



# Photocoupler

## Product Data Sheet

LTV-217-G

(Half Pitch LO Own Brand -  
1CH Halogen Free Series)

Spec No.: DS70-2009-0016

Effective Date: 09/06/2012

Revision: A

**LITE-ON DCC**

**RELEASE**

BNS-OD-FC001/A4



## FEATURES

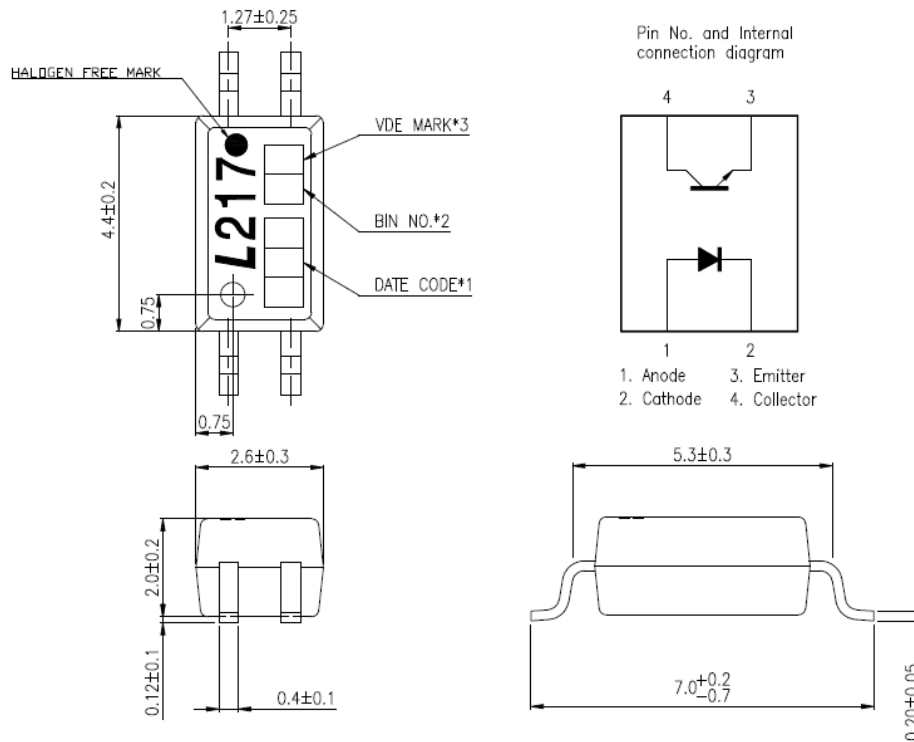
- \* Current transfer ratio  
( CTR : MIN. 50% at  $I_F = 5\text{mA}$ ,  $V_{CE} = 5\text{V}$  )
- \* Isolation voltage between input and output LTV-217 Series  
( Viso = 3.75 KVrms )
- \* Employs double transfer mold technology
  
- \* Safety Approval  
UL, cUL, CSA, FIMKO, VDE\* Approved  
(\*Requires "V" ordering option)
  
- \* RoHS compliance

## APPLICATIONS

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

## OUTLINE DIMENSIONS

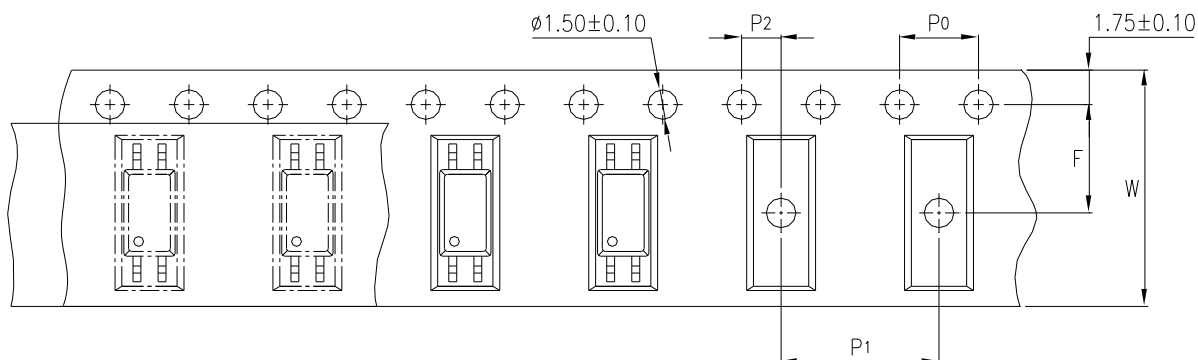
### LTV-217-G:



