SOT-23, 44V, Over-the-Top, Micropower, Precision Rail-to-Rail Comparator

FEATURES

- **Operates from 2.7V to 44V**
- **Over-The-Top®: Input Common Mode Range Extends 44V Above V^-, Independent of V^+**
- **Micropower: 35µA I_Q**
- **Offset Voltage: 1.5mV Max**
- **Valid Output with Either Input 5V Below V^-**
- Rail-to-Rail Output Swing
- Output Can Drive Loads Above V^+
- Internal Pull-Up Current
- –40°C to 125°C Operating Temperature Range
- Low Profile (1mm) SOT-23 (ThinSOT™) Package
- AEC-Q100 Qualified for Automotive Applications

APPLICATIONS

- Power Supply Monitors
- Relay/Lamp Driver
- Oscillators
- Peak Detector
- Level Shifting

DESCRIPTION

The LT®1716 comparator operates on any total power supply voltage between 2.7V and 44V drawing 35µA of quiescent current. The LT1716 has a unique input stage that can be taken 44V above V^-, independent of V^+ supply. (Built-in resistors protect the inputs for faults below the negative supply of up to 5V.) The inputs can withstand 44V both differential and common mode.

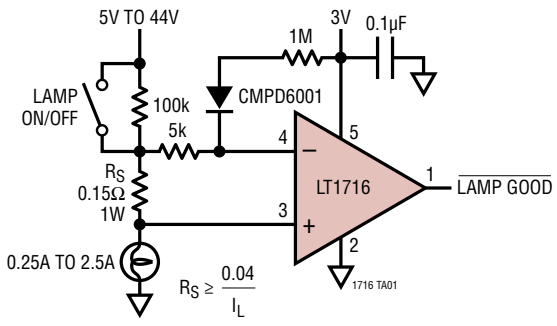
The output stage includes a class "B" pull-up current source, eliminating the need for an external resistive pull-up and saving power. Output voltage swings to within 35mV of the negative supply and 55mV of the positive supply, which makes the comparator a good choice for low voltage single supply operation. The output stage is also designed to drive loads connected to a higher supply than the LT1716 supply, the same as an open collector output stage.

The LT1716 is available in a SOT-23 5-lead package.

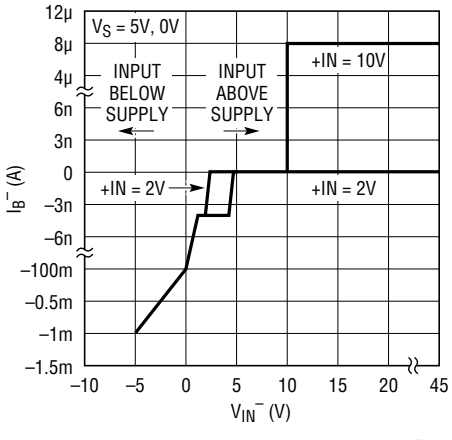
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TYPICAL APPLICATION

Lamp Monitor



Input Bias Current vs Input Bias Voltage

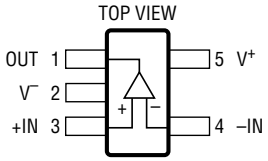


ABSOLUTE MAXIMUM RATINGS

(Note 1)

Supply Voltage (V+ to V–) 44V
Differential Input Voltage 44V
Input Voltage ..... 44V, –5V
Output Short-Circuit Duration (Note 2) ..... Indefinite
Operating Temperature Range (Note 3)
LT1716C/LT1716I ..... –40°C to 85°C
LT1716H ..... –40°C to 125°C
Specified Temperature Range (Note 4)
LT1716C/LT1716I ..... –40°C to 85°C
LT1716H ..... –40°C to 125°C
Maximum Junction Temperature ..... 150°C
Storage Temperature Range ..... –65°C to 150°C
Lead Temperature (Soldering, 10 sec) ..... 300°C

PIN CONFIGURATION



S5 PACKAGE
5-LEAD PLASTIC TSOT-23
T_{JMAX} = 150°C, θ_{JA} = 250°C/W

ORDER INFORMATION

LEAD FREE FINISH	TAPE AND REEL	PART MARKING*	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE
LT1716CS5#PBF	LT1716CS5#TRPBF	LTYD	5-Lead Plastic TSOT-23	–40°C to 85°C
LT1716IS5#PBF	LT1716IS5#TRPBF	LTYD	5-Lead Plastic TSOT-23	–40°C to 85°C
LT1716HS5#PBF	LT1716HS5#TRPBF	LTYD	5-Lead Plastic TSOT-23	–40°C to 125°C
AUTOMOTIVE PRODUCTS**				
LT1716HS5#WPBF	LT1716HS5#WTRPBF	LTYD	5-Lead Plastic TSOT-23	–40°C to 125°C

Contact the factory for parts specified with wider operating temperature ranges. *The temperature grade is identified by a label on the shipping container.

Tape and reel specifications. Some packages are available in 500 unit reels through designated sales channels with #TRMPBF suffix.

**Versions of this part are available with controlled manufacturing to support the quality and reliability requirements of automotive applications. These models are designated with a #W suffix. Only the automotive grade products shown are available for use in automotive applications. Contact your local Analog Devices account representative for specific product ordering information and to obtain the specific Automotive Reliability reports for these models.

ELECTRICAL CHARACTERISTICS

The ● denotes the specifications which apply over the full operating temperature range of –40°C ≤ T_A ≤ 85°C, otherwise specifications are at T_A = 25°C. Single supply operation V^+ = 5V, V^- = 0V; V_{CM} = V^+/2 unless otherwise noted. (Note 4)

SYMBOL	PARAMETER	CONDITIONS		LTC1716C/LT1716I MIN	TYP	MAX	UNITS
V_{OS}	Input Offset Voltage	0.5V < V_{CM} < (V_{CC} – 1V)			300	1600	µV
		0°C < T_A < 70°C	●			2100	µV
		–40°C < T_A < 85°C	●			2500	µV
	Input Offset Voltage Drift (Note 5)	0°C < T_A < 70°C	●		2		µV/°C
		–40°C < T_A < 85°C	●		2		µV/°C
I_{OS}	Input Offset Current	V_{CM} = V^+/2	●		3	15	nA
		V_{CM} = 0V	●			1.3	µA
		V_{CM} = 44V	●			0.9	µA
I_B	Input Bias Current	V_{CM} = V^+/2			20	50	nA
			●		35	75	nA
		V^+ = 0V, V_{CM} = 44V			2		nA
		V_{CM} = 0V	●		3	13	µA
		V_{CM} = 44V	●		6	9	µA
		V_{CM} = –5V	●		1	1.4	mA
	Input Voltage Range (Note 7)		●	0.5		44	V
CMRR	Common Mode Rejection Ratio	0.5V ≤ V_{CM} < (V^+ – 1V)	●	89	110		dB
		0.5V ≤ V_{CM} < 44V (Note 6)	●	81	110		dB

