

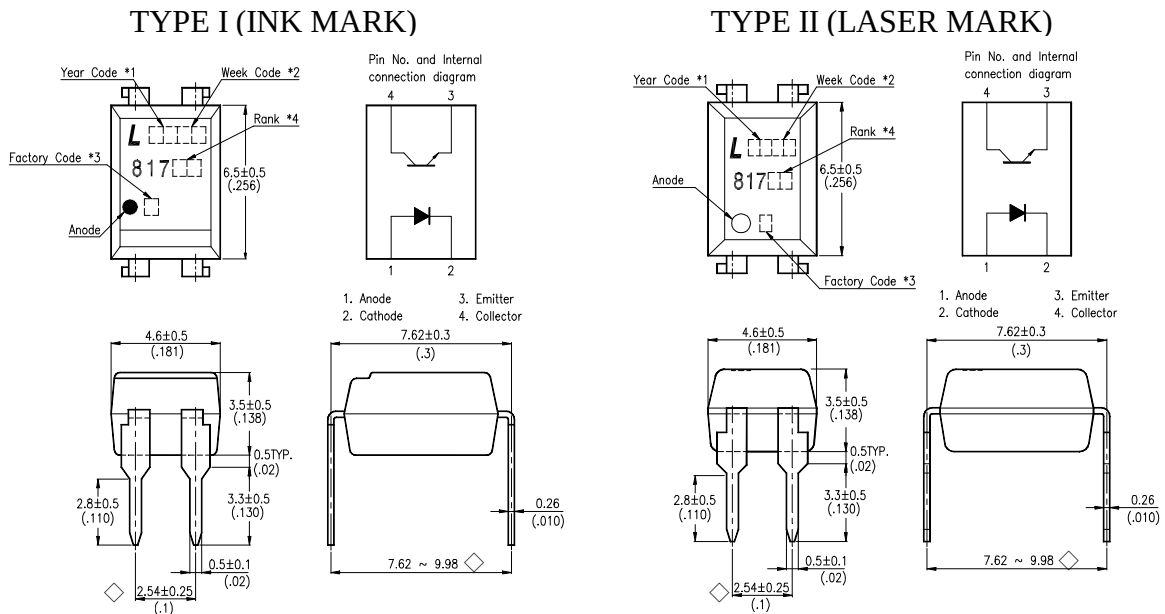
## FEATURES

Nov. 2008

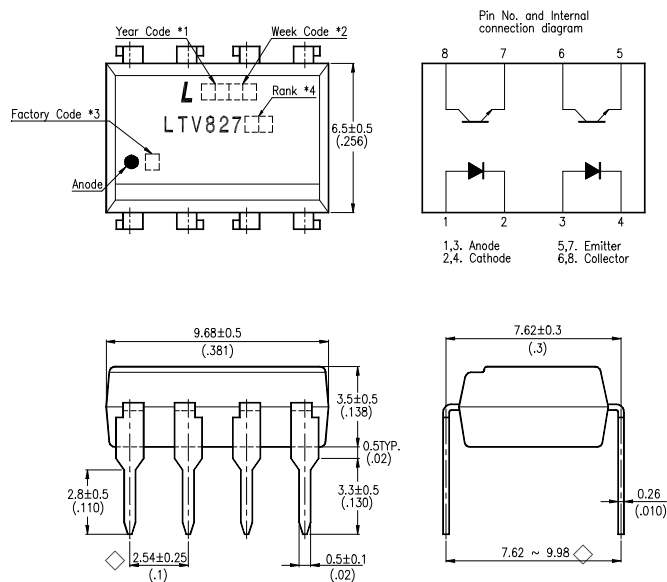
- \* Current transfer ratio  
( CTR : MIN. 50% at  $I_F = 5\text{mA}$ ,  $V_{CE} = 5\text{V}$  )
- \* High input-output isolation voltage  
(  $V_{ISO} = 5,000\text{Vrms}$  )
- \* Response time  
(  $t_r$  : TYP.  $4\mu\text{s}$  at  $V_{CE} = 2\text{V}$ ,  $I_C = 2\text{mA}$ ,  $R_L = 100\Omega$  )
- \* Dual-in-line package :
  - LTV-817 : 1-channel type
  - LTV-827 : 2-channel type
  - LTV-847 : 4-channel type
- \* Wide lead spacing package :
  - LTV-817M : 1-channel type
  - LTV-827M : 2-channel type
  - LTV-847M : 4-channel type
- \* Surface mounting package :
  - LTV-817S : 1-channel type
  - LTV-827S : 2-channel type
  - LTV-847S : 4-channel type
- \* Tape and reel packaging :
  - LTV-817S-TA1, LTV-827S-TA1
- \* UL approved
- \* CSA approved
- \* FIMKO approved
- \* NEMKO approved
- \* DEMKO approved
- \* SEMKO approved
- \* VDE approved
- \* BSI approved - LTV-817 series only
- \* RoHS compliance
- \* ◇ Critical characteristic
- \* ○ Safety or compliance characteristic.

