



# Photocoupler Product Data Sheet

LTV816/ 826/ 846  
(M, S, STA1) -V

Spec No.: DS-70-99-0029

Effective Date: 07/15/2010

Revision: C

**LITE-ON DCC**

**RELEASE**

BNS-OD-FC001/A4

## FEATURES

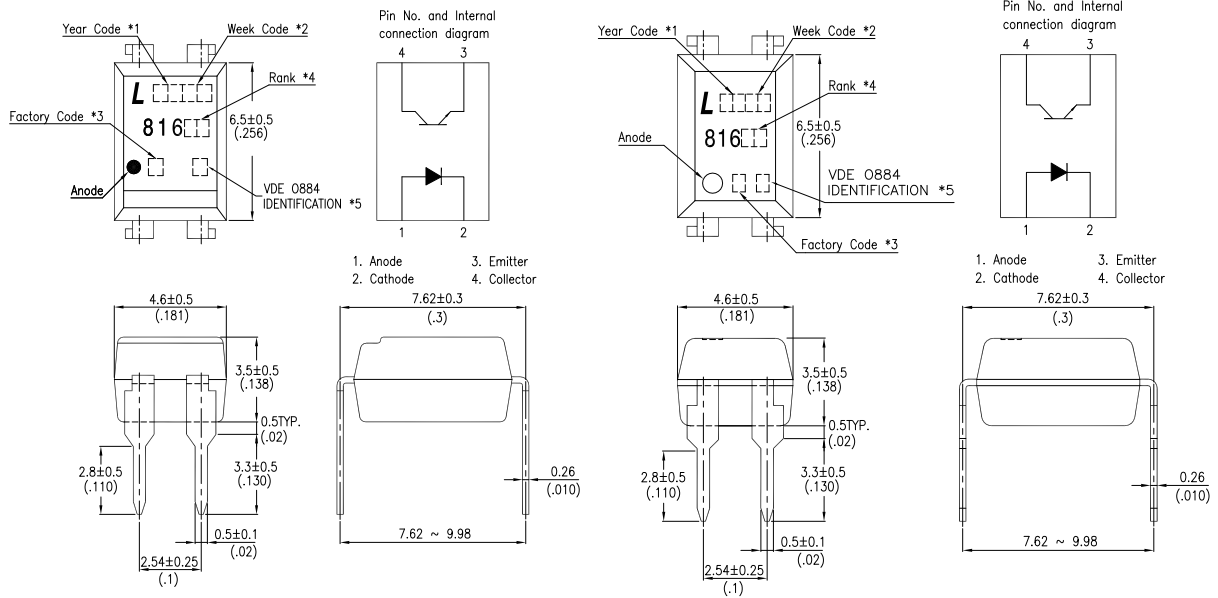


June 2010

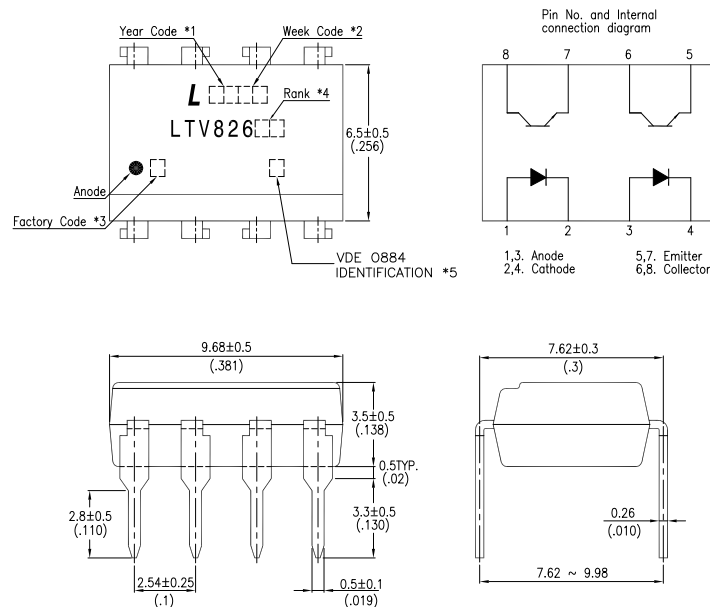
- \* Current transfer ratio  
( CTR : MIN. 50% at  $I_F = 5\text{mA}$ ,  $V_{CE} = 5\text{V}$  )
- \* High input-output isolation voltage  
(  $V_{iso} = 5,000\text{V}_{rms}$  )
- \* Response time  
(  $t_r$  : TYP.  $4\mu\text{s}$  at  $V_{CE} = 2\text{V}$ ,  $I_C = 2\text{mA}$ ,  $R_L = 100\Omega$  )
- \* Dual-in-line package :
  - LTV816-V : 1-channel type
  - LTV826-V : 2-channel type
  - LTV846-V : 4-channel type
- \* Wide lead spacing package :
  - LTV816M-V : 1-channel type
  - LTV826M-V : 2-channel type
  - LTV846M-V : 4-channel type
- \* Surface mounting package :
  - LTV816S-V : 1-channel type
  - LTV826S-V : 2-channel type
  - LTV846S-V : 4-channel type
- \* Tape and reel packaging :
  - LTV816STA1-V, LTV826STA1-V
- \* Safety approval  
UL , CSA, FIMKO, NEMKO, DEMKO, SEMKO, VDE\* approved  
(\*Requires "V" ordering option)
- \* RoHS compliance


