

IC for CMOS System Reset Monolithic IC PST37XXU Series

July 13, 2001

Outline

This CMOS output type system reset IC, developed using the CMOS. Super low consumption current of 1.0μA typ. (PST3709 ~ PST3719) has been achieved through use of the CMOS process. Also, detection voltage is high precision detection of ±2%.

Features

- | | |
|-------------------------------------|---|
| 1. Super low consumption current | 1.0μA typ. (when $V_{DD} = (-V_{DET}) + 2.0V$) PST3709 ~ PST3719 |
| 2. High precision detection voltage | ±2% |
| 3. Operating range | 0.7 ~ 10V |
| 4. Wide operating temperature range | -30 ~ +85°C |
| 5. Detection voltage | 0.9 ~ 6.0V (0.1V step) |

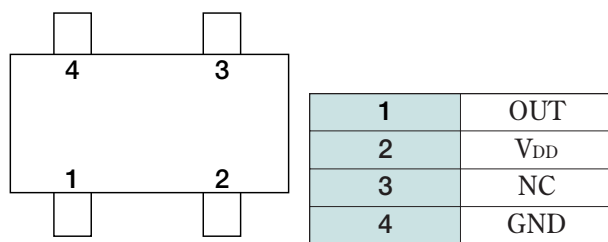
Package

SC-82ABA, SC-82ABB

Applications

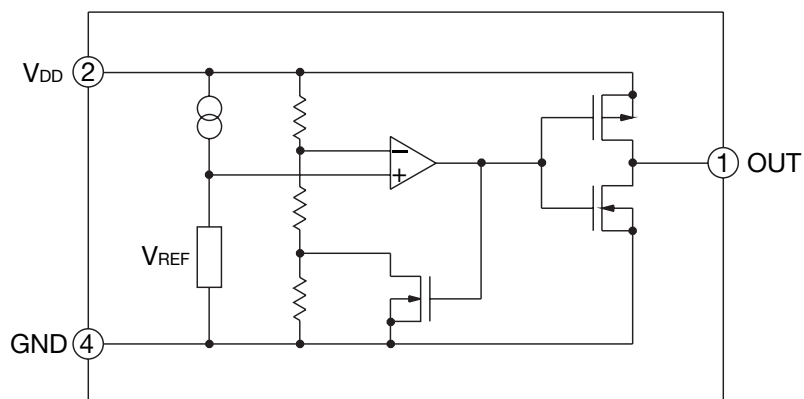
1. Microcomputer, CPU, MPU reset circuits
2. Logic circuit reset circuits
3. Battery voltage check circuits
4. Back-up circuit switching circuits
5. Level detection circuits

Pin Assignment



SC-82ABA
 SC-82ABB
 (TOP VIEW)

Block Diagram



Pin Explanations

Pin No.	Pin Name	Functions
1	OUT	Reset Signal Output Pin
2	V _{DD}	V _{DD} Pin / Voltage Detect Pin
3	NC	
4	GND	GND Pin

Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Rating	Unit
Operating Temperature	T _{OPR}	-30 ~ +85	°C
Storage Temperature	T _{STG}	-40 ~ +125	°C
Supply Voltage	V _{DD}	12	V
Output Voltage	V _{OUT}	V _{SS} - 0.3 ~ V _{DD} +0.3	V
Output Current	I _{OUT}	70	mA
Power Dissipation	P _d	150	mW

Recommended Operating Conditions

Item	Symbol	Rating	Unit
Operating Temperature	T _{OPR}	-30 ~ +85	°C
Supply Voltage	V _{DD}	+0.70 ~ +10	V

Electrical Characteristics (Ta=25°C)

