

Single-Channel: 6N135, 6N136, HCPL2503, HCPL4502 Dual-Channel: HCPL2530, HCPL2531 High Speed Transistor Optocouplers

Features

- High speed –1 MBit/s
- Superior CMR – 10kV/μs
- Dual-Channel HCPL2530/HCPL2531
- Double working voltage – 480V RMS
- CTR guaranteed 0–70°C
- U.L. recognized (File # E90700)

Applications

- Line receivers
- Pulse transformer replacement
- Output interface to CMOS-LSTTL-TTL
- Wide bandwidth analog coupling

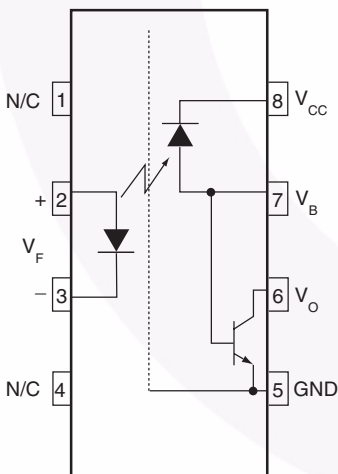
Description

The HCPL4502, HCPL2503, 6N135, 6N136, HCPL2530 and HCPL2531 optocouplers consist of an AlGaAs LED optically coupled to a high speed photodetector transistor.

A separate connection for the bias of the photodiode improves the speed by several orders of magnitude over conventional phototransistor optocouplers by reducing the base-collector capacitance of the input transistor.

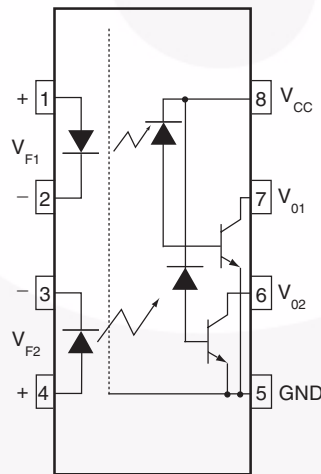
An internal noise shield provides superior common mode rejection of 10kV/μs. An improved package allows superior insulation permitting a 480V working voltage compared to industry standard of 220V.

Schematics



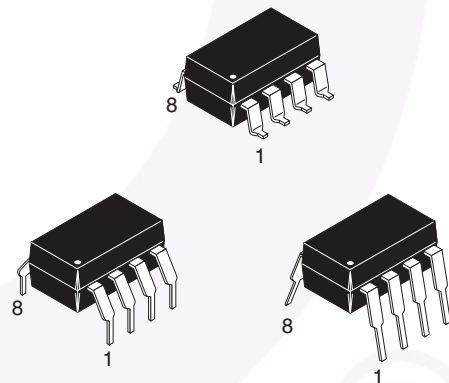
6N135, 6N136, HCPL2503, HCPL4502

Pin 7 is not connected in Part Number HCPL4502



HCPL2530/HCPL2531

Package Outlines



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

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

| Symbol | Parameter | Condition | Value | Units |
|-----------------|--|---|----------------|------------------|
| T_{STG} | Storage Temperature | | -55 to +125 | $^\circ\text{C}$ |
| T_{OPR} | Operating Temperature | | -55 to +100 | $^\circ\text{C}$ |
| T_{SOL} | Lead Solder Temperature | | 260 for 10 sec | $^\circ\text{C}$ |
| EMITTER | | | | |
| I_F (avg) | DC/Average Forward Input Current Each Channel ⁽¹⁾ | | 25 | mA |
| I_F (pk) | Peak Forward Input Current Each Channel ⁽²⁾ | 50% duty cycle, 1ms P.W. | 50 | mA |
| I_F (trans) | Peak Transient Input Current Each Channel | $\leq 1\mu\text{s}$ P.W., 300pps | 1.0 | A |
| V_R | Reverse Input Voltage Each Channel | | 5 | V |
| P_D | Input Power Dissipation Each Channel | 6N135/6N136 and HCPL2503/4502 | 100 | mW |
| | | HCPL-2530/253 ⁽³⁾ | 45 | |
| DETECTOR | | | | |
| I_O (avg) | Average Output Current Each Channel | | 8 | mA |
| I_O (pk) | Peak Output Current Each Channel | | 16 | mA |
| V_{EBR} | Emitter-Base Reverse Voltage | 6N135, 6N136 and HCPL2503 only | 5 | V |
| V_{CC} | Supply Voltage | | -0.5 to 30 | V |
| V_O | Output Voltage | | -0.5 to 20 | V |
| I_B | Base Current | 6N135, 6N136 and HCPL2503 only | 5 | mA |
| PD | Output Power Dissipation Each Channel | 6N135, 6N136, HCPL2503, HCPL4502 ⁽⁴⁾ | 100 | mW |
| | | HCPL2530, HCPL2531 | 35 | mW |

Notes:

1. Derate linearly above 70°C free-air temperature at a rate of $0.8\text{mA}/^\circ\text{C}$.
2. Derate linearly above 70°C free-air temperature at a rate of $1.6\text{mA}/^\circ\text{C}$.
3. Derate linearly above 70°C free-air temperature at a rate of $0.9\text{ mW}/^\circ\text{C}$.
4. Derate linearly above 70°C free-air temperature at a rate of $2.0\text{ mW}/^\circ\text{C}$.

