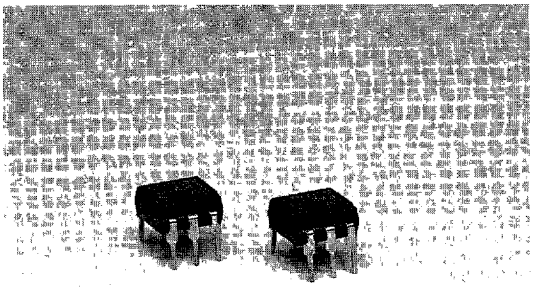
LITEON

High Isolation Voltage Type, General Purpose Photocoupler

LTV713V

T-41-83

■ FEATURES

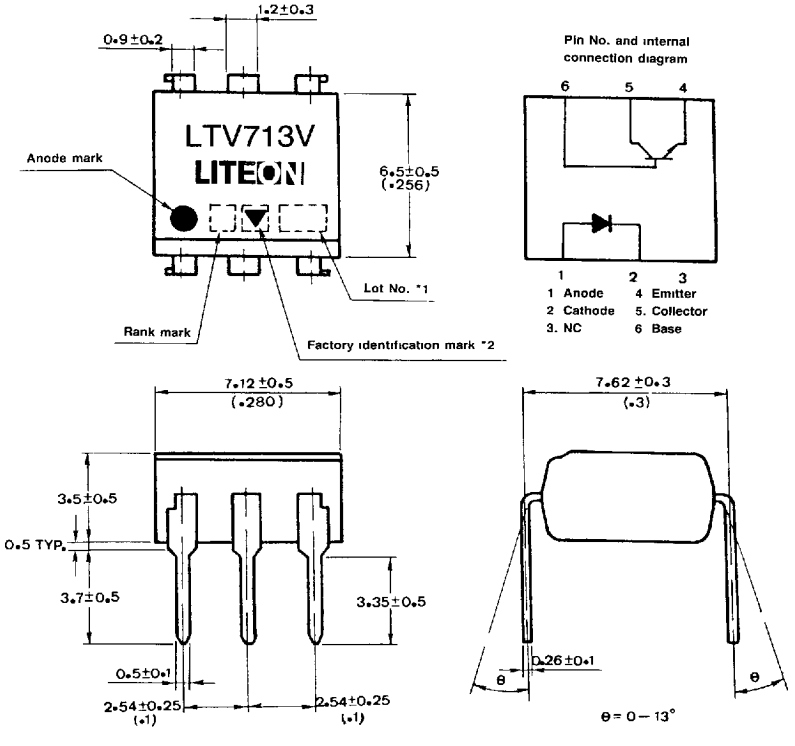


1. Directly connectable to TTL
2. Current transfer ratio
   CTR: MIN. 50% at I_F = 5mA, V_{CE} = 5V
3. Low collector dark current
   (I_{CEO}: MAX. 10^{-7}A at V_{CE} = 20V)
4. High input-output isolation voltage
   (V_{iso}: 5,000Vrms)
5. UL approved (No. E113898 (s))

■ APPLICATIONS

1. System appliances, measuring instruments
2. Registers, copiers, automatic vending machines
3. Electric home appliances such as fan heaters
4. Medial instruments, physical and chemical equipment
5. Signal transmission between circuits of different potentials and impedances

■ OUTLINE DIMENSIONS (UNIT: mm)



*1 2-digit number marked according to DIN standard
*2 Factory identification mark shall be or shall not be marked.

