LITEON®
OPTOELECTRONICS

Photocoupler
Product Data Sheet
LTV-100X-G series datasheet

Spec No. :DS70-2013-0012
Effective Date: 12/26/2018
Revision: I

LITE-ON DCC

RELEASE

BNS-OD-FC001/A4

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Photocoupler
LTV-10XX-G series

1. DESCRIPTION

1.1 Features

- Current transfer ratio (CTR : MIN. 50% at I_F = 5mA, V_{CE} = 5V, Ta=25°C)
- High input-output isolation voltage (Viso = 5,000Vrms)
- High collector-emitter voltage (V_{CEO} = 70V)
- Temperature range -55°C to 110°C
- Creepage distance > 8mm
- Employs double transfer mold technology
- Long Mini-flat package: LTV-10XX series
- Halogen Free
- Pb Free
- Safety approval
  UL 1577
  Cul CA5A
  VDE DIN EN60747-5-5 (VDE 0884-5) Maximum transient isolation voltage (VIOTM) 8,000V
  CQC GB4943.1-2011/ GB8898-2011 (meet Altitude up to 5000m)
  Nordic Safety (FIMKO/NEMKO/SEMKO/DEMKO)
- RoHS Compliance

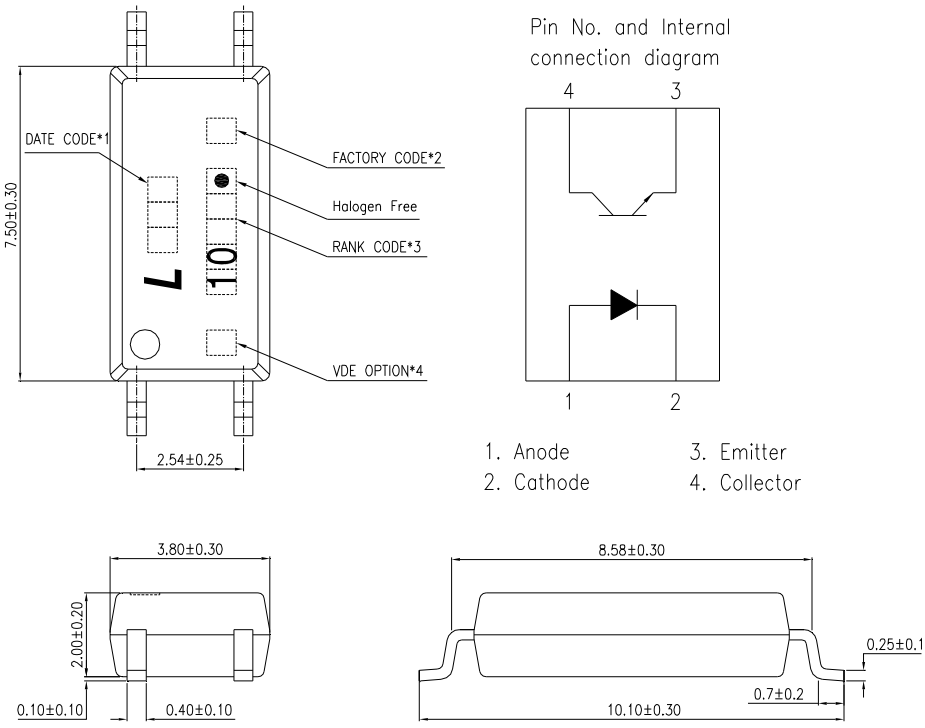
  All materials be used in device are followed EU RoHS directive (No.2002/95/EC, 2011/65/EU, and 2015/863).

1.2 Applications

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

2. PACKAGE DIMENSIONS

2.1 LTV-10XX-G series



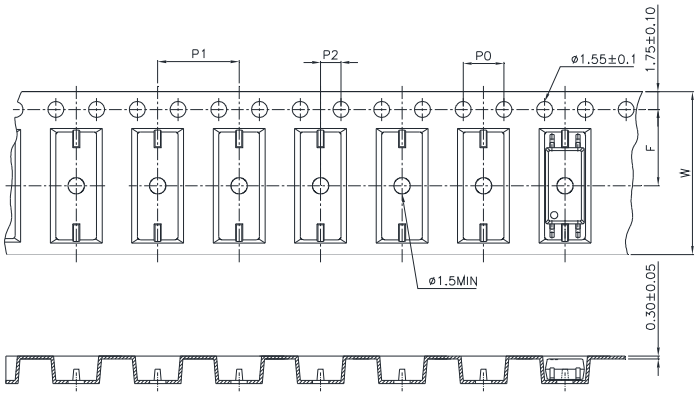
Notes :

1. 1-digit year code, Example : 2010 = A
   2-digit work week ranging from '01' to '53'
2. Factory identification mark shall be marked. (W : China-CZ, X: China -TJ)
3. CTR rank.
4. "V" for VDE option.

