



# Photocoupler

## Product Data Sheet

LTV-816/ 826/ 846  
(M, S, S-TA, S-TA1, S-TP)  
Series

Spec No.: DS-70-97-0013

Effective Date: 04/21/2010

Revision: F

**LITE-ON DCC**

**RELEASE**

BNS-OD-FC001/A4



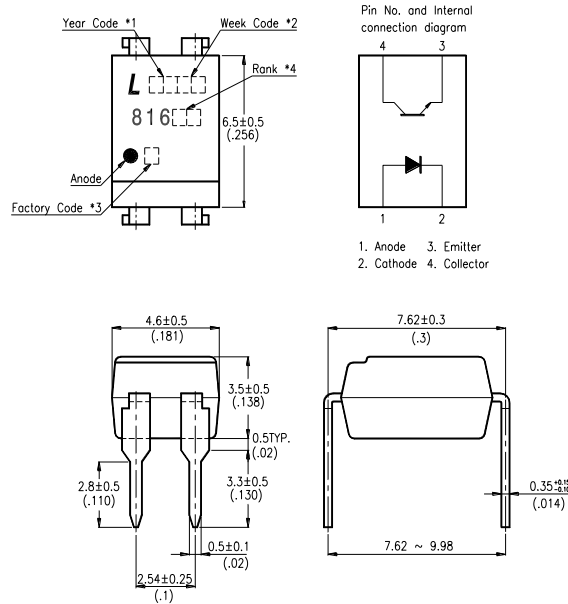
January 2010

## FEATURES

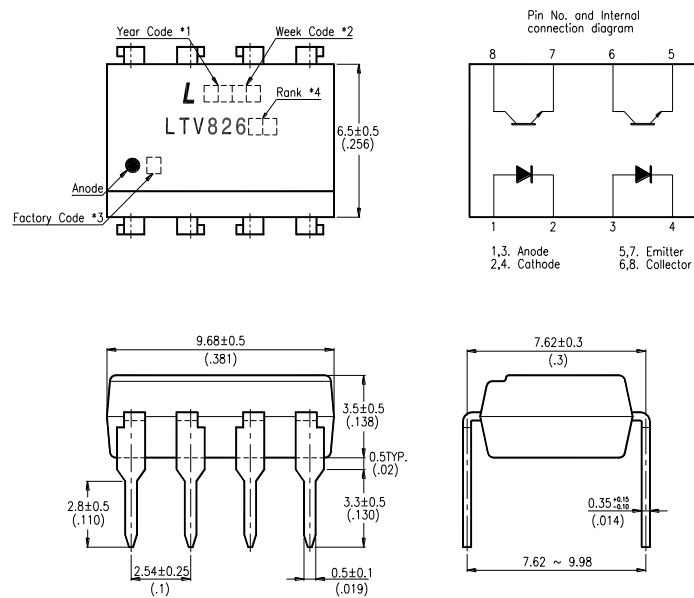
- \* Current transfer ratio  
( CTR : MIN. 50% at  $I_F = 5\text{mA}$ ,  $V_{CE} = 5\text{V}$  )
- \* High input-output isolation voltage  
(  $V_{iso} = 5,000\text{Vrms}$  )
- \* Response time  
(  $t_r$  : TYP.  $4\mu\text{s}$  at  $V_{CE} = 2\text{V}$ ,  $I_C = 2\text{mA}$ ,  $R_L = 100\Omega$  )
- \* Dual-in-line package :
  - LTV-816 : 1-channel type
  - LTV-826 : 2-channel type
  - LTV-846 : 4-channel type
- \* Wide lead spacing package :
  - LTV-816M : 1-channel type
  - LTV-826M : 2-channel type
  - LTV-846M : 4-channel type
- \* Surface mounting package :
  - LTV-816S : 1-channel type
  - LTV-826S : 2-channel type
  - LTV-846S : 4-channel type
- \* Tape and reel packaging :
  - LTV-816S-TA : 1-channel type
  - LTV-816S-TA1 : 1-channel type
  - LTV-816S-TP : 1-channel type
  - LTV-826S-TA1 : 2-channel type
- \* Safety approval  
UL / CSA / FIMKO / NEMKO / DEMKO / SEMKO / VDE\* approved
- \*Required "V" ordering option**
- \* RoHS compliance

