

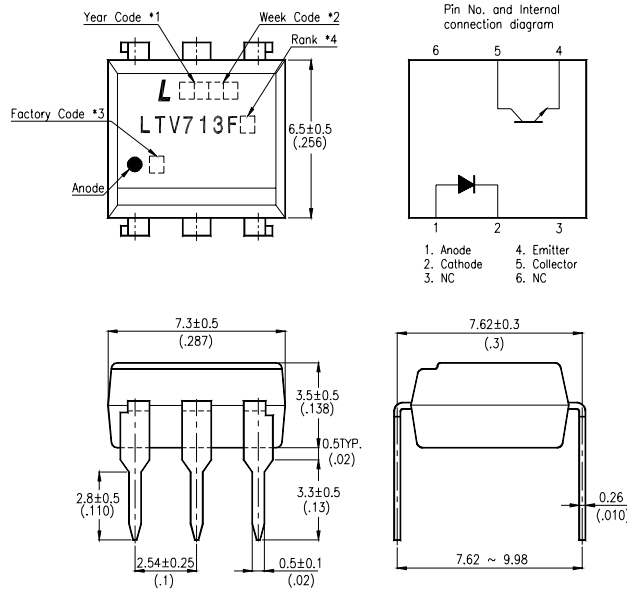


## FEATURES

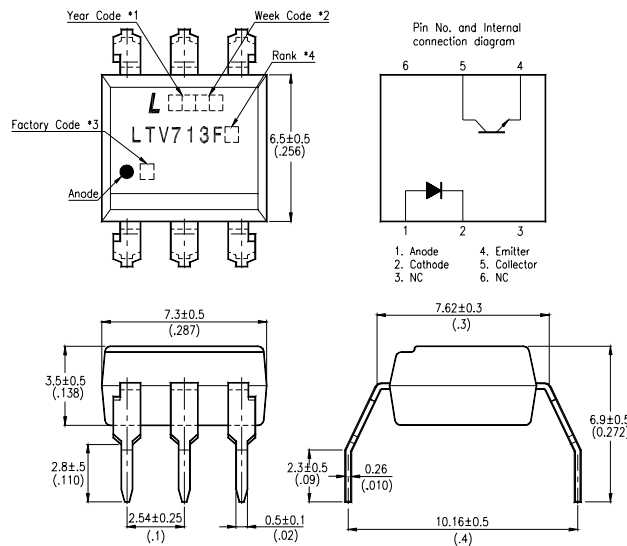
- \* Directly connectable to TTL
- \* Low collector dark current  
(  $I_{CEO}$  : MAX.  $10^{-7}$  A at  $V_{CE} = 20$  V )
- \* Current transfer ratio  
( CTR : MIN. 50% at  $I_F = 5$  mA,  $V_{CE} = 5$  V )
- \* High input-output isolation voltage  
(  $V_{iso} = 5,000$  Vrms )
- \* Response time  
(  $t_r$  : TYP.  $4\mu$ s at  $V_{CE} = 2$  V,  $I_C = 2$  mA,  $R_L = 100\Omega$  )
- \* Dual-in-line package :  
LTV-713F
- \* Wide lead spacing package :  
LTV-713FM
- \* Surface mounting package :  
LTV-713FS
- \* Tape and reel packaging :  
LTV-713FS-TA1
- \* UL approved ( No. E113898 )
- \* TUV approved ( No. R9653630 )
- \* CSA approved ( No. CA91533-1 )
- \* FIMKO approved ( No. 193422-01 )
- \* NEMKO approved ( No. P96103013 )
- \* DEMKO approved ( No. 303968 )
- \* SEMKO approved ( No. 9646047 / 01-30 )
- \* VDE approved ( No. 094722 )