## OUTLINE DIMENSIONS

### LTV816-V :



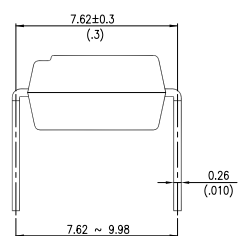
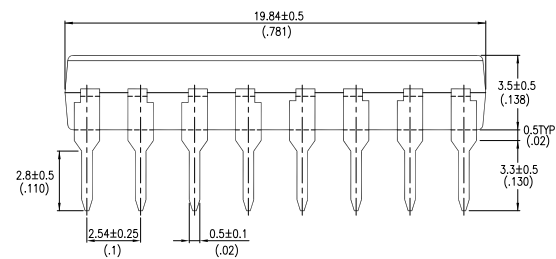
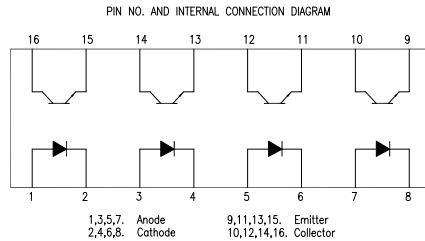
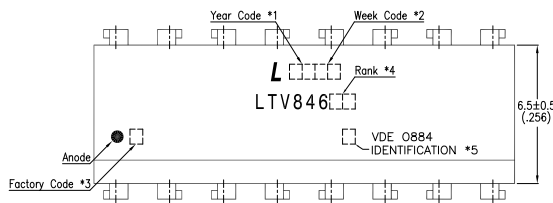
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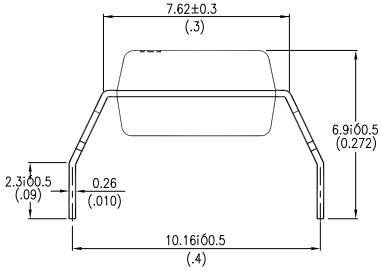
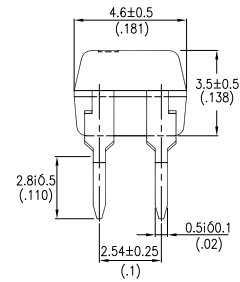
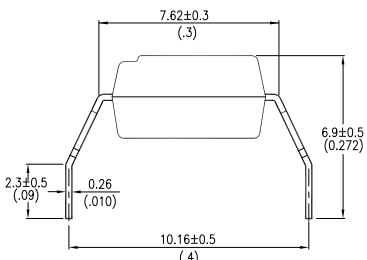
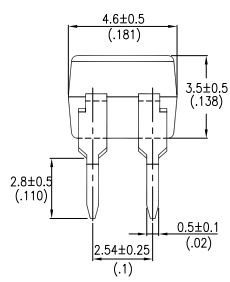
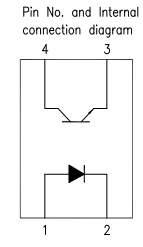
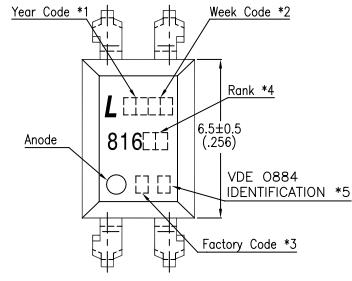
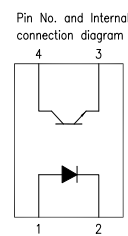
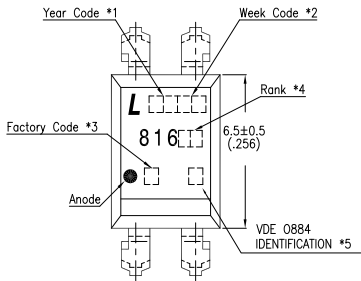
- \*1. Year date code.
- \*2. 2-digit work week.
- \*3. Factory identification mark shall be marked  
(W : China-CZ, X : China-TJ, Y : Thailand, Z : Taiwan)
- \*4. Rank shall be or shall not be marked.
- \*5. "4" or "V" for 4 pin VDE option;  for 8 & 16 pin devices.


