LITEON®
OPTOELECTRONICS

Photocoupler
Product Data Sheet
4N35/ 4N37
(M, S, S-TA1)

Spec No. :DS-70-99-0012
Effective Date: 08/22/2017
Revision: E

LITE-ON DCC

RELEASE

BNS-OD-FC001/A4

LITE-ON Technology Corp. / Optoelectronics
No.90,Chien 1 Road, Chung Ho, New Taipei City 23585, Taiwan, R.O.C.
Tel: 886-2-2222-6181 Fax: 886-2-2221-1948 / 886-2-2221-0660
http://www.liteon.com/opto

Photocoupler
4N3X series

1. DESCRIPTION

1.1 Features

- Current transfer ratio (CTR : MIN. 100% at I_F = 10mA, V_{CE} = 10V, Ta=25°C)
- High input-output isolation voltage
  4N35 series : Viso = 3,550Vrms
  4N37 series : Viso = 1,500Vrms
- Response time (tr : TYP. 3μs at Vcc = 10V, IC = 2mA, RL = 100Ω)
- Dual-in-line package :
  4N35, 4N37
- Wide lead spacing package :
  4N35M, 4N37M
- Surface mounting package :
  4N35S, 4N37S
- Tape and reel packaging :
  4N35S-TA, 4N37S-TA, 4N35S-TA1, 4N37S-TA1
- Safety approval
  * UL approved (No. E113898)
  * CSA approved (No. CA91533-1)
  * FIMKO approved (No. 193422-01)
  * VDE approved (No. 40015248)
  * BSI approved (No. 9018-9)
  * CQC approved (No.CQC11001061921-2)
- Creepage distance > 8.0 mm ; Clearance > 8.0 mm
- The relevant models are the models Approved by VDE according to DIN EN 60747-5-5

  Approved Model No.: 4N35-V / 4N37-V / 4N35M-V / 4N37M-V / 4N35S-V / 4N37S-V / 4N35STA-V / 4N37STA-V /

  4N35STA1-V / 4N37STA1-V

  VDE approved No.: 40015248 (According to the specification DIN EN 60747-5-5)
- Operating isolation voltage VIORM : 420V (Peak)
- Transient voltage VTR : 6000V (Peak)
- Pollution : 2 (According to VDE 0110-1 : 1997-04)
- Clearances distance (Between input and output) : 7.0mm (MIN.)
- Creepage distance (Between input and output) : 7.0mm (MIN.)
- Isolation thickness between input and output : 0.4mm (MIN.)
- Safety limit values Current (Isi) : 400mA (Diode side)

  Power (Psi) : 700mW (Phototransistor side)

  Temperature(Tsi) : 175°C

  In order to keep safety electric isolation of photocoupler, please set the protective

  circuit to keep within safety limit values when the actual application equipment troubled.
- Indication of VDE approval prints "  " on sleeve package.

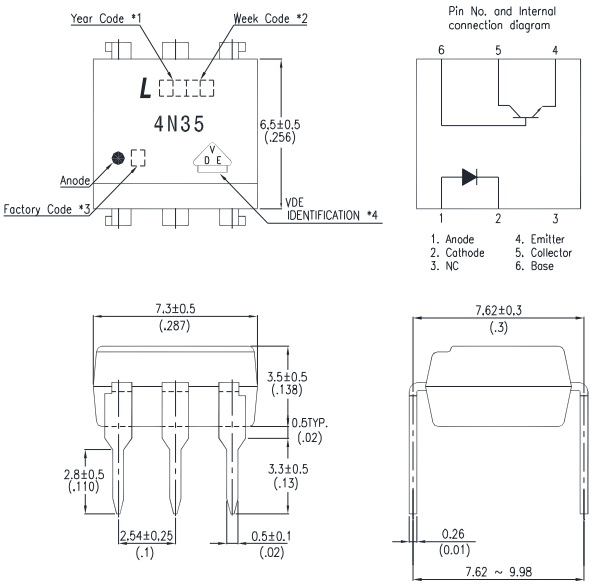
- RoHS Compliance
  All materials be used in device are followed EU RoHS directive (No.2002/95/EC).
- ESD pass HBM 8000V/MM2000V
- MSL class1

