

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 | $-30 \sim +85^{\circ}C$ |
| (5) Detection voltage | 0.9 ~ 6.0V (0.1V step) |

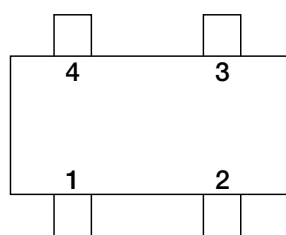
Package

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

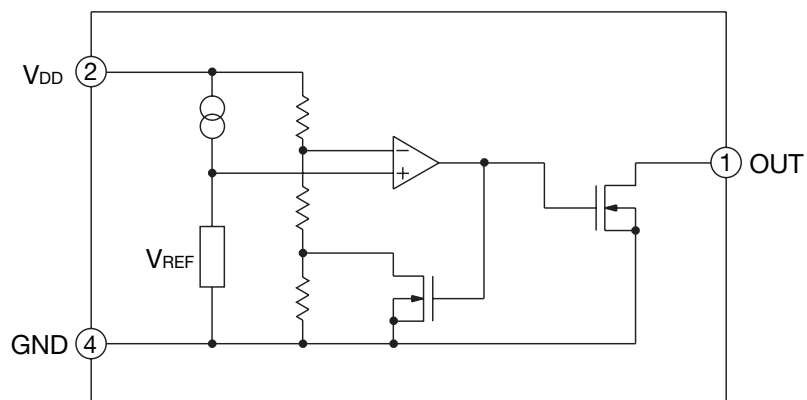
Pin Assignment



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

1	OUT
2	V_{DD}
3	NC
4	GND

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 (Ta=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	V _{DD} = (-V _{DET}) +2.0V	0.9	2.7
PST3810	0.980	1.000	1.020	0.030	0.050	0.070		1.8	4.5		1.0	3.0
PST3811	1.078	1.100	1.122	0.033	0.055	0.077		2.0	5.0		1.0	3.0
PST3812	1.176	1.200	1.224	0.036	0.060	0.084		2.5	5.5		1.0	3.0
PST3813	1.274	1.300	1.326	0.039	0.065	0.091		3.0	6.0		1.1	3.3
PST3814	1.372	1.400	1.428	0.042	0.070	0.098		3.5	7.0		1.1	3.3
PST3815	1.470	1.500	1.530	0.045	0.075	0.105		4.0	8.0		1.2	3.6
PST3816	1.568	1.600	1.632	0.048	0.080	0.112		4.5	9.0		1.2	3.6
PST3817	1.666	1.700	1.734	0.051	0.085	0.119		5.0	10.0		1.3	3.9
PST3818	1.764	1.800	1.836	0.054	0.090	0.126		5.5	11.0		1.3	3.9
PST3819	1.862	1.900	1.938	0.057	0.095	0.133		6.0	12.0		1.4	4.2
PST3820	1.960	2.000	2.040	0.060	0.100	0.140		6.5	13.0		1.4	4.2
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	V _{DD} = (-V _{DET}) -0.13V	4.0	8.0	V _{DD} = (-V _{DET}) +2.0V	1.2	3.6
PST3826	2.548	2.600	2.652	0.078	0.130	0.182		4.5	9.0		1.2	3.6
PST3827	2.646	2.700	2.754	0.081	0.135	0.189		5.0	10.0		1.3	3.9
PST3828	2.744	2.800	2.856	0.084	0.140	0.196		5.5	11.0		1.3	3.9
PST3829	2.842	2.900	2.958	0.087	0.145	0.203		6.0	12.0		1.4	4.2
PST3830	2.940	3.000	3.060	0.090	0.150	0.210		6.5	13.0		1.4	4.2
PST3831	3.038	3.100	3.162	0.093	0.155	0.217	V _{DD} = (-V _{DET}) -0.16V	5.0	10.0	V _{DD} = (-V _{DET}) +2.0V	1.3	3.9
PST3832	3.136	3.200	3.264	0.096	0.160	0.224		5.5	11.0		1.3	3.9
PST3833	3.234	3.300	3.366	0.099	0.165	0.231		6.0	12.0		1.4	4.2
PST3834	3.332	3.400	3.468	0.102	0.170	0.238		6.5	13.0		1.4	4.2
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	V _{DD} = (-V _{DET}) -0.20V	6.0	12.0	V _{DD} = (-V _{DET}) +2.0V	1.4	4.2
PST3838	3.724	3.800	3.876	0.114	0.190	0.266		6.5	13.0		1.4	4.2
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	V _{DD} = (-V _{DET}) -0.16V	5.0	10.0	V _{DD} = (-V _{DET}) +2.0V	1.3	3.9
PST3844	4.312	4.400	4.488	0.132	0.220	0.308		5.5	11.0		1.3	3.9
PST3845	4.410	4.500	4.590	0.135	0.225	0.315		6.0	12.0		1.4	4.2
PST3846	4.508	4.600	4.692	0.138	0.230	0.322		6.5	13.0		1.4	4.2
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	V _{DD} = (-V _{DET}) -0.20V	6.0	12.0	V _{DD} = (-V _{DET}) +2.0V	1.4	4.2
PST3850	4.900	5.000	5.100	0.150	0.250	0.350		6.5	13.0		1.4	4.2
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	V _{DD} = (-V _{DET}) -0.20V	6.0	12.0	V _{DD} = (-V _{DET}) +2.0V	1.4	4.2
PST3856	5.488	5.600	5.712	0.168	0.280	0.392		6.5	13.0		1.4	4.2
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						

