

Unit in mm

Programmable Controllers

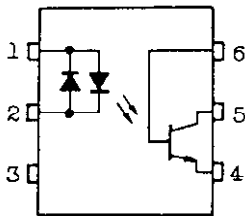
AC/DC-Input Module

Telecommunication

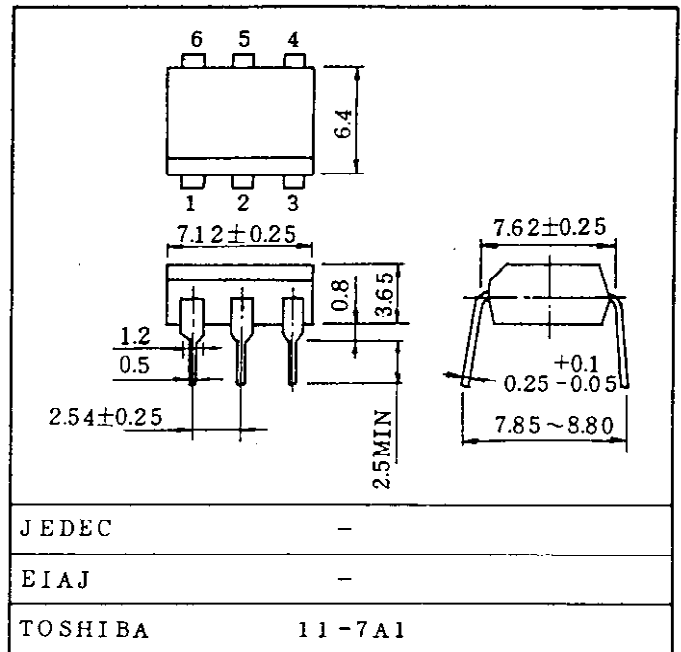
The Toshiba TLP630 consists of a photo-transistor optically coupled to two gallium arsenide infrared emitting diode connected inverse parallel in a six lead plastic DIP package.

- Collector-Emitter Voltage : 55V (Min.)
- Current Transfer Ratio : 50% (Min.)
Rank GB : 100% (Min.)
- Isolation Voltage : 5000V_{rms} (Min.)
- UL Recognized : UL1577, File No. E67349

Pin Configuration (Top View)



- 1: ANODE, CATHODE
- 2: CATHODE, ANODE
- 3: NC
- 4: EMITTER
- 5: COLLECTOR
- 6: BASE



Supplementary Information	Page (s)
Lead Form Options	31-32
Tape and Reel	39-40
Current Transfer Ratio	29-31

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Maximum Ratings (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	I_F (RMS)	60	mA
	Forward Current Derating (Ta ≥ 39°C)	$I_F/^\circ\text{C}$	-0.7	mA/°C
	Pulse Forward Current (100μs pulse, 100pps)	I_{PF}	±1	A
	Junction Temperature	T_j	125	°C
DETECTOR	Collector-Emitter Voltage	V_{CEO}	55	V
	Collector-Base Voltage	V_{CBO}	80	V
	Emitter-Collector Voltage	V_{ECO}	7	V
	Emitter-Base Voltage	V_{EBO}	7	V
	Collector Current	I_C	50	mA
	Power Dissipation	P_C	150	mW
	Power Dissipation Derating (Ta ≥ 25°C)	$P_C/^\circ\text{C}$	-1.5	mW/°C
	Junction Temperature	T_j	125	°C
Storage Temperature Range		T_{stg}	-55~125	°C
Operating Temperature Range		T_{opr}	-55~100	°C
Lead Soldering Temperature (10 sec.)		T_{sold}	260	°C
Total Package Power Dissipation		P_T	250	mW
Total Package Power Dissipation Derating (Ta ≥ 25°C)		$\Delta P_T/^\circ\text{C}$	-2.5	mW/°C
Isolation Voltage (AC, 1 min, R.H. ≤ 60%)		BV_S	5000	V_{rms}

