

HIGH-PRECISION LOW VOLTAGE DETECTOR

A4806

Description





The A4806 is a series of high precision voltage detector with ultra low current consumption (500nA typ. at $V_{DD}=3.0V$). It can work at very low voltage, which makes it perfect for system reset.

The A4806 is composed of high precision voltage reference, comparator, output driver and resistor array. Internally preset detect voltage has a low temperature drift and requires no external trimming.

Two type of output, CMOS and N-Channel Open- Drain are available.

A4806 is available in SOT-89-3, SOT-23, TO-92 & SOT-25 package.

Pin Description

SOT-89-3	TO-92
	
SOT-25	SOT-23
	

Top View

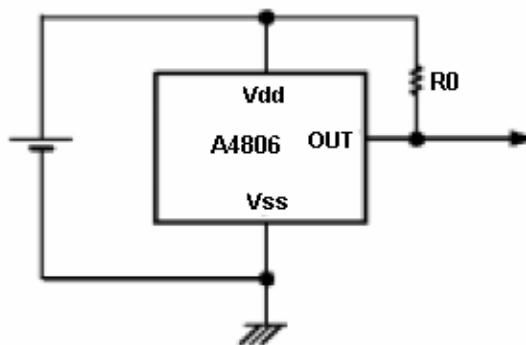
Features

- High-Precision Detection Voltage: $\pm 2\%$
- Detection Voltage: 0.9V~6.0V(in 0.1V step)
- Precise Hysteresis: 4% typ.
- Operating Voltage Range: 0.7V~10V
- Ultra-Low Current Consumption: 0.5uA typ. (at $V_{DD}=3.0V$)
- Two Output Forms: CMOS and N-Channel Open-Drain

Application

- Power Monitor for Portable Equipment such as PDA, DSC, Mobile Phone, Notebook, MP3
- CPU and Logic Circuit Reset
- Battery Checker
- Battery Back-Up Circuit
- Power Failure Detector

Typical Application



1. R0 is necessary for CMOS output products
2. The value of R0 need to be selected in
3. different application, typical value is 470K Ω

Ordering Information

Pin Number				Pin Name	Function
SOT-89-3	TO-92	SOT-23	SOT-25		
1	2	1	1	V _{OUT}	Voltage detection output pin
2	1	3	2	V _{DD}	Voltage input pin
3	2	2	3	V _{SS}	GND pin
-	-	-	4	NC	No connection
-	-	-	5	NC	No connection
Part Number					
A4806K-XXC	A4806Z-XXC	A4806E3-XXC	A4806E5-XXC		
A4806K-XXN	A4806Z-XXN	A4806E3-XXN	A4806E5-XXN		

Absolute Maximum Ratings

Input Voltage Range	0.3V~12V
Output Voltage Range	0.3V~12V
Maximum Output Current	70mA
Maximum Power Dissipation	150mW
Ambient Temperature	-40~+70°C
Storage Temperature (Ts)	-40~+125°C
Lead Temperature and Time	260°C, 10S

Electrical Characteristics

Test Condition: T_{opt}=25°C, unless otherwise noted.

1. A4806-09C/N (0.9V)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
-V _{DET}	Detector Threshold		0.882	0.9	0.918	V
V _{HYS}	Detector Threshold Hysteresis		0.018	0.036	0.054	V
I _{SS}	Current Consumption	V _{DD} =2.9V		1	1.5	μA
V _{DDH}	Maximum Operating Voltage				10	V
V _{DDL}	Minimum Operating Voltage			0.5		V
I _{OUT}	Output Current	Nch V _{DS} =0.05V, V _{DD} =0.7V V _{DS} =0.50V, V _{DD} =0.8V Pch V _{DS} =-2.1V, V _{DD} =4.5V	0.01 0.05 1.0	0.05 0.50 2.0		mA
T _{PLH}	Output Delay Time				20	μS

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2. A4806-27C/N (2.7V)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$-V_{DET}$	Detector Threshold		2.646	2.70	2.754	V
V_{HYS}	Detector Threshold Hysteresis		0.054	0.108	0.162	V
I_{SS}	Current Consumption	$V_{DD}=4.7V$		0.5	1	μA
V_{DDH}	Maximum Operating Voltage				10	V
V_{DDL}	Minimum Operating Voltage			0.5		V
I_{OUT}	Output Current	Nch $V_{DS}=0.05V, V_{DD}=0.7V$ Pch $V_{DS}=-2.1V, V_{DD}=4.5V$	0.01 1.0	0.05 2.0		mA
T_{PLH}	Output Delay Time				20	μS

3. A4806-30C/N (3.0V)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$-V_{DET}$	Detector Threshold		2.94	3.0	3.06	V
V_{HYS}	Detector Threshold Hysteresis		0.06	0.12	0.18	V
I_{SS}	Current Consumption	$V_{DD}=5.0V$		0.5	1	μA
V_{DDH}	Maximum Operating Voltage				10	V
V_{DDL}	Minimum Operating Voltage			0.5		V
I_{OUT}	Output Current	Nch $V_{DS}=0.05V, V_{DD}=0.7V$ Pch $V_{DS}=-2.1V, V_{DD}=4.5V$	0.01 1.0	0.05 2.0		mA
T_{PLH}	Output Delay Time				20	μS

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4. A4806-34C/N (3.4V)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$-V_{DET}$	Detector Threshold		3.332	3.4	3.468	V
V_{HYS}	Detector Threshold Hysteresis		0.068	0.136	0.204	V
I_{SS}	Current Consumption	$V_{DD}=5.0V$		0.5	1	μA
V_{DDH}	Maximum Operating Voltage				10	V
V_{DDL}	Minimum Operating Voltage			0.5		V
I_{OUT}	Output Current	Nch $V_{DS}=0.05V, V_{DD}=0.7V$ Pch $V_{DS}=-2.1V, V_{DD}=4.5V$	0.01 1.0	0.05 2.0		mA
T_{PLH}	Output Delay Time				20	μS

5. A4806-44C/N (4.4V)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$-V_{DET}$	Detector Threshold		4.312	4.4	4.488	V
V_{HYS}	Detector Threshold Hysteresis		0.088	0.176	0.264	V
I_{SS}	Current Consumption	$V_{DD}=6.4V$		0.5	1	μA
V_{DDH}	Maximum Operating Voltage				10	V
V_{DDL}	Minimum Operating Voltage			0.5		V
I_{OUT}	Output Current	Nch $V_{DS}=0.05V, V_{DD}=0.7V$ Pch $V_{DS}=-2.1V, V_{DD}=8.0V$	0.01 1.5	0.05 3.0		mA
T_{PLH}	Output Delay Time				20	μS