## OUTLINE DIMENSIONS

### LTV-713F :



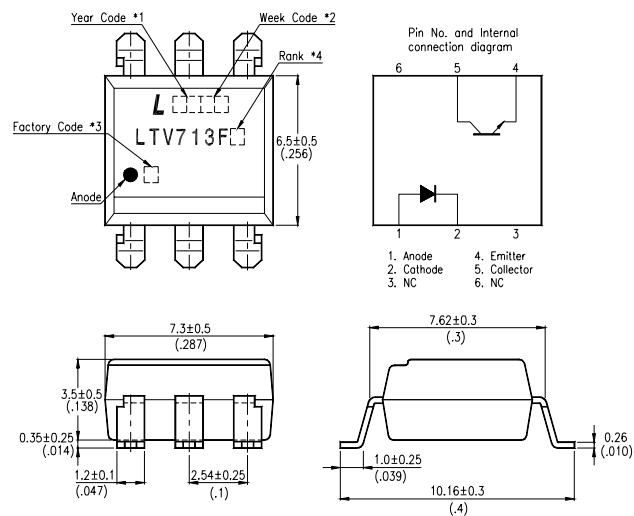
### LTV-713FM :



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

## OUTLINE DIMENSIONS

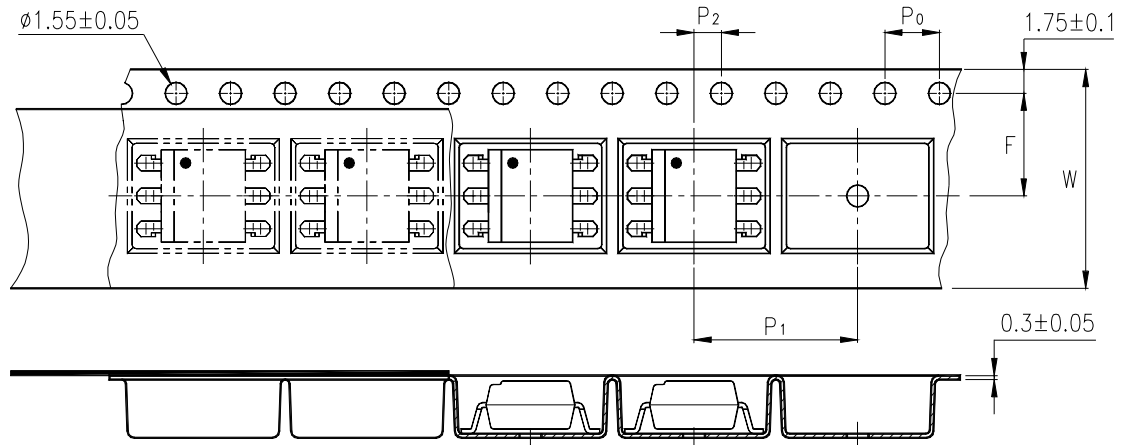
LTV-713FS :



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

## TAPING DIMENSIONS

**LTV-713FS-TA1 :**



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

**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>	35	V
	Emitter - Collector Voltage	V <sub>ECO</sub>	6	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>	170	mW
*1	Isolation Voltage	V <sub>iso</sub>	5,000	V <sub>rms</sub>
Operating Temperature		T <sub>opr</sub>	-25 ~ +100	°C
Storage Temperature		T <sub>stg</sub>	-40 ~ +125	°C
*2	Soldering Temperature	T <sub>sol</sub>	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 <sub>F</sub>	—	1.2	1.4	V	I <sub>F</sub> =20mA
	Reverse Current	I <sub>R</sub>	—	—	10	μA	V <sub>R</sub> =4V
	Terminal Capacitance	C <sub>t</sub>	—	30	250	pF	V=0, f=1KHz
OUTPUT	Collector Dark Current	I <sub>CEO</sub>	—	—	100	nA	V <sub>CE</sub> =20V, I <sub>F</sub> =0
	Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	35	—	—	V	I <sub>C</sub> =0.1mA I <sub>F</sub> =0
	Emitter-Collector Breakdown Voltage	BV <sub>ECO</sub>	6	—	—	V	I <sub>E</sub> =10μA I <sub>F</sub> =0
TRANSFER CHARACTERISTICS	Collector Current	I <sub>C</sub>	2.5	5	30	mA	I <sub>F</sub> =5mA V <sub>CE</sub> =5V
	* Current Transfer Ratio	CTR	50	100	600	%	
	Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	0.1	0.2	V	I <sub>F</sub> =20mA I <sub>C</sub> =1mA
	Isolation Resistance	R <sub>iso</sub>	5×10 <sup>10</sup>	1×10 <sup>11</sup>	—	Ω	DC500V 40 ~ 60% R.H.
	Floating Capacitance	C <sub>f</sub>	—	0.6	1	pF	V=0, f=1MHz
	Cut-Off Frequency	f <sub>c</sub>	—	80	—	kHz	V <sub>CE</sub> =5V, I <sub>C</sub> =2mA R <sub>L</sub> =100Ω, -3dB
	Response Time (Rise)	t <sub>r</sub>	—	4	18	μs	V <sub>CE</sub> =2V, I <sub>C</sub> =2mA R <sub>L</sub> =100Ω
	Response Time (Fall)	t <sub>f</sub>	—	3	18	μs	

