



Photocoupler

Product Data Sheet

LTV-817

(M, S, S-TA, S-TA1, S-TP)

Series

Spec No.: DS70-2012-0050

Effective Date: 12/12/2013

Revision: B

LITE-ON DCC

RELEASE

BNS-OD-FC001/A4

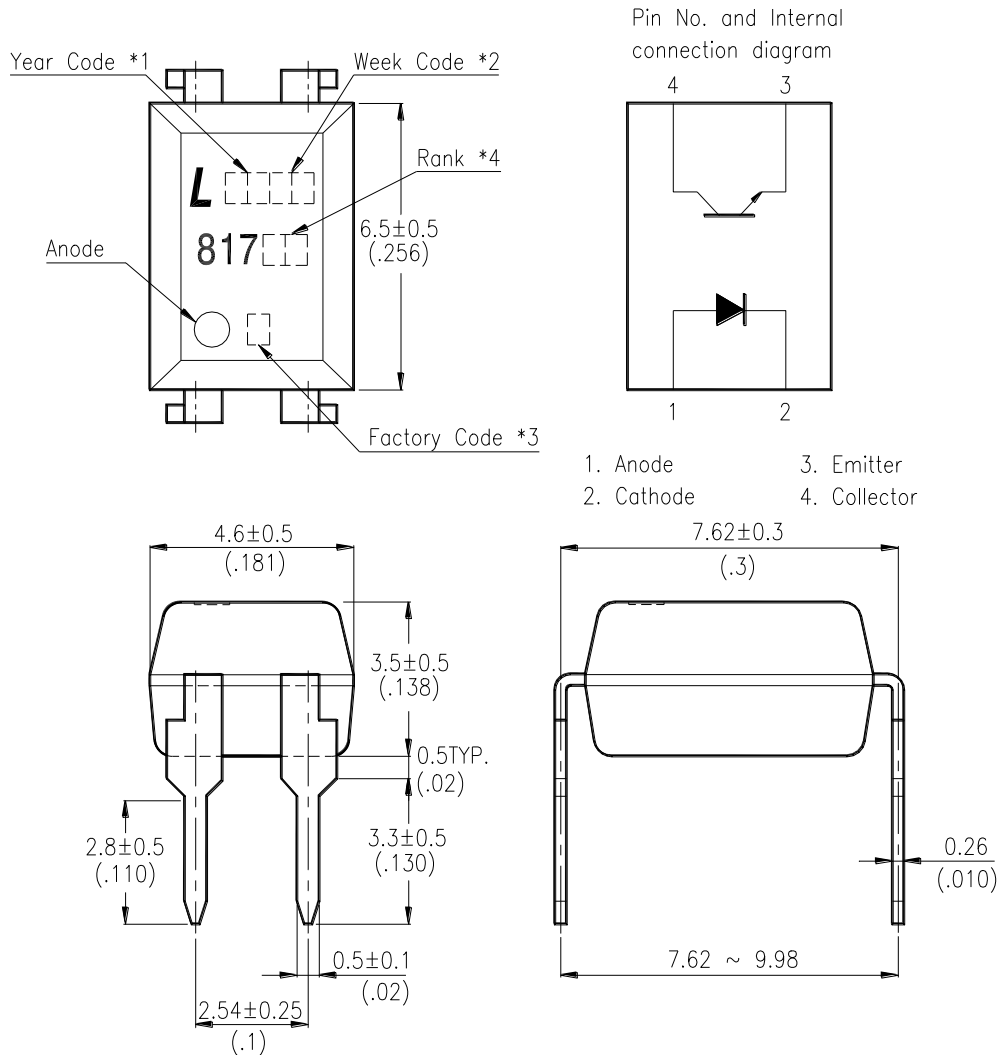


FEATURES

- * 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
- * Wide lead spacing package :
LTV-817M : 1-channel type
- * Surface mounting package :
LTV-817S : 1-channel type
- * Tape and reel packaging :
LTV-817S-TA : 1-channel type
LTV-817S-TA1 : 1-channel type
LTV-817S-TP : 1-channel type
- * Safety approval
UL 1577, Cert. No.E113898
CSA CA5A, Cert. No. 1020087 (CA 91533-1)
FIMKO EN/IEC 60950-1, EN/IEC 60065; Cert. No.NCS/FI 24426 M3
NEMKO EN/IEC 60950-1,EN/IEC 60065; Cert. No.P08209622/A1
