Photocoupler
4N2X Series

1. DESCRIPTION

1.1 Features

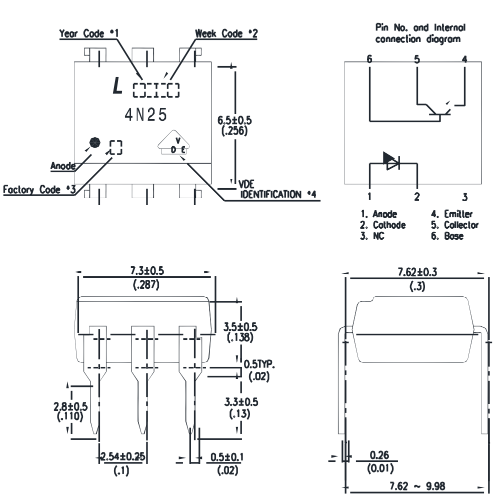
- High Current transfer ratio (CTR : MIN. 10% at IF = 10mA, VCE = 10V)
- Response time(ton : TYP. 3μs at VCC = 10V, IC = 2mA, RL = 100Ω)
- Input-output isolation voltage
  4N25 series : Viso = 2,500Vrms
  4N26 series : Viso = 1,500Vrms
  4N27 series : Viso = 1,500Vrms
  4N28 series : Viso = 500Vrms
- Dual-in-line package :
  4N25, 4N26, 4N27, 4N28
- Wide lead spacing package :
  4N25M, 4N26M, 4N27M, 4N28M
- Surface mounting package :
  4N25S, 4N26S, 4N27S, 4N28S
- Tape and reel packaging :
  4N25S-TA1, 4N26S-TA1, 4N27S-TA1, 4N28S-TA1
- Safety approval
  UL approval (NO. E113898)
  TUV approval (NO. R9653630)
  DEMKO approval (NO. 303985)
  CSA & cUL, VDE, FIMKO, CQC approved
- RoHS Compliance
  All materials be used in device are followed EU RoHS directive (No.2002/95/EC).
- ESD pass HBM 8000V/MM2000V
- MSL class 1

1.2 Applications

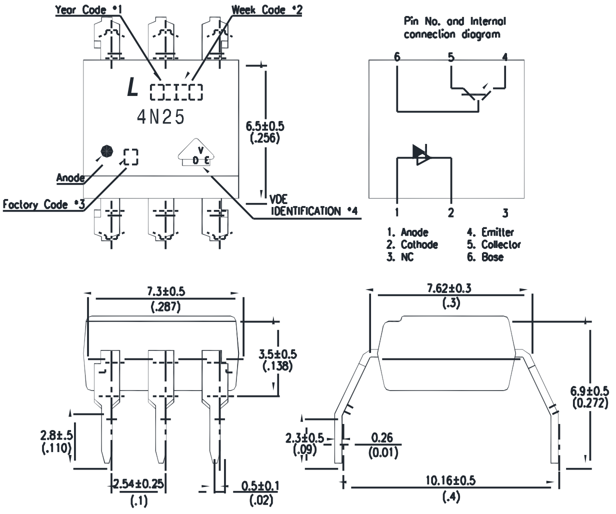
- Hybrid substrates that require high density mounting.
- Programmable controllers

