FEATURES

Lead Free RoHS COMPLIANT
April 2010

* Current transfer ratio
  (CTR : MIN. 20% at I_F = 1mA, V_{CE} = 5V)
* Isolation voltage between input and output LTV-214 / 224 / 244 Series
  (Viso = 3.75KVrms)
* Employs double transfer mold technology

* Safety approved
  UL, CSA, FIMKO, VDE* (* Requires "V" ordering option)

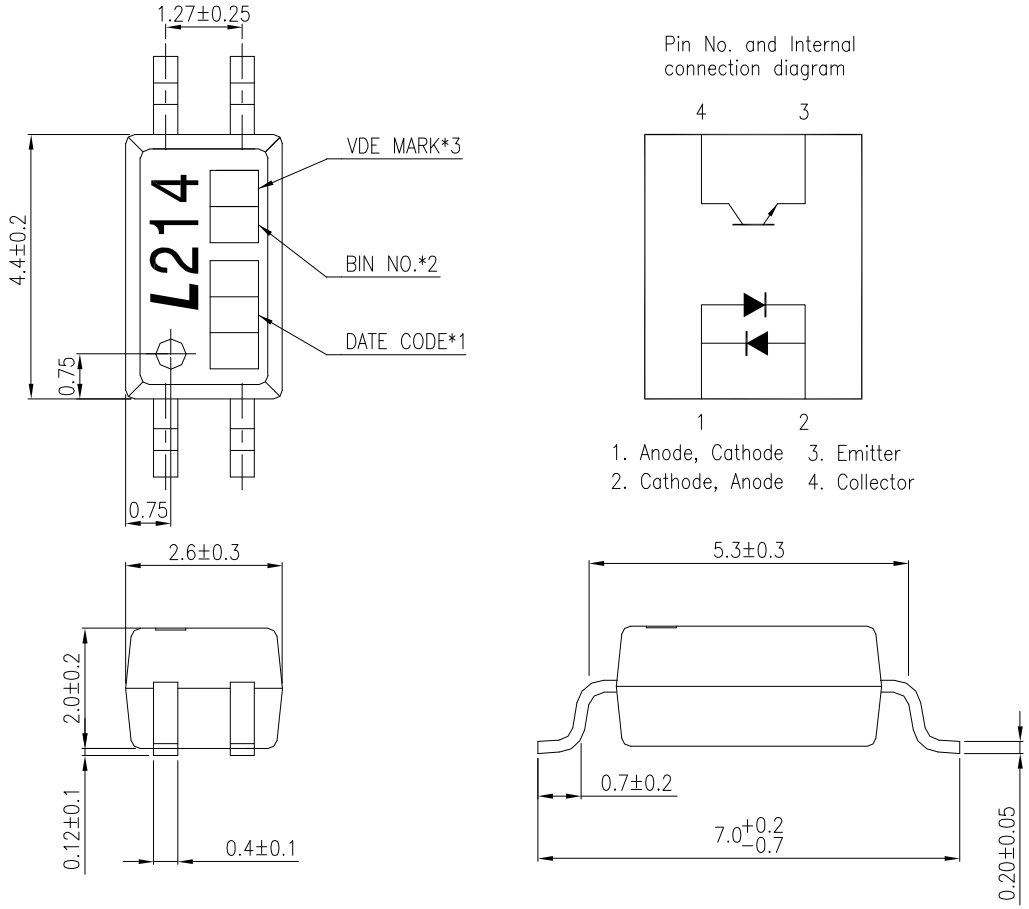
* RoHS compliance

APPLICATIONS

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

OUTLINE DIMENSIONS

LTV-214 :