Individual Electrical Characteristics (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MX.	UNIT
LED	Forward Voltage	V_F	$I_F = \pm 10\text{mA}$	1.0	1.15	1.3	V
	Capacitance	C_T	$V = 0, f = 1\text{MHz}$	-	60	-	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	$V_{(BR)CBO}$	$I_C = 0.1\text{mA}$	80	-	-	V
	Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 0.1\text{mA}$	7	-	-	V
	Collector Dark Current	I_{CEO}	$V_{CE} = 24\text{V}$ $V_{CE} = 24\text{V}, T_a = 85^\circ\text{C}$	-	10	100	nA
				-	2	50	μA
	Collector Dark Current	I_{CBO}	$V_{CB} = 10\text{V}$	-	0.1	-	nA
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.	MX.	UNIT
Current Transfer Ratio	I_C/I_F	$I_F = \pm 5\text{mA}, V_{CE} = 5\text{V}$ Rank GB	50	–	600	%
			100	–	600	
Saturated CTR	$I_C/I_{F(\text{sat})}$	$I_F = \pm 1\text{mA}, V_{CE} = 0.4\text{V}$ Rank GB	–	60	–	%
			30	–	–	
Base Photo-Current	I_{PB}	$I_F = \pm 5\text{mA}, V_{CB} = 5\text{V}$	–	10	–	μA
Collector-Emitter Saturation Voltage	$V_{CE(\text{sat})}$	$I_C = 2.4\text{mA}, I_F = \pm 8\text{mA}$	–	–	0.4	
Off-State Collector Current	$I_{C(\text{off})}$	$V_F = \pm 0.7\text{V}, V_{CE} = 24\text{V}$	–	1	10	μA
CTR Symmetry	$I_{C(\text{ratio})}$	$I_C (I_F = -5\text{mA}) / I_C (I_F = +5\text{mA})$	0.33	1	3	–

Isolation Characteristics (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MX.	UNIT
Capacitance Input to Output	C_S	$V_S = 0, f = 1\text{MHz}$	–	0.8	–	pF
Isolation Resistance	R_S	$V_S = 500\text{V}, \text{R.H.} \leq 60\%$	5×10^{10}	10^{14}	–	Ω
Isolation Voltage	BV_S	AC, 1 minute	5000	–	–	V_{rms}
		AC, 1 second	–	10000	–	
		DC, 1 minute	–	10000	–	V_{dc}

Switching Characteristics (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MX.	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	–	
Turn-off Time	t_{off}		–	3	–	
Turn-on Time	t_{ON}	$R_L = 1.9\text{k}\Omega$ (Fig. 1) $V_{CC} = 5\text{V}, I_F = \pm 16\text{mA}$	–	2	–	μs
Storage Time	t_s		–	15	–	
Turn-off Time	t_{OFF}		–	25	–	
Turn-on Time	t_{ON}	$T_L = 1.9\text{k}\Omega$ (Fig. 1) $R_{BE} = 220\text{k}\Omega$ $V_{CC} = 5\text{V}, I_F = \pm 16\text{mA}$	–	2	–	μs
Storage Time	t_s		–	12	–	
Turn-off Time	t_{OFF}		–	20	–	

Recommended Operating Conditions

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MX.	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	$^{\circ}\text{C}$

