TOSHIBA Photocoupler GaAs Ired & Photo−Transistor

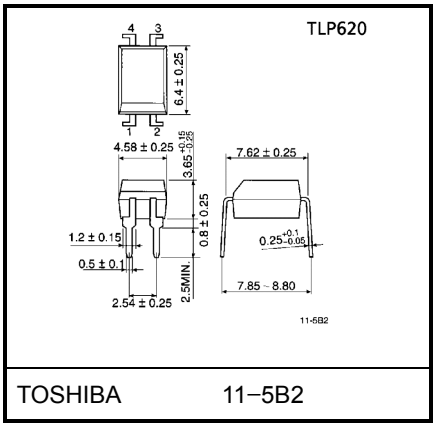
TLP620, TLP620−2, TLP620−4

Programmable Controllers

AC / DC−Input Module

Telecommunication

Unit in mm

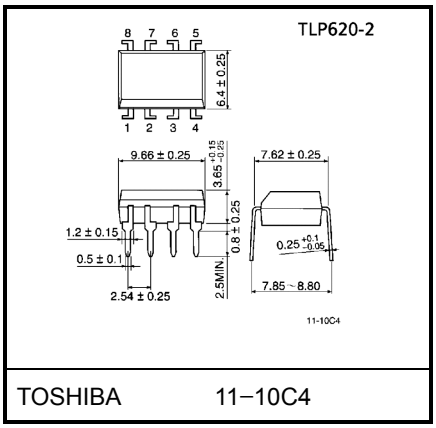


TOSHIBA 11−5B2

Weight: 0.26 g

The TOSHIBA TLP620, −2 and −4 consists of a photo−transistor optically coupled to two gallium arsenide infrared emitting diode connected in inverse parallel.
The TLP620−2 offers two isolated channels in an eight lead plastic DIP, while the TLP620−4 provides four isolated channels in a sixteen plastic DIP.

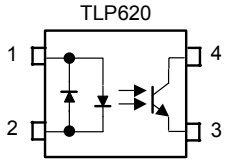
- Collector−emitter voltage: 55V (min.)
- Current transfer ratio: 50% (min.)
  Rank GB: 100% (min.)



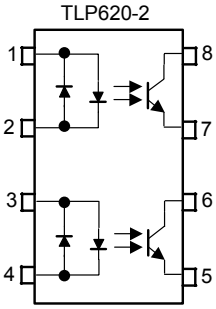
TOSHIBA 11−10C4

Weight: 0.54 g

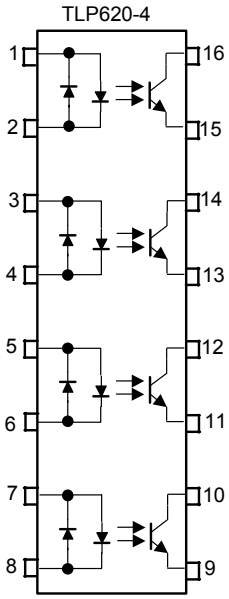
Pin Configurations (top view)



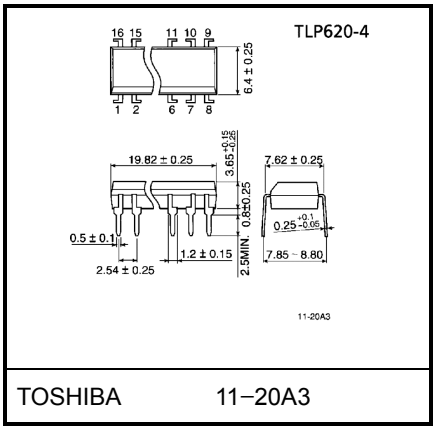
1 : ANODE
CATHODE
2 : CATHODE
ANODE
3 : EMITTER
4 : COLLECTOR



