BL8506

High-Precision Low Voltage Detector

DESCRIPTION

BL8506 is a series of high precision voltage detector with ultra low current consumption (500nA typ. at Vdd=3.0V). It can work at very low voltage, which makes it perfect for system reset.

BL8506 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.

BL8506 is available in SOT-89-3, SOT-23-3, TO92, SOT23-5 packages which are Pb free.

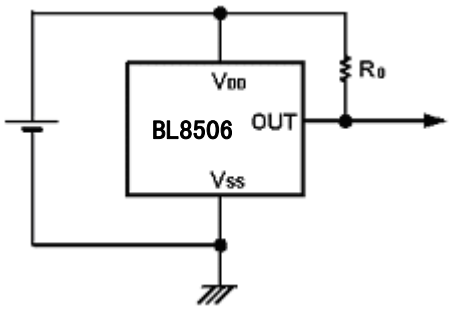
FEATURES

- High-precision detection Voltage： ±2%
- Detection Voltage：0.9V~6.0V (in 0.1V steps)
- Precise hysteresis：4% typ.
- Operating Voltage range：0.7V~10V
- Ultra-low current consumption：500nA typ. (at VDD＝3.0V)\
- Two Output Forms ： CMOS(Active Low) and N-channel open-drain(Active Low)

APPLICATIONS

- 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

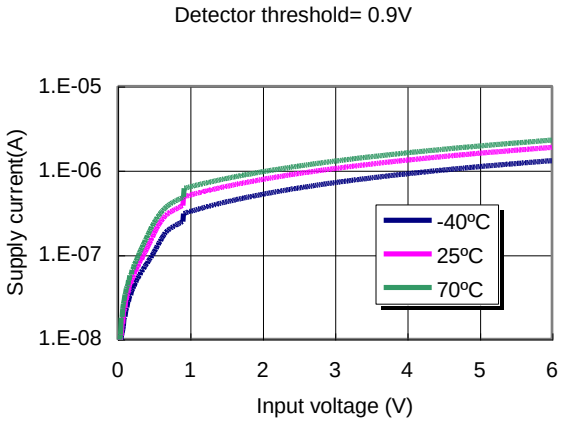
TYPICAL APPLICATION



Note：

- R_0 is unnecessary for CMOS output products.,
- The value of R_0 need to be selected in different application, Typical value is 470kΩ

ELECTRICAL CHARACTERISTICS



BL8506

High-Precision Low Voltage Detector

Selection Guide：

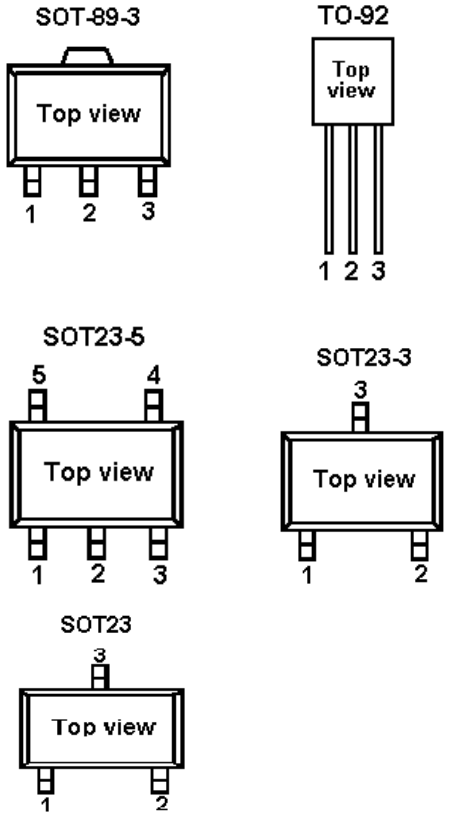
BL8506-*XX X XX*

Package Type：
RM： SOT-23-3
RN： SOT-23-5
RO： SOT23
SM： SOT-89-3
T： TO-92
（Default、Pb Free）

Output Type：
N：Nch Open-drain
C：CMOS

Detector Voltage：
09……0.9V
30……3.0V
……
50……5.0V
60……6.0V

Pin Assignment：



Pin Description:

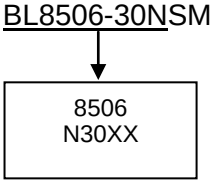
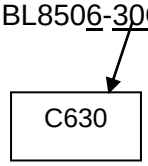
PIN Number				PIN Name	Function
SOT-89-3	TO-92	SOT-23-3/SOT23	SOT-23-5		
1	3	1	1	VOUT	Voltage detection output Pin
2	1	3	2	VDD	Voltage input Pin
3	2	2	3	VSS	GND Pin
—	—	—	4	NC	No connection
—	—	—	5	NC	No connection

Product Classification:

Product Name	*Detector Voltage*	**Output Type**	**Package**
BL8506-XXNRM	XX V	Nch Open-Drain	SOT-23-3
BL8506-XXNRN	XX V	Nch Open-Drain	SOT-23-5
BL8506-XXNRO	XX V	Nch Open-Drain	SOT-23
BL8506-XXNSM	XX V	Nch Open-Drain	SOT-89-3
BL8506-XXNT	XX V	Nch Open-Drain	TO-92
BL8506-XXCRM	XX V	CMOS	SOT-23-3
BL8506-XXCRN	XX V	CMOS	SOT-23-5
BL8506-XXCRO	XX V	CMOS	SOT-23
BL8506-XXCSM	XX V	CMOS	SOT-89-3
BL8506-XXCT	XX V	CMOS	TO-92

Product Mark Information:

Product NO.	**Mark**
BL8506-09CSM	8506 09CXX
BL8506-20CT	8506 20CXX
BL8506-27CSM	8506 27CXX
BL8506-30CT	8506 30CXX
……	……
BL8506-09NRM	N609
BL8506-11NRO	N611
BL8506-21NRN	N621
BL8506-27CRM	C627
BL8506-30CRM	C630
……	……

SOT-89-3 **TO-92**	**SOT-23-5** **SOT-23-3/SOT23**
Example： BL8506-30NSM  XX:Lot No.	Example： BL8506-30CRM 

ABSOLUTE MAXIMUM RATING

Parameter		Value
Input Voltage		-0.3V-10V
Output Voltage range		-0.3V-12V
Maximum Output current		70mA
Ambient Temperature(Ta)		-40°C -85°C
Power Dissipation	SOT-23-3	250mW
	SOT-23-5	250mW
	SOT-89-3	500mW
	TO-92	600mW
Storage Temperature(Ts)		-40°C -150°C
Lead Temperature & Time		260°C,10S

Note:
Exceed these limits to damage to the device.
Exposure to absolute maximum rating conditions may affect device reliability

RECOMMENDED WORK CONDITIONS

Item	Min	Recommended	Max.	Unit
Input Voltage Range	0.7		10	V
Ambient Temperature	-40	25	85	°C

ELECTRICAL CHARACTERISTICS

BL8506CXXTR09C/N（0.9V） (Topt＝25℃,Unless otherwise specified.)

