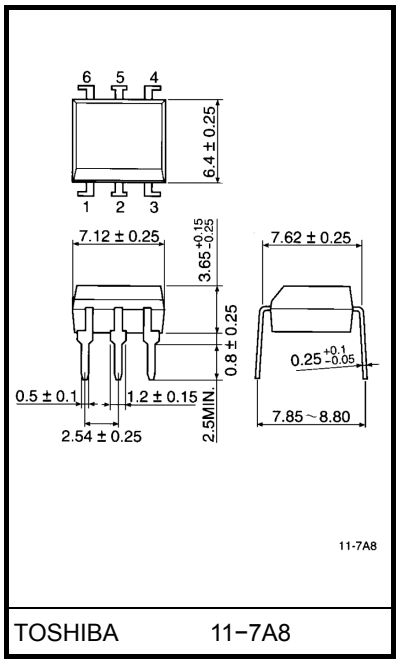
TOSHIBA Photocoupler GaAs Ired&Photo−Transistor

TLP733, TLP734

Office Machine
Household Use Equipment
Solid State Relay
Switching Power Supply

Unit in mm



TOSHIBA 11−7A8

Weight: 0.42 g

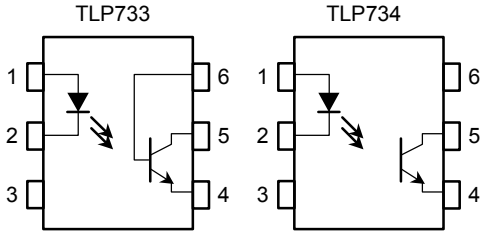
The TOSHIBA TLP733 and TLP734 consist of a photo−transistor optically coupled to a gallium arsenide infrared emitting diode in a six lead plastic DIP.
TLP734 is no−base internal connection for high−EMI environments.

- 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.)

Pin Configurations (top view)



TLP733	TLP734
1: Anode	1: Anode
2: Cathode	2: Cathode
3: Nc	3: Nc
4: Emitter	4: Emitter
5: Collector	5: Collector
6: Base	6: Nc

Current Transfer Ratio

Type	Classification *1	Current Transfer Ratio (%) (I_C / I_F) I_F = 5mA, V_{CE} = 5V, Ta = 25°C		Marking Of Classification
		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 (Ta = 25°C)

Characteristic		Symbol	Rating	Unit
LED	Forward current	I_F	60	mA
	Forward current derating (Ta ≥ 39°C)	ΔI_F / °C	−0.7	mA / °C
	Peak forward current (100 μs 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 (Ta ≥ 25°C)	ΔP_C / °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 (Ta ≥ 25°C)		ΔP_T / °C	−2.5	mW / °C
Isolation voltage (AC, 1 min., R.H.≤ 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 mA	1.0	1.15	1.3	V
	Reverse current	I_R	V_R = 5 V	—	—	10	μA
	Capacitance	C_T	V = 0, f = 1 MHz	—	30	—	pF
Detector	Collector−emitter breakdown voltage	$V_{(BR)CEO}$	I_C = 0.5 mA	55	—	—	V
	Emitter−collector breakdown voltage	$V_{(BR)ECO}$	I_E = 0.1 mA	7	—	—	V
	Collector−base breakdown voltage (TLP733)	$V_{(BR)CBO}$	I_C = 0.1 mA	80	—	—	V
	Emitter−base breakdown voltage (TLP733)	$V_{(BR)EBO}$	I_E = 0.1 mA	7	—	—	V
	Collector dark current	I_{CEO}	V_{CE} = 24 V (ambient light below 1000 ℓx)	—	0.01 (2)	0.1 (10)	μA
			V_{CE} = 24 V, Ta = 85°C (ambient light below 1000 ℓx)	—	2 (4)	50 (50)	μA
	Collector dark current (TLP733)	I_{CER}	V_{CE} = 24 V, Ta = 85°C, R_{BE} = 1MΩ	—	0.5	10	μA
	Collector dark current (TLP733)	I_{CBO}	V_{CB} = 10 V	—	0.1	—	nA
	DC forward current gain (TLP733)	h_{FE}	V_{CE} = 5 V, I_C = 0.5 mA	—	400	—	—
	Capacitance collector to emitter	C_{CE}	V = 0, f = 1 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 mA, V_{CE} = 5 V	50	—	600	%
		Rank GB	100	—	600	
Saturated CTR	I_C / $I_{F\ (sat)}$	I_F = 1 mA, V_{CE} = 0.4 V	—	60	—	%
		Rank GB	30	—	—	
Base photo−current	I_{PB}	I_F = 5 mA, V_{CB} = 5 V	—	10	—	%
Collector−emitter saturation voltage	$V_{CE\ (sat)}$	I_C = 2.4 mA, I_F = 8 mA	—	—	0.4	V
		I_C = 0.2 mA, I_F = 1 mA	—	0.2	—	
		Rank GB	—	—	0.4	

