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Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild_questions@onsemi.com.

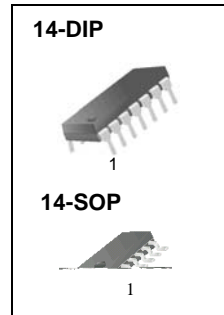


Features

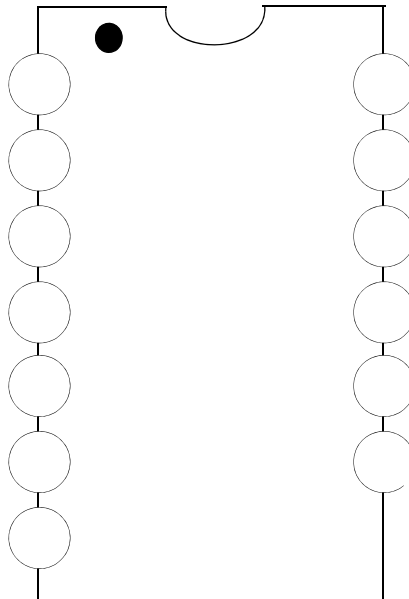
- Operates From a Single 5V Supply
- Typically 80ns Response Time at $\pm 15V$
- Open Collector Outputs : up to +35V
- High Output Drive Current : 25mA
- Inputs and Outputs can be Isolated From System Ground
- Minimum Fan-out of 2 (Each Side)
- Two Independent Comparators

Description

The KA319 is a dual high speed voltage comparator designed to operate from a single +5V supply up to $\pm 15V$ dual supplies. Open collector of the output stage makes the KA319 compatible with RTL, DTL and TTL as well as capable of driving lamps and relays at currents up to 25mA. Typical response time of 80ns with $\pm 15V$ power supplies makes the KA319 ideal for application in fast A/D converts, level shifters, oscillators, and multivibrators.



Internal Block Diagram



Schematic Diagram

Absolute Maximum Ratings

| Parameter | Symbol | Value | Unit |
|--|----------|---------|------|
| Supply Voltage | VCC | 36 | V |
| Output to Negative Supply Voltage | VO - VEE | 36 | V |
| Ground to Negative Supply Voltage | VEE | 25 | V |
| Ground to Positive Supply Voltage | VCC | 18 | V |
| Differential Input Voltage | VI(DIFF) | 5 | V |
| Input Voltage | VI | ±15 | V |
| Output Short Circuit Duration | - | 10 | sec |
| Power Dissipation | PD | 500 | mW |
| Thermal Resistance Junction-Ambient Max. | Rθja | 250 | °C/W |
| Operating Temperature Range KA319 | TOPR | 0 ~ +70 | °C |
| Storage Temperature Range | TSTG | | |

Electrical Characteristics

($V_{CC} = +15V$, $V_{EE} = -15V$, $T_A = 25^\circ C$, unless otherwise specified)

| Parameter | Symbol | Conditions | KA319 | | | Unit |
|------------------------------|------------|---|-------|----------|---------|---------|
| | | | Min. | Typ. | Max. | |
| Input Offset Voltage (Note1) | V_{IO} | $R_S \leq 5k\Omega$ Note3 | - | 2.0 | 8.0 | mV |
| Input Offset Current (Note1) | I_{IO} | Note3 | - | 10 | 200 | nA |
| Input Bias Current | I_{BIAS} | Note3 | - | 150 | 1000 | nA |
| Voltage Gain | G_V | - | 8 | 40 | - | V/mV |
| Response Time (Note2) | t_{RE} | $V_{CC} = \pm 15V$ | - | 80 | - | ns |
| Saturation Voltage | V_{SAT} | $V_{CC} = 15V, V_{EE} = -15V, V_I \leq -5mV, I_O = 25mA$ $V_{CC} = 4.5V, V_{EE} = 0V$ $V_I \leq -10mV, I_O \leq 3.2mA$ Note3 | - | 0.6 | 1.5 | V |
| Output Leakage Current | I_{LKG} | $V_I \geq 5mV, V_{O(P)} = 35V$ Note3 | - | - | - | μA |
| | | $V_I \geq 10mV, V_{O(P)} = 35V$ | - | 0.2 | 10 | |
| Input Voltage Range | $V_{(R)}$ | Note3 | | ± 13 | - | V |
| Differential Input Voltage | V_{DIFF} | - Note3 | | - | ± 5 | V |