Symbol	Parameter	Conditions	Reference data			Unit
			Min.	Typ.	Max.	
-VDET	Detector Threshold		0.882	0.9	0.918	V
VHYS	Detector Threshold Hysteresis		0.018	0.036	0.054	V
ISS	Current consumption	VDD=2.9V		1	2.5	uA
VDDH	Maximum operating voltage				10	V
VDDL	Minimum Operating voltage			0.5		V
IOUT	Output current	Nch VDS=0.05V，VDD=0.7V VDS=0.50V，VDD=0.8V	 0.01 0.05	 0.05 0.50		mA
		Pch VDS=-2.1V，VDD=4.50V	1.0	2.0		mA
TPLH	Output Delay Time				20	uS

BL8506CXXTR25C/N（2.5V） (Topt＝25℃,Unless otherwise specified.)

Symbol	Parameter	Conditions	Reference data			Unit
			Min.	Typ.	Max.	
-VDET	Detector Threshold		2.450	2.5	2.550	V
VHYS	Detector Threshold Hysteresis		0.050	0.100	0.150	V
ISS	Current consumption	VDD=4.5V		1	2.5	uA
VDDH	Maximum operating voltage				10	V
VDDL	Minimum Operating voltage			0.5		V
IOUT	Output current	Nch VDS=0.05V，VDD=0.70V	0.01	0.05		mA
		Pch VDS=-2.1V，VDD=4.50V	1.0	2.0		mA
TPLH	Output Delay Time				20	uS

BL8506CXXTR27C/N（2.7V） (Topt＝25℃,Unless otherwise specified.)

Symbol	Parameter	Conditions	Reference data			Unit
			Min.	Typ.	Max.	
-VDET	Detector Threshold		2.646	2.7	2.754	V
VHYS	Detector Threshold Hysteresis		0.054	0.108	0.162	V
ISS	Current consumption	VDD=4.7V		1	2.5	uA
VDDH	Maximum operating voltage				10	V
VDDL	Minimum Operating voltage			0.5		V
IOUT	Output current	Nch VDS=0.05V，VDD=0.70V	0.01	0.05		mA
		Pch VDS=-2.1V，VDD=4.50V	1.0	2.0		mA
TPLH	Output Delay Time				20	uS

BL8506CXXTR30C/N（3.0V） (Topt＝25℃,Unless otherwise specified.)

Symbol	Parameter	Conditions	Reference data			Unit
			Min.	Typ.	Max.	
-VDET	Detector Threshold		2.94	3.0	3.06	V
VHYS	Detector Threshold Hysteresis		0.060	0.12	0.18	V
ISS	Current consumption	VDD=5.0V		1	2.5	uA
VDDH	Maximum operating voltage				10	V
VDDL	Minimum Operating voltage			0.5		V
IOUT	Output current	Nch VDS=0.05V，VDD=0.7V	0.01	0.05		mA
		Pch VDS=-2.1V，VDD=4.50V	1.0	2.0		mA
TPLH	Output Delay Time				20	uS

BL8506CXXTR34C/N（3.4V） (Topt＝25℃,Unless otherwise specified.)

Symbol	Parameter	Conditions	Reference data			Unit
			Min.	Typ.	Max.	
-VDET	Detector Threshold		3.332	3.4	3.468	V
VHYS	Detector Threshold Hysteresis		0.068	0.136	0.204	V
ISS	Current consumption	VDD=5.0V		1	2.5	uA
VDDH	Maximum operating voltage				10	V
VDDL	Minimum Operating voltage			0.5		V
IOUT	Output current	Nch VDS=0.05V，VDD=0.7V	0.01	0.05		mA
		Pch VDS=-2.1V，VDD=4.50V	1.0	2.0		mA
TPLH	Output Delay Time				20	uS

BL8506CXXTR44C/N（4.4V） (Topt＝25℃,Unless otherwise specified.)

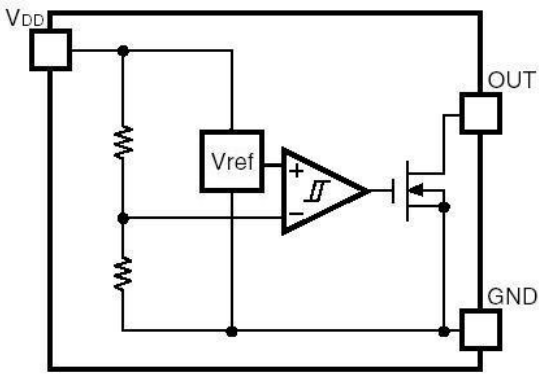
Symbol	Parameter	Conditions	Reference data			Unit
			Min.	Typ.	Max.	
-VDET	Detector Threshold		4.312	4.4	4.488	V
VHYS	Detector Threshold Hysteresis		0.088	0.176	0.264	V
ISS	Current consumption	VDD=6.4V		1	2.5	uA
VDDH	Maximum operating voltage				10	V
VDDL	Minimum Operating voltage			0.5		V
IOUT	Output current	Nch VDS=0.05V，VDD=0.7V	0.01	0.05		mA
		Pch VDS=-2.1V，VDD=8.0V	1.5	3.0		mA
TPLH	Output Delay Time				20	uS

