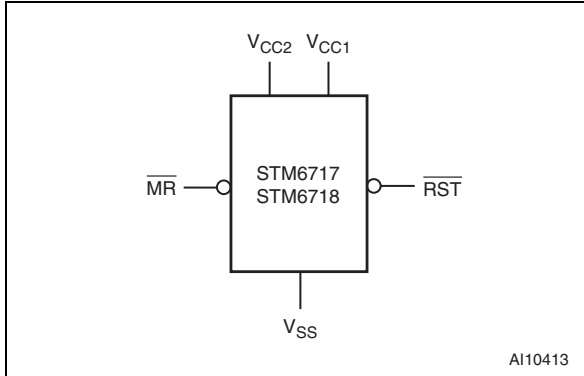


Figure 2. Logic diagram (STM6777/78)

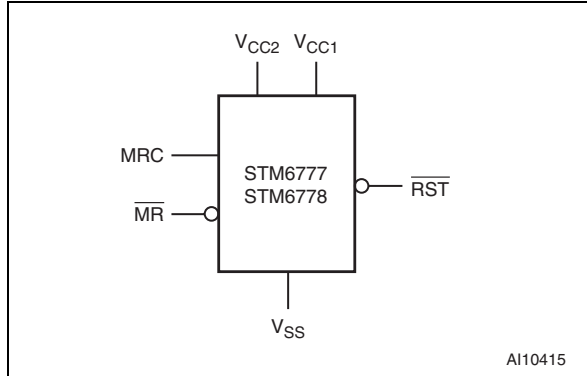


Figure 3. Logic diagram (STM6719/20)

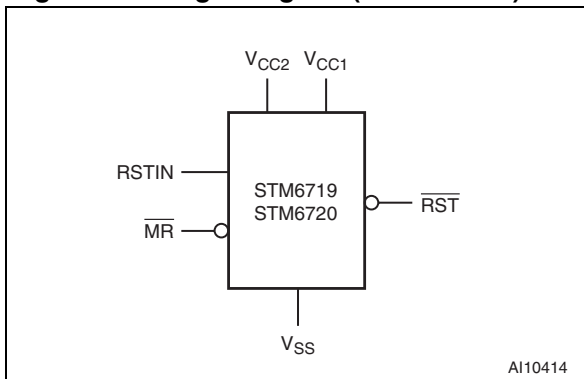


Figure 4. Logic diagram (STM6779/80)

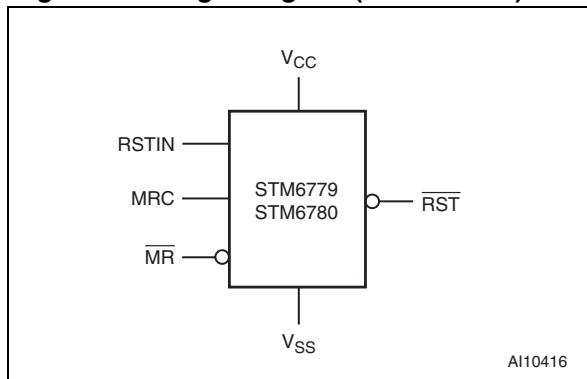


Table 2. Signal names

$\overline{\text{MR}}$	Push-button reset input
MRC	Manual reset delay input
$\overline{\text{RST}}$	Active-low reset output
$V_{\text{CC1}}$	Primary supply voltage input
$V_{\text{CC2}}$	Secondary supply voltage input
RSTIN	Adjustable reset comparator input
$V_{\text{SS}}$	Ground

Figure 5. STM6717/18 SOT23-5 connections

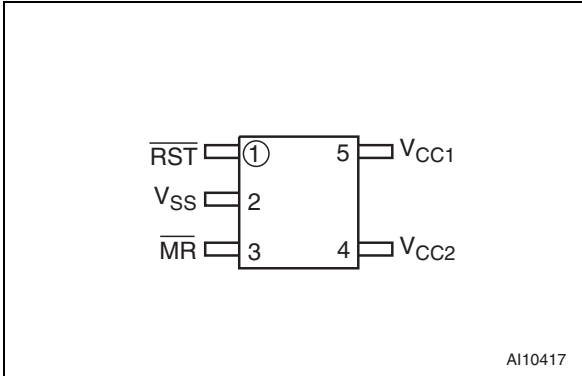


Figure 6. STM6777/78 SOT23-6 connections

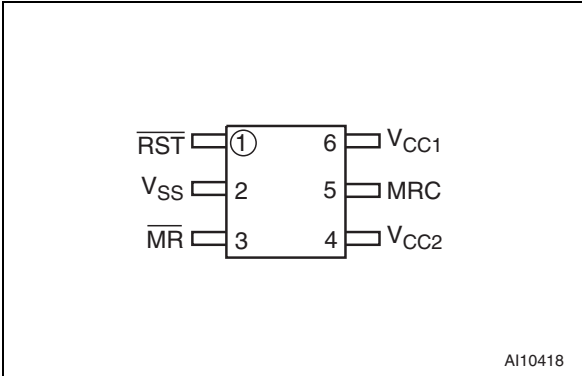


Figure 7. STM6719/20 SOT23-6 connections

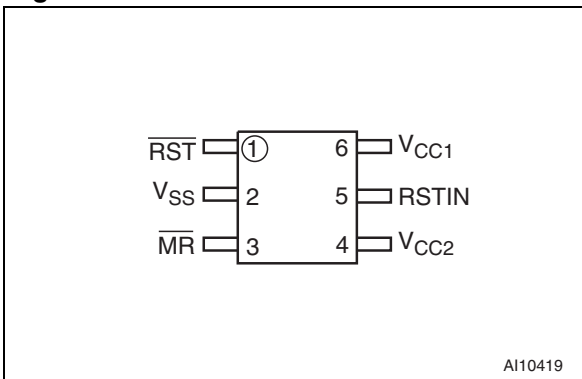
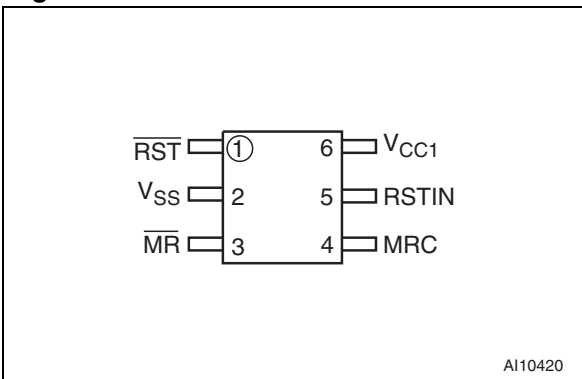


Figure 8. STM6779/80 SOT23-6 connections



## 1.1 Pin descriptions

### 1.1.1 Active-low, push-pull reset output ( $\overline{\text{RST}}$ ) - STM6718/20/78/80

The  $\overline{\text{RST}}$  pin is driven low and stays low whenever  $V_{\text{CC1}}$  or  $V_{\text{CC2}}$  or RSTIN falls below its factory-trimmed or adjustable reset threshold or when MR goes to logic low. It remains low for  $t_{\text{rec}}$  after ALL supply voltages being monitored rise above their reset thresholds and MR goes from low to high. (Push-pull outputs are referenced to  $V_{\text{CC1}}$ .)

### 1.1.2 Active-low, open drain reset output ( $\overline{\text{RST}}$ ) - STM6717/19/77/79

The  $\overline{\text{RST}}$  pin is driven low and stays low whenever  $V_{\text{CC1}}$  or  $V_{\text{CC2}}$  or RSTIN falls below its factory-trimmed or adjustable reset threshold or when MR goes to logic low. It remains low for  $t_{\text{rec}}$  after ALL supply voltages being monitored rise above their reset thresholds and MR goes from low to high. Connect an external pull-up resistor to  $V_{\text{CC1}}$ . A 10 k $\Omega$  pull-up resistor should be sufficient for most applications.

### 1.1.3 Push-button reset input ( $\overline{\text{MR}}$ )

When  $\overline{\text{MR}}$  goes low the  $\overline{\text{RST}}$  output is driven low.  $\overline{\text{RST}}$  remains low as long as  $\overline{\text{MR}}$  is low and for  $t_{\text{rec}}$  after  $\overline{\text{MR}}$  returns to high. This active-low input has an internal 50 k $\Omega$  pull-up resistor to

## Description

## STM6717/6718/6719/6720/STM6777/6778/6779/6780

$V_{CC1}$ . It can be driven from a TTL or CMOS logic line, or with open drain/collector outputs, or connected to  $V_{SS}$  through a switch. If unused, leave this pin open or connect it to  $V_{CC1}$ .

Connect a normally open momentary switch from  $\overline{MR}$  to  $V_{SS}$ ; external debounce circuitry is not required. (If  $\overline{MR}$  is driven from long cables or if the device is used in noisy environments, connecting a 0.1 $\mu$ F capacitor from  $\overline{MR}$  to  $V_{SS}$  provides additional noise immunity.

### 1.1.4 Manual reset delay input (MRC) - STM6777/78/79/80)

This pin is either left open or connected to  $V_{SS}$  via a capacitor. By selecting the appropriate capacitor, the manual reset process, initiated by pressing the push-button manual reset input, can be delayed by any value from 6  $\mu$ s or more (see [Table 7 on page 21](#)).

### 1.1.5 Primary supply voltage monitoring input ( $V_{CC1}$ )

It also is the input for the primary reset threshold monitor. Available fixed (customer-selectable, factory-programmed) reset thresholds include 4.63 V to 1.58 V.