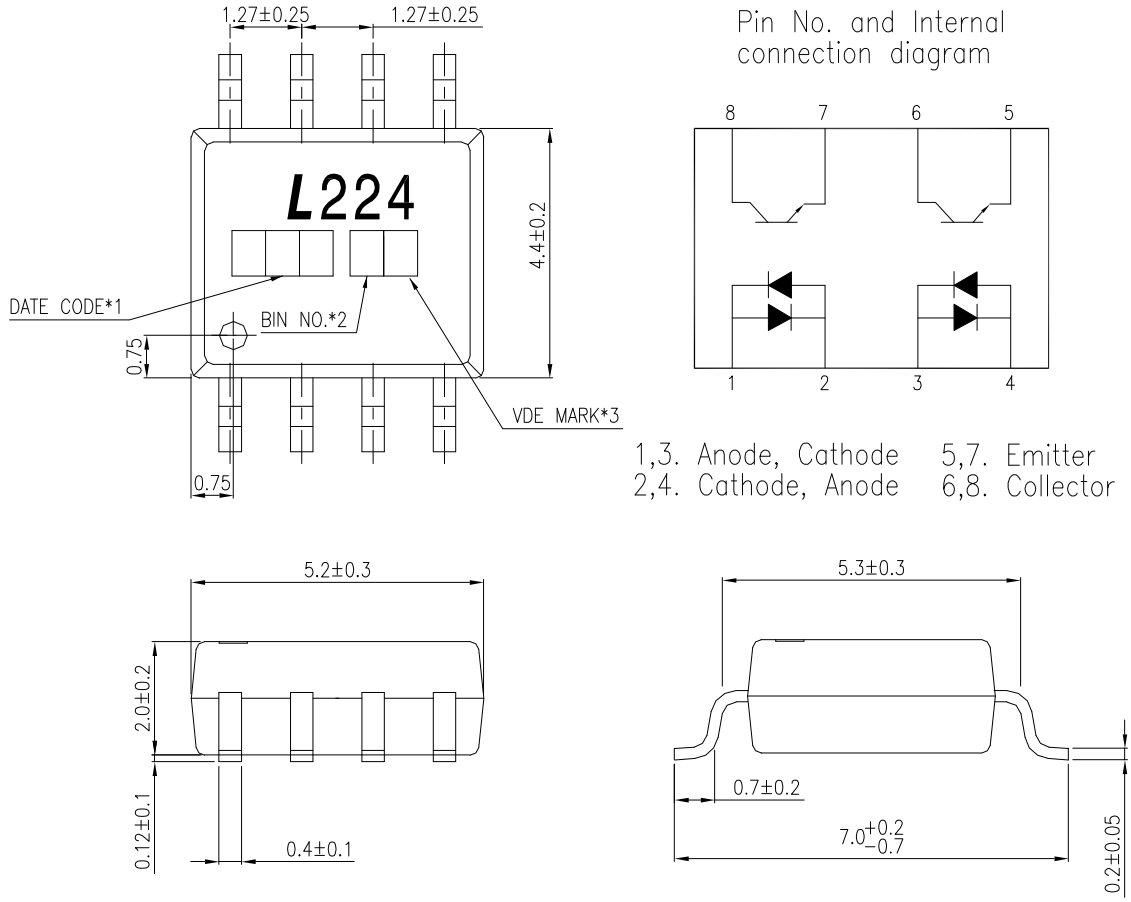


*1. 3-digit date code: Y WW
Y : Year code (Ex. A: 2010)
WW : Week code (Ex. 01 : the 1st week in that year)

*2. Rank shall be or shall not be marked.
*3. VDE mark only appears on devices ordered “V” option.

OUTLINE DIMENSIONS

LTV-224:



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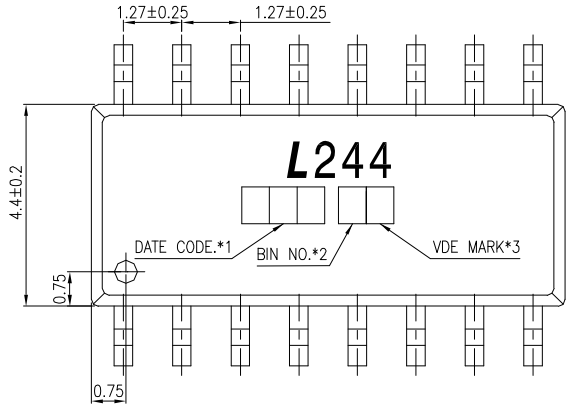
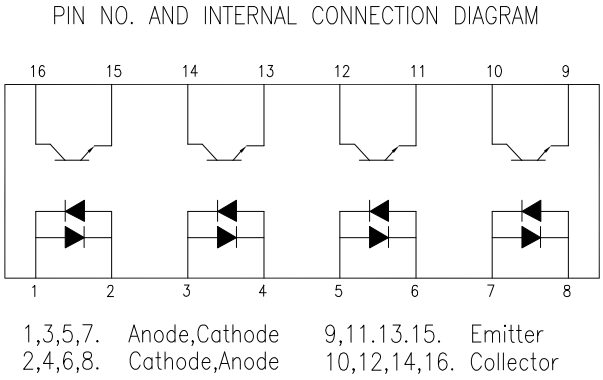
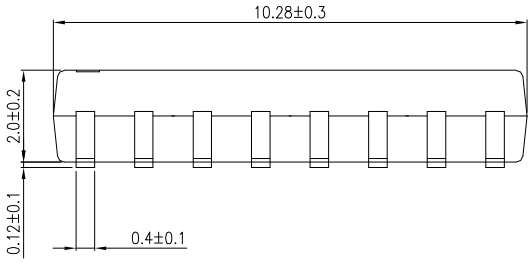
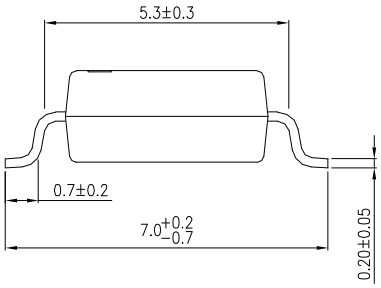
OUTLINE DIMENSIONS

LTV-244 :