DEMKO EN/IEC 60950-1,EN/IEC 60065; Cert. No.314703-02
SEMKO EN/IEC 60950-1,EN/IEC 60065; Cert. No. 1119078
VDE DIN EN60747-5-5, Cert. No. 40015248
CQC GB8898-2011/GB4943.1-2011, Cert.No.
CQC10001054420/CQC10001054421
- * RoHS compliance
All materials be used in device are followed EU RoHS directive (No.2002/95/EC).
- * ESD pass HBM 8000V/MM2000V
- *MSL class1

OUTLINE DIMENSIONS

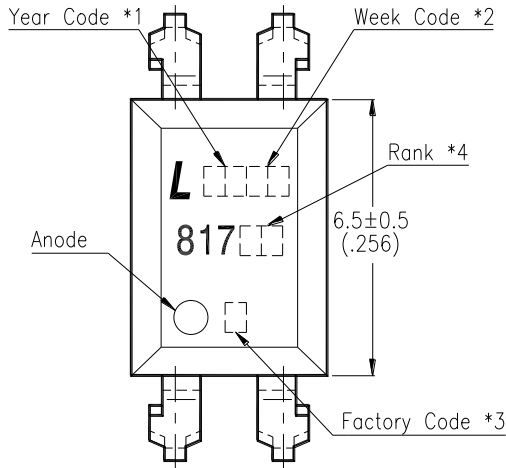
LTV-817:



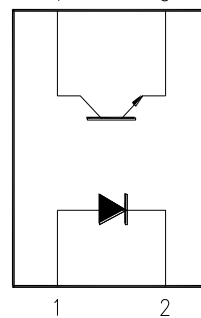
- *1. Year date code.
- *2. 2-digit work week.
- *3. Factory identification mark shall be marked.
(Y : Thailand, W : China-CZ)
- *4. Rank shall be or shall not be marked.

OUTLINE DIMENSIONS

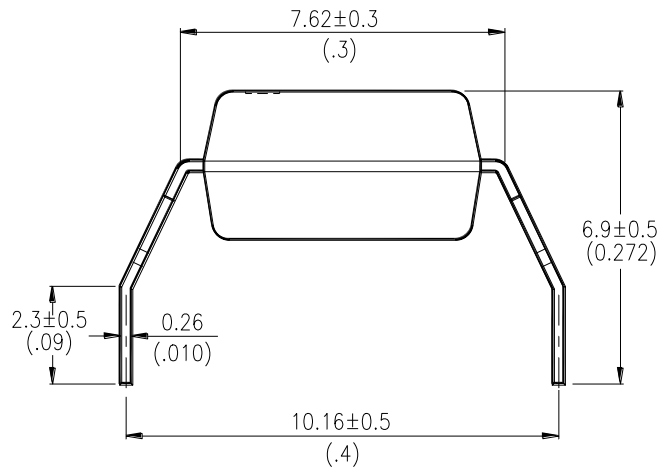
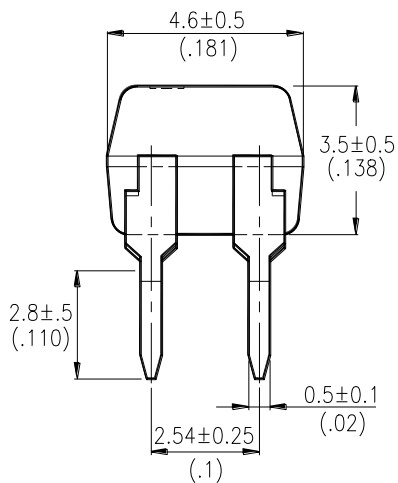
LTV-817M :



