TLP580, TLP581

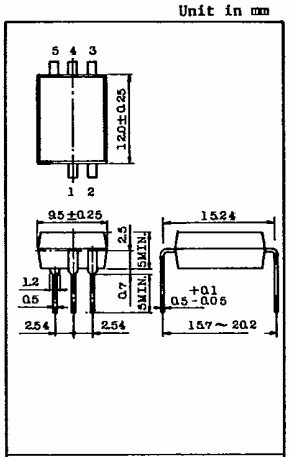
GaAlAs Infrared Emitting Diode & NPN Silicon
Photo-Transisotr

The TOSHIBA TLP580 and TLP581 consists of a gallium aluminum arsenide, infrared emitting diode coupled with a silicon photo transistor in a dual in-line package. TLP580 is no-base internal connection for high-EMI environments.

- AC Isolation Voltage : 5kV
- Nominal Isolation Operating Voltage (Note 1)
  : 1000Vac or 1200Vdc for Isolation Group B
  750Vac or 900Vdc for Isolation Group C
- Climatic Test Class : 25/100/21 DIN40045
- Internal Isolation Thickness Between Metal Parts
  : 2mm (Min.) (Note 2)
- External Creepage Distance and Airgaps
  : 14.5mm (Min.) (Note 3)
- Housing : Epoxy Molded
- TOSHIBA Unique Double Molded Construction
- High Efficiency Low Degradation Liquid Epitaxial IRED
- Low Coupling Capacity : 0.3pF (Typ.)
- Current Transfer Ratio : 60% (Typ.)

UL Recognized : File No. E67349
VDE Approved : Certificate No. 37411

Unit in mm



JEDEC	—
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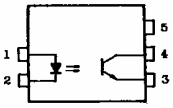
TOSHIBA	11-10D1A

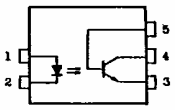
PIN CONFIGUTATION (TOP VIEW)

TLP580



1. ANODE
2. CATHODE
3. EMITTER
4. COLLECTOR
5. NC

TLP581



1. ANODE
2. CATHODE
3. EMITTER
4. COLLECTOR
5. BASE

Note 1. According to VDE0110b/2.79
2. According to VDE0730-2P
3. Creeping current resistance : Group I (KB>100-KC>100)
According to VDE0110b/2.79 Table 3.

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

	CHARACTERISTIC	SYMBOL	RATING	UNIT
LED	Reverse Voltage	V_R	5	V
	Forward Current	I_F	50	mA
	Forward Surge Current ($t_p \leq 100\mu s$)	I_{FSM}	1	A
	Power Dissipation	P_D	100	mW
	Junction Temperature	T_j	100	°C
PHOTO-TRANSISTOR	Collector-Emitter Voltage	BV_{CEO}	35	V
	Collector-Base Voltage (TLP581)	BV_{CBO}	50	V
	Emitter-Collector Voltage	BV_{ECO}	5	V
	Collector Current	I_C	50	mA
	Peak Collector Current ($\frac{t_p}{T} = 0.5$, $t_p \leq 10ms$)	I_{CM}	100	mA
	Power Dissipation	P_C	150	mW
	Junction Temperature	T_j	125	°C
COUPLED	AC Isolation Voltage	BV_S	5	kV
	Storage Temperature	T_{stg}	-55～125	°C
	Operating Temperature	T_{opr}	-55～100	°C
	Lead Soldering Temperature (at 10 sec.)	T_{sold}	260	°C
	Total Power Dissipation	P_T	250	mW

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

	CHARACTERISTIC	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V_F	I_F=10mA	-	1.65	1.8	V
	Reverse Current	I_R	V_R=5V	-	-	10	μA
	Capacitance	C_D	V=0, f=1MHz	-	45	-	pF
PHOTO-TRANSISTOR	Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=0.5mA, I_F=0	35	-	-	V
	Collector-Base Breakdown Voltage (TLP581)	$V_{(BR)CBO}$	I_C=100μA, I_F=0	50	-	-	V
	Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	I_E=100μA, I_F=0	5	-	-	V
	Collector Dark Current	I_{CEO}	V_{CE}=10V, I_F=0	-	1	50	nA
	Collector-Emitter Capacitance	C_{CE}	V=0, f=1MHz	-	15	-	pF
COUPLED	Current Transfer Ratio	I_C/I_F	I_F=10mA, V_{CE}=5V	25	60	-	%
	Saturation Voltage	$V_{CE(sat)}$	I_F=10mA, I_C=2.4mA	-	0.1	0.4	V
	Capacitance Input to Output	C_S	V=0, f=1MHz	-	0.3	-	pF
	Isolation Resistance	R_S	V=1000V, 50% R.H.	-	10^{12}	-	Ω
	AC Isolation Voltage	BV_S	t=1 minute	5	-	-	kV
	Turn-On Time	t_{on}	V_{CE}=10V, I_C=2mA R_L=100Ω	-	6	-	μs
	Turn-Off Time	t_{off}	V_{CE}=10V, I_C=2mA R_L=100Ω	-	6	-	μs