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Y : Year code (Ex. A: 2010)
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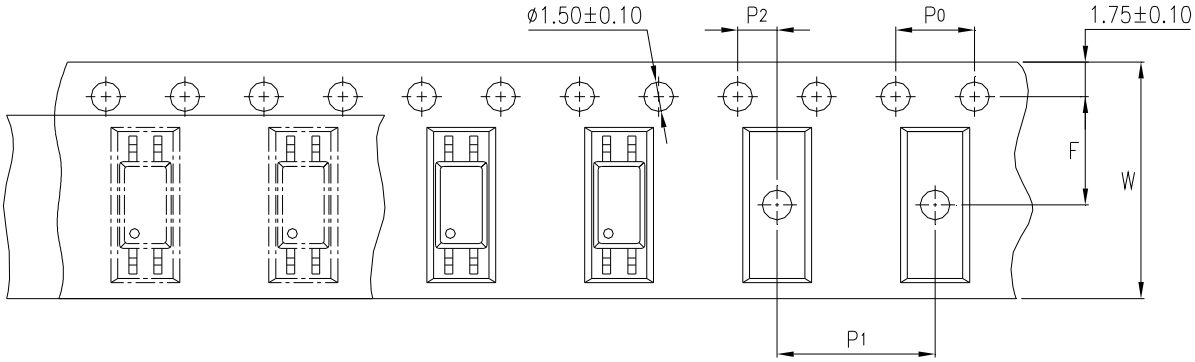
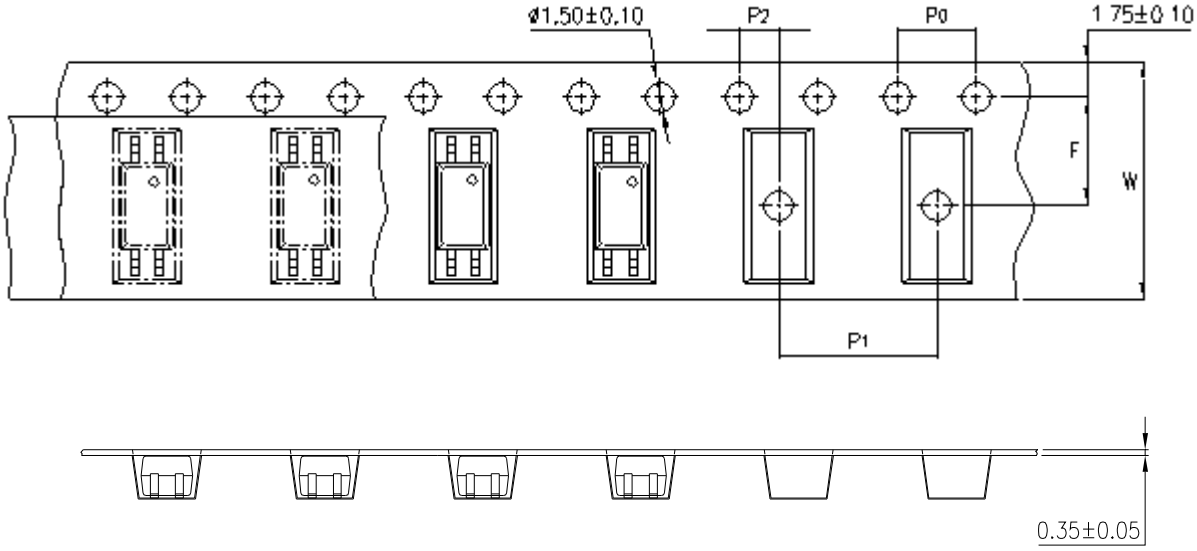
*3. VDE mark only appears on devices ordered “V” option.

TAPING DIMENSIONS

LTV-214 series:



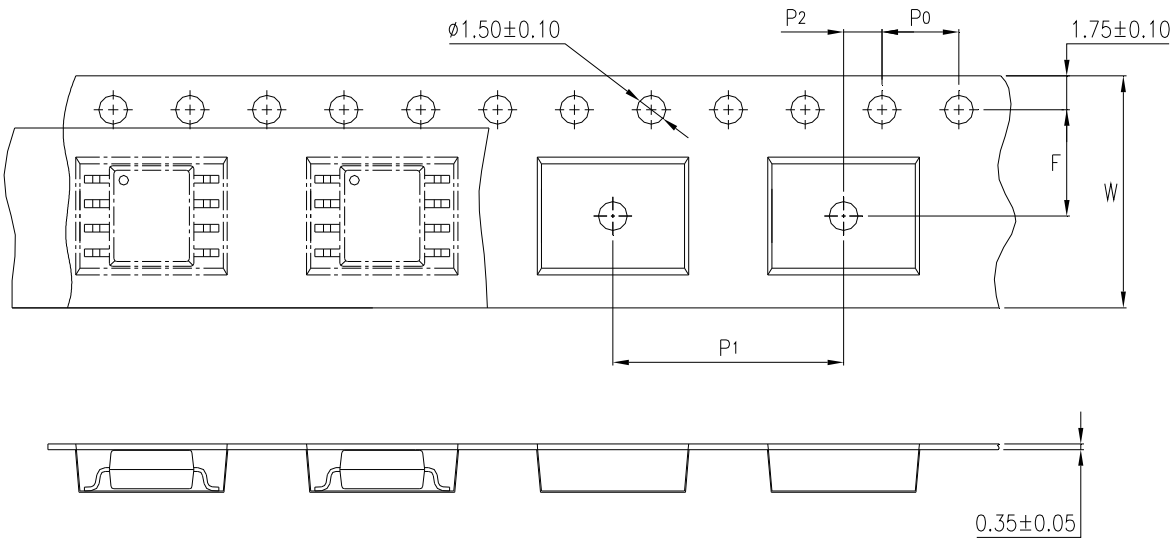
LTV-214-TP1 series



Description	Symbol	Dimension in mm (inches)
Tape wide	W	12 ± 0.3 (.47)
Pitch of sprocket holes	P_0	4 ± 0.1 (.15)
Distance of compartment	F P_2	5.5 ± 0.1 (.217) 2 ± 0.1 (.079)
Distance of compartment to compartment	P_1	8 ± 0.1 (.315)

