

TOSHIBA Photocoupler GaAs Ired & Photo-Transistor

TLP629, TLP629-2, TLP629-4

Telecommunication
Office Machine
Telephone Use Equipment

The TOSHIBA TLP629, -2, and -4 consist of a photo-transistor optically coupled to a gallium arsenide infrared emitting diode. The TLP629-2 offers two isolated channels in an eight lead plastic DIP, while the TLP629-4 provides four isolated channels in a sixteen plastic DIP. This is suitable for application of DC input current up to 150mA.

- IF maximum rating: 150 mA
- Collector-emitter voltage: 55 V (min)
- Current transfer ratio: 25% (min) (IF=20mA)
- Isolation voltage: 5000 Vrms (min)
- UL recognized: UL1577, file no. E67349
- Option (D4) type

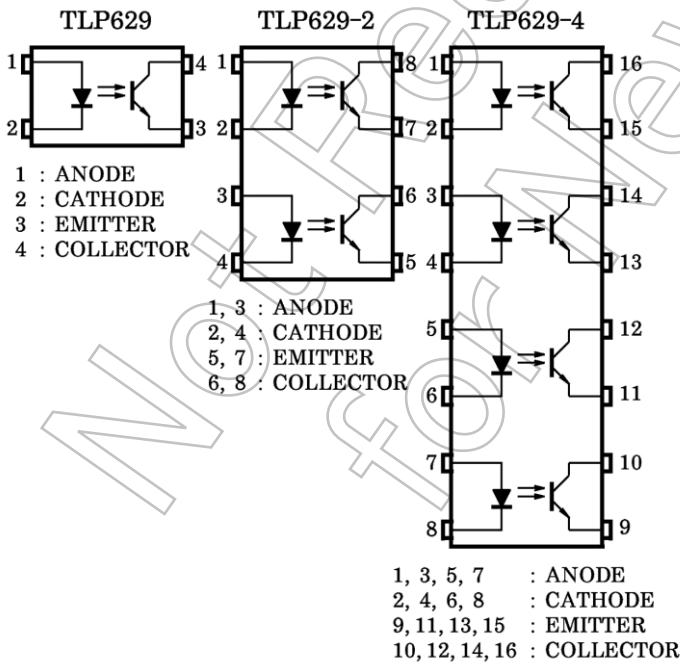
VDE approved : EN60747-5-5

Maximum operating insulation voltage: 890V_{PK}

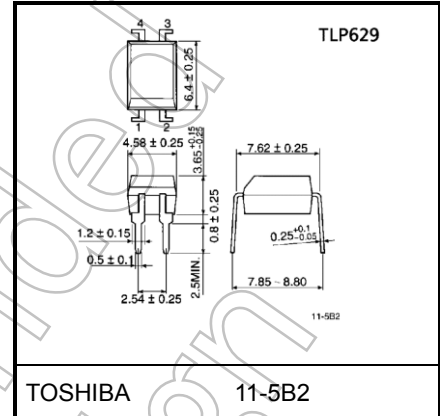
Highest permissible over voltage: 8000V_{PK}

Note: When an EN 60747-5-5 approved type is needed, please designate the "Option(D4)".

Pin Configurations (top view)

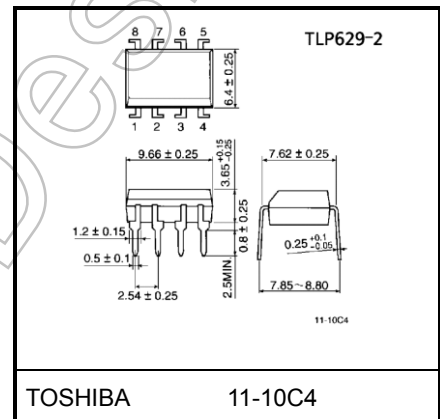


Unit: mm



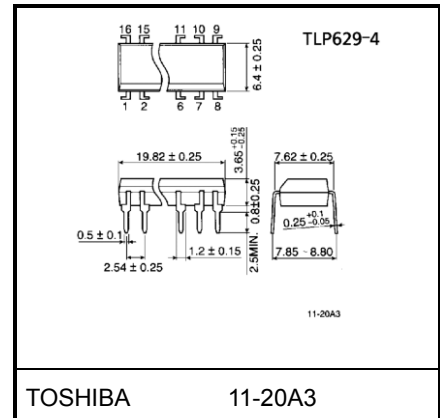
Weight: 0.26 g (typ.)

Unit: mm



Weight: 0.54 g (typ.)

Unit: mm



Weight: 1.1 g (typ.)