### 1.1.6 Secondary supply voltage monitoring input ( $V_{CC2}$ )

This function is available on the STM6717/18/19/20/77/78. Fixed (customer-selectable, factory-programmed) reset thresholds include 3.08 V to 0.79 V.

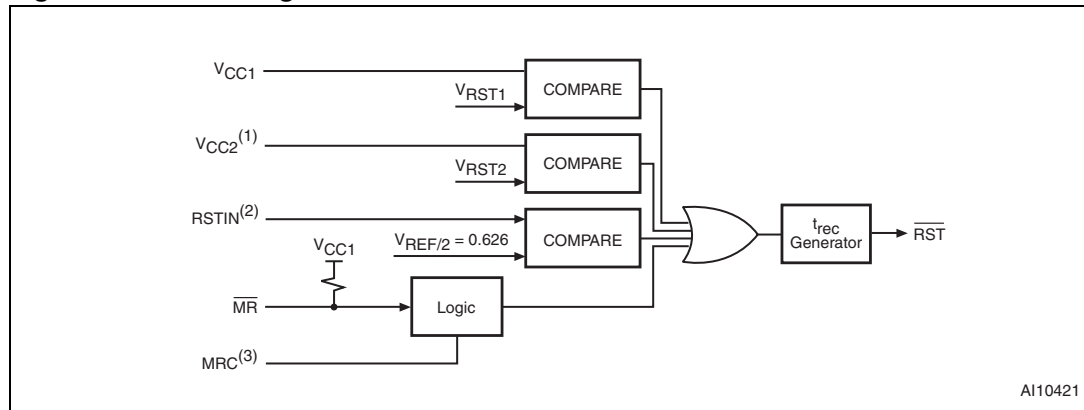
### 1.1.7 Adjustable reset comparator input (RSTIN; STM6719/20/79/80)

This is a high impedance input.  $\overline{RST}$  is driven low when the voltage at the RSTIN pin falls below 0.626 V (internal reference voltage at this comparator). The monitored voltage reset threshold is set with an external resistor-divider network.

**Table 3. Pin functions**

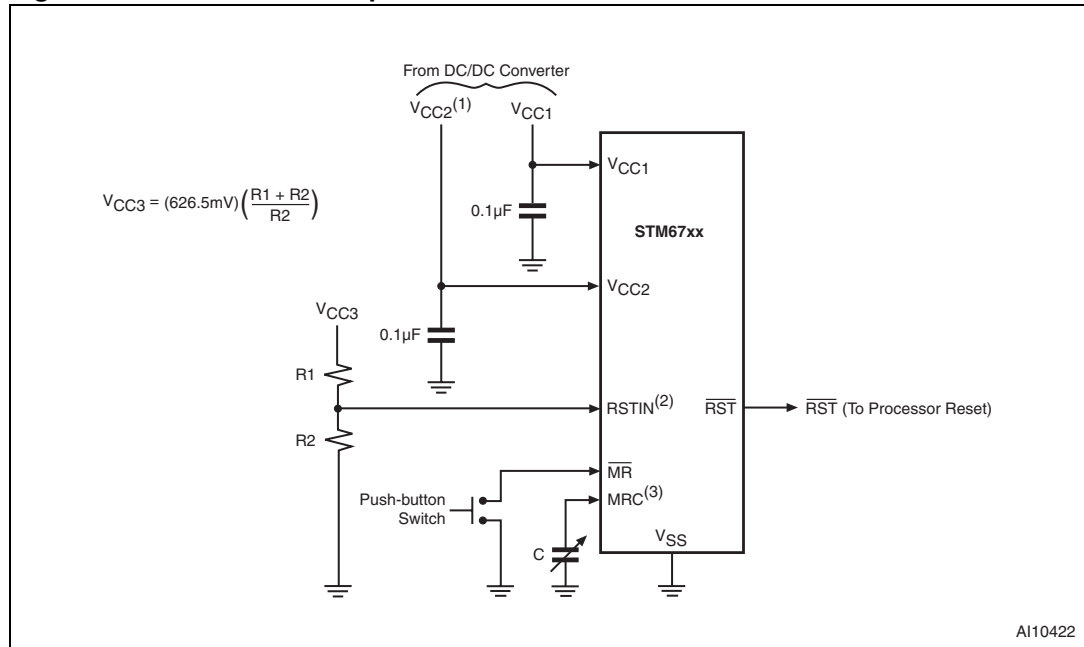
Pin				Name	Function
STM6717 STM6718	STM6719 STM6720	STM6777 STM6778	STM6779 STM6780		
1	1	1	1	$\overline{RST}$	Active-low reset output
3	3	3	3	$\overline{MR}$	Push-button reset input
—	—	5	4	MRC	Manual reset delay input
5	6	6	6	$V_{CC1}$	Primary supply voltage input
4	4	4	—	$V_{CC2}$	Secondary supply voltage input
—	5	—	5	RSTIN	Adjustable reset comparator input
2	2	2	2	$V_{SS}$	Ground

**Figure 9. Block diagram**



1.  $V_{CC2}$  input is available on STM6717/18/19/20/77/78.
2. RSTIN available only on STM6719/20/79/80.
3. MRC available only on STM6777/78/79/80.

**Figure 10. Hardware hookup**



1.  $V_{CC2}$  is available only on STM6717/18/19/20/77/78.
2. RSTIN available only on STM6719/20/79/80.
3. MRC available only on STM6777/78/79/80.

## 2 Operation

### 2.1 Applications information

1. Interfacing to processors with bi-directional reset pins

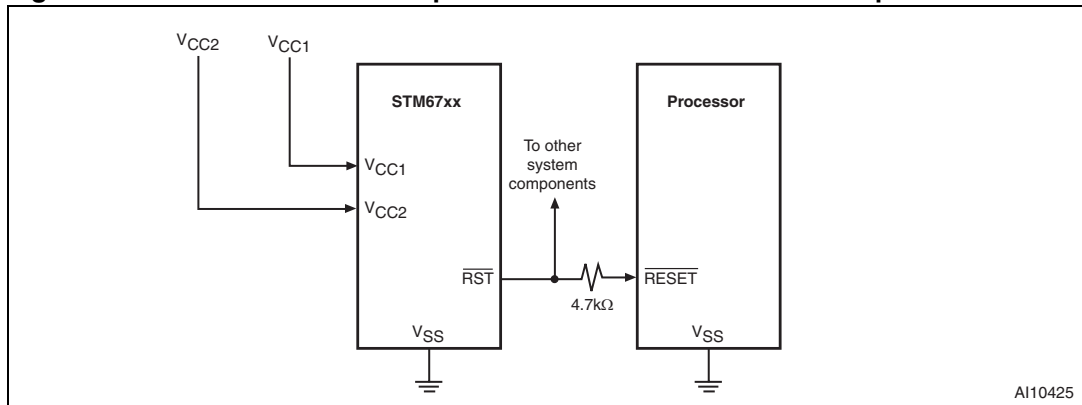
Most processors with bi-directional reset pins can interface directly to the open drain  $\overline{\text{RST}}$  outputs (STM6717/19/77/79). Systems simultaneously requiring a push-pull  $\overline{\text{RST}}$  output and a bi-directional reset interface can be in logic contention. To prevent this contention, connect a 4.7 k $\Omega$  resistor between  $\overline{\text{RST}}$  and the processor's reset I/O as shown in [Figure 11](#).

2. Ensuring a valid  $\overline{\text{RST}}$  output down to  $V_{\text{CC}} = 0 \text{ V}$

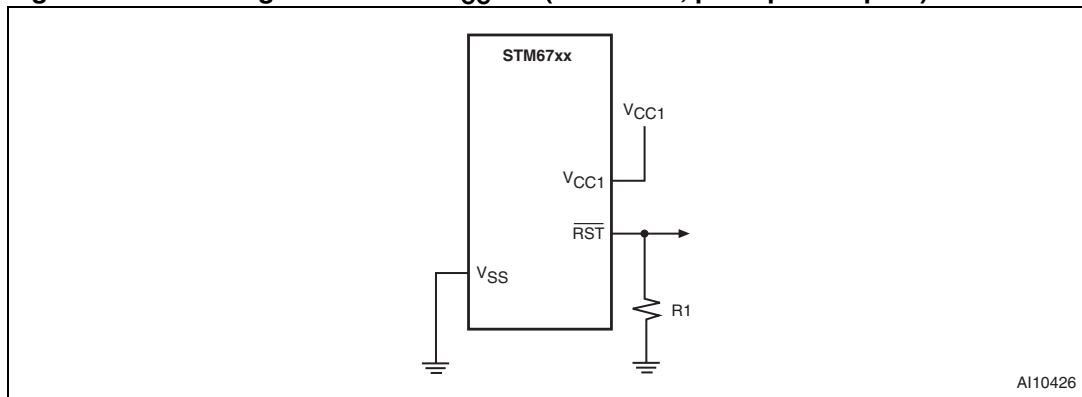
The STM67xx supervisors are guaranteed to be in the correct  $\overline{\text{RST}}$  output logic state when  $V_{\text{CC1}}$  and/or  $V_{\text{CC2}}$  is greater than 0.8 V. In applications which require valid reset levels down to  $V_{\text{CC}} = 0$ , a pull-down resistor to active-low outputs (push-pull only, see [Figure 12](#)) will ensure that the reset line is valid while the reset output can no longer sink or source current. This scheme does NOT work with the open drain outputs of the STM6717/19/77/79.