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					V _{DD} =1.0V	0.2	1.0			
PST3811										
PST3812					V _{DD} =1.0V	0.2	1.0			
PST3813										
PST3814					V _{DD} =1.0V	0.2	1.0			
PST3815										
PST3816					V _{DD} =1.0V	0.2	1.0			
PST3817										
PST3818					V _{DD} =1.0V	0.2	1.0			
PST3819										
PST3820					V _{DD} =1.0V	0.2	1.0			
PST3821										
PST3822					V _{DD} =1.0V	0.2	1.0			
PST3823										
PST3824					V _{DD} =1.0V	0.2	1.0			
PST3825										
PST3826					V _{DD} =1.0V	0.2	1.0			
PST3827										
PST3828					V _{DD} =1.0V	0.2	1.0			
PST3829										
PST3830					V _{DD} =1.0V	0.2	1.0			
PST3831										
PST3832					V _{DD} =1.0V	0.2	1.0			
PST3833										
PST3834					V _{DD} =1.0V	0.2	1.0			
PST3835										
PST3836					V _{DD} =1.0V	0.2	1.0			
PST3837										
PST3838					V _{DD} =1.0V	0.2	1.0			
PST3839										
PST3840					V _{DD} =1.0V	0.2	1.0			
PST3841										
PST3842					V _{DD} =1.0V	0.2	1.0			
PST3843										
PST3844					V _{DD} =1.0V	0.2	1.0			
PST3845										
PST3846					V _{DD} =1.0V	0.2	1.0			
PST3847										
PST3848					V _{DD} =1.0V	0.2	1.0			
PST3849										
PST3850					V _{DD} =1.0V	0.2	1.0			
PST3851										
PST3852					V _{DD} =1.0V	0.2	1.0			
PST3853										
PST3854					V _{DD} =1.0V	0.2	1.0			
PST3855										
PST3856					V _{DD} =1.0V	0.2	1.0			
PST3857										
PST3858					V _{DD} =1.0V	0.2	1.0			
PST3859										
PST3860					V _{DD} =1.0V	0.2	1.0			

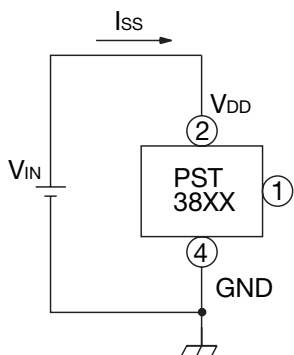
Electrical Characteristics

(Unless otherwise specified, Ta=25°C)

