

TLP131

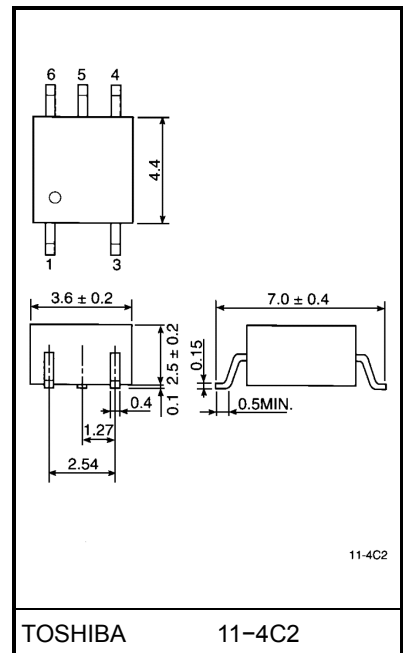
Office Machine
 Programmable Controllers
 AC / DC-Input Module
 Telecommunication

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

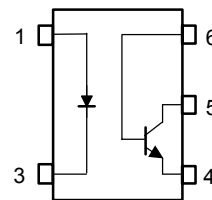
TLP131 base terminal is for the improvement of speed, reduction of dark current, and enable operation.

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
		$I_F = 5\text{mA}, V_{CE} = 5\text{V}, T_a = 25^\circ\text{C}$		
		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	—	
Off-state collector current	$I_{C (\text{off})}$	$I_F = 0.7 \text{ mA}, V_{CE} = 48 \text{ V}$	—	1	10	μA

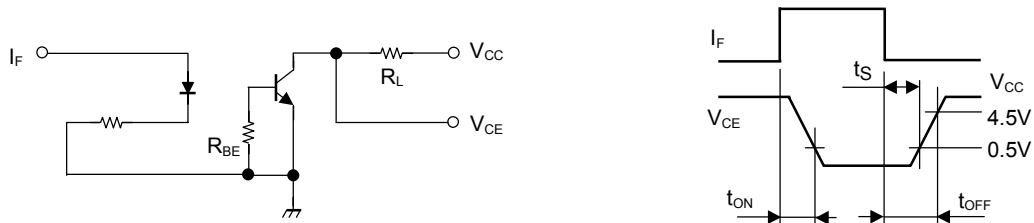
Isolation Characteristics (Ta = 25°C)

