ELECTRONICS, INC.
44 FARRAND STREET
BLOOMFIELD, NJ 07003
(973) 748–5089

NTE928M & NTE928SM
Integrated Circuit
Low Power Dual Operational Amplifier

Description:

Utilizing the circuit designs perfected for recently introduced Quad Operational Amplifiers, the NTE928M/NTE928SM dual operational amplifier features low power drain, a common mode input voltage range extending to ground/V_{EE}, and Single Supply or Split Supply Operation.

This amplifier has several distinct advantages over standard operational amplifier types in single supply applications. It can operate at supply voltages as low as 3.0 Volts or as high as 32 Volts with quiescent currents about one–fifth of those associated with the NTE941 (on a per amplifier basis). The common mode input range includes the negative supply, thereby eliminating the necessity for external biasing power supply voltage.

Features:

- Short Circuit Protected Outputs
- True Differential Input Stage
- Single Supply Operation: 3.0 to 32 Volts
- Low Input Bias Currents
- Internally compensated
- Common Mode Range Extends to Negative Supply
- Single and Split Supply Operation

Maximum Ratings:

Power Supply Voltages
- Single Supply, V_{CC} 32V
- Split Supplies, V_{CC} V_{EE} . . . . . ±16V

Input Differential Voltage Range (Note 1), V_{IDR} . . . . . ±32V
Input Common Mode Voltage Range (Note 2), V_{ICR} . . . . . –0.3 to 32V
Input Forward Current (V_I –0.3V, Note 3), I_{IF} 50mA
Output Short Circuit Duration, t_S . . . . . Continuous
Junction Temperature, T_J . . . . . –55° to +125°C
Operating Ambient Temperature Range, T_A . . . . . 0° to +70°C

Note 1. Split Power Supplies
Note 2. For supply voltages less than 32V, the absolute maximum input voltage is equal to the supply voltage.
Note 3. This input current will only exist when the voltage is negative at any of the input leads. Normal output states will reestablish when the input voltage returns to a voltage greater than 0.3V.

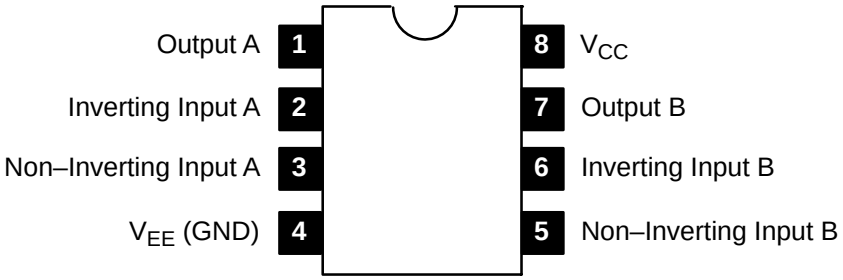
Electrical Characteristics: (V_{CC} = 5V, V_{EE} = Gnd, T_A = +25°C unless otherwise specified)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
Input Offset Voltage	V_{IO}	V_{CC} = 5V to 30V, V_{IC} =0 to V_{CC}–1.7V, $V_O \simeq$ 1.4V, R_S = 0Ω		–	2.0	7.0	mV
			0° ≤ T_A ≤ +70°C	–	–	9.0	mV
Average Temperature Coefficient of Input Offset Voltage	$\Delta V_{IO}/\Delta T$	0° ≤ T_A ≤ +70°C		–	7.0	–	µV/°C
Input Offset Current	I_{IO}			–	5.0	50	nA
		0° ≤ T_A ≤ +70°C		–	–	150	nA
Average Temperature Coefficient of Input Offset Current	$\Delta I_{IO}/\Delta T$	0° ≤ T_A ≤ +70°C		–	10	–	pA/°C
Input Bias Current	I_{IB}			–	–45	–250	nA
		0° ≤ T_A ≤ +70°C		–	–50	–500	nA
Input Common–Mode Voltage Range	V_{ICR}	V_{CC} = 30V, Note 4		0	–	28.3	V
			0° ≤ T_A ≤ +70°C	0	–	28	V
Differential Input Voltage Range	V_{IDR}			–	–	V_{CC}	V
Large Signal Open–Loop Voltage Gain	A_{VOL}	R_L = 2kΩ, V_{CC} = 15V, For Large V_O Swing		25	100	–	V/mV
			0° ≤ T_A ≤ +70°C	15	–	–	V/mV
Channel Separation		1kHz ≤ f ≤ 20kHz, Input Referenced		–	–120	–	dB
Common–Mode Rejection Ratio	CMRR	R_S ≤ 10kΩ		65	70	–	dB
Power Supply Rejection Ratio	PSRR			65	100	–	dB
Output Voltage Range	V_{OR}	R_L = 2kΩ		0	–	3.3	V
Output Voltage – High Limit	V_{OH}	V_{CC} = 30V, 0° ≤ T_A ≤ +70°C	R_L = 2kΩ	26	–	–	V
			R_L = 10kΩ	27	28	–	V
Output Voltage – Low Limit	V_{OL}	V_{CC} = 5V, R_L = 10kΩ, 0° ≤ T_A ≤ +70°C		–	5	20	mV
Output Source Current	I_{O+}	V_{ID} = +1V, V_{CC} = 15V		20	40	–	mA
Output Sink Current	$I_{O–}$	V_{ID} = –1V, V_{CC} = 15V		10	20	–	mA
		V_{ID} = –1V, V_O = 200mV		12	50	–	µA
Output Short–Circuit to GND	I_{os}	Note 5		–	40	60	mA
Power Supply Current	I_{CC}	V_O = 0, R_L = ∞, 0° ≤ T_A ≤ +70°C	V_{CC} = 30V	–	1.5	3.0	mA
			V_{CC} = 5V	–	0.7	1.2	mA