The resistor value used is not critical, but it must be large enough not to load the reset output when  $V_{\text{CC}}$  is above the reset threshold. For most applications, 100 k $\Omega$  is adequate.

**Figure 11. STM67xx interface to processor with bi-directional reset pins**



**Figure 12. Ensuring  $\overline{\text{RST}}$  valid to  $V_{\text{CC}} = 0$  (active-low, push-pull outputs)**



### 3 Typical operating characteristics

Note: Typical values are at  $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted.

Figure 13. Supply current vs. temperature ( $V_{CC1} = 5.5\text{ V}$ ;  $V_{CC2} = 3.6\text{ V}$ )

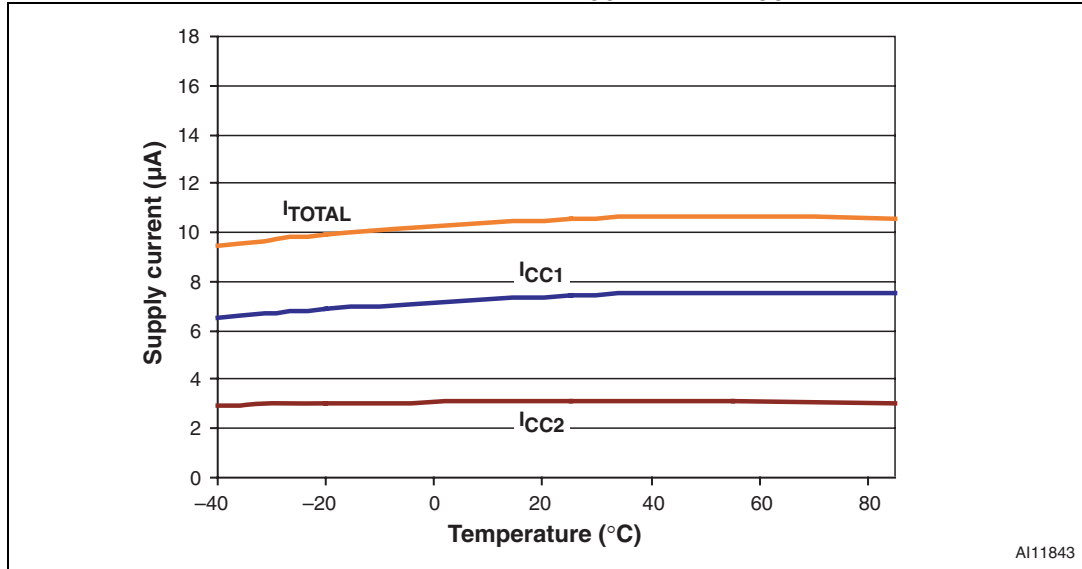


Figure 14. Supply current vs. temperature ( $V_{CC1} = 3.6\text{ V}$ ;  $V_{CC2} = 2.75\text{ V}$ )

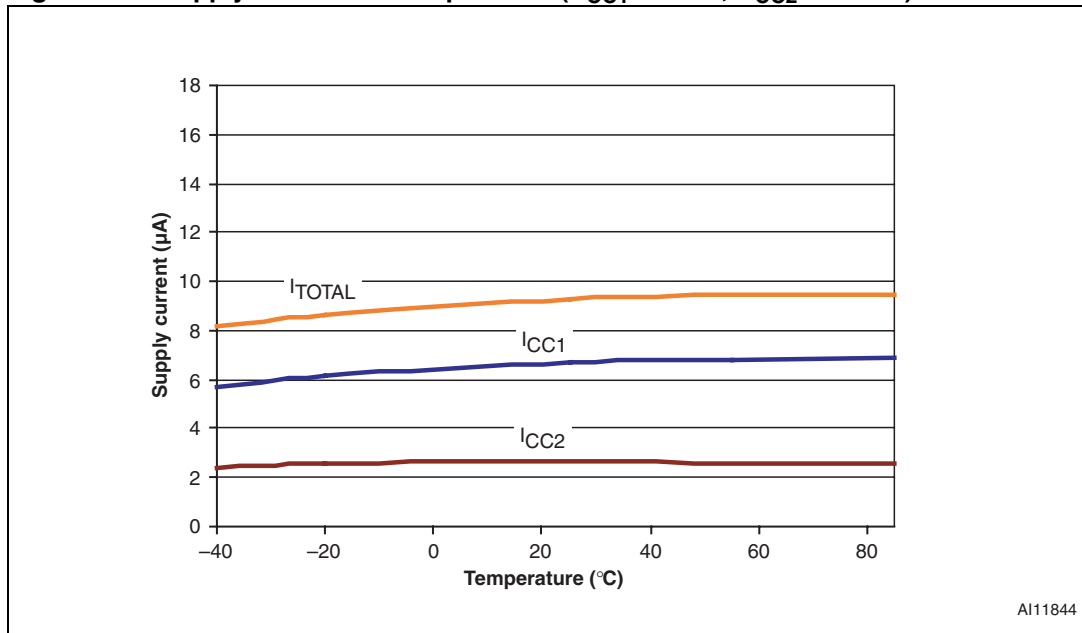


Figure 15. Supply current vs. temperature ( $V_{CC1} = 3.0\text{ V}$ ;  $V_{CC2} = 2.0\text{ V}$ )

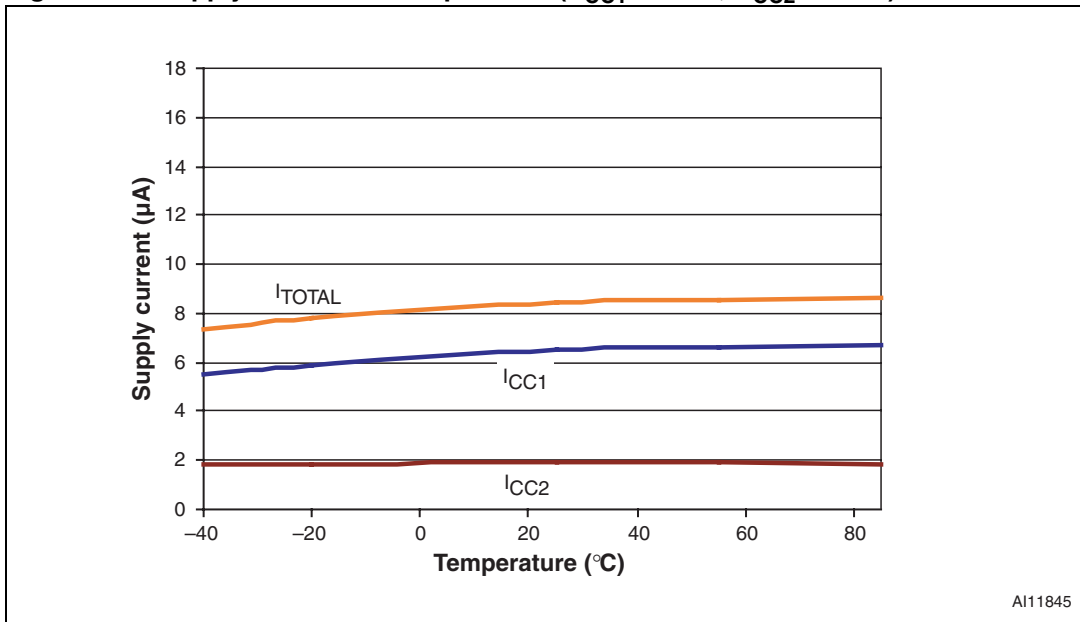


Figure 16. Supply current vs. temperature ( $V_{CC1} = 2.0\text{ V}$ ;  $V_{CC2} = 1.0\text{ V}$ )