■ RATINGS AND CHARACTERISTICS

• Absolute maximum ratings

(Ta=25°C)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	50	mA
	*1 Peak forward current	I_{FM}	1	A
	Reverse voltage	V_R	6	V
	Power dissipation	P	70	mW
Output	Collector-emitter voltage	V_{CEO}	35	V
	Emitter-collector voltage	V_{ECO}	6	V
	Collector current	I_C	50	mA
	Collector power dissipation	P_C	150	mW
	Collector-base voltage	V_{CBO}	35	V
	Emitter-base voltage	V_{EBO}	6	V
Total power dissipation		P_{tot}	170	mW
Operating temperature		T_{opr}	−25 ~ +100	°C
Storage temperature		T_{stg}	−40 ~ +125	°C
*2 Isolation voltage		V_{iso}	5	kVrms
*3 Soldering temperature		T_{sol}	260	°C

*1 Pulse width ≤ 100μs, Duty ratio. 0 001
*2 AC for 1 minute, 40 ~ 60%
*3 For 10 seconds R.H.

• Electro-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
	Peak forward voltage	V_{FM}	—	—	3.0	V	I_{FM} = 0.5A
	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}	35	—	—	V	I_C = 0.1mA, I_F = 0
	Emitter-collector breakdown voltage	BV_{ECO}	6	—	—	V	I_E = 10μA, I_F = 0
	Collector-base breakdown voltage	BV_{CBO}	35	—	—	V	I_C = 0.1mA, I_F = 0
	Current transfer ratio	CTR	50	100	600	%	I_F = 5mA, V_{CE} = 5V, R_{BE} = ∞
Transfer characteristics	*Collector current	I_C	2.5	—	30	mA	I_F = 5mA, V_{CE} = 5V
	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}	10^{11}	—	Ω	DC500V, 40 ~ 60% R.H.
	Floating capacitance	C_f	—	0.6	1.0	pF	V = 0, f = 1 MHz
	Cut-off frequency	f_c	—	80	—	kHz	V_{CE} = 5V, I_C = 2mA, −3dB R_L = 100Ω R_{BE} = ∞
	Response time (Rise)	t_r	—	4	18	μs	V_{CE} = 2V, I_C = 2mA, R_L = 100Ω R_{BE} = ∞
	Response time (Fall)	t_f	—	3	18	μs	

*CTR = $\frac{IC}{IF} \times 100\%$

■ SUPPLEMENT

- **Isolation voltage shall be measured in 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 a zero-cross circuit shall be used.
  (3) The waveform of applied voltage shall be sine wave.
  (It is recommended that the isolation voltage shall be measured in insulation oil.)

- **Rank Table of Collector current I_C**

Model No.	Rank mark	I_C (mA)
LTV713VA	A	4.0~8.0
LTV713VB	B	6.5~13
LTV713VC	C	10~20
LTV713V	A or B or C or No mark	2.5~30

Conditions	I_F=5mA V_{CE}=5V Ta=25°C

- **Inspection standard**
  Outgoing inspection standard for LITON products are shown below.
  (1) A single sampling plan, normal insection level II based on MIL-STD-105D is applied. The AQL according to the inspection items are shown below.

Defect	Inspection item	AQL (%)	Judgement criterion
Major defect	• Electrical characteristics • Unreadable marking • Open, short	0.25	Depend on the specification
Minor defect	• Appearance • Dimension	0.4	

