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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

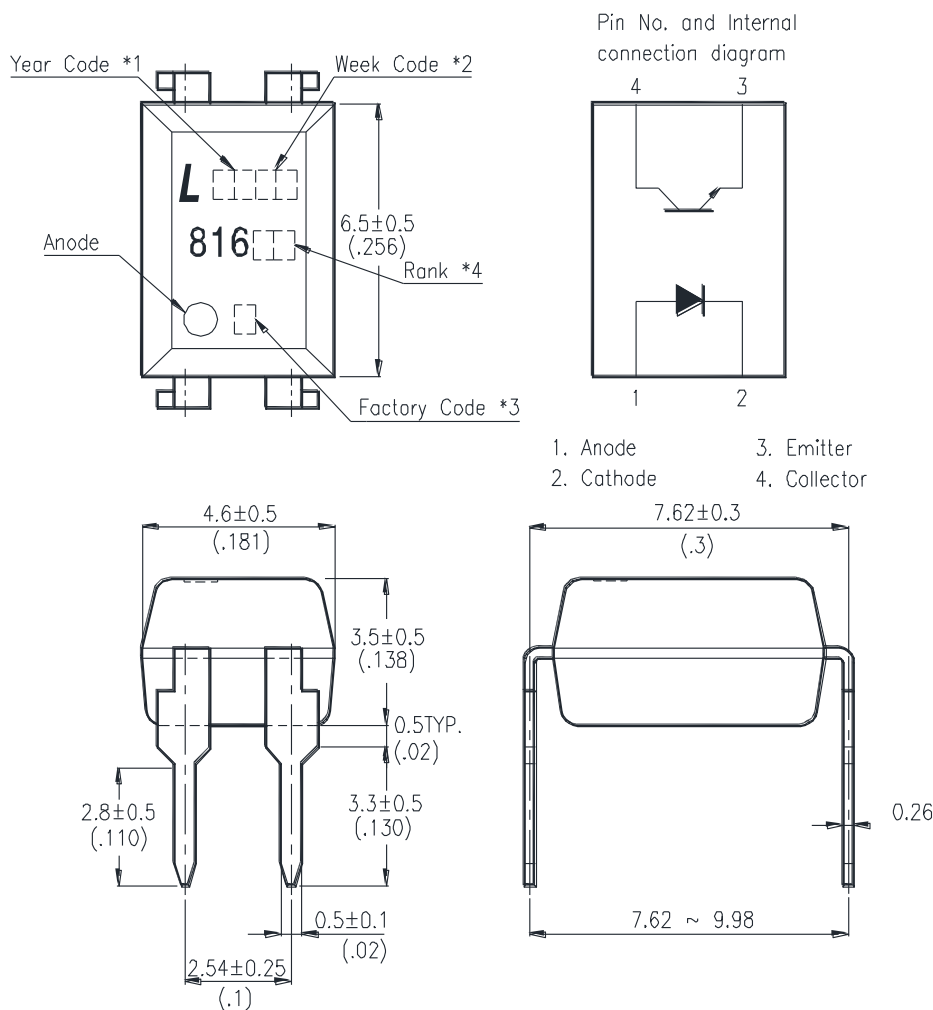
BNS-OD-FC001/A4



FEATURES

- * Current transfer ratio
(CTR : MIN. 50% at $I_F = 5\text{mA}$, $V_{CE} = 5\text{V}$)
- * High input-output isolation voltage
($V_{iso} = 5,000\text{Vrms}$)
- * Response time
(t_r : TYP. $4\mu\text{s}$ at $V_{CE} = 2\text{V}$, $I_C = 2\text{mA}$, $R_L = 100\Omega$)
- * 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

