Ultra Low Cost 3-Pin Microprocessor Reset

Description

The V6340 monitors the supply voltage of any electronic system, and generates the appropriate Reset signal. The threshold must be chosen to the minimum allowed voltage which guarantees the good functionality of the system. As long as V_{DD} stays upside this voltage level, the output stays inactive. If V_{DD} drops below V_{TH}, the output gets active. The threshold voltage may be obtained in different versions: 2.6V, 3.0V, 3.7V and 4.4V.

Features

❑ SOT-23 and TO-92 package
❑ Reset output state guaranteed down to V_{DD} = 1V @ 25°C
❑ Low supply current: stays stable during switching
   versions B, N, N: typ. 19µA at V_{DD} = 5V
   other versions: typ. 38µA at V_{DD} = 5V
❑ ±2.5% voltage threshold accuracy
❑ High noise immunity
❑ No external components required
❑ Push-pull or Open drain output
❑ Pin compatible with MAX 809 in SOT-23, by appropriate layout on PCB
❑ Pin compatible with MC 33164 in TO-92
❑ TTL output compatibility

Applications

Applications needing a voltage detection:

❑ Computer electronics
❑ White / Brown goods
❑ Automotive electronics
❑ Industrial electronics
❑ Telecom systems
❑ Hand-held systems

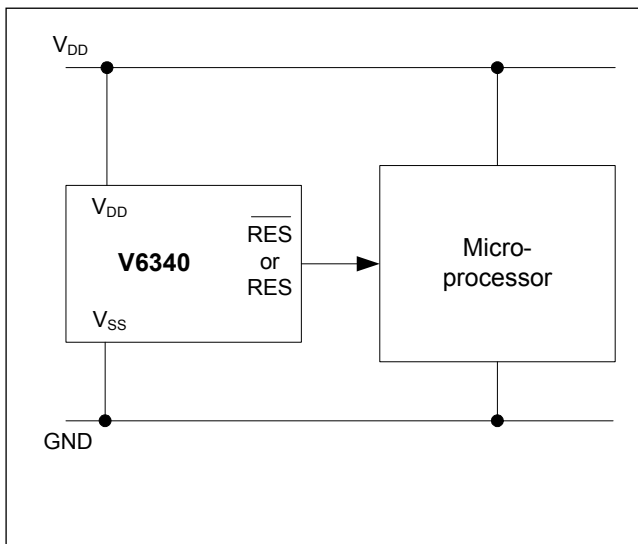## Typical Operating Configuration
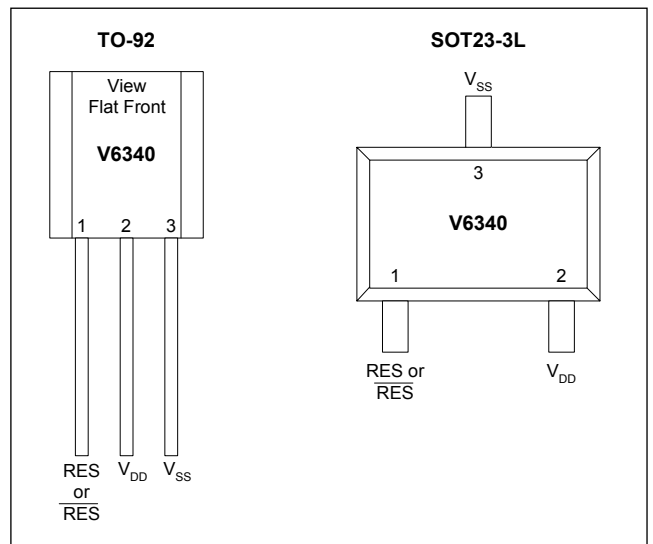

Fig. 1

Pin Assignment

Fig. 2

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Absolute Maximum Ratings

Parameter	Symbol	Conditions
Voltage at V_{DD} to V_{SS}	V_{DD}	-0.3V to +8V
Minimum voltage at RES or $\overline{RES}$	V_{min}	$V_{SS} - 0.3V$
Maximum voltage at RES or $\overline{RES}$	V_{max}	$V_{DD} + 0.3V$
Storage Temperature Range	T_{STO}	-65°C to +150°C

Table 1

Stresses above these listed maximum ratings may cause permanent damages to the device. Exposure beyond specified operating conditions may affect device reliability or cause malfunction.

Handling Procedures

This device has built-in protection against high static voltages or electric fields; however, it is advised that normal precautions be taken as for any other CMOS component. Unless otherwise specified, proper operation can only occur when all terminal voltages are kept within the voltage range.

