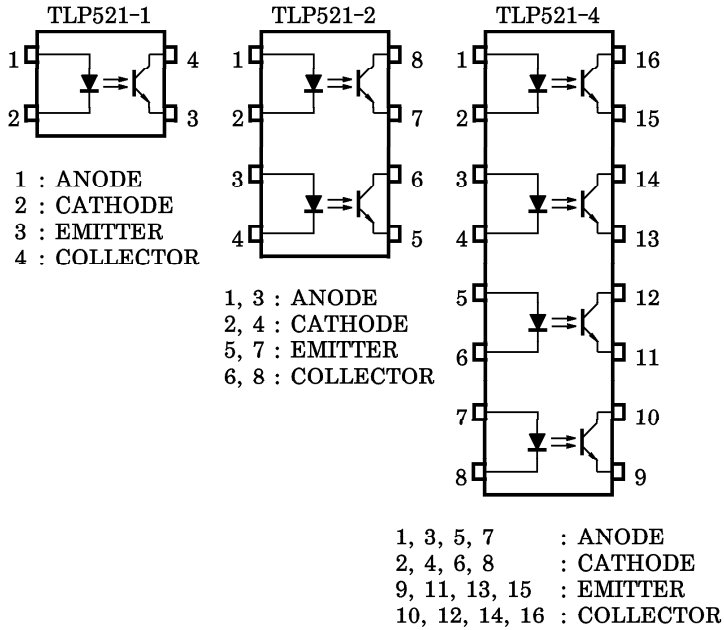


(TLP521-1)  
 PROGRAMMABLE CONTROLLERS  
 AC/DC-INPUT MODULE  
 SOLID STATE RELAY

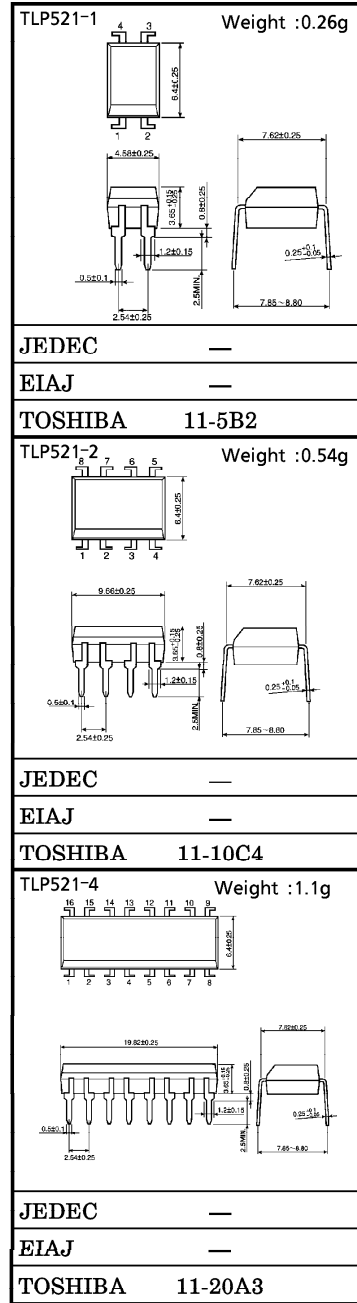
The TOSHIBA TLP521-1, -2 and -4 consist of a photo-transistor optically coupled to a gallium arsenide infrared emitting diode. The TLP521-2 offers two isolated channels in an eight lead plastic DIP package, while the TLP521-4 provides four isolated channels in a sixteen plastic DIP package.

