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LITEON®
OPTOELECTRONICS



Photocoupler

Product Data Sheet

LTV-816
(M, S, S-TA, S-TA1, S-TP)
Series

Spec No.: DS70-2012-0048

Effective Date: 12/12/2013

Revision: B

LITE-ON DCC

RELEASE

BNS-OD-FC001/A4

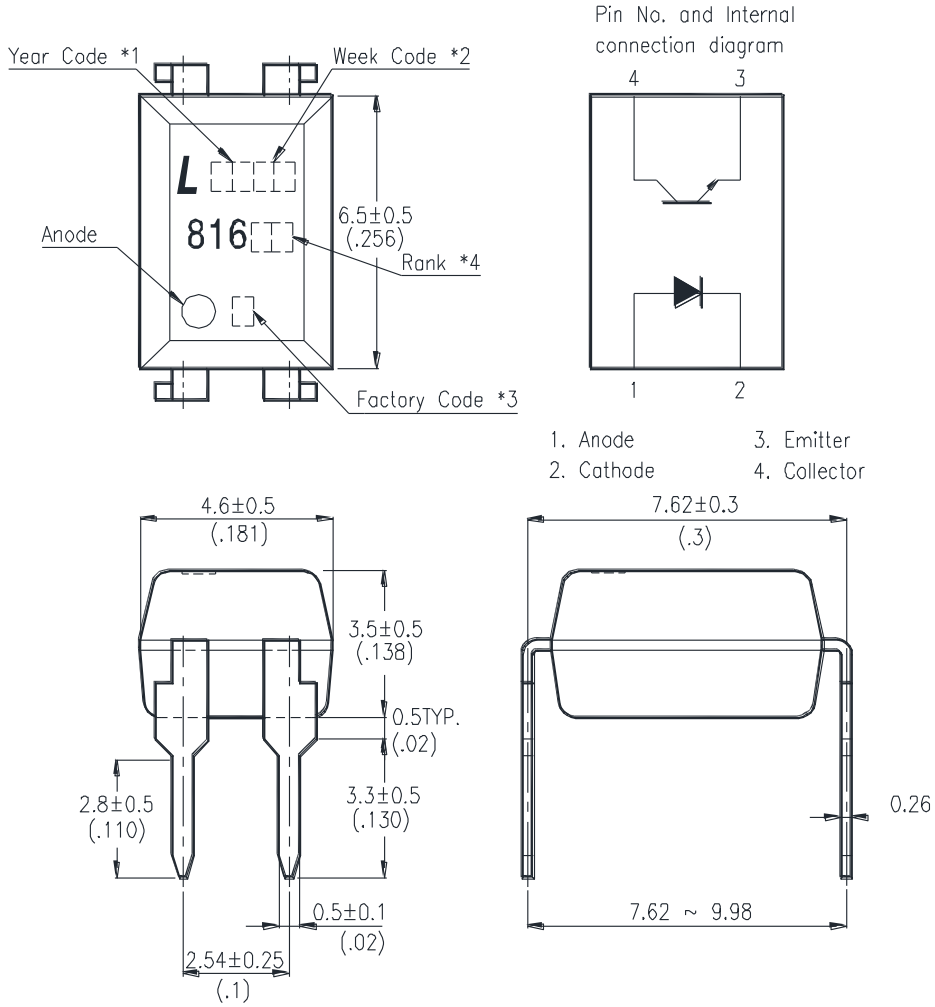
LITE-ON Technology Corp. / Optoelectronics
No.90,Chien 1 Road, Chung Ho, New Taipei City 23585, Taiwan, R.O.C.
Tel: 886-2-2222-6181 Fax: 886-2-2221-1948 / 886-2-2221-0660
http://www.liteon.com/opto

