

# ELM76xxxxB CMOS Voltage detector with delay function

## ■ General description

ELM76xxxxB is CMOS voltage detector IC with delay function; external capacitor is unnecessary for the delay time circuit. There are 4 types of delay time selection of ELM76series: Typ.250ms, Typ.500ms, Typ.150ms, Typ.50ms. The output pin of ELM76series is only available in CMOS. Two output logic modes are available, RESET and  $\overline{\text{RESET}}$ . The output level is very high for RESET mode and low for  $\overline{\text{RESET}}$  mode when Vdd is lower than detection voltage. The standard detection voltages are 2.2V, 3.0V, 4.8V and ELM76 series can also be made as semi-custom ICs within the range of 1.9V~4.8V by 0.1V step.

## ■ Features

- Detection voltage range : 1.9V~4.8V (by 0.1V)
- Low current consumption : Typ. 7  $\mu$ A
- Accuracy of detection voltage :  $\pm 2.0\%$
- Delay time after Vdd recovery : Typ. 250ms, Typ. 500ms  
Typ. 150ms, Typ. 50ms
- Hysteresis voltage : Typ. Vdetn  $\times$  1.04
- Package : SOT-23

## ■ Application

- Reset for microcomputers
- Voltage power shortage detectors
- Switch of back-up power source
- Battery checkers

## ■ Maximum absolute ratings

Parameter	Symbol	Limit	Unit
Power supply voltage	Vdd	10	V
Output voltage	Vout	Vss-0.3~Vdd+0.3	V
Output current	Iout	20	mA
Power dissipation	Pd	200	mW
Operating temperature	Top	-40~+85	$^{\circ}$ C
Storage temperature	Tstg	-55~+125	$^{\circ}$ C

## ■ Selection guide

### ELM76xxxxB-x

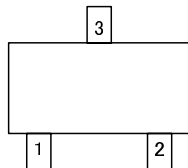
Symbol		
a,b	Detection voltage	e.g. : 22: Vdetn=2.2V 30: Vdetn=3.0V 48: Vdetn=4.8V
c	Output mode	L : $\overline{\text{RESET}}$ output mode H : RESET output mode
d	Delay time	A : Typ.250ms, B : Typ.500ms C : Typ.150ms, D : Typ.50ms
e	Product version	B
f	Taping direction	S : Refer to PKG file N : Refer to PKG file

ELM76 x x x x B - x  
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 a b c d e f

# ELM76xxxxB CMOS Voltage detector with delay function

## Pin configuration

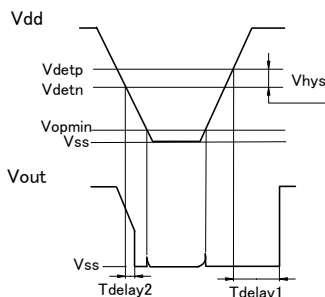
SOT-23 (TOP VIEW)



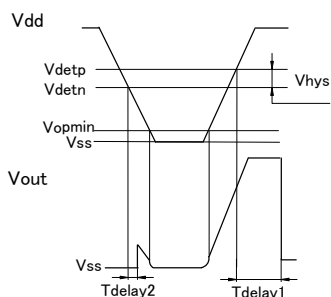
Pin No.	Pin name
1	VSS
2	OUT
3	VDD

## Timing chart

$\overline{\text{RESET}}$  output logic



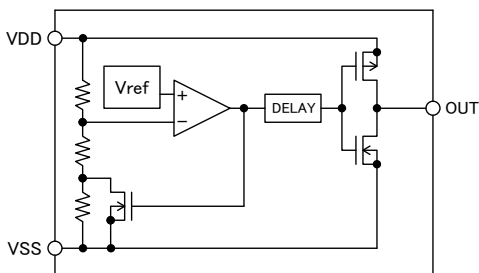
RESET output logic



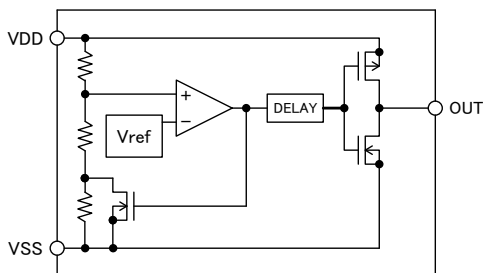
- For  $\overline{\text{RESET}}$ (ELM76xxLxB) output logic products, ELM recommends to make the rising rate of Vdd slower than  $10\text{V}/\mu\text{s}$ , or to install a capacitor larger than  $0.001\mu\text{F}$  between VSS and OUT terminals.

## Block diagram

$\overline{\text{RESET}}$  output logic



RESET output logic



# ELM76xxxxB CMOS Voltage detector with delay function

## ■ Electrical characteristics

Vdetn=2.2V (ELM7622xxB)

Top=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Detection voltage	Vdetn		2.156	2.200	2.244	V	2
Hysteresis width	Vhys		Vdetn ×0.02	Vdetn ×0.03	Vdetn ×0.06	V	2
Current consumption	I <sub>ss</sub>	Vdd=3.0V		7.0	14.0	μA	1
Power voltage	Vdd		1.000		6.000	V	2
RESET output current	Ioutn	Vdd=1.0V, Vds=0.3V	0.05	0.17		mA	3-(1)
		Vdd=2.0V, Vds=0.4V	1.5	3.2			
	Ioutp	Vdd=3.0V, Vds=0.4V	0.4	1.0			3-(2)
RESET output current	Ioutn	Vdd=3.0V, Vds=0.4V	2.5	5.5		mA	3-(1)
	Ioutp	Vdd=2.0V, Vds=0.4V	0.2	0.6			3-(2)
Delay time(50ms)	Tdelay1	Vdd=1.0V~3.0V	40	50	60	ms	4
	Tdelay2	Vdd=3.0V~1.0V		10		μs	
Delay time(150ms)	Tdelay1	Vdd=1.0V~3.0V	120	150	180	ms	4
	Tdelay2	Vdd=3.0V~1.0V		10		μs	
Delay time(250ms)	Tdelay1	Vdd=1.0V~3.0V	200	250	300	ms	4
	Tdelay2	Vdd=3.0V~1.0V		10		μs	
Delay time(500ms)	Tdelay1	Vdd=1.0V~3.0V	400	500	600	ms	4
	Tdelay2	Vdd=3.0V~1.0V		10		μs	
Temperature characteristic of Vdetn	$\frac{\Delta V_{detn}}{\Delta Top}$	Top=-40~+85°C		+100		ppm/°C	

\* Note : test circuit No.

