Photocoupler
LTV-702V (M, S, S-TA, S-TA1) series

1. DESCRIPTION

1.1 Features

- Current transfer ratio (CTR : 40% ~ 320% at I_F = 10mA, V_{CE} = 5 V, T_A=25°C)
- High input-output isolation voltage Viso = 5,000Vrms
- High collector-emitter voltage (V_{CEO} = 70V)
- Response time (tr : TYP. 2μs at V_{CC} = 5V, I_F = 10mA, R_L = 75Ω)
- Dual-in-line package :

  LTV-702V
- Wide lead spacing package :

  LTV-702VM
- Surface mounting package :

  LTV-702VS
- Tape and reel packaging :

  LTV-702VS-TA, LTV-702VS-TA1
- Safety approval
  * UL approved (No. E113898)
  * TUV approved (No. R9653630)
  * CSA approved (No. CA91533-1)
  * FIMKO approved (No. 193422-01)
  * NEMKO approved (No. P96103013)
  * DEMKO approved (No. 303968)
  * SEMKO approved (No. 9646047 / 01-30)
  * VDE approved (No. 094722)
- RoHS Compliance

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

1.2 Applications

- Directly connectable to TTL

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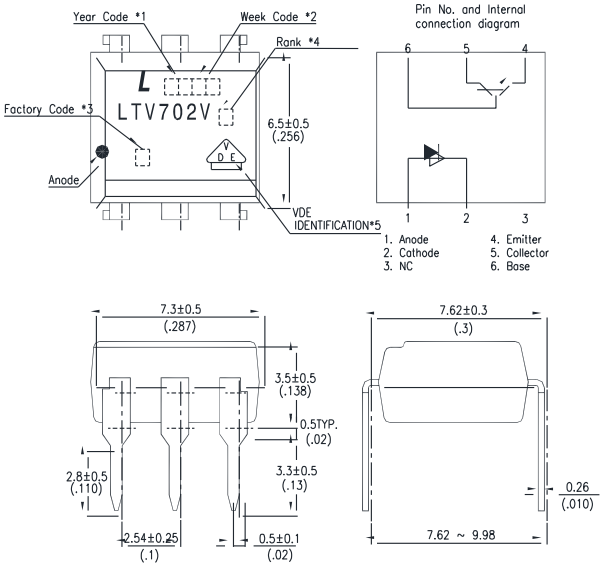
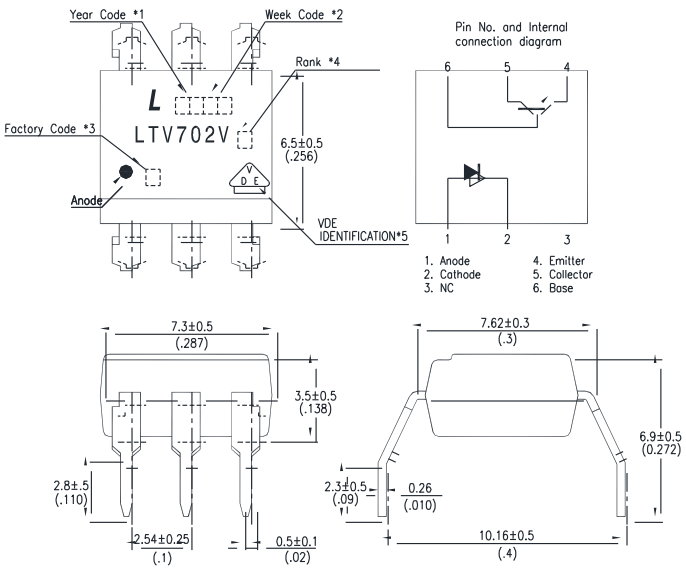
2. PACKAGE DIMENSIONS