The ● denotes the specifications which apply over the full operating temperature range of –40°C ≤ T_A ≤ 85°C, otherwise specifications are at T_A = 25°C. Single supply operation V^+ = 5V, V^- = 0V; V_{CM} = V^+/2 unless otherwise noted. (Note 4)

SYMBOL	PARAMETER	CONDITIONS		LTC1716C/LT1716I MIN	TYP	MAX	UNITS
PSRR	Power Supply Rejection Ratio	V^- = 0V, V_{CM} = 1.5V; 2.7V < V^+ < 36V	●	95	110		dB
	Minimum Operating Supply Voltage		●		2.4	2.7	V
A_{VOL}	Large-Signal Voltage Gain	R_L = 1k; 1V < V_{OUT} < 4V		200	500		V/mV
			●	100			V/mV
I_S	Supply Current	V^+ = 3V, R_L = Open, V_O = High			35	50	µA
			●			65	µA
		V^+ = 5V, R_L = Open, V_O = High			35	55	µA
			●			75	µA
		V^+ = 12V, R_L = Open, V_O = High			40	60	µA
			●			85	µA
I_{SC}^-	Output Sink Current (Note 2)	$V_{OVERDRIVE}$ > 30mV	●	10	20		mA
I_{SC}^+	Output Source Current	$V_{OVERDRIVE}$ = 5mV, V_{OUT} = 1V	●	60	85		µA
V_{OL}	Output Voltage Swing Low (Referred to V^-)	I_{SINK} = 0mA, $V_{OVERDRIVE}$ = –10mV	●		20	35	mV
		I_{SINK} = 0.1mA	●		75	110	mV
		I_{SINK} = 1mA	●		200	300	mV
		I_{SINK} = 5mA	●		550	900	mV
V_{OH}	Output Voltage Swing High (Referred to V^+)	I_{SOURCE} = 0µA, $V_{OVERDRIVE}$ = 10mV	●		30	55	mV
		I_{SOURCE} = 10µA	●		130	185	mV
	Leakage Current	V_{OUT} = 40V, $V_{OVERDRIVE}$ > 100mV	●		0.5	2	µA
	Propagation Delay	$V_{OVERDRIVE}$ > 100mV, R_{LOAD} = 10k			3	5.5	µs

ELECTRICAL CHARACTERISTICS

The ● denotes the specifications which apply over the full operating temperature range of –40°C ≤ T_A ≤ 85°C, otherwise specifications are at T_A = 25°C. Split supply operation V_S = ±15V, V_{CM} = 0V unless otherwise noted. (Note 4)

SYMBOL	PARAMETER	CONDITIONS		LT1716C/LT1716I MIN	TYP	MAX	UNITS
V_{OS}	Input Offset Voltage	–14.5V < V_{CM} < 14V			300	1500	µV
		0°C < T_A < 70°C	●			2000	µV
		–40°C < T_A < 85°C	●			2400	µV
	Input Offset Voltage Drift (Note 5)	0°C < T_A < 70°C	●		2		µV/°C
		–40°C < T_A < 85°C	●		2		µV/°C
I_{OS}	Input Offset Current	V_{CM} = 0V	●		3	15	nA
		V_{CM} = 29V	●			0.9	µA
		V_{CM} = –15V	●			1.3	µA
I_B	Input Bias Current	V_{CM} = 0V			30	60	nA
			●		50	100	nA
		V_{CM} = 29V	●		6	9	µA
		V_{CM} = –15V	●		3	13	µA
		V_{CM} = –20V	●		1	1.4	mA
	Input Voltage Range (Note 7)		●	–14.5		14	V
CMRR	Common Mode Rejection Ratio	–14.5V < V_{CM} < 14V	●	92	110		dB
		–14.5V < V_{CM} < 29V (Note 6)	●	81	98		dB
PSRR	Power Supply Rejection Ratio	V_S = ±1.35V to ±22V	●	90	110		dB
	Minimum Operating Supply Voltage		●		2.4	2.7	V
A_{VOL}	Large-Signal Voltage Gain	R_L = 6k; –14V < V_{OUT} < 14V		500	1000		V/mV
			●	400			V/mV
I_S	Supply Current	V_S = ±15V, R_L = Open, V_O = High	●		40	95	µA
I_{SC}^-	Output Sink Current (Note 2)	$V_{OVERDRIVE}$ > 30mV	●	10	20		mA
I_{SC}^+	Output Source Current	$V_{OVERDRIVE}$ = 5mV, V_{OUT} = –14V	●	70	105		µA

The ● denotes the specifications which apply over the full operating temperature range of –40°C ≤ T_A ≤ 85°C, otherwise specifications are at T_A = 25°C. Split supply operation V_S = ±15V, V_{CM} = 0V unless otherwise noted. (Note 4)

SYMBOL	PARAMETER	CONDITIONS		LT1716C/LT1716I MIN	TYP	MAX	UNITS
V_{OL}	Output Voltage Swing Low (Referred to V^-)	I_{SINK} = 0mA, $V_{OVERDRIVE}$ = –10mV	●		20	35	mV
		I_{SINK} = 0.1mA	●		75	110	mV
		I_{SINK} = 1mA	●		200	300	mV
		I_{SINK} = 5mA	●		550	900	mV
V_{OH}	Output Voltage Swing High (Referred to V^+)	I_{SOURCE} = 0µA, $V_{OVERDRIVE}$ = 10mV	●		45	75	mV
		I_{SOURCE} = 10µA	●		140	210	mV
	Leakage Current	V_{OUT} = 25V, $V_{OVERDRIVE}$ > 100mV	●		0.6	2	µA
	Propagation Delay	$V_{OVERDRIVE}$ > 100mV, R_{LOAD} = 10k			5.5	9	µs

ELECTRICAL CHARACTERISTICS

The ● denotes the specifications which apply over the full operating temperature range of –40°C < T_A < 125°C, otherwise specifications are at T_A = 25°C. Single supply operation V^+ = 5V, V^- = 0V; V_{CM} = V_{CC}/2 unless otherwise noted. (Note 4)