Vdetn=2.4V (ELM7624xxB)

Top=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Detection voltage	Vdetn		2.352	2.400	2.448	V	2
Hysteresis width	Vhys		Vdetn ×0.02	Vdetn ×0.035	Vdetn ×0.06	V	2
Current consumption	I <sub>ss</sub>	Vdd=3.0V		7.0	14.0	μA	1
Power voltage	Vdd		1.000		6.000	V	2
RESET output current	Ioutn	Vdd=1.0V, Vds=0.3V	0.05	0.17		mA	3-(1)
		Vdd=2.0V, Vds=0.4V	1.5	3.2			
	Ioutp	Vdd=3.0V, Vds=0.4V	0.4	1.0			3-(2)
RESET output current	Ioutn	Vdd=3.0V, Vds=0.4V	2.5	5.5		mA	3-(1)
	Ioutp	Vdd=2.0V, Vds=0.4V	0.2	0.6			3-(2)
Delay time(50ms)	Tdelay1	Vdd=1.0V~3.0V	40	50	60	ms	4
	Tdelay2	Vdd=3.0V~1.0V		10		μs	
Delay time(150ms)	Tdelay1	Vdd=1.0V~3.0V	120	150	180	ms	4
	Tdelay2	Vdd=3.0V~1.0V		10		μs	
Delay time(250ms)	Tdelay1	Vdd=1.0V~3.0V	200	250	300	ms	4
	Tdelay2	Vdd=3.0V~1.0V		10		μs	
Delay time(500ms)	Tdelay1	Vdd=1.0V~3.0V	400	500	600	ms	4
	Tdelay2	Vdd=3.0V~1.0V		10		μs	
Temperature characteristic of Vdetn	$\frac{\Delta V_{detn}}{\Delta Top}$	Top=-40~+85°C		+100		ppm/°C	

\* Note : test circuit No.

# ELM76xxxxB CMOS Voltage detector with delay function

Vdetn=2.6V (ELM7626xxB)

Top=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Detection voltage	Vdetn		2.548	2.600	2.652	V	2
Hysteresis width	Vhys		Vdetn ×0.02	Vdetn ×0.035	Vdetn ×0.06	V	2
Current consumption	I <sub>ss</sub>	Vdd=3.0V		7.0	14.0	μA	1
Power voltage	Vdd		1.000		6.000	V	2
RESET output current	Ioutn	Vdd=1.0V, Vds=0.3V	0.05	0.17		mA	3-(1)
		Vdd=2.0V, Vds=0.4V	1.5	3.2			
RESET output current	Ioutp	Vdd=3.0V, Vds=0.4V	0.4	1.0		mA	3-(2)
		Vdd=3.0V, Vds=0.4V	2.5	5.5			
RESET output current	Ioutn	Vdd=2.0V, Vds=0.4V	0.2	0.6		mA	3-(2)
		Vdd=2.0V, Vds=0.4V	2.5	5.5			
Delay time(50ms)	Tdelay1	Vdd=1.0V~3.0V	40	50	60	ms	4
		Vdd=3.0V~1.0V		10		μs	
Delay time(150ms)	Tdelay1	Vdd=1.0V~3.0V	120	150	180	ms	4
		Vdd=3.0V~1.0V		10		μs	
Delay time(250ms)	Tdelay1	Vdd=1.0V~3.0V	200	250	300	ms	4
		Vdd=3.0V~1.0V		10		μs	
Delay time(500ms)	Tdelay1	Vdd=1.0V~3.0V	400	500	600	ms	4
		Vdd=3.0V~1.0V		10		μs	
Temperature characteristic of Vdetn	$\frac{\Delta V_{detn}}{\Delta Top}$	Top=-40~+85°C		+100		ppm/°C	

\* Note : test circuit No.

Vdetn=2.9V (ELM7629xxB)

Top=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Detection voltage	Vdetn		2.842	2.900	2.958	V	2
Hysteresis width	Vhys		Vdetn ×0.02	Vdetn ×0.04	Vdetn ×0.06	V	2
Current consumption	I <sub>ss</sub>	Vdd=4.5V		7.0	14.0	μA	1
Power voltage	Vdd		1.000		6.000	V	2
RESET output current	Ioutn	Vdd=1.0V, Vds=0.3V	0.05	0.17		mA	3-(1)
		Vdd=2.0V, Vds=0.4V	1.5	3.2			
RESET output current	Ioutp	Vdd=4.5V, Vds=0.4V	0.6	1.5		mA	3-(2)
		Vdd=4.5V, Vds=0.4V	3.5	8.0			
RESET output current	Ioutn	Vdd=2.0V, Vds=0.4V	0.2	0.6		mA	3-(2)
		Vdd=2.0V, Vds=0.4V	3.5	8.0			
Delay time(50ms)	Tdelay1	Vdd=1.0V~4.5V	40	50	60	ms	4
		Vdd=4.5V~1.0V		10		μs	
Delay time(150ms)	Tdelay1	Vdd=1.0V~4.5V	120	150	180	ms	4
		Vdd=4.5V~1.0V		10		μs	
Delay time(250ms)	Tdelay1	Vdd=1.0V~4.5V	200	250	300	ms	4
		Vdd=4.5V~1.0V		10		μs	
Delay time(500ms)	Tdelay1	Vdd=1.0V~4.5V	400	500	600	ms	4
		Vdd=4.5V~1.0V		10		μs	
Temperature characteristic of Vdetn	$\frac{\Delta V_{detn}}{\Delta Top}$	Top=-40~+85°C		+100		ppm/°C	

\* Note : test circuit No.

# ELM76xxxxB CMOS Voltage detector with delay function

Vdetn=3.0V (ELM7630xxB)

Top=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Detection voltage	Vdetn		2.940	3.000	3.060	V	2
Hysteresis width	Vhys		Vdetn ×0.02	Vdetn ×0.04	Vdetn ×0.06	V	2
Current consumption	I <sub>ss</sub>	V <sub>dd</sub> =4.5V		7.0	14.0	μA	1
Power voltage	V <sub>dd</sub>		1.000		6.000	V	2
RESET output current	I <sub>outn</sub>	V <sub>dd</sub> =1.0V, V <sub>ds</sub> =0.3V	0.05	0.17		mA	3-(1)
		V <sub>dd</sub> =2.0V, V <sub>ds</sub> =0.4V	1.5	3.2			
RESET output current	I <sub>outp</sub>	V <sub>dd</sub> =4.5V, V <sub>ds</sub> =0.4V	0.6	1.5		mA	3-(2)
		V <sub>dd</sub> =2.0V, V <sub>ds</sub> =0.4V	0.2	0.6			
Delay time(50ms)	T <sub>delay1</sub>	V <sub>dd</sub> =1.0V~4.5V	40	50	60	ms	4
		T <sub>delay2</sub>	V <sub>dd</sub> =4.5V~1.0V		10		
Delay time(150ms)	T <sub>delay1</sub>	V <sub>dd</sub> =1.0V~4.5V	120	150	180	ms	4
		T <sub>delay2</sub>	V <sub>dd</sub> =4.5V~1.0V		10		
Delay time(250ms)	T <sub>delay1</sub>	V <sub>dd</sub> =1.0V~4.5V	200	250	300	ms	4
		T <sub>delay2</sub>	V <sub>dd</sub> =4.5V~1.0V		10		
Delay time(500ms)	T <sub>delay1</sub>	V <sub>dd</sub> =1.0V~4.5V	400	500	600	ms	4
		T <sub>delay2</sub>	V <sub>dd</sub> =4.5V~1.0V		10		
Temperature characteristic of Vdetn	$\frac{\Delta V_{detn}}{\Delta Top}$	Top=-40~+85°C		+100		ppm/°C	

\* Note : test circuit No.