Start of commercial production
1990-02

Absolute Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating		Unit
			TLP629	TLP629-2, TLP629-4	
LED	Forward current	I _F	150		mA
	Forward current derating	ΔI _F / °C	-1.5 (Ta ≥ 25°C)		mA / °C
	Pulse forward current	I _{FP}	1 (100 μs pulse, 100pps)		A
	Reverse voltage	V _R	5		V
	Diode power dissipation	P _D	200		mW
	Diode power dissipation derating	ΔP _D / °C	-2.0 (Ta ≥ 25°C)		mW / °C
Detector	Collector-emitter voltage	V _{CEO}	55		V
	Emitter-collector voltage	V _{ECO}	7		V
	Collector current	I _C	80		mA
	Collector power dissipation (1 circuit)	P _C	150	100	mW
	Collector power dissipation derating (1 circuit, Ta ≥ 25°C)	ΔP _C / °C	-1.5	-1.0	mW / °C
Storage temperature range		T _{stg}	-55 to 125		°C
Operating temperature range		T _{opr}	-55 to 100		°C
Lead soldering temperature (10s)		T _{sol}	260		°C
Total package power dissipation (1 circuit)		P _T	250	200	mW
Total package power dissipation derating (Ta ≥ 25°C, 1 circuit)		ΔP _T / °C	-2.5	-2.0	mW / °C
Isolation voltage (Note 1)		BV _S	5000 (AC, 60 s, RH ≤ 60%)		V _{rms}

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

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

Recommended Operating Conditions

Characteristics	Symbol	Min	Typ.	Max	Unit
Supply voltage	V _{CC}	—	5	24	V
Forward current	I _F	—	20	120	mA
Collector current	I _C	—	1	10	mA
Operating temperature	T _{opr}	-25	—	85	°C

Note: Recommended operating conditions are given as a design guideline to obtain expected performance of the device. Additionally, each item is an independent guideline respectively. In developing designs using this product, please confirm specified characteristics shown in this document.

Electrical Characteristics (Ta = 25°C)

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit
LED	Forward voltage	V _F	I _F = 100 mA	—	1.4	1.7	V
	Forward current	I _F	V _F = 0.7 V	—	2.5	20	μA
	Reverse current	I _R	V _R = 5 V	—	—	10	μA
	Capacitance	C _T	V = 0 V, f = 1 MHz	—	50	—	pF
Detector	Collector-emitter breakdown voltage	V _{(BR)CEO}	I _C = 0.5 mA	55	—	—	V
	Emitter-collector breakdown voltage	V _{(BR)ECO}	I _E = 0.1 mA	7	—	—	V
	Collector dark current	I _{CEO}	V _{CE} = 24 V	—	10	100	nA
			V _{CE} = 24 V, Ta = 85°C	—	2	50	μA
Capacitance collector to emitter	C _{CE}	V = 0 V, f = 1 MHz	—	10	—	pF	

Coupled Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Current transfer ratio	I _C / I _F	I _F = 20 mA, V _{CE} = 1 V	25	—	—	%
	I _C / I _F (high)	I _F = 100 mA, V _{CE} = 1 V	20	—	80	
Collector-emitter saturation voltage	V _{CE(sat)}	I _C = 2.4 mA, I _F = 20 mA	—	—	0.4	V
		I _C = 2.4 mA, I _F = 100 mA	—	—	0.4	
Off-state collector current	I _{C(off)}	V _F = 0.7V, V _{CEO} = 24 V	—	1	1.0	μA

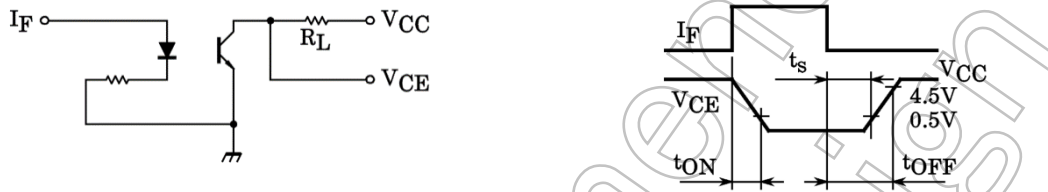
Isolation Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Capacitance input to output	C _S	V _S = 0 V, f = 1 MHz	—	0.8	—	pF
Isolation resistance	R _S	V _S = 500 V, RH ≤ 60%	5×10 ¹⁰	10 ¹⁴	—	Ω
Isolation voltage	BV _S	AC, 60 s	5000	—	—	V _{rms}
		AC, 1 s, in oil	—	10000	—	
		DC, 60 s, in oil	—	10000	—	V _{dc}