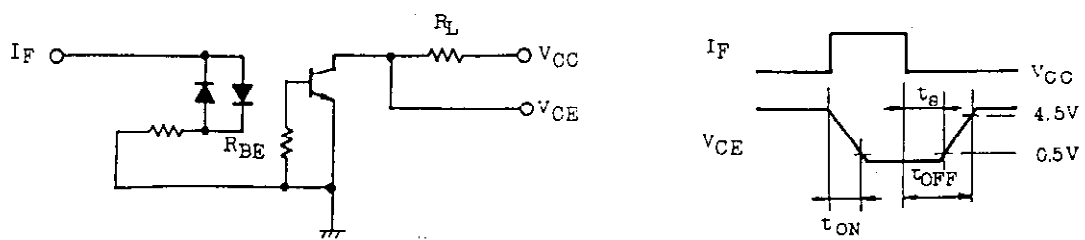
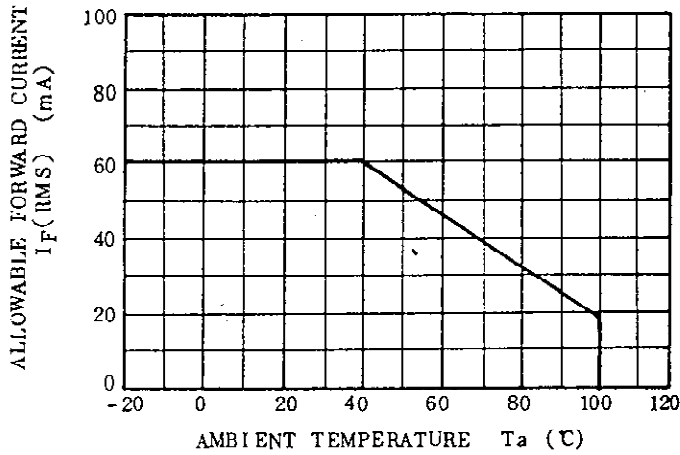
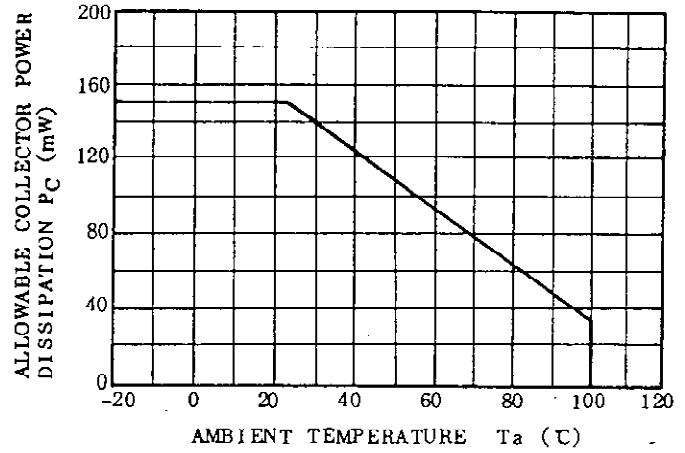


