

TOSHIBA Photocoupler GaAs Ired & Photo-Transistor

TLP131

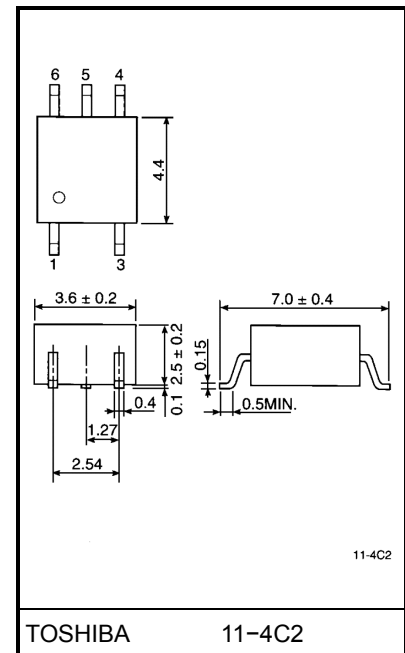
Office Machine
Programmable Controllers
AC / DC-Input Module
Telecommunication

The TOSHIBA mini flat coupler TLP131 is a small outline coupler, suitable for surface mount assembly.
TLP131 consists of a photo transistor, optically coupled to a gallium arsenide infrared emitting diode.

- Collector-emitter voltage: 80V (min.)
- Current transfer ratio: 50% (min.)
Rank GB: 100% (min.)
- Isolation voltage: 3750Vrms (min.)
- UL recognized: UL1577, file No. E67349

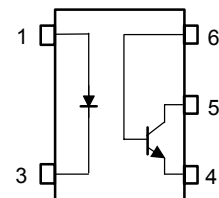
TLP131 base terminal is for the improvement of speed, reduction of dark current, and enable operation.

Unit in mm



Weight: 0.09 g

Pin Configurations (top view)



- 1 : Anode
- 3 : Cathode
- 4 : Emitter
- 5 : Collector
- 6 : Base

Current Transfer Ratio

Type	Classification	Current Transfer Ratio (%) (I _C / I _F)		Marking Of Classification
		I _F = 5mA, V _{CE} = 5V, Ta = 25°C		
		Min.	Max.	
TLP131	(None)	50	600	BLANK, Y, Y [■] , G, G [■] , B, B [■] , GB
	Rank Y	50	150	Y, Y [■]
	Rank GR	100	300	G, G [■]
	Rank GB	100	600	G, G [■] , B, B [■] , GB

Note: Application type name for certification test, please use standard product type name, i.e.
TLP131(GB): TLP131

Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristic		Symbol	Rating	Unit
LED	Forward current	I_F	50	mA
	Forward current derating ($T_a \geq 53^\circ\text{C}$)	$\Delta I_F / ^\circ\text{C}$	-0.7	mA / $^\circ\text{C}$
	Peak forward current (100 μs pulse, 100pps)	I_{FP}	1	A
	Reverse voltage	V_R	5	V
	Junction temperature	T_j	125	$^\circ\text{C}$
Detector	Collector-emitter voltage	V_{CEO}	80	V
	Collector-base voltage	V_{CBO}	80	V
	Emitter-collector voltage	V_{ECO}	7	V
	Emitter-base voltage	V_{EBO}	7	V
	Collector current	I_C	50	mA
	Peak collector current (10ms pulse, 100pps)	I_{CP}	100	mA
	Power dissipation	P_C	150	mW
	Power dissipation derating ($T_a \geq 25^\circ\text{C}$)	$\Delta P_C / ^\circ\text{C}$	-1.5	mW / $^\circ\text{C}$
	Junction temperature	T_j	125	$^\circ\text{C}$
Storage temperature range		T_{stg}	-55~125	$^\circ\text{C}$
Operating temperature range		T_{opr}	-55~100	$^\circ\text{C}$
Lead soldering temperature (10s)		T_{sol}	260	$^\circ\text{C}$
Total package power dissipation		P_T	200	mW
Total package power dissipation derating ($T_a \geq 25^\circ\text{C}$)		$\Delta P_T / ^\circ\text{C}$	-2.0	mW / $^\circ\text{C}$
Isolation voltage (AC, 1min., RH $\leq$ 60%) (Note 1)		BV_S	3750	V _{rms}

(Note 1) Device considered a two terminal device: Pins 1 and 3 shorted together, and pins 4, 5 and 6 shorted together.