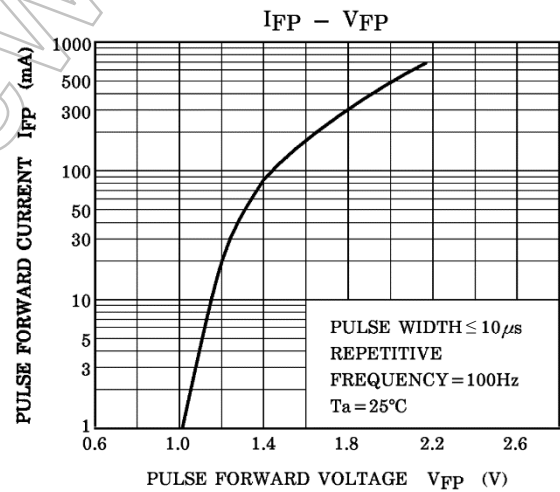
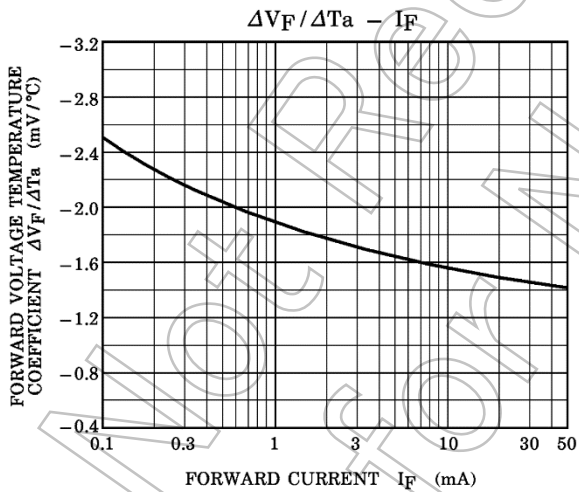
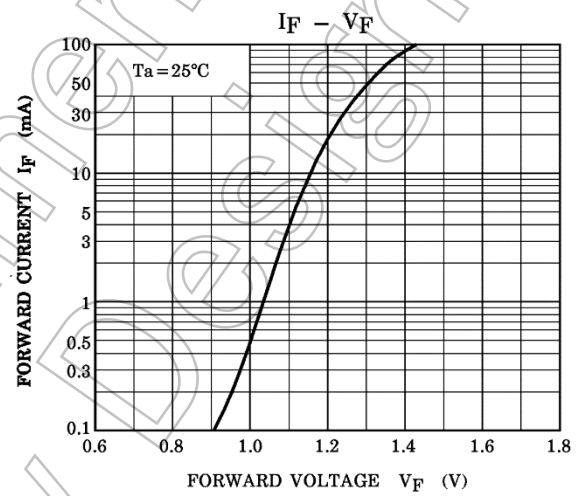
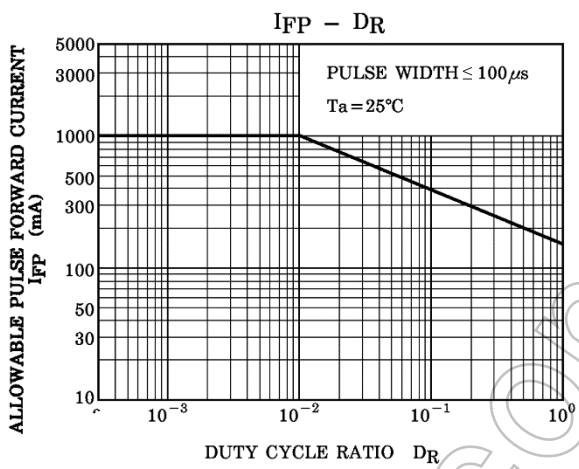
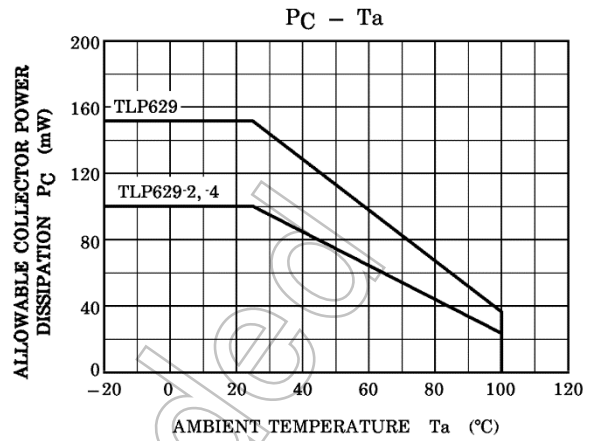
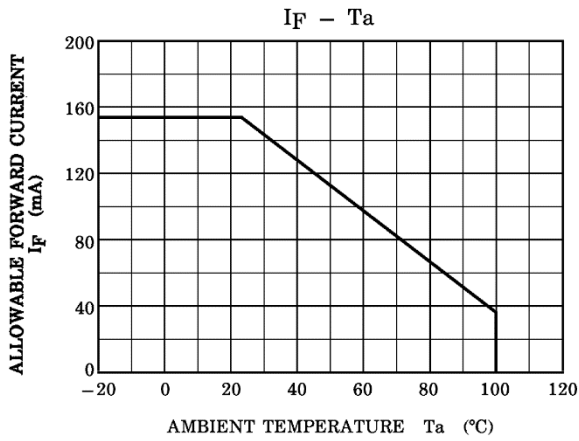
Switching Characteristics (Ta = 25°C)