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

**RANK TABLE OF CURRENT TRANSFER RATIO CTR**

MODEL NO.	RANK MARK	CTR ( % )
LTV-713F	A	80 ~ 160
LTV-713F	B	130 ~ 260
LTV-713F	C	200 ~ 400
LTV-713F	A or B or C or No mark	50 ~ 600

<b>CONDITIONS</b>	$I_F = 5 \text{ mA}$ $V_{CE} = 5 \text{ V}$ $T_a = 25 \text{ }^\circ\text{C}$
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### CHARACTERISTICS CURVES

Fig.1 Forward Current vs. Ambient Temperature

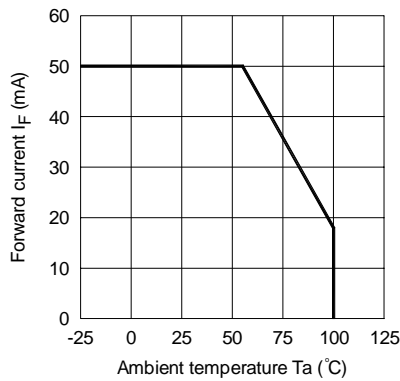


Fig.2 Collector Power Dissipation vs. Ambient Temperature

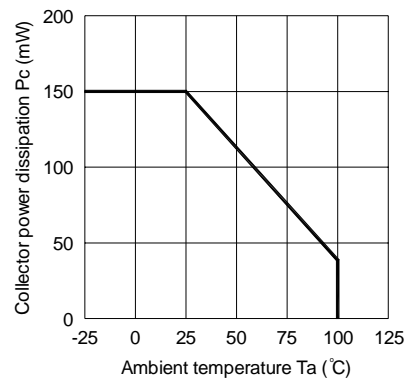


Fig.3 Frequency Response

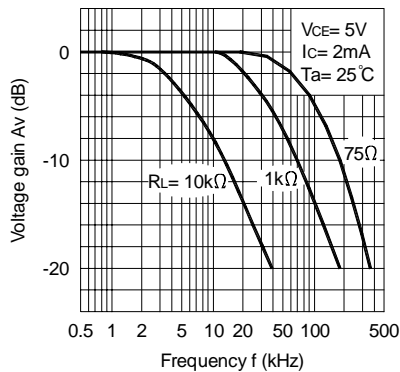


Fig.4 Forward Current vs. Forward Voltage

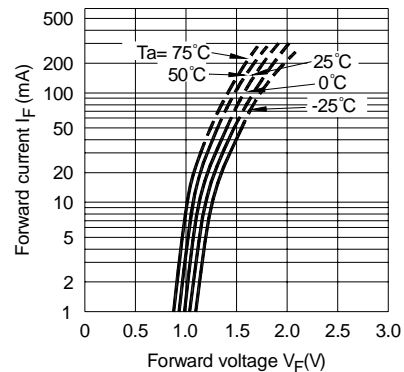


Fig.5 Current Transfer Ratio vs. Forward Current

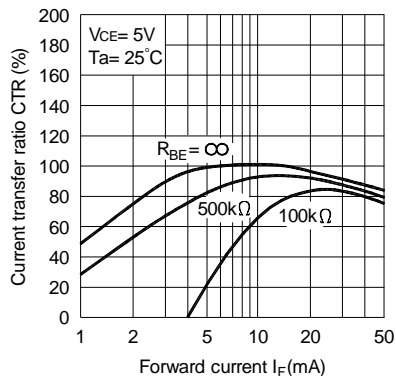
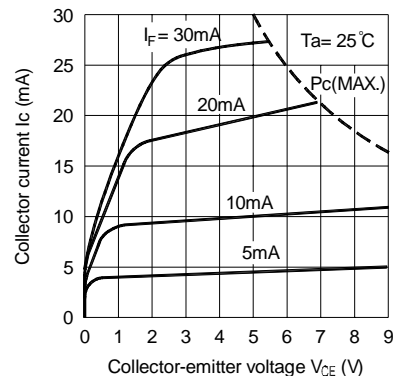