FEATURES

* Current transfer ratio
  (CTR : MIN. 50% at I_F = 5mA, V_{CE} = 5V)
* High input-output isolation voltage
  (V_{iso} = 5,000Vrms)
* Response time
  (t_r : TYP. 4μs at V_{CE} = 2V, I_C = 2mA, R_L = 100Ω)
* Dual-in-line package :
  LTV-816 : 1-channel type
* Wide lead spacing package :
  LTV-816M : 1-channel type
* Surface mounting package :
  LTV-816S : 1-channel type
* Tape and reel packaging :
  LTV-816S-TA : 1-channel type
  LTV-816S-TA1 : 1-channel type
  LTV-816S-TP : 1-channel type
* Safety approval
  UL 1577, Cert. No.E113898
  CSA CA5A, Cert. No. 1020087 (CA 91533-1)
  FIMKO EN/IEC 60950-1, EN/IEC 60065; Cert. No.NCS/FI 24426 M3
  NEMKO EN/IEC 60950-1,EN/IEC 60065; Cert. No.P08209622/A1
  DEMKO EN/IEC 60950-1,EN/IEC 60065; Cert. No.314703-02
  SEMKO EN/IEC 60950-1,EN/IEC 60065; Cert. No. 1119078
  VDE DIN EN60747-5-5, Cert. No. 40015248
  CQC GB8898-2011/GB4943-2011, Cert.No.
  CQC10001054420/CQC10001054421
* RoHS compliance
  All materials be used in device are followed EU RoHS directive (No.2002/95/EC).
* ESD pass HBM 8000V/MM2000V
*MSL class1

OUTLINE DIMENSIONS

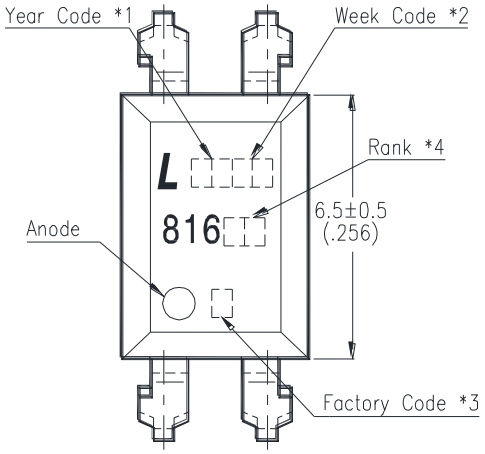
LTV-816:

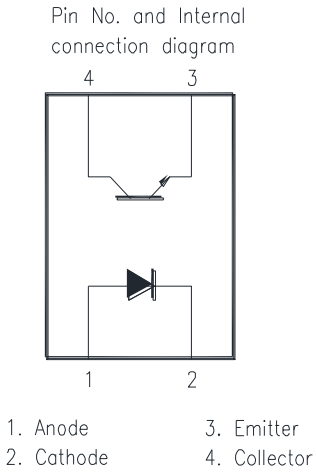


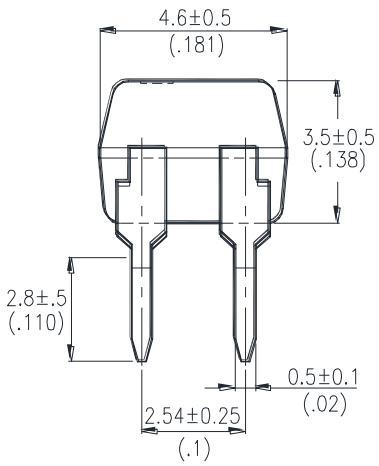
*1. Year date code.
*2. 2-digit work week.
*3. Factory identification mark shall be marked.
(Y : Thailand, W : China-CZ)
*4. Rank shall be or shall not be marked.

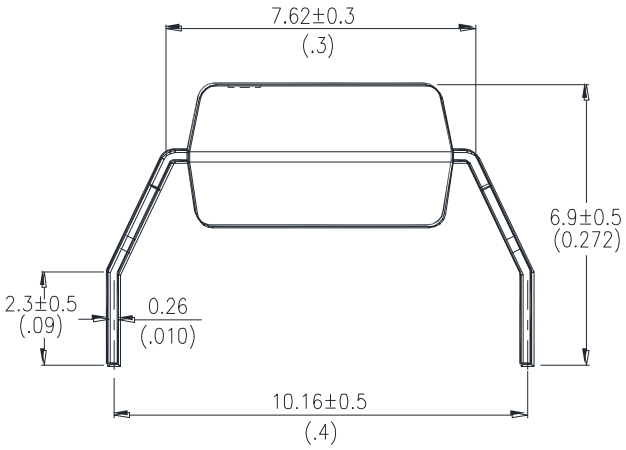
OUTLINE DIMENSIONS

LTV-816M :