Product Name	Item												
	Detecting Voltage			Hysteresis Voltage			Supply Current 1			Supply Current 2			
	-V _{DET} (V)			V _{HYS} (V)			I _{SS1} (μA)			I _{SS2} (μA)			
	Test Circuit 2			Test Circuit 2			Test Circuit 1			Test Circuit 1			
	Min.	Typ.	Max.	Min.	Typ.	Max.	Condition	Typ.	Max.	Condition	Typ.	Max.	
PST3709	0.882	0.900	0.918	0.027	0.045	0.063	V _{DD} = (-V _{DET}) -0.10V	1.5	3.7		0.9	2.7	
PST3710	0.980	1.000	1.020	0.030	0.050	0.070							
PST3711	1.078	1.100	1.122	0.033	0.055	0.077							
PST3712	1.176	1.200	1.224	0.036	0.060	0.084							
PST3713	1.274	1.300	1.326	0.039	0.065	0.091							
PST3714	1.372	1.400	1.428	0.042	0.070	0.098							
PST3715	1.470	1.500	1.530	0.045	0.075	0.105		2.5	5.5	1.0	3.0		
PST3716	1.568	1.600	1.632	0.048	0.080	0.112							
PST3717	1.666	1.700	1.734	0.051	0.085	0.119							
PST3718	1.764	1.800	1.836	0.054	0.090	0.126							
PST3719	1.862	1.900	1.938	0.057	0.095	0.133							
PST3720	1.960	2.000	2.040	0.060	0.100	0.140		3.0	6.0			1.1	3.3
PST3721	2.058	2.100	2.142	0.063	0.105	0.147							
PST3722	2.156	2.200	2.244	0.066	0.110	0.154							
PST3723	2.254	2.300	2.346	0.069	0.115	0.161		3.5	7.0				
PST3724	2.352	2.400	2.448	0.072	0.120	0.168							
PST3725	2.450	2.500	2.550	0.075	0.125	0.175							
PST3726	2.548	2.600	2.652	0.078	0.130	0.182	4.0	8.0	V _{DD} (-V _{DET}) +2.0V	1.2	3.6		
PST3727	2.646	2.700	2.754	0.081	0.135	0.189							
PST3728	2.744	2.800	2.856	0.084	0.140	0.196							
PST3729	2.842	2.900	2.958	0.087	0.145	0.203							
PST3730	2.940	3.000	3.060	0.090	0.150	0.210	V _{DD} = (-V _{DET}) -0.13V	4.5				9.0	
PST3731	3.038	3.100	3.162	0.093	0.155	0.217							
PST3732	3.136	3.200	3.264	0.096	0.160	0.224		4.5				9.0	
PST3733	3.234	3.300	3.366	0.099	0.165	0.231							
PST3734	3.332	3.400	3.468	0.102	0.170	0.238							
PST3735	3.430	3.500	3.570	0.105	0.175	0.245							
PST3736	3.528	3.600	3.672	0.108	0.180	0.252							
PST3737	3.626	3.700	3.774	0.111	0.185	0.259							
PST3738	3.724	3.800	3.876	0.114	0.190	0.266	V _{DD} = (-V _{DET}) -0.16V	5.0	10.0	1.3	3.9		
PST3739	3.822	3.900	3.978	0.117	0.195	0.273							
PST3740	3.920	4.000	4.080	0.120	0.200	0.280		5.5	11.0				
PST3741	4.018	4.100	4.182	0.123	0.205	0.287							
PST3742	4.116	4.200	4.284	0.126	0.210	0.294							
PST3743	4.214	4.300	4.386	0.129	0.215	0.301							
PST3744	4.312	4.400	4.488	0.132	0.220	0.308							
PST3745	4.410	4.500	4.590	0.135	0.225	0.315							
PST3746	4.508	4.600	4.692	0.138	0.230	0.322	V _{DD} = (-V _{DET}) -0.20V	6.0	12.0			1.4	4.2
PST3747	4.606	4.700	4.794	0.141	0.235	0.329							
PST3748	4.704	4.800	4.896	0.144	0.240	0.336		6.5	13.0				
PST3749	4.802	4.900	4.998	0.147	0.245	0.343							
PST3750	4.900	5.000	5.100	0.150	0.250	0.350							
PST3751	4.998	5.100	5.202	0.153	0.255	0.357							
PST3752	5.096	5.200	5.304	0.156	0.260	0.364							
PST3753	5.194	5.300	5.406	0.159	0.265	0.371							
PST3754	5.292	5.400	5.508	0.162	0.270	0.378	6.5	13.0					
PST3755	5.390	5.500	5.610	0.165	0.275	0.385							
PST3756	5.488	5.600	5.712	0.168	0.280	0.392							
PST3757	5.586	5.700	5.814	0.171	0.285	0.399							
PST3758	5.684	5.800	5.916	0.174	0.290	0.406	6.5	13.0					
PST3759	5.782	5.900	6.018	0.177	0.295	0.413							
PST3760	5.880	6.000	6.120	0.180	0.300	0.420							

