LITEON
OPTOELECTRONICS



Photocoupler
Product Data Sheet
LTV-817/ 827/ 847 (M, S, S-TA, S-TA1, S-TP) Series

Spec No. :DS-70-96-0016
Effective Date: 12/05/2018
Revision: Q

LITE-ON DCC

RELEASE

BNS-OD-FC001/A4

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Photocoupler
LTV-8X7 Series

1. DESCRIPTION

1.1 Features

- Current transfer ratio (CTR : MIN. 50% at I_F = 5mA, V_{CE} = 5V)
- High input-output isolation voltage (V_{iso} = 5,000Vrms)
- Response time (tr : TYP. 4μs at V_{CE} = 2V, I_C = 2mA, R_L = 100Ω)
- 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-TA : 1-channel type

  LTV-817S-TA1 : 1-channel type

  LTV-817S-TP : 1-channel type

  LTV-827S-TA : 2-channel type

  LTV-827S-TA1 : 2-channel type
- Safety approval

  UL 1577

  VDE DIN EN60747-5-5 (VDE 0884-5)

  CSA CA5A

  CQC GB4943.1-2011/ GB8898-2011 (meet Altitude up to 5000m)

  Nordic Safety (FIMKO/NEMKO/SEMKO/DEMKO)

  BSI
- Halogen Free option
- RoHS Compliance

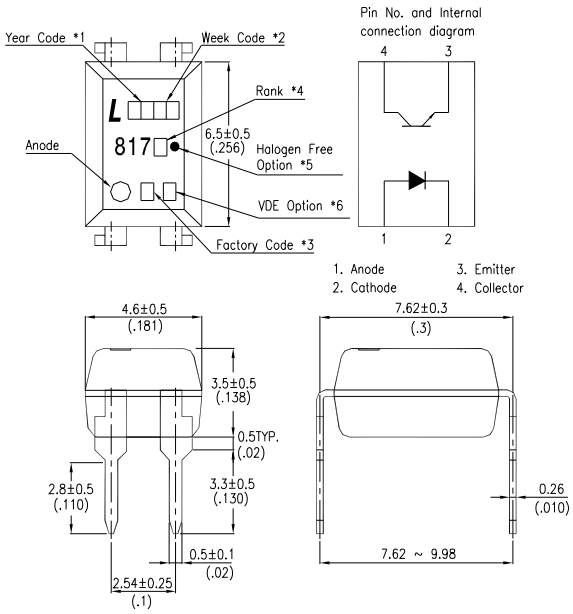
  All materials be used in device are followed EU RoHS directive (No.2002/95/EC, 2011/65/EU, and 2015/863).
- ESD pass HBM 8000V/MM2000V
- MSL class1

1.2 Applications

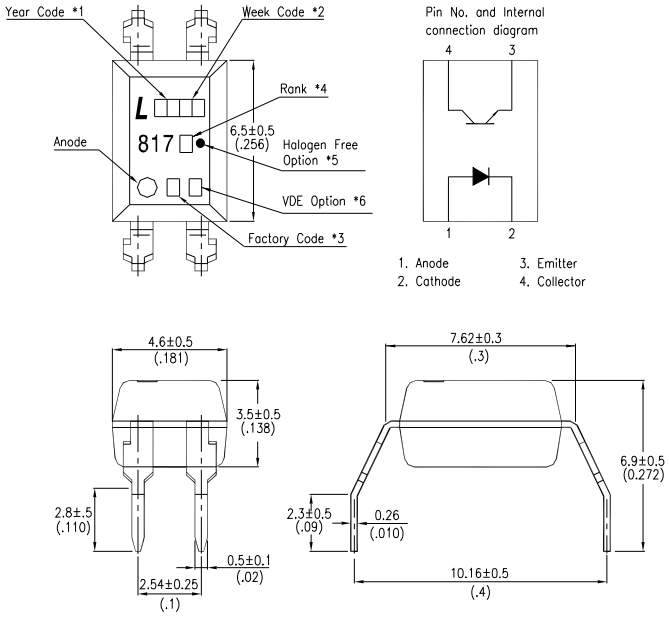
- Hybrid substrates that require high density mounting.
- Programmable controllers

