

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

TLP629, TLP629-2, TLP629-4

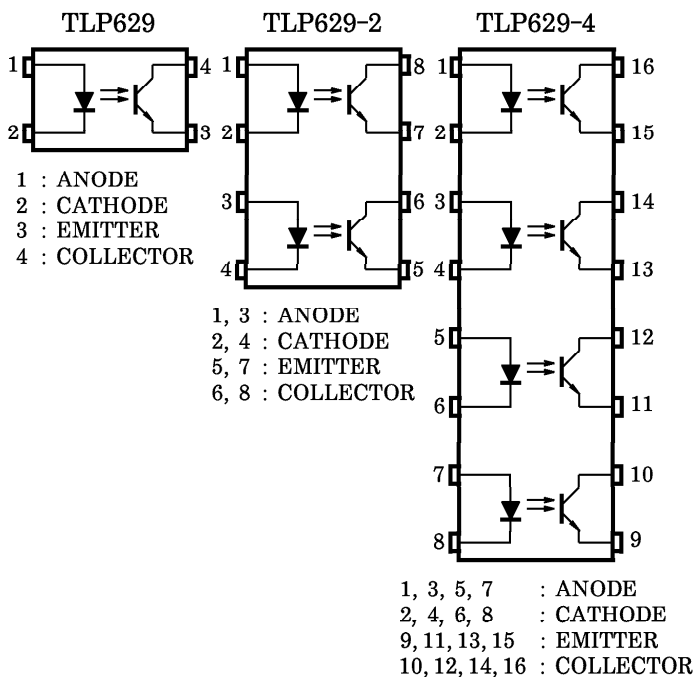
TELECOMMUNICATION
OFFICE MACHINE
TELEPHONE USE EQUIPMENT

The TOSHIBA TLP629, -2, and -4 consists of a photo-transistor optically coupled to a gallium arsenide infrared emitting diode.

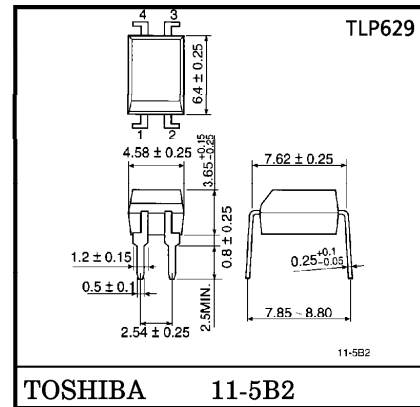
The TLP629-2 offers two isolated channels in an eight lead plastic DIP, while the TLP629-4 provides four isolated channels in a sixteen plastic DIP. This is suitable for application of DC input current up to 150mA.

- I_F Maximum Rating : 150mA
- Collector-Emitter Voltage : 55V (Min.)
- Current Transfer Ratio : 25% (Min.) ($I_F = 20mA$)
- Isolation Voltage : 5000V_{rms} (Min.)
- UL Recognized : UL1577, File No. E67349

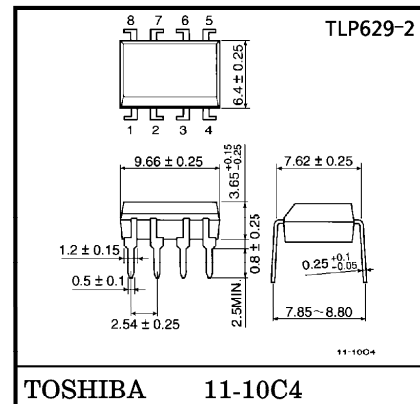
PIN CONFIGURATIONS (TOP VIEW)



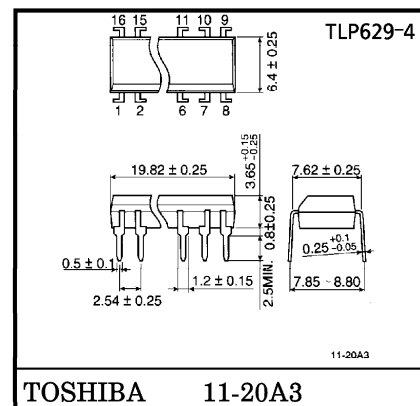
Unit in mm



Weight : 0.26g



Weight : 0.54g



Weight : 1.1g

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● TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING		UNIT
			TLP629	TLP629-2, 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 (100μs pulse, 100pps)		A
	Reverse Voltage	V _R	5		V
	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	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
	Junction Temperature	T _j	125		°C
	Storage Temperature Range	T _{stg}	−55~125		°C
Operating Temperature Range		T _{opr}	−55~100		°C
Lead Soldering Temperature		T _{sol}	260 (10s)		°C
Total Package Power Dissipation		P _T	250	200	mW
Total Package Power Dissipation Derating (Ta ≥ 25°C)		ΔP _T / °C	−2.5	2.0	mW / °C
Isolation Voltage (Note 1)		BV _S	5000 (AC, 1min., RH ≤ 60%)		V _{rms}

(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	—	20	120	mA
Collector Current	I _C	—	1	10	mA
Operating Temperature	T _{opr}	−25	—	85	°C

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- Gallium arsenide (GaAs) is a substance used in the products described in this document. GaAs dust and fumes are toxic. Do not break, cut or pulverize the product, or use chemicals to dissolve them. When disposing of the products, follow the appropriate regulations. Do not dispose of the products with other industrial waste or with domestic garbage.
- The products described in this document are subject to foreign exchange and foreign trade control laws.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.

INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V_F	$I_F = 100\text{mA}$	—	1.4	1.7	V
	Forward Current	I_F	$V_F = 0.7\text{V}$	—	2.5	20	μA
	Reverse Current	I_R	$V_R = 5\text{V}$	—	—	10	μA
	Capacitance	C_T	$V = 0, f = 1\text{MHz}$	—	50	—	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	100	nA
			$V_{CE} = 24\text{V}, T_a = 85^\circ\text{C}$	—	2	50	μA
	Capacitance Collector to Emitter	C_{CE}	$V = 0, f = 1\text{MHz}$	—	10	—	pF

COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	I_C / I_F	$I_F = 20\text{mA}, V_{CE} = 1\text{V}$	25	—	—	%
	I_C / I_F (High)	$I_F = 100\text{mA}, V_{CE} = 1\text{V}$	20	—	80	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 2.4\text{mA}, I_F = 20\text{mA}$	—	—	0.4	V
		$I_C = 2.4\text{mA}, I_F = 100\text{mA}$	—	—	0.4	
Off-State Collector Current	$I_C(\text{off})$	$V_F = 0.7\text{V}, V_{CEO} = 24\text{V}$	—	1	1.0	μA

ISOLATION CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance Input to Output	C_S	$V_S = 0, f = 1\text{MHz}$	—	0.8	—	pF
Isolation Resistance	R_S	$V_S = 500\text{V}$	5×10^{10}	10^{14}	—	Ω
Isolation Voltage	BV_S	AC, 1 minute	5000	—	—	V_{rms}
		AC, 1 second, in oil	—	10000	—	
		DC, 1 minute, in oil	—	10000	—	Vdc

SWITCHING CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	t_r	$V_{CC}=10V, I_C=2mA$ $R_L=100\Omega$	—	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}	$R_L=1.9k\Omega$ (Fig.1) $V_{CC}=5V, I_F=16mA$	—	2	—	μs
Storage Time	t_s		—	15	—	
Turn-off Time	t_{OFF}		—	25	—	

Fig.1 SWITCHING TIME TEST CIRCUIT

