

IC for CMOS System Reset

Monolithic IC PST38XXU Series

April 16, 2001

Outline

This open drain output system reset IC, developed using the CMOS process. Super low consumption current of 1.0 μ A typ. (PST3810 ~ PST3819) has been achieved through use of the CMOS process. Also, detection voltage is high precision detection of $\pm 2\%$.

Features

- | | |
|--------------------------------------|---|
| (1) Super low consumption current | 1.0 μ A typ. (when $V_{DD} = (-V_{DET}) + 2.0V$) PST3810 ~ PST3819 |
| (2) High precision detection voltage | $\pm 2\%$ |
| (3) Operating range | 0.7 ~ 10V |
| (4) Wide operating temperature range | -30 ~ +85°C |
| (5) Detection voltage | 0.9 ~ 6.0V (0.1V step) |

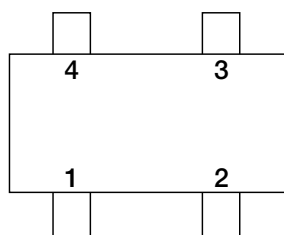
Package

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

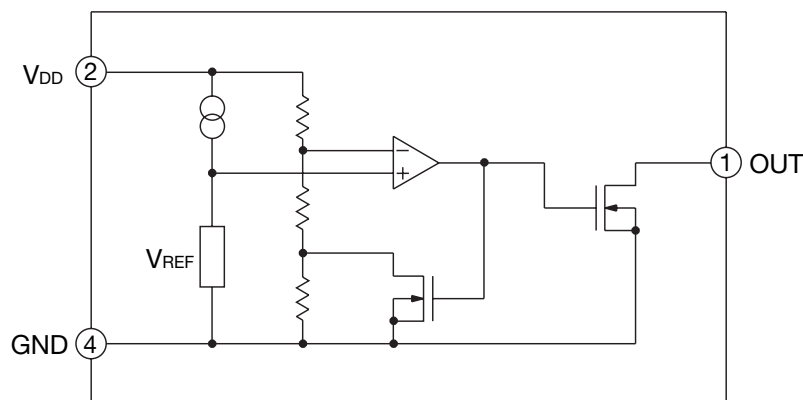
Pin Assignment



1	OUT
2	V_{DD}
3	NC
4	GND

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

Block Diagram



Pin Explanations

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

Absolute Maximum Ratings (T_a=25°C)

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

Recommended Operating Conditions

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

Electrical Characteristics (Unless otherwise specified, Ta=25°C)