## OUTLINE DIMENSIONS

### LTV846-V :



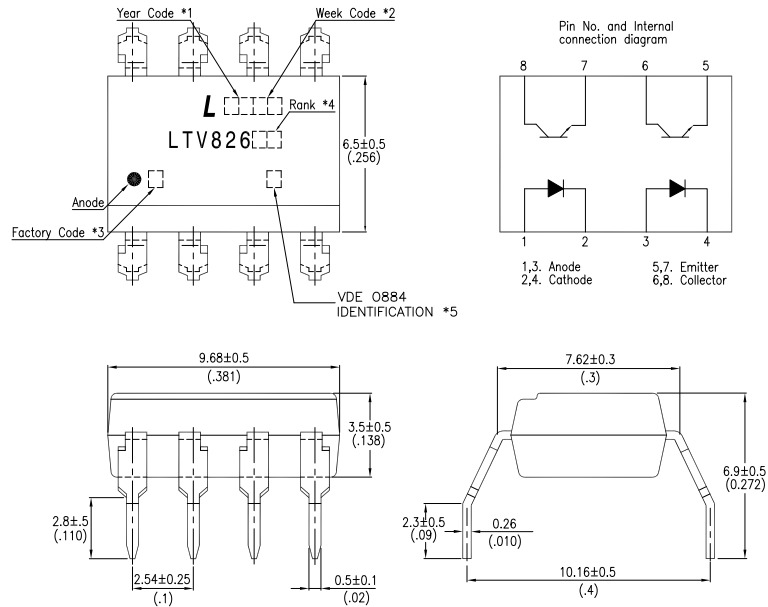
### LTV816M-V :



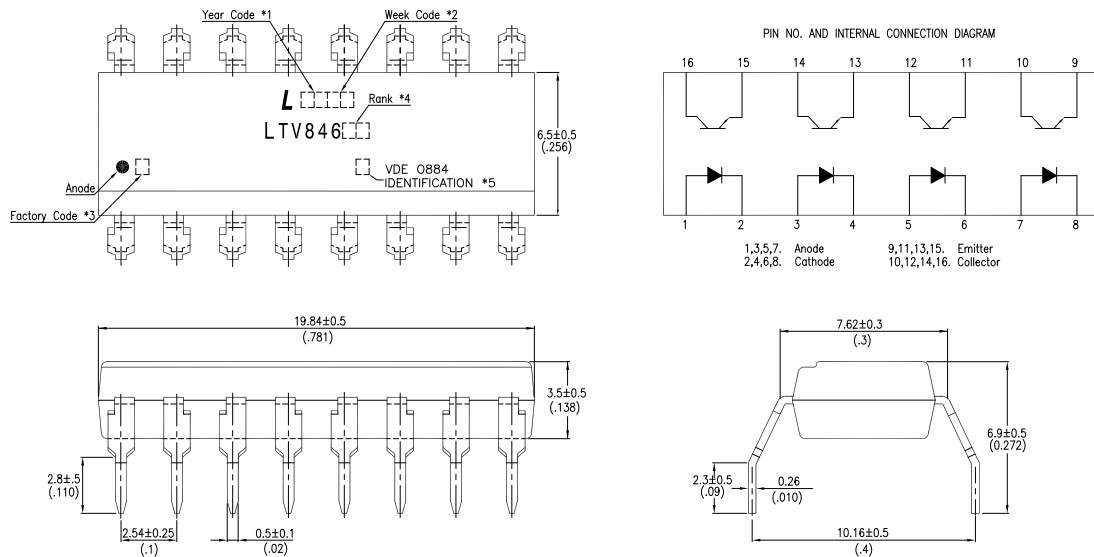
- \*1. Year date code.
- \*2. 2-digit work week.
- \*3. Factory identification mark shall be marked  
(W : China-CZ, X : China-TJ, Y : Thailand, Z : Taiwan)
- \*4. Rank shall be or shall not be marked.
- \*5. "4" or "V" for 4 pin VDE option;  for 8 & 16 pin devices.