Fig. 1 Forward Current vs. Ambient Temperature

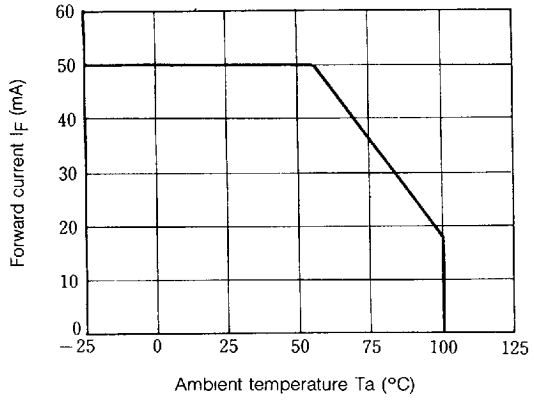


Fig. 2 Collector Power Dissipation vs. Ambient Temperature

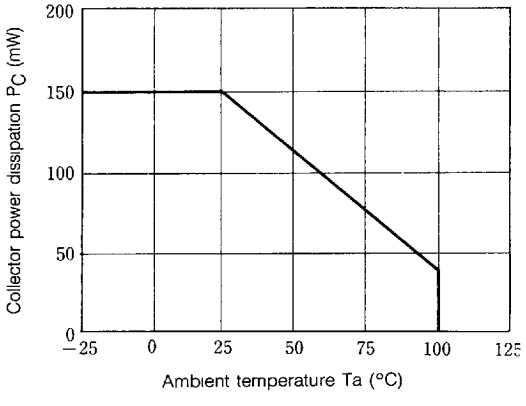


Fig. 3 Peak Forward Current vs. Duty Ratio

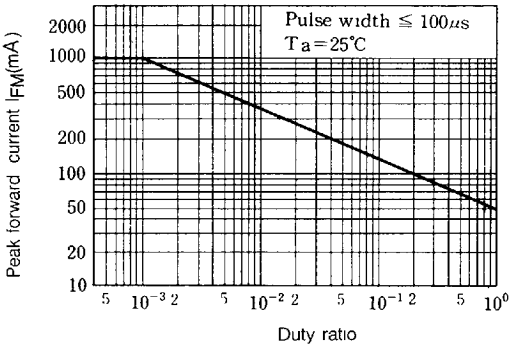


Fig. 4 Forward Current vs. Forward Voltage

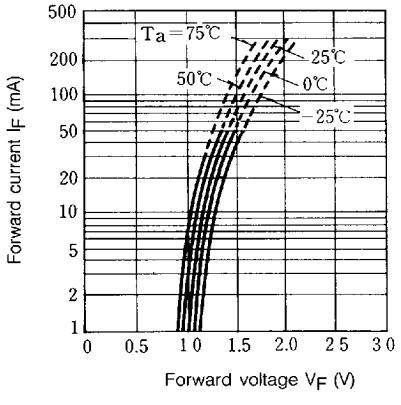


Fig. 5 Current Transfer Ratio vs. Forward Current

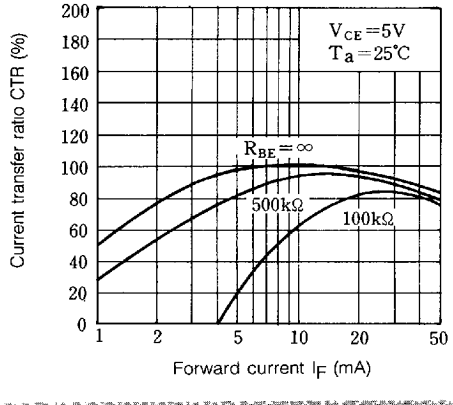


Fig. 6 Collector Current vs. Collector-emitter Voltage

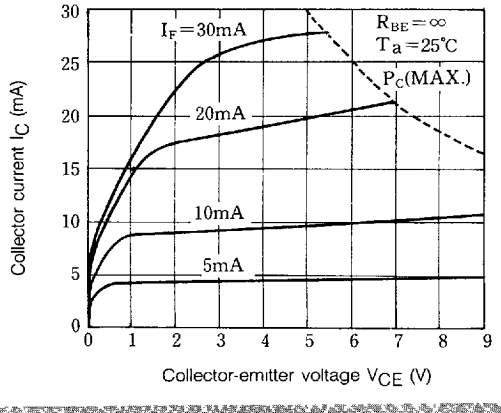


Fig. 7 Relative Current Transfer Ratio vs. Ambient Temperature