2. PACKAGE DIMENSIONS

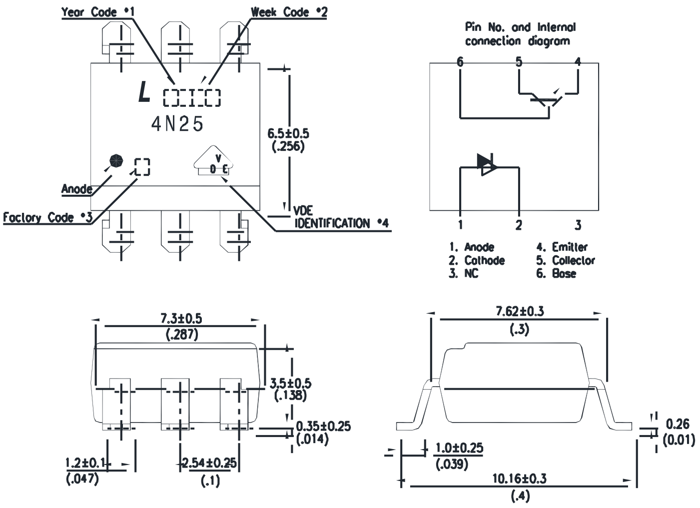
2.1 4N25



2.2 4N25M



2.3 4N25S

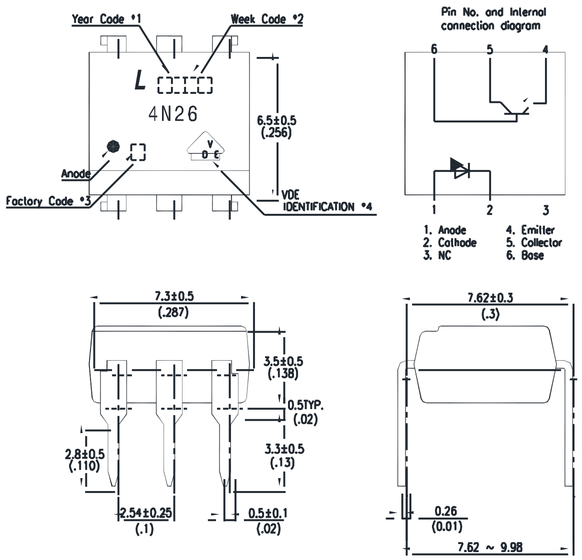


Notes :

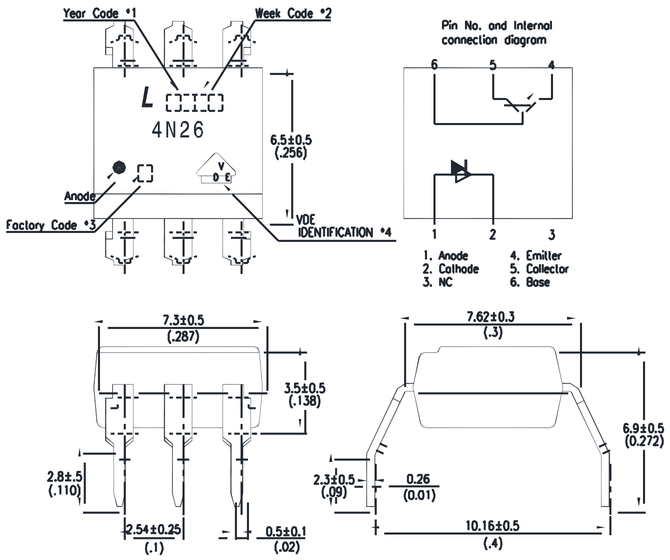
1. Year date code.
2. 2-digit work week.
3. Factory identification mark shall be marked (W: China-CZ, Y: Thailand)
4. VDE option.

Dimensions in millimeters(inches).

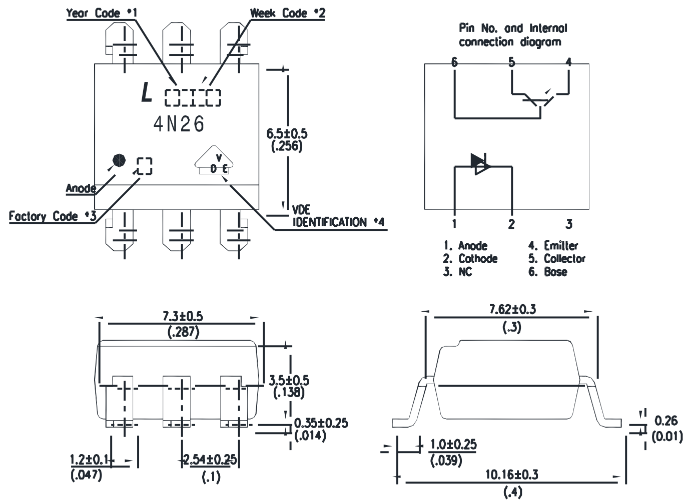
2.4 4N26



2.5 4N26M



2.6 4N26S

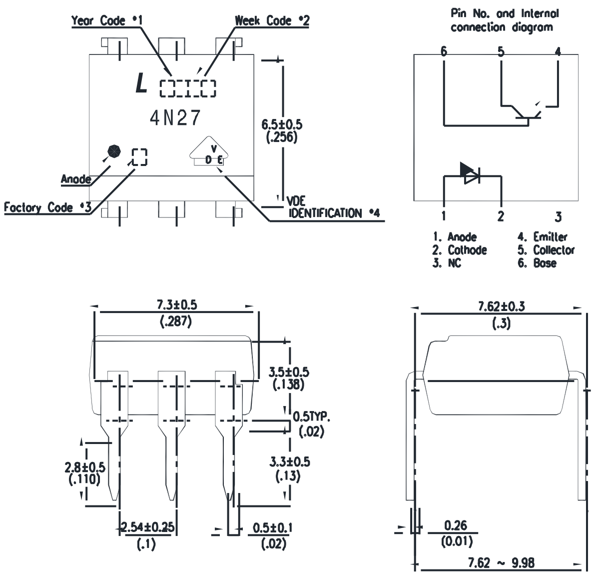


Notes :