Electrical Characteristics By Detector Threshold

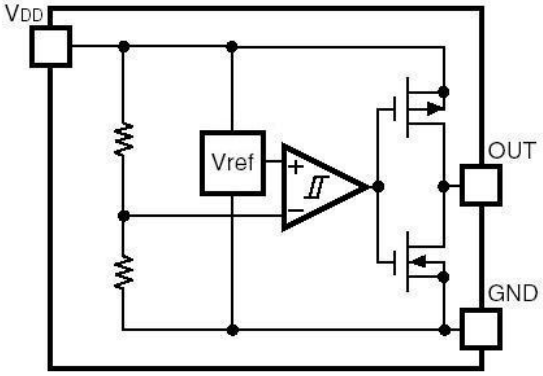
Part Number	Detector Threshold -Vdet[V]			Detector Threshold Hysteresis Vhys[V]			Supply Current1 Iss1[uA]			Supply Current2 Iss2[uA]		
	Min.	Typ.	Max.	Min.	Typ.	Max.	Condition	Typ.	Max.	Condition	Typ.	Max.
BL8506CXXTR09C/N	0.882	0.900	0.918	0.018	0.036	0.054	Vdd= (-Vdet) +0.1V	0.5	2.5	Vdd= (-Vdet) +2V	1.0	2.5
BL8506CXXTR10C/N	0.980	1.000	1.020	0.020	0.040	0.060						
BL8506CXXTR11C/N	1.078	1.100	1.122	0.022	0.044	0.066						
BL8506CXXTR12C/N	1.176	1.200	1.224	0.024	0.048	0.072						
BL8506CXXTR13C/N	1.274	1.300	1.326	0.026	0.052	0.078						
BL8506CXXTR14C/N	1.372	1.400	1.428	0.028	0.056	0.084						
BL8506CXXTR15C/N	1.470	1.500	1.530	0.030	0.060	0.090						
BL8506CXXTR16C/N	1.568	1.600	1.632	0.032	0.064	0.096						
BL8506CXXTR17C/N	1.666	1.700	1.734	0.034	0.068	0.102						
BL8506CXXTR18C/N	1.764	1.800	1.836	0.036	0.072	0.108						
BL8506CXXTR19C/N	1.862	1.900	1.938	0.038	0.076	0.114						
BL8506CXXTR20C/N	1.960	2.000	2.040	0.040	0.080	0.120					0.5	2.5
BL8506CXXTR21C/N	2.058	2.100	2.142	0.042	0.084	0.126						
BL8506CXXTR22C/N	2.156	2.200	2.244	0.044	0.088	0.132						
BL8506CXXTR23C/N	2.254	2.300	2.346	0.046	0.092	0.138						
BL8506CXXTR24C/N	2.352	2.400	2.448	0.048	0.096	0.144						
BL8506CXXTR25C/N	2.450	2.500	2.550	0.050	0.100	0.150						
BL8506CXXTR26C/N	2.548	2.600	2.652	0.052	0.104	0.156						
BL8506CXXTR27C/N	2.646	2.700	2.754	0.054	0.108	0.162						
BL8506CXXTR28C/N	2.744	2.800	2.856	0.056	0.112	0.168						
BL8506CXXTR29C/N	2.842	2.900	2.958	0.058	0.116	0.174						
BL8506CXXTR30C/N	2.940	3.000	3.060	0.060	0.120	0.180						
BL8506CXXTR31C/N	3.038	3.100	3.162	0.062	0.124	0.186						
BL8506CXXTR32C/N	3.136	3.200	3.264	0.064	0.128	0.192						
BL8506CXXTR33C/N	3.234	3.300	3.366	0.066	0.132	0.198						
BL8506CXXTR34C/N	3.332	3.400	3.468	0.068	0.136	0.204						
BL8506CXXTR35C/N	3.430	3.500	3.570	0.070	0.140	0.210						
BL8506CXXTR36C/N	3.528	3.600	3.672	0.072	0.144	0.216						
BL8506CXXTR37C/N	3.626	3.700	3.774	0.074	0.148	0.222						
BL8506CXXTR38C/N	3.724	3.800	3.876	0.076	0.152	0.228						
BL8506CXXTR39C/N	3.822	3.900	3.978	0.078	0.156	0.234						
BL8506CXXTR40C/N	3.920	4.000	4.080	0.080	0.160	0.240						
BL8506CXXTR41C/N	4.018	4.100	4.182	0.082	0.164	0.246						
BL8506CXXTR42C/N	4.116	4.200	4.284	0.084	0.168	0.252						
BL8506CXXTR43C/N	4.214	4.300	4.386	0.086	0.172	0.258						
BL8506CXXTR44C/N	4.312	4.400	4.488	0.088	0.176	0.264						
BL8506CXXTR45C/N	4.410	4.500	4.590	0.090	0.180	0.270						
BL8506CXXTR46C/N	4.508	4.600	4.692	0.092	0.184	0.276						
BL8506CXXTR47C/N	4.606	4.700	4.794	0.094	0.188	0.282						
BL8506CXXTR48C/N	4.704	4.800	4.896	0.096	0.192	0.288						
BL8506CXXTR49C/N	4.802	4.900	4.998	0.098	0.196	0.294						
BL8506CXXTR50C/N	4.900	5.000	5.100	0.100	0.200	0.300						
BL8506CXXTR51C/N	4.998	5.100	5.202	0.102	0.204	0.306						
BL8506CXXTR52C/N	5.096	5.200	5.304	0.104	0.208	0.312						
BL8506CXXTR53C/N	5.194	5.300	5.406	0.106	0.212	0.318						
BL8506CXXTR54C/N	5.292	5.400	5.508	0.108	0.216	0.324						
BL8506CXXTR55C/N	5.390	5.500	5.610	0.110	0.220	0.330						
BL8506CXXTR56C/N	5.488	5.600	5.712	0.112	0.224	0.336						
BL8506CXXTR57C/N	5.586	5.700	5.814	0.114	0.228	0.342						
BL8506CXXTR58C/N	5.684	5.800	5.916	0.116	0.232	0.348						
BL8506CXXTR59C/N	5.782	5.900	6.018	0.118	0.236	0.354						
BL8506CXXTR60C/N	5.880	6.000	6.120	0.120	0.240	0.360						

Output Current1			Output Current2				Output Delay Time	Minimum Operating Voltage		Detector Threshold Temperature Coefficient	
Iout1[mA]			Iout2[mA]				T_{PLH}[us]	V_{DDL}[V]		$-V_{DET}$/ Tppm/°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	NCH, V_{DS}=0.5V	Vdd=0.85V	0.1	0.5	20	0.5	0.7	-40°C -85°C	100
				Vdd=1.0V	0.2	1.0					
				V_{DD}=1.5V	1.0	2.0					