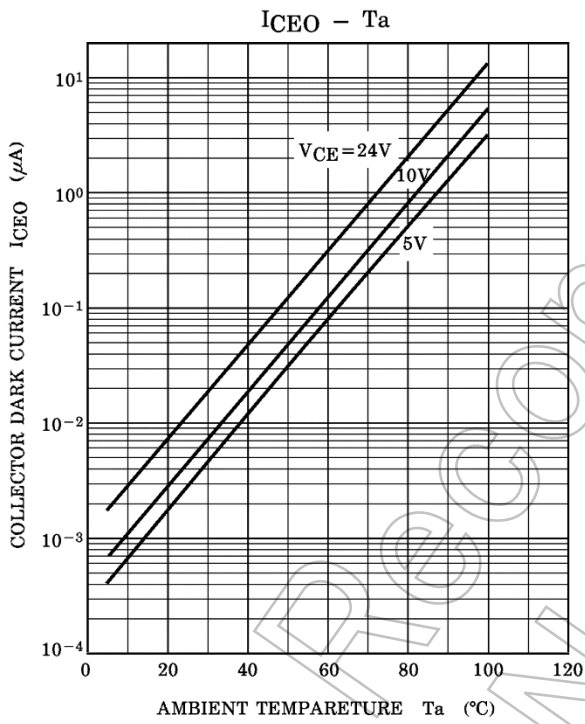
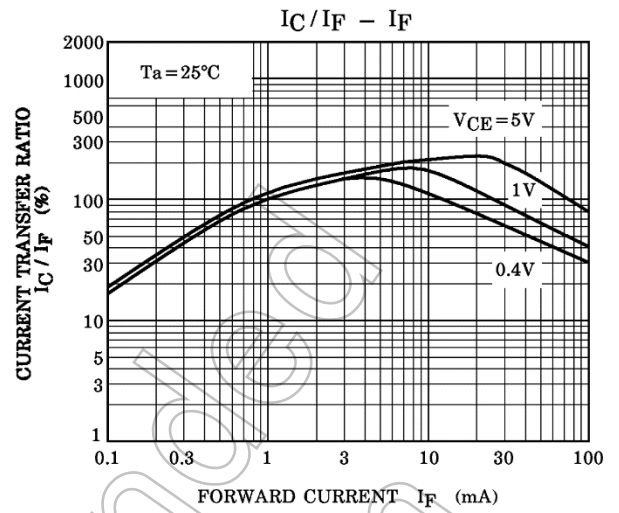
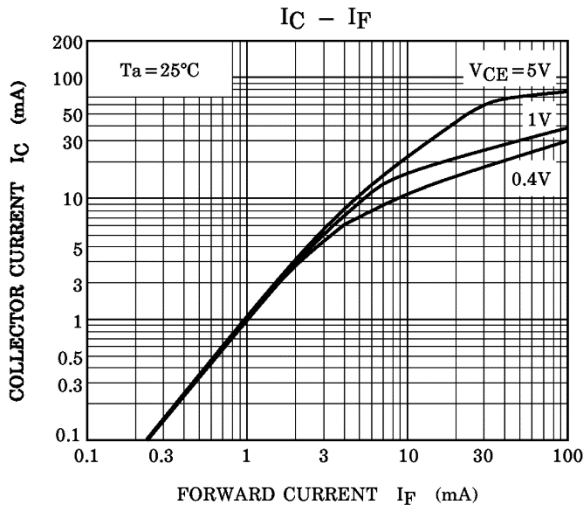
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Rise time	t_r	$V_{CC} = 10\text{ V}, I_C = 2\text{ mA}$ $R_L = 100\Omega$	—	2	—	μs
Fall time	t_f		—	3	—	
Turn-on time	t_{on}		—	3	10	
Turn-off time	t_{off}		—	3	10	
Turn-on time	t_{ON}	$R_L = 1.9\text{ k}\Omega$ $V_{CC} = 5\text{ V}, I_F = 16\text{ mA}$ (Fig.1)	—	2	—	μs
Storage time	t_s		—	15	—	
Turn-off time	t_{OFF}		—	25	—	

Fig. 1 Switching time test circuit



Not Recommended for New Design





Not for New Design

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