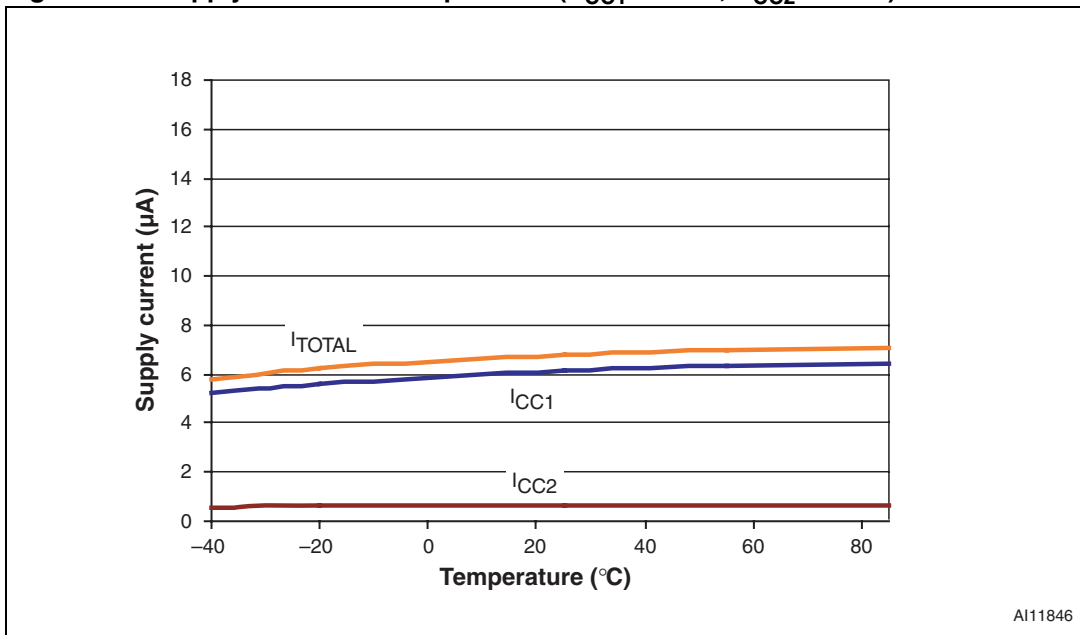


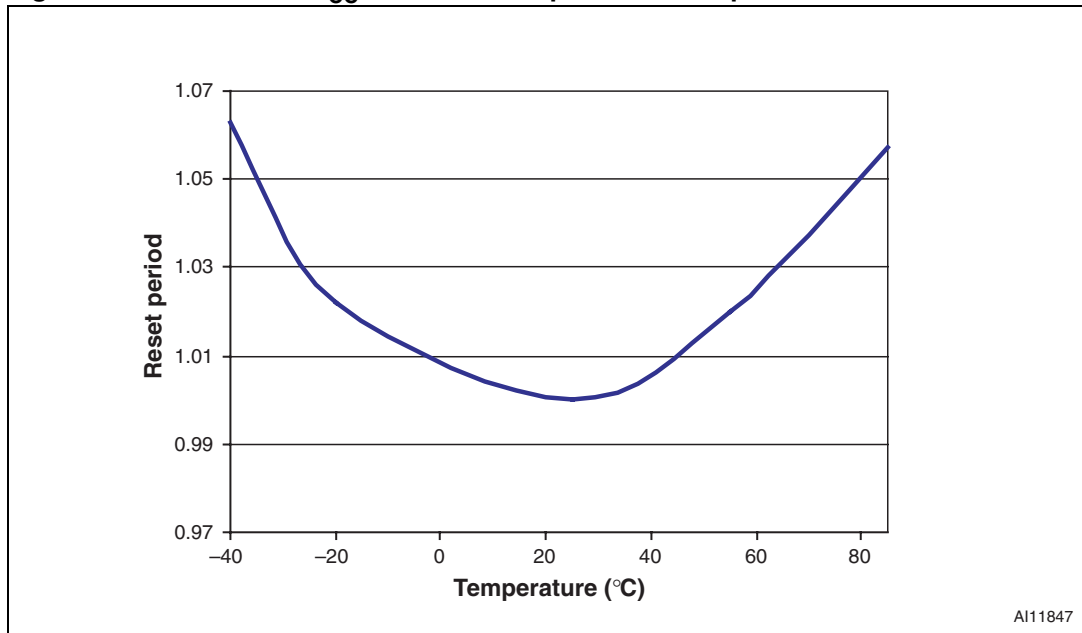
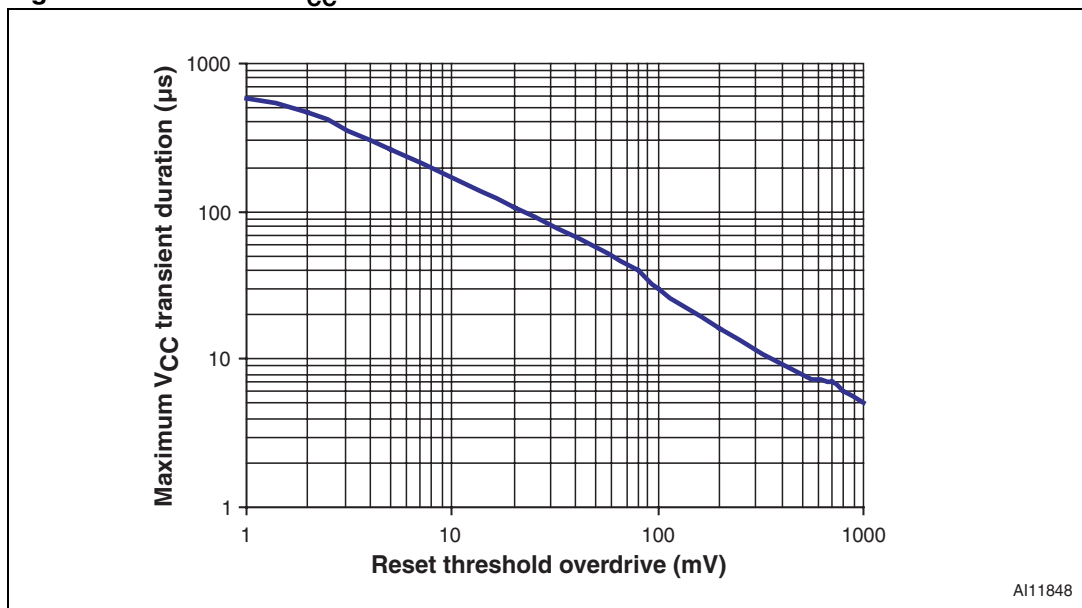
Figure 17. Normalized  $V_{CC}$  reset time-out period vs. temperatureFigure 18. Maximum  $V_{CC}$  transient duration vs. reset threshold overdrive

