

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.

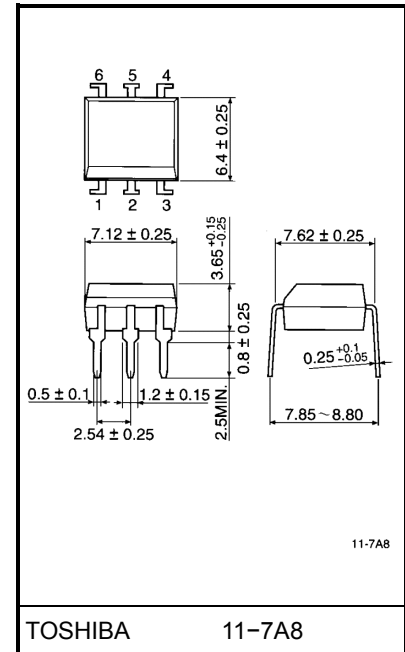
TLP734 is no-base internal connection for high-EMI environments.

- 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<sub>rms</sub> (min.)
- Option (D4) type  
VDE approved: DIN VDE0884 / 06.92,  
Certificate no. 74286, 91808  
Maximum operating insulation voltage: 630, 890 VPK  
Highest permissible over voltage: 6000, 8000 VPK

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

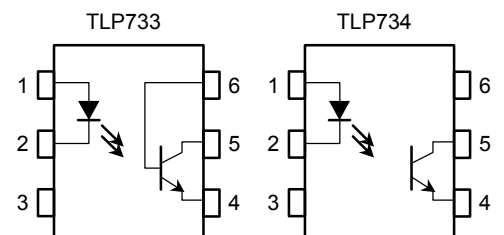
	7.62 mm pich standard type	10.16 mm pich TLPxxxF type
Creepage distance	: 7.0 mm (min.)	8.0 mm (min.)
Clearance	: 7.0 mm (min.)	8.0 mm (min.)
Internal creepage path	: 4.0 mm (min.)	4.0 mm (min.)
Insulation thickness	: 0.5 mm (min.)	0.5 mm (min.)

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 <sup>■</sup> , G, G <sup>■</sup> , B, B <sup>■</sup> , GB
		50	150	Y, Y <sup>■</sup>
	Rank GR	100	300	G, G <sup>■</sup>
		200	600	B, B <sup>■</sup>
	Rank GB	100	600	G, G <sup>■</sup> , B, B <sup>■</sup> , 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 (Ta = 25°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 / °C
	Peak forward current (100 $\mu\text{s}$ pulse, 100 pps)	$I_{FP}$	1	A
	Reverse voltage	$V_R$	5	V
	Junction temperature	$T_j$	125	°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 / °C
	Junction temperature	$T_j$	125	°C
Storage temperature range		$T_{stg}$	-55~125	°C
Operating temperature range		$T_{opr}$	-40~100	°C
Lead soldering temperature (10 s)		$T_{sol}$	260	°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 / °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	$\mu\text{A}$
	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-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)	$\mu\text{A}$
			$V_{CE} = 24 \text{ V}$ $T_a = 85^\circ\text{C}$ (ambient light below 1000 lx)	—	2 (4)	50 (50)	$\mu\text{A}$
	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	$\mu\text{A}$
	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	$V_{CE} (\text{sat})$	$I_C = 2.4 \text{ mA}, I_F = 8 \text{ mA}$	—	—	0.4	V
		$I_C = 0.2 \text{ mA}, I_F = 1 \text{ mA}$ Rank GB	—	0.2	—	
			—	—	0.4	

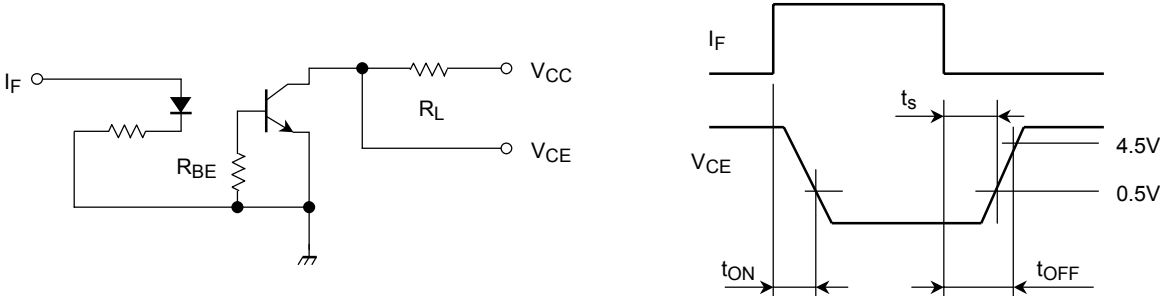
## Isolation Characteristics (Ta = 25°C)