BLOCK DIAGRAM

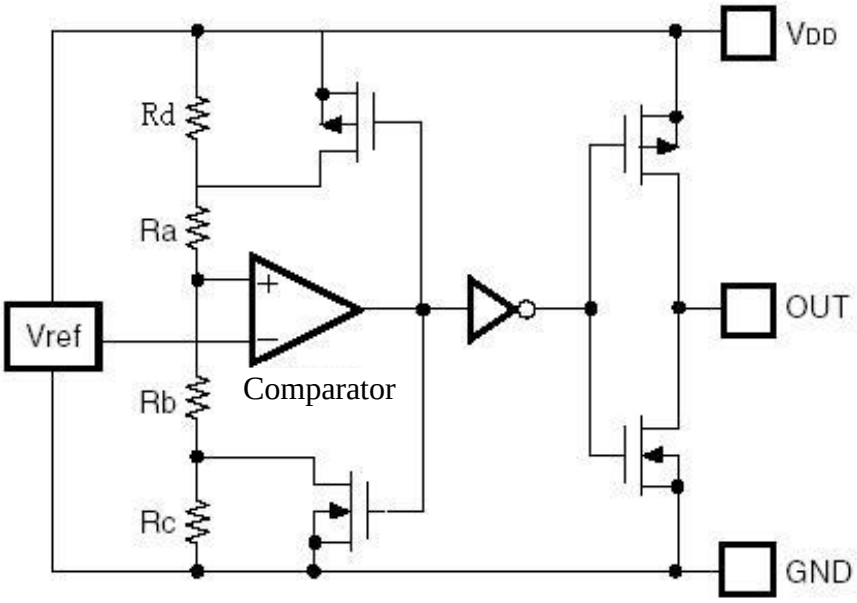


N Channel Open Drain



CMOS Output

FUNCTION DESCRIPTION



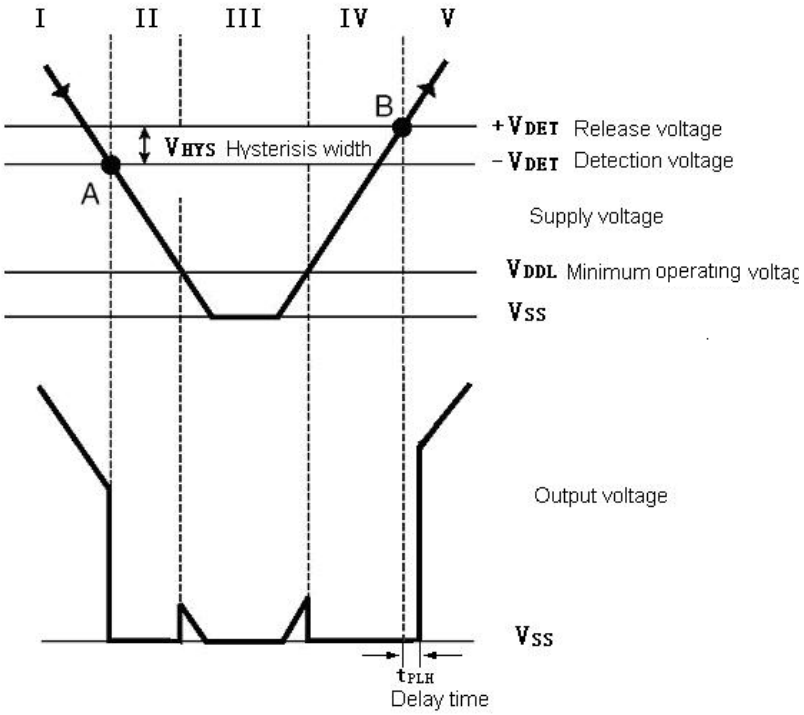
High precision low temperature co-efficiency reference voltage is applied to the negative input of a comparator. Input voltage, divided by resistor array of Ra Rb and Rc, is applied to the positive input of the comparator. Output of the comparator controls a pair of NMOS and PMOS switches, generating the hysteresis. Output of the comparator passes a series of buffer to drive the output CMOS pair.

+ V_{DET}，- V_{DET}，V_{HYS} can be calculated as follows:

- $V_{DET} = V_{REF}*(1+Ra/(Rb+Rc))$

+ $V_{DET} = V_{REF}*(1+(Ra+Rd)/Rb) = V_{REF}*(1+(Ra+Rc)/Rb)$

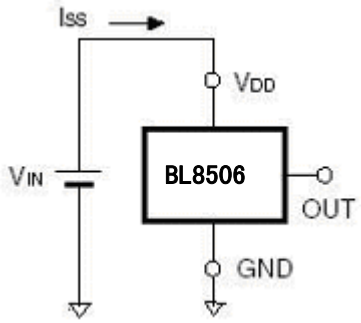
$V_{HYS} = +V_{DET} - (-V_{DET}) = V_{REF}*(Ra+Rb+Rc)(1/Rb-1/(Rb+Rc))$



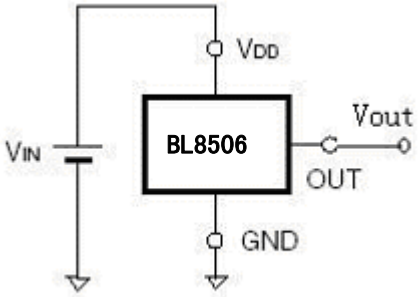
No.	Operation status	Output status
I	VDD>-VDET	Output voltage is equal to the supply voltage
II	VDD drops below - VDET	Output voltage equals to GND level
III	VDD drops further below VDDL	Output voltage is undefined
IV	VDD rises above VDDL	Output voltage equals to GND level
V	VDD rises above + VDET	Output voltage equals to supply voltage，VHYS=(+ VDET)-(- VDET)

TEST CIRCUITS

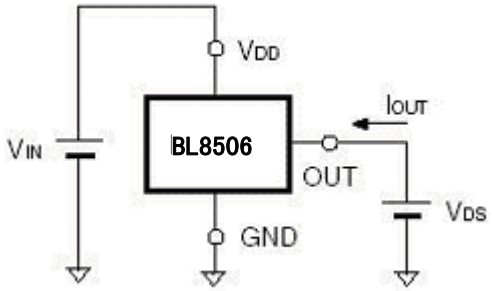
（1）Supply current test circuit



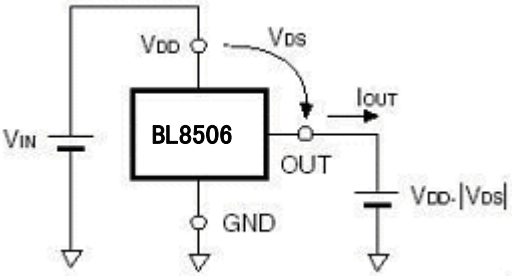
（2）Detector threshold test circuit



（3）NCH Drive Output Current Test Circuit



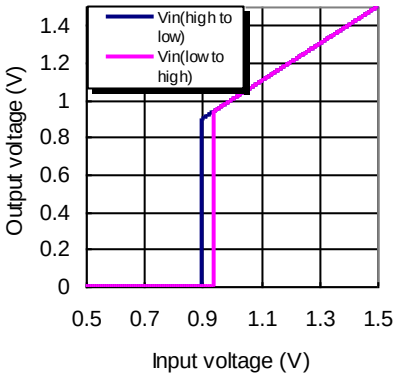
（4）PCH Drive Output Current Test Circuit