Electrical Characteristics By Detector Threshold

Part ID	Detector Threshold			Detector Threshold Hysteresis			Supply Current			Supply Current 2				
	-V _{DET} (V)			V _{HYS} (V)			I _{SS1} (uA)			I _{SS2} (uA)				
	Min	Typ	Max	Min	Typ	Max	Condition	Typ	Max	Condition	Typ	Max		
A4806-09	0.882	0.900	0.918	0.018	0.036	0.054	V _{DD} = (-V _{DET}) +0.1V	0.5	1.0	V _{DD} = (-V _{DET})+2V	1.0	1.5		
A4806-10	0.980	1.000	1.020	0.020	0.040	0.060								
A4806-11	1.078	1.100	1.122	0.022	0.044	0.066								
A4806-12	1.176	1.200	1.224	0.024	0.048	0.072								
A4806-13	1.274	1.300	1.326	0.026	0.052	0.078								
A4806-14	1.372	1.400	1.428	0.028	0.056	0.084								
A4806-15	1.470	1.500	1.530	0.030	0.060	0.090								
A4806-16	1.568	1.600	1.632	0.032	0.064	0.096								
A4806-17	1.666	1.700	1.734	0.034	0.068	0.102								
A4806-18	1.764	1.800	1.836	0.036	0.072	0.108								
A4806-19	1.862	1.900	1.938	0.038	0.076	0.114								
A4806-20	1.960	2.000	2.040	0.040	0.080	0.120								
A4806-21	2.048	2.100	2.142	0.042	0.084	0.126								
A4806-22	2.156	2.200	2.244	0.044	0.088	0.132								
A4806-23	2.254	2.300	2.346	0.046	0.092	0.138								
A4806-24	2.352	2.400	2.448	0.048	0.096	0.144								
A4806-25	2.450	2.500	2.550	0.050	0.100	0.150								
A4806-26	2.548	2.600	2.652	0.052	0.104	0.156								
A4806-27	2.646	2.700	2.754	0.054	0.108	0.162								
A4806-28	2.744	2.800	2.856	0.056	0.112	0.168								
A4806-29	2.842	2.900	2.958	0.058	0.116	0.174								
A4806-30	2.940	3.000	3.060	0.060	0.120	0.180								
A4806-31	3.038	3.100	3.162	0.062	0.124	0.186								
A4806-32	3.136	3.2	3.264	0.064	0.128	0.192								
A4806-33	3.234	3.300	3.366	0.066	0.132	0.198								
													0.5	1.0

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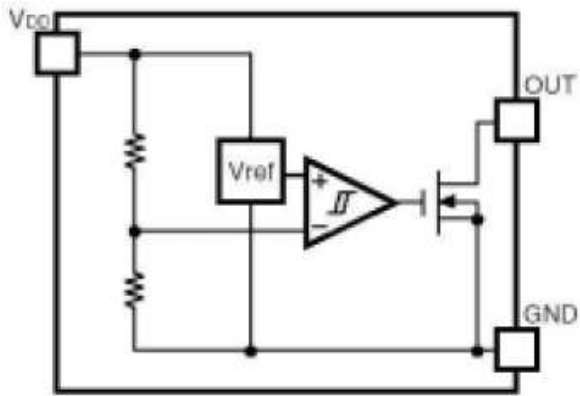
Part ID	Detector Threshold			Detector Threshold Hysteresis			Supply Current			Supply Current 2		
	-V _{DET} (V)			V _{HYS} (V)			I _{SS1} (uA)			I _{SS2} (uA)		
	Min	Typ	Max	Min	Typ	Max	Condition	Typ	Max	Condition	Typ	Max
A4806-34	3.332	3.400	3.468	0.068	0.136	0.204	V _{DD} = (-V _{DET}) +0.1V	0.5	1.0	V _{DD} = (V _{DET})+2V	0.5	1.0
A4806-35	3.430	3.500	3.570	0.070	0.140	0.210						
A4806-36	3.528	3.600	3.672	0.072	0.144	0.216						
A4806-37	3.626	3.700	3.774	0.074	0.148	0.222						
A4806-38	3.724	3.800	3.876	0.076	0.152	0.228						
A4806-39	3.822	3.900	3.978	0.078	0.156	0.234						
A4806-40	3.920	4.000	4.080	0.080	0.160	0.240						
A4806-41	4.018	4.100	4.182	0.082	0.164	0.246						
A4806-42	4.116	4.200	4.284	0.084	0.168	0.252						
A4806-43	4.214	4.300	4.386	0.086	0.172	0.258						
A4806-44	4.312	4.400	4.488	0.088	0.176	0.264						
A4806-45	4.410	4.500	4.590	0.090	0.180	0.270						
A4806-46	4.508	4.600	4.692	0.092	0.184	0.276						
A4806-47	4.606	4.700	4.794	0.094	0.188	0.282						
A4806-48	4.704	4.800	4.896	0.096	0.192	0.288						
A4806-49	4.802	4.900	4.998	0.098	0.196	0.294						
A4806-50	4.900	5.000	5.100	0.100	0.200	0.300						
A4806-51	4.998	5.100	5.202	0.102	0.204	0.306						
A4806-52	5.096	5.200	5.304	0.104	0.208	0.312						
A4806-53	5.194	5.300	5.406	0.106	0.212	0.318						
A4806-54	5.292	5.400	5.508	0.108	0.216	0.324						
A4806-55	5.390	5.500	5.610	0.110	0.220	0.330						
A4806-56	5.488	5.600	5.712	0.112	0.224	0.336						
A4806-57	5.586	5.700	5.814	0.114	0.228	0.342						
A4806-58	5.684	5.800	5.916	0.116	0.232	0.348						
A4806-59	5.782	5.900	6.018	0.118	0.236	0.354						
A4806-60	5.880	6.000	6.120	0.120	0.240	0.360						

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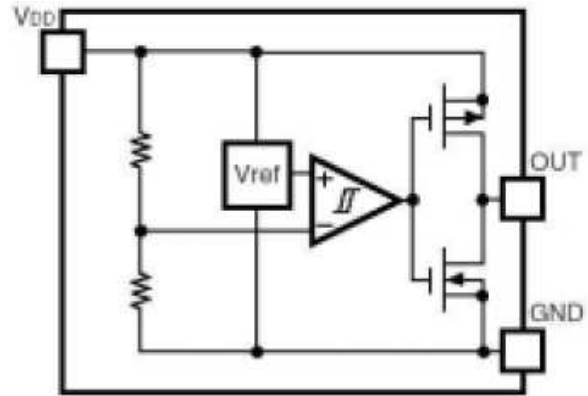
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Output Current 1			Output Current 2			Output Delay Time	Minimum Operating Voltage		Detector Threshold Temperature Coefficient	
I _{OUT1} (mA)			I _{OUT2} (mA)			T _{PLH} (uS)	V _{DDL} (V)		Δ-V _{DET} /ΔTppm/°C	
Condition	Min	Typ	Condition	Min	Typ	Max	Typ	Max	Condition	Typ
Nch V _{DS} =0.05V V _{DD} =0.7V	0.01	0.05	V _{DD} =0.85V	0.1	0.5	20	0.5	0.7	-40°C ≤ T _{opt} ≤ 85°C	± 100
			V _{DD} =1.00V	0.2	1.0					
			Nch V _{DS} =0.5V V _{DD} =1.5V	1.0	2.0					