Operating Conditions

Parameter	Symbol	Min	Max	Unit
Operating Temperature [1]	T_A	-40	+125	°C
Positive Supply Voltage [2]	V_{DD}	1	5.5	V

Table 2

[1] The maximum operating temperature is confirmed by sampling at initial device qualification. In production, all devices are tested at +25°C

[2] V_{DD} = 1V guaranteed at +25°C (see Fig. 14 for more information)

Electrical Characteristics

T_A = +25°C, unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Supply current	I_{DD}	V_{DD} = 5V, output open		38	50	µA
Threshold voltage	V_{TH}	C, I, O	2.94	3.02	3.10	V
	V_{TH}	D, J, P	3.62	3.72	3.82	V
	V_{TH}	F, L, R	4.27	4.39	4.51	V
Threshold hysteresis	V_{HYS}			5		mV
RES Output Low Level	V_{OL}	V_{DD} = 1.6V, I_{OL} = 1mA		200	270	mV
	V_{OL}	V_{DD} = 2.5V, I_{OL} = 2mA		195	250	mV
	V_{OL}	V_{DD} = 3.5V, I_{OL} = 3mA		198	250	mV
	V_{OL}	V_{DD} = 5V, I_{OL} = 4mA		185	250	mV
RES Output High Level	V_{OH}	V_{DD} = 1.6V, I_{OH} = -1mA	1.25	1.36		V
	V_{OH}	V_{DD} = 2.5V, I_{OH} = -1.5mA	2.2	2.3		V
	V_{OH}	V_{DD} = 3.5V, I_{OH} = -2.5mA	3.15	3.27		V
	V_{OH}	V_{DD} = 5V, I_{OH} = -3.5mA	4.65	4.76		V
Output leakage current[1]	I_{LEAK}	V_{DD} = 5V		0.005	1	µA

Only for version B, H and N

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Supply current	I_{DD}	V_{DD} = 5V, output open		19	31	µA
Threshold voltage	V_{TH}	B, H, N	2.56	2.65	2.74	V
Threshold hysteresis	V_{HYS}			32		mV

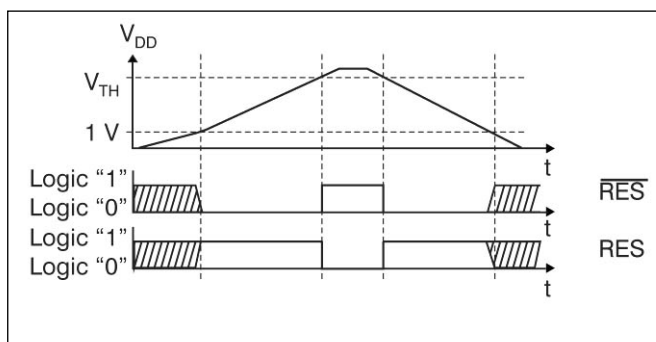**Table 3**

[1] Only for Open drain versions

Timing Waveform
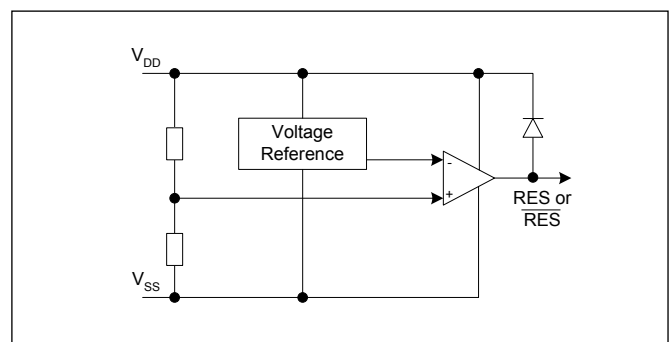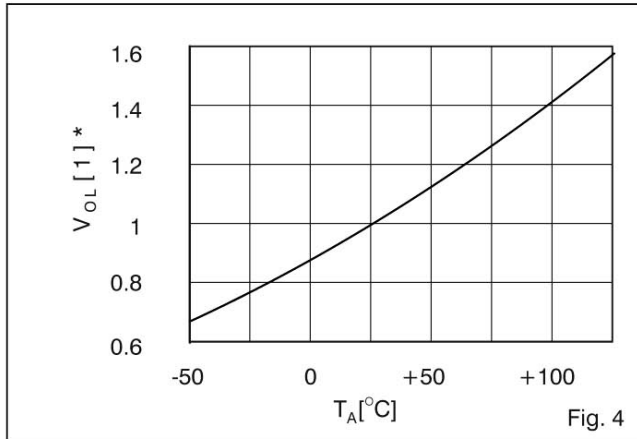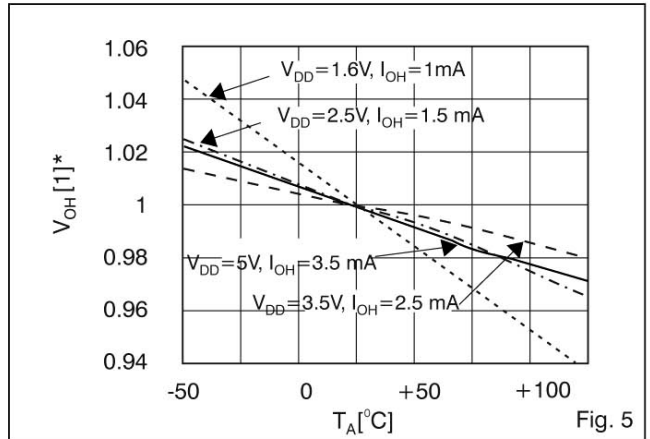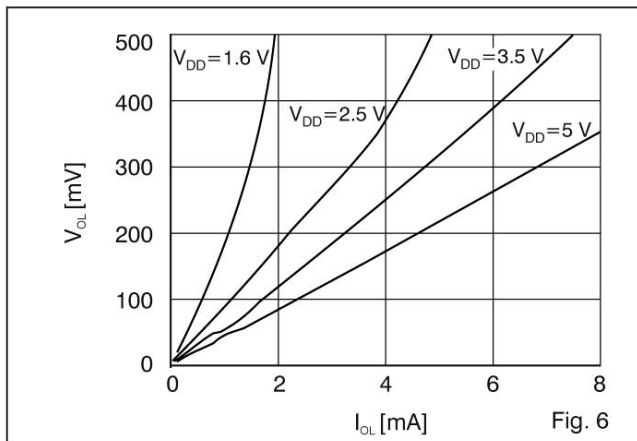