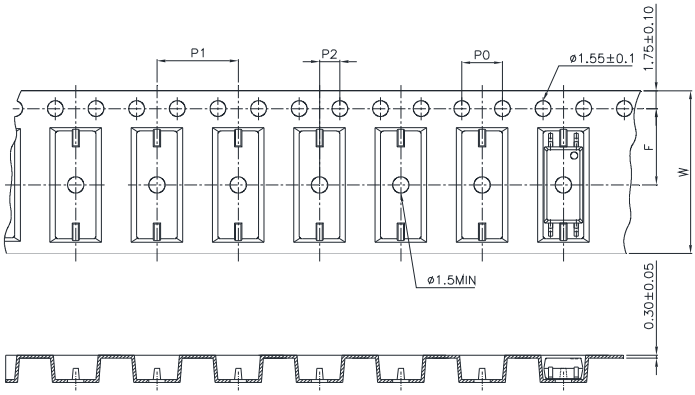
*All dimensions in millimeters.

3. TAPING DIMENSIONS

3.1 LTV-10XX-TP



3.2 LTV-10XX-TP1



Description	Symbol	Dimension in mm (inch)
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	8±0.1 (.315)

3.3 Quantities Per Reel

Package Type	LTV-10XX series
Quantities (pcs)	3000

4. RATING AND CHARACTERISTICS

4.1 Absolute Maximum Ratings at Ta=25℃

	Parameter	Symbol	Rating	Unit
Input	Forward Current	I_F	60	mA
	Reverse Voltage	V_R	6	V
	Power Dissipation	P	100	mW
	Junction Temperature	T_J	125	°C
	Thermal Resistance Junction to Ambient	Rth_{J-A}	250	°C/W
	Thermal Resistance Junction to Case	Rth_{J-C}	180	°C/W
Output	Collector - Emitter Voltage	V_{CEO}	70	V
	Emitter - Collector Voltage	V_{ECO}	7	V
	Collector Current	I_C	50	mA
	Collector Power Dissipation	P_C	150	mW
	Junction Temperature	T_J	125	°C
	Total Power Dissipation	P_{tot}	250	mW
1.	Isolation Voltage	V_{iso}	5000	V_{rms}
	Operating Temperature	T_{opr}	-55 ~ +110	°C
	Storage Temperature	T_{stg}	-55 ~ +150	°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	—	1.25	1.6	V	I_F=50mA
		Reverse Current	I_R	—	—	10	μA	V_R=4V
		Terminal Capacitance	C_t	—	50	—	pF	V=0, f=1MHz
Output		Collector Dark Current	I_{CEO}	—	10	100	nA	V_{CE}=20V, I_F=0mA
		Collector- Emitter Breakdown Voltage	BV_{CEO}	70	—	—	V	I_C=1mA I_F=0mA
		Emitter-Collector Breakdown Voltage	BV_{ECO}	7	—	—	V	I_E=100μA, I_F=0mA
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	$V_{CE(sat)}$	—	—	0.3	V	I_F=10mA I_C=1mA
		Isolation Resistance	R_{iso}	1×10^{12}	—	—	Ω	DC500V, 40 ~ 60% R.H.
		Floating Capacitance	Cf	—	0.3	—	pF	V=0, f=1MHz
		Response Time (Rise)	tr	—	3	18	μs	V_{CC}=5V, I_C=2mA R_L=100Ω,
		Response Time (Fall)	tf	—	4.7	18	μs	