Electrical Characteristics ($T_A = 0$ to 70°C Unless otherwise specified)**Individual Component Characteristics**

| Symbol | Parameter | Test Conditions | Device | Min. | Typ.* | Max. | Unit |
|-------------------------|--|---|--|------|-------|------|----------------------|
| EMITTER | | | | | | | |
| V_F | Input Forward Voltage | $I_F = 16\text{mA}$, $T_A = 25^\circ\text{C}$ | | | 1.45 | 1.7 | V |
| | | $I_F = 16\text{mA}$ | | | | 1.8 | |
| B_{VR} | Input Reverse Breakdown Voltage | $I_R = 10\ \mu\text{A}$ | | 5.0 | | | V |
| $\Delta V_F/\Delta T_A$ | Temperature Coefficient of Forward Voltage | $I_F = 16\text{mA}$ | | | -1.6 | | mV/ $^\circ\text{C}$ |
| DETECTOR | | | | | | | |
| I_{OH} | Logic High Output Current | $I_F = 0\text{mA}$, $V_O = V_{CC} = 5.5\text{V}$, $T_A = 25^\circ\text{C}$ | All | | 0.001 | 0.5 | μA |
| | | $I_F = 0\text{mA}$, $V_O = V_{CC} = 15\text{V}$, $T_A = 25^\circ\text{C}$ | 6N135 6N136 HCPL4502 HCPL2503 | | 0.005 | 1 | |
| | | $I_F = 0\text{mA}$, $V_O = V_{CC} = 15\text{V}$ | All | | | 50 | |
| I_{CCL} | Logic Low Supply Current | $I_F = 16\text{mA}$, $V_O = \text{Open}$, $V_{CC} = 15\text{V}$ | 6N135 6N136 HCPL4502 HCPL2503 | | 120 | 200 | μA |
| | | $I_{F1} = I_{F2} = 16\text{mA}$, $V_O = \text{Open}$, $V_{CC} = 15\text{V}$ | HCPL2530 HCPL2531 | | 200 | 400 | |
| I_{CCH} | Logic High Supply Current | $I_F = 0\text{mA}$, $V_O = \text{Open}$, $V_{CC} = 15\text{V}$, $T_A = 25^\circ\text{C}$ | 6N135 6N136 HCPL4502 HCPL2503 | | | 1 | μA |
| | | $I_F = 0\text{mA}$, $V_O = \text{Open}$, $V_{CC} = 15\text{V}$ | 6N135 6N136 HCPL4502 HCPL2503 | | | 2 | |
| | | $I_F = 0\text{mA}$, $V_O = \text{Open}$, $V_{CC} = 15\text{V}$ | HCPL2530 HCPL2531 | | 0.02 | 4 | |

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

Electrical Characteristics (Continued) ($T_A = 0$ to 70°C unless otherwise specified)

Transfer Characteristics

| Symbol | Parameter | Test Conditions | Device | Min. | Typ.* | Max. | Unit | |
|---|---------------------------------------|---|-------------------------------|-------------------|-------|------|------|---|
| COUPLED | | | | | | | | |
| CTR | Current Transfer Ratio ⁽⁵⁾ | $I_F = 16\text{mA}, V_O = 0.4\text{V}, V_{CC} = 4.5\text{V}, T_A = 25^\circ\text{C}$ | 6N135 HCPL2530 | 7 | 18 | 50 | % | |
| | | | 6N136 HCPL4502 HCPL2531 | 19 | 27 | 50 | % | |
| | | | HCPL2503 | 12 | 27 | | % | |
| | | $I_F = 16\text{mA}, V_{CC} = 4.5\text{V}$ | $V_{OL} = 0.4\text{V}$ | 6N135 | 5 | 21 | | % |
| | | | $V_{OL} = 0.5\text{V}$ | HCPL2530 | | | | |
| | | | $V_{OL} = 0.4\text{V}$ | 6N136 HCPL4502 | 15 | 30 | | % |
| $V_{OL} = 0.5\text{V}$ | HCPL2531 | | | | | | | |
| $V_{OL} = 0.4\text{V}$ | HCPL2503 | 9 | 30 | | % | | | |
| V_{OL} | Logic LOW Output Voltage | $I_F = 16\text{mA}, I_O = 1.1\text{mA}, V_{CC} = 4.5\text{V}, T_A = 25^\circ\text{C}$ | 6N135 | | 0.18 | 0.4 | V | |
| | | | HCPL2530 | | 0.18 | 0.5 | | |
| | | $I_F = 16\text{mA}, I_O = 3\text{mA}, V_{CC} = 4.5\text{V}, T_A = 25^\circ\text{C}$ | 6N136 HCPL2503 | | 0.25 | 0.4 | | |
| | | | HCPL2531 | | 0.25 | 0.5 | | |
| | | $I_F = 16\text{mA}, I_O = 0.8\text{mA}, V_{CC} = 4.5\text{V}$ | 6N135 HCPL2530 | | | 0.5 | | |
| $I_F = 16\text{mA}, I_O = 2.4\text{mA}, V_{CC} = 4.5\text{V}$ | HCPL4502 HCPL2531 | | | 0.5 | | | | |

