

TOSHIBA Photocoupler GaAs Ired&Photo-Transistor

TLP733, TLP734

- Office Machine
- Household Use Equipment
- Solid State Relay
- Switching Power Supply

The TOSHIBA TLP733 and TLP734 consist of a photo-transistor optically coupled to a gallium arsenide infrared emitting diode in a six lead plastic DIP.

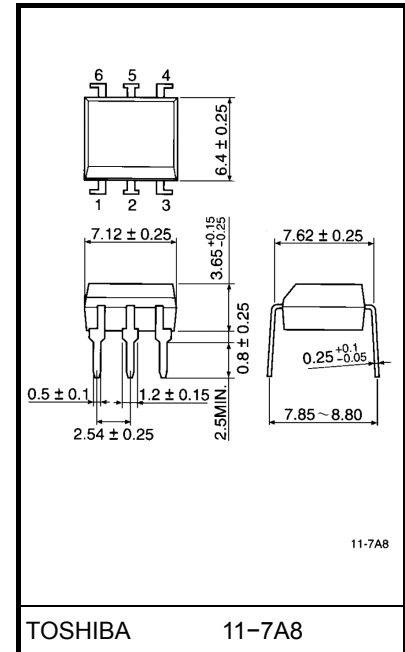
TLP734 is no-base internal connection for high-EMI environments.

- Collector-emitter voltage: 55 V (min.)
- Current transfer ratio: 50% (min.)
Rank GB: 100% (min.)
- UL recognized: UL1577, file no. E67349
- BSI approved: BS EN60065: 1994
Certificate no. 7364
BS EN60950: 1992
Certificate no. 7365
- SEMKO approved: SS4330784
Certificate no. 9325163, 9522142
- Isolation voltage: 4000 V_{rms} (min.)
- Option (D4) type
VDE approved: DIN VDE0884 / 06.92,
Certificate no. 74286, 91808
Maximum operating insulation voltage: 630, 890 V_{PK}
Highest permissible over voltage: 6000, 8000 V_{PK}

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

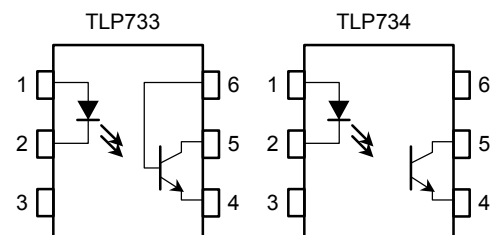
	7.62 mm pich standard type	10.16 mm pich TLP×××F type
Creepage distance	: 7.0 mm (min.)	8.0 mm (min.)
Clearance	: 7.0 mm (min.)	8.0 mm (min.)
Internal creepage path	: 4.0 mm (min.)	4.0 mm (min.)
Insulation thickness	: 0.5 mm (min.)	0.5 mm (min.)

Unit in mm



Weight: 0.42 g

Pin Configurations (top view)



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

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Current Transfer Ratio

Type	Classification *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.	
TLP733 TLP734	(None)	50	600	Blank, Y, Y [■] , G, G [■] , B, B [■] , GB
		50	150	Y, Y [■]
	Rank GR	100	300	G, G [■]
		200	600	B, B [■]
	Rank GB	100	600	G, G [■] , B, B [■] , GB

*1: Ex. rank GB: TLP733 (GB)

Note: Application type name for certification test, please use standard product type name, i.e. TLP733 (GB): TLP733

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

Characteristic		Symbol	Rating	Unit
LED	Forward current	I_F	60	mA
	Forward current derating ($T_a \geq 39^\circ\text{C}$)	$\Delta I_F / ^\circ\text{C}$	-0.7	mA / $^\circ\text{C}$
	Peak forward current (100 μs pulse, 100 pps)	I_{FP}	1	A
	Reverse voltage	V_R	5	V
	Junction temperature	T_j	125	$^\circ\text{C}$
Detector	Collector-emitter voltage	V_{CEO}	55	V
	Collector-base voltage (TLP733)	V_{CBO}	80	V
	Emitter-collector voltage	V_{ECO}	7	V
	Emitter-base voltage (TLP733)	V_{EBO}	7	V
	Collector current	I_C	50	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}	-40~100	$^\circ\text{C}$
Lead soldering temperature (10 s)		T_{sol}	260	$^\circ\text{C}$
Total package power dissipation		P_T	250	mW
Total package power dissipation derating ($T_a \geq 25^\circ\text{C}$)		$\Delta P_T / ^\circ\text{C}$	-2.5	mW / $^\circ\text{C}$
Isolation voltage (AC, 1 min., R.H. \leq 60%)		BV_S	4000	V_{rms}

