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 1.0μA typ. (PST3810 ~ PST3819) 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) PST3810 ~ PST3819
(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)

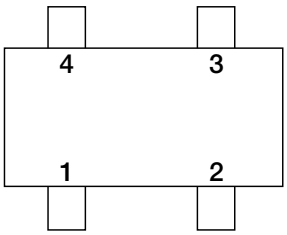
Package

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

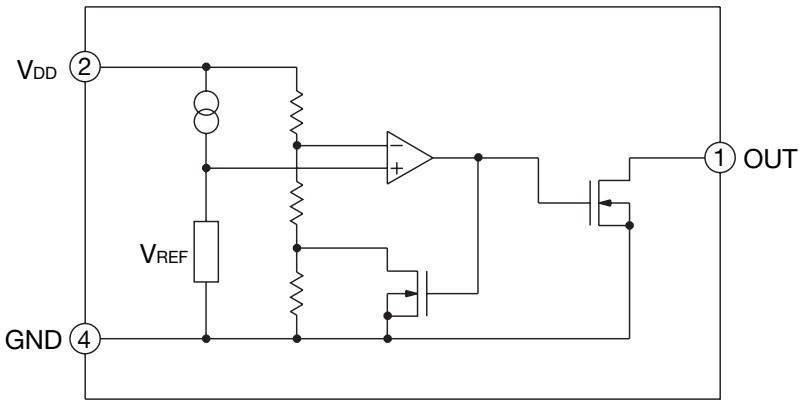
Pin Assignment



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 (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					1.0	3.0
PST3811	1.078	1.100	1.122	0.033	0.055	0.077		1.8	4.5			
PST3812	1.176	1.200	1.224	0.036	0.060	0.084						
PST3813	1.274	1.300	1.326	0.039	0.065	0.091		2.0	5.0			
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		2.5	5.5			
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						
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		3.0	6.0		1.1	3.3
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		3.5	7.0			
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	V_{DD}= ($-V_{DET}$) −0.13V	4.0	8.0		1.2	3.6
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		4.5	9.0			
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	V_{DD}= ($-V_{DET}$) −0.16V	5.0	10.0		1.3	3.9
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		5.5	11.0			
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	V_{DD}= ($-V_{DET}$) −0.20V	6.0	12.0		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		6.5	13.0			
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						

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

Product Name	Item								
	Output Current1			Output Current2			Leak Current		
	$I_{OUT}1$(mA)			$I_{OUT}2$(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				V_{DD}=1.0V	0.2	1.0			
PST3812									
PST3813									
PST3814									
PST3815									
PST3816				V_{DD}=1.5V	1.0	2.0			
PST3817									
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PST3860									

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

Product Name	Item							
	Threshold Operating Voltage1			Threshold Operating Voltage2			Detecting Voltage Temp. Coefficient	
	$V_{DDL}1$(V)			$V_{DDL}2$(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	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
PST3810								
PST3811								
PST3812								
PST3813								
PST3814								
PST3815								
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PST3817								
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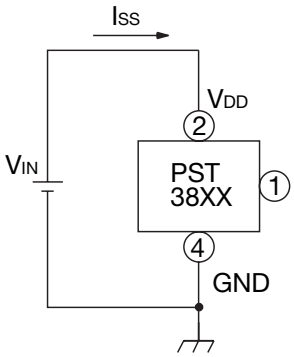
PST3860								

Measuring Circuit

(1)



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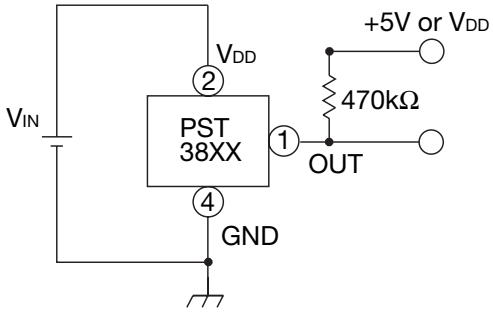

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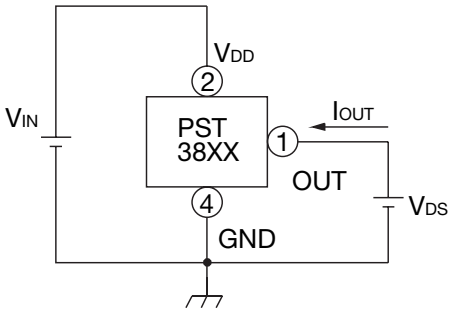