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

Note:

- Current Transfer Ratio is defined as a ratio of output collector current, I_O , to the forward LED input current, I_F , times 100%.

Electrical Characteristics (Continued) ($T_A = 0$ to 70°C unless otherwise specified)**Switching Characteristics** ($V_{CC} = 5\text{V}$)

| Symbol | Parameter | Test Conditions | Device | Min. | Typ.* | Max. | Unit |
|-----------|---|--|---|------|--------|------|------------------------|
| T_{PHL} | Propagation Delay Time to Logic LOW | $T_A = 25^\circ\text{C}$, $R_L = 4.1\text{k}\Omega$, $I_F = 16\text{mA}^{(6)}$ (Fig. 7) | 6N135 HCPL2530 | | 0.45 | 1.5 | μs |
| | | $R_L = 1.9\text{k}\Omega$, $I_F = 16\text{mA}$, $T_A = 25^\circ\text{C}^{(7)}$ (Fig. 7) | 6N136 HCPL4502 HCPL2503 HCPL2531 | | 0.45 | 0.8 | μs |
| | | $R_L = 4.1\text{k}\Omega$, $I_F = 16\text{mA}^{(6)}$ (Fig. 7) | 6N135 HCPL2530 | | | 2.0 | μs |
| | | $R_L = 1.9\text{k}\Omega$, $I_F = 16\text{mA}^{(7)}$ (Fig. 7) | 6N136 HCPL4502 HCPL2503 HCPL2531 | | | 1.0 | μs |
| T_{PLH} | Propagation Delay Time to Logic HIGH | $T_A = 25^\circ\text{C}$, ($R_L = 4.1\text{k}\Omega$, $I_F = 16\text{mA}^{(6)}$) (Fig. 7) | 6N135 HCPL2530 | | 0.5 | 1.5 | μs |
| | | $R_L = 1.9\text{k}\Omega$, $I_F = 16\text{mA}^{(7)}$ (Fig. 7) $T_A = 25^\circ\text{C}$ | 6N136 HCPL4502 HCPL2503 HCPL2531 | | 0.3 | 0.8 | μs |
| | | $R_L = 4.1\text{k}\Omega$, $I_F = 16\text{mA}^{(6)}$ (Fig. 7) | 6N135 HCPL2530 | | | 2.0 | μs |
| | | $R_L = 1.9\text{k}\Omega$, $I_F = 16\text{mA}^{(7)}$ (Fig. 7) | 6N136 HCPL4502 HCPL2503 HCPL2531 | | | 1.0 | μs |
| ICM_H | Common Mode Transient Immunity at Logic High | $I_F = 0\text{mA}$, $V_{CM} = 10\text{V}_{P-P}$, $R_L = 4.1\text{k}\Omega$, $T_A = 25^\circ\text{C}^{(8)}$ (Fig. 8) | 6N135 HCPL2530 | | 10,000 | | $\text{V}/\mu\text{s}$ |
| | | $I_F = 0\text{mA}$, $V_{CM} = 10\text{V}_{P-P}$, $R_L = 1.9\text{k}\Omega$, $T_A = 25^\circ\text{C}^{(8)}$ (Fig. 8) | 6N136 HCPL4502 HCPL2503 HCPL2531 | | 10,000 | | $\text{V}/\mu\text{s}$ |
| ICM_L | Common Mode Transient Immunity at Logic Low | $I_F = 16\text{mA}$, $V_{CM} = 10\text{V}_{P-P}$, $R_L = 4.1\text{k}\Omega$, $T_A = 25^\circ\text{C}^{(8)}$ (Fig. 8) | 6N135 HCPL2530 | | 10,000 | | $\text{V}/\mu\text{s}$ |
| | | $I_F = 16\text{mA}$, $V_{CM} = 10\text{V}_{P-P}$, $R_L = 1.9\text{k}\Omega^{(8)}$ (Fig. 8) | 6N136 HCPL4502 HCPL2503 HCPL2531 | | 10,000 | | $\text{V}/\mu\text{s}$ |

