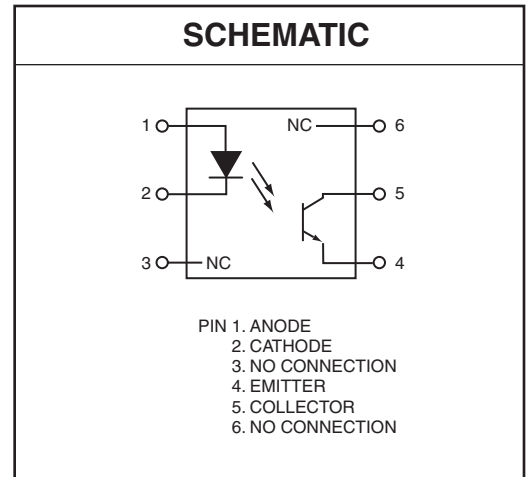
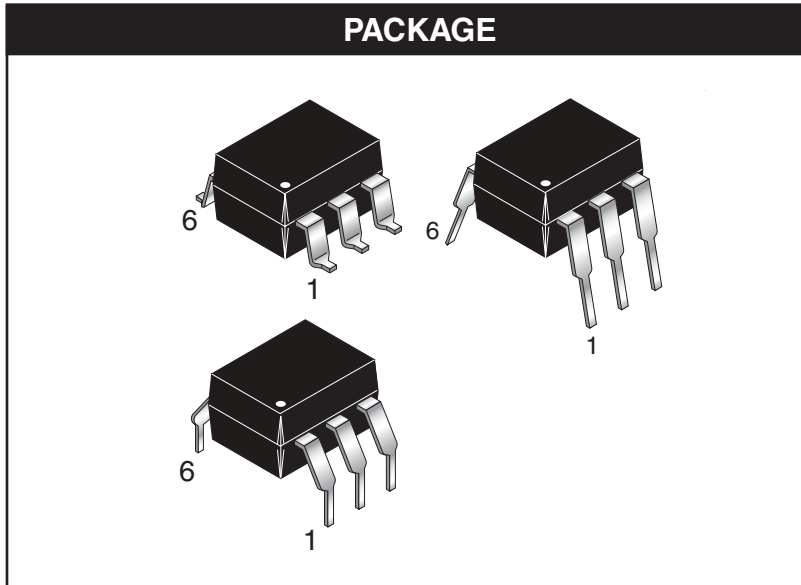


| | | | |
|-----------------|-----------------|-----------------|-----------------|
| MOC8101 | MOC8102 | MOC8103 | MOC8104 |
| MOC8105 | MOC8106 | MOC8107 | MOC8108 |
| CNY17F-1 | CNY17F-2 | CNY17F-3 | CNY17F-4 |



FEATURES

The MOC810X and CNY17F-X devices consist of a gallium arsenide LED optically coupled to a silicon phototransistor in a dual-in-line package.

- Closely Matched Current Transfer Ratio (CTR) Minimizes Unit-to-Unit Variation
- Narrow (CTR) Windows that Translate to a Narrow and Predictable Open Loop Gain Window
- Very Low Coupled Capacitance along with No Chip to Pin 6 Base Connection for Minimum Noise Susceptibility
- **To order devices that are tested and marked per VDE 0884 requirements, the suffix ".300" must be included at the end of part number. e.g. MOC8101.300 VDE 0884 is a test option.**

APPLICATIONS

- Switchmode Power Supplies (Feedback Control)
- AC Line/Digital Logic Isolation
- Interfacing and coupling systems of different potentials and impedances

**6-PIN DIP OPTOCOUPLEDERS FOR
POWER SUPPLY APPLICATIONS
(NO BASE CONNECTION)**

| | | | |
|-----------------|-----------------|-----------------|-----------------|
| MOC8101 | MOC8102 | MOC8103 | MOC8104 |
| MOC8105 | MOC8106 | MOC8107 | MOC8108 |
| CNY17F-1 | CNY17F-2 | CNY17F-3 | CNY17F-4 |

| ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ Unless otherwise specified) | | | |
|--|------------------|--------------|----------------------|
| Parameter | Symbol | Value | Unit |
| INPUT LED | | | |
| Forward Current - Continuous | I_F | 100 | mA |
| Forward Current - Peak (PW = 1 μ s, 300pps) | $I_F(\text{pk})$ | 1 | A |
| Reverse Voltage | V_R | 6 | Volts |
| LED Power Dissipation @ $T_A = 25^\circ\text{C}$ | P_D | 150 | mW |
| Derate above 25 $^\circ\text{C}$ | | 2.0 | mW/ $^\circ\text{C}$ |
| OUTPUT TRANSISTOR | | | |
| Collector-Emitter Voltage | V_{CEO} | 70 | Volts |
| MOC8106/7/8, CNY17F-1/2/3/4 | | 30 | |
| MOC8101/2/3/4/5 | | | |
| Emitter-Collector Voltage | V_{ECO} | 7 | Volts |
| Detector Power Dissipation @ $T_A = 25^\circ\text{C}$ | P_D | 150 | mW |
| Derate above 25 $^\circ\text{C}$ | | 2.0 | mW/ $^\circ\text{C}$ |
| TOTAL DEVICE | | | |
| Input-Output Isolation Voltage (f = 60 Hz, t = 1 min.) | V_{ISO} | 5300 | Vac(rms) |
| Total Device Power Dissipation @ $T_A = 25^\circ\text{C}$ | P_D | 250 | mW |
| Derate above 25 $^\circ\text{C}$ | | 3.3 | mW/ $^\circ\text{C}$ |
| Ambient Operating Temperature Range | T_{OPR} | -55 to +100 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{STG} | -55 to +150 | $^\circ\text{C}$ |
| Lead Soldering Temperature (1/16" from case, 10 sec. duration) | T_{SOL} | 260 | $^\circ\text{C}$ |

| | | | |
|-----------------|-----------------|-----------------|-----------------|
| MOC8101 | MOC8102 | MOC8103 | MOC8104 |
| MOC8105 | MOC8106 | MOC8107 | MOC8108 |
| CNY17F-1 | CNY17F-2 | CNY17F-3 | CNY17F-4 |

| ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise specified) ⁽¹⁾ | | | | | | |
|---|--|----------------------|-----------|-------|------|---------------|
| Characteristic | Symbol | Min | Typ** | Max | Unit | |
| INPUT LED | | | | | | |
| Forward Voltage | ($I_F = 60\text{ mA}$) | CNY17F-X | V_F | — | 1.40 | V |
| | ($I_F = 10\text{ mA}$) | MOC810X | | 1.0 | 1.18 | |
| Reverse Leakage Current ($V_R = 5.0\text{ V}$) | | I_R | — | 0.001 | 10 | μA |
| Capacitance | | C | — | 18 | — | pF |
| OUTPUT TRANSISTOR | | | | | | |
| Collector-Emitter Dark Current | ($V_{CE} = 10\text{ V}, T_A = 25^\circ\text{C}$) | I_{CEO1} | — | 1.0 | 50 | nA |
| | ($V_{CE} = 10\text{ V}, T_A = 100^\circ\text{C}$) | I_{CEO2} | — | 1.0 | — | μA |
| Collector-Emitter Breakdown Voltage | | $V_{(BR)CEO}$ | 30 | 100 | — | V |
| MOC8101/2/3/4/5 | ($I_C = 1.0\text{ mA}$) | | | | | |
| MOC8106/7/8, CNY17F-1/2/3/4 | ($I_C = 1.0\text{ mA}$) | | 70 | 100 | — | |
| Emitter-Collector Breakdown Voltage | ($I_E = 100\text{ }\mu\text{A}$) | $V_{(BR)ECO}$ | 7.0 | 10 | — | V |
| Collector-Emitter Capacitance | ($f = 1.0\text{ MHz}, V_{CE} = 0$) | C_{CE} | — | 8 | — | pF |
| COUPLED | | | | | | |
| Output Collector Current ($I_F = 10\text{ mA}, V_{CE} = 10\text{ V}$) | MOC8101 | (CTR) ⁽²⁾ | 50 | — | 80 | % |
| | MOC8102 | | 73 | — | 117 | |
| | MOC8103 | | 108 | — | 173 | |
| | MOC8104 | | 160 | — | 256 | |
| | MOC8105 | | 65 | — | 133 | |
| | MOC8106 | | 50 | — | 150 | |
| | MOC8107 | | 100 | — | 300 | |
| | MOC8108 | | 250 | — | 600 | |
| (I _F = 10 mA, V _{CE} = 5 V) | CNY17F-1 | | 40 | — | 80 | |
| | CNY17F-2 | | 63 | — | 125 | |
| | CNY17F-3 | | 100 | — | 200 | |
| | CNY17F-4 | | 160 | — | 320 | |
| Collector-Emitter Saturation Voltage | | $V_{CE(sat)}$ | — | — | 0.4 | V |
| CNY17F-1/2/3/4 | ($I_C = 2.5\text{ mA}, I_F = 10\text{ mA}$) | | | | | |
| MOC8101/2/3/4/5/6/7/8 | ($I_C = 500\text{ }\mu\text{A}, I_F = 5.0\text{ mA}$) | | | | | |
| Isolation Voltage | ($f = 60\text{ Hz}, t = 1.0\text{ min.}$) ⁽⁴⁾ | V_{ISO} | 5300 | — | — | Vac(rms) |
| Isolation Resistance | ($V_{I-O} = 500\text{ V}$) ⁽⁴⁾ | R_{ISO} | 10^{11} | — | — | Ω |
| Isolation Capacitance | ($V_{I-O} = 0, f = 1.0\text{ MHz}$) ⁽⁴⁾ | C_{ISO} | — | 0.5 | — | pF |