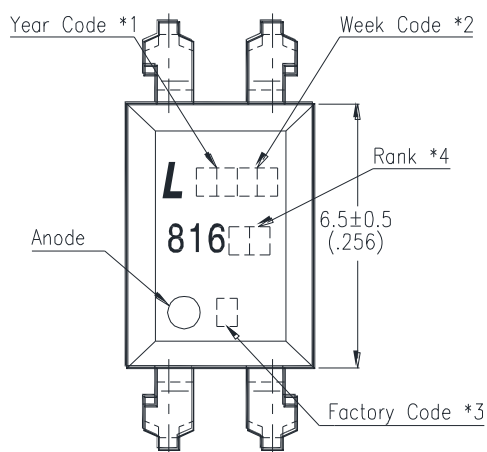
LTV-816:



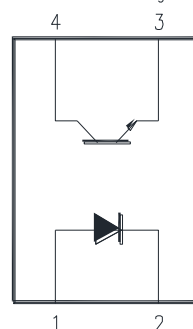
- *1. Year date code.
- *2. 2-digit work week.
- *3. Factory identification mark shall be marked.
(Y : Thailand, W : China-CZ)
- *4. Rank shall be or shall not be marked.

OUTLINE DIMENSIONS

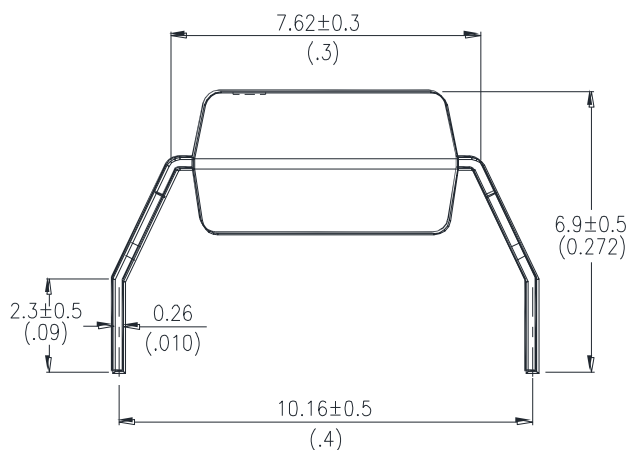
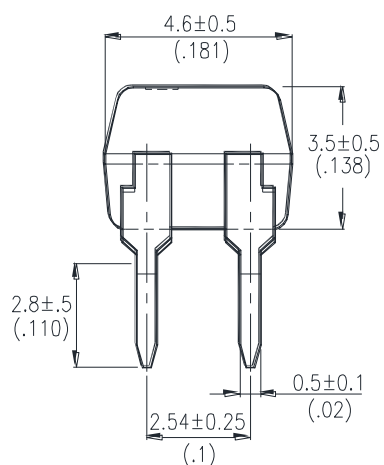
LTV-816M :



Pin No. and Internal connection diagram



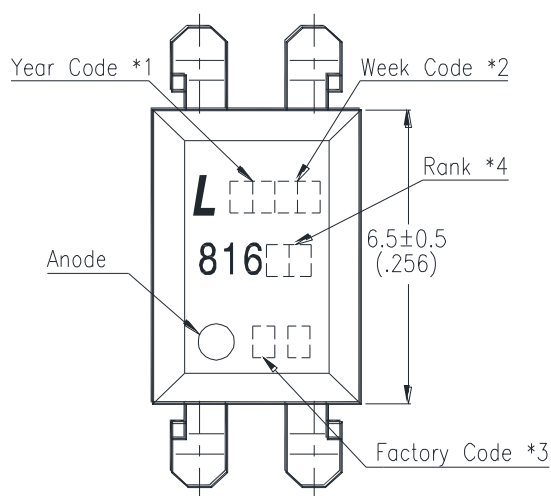
- 1. Anode
- 2. Cathode
- 3. Emitter
- 4. Collector



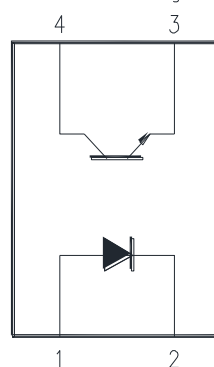
- *1. Year date code.
- *2. 2-digit work week.
- *3. Factory identification mark shall be marked.
(Y : Thailand, W : China-CZ)
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OUTLINE DIMENSIONS