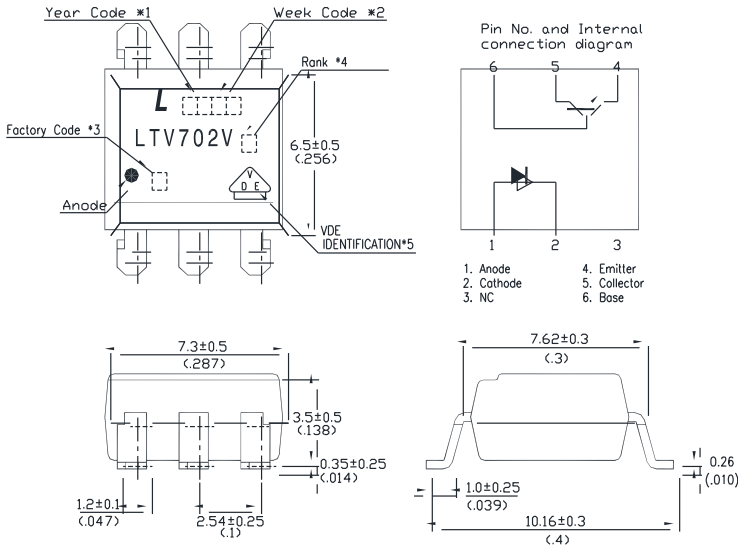
2.1 LTV-702V



2.2 LTV-702VM



2.3 LTV-702VS



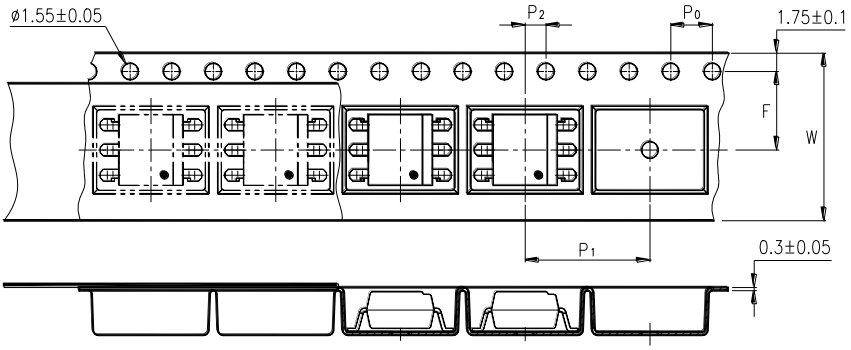
Notes :

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.
5. For VDE option.

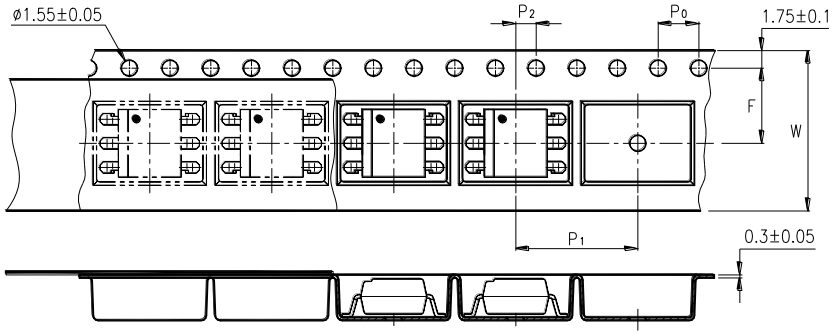
Dimensions in millimeters (inches).

3. TAPING DIMENSIONS

3.1 LTV-702VS-TA



3.2 LTV-702VS-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

4. RATING AND CHARACTERISTICS

4.1 Absolute Maximum Ratings at Ta=25°C

Parameter		Symbol	Rating	Unit
Input	Forward Current	I_F	60	mA
	Reverse Voltage	V_R	6	V
	Power Dissipation	P	105	mW
	Junction Temperature	T_J	125	°C
Output	Collector - Emitter Voltage	V_{CEO}	70	V
	Emitter - Collector Voltage	V_{ECO}	6	V
	Collector - Base Voltage	V_{CBO}	70	V
	Emitter - Base Voltage	V_{EBO}	6	V
	Collector Current	I_C	50	mA
	Collector Power Dissipation	P_C	160	mW
Total Power Dissipation		P_{tot}	200	mW
*1 Isolation Voltage		V_{iso}	5000	V_{rms}
Operating Temperature		T_{opr}	-55 ~ +100	°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

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4.2 ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C

