

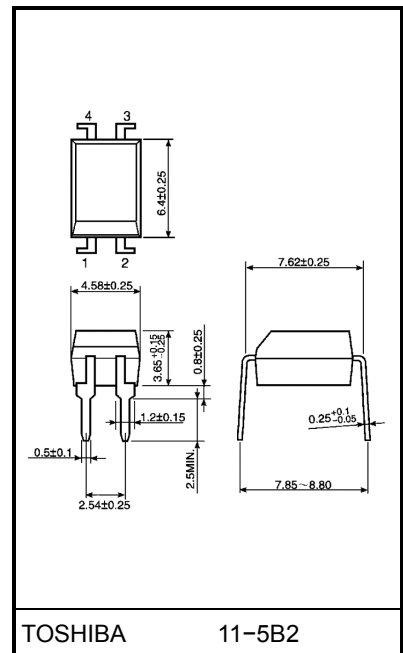
TLP421

- Office Equipment
- Household Appliances
- Solid State Relays
- Switching Power Supplies
- Various Controllers
- Signal Transmission Between Different Voltage Circuits

The TOSHIBA TLP421 consists of a silicone photo-transistor optically coupled to a gallium arsenide infrared emitting diode in a four lead plastic DIP (DIP4) with having high isolation voltage (AC: 5kVRMS (min)).

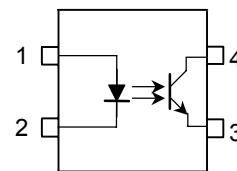
- Collector-emitter voltage: 80V (min.)
- Current transfer ratio: 50% (min.)
Rank GB: 100% (min.)
- Isolation voltage: 5000V_{rms} (min.)
- UL recognized: UL1577
- BSI approved: BS EN60065: 1994
Approved no.8411
BS EN60950: 1992
Approved no.8412
- SEMKO approved: EN60065, EN60950, EN60335
Approved no.9910249/01

Unit in mm



Weight: 0.26 g

Pin Configurations (top view)



- 1 : Anode
- 2 : Cathode
- 3 : Emitter
- 4 : Collector

- Option(D4)type
TÜV approved: DIN VDE0884
Approved no.R9950202
Maximum operating insulation voltage: 890V_{PK}
Maximum permissible overvoltage: 8000V_{PK}

(Note): When a VDE0884 approved type is needed, please designate the "Option(D4)"

Making the VDE application: DIN VDE0884

- Construction mechanical rating

	7.62mm Pich Typical Type	10.16mm Pich TLPxxxF Type
Creepage distance	7.0mm(min)	8.0mm(min)
Clearance	7.0mm(min)	8.0mm(min)
Insulation thickness	0.4mm(min)	0.4mm(min)

Current Transfer Ratio

Type	Classi- fication (*1)	Current Transfer Ratio (%) (I_C / I_E)		Marking Of Classification
		$I_F = 5\text{mA}, V_{CE} = 5\text{V}, T_a = 25^\circ\text{C}$		
		Min	Max	
TLP421	(None)	50	600	Blank, Y, Y+, G, G+, B, B+, GB
	Rank Y	50	150	Y, Y+
	Rank GR	100	300	G, G+
	Rank BL	200	600	B, B+
	Rank GB	100	600	G, G+, B, B+, GB

(*1): Ex. rank GB: TLP421 (GB)

(Note): Application type name for certification test, please use standard product type name, i. e.
TLP421 (GB): TLP421

Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
LED	Forward current	I_F	60	mA
	Forward current derating(Ta ≥ 39°C)	$\Delta I_F / ^\circ\text{C}$	-0.7	mA / °C
	Pulse forward current (Note 2)	I_{FP}	1	A
	Power dissipation	P_D	100	mW
	Power dissipation derating	$\Delta P_D / ^\circ\text{C}$	-1.0	mW / °C
	Reverse voltage	V_R	5	V
	Junction temperature	T_j	125	°C
Detector	Collector-emitter voltage	V_{CEO}	80	V
	Emitter-collector voltage	V_{ECO}	7	V
	Collector current	I_C	50	mA
	Power dissipation(single circuit)	P_C	150	mW
	Power dissipation derating (Ta ≥ 25°C)(single circuit)	$\Delta P_C / ^\circ\text{C}$	-1.5	mW / °C
	Junction temperature	T_j	125	°C
Operating temperature range		T_{opr}	-55~100	°C
Storage temperature range		T_{stg}	-55~125	°C
Lead soldering temperature (10s)		T_{sol}	260	°C
Total package power dissipation		P_T	250	mW
Total package power dissipation derating (Ta ≥ 25°C)		$\Delta P_T / ^\circ\text{C}$	-2.5	mW / °C
Isolation voltage (Note 3)		BV_S	5000	V_{rms}

(Note 2): 100µs pulse, 100Hz frequency

(Note 3): AC, 1 min., R.H.≤ 60%. Apply voltage to LED pin and detector pin together.