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	1.15	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	$V_{(BR)CEO}$	$I_C = 0.5 \text{ mA}$	55	—	—	V
	Emitter-collector breakdown voltage	$V_{(BR)ECO}$	$I_E = 0.1 \text{ mA}$	7	—	—	V
	Collector-base breakdown voltage (TLP733)	$V_{(BR)CBO}$	$I_C = 0.1 \text{ mA}$	80	—	—	V
	Emitter-base breakdown voltage (TLP733)	$V_{(BR)EBO}$	$I_E = 0.1 \text{ mA}$	7	—	—	V
	Collector dark current	I_{CEO}	$V_{CE} = 24 \text{ V}$ (ambient light below 1000 lx)	—	0.01 (2)	0.1 (10)	μA
			$V_{CE} = 24 \text{ V}$ $T_a = 85^\circ\text{C}$ (ambient light below 1000 lx)	—	2 (4)	50 (50)	μA
	Collector dark current (TLP733)	I_{CER}	$V_{CE} = 24 \text{ V}, T_a = 85^\circ\text{C}$ $R_{BE} = 1\text{M}\Omega$	—	0.5	10	μA
	Collector dark current (TLP733)	I_{CBO}	$V_{CB} = 10 \text{ V}$	—	0.1	—	nA
	DC forward current gain (TLP733)	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	—	%
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	

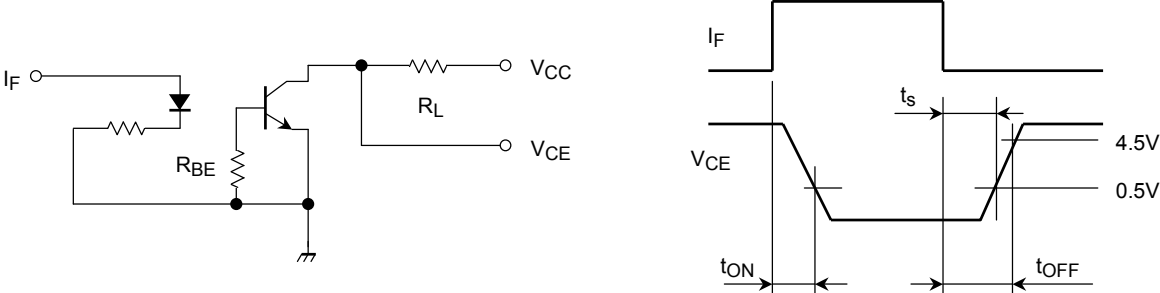
Isolation Characteristics (Ta = 25°C)