## OUTLINE DIMENSIONS

### LTV-817 :



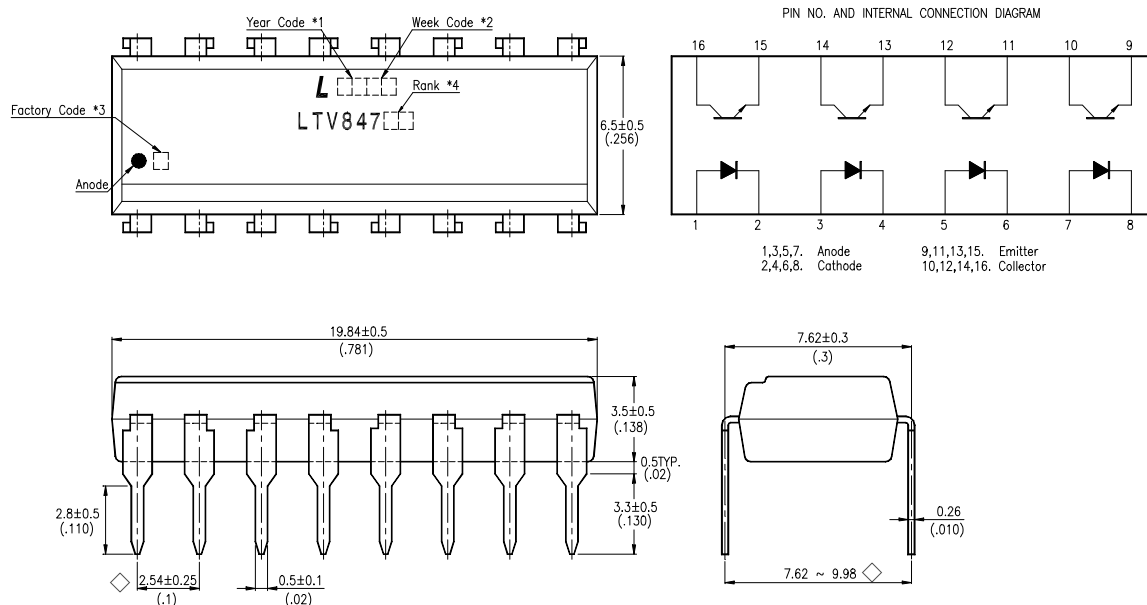
### LTV-827 :



- \*1. Year date code.
- \*2. 2-digit work week.
- \*3. Factory identification mark shall be marked (Z : Taiwan, Y : Thailand, X : China).
- \*4. Rank shall be or shall not be marked.