TAPING DIMENSIONS

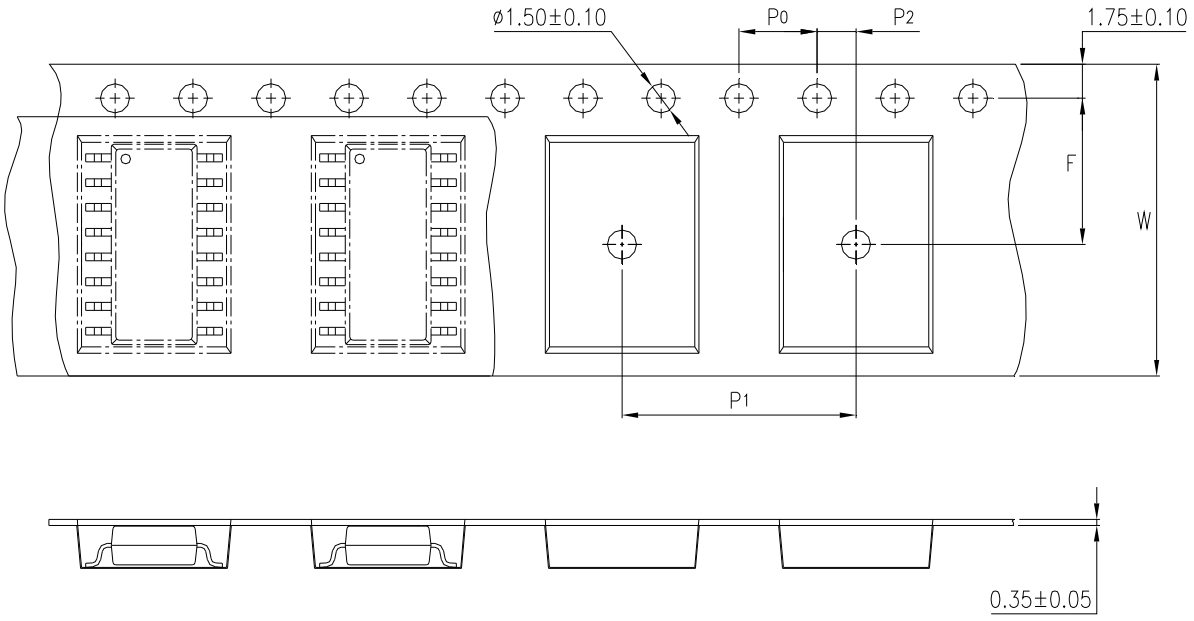
LTV-224 series



Description	Symbol	Dimension in mm (inches)
Tape wide	W	12 ± 0.3 (.47)
Pitch of sprocket holes	P_0	4 ± 0.1 (.15)
Distance of compartment	F P_2	5.5 ± 0.1 (.217) 2 ± 0.1 (.079)
Distance of compartment to compartment	P_1	8 ± 0.1 (.315)

TAPING DIMENSIONS

LTV-244 series



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 P_2	7.5 ± 0.1 (.217) 2 ± 0.1 (.079)
Distance of compartment to compartment	P_1	12 ± 0.1 (.63)

Quantities per Reel :

Package Type	LTV-214	LTV-224	LTV-244
Quantities (pcs)	**3000**	**2000**	**2000**

ABSOLUTE MAXIMUM RATING

(Ta = 25°C)

PARAMETER		SYMBOL	RATING			UNIT
			214	224	244	
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		Ptot	200		170	mW
*1 Isolation Voltage		Viso	3,750			Vrms
Operating Temperature		Topr	-55 ~ +110			°C
Storage Temperature		Tstg	-55 ~ +150			°C
*2 Soldering Temperature		Tsol	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=20mA
	Terminal Capacitance	C_t	—	60	—	pF	V=0, f=1KHz
OUTPUT	Collector Dark Current	I_{CEO}	—	—	100	nA	V_{CE}=48V, I_F=0
	Collector-Emitter Breakdown Voltage	BV_{CEO}	80	—	—	V	I_C=0.1mA I_F=0
	Emitter-Collector Breakdown Voltage	BV_{ECO}	7	—	—	V	I_E=10μA I_F=0
TRANSFER CHARACTERISTICS	Collector Current	I_C	0.2	—	4	mA	I_F=±1mA V_{CE}=5V
	*1 Current Transfer Ratio	CTR	20	—	400	%	
	Saturated Current	Ic (sat)	—	4.8	—	mA	I_F=8mA V_{CE}=2.4V
	Saturated CTR	CTR (sat)	—	60	—	%	
	Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	—	0.4	V	I_F=8mA I_C=2.4mA
	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=1MHz
	Response Time (Rise)	t_r	—	2	—	μs	V_{CE}=10V, I_C=2mA R_L=100Ω
	Response Time (Fall)	t_f	—	3	—	μs	
	Turn-On Time	ton	—	3	—	us	
	Turn-Off Time	toff	—	3	—	us	
	Turn-On Time	tON	—	2	—	us	V_{CE}=5V, I_C=16mA R_L=1.9KΩ
	Storage Time	ts	—	25	—	us	
	Turn-Off Time	tOFF	—	40	—	us	