Electrical Characteristics (Ta=25°C)

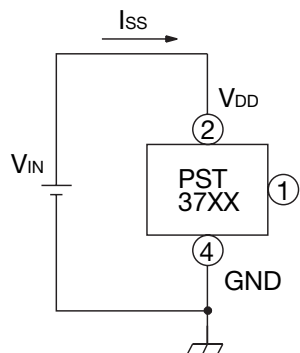
Product Name	Item									
	Output Current 1			Output Current 2			Output Current 3			
	I _{OUT1} (mA)			I _{OUT2} (mA)			I _{OUT3} (mA)			
	Test Circuit 3			Test Circuit 3			Test Circuit 4			
	Condition	Min.	Typ.	Condition		Min.	Typ.	Condition	Typ.	Max.
PST3709	N-ch V _{DS} = 0.05V V _{DD} = 0.7V	0.01	0.05	N-ch V _{DS} = 0.5V	V _{DD} = 0.85V	0.05	0.5	P-ch V _{DS} = -2.1V V _{DD} = 4.5V	1.0	2.0
PST3710					V _{DD} = 1.0V	0.2	1.0			
PST3711										
PST3712										
PST3713										
PST3714										
PST3715										
PST3716										
PST3717										
PST3718										
PST3719										
PST3720										
PST3721										
PST3722										
PST3723										
PST3724										
PST3725										
PST3726										
PST3727										
PST3728										
PST3729										
PST3730										
PST3731										
PST3732										
PST3733										
PST3734										
PST3735										
PST3736										
PST3737										
PST3738										
PST3739										
PST3740										
PST3741										
PST3742										
PST3743										
PST3744										
PST3745										
PST3746										
PST3747										
PST3748										
PST3749										
PST3750										
PST3751										
PST3752										
PST3753										
PST3754										
PST3755										
PST3756										
PST3757										
PST3758										
PST3759										
PST3760										

Electrical Characteristics

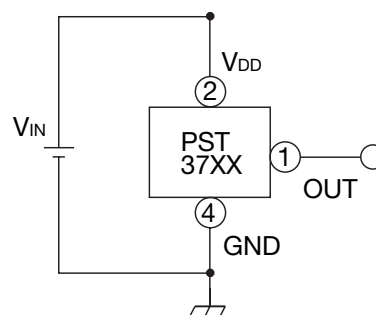
Product Name	Item							
	Threshold Operating Voltage1			Threshold Operating Voltage2			Detecting Voltage Temp. Coefficient	
	V _{DDL1} (V)			V _{DDL2} (V)			$\Delta -V_{DET} / \Delta T_{OPT}$ (ppm / °C)	
	Test Circuit 2			Test Circuit 2			Test Circuit 2	
	Condition	Typ.	Max.	Condition	Typ.	Max.	Condition	Typ.
PST3709	V _{OUT} ≤ 0.1V T _{OPT} = 25°C	0.55	0.70	V _{OUT} ≤ 0.1V -30°C ≤ T _{OPT} ≤ 85°C	0.65	0.80	-30°C ≤ T _{OPT} ≤ 85°C	±100
PST3710								
PST3711								
PST3712								
PST3713								
PST3714								
PST3715								
PST3716								
PST3717								
PST3718								
PST3719								
PST3720								
PST3721								
PST3722								
PST3723								
PST3724								
PST3725								
PST3726								
PST3727								
PST3728								
PST3729								
PST3730								
PST3731								
PST3732								
PST3733								
PST3734								
PST3735								
PST3736								
PST3737								
PST3738								
PST3739								
PST3740								
PST3741								
PST3742								
PST3743								
PST3744								
PST3745								
PST3746								
PST3747								
PST3748								
PST3749								
PST3750								
PST3751								
PST3752								
PST3753								
PST3754								
PST3755								
PST3756								
PST3757								
PST3758								
PST3759								
PST3760								