Vdetn=3.4V (ELM7634xxB)

Top=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Detection voltage	Vdetn		3.332	3.400	3.468	V	2
Hysteresis width	Vhys		Vdetn ×0.02	Vdetn ×0.04	Vdetn ×0.06	V	2
Current consumption	I <sub>ss</sub>	V <sub>dd</sub> =4.5V		7.0	14.0	μA	1
Power voltage	V <sub>dd</sub>		1.000		6.000	V	2
RESET output current	I <sub>outn</sub>	V <sub>dd</sub> =1.0V, V <sub>ds</sub> =0.3V	0.05	0.17		mA	3-(1)
		V <sub>dd</sub> =2.0V, V <sub>ds</sub> =0.4V	1.5	3.2			
RESET output current	I <sub>outp</sub>	V <sub>dd</sub> =4.5V, V <sub>ds</sub> =0.4V	0.6	1.5		mA	3-(2)
		V <sub>dd</sub> =2.0V, V <sub>ds</sub> =0.4V	0.2	0.6			
Delay time(50ms)	T <sub>delay1</sub>	V <sub>dd</sub> =1.0V~4.5V	40	50	60	ms	4
		T <sub>delay2</sub>	V <sub>dd</sub> =4.5V~1.0V		10		
Delay time(150ms)	T <sub>delay1</sub>	V <sub>dd</sub> =1.0V~4.5V	120	150	180	ms	4
		T <sub>delay2</sub>	V <sub>dd</sub> =4.5V~1.0V		10		
Delay time(250ms)	T <sub>delay1</sub>	V <sub>dd</sub> =1.0V~4.5V	200	250	300	ms	4
		T <sub>delay2</sub>	V <sub>dd</sub> =4.5V~1.0V		10		
Delay time(500ms)	T <sub>delay1</sub>	V <sub>dd</sub> =1.0V~4.5V	400	500	600	ms	4
		T <sub>delay2</sub>	V <sub>dd</sub> =4.5V~1.0V		10		
Temperature characteristic of Vdetn	$\frac{\Delta V_{detn}}{\Delta Top}$	Top=-40~+85°C		+100		ppm/°C	

\* Note : test circuit No.

# ELM76xxxxB CMOS Voltage detector with delay function

Vdetn=4.0V (ELM7640xxB)

Top=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Detection voltage	Vdetn		3.920	4.000	4.080	V	2
Hysteresis width	Vhys		Vdetn ×0.02	Vdetn ×0.04	Vdetn ×0.06	V	2
Current consumption	I <sub>ss</sub>	Vdd=4.5V		7.0	14.0	μA	1
Power voltage	Vdd		1.000		6.000	V	2
RESET output current	Ioutn	Vdd=1.0V, Vds=0.3V	0.05	0.17		mA	3-(1)
		Vdd=2.0V, Vds=0.4V	1.5	3.2			
RESET output current	Ioutp	Vdd=4.5V, Vds=0.4V	0.6	1.5		mA	3-(2)
		Vdd=4.5V, Vds=0.4V	3.5	8.0			
RESET output current	Ioutp	Vdd=2.0V, Vds=0.4V	0.2	0.6		mA	3-(2)
		Vdd=4.5V, Vds=0.4V	3.5	8.0			
Delay time(50ms)	Tdelay1	Vdd=1.0V~4.5V	40	50	60	ms	4
	Tdelay2	Vdd=4.5V~1.0V		10		μs	
Delay time(150ms)	Tdelay1	Vdd=1.0V~4.5V	120	150	180	ms	4
	Tdelay2	Vdd=4.5V~1.0V		10		μs	
Delay time(250ms)	Tdelay1	Vdd=1.0V~4.5V	200	250	300	ms	4
	Tdelay2	Vdd=4.5V~1.0V		10		μs	
Delay time(500ms)	Tdelay1	Vdd=1.0V~4.5V	400	500	600	ms	4
	Tdelay2	Vdd=4.5V~1.0V		10		μs	
Temperature characteristic of Vdetn	$\frac{\Delta V_{detn}}{\Delta Top}$	Top=-40~+85°C		+100		ppm/°C	

\* Note : test circuit No.

Vdetn=4.4V (ELM7644xxB)

Top=25°C

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Detection voltage	Vdetn		4.312	4.400	4.488	V	2
Hysteresis width	Vhys		Vdetn ×0.02	Vdetn ×0.045	Vdetn ×0.06	V	2
Current consumption	I <sub>ss</sub>	Vdd=6.0V		7.0	14.0	μA	1
Power voltage	Vdd		1.000		6.000	V	2
RESET output current	Ioutn	Vdd=1.0V, Vds=0.3V	0.05	0.17		mA	3-(1)
		Vdd=2.0V, Vds=0.4V	1.5	3.2			
RESET output current	Ioutp	Vdd=6.0V, Vds=0.4V	0.8	2.0		mA	3-(2)
		Vdd=6.0V, Vds=0.4V	5	11			
Delay time(50ms)	Tdelay1	Vdd=1.0V~6.0V	40	50	60	ms	4
	Tdelay2	Vdd=6.0V~1.0V		10		μs	
Delay time(150ms)	Tdelay1	Vdd=1.0V~6.0V	120	150	180	ms	4
	Tdelay2	Vdd=6.0V~1.0V		10		μs	
Delay time(250ms)	Tdelay1	Vdd=1.0V~6.0V	200	250	300	ms	4
	Tdelay2	Vdd=6.0V~1.0V		10		μs	
Delay time(500ms)	Tdelay1	Vdd=1.0V~6.0V	400	500	600	ms	4
	Tdelay2	Vdd=6.0V~1.0V		10		μs	
Temperature characteristic of Vdetn	$\frac{\Delta V_{detn}}{\Delta Top}$	Top=-40~+85°C		+100		ppm/°C	

\* Note : test circuit No.