2. PACKAGE DIMENSIONS

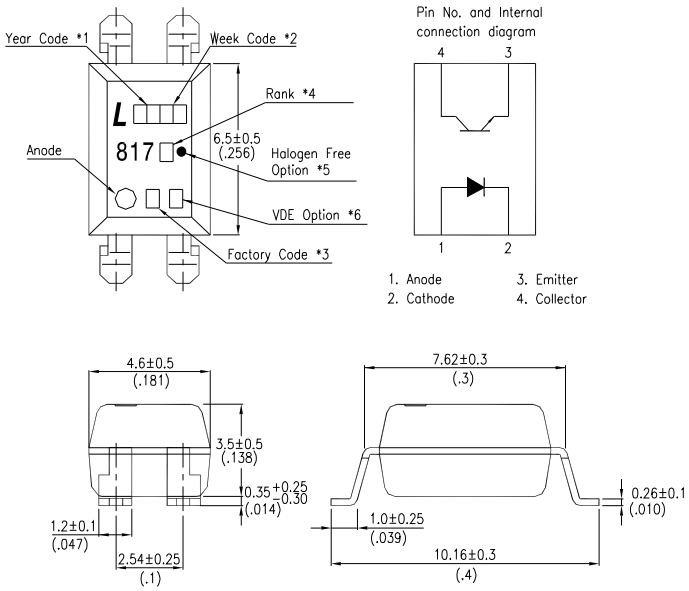
2.1 LTV-817



2.2 LTV-817M



2.3 LTV-817S

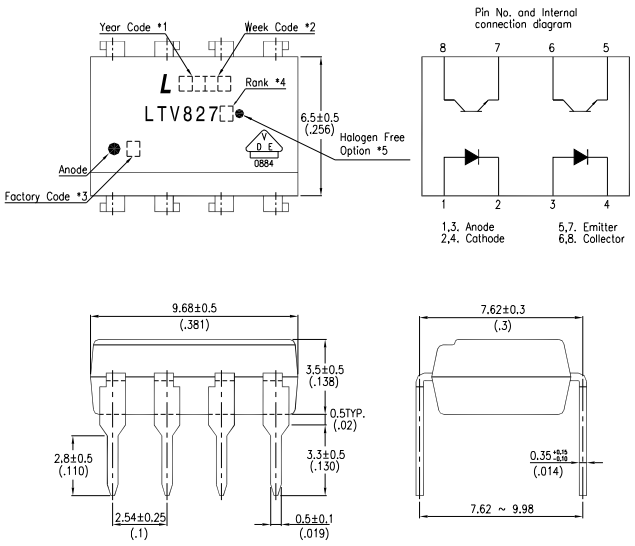


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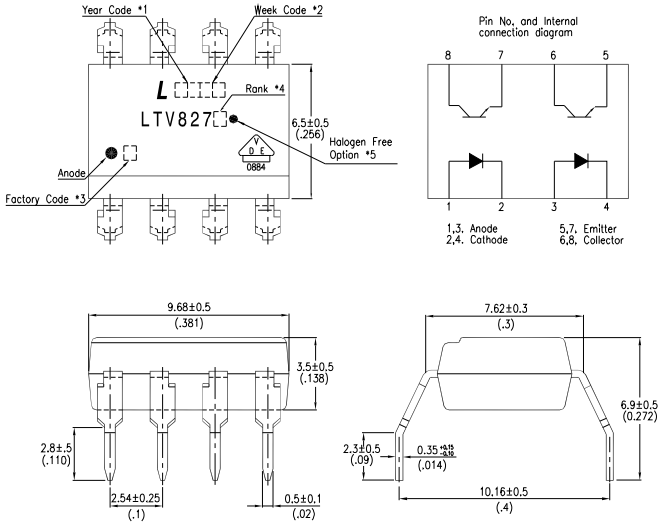
1. 2-digit year code, example : 2016 = 16
2. 2-digit work week ranging from ‘01’ to ‘53’
3. Factory identification mark shall be marked (W: China-CZ, Y: Thailand)
4. Rank shall be or shall not be marked.
5. “●” for halogen free option.
6. “V” for VDE option.

Dimensions in millimeters(inches).

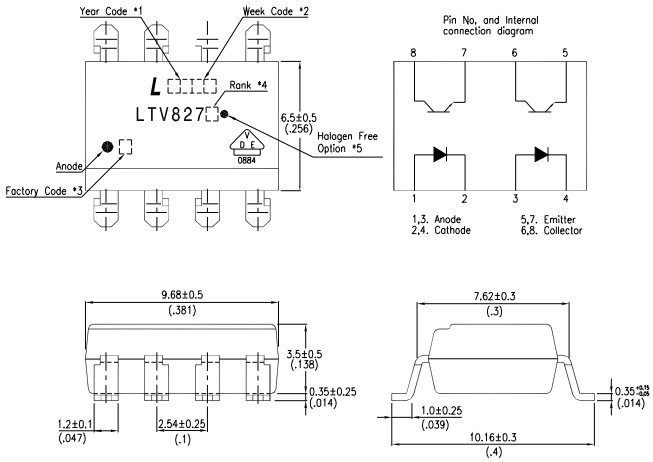
2.4 LTV-827



2.5 LTV-827M



2.6 LTV-827S

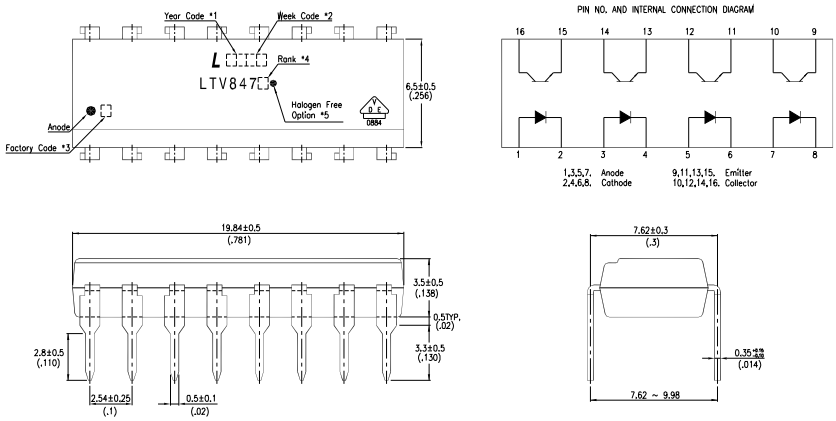


Notes :