PARAMETER		SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
INPUT	Forward Voltage	V_F	—	1.4	1.7	V	I_F=60mA
	Reverse Current	I_R	—	—	10	μA	V_R=6V
	Terminal Capacitance	Ct	—	30	250	pF	V=0, f=1KHz
OUTPUT	Collector Dark Current	I_{CEO}	—	—	50	nA	V_{CE}=10V, I_F=0
	Collector-Emitter Breakdown Voltage	BV_{CEO}	70	—	—	V	I_C=0.1mA I_F=0
	Emitter-Collector Breakdown Voltage	BV_{ECO}	6	—	—	V	I_E=10μA I_F=0
	Collector-Base Breakdown Voltage	BV_{CBO}	70	—	—	V	I_C=0.1mA I_F=0
TRANSFER CHARACTERISTICS	Collector Current	I_C	4	—	32	mA	I_F=10mA, V_{CE}=5V
	*Current Transfer Ratio	CTR	40	—	320	%	
	Collector-Emitter Saturation Voltage	VCE(sat)	—	0.25	0.4	V	I_F=10mA I_C=2.5mA
	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	—	150	—	kHz	V_{CC}=5V, I_F=10mA R_L=75Ω, -3dB
	Response Time (Rise)	t_R	—	2	7	μs	V_{CC}=5V, I_F=10mA R_L=75Ω
	Response Time (Fall)	t_f	—	2	8	μs	

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

5. RANK TABLE OF CURRENT TRANSFER RATIO CTR

CTR Rank	Min	Max	Condition
A	40	80	I_F=10mA, V_{CE}=5V, T_A=25°C
B	63	125	
C	100	200	
D	160	320	
No mark	40	320	