Pin No. and Internal connection diagram



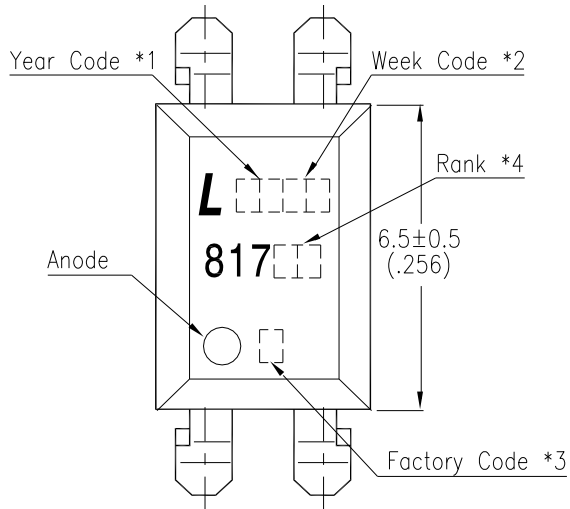
- | | |
|------------|--------------|
| 1. Anode | 3. Emitter |
| 2. Cathode | 4. Collector |



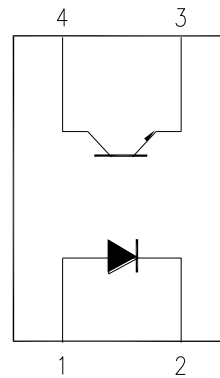
- *1. Year date code.
- *2. 2-digit work week.
- *3. Factory identification mark shall be marked.
(Y : Thailand, W : China-CZ)
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OUTLINE DIMENSIONS

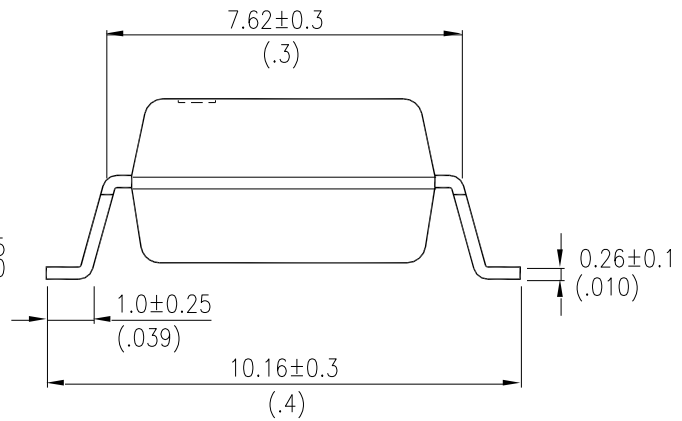
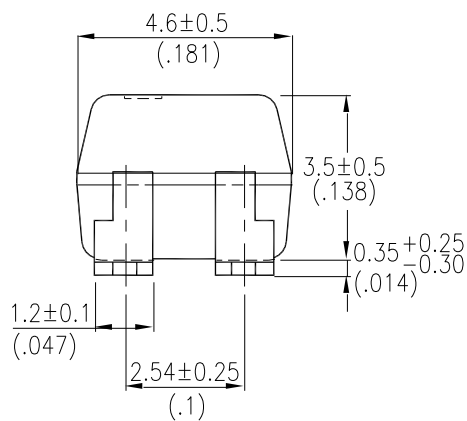
LTV-817S :



Pin No. and Internal connection diagram



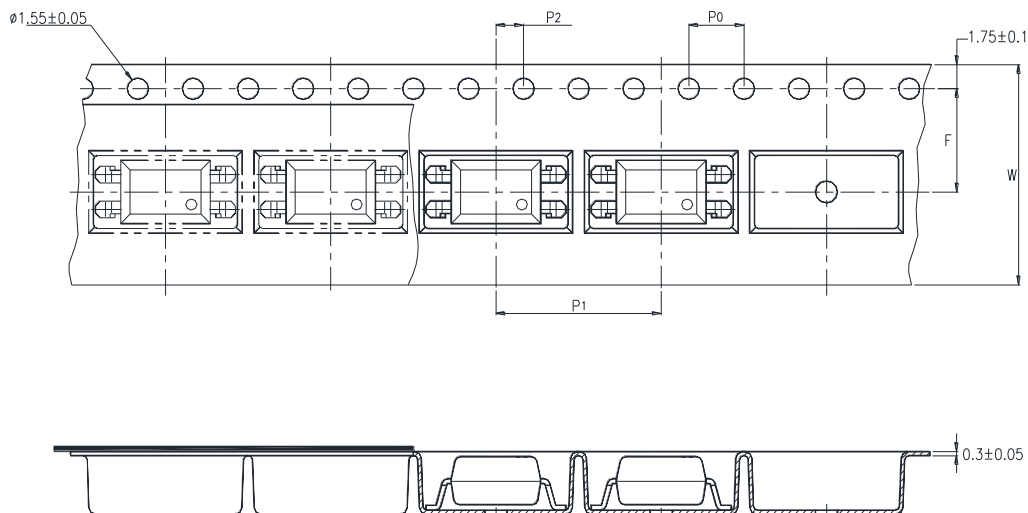
- | | |
|------------|--------------|
| 1. Anode | 3. Emitter |
| 2. Cathode | 4. Collector |



