

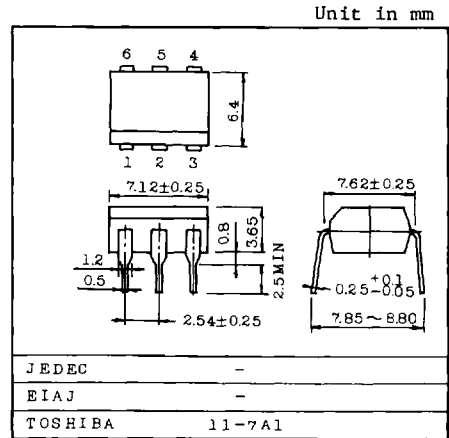
TLP531, 532

PROGRAMMABLE CONTROLLERS
 AC/DC-INPUT MODULE
 SOLID STATE RELAY

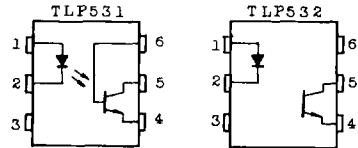
The TOSHIBA TLP531 and TLP532 consist of a photo-transistor optically coupled to a gallium arsenide infrared emitting diode in a six lead plastic DIP package.

TLP532 is no-base internal connection for high-EMI environments.

- Collector-Emitter Voltage: 55V Min.
- Current Transfer Ratio : 50% Min.
 Rank GB: 100% Min.
- Isolation Voltage : 2500Vrms Min.
- UL Recognized : File No. E67349



PIN CONFIGURATION (TOP VIEW)



- | | |
|--------------|--------------|
| 1. ANODE | 1. ANODE |
| 2. CATHODE | 2. CATHODE |
| 3. NC | 3. NC |
| 4. EMITTER | 4. EMITTER |
| 5. COLLECTOR | 5. COLLECTOR |
| 6. BASE | 6. NC |



TLP531, 532

MAXIMUM RATINGS (Ta=25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
LED	Forward Current	I_F	70	mA
	Forward Current Derating (Ta \geq 50°C)	$\Delta I_F/^\circ\text{C}$	0.93	mA/°C
	Peak Forward Current (100 μ s pulse, 100pps)	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 (TLP531)	V_{CBO}	80	V
	Emitter-Collector Voltage	V_{ECO}	7	V
	Emitter-Base Voltage (TLP531)	V_{EBO}	7	V
	Collector Current	I_C	50	mA
	Power Dissipation	P_C	150	mW
	Power Dissipation Derating (Ta \geq 25°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}	-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 \geq 25°C)		$\Delta P_T/^\circ\text{C}$	-2.5	mW/°C
Isolation Voltage (AC, 1 min, RH \leq 60%)		BV_S	2500	V _{rms}

INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta=25°C)

CHARACTERISTIC		SYMBOL	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-Base Breakdown Voltage (TLP531)	$V_{(BR)CBO}$	$I_C=0.1mA$	80	-	-	V
	Emitter-Base Breakdown Voltage (TLP531)	$V_{(BR)EBO}$	$I_E=0.1mA$	7	-	-	V
	Collector Dark Current	I_{CEO}	$V_{CE}=24V$	-	10	100	nA
			$V_{CE}=24V, T_A=85^\circ C$	-	2	50	μA
Capacitance (Collector to Emitter)	C_{CE}	$V=0, f=1MHz$	-	10	-	pF	

CHARACTERISTICS	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	I_C/I_F	$I_F=5mA, V_{CE}=5V$	50	200	600	%
		Rank Y	50	-	150	
		Rank YG	50	-	300	
		Rank GR	100	-	300	
		Rank GB	100	-	600	
		Rank BL	200	-	600	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=2.4mA, I_F=8mA$	-	-	0.4	V

ISOLATION CHARACTERISTICS (Ta=25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance(Input to Output)	CS	VS=0, f=1MHz	-	0.8	-	PF
Isolation Resistance	RS	VS=500V, R.H.≤60%	5×10 ¹⁰	10 ¹⁴	-	Ω
Isolation Voltage	BVS	AC, 1 minute	2500	-	-	Vrms

SWITCHING CHARACTERISTICS (Ta=25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	tr	VCC=10V IC=2mA RL=100Ω	-	2	-	μs
Fall Time	tf		-	3	-	
Turn-on Time	ton		-	3	-	
Turn-off Time	toff		-	3	-	
Turn-on Time	tON	RL=1.9kΩ (Fig.1)	-	2	-	μs
Storage Time	tS	RBE=OPEN	-	15	-	
Turn-off Time	tOFF	VCC=5V, IF=16mA	-	25	-	
Turn-on Time	tON	RL=1.9kΩ (Fig.1)	-	2	-	μs
Storage Time	tS	RBE=220kΩ (TLP531)	-	12	-	
Turn-off Time	tOFF	VCC=5V, IF=16mA	-	20	-	

