LM311 (KA311) SINGLE COMPARATOR

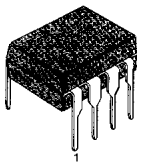
VOLTAGE COMPARATOR

The LM311 series is a monolithic, low input current voltage comparator.
The device is also designed to operate from dual or single supplies voltage

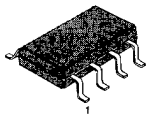
FEATURE

- Low input bias current : 250nA (Max)
- Low input offset current : 50nA (Max)
- Differential Input Voltage : ±30V.
- Power supply voltage : single 5.0V supply to ±15V.
- Offset voltage null capability.
- Strobe capability.

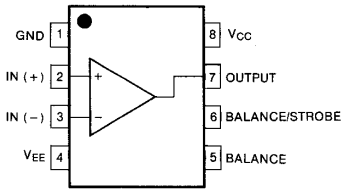
8 DIP



8 SOP



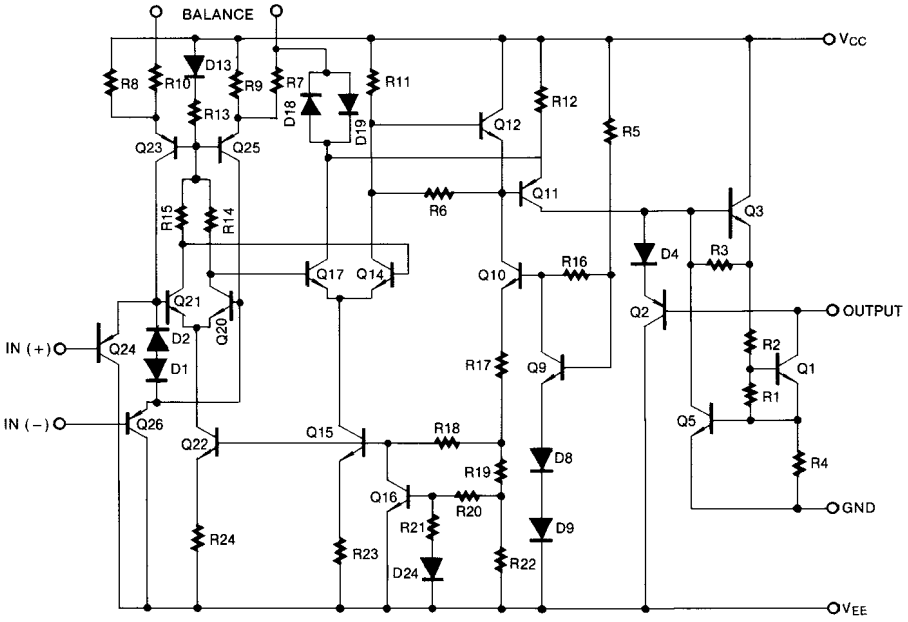
BLOCK DIAGRAM



ORDERING IN FORMATION

Device	Package	Operating Temperature
LM311N	8 DIP	0 ~ +70°C
LM311M	8 SOP	

SCHEMATIC DIAGRAM



FAIRCHILD SEMICONDUCTOR TM

Rev. B

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Total Supply Voltage	V_{CC}	36	V
Output to Negative Supply Voltage KA311	V_O - V_{EE}	40	V
Ground to Negative voltage	V_{EE}	-30	V
Differential Input Voltage	$V_{I(DIFF)}$	30	V
Input Voltage	V_I	±15	V
Output Short Circuit Duration		10	sec
Power Dissipation	P_D	500	mW
Operating Temperature Range	T_{OPR}	0 ~ +70	°C
Storage Temperature Range	T_{STG}	- 65 ~ +150	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 15V, T_A = 25°C, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Offset Voltage	V_{IO}	R_S≤50KΩ		1.0	7.5	mV
		NOTE 1			10	
Input Offset Current	I_{IO}			6	50	nA
		NOTE 1			70	
Input Bias Current	I_{BIAS}			100	250	nA
		NOTE 1			300	
Voltage Gain	G_V		40	200		V/mV
Response Time	t_{RES}	NOTE 2		200		ns
Saturation Voltage	V_{SAT}	I_O =50mA, V_I≤-10mV		0.75	1.5	V
		V_{CC}≥4.5V, V_{EE} = 0V I_{SINK} =8mA, V_I≥-10mV, NOTE 1		0.23	0.4	
Strobe “NO” Current	$I_{STR(ON)}$			3		mA
Output Leakage Current	I_{SINK}	I_{STR} =3mA, V_I≥10mV $V_{O(P)}$ =35V, V_{EE} =V_{GND} =-5V		0.2	50	nA
Input Voltage Range	$V_{I(R)}$	NOTE 1	-14.5 to 13.0	-14.7 to 13.8		V
Positive Supply Current	I_{CC}			3.0	7.5	mA
Negative Supply Current	I_{EE}			-2.2	-5.0	mA
Strobe Current	I_{STR}			3		mA