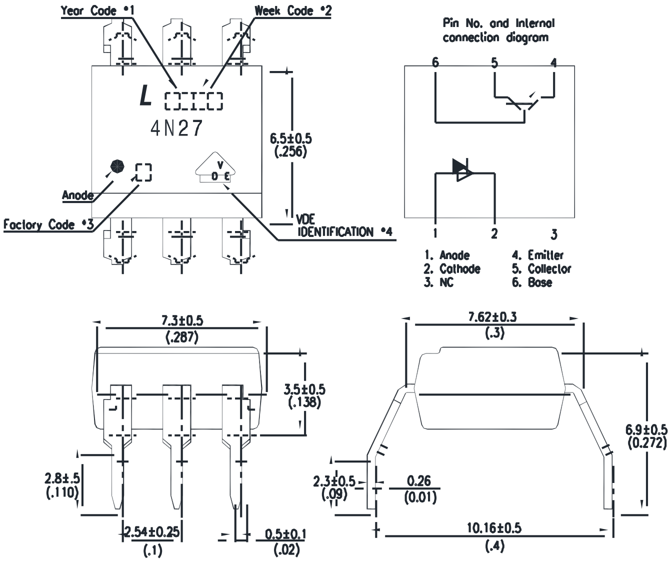
1. Year date code.
2. 2-digit work week.
3. Factory identification mark shall be marked
   (W: China-CZ, Y: Thailand)
4. VDE option.

Dimensions in millimeters(inches).

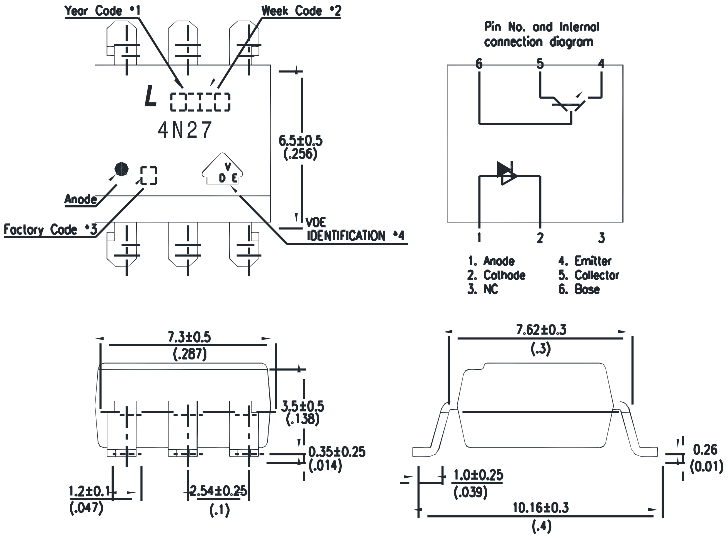
2.7 4N27



2.8 4N27M



2.9 4N27S

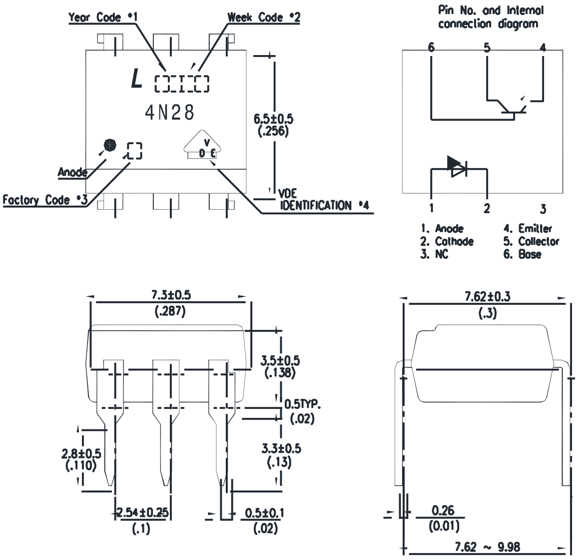


Notes :