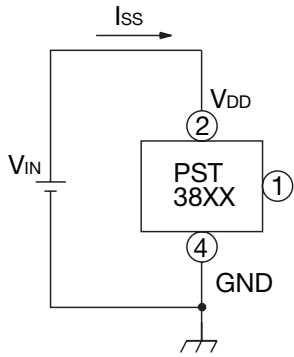
Product Name	Item												
	Detecting Voltage			Hysteresis Voltage			Supply Current1			Supply Current2			
	-V _{DET} (V)			V _{HYS} (V)			I _{SS1} (μA)			I _{SS2} (μA)			
	Test Circuit 2			Test Circuit 2			Test Circuit 1			Test Circuit 1			
Min.	Typ.	Max.	Min.	Typ.	Max.	Condition	Typ.	Max.	Condition	Typ.	Max.		
PST3809	0.882	0.900	0.918	0.027	0.045	0.063	V _{DD} = (-V _{DET}) -0.10V	1.5	3.7	1.0	0.9	2.7	
PST3810	0.980	1.000	1.020	0.030	0.050	0.070		1.8	4.5				
PST3811	1.078	1.100	1.122	0.033	0.055	0.077		2.0	5.0				
PST3812	1.176	1.200	1.224	0.036	0.060	0.084		2.5	5.5		3.0	1.1	3.3
PST3813	1.274	1.300	1.326	0.039	0.065	0.091							
PST3814	1.372	1.400	1.428	0.042	0.070	0.098							
PST3815	1.470	1.500	1.530	0.045	0.075	0.105							
PST3816	1.568	1.600	1.632	0.048	0.080	0.112							
PST3817	1.666	1.700	1.734	0.051	0.085	0.119		4.0	8.0		1.2	3.6	
PST3818	1.764	1.800	1.836	0.054	0.090	0.126							
PST3819	1.862	1.900	1.938	0.057	0.095	0.133							
PST3820	1.960	2.000	2.040	0.060	0.100	0.140							
PST3821	2.058	2.100	2.142	0.063	0.105	0.147							
PST3822	2.156	2.200	2.244	0.066	0.110	0.154							
PST3823	2.254	2.300	2.346	0.069	0.115	0.161							
PST3824	2.352	2.400	2.448	0.072	0.120	0.168							
PST3825	2.450	2.500	2.550	0.075	0.125	0.175							
PST3826	2.548	2.600	2.652	0.078	0.130	0.182							
PST3827	2.646	2.700	2.754	0.081	0.135	0.189							
PST3828	2.744	2.800	2.856	0.084	0.140	0.196							
PST3829	2.842	2.900	2.958	0.087	0.145	0.203							
PST3830	2.940	3.000	3.060	0.090	0.150	0.210							
PST3831	3.038	3.100	3.162	0.093	0.155	0.217							
PST3832	3.136	3.200	3.264	0.096	0.160	0.224							
PST3833	3.234	3.300	3.366	0.099	0.165	0.231							
PST3834	3.332	3.400	3.468	0.102	0.170	0.238							
PST3835	3.430	3.500	3.570	0.105	0.175	0.245							
PST3836	3.528	3.600	3.672	0.108	0.180	0.252							
PST3837	3.626	3.700	3.774	0.111	0.185	0.259							
PST3838	3.724	3.800	3.876	0.114	0.190	0.266							
PST3839	3.822	3.900	3.978	0.117	0.195	0.273							
PST3840	3.920	4.000	4.080	0.120	0.200	0.280							
PST3841	4.018	4.100	4.182	0.123	0.205	0.287							
PST3842	4.116	4.200	4.284	0.126	0.210	0.294							
PST3843	4.214	4.300	4.386	0.129	0.215	0.301							
PST3844	4.312	4.400	4.488	0.132	0.220	0.308							
PST3845	4.410	4.500	4.590	0.135	0.225	0.315							
PST3846	4.508	4.600	4.692	0.138	0.230	0.322							
PST3847	4.606	4.700	4.794	0.141	0.235	0.329							
PST3848	4.704	4.800	4.896	0.144	0.240	0.336							
PST3849	4.802	4.900	4.998	0.147	0.245	0.343							
PST3850	4.900	5.000	5.100	0.150	0.250	0.350							
PST3851	4.998	5.100	5.202	0.153	0.255	0.357							
PST3852	5.096	5.200	5.304	0.156	0.260	0.364							
PST3853	5.194	5.300	5.406	0.159	0.265	0.371							
PST3854	5.292	5.400	5.508	0.162	0.270	0.378							
PST3855	5.390	5.500	5.610	0.165	0.275	0.385							
PST3856	5.488	5.600	5.712	0.168	0.280	0.392							
PST3857	5.586	5.700	5.814	0.171	0.285	0.399							
PST3858	5.684	5.800	5.916	0.174	0.290	0.406							
PST3859	5.782	5.900	6.018	0.177	0.295	0.413							
PST3860	5.880	6.000	6.120	0.180	0.300	0.420							
							V _{DD} = (-V _{DET}) -0.20V	6.0	12.0	1.4	4.2		
								6.5	13.0				

Electrical Characteristics (Unless otherwise specified, Ta=25°C)