## OUTLINE DIMENSIONS

### LTV-816 :



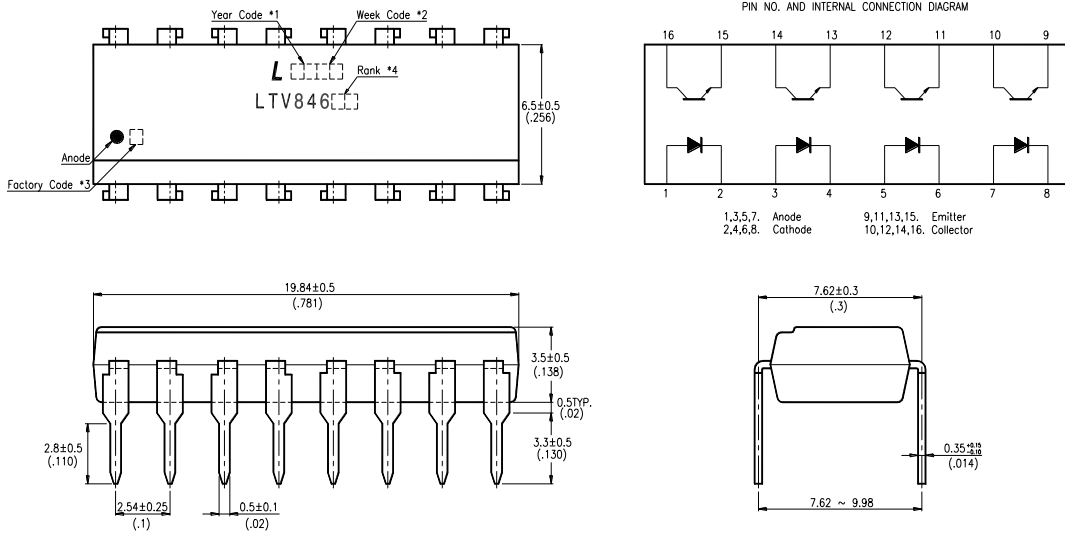
### LTV-826 :



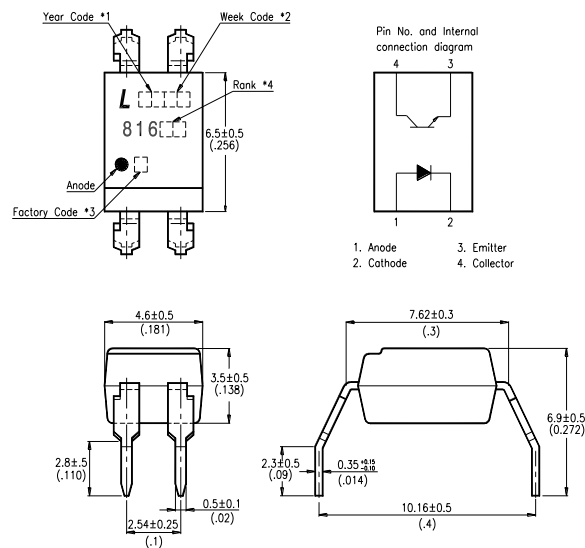
- \*1. Year date code.
- \*2. 2-digit work week.
- \*3. Factory identification mark shall be marked.  
(Z : Taiwan, Y : Thailand, X : China-TJ, W : China-CZ)
- \*4. Rank shall be or shall not be marked.

### OUTLINE DIMENSIONS

#### LTV-846 :



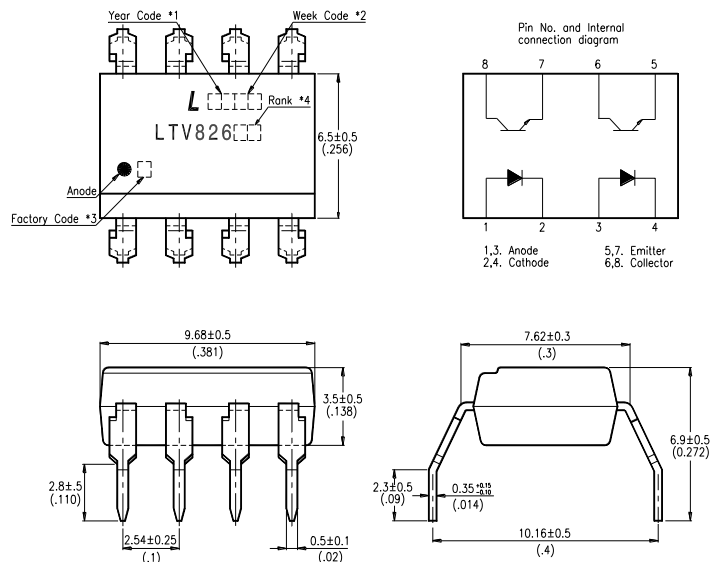
#### LTV-816M :