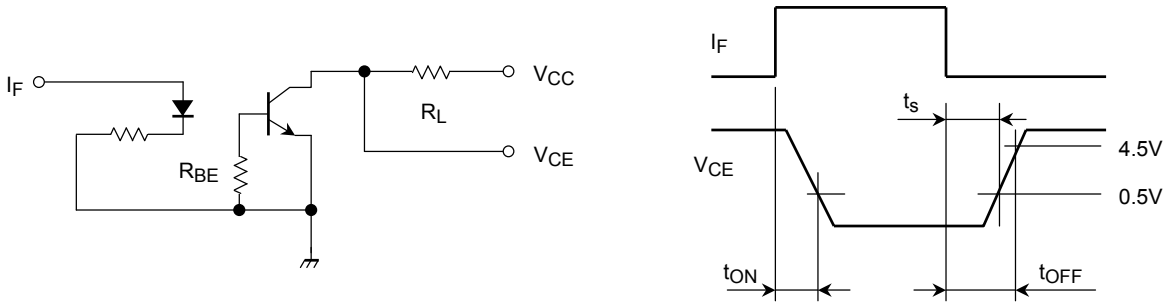
Isolation Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Capacitance (input to output)	C_S	V_S = 0, f = 1 MHz	—	0.8	—	pF
Isolation resistance	R_S	V_S = 500 V, R.H.≤ 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

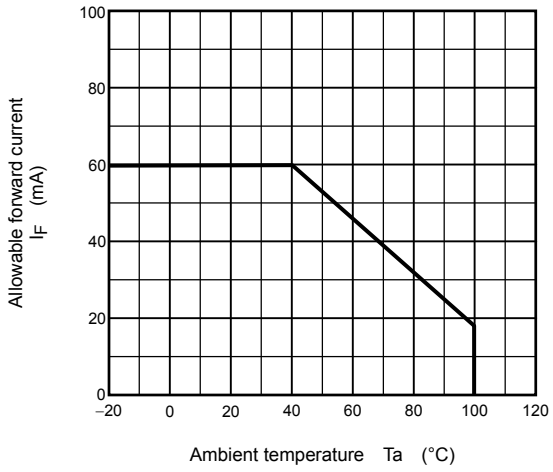
Switching Characteristics (Ta = 25°C)