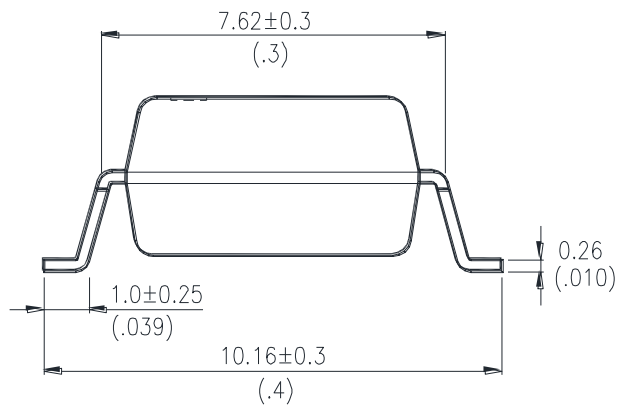
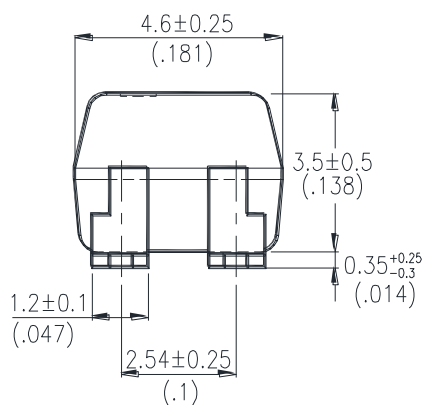
LTV-816S :



Pin No. and Internal connection diagram



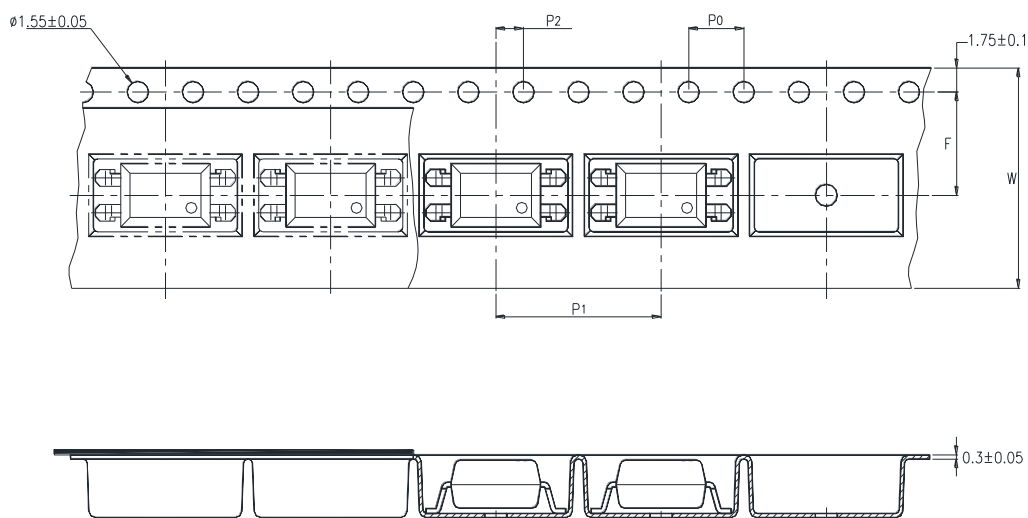
- 1. Anode
- 2. Cathode
- 3. Emitter
- 4. Collector