1, 3 : ANODE
CATHODE
2, 4 : CATHODE
ANODE
5, 7 : EMITTER
6, 8 : COLLECTOR



1, 3, 5, 7 : ANODE, CATHODE
2, 4, 6, 8 : CATHODE, ANODE
9, 11, 13, 15 : EMITTER
10, 12, 14, 16 : COLLECTOR



TOSHIBA 11−20A3

Weight: 1.1 g

	Made In Japan		Made In Thailand	
UL recognized	E67349	*1	E152349	*1
BSI approved	7426, 7427	*2	7426, 7427	*2

*1 UL1577

*2 BS EN60065: 1994, BS EN60950: 1992

- Isolation voltage: 5000V_{rms} (min.)
- Option (D4) type
  VDE approved: DIN VDE0884 / 06.92, certificate no. 68384
  Maximum operating insulation voltage: 890V_{PK}
  Highest permissible over voltage: 8000V_{PK}

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

- Creepage distance: 6.4mm (min.)
  Clearance: 6.4mm (min.)
  Insulation thickness: 0.4mm (min.)

Maximum Ratings (Ta = 25°C)

Characteristic		Symbol	Rating		Unit
			TLP620	TLP620−2 TLP620−4	
LED	Forward current	$I_{F\ (RMS)}$	60	50	mA
	Forward current derating	ΔI_F / °C	−0.7 (Ta ≥ 39°C)	−0.5 (Ta ≥ 25°C)	mA / °C
	Pulse forward current	I_{FP}	1 (100μs pulse, 100pps)		A
	Power dissipation (1 circuit)	P_D	100	70	mW
	Power dissipation derating	ΔP_D / °C	−1.0	−0.7	mW / °C
	Junction temperature	T_j	125		°C
Detector	Collector−emitter voltage	V_{CEO}	55		V
	Emitter−collector voltage	V_{ECO}	7		V
	Collector current	I_C	50		mA
	Collector power dissipation (1 circuit)	P_C	150	100	mW
	Collector power dissipation derating (1 circuit) (Ta ≥ 25°C)	ΔP_C / °C	−1.5	−1.0	mW / °C
	Junction temperature	T_j	125		°C
Storage temperature range		T_{stg}	−55~125		°C
Operating temperature range		T_{opr}	−55~100		°C
Lead soldering temperature		T_{sold}	260 (10s)		°C
Total package power dissipation		P_T	250	150	mW
Total package power dissipation derating (Ta ≥ 25°C, 1 circuit)		ΔP_T / °C	−2.5	−1.5	mW / °C
Isolation voltage		BV_S	5000 (AC, 1 min., RH ≤ 60%)		V_{rms}

Recommended Operating Conditions

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	V_{CC}	—	5	24	V
Forward current	$I_{F\ (RMS)}$	—	16	20	mA
Collector current	IC	—	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 = ±10mA	1.0	1.15	1.3	V
	Foward current	I_F	V_F = ±0.7V	—	2.5	20	μA
	Capacitance	C_T	V = 0, f = 1MHz	—	60	—	pF
Detector	Collector−emitter breakdown voltage	$V_{(BR)\ CEO}$	I_C = 0.5mA	55	—	—	V
	Emitter−collector breakdown voltage	$V_{(BR)\ ECO}$	I_E = 0.1mA	7	—	—	V
	Collector dark current	I_{CEO}	V_{CE} = 24V	—	10	100	nA
			V_{CE} = 24V, Ta = 85°C	—	2	50	μA
	Capacitance (collector to emitter)	C_{CE}	V_{CE} = 0, f = 1MHz	—	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 = ±5mA, V_{CE} = 5V	50	—	600	%
		Rank GB	100	—	600	
Saturated CTR	I_C / $I_{F\ (sat)}$	IF = ±1mA, V_{CE} = 0.4V	—	60	—	%
		Rank GB	30	—	—	
Collector−emitter saturation voltage	$V_{CE\ (sat)}$	I_C = 2.4mA, I_F = ±8mA	—	—	0.4	V
		I_C = 0.2 mA, I_F = ±1 mA	—	0.2	—	
		Rank GB	—	—	0.4	
Off−state collector current	$I_{C\ (off)}$	V_F = ± 0.7V, V_{CE} = 24V	—	1	10	μA
CTR symmetry	$I_{C\ (ratio)}$	I_C (I_F = −5mA) / I_C (I_F = +5mA)	0.33	1	3	—

