

## Photocouplers LTV-214-TP1-AK-G series

### 1. DESCRIPTION

#### 1.1 Features

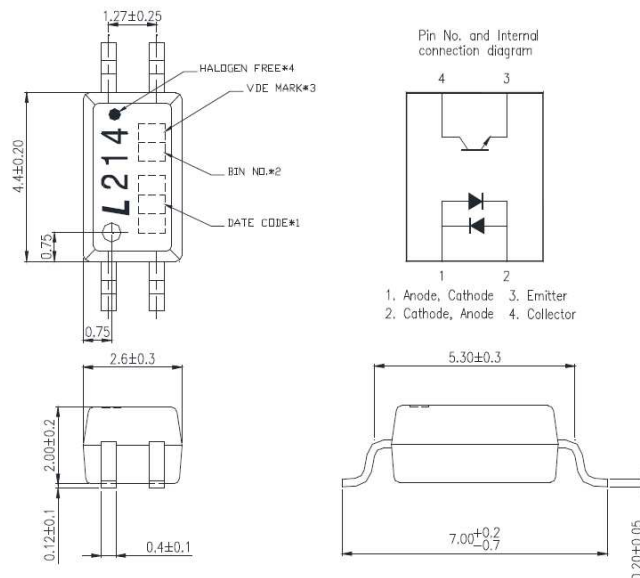
- Current transfer ratio (CTR) : MIN. 100% at  $I_F = \pm 1\text{mA}$ ,  $V_{CE} = 5\text{V}$
- High input-output isolation voltage. ( $V_{iso}=3,750\text{Vrms}$ )
- Employs double transfer mold technology
- Safety approval: UL 1577, Cert. No.E113898; CSA CA5A, Cert. No.1243207 (CA 91533); FIMKO EN/IEC 60950-1, EN/IEC 60065; Cert. No. FI 24472 M1
- RoHS Compliance: All materials be used in device are followed EU RoHS directive (No.2002/95/EC).
- ESD pass HBM 6000V/MM2000V
- MSL class1

#### 1.2 Applications

- Hybrid substrates that require high density mounting.
- Programmable controllers
- System appliances, measuring instruments

### 2. PACKAGE DIMENSIONS

#### 2.1 LTV-214-TP1-AK-G



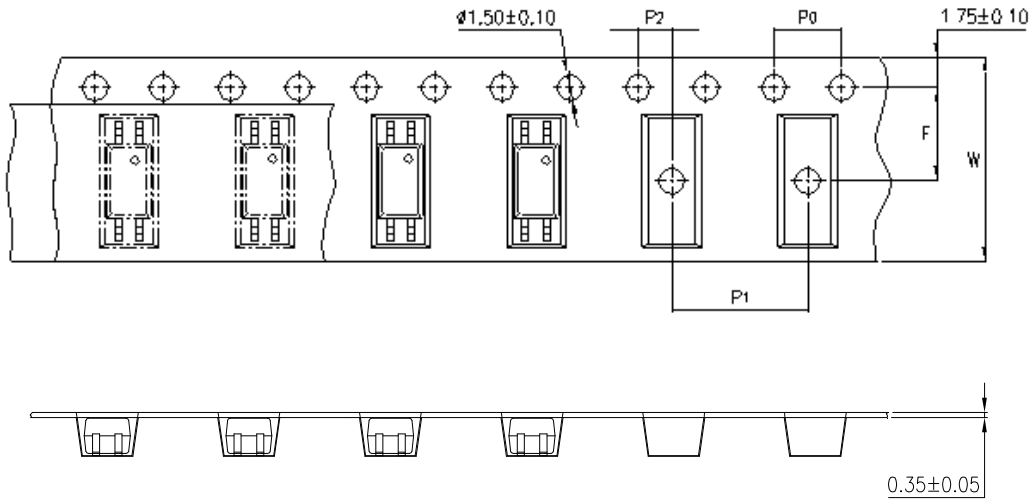
#### Notes :

1. 3-digit date code.
2. Rank mark "AK".
3. ● Mark Halogen free.