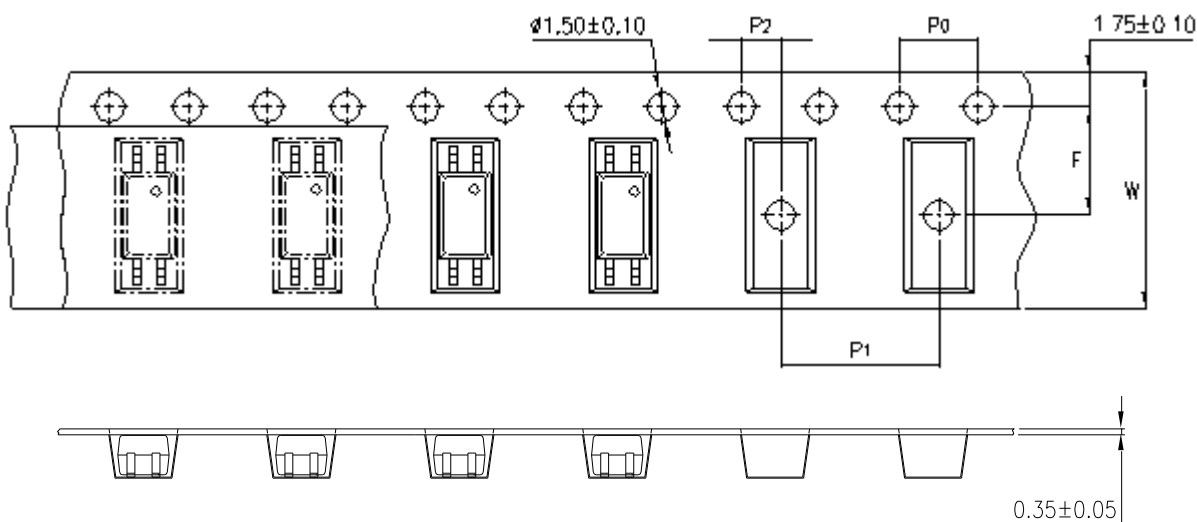
- \*1. 3-digit date code.
- \*2. Rank shall be or shall not be marked.
- \*3. VDE mark, only appears on devices ordered "V" option.

## TAPING DIMENSIONS

### LTV-217



### LTV-217-TP1



Description	Symbol	Dimension in mm (inches)
Tape wide	W	12 ± 0.3 (.47)
Pitch of sprocket holes	P <sub>0</sub>	4 ± 0.1 (.15)
Distance of compartment	F	5.5 ± 0.1 (.217)
Distance of compartment to compartment	P <sub>1</sub>	2 ± 0.1 (.079)

### Quantities per Reel :

Package Type	LTV-217
Quantities (pcs)	<b>3000</b>

**ABSOLUTE MAXIMUM RATING**

( Ta = 25°C )

PARAMETER		SYMBOL	RATING	UNIT
INPUT	Forward Current	I <sub>F</sub>	50	mA
	Reverse Voltage	V <sub>R</sub>	6	V
	Power Dissipation	P	70	mW
OUTPUT	Collector - Emitter Voltage	V <sub>CEO</sub>	70	V
	Emitter - Collector Voltage	V <sub>ECO</sub>	7	V
	Collector Current	I <sub>C</sub>	50	mA
	Collector Power Dissipation	P <sub>C</sub>	150	mW
Total Power Dissipation		P <sub>tot</sub>	200	mW
*1	Isolation Voltage	Viso	3000	V <sub>rms</sub>
Operating Temperature		T <sub>opr</sub>	-55 ~ +110	°C
Storage Temperature		T <sub>stg</sub>	-55 ~ +150	°C
*2	Soldering Temperature	T <sub>sol</sub>	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.