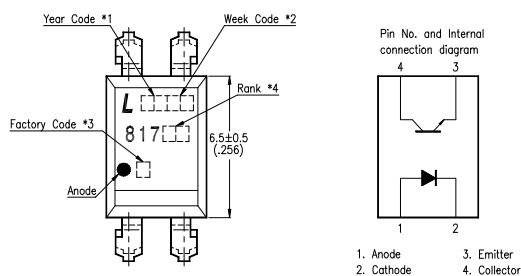
## OUTLINE DIMENSIONS

### LTV-847 :

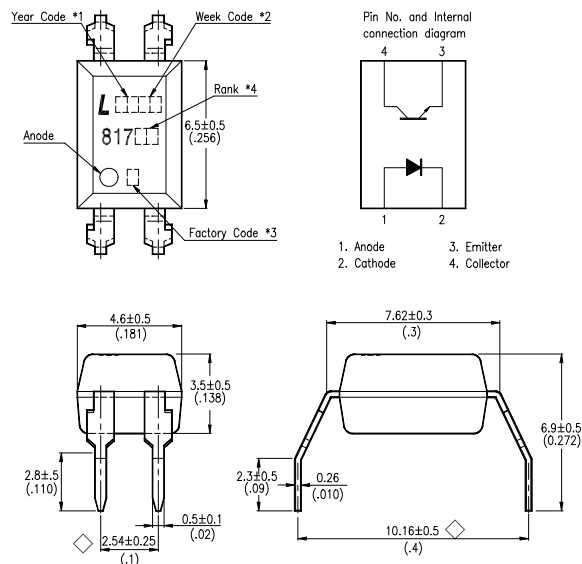


### LTV-817M :

#### TYPE I (INK MARK)



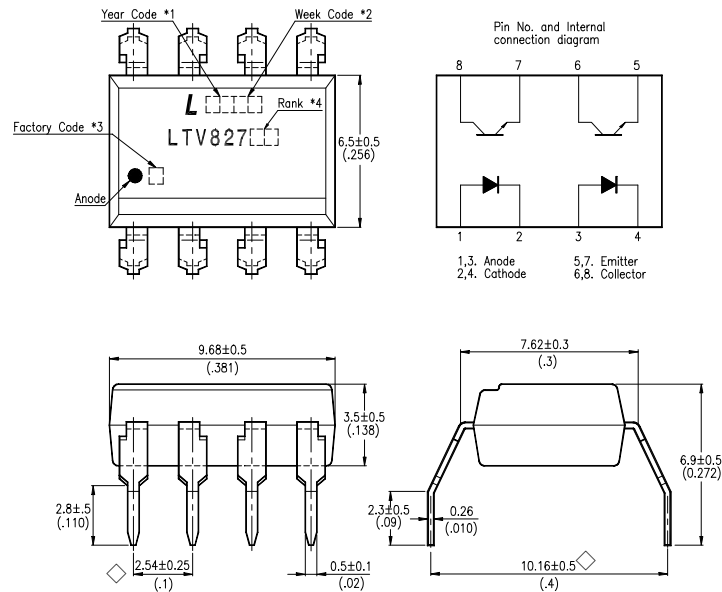
#### TYPE II (LASER MARK)



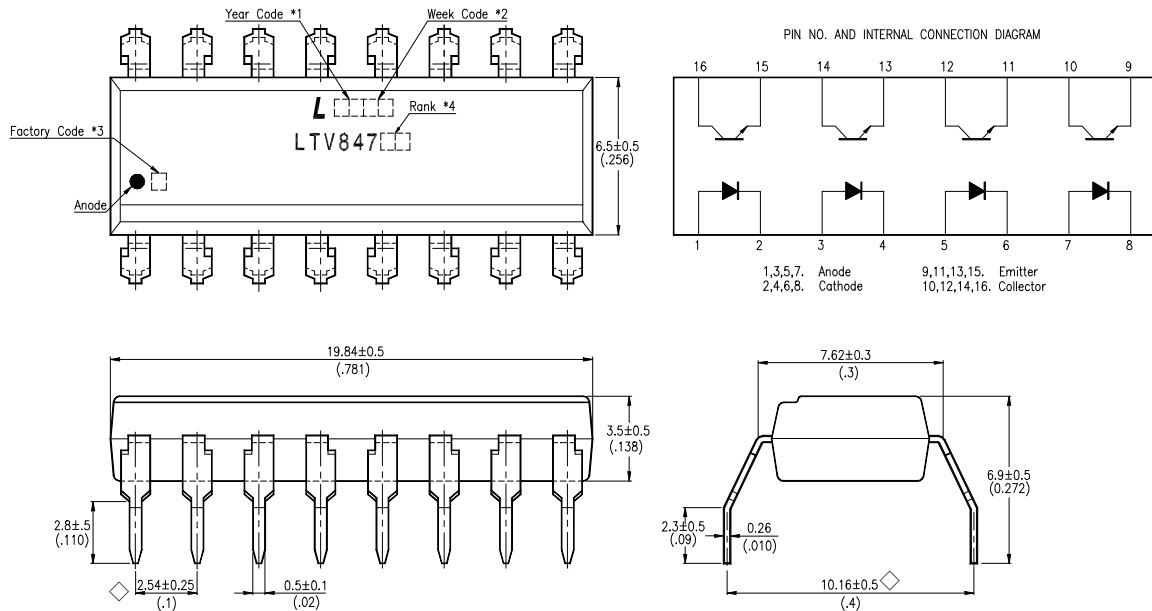
- \*1. Year date code.
- \*2. 2-digit work week.
- \*3. Factory identification mark shall be marked (Z : Taiwan, Y : Thailand, X : China).
- \*4. Rank shall be or shall not be marked.

## OUTLINE DIMENSIONS

### LTV-827M :



### LTV-847M :

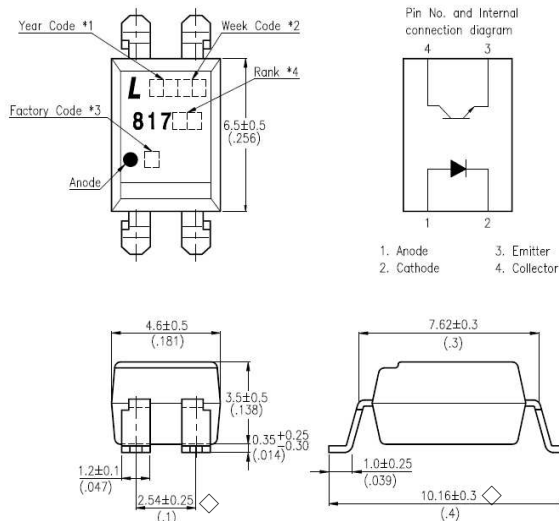


- \*1. Year date code.
- \*2. 2-digit work week.
- \*3. Factory identification mark shall be marked (Z : Taiwan, Y : Thailand, X : China).
- \*4. Rank shall be or shall not be marked.