# ELM76xxxxB CMOS Voltage detector with delay function

Vdetn=4.8V (ELM7648xxB)

Top=25°C

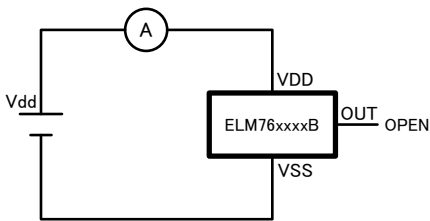
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Detection voltage	Vdetn		4.704	4.800	4.896	V	2
Hysteresis width	Vhys		Vdetn ×0.02	Vdetn ×0.05	Vdetn ×0.06	V	2
Current consumption	I <sub>ss</sub>	V <sub>dd</sub> =6.0V		7.0	14.0	μA	1
Power voltage	V <sub>dd</sub>		1.000		6.000	V	2
RESET output current	I <sub>outn</sub>	V <sub>dd</sub> =1.0V, V <sub>ds</sub> =0.3V	0.05	0.17		mA	3-(1)
		V <sub>dd</sub> =2.0V, V <sub>ds</sub> =0.4V	1.5	3.2			
RESET output current	I <sub>outp</sub>	V <sub>dd</sub> =6.0V, V <sub>ds</sub> =0.4V	0.8	2.0		mA	3-(2)
	I <sub>outn</sub>	V <sub>dd</sub> =6.0V, V <sub>ds</sub> =0.4V	5.0	11.0			
RESET output current	I <sub>outp</sub>	V <sub>dd</sub> =2.0V, V <sub>ds</sub> =0.4V	0.2	0.6		mA	3-(2)
	I <sub>outn</sub>	V <sub>dd</sub> =2.0V, V <sub>ds</sub> =0.4V	0.2	0.6			
Delay time(50ms)	T <sub>delay1</sub>	V <sub>dd</sub> =1.0V~6.0V	40	50	60	ms	4
	T <sub>delay2</sub>	V <sub>dd</sub> =6.0V~1.0V		10		μs	
Delay time(150ms)	T <sub>delay1</sub>	V <sub>dd</sub> =1.0V~6.0V	120	150	180	ms	4
	T <sub>delay2</sub>	V <sub>dd</sub> =6.0V~1.0V		10		μs	
Delay time(250ms)	T <sub>delay1</sub>	V <sub>dd</sub> =1.0V~6.0V	200	250	300	ms	4
	T <sub>delay2</sub>	V <sub>dd</sub> =6.0V~1.0V		10		μs	
Delay time(500ms)	T <sub>delay1</sub>	V <sub>dd</sub> =1.0V~6.0V	400	500	600	ms	4
	T <sub>delay2</sub>	V <sub>dd</sub> =6.0V~1.0V		10		μs	
Temperature characteristic of Vdetn	$\frac{\Delta V_{detn}}{\Delta Top}$	Top=-40~+85°C		+100		ppm/°C	

\* Note : test circuit No.

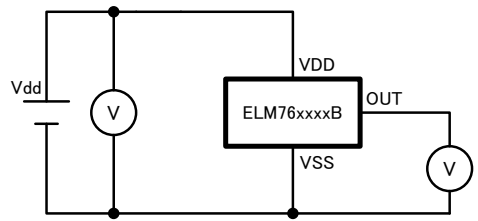
# ELM76xxxxB CMOS Voltage detector with delay function

## ■ Test circuits

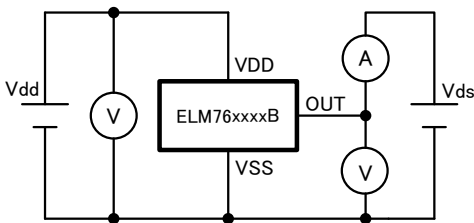
### 1) Current consumption



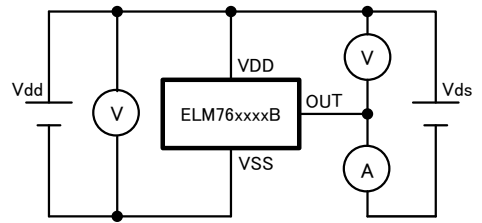
### 2) Detection voltage



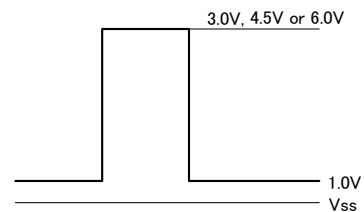
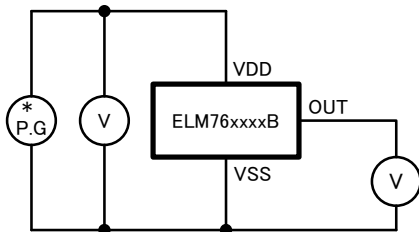
### 3)-(1) Output current (N-ch)



### 3)-(2) Output current (P-ch)



### 4) Delay time



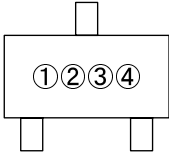
\* Input pulse



# ELM76xxxxB CMOS Voltage detector with delay function

## ■ Marking

SOT-23



Delay time : 250ms, 500ms, 150ms

No. ① : the integer digit of detection voltage

Mark	Vdetn (H: RESET)	Delay time	Mark	Vdetn (L: RESET)	Delay time
1	1.*V	250ms	2	1.*V	250ms
H	2.*V		L	2.*V	
J	3.*V		M	3.*V	
K	4.*V		N	4.*V	
3	1.*V	500ms	4	1.*V	500ms
F	2.*V		V	2.*V	
G	3.*V		W	3.*V	
Q	4.*V		Y	4.*V	
5	1.*V	150ms	6	1.*V	150ms
P	2.*V		U	2.*V	
S	3.*V		R	3.*V	
T	4.*V		Z	4.*V	

No. ② : the decimal digit of detection voltage

Mark	Vdetn	Mark	Vdetn
0	*.0V	5	*.5V
1	*.1V	6	*.6V
2	*.2V	7	*.7V
3	*.3V	8	*.8V
4	*.4V	9	*.9V

No. ③ : Assembly lot No. 0~9

No. ④ : Assembly lot No. A~Z (I, O, X excepted)

Delay time : 50ms

No. ① : the integer digit of detection voltage

Mark	Vdetn (H: RESET)	Mark	Vdetn (L: RESET)
J	1.*V	E	1.*V
K	2.*V	F	2.*V
L	3.*V	G	3.*V
M	4.*V	H	4.*V

No. ② : the decimal digit of detection voltage

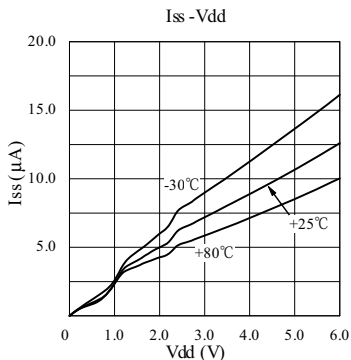
Mark	Vdetn	Mark	Vdetn
A	*.0V	F	*.5V
B	*.1V	G	*.6V
C	*.2V	H	*.7V
D	*.3V	J	*.8V
E	*.4V	K	*.9V