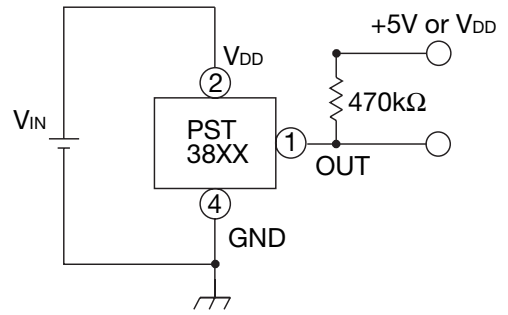
Product Name	Item									
	Output Current1			Output Current2			Leak Current			
	I _{OUT1} (mA)			I _{OUT2} (mA)			I _{LEAK} (μA)			
	Test Circuit 3			Test Circuit 3			Test Circuit 3			
	Condition	Min.	Typ.	Condition	Min.	Typ.	Condition	Typ.	Max.	
PST3809	N-ch V _{DS} = 0.05V V _{DD} = 0.7V	0.01	0.05	N-ch V _{DS} = 0.5V	V _{DD} =0.85V	0.05	0.5	V _{DD} = 10V V _{DS} = 10V	-	0.1
PST3810										
PST3811										
PST3812					V _{DD} =1.0V	0.2	1.0			
PST3813										
PST3814										
PST3815										
PST3816										
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PST3860										

Measuring Circuit

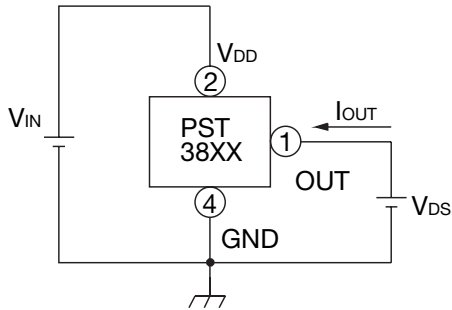
(1)



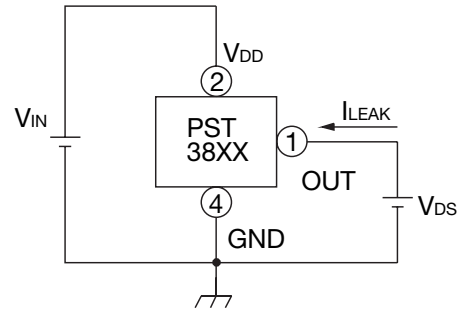
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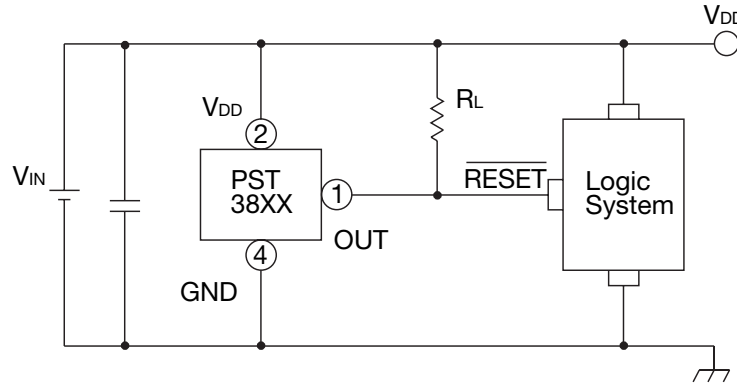
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(4)