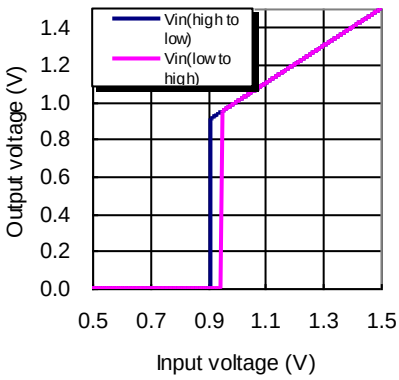
TYPICAL PERFORMANCE CHARACTERISTICS

1) Output voltage VS. Input voltage

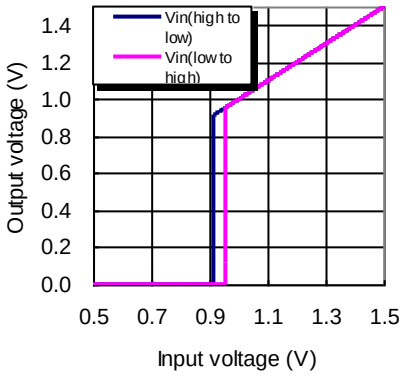
Detector threshold= 0.9V（-40°C）



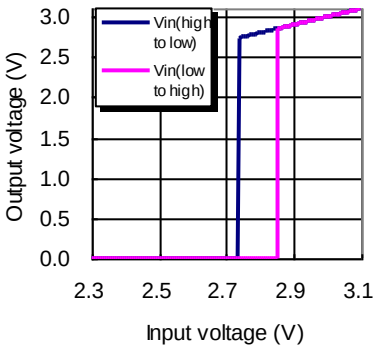
Detector threshold= 0.9V（25°C）



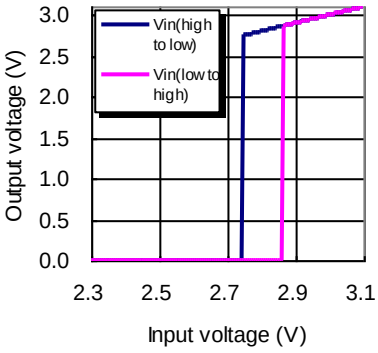
Detector threshold= 0.9V（70°C）



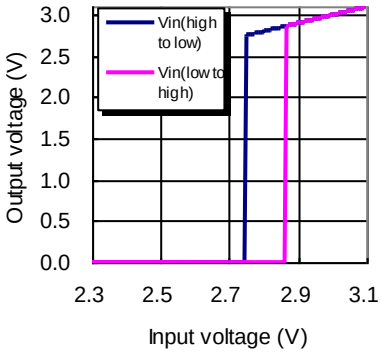
Detector threshold=2.7V（-40°C）



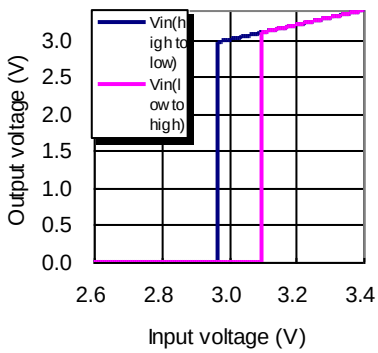
Detector threshold=2.7V（25°C）



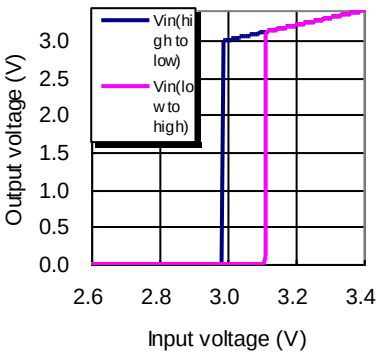
Detector threshold=2.7V（70°C）



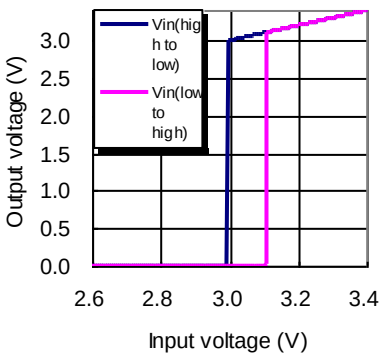
Detector threshold=3.0V（-40°C）



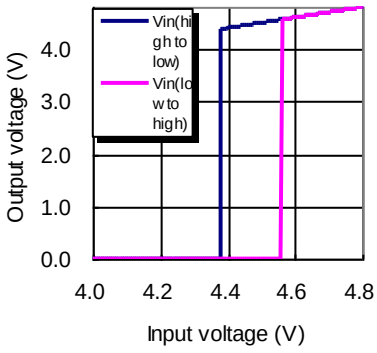
Detector threshold=3.0V（25°C）



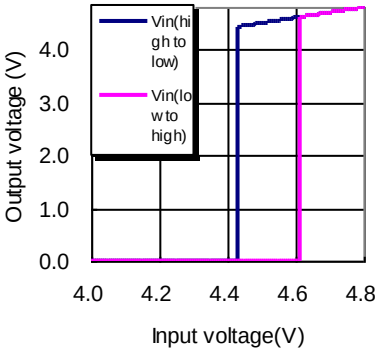
Detector threshold=3.0V（70°C）



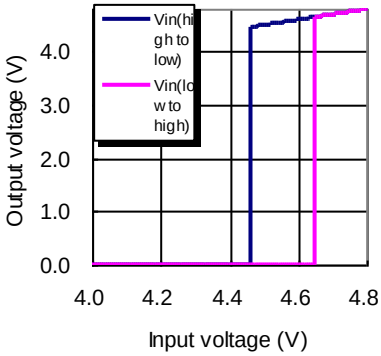
Detector threshold=4.4V（-40°C）



Detector threshold=4.4V（25°C）