Fig.3

Block Diagram

Fig.4

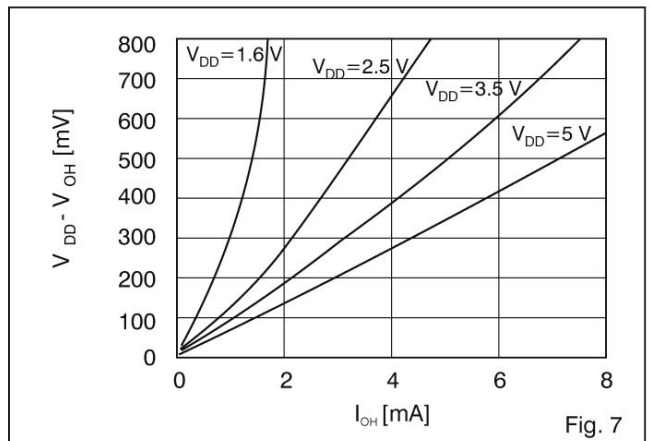## Typical Characteristics

Normalized V_{OL} vs. Temperature

Fig. 4

Normalized V_{OH} vs. Temperature

Fig. 5

V_{OL} vs. Output Current

Fig. 6

V_{DD} - V_{OH} vs. Output Current

Fig. 7

V_{OL} vs. Supply Voltage

Fig. 8
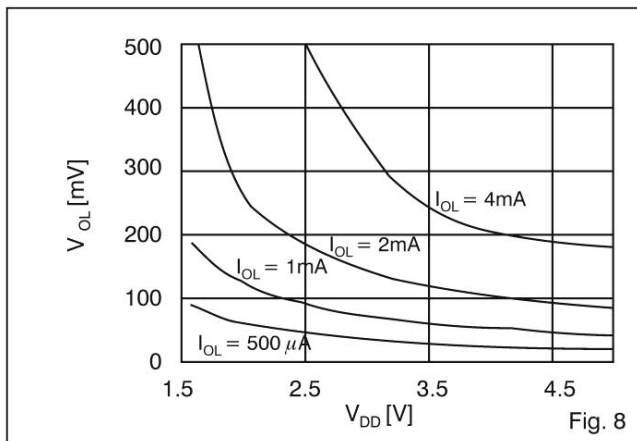
V_{DD} - V_{OH} vs. Supply Voltage
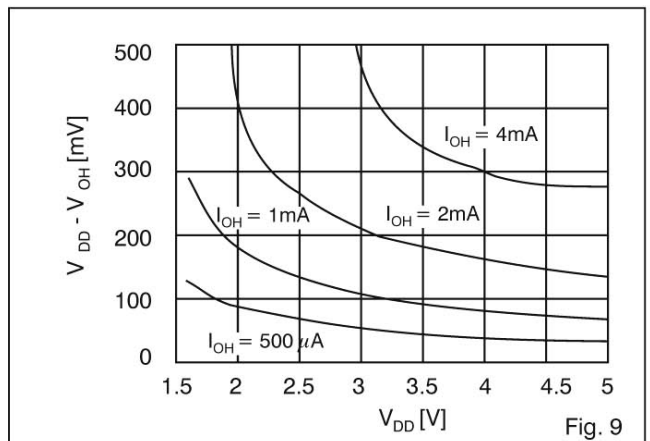
Fig. 9