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	VCC	-	5	24	V
Forward Current	IF	-	16	25	mA
Collector Current	IC	-	1	10	mA
Operating Temperature	Topr	-25	-	85	°C

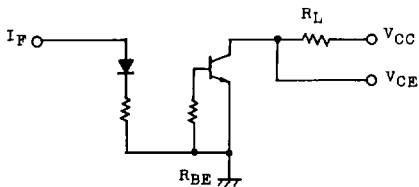
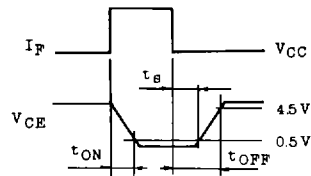
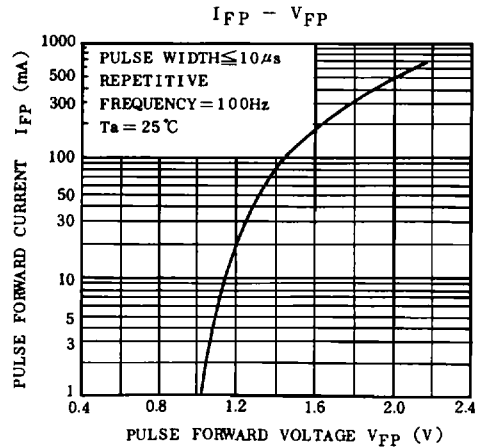
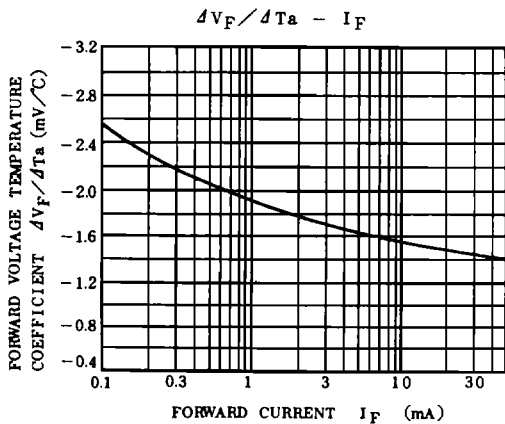
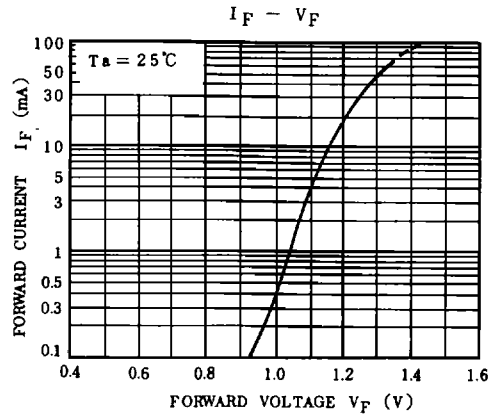
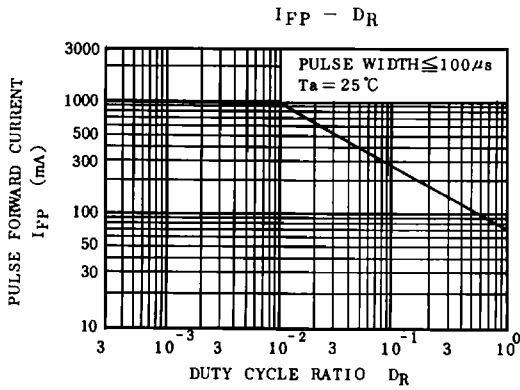