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

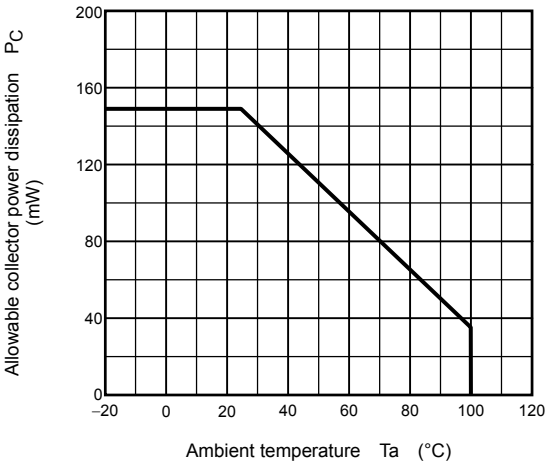
Fig. 1 Switching time test circuit



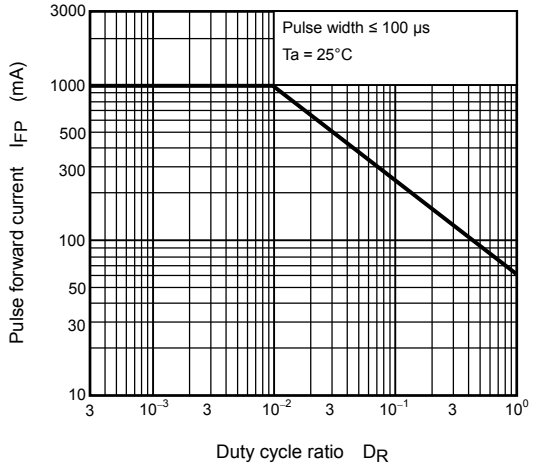
I_F – Ta



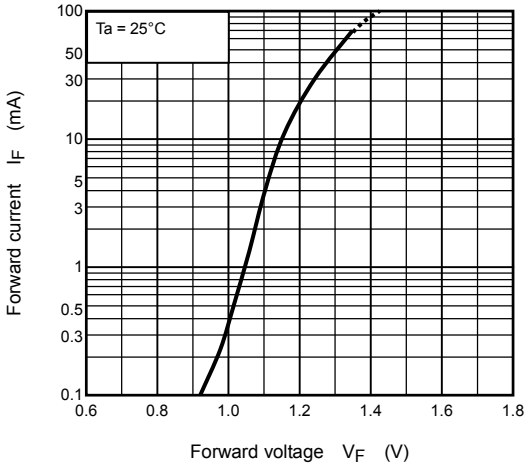
P_C – Ta



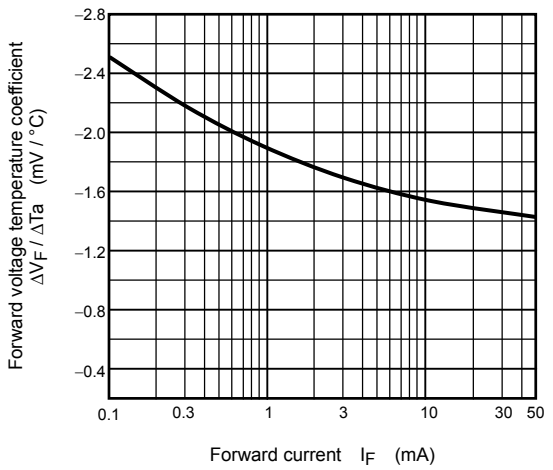
I_{FP} – D_R



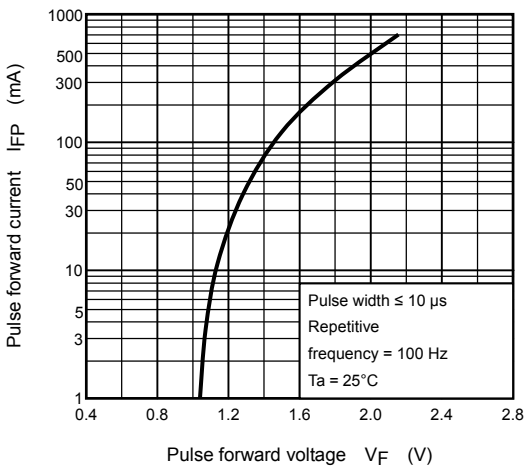
I_F – V_F



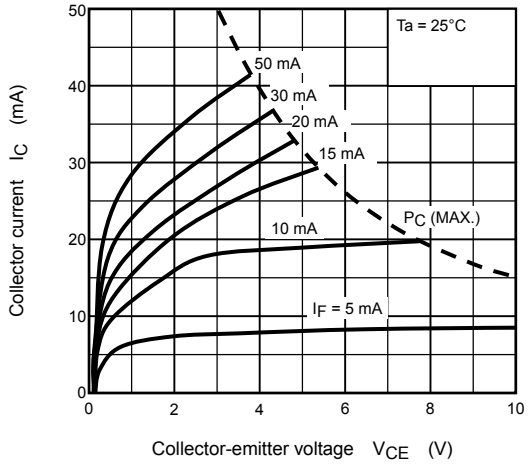
$\Delta V_F / \Delta Ta$ – I_F