\*2. For 10 Seconds

### ELECTRICAL - OPTICAL CHARACTERISTICS

( Ta = 25°C )

PARAMETER		SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
INPUT	Forward Voltage	$V_F$	—	1.2	1.4	V	$I_F=20\text{mA}$
	Reverse Current	$I_R$	—	—	10	$\mu\text{A}$	$V_R=4\text{V}$
	Terminal Capacitance	$C_t$	—	30	250	pF	$V=0, f=1\text{KHz}$
OUTPUT	Collector Dark Current	$I_{CEO}$	—	—	100	nA	$V_{CE}=50\text{V}, I_F=0$
	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 Current	$I_C$	2.5	—	30	mA	$I_F=5\text{mA}$ $V_{CE}=5\text{V}$
	*1 Current Transfer Ratio	CTR	50	—	600	%	
	Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	—	0.4	V	$I_F=8\text{mA}$ $I_C=2.4\text{mA}$
	Isolation Resistance	$R_{iso}$	$5 \times 10^{10}$	$1 \times 10^{11}$	—	$\Omega$	DC500V 40 ~ 60% R.H.
	Floating Capacitance	$C_f$	—	0.6	1	pF	$V=0, f=1\text{MHz}$
	Response Time (Rise)	$t_r$	—	2	18	$\mu\text{s}$	$V_{CE}=10\text{V}, I_C=2\text{mA}$ $R_L=100\Omega, f=100\text{Hz}$
	Response Time (Fall)	$t_f$	—	3	18	$\mu\text{s}$	
	Turn-On Time	$t_{on}$		3		$\mu\text{s}$	
Turn-Off Time	$t_{off}$		3		$\mu\text{s}$		

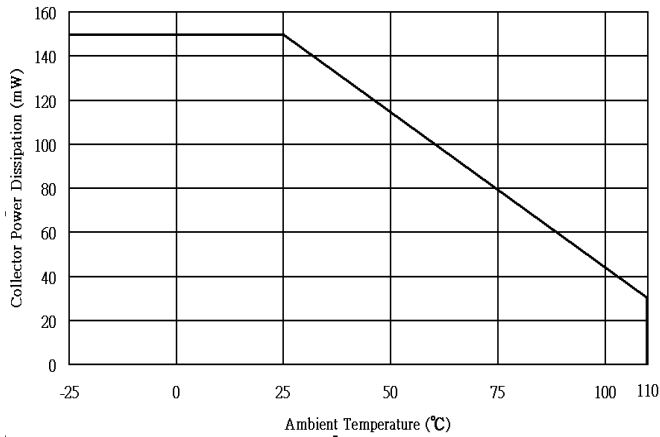
$$*1 \text{ CTR} = \frac{I_C}{I_F} \times 100\%$$

**RANK TABLE OF CURRENT TRANSFER RATIO CTR**

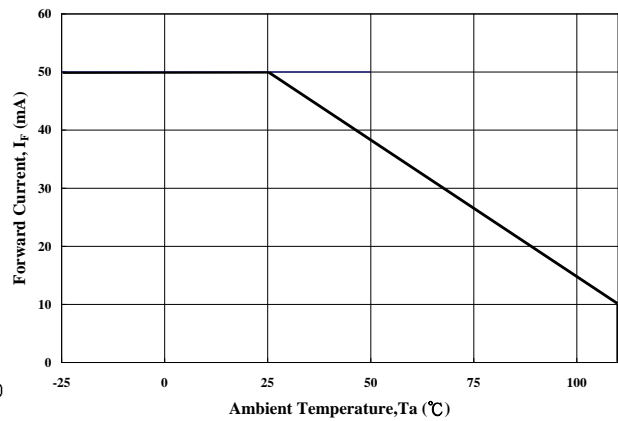
<b>MODEL NO.</b>	<b>RANK MARK</b>	<b>CTR ( % )</b>
LTV-217	A	80 ~ 160
	B	130 ~ 260
	C	200 ~ 400
	D	300 ~ 600
	A or B or C or D or No mark	50 ~ 600
<b>CONDITIONS</b>	IF = 5 mA VCE = 5 V Ta = 25 °C	

## CHARACTERISTICS CURVES

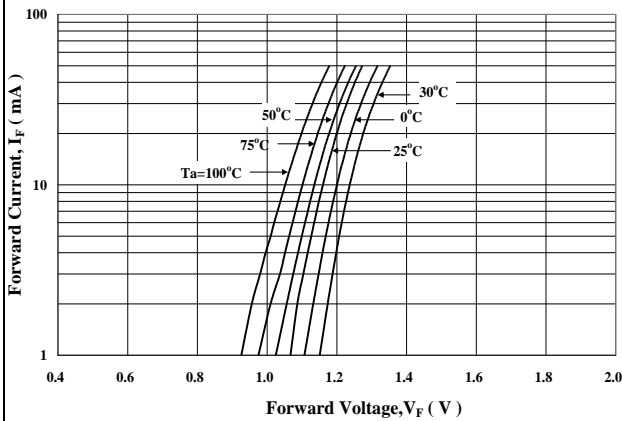
**Figure 1. Collector Power Dissipation vs. Ambient Temperature**