1.2 Applications

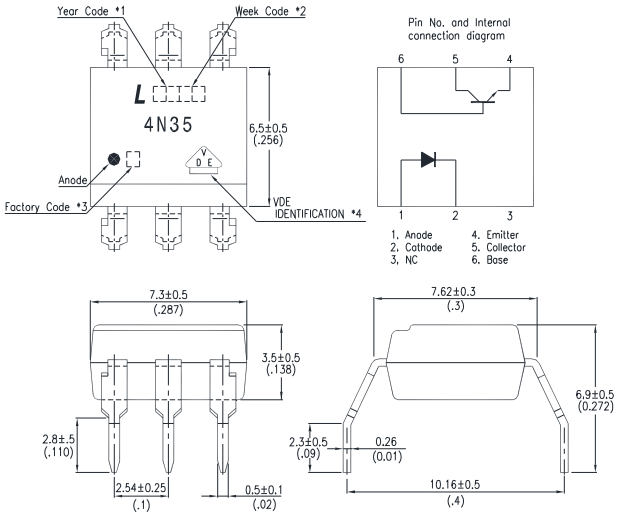
- Power Supply regulators
- Digital logic inputs
- Microprocessor inputs

2. PACKAGE DIMENSIONS

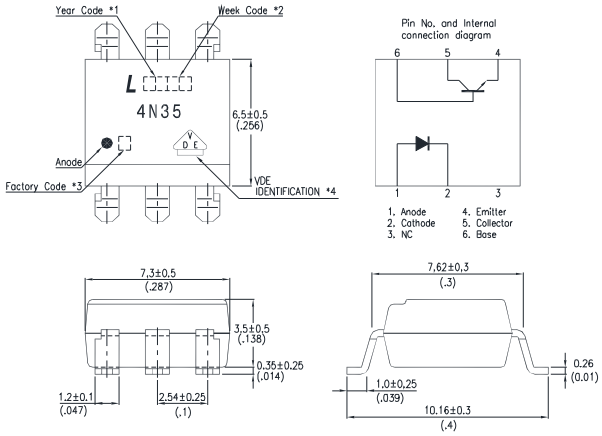
2.1 4N35



2.2 4N35M



2.3 4N35S

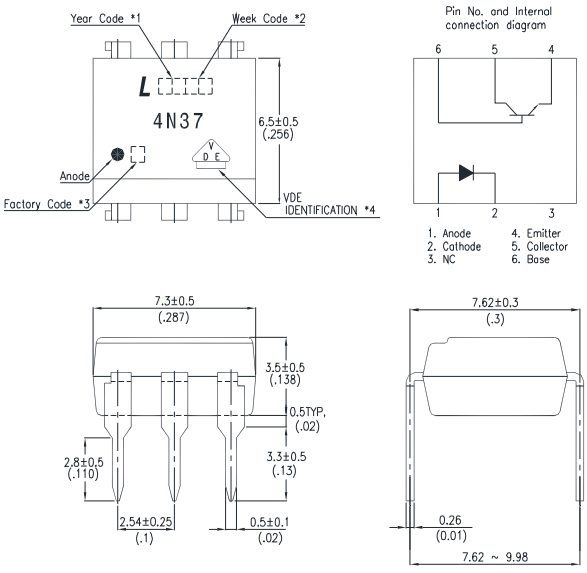


Notes :

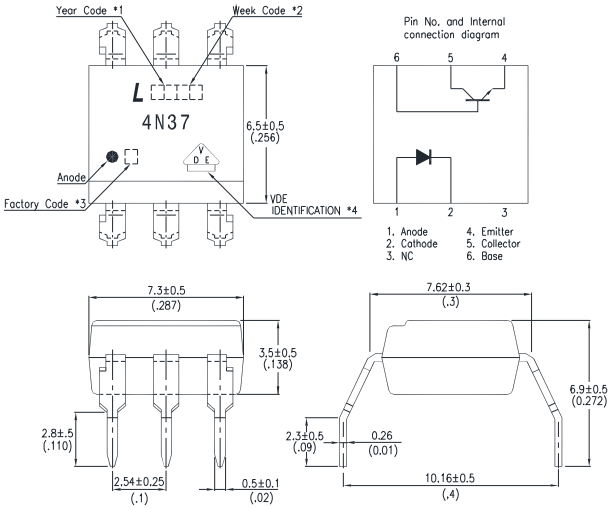
1. Year date code.
2. 2-digit work week.
3. Factory identification mark shall be marked
   (W: China-CZ, Y: Thailand X: China-TJ).
4. VDE option.