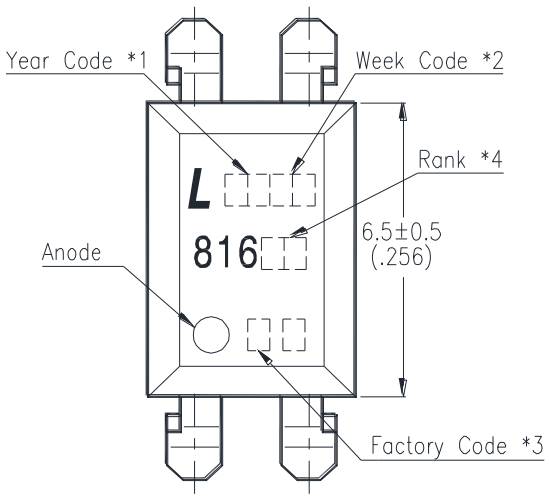


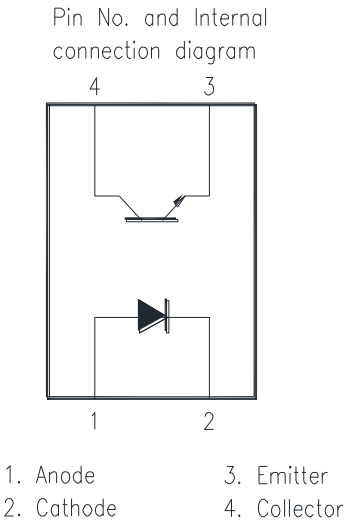


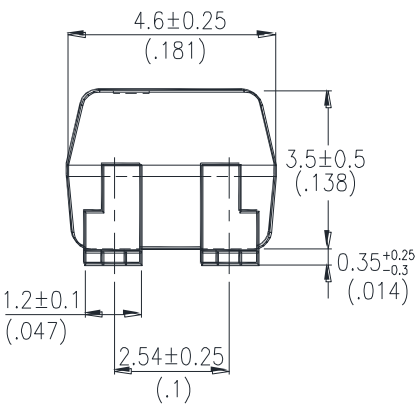
*1. Year date code.
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(Y : Thailand, W : China-CZ)
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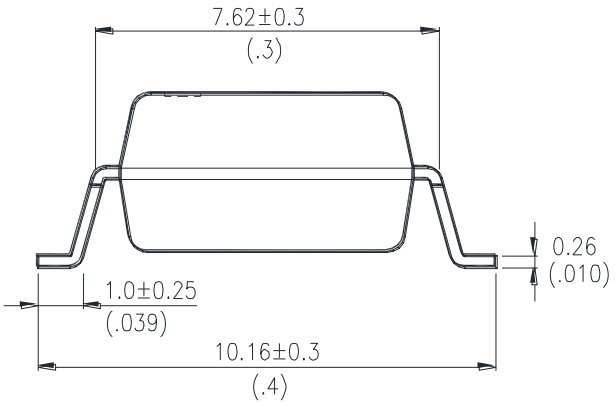
OUTLINE DIMENSIONS

LTV-816S :