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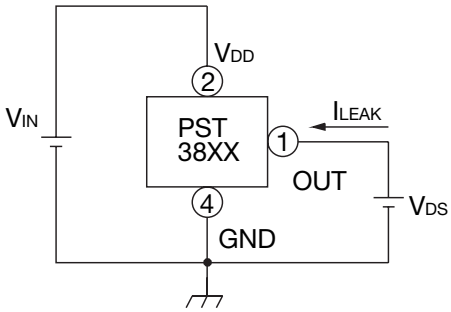
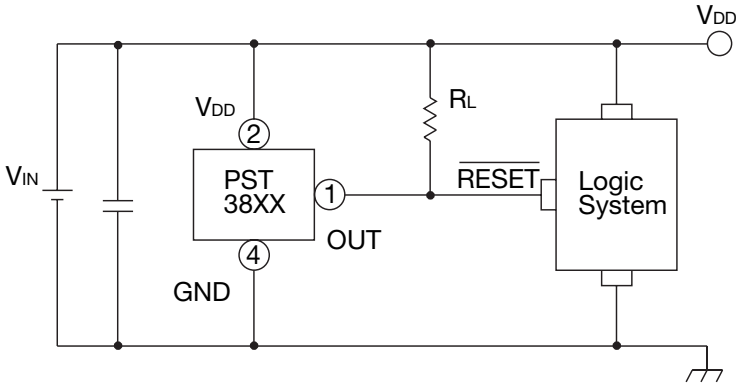
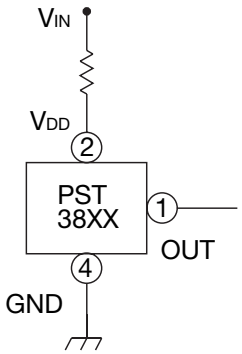


Application Circuits



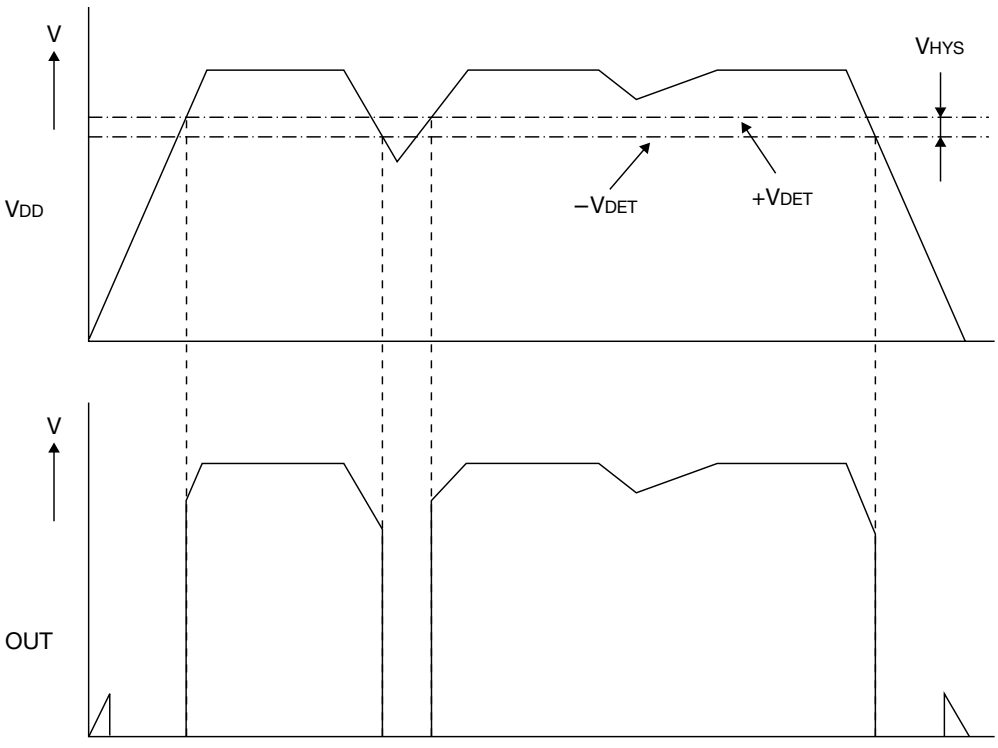
Please be advised that Mitsumi Electric Co., Ltd. is not liable for any accidents or damage caused as a result of the use of this circuit.

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.