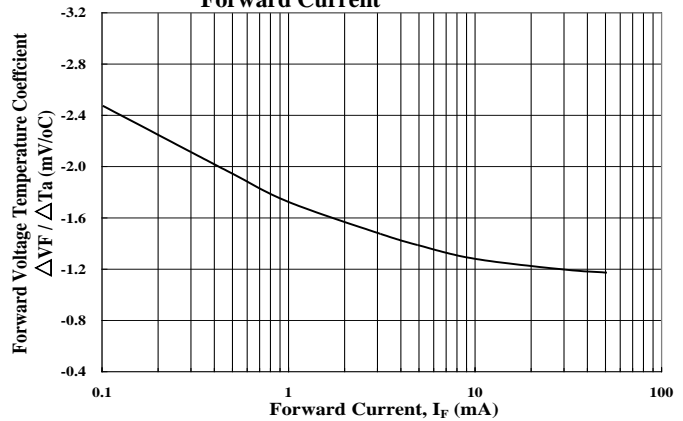
**Figure 2. Forward Current vs. Ambient Temperature**



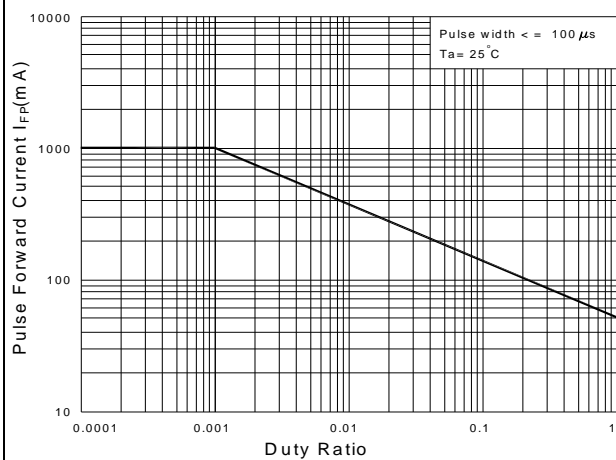
**Figure 3. Forward Current vs. Forward Voltage**



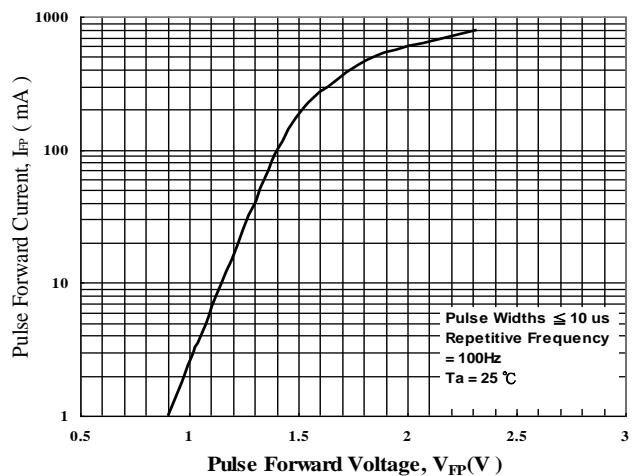
**Figure 4. Forward Voltage Temperature Coefficient vs. Forward Current**