Notes :

1. The offset voltage and offset currents given are the maximum values required to drive the output within a volt of either supply with a 1mA load. Thus, these parameters define an error band and take into account the worst case effects of voltage gain and input impedance.
2. The response time specified is for a 100mV input step with 5mV overdrive.
3. KA319 : $0 \leq T_A \leq +70^\circ C$

Typical Performance Characteristics

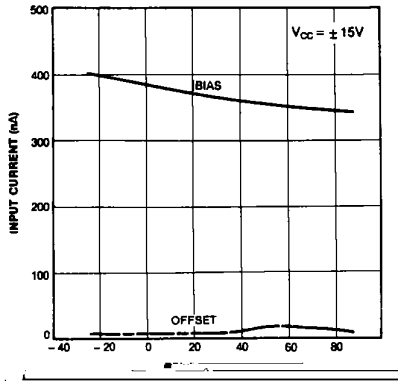


Figure 1. Input Current

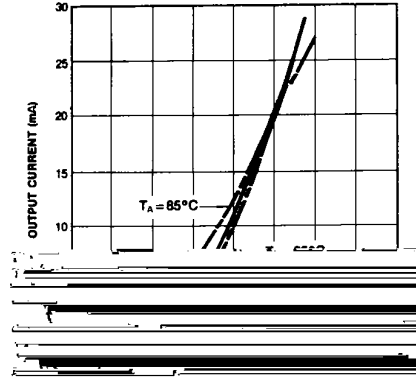


Figure 2. Output Saturation Voltage

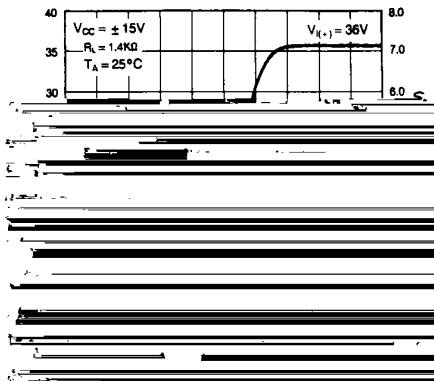


Figure 3. Transfer Function

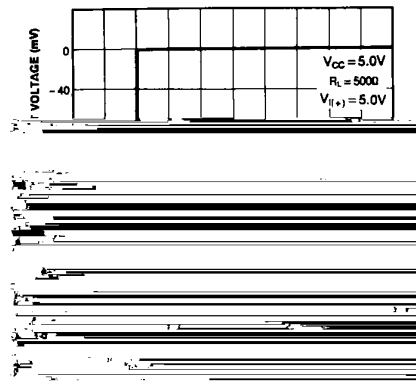


Figure 4. Response Time for Various Input Overdrive

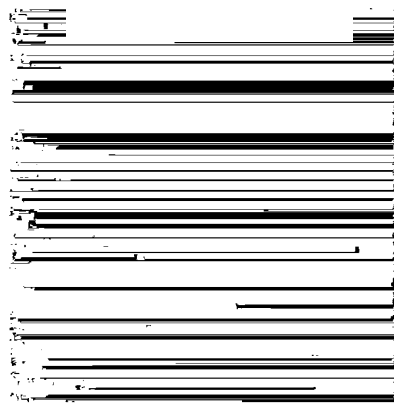


Figure 5. Response Time Various Input Overdrive

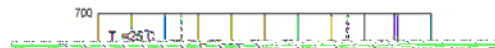


Figure 6. Input Characteristics

Typical Performance Characteristics (Continued)