Figure 1. Switching Time Test Circuit

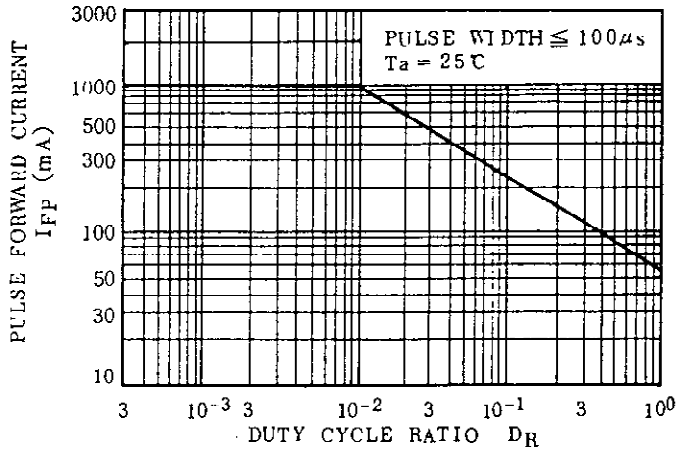
$I_F(\text{RMS}) - T_a$



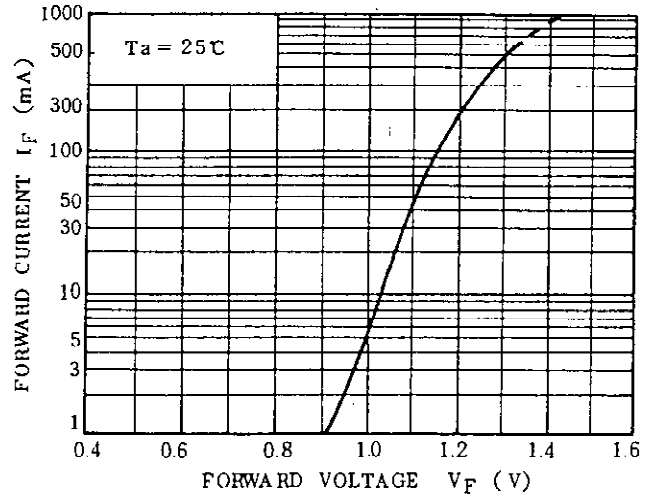
$P_C - T_a$