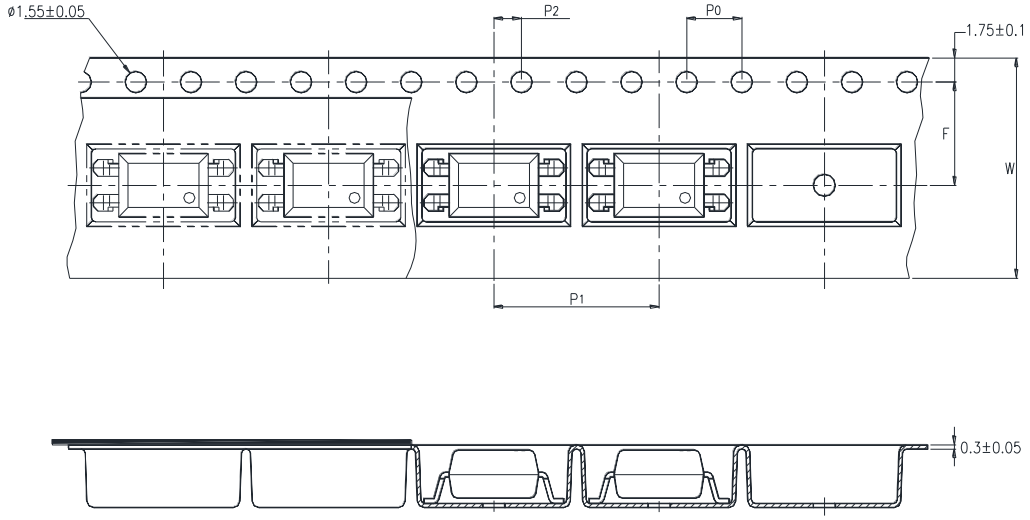




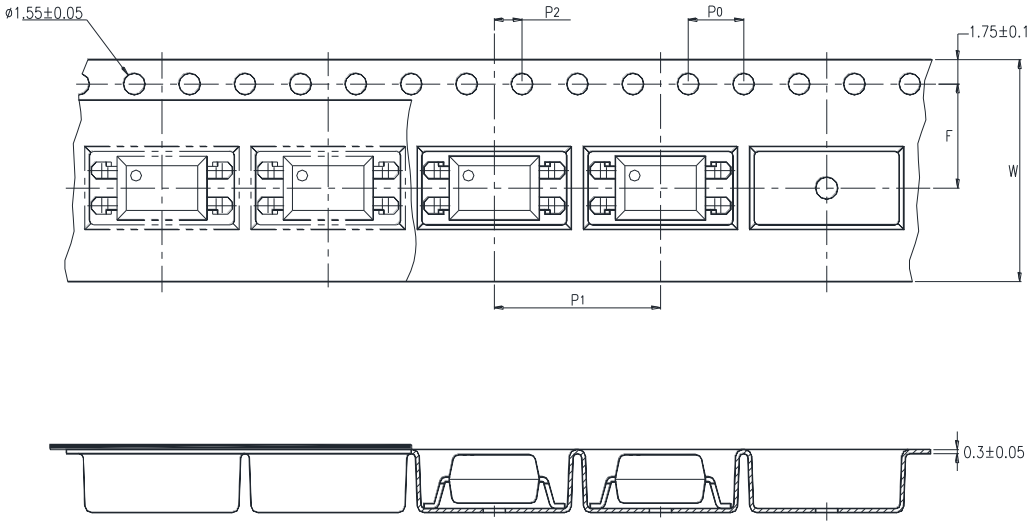
*1. Year date code.
*2. 2-digit work week.
*3. Factory identification mark shall be marked.
(Y : Thailand, W : China-CZ)
*4. Rank shall be or shall not be marked.

TAPING DIMENSIONS

LTV-816S-TA :



