TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

TLP621, TLP621-2, TLP621-4

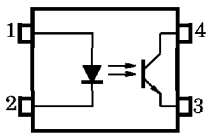
PROGRAMMABLE CONTROLLER
AC / DC - INPUT MODULE
SOLID STATE RELAY

The TOSHIBA TLP621, -2, and -4 consists of a photo-transistor optically coupled to a gallium arsenide infrared emitting diode. The TLP621-2 offers two isolated channels in an eight lead plastic DIP, which the TLP621-4 provides four isolated channels in a sixteen plastic DIP.

- Collector-Emitter Voltage : 55V (Min.)
- Current Transfer Ratio : 50% (Min.)
  Rank GB : 100% (Min.)

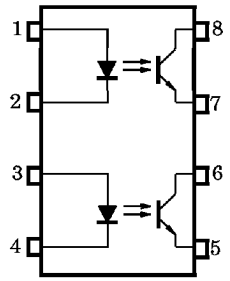
PIN CONFIGURATIONS (TOP VIEW)

TLP621



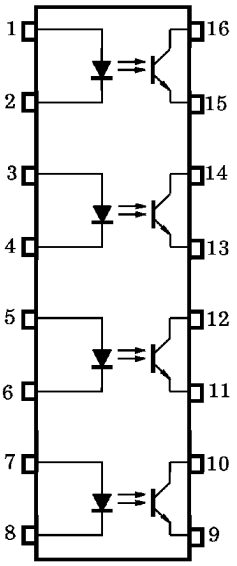
1 : ANODE
2 : CATHODE
3 : EMITTER
4 : COLLECTOR

TLP621-2



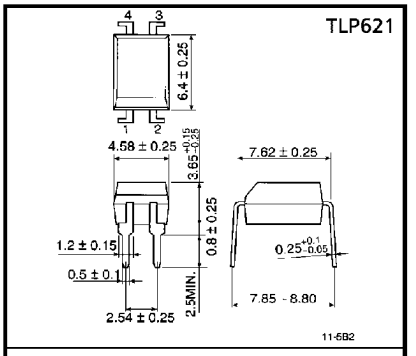
1, 3 : ANODE
2, 4 : CATHODE
5, 7 : EMITTER
6, 8 : COLLECTOR

TLP621-4



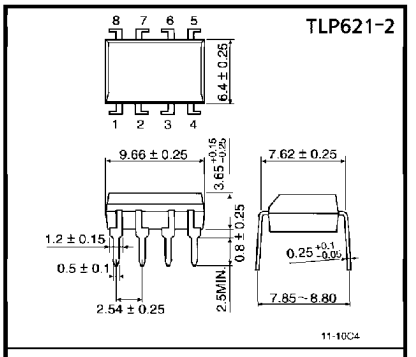
1, 3, 5, 7 : ANODE
2, 4, 6, 8 : CATHODE
9, 11, 13, 15 : EMITTER
10, 12, 14, 16 : COLLECTOR

Unit in mm



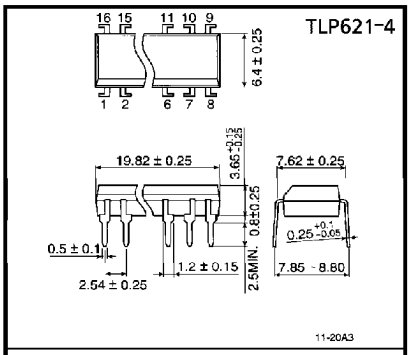
TOSHIBA 11-5B2

Weight : 0.26g



TOSHIBA 11-10C4

Weight : 0.54g



TOSHIBA 11-20A3

Weight : 1.1g

961001EBC2

- 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.	
TLP621	(None)	50	600	BLANK, Y, Y■, G, G■, B, B■, GB
	Rank Y	50	150	Y, Y■
	Rank GR	100	300	G, G■
	Rank BL	200	600	B, B■
	Rank GB	100	600	G, G■, B, B■, GB
TLP621-2 TLP621-4	(None)	50	600	BLANK, GR, BL, GB
	Rank GB	100	600	GR, BL, GB

*1 : Ex. Rank GB : TLP621 (GB)

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

TLP621 (GB) : TLP621
TLP621-2 (GB) : TLP621-2

	MADE IN JAPAN		MADE IN THAILAND	
UL Recognized	E67349	*2	E152349	*2
BSI Approved	6508, 7445	*3	6505, 7445	*3
SEMKO Approved	9735090 / 01	*4	—	