Recommended Operating Conditions

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	V_{CC}	—	5	48	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	1.15	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	$V_{(BR)CEO}$	$I_C = 0.5 \text{ mA}$	80	—	—	V
	Emitter–collector breakdown voltage	$V_{(BR)ECO}$	$I_E = 0.1 \text{ mA}$	7	—	—	V
	Collector–base breakdown voltage	$V_{(BR)CBO}$	$I_C = 0.1 \text{ mA}$	80	—	—	V
	Emitter–base breakdown voltage	$V_{(BR)EBO}$	$I_E = 0.1 \text{ mA}$	7	—	—	V
	collector dark current	I_{CEO}	$V_{CE} = 48 \text{ V}$	—	10	100	nA
			$V_{CE} = 48 \text{ V}, T_a = 85^\circ\text{C}$	—	2	50	μA
	Collector dark current	I_{CER}	$V_{CE} = 48 \text{ V}, T_a = 85^\circ\text{C}$ $R_{BE} = 1 \text{ M}\Omega$	—	0.5	10	μA
	Collector dark current	I_{CBO}	$V_{CB} = 10 \text{ V}$	—	0.1	—	nA
	DC forward current gain	h_{FE}	$V_{CE} = 5 \text{ V}, I_C = 0.5 \text{ mA}$	—	400	—	—
	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	—	—	
Base photo–current	I_{PB}	$I_F = 5 \text{ mA}, V_{CB} = 5 \text{ V}$	—	10	—	μA
Collector–emitter saturation voltage	$V_{CE (\text{sat})}$	$I_C = 2.4 \text{ mA}, I_F = 8 \text{ mA}$	—	—	0.4	V
		$I_C = 0.2 \text{ mA}, I_F = 1 \text{ mA}$ Rank GB	—	0.2	—	
			—	—	0.4	
Off–state collector current	$I_{C (\text{off})}$	$I_F = 0.7 \text{ mA}, V_{CE} = 48 \text{ V}$	—	1	10	μA

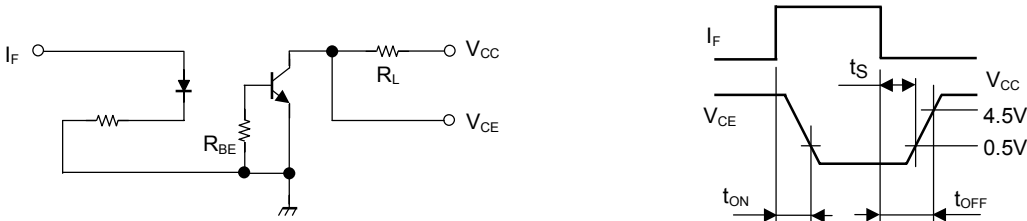
Isolation Characteristics (Ta = 25°C)

