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## NTE1567 Integrated Circuit Vertical Deflection Output Circuit

**Description:**

The NTE1567 is a vertical deflection output circuit in a 9-Lead SIP type package designed to drive various deflection systems with deflection currents up to 2A peak-to-peak.

**Functions:**

- Driver
- Output Stage
- Thermal Protection and Output Stage Protection
- Flyback Generator
- Voltage Stabilizer

**Absolute Maximum Ratings:**

**Voltages** (Pins4 and Pin2 externally connected to GND)

Output Voltage (Pin5), $V_{5-4}$ .....	55V
Supply voltage (Pin9), $V_{9-4}$ ( $V_P$ ) .....	50V
Supply Voltage Output Stage (Pin6), $V_{6-4}$ .....	55V
Input Voltage (Pin1 and Pin3), $V_{1-2}$ , $V_{3-2}$ .....	$V_P$

**Currents**

Repetitive Peak Output Current (Pin5), $\pm I_{5RM}$ .....	0.75A
Non-Repetitive Peak Output Current (Pin5, Note 1), $\pm I_{5SM}$ .....	1.5A
Repetitive Peak Flyback Generator Output Current (Pin8), $I_{8RM}$ .....	-0.75A, +0.85A
Non-Repetitive Peak Flyback Generator Output Current (Pin8, Note 1), $I_{8SM}$ .....	-1.5A, +1.6A

**Temperatures**

Storage Temperature Range, $T_{stg}$ .....	-65° to +150°C
Operating Ambient Temperature Range, $T_A$ .....	-25° to +65°C
Operating Junction Temperature Range, $T_J$ .....	-25° to +150°C

Note 1. Non-Repetitive duty factor maximum 3.3%.

**Electrical Characteristics:** ( $T_A = +25^\circ\text{C}$ ,  $V_P = 26\text{V}$ , Pin4 and Pin2 externally connected to GND unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Current (Peak-to-Peak)	$I_{5(P-P)}$		-	1.2	1.5	A
Flyback Generator Output Current	$-I_8$		-	0.7	0.85	A
	$I_8$		-	0.6	0.75	A
<b>Output Voltages</b>						
Peak Voltage During Flyback	$V_{5-4M}$		-	-	55	V
Saturation Voltage to Supply	$-V_{5-6(\text{sat})}$	$-I_5 = 1\text{A}$	-	2.5	3.0	V
		$-I_5 = 0.75\text{A}$	-	2.2	2.7	V
Saturation Voltage to GND	$-V_{5-4(\text{sat})}$	$I_5 = 1\text{A}$	-	2.5	3.0	V
		$I_5 = 0.75\text{A}$	-	2.2	2.7	V
<b>Supply</b>						
Supply Voltage	$V_{9-2; 4}$	Note 2	10	-	50	V
Supply Voltage, Output Stage	$V_{6-4}$	Note 2	-	-	55	V
Supply Current	$I_9$	No Load and No Quiescent Current	-	9	12	mA
Quiescent Current	$I_4$		25	38	52	mA
Variation of Quiescent Current with Temperature			-	-0.04	-	mA/°C
<b>Flyback Generator</b>						
Saturation Voltage	$V_{9-8(\text{sat})}$	$-I_8 = 1.1\text{A}$	-	1.6	2.1	V
		$I_8 = 0.85\text{A}$	-	1.4	1.9	V
	$V_{8-9(\text{sat})}$	$I_8 = 1\text{A}$	-	2.5	3.0	V
		$I_8 = 0.75\text{A}$	-	2.3	2.8	V
Flyback Generator Active if:	$V_{5-9}$		-	-	4	V
Leakage Current	$-I_8$		-	5	100	$\mu\text{A}$
Input Current	$I_1$	$\pm I_5 = 1\text{A}$	175	230	380	$\mu\text{A}$
Input Voltage During Scan	$V_{1-2}$		0.9	1.9	2.7	V
	$V_{3-2}$		0.9	-	$V_P$	V
Input Current During Scan	$I_3$		0.01	-	2.5	mA
Input Voltage During Flyback	$V_{3-2}$		0	-	0.2	V
Voltage at Pin7	$V_{7-2}$		5.6	6.1	6.6	V
Load Current of Pin7	$I_7$		-	-	2	mA
Unloaded Voltage at Pin7 During Flyback	$V_{7-2}$		-	15	-	V
Junction Temperature of Switching on the Thermal Protection	$T_J$		158	175	192	°C
Thermal Resistance	$R_{\text{thJ-MB}}$		-	3	4	K/W
Open Loop Gain	$G_O$	$R_L = 1\text{k}\Omega$ , 1kHz	-	36	-	dB
Frequency Response (-3dB)	f	$R_L = 1\text{k}\Omega$	-	60	-	kHz

Note 2. The maximum supply voltage should be chosen such that during flyback the voltage at Pin5 does not exceed 55V.

## **General Description:**

### **Output Stage and Protection Circuit**

Pin5 is the output pin. The supply for the output stage is fed to Pin6 and the output stage is fed to Pin6 and the output stage ground is connected to Pin4. The output transistors of the class-B output stage can each deliver 1A maximum. The upper power transistor is protected against short-circuit currents to ground, whereas, during flyback, the “lower” power transistor is protected against short-circuit currents to ground, whereas, during flyback, the “lower” power transistor is protected against too high voltages which may occur during adjustments.

Moreover, the output transistors have been given extra solidity by means of special measures in the internal circuit layout.

A thermal protection circuit is incorporated to protect the IC against too high dissipation. This circuit is “active” at 175°C and then reduces the deflection current to such a value that the dissipation cannot increase.

### **Driver and Switching Circuit:**

Pin1 is the input for the driver of the output stage. The signal at Pin1 is also applied to Pin3 which is the input of a switching circuit. When the flyback starts, this switching circuit rapidly turns off the lower output stage and so limits the turn-off dissipation. It also allows a quick start of the flyback generator. Pin3 is connected externally to Pin1, in order to allow for different applications in which Pin3 is driven separate from Pin1.

### **Flyback Generator**

The capacitor at Pin6 is charged to a maximum voltage, which is equal to the supply voltage  $V_p$  (Pin9), during scan.

When the flyback starts and the voltage at the output pin (Pin5) exceeds the supply voltage (Pin9), the flyback generator is activated. The  $V_p$  is connected in series (via Pin8) with the voltage across the capacitor.

The voltage at the supply pin (Pin6) of the output stage will then be maximum twice  $V_p$ . Lower voltages can be chosen by changing the value of the external resistor at Pin8.

### **Voltage Stabilizer**

The internal voltage stabilizer provides a stabilized supply of 6V for drive of the output stage, so the drive current of the output stage is not affected by supply voltage variations. The stabilized voltage is available at Pin7.

A decoupling capacitor of 2.2 $\mu$ F can be connected to this pin.

**Pin Connection Diagram**  
(Front View)