*2 UL1577
*3 BS EN60065 : 1994, BS EN60950 : 1992
*4 EN60950 (Approved is TLP621 only)

- 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 VIDE0884 approved type is needed, please disignate the "Option (D4)"

	7.62mm pich standard type	10.16mm pich (LF2) type
• Creepage Distance	: 6.4mm (Min.)	8.0mm (Min)
Clearance	: 6.4mm (Min.)	8.0mm (Min)
Insulation Thickness	: 0.4mm (Min.)	0.4mm (Min)

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING		UNIT
			TLP621	TLP621-2 TLP621-4	
LED	Forward Current	I_F	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	P_D	100	70	mW
	Power Dissipation Derating	ΔP_D / °C	−1.0	−0.7	mW / °C
	Reverse Voltage	V_R	5		V
	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_{sol}	260 (10s)		°C
Total Package Power Dissipation		P_T	250	150	mW
Total Package Power Dissipation Derating (Ta ≧ 25°C)		ΔP_T / °C	−2.5	−1.5	mW / °C
Isolation Voltage	(Note 1)	BV_S	5000 (AC, 1min., R.H. ≦ 60%)		V_{rms}

(Note 1) Device considered a two terminal : LED side pins shorted together, and DETECTOR side pins shorted together.

RECOMMENDED OPERATING CONDITIONS

CHARACTERICTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{CC}	—	5	24	V
Forward Current	I_F	—	16	20	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 = 10mA	1.0	1.15	1.3	V
	Reverse Current	I_R	V_R = 5V	—	—	10	μA
	Capacitance	C_T	V = 0, f = 1MHz	—	30	—	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 = 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	$I_C / I_{F(sat)}$	I_F = 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 = 0.2mA, I_F = 1mA	—	0.2	—	
		Rank GB	—	—	0.4	

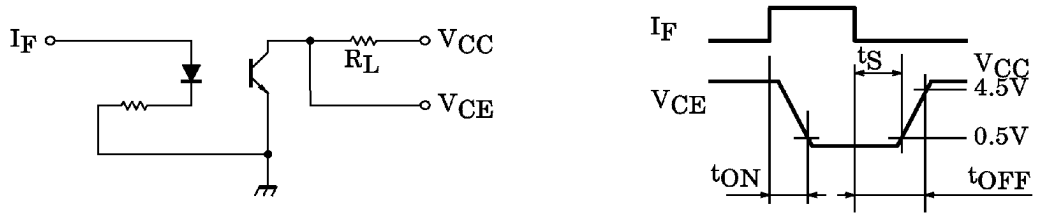
ISOLATION CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance (Input to Output)	C_S	V_S = 0, f = 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	—	
		DC, 1 minute, in oil	—	10000	—	V_{dc}

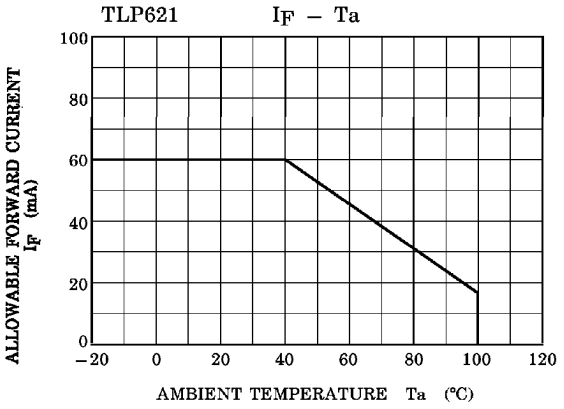
SWITCHING CHARACTERISTICS (Ta = 25°C)