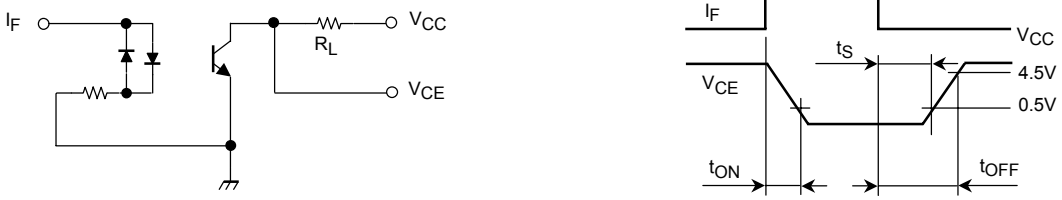
Isolation Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Capacitance input to output	C_S	V_S = 0, f = 1MHz	—	0.8	—	pF
Isolation resistance	R_S	V_S = 500V	1×10^{12}	10^{14}	—	Ω
Isolation voltage	BV_S	AC, 1 minute	5000	—	—	V_{rms}
		AC, 1 second, in oil	—	10000	—	V_{rms}
		DC, 1 minute, in oil	—	10000	—	V_{dc}

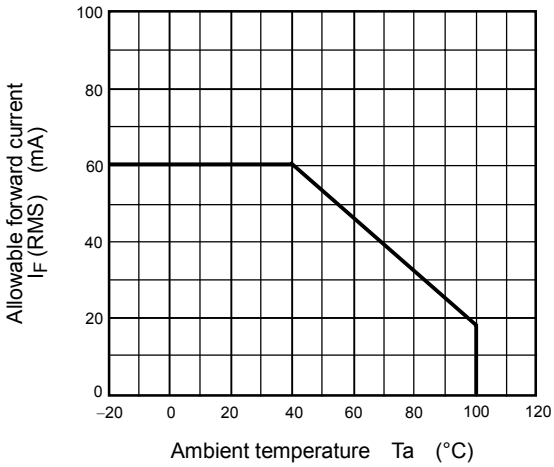
Switching Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Rise time	t_r	V_{CC} = 10V I_C = 2mA R_L = 100Ω	—	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 = 1.9kΩ (Fig.1) V_{CC} = 5V, I_F = ±16mA	—	2	—	μs
Storage time	t_s		—	15	—	
Turn−off time	t_{OFF}		—	25	—	