Block Diagram



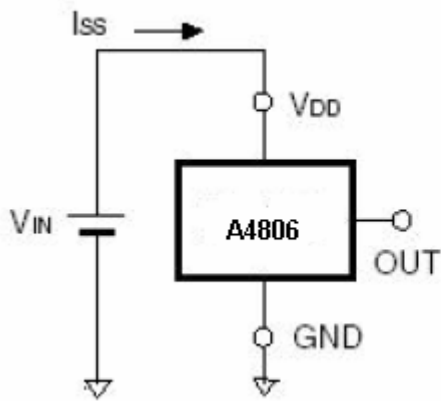
N channel open-drain



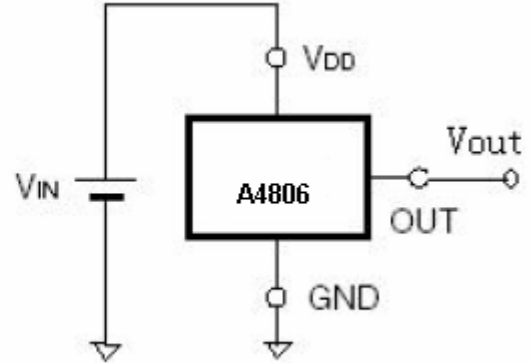
CMOS output

Test Circuits

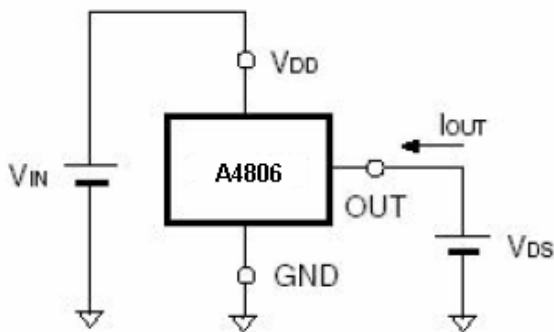
1. Supply Current



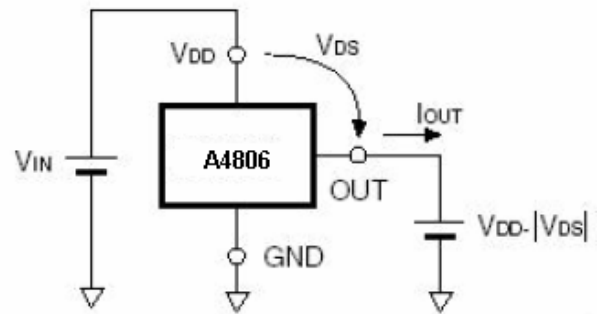
2. Detector Threshold



3. Nch Drive Output Current

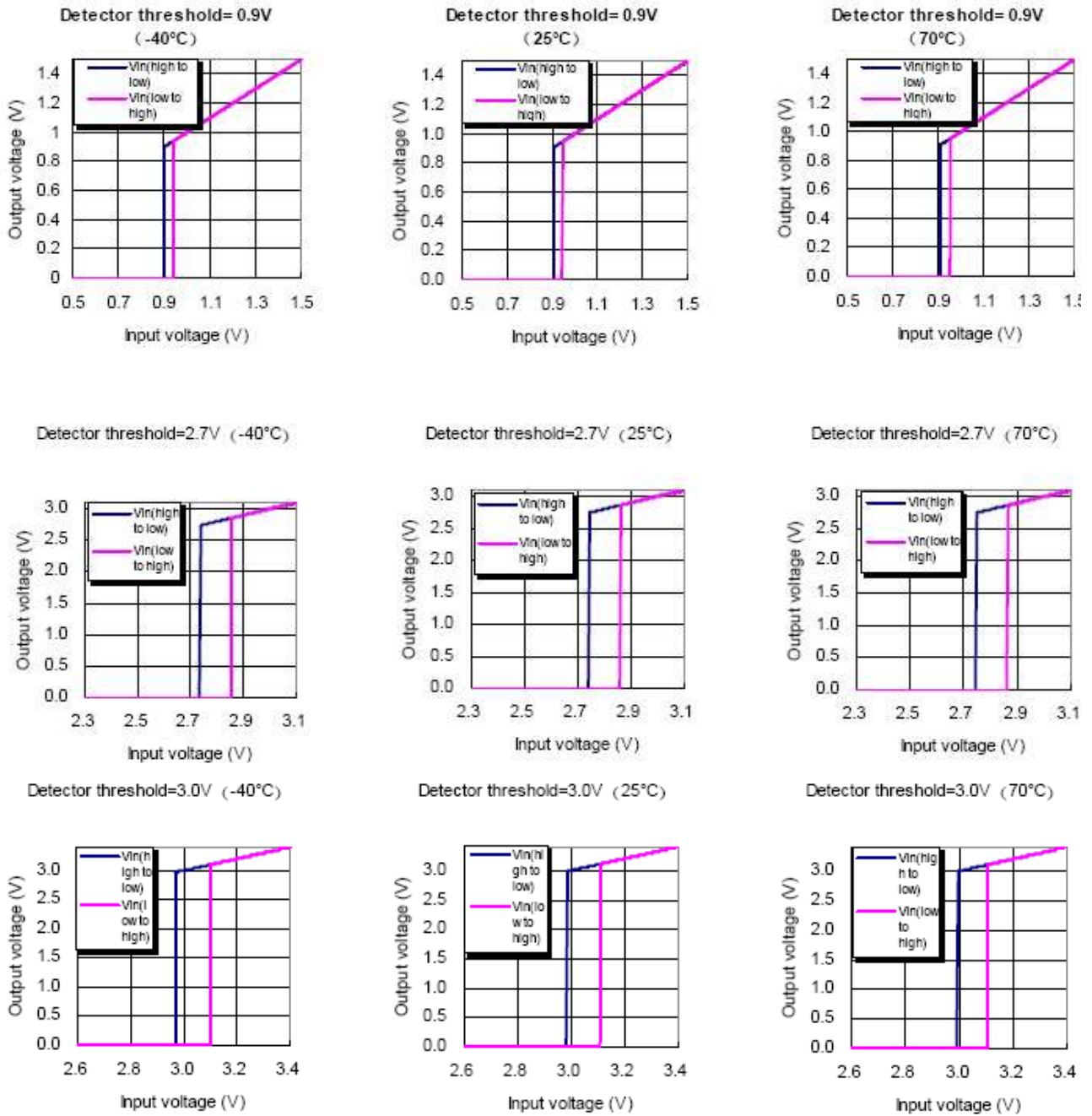


4. Pch Drive Output Current



Typical Performance Characteristics

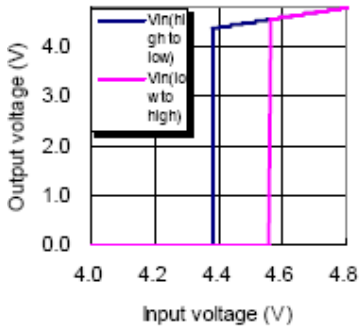
1. Output Voltage vs Input Voltage



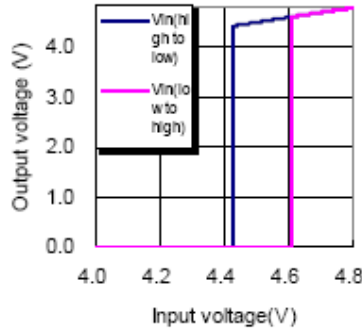
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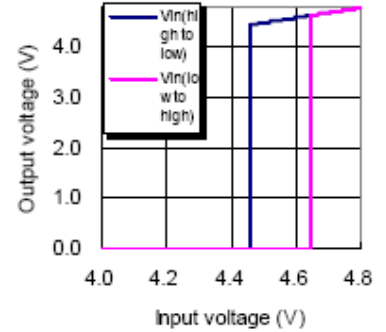
Detector threshold=4.4V (-40°C)



Detector threshold=4.4V (25°C)

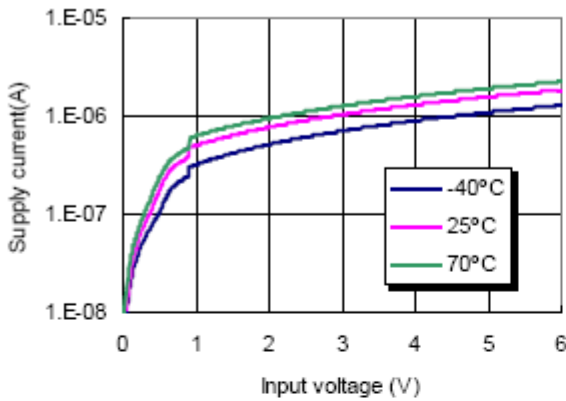


Detector threshold=4.4V (70°C)