** All Typical at $T_A = 25^\circ\text{C}$ **Notes:**

- The $4.1\text{k}\Omega$ load represents 1 LSTTL unit load of 0.36mA and $6.1\text{k}\Omega$ pull-up resistor.
- The $1.9\text{k}\Omega$ load represents 1 TTL unit load of 1.6mA and $5.6\text{k}\Omega$ pull-up resistor.
- Common mode transient immunity in logic high level is the maximum tolerable (positive) dV_{cm}/dt on the leading edge of the common mode pulse signal V_{CM} , to assure that the output will remain in a logic high state (i.e., $V_O > 2.0\text{V}$). Common mode transient immunity in logic low level is the maximum tolerable (negative) dV_{cm}/dt on the trailing edge of the common mode pulse signal, V_{CM} , to assure that the output will remain in a logic low state (i.e., $V_O < 0.8\text{V}$).

Electrical Characteristics (Continued) ($T_A = 0$ to 70°C unless otherwise specified)**Isolation Characteristics** ($T_A = 0$ to 70°C Unless otherwise specified)

| Symbol | Characteristics | Test Conditions | Min | Typ** | Max | Unit |
|-----------|---|--|------|-----------|-----|---------------|
| I_{I-O} | Input-Output Insulation Leakage Current | Relative humidity = 45%, $T_A = 25^\circ\text{C}$, $t = 5\text{s}$, $V_{I-O} = 3000\text{VDC}^{(9)}$ | | | 1.0 | μA |
| V_{ISO} | Withstand Insulation Test Voltage | $RH \leq 50\%$, $T_A = 25^\circ\text{C}$, $I_{I-O} \leq 2\mu\text{A}$, $t = 1\text{min.}^{(9)}$ | 2500 | | | V_{RMS} |
| R_{I-O} | Resistance (Input to Output) | $V_{I-O} = 500\text{VDC}^{(9)}$ | | 10^{12} | | Ω |
| C_{I-O} | Capacitance (Input to Output) | $f = 1\text{MHz}^{(9)}$ | | 0.6 | | pF |
| HFE | DC Current Gain | $I_O = 3\text{mA}$, $V_O = 5\text{V}^{(9)}$ | | 150 | | |
| I_{I-I} | Input-Input Insulation Leakage Current | $RH \leq 45\%$, $V_{I-I} = 500\text{VDC}^{(10)}$ $t = 5\text{s}$, (HCPL2530/2531 only) | | 0.005 | | μA |
| R_{I-I} | Input-Input Resistance | $V_{I-I} = 500\text{VDC}^{(10)}$ (HCPL2530/2531 only) | | 10^{11} | | Ω |
| C_{I-I} | Input-Input Capacitance | $f = 1\text{MHz}^{(10)}$ (HCPL2530/2531 only) | | 0.03 | | pF |

Notes:

9. Device is considered a two terminal device: Pins 1, 2, 3 and 4 are shorted together and Pins 5, 6, 7 and 8 are shorted together.
10. Measured between pins 1 and 2 shorted together, and pins 3 and 4 shorted together.