Dimensions in millimeters(inches).

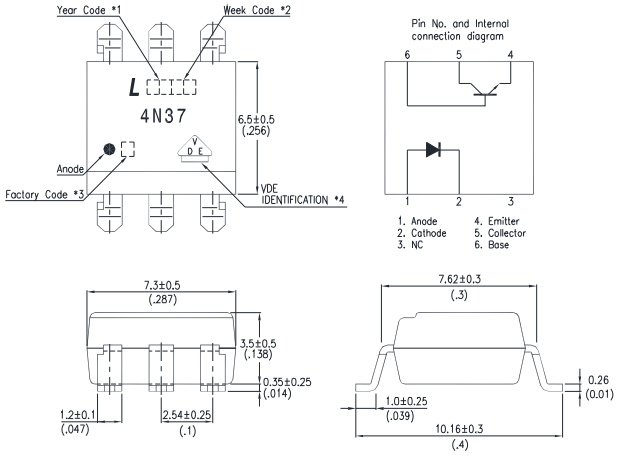
2.4 4N37



2.5 4N37M



2.6 4N37S



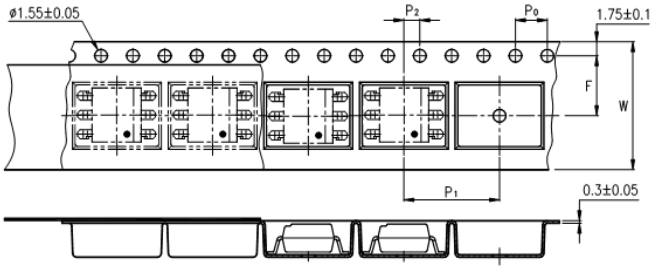
Notes :

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

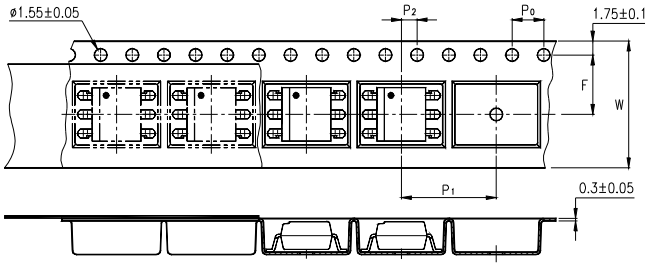
Dimensions in millimeters(inches).

3. TAPING DIMENSIONS

3.1 4N35S-TA , 4N37S-TA :



3.2 4N35S-TA1 , 4N37S-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℃

Parameter			Symbol	Rating	Unit
Input	Forward Current		I_F	60	mA
	Reverse Voltage		V_R	6	V
	Power Dissipation		P	100	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	300	mW
Total Power Dissipation			P_{tot}	350	mW
*1 Isolation Voltage		4N35 series	V_{iso}	3,550	V_{rms}
		4N37 series		1,500	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

4.2 ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25℃

PARAMETER			SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
INPUT	Forward Voltage		VF	—	1.2	1.5	V	IF=10mA
	Reverse Current		IR	—	—	10	μA	VR=4V
	Terminal Capacitance		Ct	—	50	—	pF	V=0, f=1KHz
OUTPUT	Collector Dark Current	Ta=25°C	ICEO	—	—	50	nA	VCE=10V, IF=0
		Ta=100°C		—	—	500	μA	VCE=30V, IF=0
	Collector-Emitter Breakdown Voltage		BVCEO	30	—	—	V	IC=0.1mA IF=0
	Emitter-Collector Breakdown Voltage		BVECO	7	—	—	V	IE=10μA IF=0
	Collector-Base Breakdown Voltage		BVCBO	70	—	—	V	IC=0.1mA IF=0
TRANSFER CHARACTERISTICS	Collector Current		IC	10	—	—	mA	IF=10mA VCE=10V
	*Current Transfer Ratio		CTR	100	—	—	%	
	Collector-Emitter Saturation Voltage		VCE(sat)	—	—	0.3	V	IF=50mA IC=2mA
	Isolation Resistance		Riso	5×10^{10}	1×10^{11}	—	Ω	DC500V 40 ~ 60% R.H.
	Floating Capacitance		Cf	—	1	2.5	pF	V=0, f=1MHz
	Response Time (Rise)		tr	—	3	10	μs	VCE=10V, IC=2mA RL=100Ω
	Response Time (Fall)		tf	—	3	10	μs	