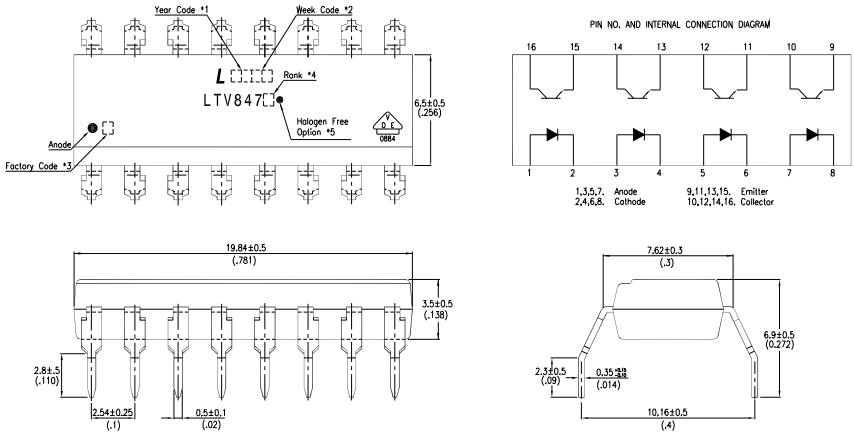
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3. Factory identification mark shall be marked
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4. Rank shall be or shall not be marked.
5. “●” for halogen free option.
6. VDE option shall be .

Dimensions in millimeters(inches).

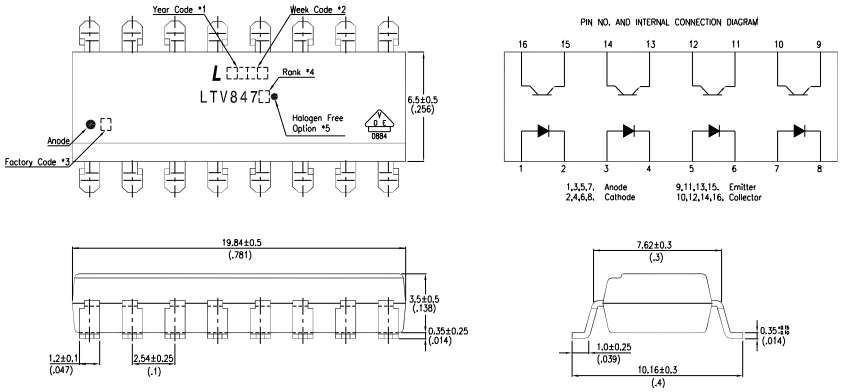
2.7 LTV-847



2.8 LTV-847M



2.9 LTV-847S



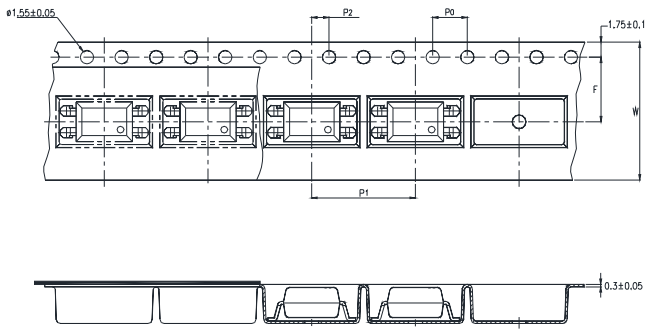
Notes :

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3. Factory identification mark shall be marked
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4. Rank shall be or shall not be marked.
5. “●” for halogen free option.
6. VDE option shall be .

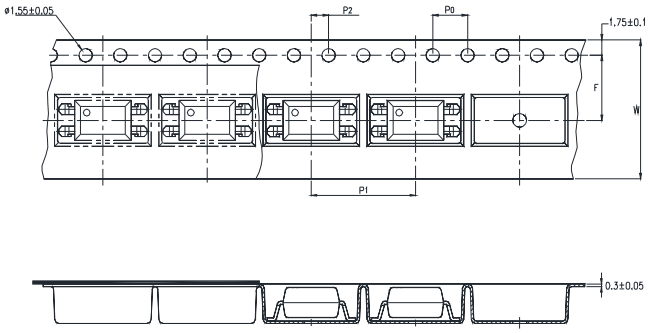
Dimensions in millimeters(inches).

