Micropower, Low Voltage Comparator with 400mV Reference

FEATURES

- **Internal 400mV Reference**
- **Total Threshold Error: ±1.25% Max at 25°C**
- **Wide Supply Range: 1.4V to 18V**
- **Input and Output Operate to 36V**
- **Specified for –40°C to 125°C Temperature Range**
- Low Quiescent Current: 6.5µA Typ at 5V
- Internal Hysteresis: 6.5mV Typ
- Low Input Bias Current: ±10nA Max
- Over-The-Top® Input also Includes Ground
- Open-Collector Output Allows Level Translation
- Choice of Input Polarities: LT6703-2/LT6703-3/ LT6703HV-2/LT6703HV-3
- Available in 2mm × 2mm DFN and Low Profile (1mm) SOT-23 (ThinSOT™) Packages

APPLICATIONS

- Battery-Powered System Monitoring
- Threshold Detectors
- Window Comparators
- Relay Driving
- Industrial Control Systems
- Handheld Instruments
- Automotive Monitor and Controls

DESCRIPTION

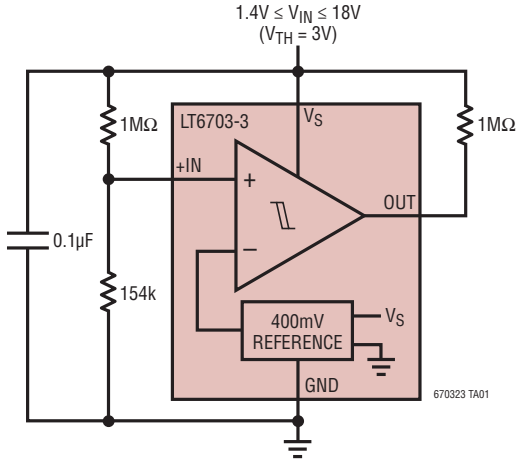
The LT®6703-2/LT6703-3/LT6703HV-2/LT6703HV-3 combine a micropower, low voltage comparator with a 400mV reference in a tiny DFN package. Operating with supplies from 1.4V up to 18V, these devices draw only 6.5µA, making them ideal for low voltage system monitoring. Hysteresis is included in the comparator, ensuring stable operation.

The comparator has one input available externally while the other input is connected internally to the reference. The comparator output is open collector and the output load can be referred to any voltage up to 18V (36V for LT6703HV) independent of supply voltage. The output stage has a guaranteed current sink capability of more than 5mA over temperature.

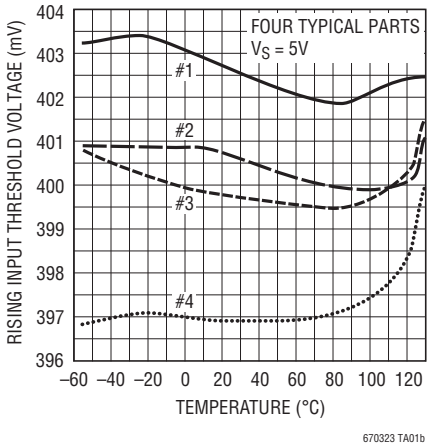
The two versions of this part differ by the polarity of the available comparator input. The LT6703-2/LT6703HV-2 has an inverting input and the LT6703-3/LT6703HV-3 has a noninverting input. Both versions are offered in commercial, industrial and automotive temperature ranges.

TYPICAL APPLICATION

Micropower Supply Voltage Monitor



Rising Input Threshold Voltage vs Temperature



ABSOLUTE MAXIMUM RATINGS

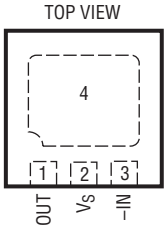
(Note 1)

Total Supply Voltage (V_S to GND) 18.5V
Input Voltage (+IN, –IN)
(Note 3)..... 18.5V to (GND – 0.3V)
LT6703HV ..... 40V to (GND – 0.3V)
Output Voltage (OUT)..... 18.5V to (GND – 0.3V)
LT6703HV ..... 40V to (GND – 0.3V)
Output Short-Circuit Duration (Note 2) ..... Indefinite
Input Current (Note 3).....–10mA

Operating Temperature Range (Note 4)
LT6703C-2/-3/LT6703HVC-2/-3 .....–40°C to 85°C
LT6703I-2/-3/LT6703HVI-2/-3 .....–40°C to 85°C
LT6703H-2/-3/LT6703HVH-2/-3 .....–40°C to 125°C
Specified Temperature Range (Note 5)
LT6703C-2/-3/LT6703HVC-2/-3 ..... 0°C to 70°C
LT6703I-2/-3/LT6703HVI-2/-3 .....–40°C to 85°C
LT6703H-2/-3/LT6703HVH-2/-3 .....–40°C to 125°C
Maximum Junction Temperature..... 125°C
Storage Temperature Range.....–65°C to 125°C
Lead Temperature (Soldering, 10 sec) ..... 300°C

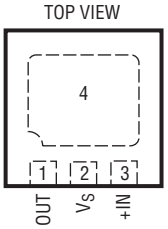
PIN CONFIGURATION

LT6703-2



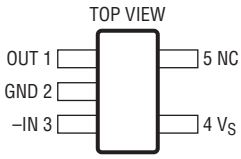
DC PACKAGE
3-LEAD (2mm × 2mm) PLASTIC DFN
T_{JMAX} = 125°C, θ_{JA} = 102°C/W
EXPOSED PAD (PIN 4) IS GND, MUST BE SOLDERED TO PCB