Measuring Circuit

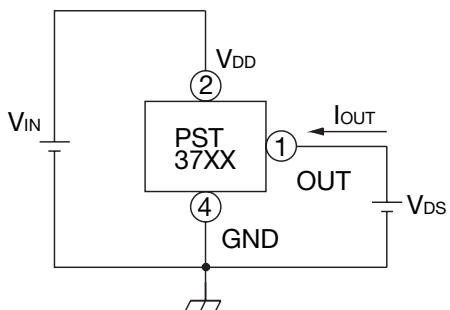
(1)



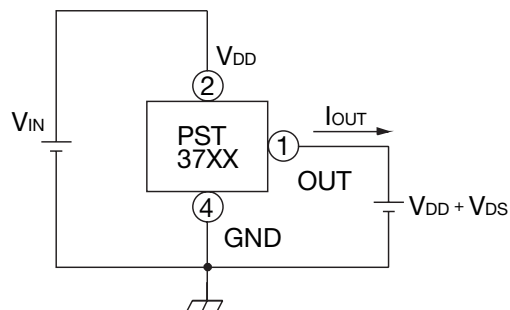
(2)



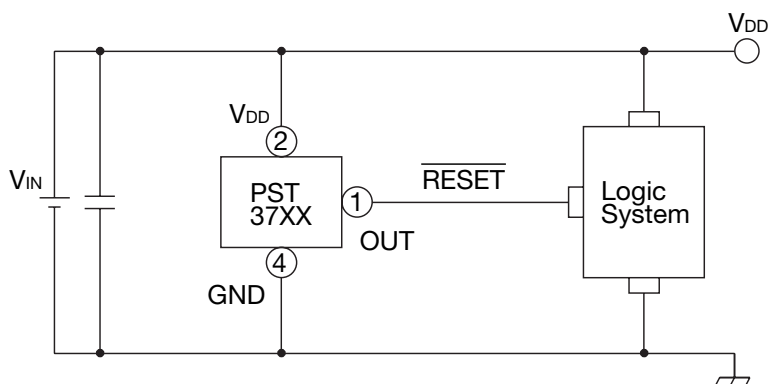
(3)



(4)