** All typicals at $T_A = 25^\circ\text{C}$

| | | | |
|-----------------|-----------------|-----------------|-----------------|
| MOC8101 | MOC8102 | MOC8103 | MOC8104 |
| MOC8105 | MOC8106 | MOC8107 | MOC8108 |
| CNY17F-1 | CNY17F-2 | CNY17F-3 | CNY17F-4 |

| TRANSFER CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise specified) | | | | | | |
|--|---|---------------|------------|--------------|--|---------------|
| AC Characteristic | Test Conditions | Symbol | Min | Typ** | Max | Unit |
| NON-SATURATED SWITCHING TIME | | | | | | |
| Turn-on Time CNY17F-1/2/3/4 Only | ($R_L = 100 \Omega$, $I_C = 2 \text{ mA}$) | t_{on} | — | 2 | 10 | μs |
| Turn-off Time CNY17F-1/2/3/4 Only | ($V_{CC} = 10 \text{ V}$) | t_{off} | — | 3 | 10 | |
| Turn-On Time | MOC8101-5 MOC8106-8 ($I_C = 2.0 \text{ mA}$, $V_{CC} = 10 \text{ V}$, $R_L = 100 \Omega$) ⁽³⁾ | t_{on} | — | 2 | 20 | μs |
| | | | | | — | |
| Turn-Off Time | MOC8101-5 MOC8106-8 ($I_C = 2.0 \text{ mA}$, $V_{CC} = 10 \text{ V}$, $R_L = 100 \Omega$) ⁽³⁾ | t_{off} | — | 3 | 20 | |
| | | | | | — | |
| Rise Time | All Devices ($I_C = 2.0 \text{ mA}$, $V_{CC} = 10 \text{ V}$, $R_L = 100 \Omega$) ⁽³⁾ | t_r | — | 1 | — | μs |
| All Devices | | | | | | |
| Fall Time | All Devices ($I_C = 2.0 \text{ mA}$, $V_{CC} = 10 \text{ V}$, $R_L = 100 \Omega$) ⁽³⁾ | t_f | — | 2 | — | μs |
| All Devices | | | | | | |
| SATURATED SWITCHING TIMES | | | | | | |
| Turn-on Time | CNY17F-1 ($I_F = 20 \text{ mA}$, $V_{CE} = 0.4 \text{ V}$) | t_{on} | — | — | 5.5 | μs |
| CNY17F-2 CNY17F-3 CNY17F-4 | | | | | ($I_F = 10 \text{ mA}$, $V_{CE} = 0.4 \text{ V}$) | |
| Rise Time | CNY17F-1 ($I_F = 20 \text{ mA}$, $V_{CE} = 0.4 \text{ V}$) | t_r | — | — | 4.0 | μs |
| CNY17F-2 CNY17F-3 CNY17F-4 | | | | | ($I_F = 20 \text{ mA}$, $V_{CE} = 0.4 \text{ V}$) | |
| Turn-off Time | CNY17F-1 ($I_F = 20 \text{ mA}$, $V_{CE} = 0.4 \text{ V}$) | t_{off} | — | — | 34 | μs |
| CNY17F-2 CNY17F-3 CNY17F-4 | | | | | ($I_F = 10 \text{ mA}$, $V_{CE} = 0.4 \text{ V}$) | |
| Fall Time | CNY17F-1 ($I_F = 20 \text{ mA}$, $V_{CE} = 0.4 \text{ V}$) | t_f | — | — | 20 | μs |
| CNY17F-2 CNY17F-3 CNY17F-4 | | | | | ($I_F = 10 \text{ mA}$, $V_{CE} = 0.4 \text{ V}$) | |

** All typicals at $T_A = 25^\circ\text{C}$

NOTES:

1. Always design to the specified minimum/maximum electrical limits (where applicable).
2. Current Transfer Ratio (CTR) = $I_C/I_F \times 100\%$.
3. For test circuit setup and waveforms, refer to Figure 11.
4. For this test, Pins 1 and 2 are common, and Pins 4 and 5 are common.

| | | | |
|-----------------|-----------------|-----------------|-----------------|
| MOC8101 | MOC8102 | MOC8103 | MOC8104 |
| MOC8105 | MOC8106 | MOC8107 | MOC8108 |
| CNY17F-1 | CNY17F-2 | CNY17F-3 | CNY17F-4 |

