# High Transfer Efficiency AC Input Type Photocoupler

LTV-8141 Series

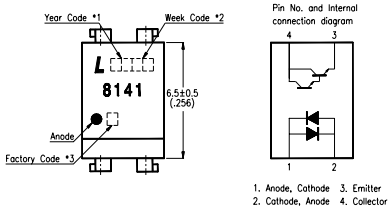
## Features

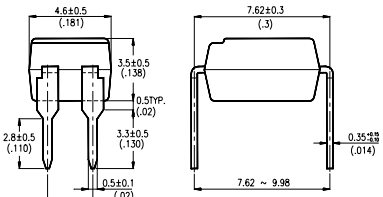
- AC input response
- High current transfer ratio
  (CTR : MIN. 600% at $I_F = \pm$ 1mA, $V_{CE}$=2V)
- High input-output isolation voltage:
  ($V_{ISO}$ : 5,000$V_{rms}$)
- Compact dual-in-line package
  LTV-8141 : 1-channel type
  LTV-8241 : 2-channel type
  LTV-8441 : 4-channel type
- UL approved (No. E113898)
- TUV approved (No.R9653630)
- CSA approved (No. CA91533-1)
- FIMKO approved (No. 193422)
- NEMKO approved (No. P96103013)
- DEMKO approved (No. 303986)
- SEMKO approved (No. 9646047/01-30)
- Options available :
  -Leads with 0.4"(10.16mm)spacing (M Type)
  -Leads bends for surface mounting(S Type)
  -Tape and Reel of Type I for SMD(Add"-TA"Suffix)
  -Tape and Reel of Type II for SMD(Add"-TA1"Suffix)

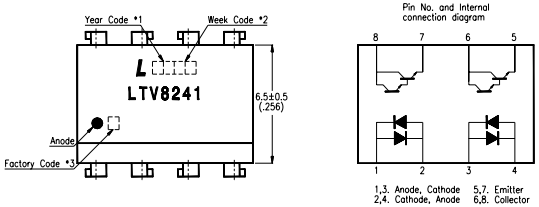
## Applications

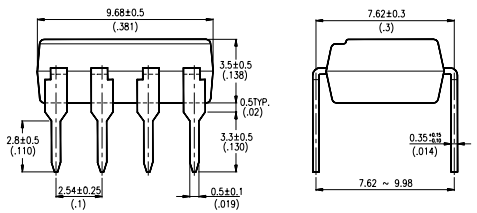
1. System appliances, measuring instruments.
2. Industrial robots.
3. Copiers, automatic vending machines.
4. Signal transmission between circuits of different potentials and impedances.

## Package Dimensions

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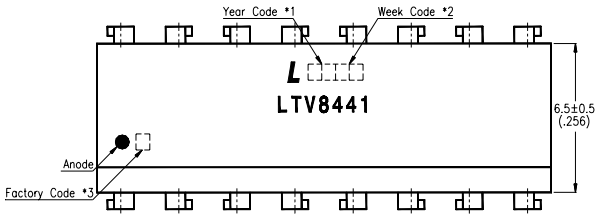


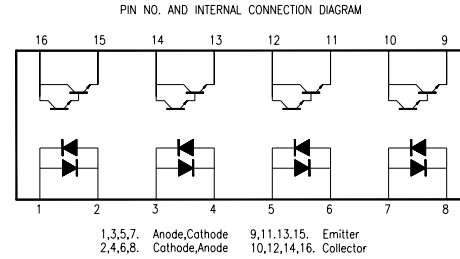


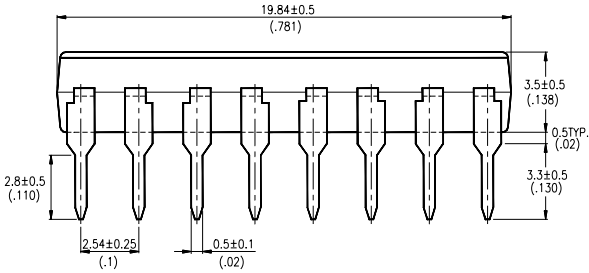


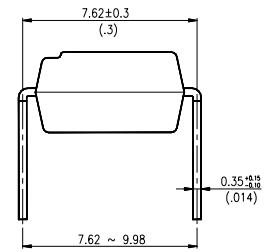


Note:
1.Year date code.
2. 2-digit work week.
3. Factory code shall be marked (Z : Taiwan, Y : Thailand).
4. All dimensions are in millimeters (inches).
5. Tolerance is ± 0.25mm (.010") unless otherwise noted.
6. Specifications are subject to change without notice.