NOTE 1. 0 ≤ T_A ≤ +70°C

2. The response time specified is for a 100mV input step with 5mV over drive.

TYPICAL PERFORMANCE CHARACTERISTICS

Fig. 1 INPUT BIAS CURRENT

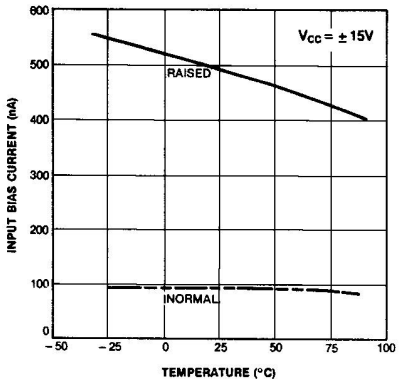


Fig. 2 INPUT OFFSET CURRENT

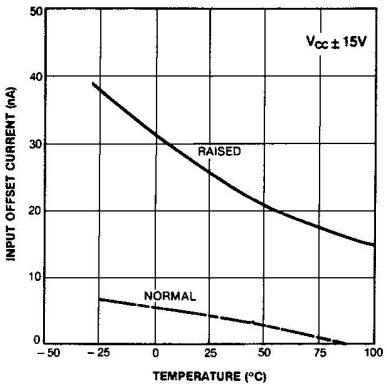


Fig. 3 OFFSET VOLTAGE VS INPUT RESISTANCE

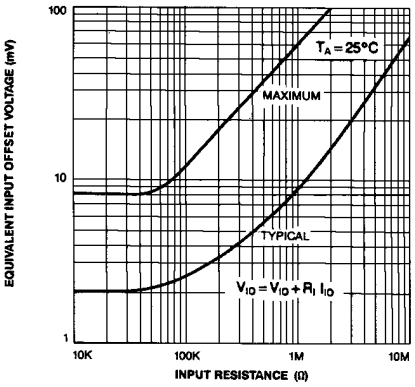


Fig. 4 INPUT BIAS CURRENT VS DIFFERENTIAL

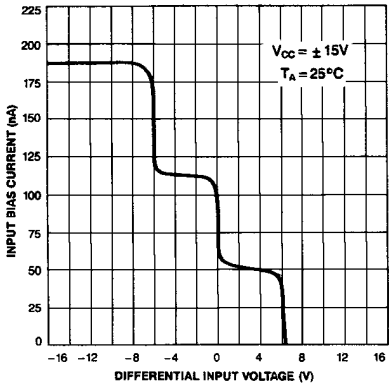


Fig. 5 COMMON MODE LIMITS VS TEMPERATURE

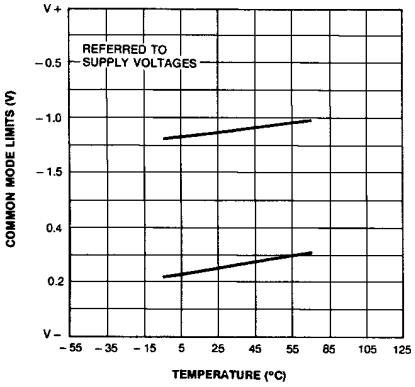


Fig. 6 OUTPUT VOLTAGE VS DIFFERENTIAL

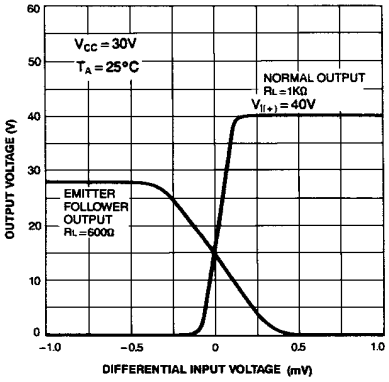


Fig. 7 SATURATION VOLTAGE VS CURRENT

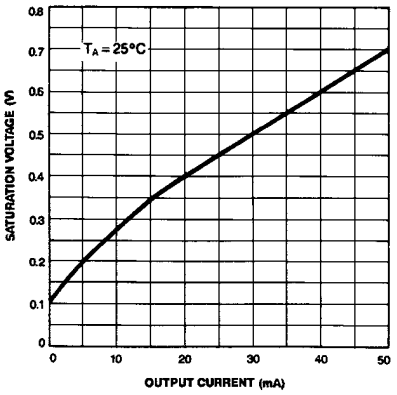


Fig. 8 SUPPLY CURRENT VS TEMPERATURE