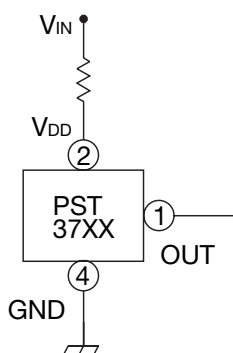


Application Circuits



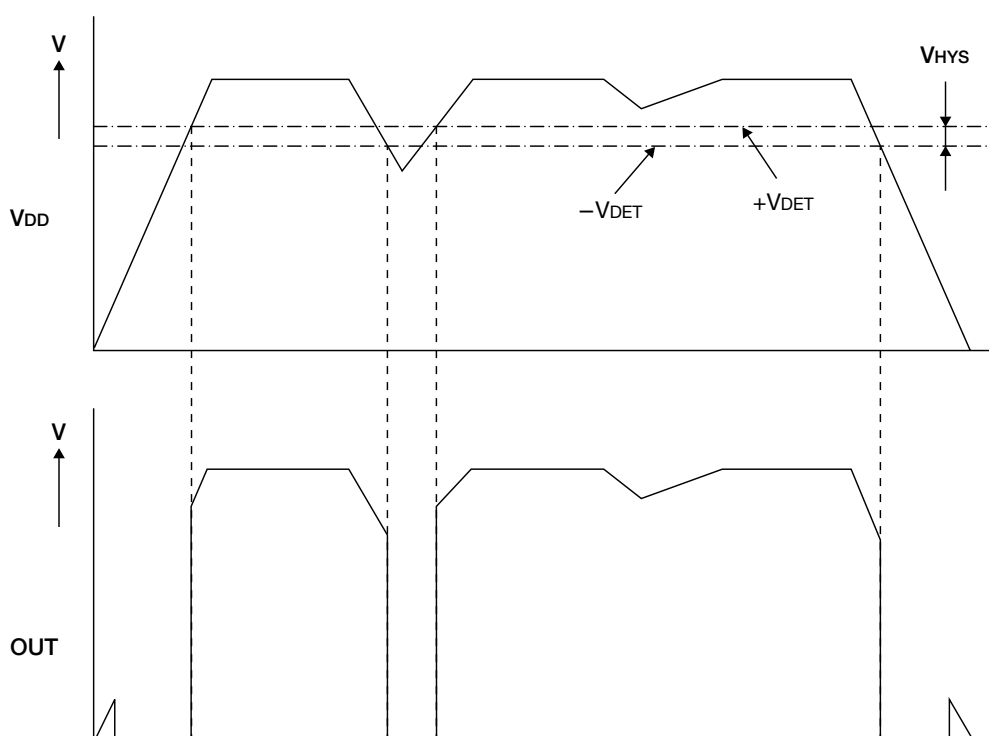
Please be advised that Mitsumi Electric Co., Ltd. is not liable for any accidents or damage caused as a result of the use of this circuit.

In the event a problem which may affect industrial property or any other rights of us or a third party is encountered during the use of information described in these circuit, Mitsumi Electric Co., Ltd. shall not be liable for any such problem, nor grant a license therefore.



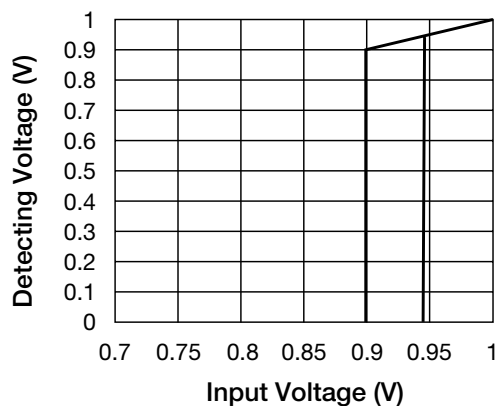
Please note that there is any possibility of circuit oscillation when resistance put in the line V_{IN} .

Timing Chart

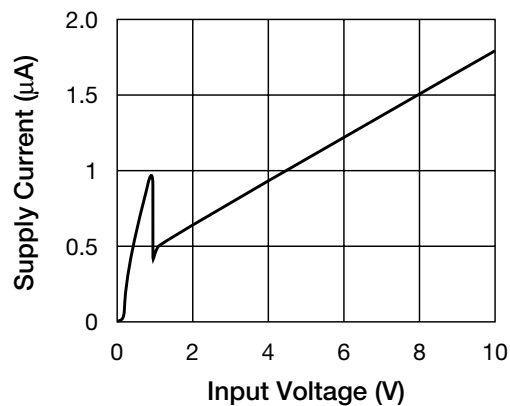


Characteristics (Typical Performance Characteristics 0.9V)