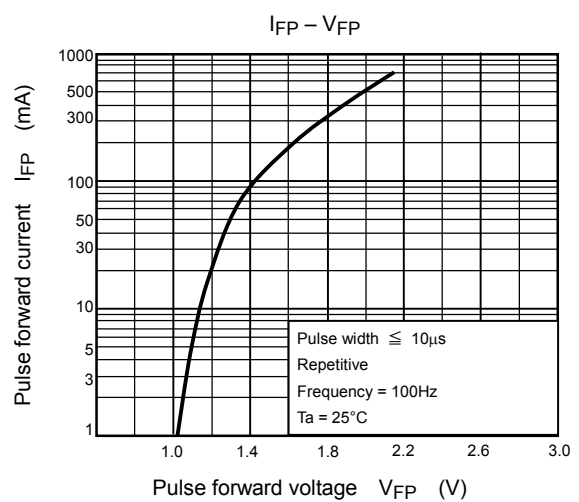
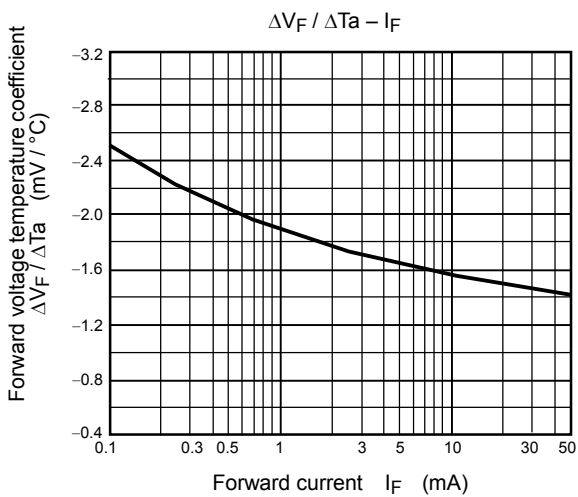
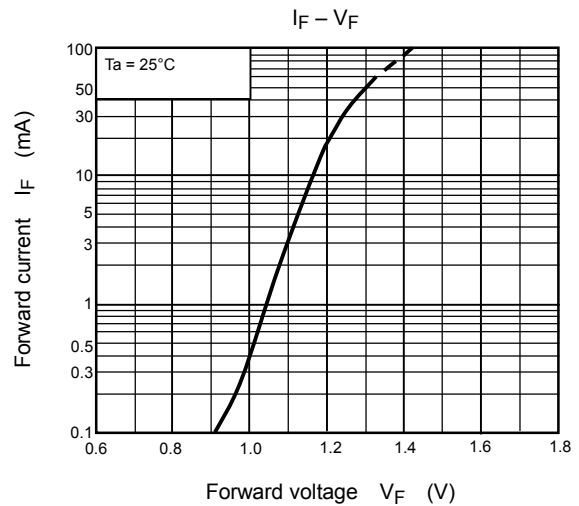
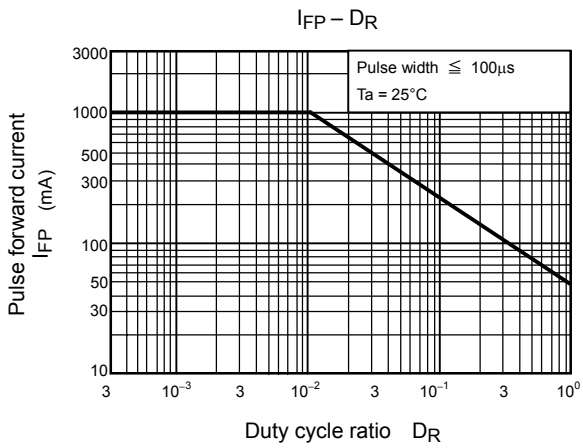
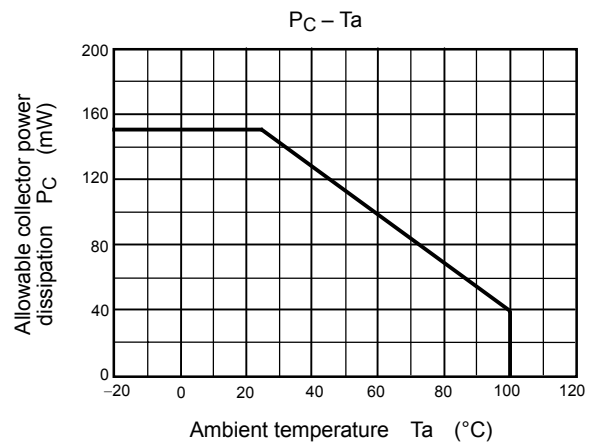
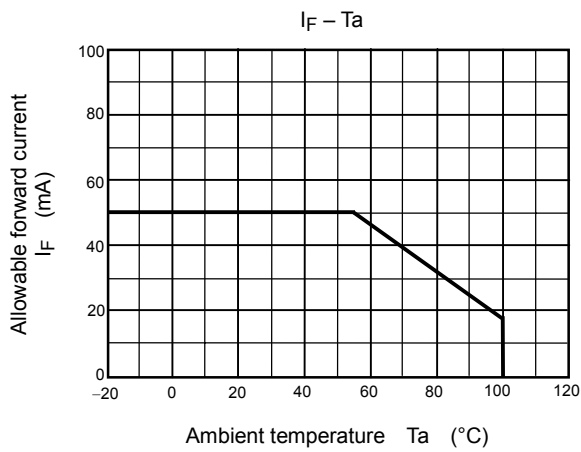
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Capacitance (input to output)	C_S	$V_S = 0, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	R_S	$V_S = 500 \text{ V}$	5×10^{10}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 1 minute	3750	—	—	Vrms
		AC, 1 second, in oil	—	10000	—	—
		DC, 1 minute, in oil	—	10000	—	Vdc