Figure 19. Normalized  $V_{RST1}$  threshold vs. temperature

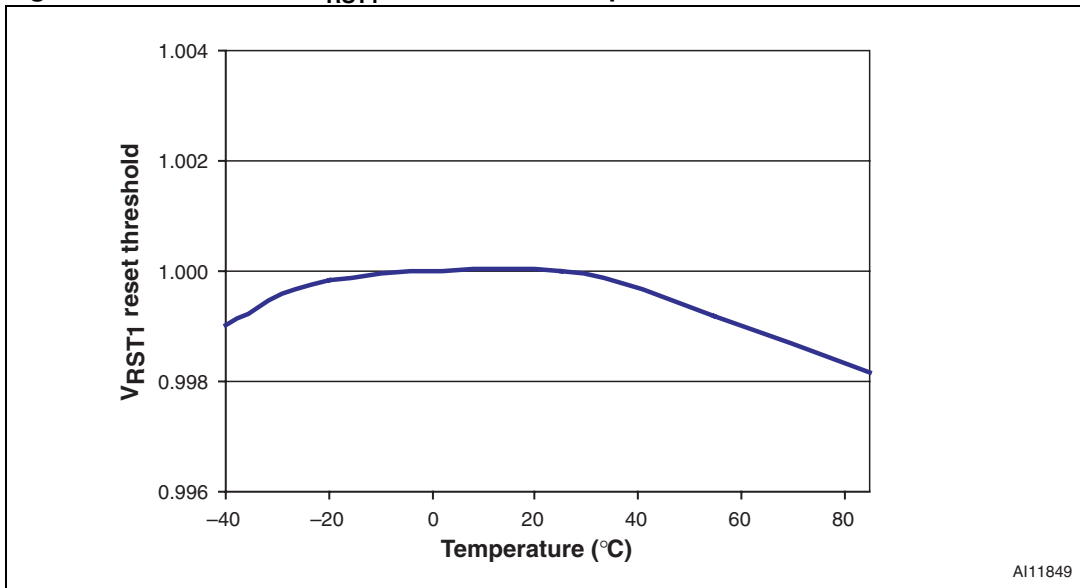


Figure 20. Normalized  $V_{RST2}$  threshold vs. temperature

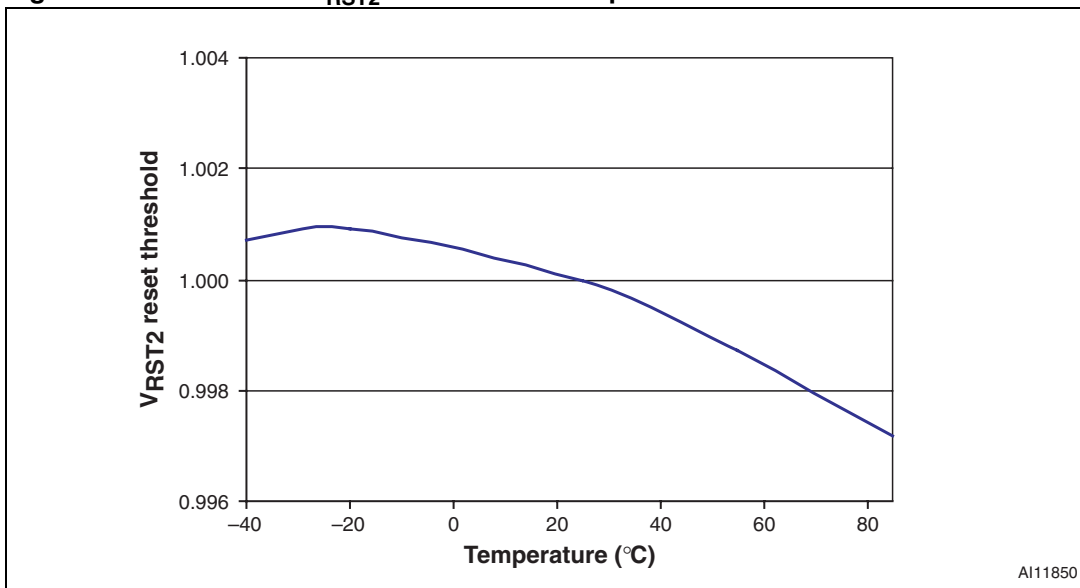


Figure 21. Reset input threshold vs. temperature

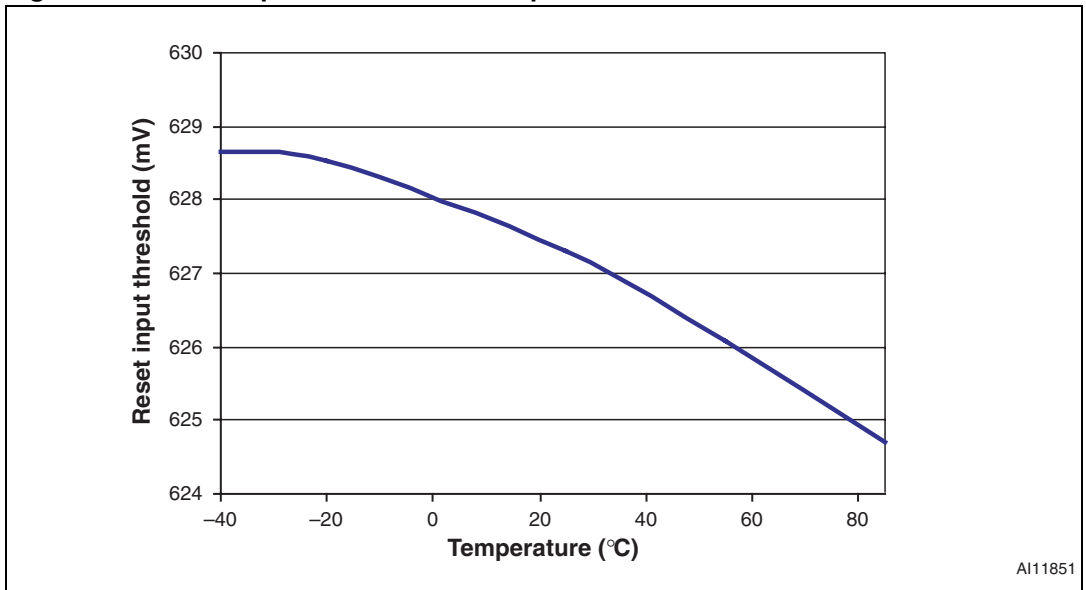


Figure 22. V<sub>CC1</sub>-to-reset delay vs. temperature

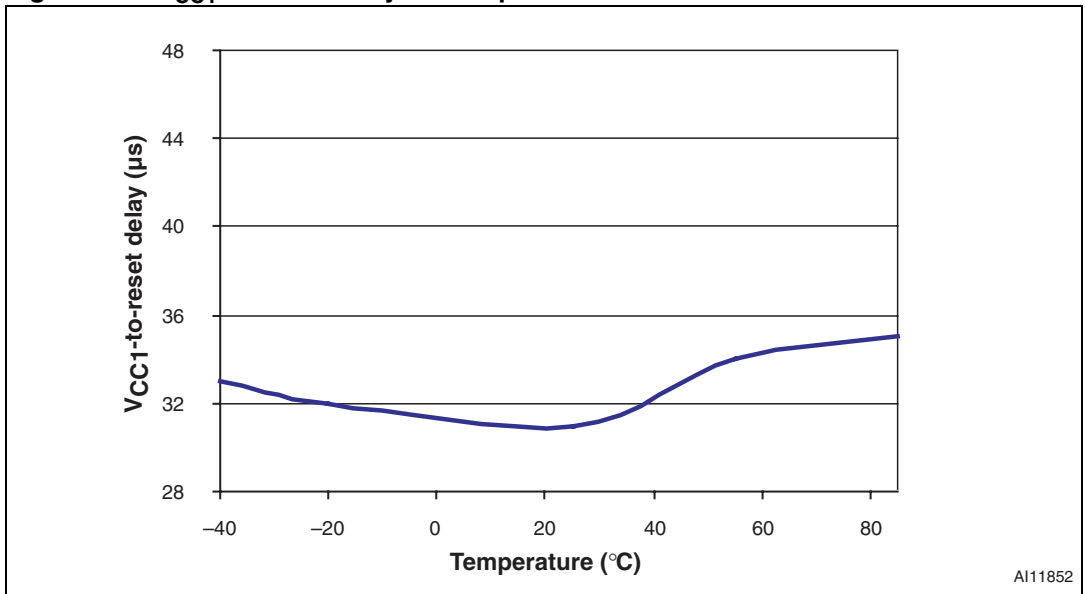


Figure 23. Reset input-to-reset output delay vs. temperature

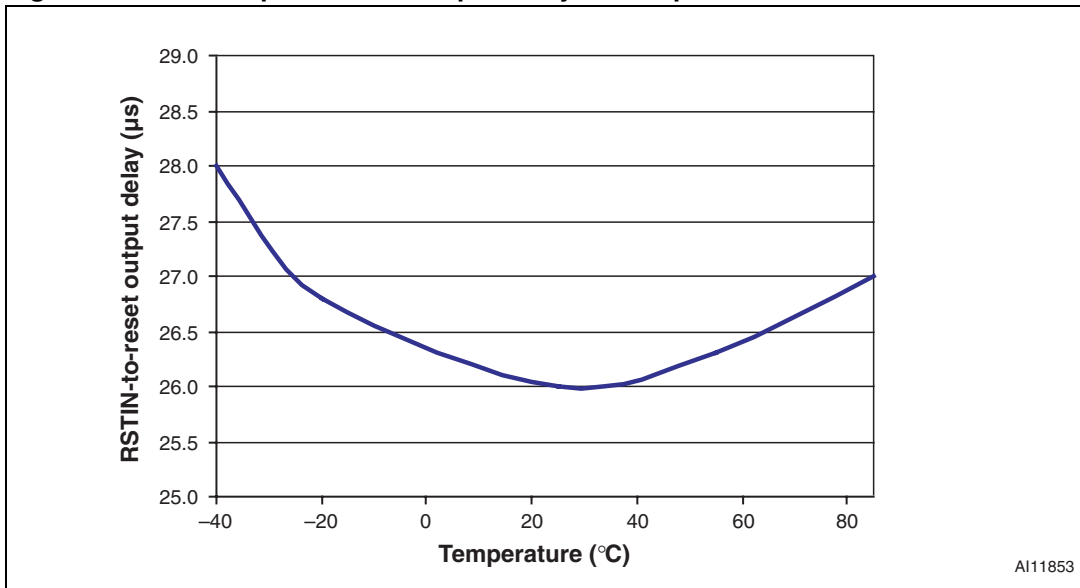
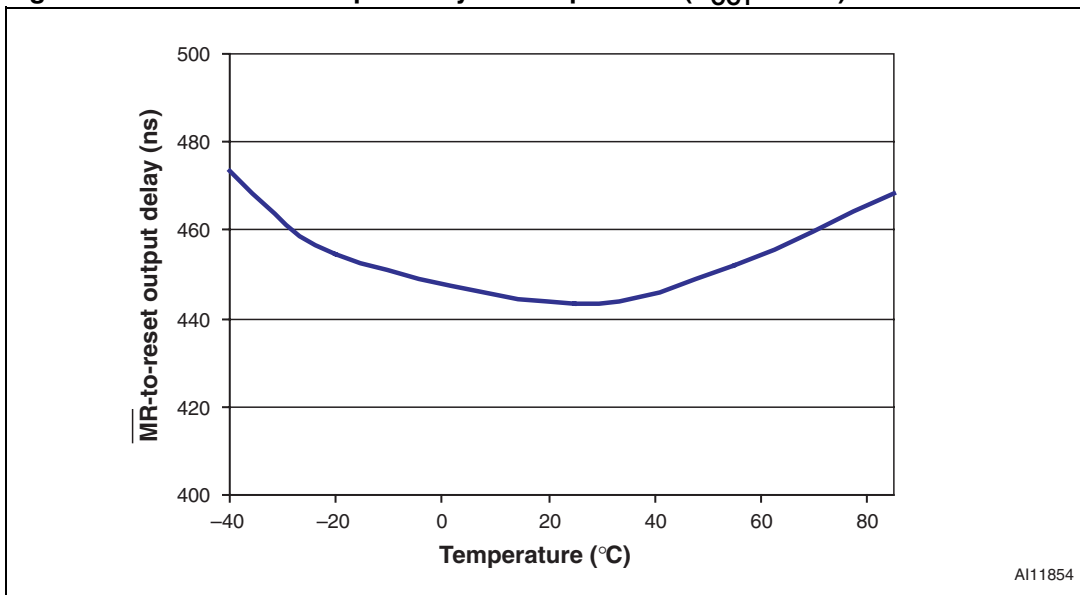


Figure 24.  $\overline{\text{MR}}$ -to-reset output delay vs. temperature ( $V_{CC1} = 3.6V$ )



## 4 Maximum rating

Stressing the device above the rating listed in the Absolute Maximum Ratings” table 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 the Operating sections of this specification is not implied. Exposure to Absolute Maximum Rating conditions for extended periods may affect device reliability. Refer also to the STMicroelectronics SURE Program and other relevant quality documents.