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

5. RANK TABLE OF CURRENT TRANSFER RATIO CTR

CTR Rank	Min.	Typ.	Max.	Unit	Condition
LTV-1000	50	—	600	%	I_F=5mA, V_{CE}=5V, Ta=25°C
LTV-1001	100	—	160		
LTV-1004	100	—	200		
LTV-1005	50	—	150		
LTV-1006	100	—	300		
LTV-1007	80	—	160		
LTV-1008	130	—	260		
LTV-1009	200	—	400		
LTV-1010	150	—	300		
LTV-1019	250	—	500		
LTV-1002	22	—	—	%	I_F=1mA, V_{CE}=5V, Ta=25°C
LTV-1003	34	—	—		
LTV-1014	56	—	—		
LTV-1015	63	—	125		
LTV-1018	100	—	200		
LTV-1002	63	—	125	%	I_F=10mA, V_{CE}=5V, Ta=25°C
LTV-1003	100	—	200		
LTV-1014	160	—	320		

6. CHARACTERISTICS CURVES (TYPICAL PERFORMANCE)

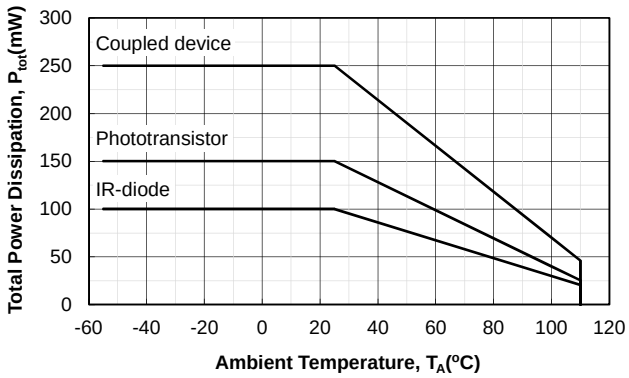


Figure 1. P_{tot} vs. T_A

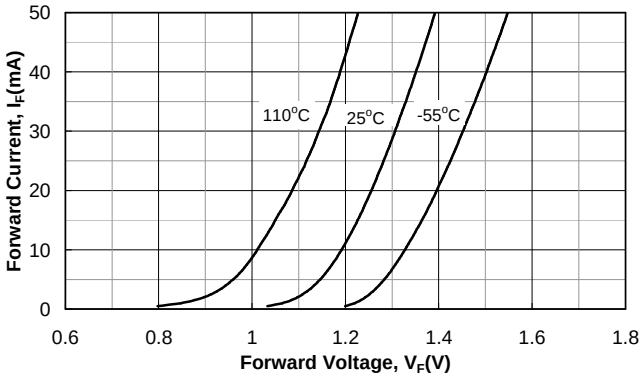


Figure 4. I_F vs. V_F

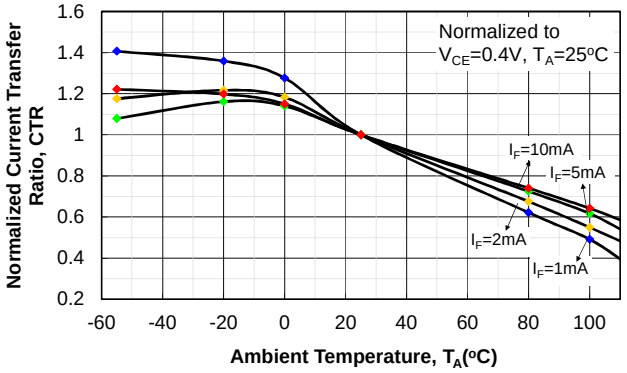


Figure 2. Saturated Normalized CTR vs. T_A

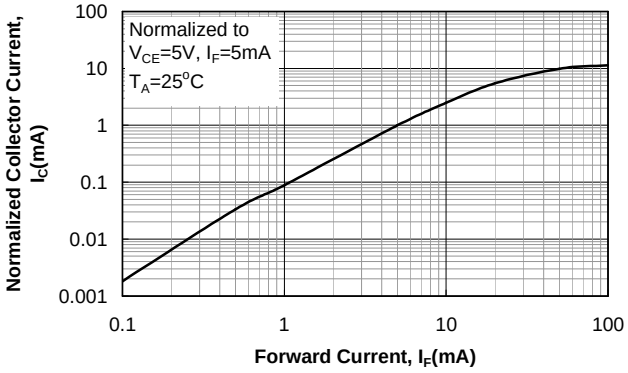


Figure 5. Normalized I_C vs. I_F

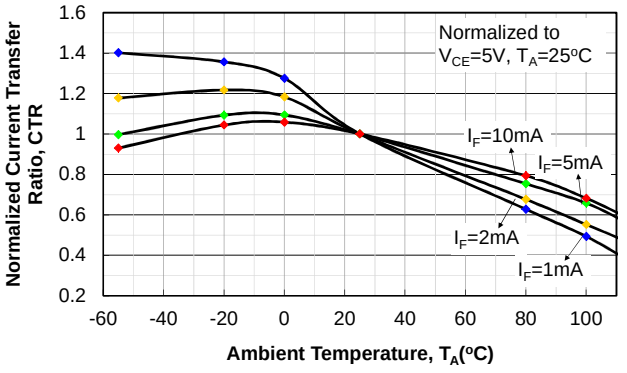


Figure 3. Non-saturated Normalized CTR vs. T_A