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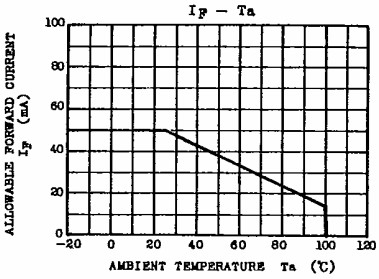
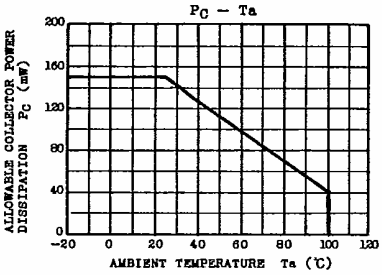
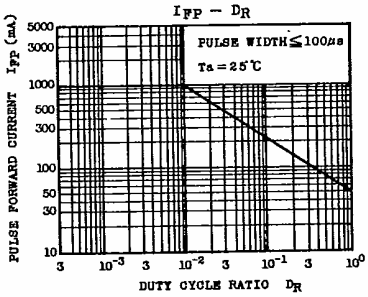
I_F – Ta



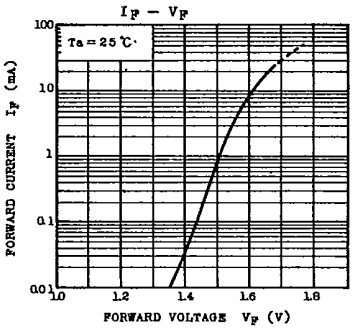
P_C – Ta



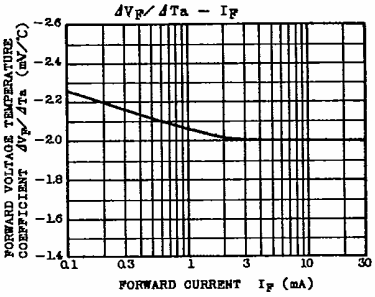
I_{FP} – D_R



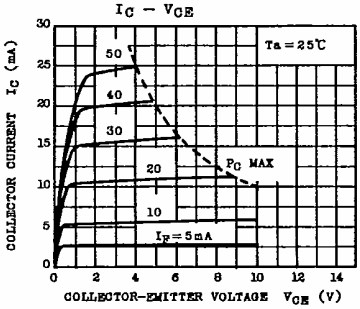
I_F – V_F



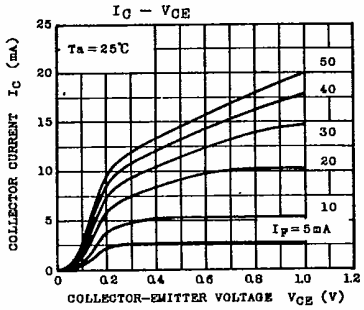
$\Delta V_F/\Delta Ta$ – I_F



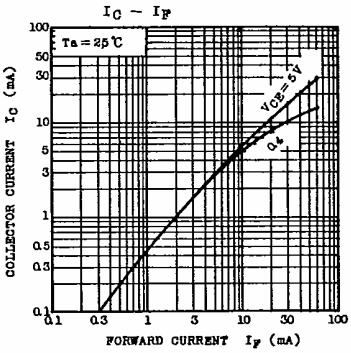
I_C – V_{CE}



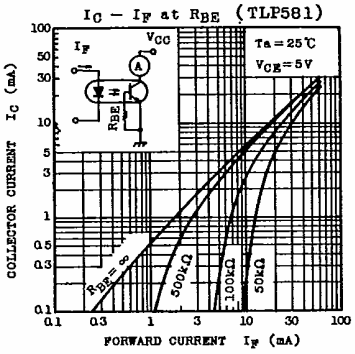
I_C – V_{CE}



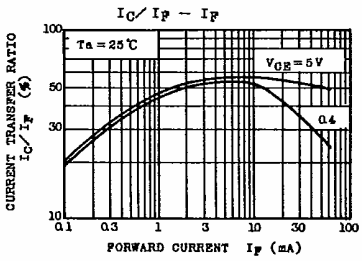
I_C – I_F



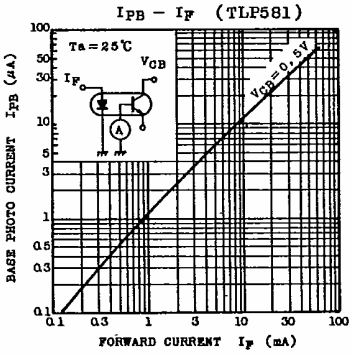
I_C – I_F at R_{BE} (TLP581)