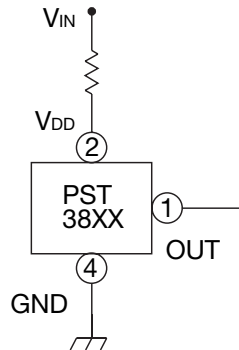


Application Circuits



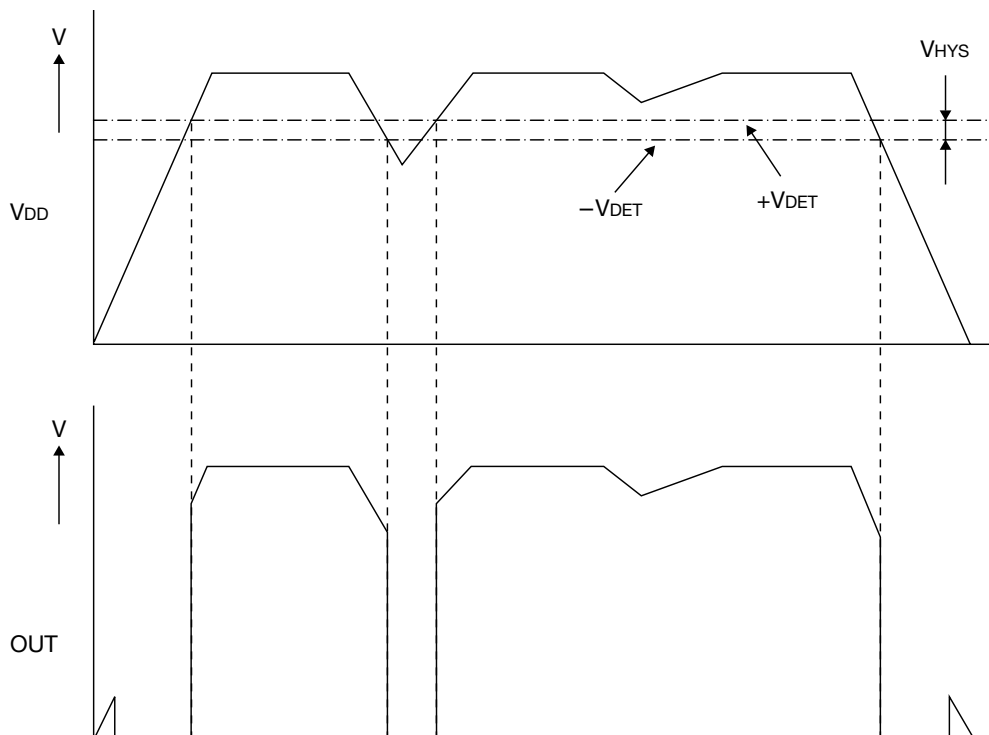
Please be advised that Mitsumi Electric Co., Ltd. is not liable for any accidents or damage caused as a result of the use of this circuit.

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 therefor.



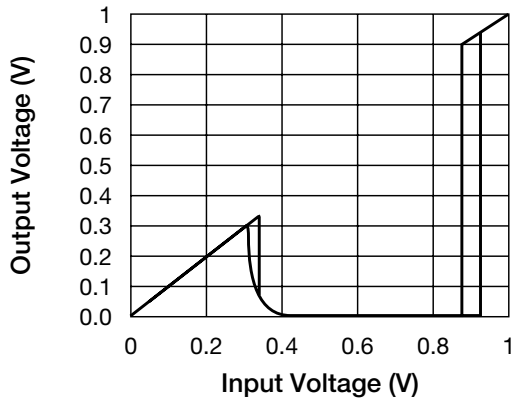
Please note that there is any possibility of circuit oscillation when resistance put in the line V_{IN} .

Timing Chart

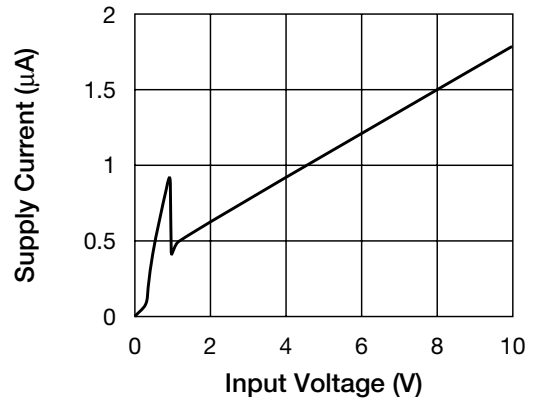


Characteristics PST3809 ($-V_{DET}=0.9V$)