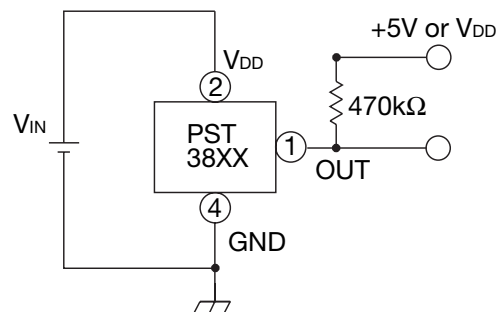
Product Name	Item							
	Threshold Operating Voltage1			Threshold Operating Voltage2			Detecting Voltage Temp. Coefficient	
	V _{DDL1} (V)			V _{DDL2} (V)			$\Delta -V_{DET} / \Delta T_{OPT}$ (ppm/°C)	
	Test Circuit 2			Test Circuit 2			Test Circuit 2	
	Condition	Typ.	Max.	Condition	Typ.	Max.	Condition	Typ.
PST3809								
PST3810								
PST3811								
PST3812								
PST3813								
PST3814								
PST3815								
PST3816								
PST3817								
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PST3859								
PST3860								

Measuring Circuit

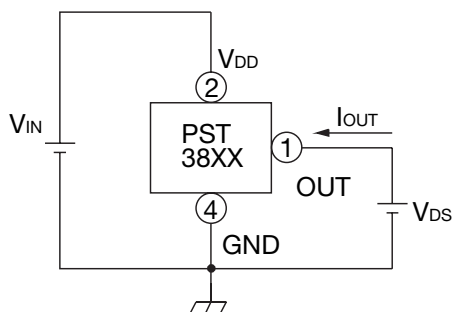
(1)



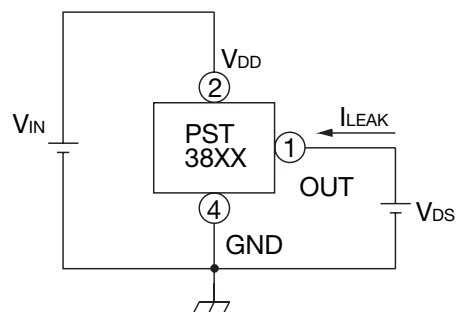
(2)



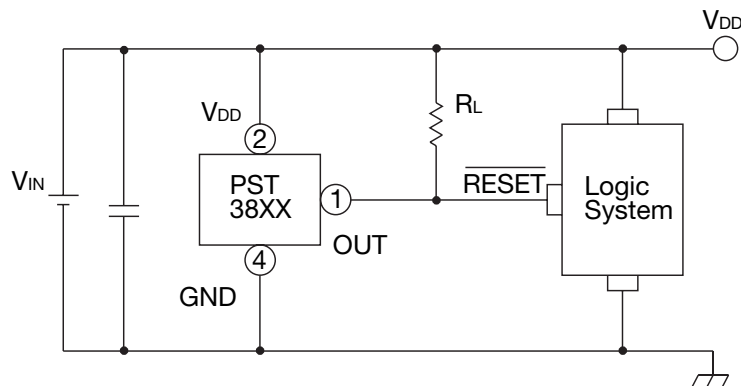
(3)



(4)