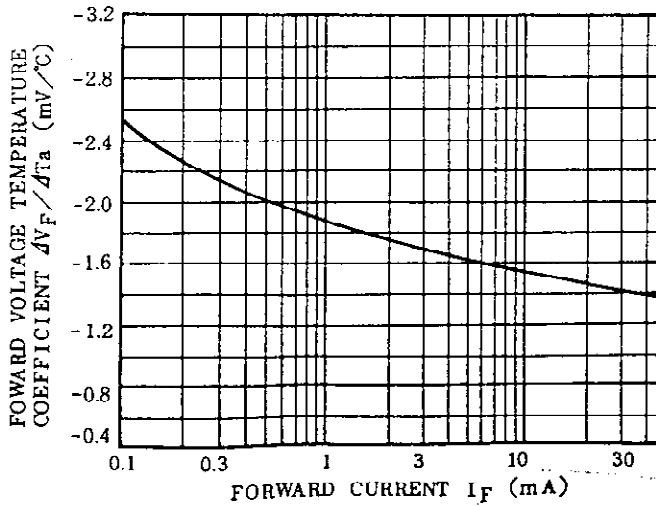
$I_{FP} - D_R$



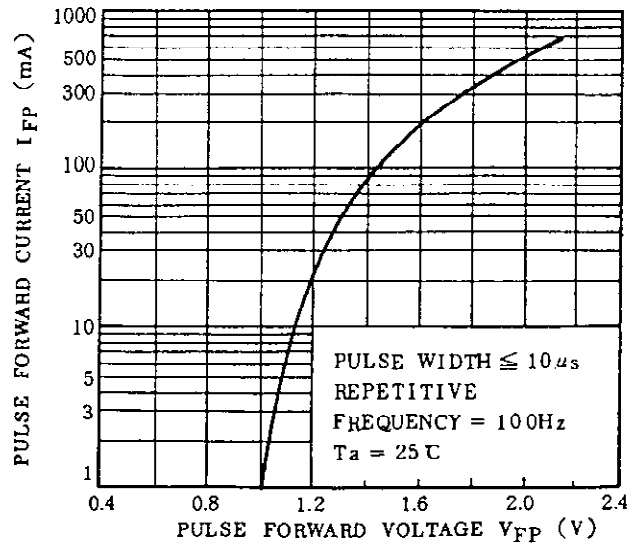
$I_F - V_F$

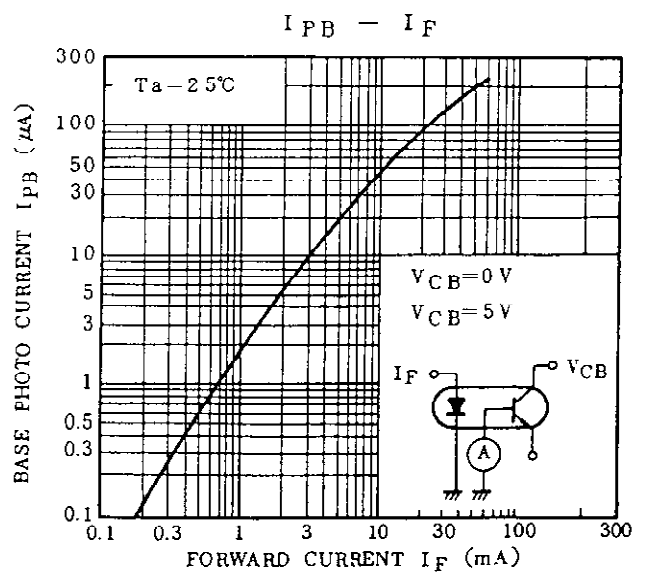
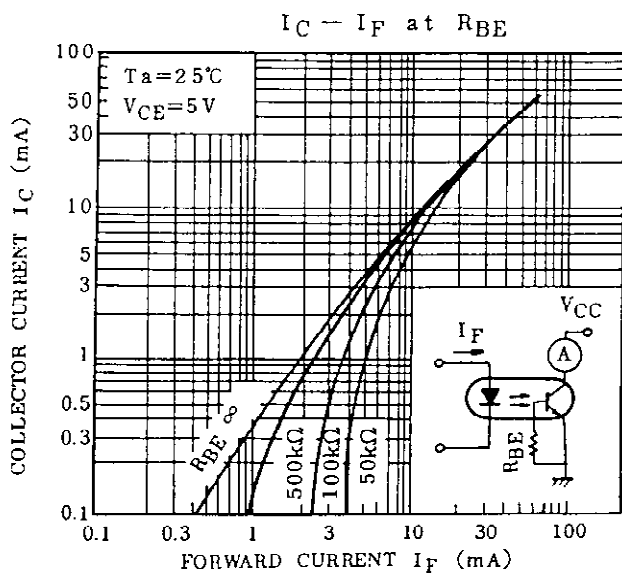