SYMBOL	PARAMETER	CONDITIONS		LT1716H MIN	LT1716H TYP	LT1716H MAX	UNITS
V_{OS}	Input Offset Voltage	0.5V < V_{CM} < (V_{CC} – 1V)	 ●		300	1600 2900	µV µV
	Input Offset Voltage Drift (Note 5)		●		2		µV/°C
I_{OS}	Input Offset Current	V_{CM} = V^+/2 V_{CM} = 0V V_{CM} = 44V	● ● ●		3	220 1.3 0.9	nA µA µA
I_B	Input Bias Current	V_{CM} = V^+/2	 ●		20	50 900	nA nA
		V^+ = 0V, V_{CM} = 44V V_{CM} = 0V V_{CM} = 44V V_{CM} = –5V	 ● ● ●		2 3 6 1	 25 14 1.4	nA µA µA mA
	Input Voltage Range (Note 7)			0.5		44	V
CMRR	Common Mode Rejection Ratio	0.5V < V_{CM} < (V^+ – 1V) 0.5V < V_{CM} < 44V (Note 6)	● ●	75 72	110 110		dB dB
PSRR	Power Supply Rejection Ratio	V^- = 0V, V_{CM} = 1.5V, 2.7V < V^+ < 36V	●	85	110		dB
	Minimum Operating Supply Voltage		●		2.4	2.7	V
A_{VOL}	Large-Signal Voltage Gain	R_L = 1k, 1V < V_{OUT} < 4V R_L = 6k	 ●	200 20	500		V/mV V/mV
I_S	Supply Current per Amplifier	V^+ = 3V, R_L = Open, V_O = High	 ●		35	50 70	µA µA
		V^+ = 5V, R_L = Open, V_O = High	 ●		35	55 75	µA µA
		V^+ = 12V, R_L = Open, V_O = High	 ●		40	60 85	µA µA
I_{SC}^-	Output Sink Current (Note 2)	$V_{OVERDRIVE}$ > 30mV	●	5	10		mA
I_{SC}^+	Output Source Current	$V_{OVERDRIVE}$ = 5mV, V_{OUT} = 1V	●	60	110		µA
V_{OL}	Output Voltage Swing Low (Referred to V^-)	I_{SINK} = 0mA, $V_{OVERDRIVE}$ = –10mV I_{SINK} = 0.1mA I_{SINK} = 1mA I_{SINK} = 5mA	● ● ● ●		20 75 200 550	60 170 480 1200	mV mV mV mV
V_{OH}	Output Voltage Swing High (Referred to V^+)	I_{SOURCE} = 0µA, $V_{OVERDRIVE}$ = –10mV I_{SOURCE} = 10µA	● ●		50 130	110 220	mV mV
	Leakage Current	V_{OUT} = 40V, $V_{OVERDRIVE}$ > 100mV	●		1.7	5	µA
	Propagation Delay	$V_{OVERDRIVE}$ > 100mV, R_{LOAD} = 10k			6	9	µs

ELECTRICAL CHARACTERISTICS

The ● denotes the specifications which apply over the full operating temperature range of –40°C < T_A < 125°C, otherwise specifications are at T_A = 25°C. Split supply operation V_S = ±15V, V_{CM} = 0V unless otherwise noted. (Note 4)

SYMBOL	PARAMETER	CONDITIONS		LT1716H MIN	LT1716H TYP	LT1716H MAX	UNITS
V_{OS}	Input Offset Voltage	–14.5V < V_{CM} < 14V	 ●		300	1500 2900	µV µV
	Input Offset Voltage Drift (Note 5)		●		2		µV/°C
I_{OS}	Input Offset Current	V_{CM} = 0V V_{CM} = 29V V_{CM} = –15V	● ● ●		3	280 0.9 1.3	nA µA µA
I_B	Input Bias Current	V_{CM} = 0V	 ●		30 50	60 1400	nA nA
		V_{CM} = 29V V_{CM} = –15V V_{CM} = –20V	● ● ●		6 3 1	20 30 1.4	µA µA mA
	Input Voltage Range (Note 7)		●	–14.5		14	V
CMRR	Common Mode Rejection Ratio	–14.5V < V_{CM} < 14V –14.5V < V_{CM} < 29V (Note 6)	● ●	85 70	110 93		dB dB
PSRR	Power Supply Rejection Ratio	V_S = ±1.35V to ±22V	●	80	110		dB
	Minimum Operating Supply Voltage		●		2.4	2.7	V
A_{VOL}	Large-Signal Voltage Gain	R_L = 6k; –14V < V_{OUT} < 14V R_L = 6k; –13V < V_{OUT} < 13V	 ●	500 50	1000		V/mV V/mV
I_S	Supply Current	V_S = ±15V, R_L = Open, V_O = High			40	95	µA
I_{SC}^-	Output Sink Current (Note 2)	$V_{OVERDRIVE}$ > 30mV	●	5	10		mA
I_{SC}^+	Output Source Current	$V_{OVERDRIVE}$ = 5mV, V_{OUT} = –14V	●	70	155		µA
V_{OL}	Output Voltage Swing Low (Referred to V^-)	I_{SINK} = 0mA, $V_{OVERDRIVE}$ = –10mV I_{SINK} = 0.1mA I_{SINK} = 1mA I_{SINK} = 5mA	● ● ● ●		20 75 200 550	70 170 480 1200	mV mV mV mV
V_{OH}	Output Voltage Swing High (Referred to V^+)	I_{SOURCE} = 0µA, $V_{OVERDRIVE}$ = 10mV I_{SOURCE} = 10µA	● ●		45 140	120 250	mV mV
	Leakage Current	V_{OUT} = 25V, $V_{OVERDRIVE}$ > 100mV	●		1.5	5	µA
	Propagation Delay	$V_{OVERDRIVE}$ > 100mV, R_{LOAD} = 10k			5.5	10	µs

Note 1: Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. Exposure to any Absolute Maximum Rating condition for extended periods may affect device reliability and lifetime.

Note 2: A heat sink may be required to keep the junction temperature below absolute maximum.

Note 3: The LT1716C/LT1716I are guaranteed functional over the operating temperature range of –40°C to 85°C. The LT1716H is guaranteed functional over the operating temperature range of –40°C to 125°C.

Note 4: The LT1716C is guaranteed to meet specified performance from 0°C to 70°C. The LT1716C is designed, characterized and expected to meet performance from –40°C to 85° but is not tested or QA sampled at the temperatures. The LT1716I is guaranteed to meet specified performance from –40°C to 85°C. The LT1716H is guaranteed to meet specified performance from –40°C to 125°C.