Typical Performance Curves

Fig. 1 Normalized CTR vs. Forward Current

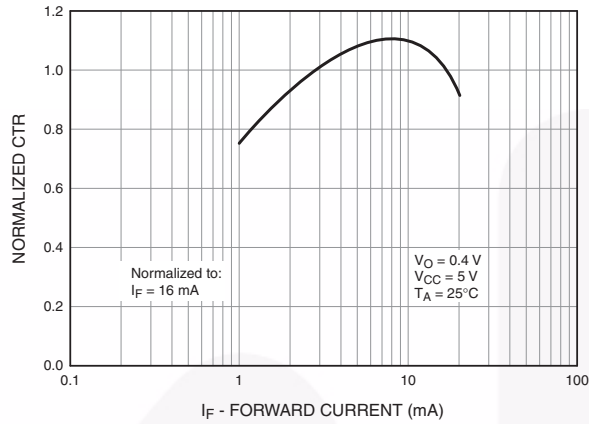


Fig. 2 Normalized CTR vs. Temperature

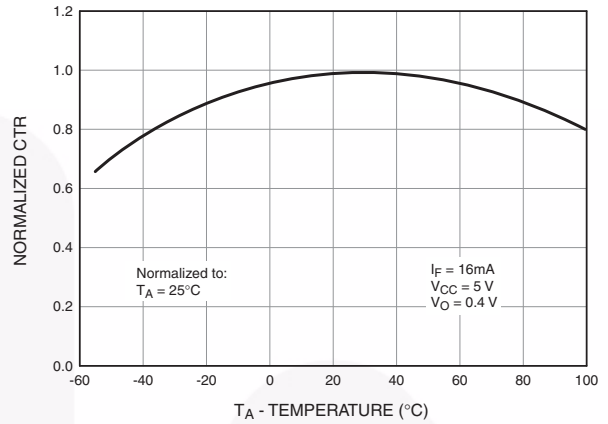


Fig. 3 Output Current vs. Output Voltage

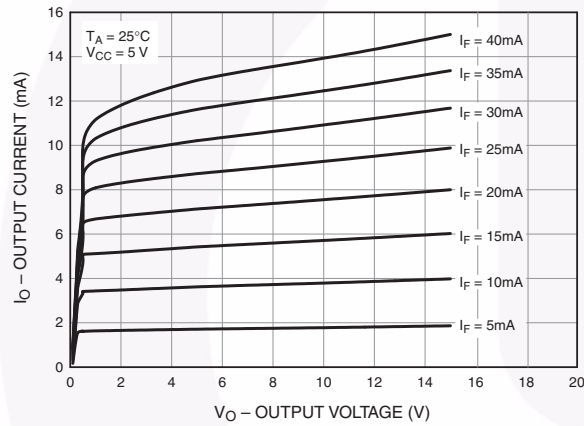


Fig. 4 Logic High Output Current vs. Temperature

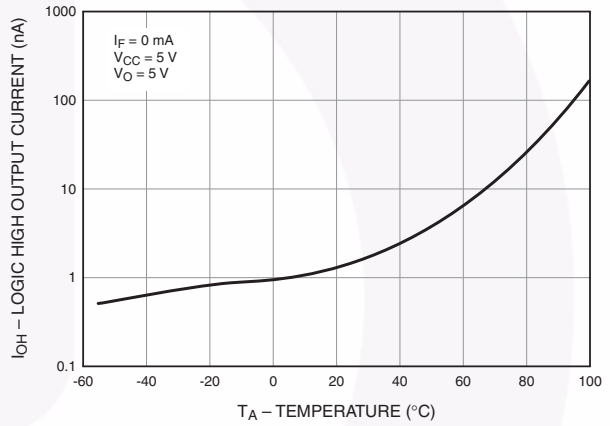


Fig. 5 Propagation Delay vs. Temperature

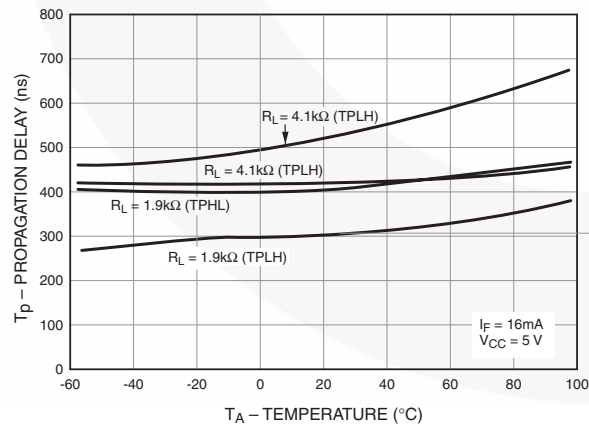
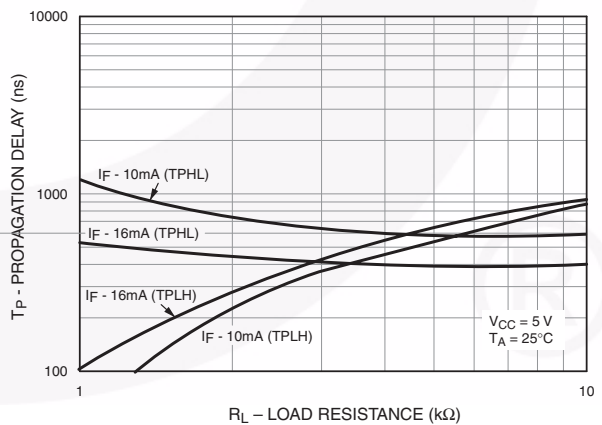
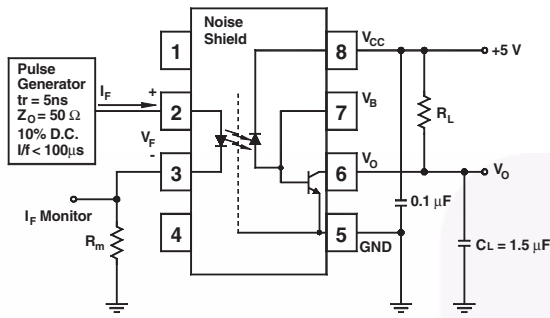