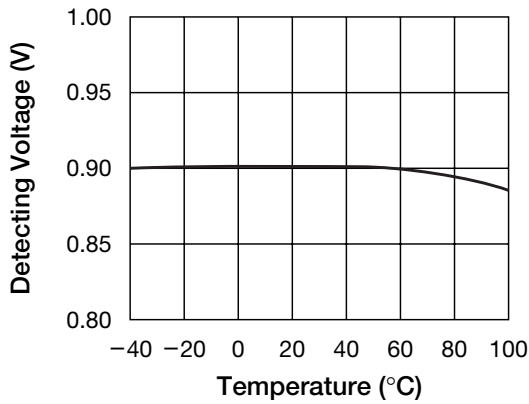
■ Detecting voltage vs input voltage



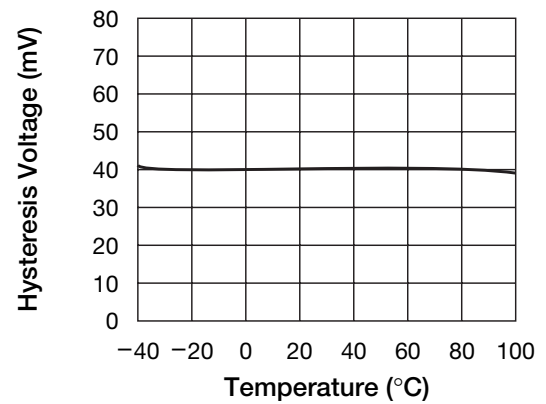
■ Supply Current vs input voltage



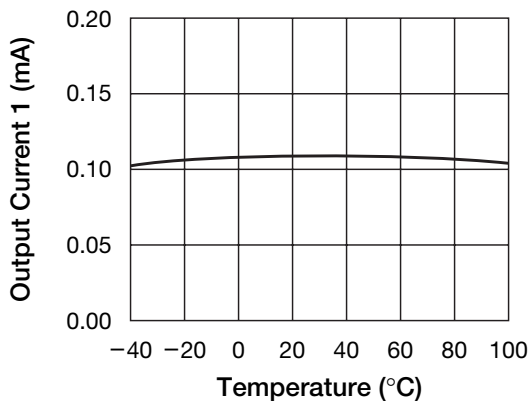
■ Detecting voltage vs temperature



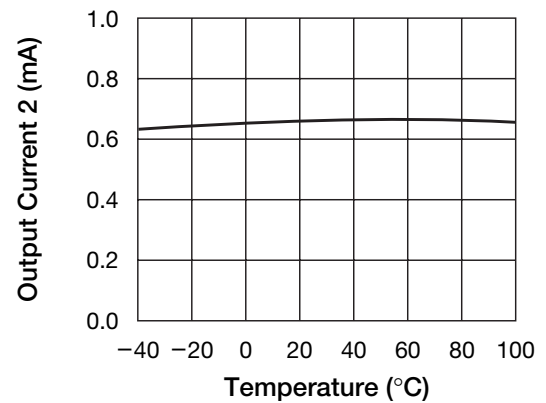
■ Hysteresis voltage vs temperature



■ Output current 1 vs temperature



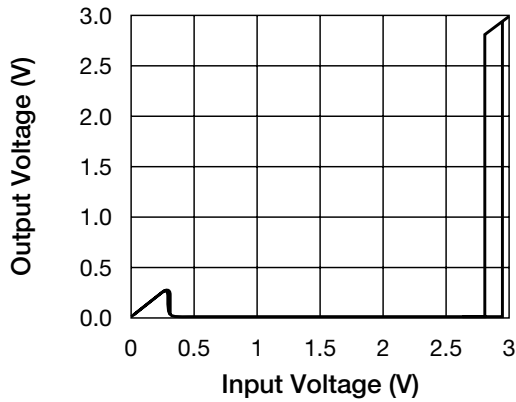
■ Output current 2 vs temperature



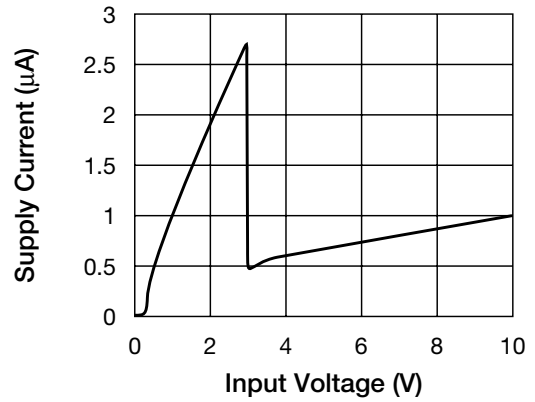
Note: These are typical characteristics.