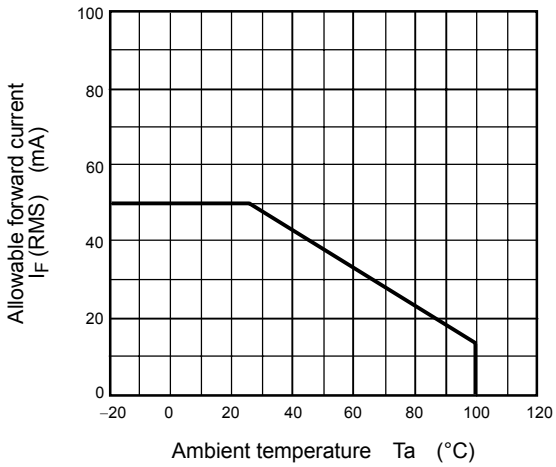
Fig. 1 Switching time test circuit



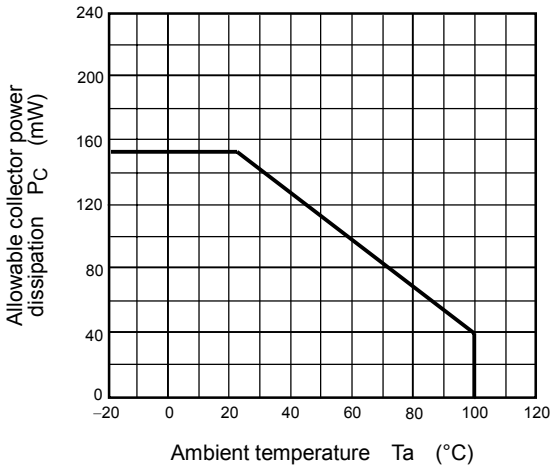
TLP620 I_F – Ta



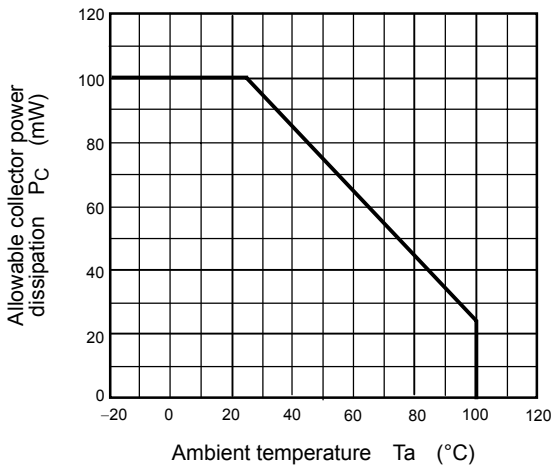
TLP620-2
TLP620-4 I_F – Ta



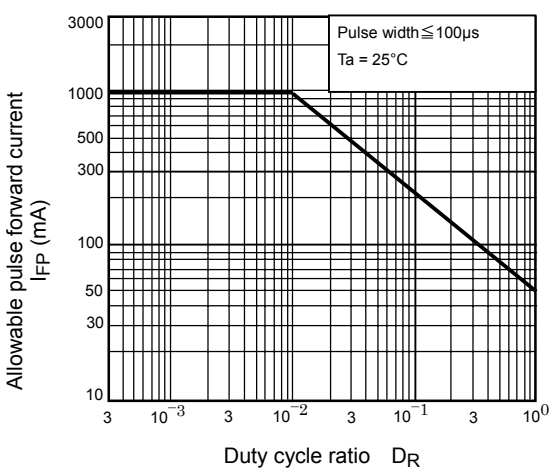
TLP620 P_C – Ta



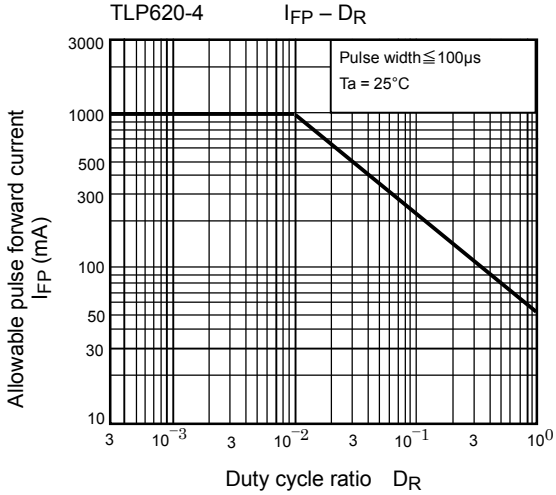
TLP620-2