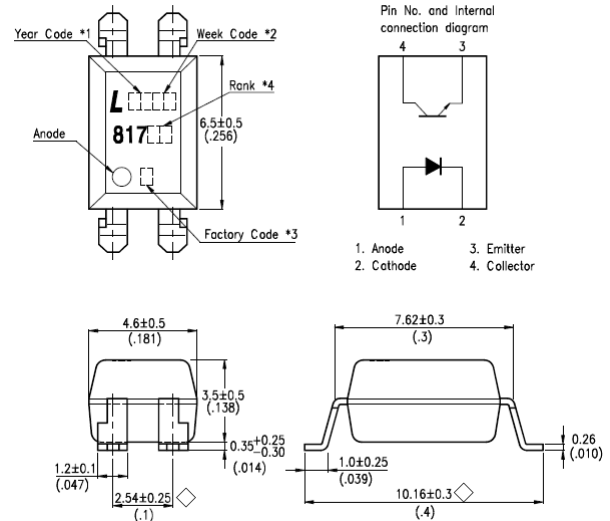
## OUTLINE DIMENSIONS

### LTV-817S :

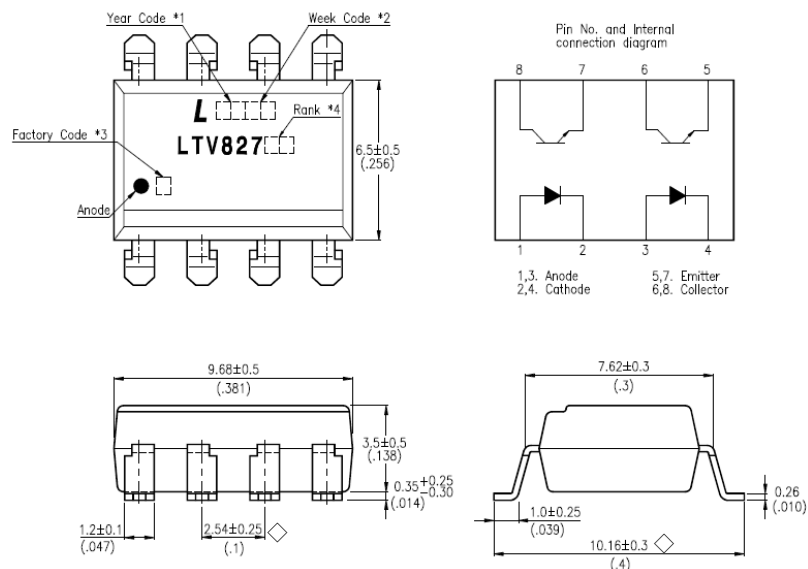
#### TYPE I (INK MARK)



#### TYPE II (LASER MARK)



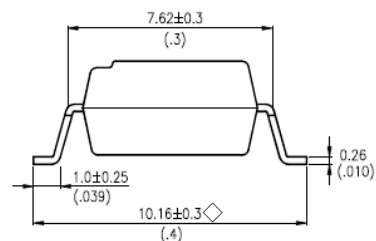
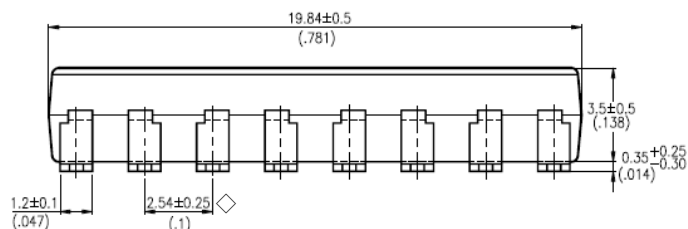
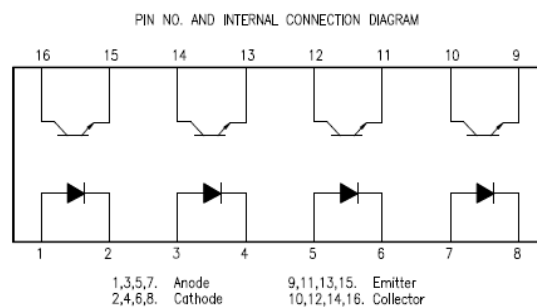
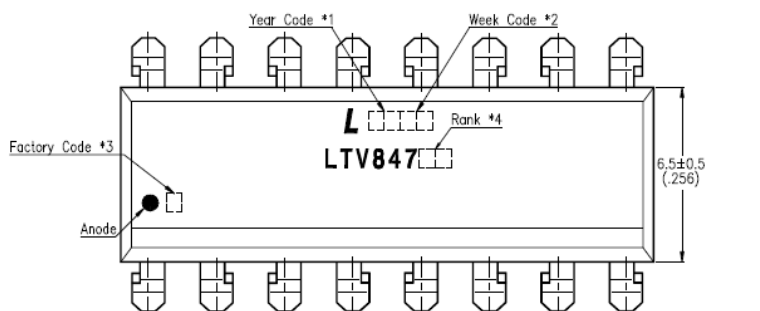
### LTV-827S :



- \*1. Year date code.
- \*2. 2-digit work week.
- \*3. Factory identification mark shall be marked (Z : Taiwan, Y : Thailand, X : China).
- \*4. Rank shall be or shall not be marked.

