

TOSHIBA Photocoupler GaAs Ired & Photo-Transistor

TLP626, TLP626-2, TLP626-4

Programmable Controllers
AC / DC-Input Module
Telecommunication

The TOSHIBA TLP626, -2 and -4 consist of gallium arsenide infrared emitting diodes connected in inverse parallel, optically coupled to a photo-transistor.

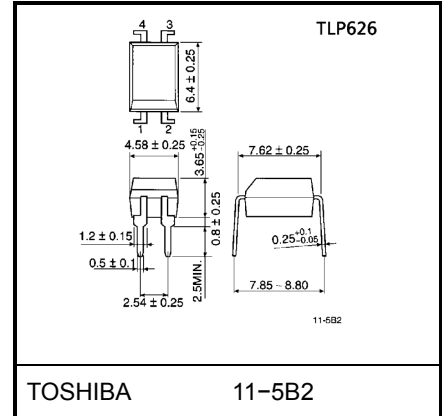
The TLP626-2 offers two isolated channels in an eight lead plastic DIP, while the TLP626-4 provides four isolated channels in a sixteen plastic DIP.

- Collector-emitter voltage: 55V(min.)
- Current transfer ratio

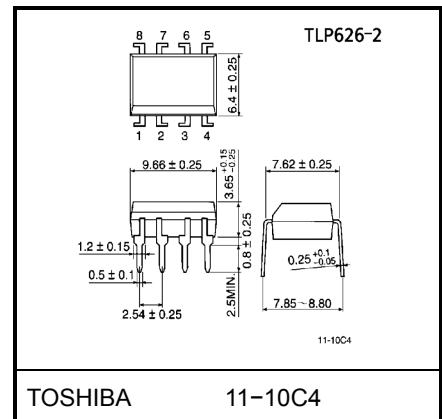
Classi- fication	Current Transfer Ratio(min.)			Marking Of Classi- fication
	Ta = 25°C		Ta = -25~75°C	
	If = ±1mA VCE = 0.5V	If = ±0.5mA VCE = 1.5V	If = ±1mA VCE = 0.5V	
Rank BV	200%	100%	100%	BV
Standard	100%	50%	50%	BV, blank

- Isolation voltage: 5000V_{rms} min.
- UL recognized: UL1577, file no.E67349
- BSI approved: BS EN60065: 1994 certificate no.7426
BS EN60950: 1992 certificate no.7427
- Note: Application type name for certification test,
please use standard product type name, i.e.
TLP626(BV): TLP626

Unit in mm

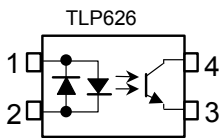


Weight: 0.26g

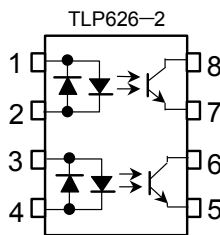


Weight: 0.54g

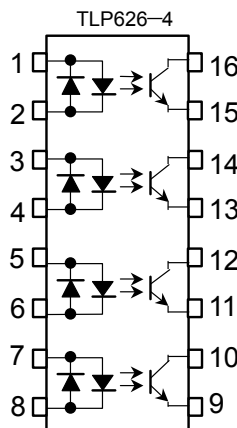
Pin Configuration (top view)



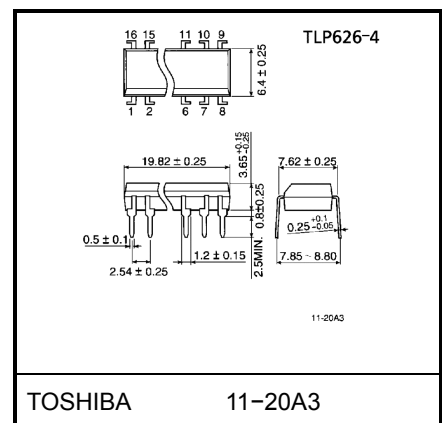
- 1 : Anode
- 2 : Cathode
- 3 : Emitter
- 4 : Collector