CHARACTERICTIC	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	—	

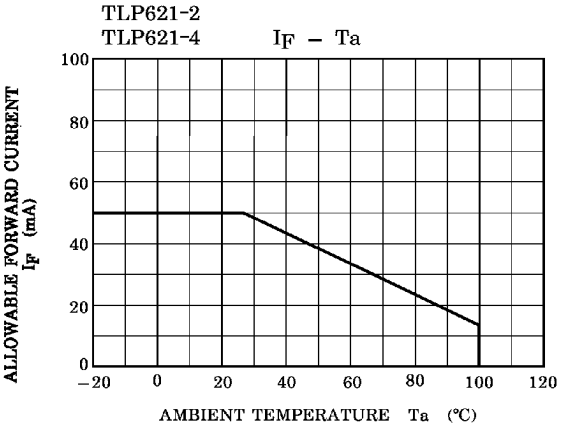
Fig.1 SWITCHING TIME TEST CIRCUIT



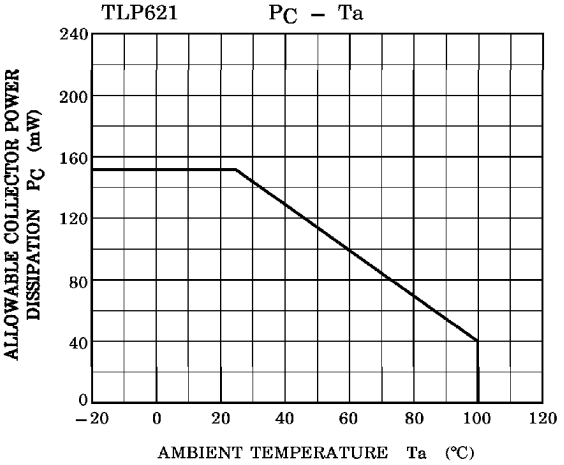
TLP621 I_F – Ta



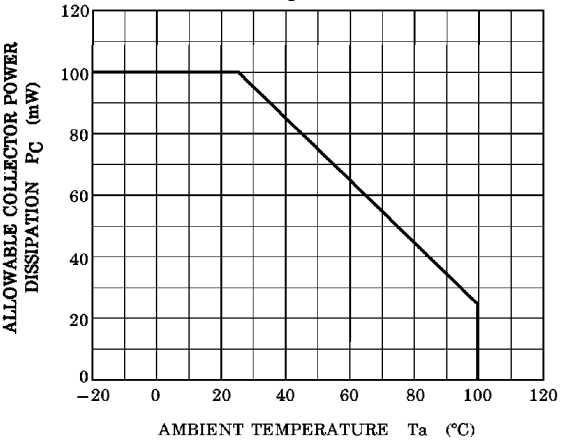
TLP621-2
TLP621-4 I_F – Ta



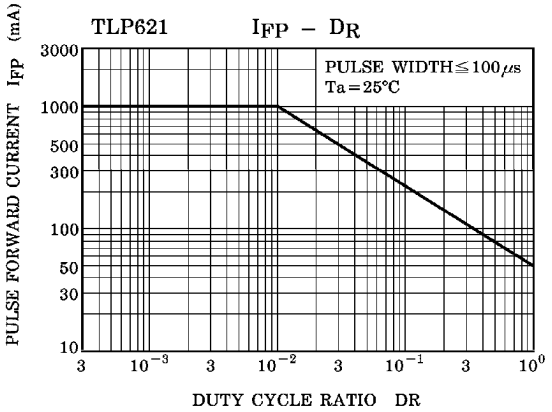
TLP621 P_C – Ta



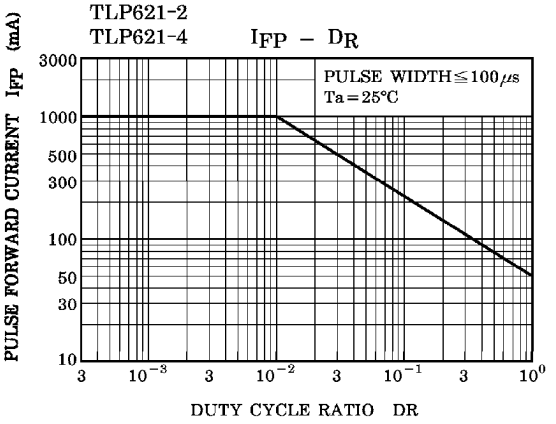
