



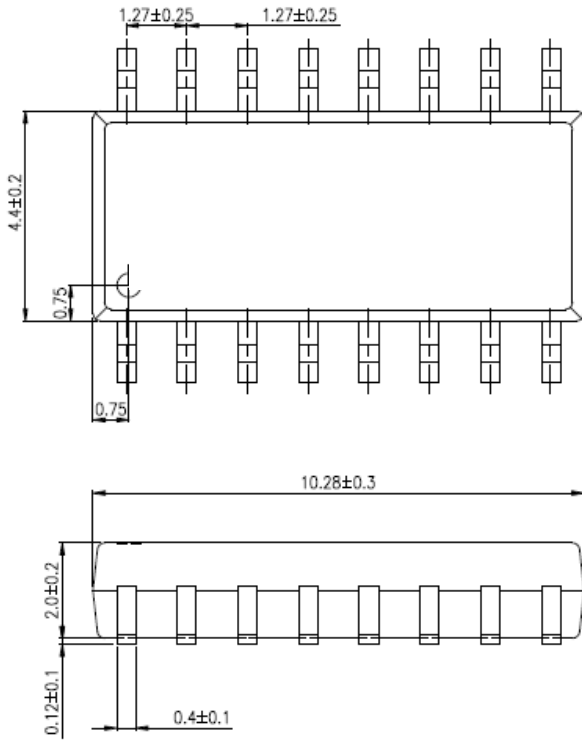
FEATURES

- * Current transfer ratio
(CTR : MIN. 50% at $I_F = 5\text{mA}$, $V_{CE} = 5\text{V}$)
- * Isolation voltage between input and output
(Viso = 3KVrms)
- * Compact dual-in-line package
4 channels type
- * Employs double transfer mold technology
- * Marked as THP4
- * ROHS compliance
- * G : Halogen Free