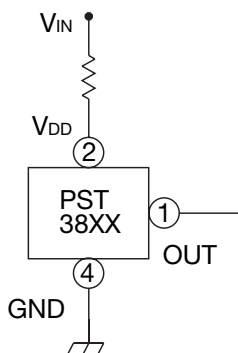


Application Circuits



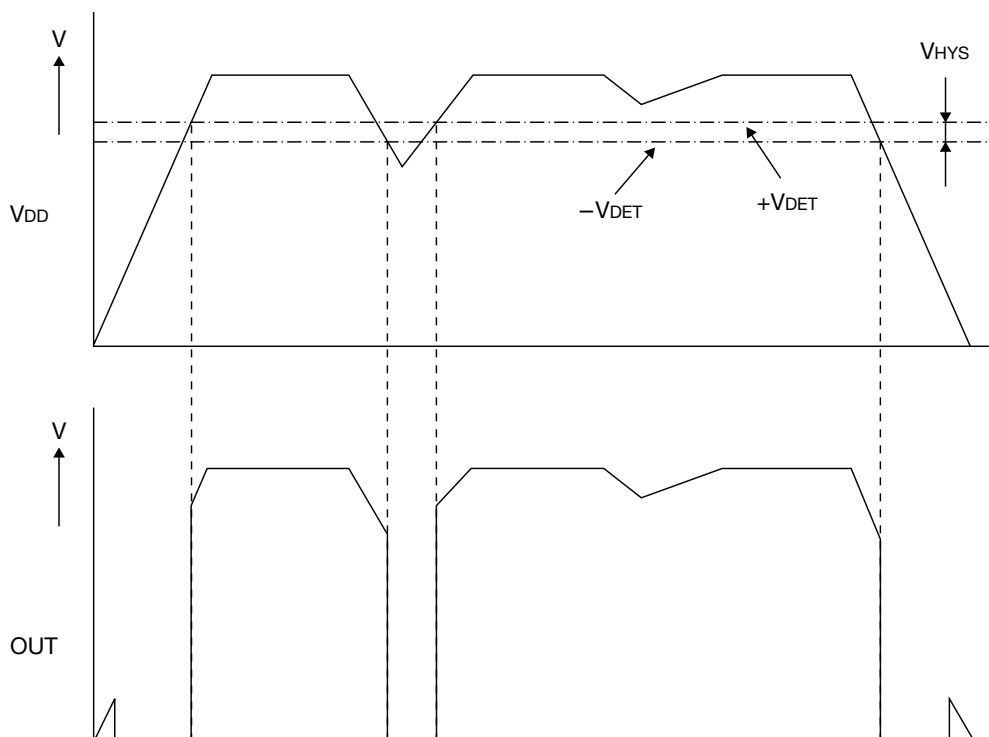
Please be advised that Mitsumi Electric Co., Ltd. is not liable for any accidents or damage caused as a result of the use of this circuit.

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 therefor.



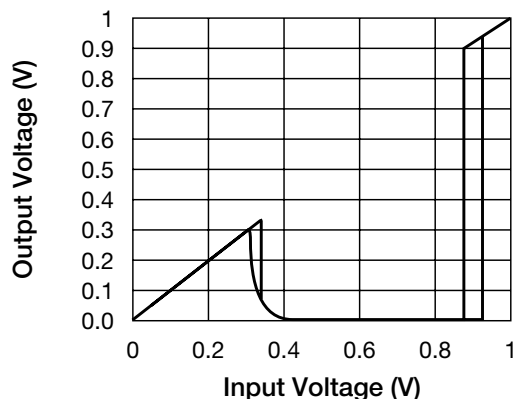
Please note that there is any possibility of circuit oscillation when resistance put in the line V_{IN} .

Timing Chart

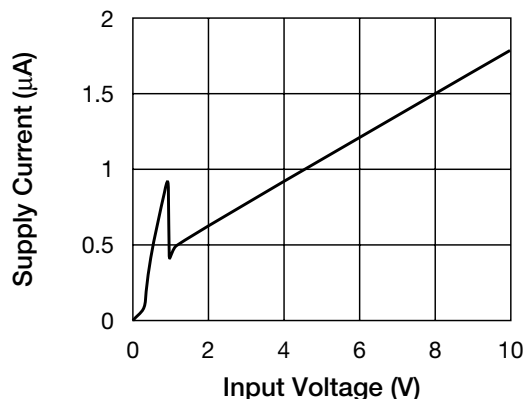


Characteristics PST3809 ($-V_{DET}=0.9V$)