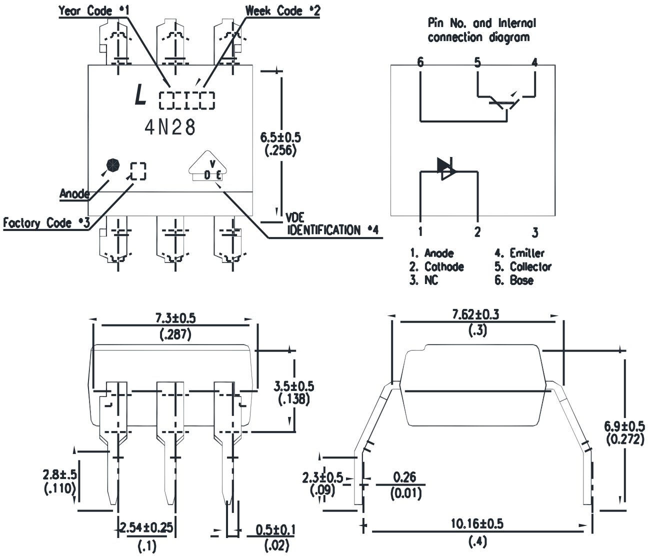
1. Year date code.
2. 2-digit work week.
3. Factory identification mark shall be marked (W: China-CZ, Y: Thailand)
4. VDE option.

Dimensions in millimeters(inches).

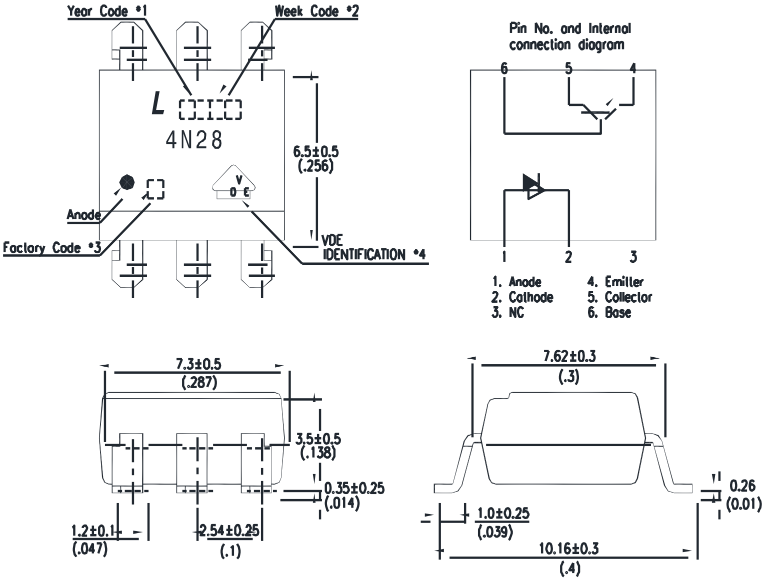
2.10 4N28



2.11 4N28M



2.12 4N28S



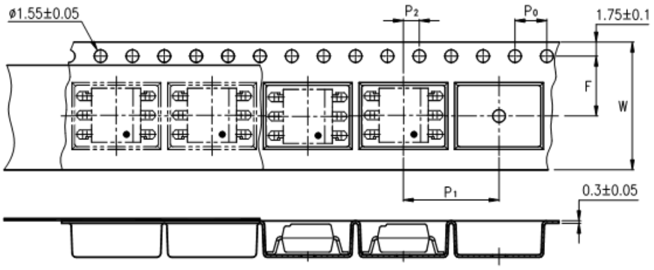
Notes :

1. Year date code.
2. 2-digit work week.
3. Factory identification mark shall be marked
   (W: China-CZ, Y: Thailand)
4. VDE option.

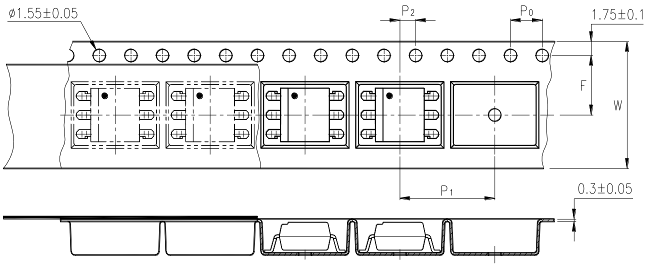
Dimensions in millimeters(inches).