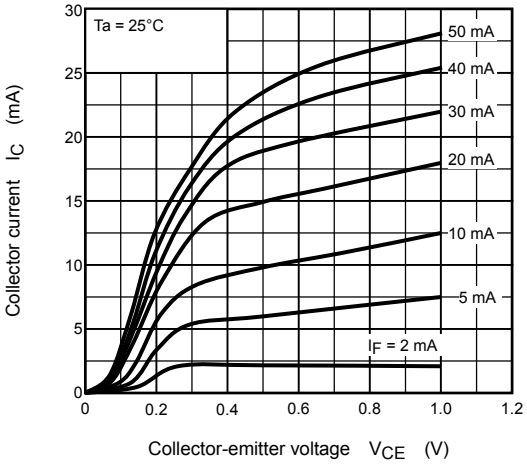
I_{FP} – V_{FP}



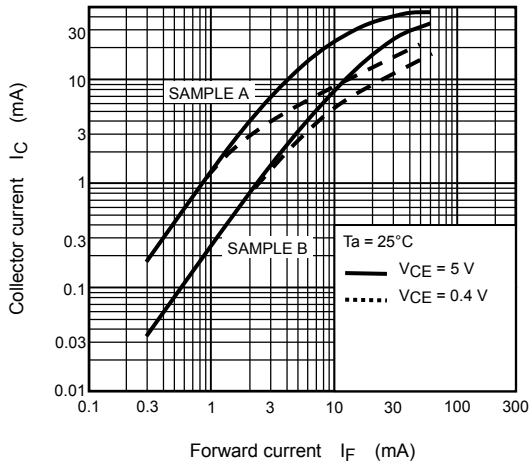
$I_C - V_{CE}$



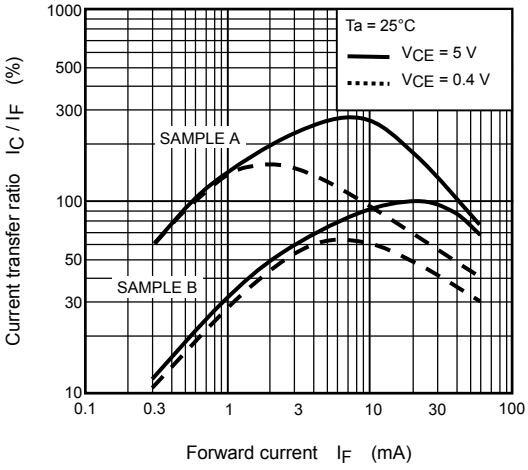
$I_C - V_{CE}$



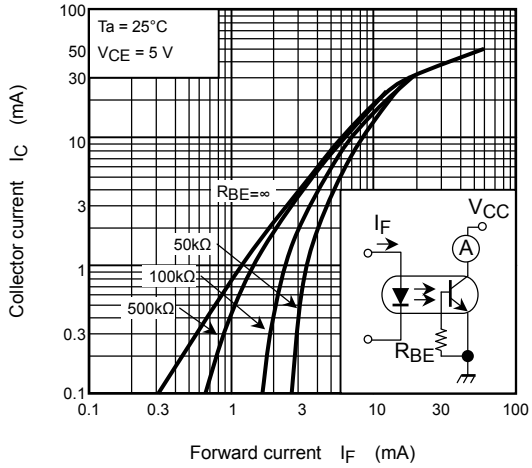
$I_C - I_F$



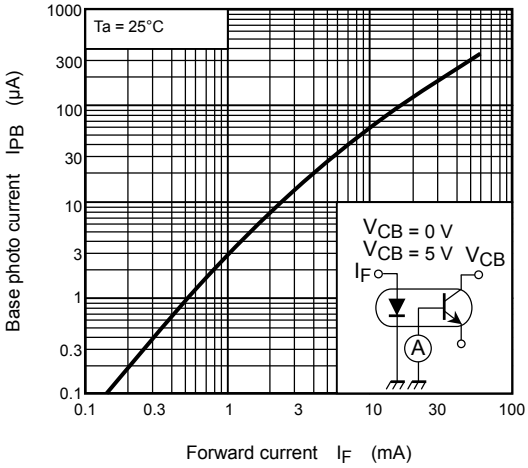
$I_C / I_F - I_F$



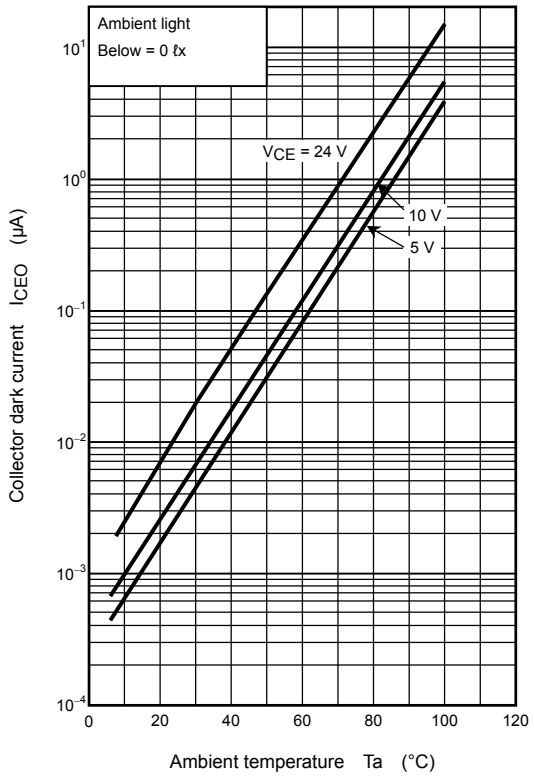
TLP733 $I_C - I_F$ at R_{BE}



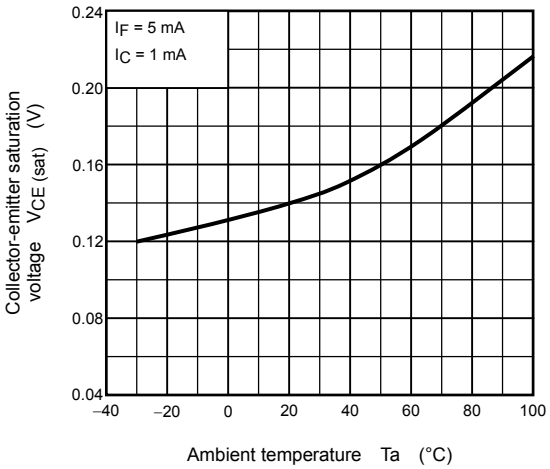
TLP733 $I_{PB} - I_F$



