

LTV-200/205/206/207/208

Optocouplers, Phototransistor Output, Dual Channel,
SOP8 Package



Rev.A March2011



Description

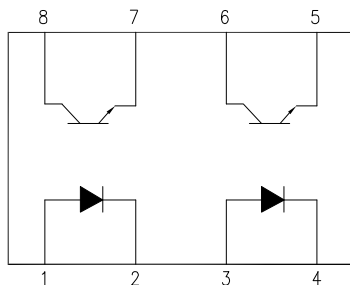
The LTV-200/205/206/207/208 are consist of a high efficient Gallium Arsenide Infrared LED and a Silicon NPN phototransistor. This design provides excellent isolation between the input and output sides of the Optocoupler.

The LTV-200/205/206/207/208 come in a standard SOP8 small outline package for surface mounting which makes it ideally suited for high density application with limited space.

A Specific CTR range allows a narrow tolerance in the electrical design of the adjacent circuits.

Functional Diagram

Pin No. and Internal connection diagram



1,3. Anode
2,4. Cathode

5,7. Emitter
6,8. Collector

Features

- Two Channel Coupler
- SOP8 surface mountable Package
- Isolation Voltage 3.75KV
- UL, CSA, VDE in progress

Application

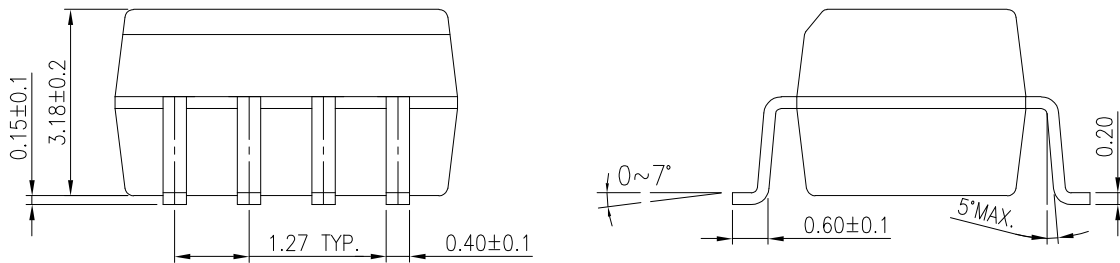
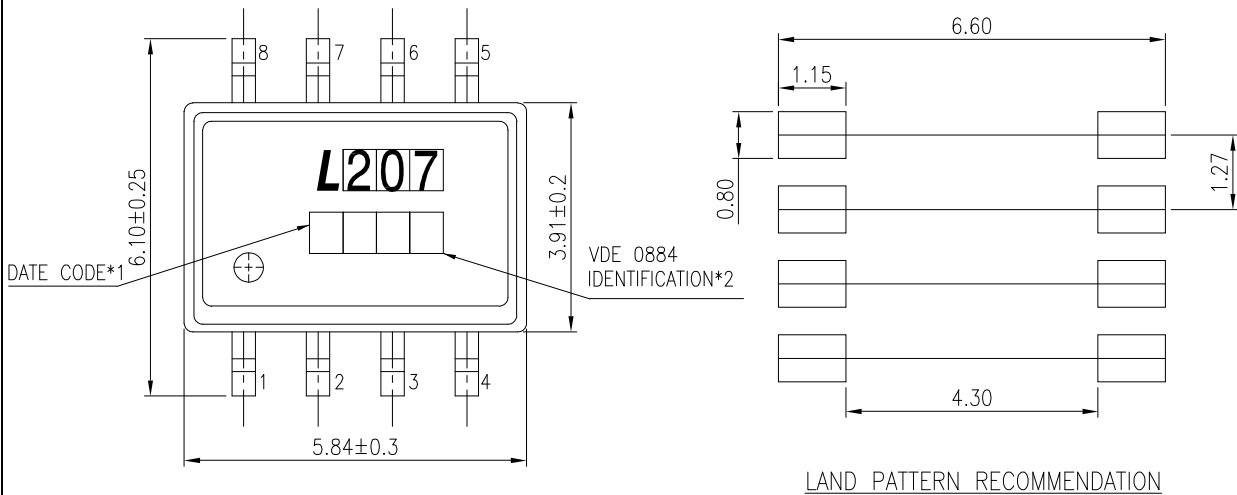
- Feedback Control Circuits
- Feedback element in switching mode power supplier
- Monitor & Detection Circuits