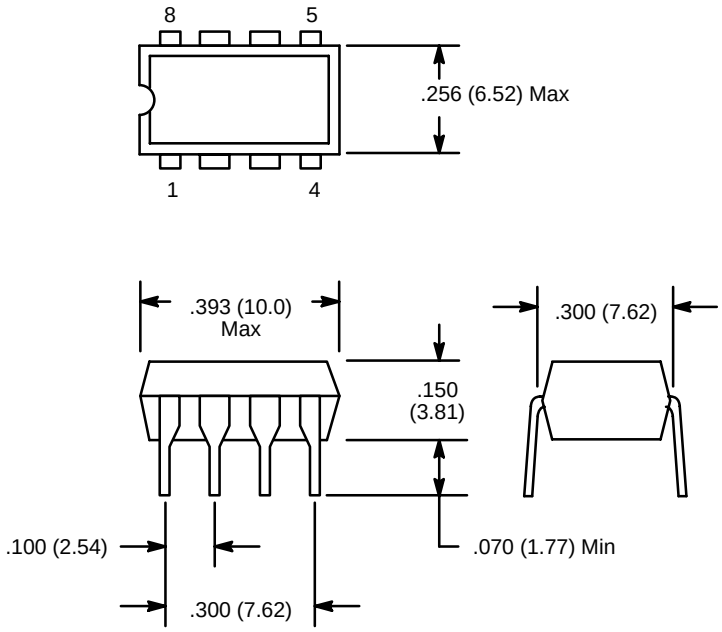
Note 4. The input common–mode voltage or either input signal voltage should not be allowed to go negative by more than 0.3V. The upper end of the common–mode voltage range is V_{CC}–1.7V, but either or both inputs can goto +32V without damage.

Note 5. Short circuit from the output to V_{CC} can cause excessive heating and eventual destruction. Destructive dissipation can result from simultaneous shorts on all amplifiers.

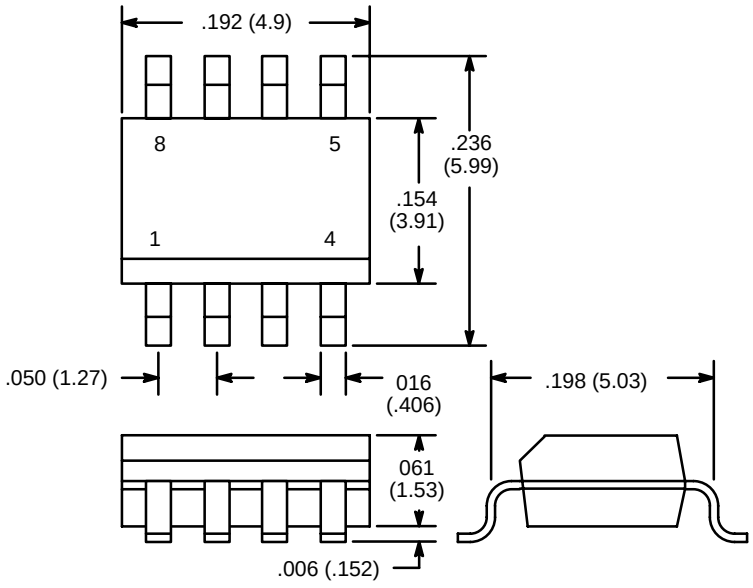
Pin Connection Diagram



NTE928M



NTE928SM



NOTE: Pin1 on Beveled Edge

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Operational Amplifiers - Op Amps ***category:***

Click to view products by NTE ***manufacturer:***

Other Similar products are found below :

OPA2991IDSGR OPA607IDCKT 007614D 633773R 635798C 635801A 702115D 709228FB 741528D NCV33072ADR2G SC2902DTBR2G SC2903DR2G SC2903VDR2G LM258AYDT LM358SNG 430227FB 430228DB 460932C AZV831KTR-G1 409256CB 430232AB LM2904DR2GH LM358YDT LT1678IS8 042225DB 058184EB 070530X SC224DR2G 714228XB 714846BB 873836HB MIC918YC5-TR TS912BIYDT NCS2004MUTAG NCV33202DMR2G M38510/13101BPA NTE925 SC2904DR2G SC358DR2G LM358EDR2G AZV358MTR-G1 AP4310AUMTR-AG1 HA1630D02MMEL-E NJM358CG-TE2 HA1630S01LPEL-E LM324AWPT HA1630Q06TELL-E NJM4558CG-TE2 AZV358MMTR-G1 SCY33178DR2G