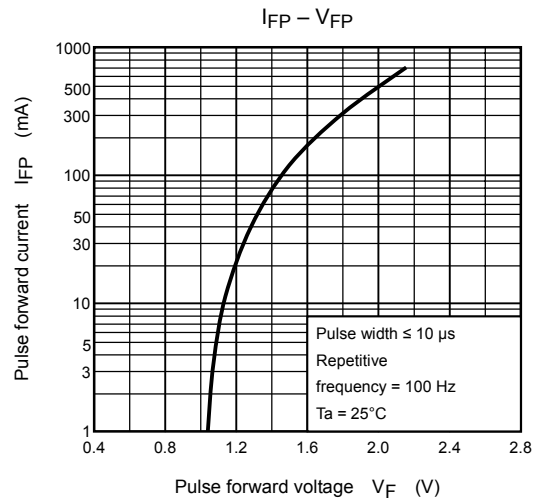
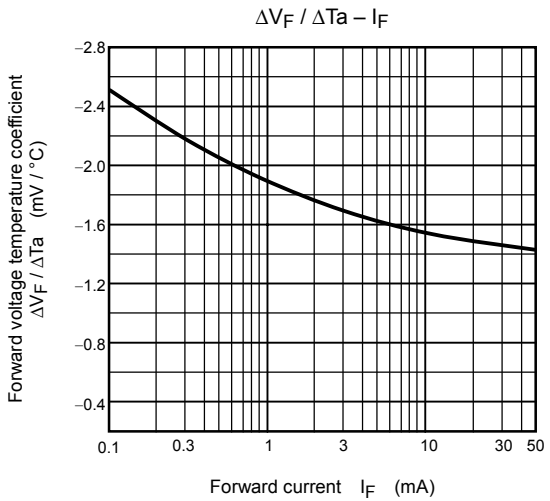
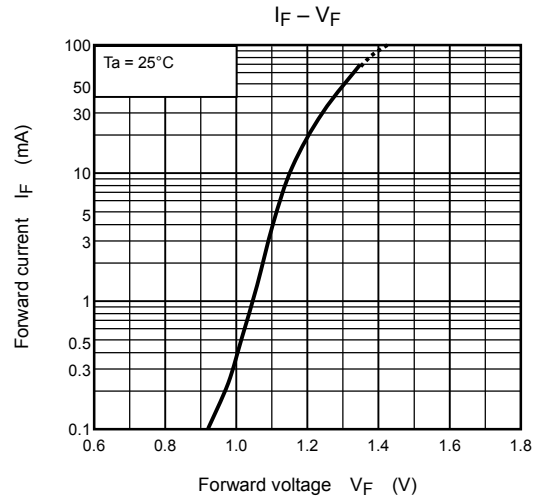
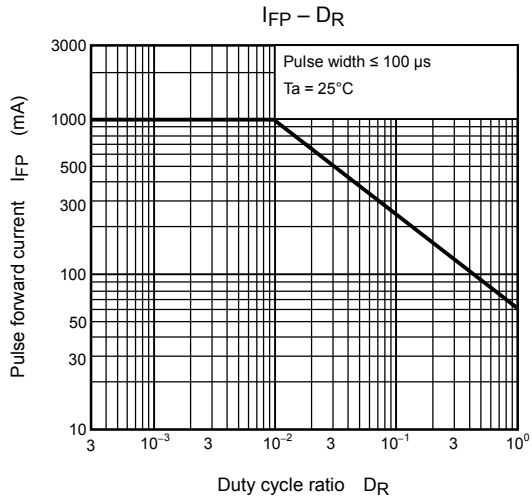
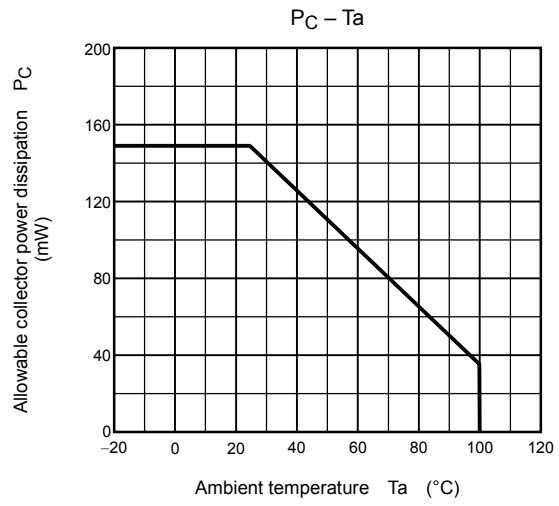
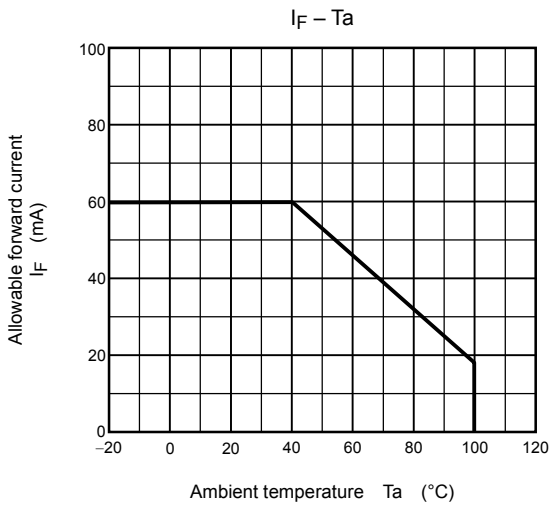
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Capacitance (input to output)	$C_S$	$V_S = 0, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation resistance	$R_S$	$V_S = 500 \text{ V}, R.H. \leq 60\%$	$1 \times 10^{12}$	$10^{14}$	—	$\Omega$
Isolation voltage	$BV_S$	AC, 1 minute	4000	—	—	Vrms
		AC, 1 second,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