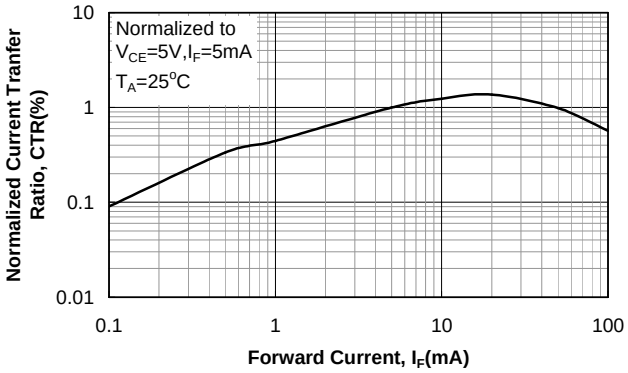


Figure 6. Normalized CTR vs. I_F

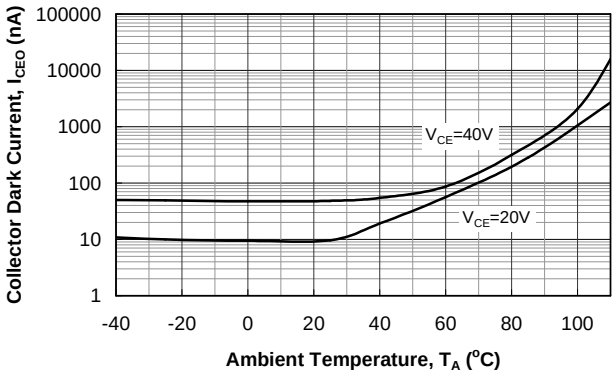


Figure 7. I_{CEO} vs. T_A

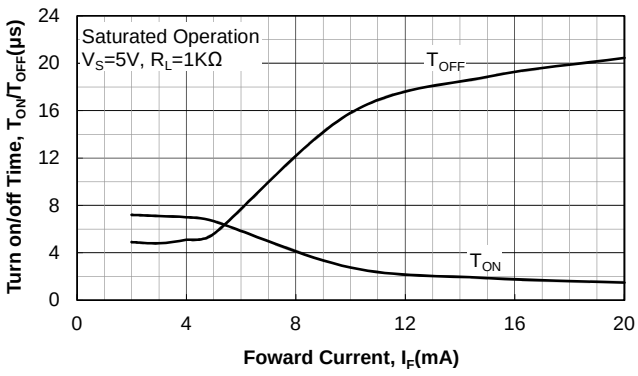


Figure 10. T_{ON} / T_{OFF} vs. I_F

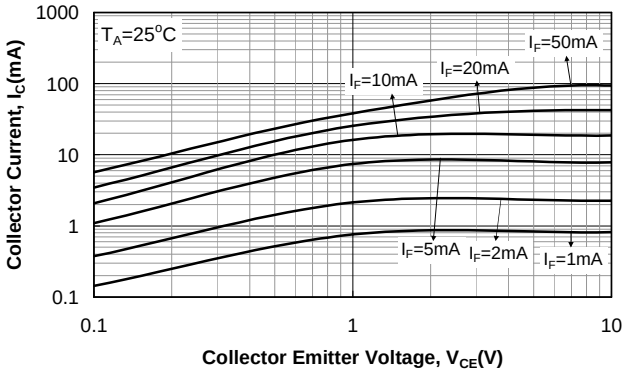


Figure 8. I_C vs. V_{CE}

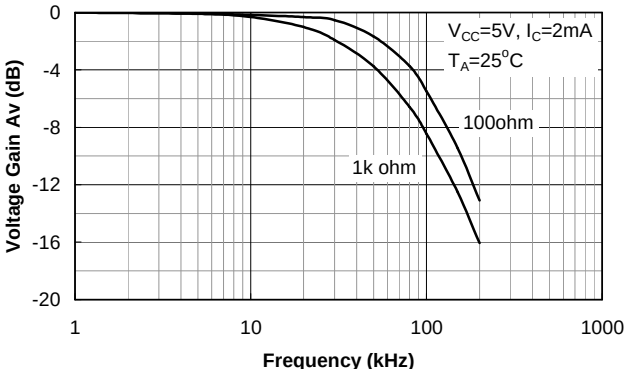


Figure 11. Frequency Response

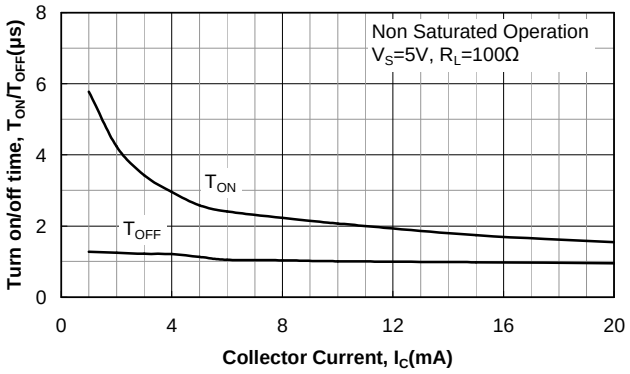


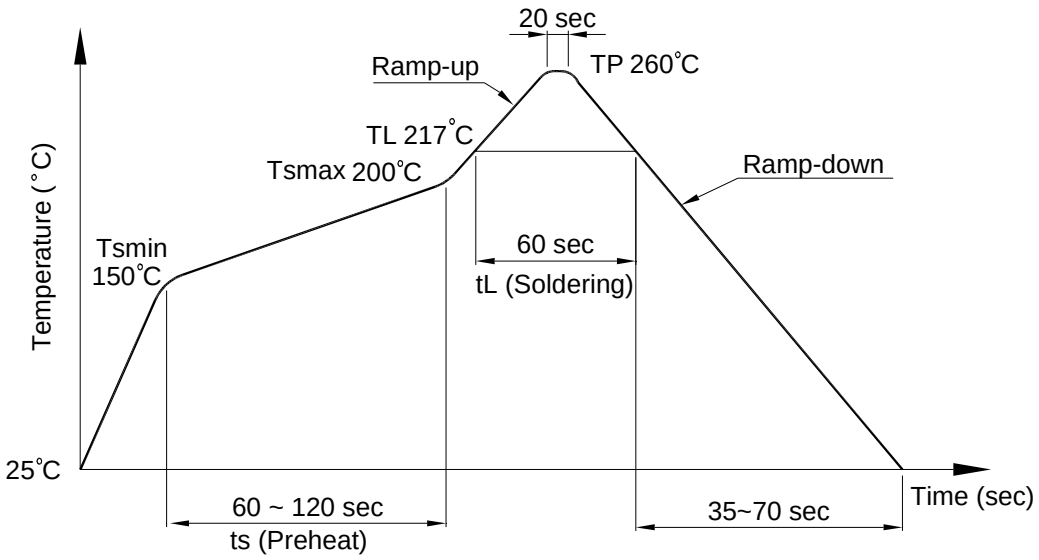
Figure 9. T_{ON} / T_{OFF} vs. I_C

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)