## OUTLINE DIMENSIONS

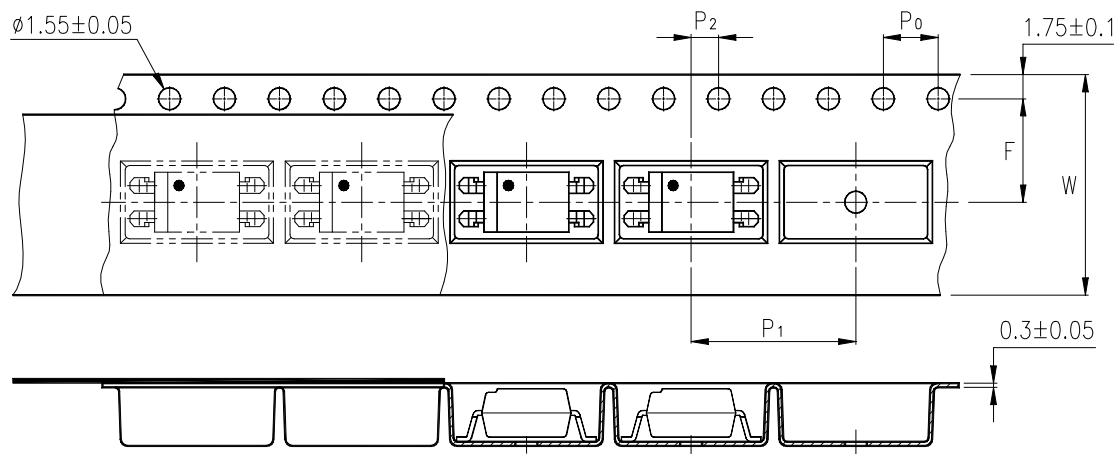
### LTV-847S :



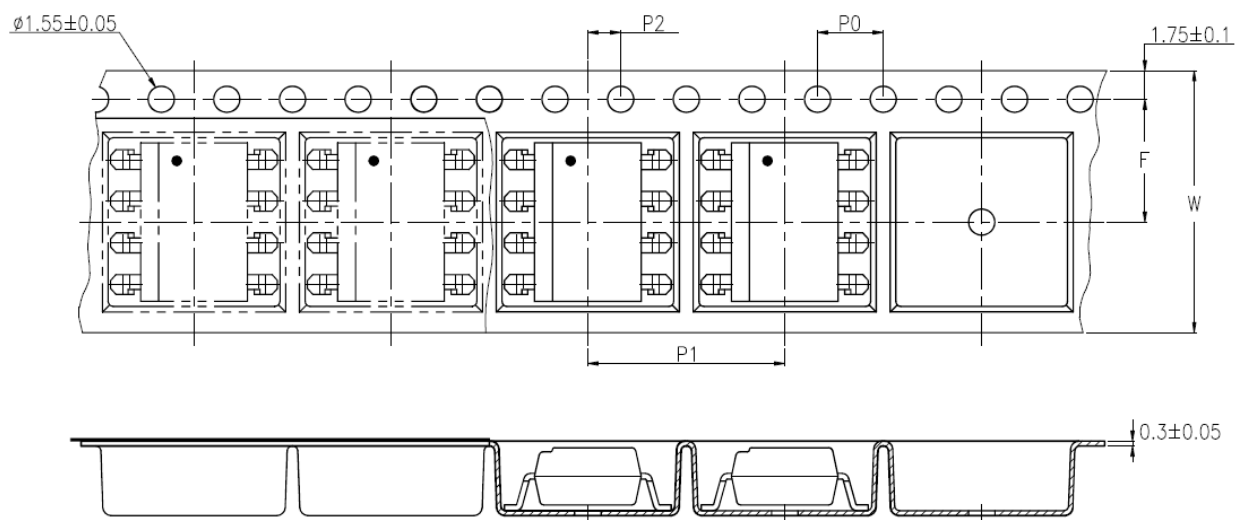
- \*1. Year date code.
- \*2. 2-digit work week.
- \*3. Factory identification mark shall be marked (Z : Taiwan, Y : Thailand, X : China).
- \*4. Rank shall be or shall not be marked.

