

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

TLP523, TLP523-2, TLP523-4

PROGRAMMABLE CONTROLLERS

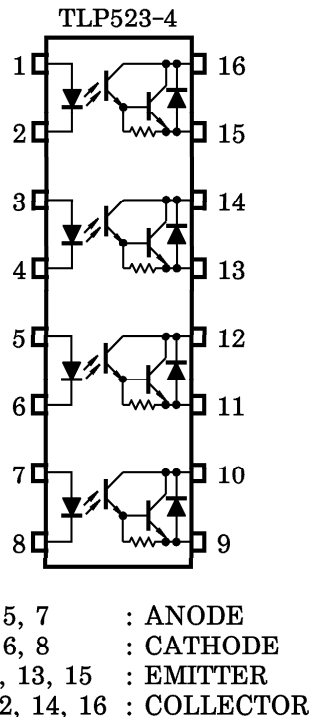
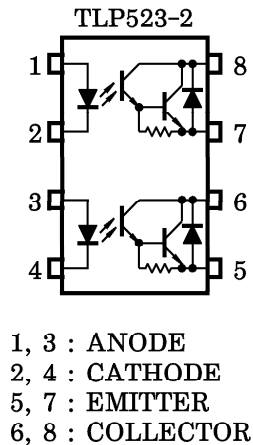
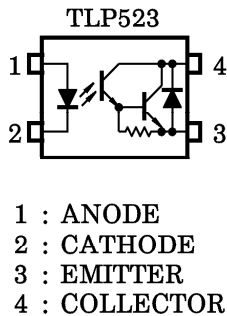
DC-OUTPUT MODULE

SOLID STATE RELAY

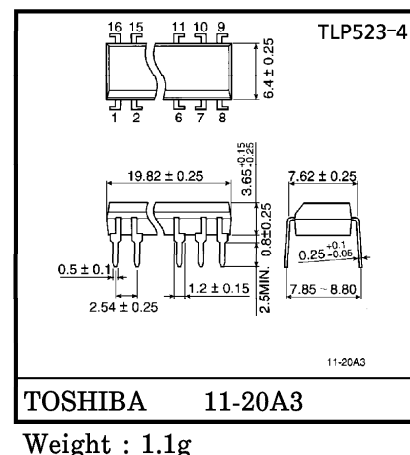
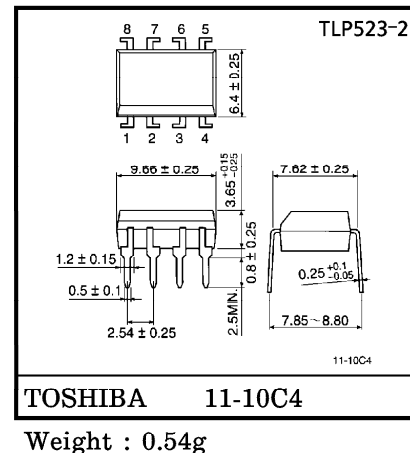
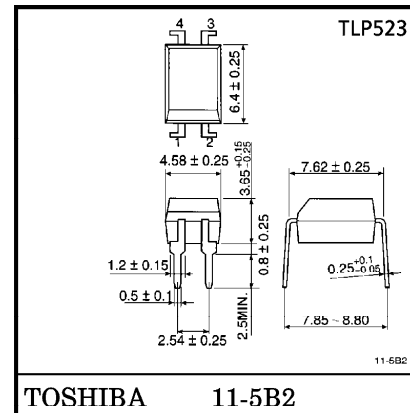
The TOSHIBA TLP523, -2 and -4 consists of a gallium arsenide infrared emitting diode coupled with a silicon, darlington connected, phototransistor which has an integral base-emitter resistor to optimize switching speed and elevated temperature characteristics. The TLP523-2 offers two isolated channels in a eight lead plastic DIP package, while the TLP523-4 provide four isolated channels per package.

- Current Transfer Ratio : 500% (Min.) ($I_F = 1\text{mA}$)
- Isolation Voltage : 2500Vrms (Min.)
- Collector-Emitter Voltage : 55V (Min.)
- Leakage Current : $10\mu\text{A}$ (Max.) ($T_a = 85^\circ\text{C}$)
- UL Recognized : UL1577, File No. E67349

PIN CONFIGURATIONS (TOP VIEW)



Unit in mm



961001EAA2

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MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING		UNIT
			TLP523	TLP523-2 TLP523-4	
LED	Forward Current	I_F	60	50	mA
	Forward Current Derating	$\Delta I_F / ^\circ\text{C}$	$-0.7 (T_a \geq 39^\circ\text{C})$	$-0.5 (T_a \geq 25^\circ\text{C})$	mA / $^\circ\text{C}$
	Pulse Forward Current	I_{FP}	1 (100 μs pulse, 100pps)		A
	Reverse Voltage	V_R	5		V
DETECTOR	Collector-Emitter Voltage	V_{CEO}	55		V
	Emitter-Collector Voltage	V_{ECO}	0.3		V
	Collector Current	I_C	150		mA
	Collector Power Dissipation (1 Circuit)	P_C	150	100	mW
	Collector Power Dissipation Derating (1 Circuit ($T_a \geq 25^\circ\text{C}$))	$\Delta P_C / ^\circ\text{C}$	-1.5	-1.0	mW / $^\circ\text{C}$
Operating Temperature Range		T_{opr}	$-55 \sim 100$		$^\circ\text{C}$
Storage Temperature Range		T_{stg}	$-55 \sim 125$		$^\circ\text{C}$
Lead Soldering Temperature (10s)		T_{sol}	260		$^\circ\text{C}$
Total Power Dissipation		P_T	250	150	mW
Total Power Dissipation Derating ($T_a \geq 25^\circ\text{C}$)		$\Delta P_T / ^\circ\text{C}$	-2.5	-1.5	mW / $^\circ\text{C}$
Isolation Voltage (Note 1)		BV_S	2500 (AC, 1 min., R.H. $\leq 60\%$)		Vrms

(Note 1) Device considered a two terminal device : 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	—	16	20	mA
Operating Temperature Range	T_{opr}	-25	—	85	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V_F	$I_F = 10\text{mA}$	1.0	1.15	1.3	V
	Reverse Current	I_R	$V_R = 5\text{V}$	—	—	10	μA
	Capacitance	C_T	$V = 0, f = 1\text{MHz}$	—	30	—	pF
DETECTOR	Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 1\text{mA}$	55	—	—	V
	Collector Dark Current	I_{CEO}	$V_{CE} = 24\text{V}$	—	10	200	nA
			$V_{CE} = 24\text{V}, T_a = 85^\circ\text{C}$	—	0.5	10	μA
	Capacitance Collector to Emitter	C_{CE}	$V = 0, f = 1\text{MHz}$	—	10	—	pF
COUPLED	Current Transfer Ratio	I_C / I_F	$I_F = 1\text{mA}, V_{CE} = 1\text{V}$	500	2000	—	%
	Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 50\text{mA}, I_F = 10\text{mA}$	—	—	1	V
	Capacitance Input to Output	C_S	$V_S = 0, f = 1\text{MHz}$	—	0.8	—	pF
	Isolation Resistance	R_S	$V_S = 500\text{V}, \text{R.H.} \leq 60\%$	5×10^{10}	10^{14}	—	Ω

SWITCHING CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Turn-on Time	t_{ON}	$V_{CC} = 10\text{V}, R_L = 180\Omega$ $I_F = 16\text{mA}$	—	3	—	μs
Turn-off Time	t_{OFF}		—	80	—	μs

SWITCHING TIME TEST CIRCUIT