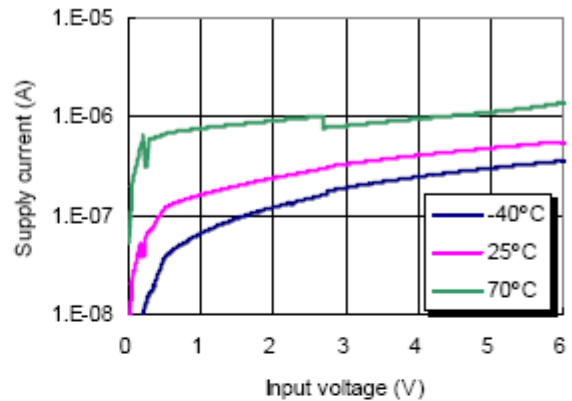


2. Supply Current vs. Input Voltage

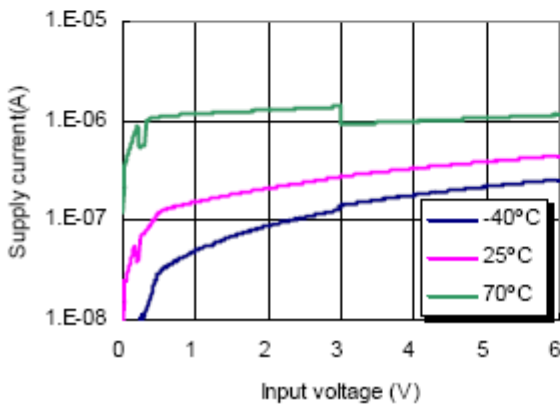
Detector threshold= 0.9V



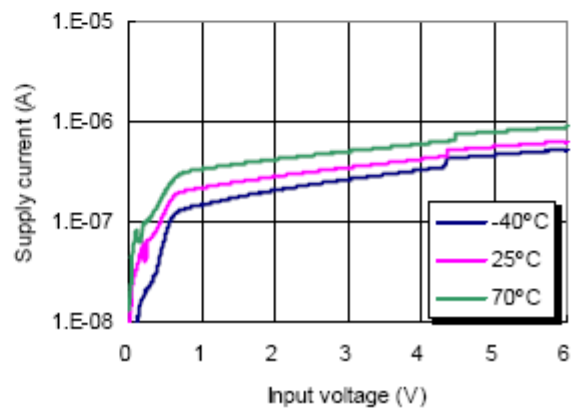
Detector threshold=2.7V



Detector threshold=3.0V

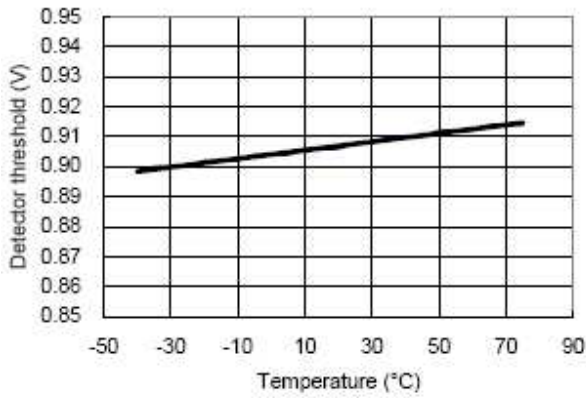


Detector threshold=4.4V

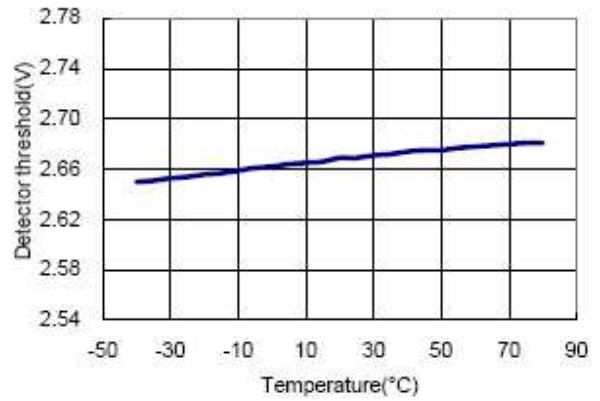


3. Detector Threshold Hysteresis vs Temperature

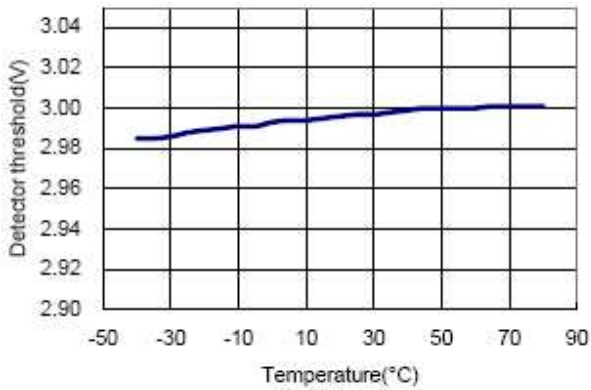
Detector threshold= 0.9V



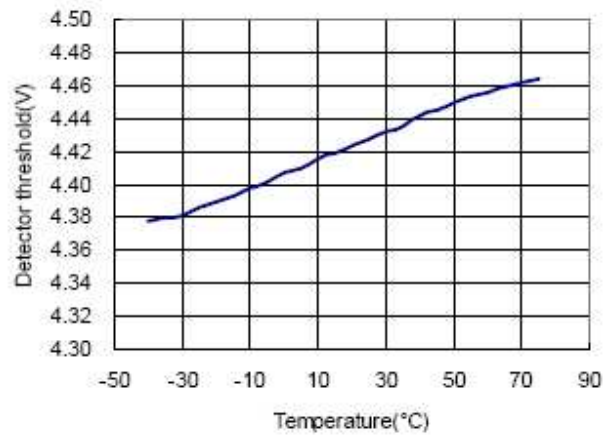