6. CHARACTERISTICS CURVES

Fig.1 Forward Current vs. Ambient Temperature

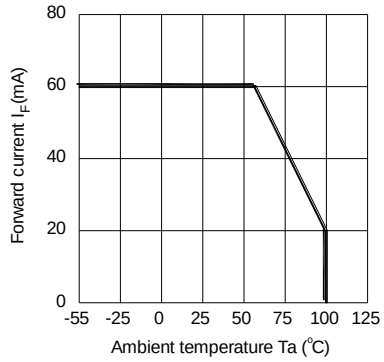

Fig.2 Collector Power Dissipation vs. Ambient Temperature

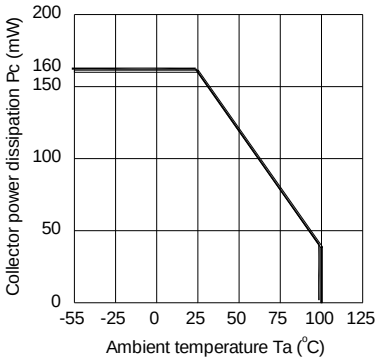

Fig.3 Collector-emitter Saturation Voltage vs. Forward Current

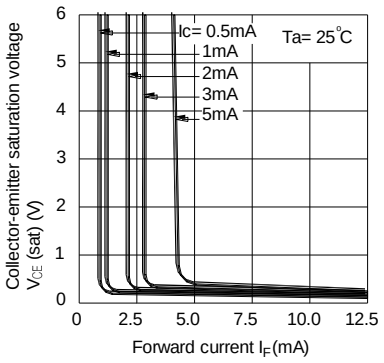

Fig.4 Forward Current vs. Forward Voltage

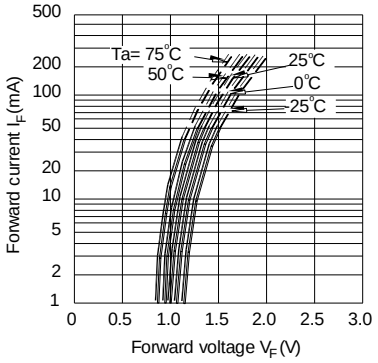

Fig.5 Current Transfer Ratio vs. Forward Current

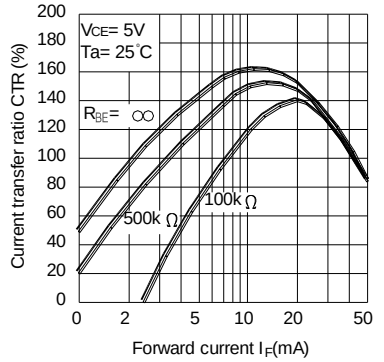

Fig.6 Collector Current vs. Collector-emitter Voltage

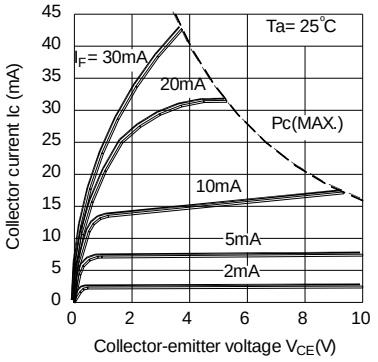

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Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

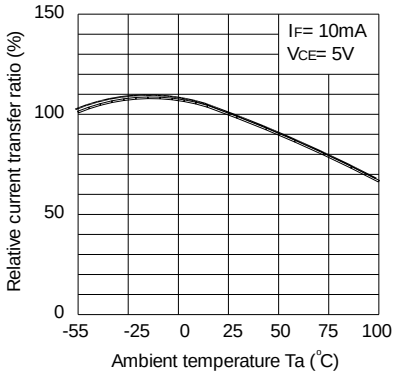


Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

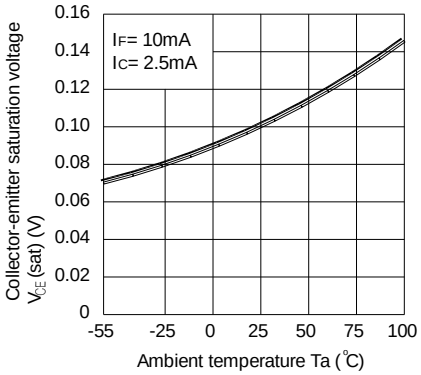


Fig.9 Collector Dark Current vs. Ambient Temperature

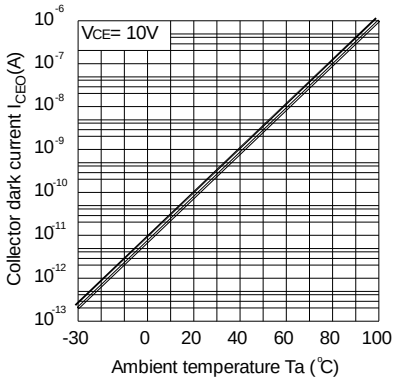


Fig.10 Response Time vs. Load Resistance

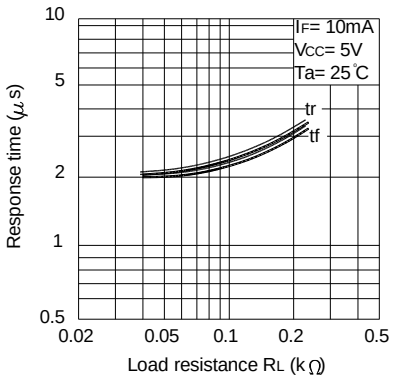
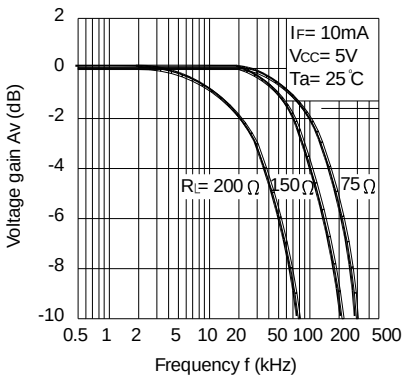
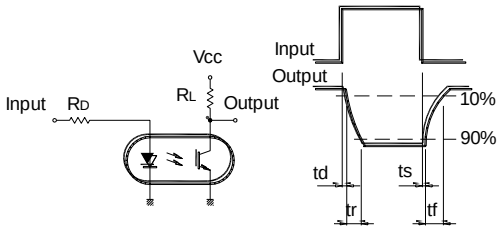