- Collector-Emitter Voltage : 55V (Min.)
- Current Transfer Ratio : 50% (Min.)  
 Rank GB : 100% (Min.)
- Isolation Voltage : 2500Vrms (Min.)
- UL Recognized : UL1577, File No. E67349

**PIN CONFIGURATIONS (TOP VIEW)**



Unit in mm



③ 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.  
 ④ These TOSHIBA products are intended for use in general commercial applications (office equipment, communication equipment, measuring equipment, domestic appliances, etc.). please make sure that you consult with us before you use these TOSHIBA products in equipment which requires extraordinarily high quality and/or reliability, and in equipment which may involve life threatening or critical application, including but not limited to such uses as atomic energy control, airplane or spaceship instrumentation, traffic signals, medical instrumentation, combustion control, all types of safety devices, etc. TOSHIBA cannot accept and hereby disclaims liability for any damage which may occur in case the TOSHIBA products are used in such equipment or applications without prior consultation with TOSHIBA.

(TLP521-1)

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING		UNIT
			TLP521-1	TLP521-2, 4	
LED	Forward Current	I <sub>F</sub>	70	50	mA
	Forward Current Derating	ΔI <sub>F</sub> /°C	-0.7 (Ta ≥ 39°C)	-0.5 (Ta ≥ 25°C)	mA/°C
	Pulse Forward Current	I <sub>FP</sub>	1 (100μ pulse, 100pps)		A
	Reverse Voltage	V <sub>R</sub>	5		V
	Junction Temperature	T <sub>j</sub>	125		°C
DETECTOR	Collector-Emitter Voltage	V <sub>CEO</sub>	55		V
	Emitter-Collector Voltage	V <sub>ECO</sub>	7		V
	Collector Current	I <sub>C</sub>	50		mA
	Collector Power Dissipation (1 Circuit)	P <sub>C</sub>	150	100	mW
	Collector Power Dissipation Derating (1 Circuit, Ta ≥ 25°C)	ΔP <sub>C</sub> /°C	-1.5	-1.0	mW/°C
	Junction Temperature	T <sub>j</sub>	125		°C
	Storage Temperature Range	T <sub>stg</sub>	-55~125		°C
Operating Temperature Range	T <sub>opr</sub>	-55~100		°C	
Lead Soldering Temperature	T <sub>sold</sub>	260 (10 sec.)		°C	
Total Package Power Dissipation	P <sub>T</sub>	250	150	mW	
Total Package Power Dissipation Derating (Ta ≥ 25°C)	ΔP <sub>T</sub> /°C	-2.5	-1.5	mW/°C	
Isolation Voltage	BV <sub>S</sub>	2500 (AC, 1 min., RH ≤ 60%) (Note 1)		V <sub>rms</sub>	

Note 1 : Device considered a two terminal device : LED side pins shorted together and DETECTOR side pins shorted together.

(TLP521-1)

TYPE	CLASSI- FICATION *1	CURRENT TRANSFER RATIO (%) ( $I_C / I_F$ )		MARKING OF CLASSIFICATION
		$I_F = 5\text{mA}, V_{CE} = 5\text{V}, T_a = 25^\circ\text{C}$		
		MIN.	MAX.	
TLP521	A	50	600	BLANK, Y, Y <sup>■</sup> , G, G <sup>■</sup> , B, B <sup>■</sup> , GB
	Rank Y	50	150	Y, Y <sup>■</sup>
	Rank GR	100	300	G, G <sup>■</sup>
	Rank BL	200	600	B, B <sup>■</sup>
	Rank GB	100	600	G, G <sup>■</sup> , B, B <sup>■</sup> , GB
TLP521-2	A	50	600	BLANK, GR, BL, GB
TLP521-4	Rank GB	100	600	GR, BL, GB

\*1 : Ex. Rank GB : TLP521-1 (GB)

Note : Application type name for certification test, please use standard product type name,  
i.e.