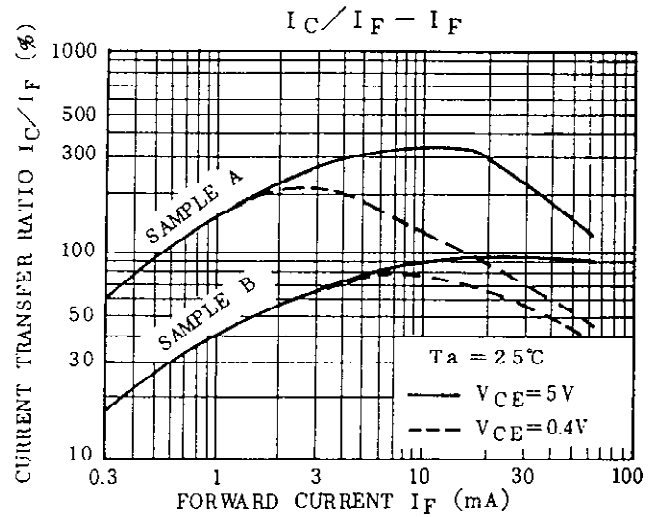
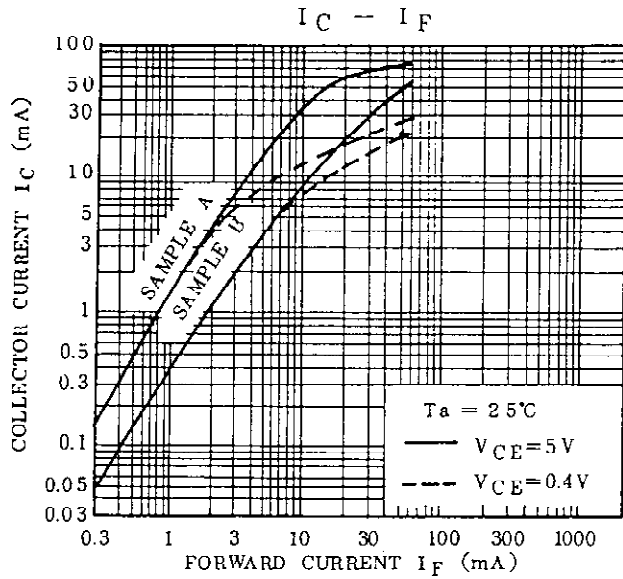
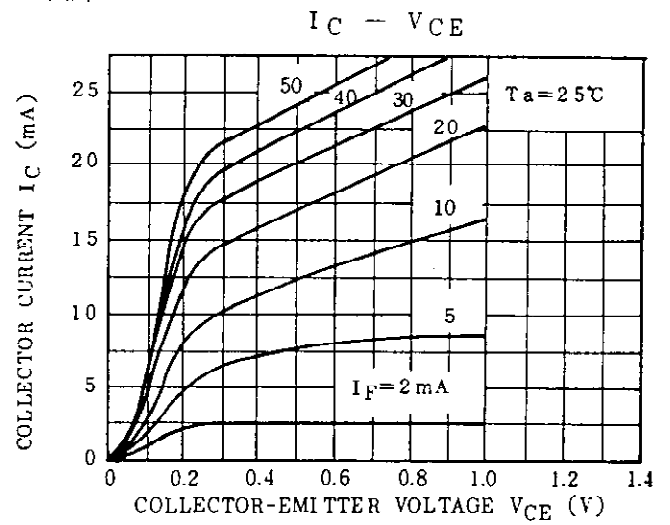
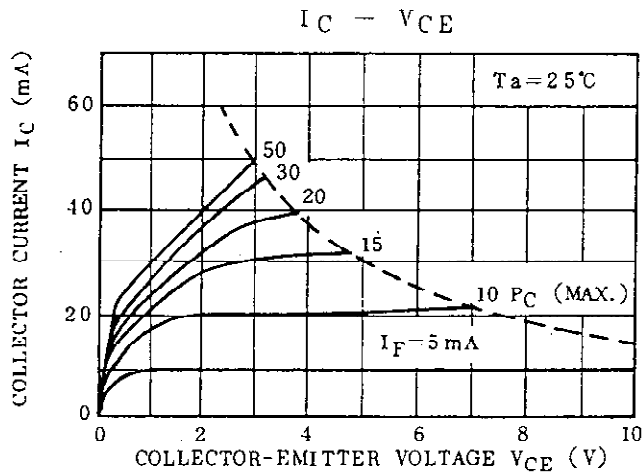