3. TAPING DIMENSIONS

3.1 LTV-817S-TA



3.2 LTV-817S-TA1

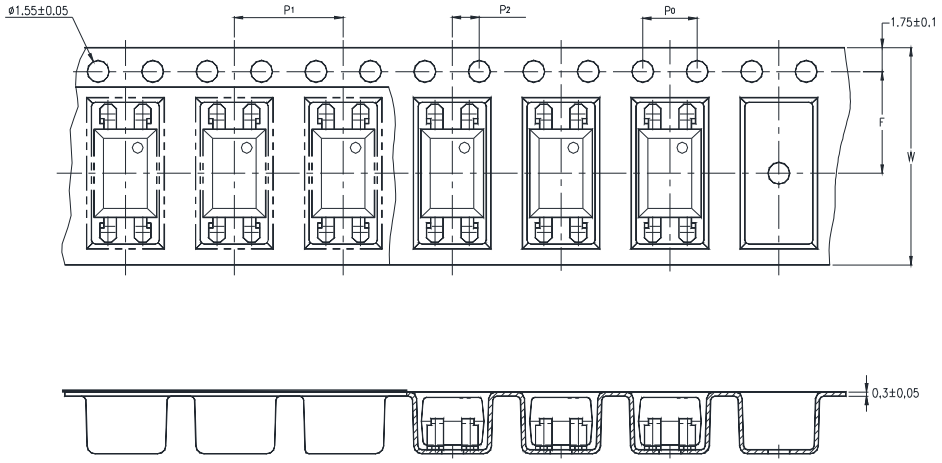


Description	Symbol	Dimension in mm (inch)
Tape wide	W	16±0.3 (0.63)
Pitch of sprocket holes	P_0	4±0.1 (0.15)
Distance of compartment	F	7.5±0.1 (0.295)
	P_2	2±0.1 (0.079)
Distance of compartment to compartment	P_1	12±0.1 (0.472)

3.3 Quantities Per Reel

Package Type	TA/TA1
Quantities (pcs)	1000

3.4 LTV-817S-TP

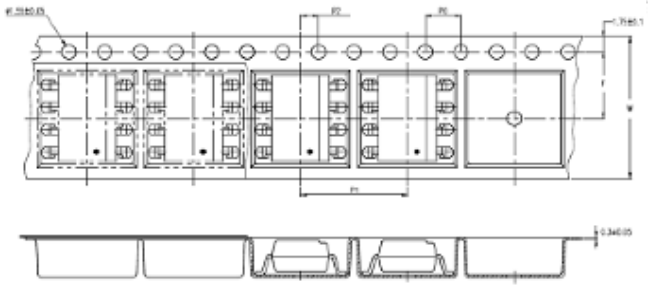


Description	Symbol	Dimension in mm (inch)
Tape wide	W	16±0.3 (0.63)
Pitch of sprocket holes	P_0	4±0.1 (0.15)
Distance of compartment	F	7.5±0.1 (0.295)
	P_2	2±0.1 (0.079)
Distance of compartment to compartment	P_1	8±0.1 (0.315)

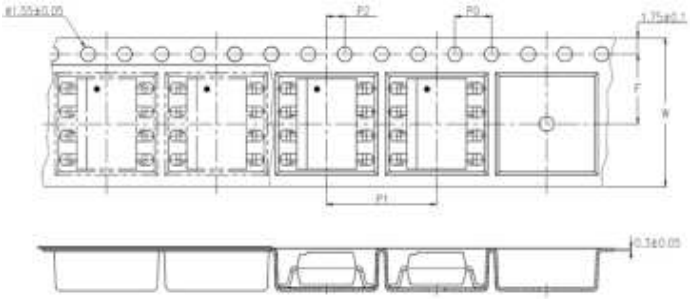
3.5 Quantities Per Reel

Package Type	TP
Quantities (pcs)	2000

3.6 LTV-827S-TA



3.7 LTV-827S-TA1



Description	Symbol	Dimension in mm (inch)
Tape wide	W	16±0.3 (0.63)
Pitch of sprocket holes	P_0	4±0.1 (0.15)
Distance of compartment	F	7.5±0.1 (0.295)
	P_2	2±0.1 (0.079)
Distance of compartment to compartment	P_1	12±0.1 (0.472)

3.8 Quantities Per Reel

Package Type	TA/TA1
Quantities (pcs)	1000

4. RATING AND CHARACTERISTICS

4.1 Absolute Maximum Ratings at Ta=25℃

	Parameter	Symbol	Rating	Unit
Input	Forward Current	I_F	50	mA
	Reverse Voltage	V_R	6	V
	Power Dissipation	P	70	mW
	Peak Forward Current (100μs pulse, 100Hz frequency)	IFP	1	A
	Thermal Resistance Junction-Ambient	Rth_{J-A}	325	°C/W
	Thermal Resistance Junction-Case	Rth_{J-C}	200	°C/W
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}	5000	V_{rms}
	Operating Temperature (LTV-827/847)	T_{opr}	-30 ~ +100	°C
	Operating Temperature (LTV-817)	T_{opr}	-55 ~ +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

4.2 ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25℃

Parameter			Symbol	Min.	Typ.	Max.	Unit	Test Condition
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, V_{CE}=5V
	1.	Current Transfer Ratio	CTR	50	—	600	%	
		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	Cf	—	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)	tr	—	4	18	μs	V_{CE}=2V, I_C=2mA R_L=100Ω,
		Response Time (Fall)	tf	—	3	18	μs	