TYPICAL PERFORMANCE CURVES

Fig. 1 LED Forward Voltage vs. Forward Current

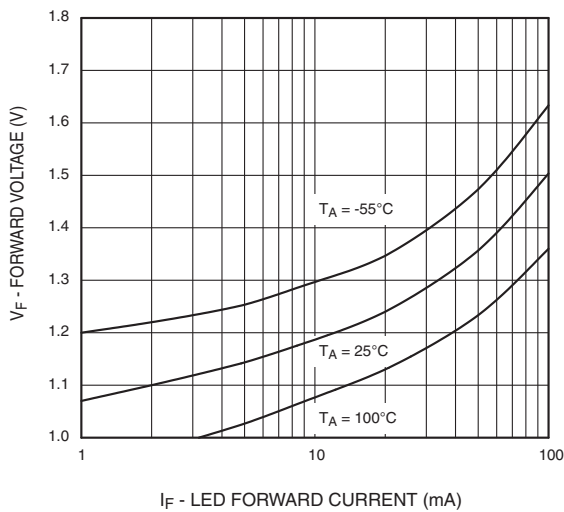


Fig. 2 Normalized CTR vs. Forward Current

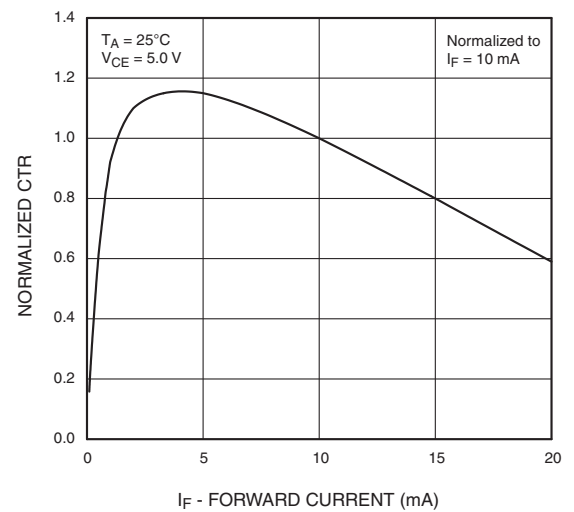


Fig. 3 Normalized CTR vs. Ambient Temperature

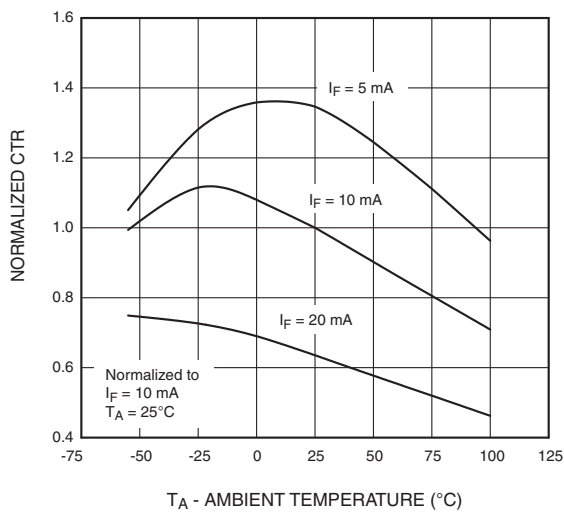
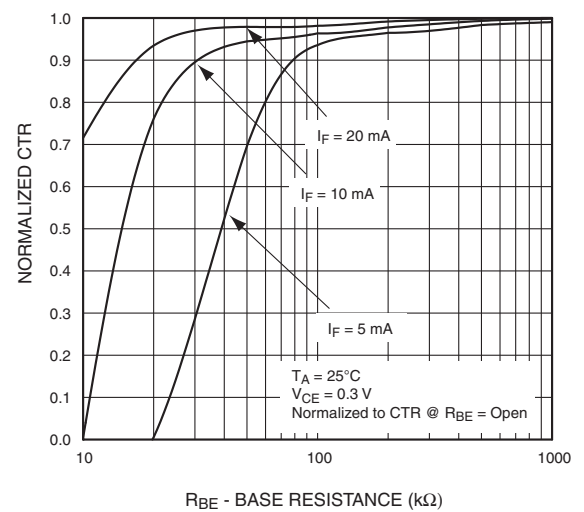


Fig. 4 CTR vs. RBE (Saturated)



| | | | |
|-----------------|-----------------|-----------------|-----------------|
| MOC8101 | MOC8102 | MOC8103 | MOC8104 |
| MOC8105 | MOC8106 | MOC8107 | MOC8108 |
| CNY17F-1 | CNY17F-2 | CNY17F-3 | CNY17F-4 |

TYPICAL PERFORMANCE CURVES (continued)

Fig. 5 CTR vs. R_{BE} (Unsaturated)