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

4.3 ISOLATION SPECIFICATION ACCORDING TO VDE

Parameter		Symbol	Conditions	Rating	Unit	Remark
Class of environmental test		-	DIN IEC68	55/100/21	-	
Pollution		-	DIN VDE0110	2	-	
Maximum Operating Isolation Voltage		V_{IORM}	-	420	V_{PEAK}	Refer to the Diagram 1, 2
Partial Discharge Test Voltage (Between Input and Output)	Diagram 1	Vpr	tp=60s, qc<5pC	630	V_{PEAK}	
	Diagram 2		tp=1s, qc<5pC	788	V_{PEAK}	
Maximum Over-Voltage		$V_{INITIAL}$	t_{INI} = 10s	6000	V_{PEAK}	
Safety Maximum Ratings						Refer to the Figure 1, 3
1) Case Temperature		Tsi	I_F = 0, Pc = 0	175	°C	
2) Input Current		Isi	Pc=0	400	mA	
3) Electric Power (Output or Total Power Issipation)		Psi	-	700	mW	
Isolation Resistance (Test Voltage Between Input and Output : DC500V)		R_{ISO}	Ta=Tsi	MIN.10^9	Ω	
			Ta=Topr(MAX.)	MIN.10^{11}		
			Ta=25 °C	MIN.10^{12}		

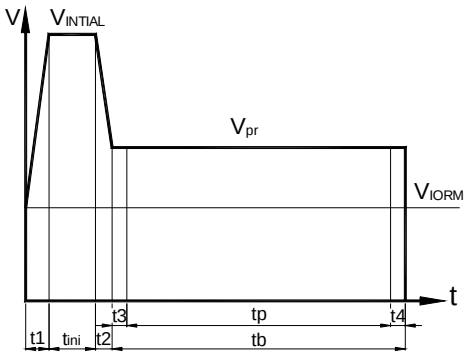
Precautions in performing isolation test

* Partial discharge test methods shall be the ones according to the specifications of DIN EN 60747-5-5

* Please don't carry out isolation test (Viso) over $V_{INITIAL}$,This product deteriorates isolation characteristics by partial discharge due to applying high voltage (ex. $V_{INITIAL}$). And there is possibility that this product occurs partial discharge in operating isolation voltage (V_{IORM})

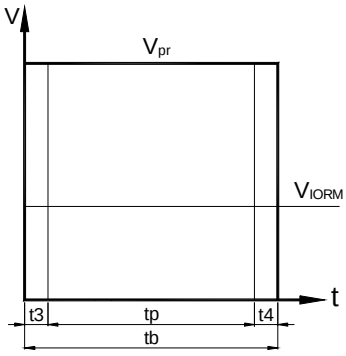
4.4 PARTIAL DISCHARGE TEST METHOD

Method (A) for type testing and random testing.



t1, t2 = 1 to 10s
t3, t4 = 1s
tp (Partial Discharge Measuring Time)= 60s
tb = 62s
tini = 10s

Method (B) for routine testing.



t3, t4 = 0.1s
tp (Partial Discharge Measuring Time)= 1s
tb = 1.2s

The partial discharge level shall not exceed 5 pc during the partial discharge measuring time interval t_p under the test conditions shown above.