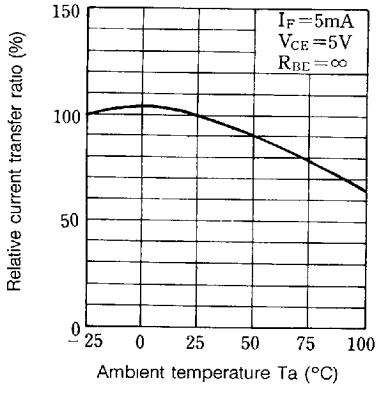


Fig. 8 Collector-emmitter Saturation Voltage vs. Ambient Temperature

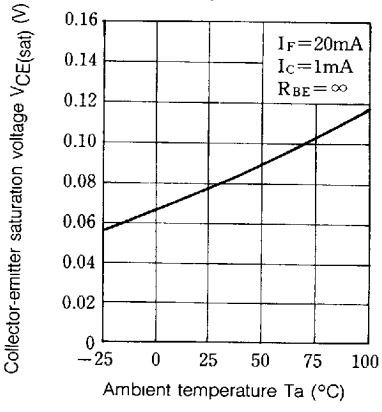


Fig. 9 Collector Dark Current vs. Ambient Temperature

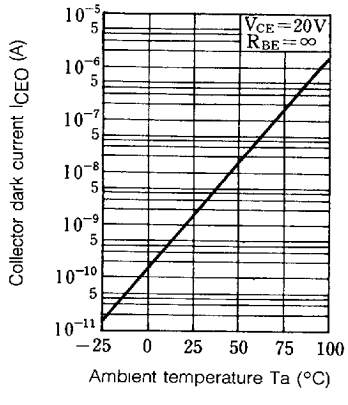


Fig. 10 Collector-base Dark Current vs. Ambient Temperature

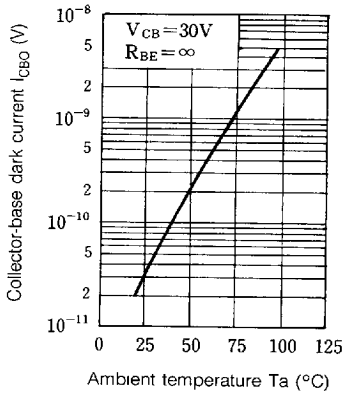


Fig. 11 Response Time vs. Load Resistance

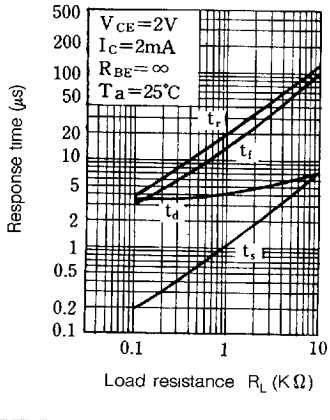
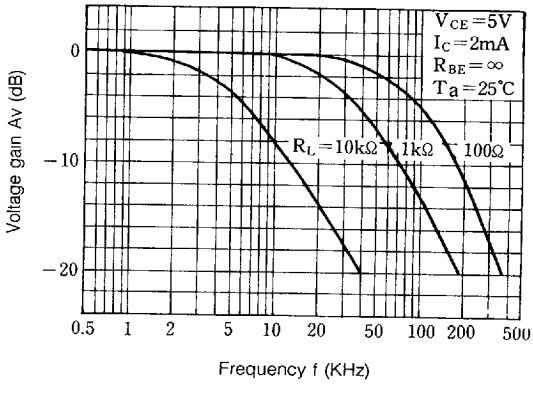
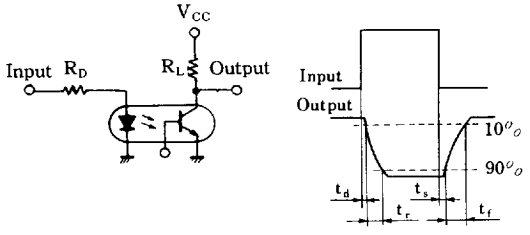


Fig. 12 Frequency Response



Test Circuit for Response Time



Test Circuit for Frequency Response