## TAPING DIMENSIONS

### LTV-817S-TA1 :



### LTV-827S-TA1 :



| Description                            | Symbol | Dimensions in mm ( inches ) |
|----------------------------------------|--------|-----------------------------|
| Tape wide                              | W      | $16 \pm 0.3$ ( .63 )        |
| Pitch of sprocket holes                | $P_0$  | $4 \pm 0.1$ ( .15 )         |
| Distance of compartment                | F      | $7.5 \pm 0.1$ ( .295 )      |
| Distance of compartment to compartment | $P_2$  | $2 \pm 0.1$ ( .079 )        |
| Distance of compartment to compartment | $P_1$  | $12 \pm 0.1$ ( .472 )       |

## ABSOLUTE MAXIMUM RATING

( Ta = 25°C )

| PARAMETER                                |                             | SYMBOL           | RATING     | UNIT             |
|------------------------------------------|-----------------------------|------------------|------------|------------------|
| INPUT                                    | Forward Current             | I <sub>F</sub>   | 50         | mA               |
|                                          | Reverse Voltage             | V <sub>R</sub>   | 6          | V                |
|                                          | Power Dissipation           | P                | 70         | mW               |
| OUTPUT                                   | Collector - Emitter Voltage | V <sub>CEO</sub> | 35         | V                |
|                                          | Emitter - Collector Voltage | V <sub>ECO</sub> | 6          | V                |
|                                          | Collector Current           | I <sub>C</sub>   | 50         | mA               |
|                                          | Collector Power Dissipation | P <sub>C</sub>   | 150        | mW               |
| Total Power Dissipation                  |                             | P <sub>tot</sub> | 200        | mW               |
| *1 Isolation Voltage ○                   |                             | V <sub>iso</sub> | 5,000      | V <sub>rms</sub> |
| Operating Temperature ( LTV- 827 / 847 ) |                             | T <sub>opr</sub> | -30 ~ +110 | °C               |
| Operating Temperature ( LTV-817 )        |                             | T <sub>opr</sub> | -30 ~ +110 | °C               |
| Storage Temperature                      |                             | T <sub>stg</sub> | -55 ~ +125 | °C               |
| *2 Soldering Temperature                 |                             | T <sub>sol</sub> | 260        | °C               |

\*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 and emitter on the secondary side.
- (2) The isolation voltage tester with zero-cross circuit shall be used.
- (3) The waveform of applied voltage shall be a sine wave.

\*2. For 10 Seconds

## ELECTRICAL - OPTICAL CHARACTERISTICS

( Ta = 25°C )

| PARAMETER                |                                      | SYMBOL               | MIN.               | TYP.               | MAX. | UNIT | CONDITIONS                                                             |
|--------------------------|--------------------------------------|----------------------|--------------------|--------------------|------|------|------------------------------------------------------------------------|
| INPUT                    | Forward Voltage                      | V <sub>F</sub>       | —                  | 1.2                | 1.4  | V    | I <sub>F</sub> =20mA                                                   |
|                          | Reverse Current                      | I <sub>R</sub>       | —                  | —                  | 10   | μA   | V <sub>R</sub> =4V                                                     |
|                          | Terminal Capacitance                 | C <sub>t</sub>       | —                  | 30                 | 250  | pF   | V=0, f=1KHz                                                            |
| OUTPUT                   | Collector Dark Current               | I <sub>CEO</sub>     | —                  | —                  | 100  | nA   | V <sub>CE</sub> =20V, I <sub>F</sub> =0                                |
|                          | Collector-Emitter Breakdown Voltage  | BV <sub>CEO</sub>    | 35                 | —                  | —    | V    | I <sub>C</sub> =0.1mA<br>I <sub>F</sub> =0                             |
|                          | Emitter-Collector Breakdown Voltage  | BV <sub>ECO</sub>    | 6                  | —                  | —    | V    | I <sub>E</sub> =10μA<br>I <sub>F</sub> =0                              |
| TRANSFER CHARACTERISTICS | Collector Current                    | I <sub>C</sub>       | 2.5                | —                  | 30   | mA   | I <sub>F</sub> =5mA<br>V <sub>CE</sub> =5V                             |
|                          | *1 Current Transfer Ratio ◇          | CTR                  | 50                 | —                  | 600  | %    |                                                                        |
|                          | Collector-Emitter Saturation Voltage | V <sub>CE(sat)</sub> | —                  | 0.1                | 0.2  | V    | I <sub>F</sub> =20mA<br>I <sub>C</sub> =1mA                            |
|                          | Isolation Resistance                 | R <sub>iso</sub>     | 5×10 <sup>10</sup> | 1×10 <sup>11</sup> | —    | Ω    | DC500V<br>40 ~ 60% R.H.                                                |
|                          | Floating Capacitance                 | C <sub>f</sub>       | —                  | 0.6                | 1    | pF   | V=0, f=1MHz                                                            |
|                          | Cut-Off Frequency                    | f <sub>c</sub>       | —                  | 80                 | —    | kHz  | V <sub>CE</sub> =5V, I <sub>C</sub> =2mA<br>R <sub>L</sub> =100Ω, -3dB |
|                          | Response Time (Rise)                 | t <sub>r</sub>       | —                  | 4                  | 18   | μs   | V <sub>CE</sub> =2V, I <sub>C</sub> =2mA<br>R <sub>L</sub> =100Ω       |
|                          | Response Time (Fall)                 | t <sub>f</sub>       | —                  | 3                  | 18   | μs   |                                                                        |