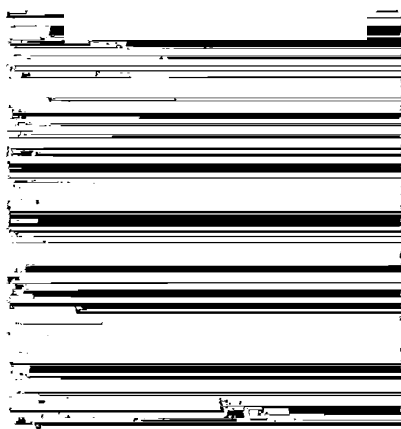


Figure 7. Response Time for Various Input Over driver

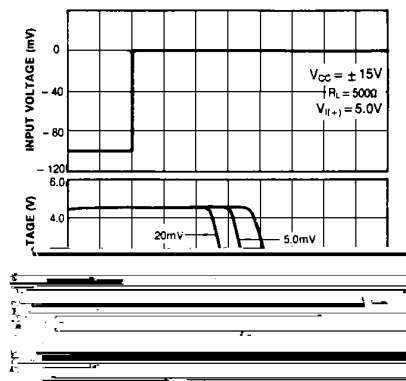


Figure 8. Response Time for Various Input Over driver

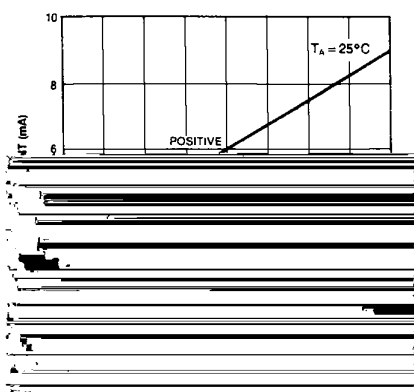


Figure 9. Supply Current

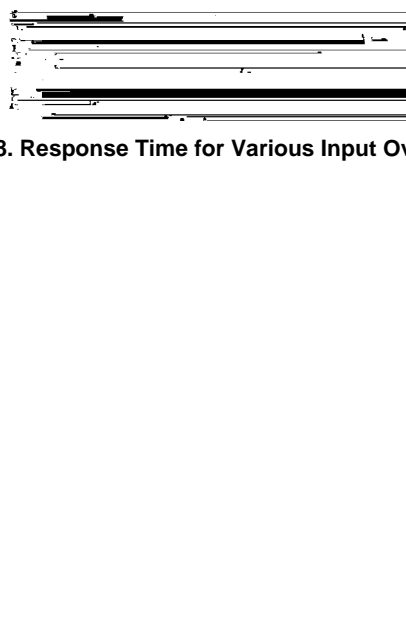


Figure 10. Supply Current

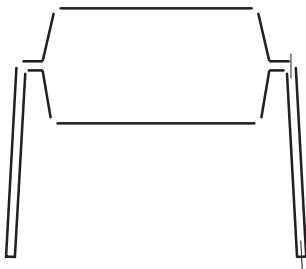
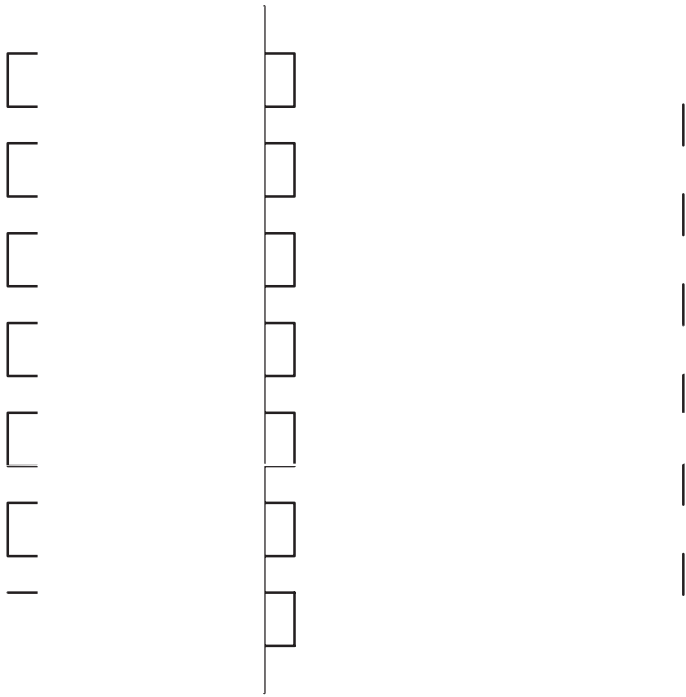
Figure 11. Common Mode Limits

Figure 12. Output Limiting Characteristics

Mechanical Dimensions

Package

Dimensions in millimeters



Mechanical Dimensions (Continued)**Package****Dimensions in millimeters**A1E1A
A1E1A

A1E1A

A1E1A

A1E1A

A1E1A A1E1A

A1E1A

Ordering Information

| Product Number | Package | Operating Temperature |
|----------------|---------|-----------------------|
| KA319 | 14-DIP | 0 ~ +70°C |
| KA319D | 14-SOP | |

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