- 1, 3 : Anode
- 2, 4 : Cathode
- 5, 7 : Emitter
- 6, 8 : Collector



- 1, 3, 5, 7 : Anode, Cathode
- 2, 4, 6, 8 : Cathode, Anode
- 9, 11, 13, 15 : Emitter
- 10, 12, 14, 16 : Collector



Weight: 1.1g

Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating		Unit
			TLP626	TLP626-2 TLP626-4	
LED	Forward current	I_F	60	50	mA
	Forward current derating	$\Delta I_F / ^\circ\text{C}$	-0.7(Ta ≥ 39°C)	-0.5(Ta ≥ 39°C)	mA / °C
	Pulse forward current	I_{FP}	1(100μs pulse, 100pps)		A
	Power dissipation (1 circuit)	P_D	100	70	mW
	Power dissipation derating (Ta ≥ 25°C, 1 circuit)	$\Delta P_D / ^\circ\text{C}$	-1.0	-0.7	mW / °C
	Junction temperature	T_j	125		°C
Detector	Collector-emitter voltage	V_{CEO}	55		V
	Emitter-collector voltage	V_{ECO}	7		V
	Collector current	I_C	50		mA
	Collector power dissipation (1 circuit)	P_C	150	100	mW
	Collector power dissipation derating (Ta ≥ 25°C, 1 circuit)	$\Delta P_C / ^\circ\text{C}$	-1.5	-1.0	mW / °C
	Junction temperature	T_j	125		°C
Storage temperature range		T_{stg}	-55~125		°C
Operating temperature range		P_{opr}	-55~100		°C
Lead soldering temperature		T_{sol}	260(10s)		°C
Total package power dissipation (1 circuit)		P_T	250	150	mW
Total package power dissipation derating (Ta ≥ 25°C, 1 circuit)		$\Delta P_T / ^\circ\text{C}$	-2.5	-1.5	mW / °C
Isolation voltage (Note 1)		BV_S	5000(AC, 1min., RH≤60%)		Vrms

(Note 1) Device considered a two terminal: LED side pins shorted together, and detector side pins shorted together.

Recommended Operating Conditions

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	V_{CC}	—	5	24	V
Forward current	$I_{F(RMS)}$	—	1.6	20	mA
Collector current	I_C	—	1	10	mA
Operating temperature	T_{opr}	-25	—	75	°C

Individual Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min.	Typ.	Max.	Unit
LED	Forward voltage	V_F	$I_F = \pm 10\text{mA}$	1.0	1.15	1.3	V
	Reverse current	I_F	$V_F = \pm 0.7\text{V}$	—	2.5	20	μA
	Capacitance	C_T	$V = 0, f = 1\text{MHz}$	—	60	—	pF
Detector	Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = 0.5\text{mA}$	55	—	—	V
	Emitter-collector breakdown voltage	$V_{(BR)ECO}$	$I_E = 0.1\text{mA}$	7	—	—	V
	Collector dark current	I_{CEO}	$V_{CE} = 24\text{V}$	—	10	10	nA
			$V_{CE} = 24\text{V}, T_a = 85^\circ\text{C}$	—	2	50	μA
Capacitance collector to emitter	C_{CE}	$V=0, f=1\text{MHz}$	—	12	—	pF	

Coupled Electrical Characteristics (Ta = 25°C)

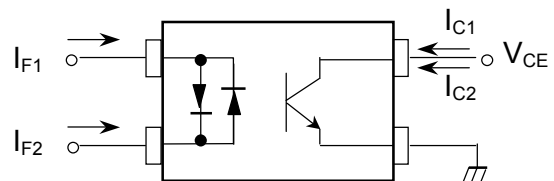
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Current transfer ratio	I_C / I_F	$I_F = \pm 1\text{mA}, V_{CE} = 0.5\text{V}$ rank BV	100	—	1200	%
			200	—	1200	
Low input CTR	$I_C / I_F(\text{low})$	$I_F = \pm 0.5\text{mA}, V_{CE} = 1.5\text{V}$ rank BV	50	—	—	%
			100	—	—	
Collector-emitter saturation voltage	$V_{CE(\text{sat})}$	$I_C = 0.5\text{mA}, I_F = \pm 1\text{mA}$ $I_C = 1\text{mA}, I_F = \pm 1\text{mA}$ rank BV	—	—	0.4	V
			—	0.2	—	
			—	—	0.4	
Off-state collector current	$I_{C(\text{off})}$	$V_F = \pm 0.7\text{V}, V_{CE} = 24\text{V}$	—	1	10	μA
CTR symmetry *1	$I_C(\text{ratio})$	$I_C(I_F = -1\text{mA}) / I_C(I_F = 1\text{mA})$	0.5	—	2	—