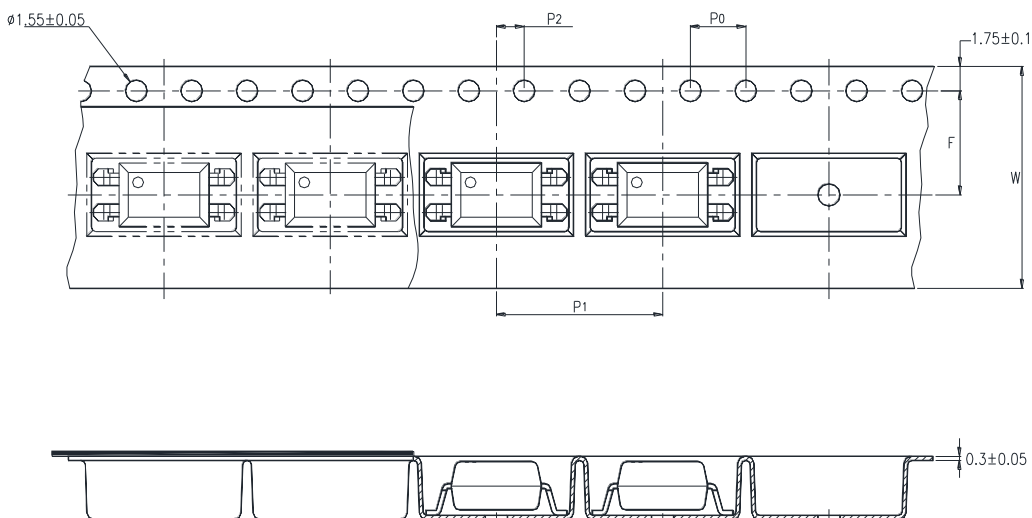
- *1. Year date code.
- *2. 2-digit work week.
- *3. Factory identification mark shall be marked.
(Y : Thailand, W : China-CZ)
- *4. Rank shall be or shall not be marked.

TAPING DIMENSIONS

LTV-817S-TA :



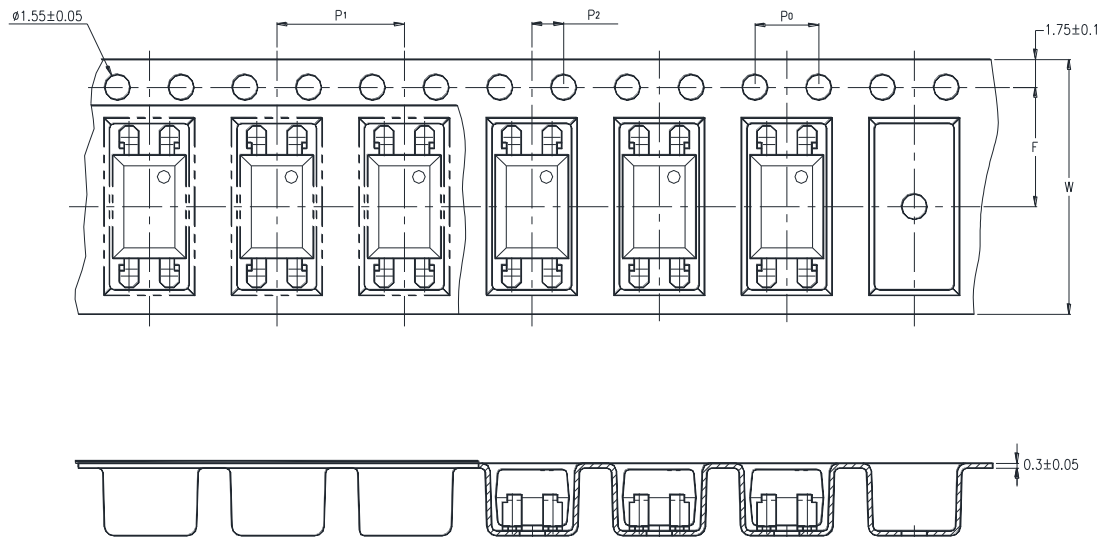
LTV-817S-TA1 :