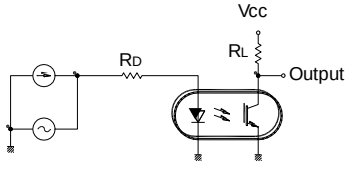
Fig.11 Frequency Response



Test Circuit for Response Time



Test Circuit for Frequency Response

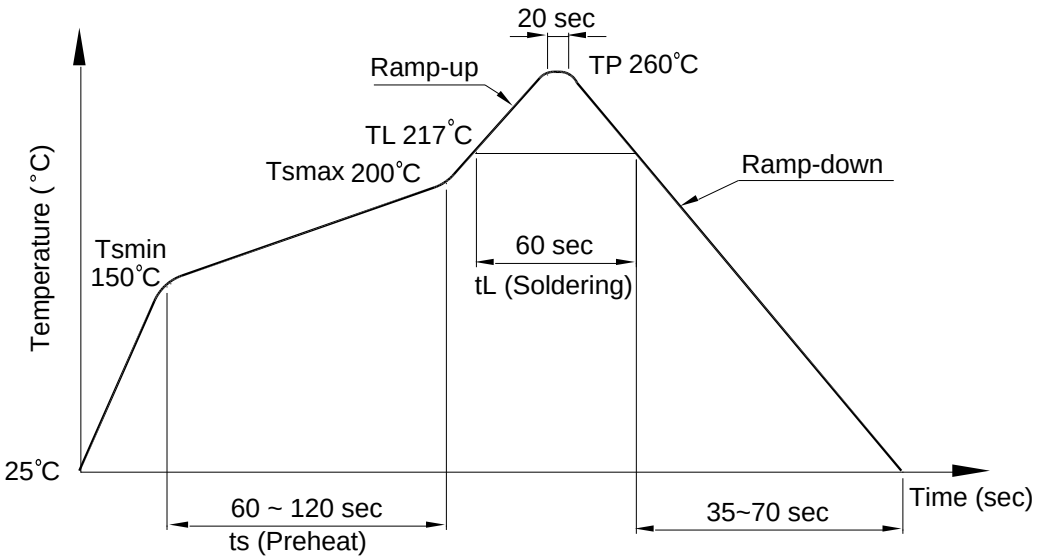


7. TEMPERATURE PROFILE OF SOLDERING

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)

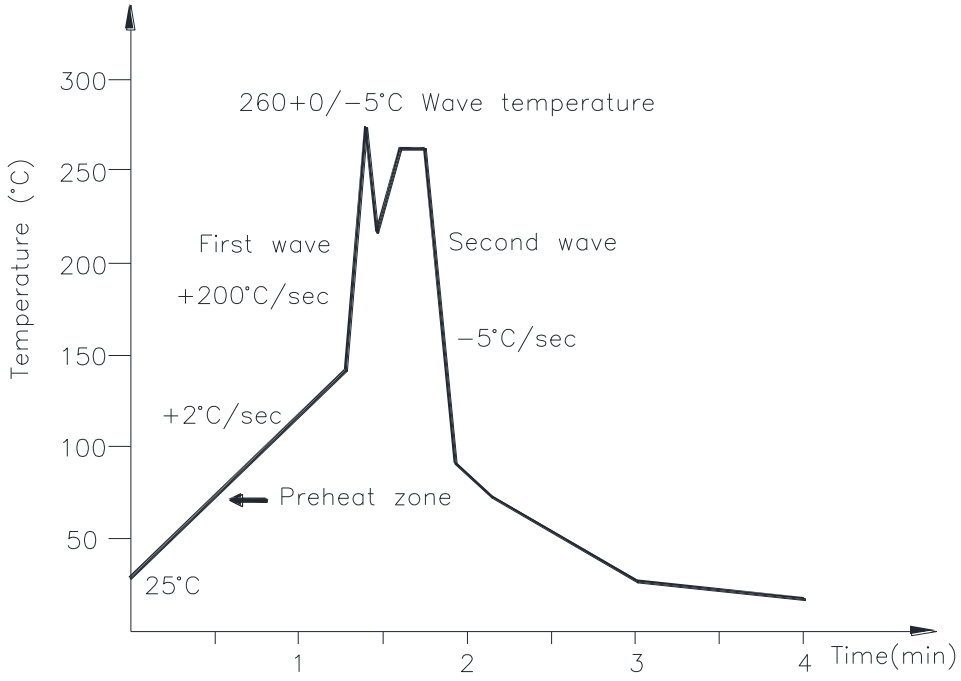
One time soldering is recommended within the condition of temperature.