[1]*   Multiply value at $+25^{\circ}$C by this factor to determine the value at temperature

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Supply Current vs. Temperature

Fig. 10
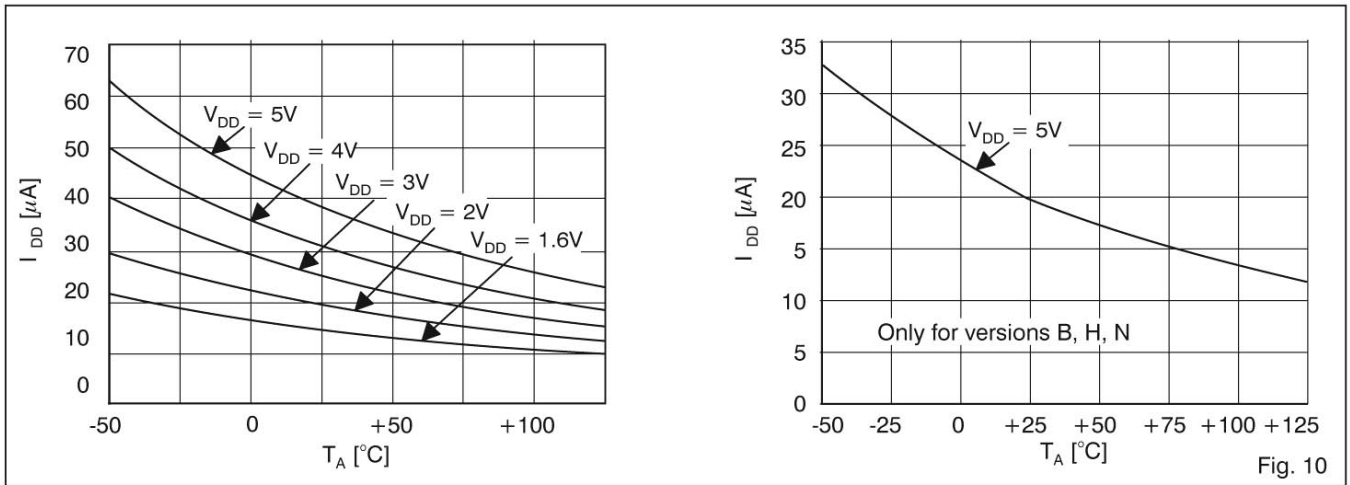
Normalized Threshold vs. Temperature

Fig. 11

Typical Sensivity vs. Temperature

Fig. 12

Typical Sensivity vs. Temperature

Fig. 13

Typical Minimum Operating Supply Voltage (V_{DD})

Fig. 14
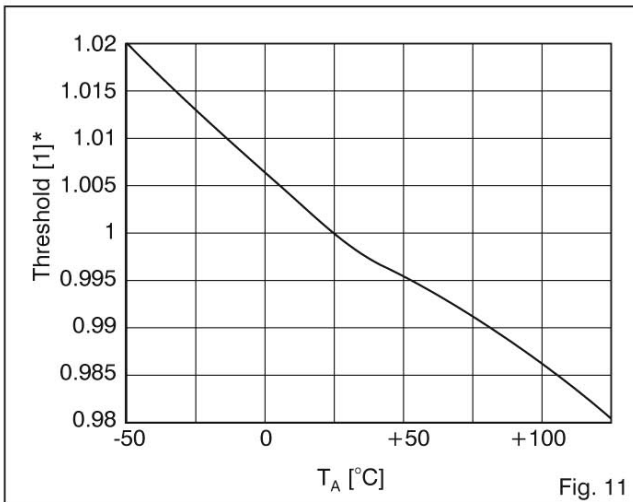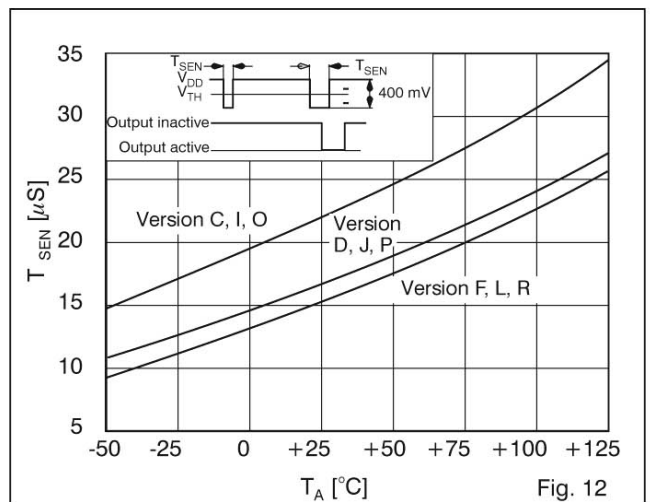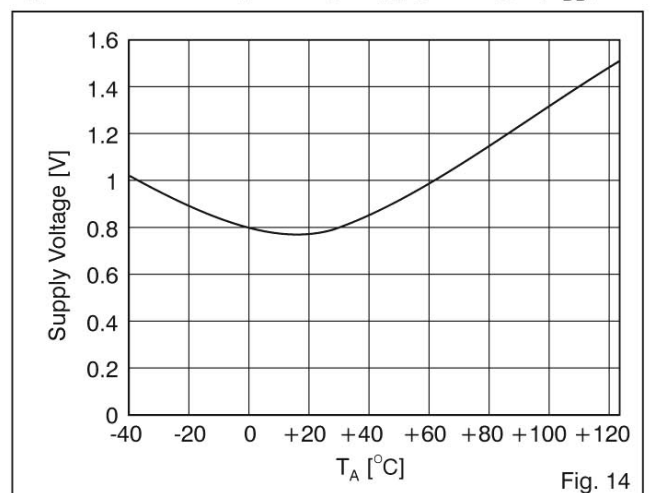
[1]* Multiply value at $+25^{\circ}$C by this factor to determine the value at temperature