## OUTLINE DIMENSIONS

### LTV826M-V :



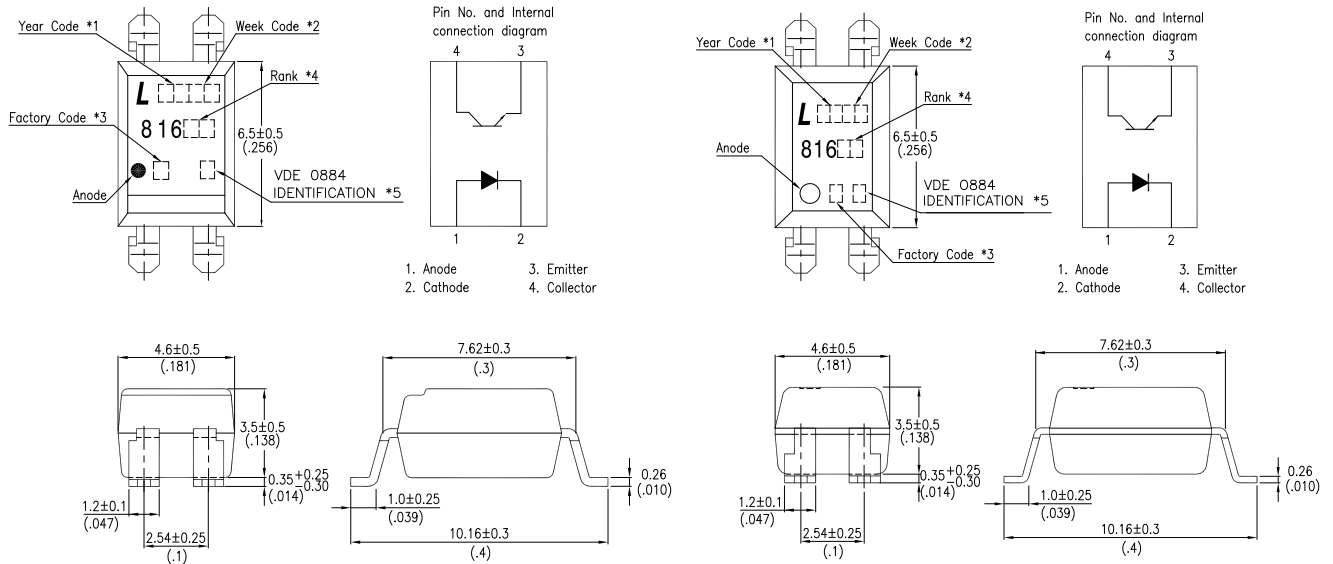
### LTV846M-V :



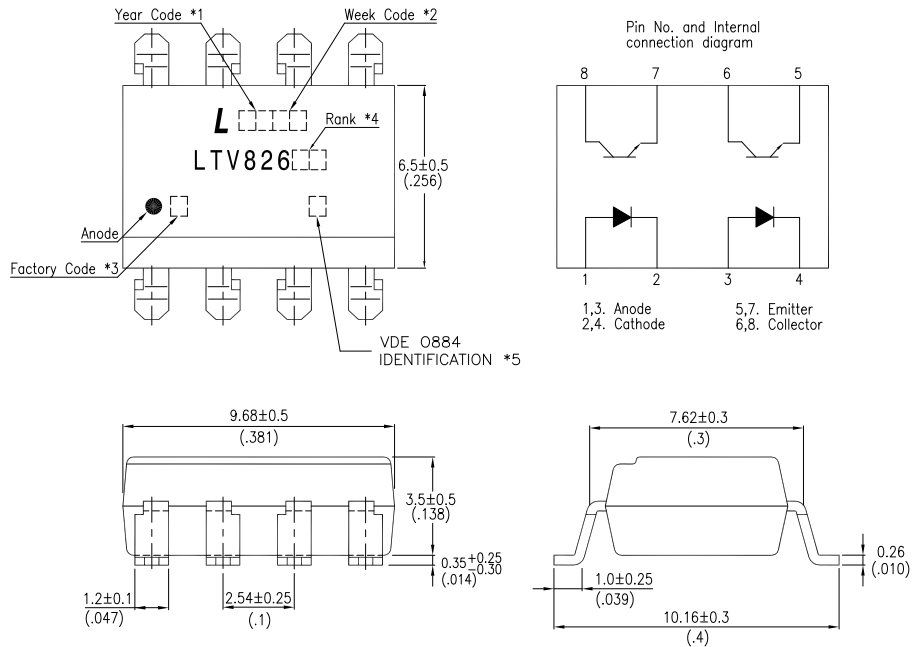
- \*1. Year date code.
- \*2. 2-digit work week.
- \*3. Factory identification mark shall be marked  
(Z : Taiwan, Y : Thailand, X : China-TJ, W: China-CZ)
- \*4. Rank shall be or shall not be marked.
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## OUTLINE DIMENSIONS