TLP620-4 P_C – Ta



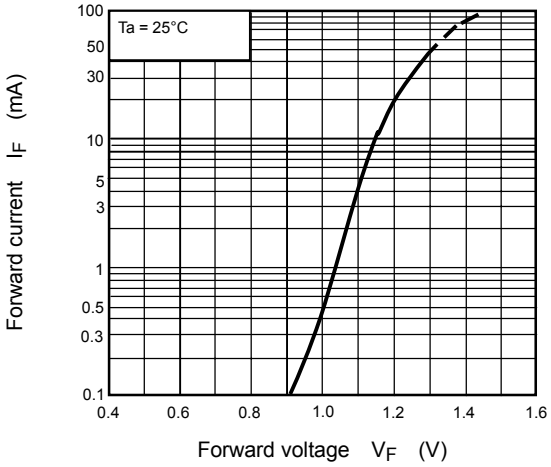
TLP620 I_{FP} – D_R



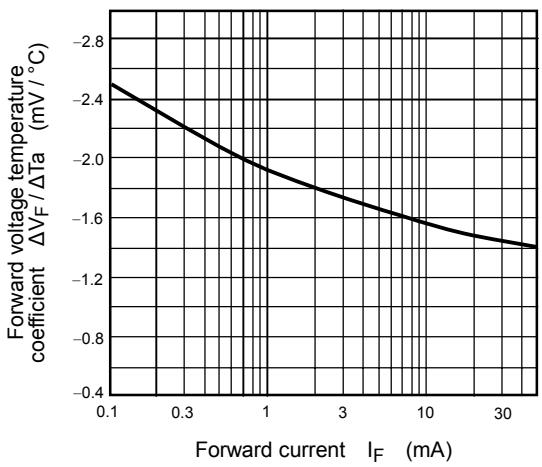
TLP620-2
TLP620-4 I_{FP} – D_R



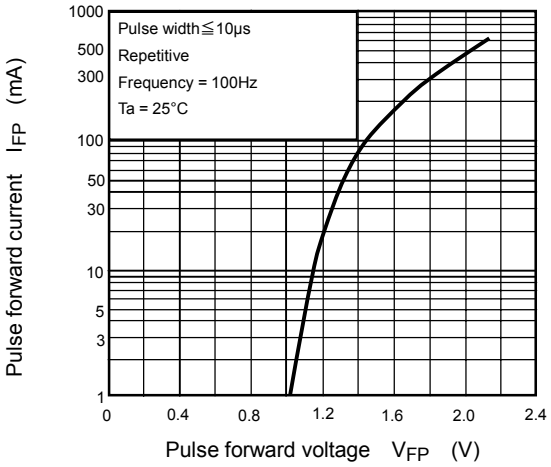
$I_F - V_F$



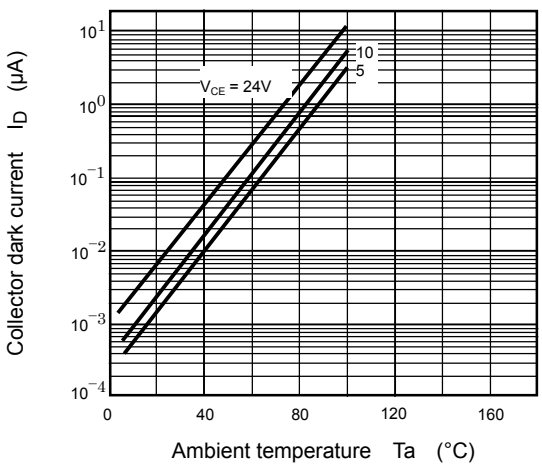
$\Delta V_F / \Delta Ta - I_F$



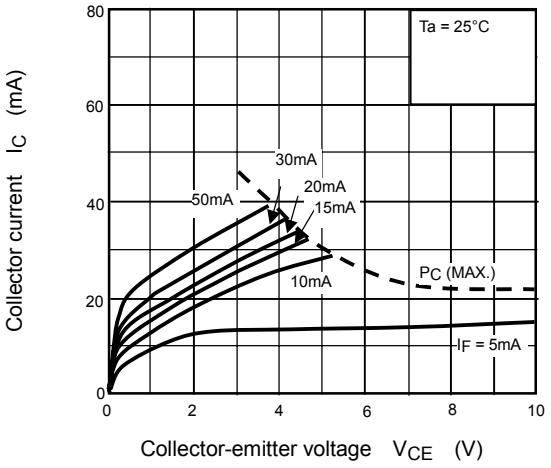