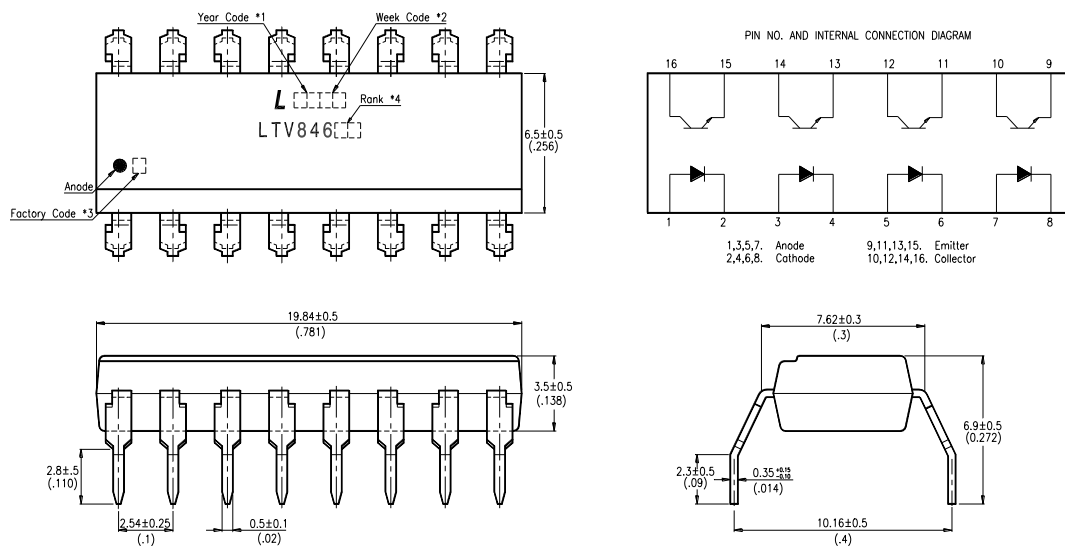
- \*1. Year date code.
- \*2. 2-digit work week.
- \*3. Factory identification mark shall be marked.  
(Z : Taiwan, Y : Thailand, X : China-TJ, W : China-CZ)
- \*4. Rank shall be or shall not be marked.

## OUTLINE DIMENSIONS

### LTV-826M :



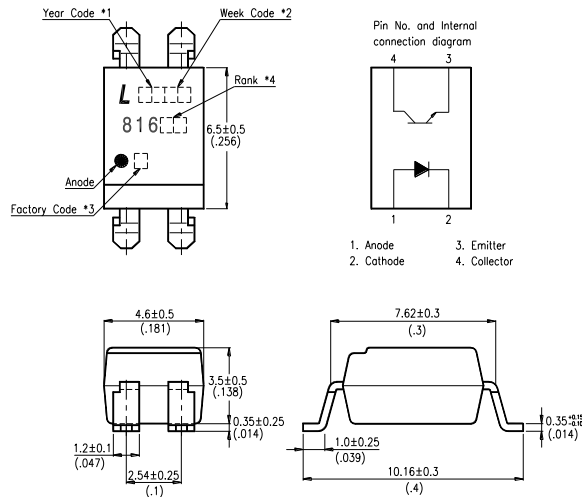
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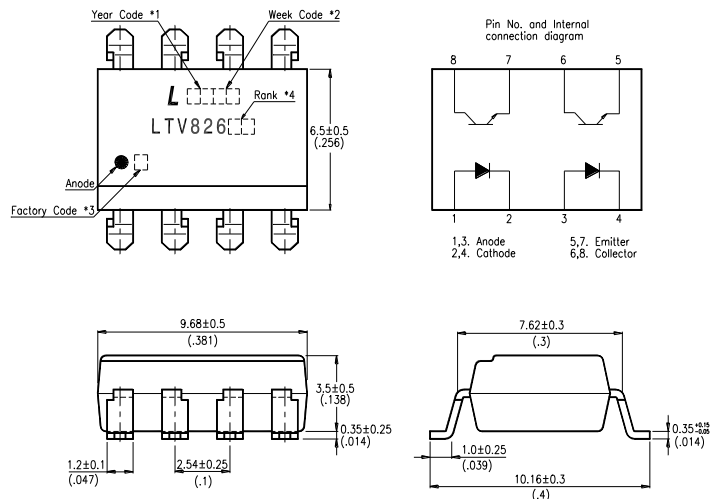
- \*1. Year date code.
- \*2. 2-digit work week.
- \*3. Factory identification mark shall be marked.  
(Z : Taiwan, Y : Thailand, X : China-TJ, W : China-CZ)
- \*4. Rank shall be or shall not be marked.