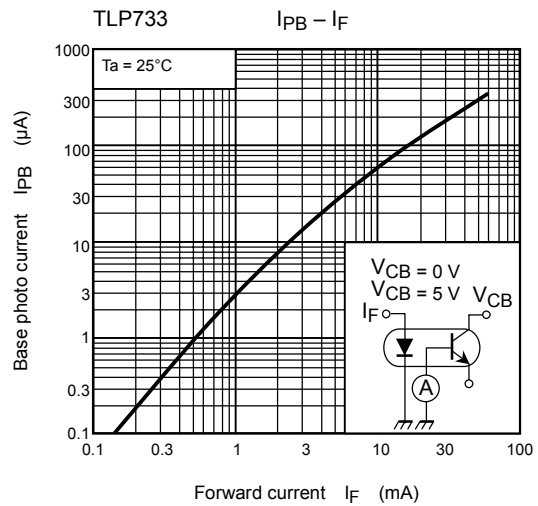
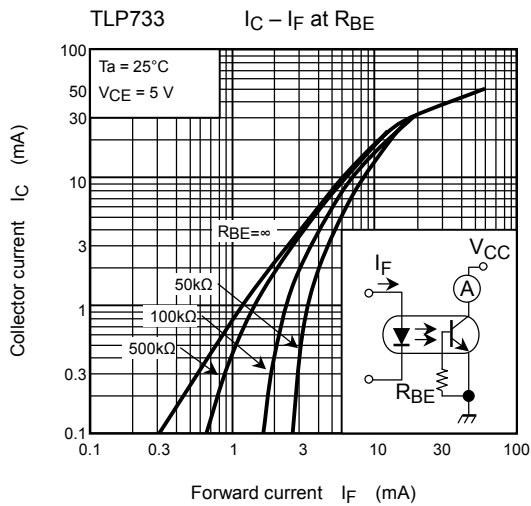
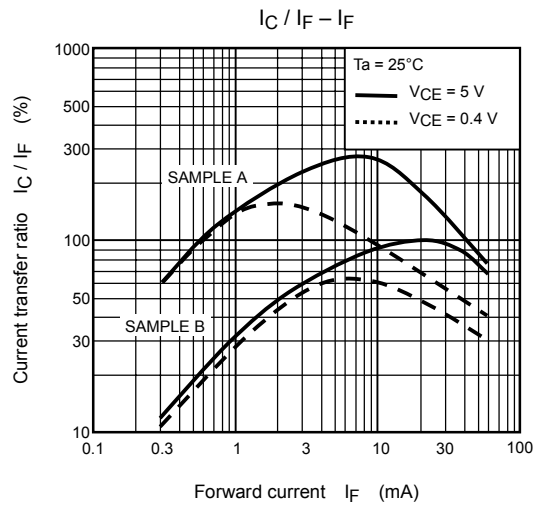
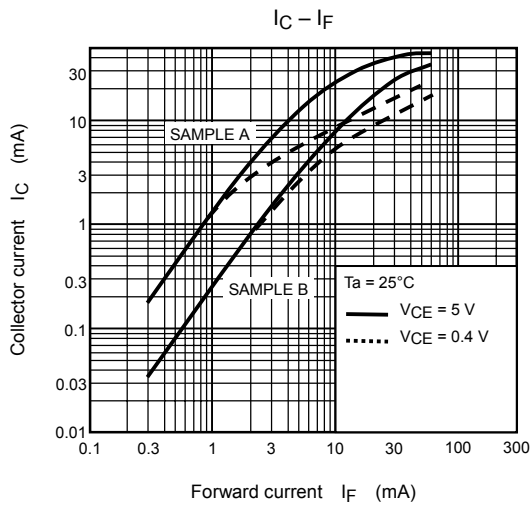
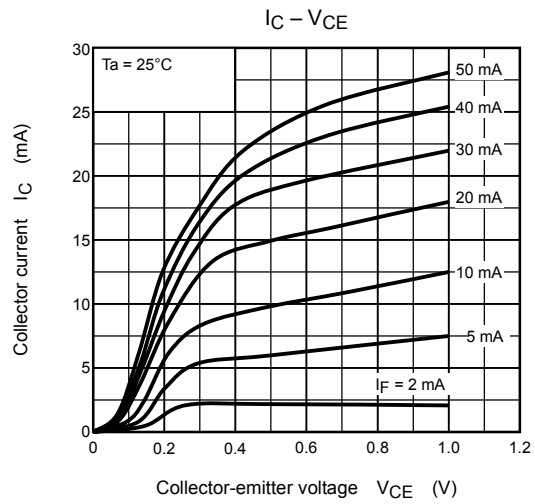
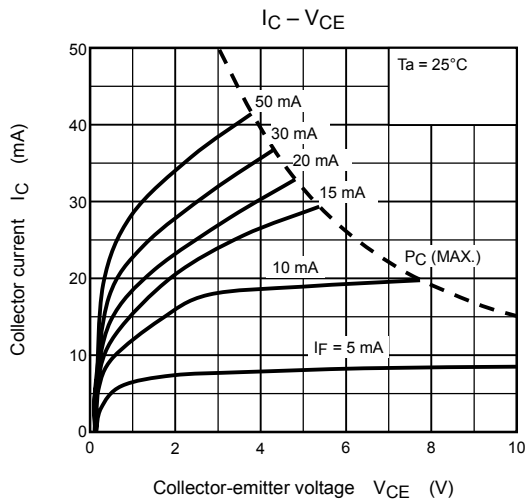
## Switching Characteristics (Ta = 25°C)