**Figure 5. Pulse Forward Current vs. Duty Cycle Ratio**



**Figure 6. Pulse Forward Current vs. Pulse Forward Voltage**





## CHARACTERISTICS CURVES

Figure 7. Collector-Emitter Saturation Voltage vs. Forward Current

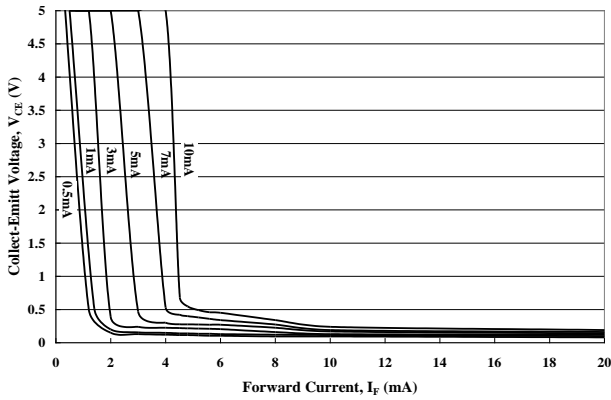


Figure 8. Collector Current vs. Collector-Emitter Voltage

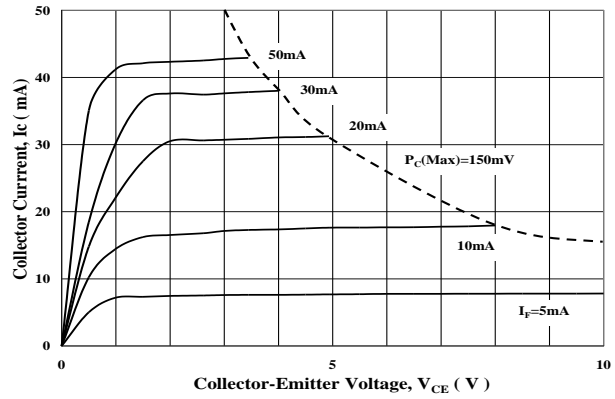


Figure 9. Collector Current vs. Small Collector-Emitter Voltage

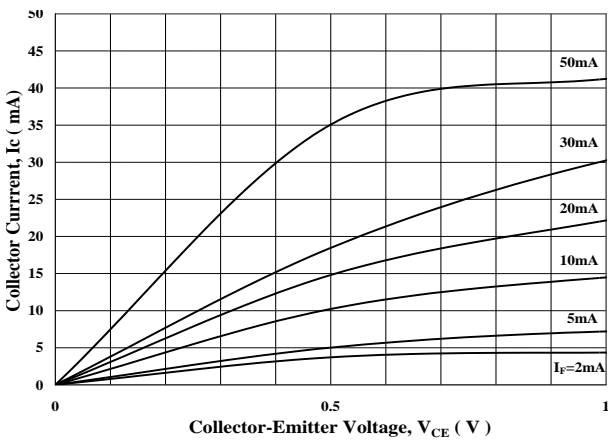


Figure 10. Collector Current vs. Forward Current

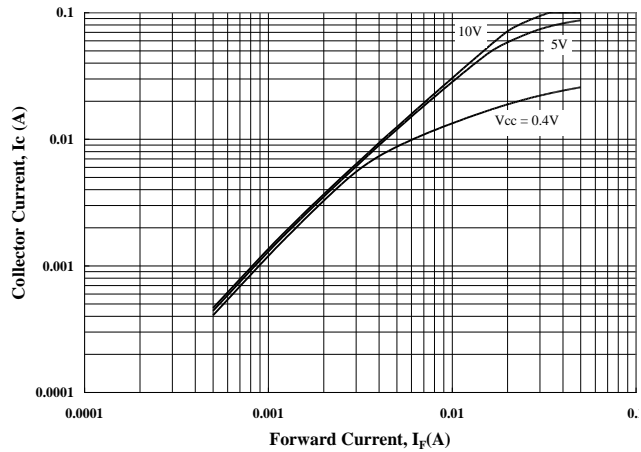