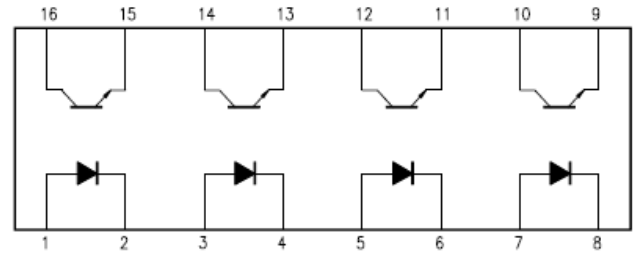
APPLICATIONS

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

OUTLINE DIMENSIONS

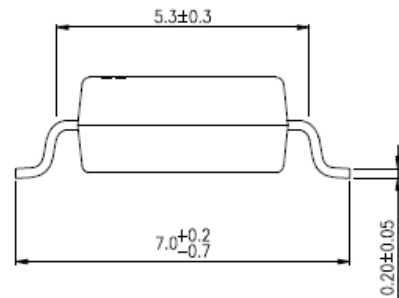


PIN NO. AND INTERNAL CONNECTION DIAGRAM



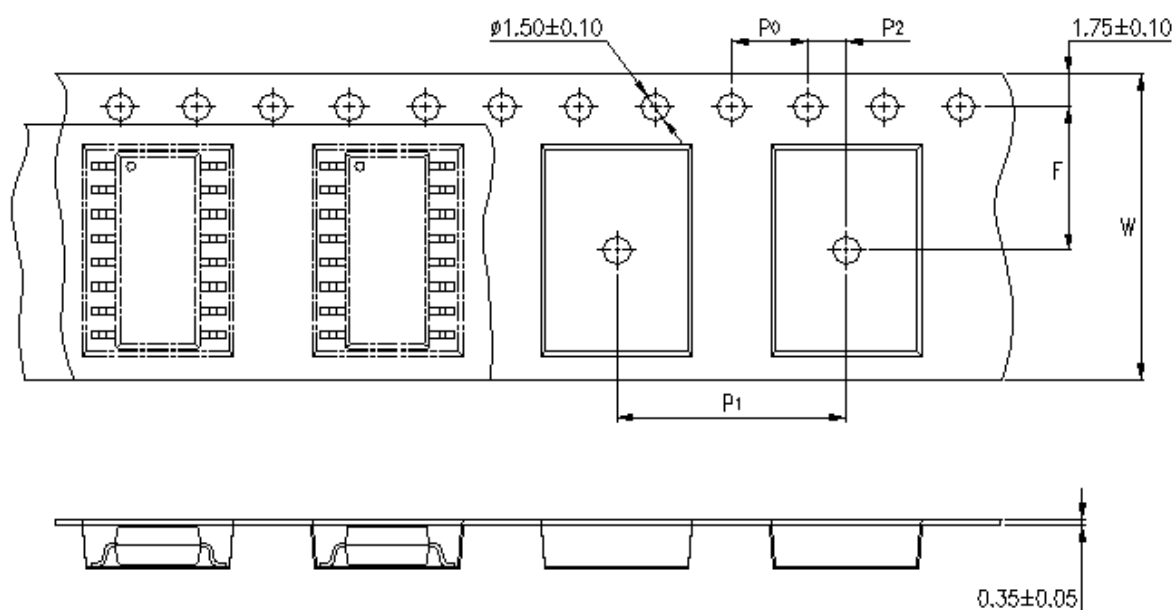
1,3,5,7. Anode
 2,4,6,8. Cathode

9,11,13,15. Emitter
 10,12,14,16. Collector



- *1. 3-digit date code.
- *2. Rank shall be or shall not be marked.

TAPING DIMENSIONS



Description	Symbol	Dimension in mm (inches)
Tape wide	W	16 ± 0.3 (.47)
Pitch of sprocket holes	P_0	4 ± 0.1 (.15)
Distance of compartment	F	7.5 ± 0.1 (.217)
Distance of compartment to compartment	P_2	2 ± 0.1 (.079)
Distance of compartment to compartment	P_1	12 ± 0.1 (.63)

Quantities per Reel :

Package Type	
Quantities (pcs)	2000

ABSOLUTE MAXIMUM RATING

(Ta = 25°C)

PARAMETER		SYMBOL	RATING			UNIT
			217	227	247	
INPUT	Forward Current	I _F	50			mA
	Reverse Voltage	V _R	6			V
	Power Dissipation	P	70			mW
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		100	mW
Total Power Dissipation		P _{tot}	200		170	mW
*1 Isolation Voltage		V _{iso}	3,750			V _{rms}
Operating Temperature		T _{opr}	-55 ~ +110			°C
Storage Temperature		T _{stg}	-55 ~ +150			°C
*2 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.

*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	μA	$V_R=4\text{V}$
	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	$I_F=2.4\text{mA}$ $I_C=8\text{mA}$
	Isolation Resistance	R_{iso}	5×10^{10}	1×10^{11}	—	Ω	DC500V 40 ~ 60% R.H.
	Floating Capacitance	C_f	—	0.6	1	pF	$V=0$, $f=1\text{MHz}$
	Response Time (Rise)	t_r	—	3	18	μs	$V_{CE}=2\text{V}$, $I_C=2\text{mA}$ $R_L=100\Omega$
	Response Time (Fall)	t_f	—	4	18	μs	