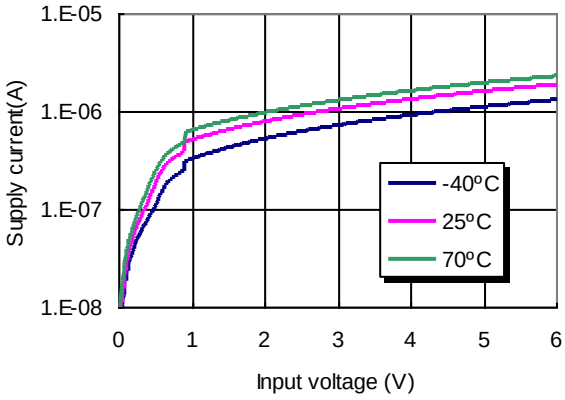


Detector threshold=4.4V（70°C）

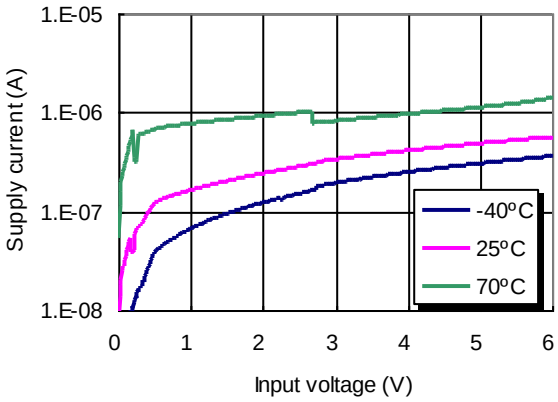


2) Supply current VS. Input voltage

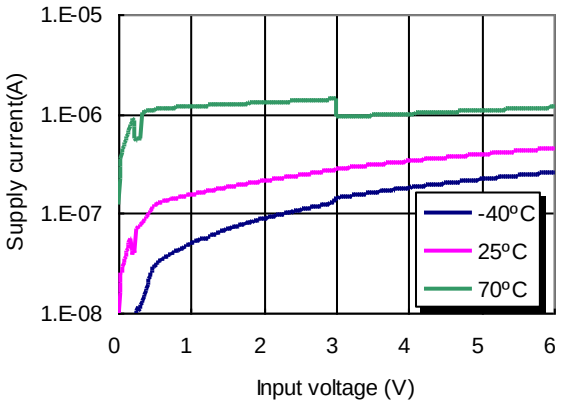
Detector threshold= 0.9V



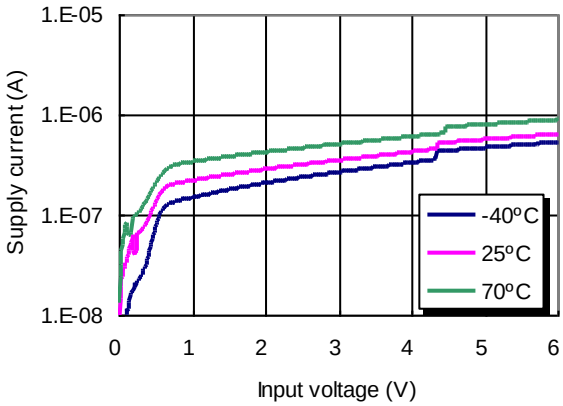
Detector threshold=2.7V



Detector threshold=3.0V

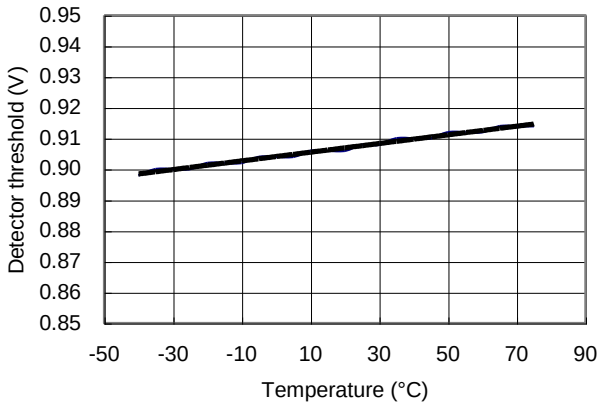


Detector threshold=4.4V

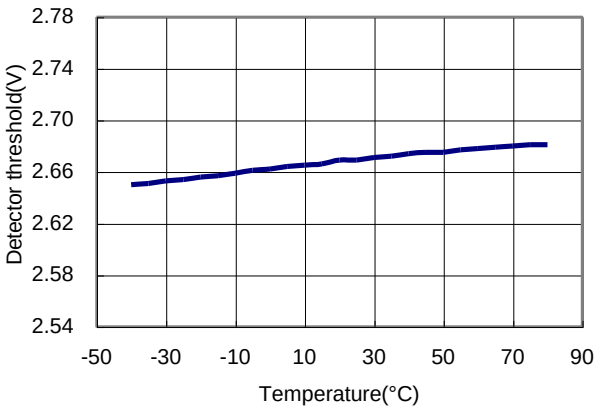


3) Detector Threshold Hysteresis VS. Temperature

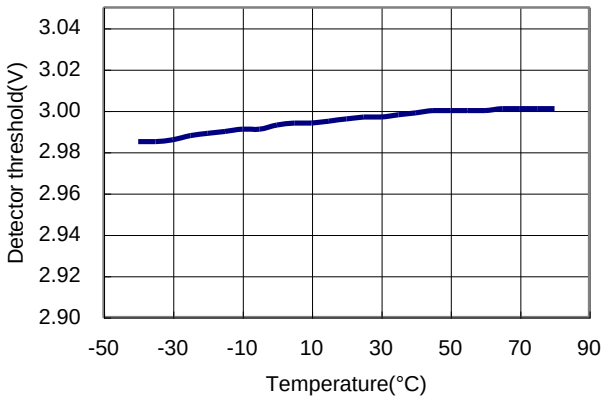
Detector threshold= 0.9V



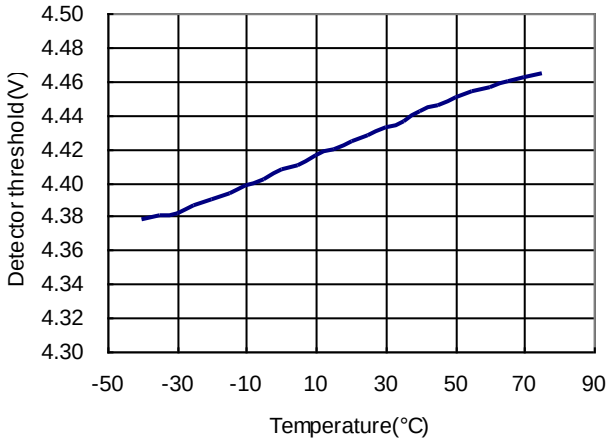
Detector threshold=2.7V



Detector threshold=3.0V

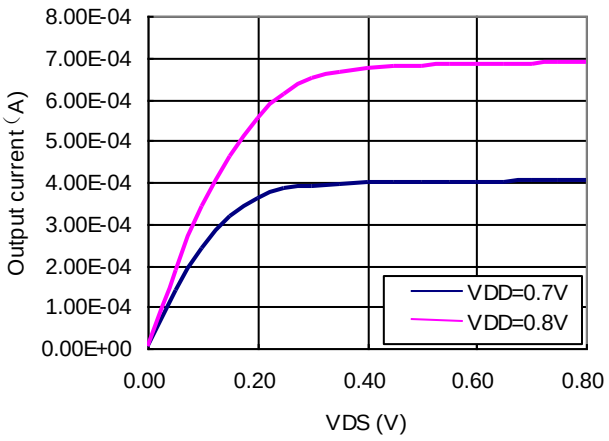


Detector threshold=4.4V

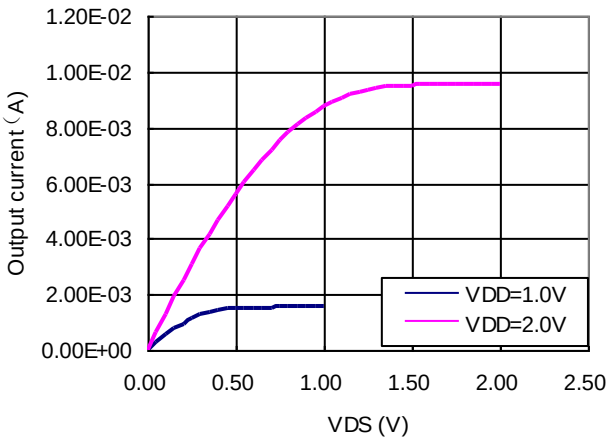


4）Nch Driver Output Current VS. V_{DS}

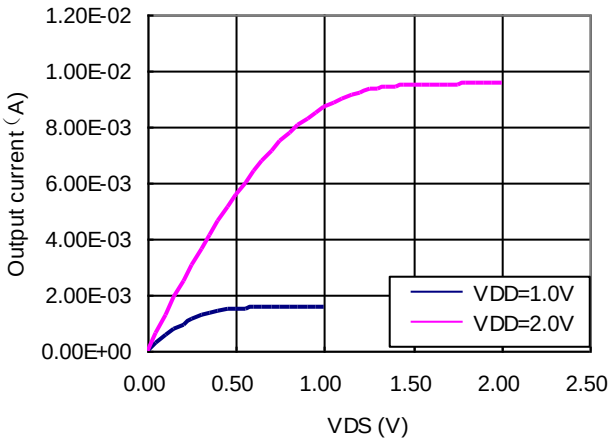
BL8506-09CXX



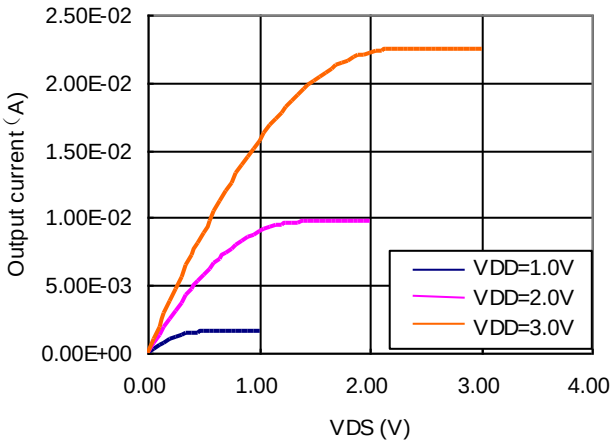
BL8506-27CXX