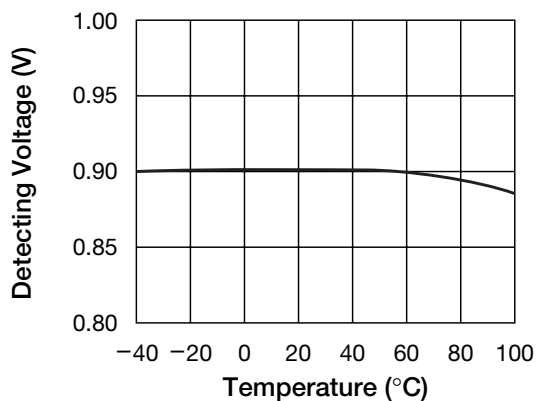
Detecting Voltage vs Input Voltage



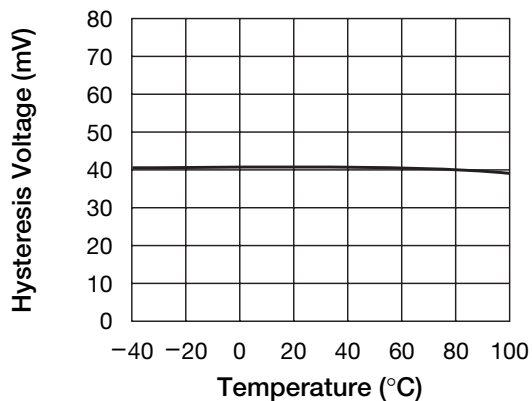
Supply Current vs Input Voltage



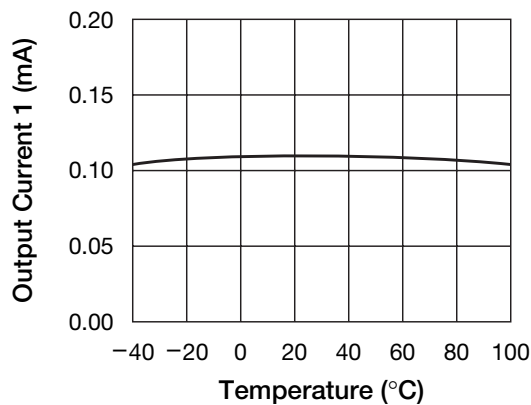
Detecting Voltage vs Temperature



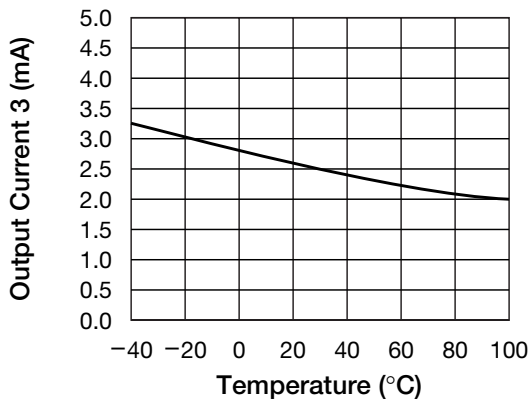
Hysteresis Voltage vs Temperature



Output Current1 (N-ch) vs Temperature ($V_{DD} = 0.7V$, $V_{DS} = 0.05V$)



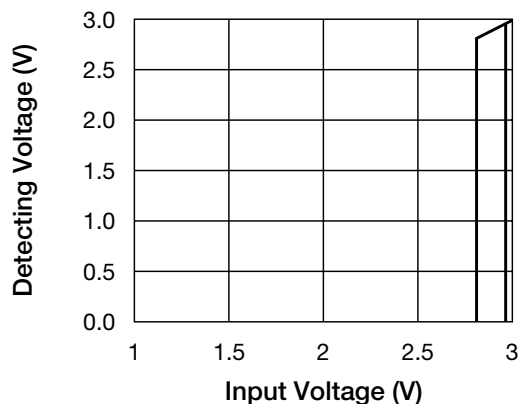
Output Current3 (P-ch) vs Temperature ($V_{DD} = 4.5V$, $V_{DS} = -2.1V$)



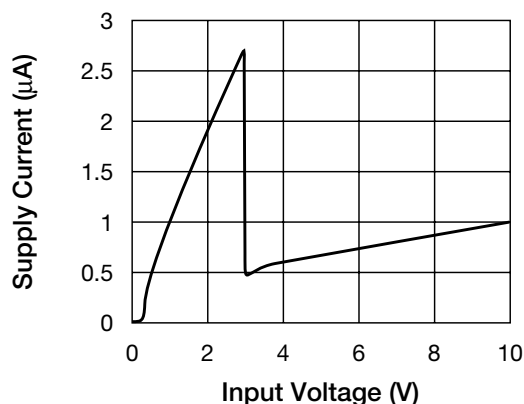
note : these are typical characteristics