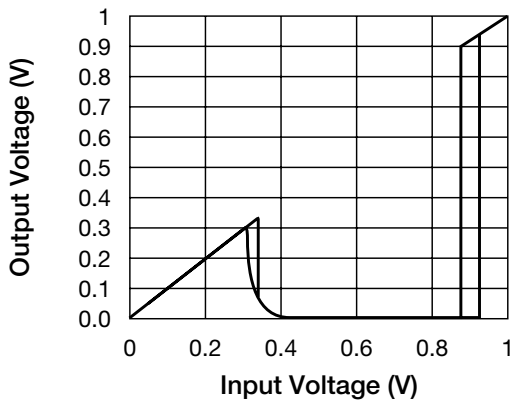
Please note that there is any possibility of circuit oscillation when resistance put in the line V_{IN}.

Timing Chart

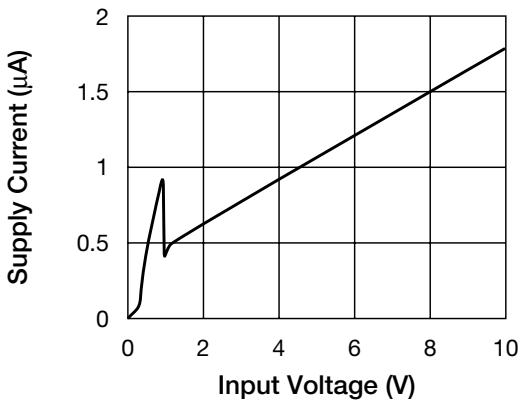


Characteristics PST3809 (−V_{DET}=0.9V)