No. ③ : Assembly lot No. A~F

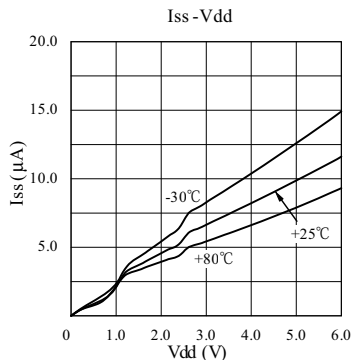
No. ④ : Assembly lot No. A~Z (I, O, X excepted)

## Current consumption characteristics

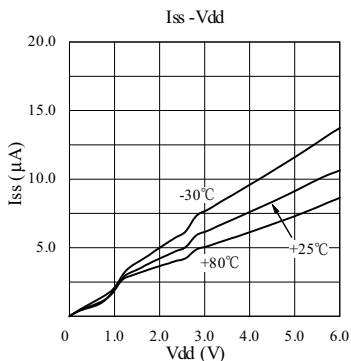
- Vdetn=2.2V (ELM7622xxB)



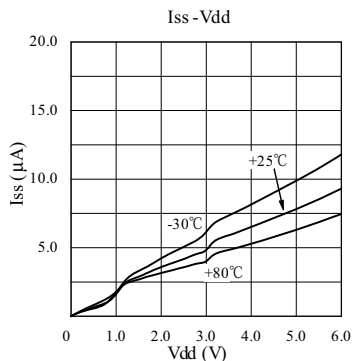
- Vdetn=2.4V (ELM7624xxB)



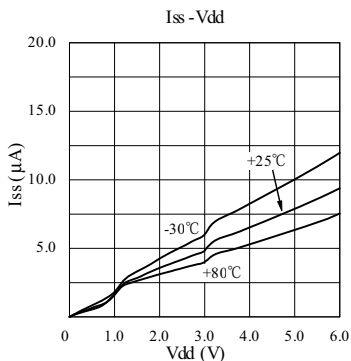
- Vdetn=2.6V (ELM7626xxB)



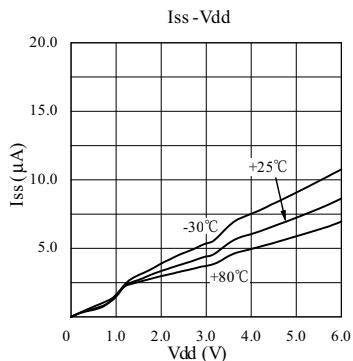
- Vdetn=2.9V (ELM7629xxB)



- Vdetn=3.0V (ELM7630xxB)

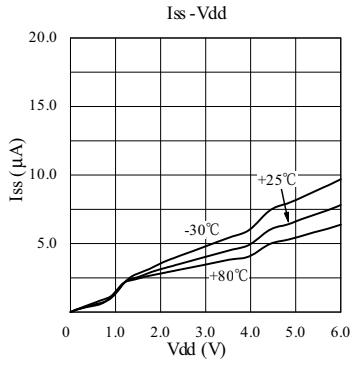


- Vdetn=3.4V (ELM7634xxB)

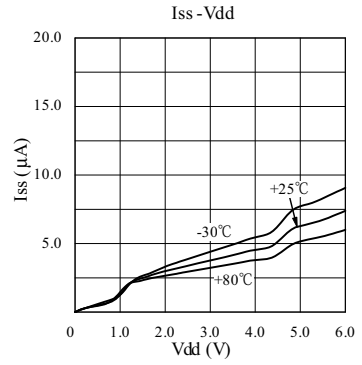


# ELM76xxxxB CMOS Voltage detector with delay function

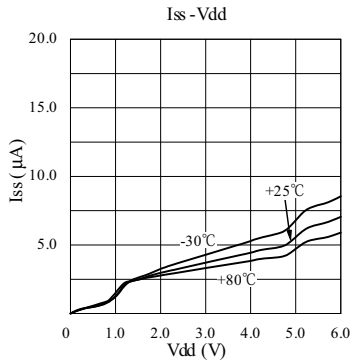
- Vdetn=4.0V (ELM7640xxB)



- Vdetn=4.4V (ELM7644xxB)

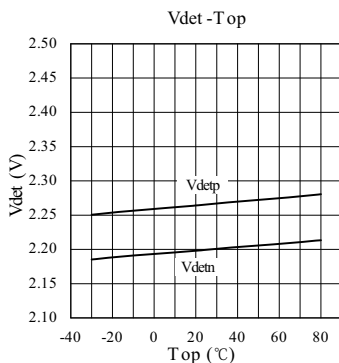


- Vdetn=4.8V (ELM7648xxB)

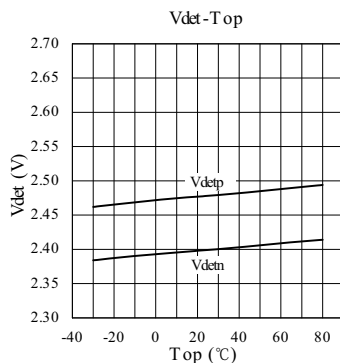


## ■ Detection voltage characteristics

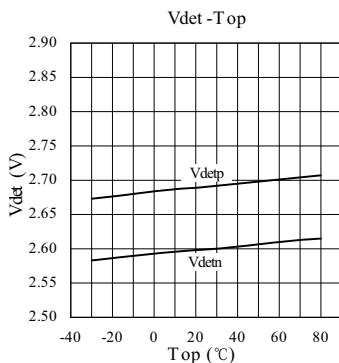
- Vdetn=2.2V (ELM7622xxB)



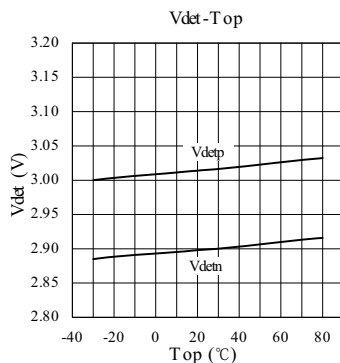
- Vdetn=2.4V (ELM7624xxB)



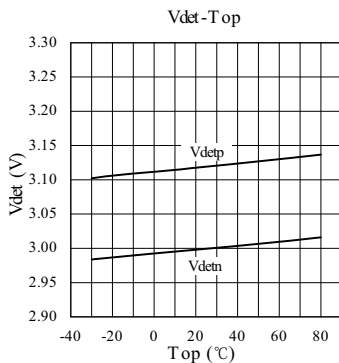
- Vdetn=2.6V (ELM7626xxB)