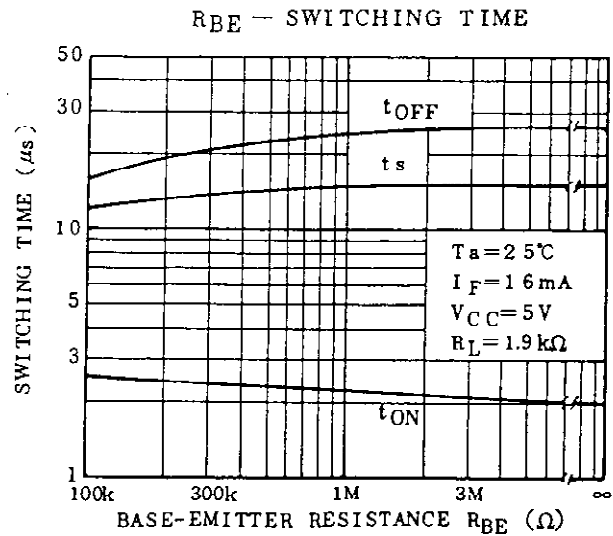
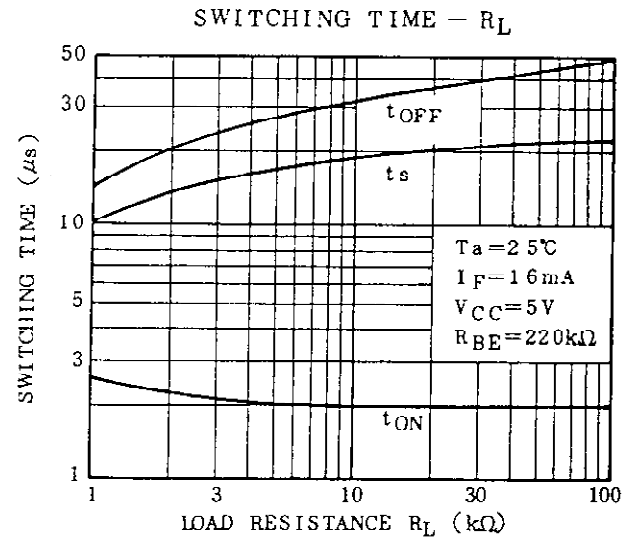
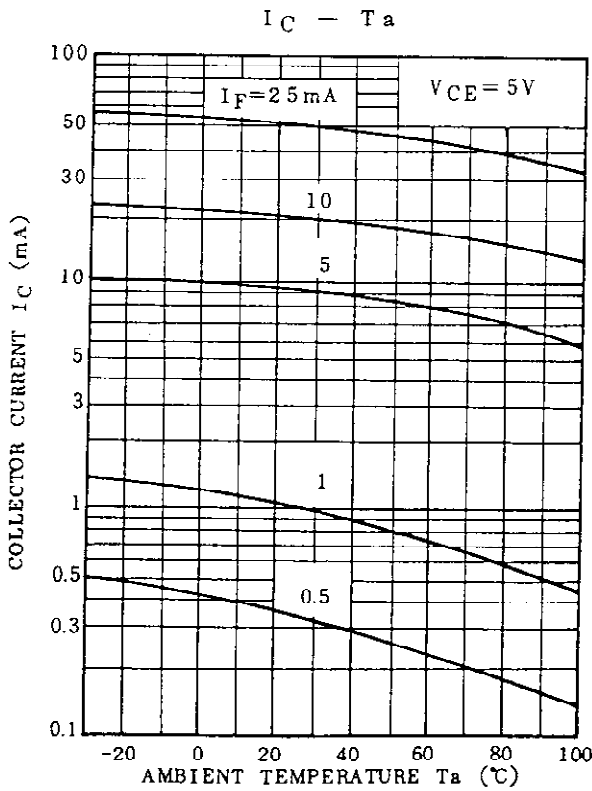
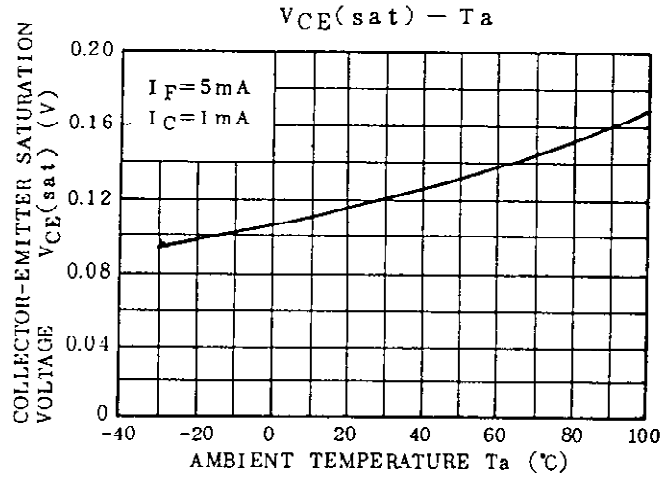
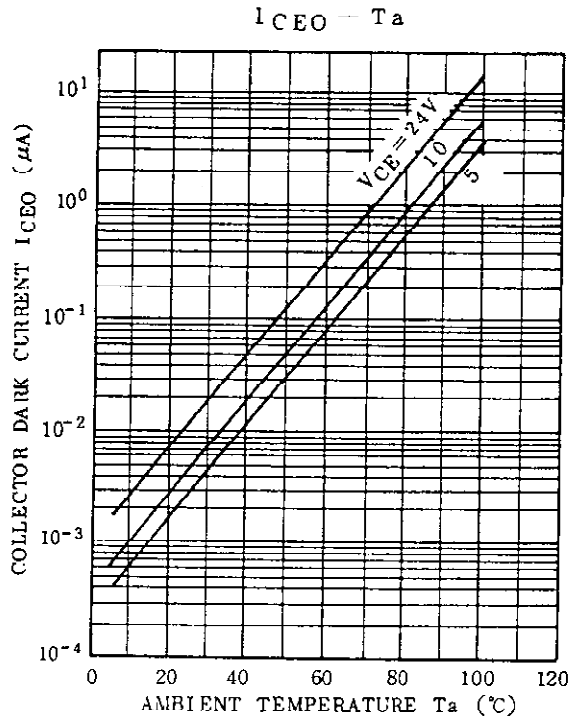
$\Delta V_F / \Delta T_a - I_F$