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

5. RANK TABLE OF CURRENT TRANSFER RATIO

	CTR Rank	Min	Max	Condition
LTV-817	L	50	100	I_F=5mA, V_{CE}=5V, Ta=25°C
	A	80	160	
	B	130	260	
	C	200	400	
	D	300	600	
	No bin (L or A or B or C or D or no mark)	50	600	
LTV-827	No bin	50	600	
	A	80	160	
	B	130	260	
	C	200	400	
	D	300	600	
	BC	130	400	
	CD	200	600	
LTV-847	No bin	50	600	
	BC	130	400	
	CD	200	600	

6. CHARACTERISTICS CURVES

Fig.1 Forword Current vs. Ambient Temperatute

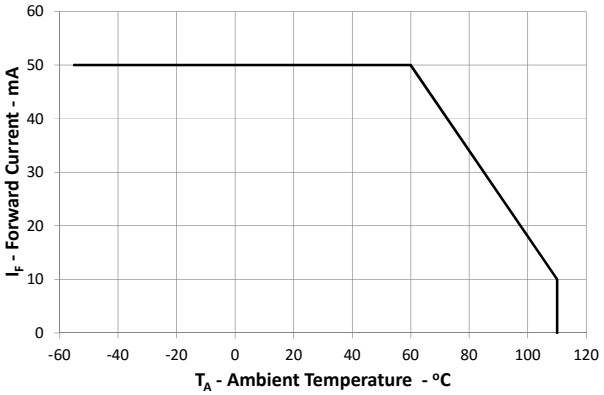


Fig.2 Collector Power Dissipation vs. Ambient Temperature

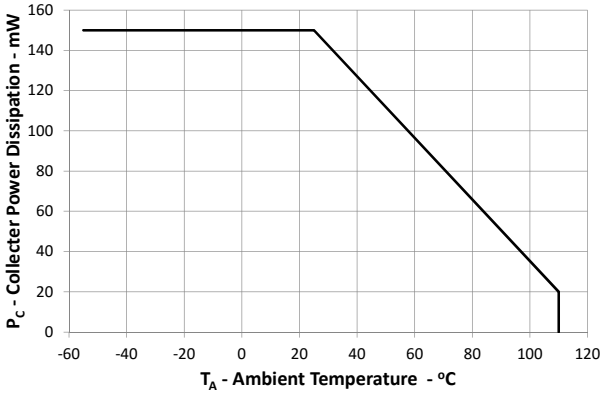


Fig.3 Collector-emitter Saturation Voltage vs. Forward Current

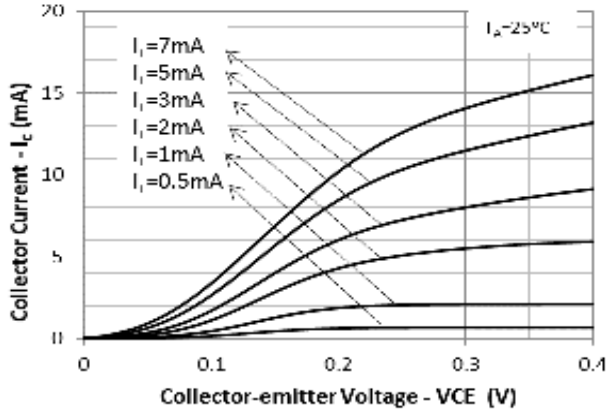