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

RANK TABLE OF CURRENT TRANSFER RATIO CTR

MODEL NO.	RANK MARK	CTR (%)
LTV-214	0	20 ~ 400
	A	50 ~ 250
LTV-224 LTV-244	0	20~400

CONDITIONS	IF = ±1 mA VCE = 5 V Ta = 25 °C

CHARACTERISTICS CURVES

Figure 1. Collector Power Dissipation vs. Ambient Temperature

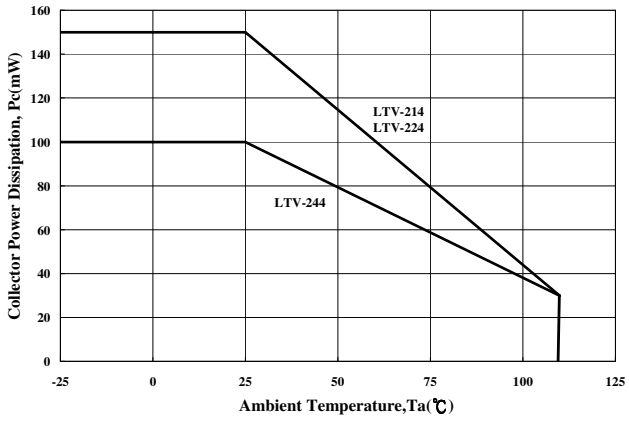


Figure 2. Forward Current vs. Ambient Temperature

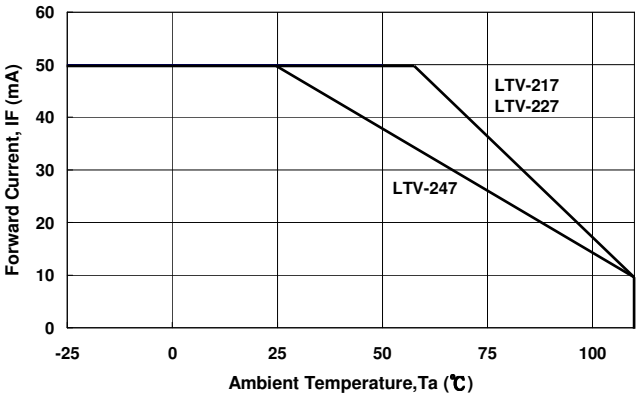


Figure 3. Forward Current vs. Forward Voltage

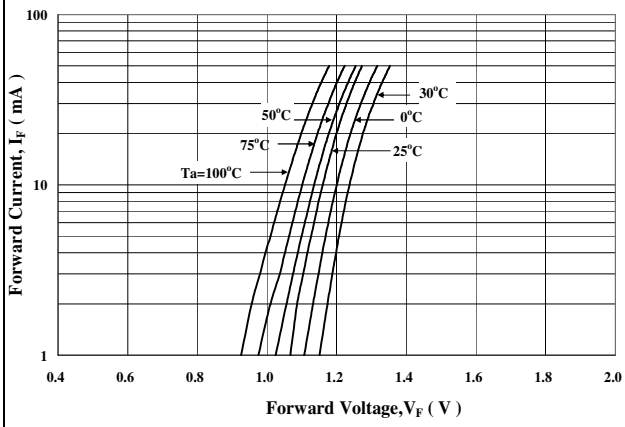


Figure 4. Forward Voltage Temperature Coefficient vs. Forward Current

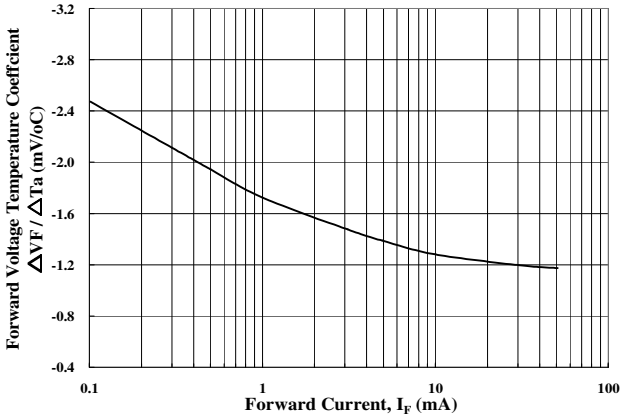


Figure 5. Pulse Forward Current vs. Duty Cycle Ratio

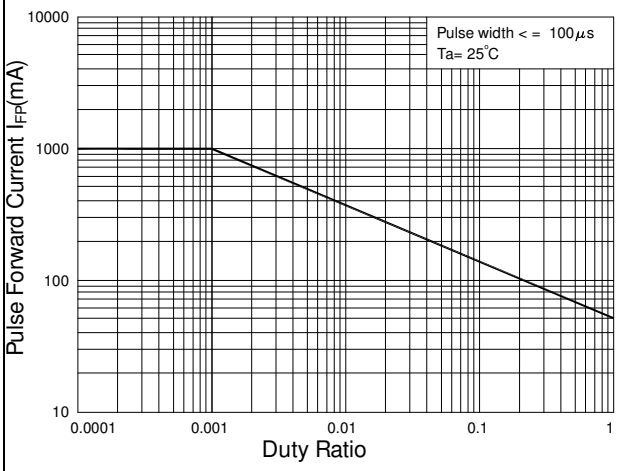
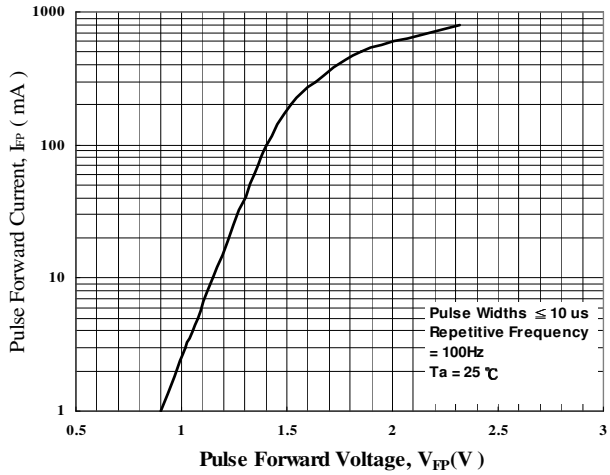


