

IH5005 — IH5007 2-Channel Drivers with SPST FET Switches (Gate Available)

FEATURES

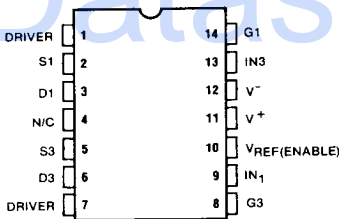
- Gate Lead Available for Nulling Charge Injection Voltage
- Expansion Capability Available
- Each Channel Complete—Interfaces With Most Integrated Logic
- Low OFF power dissipation, 1 mW
- Low $r_{DS(ON)}$, 10Ω Max on IH5005

GENERAL DESCRIPTION

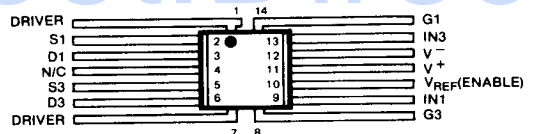
These switching circuits contain two channels in one package, each channel consisting of a driver circuit controlling a SPST junction FET switch. The driver interfaces DTL, TTL, or RTL logic signals for multiplexing, commutating, and D/A converter applications, which permits logic design

directly with the switch function. Logic "1" at the input turns the FET switch ON, and Logic "0" turns it OFF. The gate lead of the FETs has been brought out to enable the application of a referral resistor for nulling offset voltage due to charge injection. Driver points are brought out to provide for the addition of external FETs for expansion capability.

PIN CONFIGURATIONS



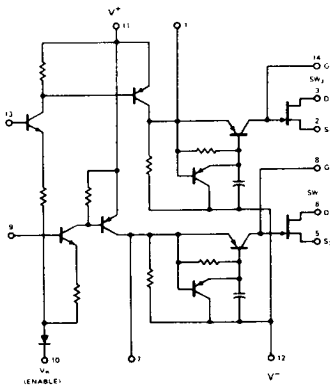
OUTLINE DWG
DD, PD, JD



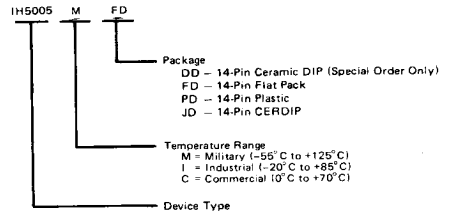
OUTLINE DWG
FD-2

SCHEMATIC AND LOGIC DIAGRAMS

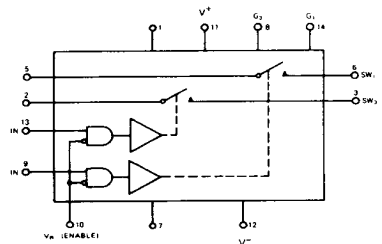
IH5005 ($r_{DS(on)} = 10\Omega$)
IH5006 ($r_{DS(on)} = 30\Omega$)
IH5007 ($r_{DS(on)} = 80\Omega$)



ORDERING INFORMATION



NOTE: Military temperature range not available in plastic package.



ABSOLUTE MAXIMUM RATINGS

Analog Signal Voltage ($V_A - V^-$ or $V^+ - V_A$) 30V
 Total Supply Voltage ($V^+ - V^-$) 36V
 Pos. Supply Voltage to Ref. Voltage ($V^+ - V_R$) 25V
 Ref. Voltage to Neg. Supply Voltage ($V_R - V^-$) 22V
 Power Dissipation (Note) 750 mW
 Current (Any Terminal) 30 mA
 Storage Temperature -65°C to +150°C
 Operating Temperature -65°C to +125°C
 Lead Temperature (soldering, 10 sec.) 300°C

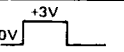
NOTE: Dissipation rating assumes device is mounted with all leads welded or soldered to printed circuit board in ambient temperature below 70°C. For higher temperature, derate at rate of 10 mW/°C.

Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions above those indicated in the operation sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

Applied Voltages for all tests $V^+ = +12V$, $V^- = -18V$, $V_R = 0$. Input test condition which guarantees FET switch ON or OFF as specified is used for output and power supply specifications.