Characteristics PST3828 ($-V_{DET}=2.8V$)

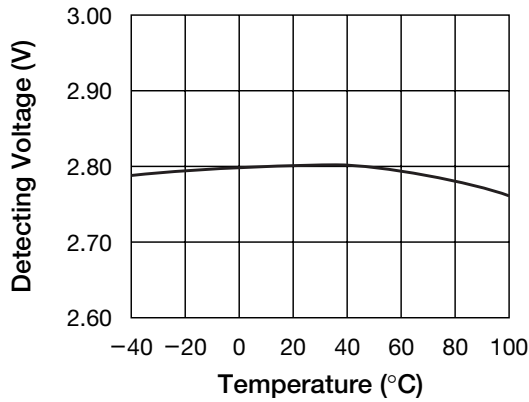
■ Detecting voltage vs input voltage



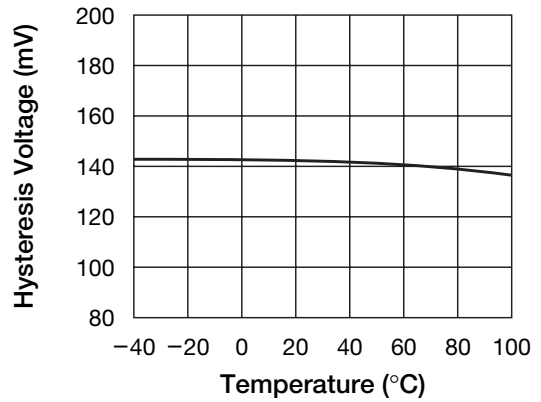
■ Supply current vs input voltage



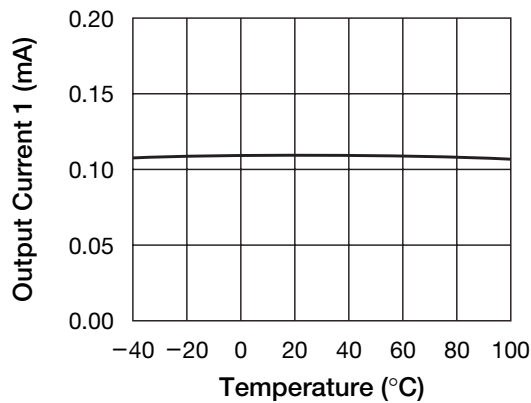
■ Detecting voltage vs temperature



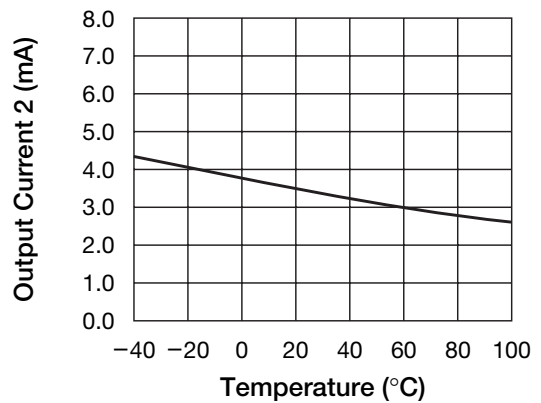
■ Hysteresis voltage vs temperature



■ Output current 1 vs temperature



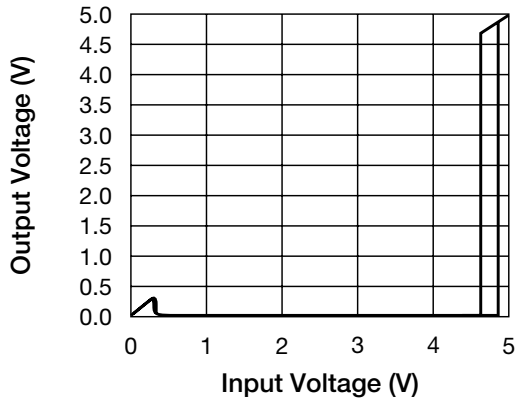
■ Output current 2 vs temperature



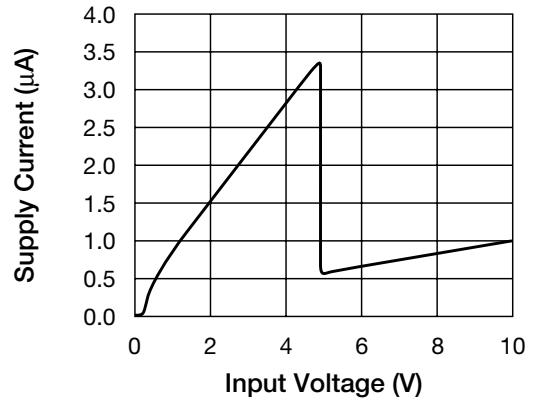