Figure 6. Pulse Forward Current vs. Pulse Forward Voltage



CHARACTERISTICS CURVES

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

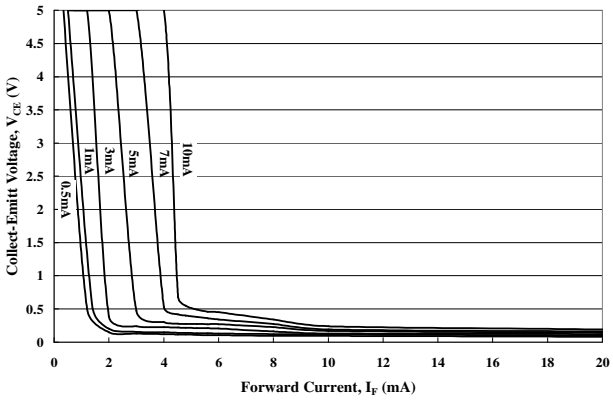


Figure 8. Collector Current vs. Collector-Emitter Voltage

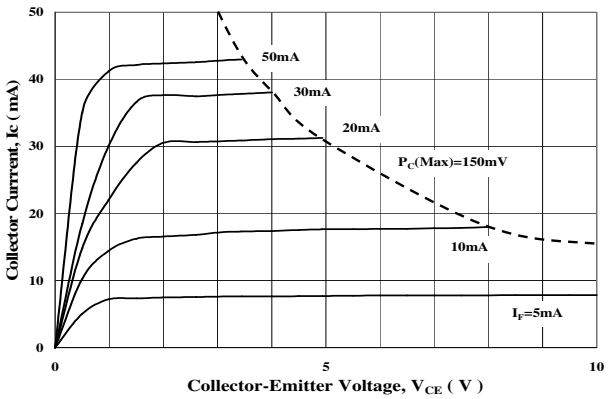


Figure 9. Collector Current vs. Small Collector-Emitter Voltage

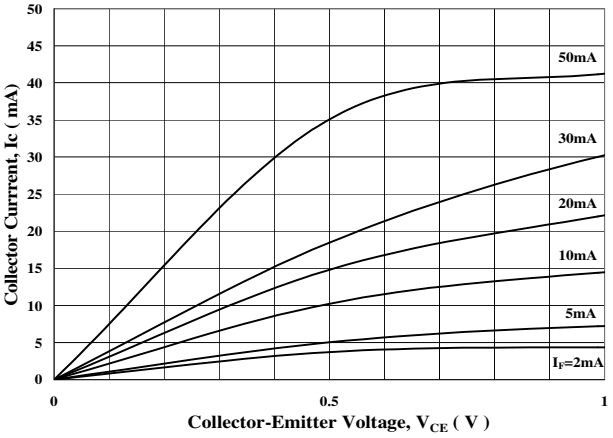


Figure 10. Collector Current vs. Forward Curent

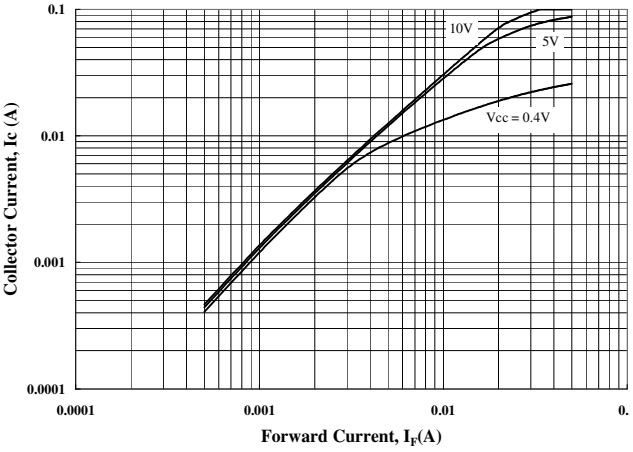


Figure 11. Collector Dark Current vs. Ambient Temperature

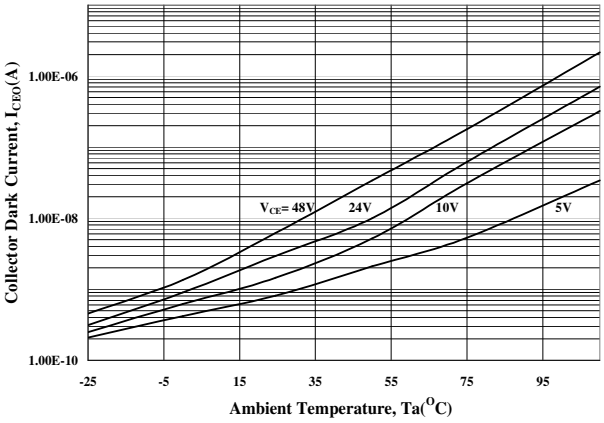
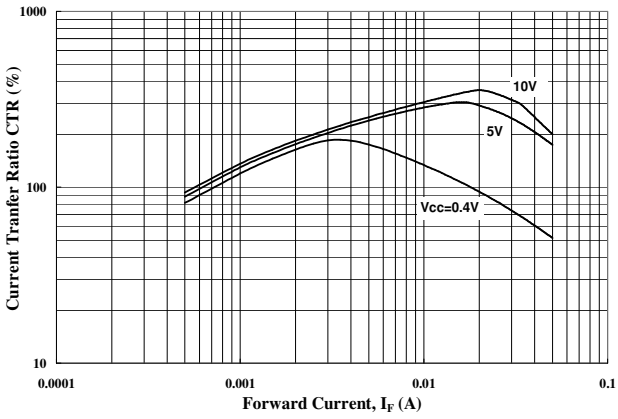