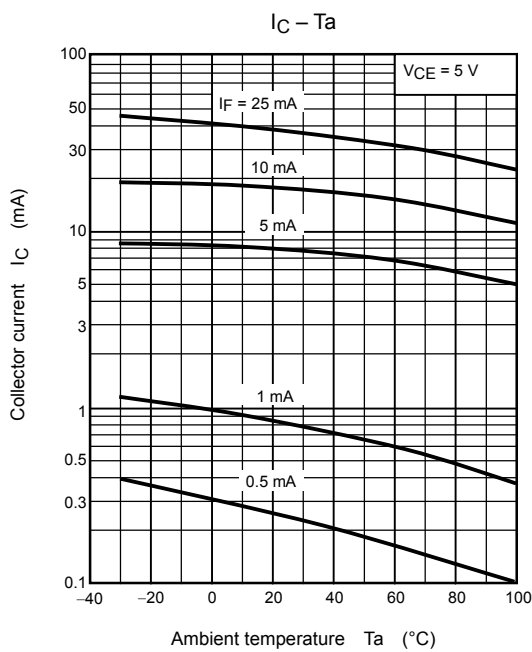
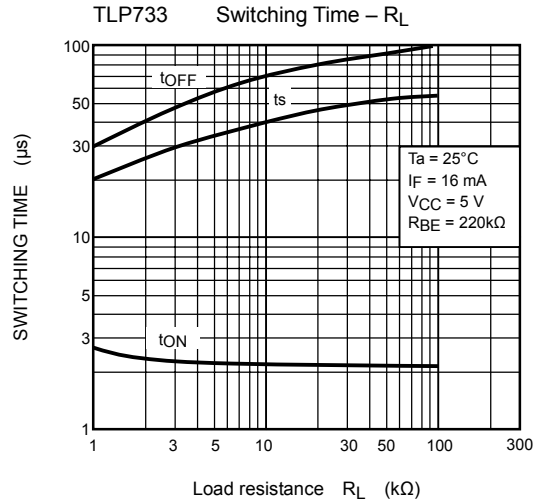
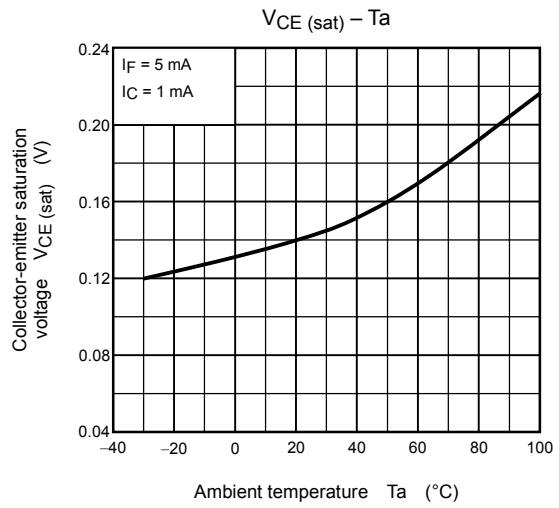
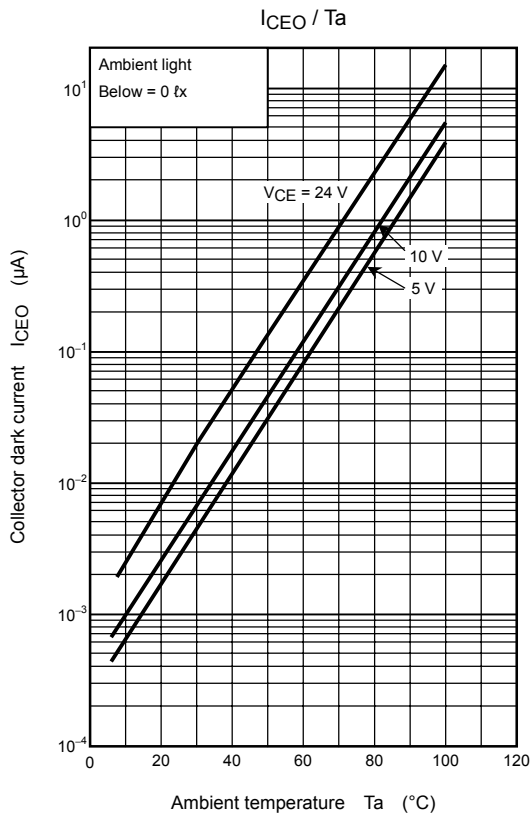
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Rise time	$t_r$	$V_{CC} = 10 \text{ V}, I_C = 2 \text{ mA}$ $R_L = 100 \Omega$	—	2	—	$\mu\text{s}$
Fall time	$t_f$		—	3	—	
Turn-on time	$t_{ON}$		—	3	10	
Turn-off time	$t_{OFF}$		—	3	10	
Turn-on time	$t_{ON}$	$R_L = 1.9 \text{ k}\Omega$ $R_{BE}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