## Ordering Information

| Part Number | Package | Safety Standard Approval | Application part number |
|---|---|---|---|
| LTV-8141<br>LTV-8141M<br>LTV-8141S<br>LTV-8141S-TA<br>LTV-8141S-TA1 | 4-pin DIP<br>4-pin (leads with 0.4" spacing)<br>4-pin (lead bends for surface mount)<br>4-pin (tape and reel packaging of type I)<br>4-pin (tape and reel packaging of type II) | • UL approved<br>• TUV approved<br>• CSA approved<br>• FIMKO approved<br>• NEMKO approved<br>• SEMKO approved<br>• DEMKO approved | LTV-8141 |
| LTV-8241<br>LTV-8241M<br>LTV-8241S<br>LTV-8241S-TA<br>LTV-8241S-TA1 | 8-pin DIP<br>8-pin (leads with 0.4" spacing)<br>8-pin (lead bends for surface mount)<br>8-pin (tape and reel packaging of type I)<br>8-pin (tape and reel packaging of type II) | | LTV-8241 |
| LTV-8441<br>LTV-8441M<br>LTV-8441S<br>LTV-8441S-TA<br>LTV-8441S-TA1 | 16-pin DIP<br>16-pin (leads with 0.4" spacing)<br>16-pin (lead bends for surface mount)<br>16-pin (tape and reel packaging of type I)<br>16-pin (tape and reel packaging of type II) | | LTV-8441 |
| LTV8141-V<br>LTV8141M-V<br>LTV8141S-V<br>LTV8141STA-V<br>LTV8141STA1-V | 4-pin DIP<br>4-pin (leads with 0.4" spacing)<br>4-pin (lead bends for surface mount)<br>4-pin (tape and reel packaging of type I)<br>4-pin (tape and reel packaging of type II) | • VDE approved | LTV-8141 |
| LTV8241-V<br>LTV8241M-V<br>LTV8241S-V<br>LTV8241STA-V<br>LTV8241STA1-V | 8-pin DIP<br>8-pin (leads with 0.4" spacing)<br>8-pin (lead bends for surface mount)<br>8-pin (tape and reel packaging of type I)<br>8-pin (tape and reel packaging of type II) | | LTV-8241 |
| LTV8441-V<br>LTV8441M-V<br>LTV8441S-V<br>LTV8441STA-V<br>LTV8441STA1-V | 16-pin DIP<br>16-pin (leads with 0.4" spacing)<br>16-pin (lead bends for surface mount)<br>16-pin (tape and reel packaging of type I)<br>16-pin (tape and reel packaging of type II) | | LTV-8441 |

## Absolute Maximum Ratings

(Ta=25℃)

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Input | Forward Current | $I_F$ | ± 50 | mA |
| | Power Dissipation | P | 70 | mW |
| Output | Collector-Emitter Voltage | $V_{CEO}$ | 35 | V |
| | Emitter-Collector Voltage | $V_{ECO}$ | 6 | V |
| | Collector Current | $I_C$ | 80 | mA |
| | Collector Power Dissipation | $P_C$ | 150 | mW |
| Total Power Dissipation | | $P_{tot}$ | 200 | mW |
| Operating Temperature | | $T_{opr}$ | -30~+100 | ℃ |
| Storage Temperature | | $T_{stg}$ | -55~+125 | ℃ |
| *1.Isolation Voltage | | $V_{iso}$ | 5 | $KV_{rms}$ |
| *2.Soldering Temperature | | $T_{sol}$ | 260 | ℃ |

*1. AC for 1 minute, R.H. = 40 ~ 60%

- Isolation voltage shall be measured using the following method.
  (1)Short between anode and cathode on the primary side and between collector, emitter and base on the secondary side.
  (2)The isolation voltage tester with zero-cross circuit shall be used.
  (3)The waveform of applied volttage shall be a sine wave.

*2. For 10 seconds.