LT6703-3



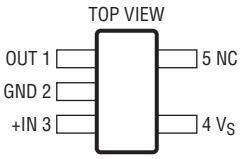
DC PACKAGE
3-LEAD (2mm × 2mm) PLASTIC DFN
T_{JMAX} = 125°C, θ_{JA} = 102°C/W
EXPOSED PAD (PIN 4) IS GND, MUST BE SOLDERED TO PCB

LT6703HV-2



S5 PACKAGE
5-LEAD PLASTIC TSOT-23
T_{JMAX} = 125°C, θ_{JA} = 250°C/W

LT6703HV-3



S5 PACKAGE
5-LEAD PLASTIC TSOT-23
T_{JMAX} = 125°C, θ_{JA} = 250°C/W

ORDER INFORMATION

Lead Free Finish

TAPE AND REEL (MINI)	TAPE AND REEL	PART MARKING*	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE
LT6703CDC-2#TRMPBF	LT6703CDC-2#TRPBF	LCWP	3-Lead (2mm × 2mm) Plastic DFN	0°C to 70°C
LT6703IDC-2#TRMPBF	LT6703IDC-2#TRPBF	LCWP	3-Lead (2mm × 2mm) Plastic DFN	–40°C to 85°C
LT6703HDC-2#TRMPBF	LT6703HDC-2#TRPBF	LCWP	3-Lead (2mm × 2mm) Plastic DFN	–40°C to 125°C
LT6703CDC-3#TRMPBF	LT6703CDC-3#TRPBF	LCTW	3-Lead (2mm × 2mm) Plastic DFN	0°C to 70°C
LT6703IDC-3#TRMPBF	LT6703IDC-3#TRPBF	LCTW	3-Lead (2mm × 2mm) Plastic DFN	–40°C to 85°C
LT6703HDC-3#TRMPBF	LT6703HDC-3#TRPBF	LCTW	3-Lead (2mm × 2mm) Plastic DFN	–40°C to 125°C
LT6703HVCS5-2#TRMPBF	LT6703HVCS5-2#TRPBF	LTDMN	5-Lead Plastic TSOT-23	0°C to 70°C
LT6703HVIS5-2#TRMPBF	LT6703HVIS5-2#TRPBF	LTDMN	5-Lead Plastic TSOT-23	–40°C to 85°C
LT6703HVHS5-2#TRMPBF	LT6703HVHS5-2#TRPBF	LTDMN	5-Lead Plastic TSOT-23	–40°C to 125°C
LT6703HVCS5-3#TRMPBF	LT6703HVCS5-3#TRPBF	LTDMP	5-Lead Plastic TSOT-23	0°C to 70°C
LT6703HVIS5-3#TRMPBF	LT6703HVIS5-3#TRPBF	LTDMP	5-Lead Plastic TSOT-23	–40°C to 85°C
LT6703HVHS5-3#TRMPBF	LT6703HVHS5-3#TRPBF	LTDMP	5-Lead Plastic TSOT-23	–40°C to 125°C

TRM = 500 pieces. *Temperature grades are identified by a label on the shipping container.

Consult LTC Marketing for parts specified with wider operating temperature ranges.
Consult LTC Marketing for information on lead based finish parts.

For more information on lead free part marking, go to: http://www.linear.com/leadfree/
For more information on tape and reel specifications, go to: http://www.linear.com/tapeandreel/

ELECTRICAL CHARACTERISTICS

T_A = 25°C (LT6703-2/LT6703-3) unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
$V_{TH(R)}$	Rising Input Threshold Voltage (Note 6)	R_L = 100k, V_O = 2V Swing, V_S = 5V	395	400	405	mV
$V_{TH(F)}$	Falling Input Threshold Voltage (Note 6)	R_L = 100k, V_O = 2V Swing, V_S = 5V	387	393.5	400	mV
HYS	HYS = $V_{TH(R)} – V_{TH(F)}$	V_S = 5V, R_L = 100k, V_O = 2V Swing	3.5	6.5	9.5	mV
I_B	Input Bias Current	V_S = 1.4V, 18V, $V_{IN} = V_S$ V_S = 1.4V, V_{IN} = 18V V_S = 1.4V, 18V, V_{IN} = 0.1V		±0.01 ±0.01 ±4	±10 ±10 ±10	nA nA nA
V_{OL}	Output Low Voltage	10mV Input Overdrive, V_S = 5V, I_{OUT} = 5mA		70	200	mV
I_{OFF}	Output Leakage Current	V_S = 1.4V, 18V, $V_{OUT} = V_S$, V_{IN} = 40mV Overdrive V_S = 1.4V, V_{OUT} = 18V, V_{IN} = 40mV Overdrive		0.01 0.01	0.8 0.8	µA µA
$t_{PD(HL)}$	High-to-Low Propagation Delay	V_S = 5V, 10mV Input Overdrive, R_L = 10k, V_{OL} = 400mV		18		µs
$t_{PD(LH)}$	Low-to-High Propagation Delay	V_S = 5V, 10mV Input Overdrive, R_L = 10k, $V_{OH} = 0.9 • V_S$		29		µs
t_r	Output Rise Time	V_S = 5V, 10mV Input Overdrive, R_L = 10k V_O = (0.1 to 0.9) • V_S		2.2		µs
t_f	Output Fall Time	V_S = 5V, 10mV Input Overdrive, R_L = 10k V_O = (0.1 to 0.9) • V_S		0.22		µs
I_S	Supply Current	No Load Current, V_S = 5V		6.5	11	µA