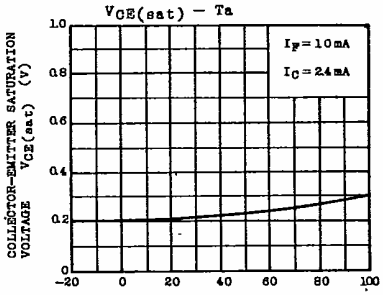
I_C/I_F – I_F

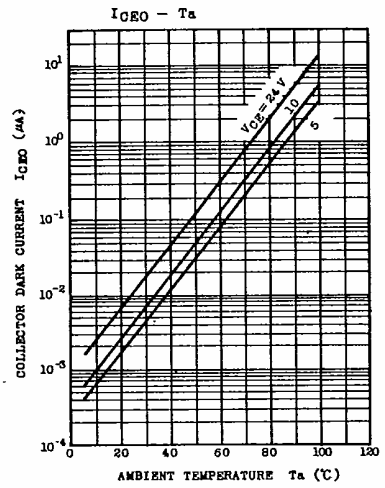


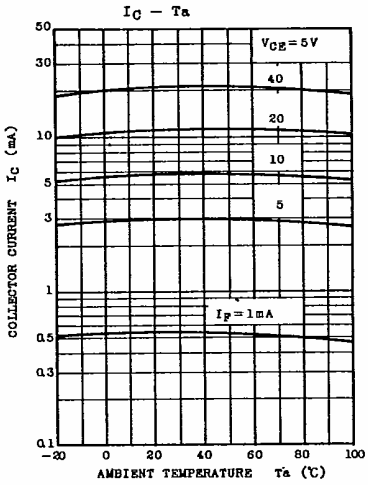
I_{PB} – I_F (TLP581)

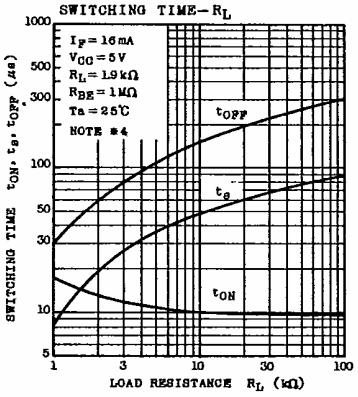


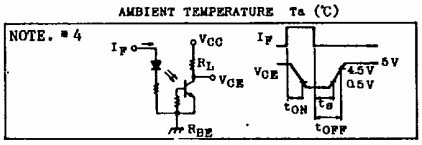
$V_{CE(sat)}$ – Ta




ICEO – Ta
COLLECTOR DARK CURRENT ICEO (μA)
AMBIENT TEMPERATURE Ta (℃)
VCE=24 V
10
5


IC – Ta
COLLECTOR CURRENT IC (mA)
AMBIENT TEMPERATURE Ta (℃)
VCE=5V
40
20
10
5
IF=1mA


SWITCHING TIME–RL
IF=16mA
VCC=5V
RL=1.9kΩ
RBE=1MΩ
Ta=25℃
NOTE #4
tOFF
ts
tON
SWITCHING TIME tON, ts, tOFF (μs)
LOAD RESISTANCE RL (kΩ)


AMBIENT TEMPERATURE Ta (℃)
NOTE. #4
IF
VCC
RL
VCE
RBE
IF
VCE
4.5V
5V
0.5V
tON
ts
tOFF