3. TAPING DIMENSIONS

3.1 4N25S-TA , 4N26S-TA , 4N27S-TA , 4N28S-TA



3.2 4N25S-TA1 , 4N26S-TA1 , 4N27S-TA1 , 4N28S-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	80	mA
	Reverse Voltage	V_R	6	V
	Power Dissipation	P	150	mW
Output	Collector - Emitter Voltage	V_{CEO}	30	V
	Emitter - Collector Voltage	V_{ECO}	7	V
	Collector - Base Voltage	V_{CBO}	70	V
	Collector Current	I_C	100	mA
	Collector Power Dissipation	P_C	150	mW
Total Power Dissipation		P_{tot}	250	mW
*1 Isolation Voltage	4N25 series	V_{iso}	2,500	V_{rms}
	4N26 series		1,500	
	4N27 series		1,500	
	4N28 series		500	
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

4.2 Electrical Optical Characteristics at Ta=25°C

Parameter		Symbol	Min.	Typ.	Max.	Unit	Test Condition
Input	Forward Voltage	V_F	—	1.2	1.5	V	I_F=10mA
	Reverse Current	I_R	—	—	10	μA	V_R=4V
	Terminal Capacitance	C_t	—	50	—	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}	30	—	—	V	I_C=0.1mA, I_F=0
	Emitter-Collector Breakdown Voltage	BV_{ECO}	7	—	—	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 (4N25/4N26)	I_C	2	—	—	mA	I_F=10mA, V_{CE}=10V
	* Current Transfer Ratio (4N25/4N26)	CTR	20	—	—	%	
	Collector Current (4N27/4N28)	I_C	1	—	—	mA	
	* Current Transfer Ratio (4N27/4N28)	CTR	10	—	—	%	
	Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	0.1	0.5	V	I_F=50mA, I_C=2mA
	Isolation Resistance	R_{iso}	5×10^{10}	1×10^{11}	—	Ω	DC500V, 40 ~ 60% R.H.
	Floating Capacitance	C_f	—	1	—	pF	V=0, f=1MHz
	Response Time (Rise)	t_r	—	3	—	μs	V_{CE}=2V, I_C=2mA R_L=100Ω,
	Response Time (Fall)	t_f	—	3	—	μs	