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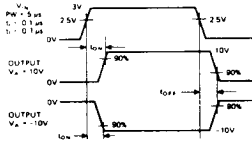
| | SYMBOL (NOTE) | CHARACTERISTIC | TYPE | ABSOLUTE MAX. LIMIT | | | UNITS | TEST CONDITIONS | |
|---------------|---------------|--|------------------------|---------------------|---------|---------|-------|---|-------------------------|
| | | | | -55° | 25° | 125° | | | |
| INPUT | $V_{IN(ON)}$ | Input Voltage—ON | All Circuits | 2.9 min | 2.5 min | 2.0 min | Volts | $V^- = -12V$ | |
| | $V_{IN(OFF)}$ | Input Voltage—OFF | | 1.4 | 1.0 | 0.6 | Volts | $V^- = -12V$ | |
| | $I_{IN(ON)}$ | Input Current | | 120 | 60 | 60 | µA | $V_{IN} = 2.5V$ | |
| | $I_{IN(OFF)}$ | Input Leakage Current | | 0.1 | 0.1 | 2 | µA | $V_{IN} = 0.8V$ | |
| SWITCH OUTPUT | $r_{DS(ON)}$ | Drain-Source On Resistance | IH5007 | 80 | 80 | 150 | Ω | $V_D = 10V, I_S = 10 mA$ | |
| | | | IH5006 | 30 | 30 | 50 | Ω | | |
| | | | IH5005 | 10 | 10 | 20 | Ω | | |
| | | $I_{D(ON)} + I_{S(ON)}$ | Drive Leakage Current | | 2 | 100 | nA | $V_D = V_S = -10V$ | |
| | | $I_{S(OFF)}$ | Source Leakage Current | IH5006 | | 1 | 100 | nA | $V_S = 10V, V_D = -10V$ |
| | | $I_{D(OFF)}$ | Drain Leakage Current | IH5007 | | 1 | 100 | nA | $V_D = 10V, V_S = -10V$ |
| | | $I_{D(ON)} + I_{S(ON)}$ | Drive Leakage Current | | 2 | 100 | nA | $V_D = V_S = -10V$ | |
| POWER SUPPLY | $I_{S(OFF)}$ | Source Leakage Current | IH5005 | | 10 | 1000 | nA | $V_S = 10V, V_D = -10V$ | |
| | $I_{D(OFF)}$ | Drain Leakage Current | | | 10 | 1000 | nA | $V_D = 10V, V_S = -10V$ | |
| | I^+ | Positive Power Supply Drain Current | All Circuits | | 3 | | mA | One Driver ON, $V_{IN} = 2.5V$ | |
| | I^- | Negative Power Supply Drain Current | | | -1.8 | | mA | | |
| | I_{REF} | Reference Power Supply Drain Current | | | -1.4 | | mA | | |
| | I^+_{LK} | Positive Power Supply Leakage Current | | | | 25 | µA | Both Drivers OFF, $V_{IN} = 0.8V$ | |
| | I^-_{LK} | Negative Power Supply Leakage Current | | | | -25 | µA | | |
| | I_{RLK} | Reference Power Supply Leakage Current | | | | -25 | µA | | |
| | SWITCHING | t_{on} | Turn-ON Time | IH5005 | | 1.0 | 1.5 | µs | See Page 3 |
| | | t_{off} | Turn-OFF Time | | | 2.5 | 3.7 | µs | |
| t_{on} | | Turn-ON Time | IH5006 | | 0.5 | 0.8 | µs | | |
| t_{off} | | Turn-OFF Time | IH5007 | | 1.0 | 1.5 | µs | | |
| POWER | P_{ON} | ON Driver Power | All Circuits | | 175 | | mW | Both Inputs $V_{IN} = 2.5$ | |
| | P_{OFF} | OFF Driver Power | | | 1 | | mW | Both Inputs $V_{IN} = 1.0$ | |
| FET | V_{GSSF} | Gate Source Forward Voltage | All Circuits | | 1.5 | | Volts | $I_G = 1.0 mA, V_{DS} = 0$ | |
| EXPAND | V_{PP} | Peak-Peak Voltage at Expansion Outputs | All Circuits | | 30 | | Volts | $V_{IN} = 0V$  $V^+ = +18V, V^- = -18V, R_L \geq 10\Omega$ | |

NOTE: (OFF) and (ON) subscript notation refers to the conduction state of the FET switch for the given test.

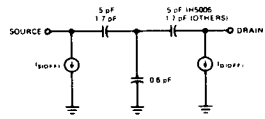
IH5005 — IH5007

INTERSI

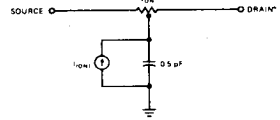
SWITCHING TIMES (at 25°C)



OFF MODEL

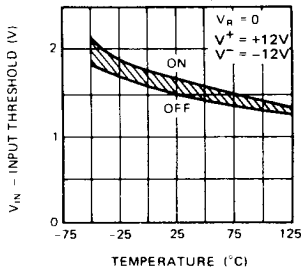


ON MODEL

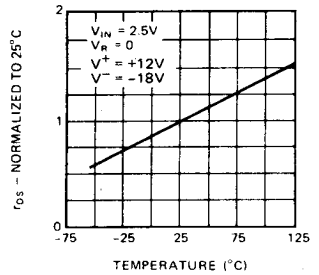


TYPICAL CHARACTERISTICS (per channel)

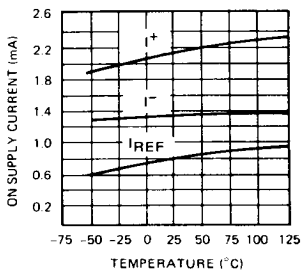
V_{IN} THRESHOLD vs TEMPERATURE



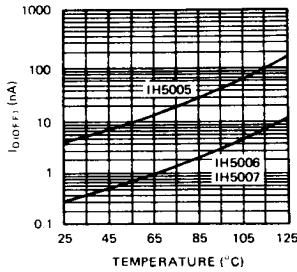
$t_{DS(ON)}$ vs TEMPERATURE (Normalized to 25°C Value)



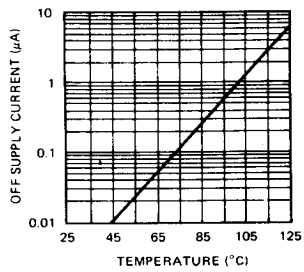
ON SUPPLY CURRENT vs TEMPERATURE



$I_D(OFF)$ vs TEMPERATURE



OFF SUPPLY CURRENT vs TEMPERATURE



APPLICATION

Expansion Capability IH5005

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