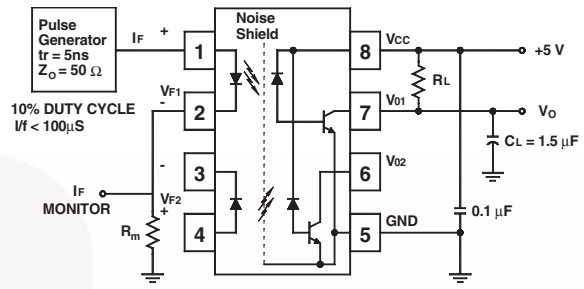
Fig. 6 Propagation Delay vs. Load Resistance



Test Circuits



Test Circuit for 6N135, 6N136, HCPL-2503 and HCPL-4502



Test Circuit for HCPL-2530 and HCPL-2531

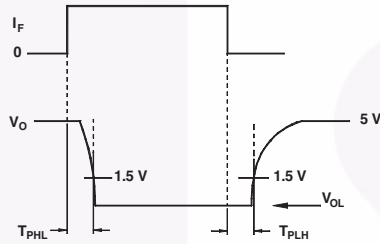
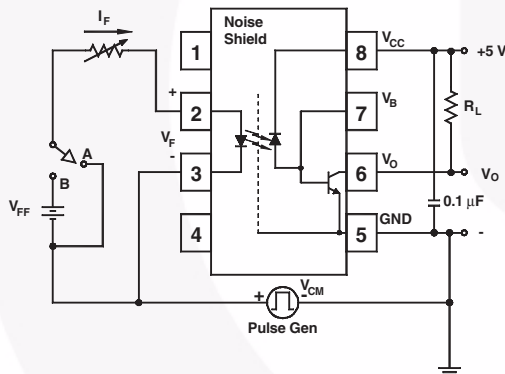
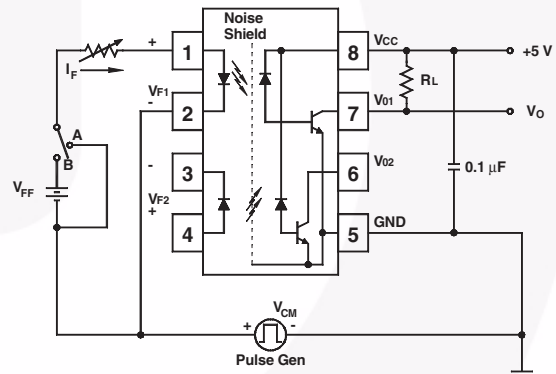


Fig. 7 Switching Time Test Circuit



Test Circuit for 6N135, 6N136, HCPL-2503 and HCPL-4502



Test Circuit for HCPL-2530 and HCPL-2531

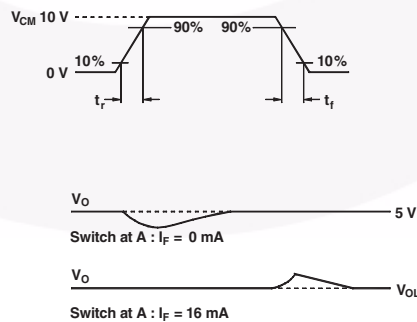
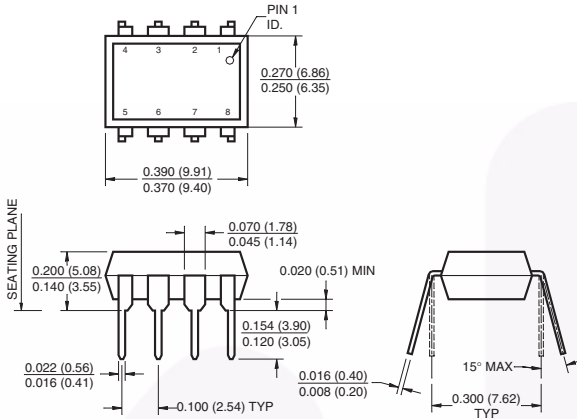


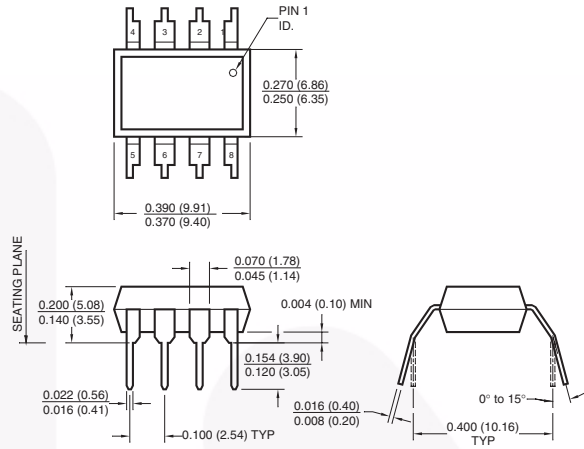
Fig. 8 Common Mode Immunity Test Circuit

