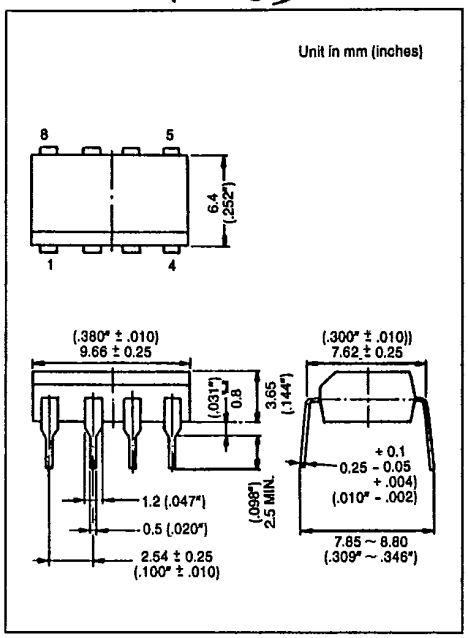
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## MT6500, MT6510

T-41-83




### APPLICATIONS

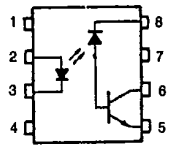
- DIGITAL LOGIC ISOLATION
- LINE RECEIVER FEEDBACK CONTROL
- POWER SUPPLY CONTROL
- SWITCHING POWER SUPPLY
- TRANSISTOR INVERTOR

Both the MT6500 and the MT6510 contain a high output emitting diode and a one chip photo diode transistor in an 8 lead dip package. The MT6500 has no internal base connection and is best suited for applications in noisy environmental conditions. The MT6510 contains an internal base connection and is used for analog applications or enable operation.

### FEATURES

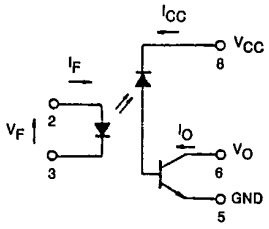
- Isolation Voltage : 5000$V_{rms}$ Min.
- Switching Speed : $t_{PHL}$, $t_{PLH}$=0.5 $\mu$s (Typ.) ($R_L$=1.9k$\Omega$)
- TTL Compatible

MT6500
PIN CONFIGURATIONS (TOP VIEW)

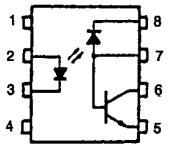



1. NC
2. ANODE
3. CATHODE
4. NC
5. EMITTER
6. COLLECTOR
7. NC
8. $V_{CC}$

SCHEMATIC

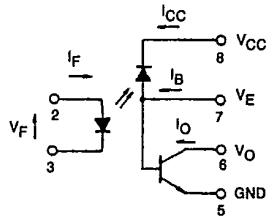



MT6510
PIN CONFIGURATIONS (TOP VIEW)




1. NC
2. ANODE
3. CATHODE
4. NC
5. EMITTER
6. COLLECTOR
7. BASE
8. $V_{CC}$

SCHEMATIC



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## MAXIMUM RATINGS (Ta = 25°C)

| | CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|---|---|---|---|---|---|
| LED | Forward Current | (Note 1) | $I_F$ | 25 | mA |
| | Pulse Forward Current | (Note 2) | $I_{FP}$ | 50 | mA |
| | Total Pulse Forward Current | (Note 3) | $I_{FPT}$ | 1 | A |
| | Reverse Voltage | | $V_R$ | 5 | V |
| | Diode Power Dissipation | (Note 4) | $P_D$ | 45 | mW |
| DETECTOR | Output Current | | $I_O$ | 8 | mA |
| | Peak Output Current | | $I_{OP}$ | 16 | mA |
| | MT6500 | | — | — | — |
| | MT6510 Emitter-Base Reverse Voltage | | $V_{EB}$ | 5 | V |
| | Supply Voltage | | $V_{CC}$ | -0.5 ~ 15 | V |
| | Output Voltage | | $V_O$ | -0.5 ~ 15 | V |
| | MT6500 | | — | — | — |
| | MT6510 Base Current | | $I_B$ | 5 | mA |
| | Output Power Dissipation | (Note 5) | $P_o$ | 100 | mW |
| Operating Temperature Range | | | $T_{opr}$ | -55 ~ 100 | °C |
| Storage Temperature Range | | | $T_{stg}$ | -55 ~ 125 | °C |
| Isolation Voltage | | (Note 6) | $BV_S$ | 5000 | $V_{rms}$ |

Note 1: Derate 0.8mA above 70°C.

Note 2: 50% duty cycle, 1ms pulse width.
Derate 1.6mA/°C above 70°C.

Note 3: Pulse width 1μs, 300pps.

Note 4: Derate 0.9mW/°C above 70°C.

Note 5: Derate 2mW/°C above 70°C.