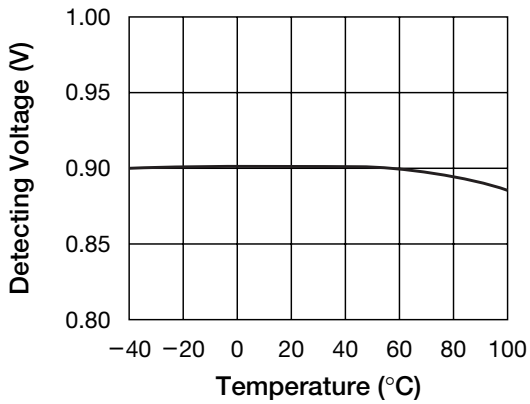
Detecting voltage vs input voltage



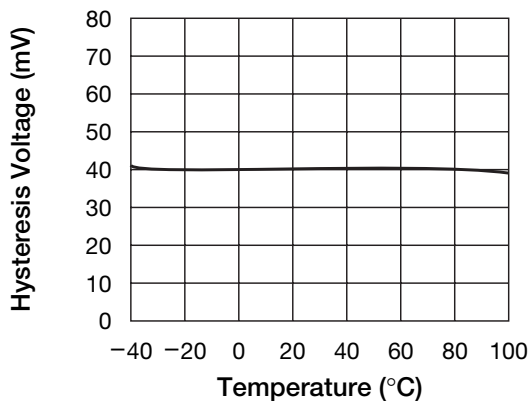
Supply Current vs input voltage



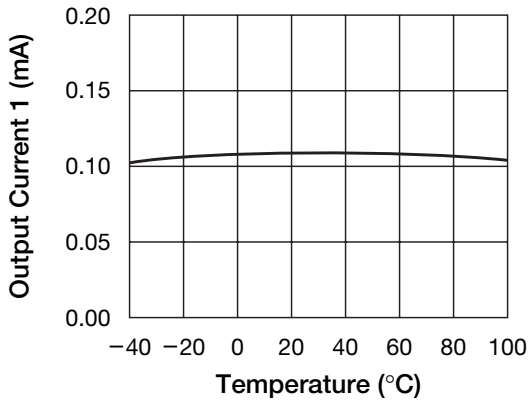
Detecting voltage vs temperature



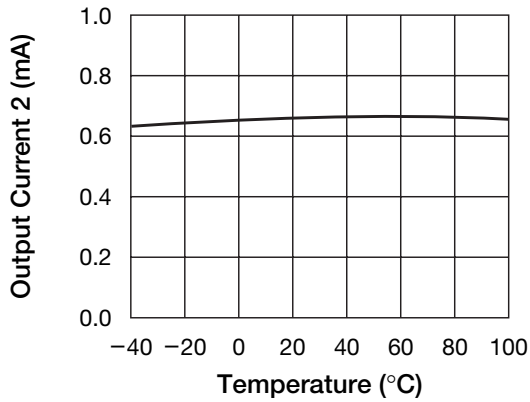
Hysteresis voltage vs temperature



Output current 1 vs temperature



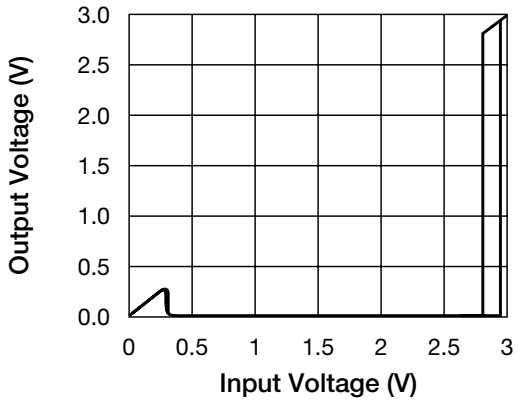
Output current 2 vs temperature



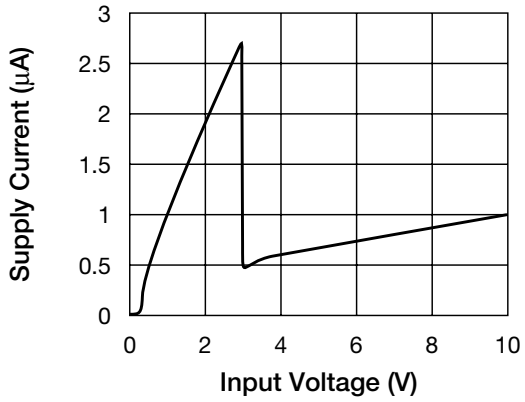
Note: These are typical characteristics.

Characteristics PST3828 (−V_{DET}=2.8V)