TLP521-1 (GB) : TLP521-1, TLP521-2 (GB) : TLP521-2

TLP521-1 - 3

1996 - 4 - 8

**TOSHIBA CORPORATION**

(TLP521-1)

INDIVIDUAL 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	$\mu\text{A}$
	Capacitance	$C_T$	$V = 0, f = 1\text{MHz}$	—	30	—	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	$\mu\text{A}$
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	$I_C / I_F$	$I_F = 5\text{mA}, V_{CE} = 5\text{V}$ Rank GB	50	—	600	%
			100	—	600	
Saturated CTR	$I_C / I_F (\text{sat})$	$I_F = 1\text{mA}, V_{CE} = 0.4\text{V}$ Rank GB	—	60	—	%
			30	—	—	
Collector-Emitter Saturation Voltage	$V_{CE} (\text{sat})$	$I_C = 2.4\text{mA}, I_F = 8\text{mA}$	—	—	0.4	V

ISOLATION CHARACTERISTICS (Ta = 25°C)

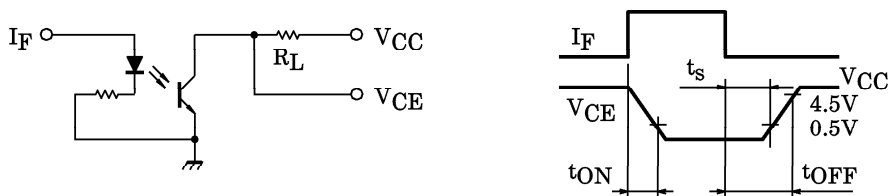
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance (Input to Output)	$C_S$	$V_S = 0, f = 1\text{MHz}$	—	0.8	—	pF
Isolation Resistance	$R_S$	$V_S = 500\text{V}, \text{R.H.} \leq 60\%$	—	$10^{11}$	—	$\Omega$
Isolation Voltage	$BV_S$	AC, 1 minute	2500	—	—	Vrms

(TLP521-1)

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	—	$\mu s$
Fall Time	$t_f$		—	3	—	
Turn-on Time	$t_{on}$		—	3	—	
Turn-off Time	$t_{off}$		—	3	—	
Turn-on Time	$t_{ON}$	$R_L = 1.9k\Omega$ (Fig.1) $V_{CC} = 5V, I_F = 16mA$	—	2	—	$\mu s$
Storage Time	$t_s$		—	15	—	
Turn-off Time	$t_{OFF}$		—	25	—	