BL8506-30CXX

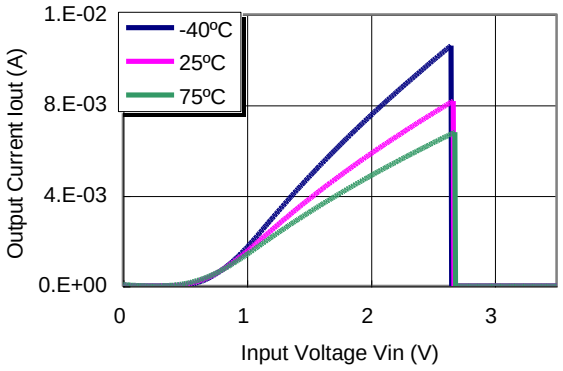


BL8506-44CXX

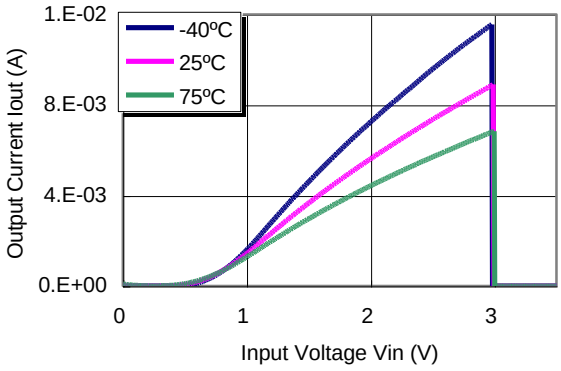


5）NCH Driver Output Current vs. Input Voltage

Detector threshold=2.7V

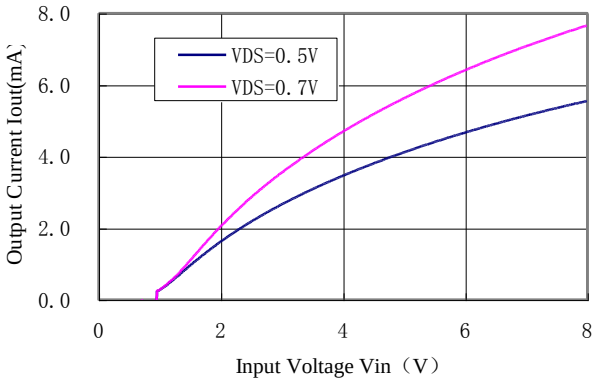


Detector threshold=3.0V

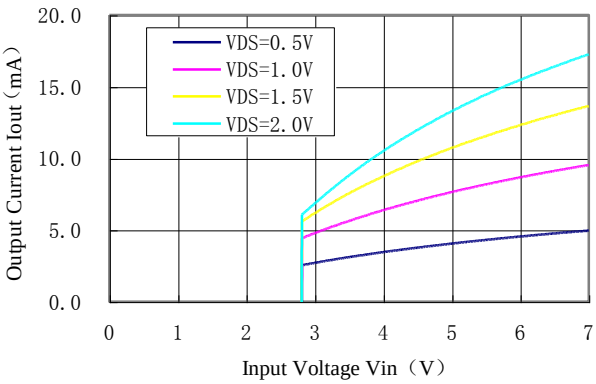


6）PCH Driver Output Current vs. Input Current

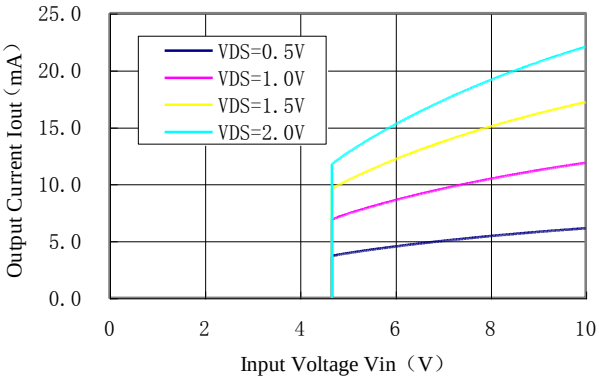
Detector threshold=0. 9V



Detector threshold=2. 7V



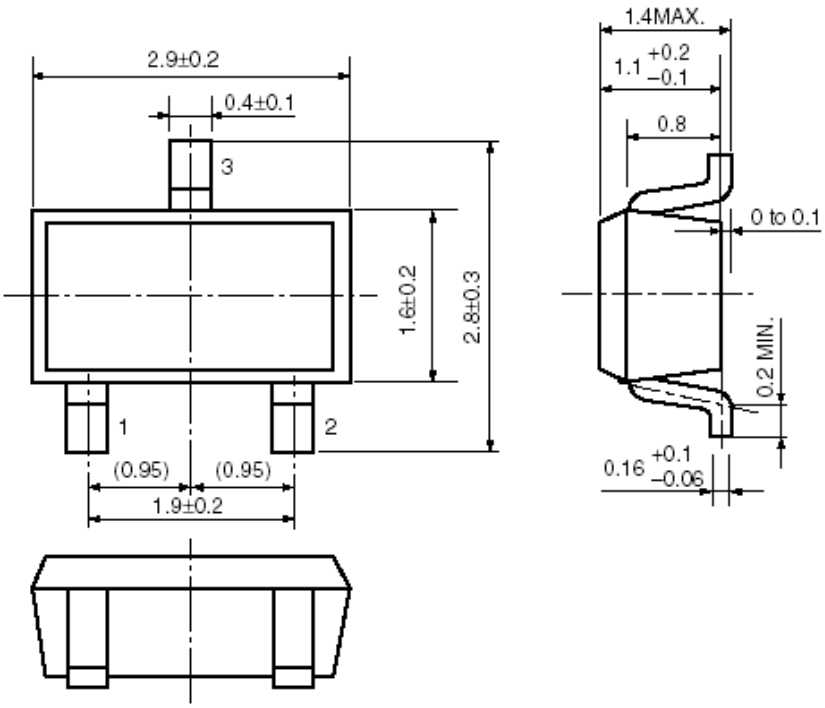
Detector threshold=4. 4V



PACKAGE LINE

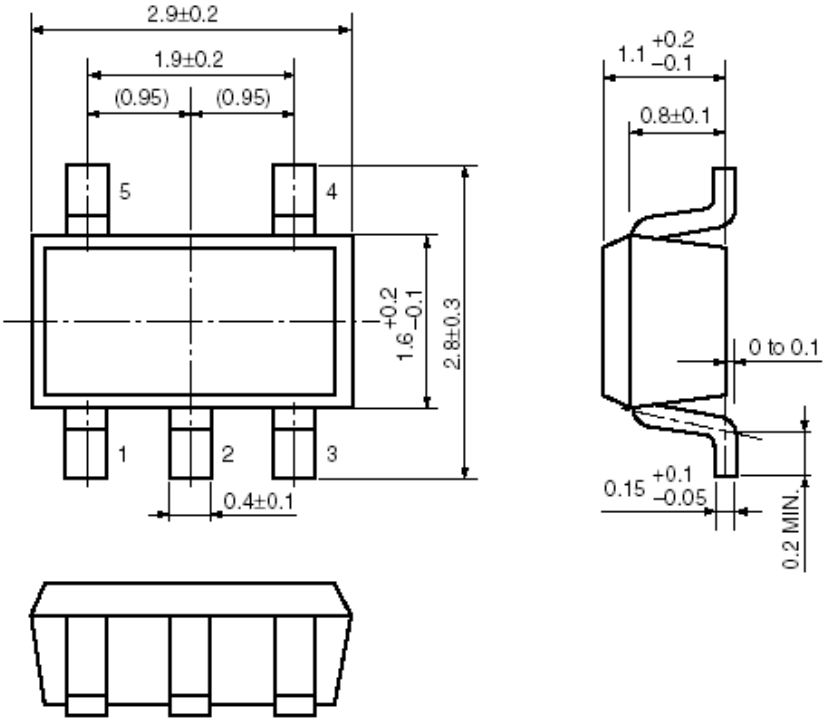
Package	SOT-23-3	Devices per reel	3000Pcs	Unit	mm

Package dimension：



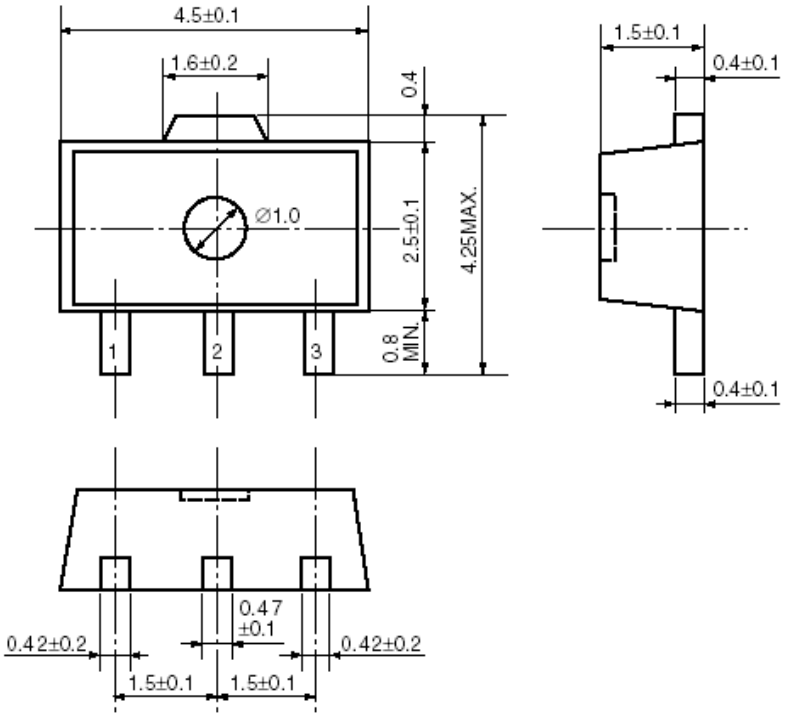
Package	SOT-23-5	Devices per reel	3000Pcs	Unit	mm

Package Dimension:



Package	SOT-89-3	Devices per reel	1000Pcs	Unit	mm

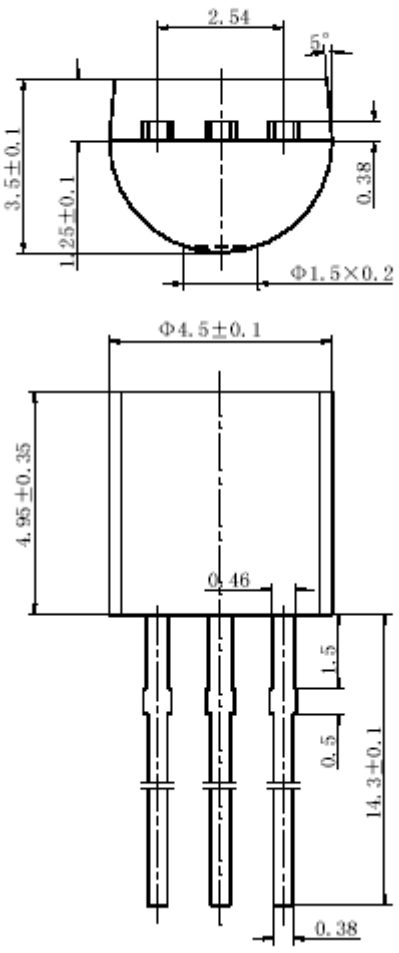
Package Dimension:



Package	TO-92	Devices per Bag	1000Pcs	Unit	mm