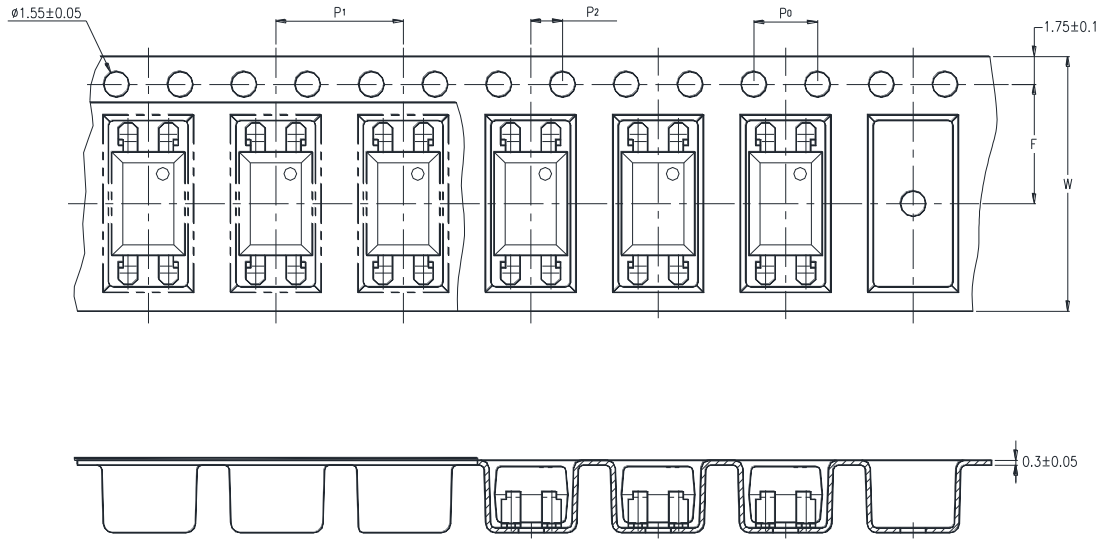
LTV-816S-TA1 :



Description	Symbol	Dimensions in mm (inches)
Tape wide	W	16 ± 0.3 (.63)
Pitch of sprocket holes	P_0	4 ± 0.1 (.15)
Distance of compartment	F P_2	7.5 ± 0.1 (.295) 2 ± 0.1 (.079)
Distance of compartment to compartment	P_1	12 ± 0.1 (.472)

TAPING DIMENSIONS

LTV-816S-TP :



Description	Symbol	Dimensions in mm (inches)
Tape wide	W	16 ± 0.3 (.63)
Pitch of sprocket holes	P_0	4 ± 0.1 (.15)
Distance of compartment	F P_2	7.5 ± 0.1 (.295) 2 ± 0.1 (.079)
Distance of compartment to compartment	P_1	12 ± 0.1 (.472)

ABSOLUTE MAXIMUM RATING

(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
OUTPUT	Collector - Emitter Voltage	V_{CEO}	80	V
	Emitter - Collector Voltage	V_{ECO}	6	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}	5,000	Vrms
Operating Temperature		T_{opr}	-30 ~ +110	°C
Storage Temperature		T_{stg}	-55 ~ +125	°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

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
	Reverse Current	I_R	—	—	10	μA	V_R=4V
	Terminal Capacitance	C_t	—	30	250	pF	V=0, f=1KHz
OUTPUT	Collector Dark Current	I_{CEO}	—	—	100	nA	V_{CE}=20V, I_F=0
	Collector-Emitter Breakdown Voltage	BV_{CEO}	80	—	—	V	I_C=0.1mA I_F=0
	Emitter-Collector Breakdown Voltage	BV_{ECO}	6	—	—	V	I_E=10μA I_F=0
TRANSFER CHARACTERISTICS	Collector Current	I_C	2.5	—	30	mA	I_F=5mA V_{CE}=5V
	*1 Current Transfer Ratio ◇	CTR	50	—	600	%	
	Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	0.1	0.2	V	I_F=20mA I_C=1mA
	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
	Cut-Off Frequency	f_c	—	80	—	kHz	V_{CE}=5V, I_C=2mA R_L=100Ω, -3dB
	Response Time (Rise)	t_r	—	4	18	μs	V_{CE}=2V, I_C=2mA R_L=100Ω
	Response Time (Fall)	t_f	—	3	18	μs	

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

RANK TABLE OF CURRENT TRANSFER RATIO CTR

MODEL NO.	RANK MARK	CTR (%)
LTV-816	L	50 ~ 100
	A	80 ~ 160
	B	130 ~ 260
	C	200 ~ 400
	D	300 ~ 600
	L or A or B or C or D	50 ~ 600