Characteristics (Typical Performance Characteristics 2.8V)

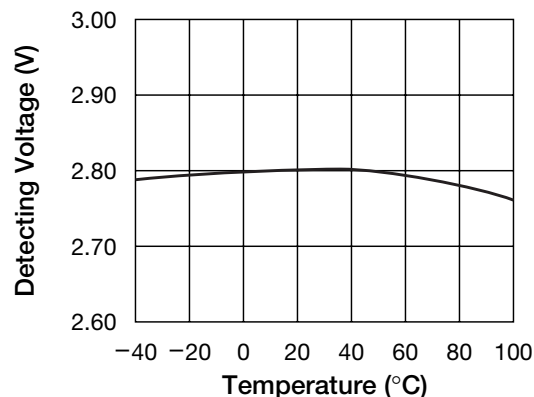
Detecting Voltage vs Input Voltage



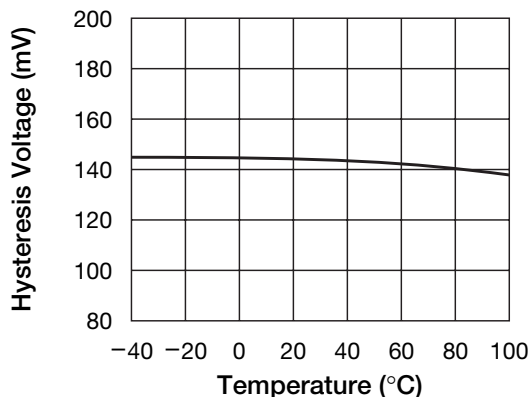
Supply Current vs Input Voltage



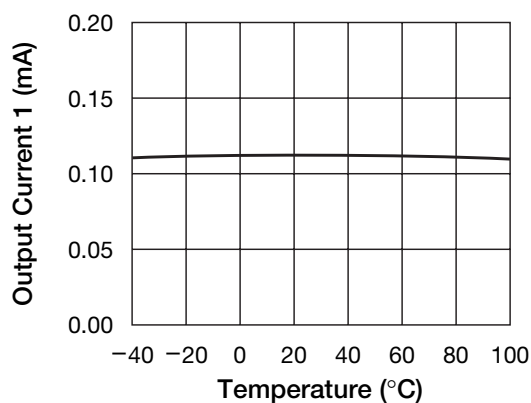
Detecting Voltage vs Temperature



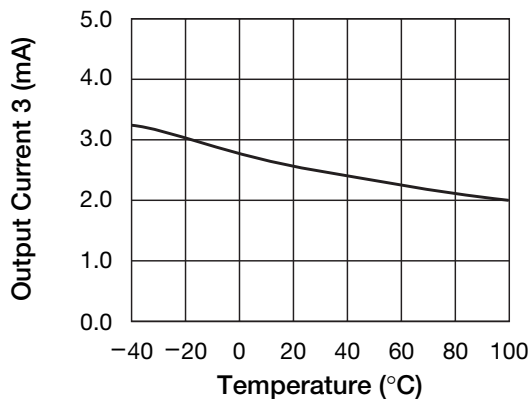
Hysteresis Voltage vs Temperature



Output Current1 (N-ch) vs Temperature ($V_{DD} = 0.7V$, $V_{DS} = 0.05V$)