5. CHARACTERISTICS CURVES

Fig.1 Forward Current vs. Ambient Temperature

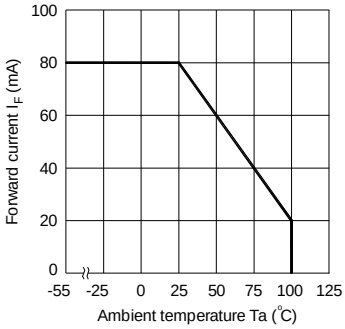


Fig.2 Collector Power Dissipation vs. Ambient Temperature

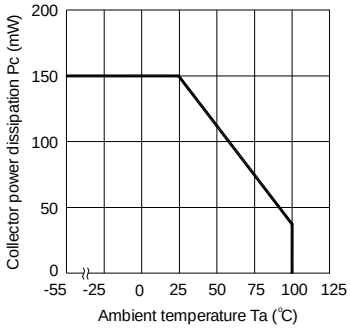


Fig.3 Forward Current vs. Forward Voltage

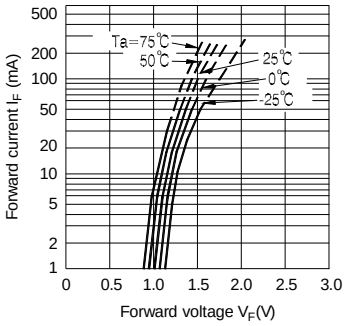


Fig.4 Current Transfer Ratio vs. Forward Current

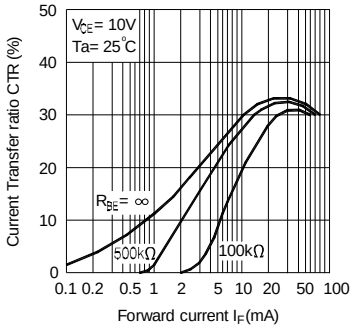


Fig.5 Collector Current vs. Collector-emitter Voltage

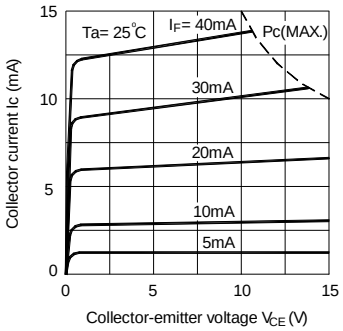


Fig.6 Relative Current Transfer Ratio vs. Ambient Temperature

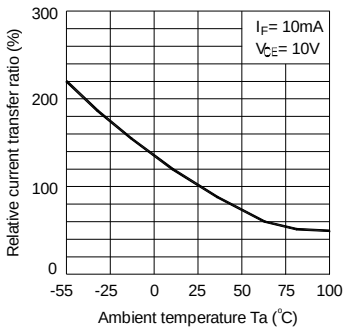


Fig.7 Collector-emitter Saturation Voltage vs. Ambient Temperature

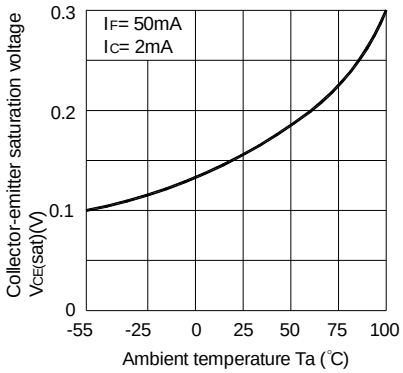


