TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

TLP627A,TLP627A-2,TLP627A-4

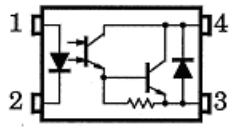
TELECOMMUNICATION
PROGRAMMABLE CONTROLLERS
DC-OUTPUT MODULE

The TOSHIBA TLP627A, -2, and -4 consist of a gallium arsenide infrared emitting diode optically coupled to a darlington connected phototransistor which has a 350V high voltage of collector-emitter breakdown voltage.
The TLP627A-2 offer two isolated channels in a eight lead plastic DIP package, while the TLP627A-4 provide four isolated channels per package.

- Collector-Emitter Voltage : 350V(MIN)
- Current Transfer Ratio : 1500% (MIN)
- Isolation Voltage : 5000Vrms(MIN)

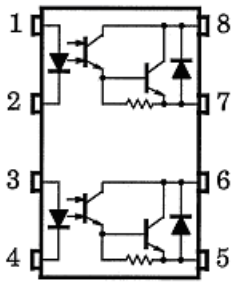
Pin Configuration (top view)

TLP627A



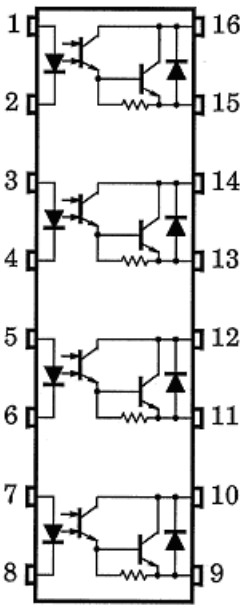
1 : ANODE
2 : CATHODE
3 : EMITTER
4 : COLLECTOR

TLP627A-2



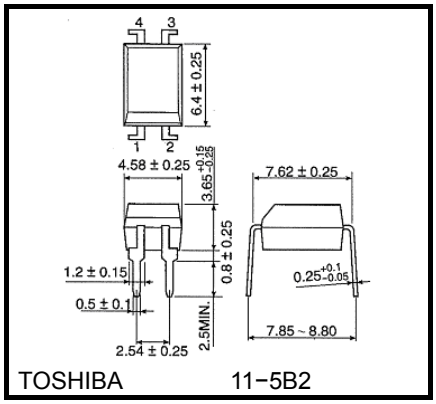
1, 3 : ANODE
2, 4 : CATHODE
5, 7 : EMITTER
6, 8 : COLLECTOR

TLP627A-4



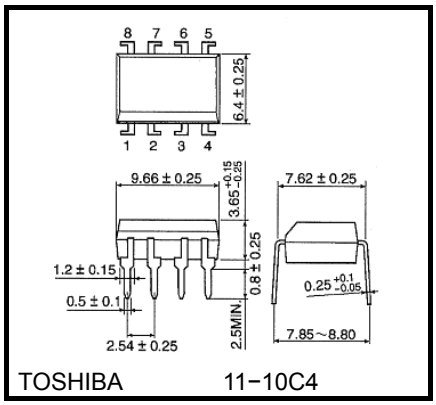
1, 3, 5, 7 : ANODE
2, 4, 6, 8 : CATHODE
9, 11, 13, 15 : EMITTER
10, 12, 14, 16 : COLLECTOR

単位: mm



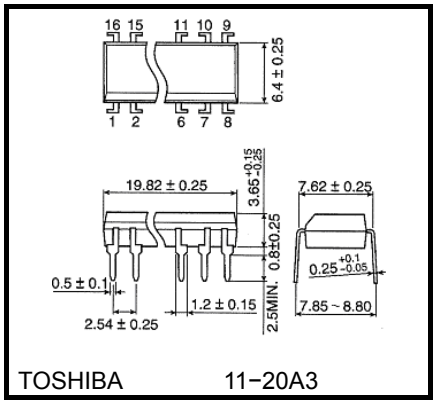
TOSHIBA 11−5B2

Weight : 0.26 g



TOSHIBA 11−10C4

Weight : 0.54 g



TOSHIBA 11−20A3

Weight : 1.1 g

Absolute Maximum Ratings (Ta = 25°C)