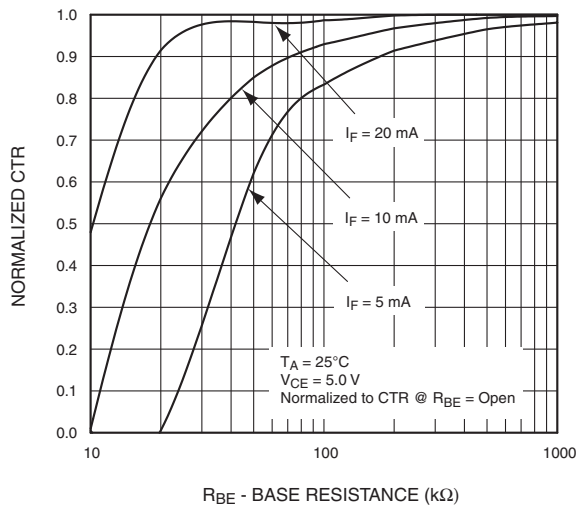


Fig. 6 Collector Emitter Saturation Voltage vs Collector Current

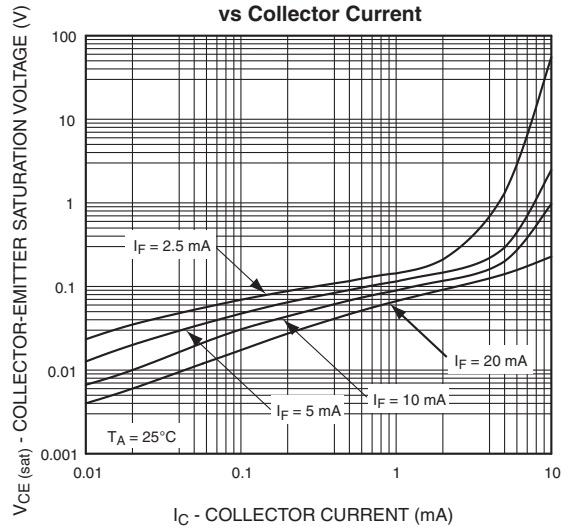


Fig. 7 Normalized t_{on} vs. R_{BE}

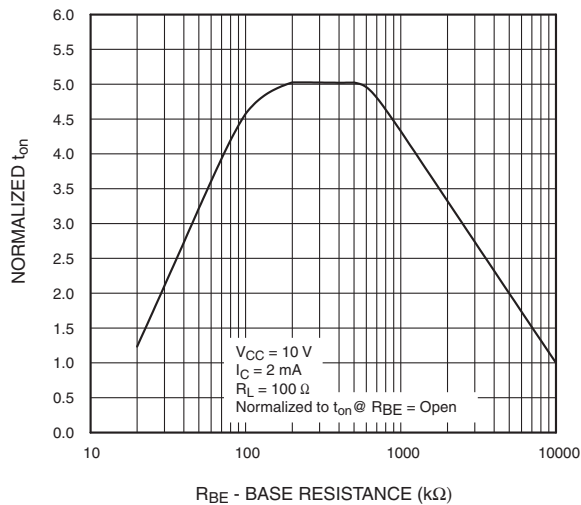
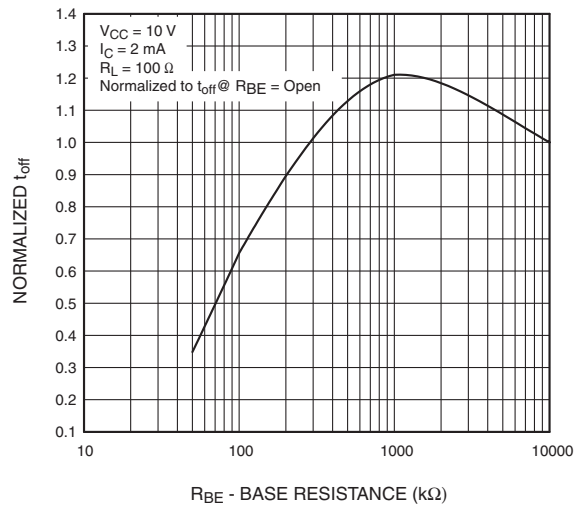


Fig. 8 Normalized t_{off} vs. R_{BE}



| | | | |
|-----------------|-----------------|-----------------|-----------------|
| MOC8101 | MOC8102 | MOC8103 | MOC8104 |
| MOC8105 | MOC8106 | MOC8107 | MOC8108 |
| CNY17F-1 | CNY17F-2 | CNY17F-3 | CNY17F-4 |

TYPICAL PERFORMANCE CURVES (continued)