Recommended Operating Conditions

Characteristic	Symbol	Min	Typ.	Max	Unit
Supply voltage	V_{CC}	—	5	24	V
Forward current	I_F	—	16	25	mA
Collector current	I_C	—	1	10	mA
Operating temperature	T_{opr}	-25	—	85	°C

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	1.2	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	$V_{(BR) CEO}$	$I_C = 0.5 \text{ mA}$	80	—	—	V
	Emitter-collector breakdown voltage	$V_{(BR) ECO}$	$I_E = 0.1 \text{ mA}$	7	—	—	V
	Collector dark current	$I_D(I_{CEO})$	$V_{CE} = 24 \text{ V}$ (ambient light below 1000 lx)	—	0.01 (0.1)	0.1 (10)	μA
			$V_{CE} = 24 \text{ V}$ (ambient light $T_a = 85^\circ\text{C}$ below 1000 lx)	—	0.6 (1)	50 (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	$I_F = 5 \text{ mA}, V_{CE} = 5 \text{ V}$ 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	$V_{CE}(\text{sat})$	$I_C = 2.4 \text{ mA}, I_F = 8 \text{ mA}$ $I_C = 0.2 \text{ mA}, I_F = 1 \text{ mA}$ Rank GB	—	—	0.4	V
			—	0.2	—	
			—	—	0.4	

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	$V_S = 500 \text{ V}$	1×10^{12}	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)

Characteristics	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	—	
Turn-off time	t_{off}		—	3	—	
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		—	25	—	
Turn-off time	t_{OFF}		—	50	—	