Fig.4 Forward Current vs. Forward Voltage

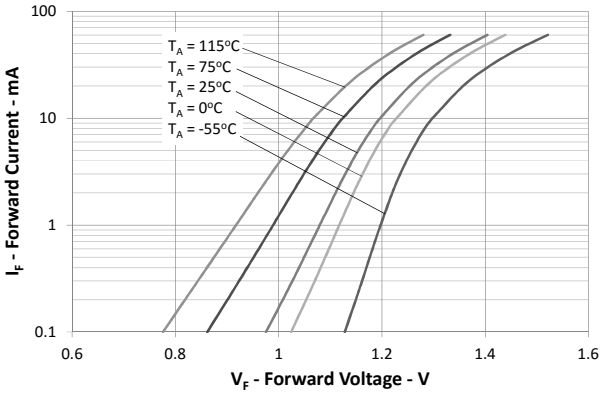


Fig.5 Current Transfer Ratio vs. Forward Current

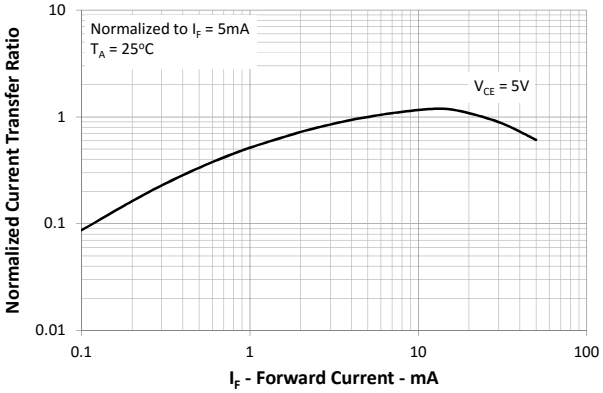


Fig.6 Collector Current vs. Collector-emitter Voltage

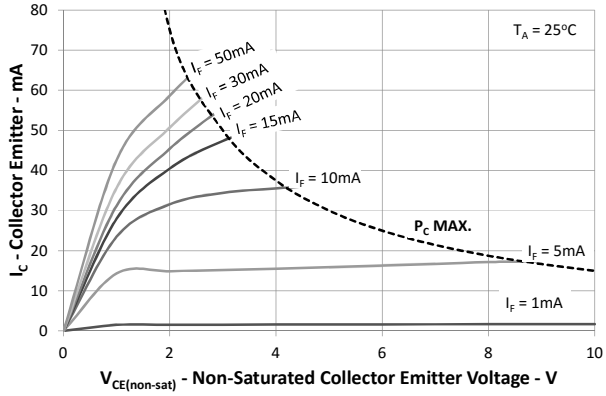


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

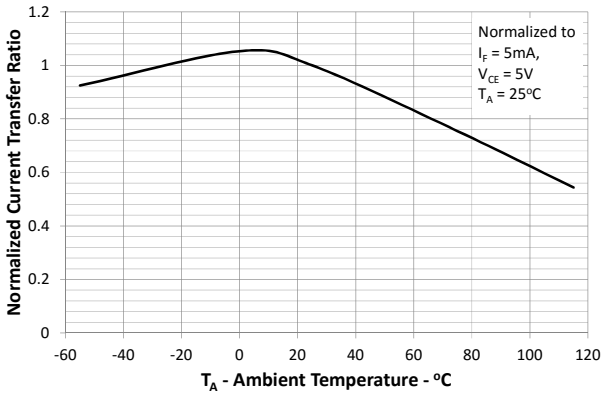


Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

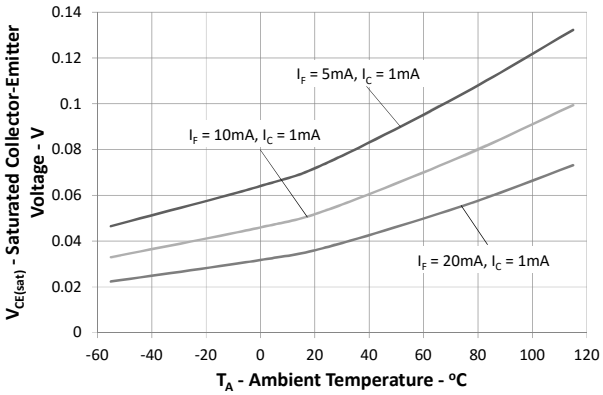


Fig.9 Collector Dark Current vs. Ambient Temperature

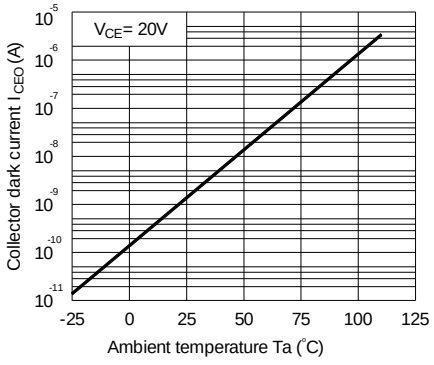


Fig.10 Response Time vs. Load Resistance

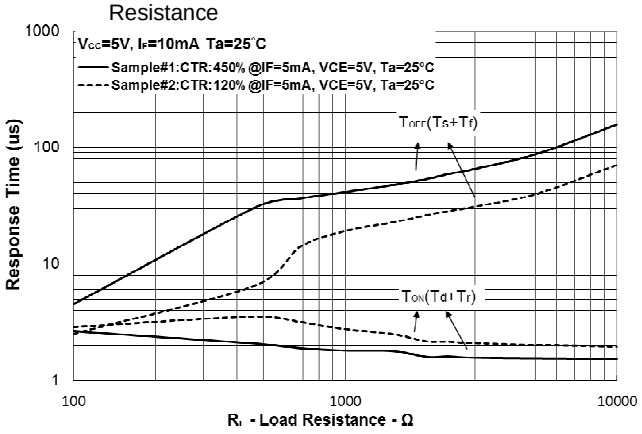
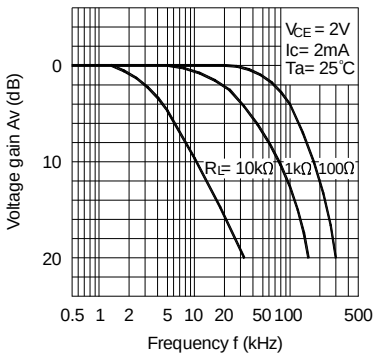
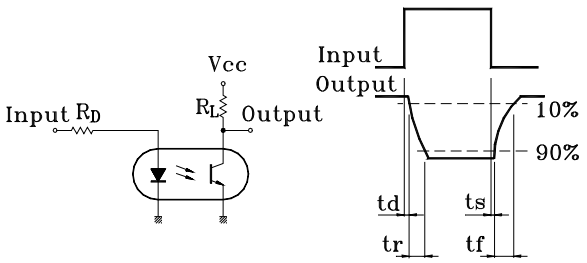