Typical Applications

Voltage Monitor with Manual Reset

Use only an active low version

$V_T = V_{TH} + R_1 \cdot I_{DD}$

Fig. 15
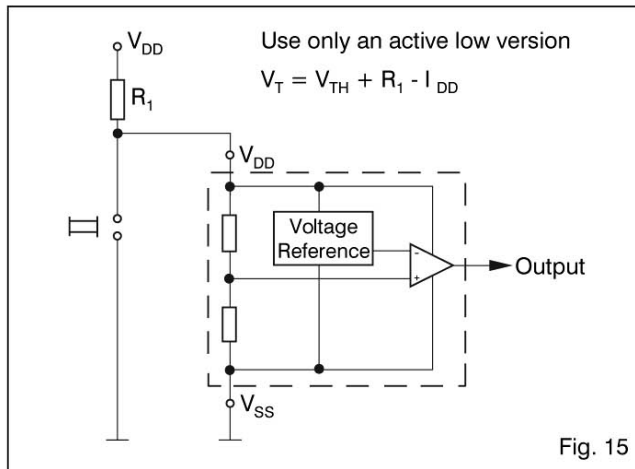
Reset Circuit with Hysteresis

Use only an active low version

$V_{T-} = V_{TH} + R_1 \cdot I_{DD}$

$V_{T+} = V_{TH} + R_1 \dfrac{V_{TH} - V_{OL}}{R_2} I_{DD}$

Fig. 16
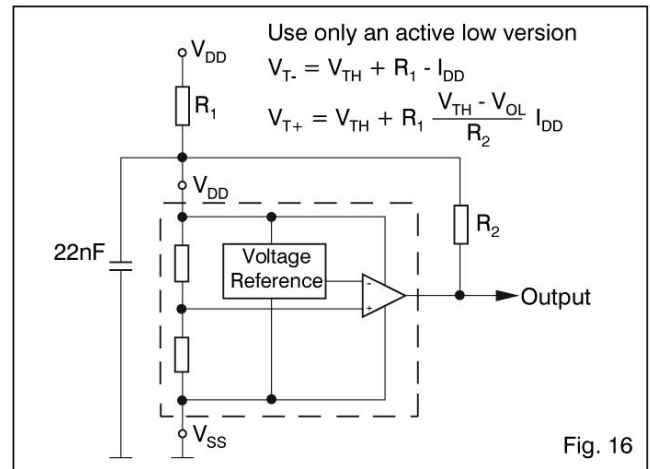
Solar Cell Power O.K. Indicator

Fig. 17