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

CHARACTERISTICS CURVES

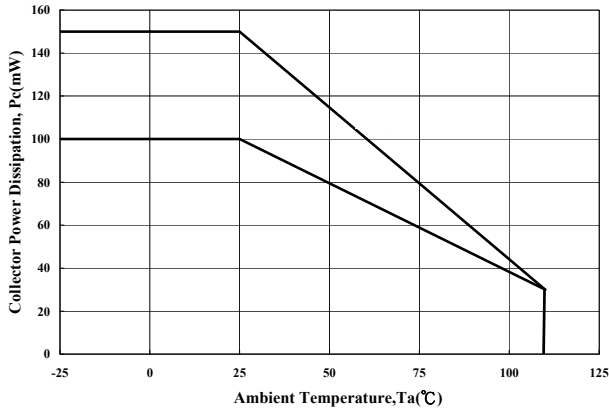


Figure 1. Collector Power Dissipation vs. Ambient Temperature

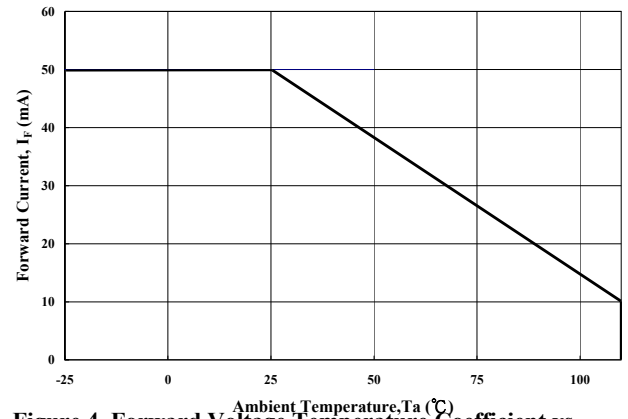


Figure 2. Forward Current vs. Ambient Temperature

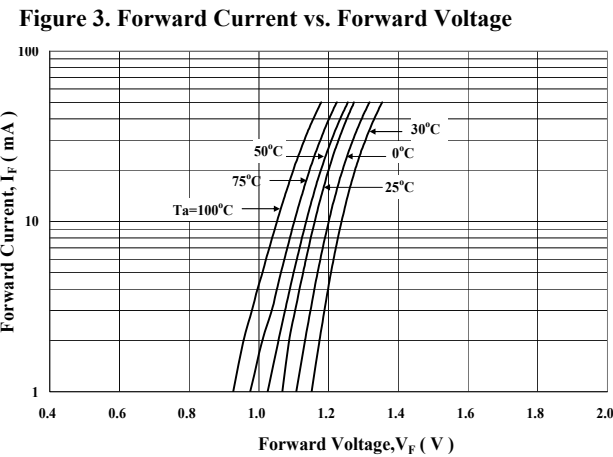


Figure 3. Forward Current vs. Forward Voltage

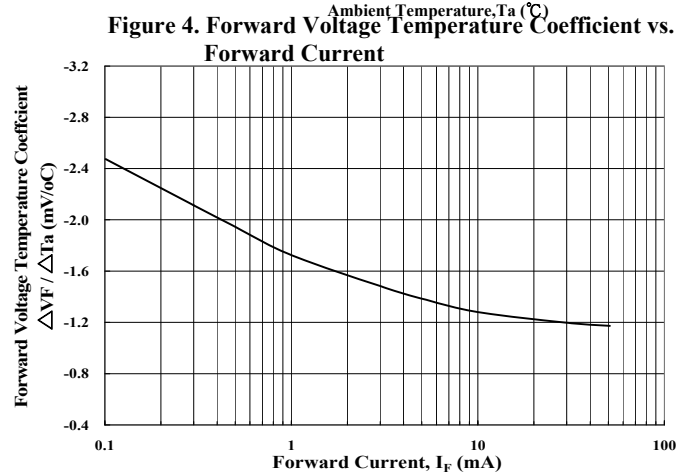