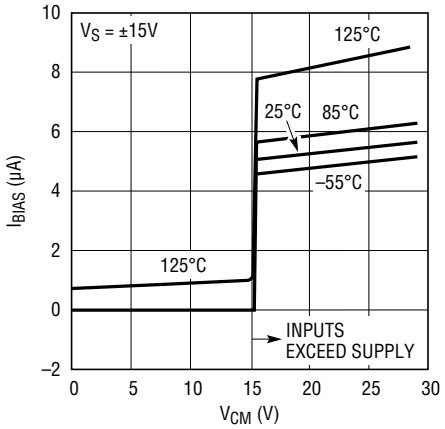
Note 5: This parameter is not 100% tested.

Note 6: Typical input offset voltage of 500µV at V_{CM} = 44V above V– and a maximum input offset voltage of 4mV at V_{CM} = 44V above V–.

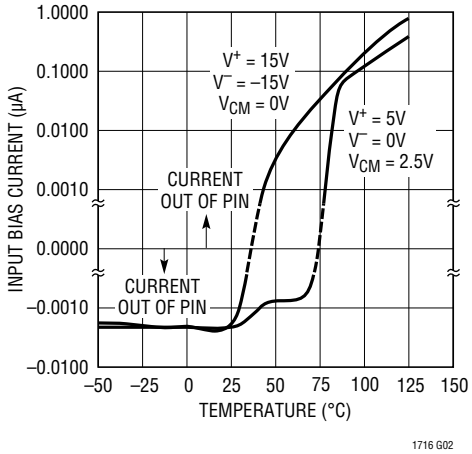
Note 7: If one input is within this input range, the other input can go 5V below V– and the output will be valid.

TYPICAL PERFORMANCE CHARACTERISTICS

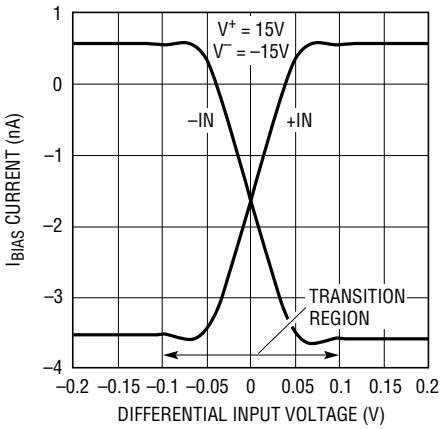
Input Bias Current vs Common Mode Voltage



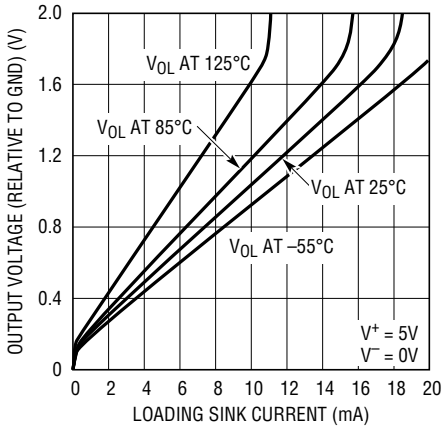
Input Bias Current vs Temperature



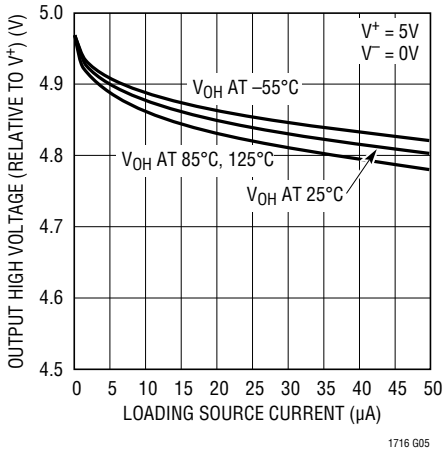
Input Bias Current vs Differential Input Voltage



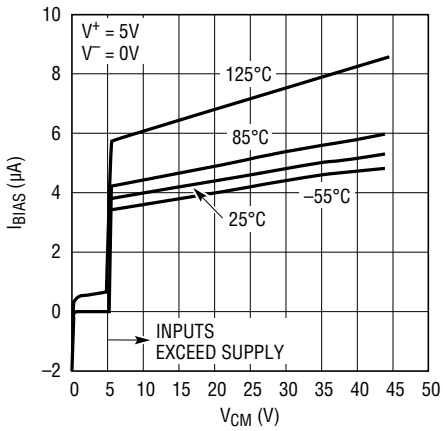
Output Low Voltage vs Sink Current



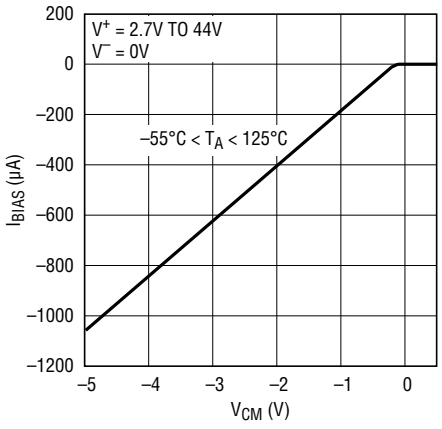
Output High Voltage vs Source Current



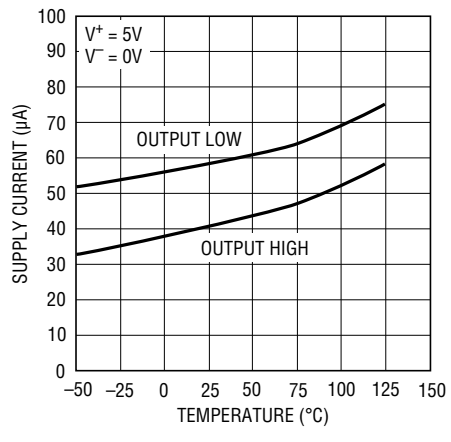
Input Bias Current with Inputs Driven Above the Supply



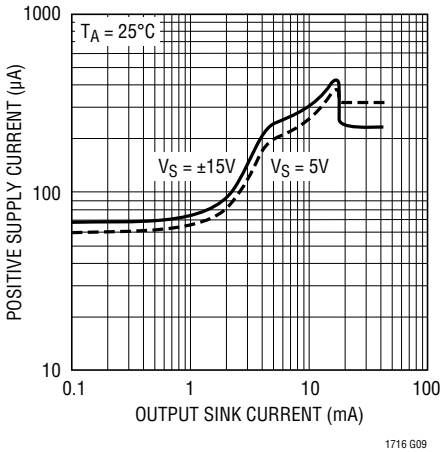
Input Bias Current with Inputs Driven Below the Supply