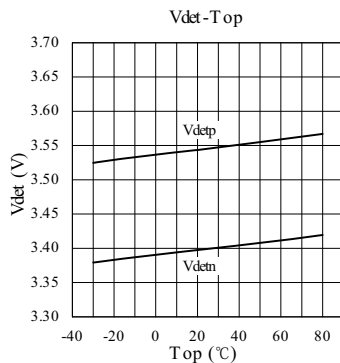
- Vdetn=2.9V (ELM7629xxB)



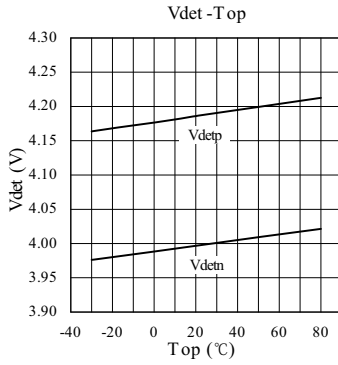
- Vdetn=3.0V (ELM7630xxB)



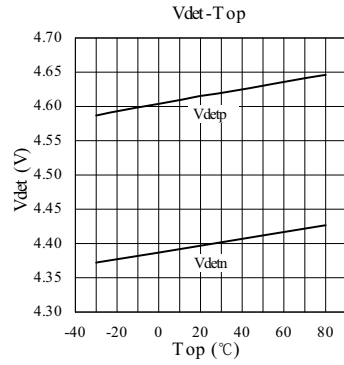
- Vdetn=3.4V (ELM7634xxB)



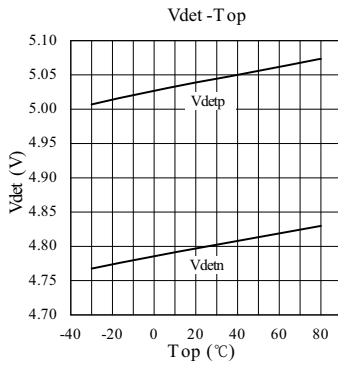
- Vdetn=4.0V (ELM7640xxB)



- Vdetn=4.4V (ELM7644xxB)

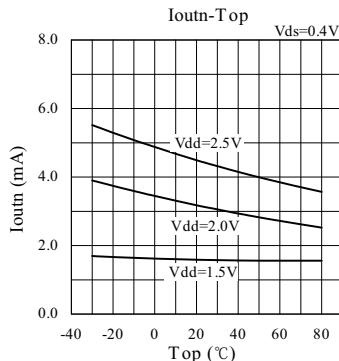
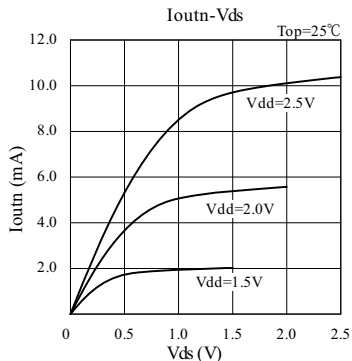
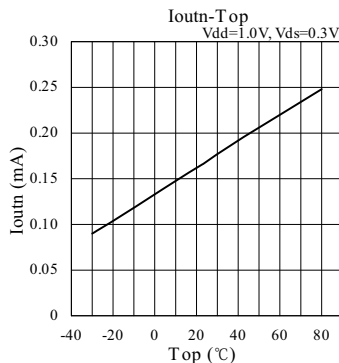
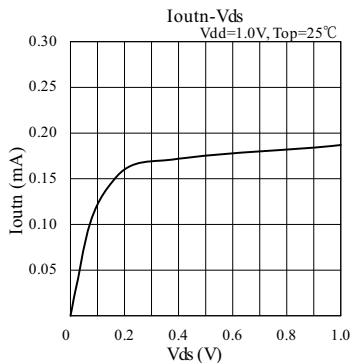


- Vdetn=4.8V (ELM7648xxB)

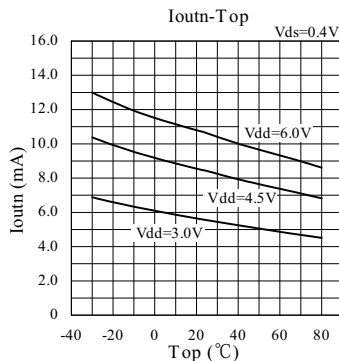
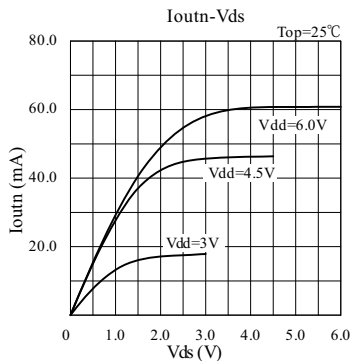


## ■ N-ch output current characteristics

- ELM76xxLxB

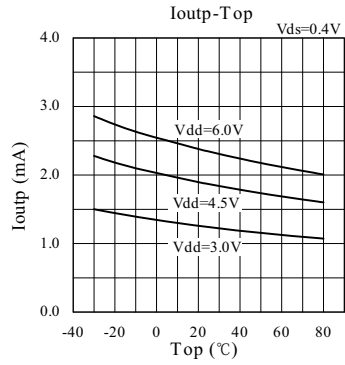
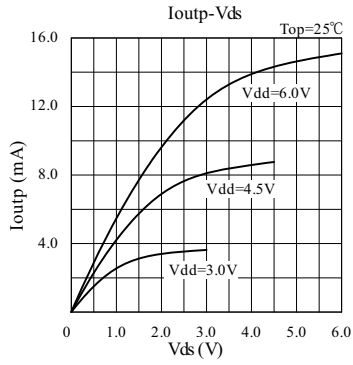


- ELM76xxHxB

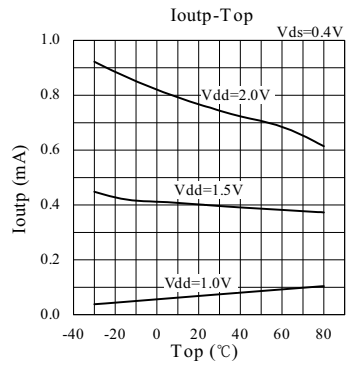
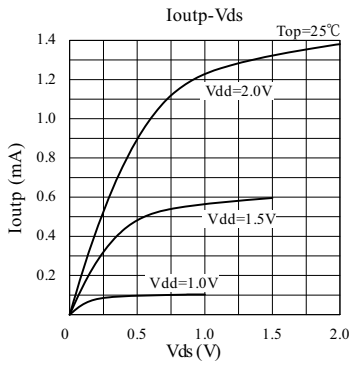


