SEMICONDUCTOR
TOSHIBA
TECHNICAL DATA

TOSHIBA PHOTOCOUPLER
TLP627, TLP627-2, TLP627-4
GaAs IRED & PHOTO-TRANSISTOR

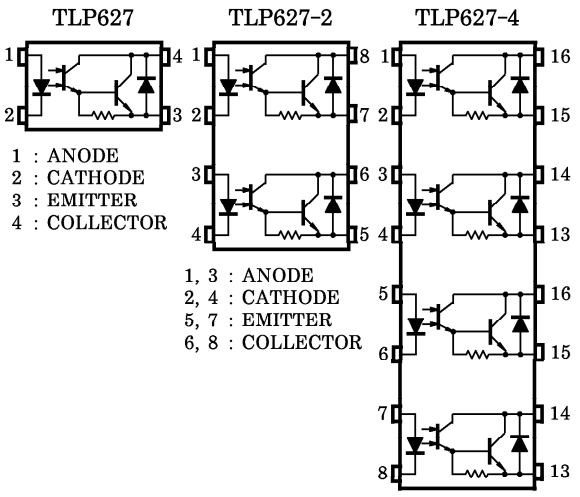
(TLP627)

PROGRAMMABLE CONTROLLERS.
DC - OUTPUT MODULE.
TELECOMMUNICATION.

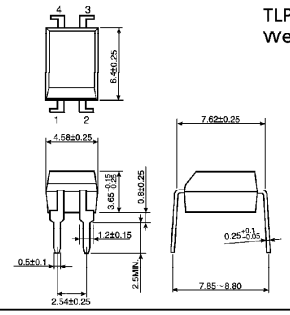
The TOSHIBA TLP627, -2, and -4 consist of a gallium arsenide infreared emitting diode optically coupled to a darlington connected phototransistor which has an integral base-emitter resistor to optimize switching speed and elevated temperature characteristics.
The TLP627-2 offers two isolated channels in a eight lead plastic DIP package, while the TLP627-4 provide four isolated channels per package.

- Collector-Emitter Voltage : 300V (Min.)
- Current Transfer Ratio : 1000% (Min.)
- Isoration Voltage : 5000Vrms (Min.)
- UL Recognized : UL1577, File No. E67349

PIN CONFIGURATIONS (TOP VIEW)



Unit in mm



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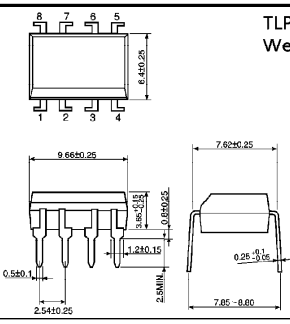
EIAJ	—
TOSHIBA	11-5B2



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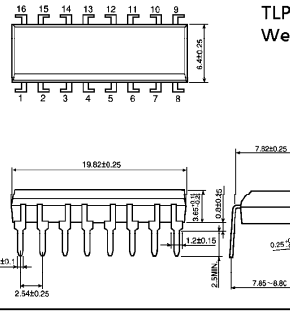

JEDEC	—
EIAJ	—
TOSHIBA	11-20A3

(TLP627)

MAXIMUM RWTINGS (Ta = 25°C)

CHARACTORISTIC		SYMBOL	RATING		UNIT
			TLP627	TLP627-2 TLP627-4	
LED	Forward Current	I_F	60	50	mA
	Forward Current Darating	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 (Ta≧25°C, 1 Circuit)	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}	300		V
	Emitter-Collector Voltage	V_{ECO}	0.3		V
	Collector Current	I_C	150		mA
	Collector Power Dissipation (1 Circuit)	P_C	150 (*300)	100	mW
	Collector Power Dissipation Derating (Ta≧25°C, 1 Circuit)	ΔP_C / °C	−1.5 (*−3.5)	−1.0	mW / °C
	Junction Temperature	T_j	125		°C
Storage Temperature Range		T_{stg}	−55~150		°C
Operating Temperature Range		T_{opr}	−55~100		°C
Lead Soldering Temperature		T_{sold}	260 (10sec)		°C
Total Package Power Dissipation (1 Circuit)		P_T	200 (*320)	150	mW
Total Package Power Dissipation Derating (Ta≧25°C, 1 Circuit)		ΔP_T / °C	−2.0 (*−3.2)	−1.5	mW / °C
Isolation Voltage		BV_S	5000 (AC, 1min., R.H.≦60%)		Vrms

