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NTE1961, NTE1963, NTE1965, NTE1967, NTE1971, NTE1973, NTE1975, NTE1977 Integrated Circuit Negative, 3-Terminal Voltage Regulator

Description:

The NTE1961 through NTE1977 series of monolithic 3-terminal negative voltage regulators employ internal current limiting, thermal shut-down, and safe-area compensation in an isolated TO220 type package making them essentially indestructible. If adequate heat sinking is provided, they can deliver over 1A output current. These devices are intended for use as fixed voltage regulators in a wide range of applications including local (on card) regulation for elimination of distribution problems associated with single point regulation. In addition to use as fixed voltage regulators, they can be used with external components to obtain adjustable output voltages and currents.

Absolute Maximum Ratings: ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Input Voltage, V_{IN}	
NTE1961, NTE1963, NTE1965, NTE1967, NTE1971, NTE1973 -35V
NTE1975, NTE1977 -40V
Power Dissipation ($T_C \leq +70^\circ\text{C}$), P_D 16W
Operating Junction Temperature Range, T_J -30° to $+150^\circ\text{C}$
Operating Ambient Temperature Range, T_{opr} -30° to $+75^\circ\text{C}$
Storage Temperature Range, T_{stg} -40° to $+125^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient, R_{thJA} 60°C/W
Thermal Resistance, Junction-to-Case, R_{thJC} 5°C/W

Electrical Characteristics: ($T_J = +25^\circ\text{C}$, $C_I = 2.2\mu\text{F}$, $C_O = 0.1\mu\text{F}$, Note 1 unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}					
NTE1961		$V_{IN} = -10\text{V}$, $I_O = 0.5\text{A}$	-4.8	-5.0	-5.25	V
NTE1963		$V_{IN} = -11\text{V}$, $I_O = 0.5\text{A}$	-5.75	-6.0	-6.25	V
NTE1965		$V_{IN} = -14\text{V}$, $I_O = 0.5\text{A}$	-7.7	-8.0	-8.3	V
NTE1967		$V_{IN} = -15\text{V}$, $I_O = 0.5\text{A}$	-8.65	-9.0	-9.35	V
NTE1971		$V_{IN} = -19\text{V}$, $I_O = 0.5\text{A}$	-11.5	-12.0	-12.5	V
NTE1973		$V_{IN} = -23\text{V}$, $I_O = 0.5\text{A}$	-14.4	-15.0	-15.6	V
NTE1975		$V_{IN} = -27\text{V}$, $I_O = 0.5\text{A}$	-17.3	-18.0	-18.7	V
NTE1977	$V_{IN} = -33\text{V}$, $I_O = 0.5\text{A}$	-23.0	-24.0	-25.0	V	

Note 1. Measurement is to be conducted in pulse testing.