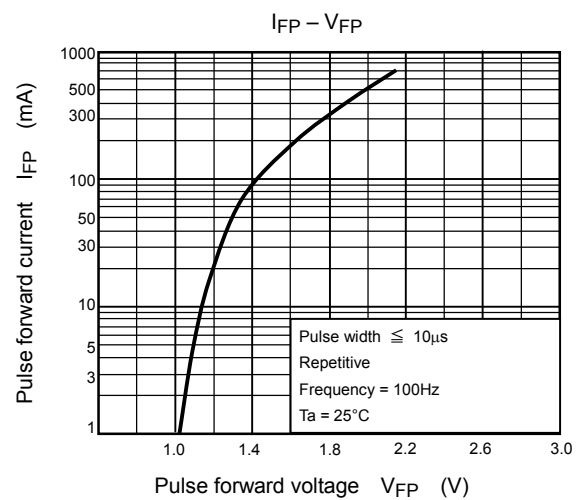
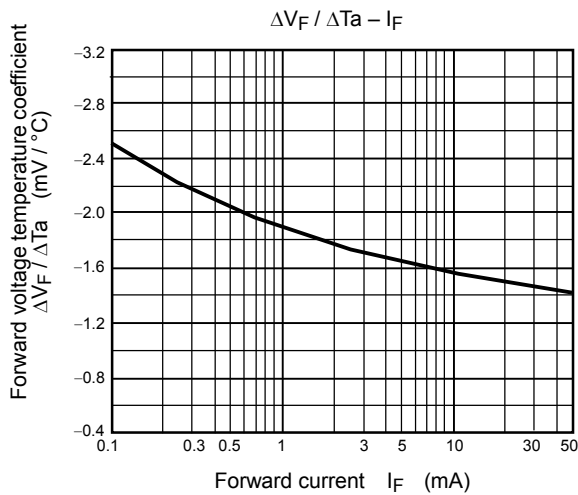
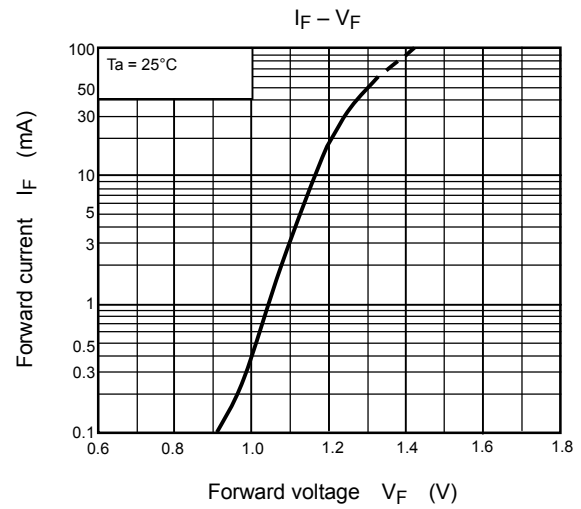
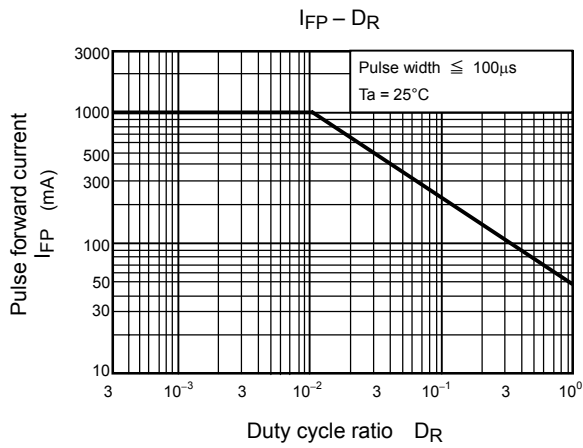
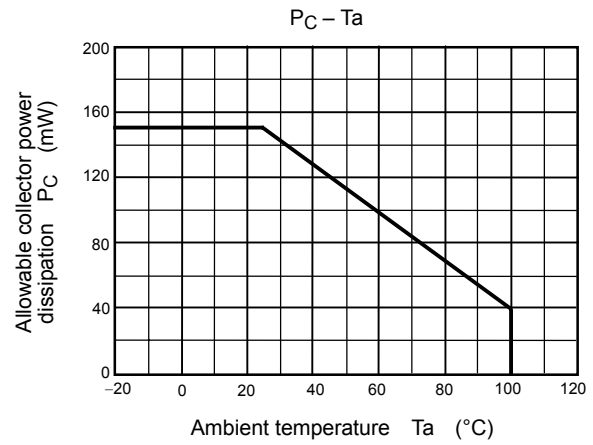
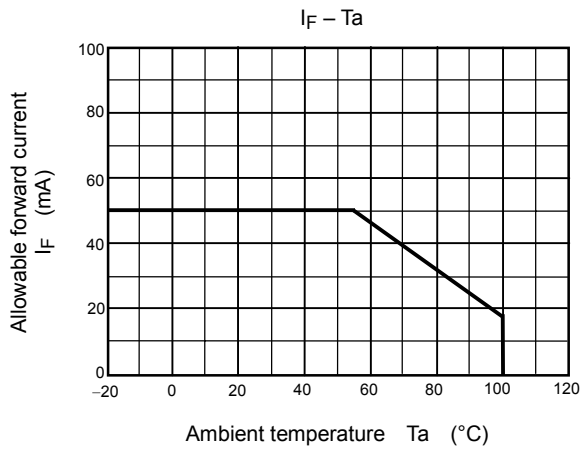
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Capacitance (input to output)	CS	VS = 0, f = 1 MHz	—	0.8	—	pF
Isolation resistance	RS	VS = 500 V	5×10 ¹⁰	10 ¹⁴	—	Ω
Isolation voltage	BVS	AC, 1 minute	3750	—	—	Vrms
		AC, 1 second, in oil	—	10000	—	
		DC, 1 minute, in oil	—	10000	—	Vdc