*. Current Transfer Ratio $CTR = \frac{I_C}{I_F} \times 100\%$

5. CHARACTERISTICS CURVES

Fig.1 Forward Current vs. Ambient Temperature

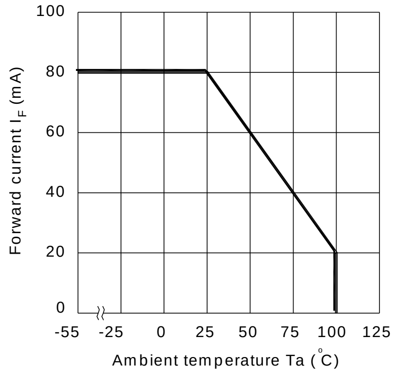


Fig.2 Collector Power Dissipation vs. Ambient Temperature

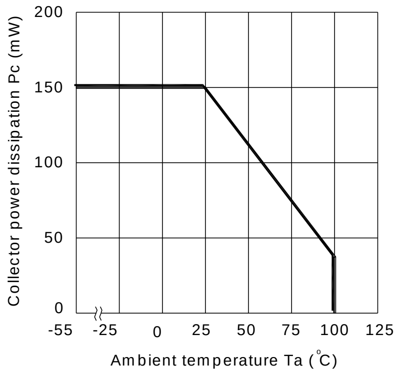


Fig.3 Forward Current vs. Forward Voltage

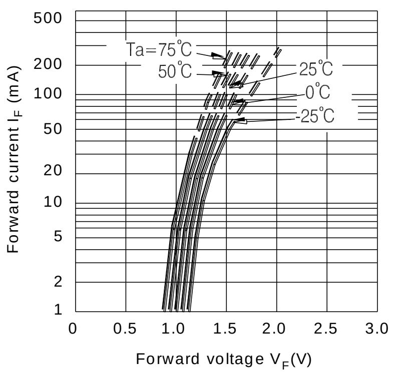


Fig.4 Current Transfer Ratio vs. Forward Current

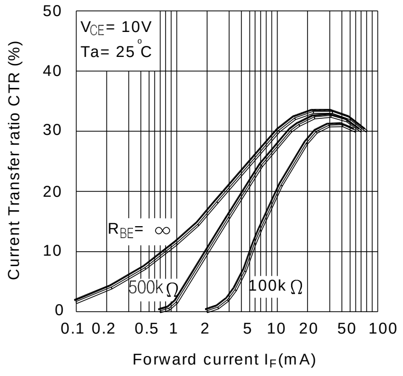


Fig.5 Collector Current vs. Collector-emitter Voltage

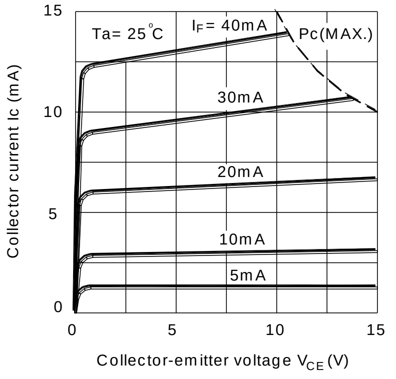


Fig.6 Relative Current Transfer Ratio vs. Ambient Temperature

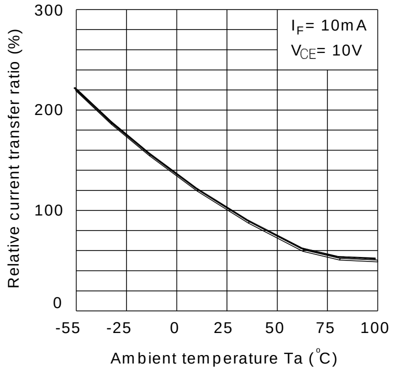


Fig.7 Collector-emitter Saturation Voltage vs. Ambient Temperature

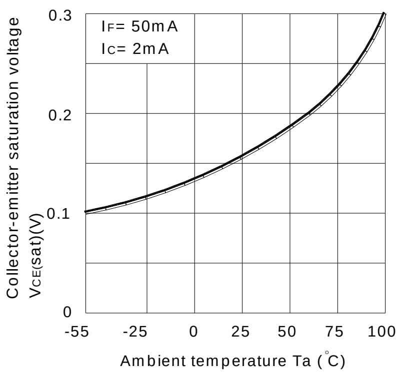


Fig.8 Collector Dark Current vs. Ambient Temperature

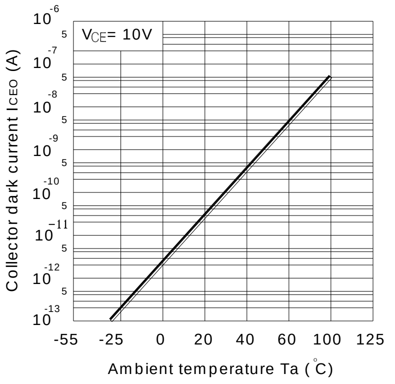


Fig.9 Response Time vs. Load Resistance

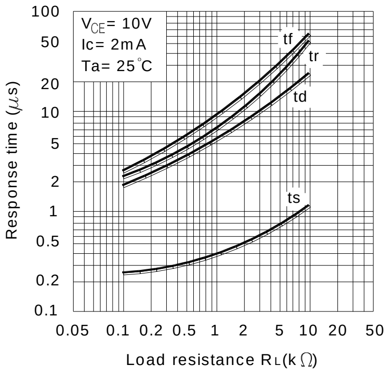


Fig.10 Frequency Response

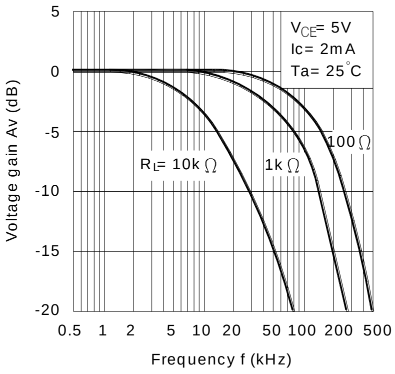
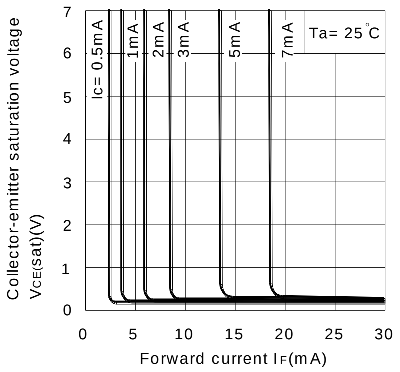
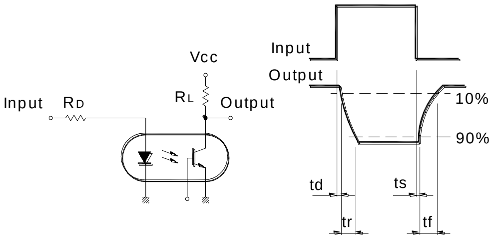