### OUTLINE DIMENSIONS

#### LTV-816S :



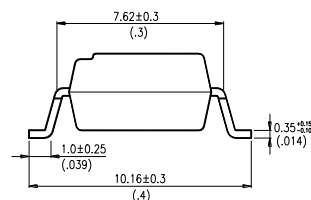
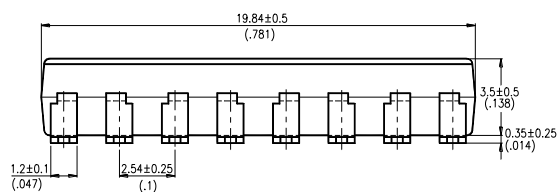
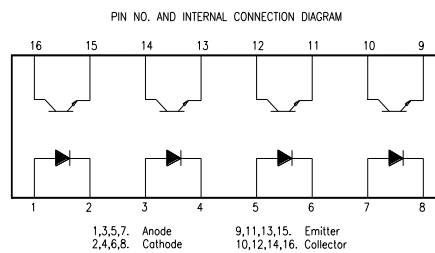
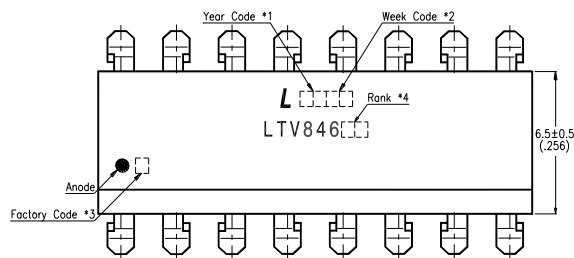
#### LTV-826S :



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

## OUTLINE DIMENSIONS

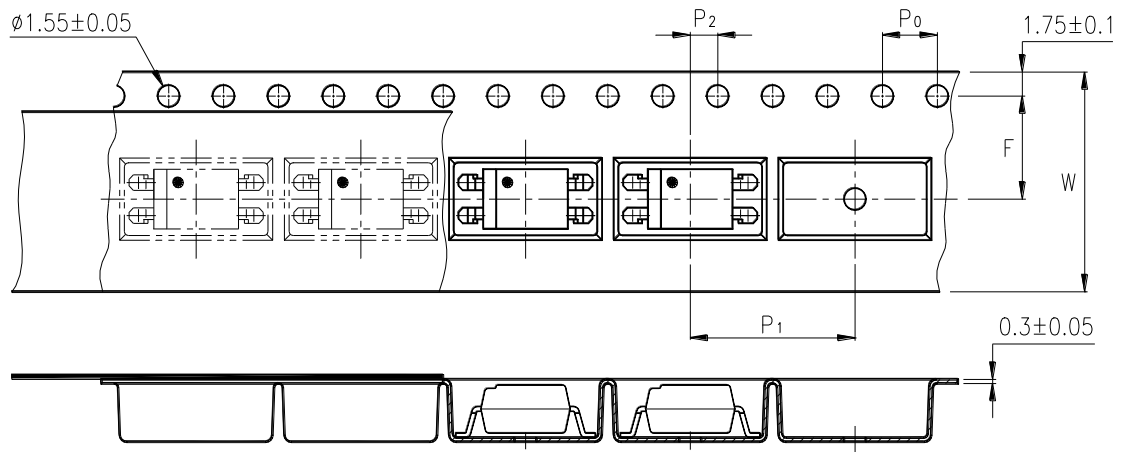
### LTV-846S :