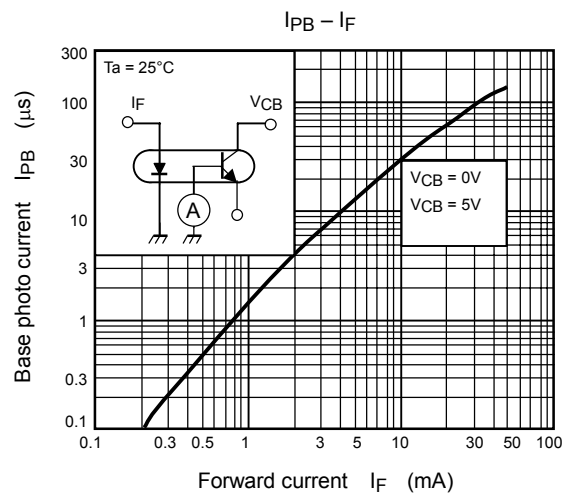
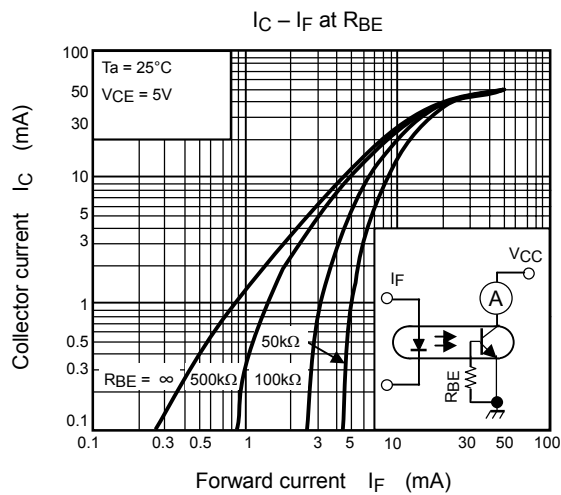
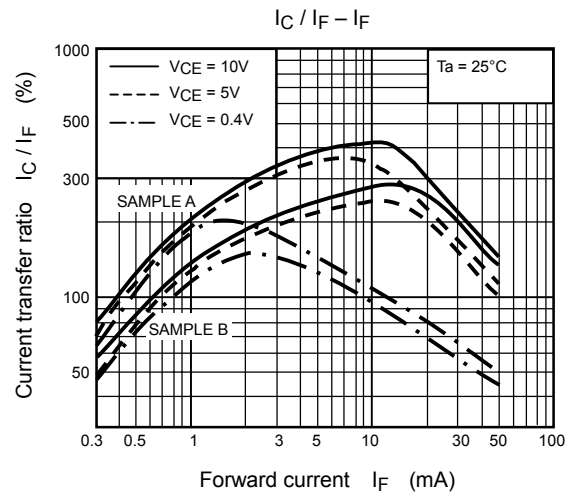
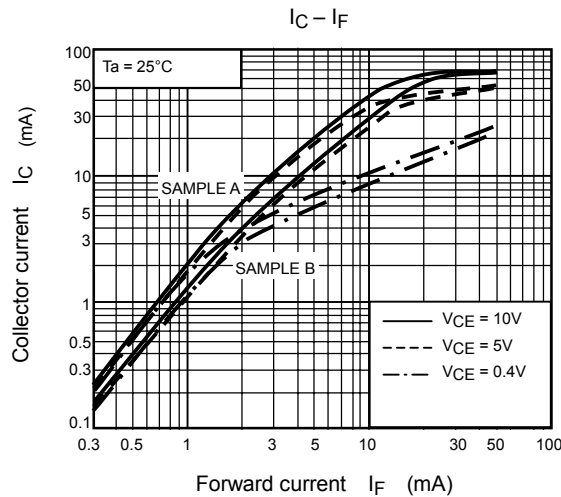
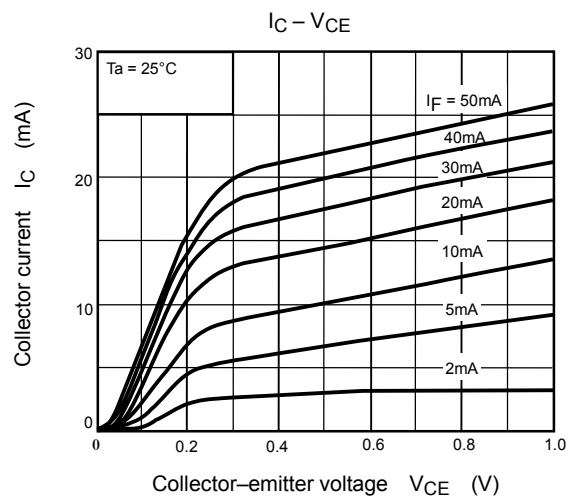
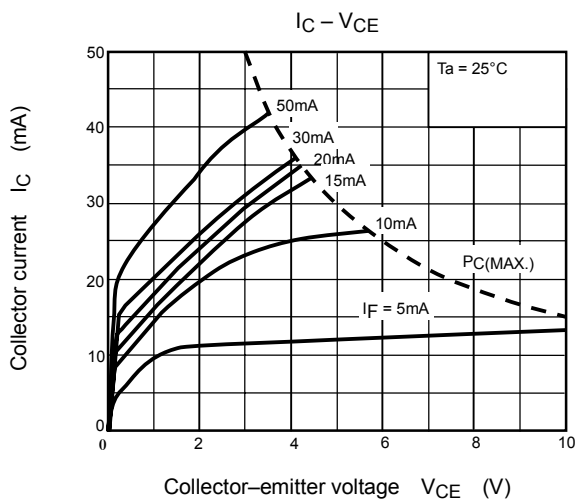
Switching Characteristics (Ta = 25°C)