Coupled Electrical Characteristics (Ta = -25~75°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Current transfer ratio	I_C / I_F	$I_F = 1\text{mA}, V_{CE} = 0.5\text{V}$ rank BV	50	—	—	%
			100	—	—	
Low input CTR	$I_C / I_F(\text{low})$	$I_F = 0.5\text{mA}, V_{CE} = 1.5\text{V}$ rank BV	—	50	—	%
			—	100	—	

*1

$$I_C(\text{ratio}) = \frac{I_{C2}(I_F = I_{F2}, V_{CE} = 5\text{V})}{I_{C1}(I_F = I_{F1}, V_{CE} = 5\text{V})}$$



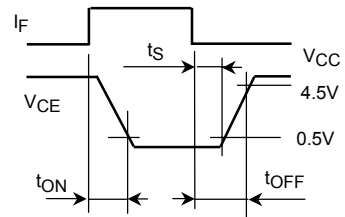
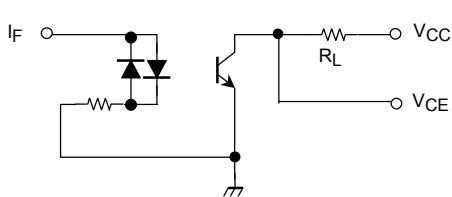
Isolation Characteristics (Ta = 25°C)