Figure 4. Forward Voltage Temperature Coefficient vs. Forward Current

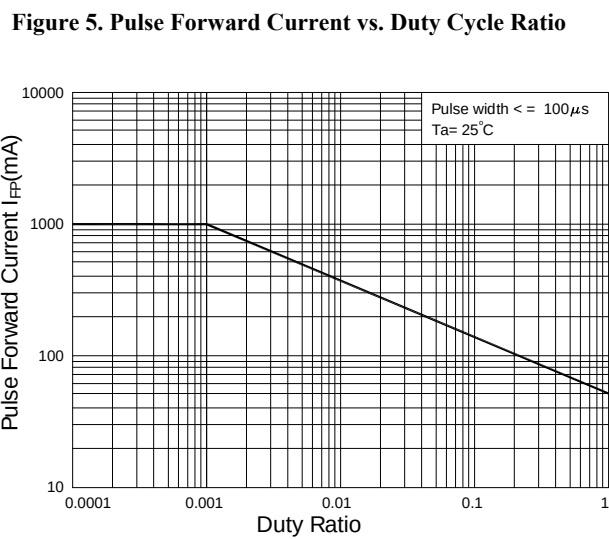


Figure 5. Pulse Forward Current vs. Duty Cycle Ratio

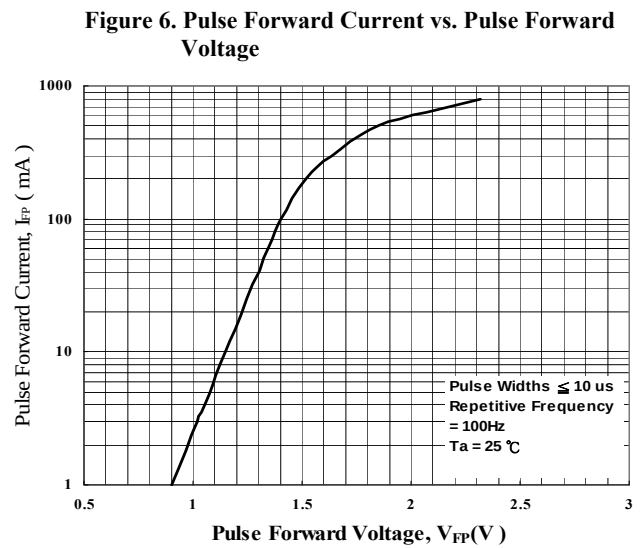


Figure 6. Pulse Forward Current vs. Pulse Forward Voltage

CHARACTERISTICS CURVES

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

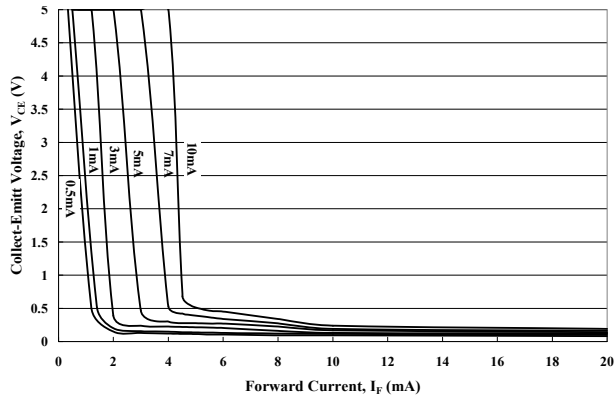