$$*1 \text{ CTR} = \frac{I_C}{I_F} \times 100\%$$

**RANK TABLE OF CURRENT TRANSFER RATIO CTR**

| MODEL NO. | RANK MARK             | CTR ( % ) |
|-----------|-----------------------|-----------|
| LTV-817   | L                     | 50 ~ 100  |
|           | A                     | 80 ~ 160  |
|           | B                     | 130 ~ 260 |
|           | C                     | 200 ~ 400 |
|           | D                     | 300 ~ 600 |
|           | L or A or B or C or D | 50 ~ 600  |
| LTV-827   | No Bin                | 50~600    |
|           | B                     | 130 ~ 260 |
|           | C                     | 200 ~ 400 |
|           | BC                    | 130~400   |
|           | CD                    | 200~600   |
| LTV-847   | No Bin                | 50~600    |
|           | BC                    | 130~400   |
|           | CD                    | 200~600   |

|            |                                                                                     |
|------------|-------------------------------------------------------------------------------------|
| CONDITIONS | $I_F = 5 \text{ mA}$<br>$V_{CE} = 5 \text{ V}$<br>$T_a = 25 \text{ }^\circ\text{C}$ |
|------------|-------------------------------------------------------------------------------------|

## CHARACTERISTICS CURVES

Fig.1 Forward Current  
vs. Ambient Temperature

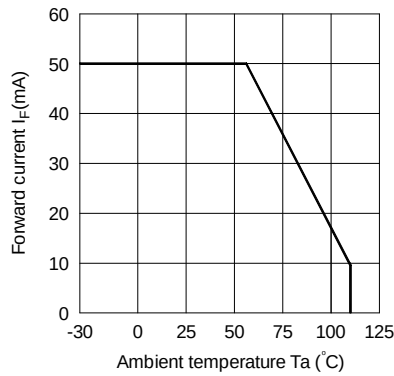


Fig.2 Collector Power Dissipation  
vs. Ambient Temperature

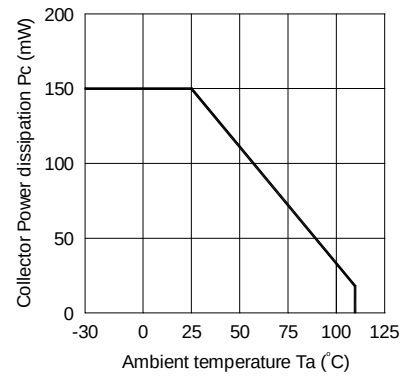


Fig.3 Collector-emitter Saturation  
Voltage vs. Forward Current

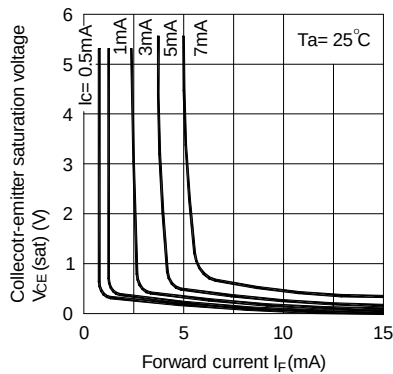


Fig.4 Forward Current vs. Forward  
Voltage

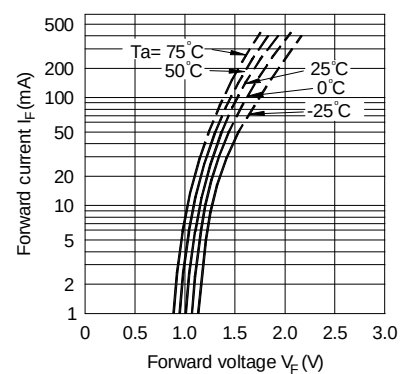


Fig.5 Current Transfer Ratio vs.  
Forward Current

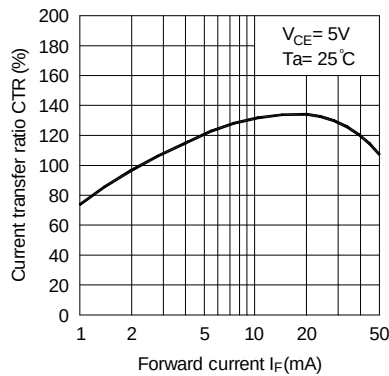
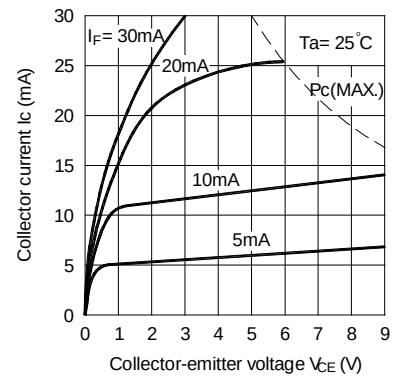