Supply Current vs Temperature



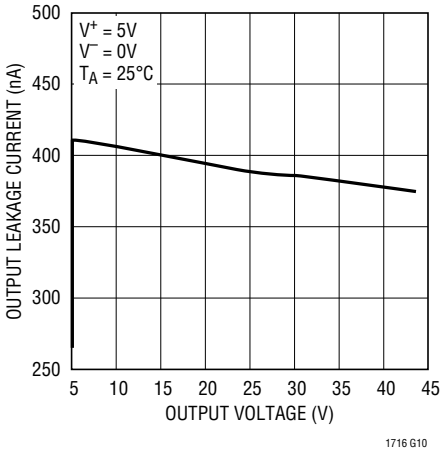
Positive Supply Current vs Output Sinking Current



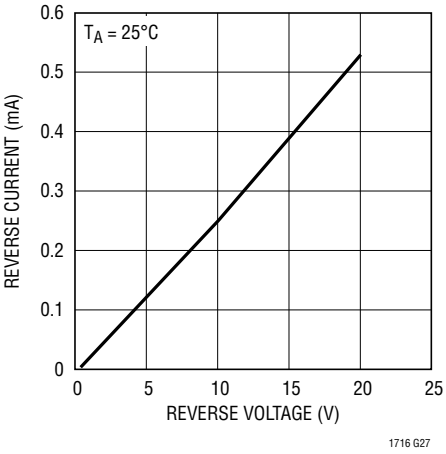
Rev. B

TYPICAL PERFORMANCE CHARACTERISTICS

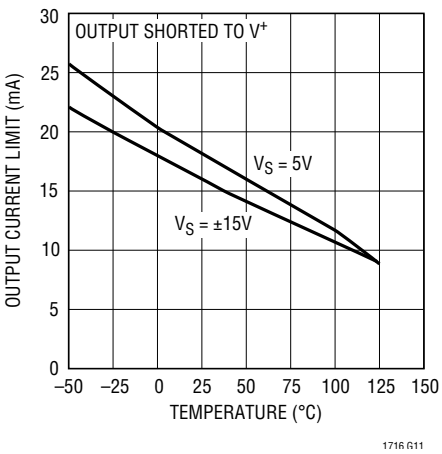
Output Leakage Current vs Output Voltage



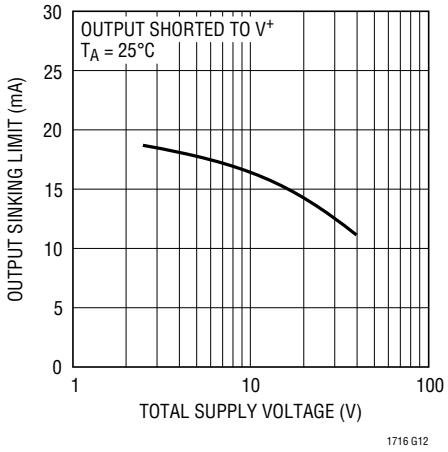
Reverse Supply Current



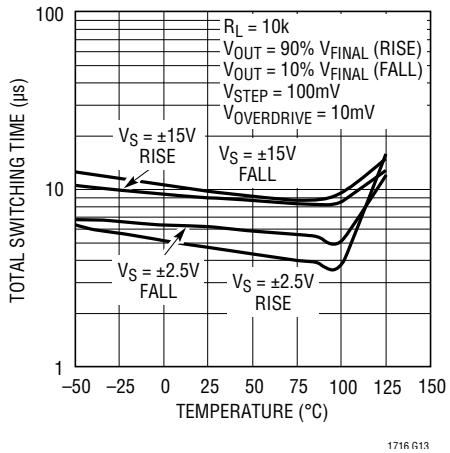
Output Sinking Current Limit vs Temperature



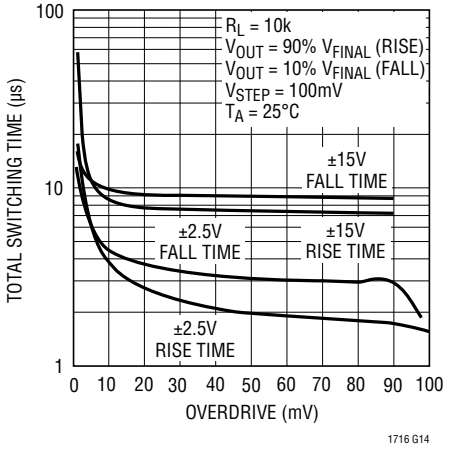
Output Sinking Current vs Total Supply Voltage



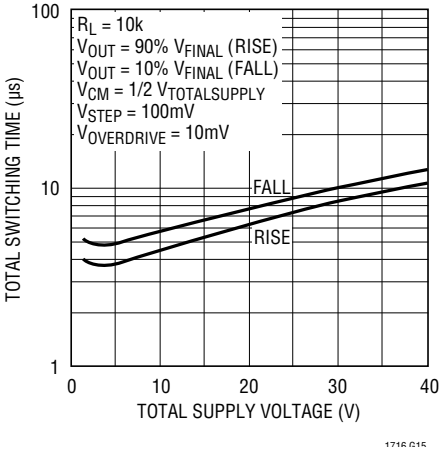
Total Switching Time vs Temperature



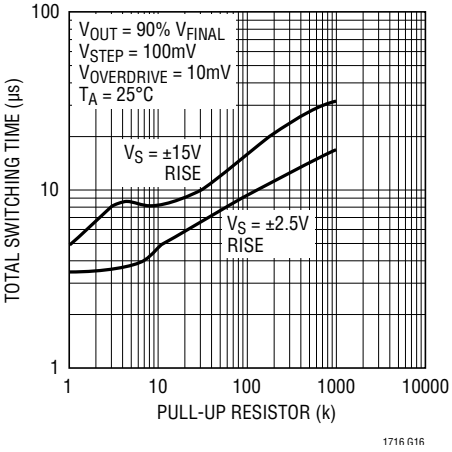
Total Switching Time vs Overdrive



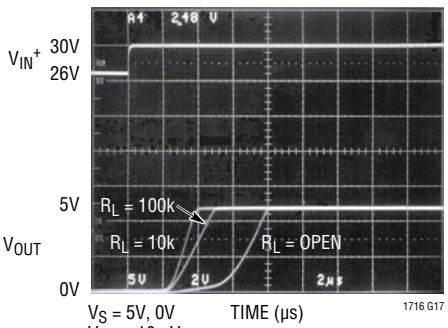
Total Switching Time vs Total Supply Voltage