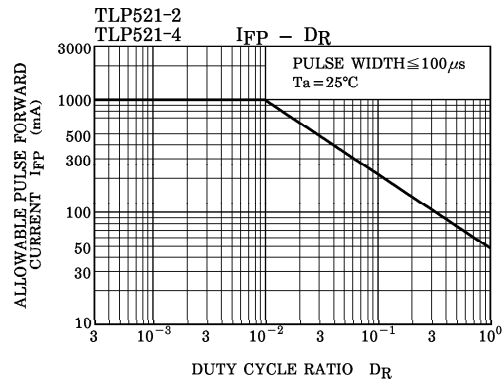
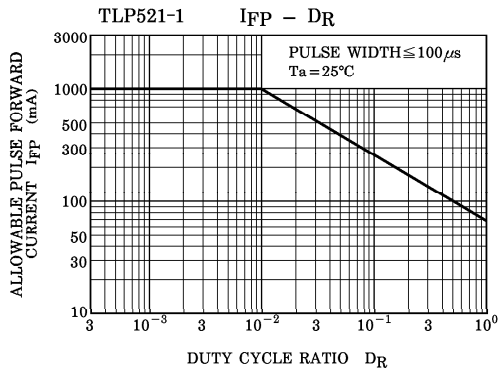
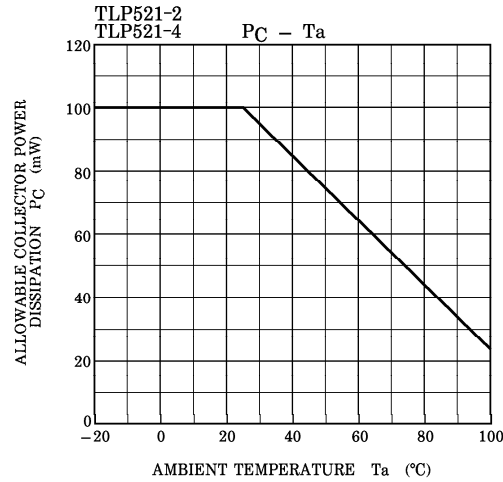
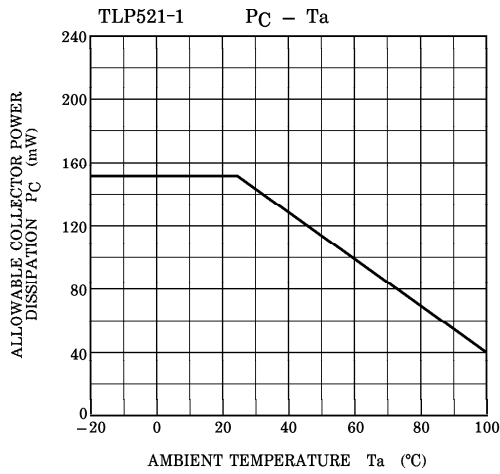
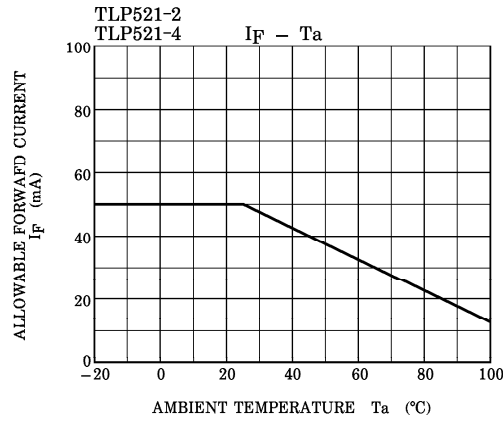
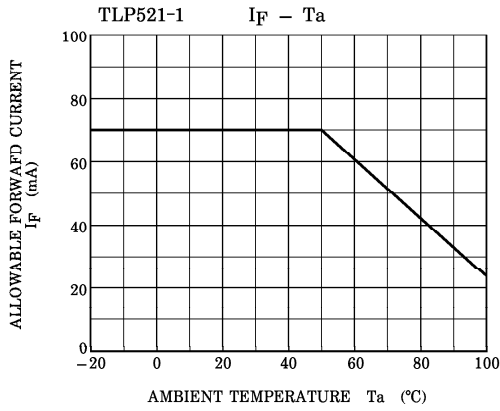
Fig.1 SWITCHING TIME TEST CIRCUIT