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## 3. TAPING DIMENSIONS

### 3.1 P/N : LTV-214-TP1-AK-G



Description	Symbol	Dimension in mm (inch)
Tape wide	W	12±0.3 (0.47)
Pitch of sprocket holes	$P_0$	4±0.1 (0.15)
Distance of compartment	F	5.5±0.1 (0.217)
	$P_2$	2±0.1 (0.079)
Distance of compartment to compartment	$P_1$	8±0.1 (0.315)

Package Type	LTV-214
Quantities (pcs)	3000

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### 4. RATING AND CHARACTERISTICS

#### 4.1 Absolute Maximum Ratings at Ta=25°C

	Parameter	Symbol	Rating	Unit
Input	Forward Current	$I_F$	50	mA
	Reverse Voltage	$V_R$	6	V
	Power Dissipation	P	70	mW
	Pulse Forward Current	$I_{FSM}$	1	A
Output	Collector - Emitter Voltage	$V_{CEO}$	80	V
	Emitter - Collector Voltage	$V_{ECO}$	7	V
	Collector Current	$I_C$	50	mA
	Collector Power Dissipation	$P_C$	150	mW
	Total Power Dissipation	$P_{tot}$	200	mW
1.	Isolation Voltage	$V_{iso}$	3750	$V_{rms}$
	Operating Temperature	$T_{opr}$	-55 ~ +110	°C
	Storage Temperature	$T_{stg}$	-55 ~ +150	°C
	Soldering Temperature	$T_{sol}$	260(10s)	°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.

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### 4.2 ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C

Parameter		Symbol	Min.	Typ.	Max.	Unit	Test Condition
Input	Forward Voltage	$V_F$	—	1.2	1.4	V	$I_F = \pm 20\text{mA}$
	Terminal Capacitance	$C_t$	—	60	—	pF	$V = 0, f = 1\text{KHz}$
Output	Collector Dark Current	$I_{CEO}$	—	—	100	nA	$V_{CE} = 20\text{V}, I_F = 0$
	Collector-Emitter Breakdown Voltage	$BV_{CEO}$	80	—	—	V	$I_C = 0.1\text{mA}, I_F = 0$
	Emitter-Collector Breakdown Voltage	$BV_{ECO}$	7	—	—	V	$I_E = 10\mu\text{A}, I_F = 0$
TRANSFER CHARACTERISTICS	Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	—	0.4	V	$I_F = \pm 8\text{mA}, I_C = 2.4\text{mA}$
	Isolation Resistance	$R_{iso}$	$5 \times 10^{10}$	$1 \times 10^{11}$	—	$\Omega$	DC500V, 40 ~ 60% R.H.
	Floating Capacitance	$C_f$	—	0.8	1	pF	$V = 0, f = 1\text{MHz}$
	Response Time (Rise)	$t_r$	—	3	18	$\mu\text{s}$	$V_{CE} = 10\text{V}, I_C = \pm 2\text{mA}$
	Response Time (Fall)	$t_f$	—	4	18	$\mu\text{s}$	$R_L = 100\Omega, f = 100\text{Hz}$

### 5. RANK TABLE OF CURRENT TRANSFER RATIO CTR

CTR Rank	Min	Max	Condition
AK	100	200	$I_F = \pm 1\text{mA}, V_{CE} = 5\text{V}, T_a = 25^\circ\text{C}$

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

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## 6. CHARACTERISTICS CURVES