Electrical Characteristics (Cont'd): ($T_J = +25^\circ\text{C}$, $C_I = 0.33\mu\text{F}$, $C_O = 0.1\mu\text{F}$, Note 1 unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Quiescent Current NTE1961	I_Q	$V_{IN} = -10\text{V}$, $I_O = 0\text{mA}$	–	4.2	6.0	mA
NTE1963		$V_{IN} = -11\text{V}$, $I_O = 0\text{mA}$	–	4.3	6.0	mA
NTE1965		$V_{IN} = -14\text{V}$, $I_O = 0\text{mA}$	–	4.3	6.0	mA
NTE1967		$V_{IN} = -15\text{V}$, $I_O = 0\text{mA}$	–	4.3	6.0	mA
NTE1971		$V_{IN} = -19\text{V}$, $I_O = 0\text{mA}$	–	4.3	6.0	mA
NTE1973		$V_{IN} = -23\text{V}$, $I_O = 0\text{mA}$	–	4.4	6.0	mA
NTE1975		$V_{IN} = -27\text{V}$, $I_O = 0\text{mA}$	–	4.5	6.0	mA
NTE1977		$V_{IN} = -33\text{V}$, $I_O = 0\text{mA}$	–	4.6	6.0	mA
Load Regulation NTE1961	$\Delta V_O - I_O$	$V_{IN} = -10\text{V}$, $I_O = 0.005$ to 1.5A	–	15	50	mV
NTE1963		$V_{IN} = -11\text{V}$, $I_O = 0.005$ to 1.5A	–	15	60	mV
NTE1965		$V_{IN} = -14\text{V}$, $I_O = 0.005$ to 1.5A	–	15	80	mV
NTE1967		$V_{IN} = -15\text{V}$, $I_O = 0.005$ to 1.5A	–	15	90	mV
NTE1971		$V_{IN} = -19\text{V}$, $I_O = 0.005$ to 1.5A	–	25	120	mV
NTE1973		$V_{IN} = -23\text{V}$, $I_O = 0.005$ to 1.5A	–	35	150	mV
NTE1975		$V_{IN} = -27\text{V}$, $I_O = 0.005$ to 1.5A	–	55	180	mV
NTE1977		$V_{IN} = -33\text{V}$, $I_O = 0.005$ to 1.5A	–	65	240	mV
Line Regulation NTE1961	$\Delta V_O - V_{IN}$	$V_{IN} = -7\text{V}$ to -25V , $I_O = 0.5\text{A}$	–	3	50	mV
NTE1963		$V_{IN} = -8\text{V}$ to -25V , $I_O = 0.5\text{A}$	–	5	60	mV
NTE1965		$V_{IN} = -10.5\text{V}$ to -25V , $I_O = 0.5\text{A}$	–	6	80	mV
NTE1967		$V_{IN} = -11.5\text{V}$ to -25V , $I_O = 0.5\text{A}$	–	7	90	mV
NTE1971		$V_{IN} = -14.5\text{V}$ to -30V , $I_O = 0.5\text{A}$	–	10	120	mV
NTE1973		$V_{IN} = -17.5\text{V}$ to -30V , $I_O = 0.5\text{A}$	–	11	150	mV
NTE1975		$V_{IN} = -21\text{V}$ to -33V , $I_O = 0.5\text{A}$	–	15	180	mV
NTE1977		$V_{IN} = -27\text{V}$ to -38V , $I_O = 0.5\text{A}$	–	18	240	mV
Ripple Rejection NTE1961	RR	$V_{IN} = -10\text{V}$, $I_O = 0.5\text{A}$, $e_{in} = 2V_{P-P}$, $f = 120\text{Hz}$	68	78	–	dB
NTE1963		$V_{IN} = -11\text{V}$, $I_O = 0.5\text{A}$, $e_{in} = 2V_{P-P}$, $f = 120\text{Hz}$	65	75	–	dB
NTE1965		$V_{IN} = -14\text{V}$, $I_O = 0.5\text{A}$, $e_{in} = 2V_{P-P}$, $f = 120\text{Hz}$	62	72	–	dB
NTE1967		$V_{IN} = -15\text{V}$, $I_O = 0.5\text{A}$, $e_{in} = 2V_{P-P}$, $f = 120\text{Hz}$	62	72	–	dB
NTE1971		$V_{IN} = -19\text{V}$, $I_O = 0.5\text{A}$, $e_{in} = 2V_{P-P}$, $f = 120\text{Hz}$	62	71	–	dB
NTE1973		$V_{IN} = -23\text{V}$, $I_O = 0.5\text{A}$, $e_{in} = 2V_{P-P}$, $f = 120\text{Hz}$	60	70	–	dB
NTE1975		$V_{IN} = -27\text{V}$, $I_O = 0.5\text{A}$, $e_{in} = 2V_{P-P}$, $f = 120\text{Hz}$	59	69	–	dB
NTE1977		$V_{IN} = -33\text{V}$, $I_O = 0.5\text{A}$, $e_{in} = 2V_{P-P}$, $f = 120\text{Hz}$	56	66	–	dB
Output Noise Voltage NTE1961	V_{NO}	$V_{IN} = -10\text{V}$, $\text{BW} = 10\text{Hz}$ to 100kHz , $I_O = 0.5\text{A}$	–	45	–	μV
NTE1963		$V_{IN} = -11\text{V}$, $\text{BW} = 10\text{Hz}$ to 100kHz , $I_O = 0.5\text{A}$	–	45	–	μV
NTE1965		$V_{IN} = -14\text{V}$, $\text{BW} = 10\text{Hz}$ to 100kHz , $I_O = 0.5\text{A}$	–	55	–	μV
NTE1967		$V_{IN} = -15\text{V}$, $\text{BW} = 10\text{Hz}$ to 100kHz , $I_O = 0.5\text{A}$	–	60	–	μV
NTE1971		$V_{IN} = -19\text{V}$, $\text{BW} = 10\text{Hz}$ to 100kHz , $I_O = 0.5\text{A}$	–	75	–	μV
NTE1973		$V_{IN} = -23\text{V}$, $\text{BW} = 10\text{Hz}$ to 100kHz , $I_O = 0.5\text{A}$	–	90	–	μV
NTE1975		$V_{IN} = -27\text{V}$, $\text{BW} = 10\text{Hz}$ to 100kHz , $I_O = 0.5\text{A}$	–	100	–	μV
NTE1977		$V_{IN} = -33\text{V}$, $\text{BW} = 10\text{Hz}$ to 100kHz , $I_O = 0.5\text{A}$	–	120	–	μV

Note 1. Measurement is to be conducted in pulse testing.

Electrical Characteristics (Cont'd): ($T_J = +25^\circ\text{C}$, $C_I = 0.33\mu\text{F}$, $C_O = 0.1\mu\text{F}$, Note 1 unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Average Temperature Coefficient of Output Voltage NTE1961	V_{NO}	$V_{IN} = -10\text{V}$, $I_O = 0.5\text{A}$	-	-0.5	-	mV/°C
NTE1963		$V_{IN} = -11\text{V}$, $I_O = 0.5\text{A}$	-	-0.6	-	mV/°C
NTE1965		$V_{IN} = -14\text{V}$, $I_O = 0.5\text{A}$	-	-0.8	-	mV/°C
NTE1967		$V_{IN} = -15\text{V}$, $I_O = 0.5\text{A}$	-	-0.9	-	mV/°C
NTE1971		$V_{IN} = -19\text{V}$, $I_O = 0.5\text{A}$	-	-1.2	-	mV/°C
NTE1973		$V_{IN} = -23\text{V}$, $I_O = 0.5\text{A}$	-	-1.5	-	mV/°C
NTE1975		$V_{IN} = -27\text{V}$, $I_O = 0.5\text{A}$	-	-1.8	-	mV/°C
NTE1977		$V_{IN} = -33\text{V}$, $I_O = 0.5\text{A}$	-	-2.4	-	mV/°C

Note 1. Measurement is to be conducted in pulse testing.