CONDITIONS	I_F = 5 mA V_{CE} = 5 V Ta = 25 °C

CHARACTERISTICS CURVES

Fig.1 Forword Current vs. Ambient Temperatute

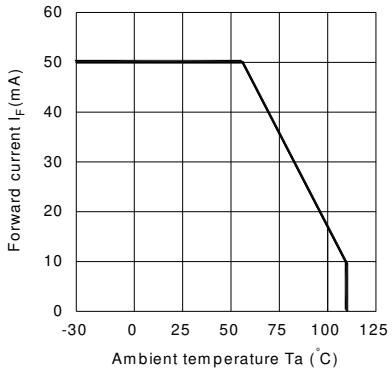


Fig.2 Collector Power Dissiption vs. Ambient Temperature

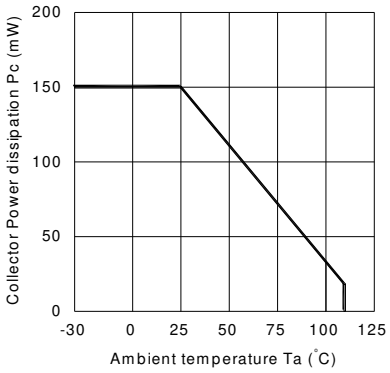


Fig.3 Collector-emitter Saturation Voltage vs. Forward Current

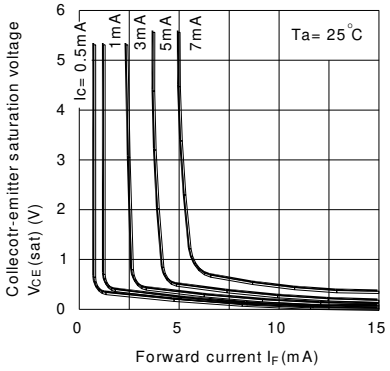


Fig.4 Forward Current vs. Forward Voltage

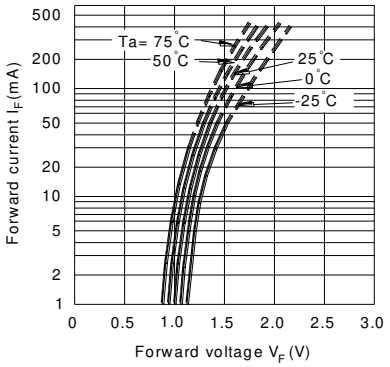


Fig.5 Current Transfer Ratio vs. Forward Current

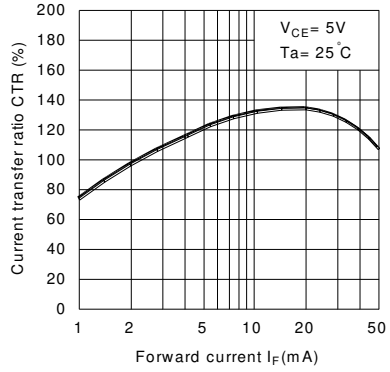
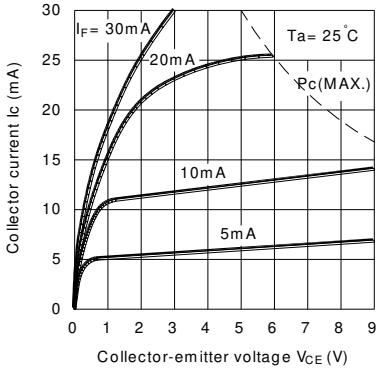