Fig.8 Collector Dark Current vs. Ambient Temperature

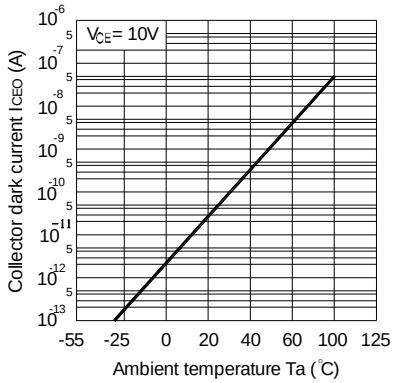


Fig.9 Response Time vs. Load Resistance

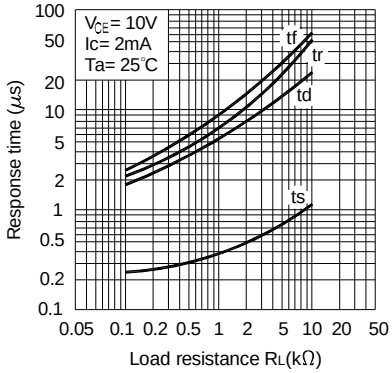


Fig.10 Frequency Response

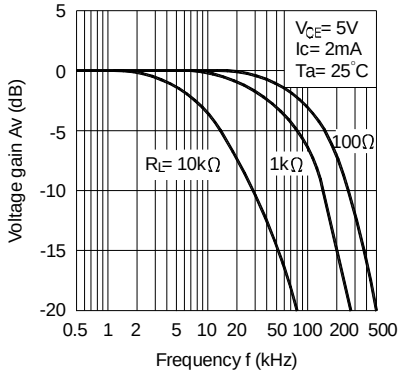
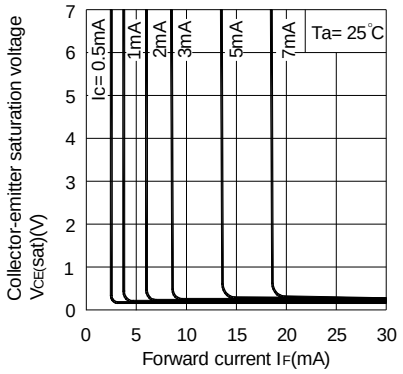
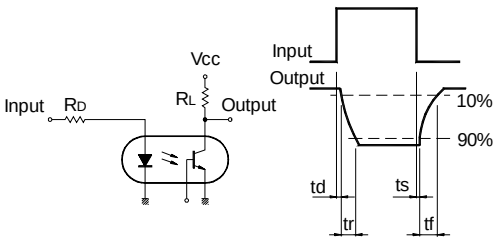


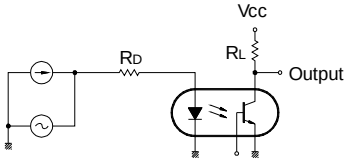
Fig.11 Collector-emitter Saturation Voltage vs. Forward Current



Test Circuit for Response Time



Test Circuit for Frequency Response

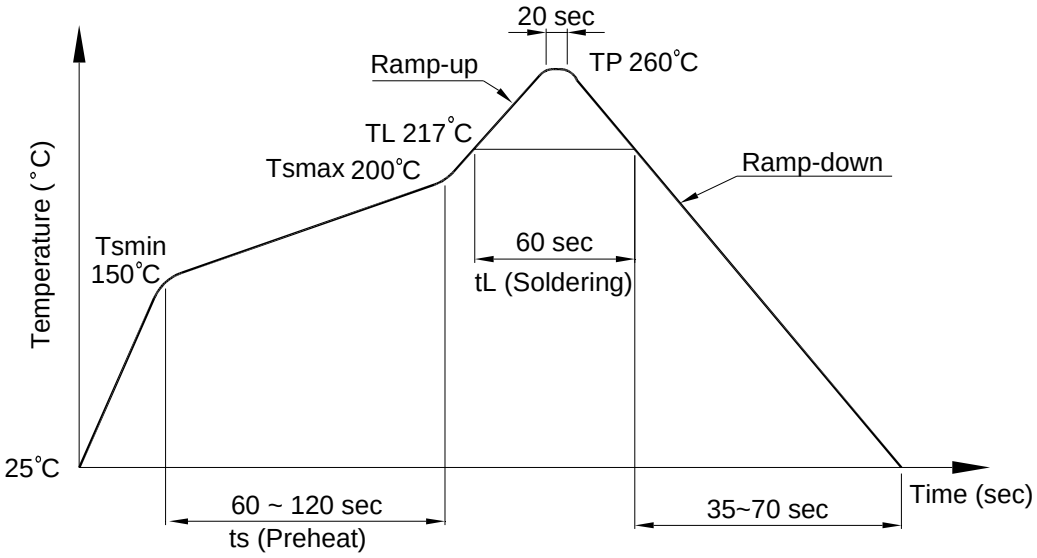


6. TEMPERATURE PROFILE OF SOLDERING

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})	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