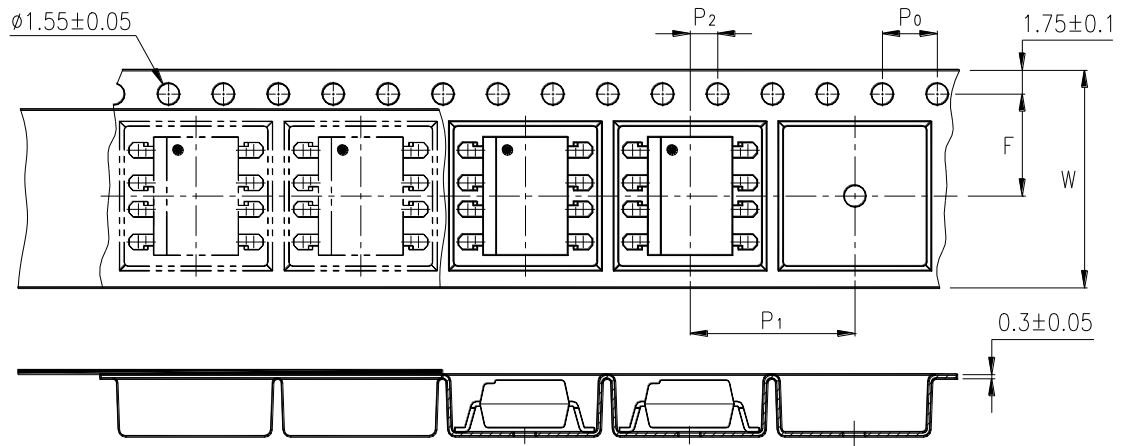
- \*1. Year date code.
- \*2. 2-digit work week.
- \*3. Factory identification mark shall be marked.  
(Z : Taiwan, Y : Thailand, X : China-TJ, W : China-CZ)
- \*4. Rank shall be or shall not be marked.

## TAPING DIMENSIONS

### LTV-816S-TA1 :



### LTV-826S-TA1 :

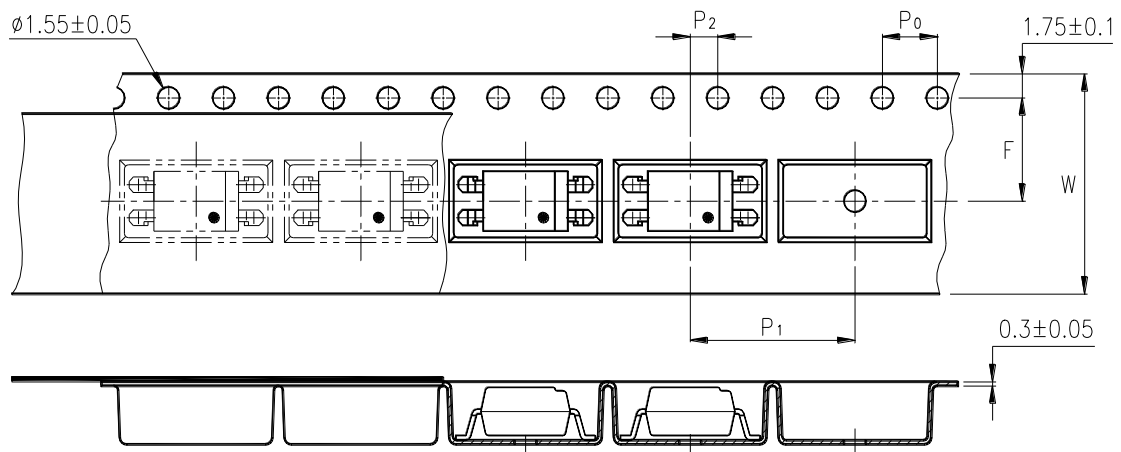


Description	Symbol	Dimensions in mm ( inches )
Tape wide	W	$16 \pm 0.3$ ( .63 )
Pitch of sprocket holes	$P_0$	$4 \pm 0.1$ ( .15 )
Distance of compartment	F	$7.5 \pm 0.1$ ( .295 )
	$P_2$	$2 \pm 0.1$ ( .079 )
Distance of compartment to compartment	$P_1$	$12 \pm 0.1$ ( .472 )