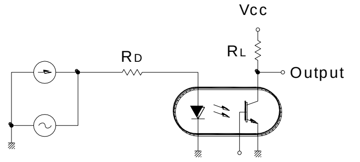
Fig.11 Collector-emitter Saturation Voltage vs. Forward Current



Test Circuit for Response Time



Test Circuit for Frequency Response

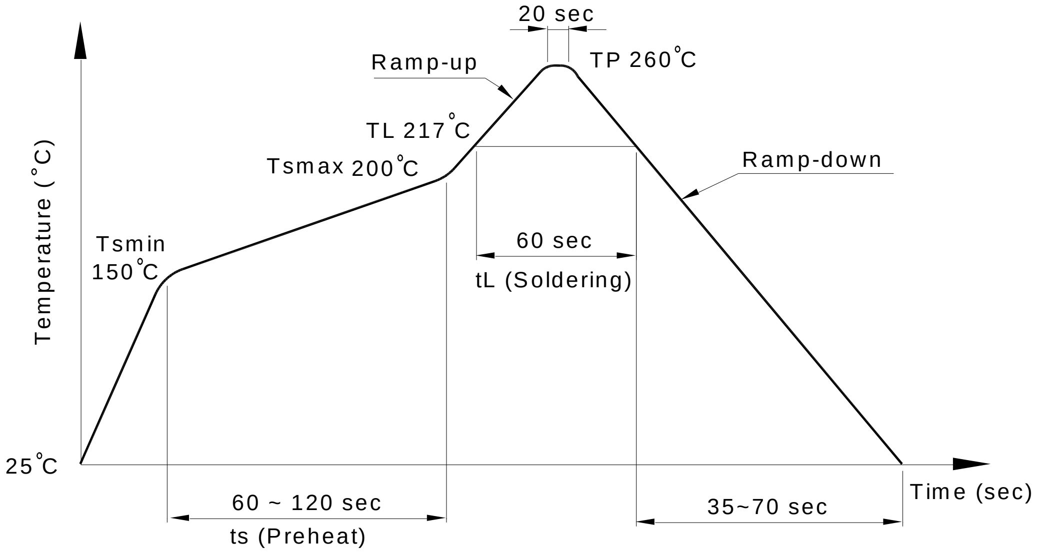


6. TEMPERATURE PROFILE OF SOLDERING

6.1 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}) - Temperature Max (T_{Smax}) - Time (min to max) (ts)	 150˚C 200˚C 90±30 sec
Soldering zone - Temperature (T_L) - Time (t_L)	 217˚C 60 sec
Peak Temperature (T_P)	260˚C
Ramp-up rate	3˚C / sec max.
Ramp-down rate	3~6˚C / sec



6.2 Wave Soldering (JEDEC22A111 compliant)

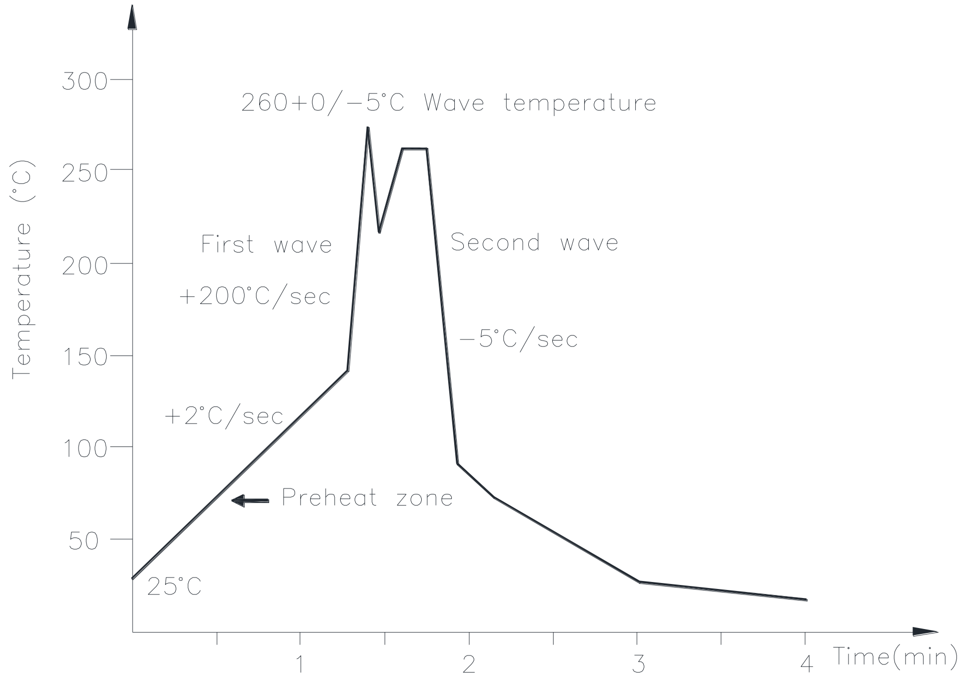
One time soldering is recommended within the condition of temperature.