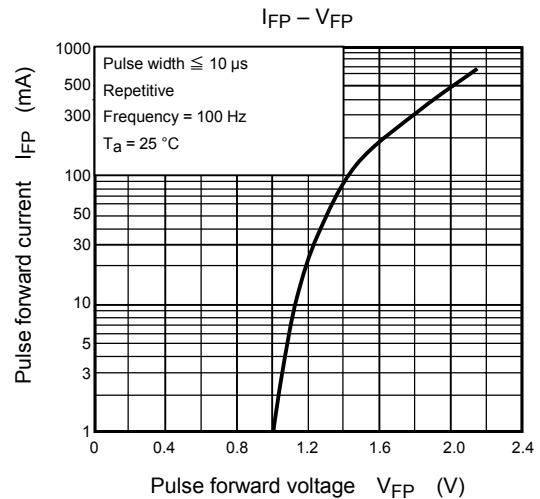
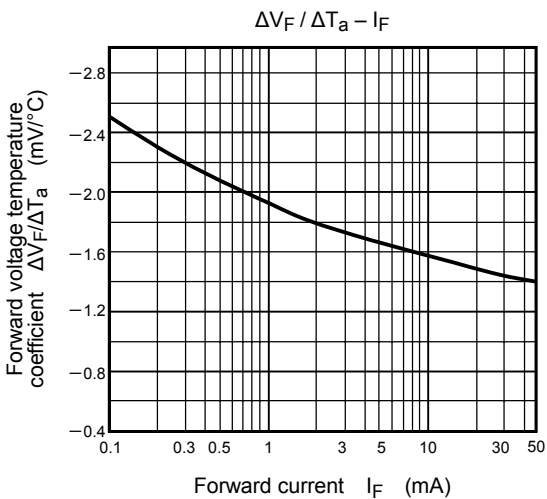
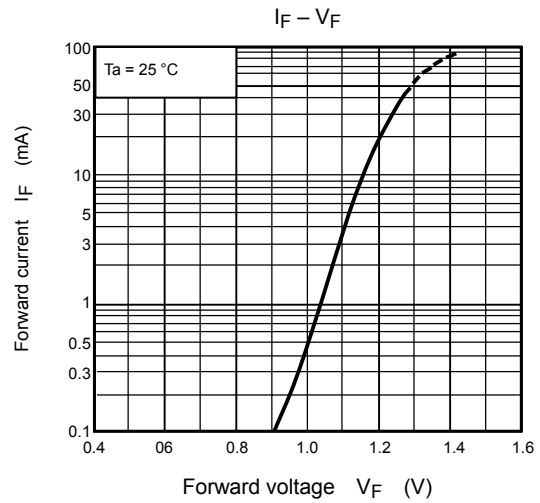
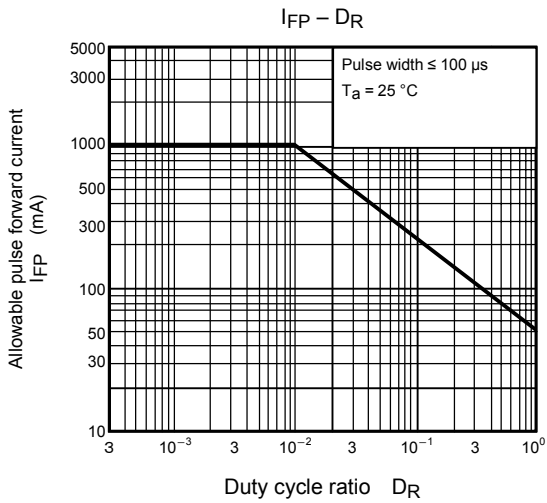
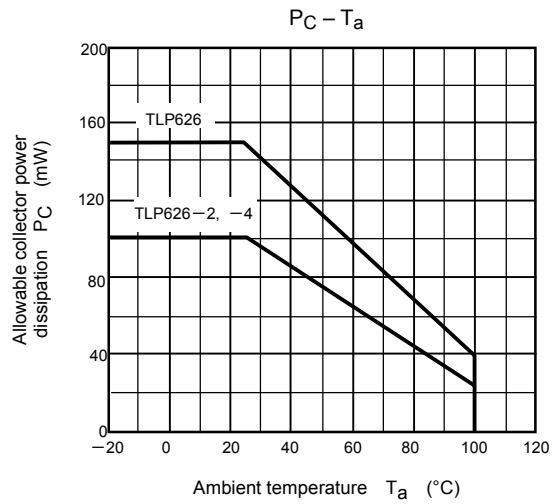
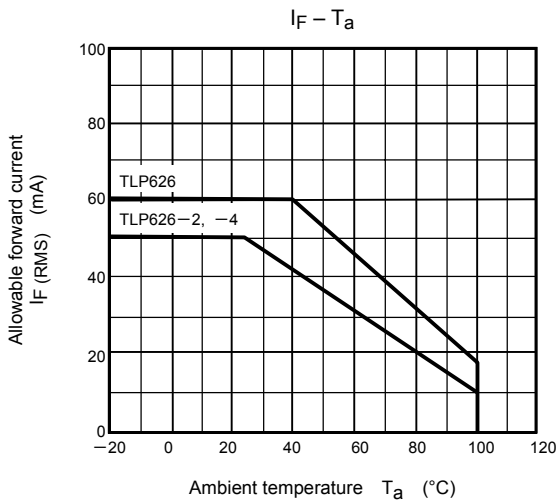
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Capacitance input to output	C _S	V _S = 0, f = 1MHz	—	0.8	—	pF
Isolation resistance	R _S	V _S = 500V	5×10 ¹⁰	10 ¹⁴	—	Ω
Isolation voltage	BV _S	AC, 1 minute	5000	—	—	Vrms
		AC, 1 second, in oil	—	10000	—	Vrms
		DC, 1 minute, in oil	—	10000	—	Vdc