**Table 4. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$T_{STG}$	Storage temperature ( $V_{CC}$ off)	-55 to 150	°C
$T_{SLD}^{(1)}$	Lead solder temperature for 10 seconds	260	°C
$V_{IO}$	Input or output voltage	-0.3 to $V_{CC1} + 0.3$	V
		-0.3 to $V_{CC2} + 0.3$	V
$V_{CC1}, V_{CC2}$	Supply voltage	-0.3 to 7.0	V
$I_{IO}$	Input or output current (all pins)	20	mA
$P_D$	Power dissipation	SOT23-5	654
		SOT23-6	675

1. Reflow at peak temperature of 260 °C. The time above 255 °C must not exceed 30 seconds.

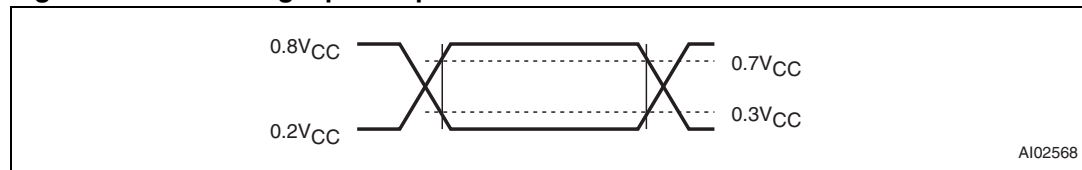
## 5 DC and AC parameters

This section summarizes the operating measurement conditions, and the DC and AC characteristics of the device. The parameters in the DC and AC characteristics tables that follow, are derived from tests performed under the measurement conditions summarized in [Table 5: Operating and AC measurement conditions](#). Designers should check that the operating conditions in their circuit match the operating conditions when relying on the quoted parameters.

**Table 5. Operating and AC measurement conditions**

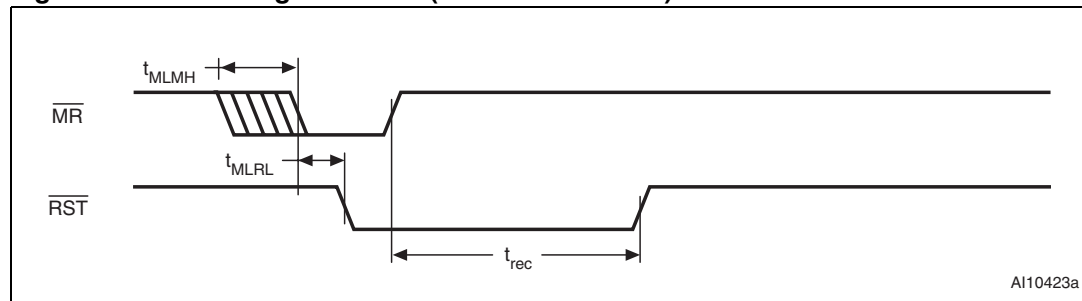
Parameter	STM67xx	Unit
$V_{CC}$ supply voltage	0.8 to 5.5	V
Ambient operating temperature ( $T_A$ )	-40 to 85	°C
Input rise and fall times	$\leq 5$	ns
Input pulse voltages	0.2 to $0.8V_{CC}$	V
Input and output timing ref. voltages	0.3 to $0.7V_{CC}$	V

**Figure 25. AC testing input/output waveforms**



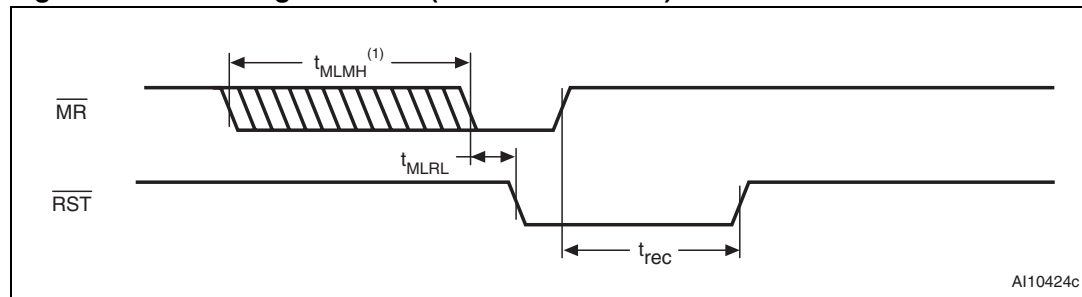
AI02568

**Figure 26.  $\overline{MR}$  timing waveform (STM6717/18/19/20)**



AI10423a

**Figure 27.  $\overline{MR}$  timing waveform (STM6777/78/79/80)**



AI10424c

1. By connecting a certain capacitor between the MRC pin and  $V_{SS}$ , the  $\overline{RST}$  can be delayed from 6  $\mu$ s or more ( $t_{MLMH}$ , see [Table 7 on page 21](#)).

Table 6. DC and AC characteristics

Sym	Alter-native	Description	Test condition <sup>(1)</sup>	Min	Typ	Max	Unit
$V_{CC}$		Operating voltage		0.8		5.5	V
$I_{CC1}$		$V_{CC1}$ supply current	$V_{CC1} < 5.5$ V, all I/O pins open		12	35	$\mu$ A
			$V_{CC1} < 3.6$ V, all I/O pins open		8	23	$\mu$ A
$I_{CC2}$		$V_{CC2}$ supply current	$V_{CC2} < 3.6$ V, all I/O pins open		3	9	$\mu$ A
			$V_{CC2} < 2.75$ V, all I/O pins open		2.5	7	$\mu$ A
$I_{LI}^{(2)}$		Input leakage current	$0$ V = $V_{IN} = V_{CC}$	-1		+1	$\mu$ A
$I_{LO}$		Open drain $\overline{RST}$ output leakage current	$V_{CC1} > V_{RST1}$ , $V_{CC2} > V_{RST2}$ ; $\overline{RST}$ not asserted			0.5	$\mu$ A
$V_{OL}$		Output low voltage ( $\overline{RST}$ ; push-pull or open drain)	$V_{CC1}$ or $V_{CC2} \geq 0.8$ V, $I_{SINK} = 1$ $\mu$ A, $\overline{RST}$ asserted			0.3	V
			$V_{CC1}$ or $V_{CC2} \geq 1.0$ V, $I_{SINK} = 50$ $\mu$ A, $\overline{RST}$ asserted			0.3	V
			$V_{CC1}$ or $V_{CC2} \geq 1.2$ V, $I_{SINK} = 100$ $\mu$ A, $\overline{RST}$ asserted			0.3	V
			$V_{CC1}$ or $V_{CC2} \geq 2.7$ V, $I_{SINK} = 1.2$ mA, $\overline{RST}$ asserted			0.3	V
			$V_{CC1}$ or $V_{CC2} \geq 4.5$ V, $I_{SINK} = 3.2$ mA, $\overline{RST}$ asserted			0.4	V
$V_{OH}$		Output high voltage ( $\overline{RST}$ ; push-pull only)	$V_{CC1} \geq 1.8$ V, $I_{SOURCE} = 200$ $\mu$ A, $\overline{RST}$ not asserted	$0.8V_{CC1}$			V
			$V_{CC1} \geq 2.7$ V, $I_{SOURCE} = 500$ $\mu$ A, $\overline{RST}$ not asserted	$0.8V_{CC1}$			V
			$V_{CC1} \geq 4.5$ V, $I_{SOURCE} = 800$ $\mu$ A, $\overline{RST}$ not asserted	$0.8V_{CC1}$			V
$t_R^{(3)}$		Push-pull $\overline{RST}$ rise time (STM6718/20/78/80)	Rise time measured from 10% to 90% of $V_{CC}$ ; $C_L = 5$ pF, $V_{CC} = 3.3$ V		5	25	ns
<b>Reset thresholds</b>							
$V_{RST}^{(4)}$	$V_{TH1}$	$V_{CC1}$ reset threshold	L (falling)	4.500	4.625	4.750	V
			M (falling)	4.250	4.375	4.500	V
			T (falling)	3.000	3.075	3.150	V
			S (falling)	2.850	2.925	3.000	V
			R (falling)	2.550	2.625	2.700	V
			Z (falling)	2.250	2.313	2.375	V
			Y (falling)	2.125	2.188	2.250	V
			W (falling)	1.620	1.665	1.710	V
V (falling)	1.530	1.575	1.620	V			

## DC and AC parameters

## STM6717/6718/6719/6720/STM6777/6778/6779/6780

Table 6. DC and AC characteristics (continued)

Sym	Alternative	Description	Test condition <sup>(1)</sup>	Min	Typ	Max	Unit
$V_{RST2}^{(4)}$	$V_{TH2}$	$V_{CC2}$ reset threshold	T (falling)	3.000	3.075	3.150	V
			S (falling)	2.850	2.925	3.000	V
			R (falling)	2.550	2.625	2.700	V
			Z (falling)	2.250	2.313	2.375	V
			Y (falling)	2.125	2.188	2.250	V
			W (falling)	1.620	1.665	1.710	V
			V (falling)	1.530	1.575	1.620	V
			I (falling)	1.350	1.388	1.425	V
			H (falling)	1.275	1.313	1.350	V
			G (falling)	1.080	1.110	1.140	V
			F (falling)	1.020	1.050	1.080	V
			K (falling)	0.895	0.925	0.955	V
			J (falling)	0.845	0.875	0.905	V
			E (falling)	0.810	0.833	0.855	V
D (falling)	0.765	0.788	0.810	V			
$V_{HYST}$		Reset threshold hysteresis	Referenced to $V_{RST}$ typical		0.5		%
$t_{RD}$		$V_{CC}$ to $\overline{RST}$ delay	$V_{CC1} = (V_{RST1} + 100 \text{ mV})$ to $(V_{RST} - 100 \text{ mV})$		20		$\mu\text{s}$
			$V_{CC2} = (V_{RST2} + 75 \text{ mV})$ to $(V_{RST2} - 75 \text{ mV})$		20		$\mu\text{s}$
$t_{rec}$	$t_{RP}$	$\overline{RST}$ pulse width	blank	140	210	280	ms
			B	8.8	13.2	17.6	
			G	600	900	1200	
<b>Adjustable reset comparator input (STM6719/20/79/80)</b>							
$V_{RSTIN}$		RSTIN input threshold		611	626.5	642	mV
$I_{RSTIN}$		RSTIN input current		-25		+25	nA
		RSTIN hysteresis			3		mV
$t_{RSTIND}$		RSTIN to $\overline{RST}$ output delay	$V_{RSTIN}$ to $(V_{RSTIN} - 30 \text{ mV})$		22		$\mu\text{s}$