Figure 11. Collector Dark Current vs. Ambient Temperature

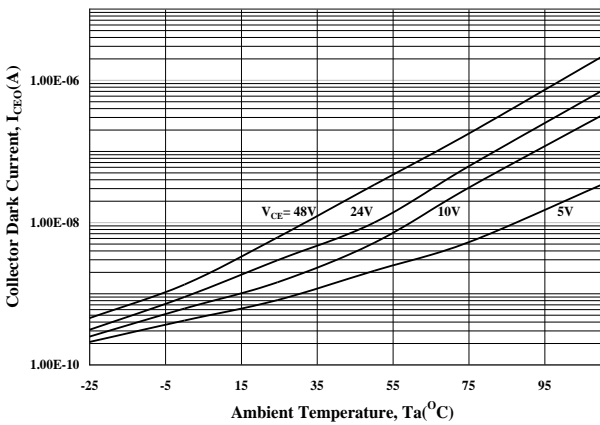
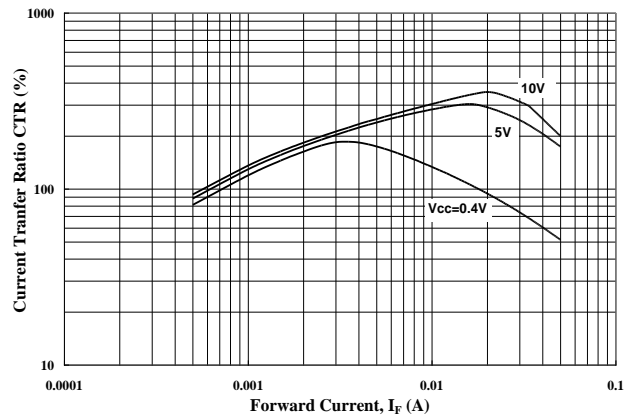
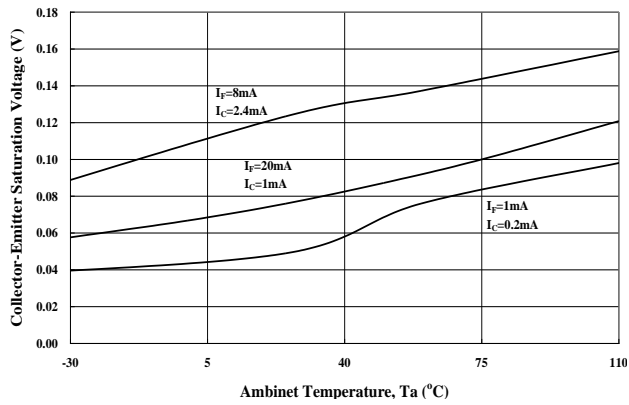


Figure 12. Current Transfer Ratio vs. Forward Current

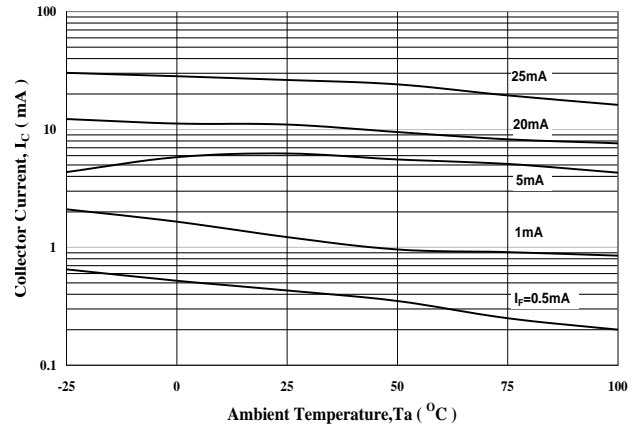


### CHARACTERISTICS CURVES

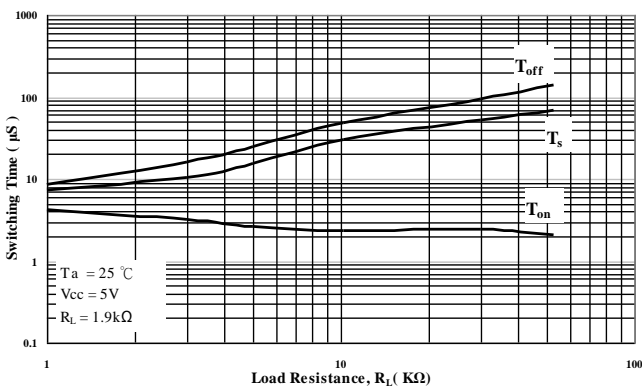
**Figure 13. Collector-Emitter Saturation Voltage vs. Ambient Temperature**



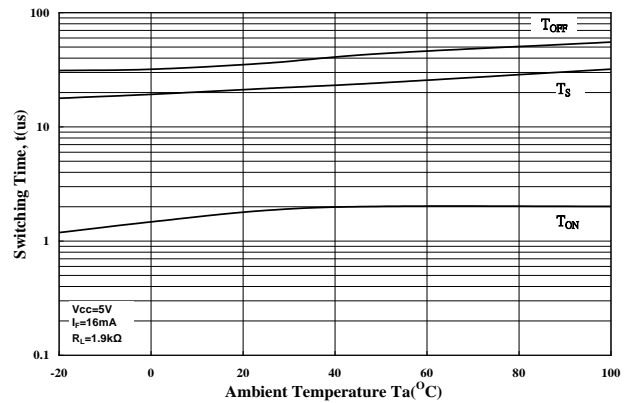
**Figure 14. Collector Current vs. Ambient Temperature**