Note: These are typical characteristics.

Characteristics PST3846 ($-V_{DET}=4.6V$)

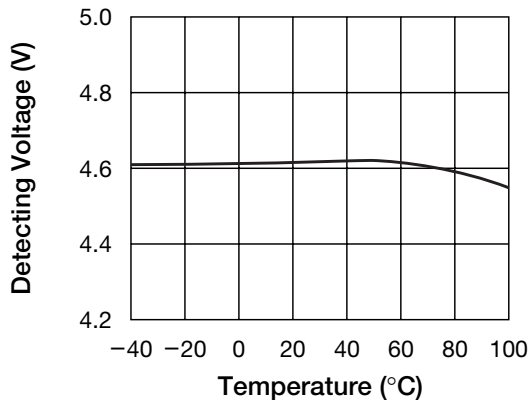
■ Detecting voltage vs input voltage



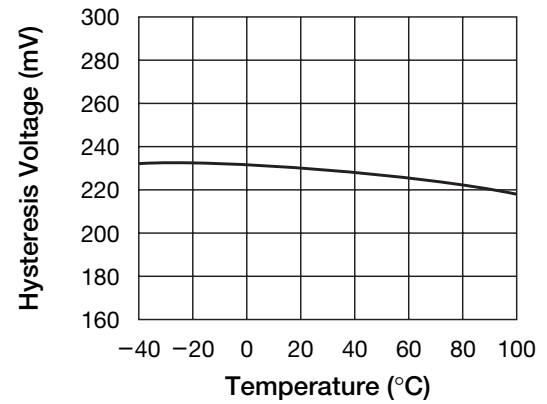
■ Supply current vs input voltage



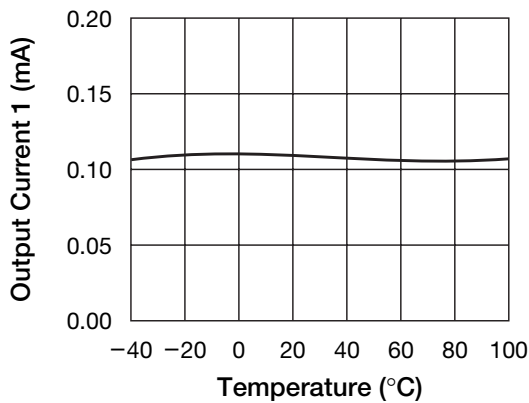
■ Detecting voltage vs temperature



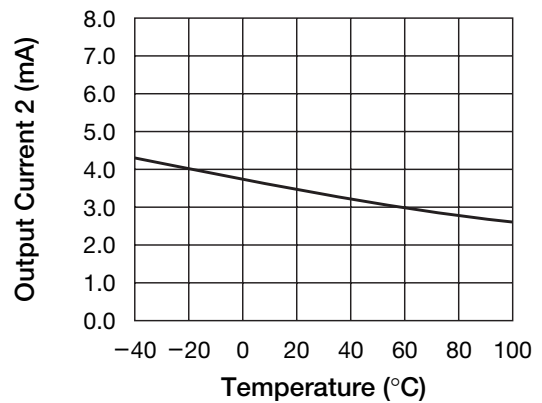
■ Hysteresis voltage vs temperature



■ Output current 1 vs temperature



■ Output current 2 vs temperature



Note: These are typical characteristics.