Note 6: R.H. = 40 ~ 60%, AC/1 min.

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## ELECTRICAL CHARACTERISTICS (Ta=25°C)

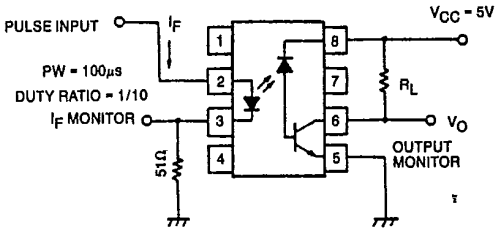
| | CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| LED | Forward Voltage | $V_F$ | $I_F$=16mA | 1.45 | 1.65 | 1.85 | V |
| | Forward Voltage Temperature Coefficient | $\Delta V_F/\Delta Ta$ | $I_F$=16mA | — | -2 | — | mV/°C |
| | Reverse Current | $I_R$ | $V_R$=5V | — | — | 10 | μA |
| | Capacitance Between Terminal | $C_T$ | $V_F$=0, f=1MHz | — | 60 | — | pF |
| DETECTOR | High Level Output Current | $I_{OH}$(1) | $I_F$=0mA, $V_{CC}$=$V_O$=5.5V | — | 3 | 500 | nA |
| | | $I_{OH}$(2) | $I_F$=0mA, $V_{CC}$=$V_O$=15V | — | — | 5 | μA |
| | | $I_{OH}$ | $I_F$=0mA, $V_{CC}$=$V_O$=15V,Ta=70°C | — | — | 250 | μA |
| | High Level Supply Voltage | $I_{CCH}$ | $I_F$=0mA, $V_{CC}$=15V | — | 0.01 | 1 | μA |
| COUPLED | Current Transfer Ratio | $I_O/I_F$ | $I_F$=16mA, $V_{CC}$=4.5V, $V_O$=0.4V, Ta=25°C | 10 | 30 | — | % |
| | | | rank: 0 | 19 | 30 | — | |
| | | | Ta=0 ~ 70°C | 5 | — | — | |
| | | | rank: 0 | 15 | — | — | |
| | Low Level Output Voltage | $V_{OL}$ | $I_F$=16mA, $V_{CC}$=4.5V, $I_O$=1.1mA (rank 0:$I_O$=2.4mA) | — | — | 0.4 | V |
| | Isolation Resistance | $R_S$ | R.H.=40~60%,V=1kV DC(Note 9) | — | $10^{12}$ | — | Ω |
| | Capacitance Between Input to Output | $C_S$ | V=0, f=1MHz | — | 0.8 | — | pF |

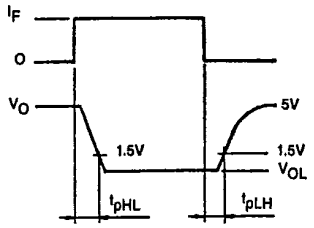
## SWITCHING CHARACTERISTICS (Ta=25°C, $V_{CC}$=5V)

| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Propagation Delay Time (H→L) | | $t_{pHL}$ | $I_F$=0→16mA, $V_{CC}$=5V, $R_L$=4.1kΩ | — | 0.3 | 0.8 | μs |
| | | | (Note 7) rank 0:$R_L$=1.9kΩ | — | 0.5 | 0.8 | |
| Propagation Delay Time (L→H) | | $t_{pLH}$ | $I_F$=16→0mA, $V_{CC}$=5V, $R_L$=4.1kΩ | — | 1.0 | 2.0 | μs |
| | | | (Note 7) rank 0:$R_L$=1.9kΩ | — | 0.6 | 1.2 | |
| Common Mode Transient Immunity at Logic High Output | MT6500 | $CM_H$ | $I_F$=0mA, $V_{CM}$=200$V_{p-p}$ | — | 1500 | — | V/μs |
| | MT6510 | | $R_L$=4.1kΩ, (Rank O:$R_L$=1.9kΩ) (Note 8) | — | 400 | — | |
| Common Mode Transient Immunity at Logic Low Output | MT6500 | $CM_L$ | $I_F$=16mA, $V_{CM}$=200$V_{p-p}$ | — | -1500 | — | V/μs |
| | MT6510 | | $R_L$=4.1kΩ, (Rank O:$R_L$=1.9kΩ) (Note 8) | — | -1000 | — | |

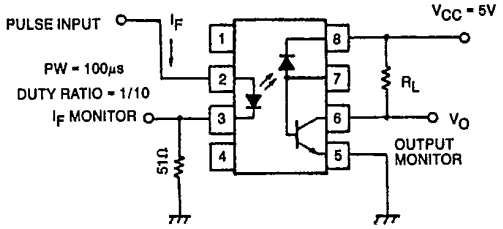
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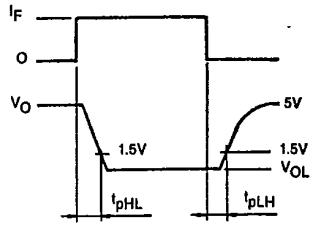
MT6500
Note 7. Switching Time Test Circuit