$I_{FP} - V_{FP}$



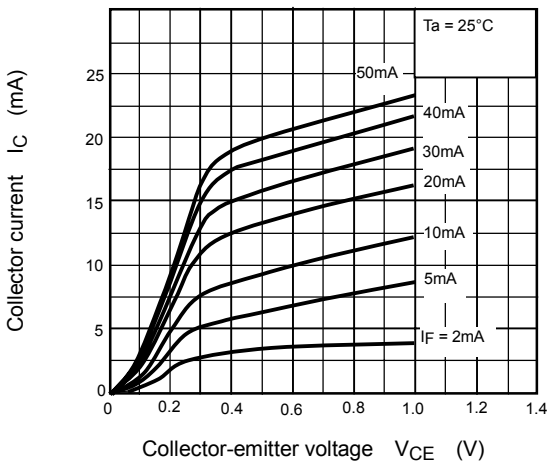
$I_D - T_a$



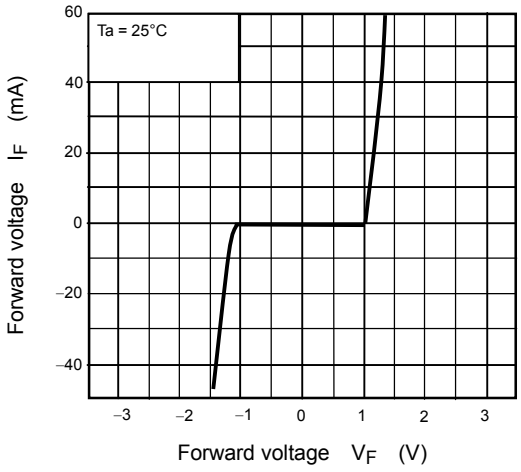
$I_C - V_{CE}$



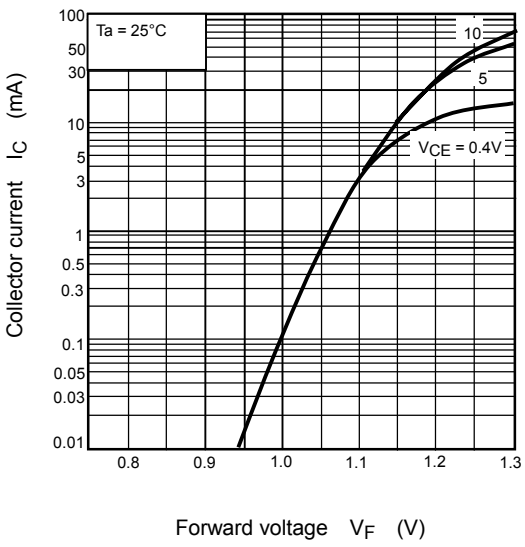
$I_C - V_{CE}$



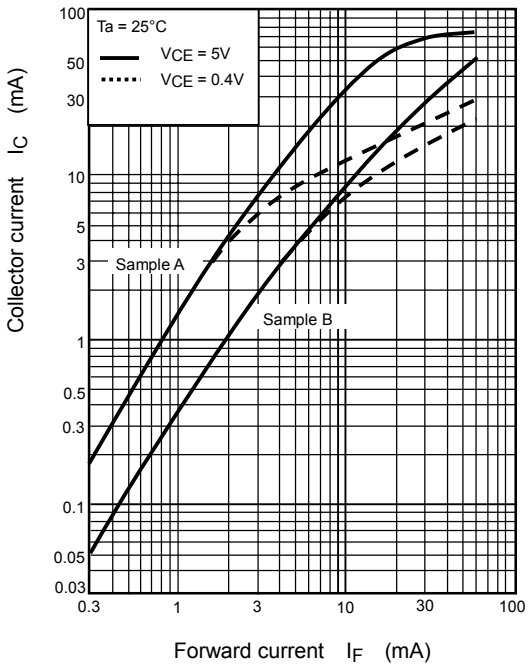
$V_F - I_F$



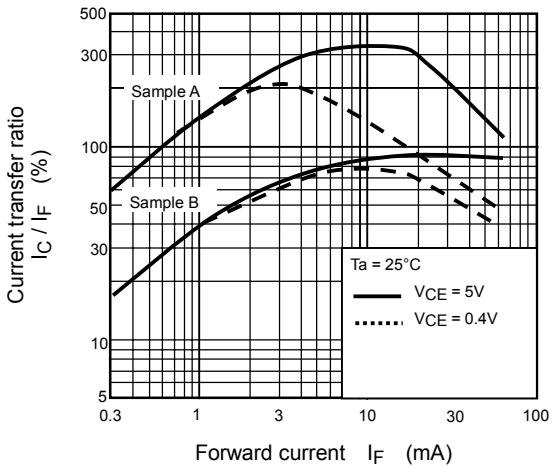
$I_C - V_F$