### LTV816S-V :



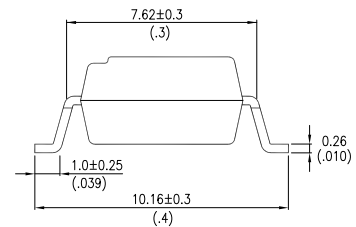
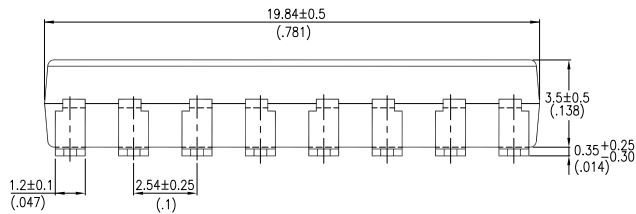
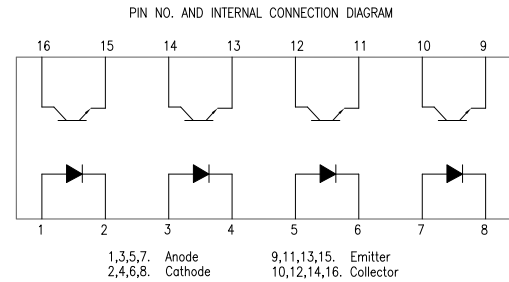
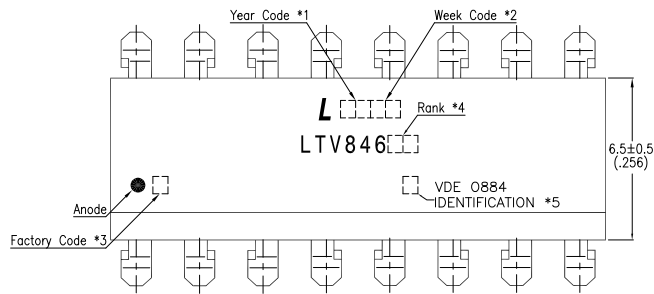
### LTV826S-V :




- \*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.
- \*5. "4" or "V" for 4 pin VDE option;  for 8 & 16 pin devices.

## OUTLINE DIMENSIONS

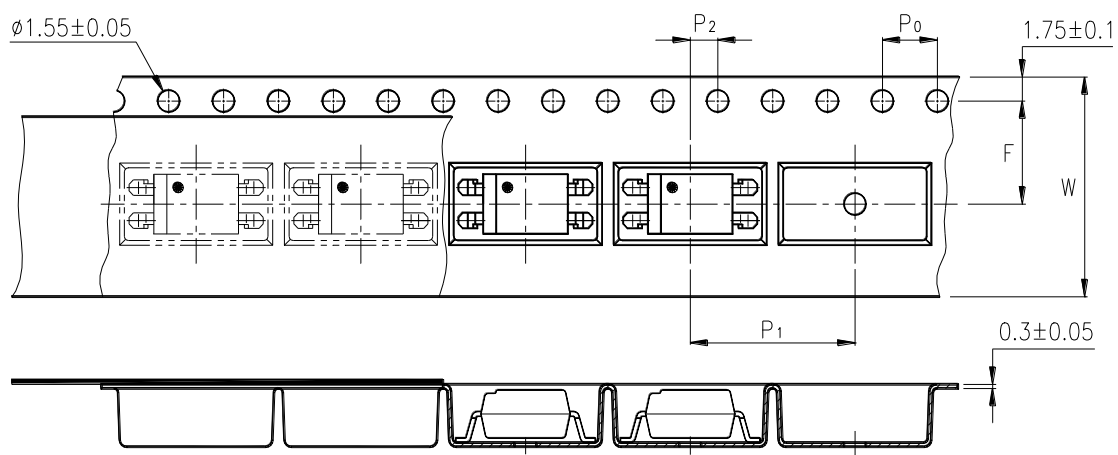
### LTV846S-V :