Fig. 1 Switching time test circuit

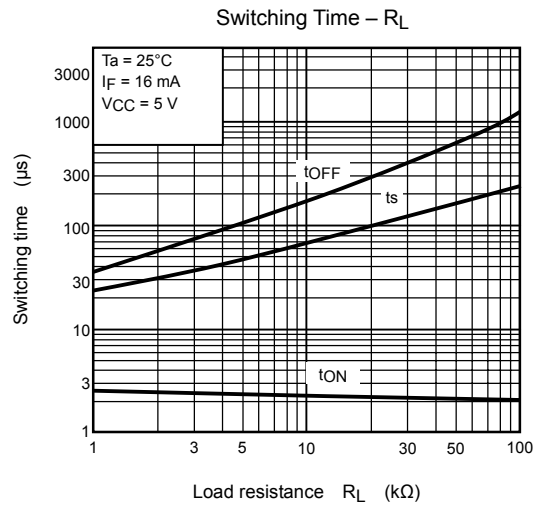
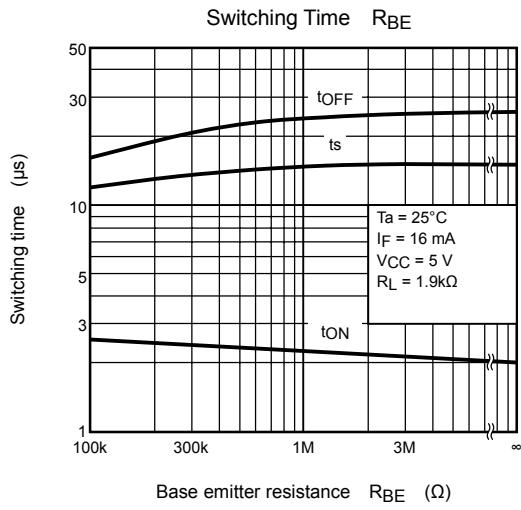












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