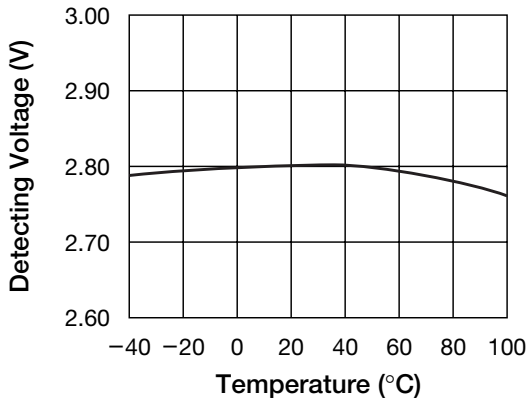
Detecting voltage vs input voltage



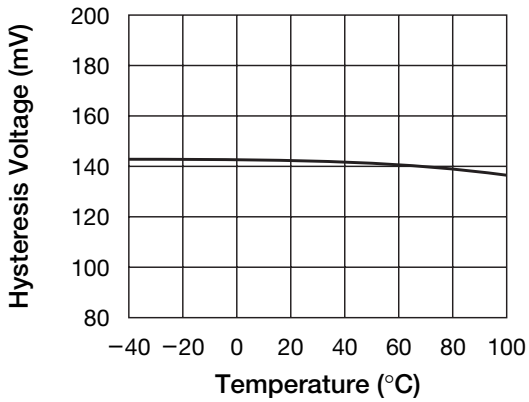
Supply current vs input voltage



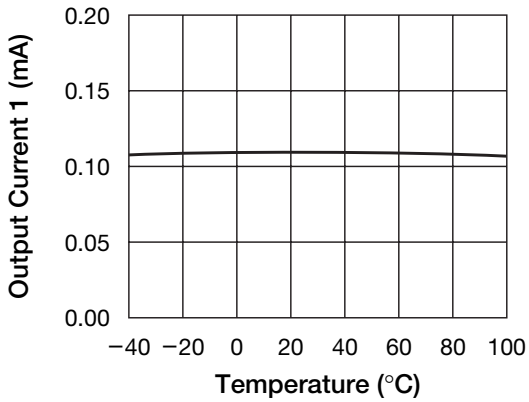
Detecting voltage vs temperature



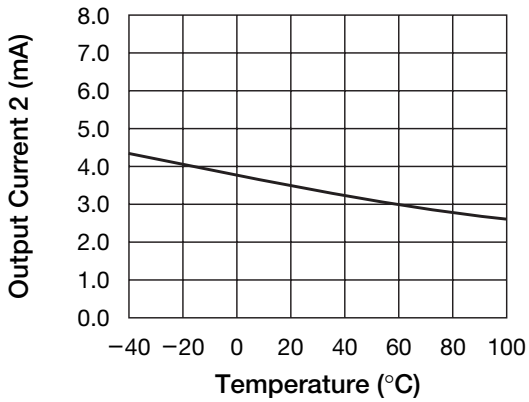
Hysteresis voltage vs temperature



Output current 1 vs temperature



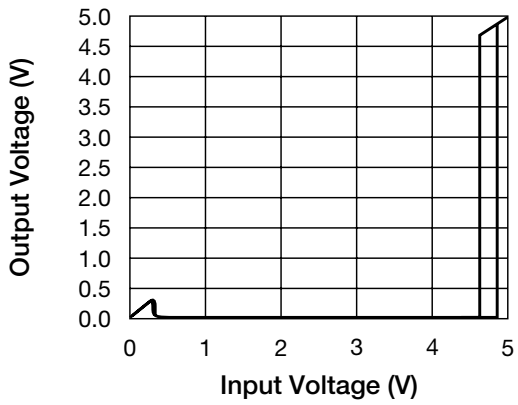
Output current 2 vs temperature



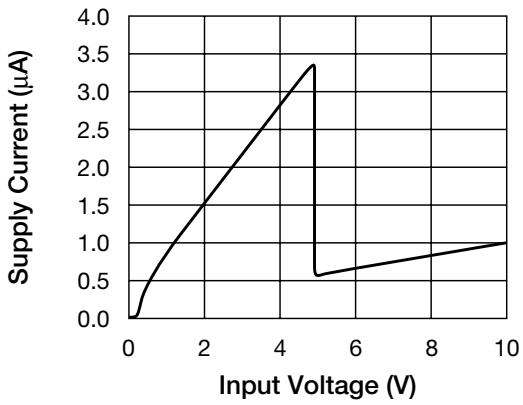
Note: These are typical characteristics.

Characteristics PST3846 (−V_{DET}=4.6V)

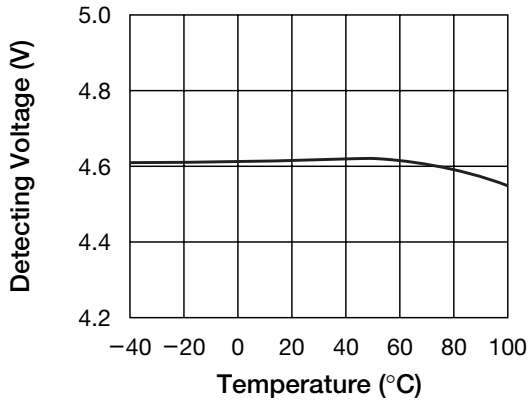
Detecting voltage vs input voltage



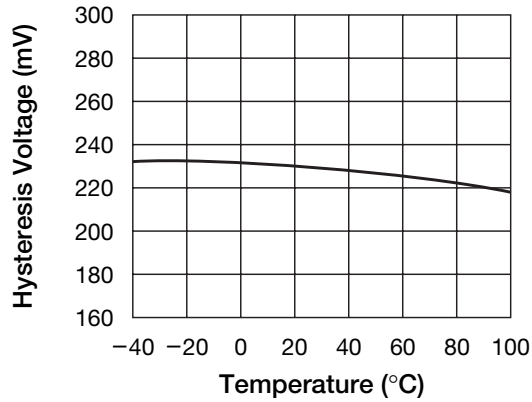
Supply current vs input voltage



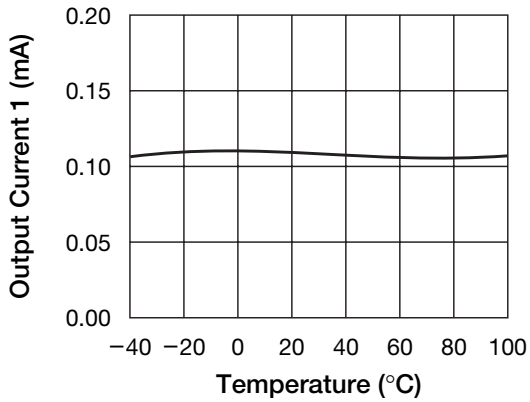
Detecting voltage vs temperature



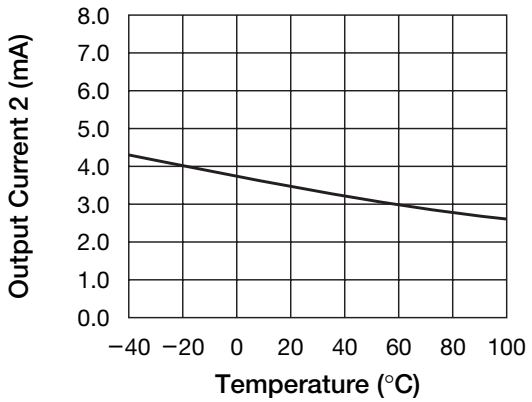
Hysteresis voltage vs temperature



Output current 1 vs temperature



Output current 2 vs temperature



Note: These are typical characteristics.