Total Switching Time vs Pull-Up Resistor



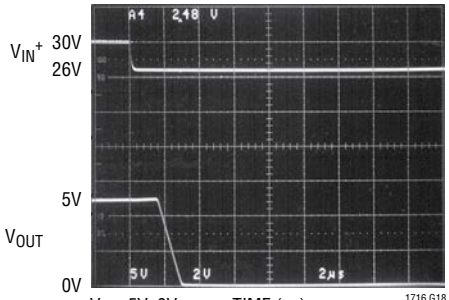
Response Time



V_S = 5V, 0V
V_{OD} = 10mV
R_L = 10k, 100k, OPEN
V_{IN}^+ = 26V TO 30V
V_{IN}^- = 29.99V

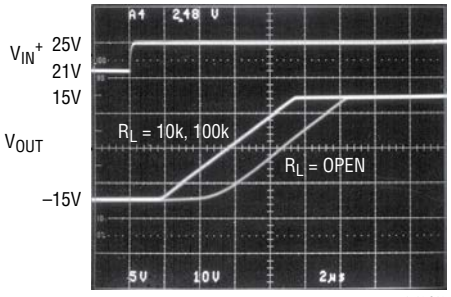
TYPICAL PERFORMANCE CHARACTERISTICS

Response Time



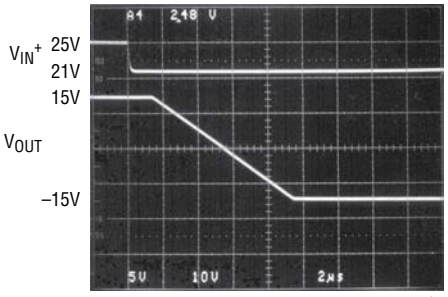
V_S = 5V, 0V TIME (µs)
V_{OD} = 10mV
R_L = 10k, 100k, OPEN
V_{IN}^+ = 30V TO 26V
V_{IN}^- = 26.01V

Response Time



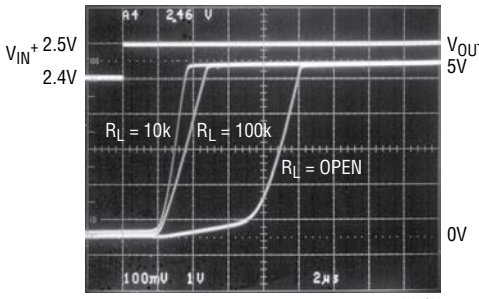
V_S = ±15V TIME (µs)
V_{OD} = 10mV
R_L = 10k, 100k, OPEN
V_{IN}^+ = 21V TO 25V
V_{IN}^- = 24.99V

Response Time



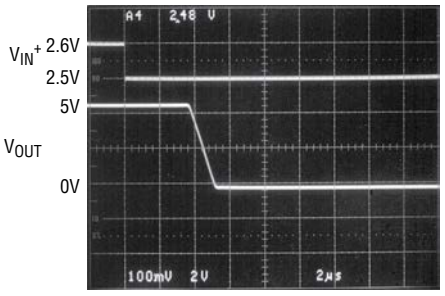
V_S = ±15V TIME (µs)
V_{OD} = 10mV
R_L = 10k, 100k, OPEN
V_{IN}^+ = 25V TO 21V
V_{IN}^- = 21.01V

Response Time



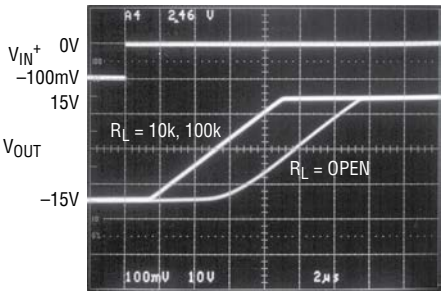
V_S = ±15V TIME (µs)
V_{OD} = 10mV
R_L = 10k, 100k, OPEN
V_{IN}^+ = 2.4V TO 2.5V
V_{IN}^- = 2.49V

Response Time



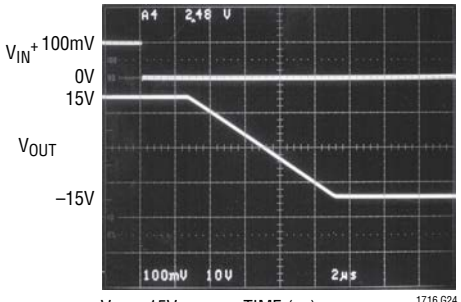
V_S = 5V TIME (µs)
V_{OD} = 10mV
R_L = 10k, 100k, OPEN
V_{IN}^+ = 2.6V TO 2.5V
V_{IN}^- = 2.51V

Response Time



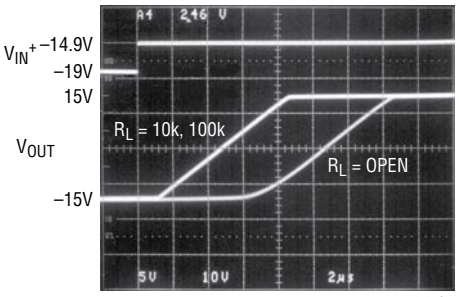
V_S = ±15V TIME (µs)
V_{OD} = 10mV
R_L = 10k, 100k, OPEN
V_{IN}^+ = –100mV TO 0V
V_{IN}^- = –10mV

Response Time



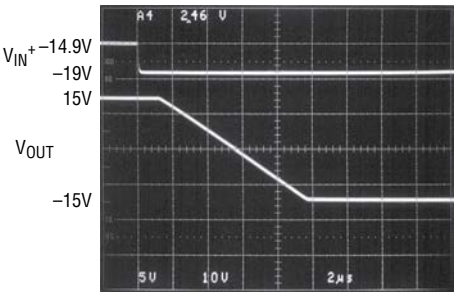
V_S = ±15V TIME (µs)
V_{OD} = 10mV
R_L = 10k, 100k, OPEN
V_{IN}^+ = 110mV TO 0mV
V_{IN}^- = 10mV

Below V_S^- Fault (Rising)



V_S = ±15V TIME (µs)
R_L = 10k, 100k, OPEN
V_{IN}^+ = –19V TO –14.9V
V_{IN}^- = –15V

Below V_S^- Fault (Falling)



V_S = ±15V TIME (µs)
R_L = 10k, 100k, OPEN
V_{IN}^+ = –14.9V TO –19V
V_{IN}^- = –15V

APPLICATIONS INFORMATION

The LT1716 comparator features low power operation with exceptional input precision with rail-to-rail input and output swing. The comparator operates flawlessly even when the inputs are pulled over the positive rail or below the negative rail.