Fig.6 Collector Current vs. Collector-emitter Voltage



CHARACTERISTICS CURVES

Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

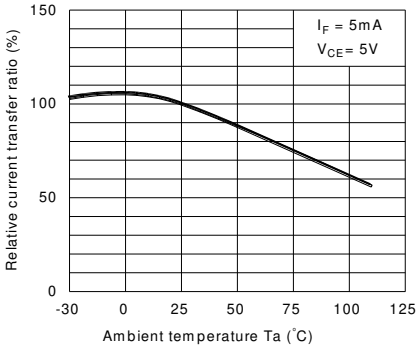


Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

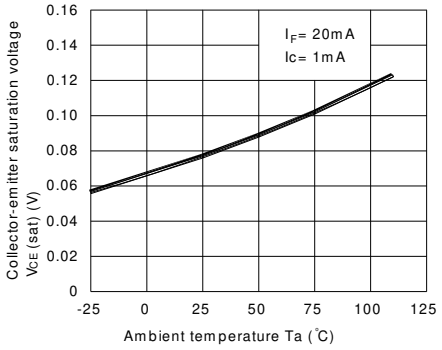


Fig.9 Collector Dark Current vs. Ambient Temperature

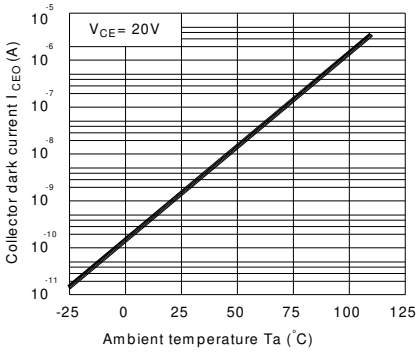


Fig.10 Response Time vs. Load Resistance

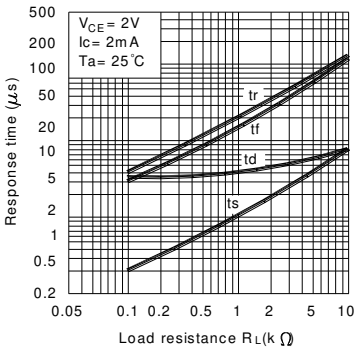
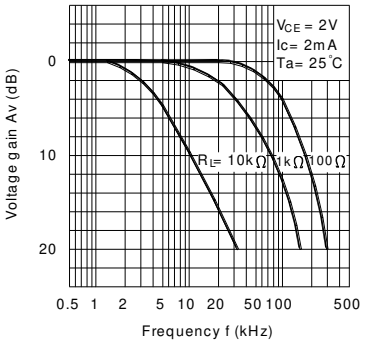
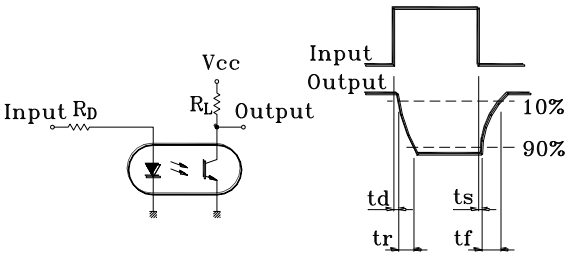


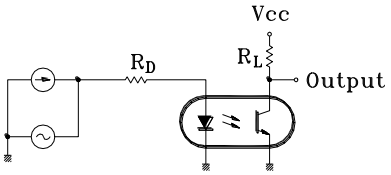
Fig.11 Frequency Response



Test Circuit for Response Time



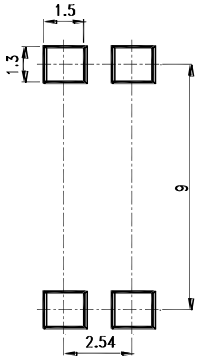
Test Circuit for Frequency Response



RECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)