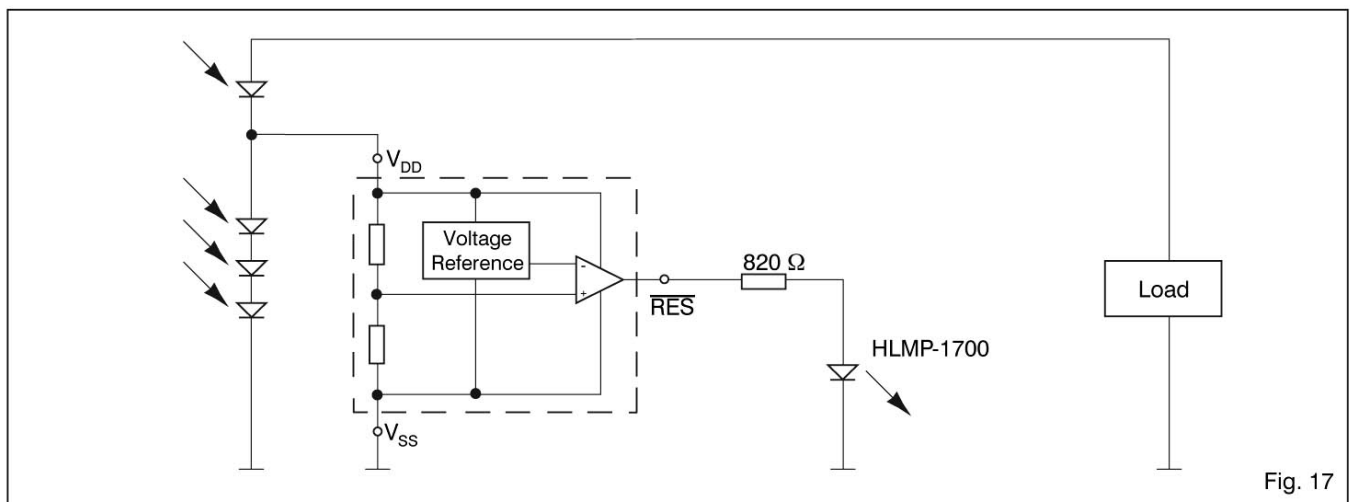
Accurate High Voltage Monitoring

Use only a push-pull version

$V_T = R_1 (I_{DD} + \dfrac{V_{TH}}{R_2}) + V_{TH}$

Fig. 18
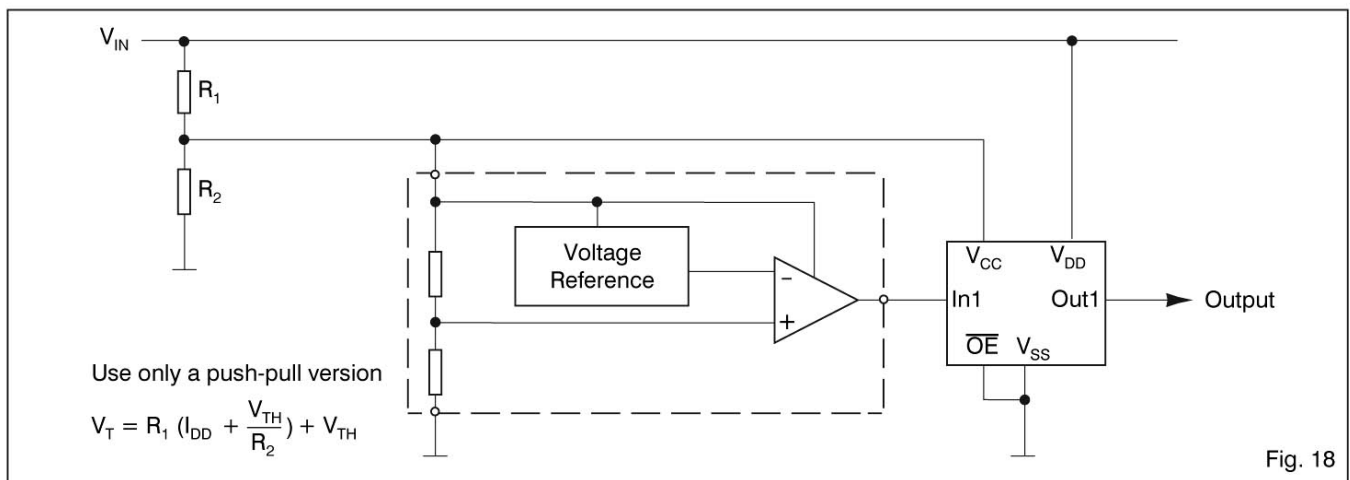
Pin Description

TO-92

Pin	Name	Function
1	RES or $\overline{RES}$	Reset output
2	V_{DD}	Positive supply
3	V_{SS}	Supply ground

Table 5

SOT23-3L

Pin	Name	Function
1	RES or $\overline{RES}$	Reset output
2	V_{DD}	Positive supply
3	V_{SS}	Supply ground