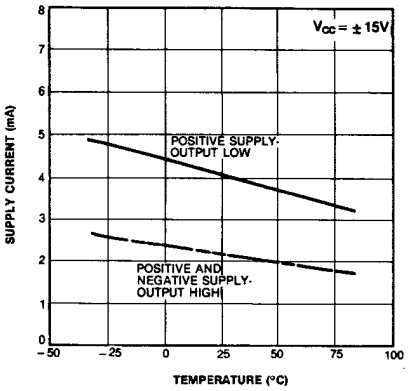


Fig. 9 LEAKAGE CURRENTS VS TEMPERATURE

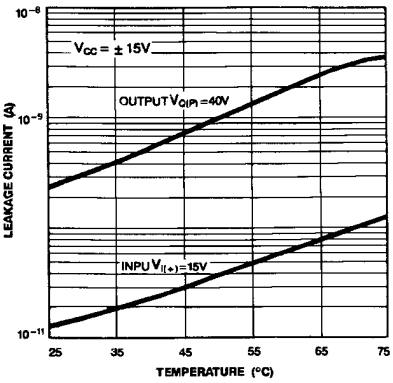


Fig. 10 SUPPLY CURRENT VS SUPPLY VOLTAGE

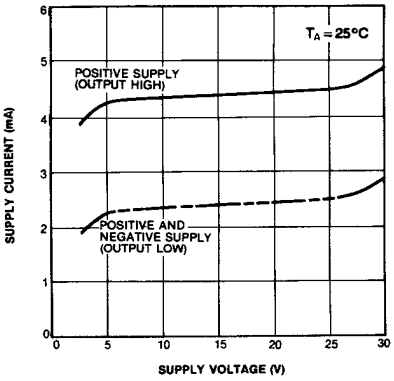


Fig. 11 OUTPUT SATURATION VOLTAGE

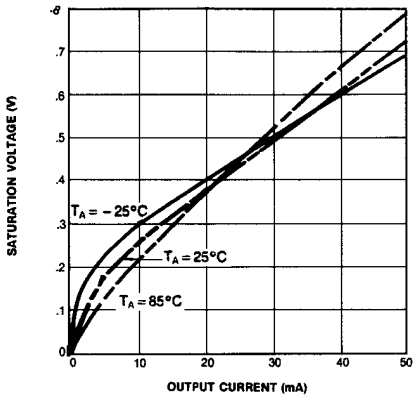
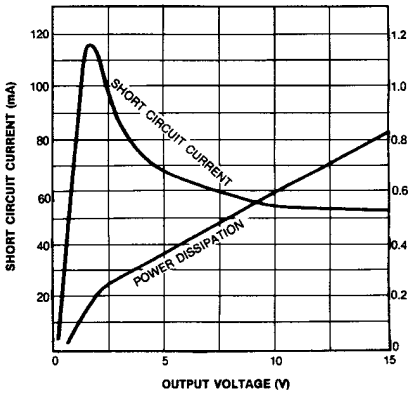


Fig. 12 OUTPUT LIMITING CHARACTERISTICS



TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACEx™
CoolFET™
CROSSVOLT™
E^2CMOS^{TM}
FACT™
FACT Quiet Series™
FAST®
FASTr™
GTO™
HiSeC™
ISOPLANAR™
MICROWIRE™
POP™
PowerTrench™
QS™
Quiet Series™
SuperSOT™-3
SuperSOT™-6
SuperSOT™-8
TinyLogic™

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.
As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.