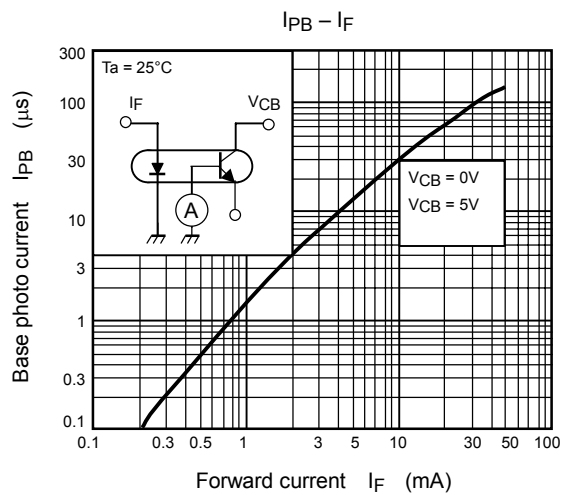
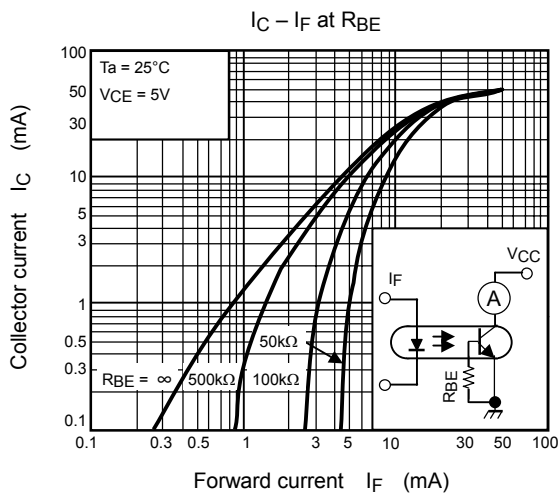
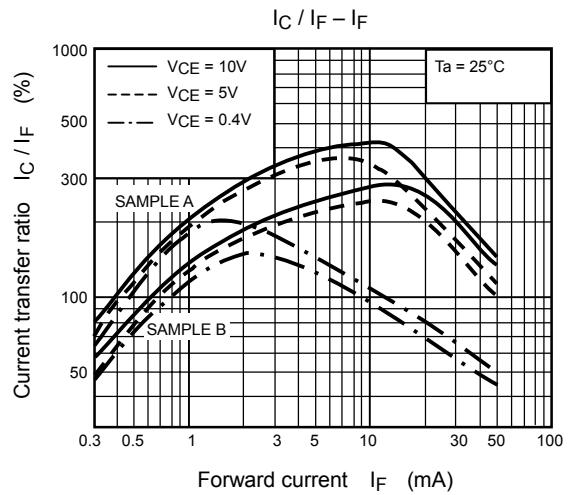
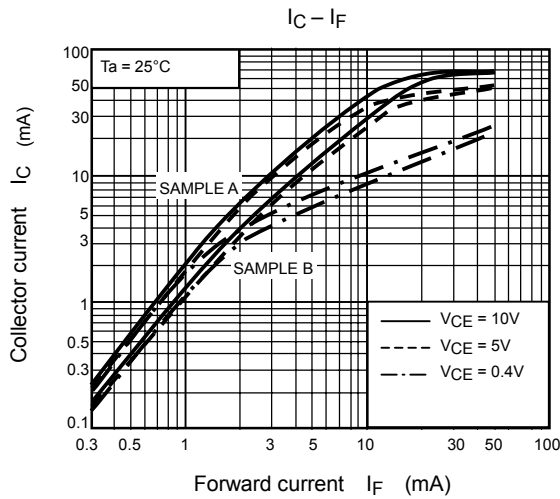
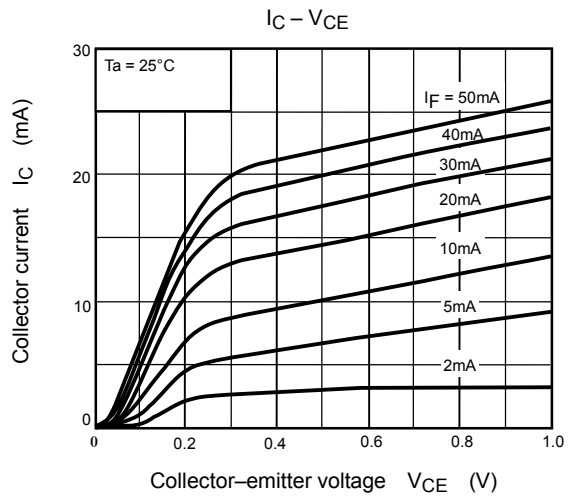
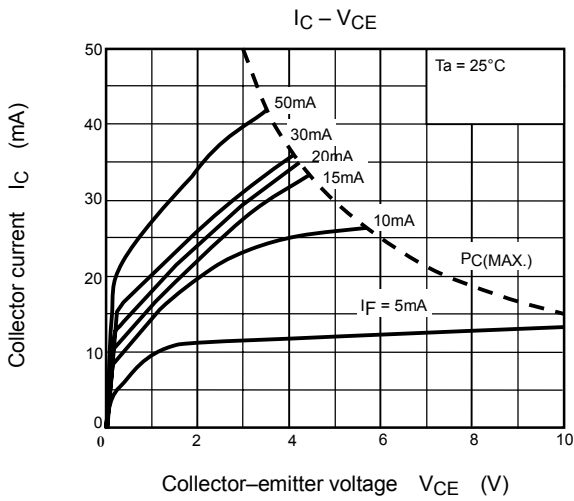
Switching Characteristics (Ta = 25°C)