Figure 12. Current Transfer Ratio vs. Forward Current



CHARACTERISTICS CURVES

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

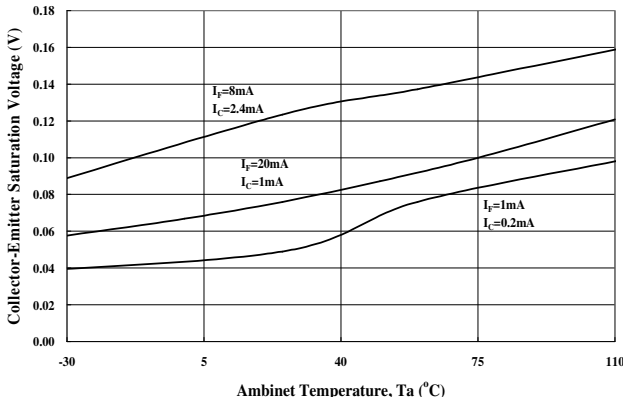


Figure 14. Collector Current vs. Ambient Temperature

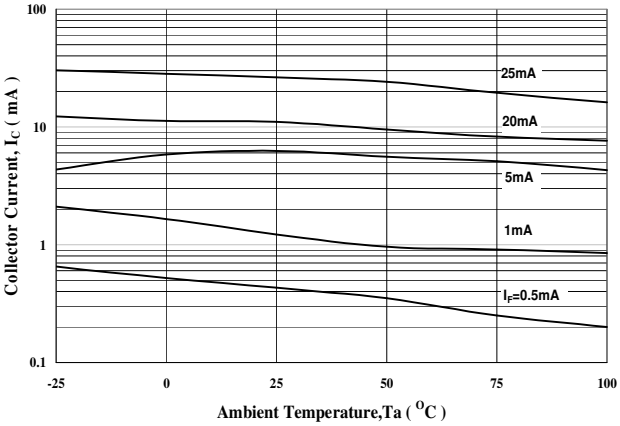


Figure 15. Switching Time vs. Load Resistance

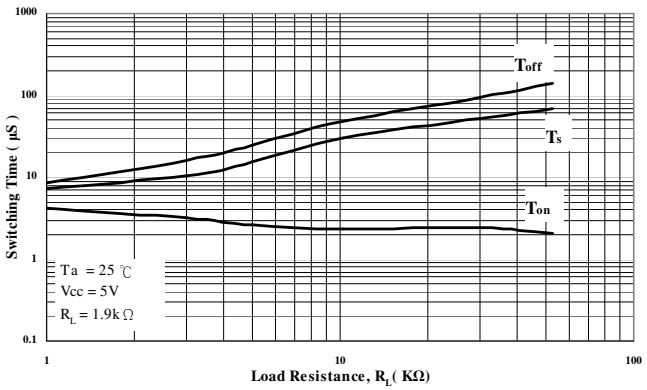


Figure 16. Switching Time vs. Ambient Temperature

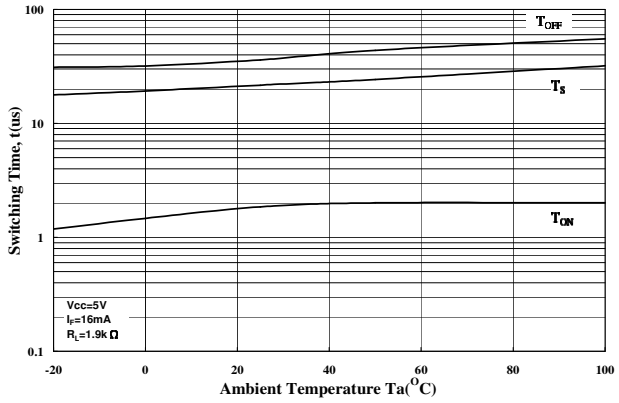
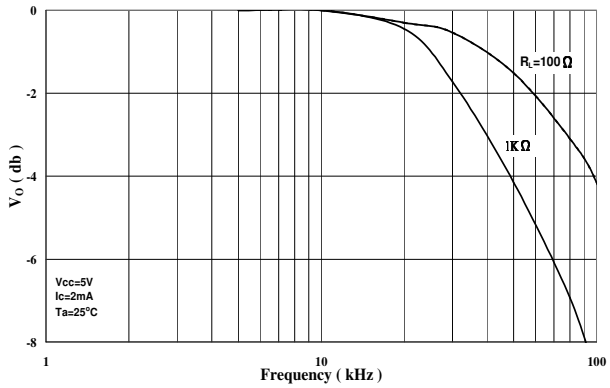
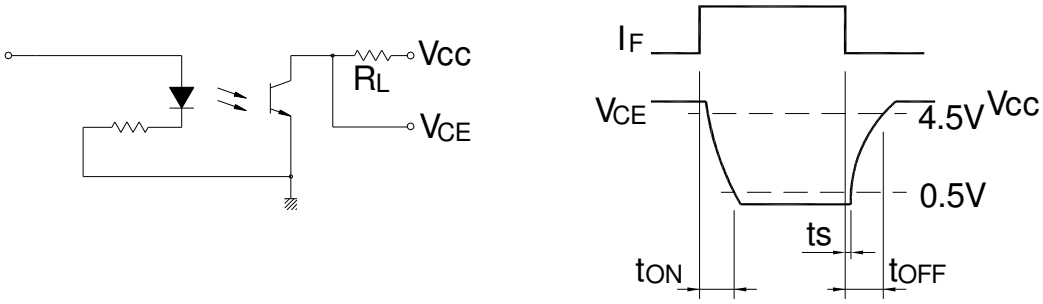