Figure 8. Collector Current vs. Collector-Emitter Voltage

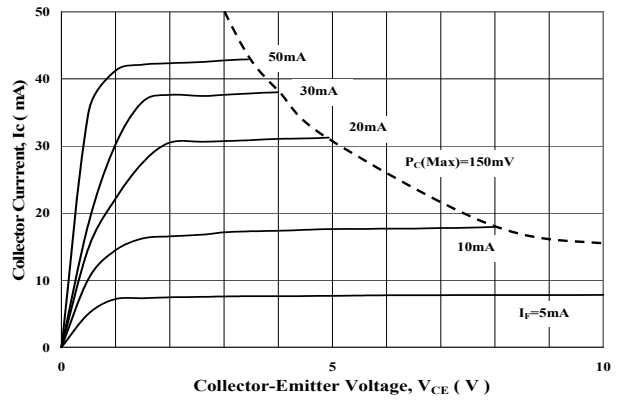


Figure 9. Collector Current vs. Small Collector-Emitter Voltage

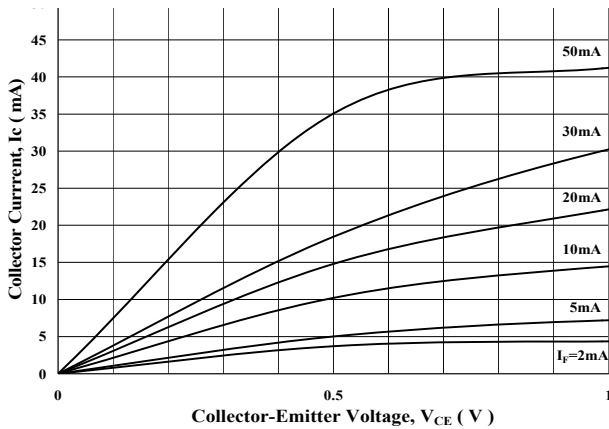


Figure 10. Collector Current vs. Forward Current

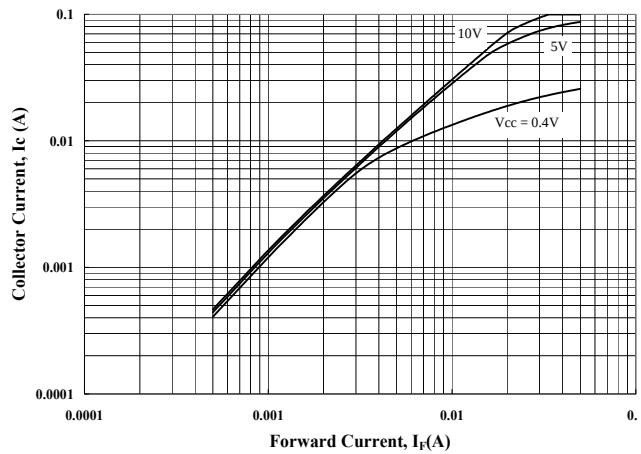


Figure 11. Collector Dark Current vs. Ambient Temperature

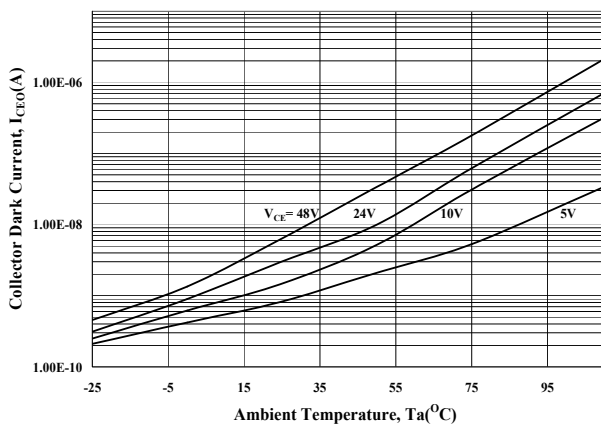
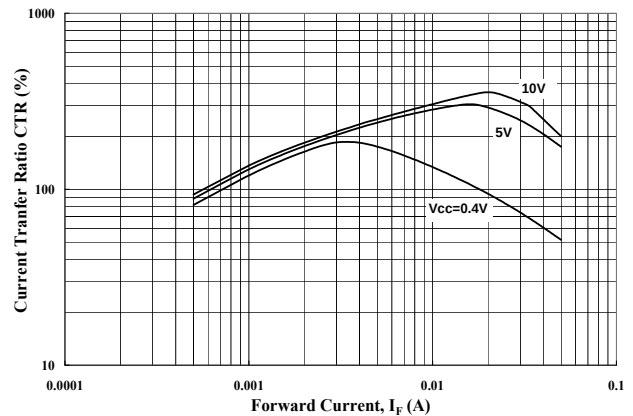