* I_F = 20mA Max

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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 = 0.1mA	300	—	—	V
	Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	I_E = 0.1mA	0.3	—	—	V
	Collector Dark Current	I_{CEO}	V_{CE} = 200V	—	10	200	nA
			V_{CE} = 200V, Ta = 85°C	—	—	20	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 = 1mA, V_{CE} = 1V	1000	4000	—	%
Saturated CTR	$I_C / I_{F(sat)}$	I_F = 10mA, V_{CE} = 1V	500	—	—	%
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 10mA, I_F = 1mA	—	—	1.0	V
		I_C = 100mA, I_F = 10mA	0.3	—	1.2	

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 R.H. ≦ 60%	5×10^{10}	10^{14}	—	Ω
Isolation Voltage	BV_S	AC, 1 minute	5000	—	—	Vrms
		AC, 1 second, in oil	—	10000	—	
		DC, 1 minute, in oil	—	10000	—	Vdc

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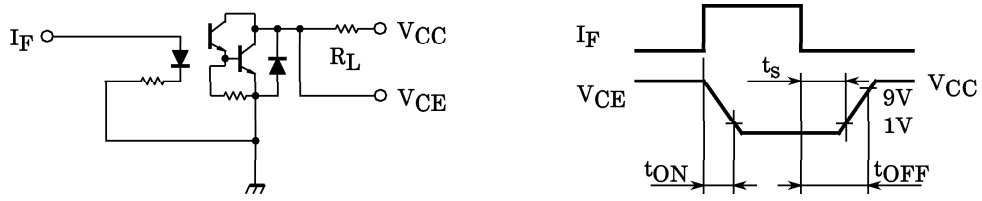
SWITCHING CHARACTERISTICS (Ta = 25°C)

CHARACTERICTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	t_r	V_{CC} = 10V I_C = 10mA R_L = 100Ω	—	40	—	μs
Fall Time	t_f		—	15	—	
Turn-on Time	t_{on}		—	50	—	
Turn-off Time	t_{off}		—	15	—	
Turn-on Time	t_{ON}	R_L = 180Ω (Fig.1) V_{CC} = 10V, I_F = 16mA	—	5	—	μs
Strage Time	t_s		—	40	—	
Tuen-off Time	t_{OFF}		—	80	—	

RECOMMENDED OPERATING CONDITIONS

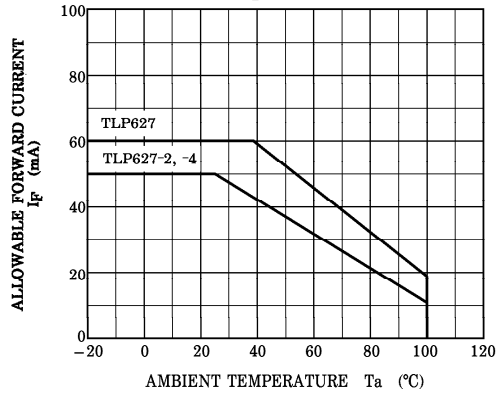
CHARACTERICTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{CC}	—	—	200	V
Forward Current	I_F	—	16	25	mA
Collector Current	I_C	—	—	120	mA
Operating Temperature	T_{opr}	−25	—	85	°C

Fig.1 SWITCHING TIME TEST CIRCUIT

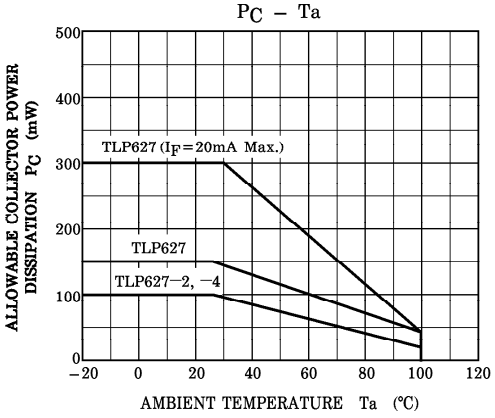


(TLP627)