Fig.6 Collector Current vs. Collector-emitter Voltage





## CHARACTERISTICS CURVES

Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

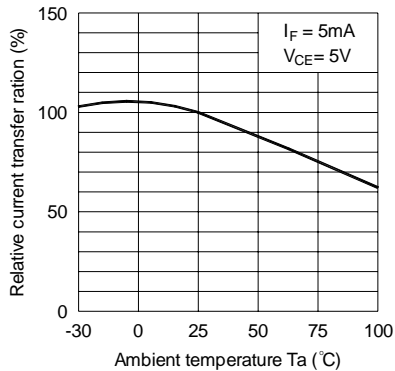


Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

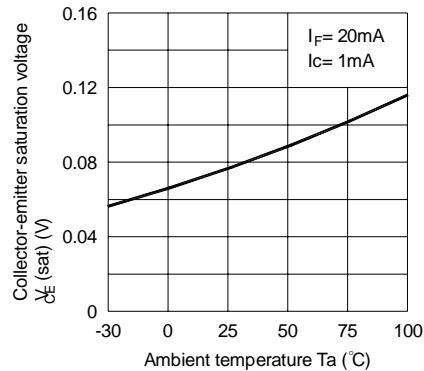


Fig.9 Collector Dark Current vs. Ambient Temperature

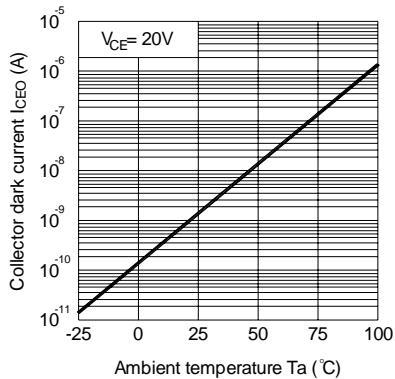


Fig.10 Collector-base Dark Current vs. Ambient Temperature

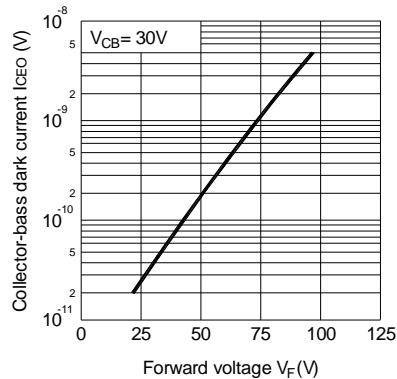
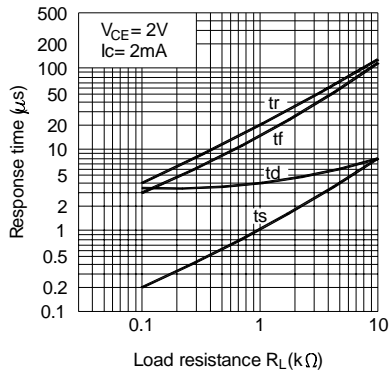
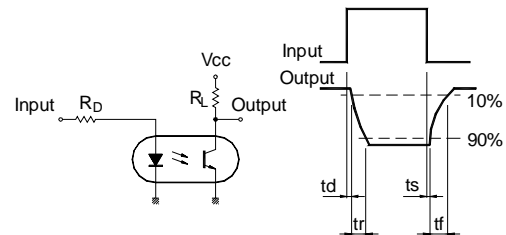


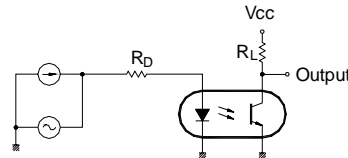
Fig.11 Response Time vs. Load Resistance



Test Circuit for Response Time



Test Circuit for Frequency Response



## RECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)

Unit : mm