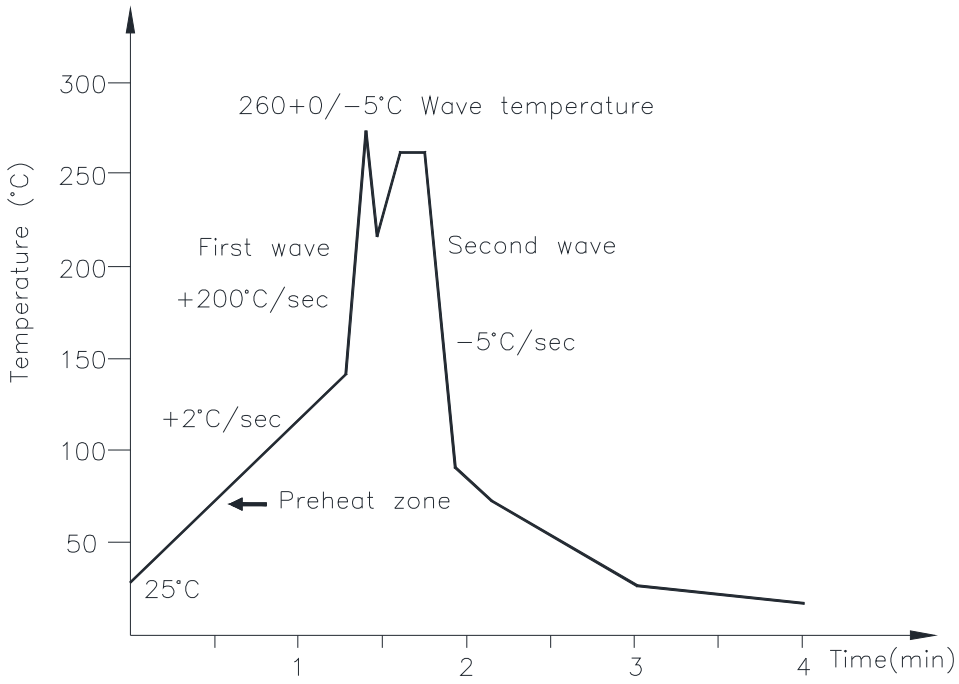
One time soldering is recommended within the condition of temperature.

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

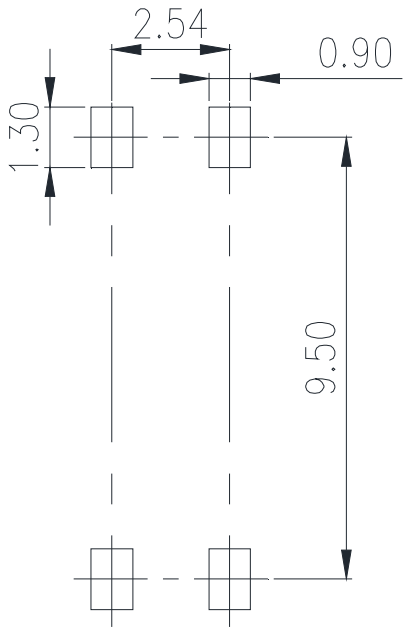
Allow single lead soldering in every single process. One time soldering is recommended.

Temperature: 380+0/-5˚C

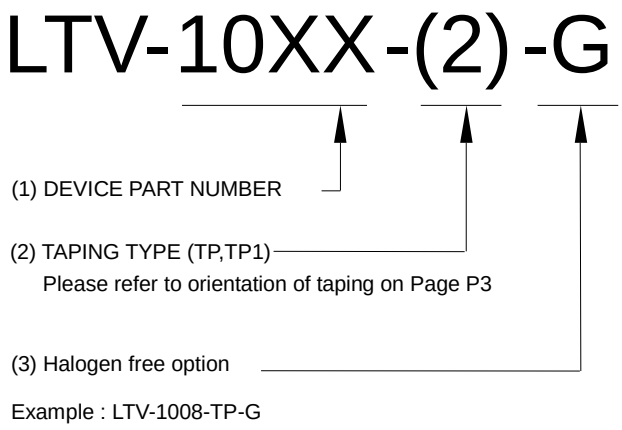
Time: 3 sec max.

8. RECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)

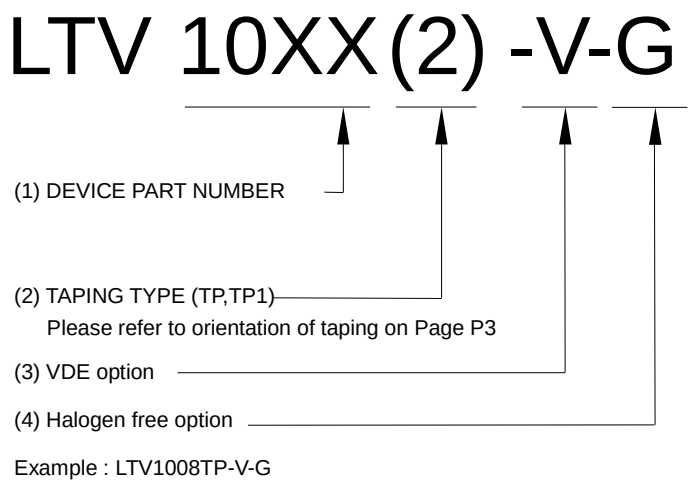
Unit: mm



9. NAMING RULE



Example : LTV-1008-TP-G



Example : LTV1008TP-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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