RECOMMENDED OPERATING CONDITIONS

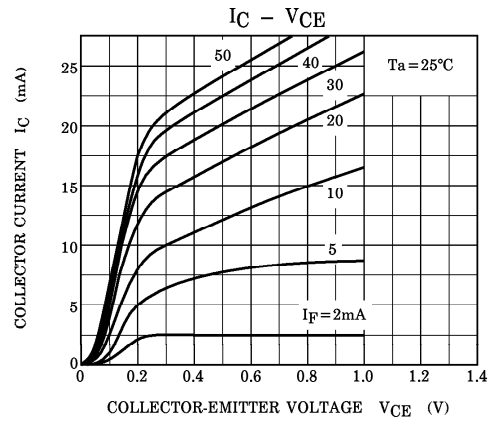
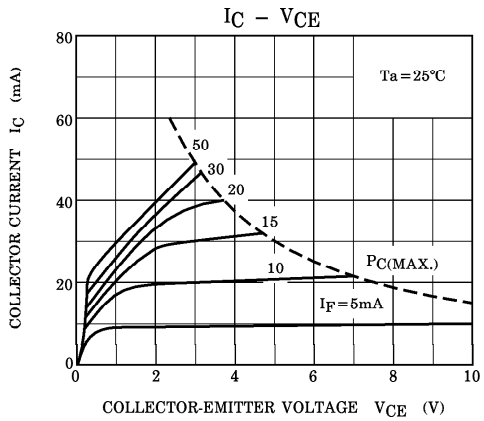
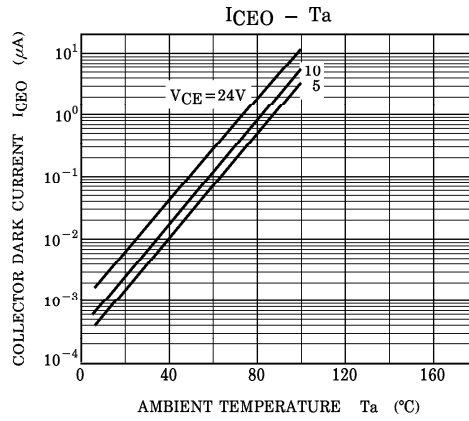
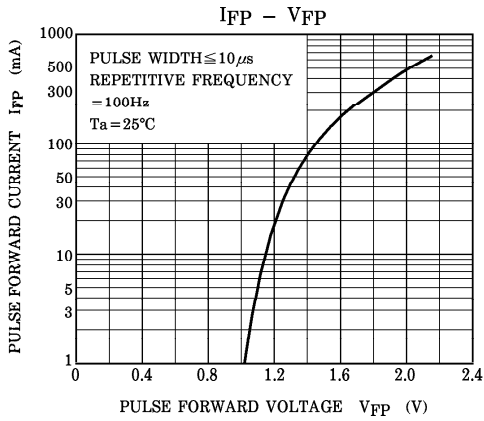
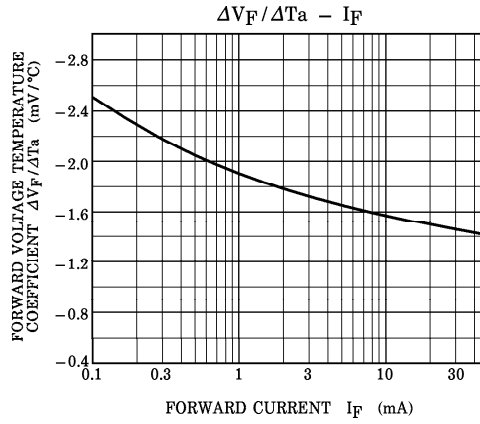
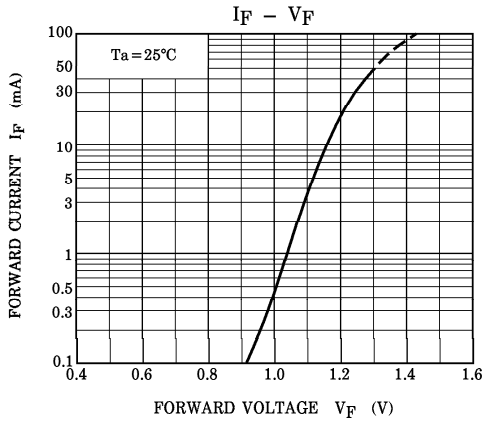
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	$V_{CC}$	—	5	24	V
Forward Current	$I_F$	—	16	20	mA
Collector Current	$I_C$	—	1	10	mA
Operating Temperature	$T_{opr}$	-25	—	85	°C

(TLP521-1)