MT6510
Note 7. Switching Time Test Circuit



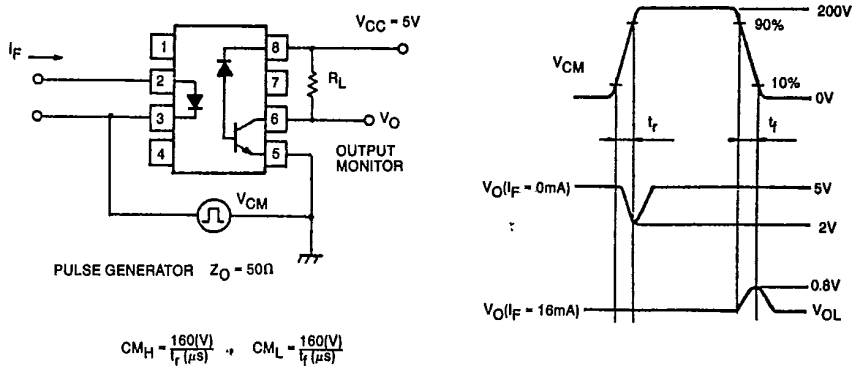



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MT6500

Note 8. Common Mode Noise Immunity Test Circuit

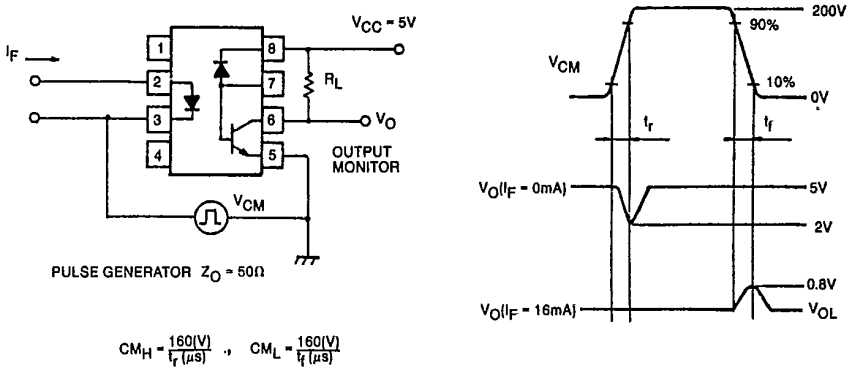



$$CM_H = \frac{160(V)}{t_r(\mu s)} \quad , \quad CM_L = \frac{160(V)}{t_f(\mu s)}$$

Note 9. Device considered a two-terminal device: Pins 1,2,3 and 4 shorted together and Pin 5,6,7 and 8 shorted together.

MT6510

Note 8. Common Mode Noise Immunity Test Circuit



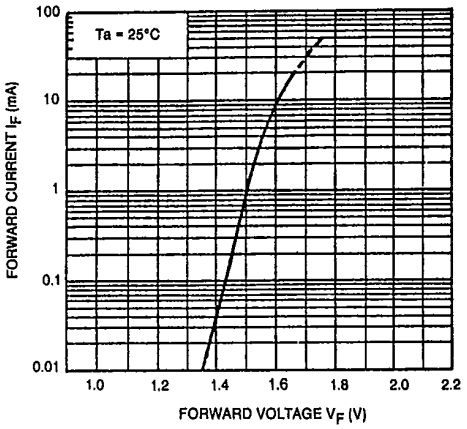

$$CM_H = \frac{160(V)}{t_r(\mu s)} \quad , \quad CM_L = \frac{160(V)}{t_f(\mu s)}$$

Note 9. Device considered a two-terminal device: Pins 1,2,3 and 4 shorted together and Pin 5,6,7 and 8 shorted together.

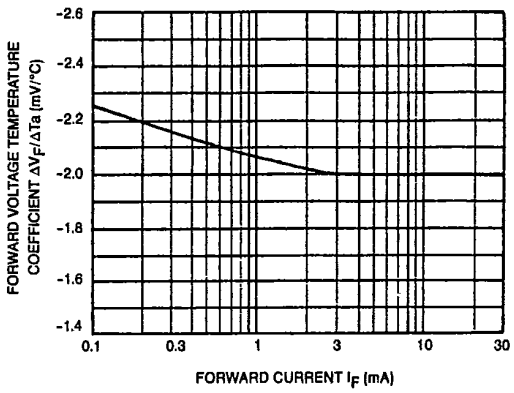
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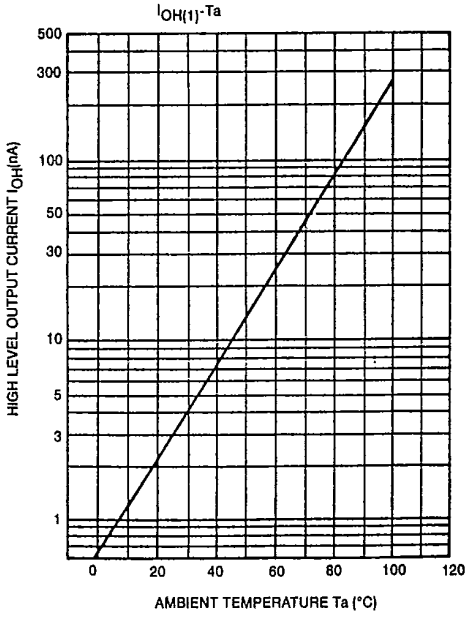
$I_F$ - $V_F$