Table 6

Packaging and Ordering Information

Dimensions of SOT23-3L Package

Dimensions in mm

	Min.	Nom.	Max.
A	0.89	1.04	1.12
A1	0.013		0.10
A2	0.95	0.97	1.00
B	0.37		0.51
C	0.085	0.12	0.18
D	2.80	2.95	3.04
E	1.20	1.32	1.40
e		0.95	
e1	1.78	1.90	2.05
H	2.10	2.40	2.64
L	0.65		0.89
α	0°		5°
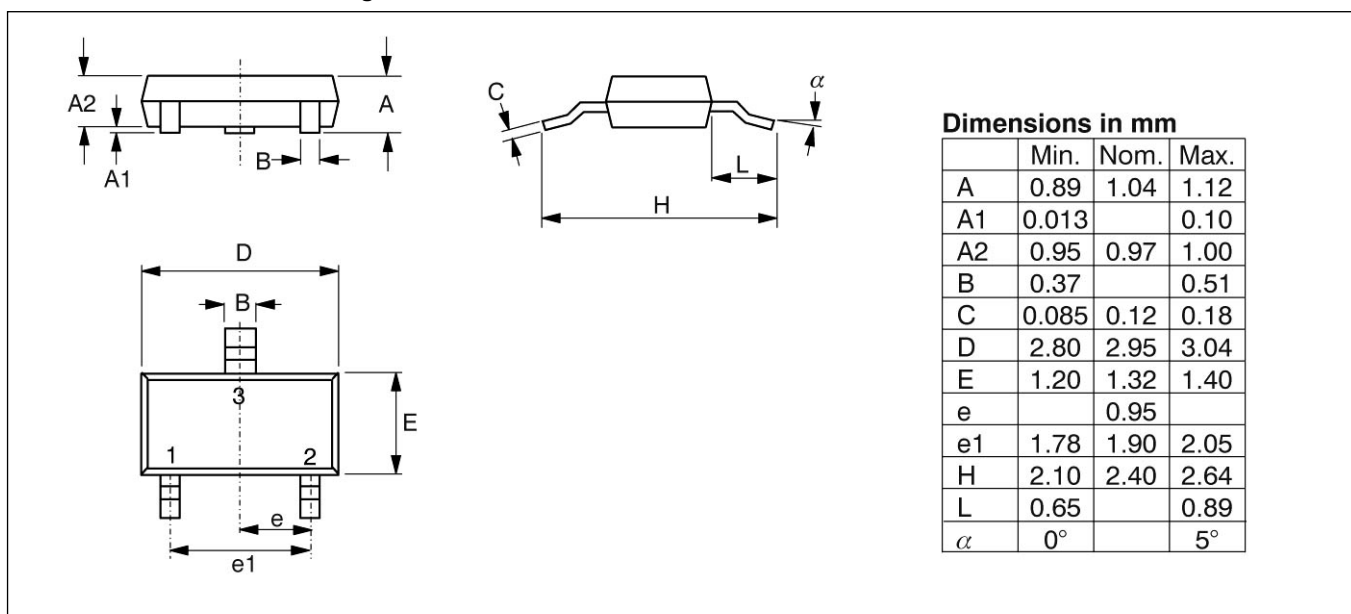
Fig. 5

Dimensions of TO-92 Package

Dimensions in mm

	Min.	Nom.	Max.
A	4.32		4.95
b	0.36		0.51
D	4.45		4.95
E	3.30		3.94
e	2.41		2.67
e1	1.14		1.40
L	12.70		15.49
R	2.16		2.41
S1	1.14		1.52
W	0.41		0.56
α	4°		6°
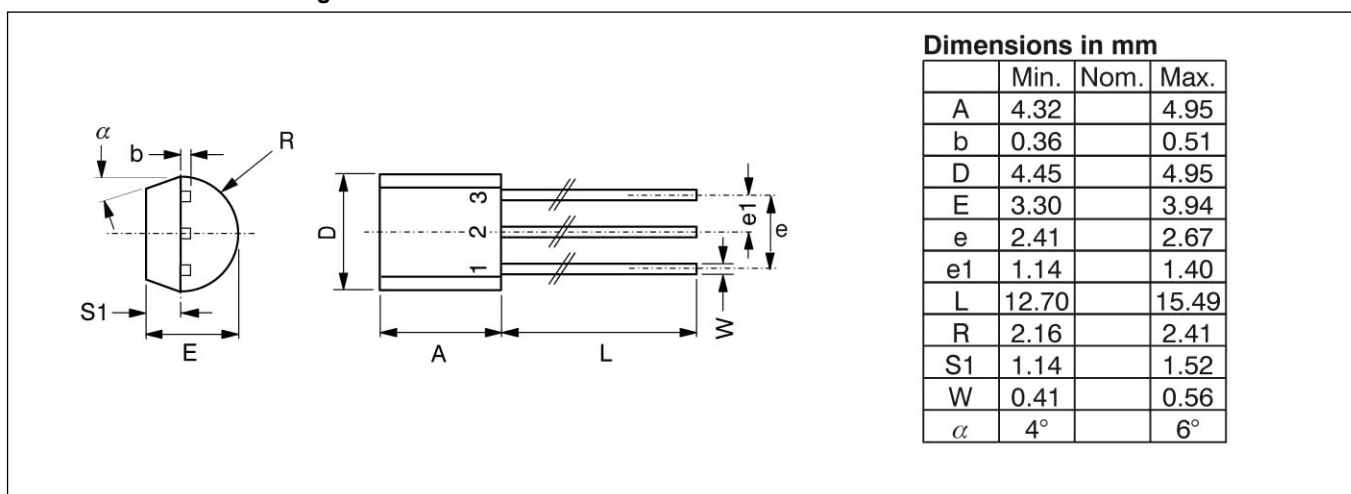
Fig. 6