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

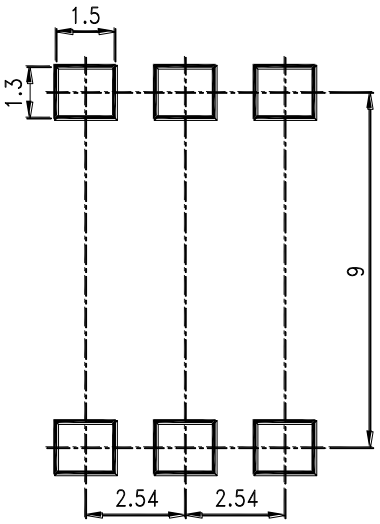
Allow single lead soldering in every single process. One time soldering is recommended.

Temperature: 380+0/-5˚C

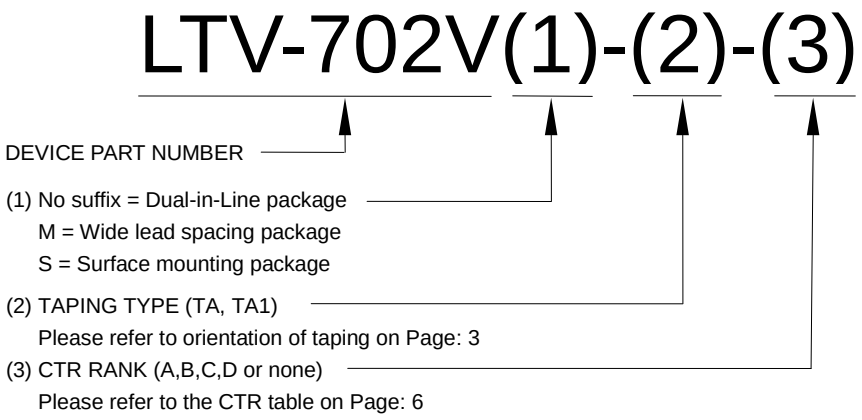
Time: 3 sec max.

8. RECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)

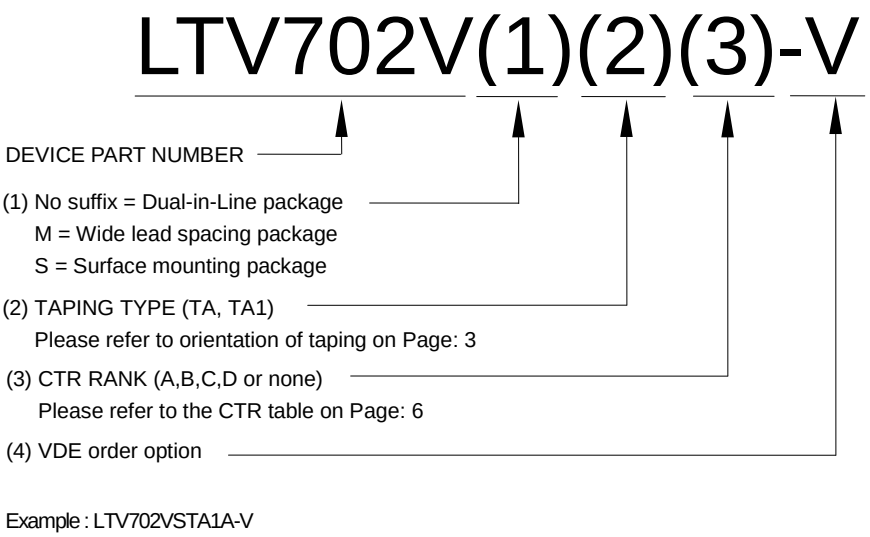
Unit: mm



9. NAMING RULE



Example : LTV-702VS-TA1-A



Example : LTV702VSTA1A-V

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.