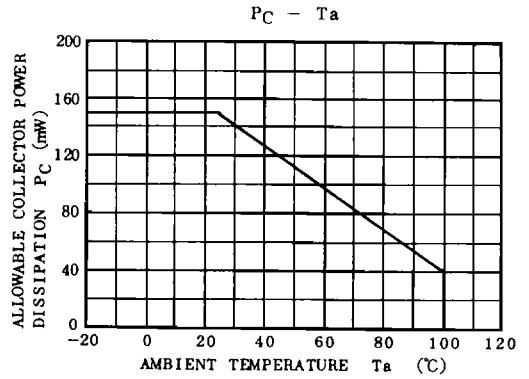
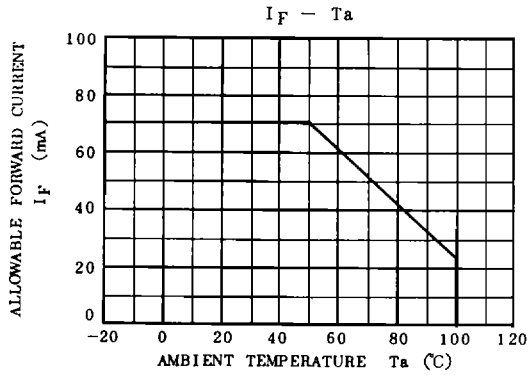
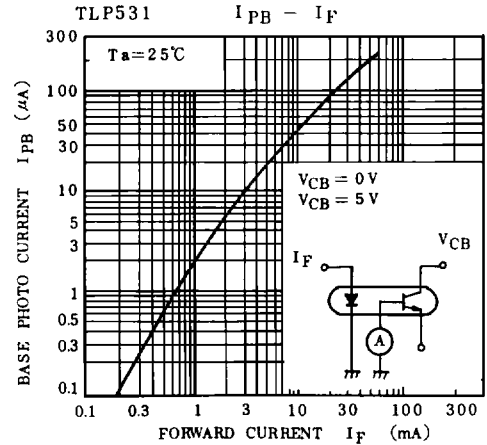
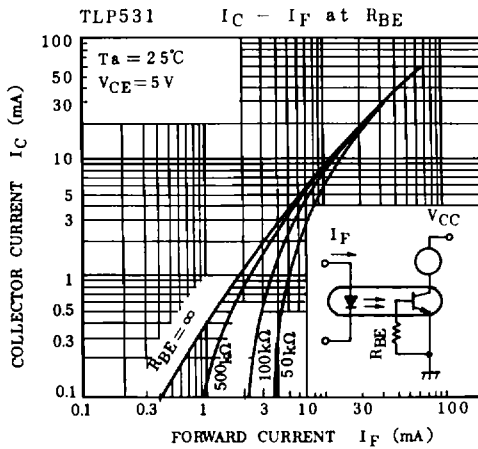
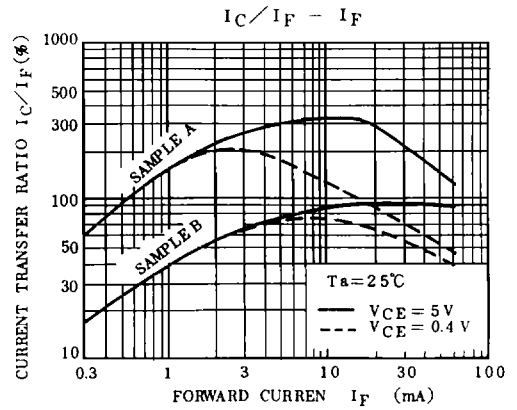
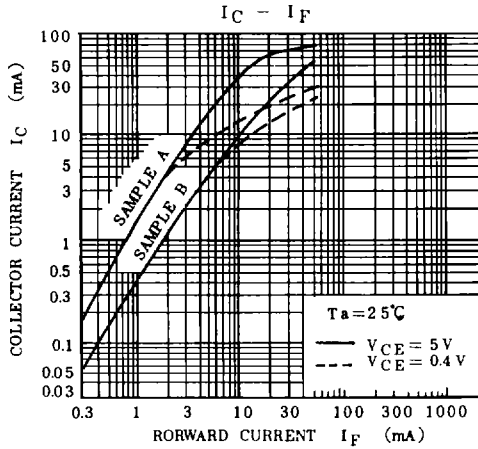
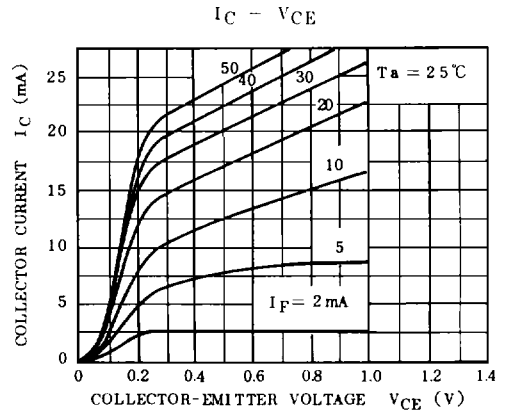
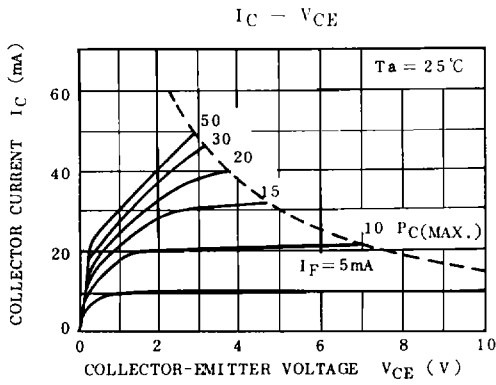
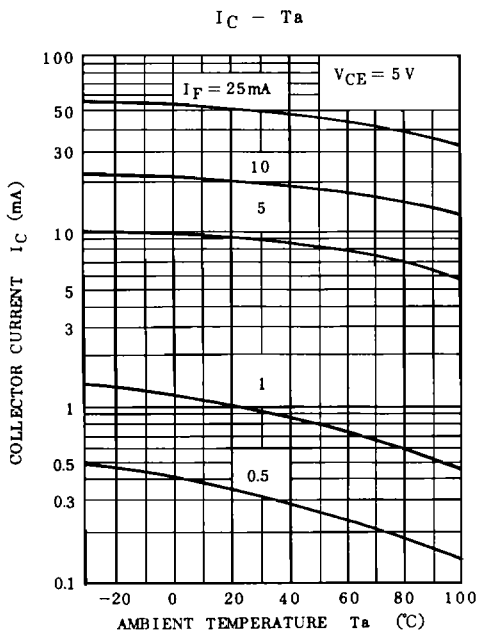
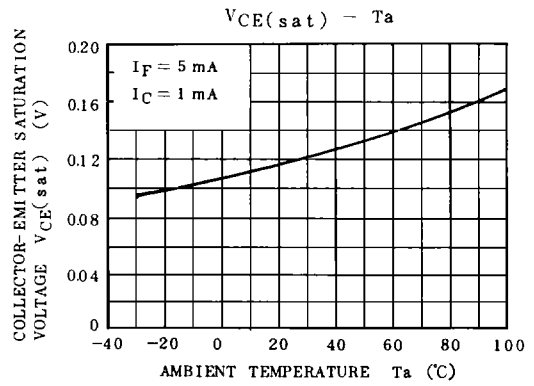
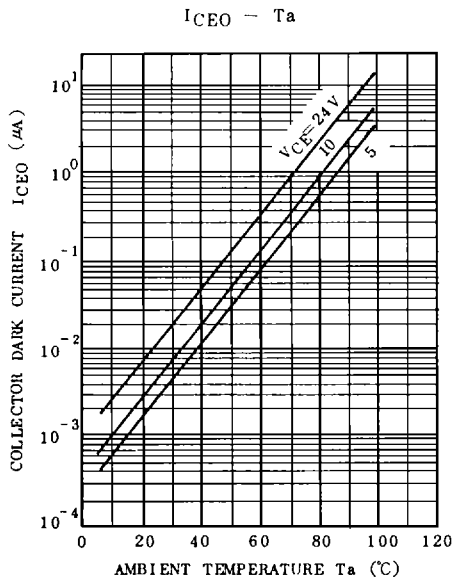