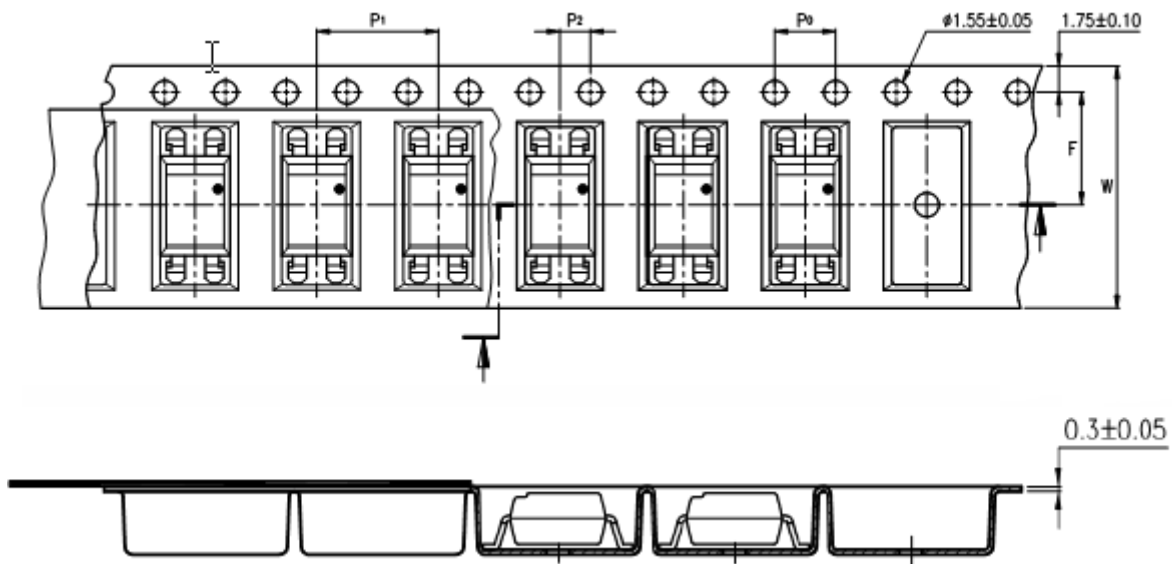


## TAPING DIMENSIONS

### LTV-816S-TA :



### LTV-816S-TP :



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>	80	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- 826 / 846 )		T <sub>opr</sub>	-30 ~ +100	°C
Operating Temperature ( LTV-816 )		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>	80	—	—	V	I <sub>C</sub> =0.1mA I <sub>F</sub> =0
	Emitter-Collector Breakdown Voltage	BV <sub>ECO</sub>	6	—	—	V	I <sub>E</sub> =10μA I <sub>F</sub> =0
TRANSFER CHARACTERISTICS	Collector Current	I <sub>C</sub>	2.5	—	30	mA	I <sub>F</sub> =5mA
	*1 Current Transfer Ratio	CTR	50	—	600	%	V <sub>CE</sub> =5V
	Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	0.1	0.2	V	I <sub>F</sub> =20mA I <sub>C</sub> =1mA
	Isolation Resistance	R <sub>iso</sub>	5×10 <sup>10</sup>	1×10 <sup>11</sup>	—	Ω	DC500V 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 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 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-816	L	50 ~ 100
LTV-816	A	80 ~ 160
LTV-816	B	130 ~ 260
LTV-816	C	200 ~ 400
LTV-816	D	300 ~ 600
LTV-816	L or A or B or C or D	50 ~ 600
LTV-8※6	B	130 ~ 260
LTV-8※6	B or C or BC	130 ~ 400
LTV-8※6	C	200 ~ 400
LTV-8※6	C or D or CD	200 ~ 600
LTV-8※6	B、BC、C、CD or No mark	50 ~ 600

※ = 2 or 4

<b>CONDITIONS</b>	$I_F = 5 \text{ mA}$ $V_{CE} = 5 \text{ V}$ $T_a = 25 \text{ }^\circ\text{C}$
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## CHARACTERISTICS CURVES