Ordering Information

Part Number: V6340   R   SP3B   +

Threshold Voltage and Output Type

	2.6V	3.0V	3.7V	4.4V
Push-pull, Reset active low	B	C	D	F
Push-pull, Reset active high	H	I	J	L
Open drain, Reset active low	N	O	P	R

Table 7

RoHS
+ = lead-free & green mold
[blank] = leaded

Package and Delivery Form
SP3B   = SOT23-3, Tape & Reel
TO3E   = TO92, Ammopack

Note: Subject to availability (see standard versions list below). When ordering, please give complete Part Number without space between letters: eg. V6340RSP3B, etc.

Standard Versions (Top Marking)

Marking for TO-92 package

Part Number	Package Marking
V6340FTO3E+	V6340F
V6340NTO3E	V6340N
V6340OTO3E	V6340O

Part Number	Package Marking
V6340RTO3E+	V6340R
V6340RTO3E	V6340R

Table 8

Marking for SOT23-3 package

Part Number	Threshold Voltage	Output type	Package and Delivery Form	Top Marking [1]	Top Marking [2] with 4 Characters	Top Marking [3] with 3 Characters
V6340BSP3B	2.6V	Active low push-pull	SOT23-3L, Tape & Reel 3000 pcs		AAAB	AB#
V6340BSP3B+	2.6V			E1##	BAAB	
V6340CSP3B	3.0V				AAAC	AC#
V6340CSP3B+	3.0V			EC##	BAAC	
V6340DSP3B	3.7V			AU##	AAAD	AD#
V6340DSP3B+	3.7V			BU##	BAAD	
V6340FSP3B	4.4V				AAAF	AF#
V6340FSP3B+	4.4V			EA##	BAAF	
V6340HSP3B	2.6V	Active high push-pull			AAAH	AH#
V6340ISP3B	3.0V				AAAI	AI#
V6340JSP3B	3.7V				AAAJ	AJ#
V6340LSP3B	4.4V				AAAL	AL#
V6340LSP3B+	4.4V			E8##	BAAL	
V6340NSP3B	2.6V	Active low open-drain			AAAN	AN#
V6340OSP3B	3.0V				AAAO	AO#
V6340OSP3B+	3.0V			EB##	BAAO	
V6340PSP3B	3.7V				AAAP	AP#
V6340PSP3B+	3.7V			ED##	BAAP	
V6340RSP3B	4.4V			P9##	AAAR	AR#
V6340RSP3B+	4.4V			E3##	BAAR	

Table 9

[1]   Top marking is standard from 2006. No bottom marking exists. Where ## refers to the lot number (EM internal reference only)

[2]   Top marking with 4 characters is standard from 2003. For lead-free/green mold (RoHS) parts, the first letter of top marking with 4 characters begins with letter "B" instead of letter "A". Bottom marking indicates the lot number.

[3]   Top marking with 3 characters is kept as information since it was used until 2002.
Where # refers to the lot number (EM internal reference only)

Traceability for small packages
Due to the limited space on the package surface, the bottom marking contains a limited number of characters that provide only partial information for lot traceability. Full information for complete traceability is however provided on the packing

labels of the product at delivery from EM: It is highly recommended that the customer insures full lot traceability of EM product in his final product.

Standards Version (Samples)

Part Number
V6340BSP3B+
V6340CSP3B+
V6340DSP3B+
V6340FSP3B+
V6340LSP3B
V6340OSP3B+

Part Number
V6340PSP3B+
V6340RSP3B+
V6340FTO3E+
V6340NTO3E
V6340OTO3E
V6340RTO3E+

Sample stock is generally held on **standard versions** only. Non standard versions have a 30,000 pieces minimum order quantity. Please contact factory for other versions not shown here and for availability of non standard versions.