## Electrical/Optical Characteristics

(Ta=25℃)

| Parameter | | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|---|
| Input | Forward Voltage | $V_F$ | – | 1.2 | 1.4 | V | $I_F$= ± 20mA |
| | Terminal Capacitance | $C_t$ | – | 50 | 250 | pF | V=0, f=1KHz |
| Output | Collector Dark Current | $I_{CEO}$ | – | – | 1 | μA | $V_{CE}$=10V |
| | Collector-Emitter Breakdown Voltage | $BV_{CEO}$ | 35 | – | – | V | $I_C$=0.1mA |
| | Emitter-Collector Breakdown Voltage | $BV_{ECO}$ | 6 | – | – | V | $I_E$=10 μ A |
| Transfer Characteristics | Collector Current | $I_C$ | 6 | – | 75 | mA | $I_F$= ± 1mA $V_{CE}$=2V |
| | *Current Transfer Ratio | CTR | 600 | – | 7,500 | % | |
| | Collector-emitter Saturation Voltage | $V_{CE(sat)}$ | – | 0.8 | 1.0 | V | $I_F$= ± 20mA, $I_C$=5mA |
| | Isolation Resistance | $R_{ISO}$ | 50 | 100 | – | GΩ | DC500V, 40~60% R.H. |
| | Floating Capacitance | $C_f$ | – | 0.6 | 1.0 | pF | V=0, f=1MHz |
| | Cut-off Frequency | $f_c$ | 1 | 6 | – | KHz | $V_{CE}$=5V, $I_C$=2mA $R_L$=100 Ω, -3dB |
| | Response Time (Rise) | $t_r$ | – | 60 | 300 | μs | $V_{CE}$=2V, $I_C$=10mA $R_L$=100 Ω |
| | Response Time (Fall) | $t_f$ | – | 53 | 250 | μs | |

*CTR= $\frac{I_C}{I_F} \times 100\%$

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## Typical Electrical/Optical Characteristic Curves
## (25℃ Ambient Temperature Unless Otherwise Noted)