Fig. 9 Switching Speed vs. Load Resistor

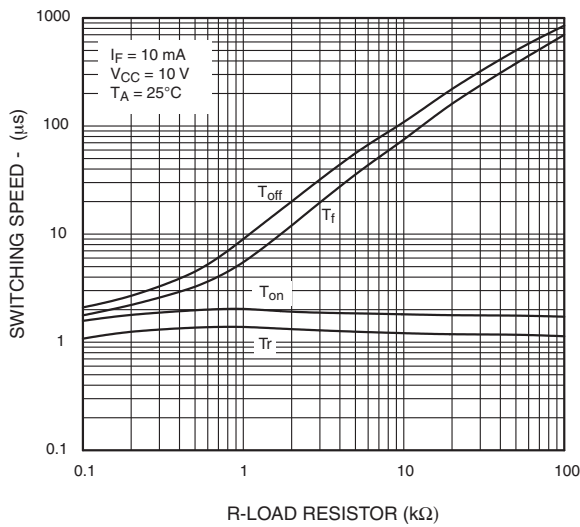
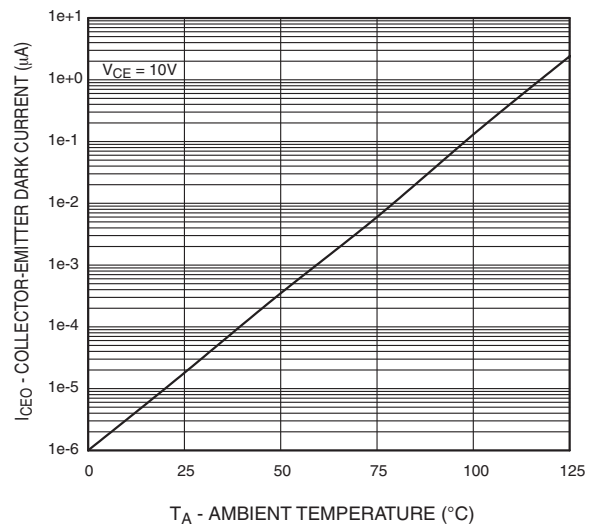
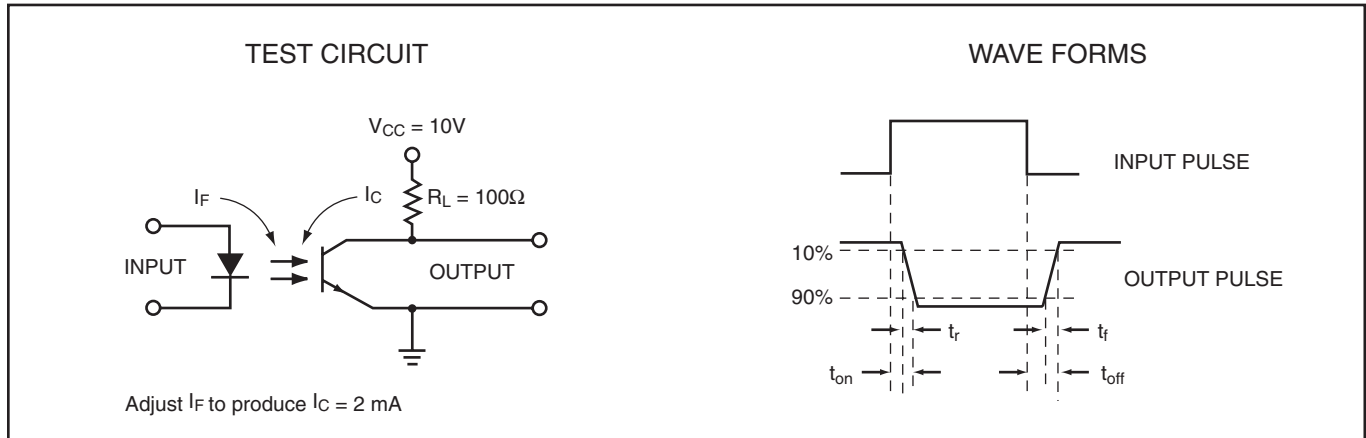


Fig. 10 Dark current vs. Ambient Temperature.



| | | | |
|-----------------|-----------------|-----------------|-----------------|
| MOC8101 | MOC8102 | MOC8103 | MOC8104 |
| MOC8105 | MOC8106 | MOC8107 | MOC8108 |
| CNY17F-1 | CNY17F-2 | CNY17F-3 | CNY17F-4 |

Figure 11. Switching Time Test Circuit and Waveforms



6-PIN DIP OPTOCOUPPLERS FOR POWER SUPPLY APPLICATIONS (NO BASE CONNECTION)