Temperature: 260+0/-5˚C

Time: 10 sec.

Preheat temperature:25 to 140˚C

Preheat time: 30 to 80 sec.



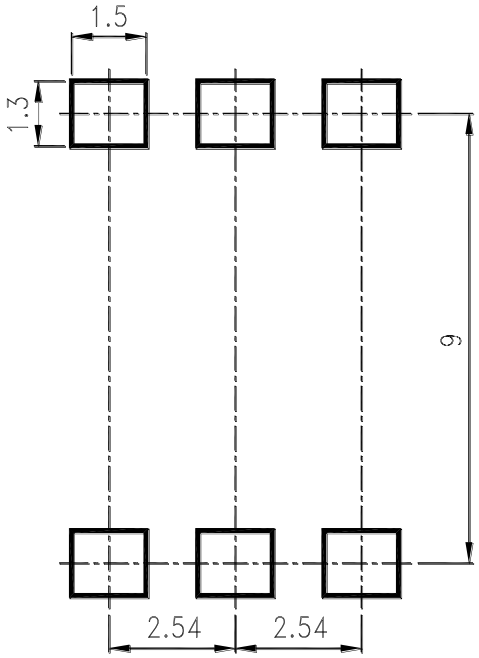
6.3 Hand Soldering by Soldering Iron

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

Temperature: 380+0/-5˚C

Time: 3 sec max.

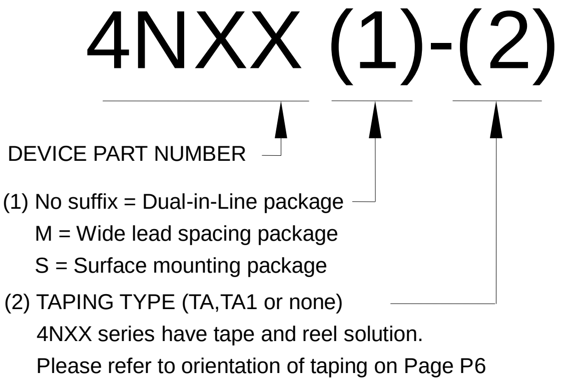
7. RRECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)



Note :

Dimensions in millimeters.

8. Naming rule



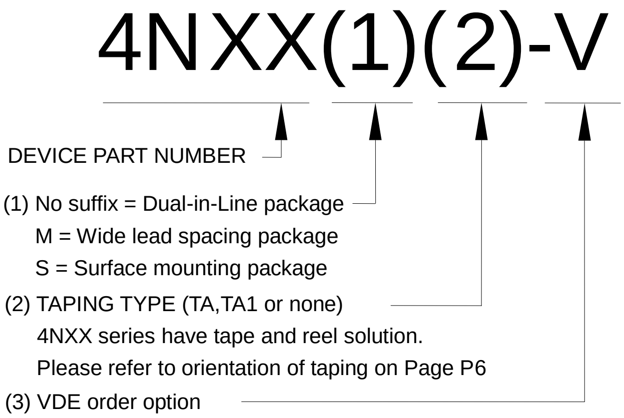
4NXX (1)-(2)

DEVICE PART NUMBER

(1) No suffix = Dual-in-Line package
M = Wide lead spacing package
S = Surface mounting package

(2) TAPING TYPE (TA,TA1 or none)
4NXX series have tape and reel solution.
Please refer to orientation of taping on Page P6

Example : 4N25S-TA1



4NXX(1)(2)-V

DEVICE PART NUMBER

(1) No suffix = Dual-in-Line package
M = Wide lead spacing package
S = Surface mounting package

(2) TAPING TYPE (TA,TA1 or none)
4NXX series have tape and reel solution.
Please refer to orientation of taping on Page P6

(3) VDE order option

Example : 4N25STA1-V-G

9. 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.
- Immerging unit’s body in solder paste is not recommended.