## ■ P-ch output current characteristics

- ELM76xxLxB

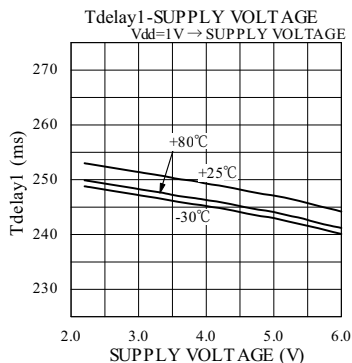
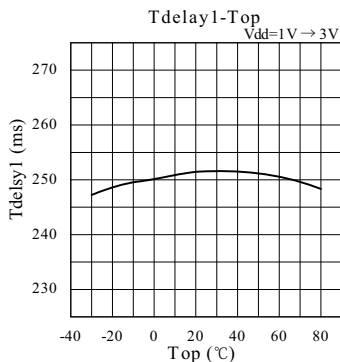


- ELM76xxHxB

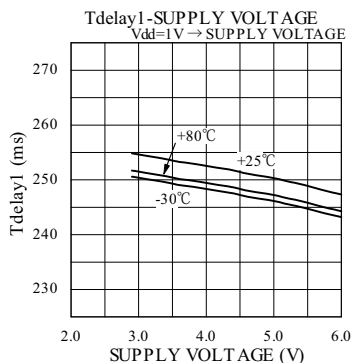
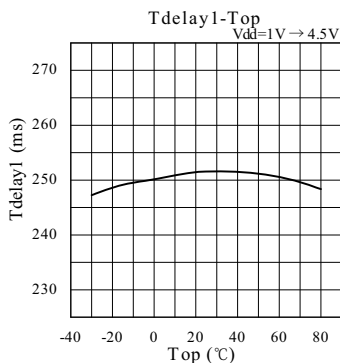


## ■ Delay time characteristics (Tdelay1)

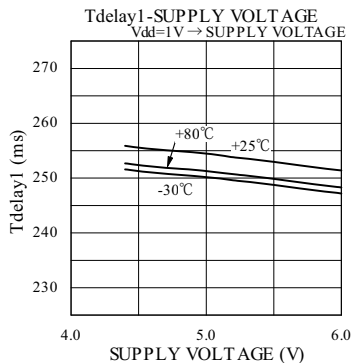
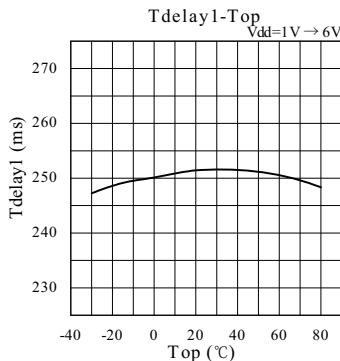
- Vdetn=2.2V, Vdetn=2.4V, Vdetn=2.6V (delay time : 250ms)



- Vdetn=2.9V, Vdetn=3.0V, Vdetn=3.4V, Vdetn=4.0V (delay time : 250ms)

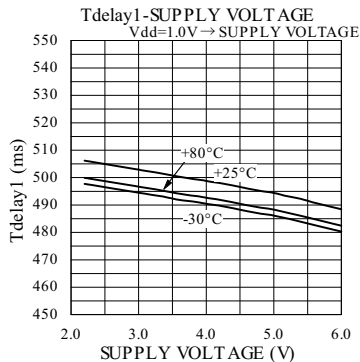
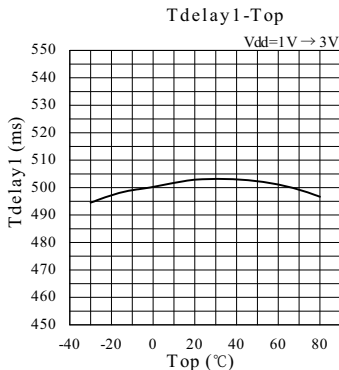


- Vdetn=4.4V, Vdetn=4.8V (delay time : 250ms)

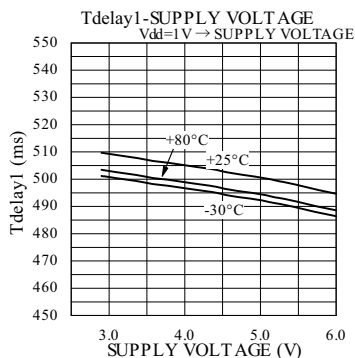
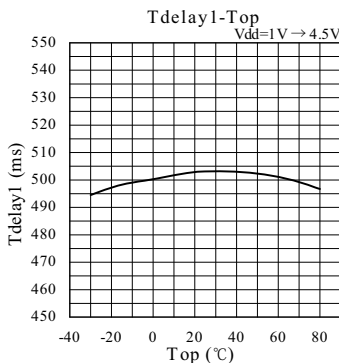




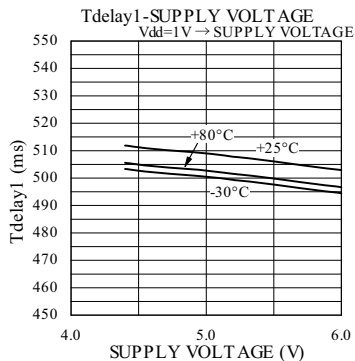
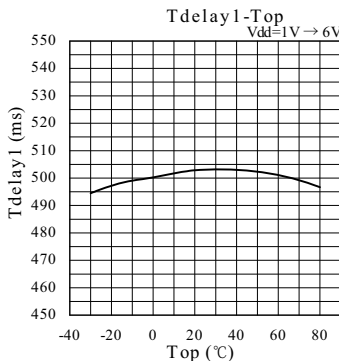
- Vdetn=2.2V, Vdetn=2.4V, Vdetn=2.6V (delay time : 500ms)



- Vdetn=2.9V, Vdetn=3.0V, Vdetn=3.4V, Vdetn=4.0V (delay time : 500ms)

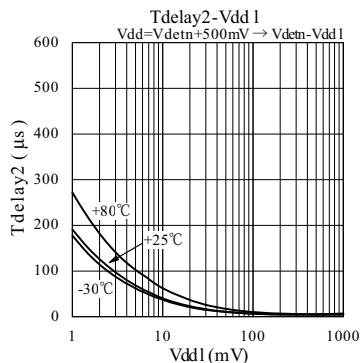
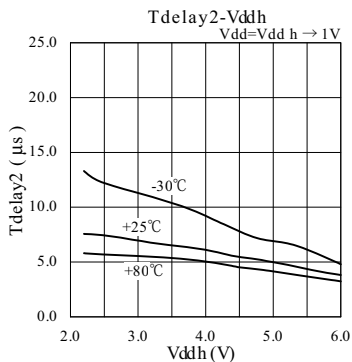


- Vdetn=4.4V, Vdetn=4.8V (delay time : 500ms)