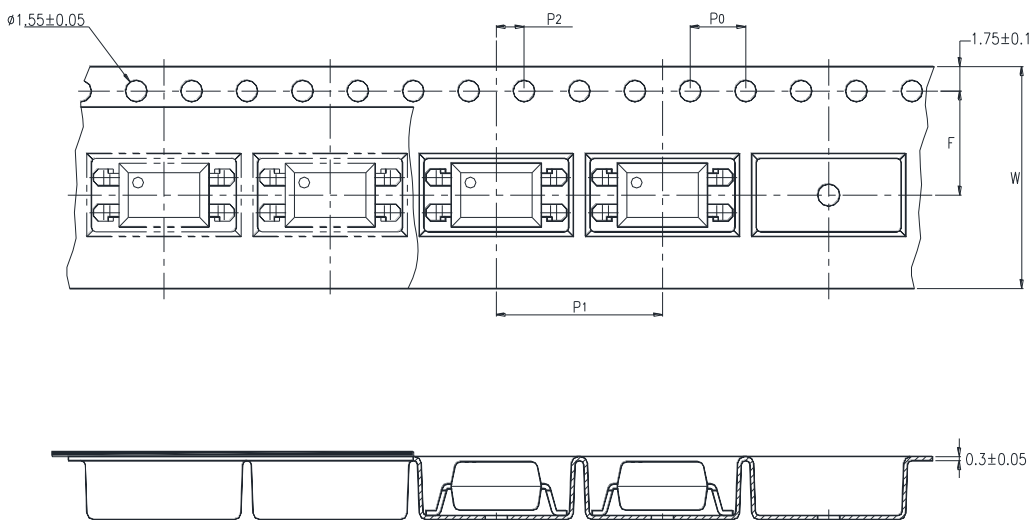
- *1. Year date code.
- *2. 2-digit work week.
- *3. Factory identification mark shall be marked.
(Y : Thailand, W : China-CZ)
- *4. Rank shall be or shall not be marked.

TAPING DIMENSIONS

LTV-816S-TA :



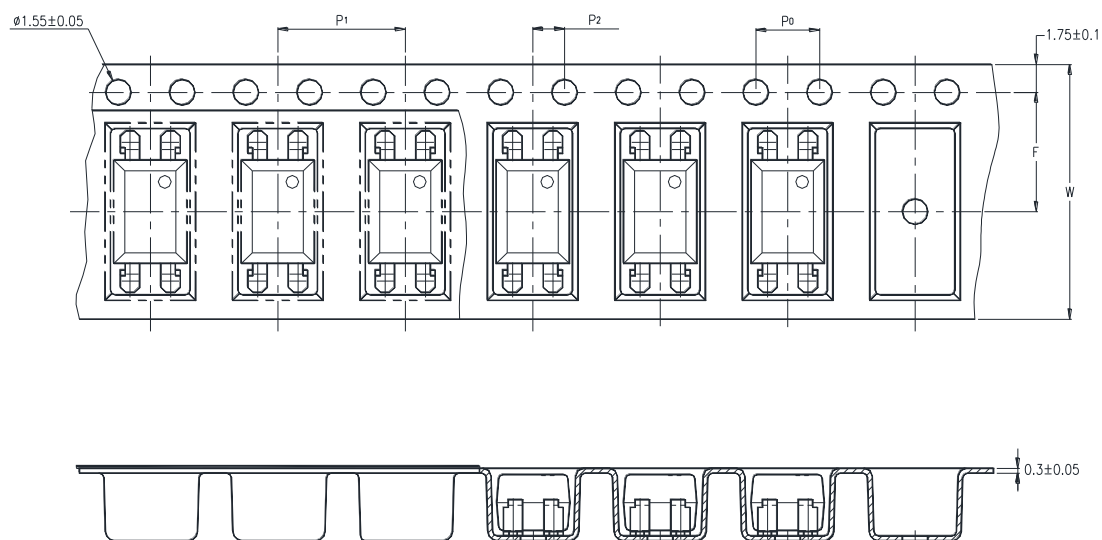
LTV-816S-TA1 :



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	7.5 ± 0.1 (.295)
Distance of compartment to compartment	P_2	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	7.5 ± 0.1 (.295)
	P_2	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	V _{rms}
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	

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

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	$I_F = 5 \text{ mA}$ $V_{CE} = 5 \text{ V}$ $T_a = 25 \text{ }^{\circ}\text{C}$
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CHARACTERISTICS CURVES