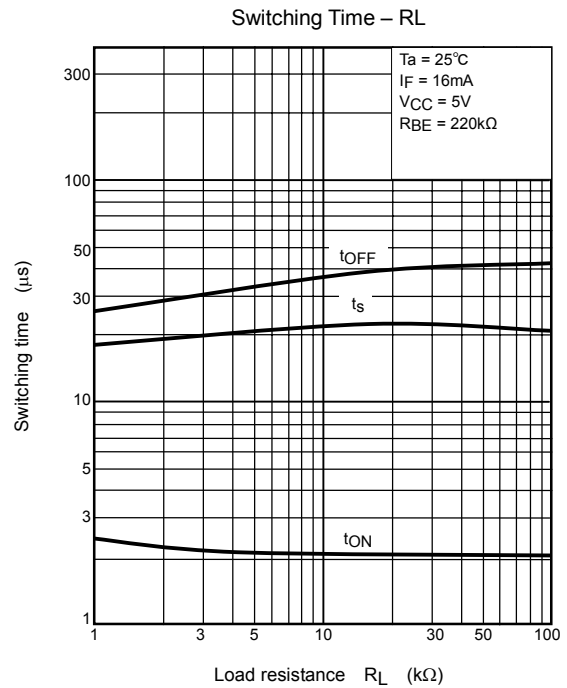
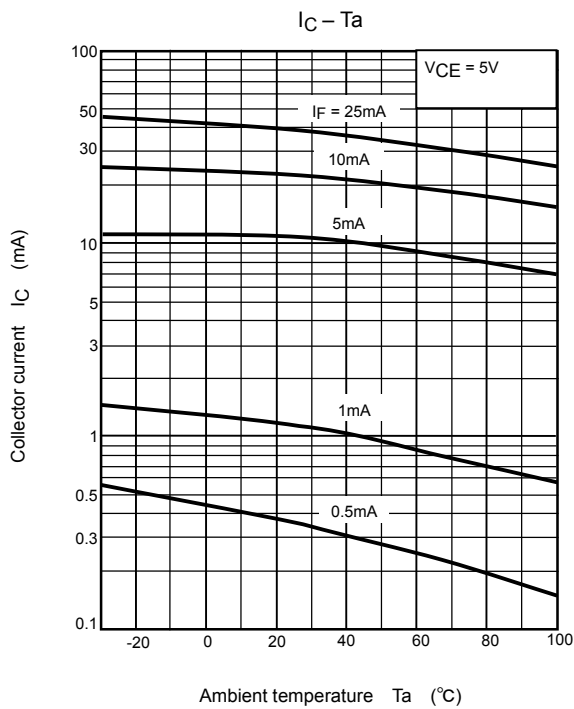
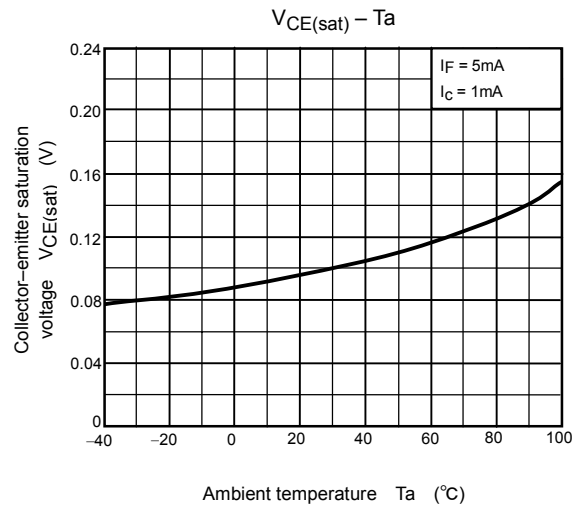
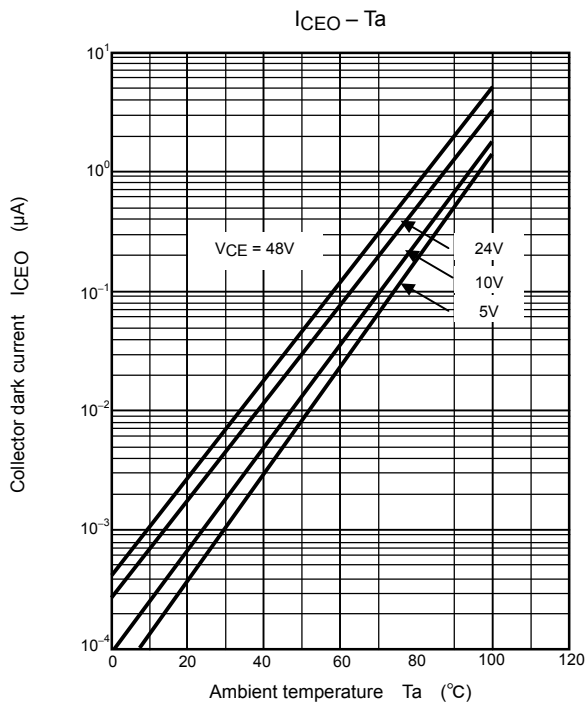
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Rise time	t_r	$V_{CC} = 10 \text{ V}, I_C = 2 \text{ mA}$ $R_L = 100 \Omega$	—	2	—	μs
Fall time	t_f		—	3	—	
Turn-on time	t_{on}		—	3	—	
Turn-off time	t_{off}		—	3	—	
Turn-on time	t_{ON}	$R_L = 1.9 \text{ k}\Omega$ (Fig. 1) $R_{BE} = \text{OPEN}$ $V_{CC} = 5 \text{ V}, I_F = 16 \text{ mA}$	—	2	—	μs
Storage time	t_s		—	25	—	
Turn-off time	t_{OFF}		—	40	—	
Turn-on time	t_{ON}	$R_L = 1.9 \text{ k}\Omega$ (Fig. 1) $R_{BE} = 220 \text{ k}\Omega$ $V_{CC} = 5 \text{ V}, I_F = 16 \text{ mA}$	—	2	—	μs
Storage time	t_s		—	20	—	
Turn-off time	t_{OFF}		—	30	—	