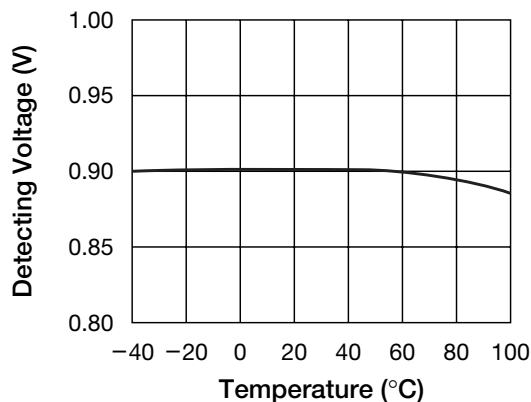
■ Detecting voltage vs input voltage



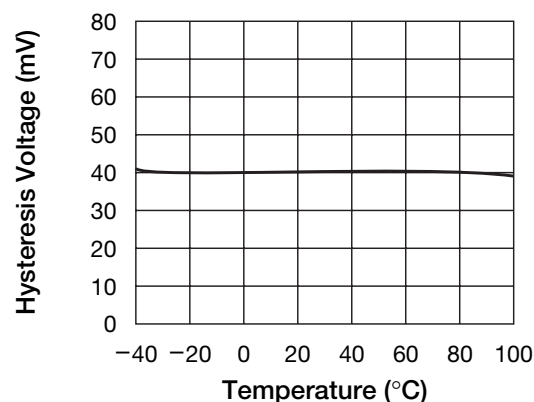
■ Supply Current vs input voltage



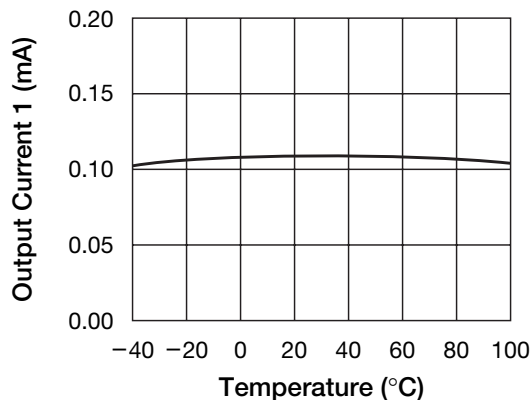
■ Detecting voltage vs temperature



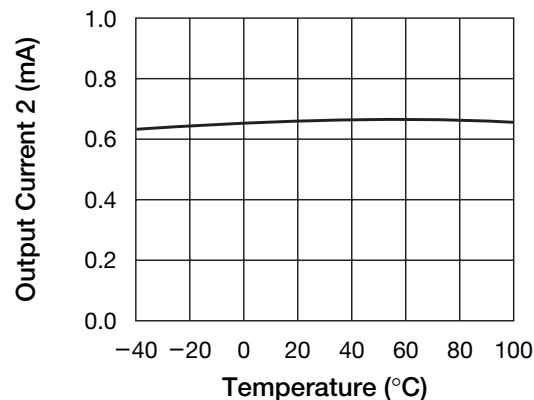
■ Hysteresis voltage vs temperature



■ Output current 1 vs temperature



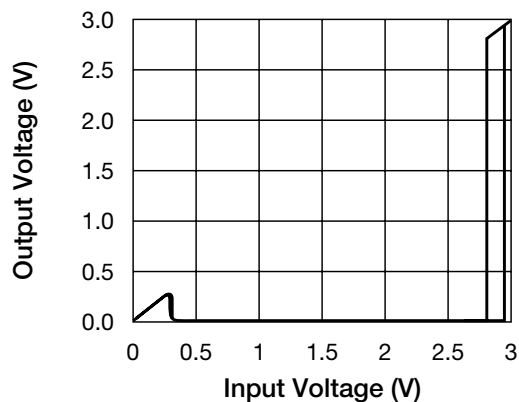
■ Output current 2 vs temperature



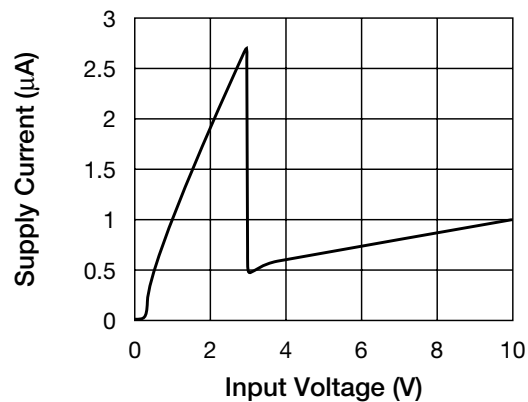
Note: These are typical characteristics.