Order Information

| P/N | Remarks |
|---------|--------------------|
| LTV-200 | CTR > 20%, SOP8 |
| LTV-205 | CTR 40-80%, SOP8 |
| LTV-206 | CTR 63-125%, SOP8 |
| LTV-207 | CTR 100-200%, SOP8 |
| LTV-208 | CTR >100%, SOP8 |

Package Dimensions

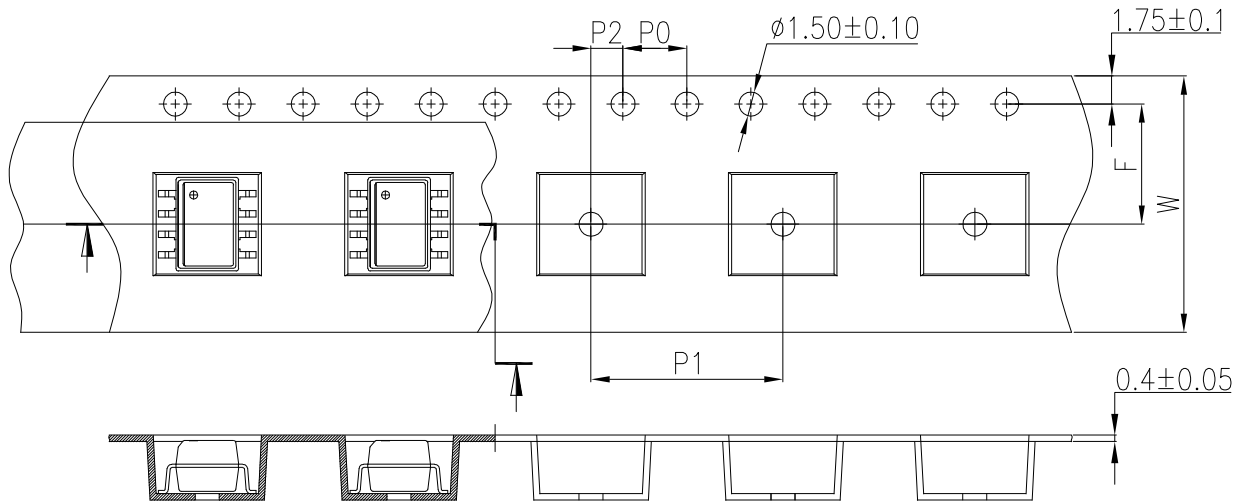
SOP8 Package (LTV-200/205/206/207/208)



- *1. Date code
- *2. "V" to represent VDE0884

Dimensions are all in Millimeters.

Taping Dimensions



| Description | Symbol | Dimensions in millimeters (inches) |
|--|---------|--------------------------------------|
| Tape wide | W | 16.0±0.30(0.63) |
| Pitch of sprocket holes | P0 | 4.0±0.10(0.15) |
| Distance of compartment | F P2 | 7.5±0.10(0.295) 2±0.10(0.079) |
| Distance of compartment to compartment | P1 | 12.0±0.10(0.47) |