Detector threshold=2.7V



Detector threshold=3.0V



Detector threshold=4.4V

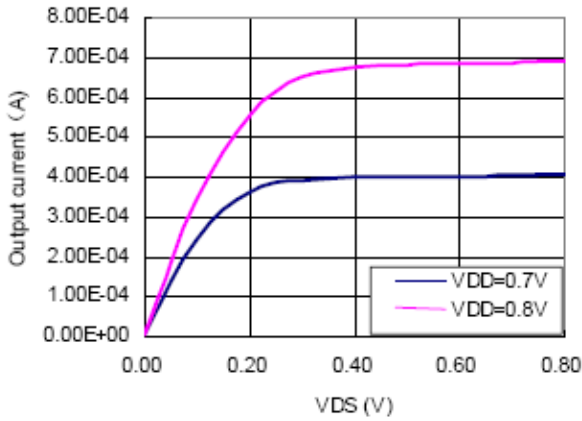


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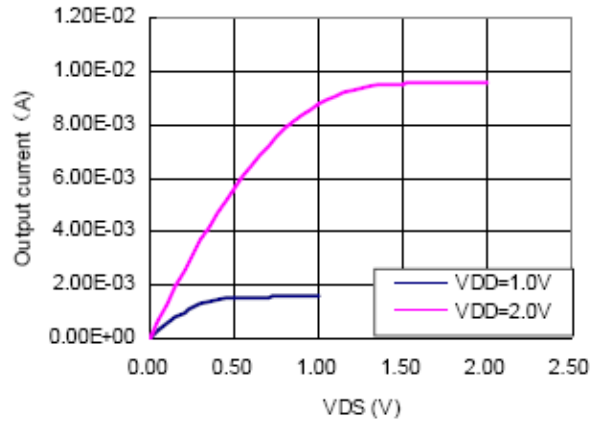
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4. Nch Driver Output Current vs V_{DS}

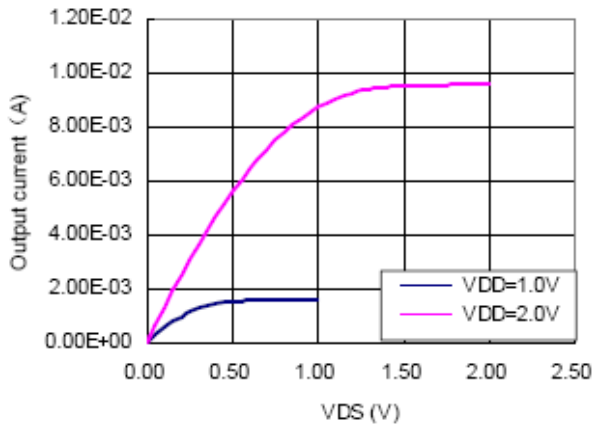
A4806-09C



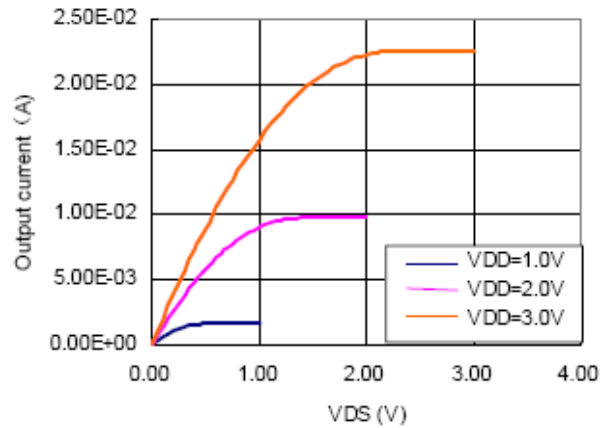
A4806-27C



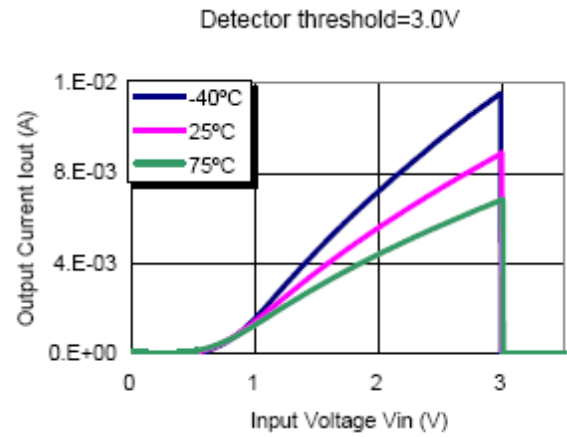
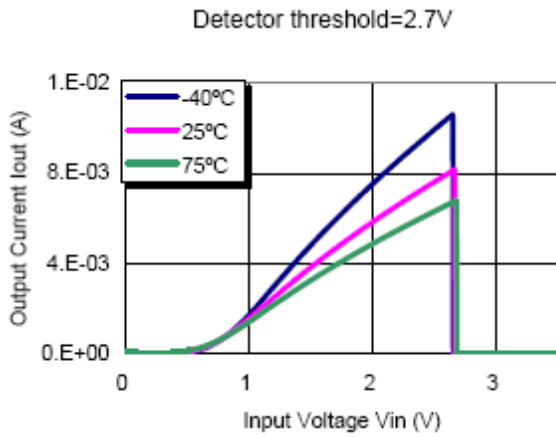
A4806-30C