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

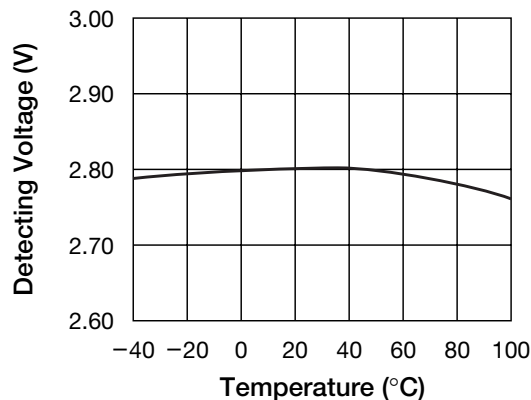
Detecting voltage vs input voltage



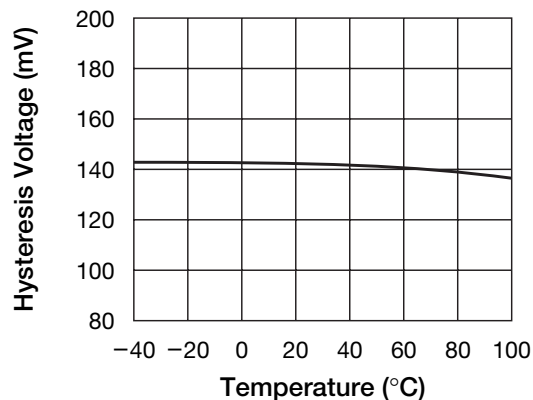
Supply current vs input voltage



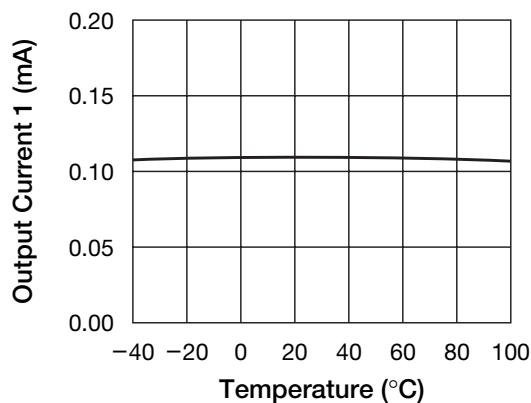
Detecting voltage vs temperature



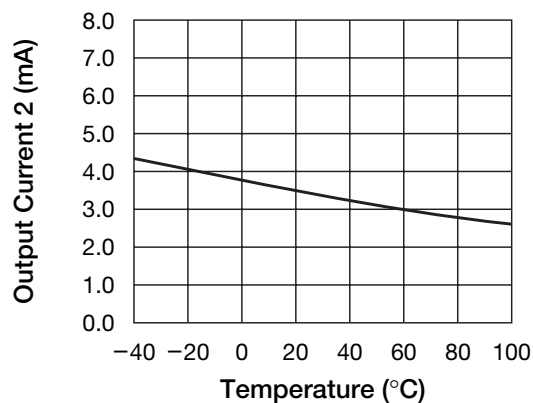
Hysteresis voltage vs temperature



Output current 1 vs temperature



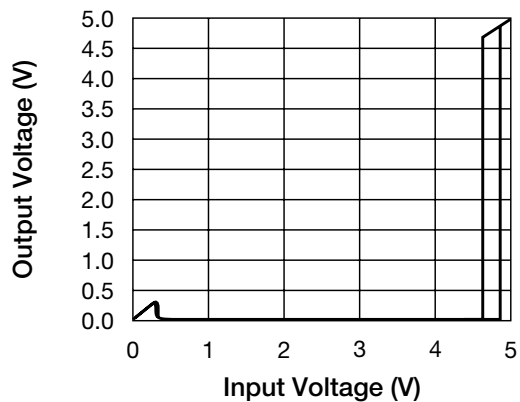
Output current 2 vs temperature



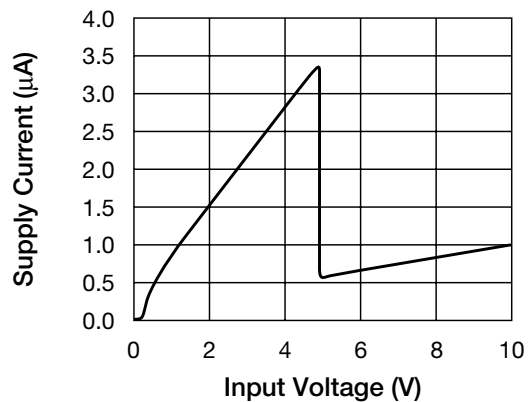