Fig.1 Forward Current
vs. Ambient Temperature

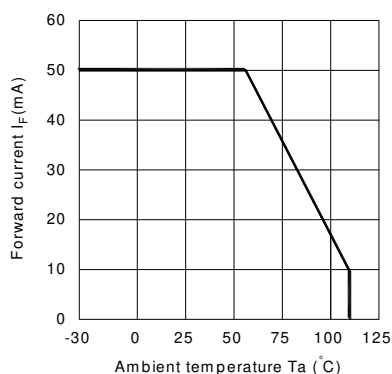


Fig.2 Collector Power Dissipation
vs. Ambient Temperature

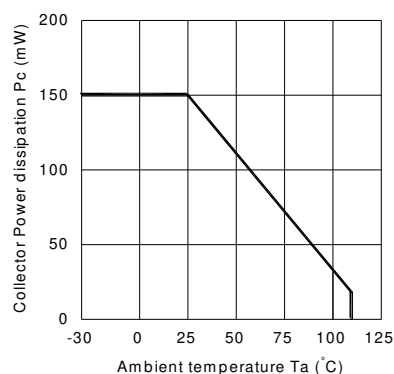


Fig.3 Collector-emitter Saturation
Voltage vs. Forward Current

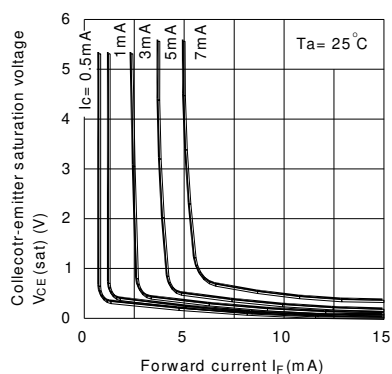


Fig.4 Forward Current vs. Forward
Voltage

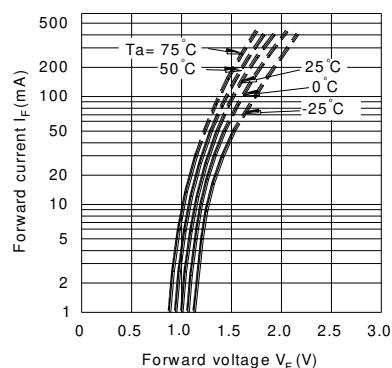


Fig.5 Current Transfer Ratio vs.
Forward Current

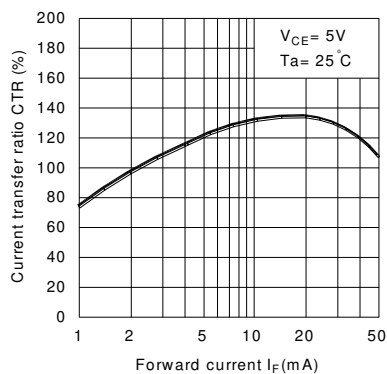
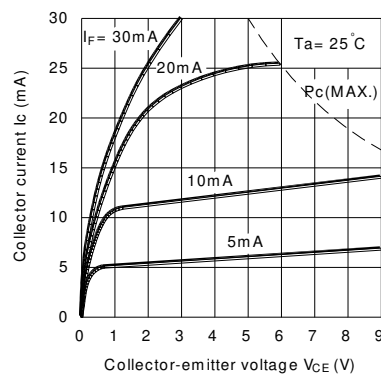