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

TAPING DIMENSIONS

LTV-817S-TP :



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

ABSOLUTE MAXIMUM RATING

(Ta = 25°C)

| PARAMETER | | SYMBOL | RATING | UNIT |
|-------------------------|-----------------------------|------------------|------------|------------------|
| INPUT | Forward Current | I _F | 50 | mA |
| | Reverse Voltage | V _R | 6 | V |
| | Power Dissipation | P | 70 | mW |
| OUTPUT | Collector - Emitter Voltage | V _{CEO} | 35 | V |
| | Emitter - Collector Voltage | V _{ECO} | 6 | V |
| | Collector Current | I _C | 50 | mA |
| | Collector Power Dissipation | P _C | 150 | mW |
| Total Power Dissipation | | P _{tot} | 200 | mW |
| *1 | Isolation Voltage ○ | V _{iso} | 5,000 | V _{rms} |
| Operating Temperature | | T _{opr} | -30 ~ +110 | °C |
| Storage Temperature | | T _{stg} | -55 ~ +125 | °C |
| *2 | Soldering Temperature | T _{sol} | 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 _F | — | 1.2 | 1.4 | V | I _F =20mA |
| | Reverse Current | I _R | — | — | 10 | μA | V _R =4V |
| | Terminal Capacitance | C _t | — | 30 | 250 | pF | V=0, f=1KHz |
| OUTPUT | Collector Dark Current | I _{CEO} | — | — | 100 | nA | V _{CE} =20V, I _F =0 |
| | Collector-Emitter Breakdown Voltage | BV _{CEO} | 35 | — | — | V | I _C =0.1mA I _F =0 |
| | Emitter-Collector Breakdown Voltage | BV _{ECO} | 6 | — | — | V | I _E =10μA I _F =0 |
| TRANSFER CHARACTERISTICS | Collector Current | I _C | 2.5 | — | 30 | mA | I _F =5mA |
| | *1 Current Transfer Ratio ◇ | CTR | 50 | — | 600 | % | V _{CE} =5V |
| | Collector-Emitter Saturation Voltage | V _{CE(sat)} | — | 0.1 | 0.2 | V | I _F =20mA I _C =1mA |
| | Isolation Resistance | R _{iso} | 5×10 ¹⁰ | 1×10 ¹¹ | — | Ω | DC500V 40 ~ 60% R.H. |
| | Floating Capacitance | C _f | — | 0.6 | 1 | pF | V=0, f=1MHz |
| | Cut-Off Frequency | f _c | — | 80 | — | kHz | V _{CE} =5V, I _C =2mA R _L =100Ω, -3dB |
| | Response Time (Rise) | t _r | — | 4 | 18 | μs | V _{CE} =2V, I _C =2mA R _L =100Ω |
| | Response Time (Fall) | t _f | — | 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 |