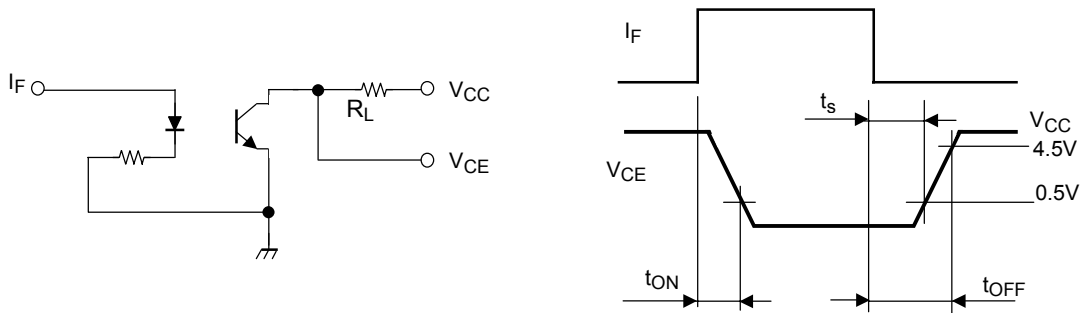
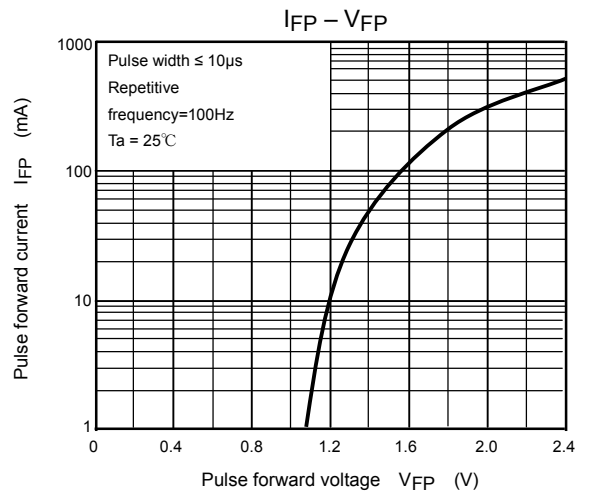
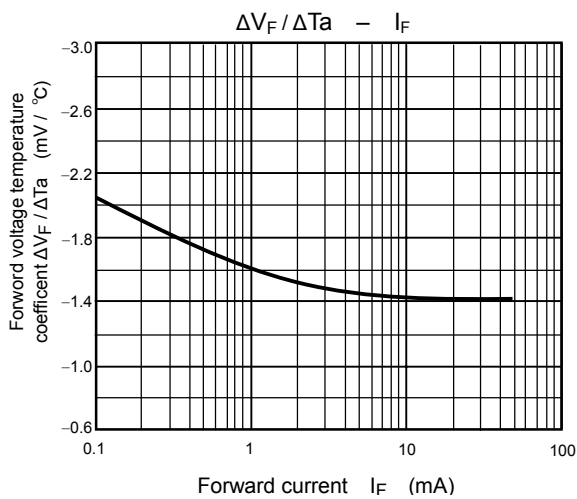
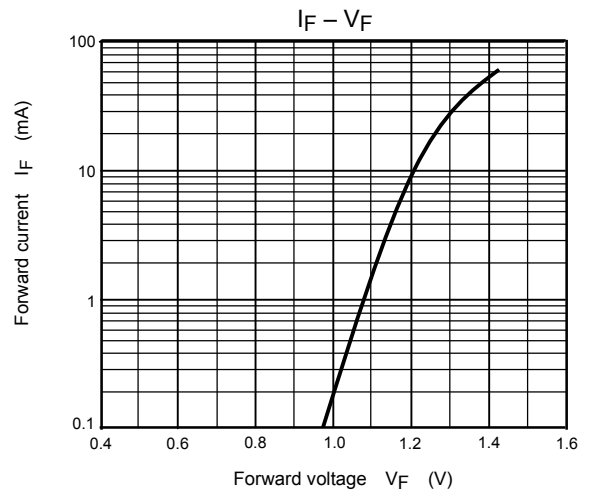
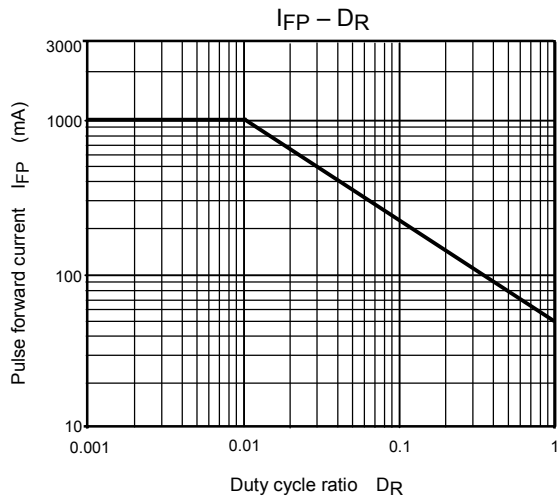
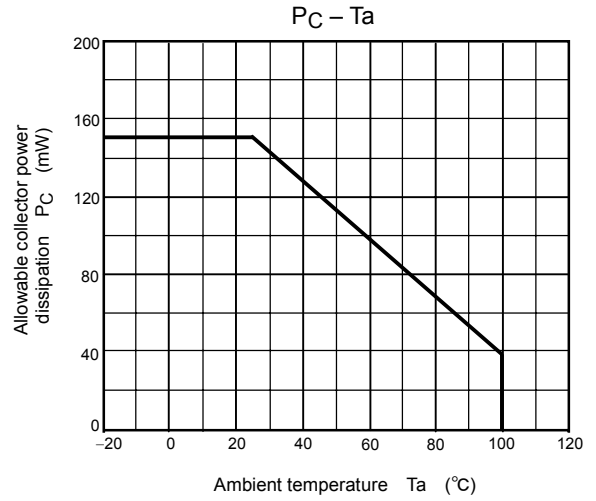