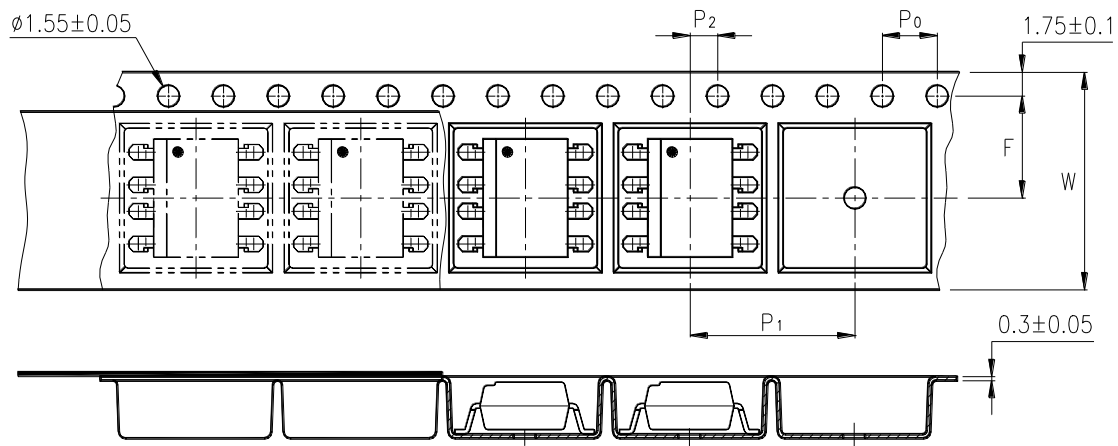
- \*1. Year date code.
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## TAPING DIMENSIONS

### LTV816STA1-V :



### LTV826STA1-V :



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 )



## 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
	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 ( % )
LTV816-V	L	50 ~ 100
LTV816-V	A	80 ~ 160
LTV816-V	B	130 ~ 260
LTV816-V	C	200 ~ 400
LTV816-V	D	300 ~ 600
LTV816-V	L or A or B or C or D	50 ~ 600
LTV8※6-V	B	130 ~ 260
LTV8※6-V	B or C or BC	130 ~ 400
LTV8※6-V	C	200 ~ 400
LTV8※6-V	C or D or CD	200 ~ 600
LTV8※6-V	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