Note: These are typical characteristics.

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

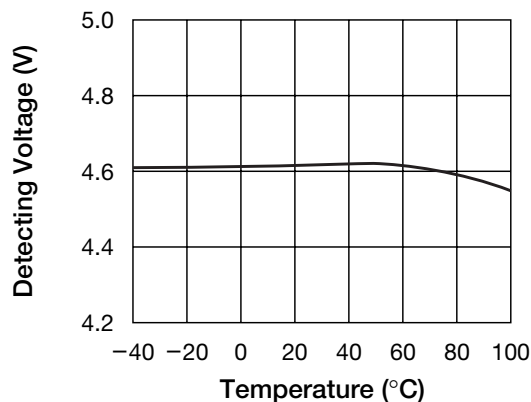
■ Detecting voltage vs input voltage



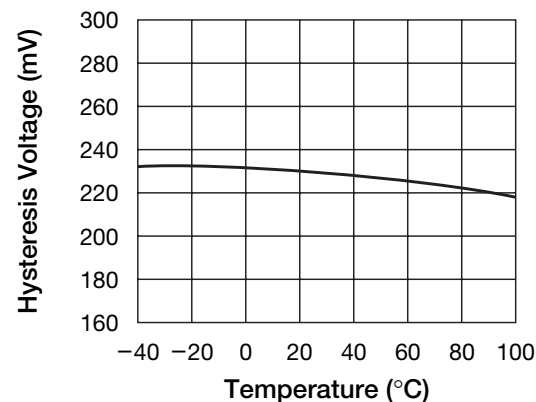
■ Supply current vs input voltage



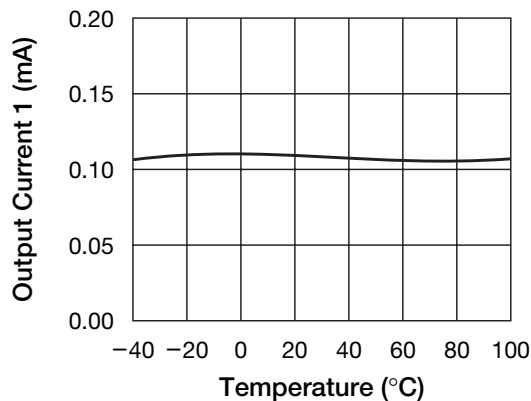
■ Detecting voltage vs temperature



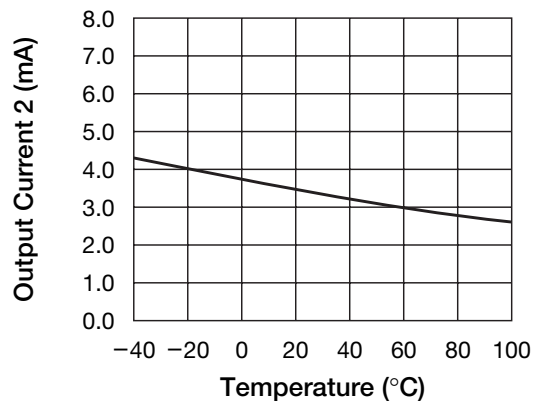
■ Hysteresis voltage vs temperature



■ Output current 1 vs temperature



■ Output current 2 vs temperature



Note: These are typical characteristics.