Figure 1. Collector Power Dissipation vs. Ambient Temperature

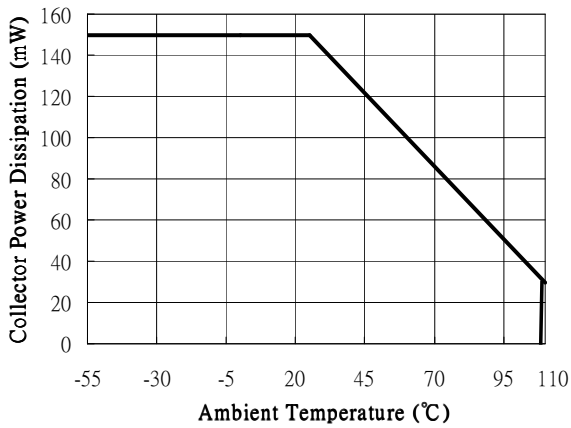


Figure 2. Forward Current vs. Ambient Temperature

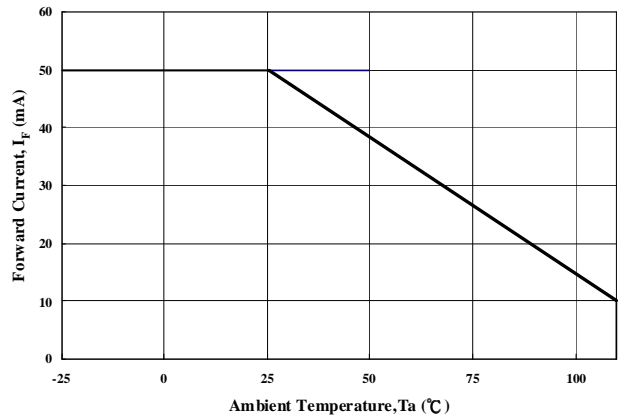


Figure 3. Forward Current vs. Forward Voltage

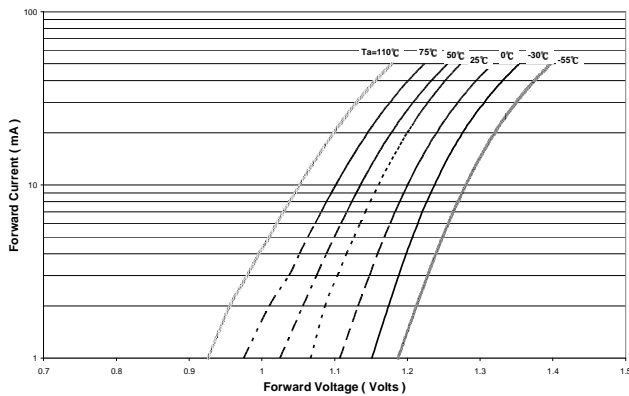


Figure 4. Forward Voltage Temperature Coefficient vs. Forward Current

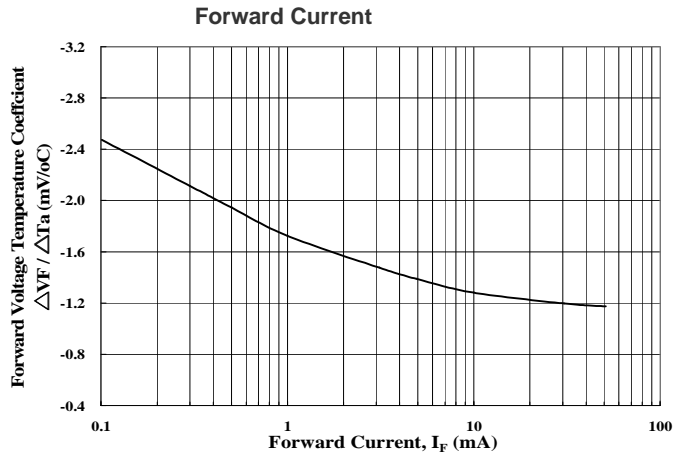


Figure 5. Pulse Forward Current vs. Duty Cycle Ratio

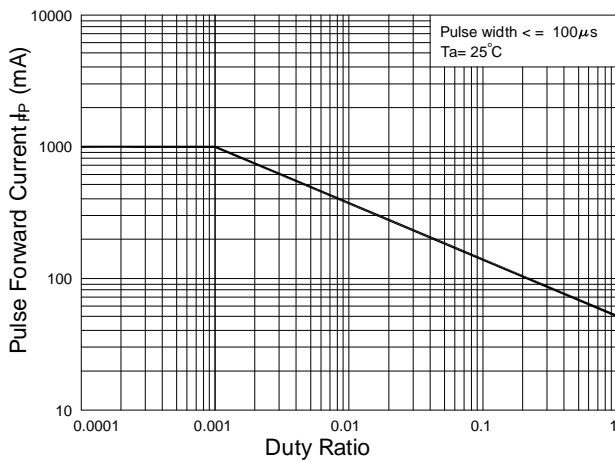
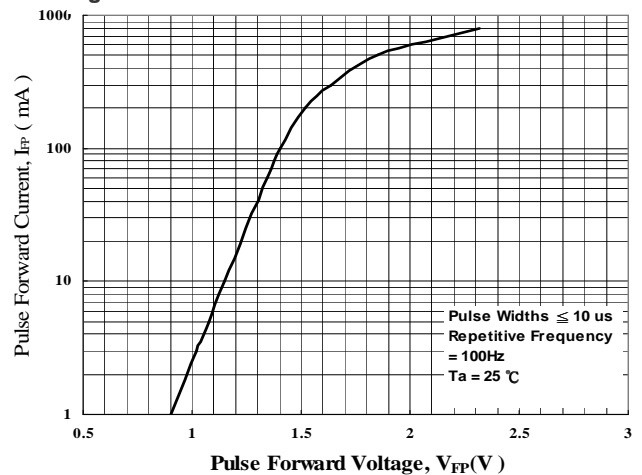