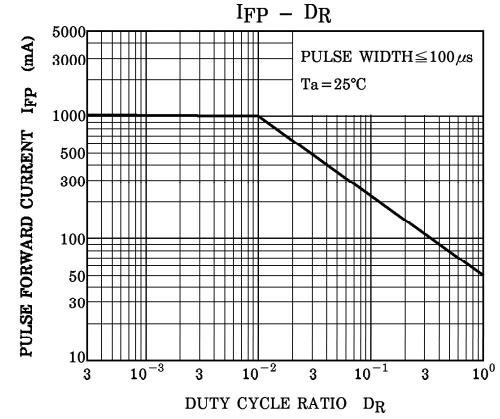
I_F – Ta



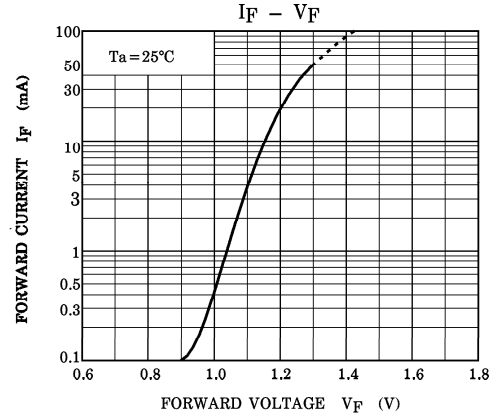
P_C – Ta



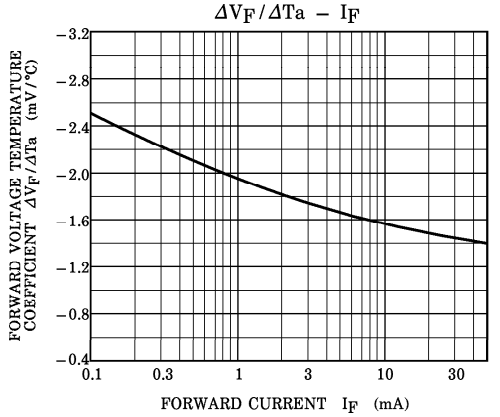
I_{FP} – D_R



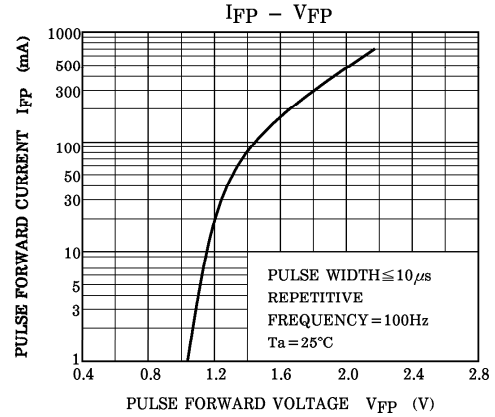
I_F – V_F



$\Delta V_F / \Delta Ta$ – I_F



I_{FP} – V_{FP}



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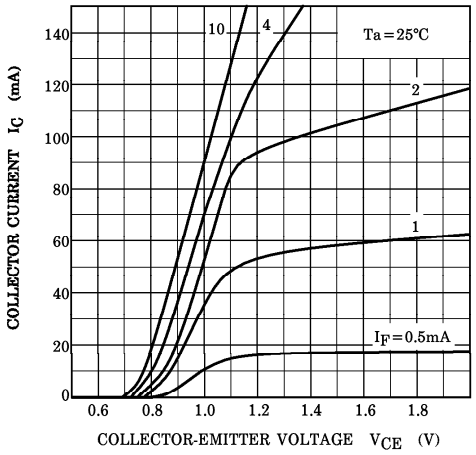
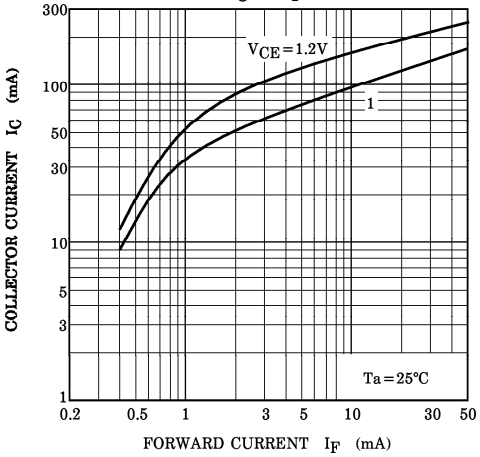
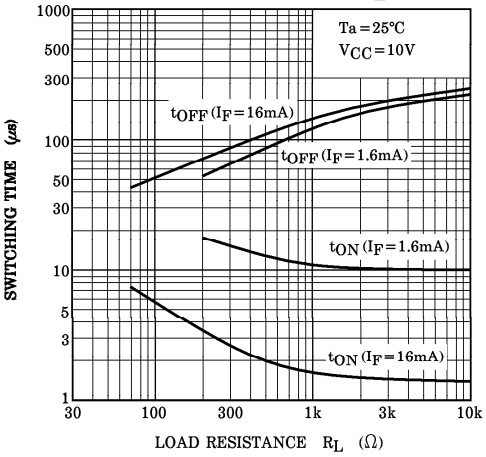
$I_C - V_{CE}$