Fig.6 Collector Current vs.
Collector-emitter Voltage



CHARACTERISTICS CURVES

Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

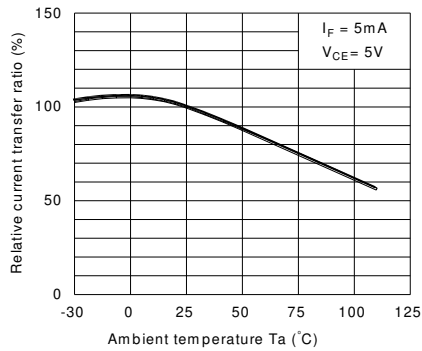


Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

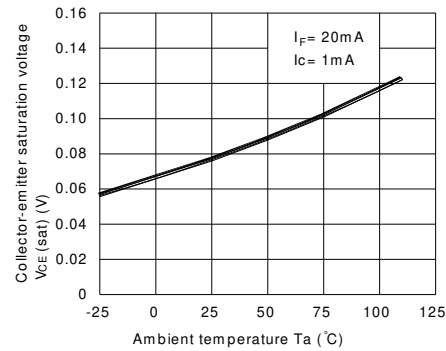


Fig.9 Collector Dark Current vs. Ambient Temperature

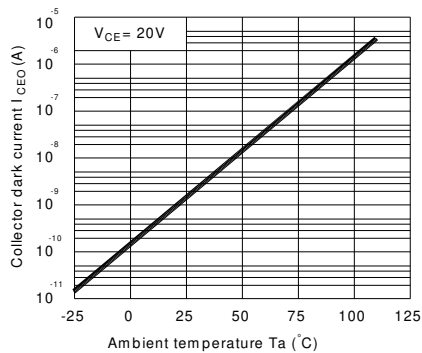


Fig.10 Response Time vs. Load Resistance

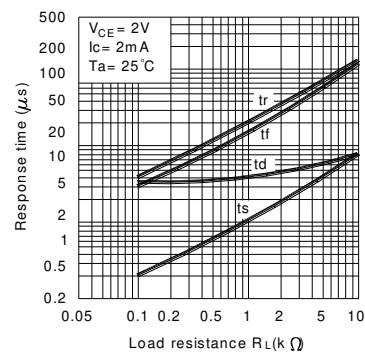
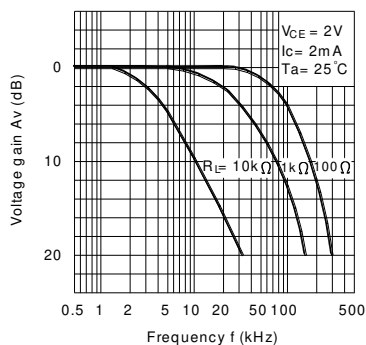
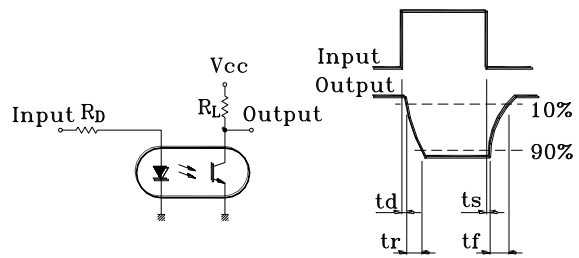


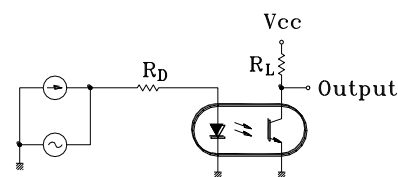
Fig.11 Frequency Response



Test Circuit for Response Time



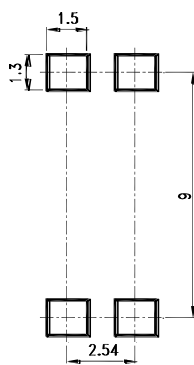
Test Circuit for Frequency Response



RECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)