Table 6. DC and AC characteristics (continued)

Sym	Alternative	Description	Test condition <sup>(1)</sup>	Min	Typ	Max	Unit
<b>Manual (push-button) reset input</b>							
$V_{IL}$		$\overline{MR}$ input voltage				$0.3V_{CC1}$	V
$V_{IH}$				$0.7V_{CC1}$			V
$t_{MLMH}$	$t_{MR}$	$\overline{MR}$ minimum pulse width (STM6717/18/19/20)		1			$\mu\text{s}$
		$\overline{MR}$ minimum pulse width (STM6777/78/79/80)	MRC connected via capacitor to $V_{SS}$		6		$\mu\text{s}$
$t_{MLRL}$	$t_{MRD}$	$\overline{MR}$ to $\overline{RST}$ output delay			200		ns
		$\overline{MR}$ glitch immunity (STM6717/18/19/20)			100		ns
		$\overline{MR}$ pull-up resistance		25	50	80	k $\Omega$

- Valid for ambient operating temperature:  $T_A = -40$  to  $85$  °C;  $V_{CC1} = 0.8$  to  $5.5$  V and  $V_{CC2} = 0.8$  to  $3.6$  V (except where noted).
- Input leakage for the MRC pin is not tested.
- Guaranteed by design.
- The leakage current measured on the  $\overline{RST}$  pin is tested with the reset de-asserted (output high impedance).

Table 7.  $t_{MLMH}$  minimum pulse width

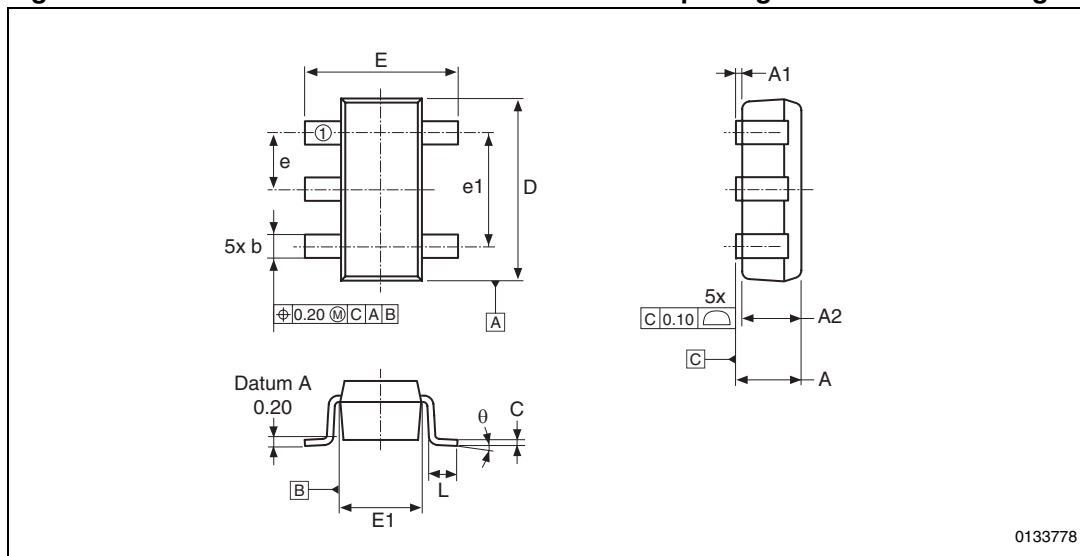
$V_{CC1}$	Capacitor value <sup>(1)</sup>					
	100 pF	0.1 $\mu\text{F}$	2.2 $\mu\text{F}$	3.3 $\mu\text{F}$	4.7 $\mu\text{F}$	6.8 $\mu\text{F}$
1.6 V	120 $\mu\text{s}$	120 ms	2.6 s	4.0 s	5.6 s	8.2 s
2.0 V	122 $\mu\text{s}$	122 ms	2.7 s	4.0 s	5.8 s	8.3 s
3.0 V	125 $\mu\text{s}$	125 ms	2.7 s	4.1 s	5.9 s	8.5 s
4.0 V	128 $\mu\text{s}$	129 ms	2.8 s	4.2 s	6.0 s	8.7 s
5.0 V	130 $\mu\text{s}$	130 ms	2.8 s	4.3 s	6.1 s	8.8 s

- At  $25$  °C (typical)

## 6 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK<sup>®</sup> is an ST trademark.

Figure 28. SOT23-5 – 5-lead small outline transistor package mechanical drawing



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Note: Drawing is not to scale.

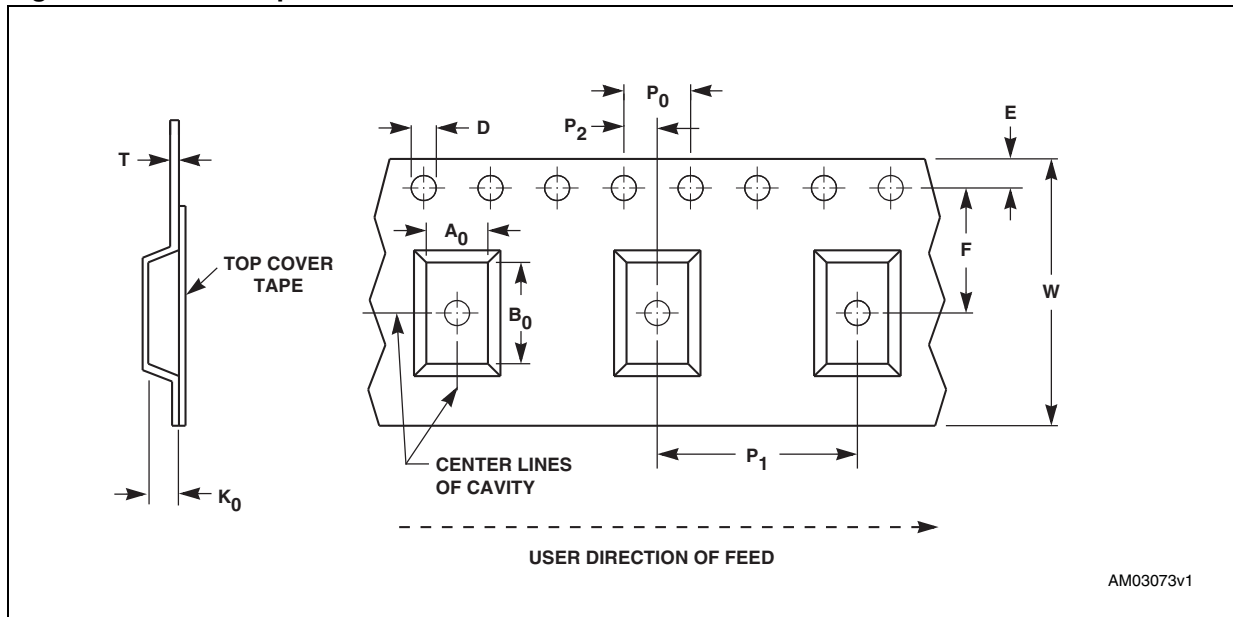
Table 8. SOT23-5 – 5-lead small outline transistor package mechanical data

Symb	mm			inches		
	Min	Typ	Max	Min	Typ	Max
A	—	—	1.45	—	—	0.057
A1	—	—	0.15	—	—	0.006
A2	0.90	1.15	1.30	0.035	0.045	0.051
b	0.30	—	0.50	0.012	—	0.020
C	0.08	—	0.22	0.003	—	0.009
D	—	2.90	—	—	0.114	—
E	—	2.80	—	—	0.110	—
E1	—	1.60	—	—	0.063	—
e	—	0.95	—	—	0.037	—
e1	—	1.90	—	—	0.075	—
L	0.30	0.45	0.60	0.012	0.018	0.024
Q	0°	4°	8°	0°	4°	8°
N	5			5		

Note: Dimensions per JEDEC SOT/SOP product outline MO-178C, variation AA



Figure 30. Carrier tape for SOT23-5L and SOT23-6L



Note: Part pin 1 indicator is on bottom left for shipping method "F" and is on top right for shipping method "R" see Section 7.