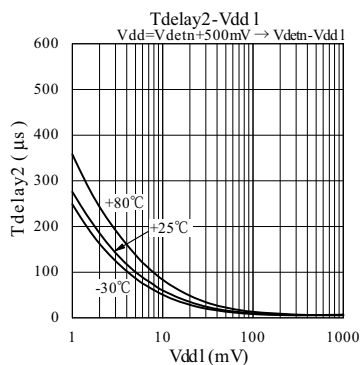
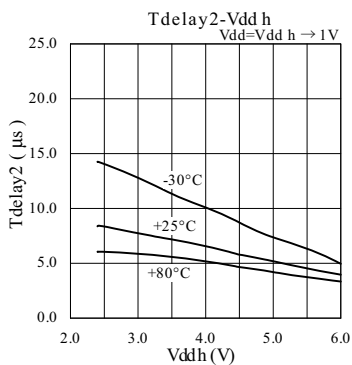


## ■ Delay time characteristics (Tdelay2)

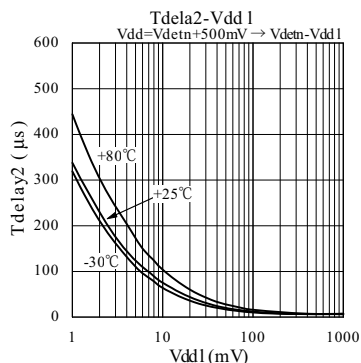
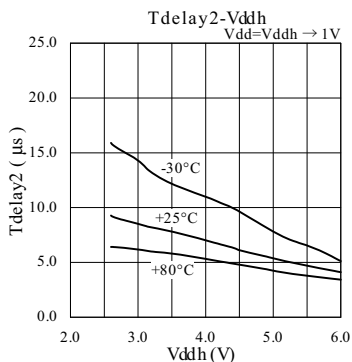
- Vdetn=2.2V (ELM7622xxB)



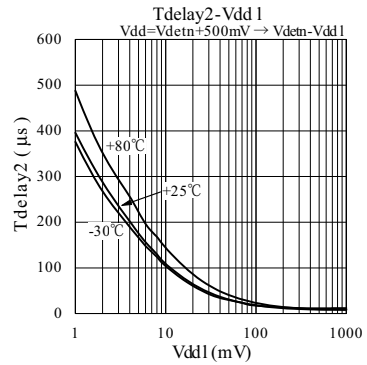
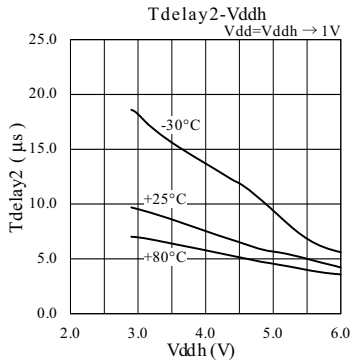
- Vdetn=2.4V (ELM7624xxB)



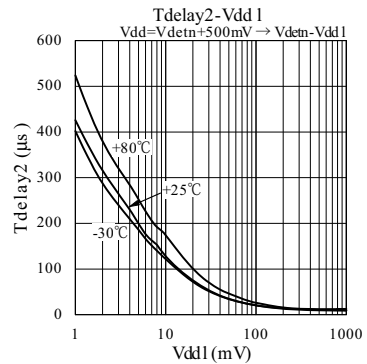
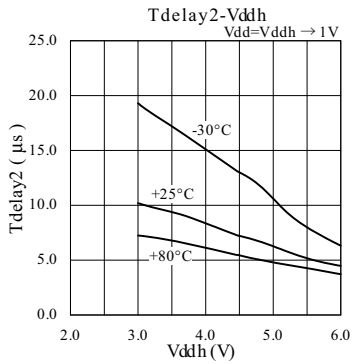
- Vdetn=2.6V (ELM7626xxB)



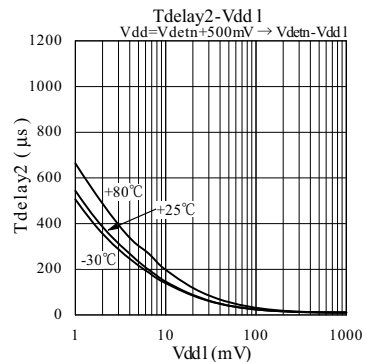
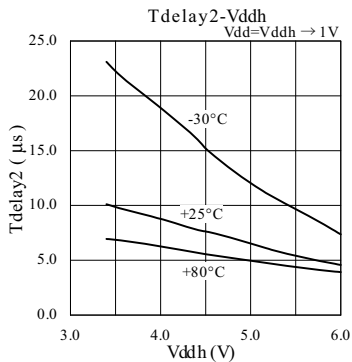
- $V_{detn}=2.9V$  (ELM7629xxB)



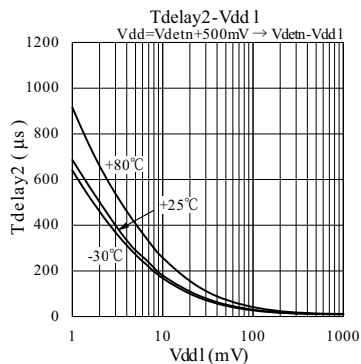
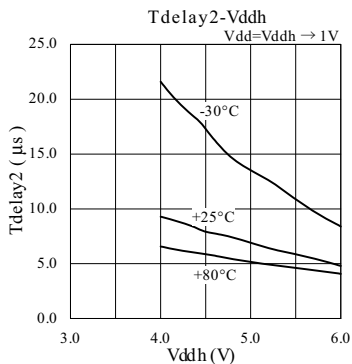
- $V_{detn}=3.0V$  (ELM7630xxB)



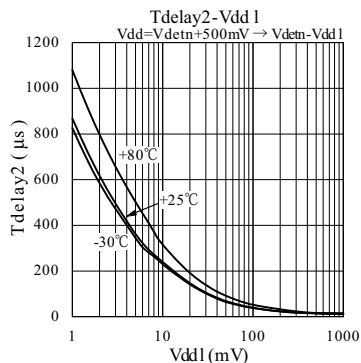
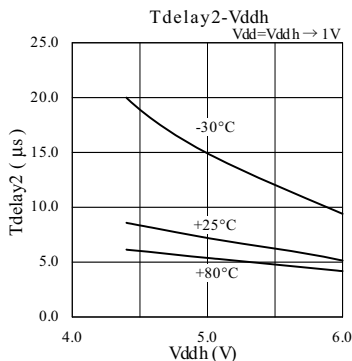
- $V_{detn}=3.4V$  (ELM7634xxB)



- $V_{detn}=4.0V$  (ELM7640xxB)



- $V_{detn}=4.4V$  (ELM7644xxB)



- $V_{detn}=4.8V$  (ELM7648xxB)