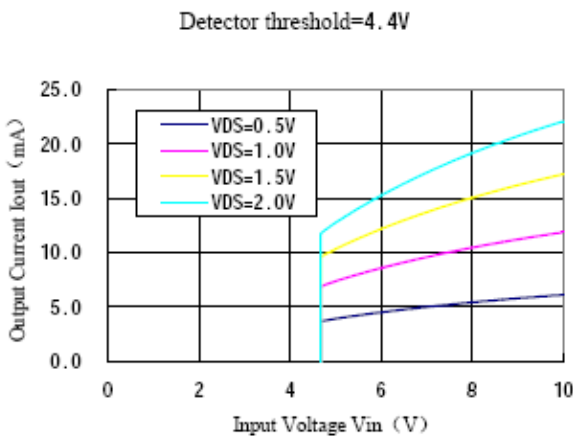
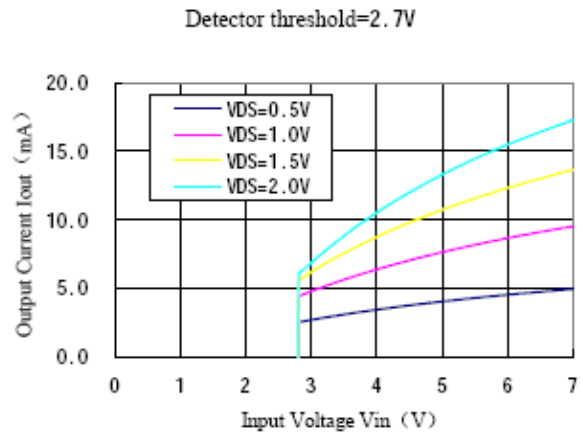
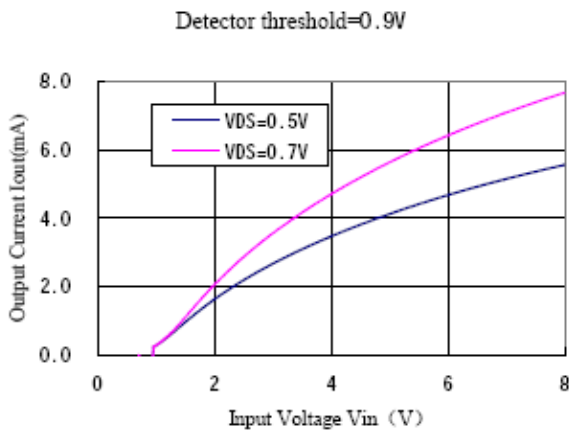
A4806-44C



5. Nch Driver Output Current vs Input Voltage

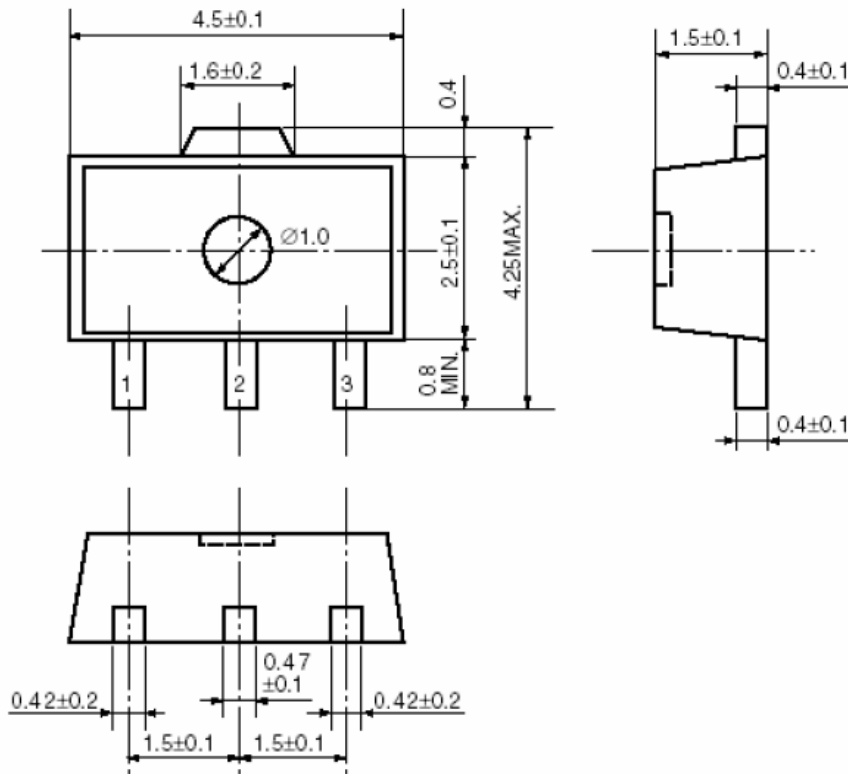


6. Pch Driver Output Current vs Input Current

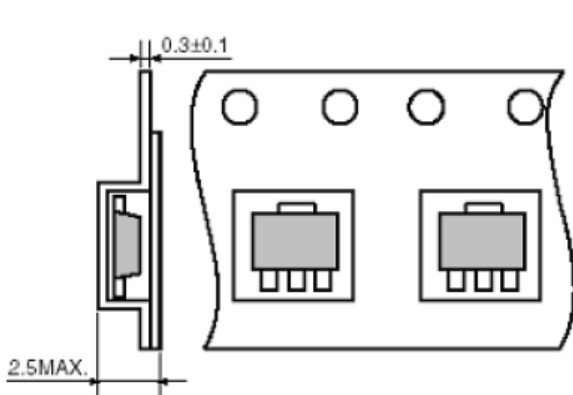


Package Information

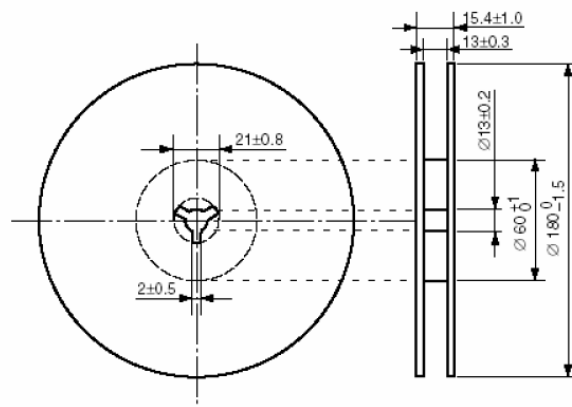
Dimension in SOT-89-3 (Unit: mm)