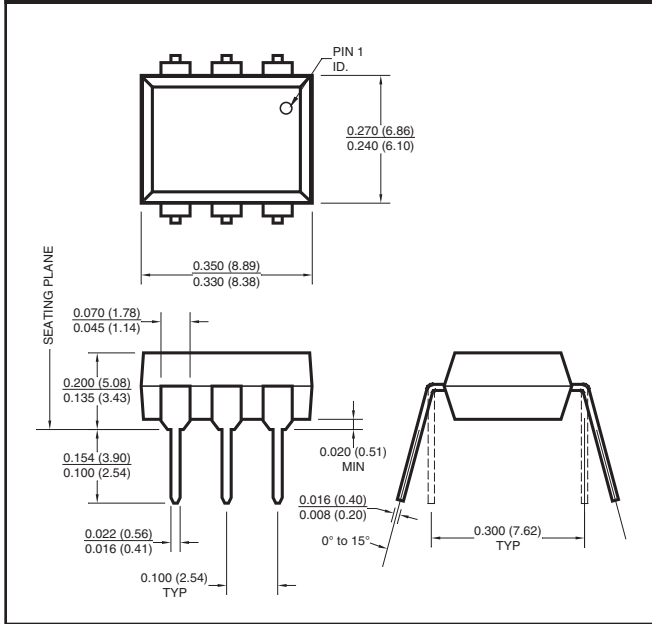
MOC8101
MOC8105
CNY17F-1

MOC8102
MOC8106
CNY17F-2

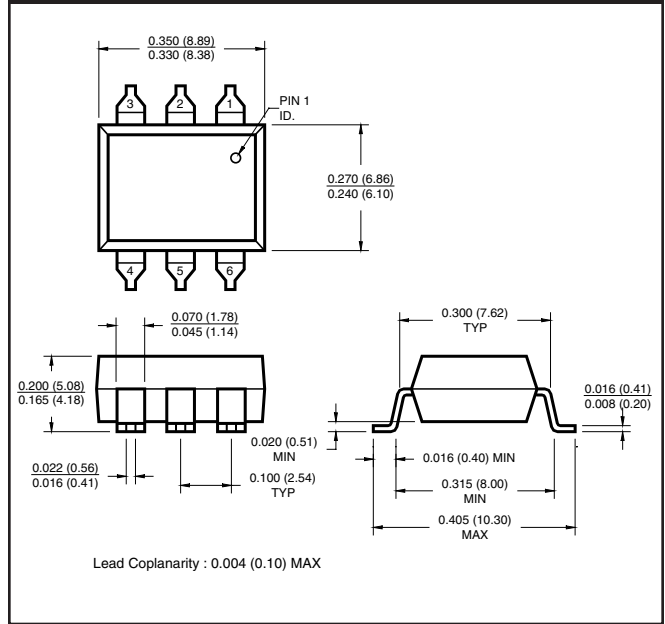
MOC8103
MOC8107
CNY17F-3

MOC8104
MOC8108
CNY17F-4

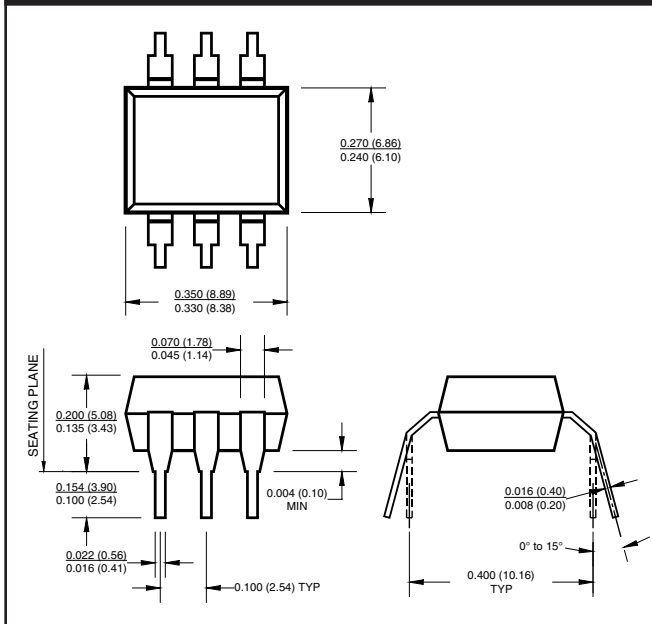
Package Dimensions (Through Hole)



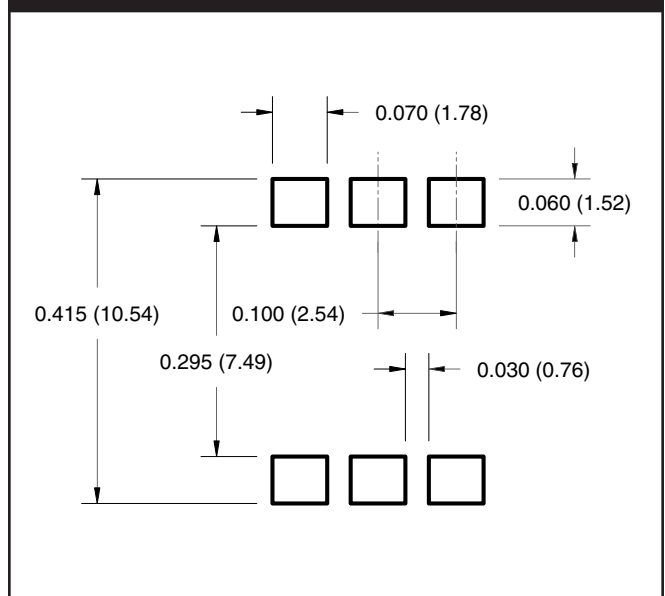
Package Dimensions (Surface Mount)



Package Dimensions (0.4" Lead Spacing)



Recommended Pad Layout for Surface Mount Leadform



NOTE

All dimensions are in inches (millimeters)