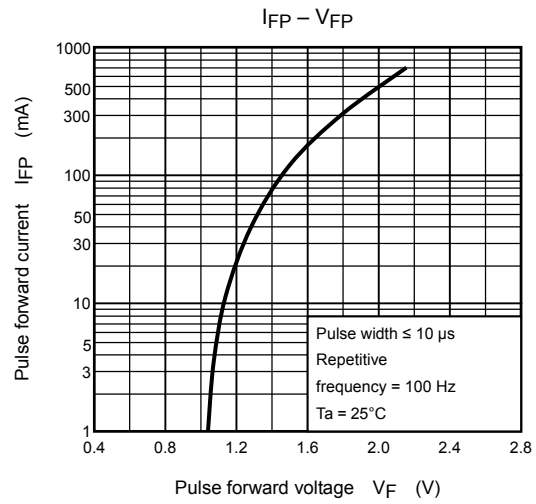
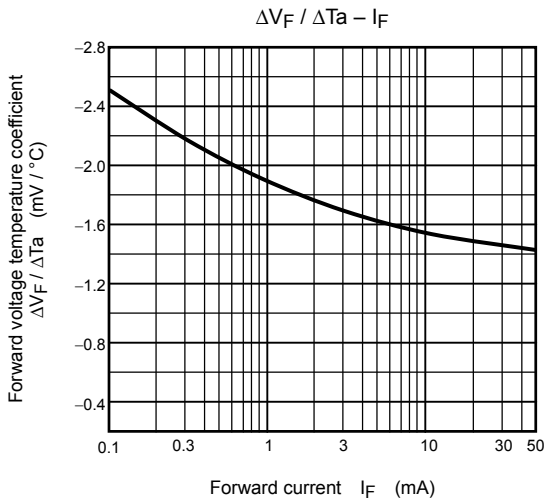
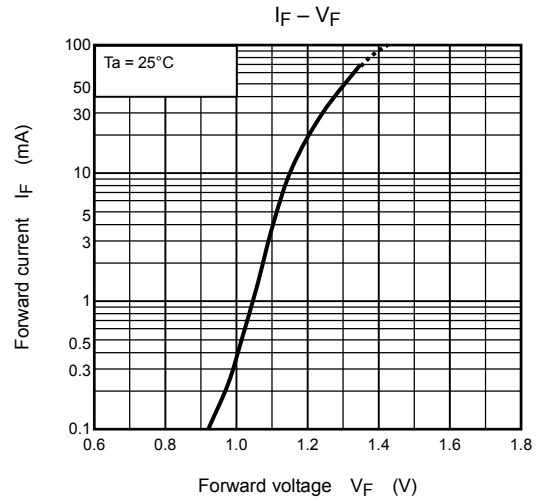
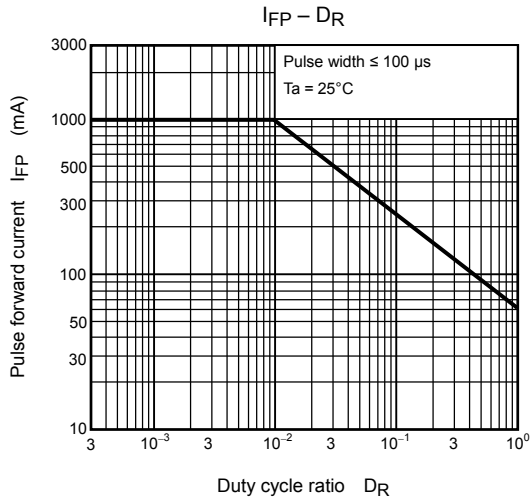
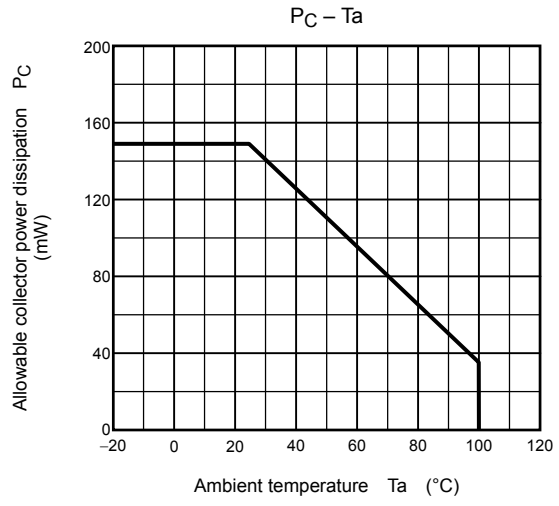
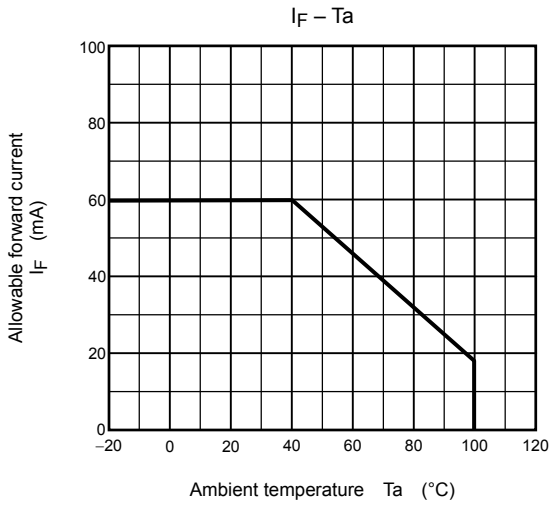
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Capacitance (input to output)	C_S	$V_S = 0, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	R_S	$V_S = 500 \text{ V}, R.H. \leq 60\%$	1×10^{12}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 1 minute	4000	—	—	Vrms
		AC, 1 second, in oil	—	10000	—	
		DC, 1 minute, in oil	—	10000	—	Vdc