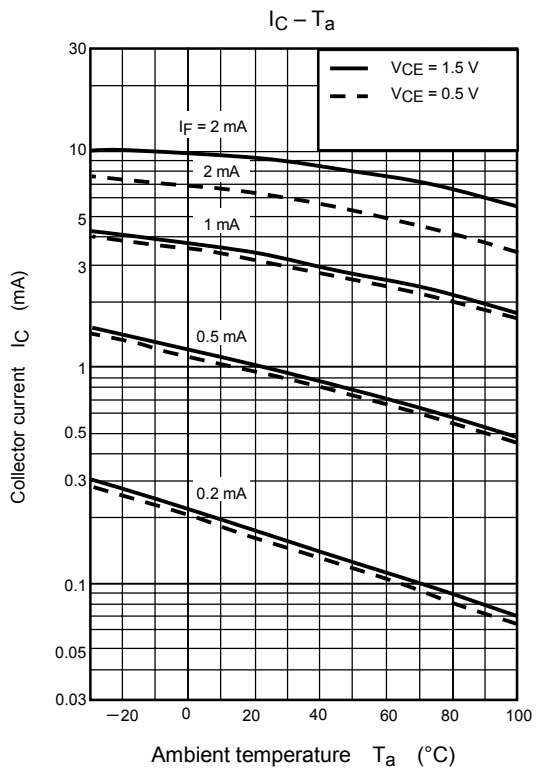
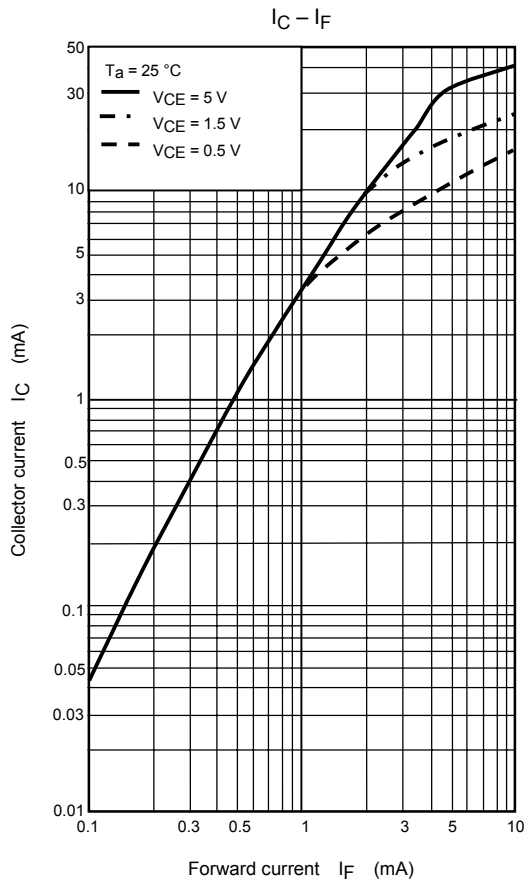
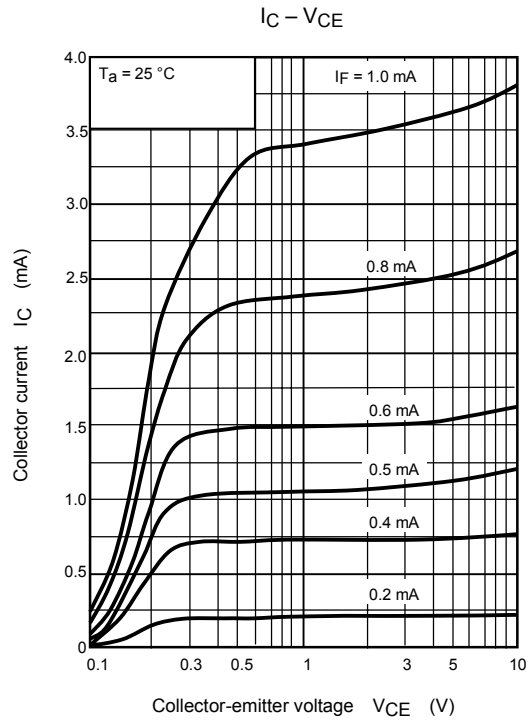
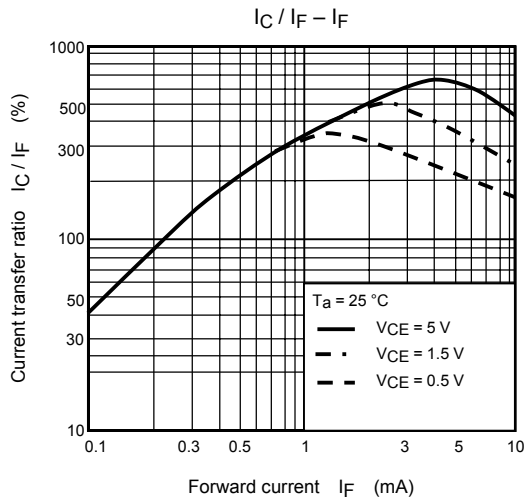
Switching Characteristics (Ta = 25°C)