Unit : mm

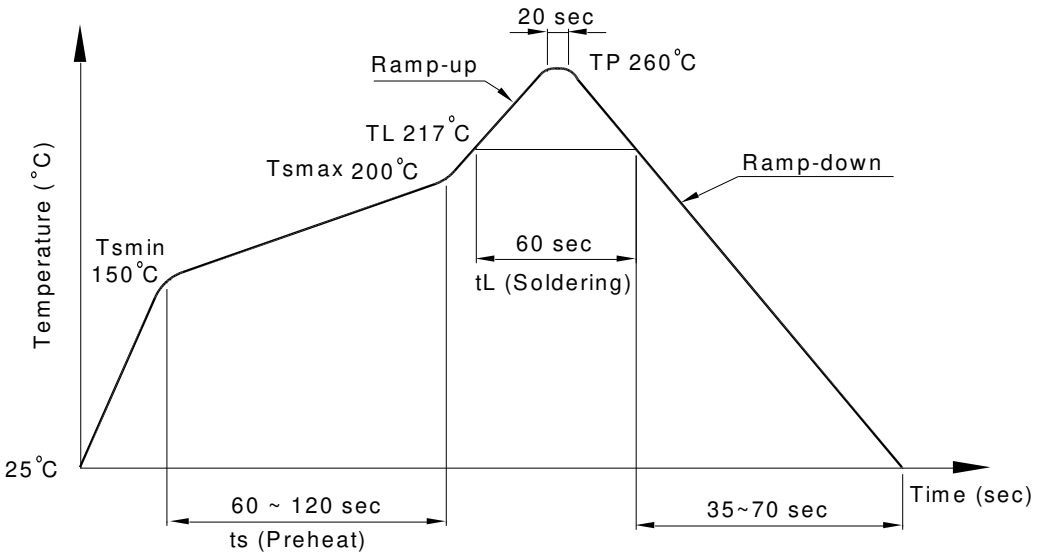
4 PIN



TEMPERATURE PROFILE OF SOLDERING REFLOW

(1) IR Reflow soldering (JEDEC-STD-020C compliant)
One time soldering reflow is recommended within the condition of temperature and time profile shown below.

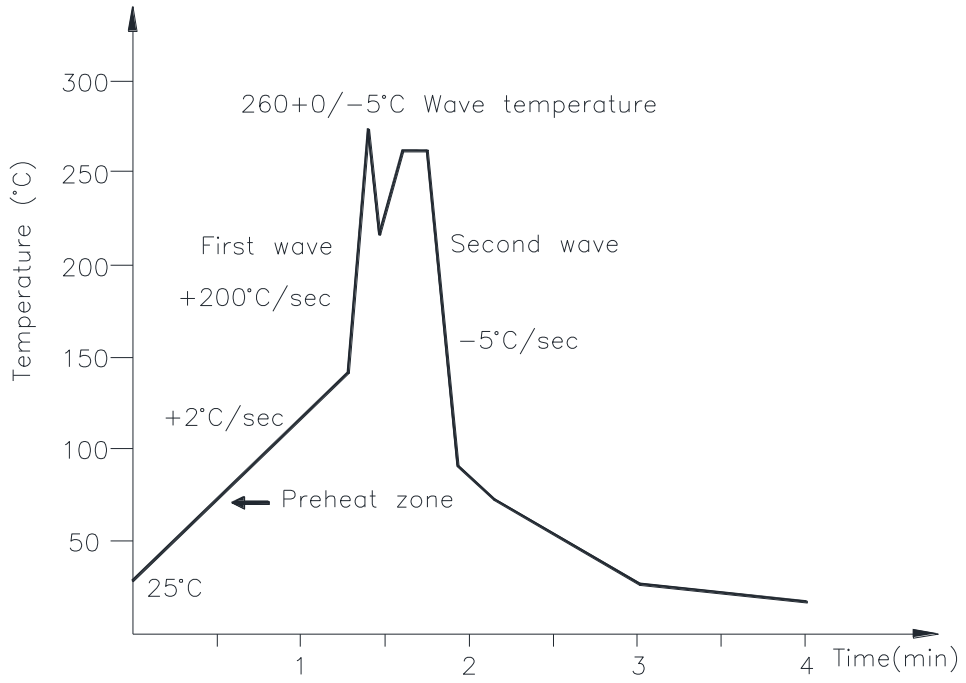
Profile item	Conditions
Preheat - Temperature Min (T_{Smin}) - Temperature Max (T_{Smax}) - Time (min to max) (ts)	 150˚C 200˚C 90±30 sec
Soldering zone - Temperature (T_L) - Time (t_L)	 217˚C 60 sec
Peak Temperature (T_P)	260˚C
Ramp-up rate	3˚C /sec max.
Ramp-down rate	3~6˚C / sec



-

TEMPERATURE PROFILE OF SOLDERING REFLOW

(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.



(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.

NAMING RULE

LTV- 816-(1)-(2)

DEVICE PART NUMBER
(1)=TAPING TYPE(TA,TA1,TP or none)
(2)=CTR RANK(A,B,C,D,L or none)

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.
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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.