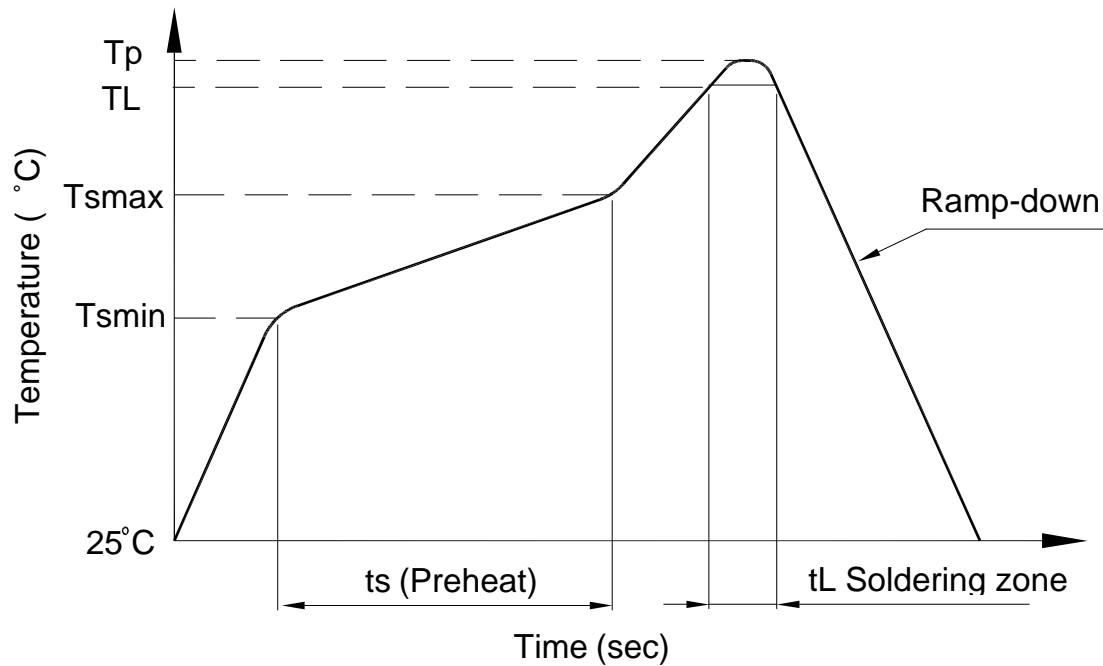
Quantities Per Reel

| Package Type | LTV-200 / 205 / 206 / 207 / 208 |
|------------------|---------------------------------|
| Quantities (pcs) | 1500 |

Recommended Lead Free Reflow Profile

One time soldering reflow is recommended within the conditions below:

| Profile item | Conditions |
|--|---------------------------|
| Preheat - Temperature Min (T _{smin}) - Temperature Max (T _{smax}) - Time (Min to Max) (T _s) | 150°C 180°C 90±30°C |
| Soldering zone - Temperature (T _L) - Time (t _L) | 250°C 10~15 sec |
| Peak temperature (T _P) | 260°C |
| Ramp-down rate | 3° ~ 6°C / sec |



Absolute Maximum Ratings*1

Tamp. = 25°C

| Parameter | Symbol | Value | Units | Note |
|---|-------------------|-----------|------------------|------|
| Storage Temperature | T _{ST} | -55 ~ 150 | °C | |
| Operating Temperature | T _A | -55 - 110 | °C | |
| Isolation Voltage | V _{ISO} | 3750 | V _{RMS} | |
| Peak Pulse Current, 1us 300pps | I _{peak} | 1 | A | |
| Lead Solder Temperature * 2 | | 260 | °C | 2 |
| Input | | | | |
| Average Forward Input Current per channel | I _F | 30 | mA | |
| Reverse Input Voltage | V _R | 6 | V | |
| Input Power Dissipation | P _I | 50 | mW | |
| Output | | | | |
| Corrector-emitter Breakdown Voltage | BV _{ceo} | 80 | V | |
| Emitter-corrector Breakdown Voltage | BV _{eco} | 7 | V | |
| Output Collector Power Dissipation | P _O | 125 | mW | |

1. Ambient temperature = 25°C, unless otherwise specified. Stresses exceeding the absolute maximum ratings can cause permanent damage to the device. Exposure to absolute maximum ratings for long periods of time can adversely affect reliability.

2. 260°C for 10 seconds. Refer to Lead Free Reflow Profile.

Electrical Specifications

| Parameters | Test Condition | Symbol | Min | Typ | Max | Units |
|--------------------------------------|---|---------------|------|-----------|------|---------------|
| Input | | | | | | |
| Input Forward Voltage | $I_F = 10\text{mA}$ | V_F | | 1.2 | 1.55 | V |
| Input Reverse Current | $V_R = 6\text{V}$ | I_R | | 0.1 | 100 | μA |
| Capacitance | $V_R = 0\text{V}$ | C_i | | 25 | | pF |
| Detector | | | | | | |
| Corrector-emitter Breakdown Voltage | $I_C = 10\mu\text{A}$ | BV_{ce0} | 80 | | | V |
| Emitter-corrector Breakdown Voltage | $I_E = 10\mu\text{A}$ | BV_{eco} | 7 | | | V |
| Corrector-emitter Leakage Current | $V_{CE} = 10\text{V}, I_F = 0\text{mA}$ | I_{CEO} | | 5 | 50 | nA |
| Corrector-emitter Capacitance | $V_{CE} = 0\text{V}$ | C_{CE} | | 10 | | pF |
| Coupler | | | | | | |
| Corrector-emitter Saturation Voltage | $I_F = 10\text{mA}, I_c = 2.5\text{mA}$ | $V_{ce(sat)}$ | | | 0.4 | V |
| Input-output Capacitance | | C_{iO} | | 0.5 | | pF |
| Isolation Test Voltage | $RH \leq 50\%, t = 1\text{min},$ | V_{ISO} | 3750 | | | V |
| Resistance, Input to Output | $V_{I-O} = 500\text{V DC}$ | R_{ISO} | | 10^{12} | | Ω |