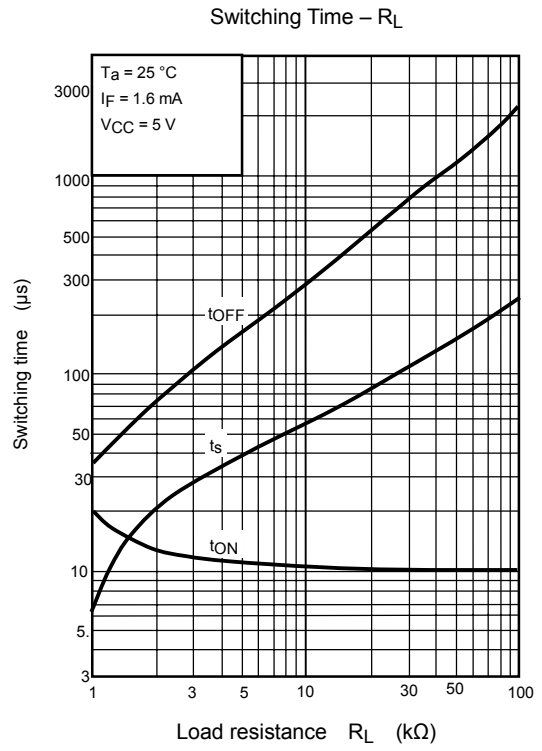
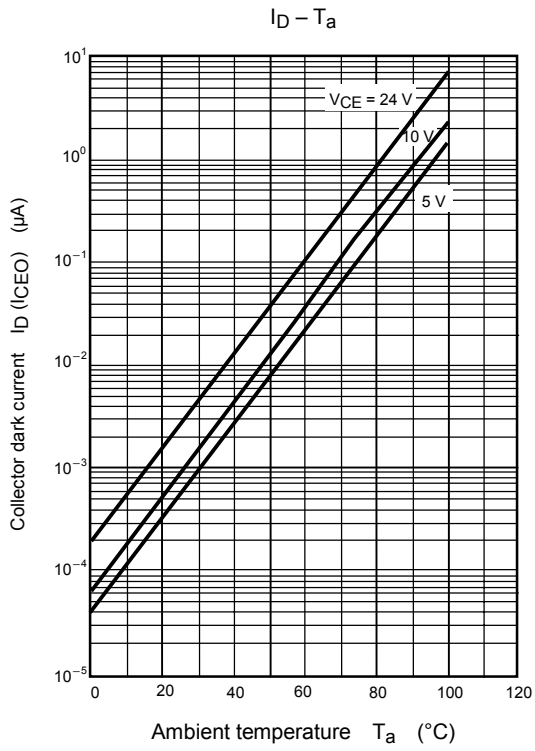
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Rise time	t _r	V _{CC} = 10V, I _C = 2mA R _L = 100Ω	—	8	—	μs
Fall time	t _f		—	8	—	
Turn-on time	t _{on}		—	10	—	
Turn-off time	t _{off}		—	8	—	
Turn-on time	t _{ON}	R _L = 4.7kΩ (Fig.1) V _{CC} = 5V, I _F = ±1.6mA	—	10	—	μs
Storage time	t _s		—	50	—	
Turn-off time	T _{OFF}		—	300	—	

Fig. 1 Switching operating conditions









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000707EBC

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