Fig.1 Forward Current vs. Ambient Temperature

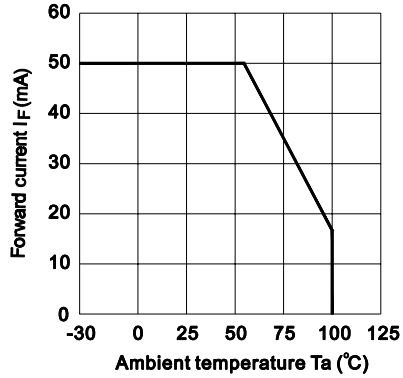



Fig.2 Collector Power Dissipation vs. Ambient Temperature

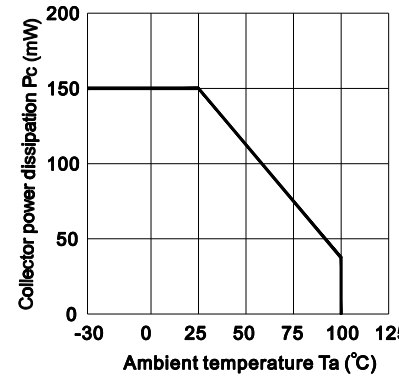



Fig.3 Collector-emitter Saturation Voltage vs. Forward Current

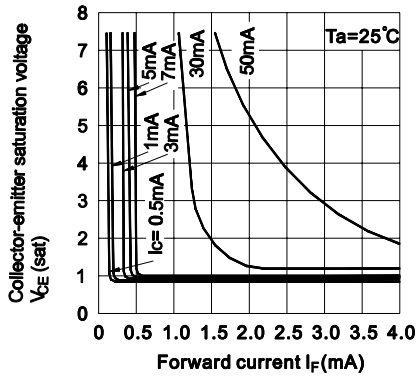



Fig.4 Forward Current vs. Forward Voltage

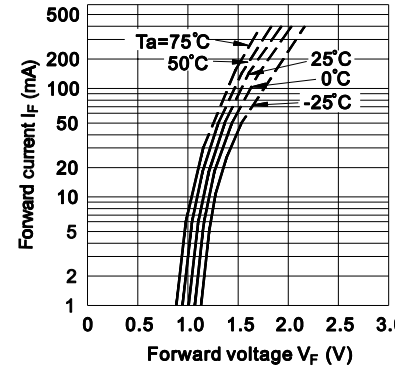



Fig.5 Current Transfer Ratio vs. Forward Current

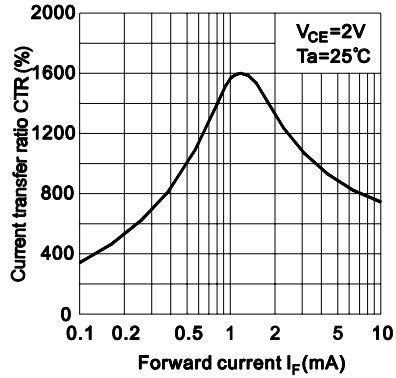



Fig.6 Collector Current vs. Collector-emitter Voltage

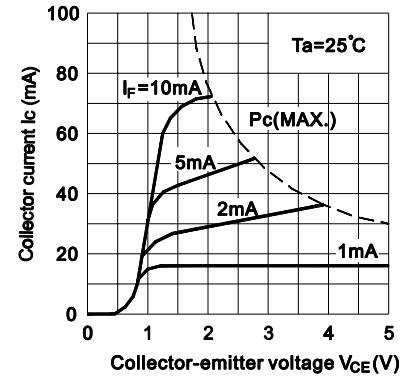


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

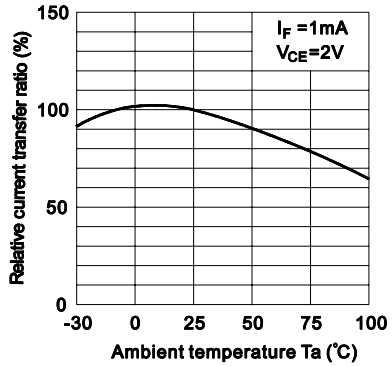



Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

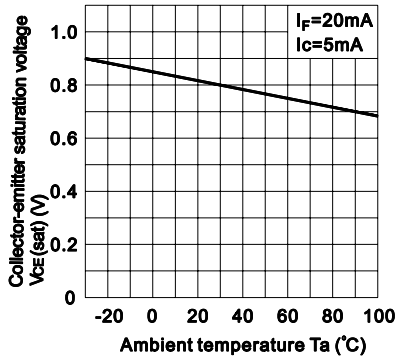



Fig.9 Collector Dark Current vs. Ambient Temperature

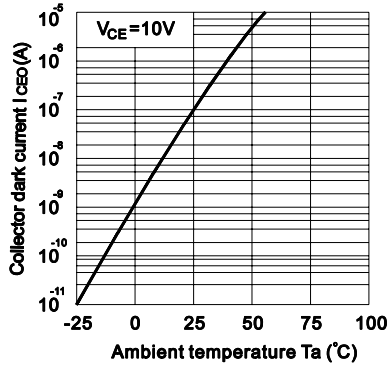



Fig.10 Response Time vs. Load Resistance

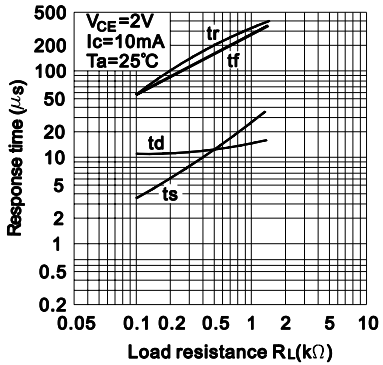
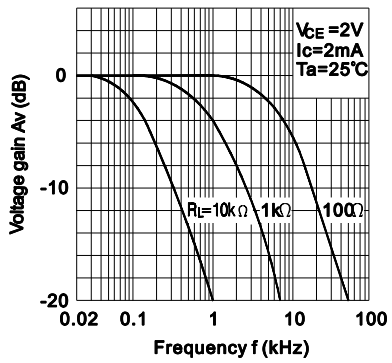
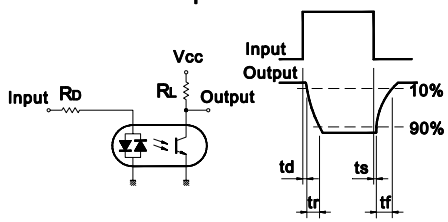


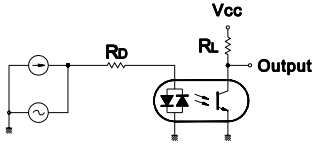

Fig.11 Frequency Response




Test Circuit for Response Time




Test Circuit for Frequency Response

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