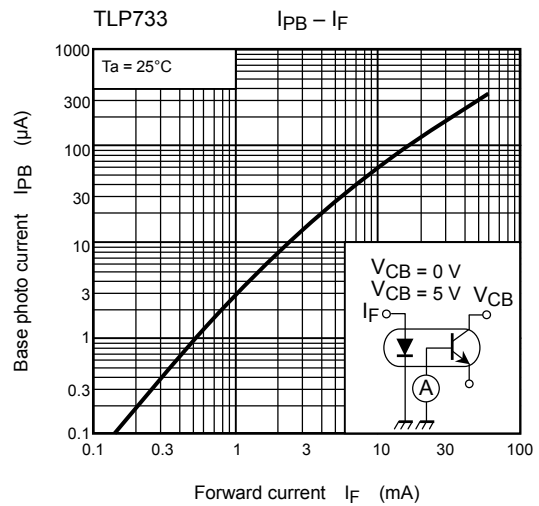
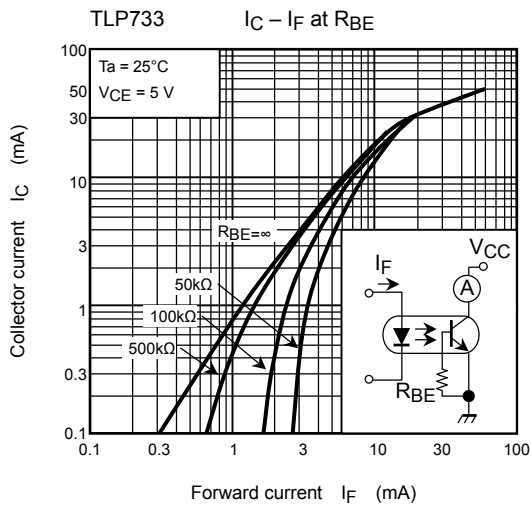
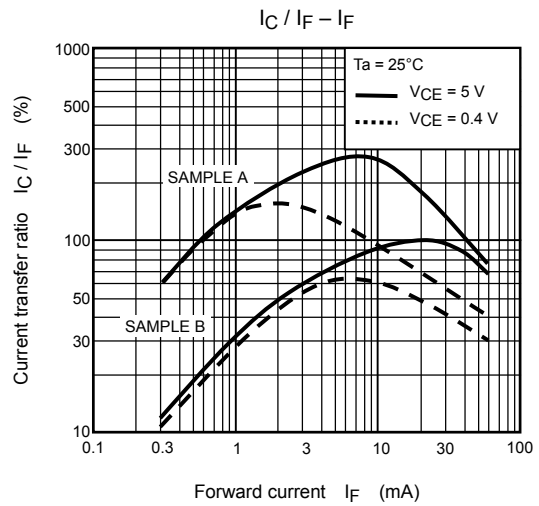
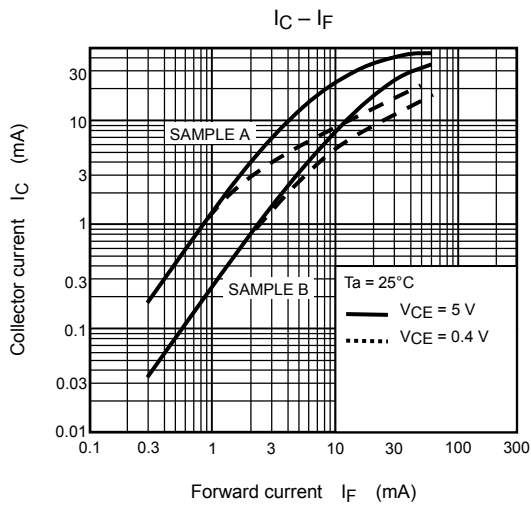
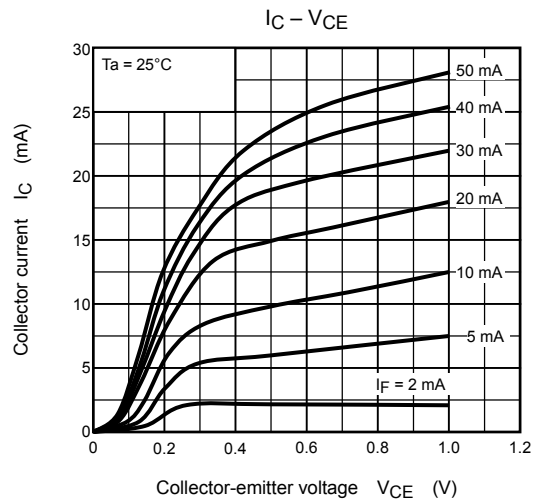
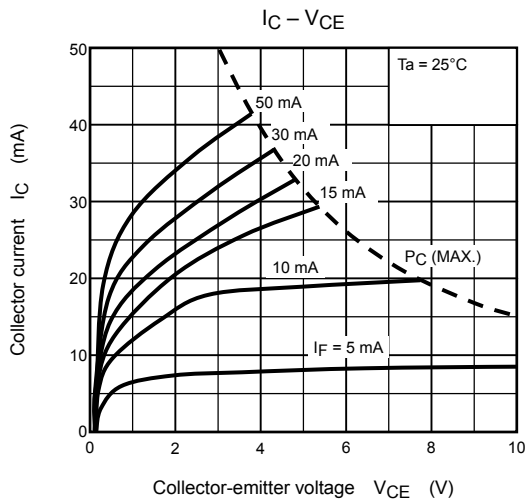
Switching Characteristics (Ta = 25°C)