Unit : mm

4 PIN

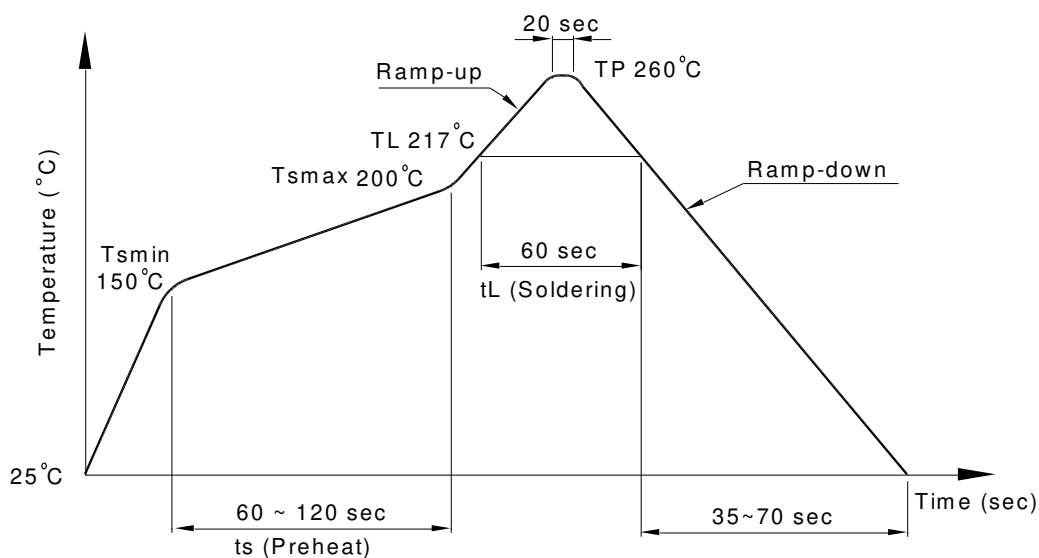


TEMPERATURE PROFILE OF SOLDERING REFLOW

(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})	150°C
- Temperature Max (T_{Smax})	200°C
- Time (min to max) (ts)	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



TEMPERATURE PROFILE OF SOLDERING REFLOW

(2) Wave soldering (JEDEC22A111 compliant)

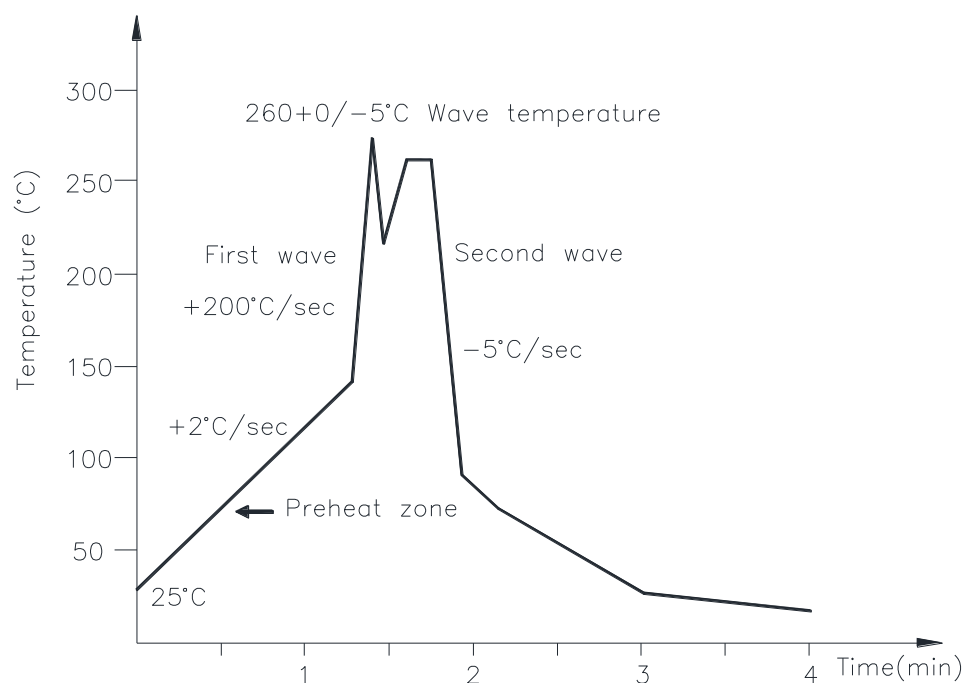
One time soldering is recommended within the condition of temperature.

Temperature: $260 \pm 0/-5^{\circ}\text{C}$

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: $380 \pm 0/-5^{\circ}\text{C}$

Time: 3 sec max.

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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)

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