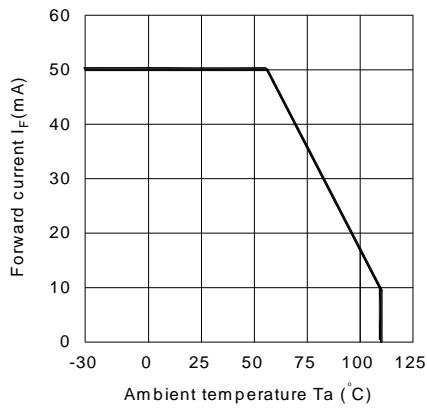


Fig.2 Collector Power Dissipation vs. Ambient Temperature

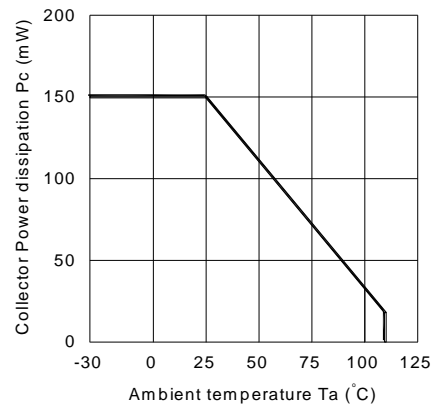


Fig.3 Collector-emitter Saturation Voltage vs. Forward Current

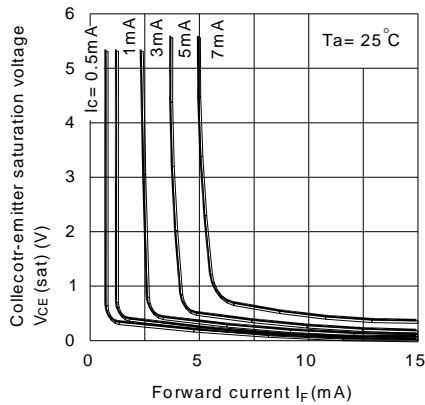


Fig.4 Forward Current vs. Forward Voltage

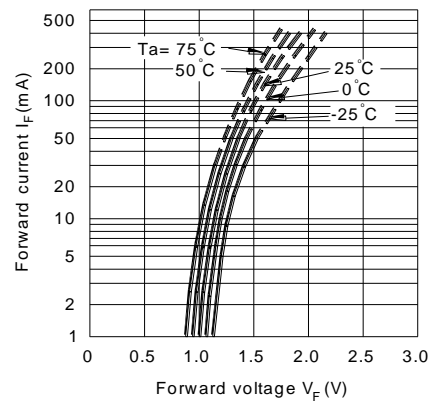


Fig.5 Current Transfer Ratio vs. Forward Current

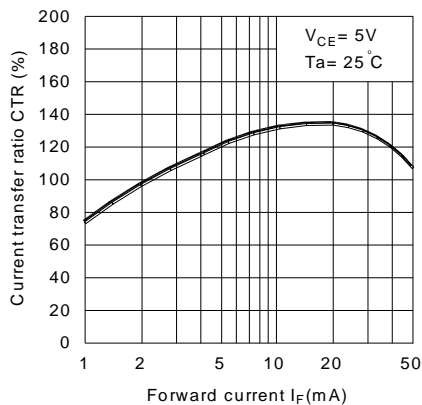
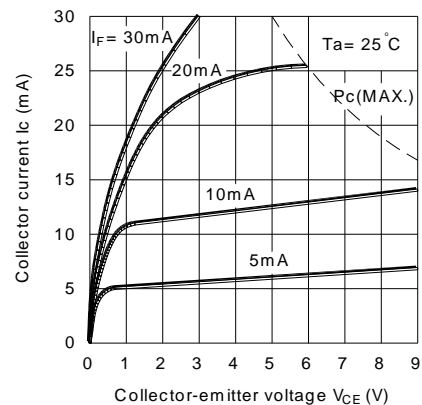


Fig.6 Collector Current vs. Collector-emitter Voltage



## CHARACTERISTICS CURVES

Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

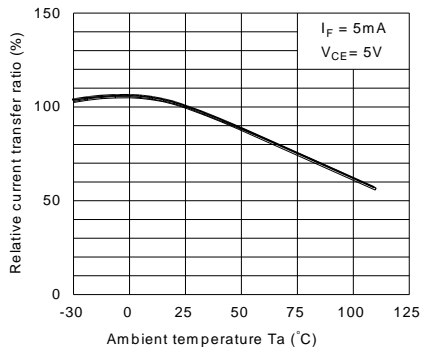


Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

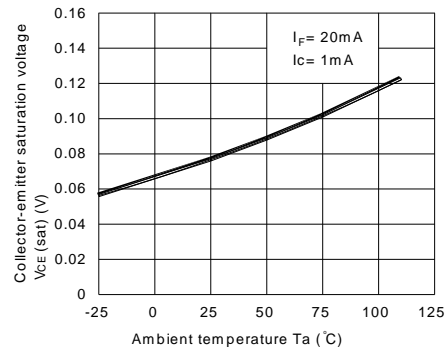


Fig.9 Collector Dark Current vs. Ambient Temperature

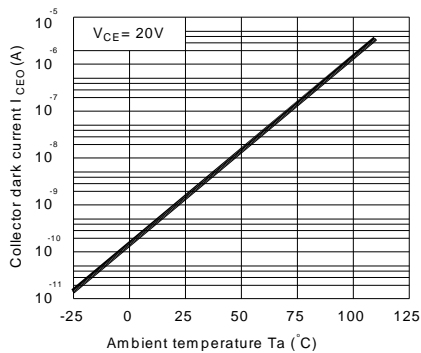


Fig.10 Response Time vs. Load Resistance

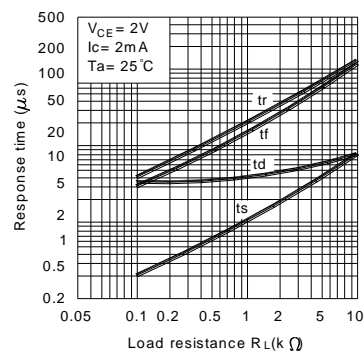
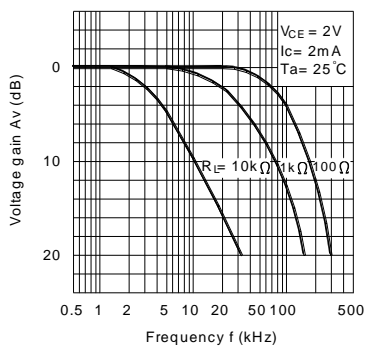
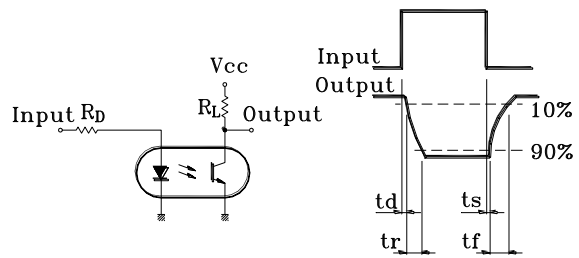