Fig.6 Collector Current vs.  
Collector-emitter Voltage



## CHARACTERISTICS CURVES

Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

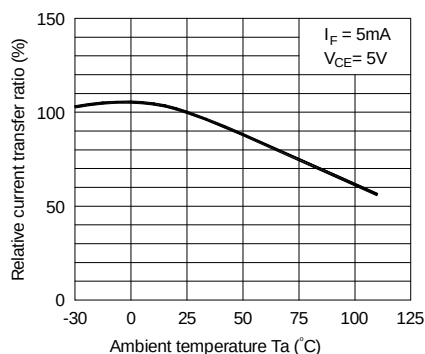


Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

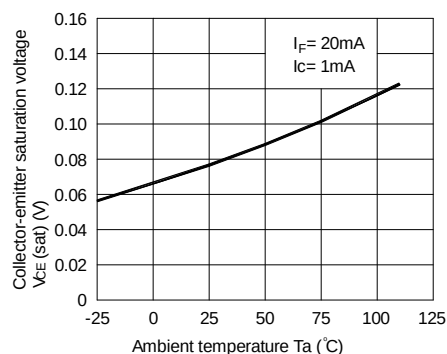


Fig.9 Collector Dark Current vs. Ambient Temperature

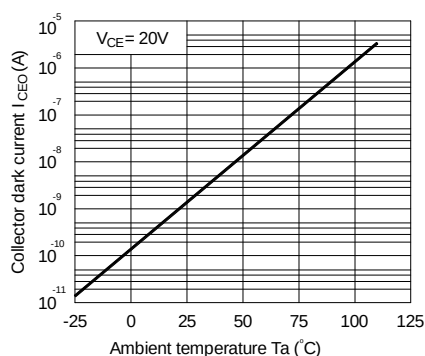


Fig.10 Response Time vs. Load Resistance

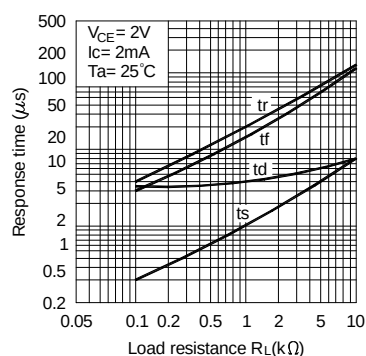
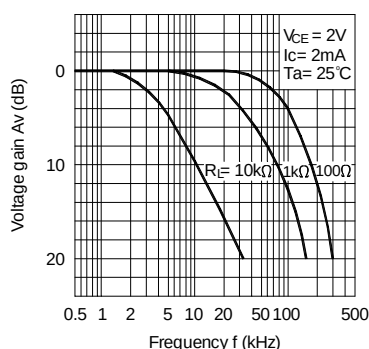
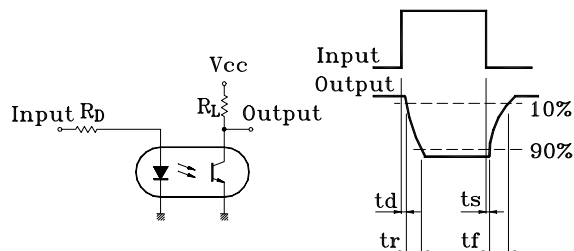


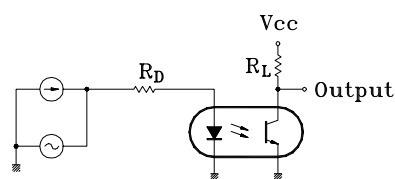
Fig.11 Frequency Response



Test Circuit for Response Time



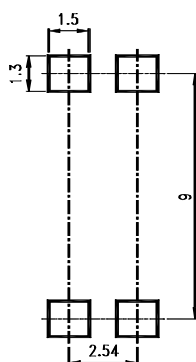
Test Circuit for Frequency Response



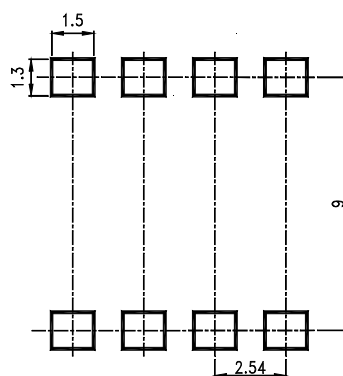
## RECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)

Unit : mm

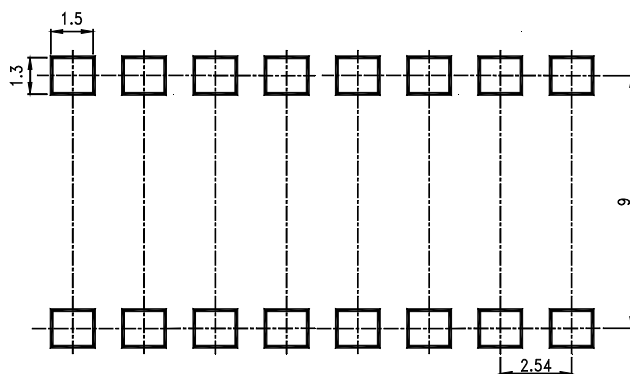
4 PIN



8 PIN



16 PIN



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