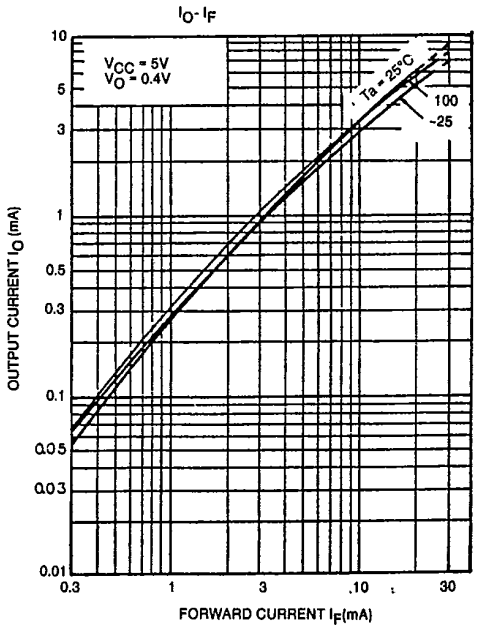

$\Delta V_F / \Delta Ta$ - $I_F$




$I_{OH(1)}$-Ta



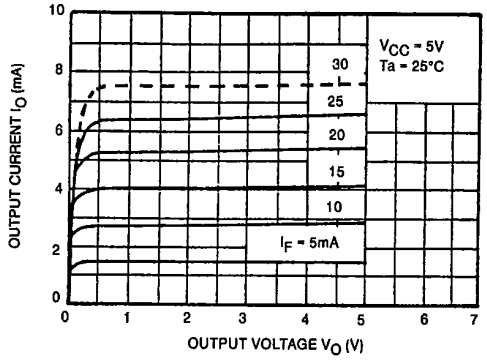

$I_O$- $I_F$



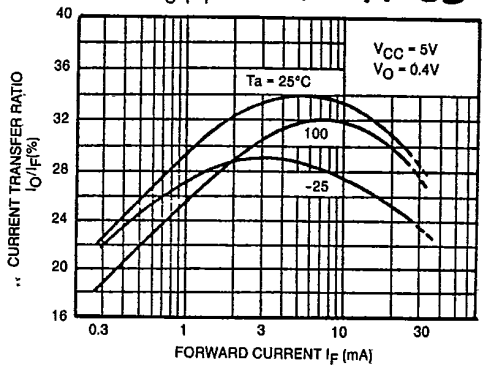
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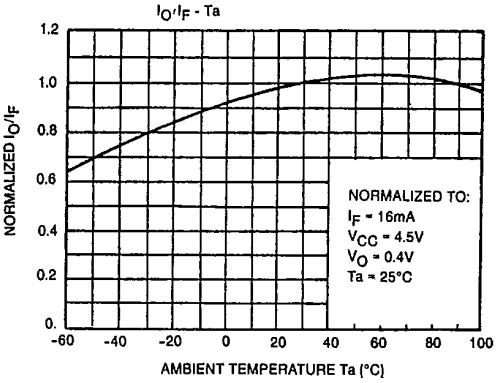
$I_O$-$V_O$



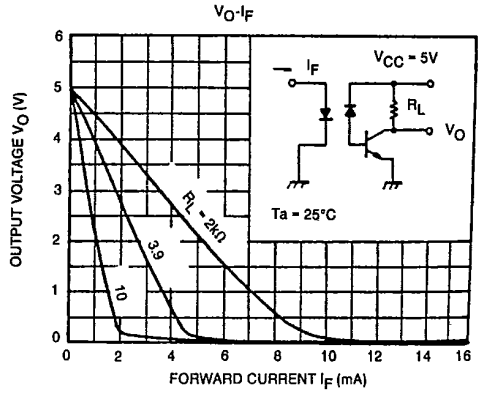

$I_O/I_F$-$I_F$




$I_O/I_F$ - Ta




$V_O$-$I_F$




$t_{pHL}$,$t_{pLH}$-$R_L$