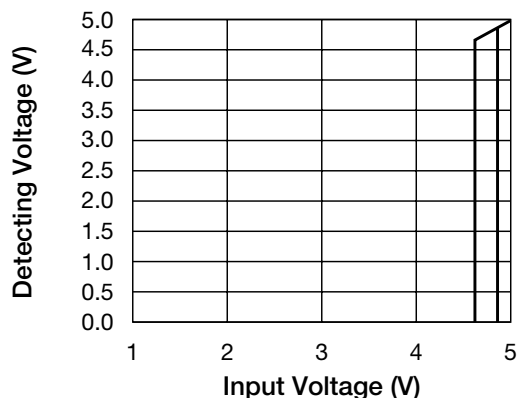
Output Current3 (P-ch) vs Temperature ($V_{DD} = 4.5V$, $V_{DS} = -2.1V$)



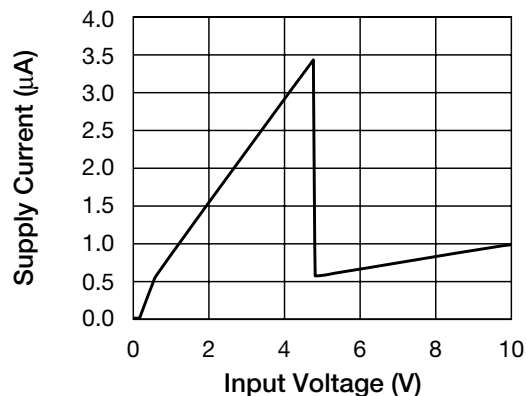
note : these are typical characteristics

Characteristics (Typical Performance Characteristics 4.6V)

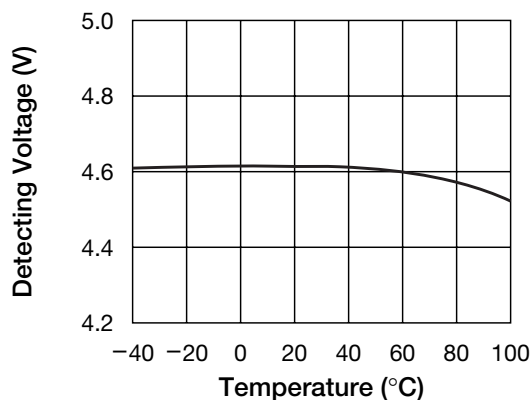
Detecting Voltage vs Input Voltage



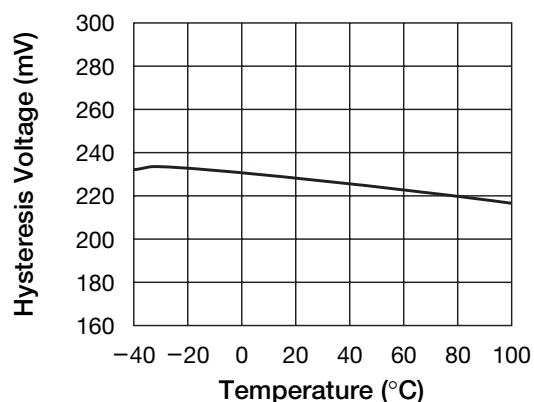
Supply Current vs Input Voltage



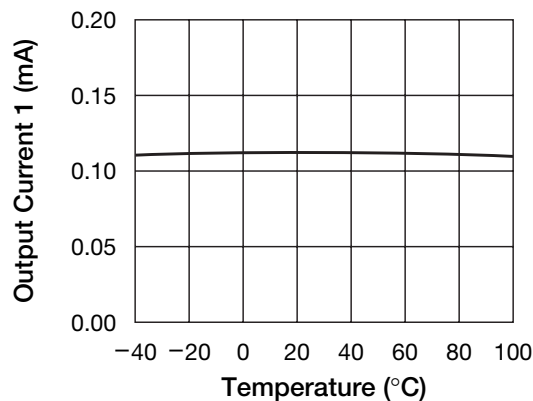
Detecting Voltage vs Temperature



Hysteresis Voltage vs Temperature



Output Current1 (N-ch) vs Temperature ($V_{DD} = 0.7V$, $V_{DS} = 0.05V$)



Output Current3 (P-ch) vs Temperature ($V_{DD} = 4.5V$, $V_{DS} = -2.1V$)