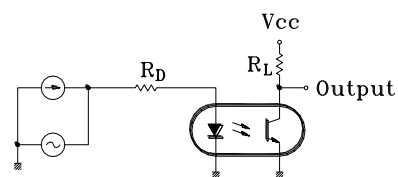
Fig.11 Frequency Response



Test Circuit for Response Time



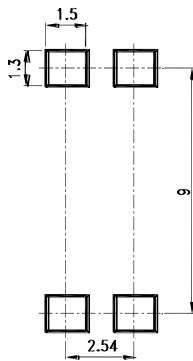
Test Circuit for Frequency Response



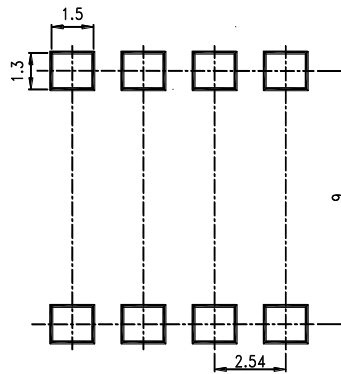
## RECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)

Unit : mm

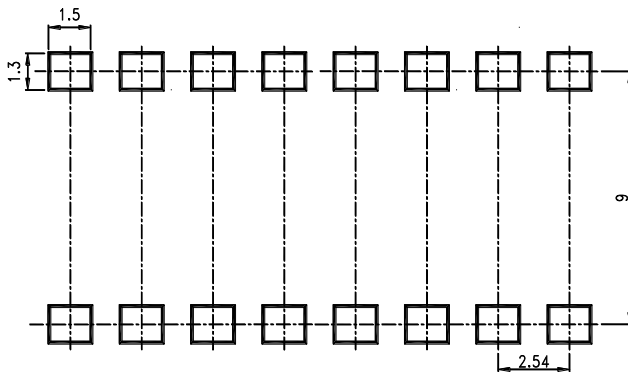
4 PIN



8 PIN



16 PIN



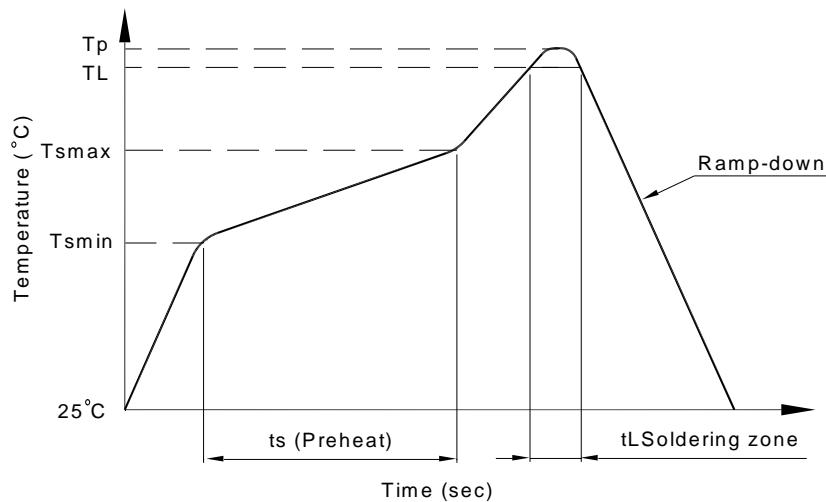
### TEMPERATURE PROFILE OF SOLDERING REFLOW

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

1. Wave solder
  - 260°C / 10 sec.

2. IR Reflow

Profile item	Conditions
Preheat	
- Temperature Min ( $T_{Smin}$ )	150°C
- Temperature Max ( $T_{Smax}$ )	180°C
- Time (min to max) (ts)	90±30°C
Soldering zone	
- Temperature ( $T_L$ )	250°C
- Time ( $t_L$ )	10~15 sec
Peak Temperature ( $T_P$ )	260°C
Ramp-down rate	3~6°C / sec



(2) When using another soldering method such as infrared ray lamp, the temperature may rise partially in the mold of the device.

Keep the temperature on the package of the device within the condition of above (1)

### **Notes:**

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- For equipment/devices where high reliability or safety is required, such as space applications, nuclear power control equipment, medical equipment, etc, please contact our sales representatives.
- When requiring a device for any " specific" application, please contact our sales in advice.
- If there are any questions about the contents of this publication, please contact us at your convenience.
- The contents described herein are subject to change without prior notice.
- Immerse body in solder paste is not recommended.