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

CHARACTERISTICS CURVES

Fig.1 Forward Current vs. Ambient Temperature

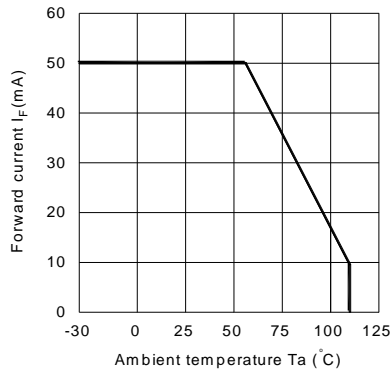


Fig.2 Collector Power Dissipation vs. Ambient Temperature

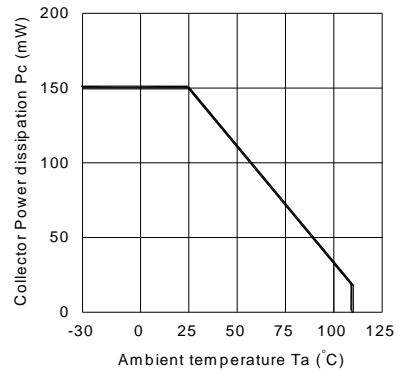


Fig.3 Collector-emitter Saturation Voltage vs. Forward Current

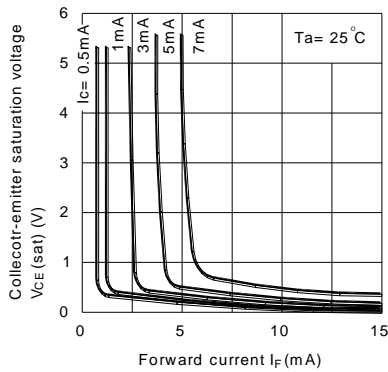


Fig.4 Forward Current vs. Forward Voltage

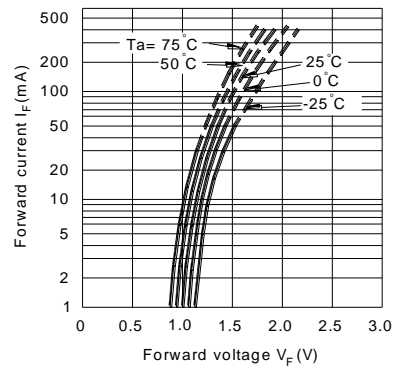


Fig.5 Current Transfer Ratio vs. Forward Current

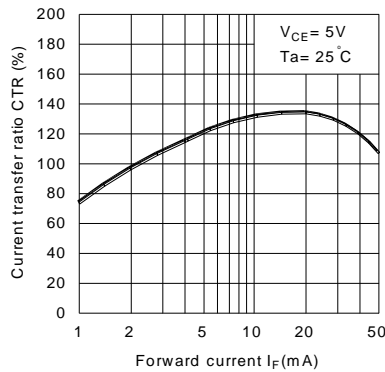
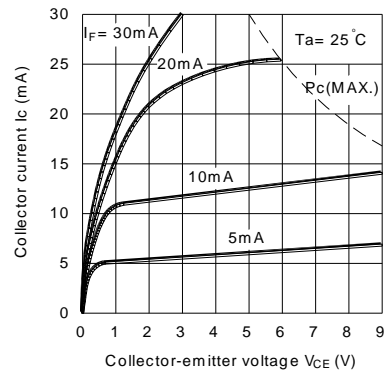