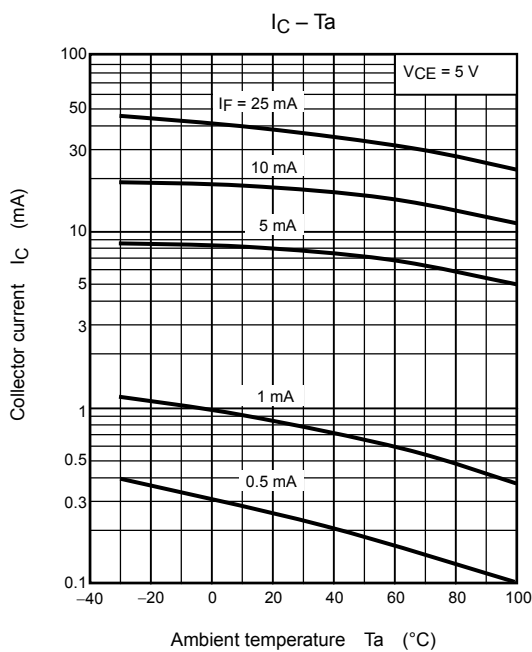
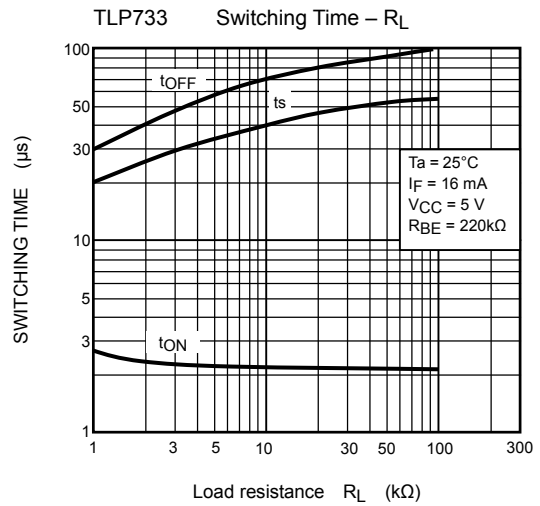
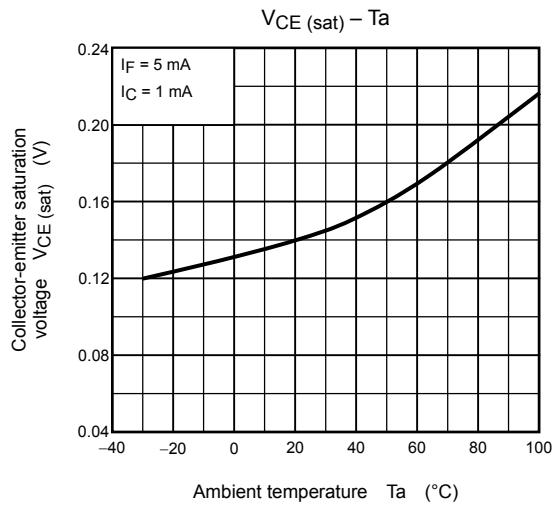
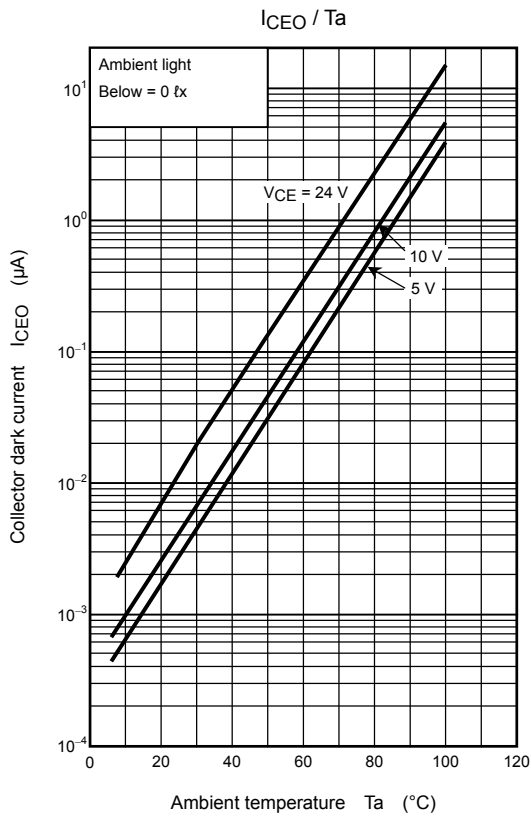
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Rise time	t_r	$V_{CC} = 10 \text{ V}, I_C = 2 \text{ mA}$ $R_L = 100 \Omega$	—	2	—	μs
Fall time	t_f		—	3	—	
Turn-on time	t_{ON}		—	3	10	
Turn-off time	t_{OFF}		—	3	10	
Turn-on time	t_{ON}	$R_L = 1.9 \text{ k}\Omega$ $R_{BE} = \text{open}$ $V_{CC} = 5 \text{ V}, I_F = 16 \text{ mA}$ (Fig.1)	—	3	—	μs
Storage time	t_s		—	40	—	
Turn-off time	t_{OFF}		—	90	—	
Turn-on time	t_{ON}	$R_L = 1.9 \text{ k}\Omega$ $R_{BE} = 220 \text{ k}\Omega$ (TLP733) $V_{CC} = 5 \text{ V}, I_F = 16 \text{ mA}$ (Fig.1)	—	3	—	μs
Storage time	t_s		—	30	—	
Turn-off time	t_{OFF}		—	60	—	