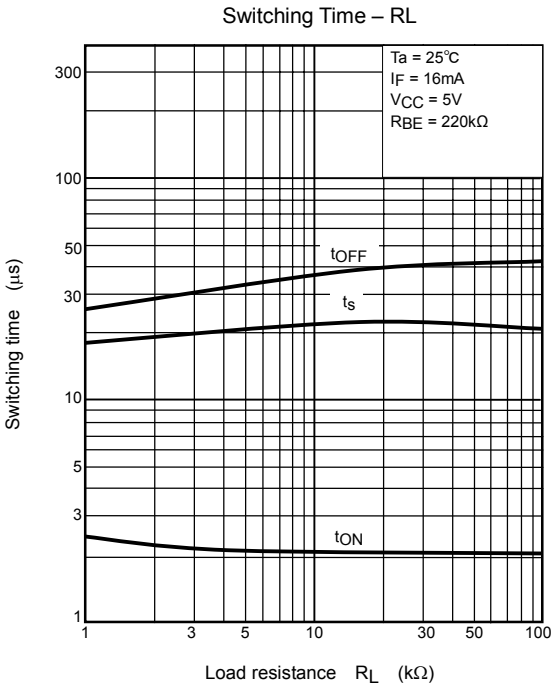
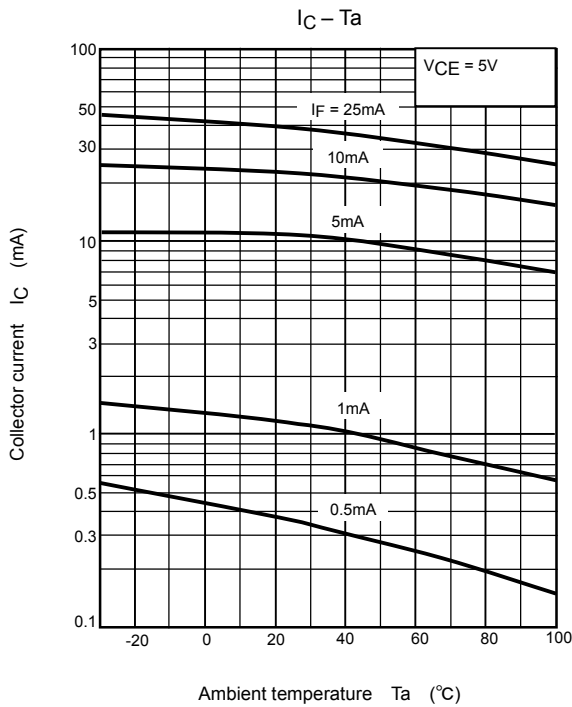
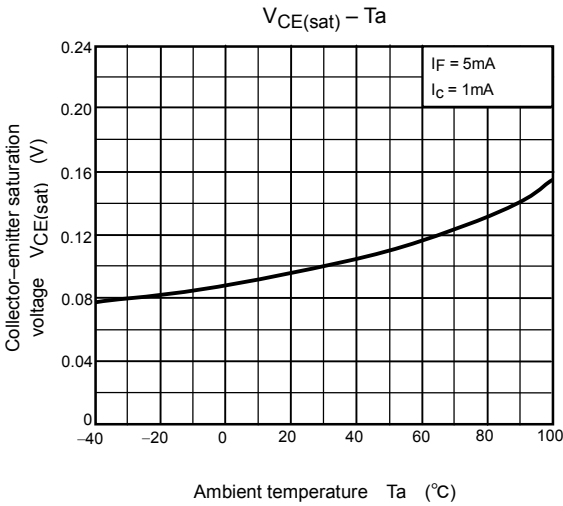
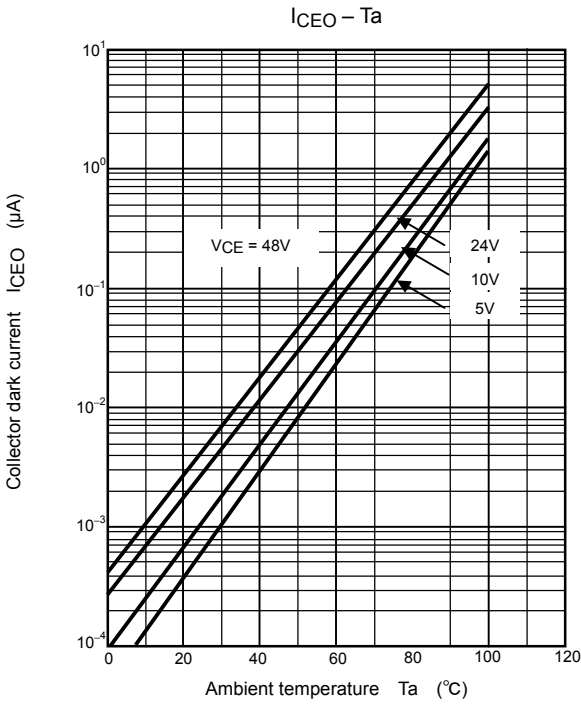
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Rise time	tr	VCC = 10 V, IC = 2 mA RL = 100Ω	—	2	—	μs
Fall time	tf		—	3	—	
Turn-on time	ton		—	3	—	
Turn-off time	toff		—	3	—	
Turn-on time	tON	RL = 1.9 kΩ%) (Fig.1) RBE = OPEN VCC = 5 V, IF = 16 mA	—	2	—	μs
Storage time	ts		—	25	—	
Turn-off time	tOFF		—	40	—	
Turn-on time	tON	RL = 1.9 kΩ%) (Fig.1) RBE = 220 kΩ VCC = 5 V, IF = 16 mA	—	2	—	μs
Storage time	ts		—	20	—	
Turn-off time	tOFF		—	30	—	