Package Dimensions

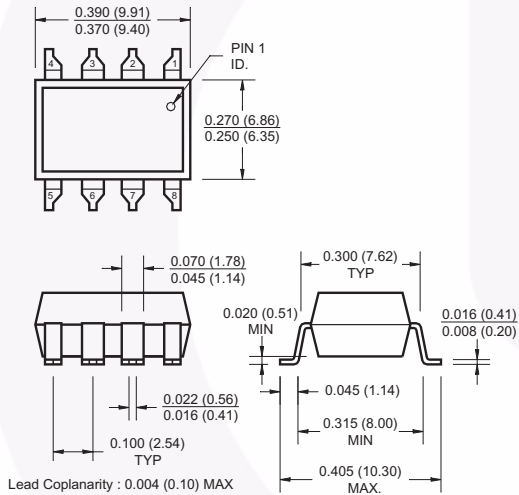
Through Hole



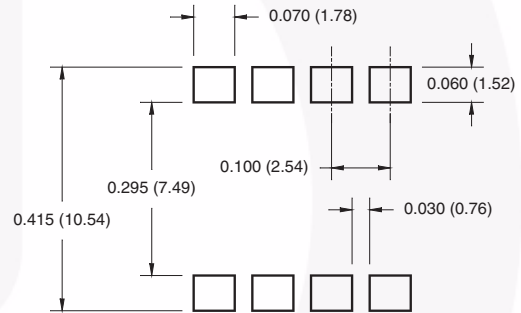
0.4" Lead Spacing



Surface Mount



8-Pin DIP – Land Pattern



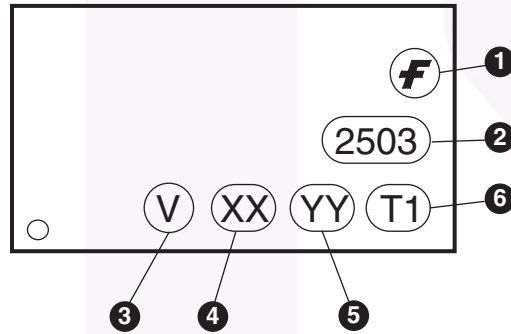
Note:

All dimensions are in inches (millimeters)

Ordering Information

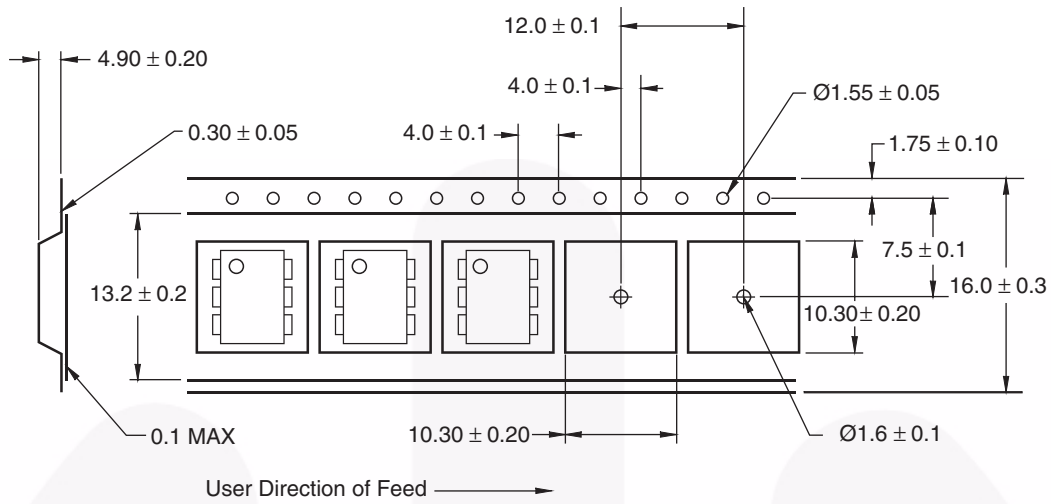
| Option | Example Part Number | Description |
|--------|---------------------|---------------------------------------|
| S | 6N135S | Surface Mount Lead Bend |
| SD | 6N135SD | Surface Mount; Tape and reel |
| W | 6N135W | 0.4" Lead Spacing |
| V | 6N135V | VDE0884 |
| WV | 6N135WV | VDE0884; 0.4" lead spacing |
| SV | 6N135SV | VDE0884; surface mount |
| SDV | 6N135SDV | VDE0884; surface mount; tape and reel |