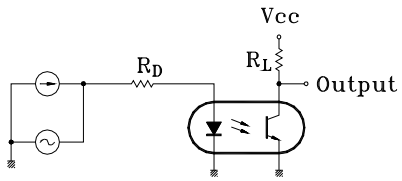
Fig.11 Frequency Response



Test Circuit for Response Time



Test Circuit for Frequency Response

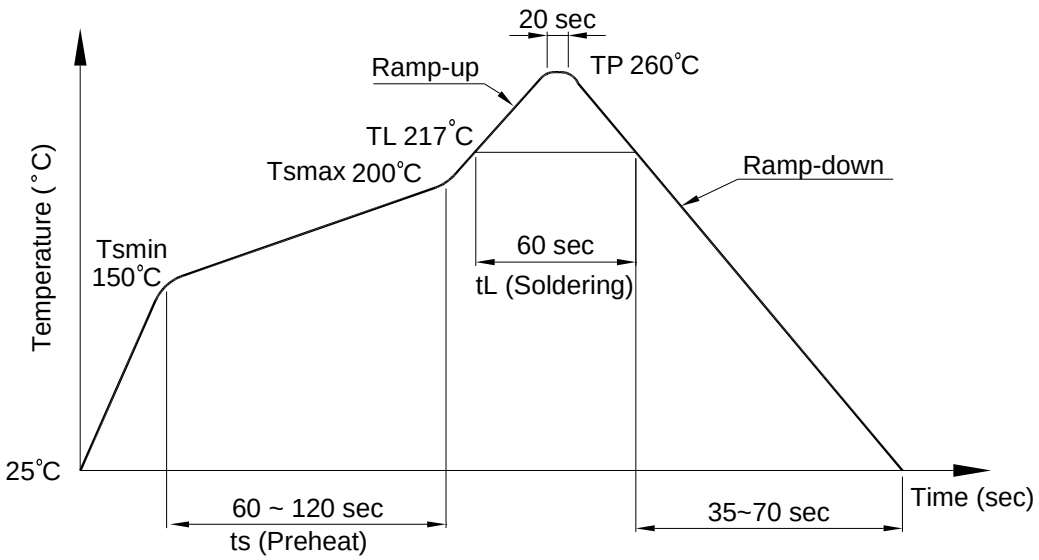


7. TEMPERATURE PROFILE OF SOLDERING

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

One time soldering reflow is recommended within the condition of temperature and time profile shown below. Do not solder more than three times.

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



7.2 Wave soldering (JEDEC22A111 compliant)

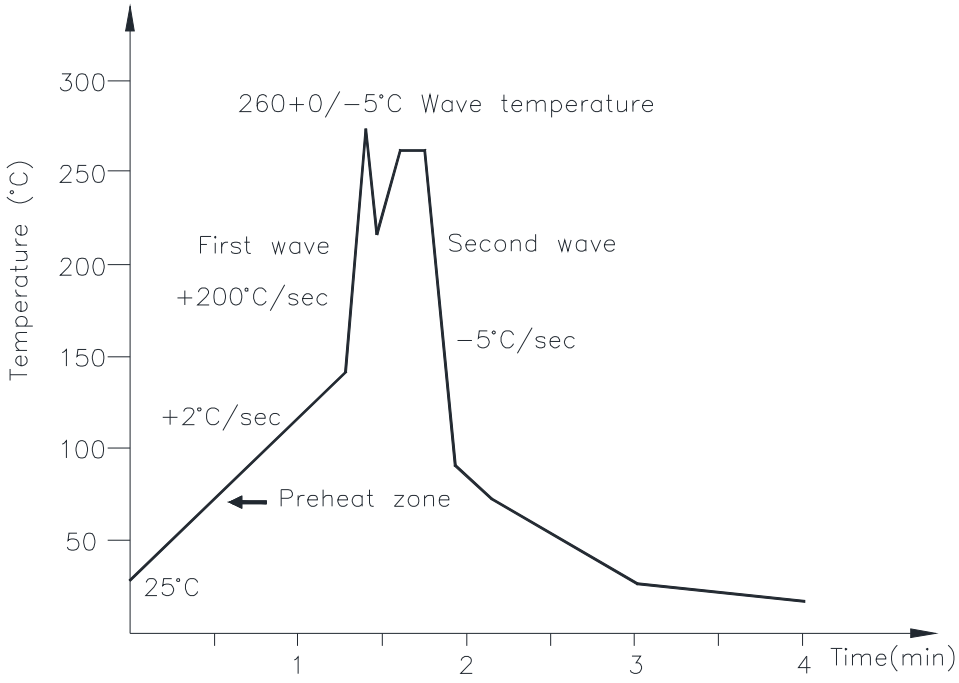
One time soldering is recommended within the condition of temperature.

Temperature: 260+0/-5˚C

Time: 10 sec.

Preheat temperature:25 to 140˚C

Preheat time: 30 to 80 sec.