Figure 6. Pulse Forward Current vs. Pulse Forward Voltage



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Figure 7. Collector-Emitter Saturation Voltage vs. Forward

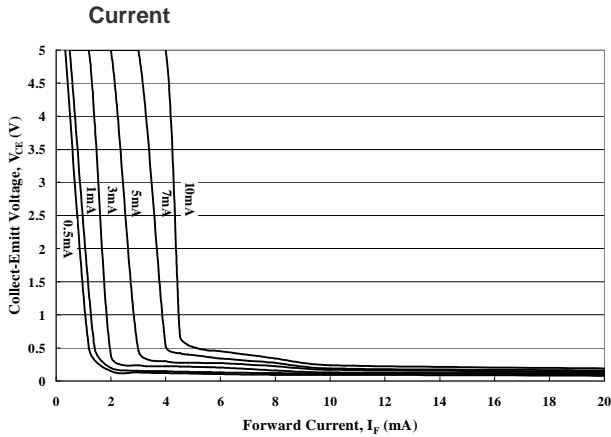


Figure 9. Collector Current vs. Small Collector-Emitter

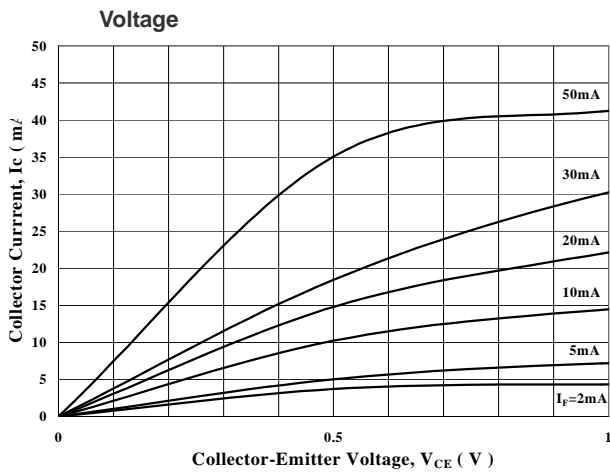


Figure 11. Collector Dark Current vs. Ambient Temperature

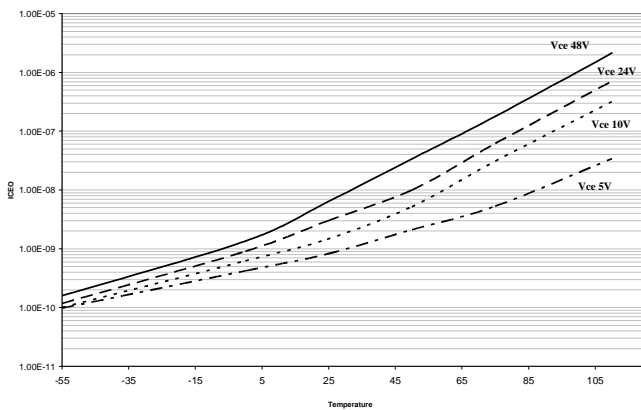


Figure 8. Collector Current vs. Collector-Emitter