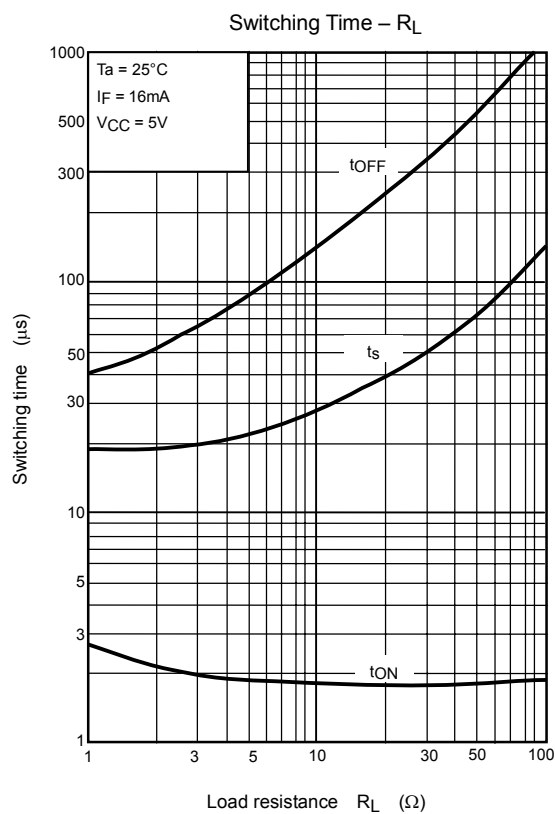
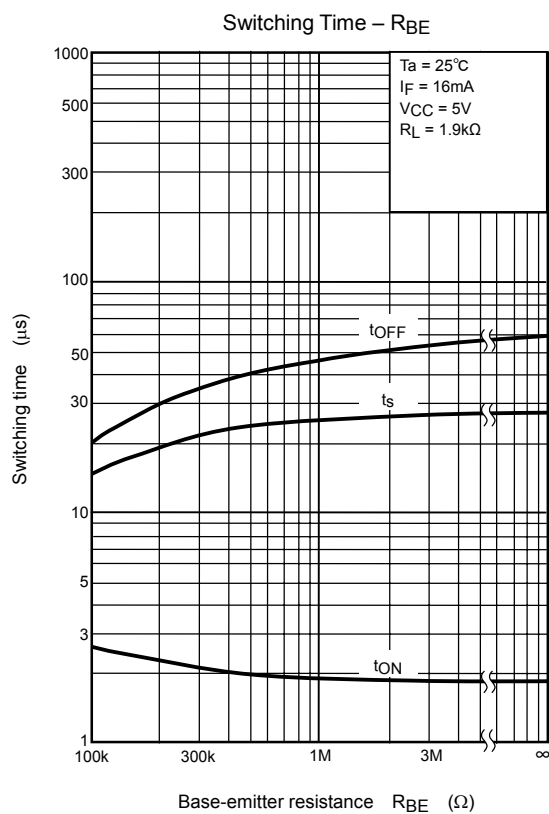
Fig. 1 Switching time test circuit











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