Package Dimension:

TO-92



X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Supervisory Circuits ***category:***

Click to view products by Belling ***manufacturer:***

Other Similar products are found below :

CAT1161LI-25-G CAT853STBI-T3 TC54VN2402EMB713 MCP1316T-44NE/OT MCP1316MT-45GE/OT MCP1316MT-23LI/OT DS1232L NCV302HSN45T1G MCP1316T-23LI/OT PT7M6130NLTA3EX S-1000N28-I4T1U CAT1161LI-28-G MCP1321T-29AE/OT MCP1319MT-47QE/OT S-1000N23-I4T1U S-1000N19-I4T1U CAT824UTDI-GT3 TC54VC2502ECB713 PT7M6133NLTA3EX PT7M6127NLTA3EX BD48E23G-TR BD48E49G-TR BD48E52G-TR MP6412GQGU-Z XC61GN2502HR-G HG810RM3/TR ME2808A33XG ME2801A33M3G SGM809B-RXN3LG/TR HT7033S UM803RS UM805RE BL8506-40CRM SSP54123 SSP61CN1902MR Aip54123 MAX809C263NR HE61CN2402MR UM810MS MAX809C293NR MAX809C308NR HE61CN2702MR UM811SE XC61CN1902MR BD48K34G-TL BL8506-20CRM CN825R XC61CC1502MR XC61CN1802MR BL8509CCB3TR263DC