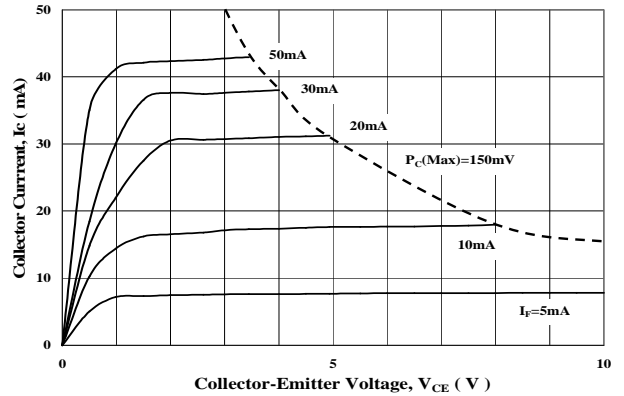


Figure 10. Collector Current vs. Forward Current

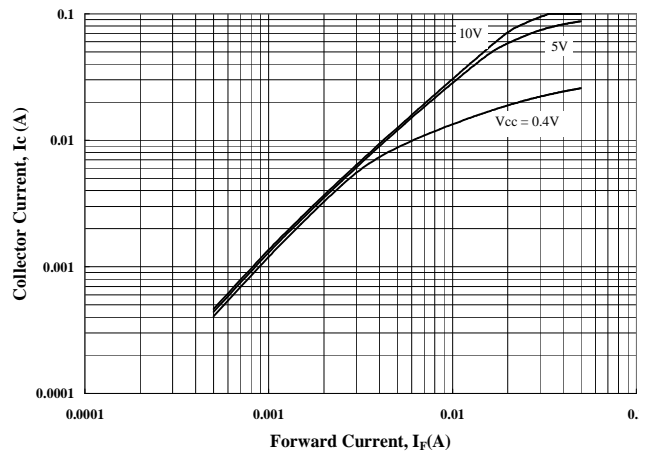
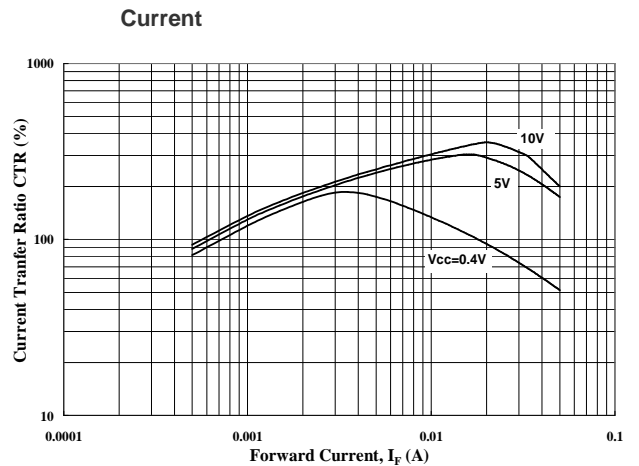
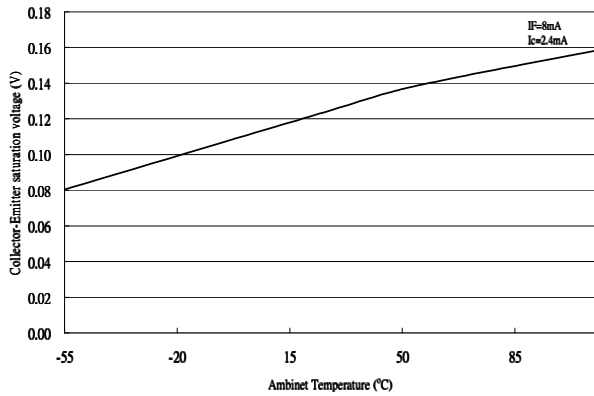


Figure 12. Current Transfer Ratio vs. Forward

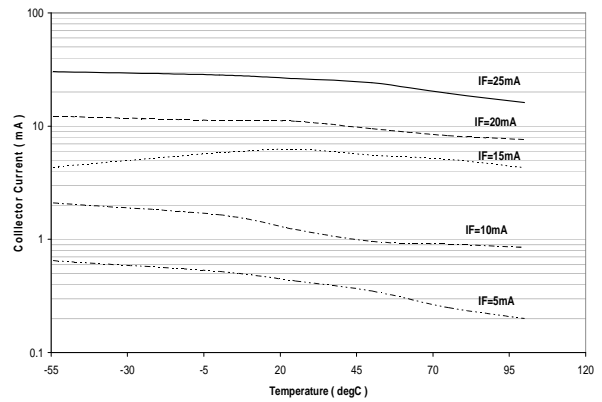


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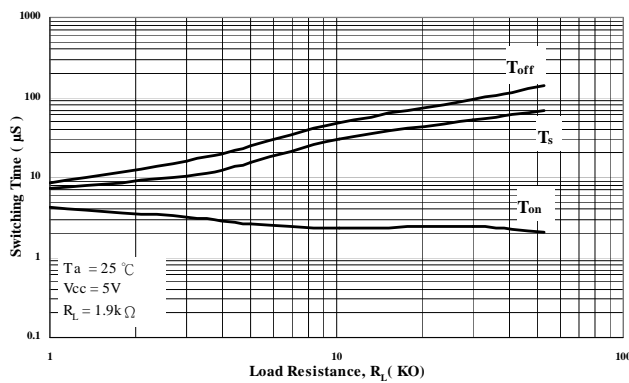
**Figure 13. Collector-Emitter Saturation Voltage vs. Ambient Temperature**