CHARACTERISTICS		SYMBOL	RATING		UNIT
			TLP627A	TLP627A−2 TLP627A−4	
LED	Forward Current	I_F	60	50	mA
	Forward Current Derating	ΔI_F /℃	−0.7 (Ta≧39℃)	−0.5 (Ta≧25℃)	mA /℃
	Pulse Forward Current	I_{FP}	1 (100 μs Pulse、100 pps)		A
	Reverse Voltage	V_R	5		V
DETECTOR	Collector-Emitter Voltage	V_{CEO}	350		V
	Emitter-Collector Voltage	V_{ECO}	0.3		V
	Collector Current	I_C	150		mA
	Collector Power Dissipation (1 circuit)	P_C	150 (300) (*)	100	mW
	Collector Power Dissipation Derating (Ta≧25℃, 1 Circuit)	ΔP_C /℃	−1.5 (−3.5) (*)	−1.0	mA /℃
Storage Temperature Range		T_{stg}	−55～125		℃
Operating Temperature Range		T_{opr}	−55～100		℃
Lead Soldering Temperature		T_{sol}	260 (10 sec)		℃
Total Package Power Dissipation (1 circuit)		P_T	250 (320) (*)	150	mW
Total Package Power Dissipation Derating (Ta≧25℃, 1 circuit)		ΔP_T /℃	−2.5 (−3.2) (*)	−1.5	mW /℃
Isolation Voltage		BV_S	5000 (AC、1 min、R.H.≦60%) (**)		Vrms

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).

* : IF = 20 mA max

** : Device considered a two terminal device : LED side pins shorted together and DETECTOR side pins shorted together.

Recommended Operating Conditions

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{CC}	—	—	200	V
Forward Current	I_F	—	16	25	mA
Collector Current	I_C	—	—	120	mA
Operating Temperature	T_{opr}	−25	—	85	℃

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.

Individual Electrical Characteristics (Ta = 25°C)

CHARACTERISTICS		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V_F	I_F = 10 mA	1.0	1.15	1.3	V
	Reverse Current	I_R	V_R = 5 V	—	—	10	μA
	Capacitance	C_T	V = 0, f = 1 MHz	—	30	—	pF
DETECTOR	Collector-Emitter Breakdown Voltage	$V_{(BR)\ CEO}$	I_C = 0.1 mA	350	—	—	V
	Emitter-Collector Breakdown Voltage	$V_{(BR)\ ECO}$	I_E = 0.1 mA	0.3	—	—	V
	Collector Dark Current	I_{CEO}	V_{CE} = 300 V	—	10	200	nA
			V_{CE} = 300 V, Ta = 85℃	—	—	20	μA
	Capacitance Collector to Emitter	C_{CE}	V = 0, f = 1 MHz	—	10	—	pF

Coupled Electrical Characteristics (Ta = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	I_C / I_F	I_F = 1 mA, V_{CE} = 1 V	1500	4000	—	%
Saturated CTR	I_C / $I_{F\ (sat)}$	I_F = 10 mA, V_{CE} = 1 V	500	—	—	%
Collector-Emitter Saturation Voltage	$V_{CE\ (sat)}$	I_C = 15 mA, I_F = 1 mA	—	—	1.0	V
		I_C = 100 mA, I_F = 10 mA	0.3	—	1.2	

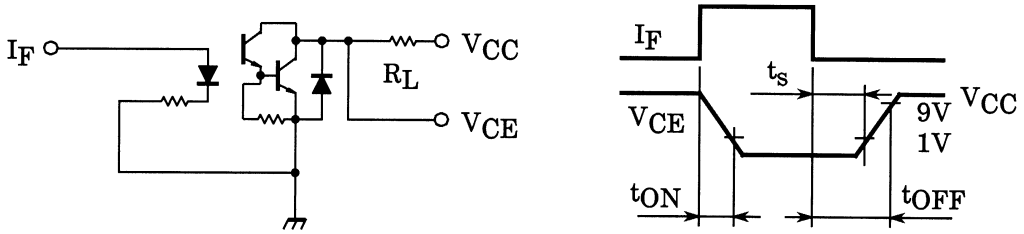
Isolation Characteristics (Ta = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance Input to Output	C_S	V_S = 0, f = 1 MHz	—	0.8	—	pF
Isolation Resistance	R_S	V_S = 500 V, R.H.≦60%	5×10^{12}	10^{14}	—	Ω
Isolation Voltage	BV_S	AC、1 minite	5000	—	—	Vrms
		AC、1 second、in oil	—	10000	—	
		DC、1 second、in oil	—	10000	—	Vdc

Switching Characteristics (Ta = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	t_r	V_{CC} = 10 V I_C = 10 mA R_L = 100 Ω	—	40	—	μs
Fall Time	t_f		—	15	—	
Turn-on Time	t_{on}		—	50	—	
Turn-off Time	t_{off}		—	15	—	
Turn-on Time	t_{ON}	R_L = 180 Ω (Fig.1) V_{CC} = 10 V, I_F = 16 mA	—	5	—	μs
Strage Time	t_s		—	40	—	
Turn-off Time	t_{OFF}		—	80	—	

Fig.1: SWITCHING TIME TEST CIRCUIT



RESTRICTIONS ON PRODUCT USE

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- TOSHIBA is continually working to improve the quality and 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 comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products 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 TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the “Handling Guide for Semiconductor Devices,” or “TOSHIBA Semiconductor Reliability Handbook” etc.
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