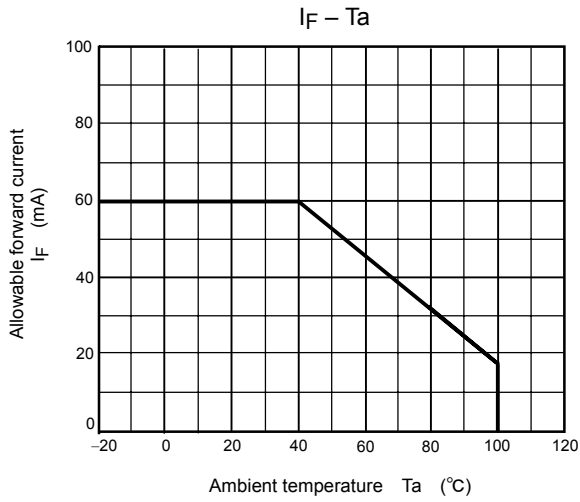
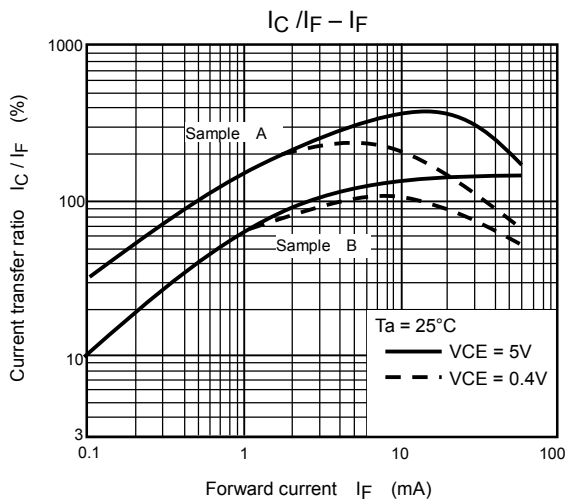
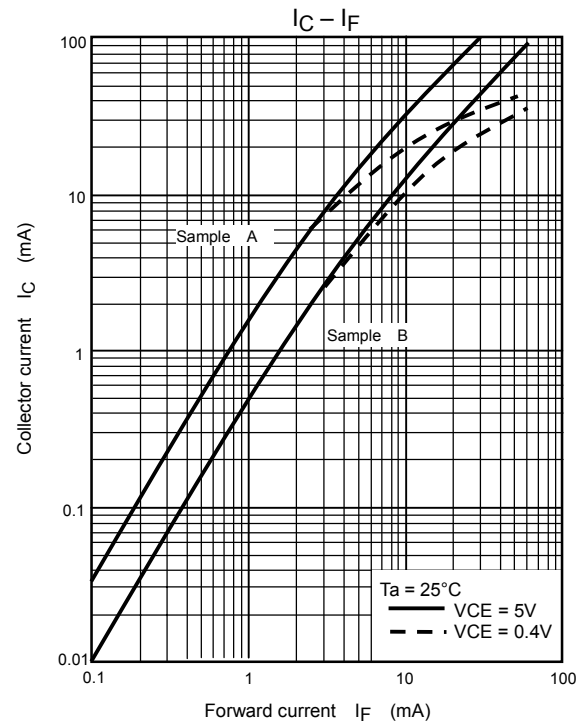
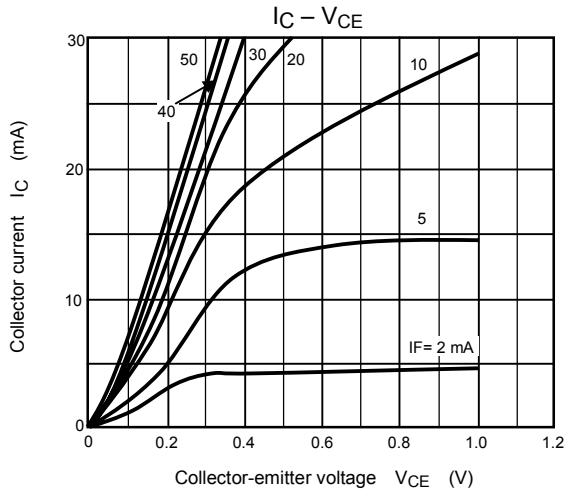
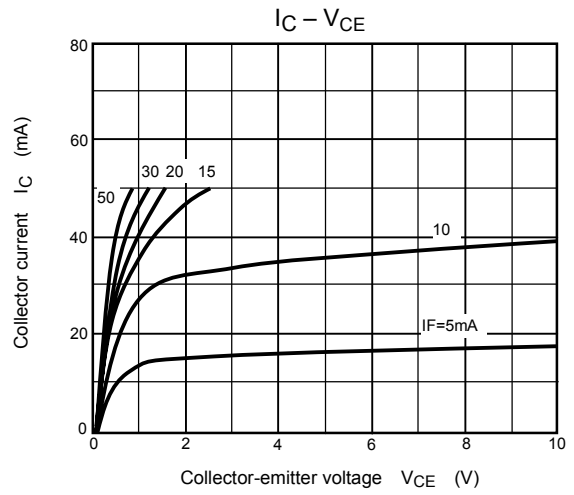
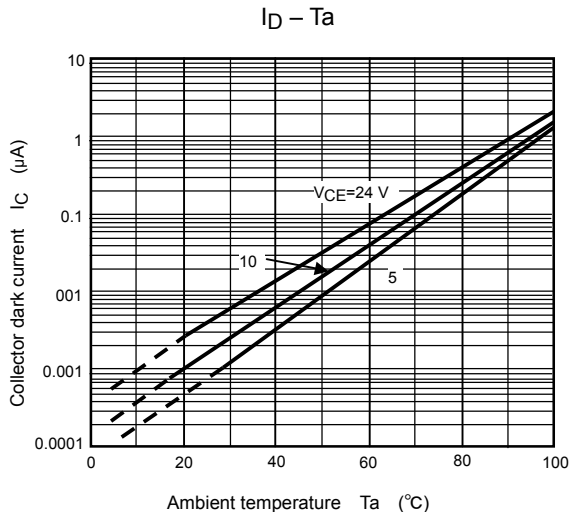