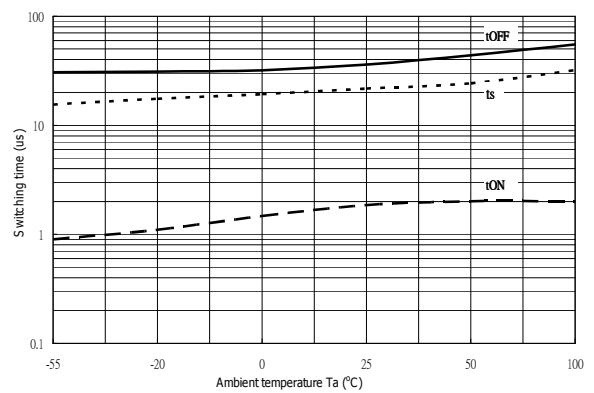
**Figure 14. Collector Current vs. Ambient Temperature**



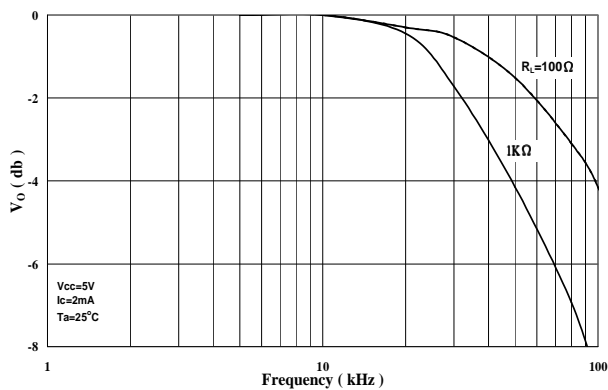
**Figure 15. Switching Time vs. Load Resistance**



**Figure 16. Switching Time vs. Ambient Temperature**

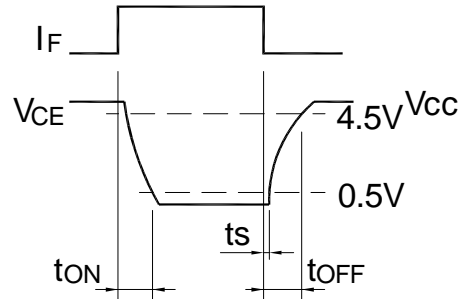
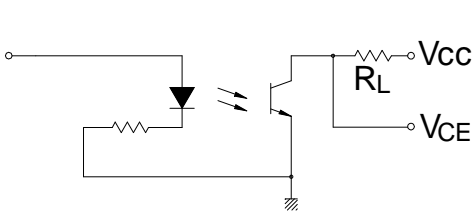


**Figure 17. Frequency Response**



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### 7. SWITCHING TIME TEST CIRCUIT



### 8. TEMPERATURE PROFILE OF SOLDERING

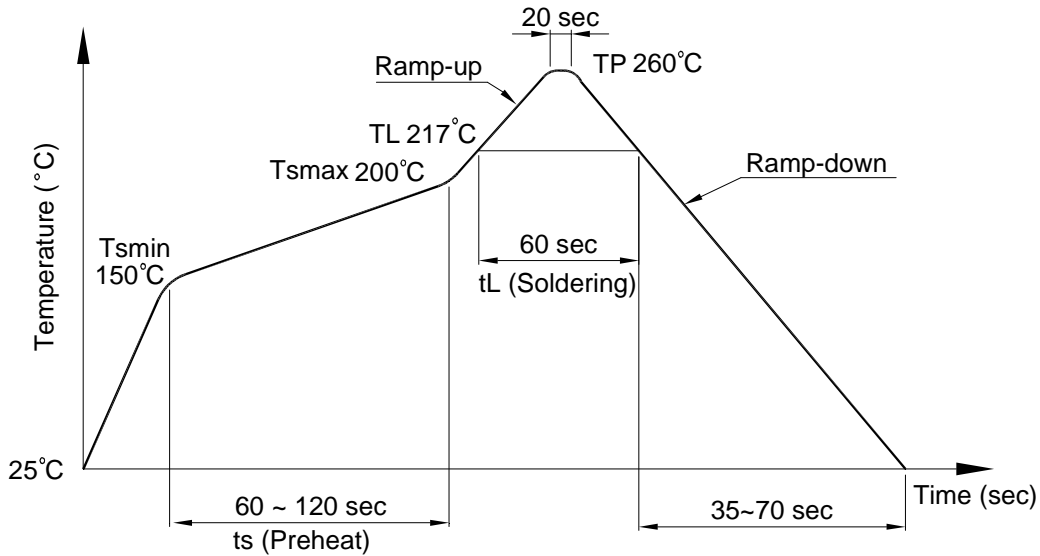
#### 8.1 IR Reflow soldering (JEDEC-STD-020C compliant)