Tape Dimension



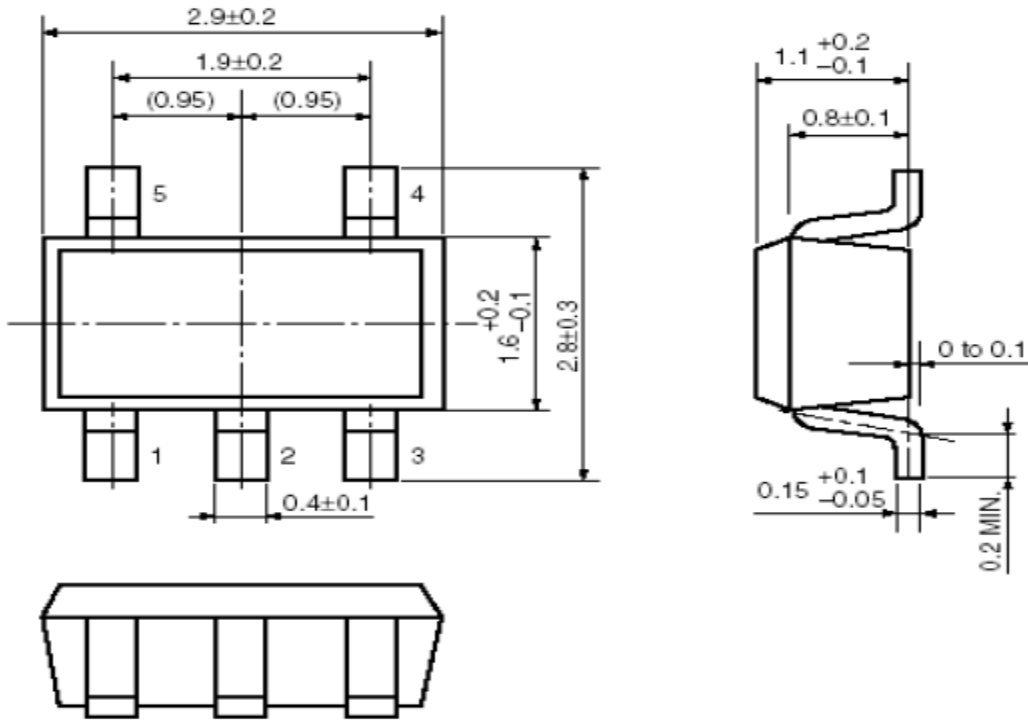
Tape & Reel Dimension



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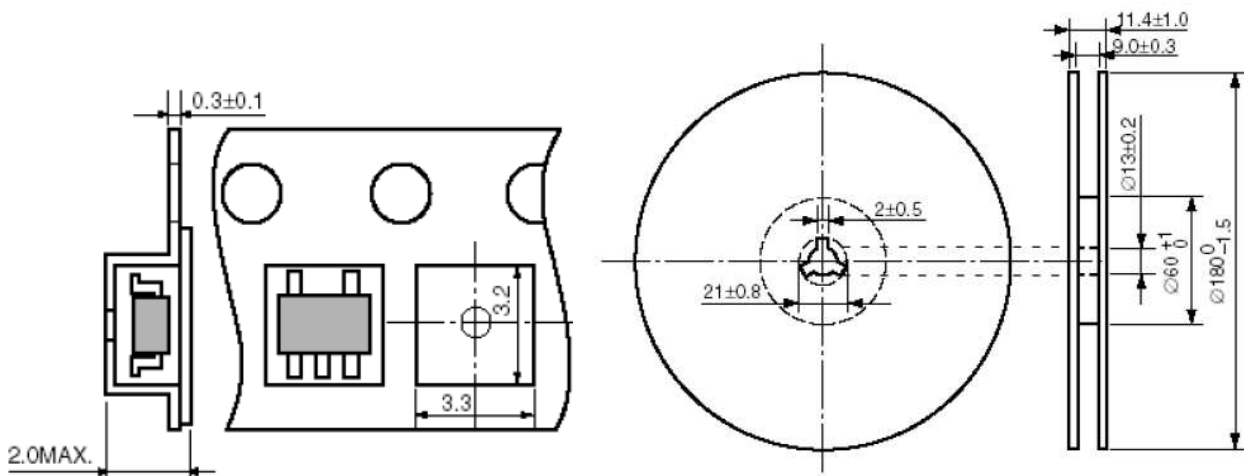
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Dimension in SOT-25 (Unit: mm)



Tape Dimension

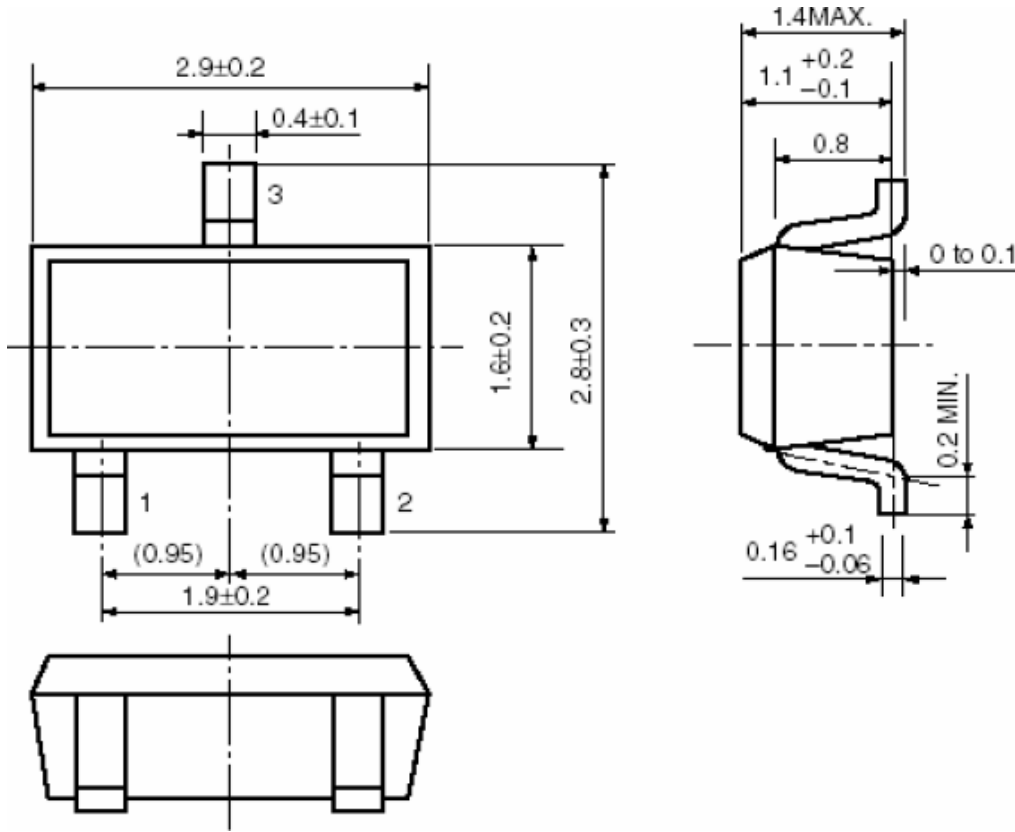
Tape & Reel Dimension



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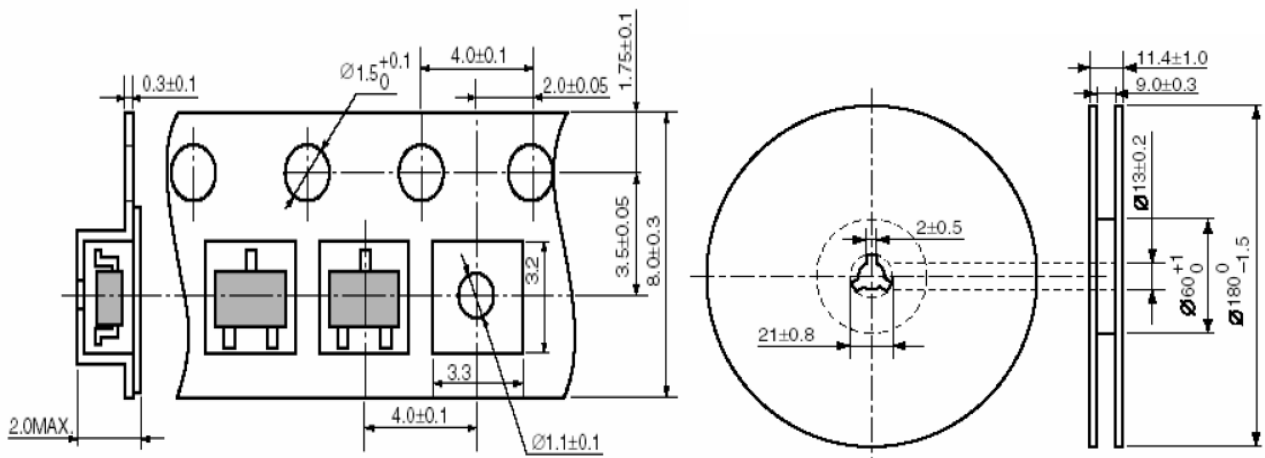
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Dimension in SOT-23 (Unit: mm)