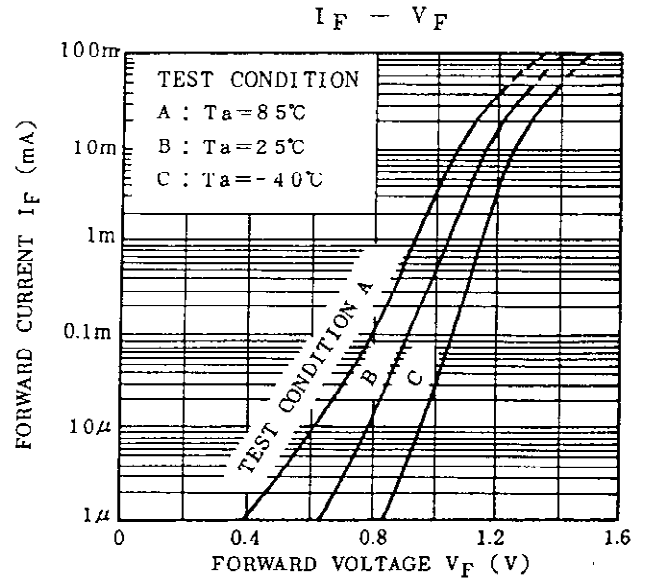
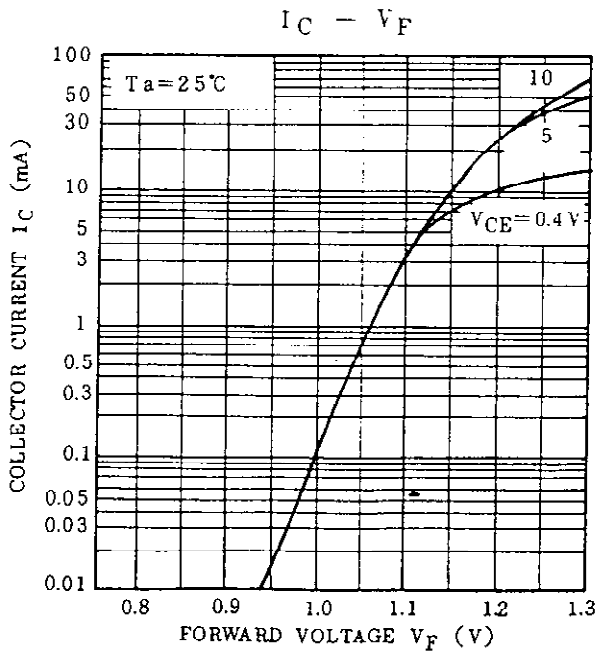
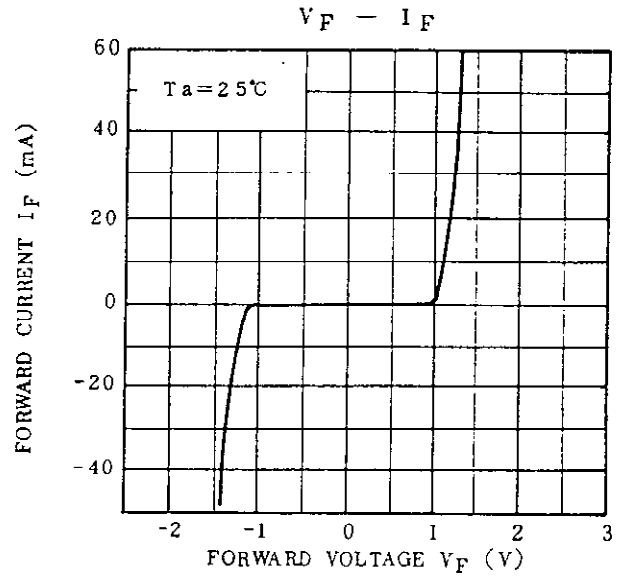
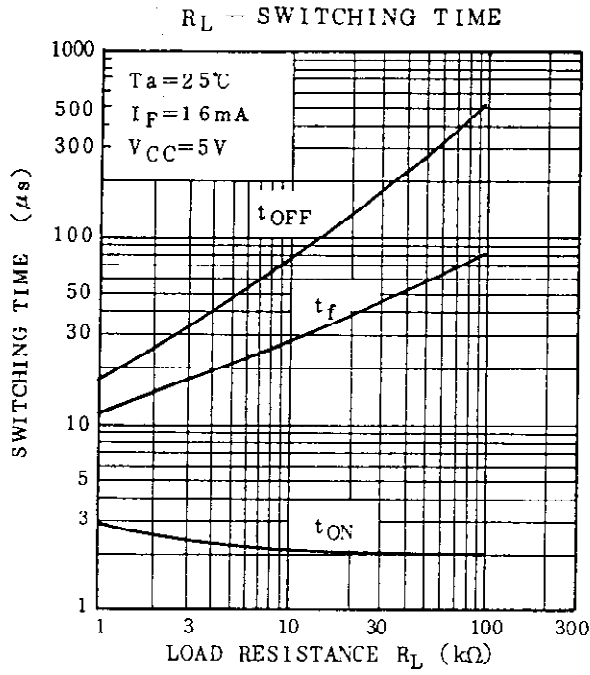


$I_{FP} - V_{FP}$









Notes