Supply Voltage

The LT1716 operates from 2.7V to 44V. The comparator can be shut down by removing V^+. In this condition, the input bias current is typically less than 3nA, even if the inputs are 44V above the negative supply. The LT1716 is protected against reverse battery voltages of up to 20V. The reverse battery current is resistive as shown in the Reverse Supply Current graph.

Inputs

The comparator inputs can swing from 0.5V above to 44V above $V^–$. If one input is within this range, the other input can be forced up to 5V below $V^–$ without phase reversal occuring at the output.

The LT1716 has three stages—NPN, PNP and common base (see Simplified Schematic)—resulting in three distinct operating regions and two transition regions as shown in the Input Bias Current vs Common Mode typical performance curve.

For input voltages about 0.8V or more below V^+, the PNP input stage is active and the input bias current is typically –4nA. The PNP differential input stage will have bias current that flows out of the device. With a differential input voltage of even just 100mV or so, there will be zero bias current into the higher of the two inputs, while the current flowing out of the lower input will be twice the measured bias current.

When the input voltage is about 0.5V or less from V^+, the NPN state is operating and the input bias current is typically 10nA. Increases in temperature will cause the voltage at which operation switches from the PNP stage to the NPN stage to move towards V^+. The input offset voltage of the NPN stage is untrimmed and is typically 500µV.

A Schottky diode in the collector of each NPN transistor of the NPN input stage allows the LT1716 to operate with either or both of its inputs above V^+. At about 0.3V above V^+, the NPN transistor is fully saturated and the input bias current is typically 4µA at room temperature. The input offset voltage is typically 500µV when operating above V^+. The LT1716 will operate with its input 44V above $V^–$, regardless of V^+.

The transition to the negative common mode input stage occurs at 0.3V above $V^–$. Above this trip point the PNP stage is active. When the inputs are 0.3V below $V^–$, the common base input stage is active in addition to the PNP stage. The input bias current out of each input becomes $V_{IN}/5k\Omega$. The LT1716 is designed to operate when either input falls below the negative supply. Internal resistors protect the inputs for faults below the negative supply of up to 5V without phase reversal. The built-in 5k resistor limits the current at each input to 1mA at 5V below the negative supply. External matched input resistors can be added for increased voltage fault operation below the negative supply but the maximum input current should be kept under 1mA.

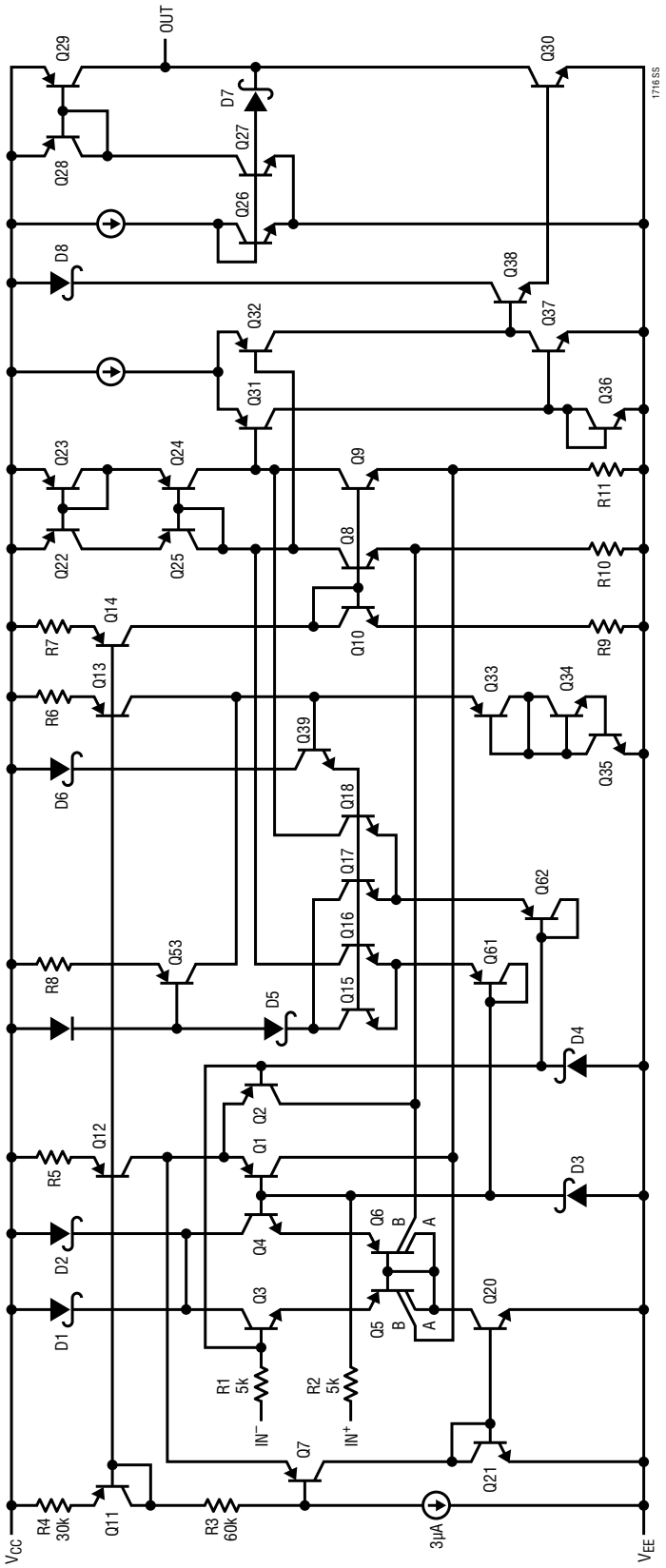
Input Protection

The inverting and noninverting input pins of the LT1716 have on-chip protection. ESD protection is provided to prevent damage during handling. The input transistors have voltage clamping and limiting resistors to protect against excursions as much as 5V below $V^–$. There are no clamping diodes between the inputs and the maximum differential input voltage is 44V.