Figure 12. Current Transfer Ratio vs. Forward Current



CHARACTERISTICS CURVES

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

Figure 14. Collector Current vs. Ambient Temperature

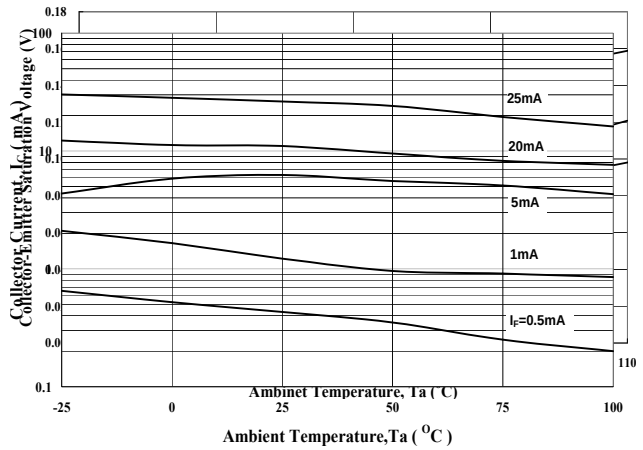


Figure 15. Switching Time vs. Load Resistance

Figure 16. Switching Time vs. Ambient Temperature

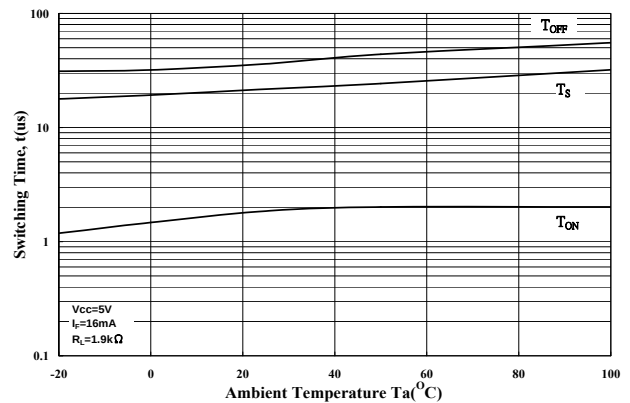
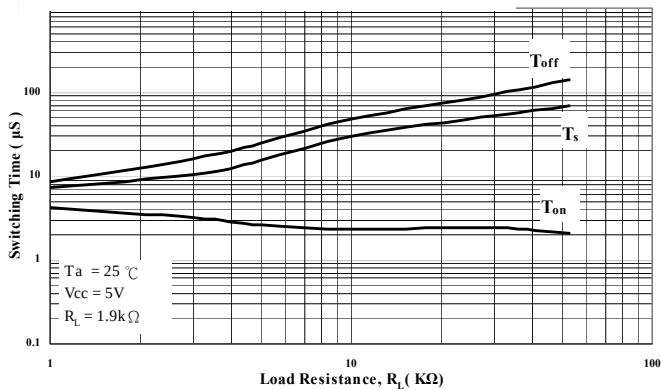
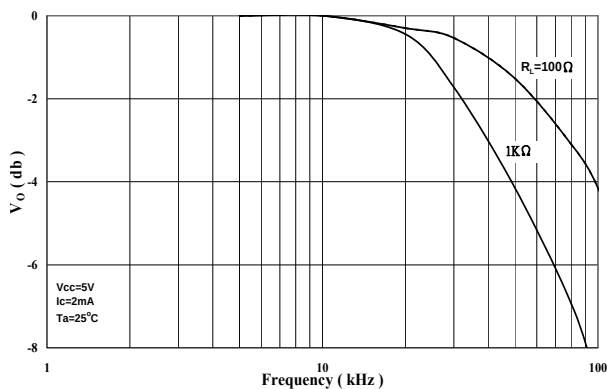
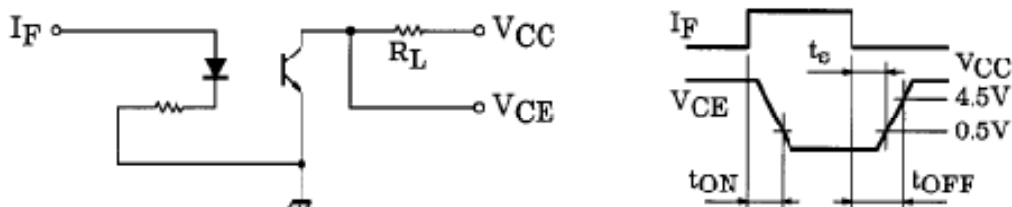


Figure 17. Frequency Response



SWITCHING TIME TEST CIRCUIT



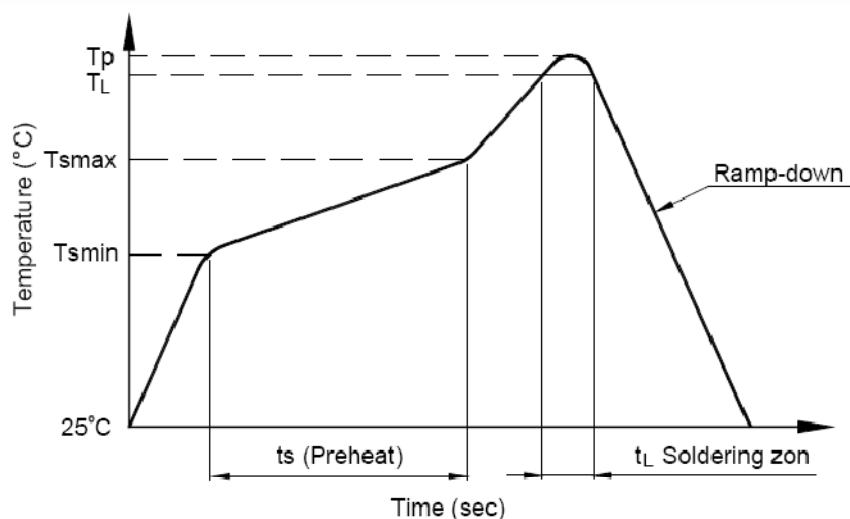
TEMPERATURE PROFILE OF SOLDERING REFLOW

(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	Condition
Preheat	
- Temperature Min (T_{smin})	150 °C
- Temperature Max (T_{smax})	180 °C
- Time (min to max) (t_s)	90 ± 30 sec
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 infrated 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)

Notes:

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- 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.
- Do not immerse unit's body in solder paste.