Fig.6 Collector Current vs. Collector-emitter Voltage



CHARACTERISTICS CURVES

Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

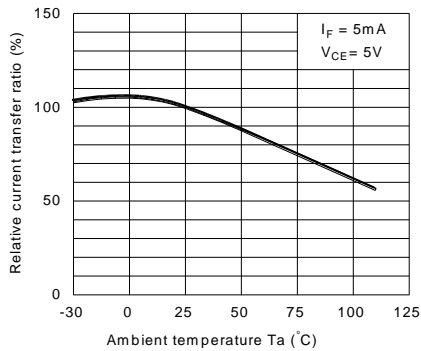


Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

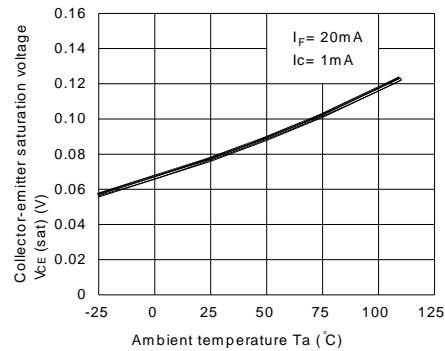


Fig.9 Collector Dark Current vs. Ambient Temperature

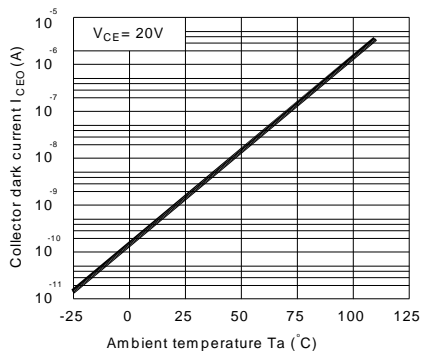


Fig.10 Response Time vs. Load Resistance

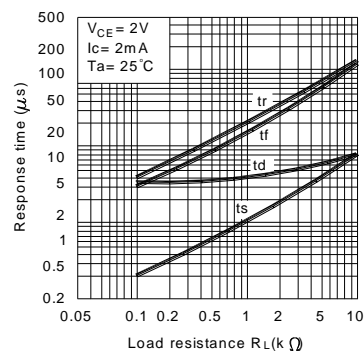
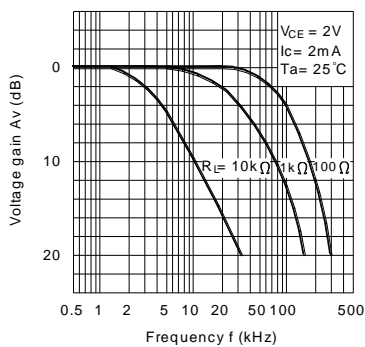
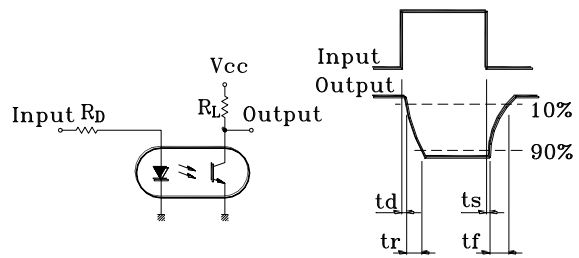


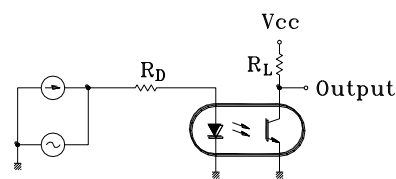
Fig.11 Frequency Response



Test Circuit for Response Time



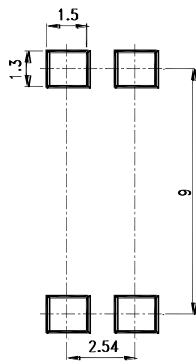
Test Circuit for Frequency Response



RECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)

Unit : mm

4 PIN

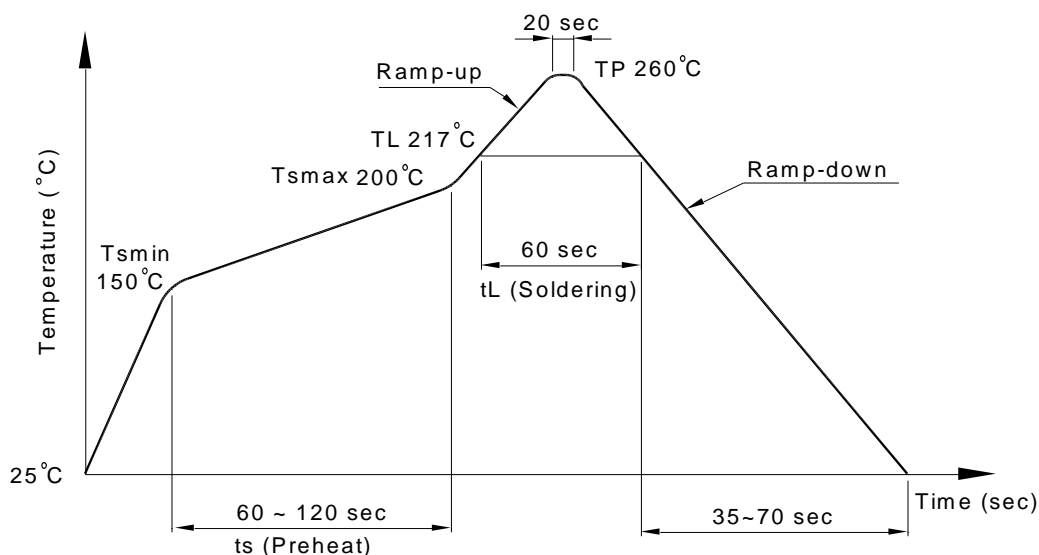


TEMPERATURE PROFILE OF SOLDERING REFLOW

(1) IR Reflow soldering (JEDEC-STD-020C compliant)