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

Current Transfer Ratio

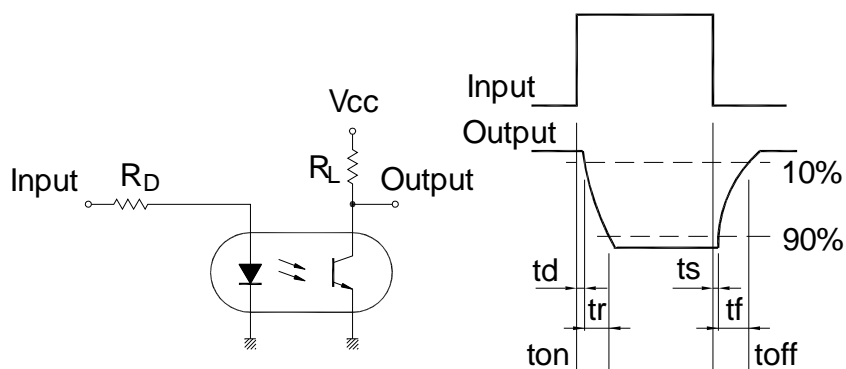
| Parameter | Test Condition | Part | Min | Typ | Max | Units |
|---------------------------|---------------------------|---------|-----|-----|-----|-------|
| DC Current Transfer Ratio | $V_{CE} = 5V, I_F = 10mA$ | LTV-200 | 20 | | | % |
| | | LTV-205 | 40 | | 80 | % |
| | | LTV-206 | 63 | | 125 | % |
| | | LTV-207 | 100 | | 200 | % |
| | | LTV-208 | 100 | | | % |
| | $V_{CE} = 5V, I_F = 1mA$ | LTV-205 | 13 | | | % |
| | | LTV-206 | 22 | | | % |
| | | LTV-207 | 34 | | | % |
| | | LTV-208 | 100 | | | % |

Switching Specifications

| Parameter | Test Condition | Symbol | Min | Typ | Max | Units |
|---------------|---|--------|-----|-----|-----|---------|
| Turn-on Time | $I_C=2mA, R_L=100\Omega$ $V_{CC}=5V$ | ton | | 3 | | μS |
| Turn-off Time | $I_C=2mA, R_L=100\Omega$ $V_{CC}=5V$ | toff | | 3 | | μS |