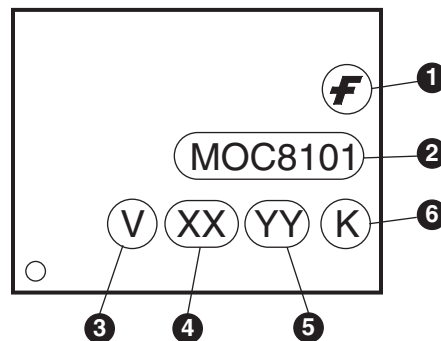
6-PIN DIP OPTOCOUPPLERS FOR POWER SUPPLY APPLICATIONS (NO BASE CONNECTION)

| | | | |
|----------|----------|----------|----------|
| MOC8101 | MOC8102 | MOC8103 | MOC8104 |
| MOC8105 | MOC8106 | MOC8107 | MOC8108 |
| CNY17F-1 | CNY17F-2 | CNY17F-3 | CNY17F-4 |

ORDERING INFORMATION

| Option | Order Entry Identifier | Description |
|--------|------------------------|--|
| S | .S | Surface Mount Lead Bend |
| SD | .SD | Surface Mount; Tape and Reel |
| W | .W | 0.4" Lead Spacing |
| 300 | .300 | VDE 0884 |
| 300W | .300W | VDE 0884, 0.4" Lead Spacing |
| 3S | .3S | VDE 0884, Surface Mount |
| 3SD | .3SD | VDE 0884, Surface Mount, Tape and Reel |

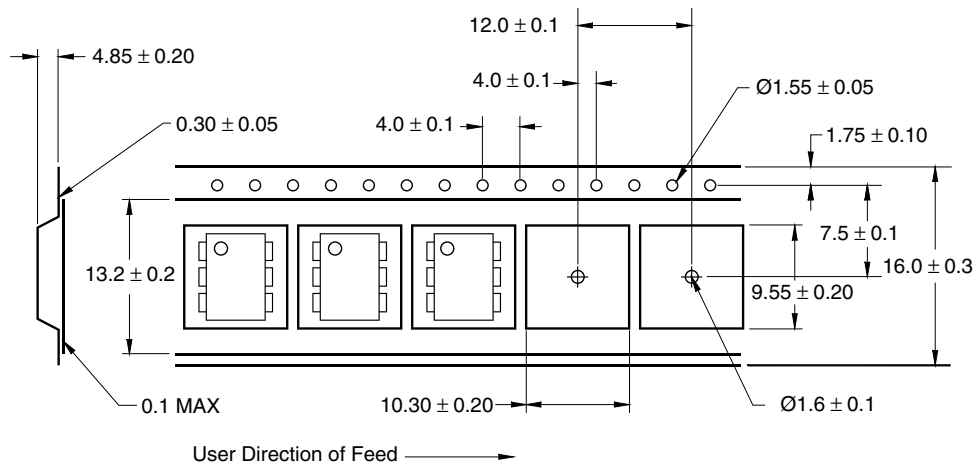
MARKING INFORMATION



| Definitions | |
|-------------|--|
| 1 | Fairchild logo |
| 2 | Device number |
| 3 | VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table) |
| 4 | Two digit year code, e.g., '03' |
| 5 | Two digit work week ranging from '01' to '53' |
| 6 | Assembly package code |

| | | | |
|----------|----------|----------|----------|
| MOC8101 | MOC8102 | MOC8103 | MOC8104 |
| MOC8105 | MOC8106 | MOC8107 | MOC8108 |
| CNY17F-1 | CNY17F-2 | CNY17F-3 | CNY17F-4 |

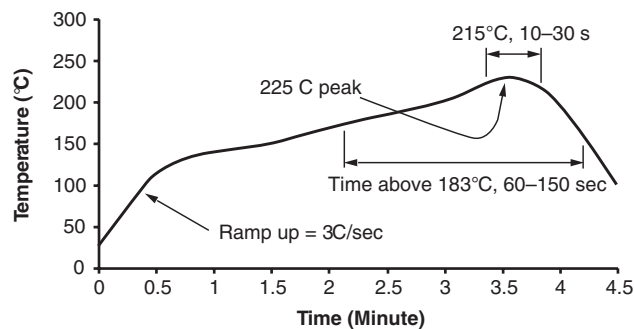
Carrier Tape Specifications ("D" Taping Orientation)



NOTE

All dimensions are in inches (millimeters)

Reflow Profile (Black Package, No Suffix)



- Peak reflow temperature: 225°C (package surface temperature)
- Time of temperature higher than 183°C for 60–150 seconds
- One time soldering reflow is recommended

| | | | |
|-----------------|-----------------|-----------------|-----------------|
| MOC8101 | MOC8102 | MOC8103 | MOC8104 |
| MOC8105 | MOC8106 | MOC8107 | MOC8108 |
| CNY17F-1 | CNY17F-2 | CNY17F-3 | CNY17F-4 |

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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.