Output

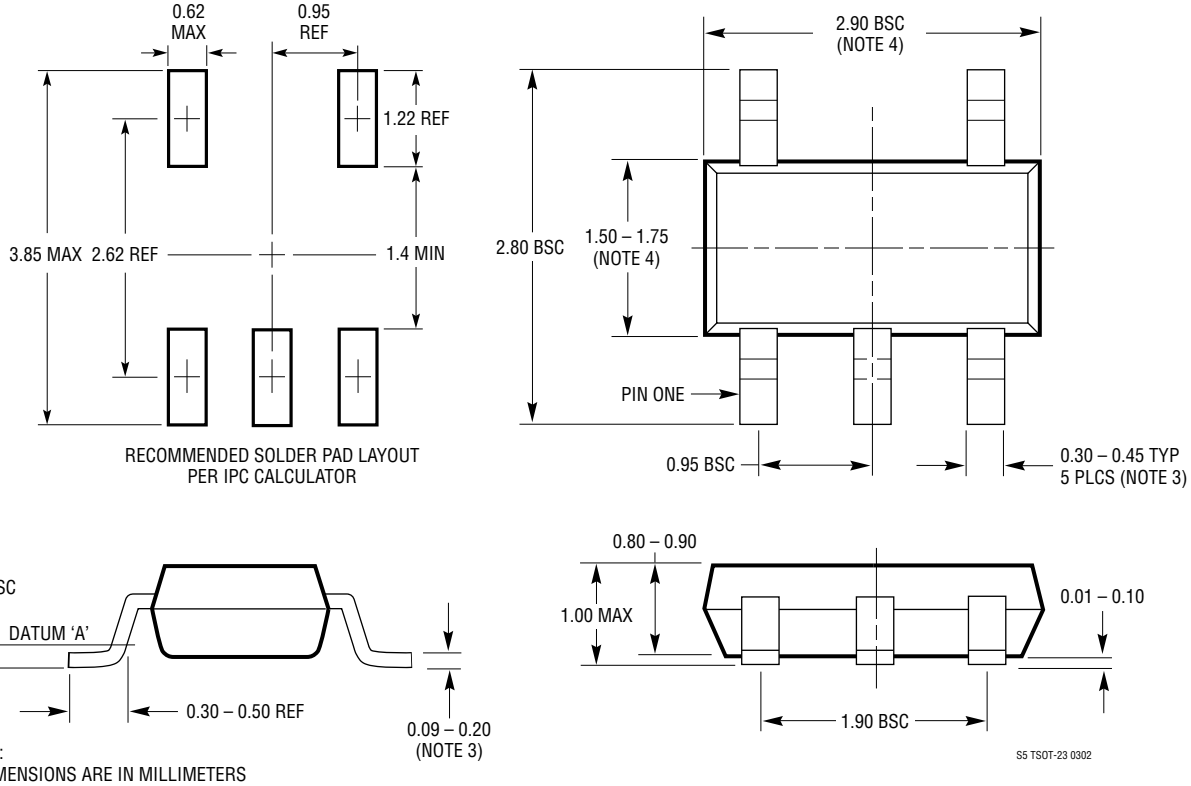
The output stage of the LT1716 can drive loads connected to a supply more positive than the device, the same as comparators with open collector output stages. The output of the LT1716 can be pulled up to 44V above $V^–$, regardless of V^+.

SIMPLIFIED SCHEMATIC



PACKAGE DESCRIPTION

S5 Package
5-Lead Plastic TSOT-23
(Reference LTC DWG # 05-08-1635)



NOTE:
1. DIMENSIONS ARE IN MILLIMETERS
2. DRAWING NOT TO SCALE
3. DIMENSIONS ARE INCLUSIVE OF PLATING
4. DIMENSIONS ARE EXCLUSIVE OF MOLD FLASH AND METAL BURR
5. MOLD FLASH SHALL NOT EXCEED 0.254mm
6. JEDEC PACKAGE REFERENCE IS MO-193

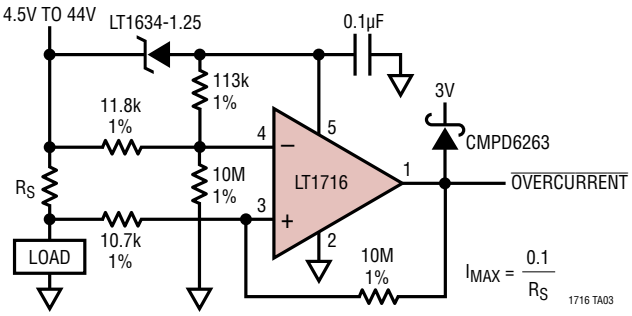
REVISION HISTORY

REV	DATE	DESCRIPTION	PAGE NUMBER
B	10/19	Added Automotive Qualified Parts	All

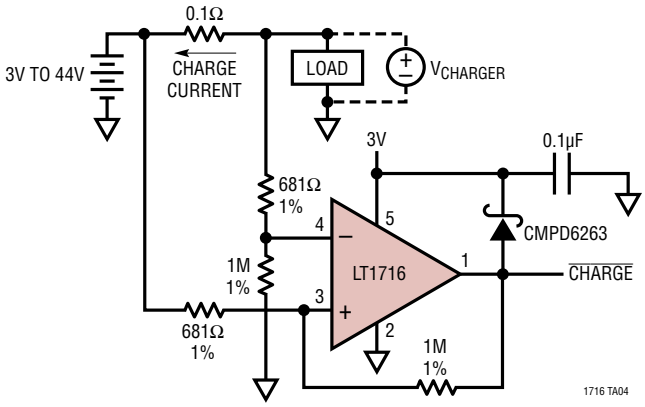
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TYPICAL APPLICATIONS

Overcurrent Flag



Charge/Discharge Indicator



RELATED PARTS

PART NUMBER	DESCRIPTION	COMMENTS
LTC1442	Dual Micropower Comparator and 1% Reference	1.182V ±1% Reference, ±10mV$_{MAX}$ Input Offset
LTC1540	Nanopower Comparator and 1% Reference	1.182V ±1% Reference, ±10mV$_{MAX}$ Input Offset
LT1634	Micropower Precision Shunt Reference	0.05%, 10µA, 10ppm/°C Max Drift, 1.25V, 2.5V, 4.096V, 5V, MSOP, SO-8, TO-92 Packages
LTC1921	Dual –48V Telecom Supply Monitor	Monitors Two Supplies and Fuses
LTC1998	Micropower Li-Ion Battery Monitor	1% Trip Point Adjustable from 2.5V to 3.25V

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