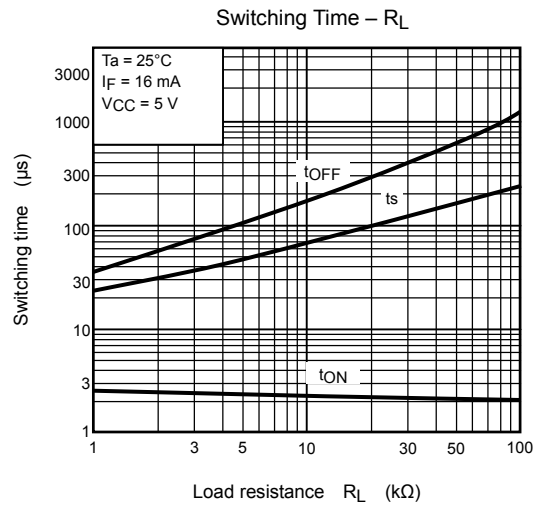
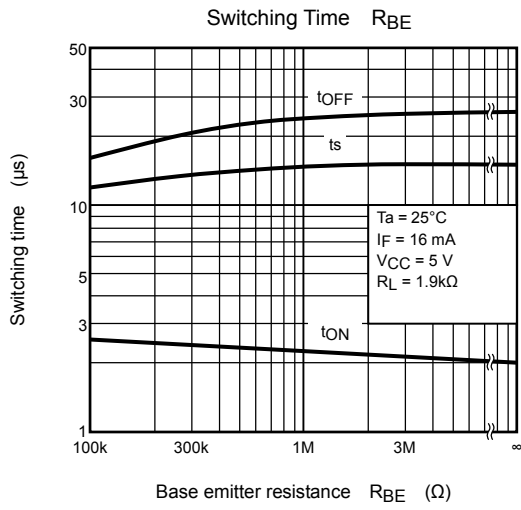
Fig. 1 Switching time test circuit











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