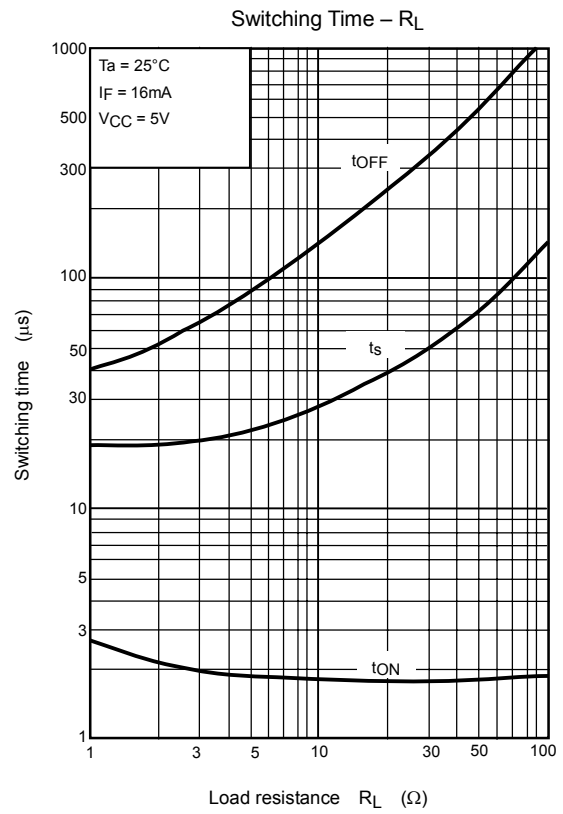
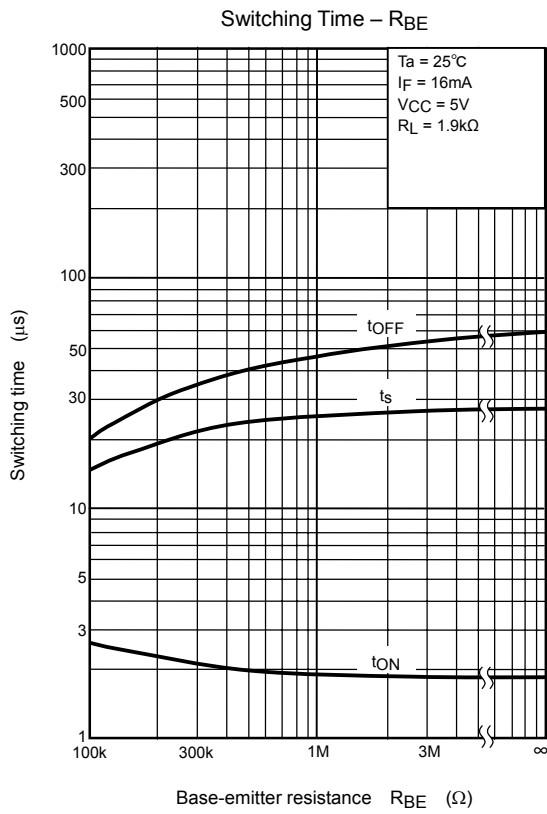
Fig. 1 Switching time test circuit











RESTRICTIONS ON PRODUCT USE

000707EBC

- 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..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- Gallium arsenide (GaAs) is a substance used in the products described in this document. GaAs dust and fumes are toxic. Do not break, cut or pulverize the product, or use chemicals to dissolve them. When disposing of the products, follow the appropriate regulations. Do not dispose of the products with other industrial waste or with domestic garbage.
- The products described in this document are subject to the foreign exchange and foreign trade laws.
- 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.
- The information contained herein is subject to change without notice.