Table 10. Carrier tape dimensions for SOT23-5L and SOT23-6L

Package	W	D	E	P <sub>0</sub>	P <sub>2</sub>	F	A <sub>0</sub>	B <sub>0</sub>	K <sub>0</sub>	P <sub>1</sub>	T	Unit	Bulk Qty
SOT23-5 SOT23-6	8.00 +0.30/ -0.10	1.50 +0.10/ -0.00	1.75 ±0.10	4.00 ±0.10	2.00 ±0.10	3.50 ±0.05	3.23 ±0.10	3.17 ±0.10	1.37 ±0.10	4.00 ±0.10	0.254 ±0.013	mm	3000

## 7 Part numbering

**Table 11. Ordering information scheme**

Example:	STM67xx	LT	WY	6	F
<b>Device type</b>					
STM67xx					
<b>Reset thresholds (<math>V_{RST1}</math> and <math>V_{RST2}</math>) for <math>V_{CC1}</math> and <math>V_{CC2}</math></b>					
<b>STM6717/18/19/20/77/78 (<math>V_{RST1}</math> and <math>V_{RST2}</math>)</b>			<b>STM6779/80 (<math>V_{RST1}</math> only)</b>		
Suffix	$V_{RST1}$	$V_{RST2}$	Suffix	$V_{RST1}$	
LT	4.625	3.075	L <sup>(1)</sup>	4.625	
MS	4.375	2.925	T <sup>(1)</sup>	3.075	
MR	4.375	2.625	S <sup>(1)</sup>	2.925	
TZ <sup>(1)</sup>	3.075	2.313	Y <sup>(1)</sup>	2.188	
TW <sup>(1)</sup>	3.075	1.665	V <sup>(1)</sup>	1.575	
TI	3.075	1.388	R-	2.625	
TG <sup>(1)</sup>	3.075	1.110	Z-	2.313	
TK	3.075	0.925			
TE	3.075	0.833			
SY <sup>(1)</sup>	2.925	2.188			
SV <sup>(1)</sup>	2.925	1.575			
SH <sup>(2)</sup>	2.925	1.313			
SF <sup>(1)</sup>	2.925	1.050			
SJ <sup>(3)</sup>	2.925	0.875			
SD <sup>(3)</sup>	2.925	0.788			
YV	2.188	1.575			
YH	2.188	1.313			
YF	2.188	1.050			
YJ	2.188	0.875			
YD	2.188	0.788			
VH	1.575	1.313			
VF	1.575	1.050			
VJ	1.575	0.875			
VD	1.575	0.788			
<b>Reset pulse width</b>					
blank: $t_{rec}$ = 140 ms to 280 ms					
B: $t_{rec}$ = 8.8 ms to 17.6 ms					
G: $t_{rec}$ = 600 ms to 1200 ms					
<b>Package</b>					
WY = SOT23-5					
WB = SOT23-6					
<b>Temperature range</b>					
6 = -40 to 85°C					
<b>Shipping method</b>					
E = ECOPACK <sup>®</sup> package, tubes					
F = ECOPACK <sup>®</sup> package, tape and reel					
R <sup>(4)</sup> = ECOPACK <sup>®</sup> package, tape and reel (pin 1 at top right).					

1. These are standard versions and are typically held in stock. A non-standard version may require a higher minimum volumes, and/or longer delivery times. For other options, or for more information on any aspect of this device, please contact the ST sales office nearest you.
2. Available in STM6719 version only.
3. Available in STM6717 version only.
4. Available for STM6720SY, STM6719SF and STM6719SFB versions only.

STM6717/6718/6719/6720/STM6777/6778/6779/6780

Part numbering

Table 12. Marking description

Part number	V <sub>RST1</sub> threshold (V)	V <sub>RST2</sub> threshold (V)	Topside marking	Bottomside marking
STM6717SD	2.925	0.788	7SD1	PYWW
STM6717SJ	2.925	0.875	7SJ1	PYWW
STM6717SF	2.925	1.050	7SF1	PYWW
STM6717TG	3.075	1.110	7TG1	PYWW
STM6717TGG	3.075	1.110	7TG9	PYWW
STM6717TW	3.075	1.665	7TW1	PYWW
STM6717SV	2.925	1.575	7SV1	PYWW
STM6717SY	2.925	2.188	7SY1	PYWW
STM6717TZ	3.075	2.313	7TZ1	PYWW
STM6718SF	2.925	1.050	7SF2	PYWW
STM6718TG	3.075	1.110	7TG2	PYWW
STM6718TW	3.075	1.665	7TW2	PYWW
STM6718SV	2.925	1.575	7SV2	PYWW
STM6718SY	2.925	2.188	7SY2	PYWW
STM6718TZ	3.075	2.313	7TZ2	PYWW
STM6719SF	2.925	1.050	7SF3	PYWW
STM6719SFB	2.925	1.050	7SFB	PYWW
STM6719TG	3.075	1.110	7TG3	PYWW
STM6719SH	2.925	1.313	7SH3	PYWW
STM6719TW	3.075	1.665	7TW3	PYWW
STM6719SV	2.925	1.575	7SV3	PYWW
STM6719SY	2.925	2.188	7SY3	PYWW
STM6719TZ	3.075	2.313	7TZ3	PYWW
STM6720SF	2.925	1.050	7SF4	PYWW
STM6720TG	3.075	1.110	7TG4	PYWW
STM6720TW	3.075	1.665	7TW4	PYWW
STM6720SV	2.925	1.575	7SV4	PYWW
STM6720SY	2.925	2.188	7SY4	PYWW
STM6720TZ	3.075	2.313	7TZ4	PYWW
STM6777SF	2.925	1.050	7SF5	PYWW
STM6777TG	3.075	1.110	7TG5	PYWW
STM6777TW	3.075	1.665	7TW5	PYWW
STM6777SV	2.925	1.575	7SV5	PYWW
STM6777SY	2.925	2.188	7SY5	PYWW
STM6777TZ	3.075	2.313	7TZ5	PYWW

## Part numbering

## STM6717/6718/6719/6720/STM6777/6778/6779/6780

Table 12. Marking description (continued)

Part number	$V_{RST1}$ threshold (V)	$V_{RST2}$ threshold (V)	Topside marking	Bottomside marking
STM6778SF	2.925	1.050	7SF6	PYWW
STM6778TG	3.075	1.110	7TG6	PYWW
STM6778TW	3.075	1.665	7TW6	PYWW
STM6778SV	2.925	1.575	7SV6	PYWW
STM6778SY	2.925	2.188	7SY6	PYWW
STM6778TZ	3.075	2.313	7TZ6	PYWW
STM6779L	4.625	—	7Lx7	PYWW
STM6779T	3.075	—	7Tx7	PYWW
STM6779S	2.925	—	7Sx7	PYWW
STM6779Y	2.188	—	7Yx7	PYWW
STM6779V	1.575	—	7Vx7	PYWW
STM6780L	4.625	—	7Lx8	PYWW
STM6780T	3.075	—	7Tx8	PYWW
STM6780S	2.925	—	7Sx8	PYWW
STM6780Y	2.188	—	7Yx8	PYWW
STM6780V	1.575	—	7Vx8	PYWW

Note: For topside marking, “7” is the family number, followed by the  $V_{RST1}$  threshold,  $V_{RST2}$  threshold and device number (1,9 = STM6717, 2 = 6718, 3 = 6719, 4 = 6720, 5 = 6777, 6 = 6778, 7 = 6779, 8 = 6780).

For bottomside marking, “P” = assembly site, “Y” = 1-digit year, and “WW” = 2-digit work week.

## 8 Revision history

**Table 13. Document revision history**

Date	Revision	Changes
18-Oct-2004	1	First draft
25-Oct-2004	1.1	Descriptive text, sales types ( <a href="#">Table 11</a> )
14-Jan-2005	1.2	Update characteristics, pin functions ( <a href="#">Table 2</a> )
09-Feb-2005	1.3	Update characteristics ( <a href="#">Figure 9</a> ; <a href="#">Table 3</a> )
08-Apr-2005	1.4	Update characteristics and mechanical dimensions; add table ( <a href="#">Figure 9</a> , <a href="#">10</a> , <a href="#">27</a> , <a href="#">28</a> , <a href="#">29</a> ; <a href="#">Table 4</a> , <a href="#">6</a> , <a href="#">11</a> , <a href="#">8</a> , <a href="#">9</a> )
28-Jul-2005	1.5	Update characteristics, reset delay ( <a href="#">Figure 10</a> , <a href="#">27</a> ; <a href="#">Table 4</a> , <a href="#">6</a> , <a href="#">7</a> , <a href="#">11</a> )
13-Sep-2005	2	Add operating characteristics; update timings, document status, Lead-free text ( <a href="#">Figure 13</a> , <a href="#">14</a> , <a href="#">15</a> , <a href="#">16</a> , <a href="#">17</a> , <a href="#">18</a> , <a href="#">19</a> , <a href="#">20</a> , <a href="#">21</a> , <a href="#">22</a> , <a href="#">23</a> , <a href="#">24</a> , <a href="#">26</a> , <a href="#">27</a> ; <a href="#">Table 11</a> )
07-Oct-2005	3	Marked STM6779/6780 as availability request parts ( <a href="#">Table 1</a> , <a href="#">11</a> )
07-Feb-2007	4	Updated STM6779/6780 availability (cover page, <a href="#">Table 1</a> , <a href="#">11</a> )
12-Jun-2007	5	Updated <a href="#">Table 11</a> , added <a href="#">Table 12: Marking description</a> .
05-Dec-2007	6	Updated cover page, <a href="#">Table 6</a> , <a href="#">11</a> , and <a href="#">12</a> .
22-Mar-2010	7	Updated <a href="#">Features</a> ; <a href="#">Table 6</a> , <a href="#">8</a> , <a href="#">9</a> , <a href="#">11</a> , <a href="#">12</a> ; footnote <a href="#">1</a> of <a href="#">Table 4</a> ; <a href="#">Section 6: Package mechanical data</a> ; added tape and reel specifications ( <a href="#">Figure 30</a> , <a href="#">Table 10</a> , footnote <a href="#">4</a> of <a href="#">Table 11</a> ); reformatted document.
02-Aug-2011	8	Removed footnote from <a href="#">Table 6: DC and AC characteristics</a> .

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