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) ( $t_s$ )	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



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## 8.2 Wave soldering (JEDEC22A111 compliant)

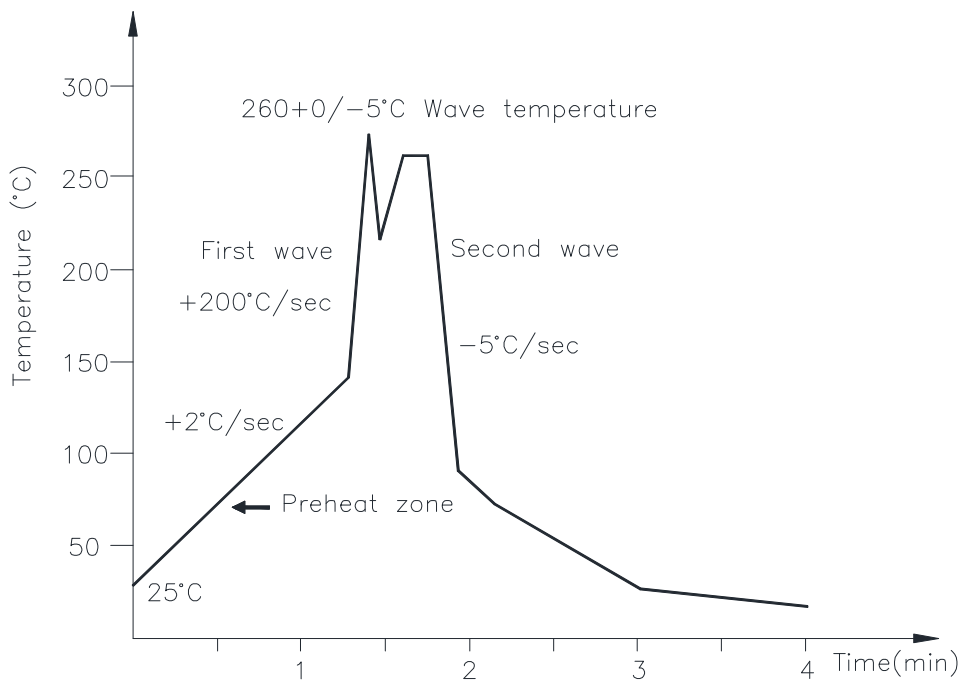
One time soldering is recommended within the condition of temperature.

Temperature: 260+0/-5°C

Time: 10 sec.

Preheat temperature: 25 to 140°C

Preheat time: 30 to 80 sec.



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### 8.3 Hand soldering by soldering iron

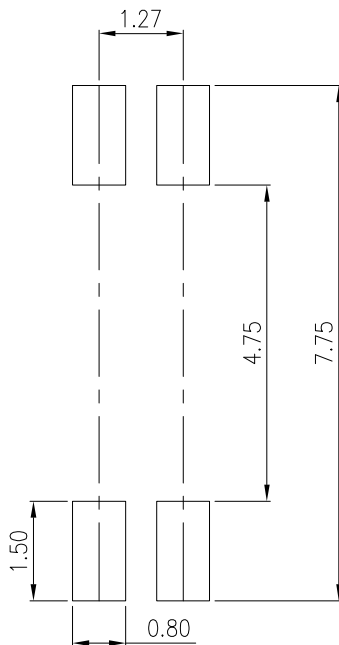
Allow single lead soldering in every single process. One time soldering is recommended.

Temperature: 380+0/-5°C

Time: 3 sec max.

## 9. RRECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)

Unit: mm



## 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.
- Immerse unit's body in solder paste is not recommended.