Tape Dimension

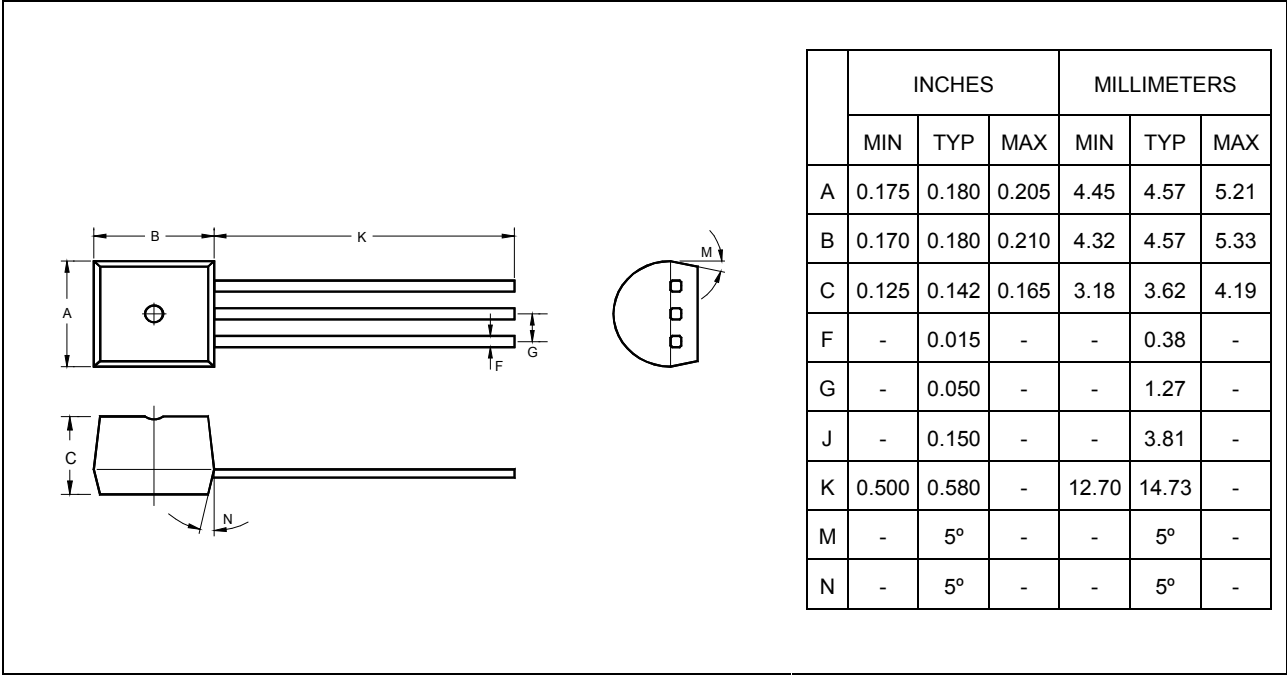
Tape & Reel Dimension



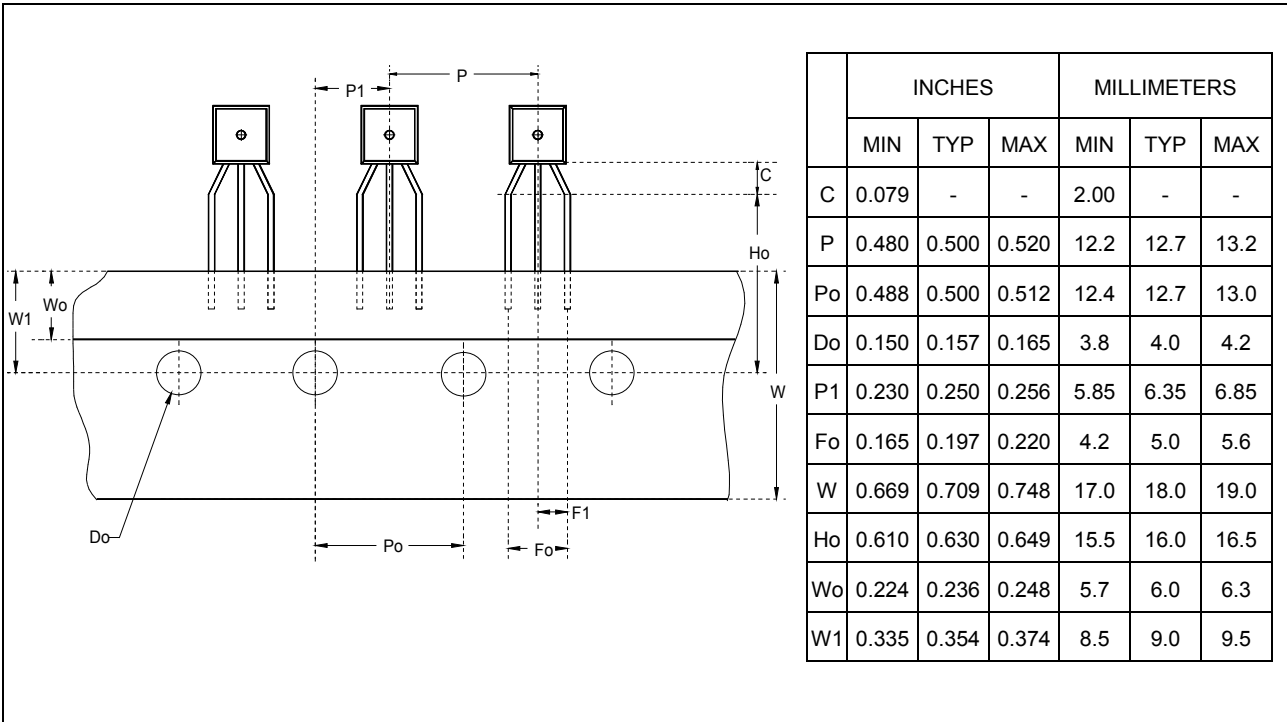
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Dimension in TO-92 (Unit: mm)



Ammono Dimension



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