6.2 Wave soldering (JEDEC22A111 compliant)

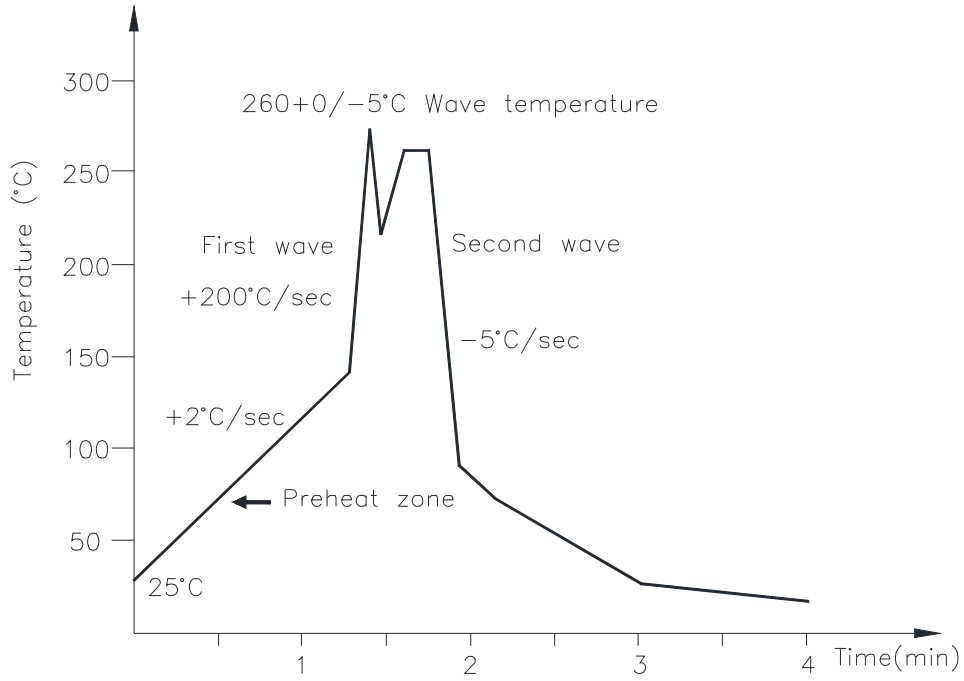
One time soldering is recommended within the condition of temperature.

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

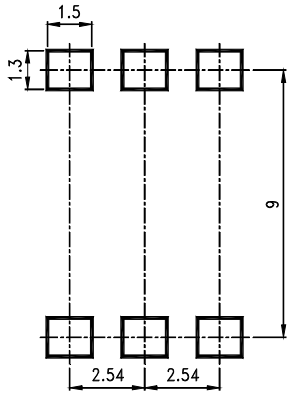
Allow single lead soldering in every single process. One time soldering is recommended.

Temperature: 380+0/-5˚C

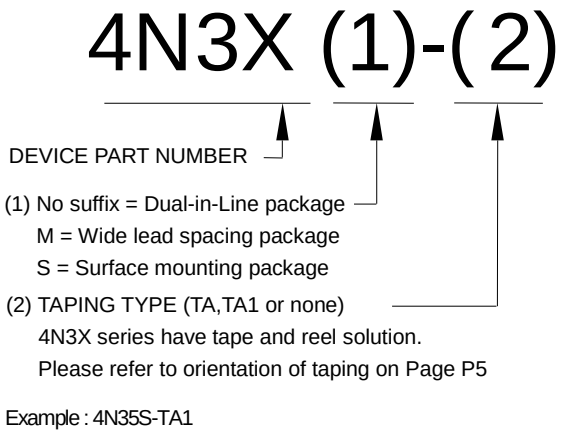
Time: 3 sec max.

7. RRECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)

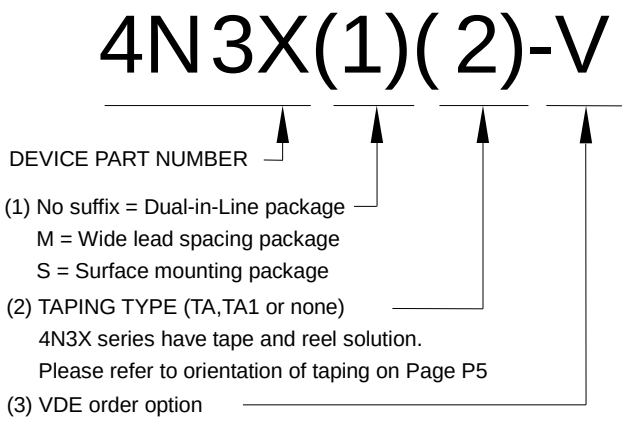
Unit: mm



8. Naming rule



Example : 4N35S-TA1



Example : 4N35STA1-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.
- Immerge unit’s body in solder paste is not recommended.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Lite-On:

4N35S-TA1 4N37S-TA 4N35S-TA 4N37S-TA1 4N37M 4N35M 4N35 4N37 4N37S 4N35S

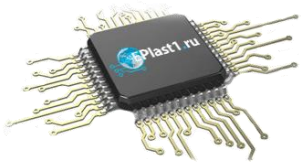
Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)
Факс: 8 (812) 320-02-42
Электронная почта: org@eplast1.ru
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.