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

Test Circuit for Response Time



Characteristics Curves

Figure1. Forward Current vs. Forward Voltage

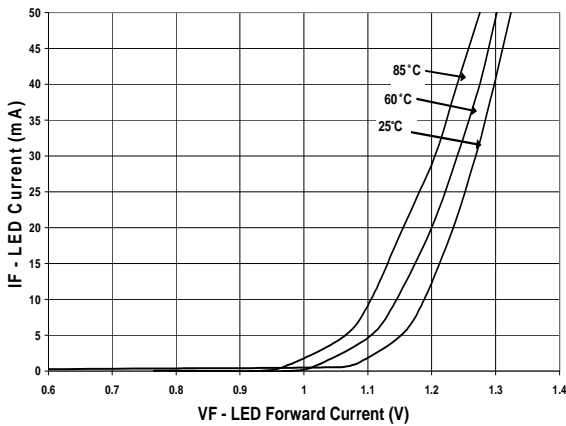


Figure2. Collector-Emitter Voltage vs. Collector Current

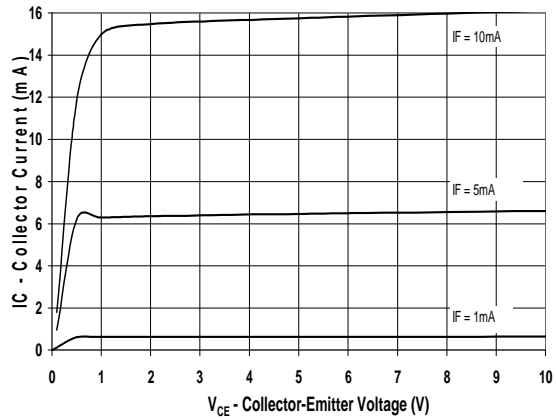


Figure3. CTR vs. Forward Current

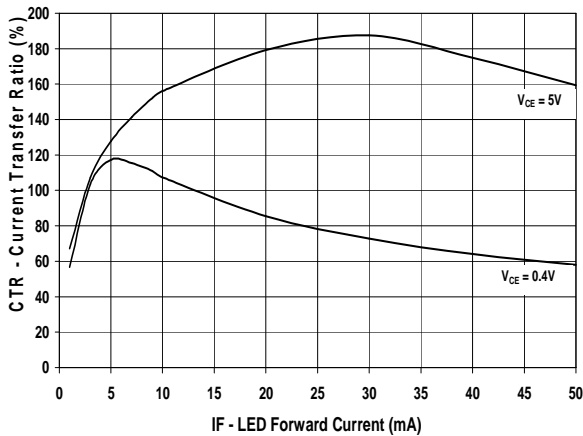


Figure4. Current Transfer Ratio vs. Ambient Temperature

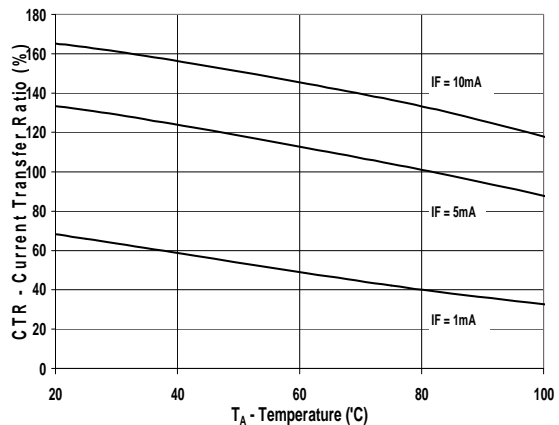


Figure5. Switching Speed vs. Load Resistor

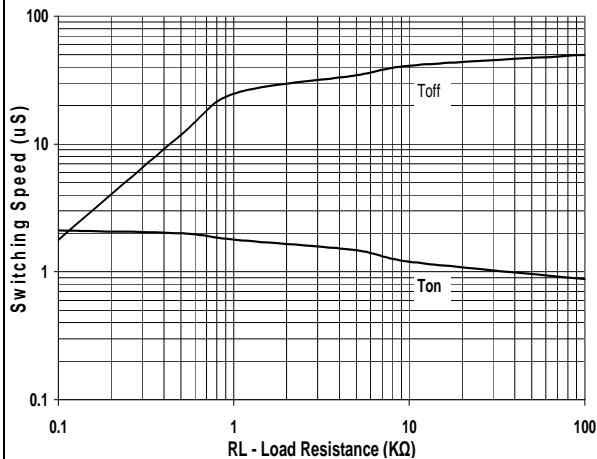
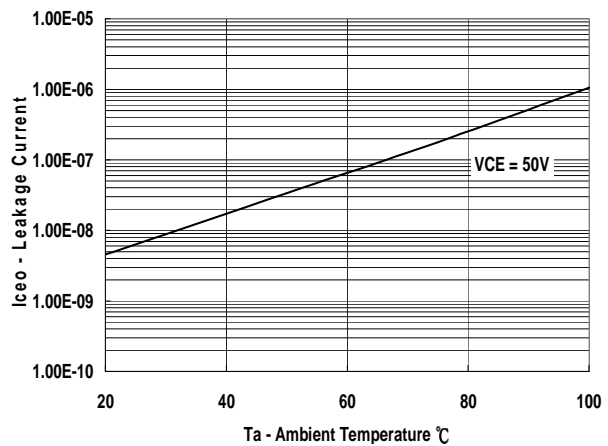
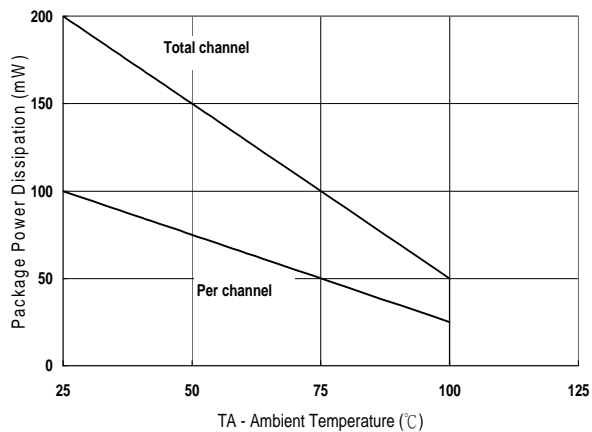


Figure6. Collector Leakage Current vs. Ambient Temperature



Characteristics Curves

Figure7. Power Dissipation vs. Ambient Temperature



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