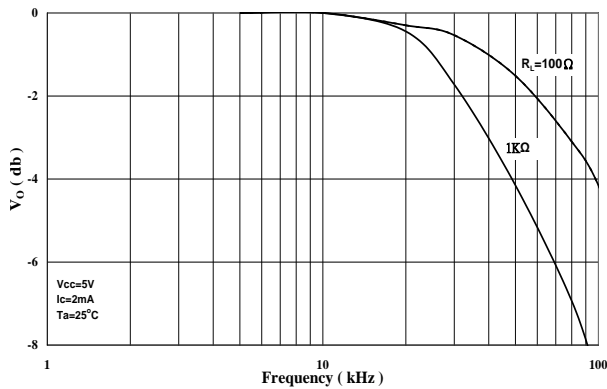
**Figure 15. Switching Time vs. Load Resistance**



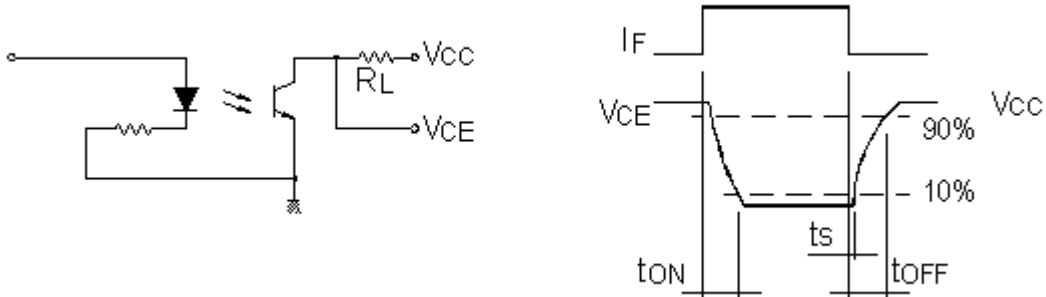
**Figure 16. Switching Time vs. Ambient Temperature**



**Figure 17. Frequency Response**



### SWITCHING TIME TEST CIRCUIT



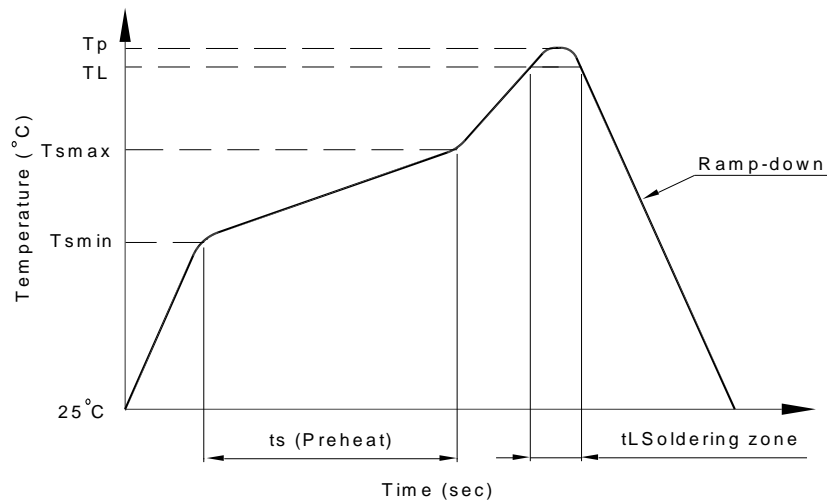
### TEMPERATURE PROFILE OF SOLDERING REFLOW

(1) One time soldering reflow is recommended within the condition of temperature and time profile shown below.

1. Wave solder
  - 260°C / 10 sec.

2. IR Reflow

Profile item	Conditions
Preheat	
- Temperature Min ( $T_{Smin}$ )	150°C
- Temperature Max ( $T_{Smax}$ )	180°C
- Time (min to max) ( $t_s$ )	90±30°C
Soldering zone	
- Temperature ( $T_L$ )	250°C
- Time ( $t_L$ )	10~15 sec
Peak Temperature ( $T_P$ )	260°C
Ramp-down rate	3~6°C / sec



## **TEMPERATURE PROFILE OF SOLDERING REFLOW**

(2) When using another soldering method such as infrared ray lamp, the temperature may rise partially in the mold of the device.

Keep the temperature on the package of the device within the condition of above (1)

(3) When using another soldering method such as infrared ray lamp, the temperature may rise partially in the mold of the device.

Keep the temperature on the package of the device within the condition of above (1)

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- 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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