Figure 17. Frequency Response



SWITCHING TIME TEST CIRCUIT



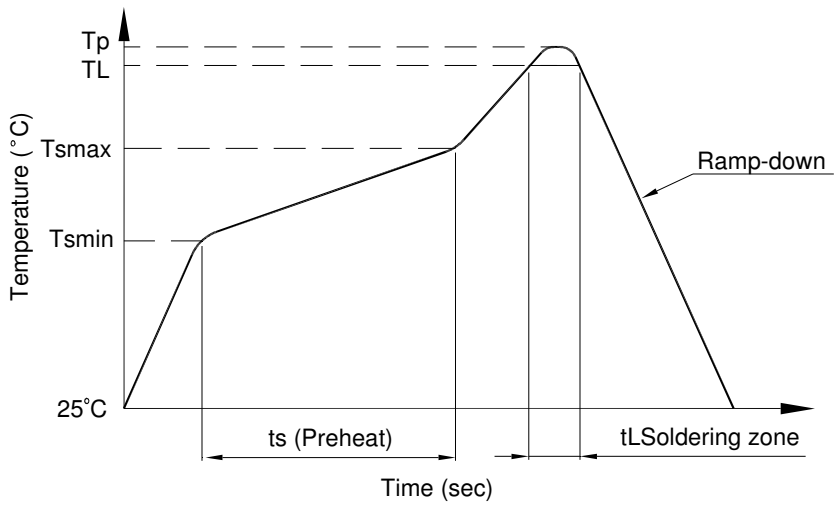
TEMPERATURE PROFILE OF SOLDERING REFLOW

(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}) - Temperature Max (T_{Smax}) - Time (min to max) (ts)	 150˚C 180˚C 90±30˚C
Soldering zone - Temperature (T_L) - Time (t_L)	 250˚C 10~15 sec
Peak Temperature (T_P)	260˚C
Ramp-down rate	3~6˚C / sec



TEMPERATURE PROFILE OF SOLDERING REFLOW

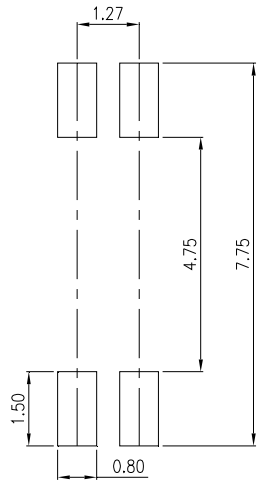
(2) When using another soldering method such as infrated ray lamp, the temperature may rise partially in the mold of the device.

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

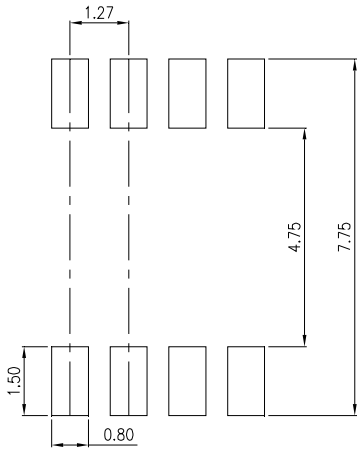
RECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)

Unit:mm

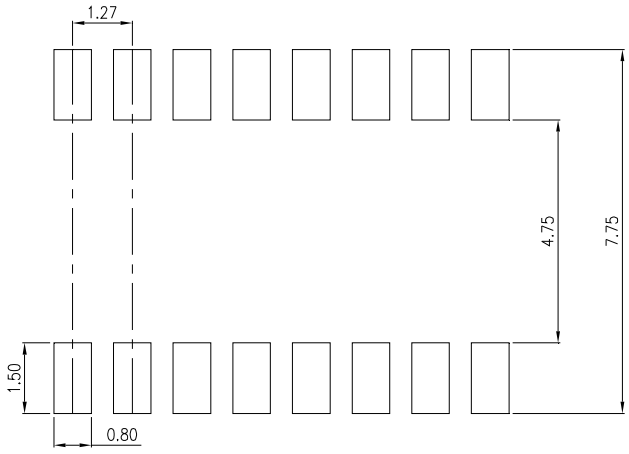
LTV-214 series:



LTV-224 series:



LTV-244 series:



Notes:

- Lite-On is continually improving the quality, reliability, function or design and Lite-On 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.
- Do not immerse unit’s body in solder paste.