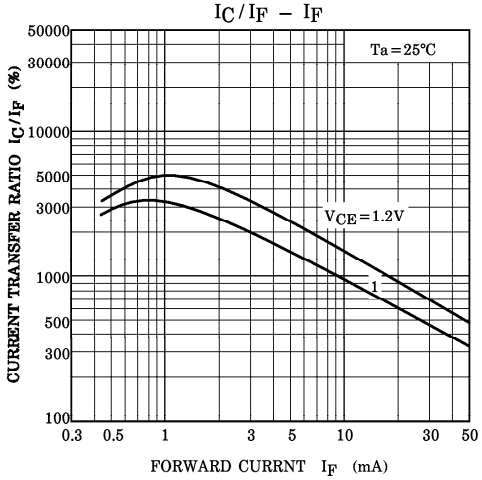
$I_C - I_F$



SWITCHING TIME – R_L



$I_C / I_F - I_F$



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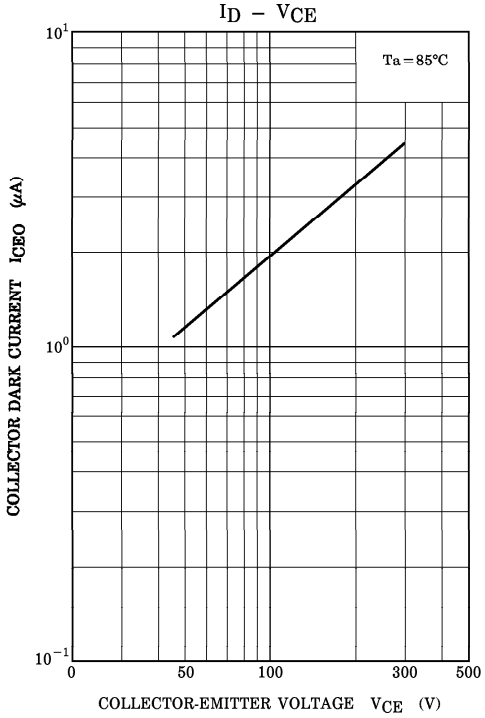
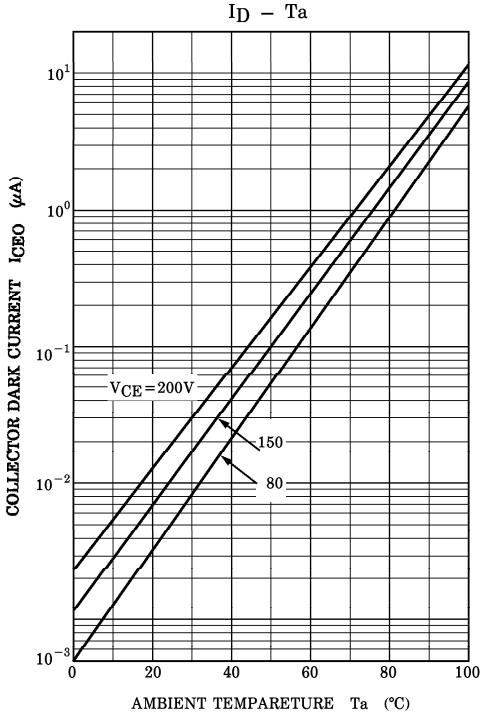
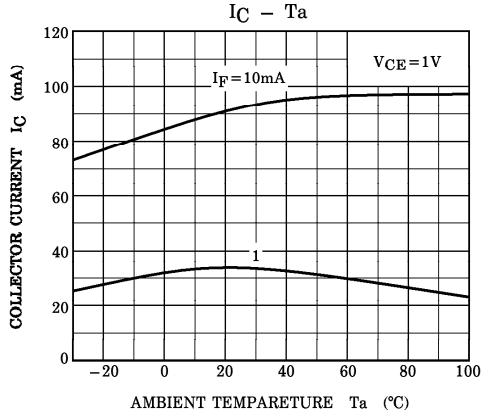
$I_D - V_{CE}$



$I_D - Ta$



$I_C - Ta$



$I_C - Ta$