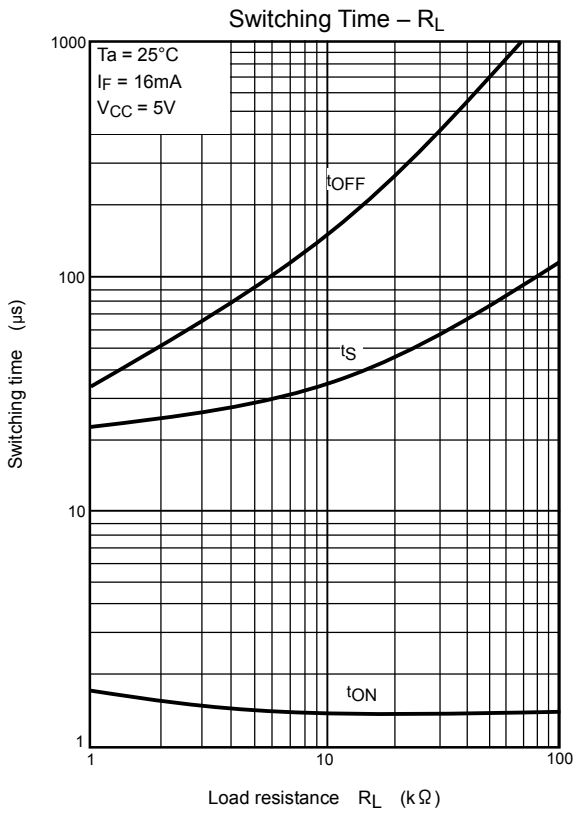
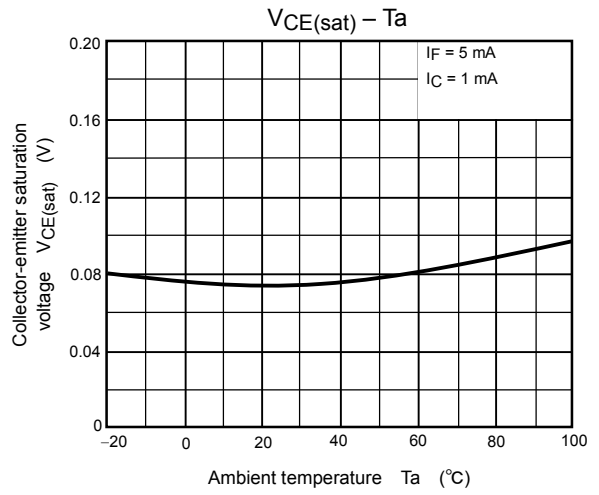
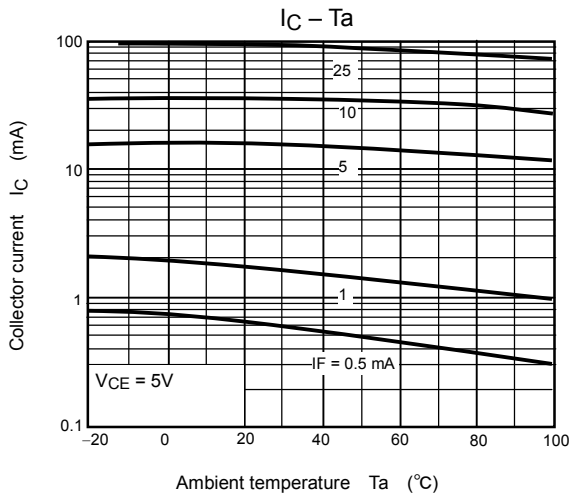


Fig.1 Switching time test circuit







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