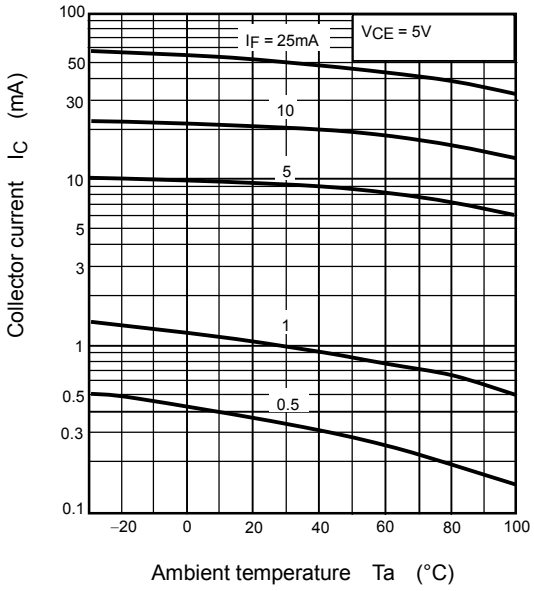
$I_C - I_F$



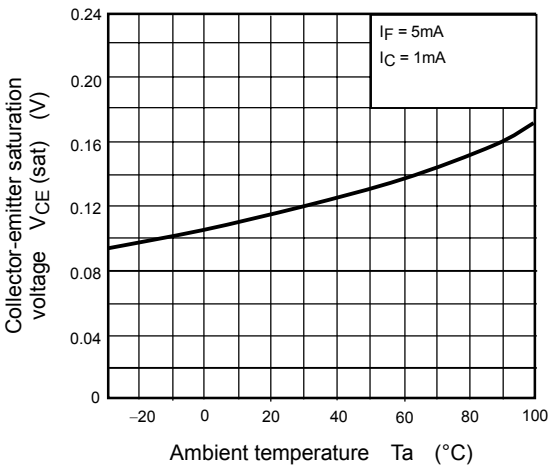
$I_C / I_F - I_F$

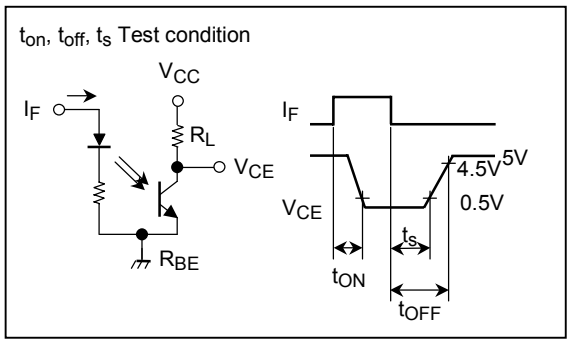


I_C – Ta

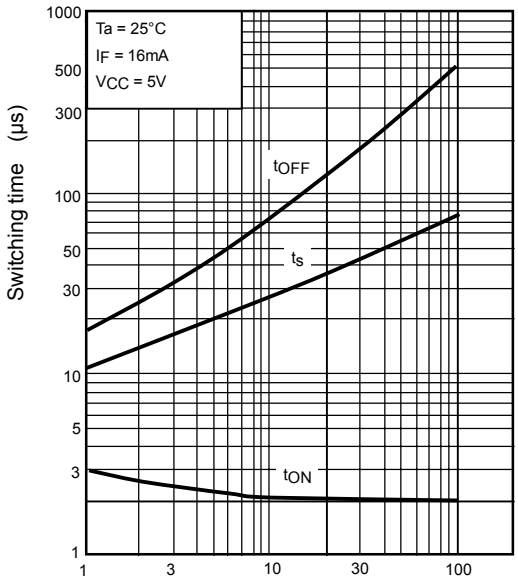


V_{CE} (sat) – Ta





R_L – Switching Time



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