TLP621-2
TLP621-4 P_C – Ta



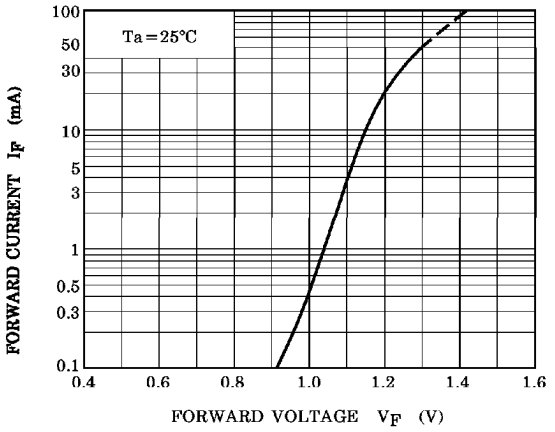
TLP621 I_{FP} – D_R



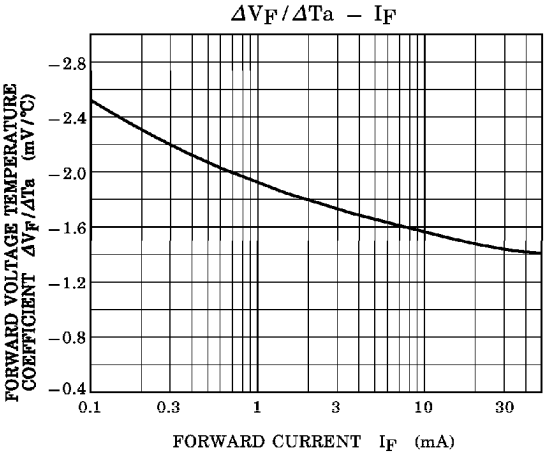
TLP621-2
TLP621-4 I_{FP} – D_R



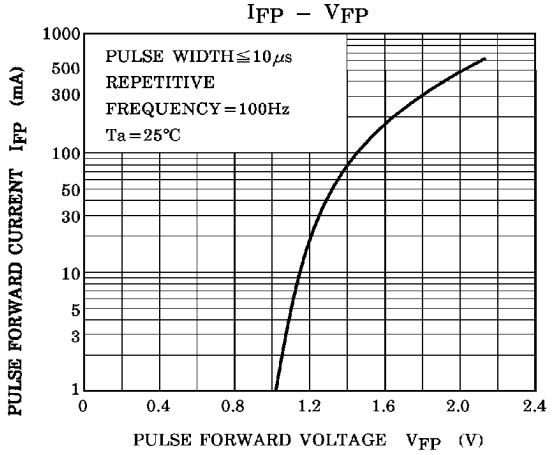
$I_F - V_F$



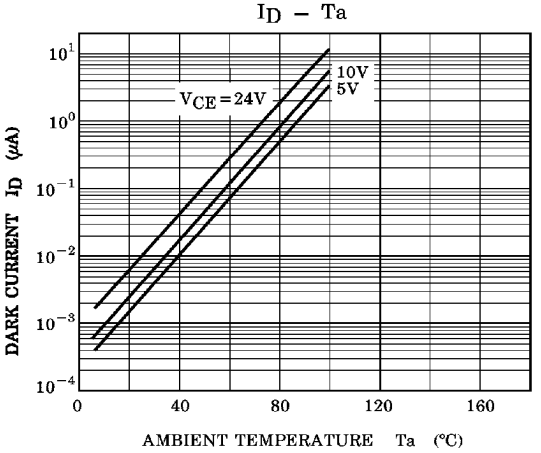
$\Delta V_F / \Delta Ta - I_F$



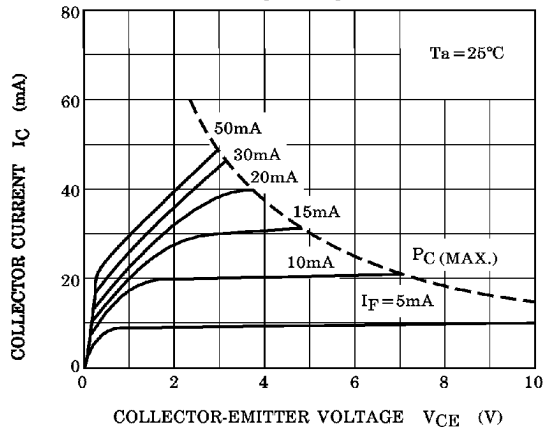