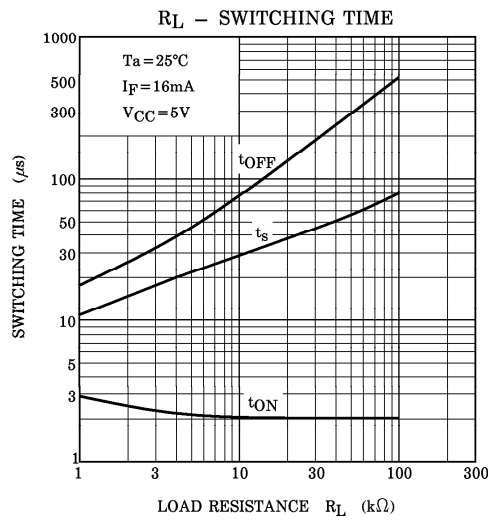
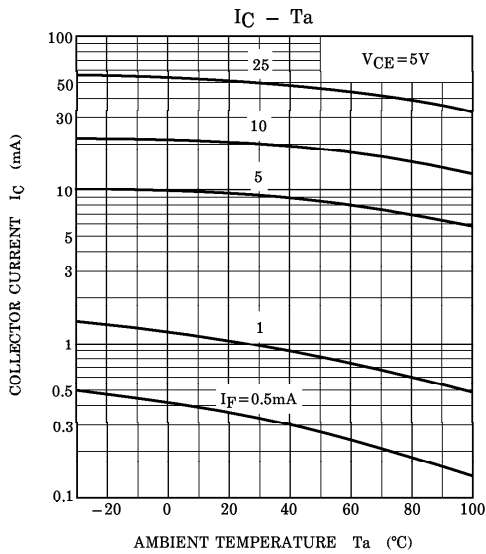
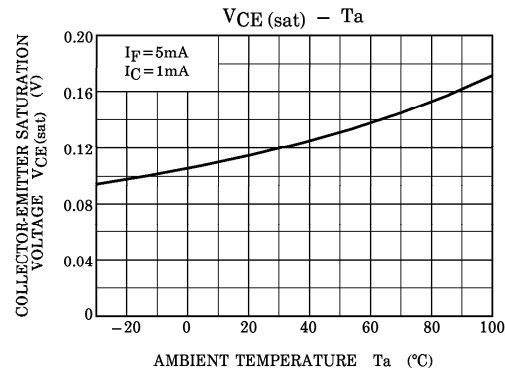
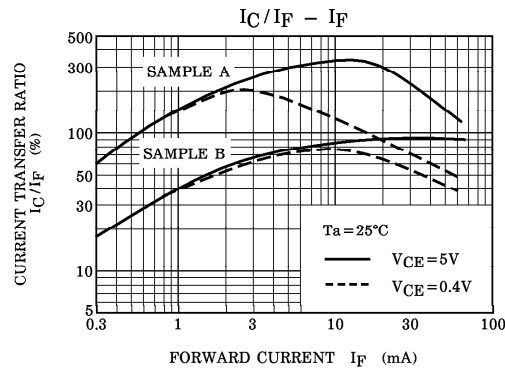
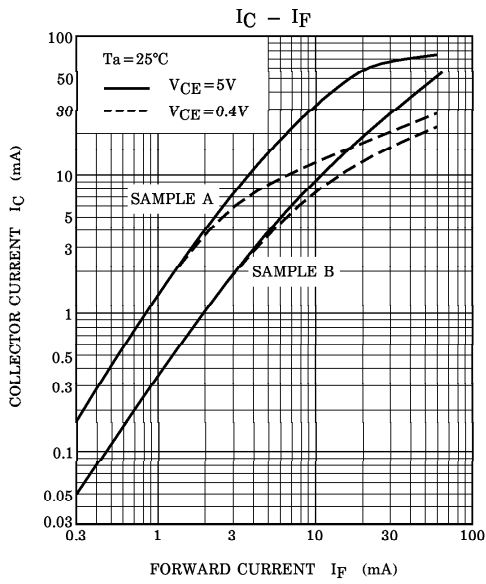
TLP521-1-6
1996-4-8
<b>TOSHIBA CORPORATION</b>

(TLP521-1)



TLP521-1-7  
1996-4-8  
TOSHIBA CORPORATION

(TLP521-1)



TLP521-1-8\*  
 1996-4-8  
**TOSHIBA CORPORATION**