Marking Information

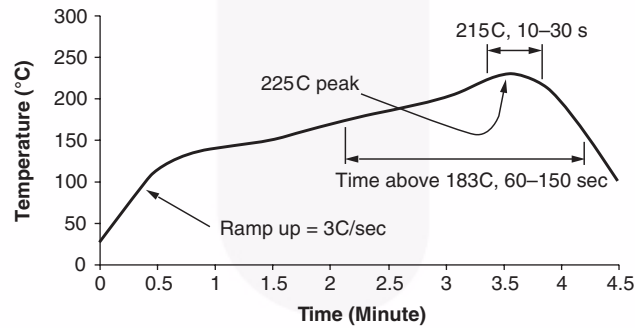


| Definitions | |
|-------------|--|
| 1 | Fairchild logo |
| 2 | Device number |
| 3 | VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table) |
| 4 | Two digit year code, e.g., '03' |
| 5 | Two digit work week ranging from '01' to '53' |
| 6 | Assembly package code |

Tape Specifications



Reflow Profile





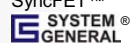


- Peak reflow temperature: 225C (package surface temperature)
- Time of temperature higher than 183C for 60-150 seconds
- One time soldering reflow is recommended



TRADEMARKS

The following includes registered and unregistered trademarks and service marks, owned by Fairchild Semiconductor and/or its global subsidiaries, and is not intended to be an exhaustive list of all such trademarks.

- | | | | |
|---|---|---|---|
| Build it Now™ | FPS™ | PDP SPM™ | The Power Franchise® |
| CorePLUS™ | F-PFS™ | Power-SPM™ | the power franchise |
| CorePOWER™ | FRFET® | PowerTrench® | TinyBoost™ |
| CROSSVOLT™ | Global Power Resource SM | Programmable Active Droop™ | TinyBuck™ |
| CTL™ | Green FPS™ | QFET® | TinyLogic® |
| Current Transfer Logic™ | Green FPS™ e-Series™ | QS™ | TINYOPTO™ |
| EcoSPARK® | GTO™ | Quiet Series™ | TinyPower™ |
| EfficientMax™ | IntelliMAX™ | RapidConfigure™ | TinyPWM™ |
| EZSWITCH™ * | ISOPLANAR™ | Saving our world, 1mW at a time™ | TinyWire™ |
|  | MegaBuck™ | SmartMax™ | μSerDes™ |
|  | MICROCOUPLER™ | SMART START™ |  |
| Fairchild® | MicroFET™ | SPM® | UHC® |
| Fairchild Semiconductor® | MicroPak™ | STEALTH™ | Ultra FRFET™ |
| FACT Quiet Series™ | MillerDrive™ | SuperFET™ | UniFET™ |
| FACT® | MotionMax™ | SuperSOT™3 | VCX™ |
| FAST® | Motion-SPM™ | SuperSOT™6 | VisualMax™ |
| FastvCore™ | OPTOLOGIC® | SuperSOT™8 | |
| FlashWriter® * | OPTOPLANAR® | SupreMOS™ | |
| |  | SyncFET™ | |
| | |  | |

* EZSWITCH™ and FlashWriter® are trademarks of System General Corporation, used under license by Fairchild Semiconductor.

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
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.

ANTI-COUNTERFEITING POLICY

Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy. Fairchild's Anti-Counterfeiting Policy is also stated on our external website, www.fairchildsemi.com, under Sales Support.

Counterfeiting of semiconductor parts is a growing problem in the industry. All manufacturers of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed applications, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handling and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address any warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

PRODUCT STATUS DEFINITIONS

Definition of Terms

| Datasheet Identification | Product Status | Definition |
|--------------------------|-----------------------|---|
| Advance Information | Formative / In Design | Datasheet contains the design specifications for product development. Specifications may change in any manner without notice. |
| Preliminary | First Production | Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design. |
| No Identification Needed | Full Production | Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design. |
| Obsolete | Not In Production | Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only. |

Rev. 135

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Fairchild Semiconductor:

[HCPL4502SDV](#) [6N136SV](#) [6N135SDV](#) [HCPL2531SV](#) [HCPL2530S_Q](#) [6N135_Q](#) [HCPL2531_Q](#) [HCPL2503_Q](#)
[HCPL4502S](#) [HCPL4502W](#) [HCPL4502V](#) [6N135](#) [6N136W](#) [6N135W](#) [HCPL2531W](#) [6N135V](#) [6N135S](#) [HCPL2530SV](#)
[HCPL4502SV](#) [HCPL4502WV](#) [HCPL4502SD](#) [HCPL2530W](#) [6N135WV](#) [6N135SV](#) [6N135SD](#) [HCPL4502](#) [6N136S_Q](#)
[6N136_Q](#) [HCPL4502_Q](#) [HCPL2530_Q](#) [HCPL4534S](#)