One time soldering reflow is recommended within the condition of temperature and time profile shown below.

| Profile item | Conditions |
|----------------------------------|---------------|
| Preheat | |
| - Temperature Min (T_{Smin}) | 150°C |
| - Temperature Max (T_{Smax}) | 200°C |
| - Time (min to max) (ts) | 90±30 sec |
| Soldering zone | |
| - Temperature (T_L) | 217°C |
| - Time (t_L) | 60 sec |
| Peak Temperature (T_P) | 260°C |
| Ramp-up rate | 3°C /sec max. |
| Ramp-down rate | 3~6°C / sec |



TEMPERATURE PROFILE OF SOLDERING REFLOW

(2) Wave soldering (JEDEC22A111 compliant)

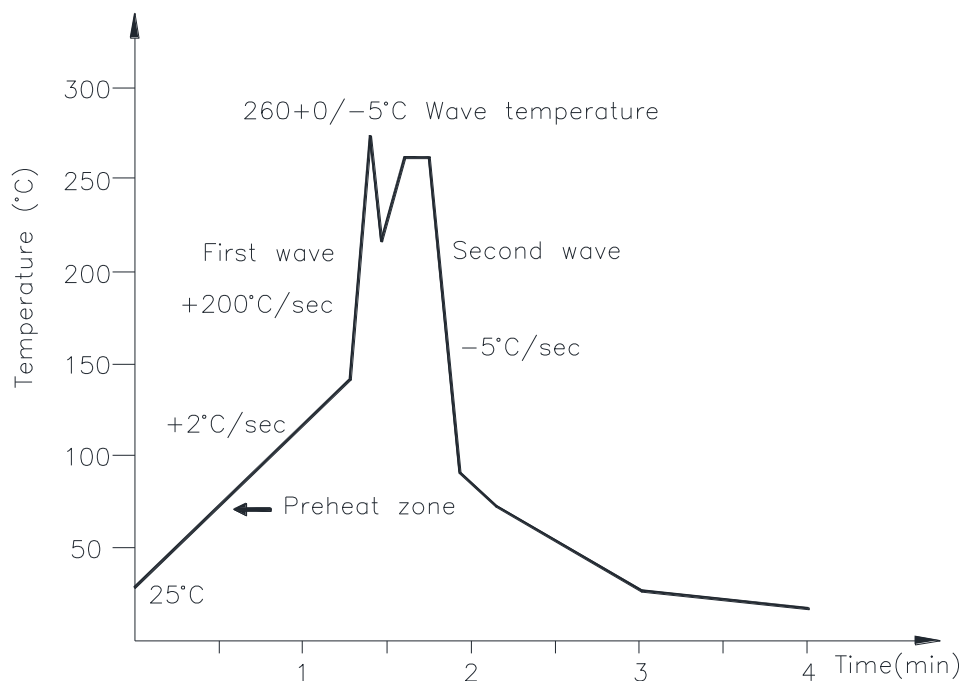
One time soldering is recommended within the condition of temperature.

Temperature: $260 \pm 5^\circ\text{C}$

Time: 10 sec.

Preheat temperature: 25 to 140°C

Preheat time: 30 to 80 sec.



(3) Hand soldering by soldering iron

Allow single lead soldering in every single process. One time soldering is recommended.

Temperature: $380 \pm 5^\circ\text{C}$

Time: 3 sec max.

NAMING RULE

LTV- 817-(1)-(2)

DEVICE PART NUMBER

(1)= TAPING TYPE(TA,TA1,TP or none)

(2)= CTR RANK(A,B,C,D,L or none)

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