$I_{FP} - V_{FP}$



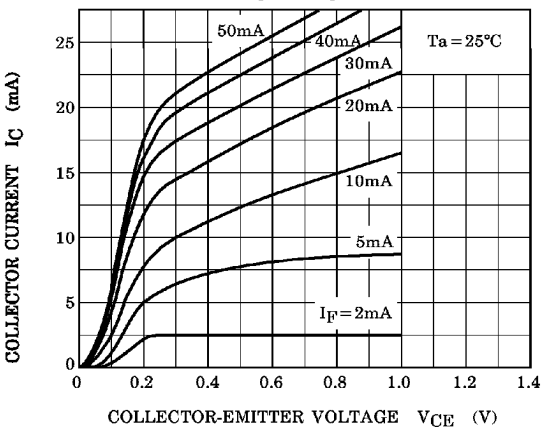
$I_D - Ta$



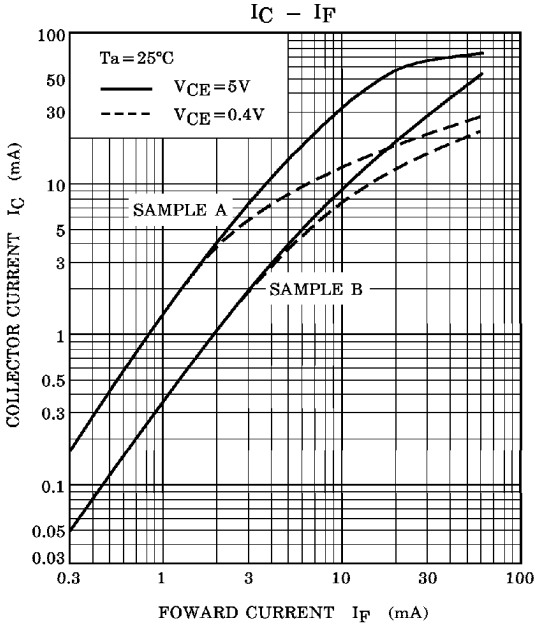
$I_C - V_{CE}$



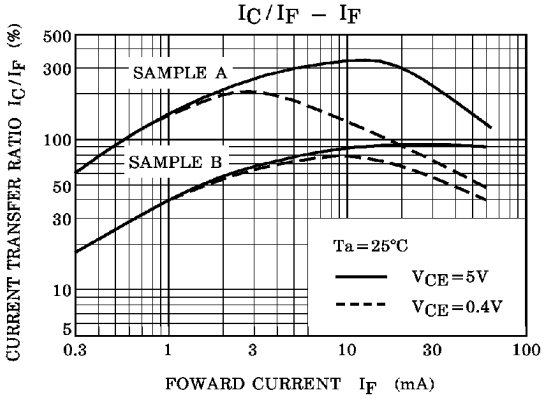
$I_C - V_{CE}$



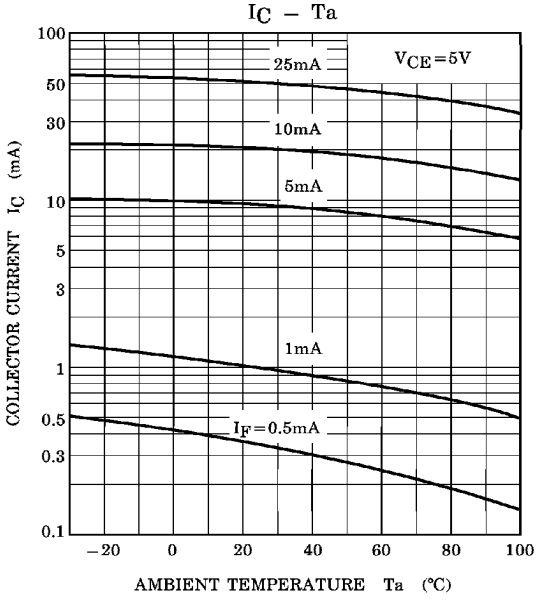
$I_C - I_F$



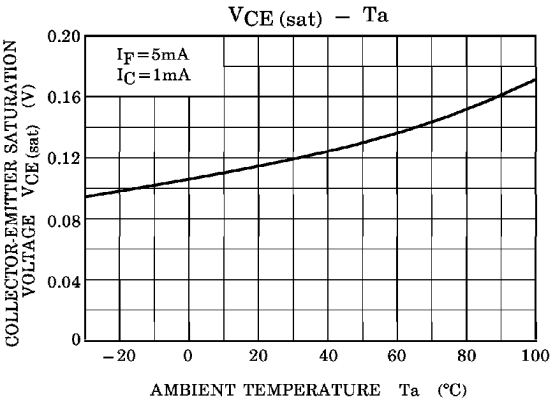
$I_C / I_F - I_F$



$I_C - Ta$



$V_{CE\,(sat)} - Ta$



SWITCHINGTIME $- R_L$