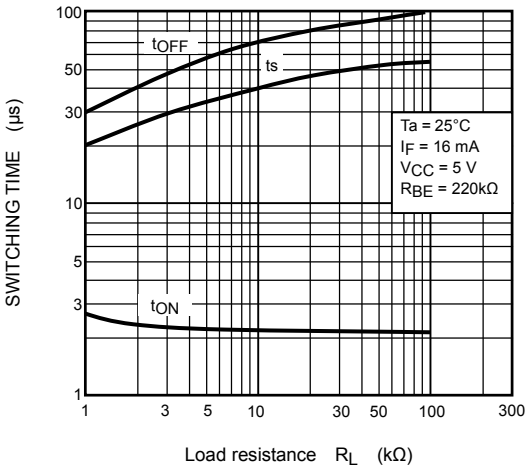
I_{CEO} / Ta



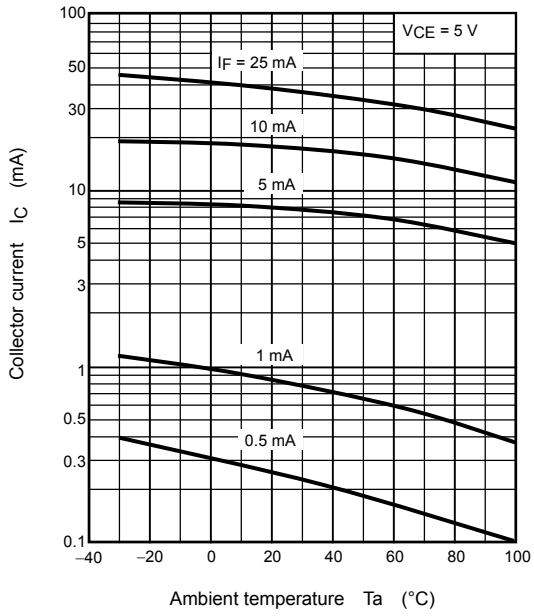
$V_{CE\ (sat)}$ – Ta



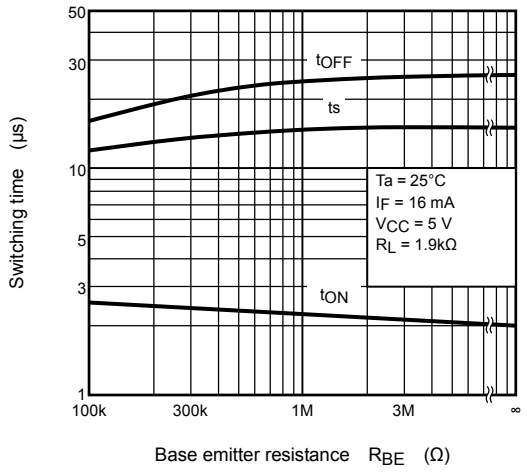
TLP733 Switching Time – R_L



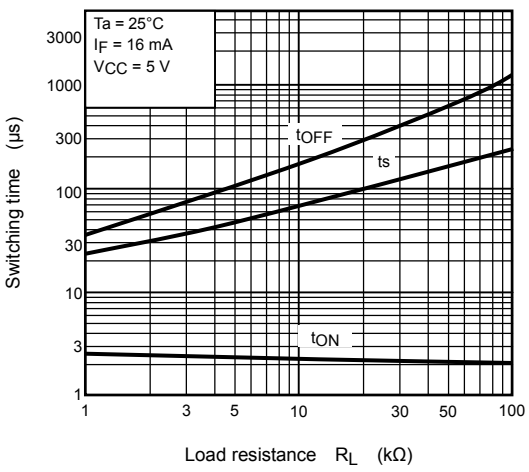
I_C – Ta



Switching Time R_{BE}



Switching Time – R_L



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20070701-EN

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