Fig.1 Forward Current vs. Ambient Temperature

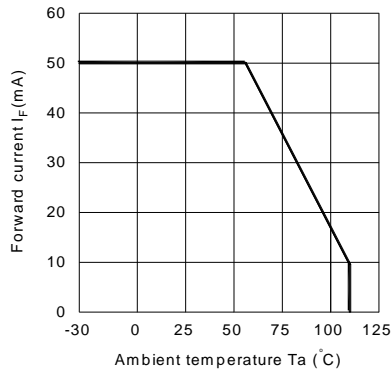


Fig.2 Collector Power Dissipation vs. Ambient Temperature

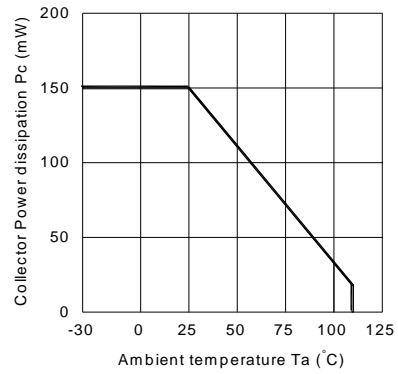


Fig.3 Collector-emitter Saturation Voltage vs. Forward Current

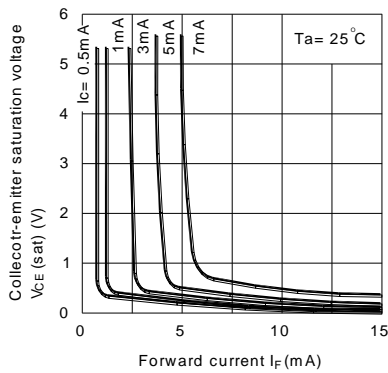


Fig.4 Forward Current vs. Forward Voltage

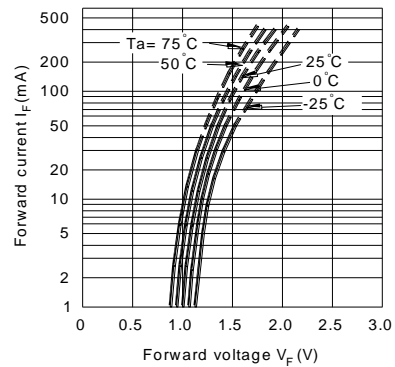


Fig.5 Current Transfer Ratio vs. Forward Current

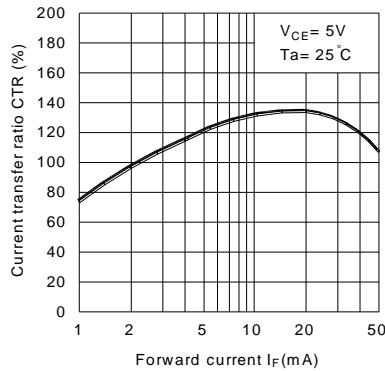
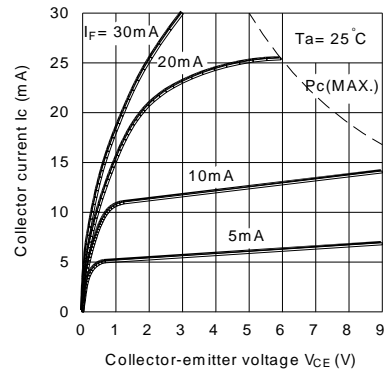


Fig.6 Collector Current vs. Collector-emitter Voltage



## CHARACTERISTICS CURVES

Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

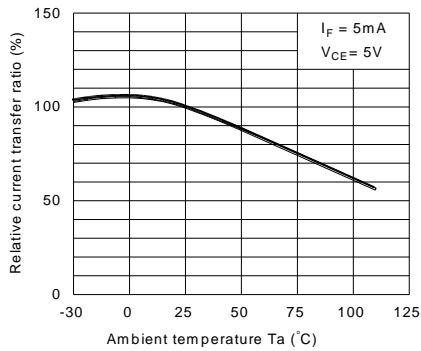


Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

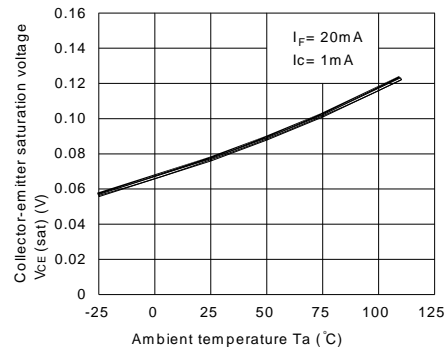


Fig.9 Collector Dark Current vs. Ambient Temperature

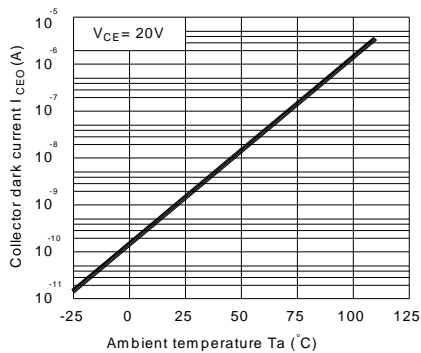


Fig.10 Response Time vs. Load Resistance

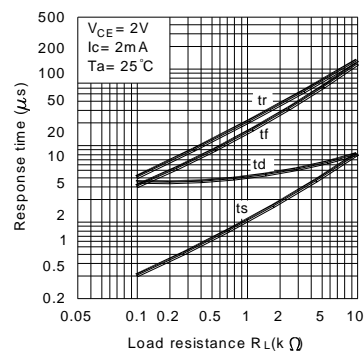
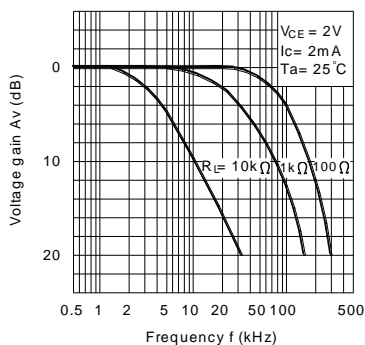
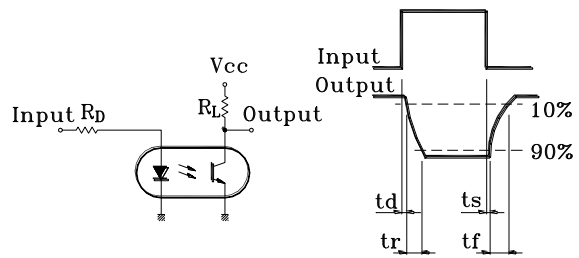