7.3 Hand soldering by soldering iron

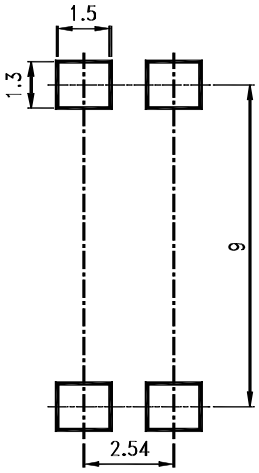
Allow single lead soldering in every single process. One time soldering is recommended.

Temperature: 380+0/-5˚C

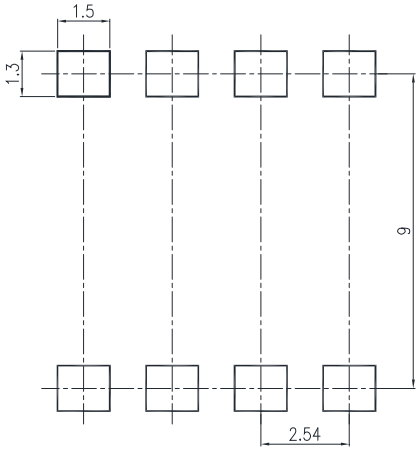
Time: 3 sec max.

8. RECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)

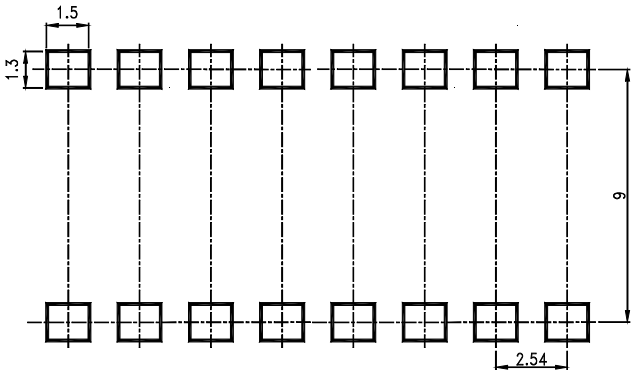
8.1 4 PIN



8.2 8 PIN



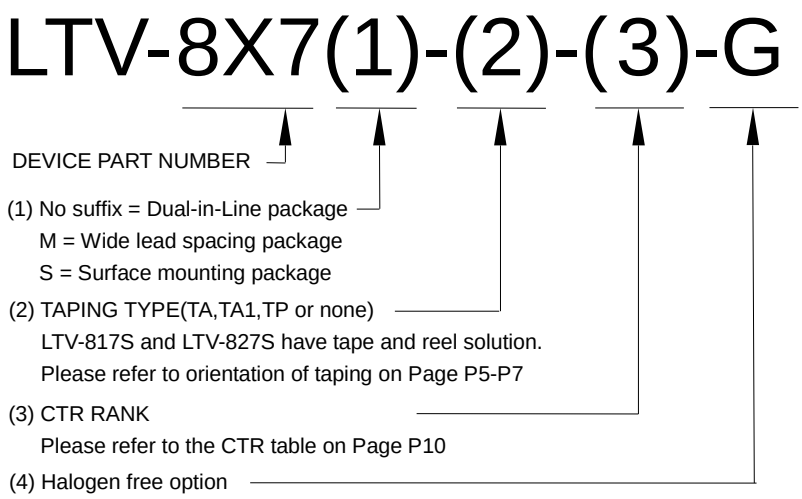
8.3 16PIN



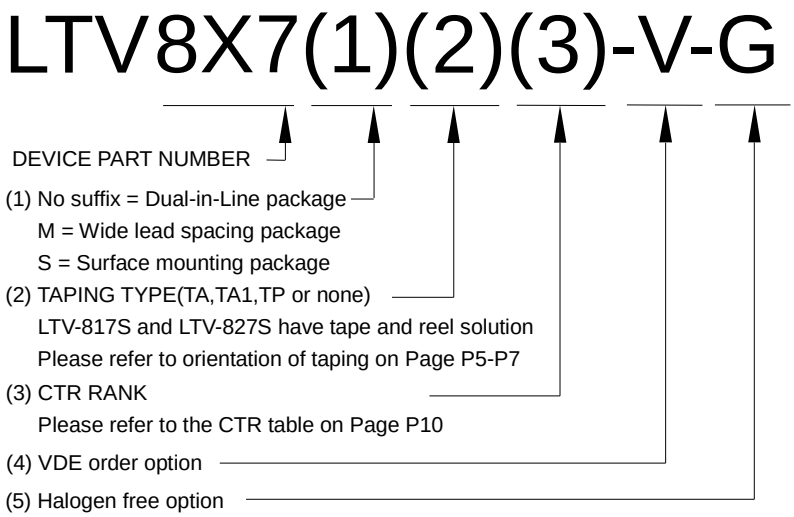
Note :

Dimensions in millimeters.

9. Naming rule



Example : LTV-817S-TA1-A-G



Example : LTV817STA1A-V-G

10. Notes:

- LiteOn is continually improving the quality, reliability, function or design and LiteOn reserves the right to make changes without further notices.
- The products shown in this publication are designed for the general use in electronic applications such as office automation equipment, communications devices, audio/visual equipment, electrical application and instrumentation.
- 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.
- Immerge unit’s body in solder paste is not recommended.
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