Fig. 1 Switching Time Test Circuit

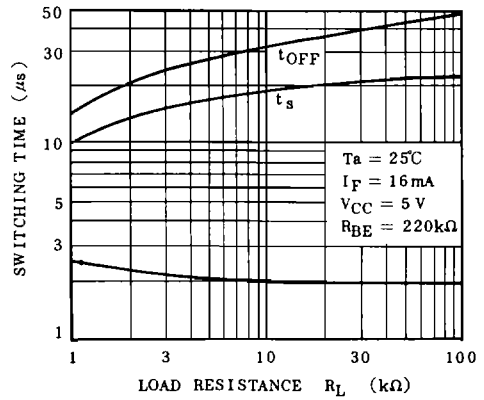




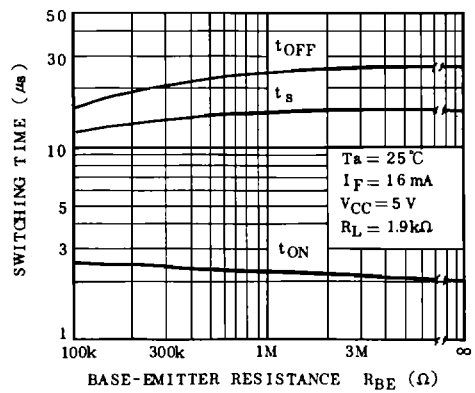




TLP531 SWITCHING TIME - R_L



TLP531 $R_{BE} -$ SWITCHING TIME



TLP531,532