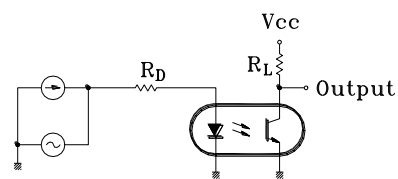
Fig.11 Frequency Response



Test Circuit for Response Time



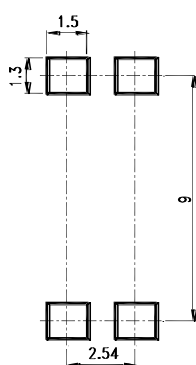
Test Circuit for Frequency Response



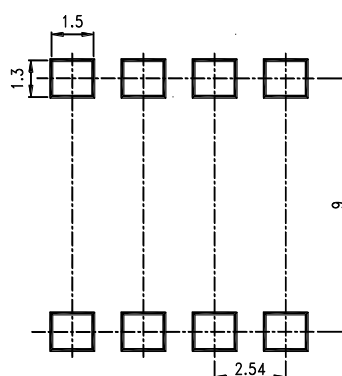
## RECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)

Unit : mm

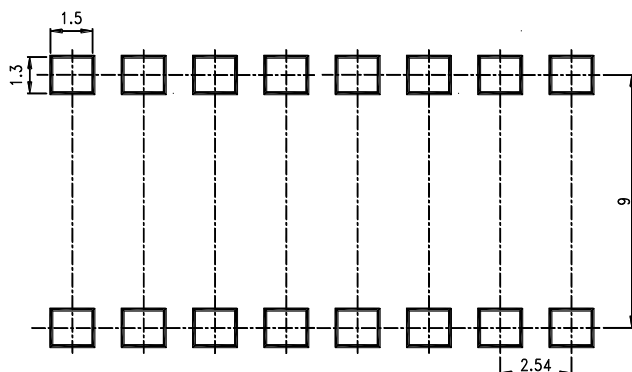
4 PIN



8 PIN



16 PIN

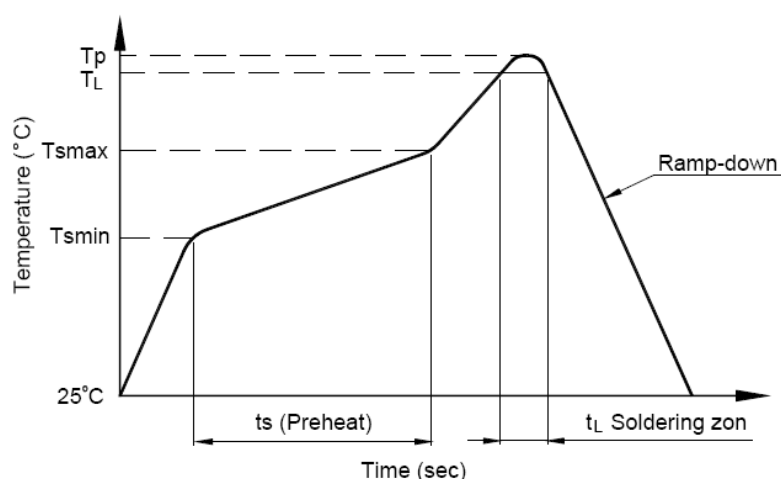


### TEMPERATURE PROFILE OF SOLDERING REFLOW

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

1. Wave soldering
  - 260 °C / 10 sec
2. IR reflow

Profile Item	Condition
Preheat	
- Temperature Min ( $T_{Smin}$ )	150 °C
- Temperature Max ( $T_{Smax}$ )	180 °C
- Time (min to max) (ts)	90 ± 30 sec
Soldering zone	
- Temperature ( $T_L$ )	250 °C
- Time ( $t_L$ )	10 ~150 sec
Peak temperature ( $T_p$ )	260 °C
Ramp-down rate	3 ~ 6 °C/sec





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- When requiring a device for any "specific" application, please contact our sales in advice.
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