

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

TLP624, TLP624-2, TLP624-4

PROGRAMMABLE CONTROLLERS
AC/DC-INPUT MODULE
TELECOMMUNICATION

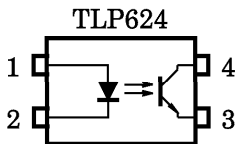
The TOSHIBA TLP624, -2 and -4 consist of a gallium arsenide infrared emitting diode optically coupled to a photo-transistor. The TLP624-2 offers two isolated channels in an eight lead plastic DIP, while the TLP624-4 provides four isolated channels in a sixteen plastic DIP.

- Collector-Emitter Voltage : 55V Min.
- Current Transfer Ratio

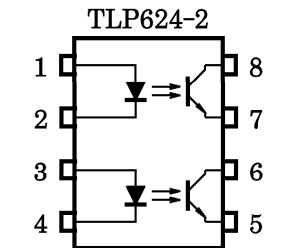
CLASSIFICATION	CURRENT TRANSFER RATIO (Min.)			MARKING OF CLASSIFICATION
	Ta = 25°C		Ta = -25~75°C	
	If = 1mA VCE = 0.5V	If = 0.5mA VCE = 1.5V	If = 1mA VCE = 0.5V	
Rank BV	200%	100%	100%	BV
Standard	100%	50%	50%	BV, Blank

- Isolation Voltage : 5000V_{rms} Min.
- UL Recognized : UL1577, File No. E67349
- BSI Approved : BS EN60065 : 1994 Certificate No.7426
BS EN60950 : 1992 Certificate No.7427
- Note : Application type name for certification test, please use standard product type name, i.e.
TLP624 (BV) : TLP624
TLP624-2 (BV) : TLP624-2

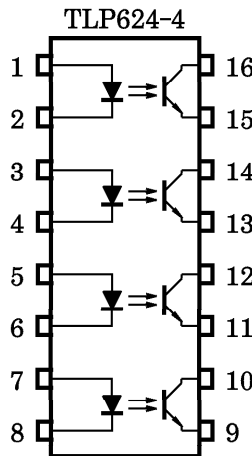
PIN CONFIGURATIONS (TOP VIEW)



- 1. ANODE
- 2. CATHODE
- 3. EMITTER
- 4. COLLECTOR

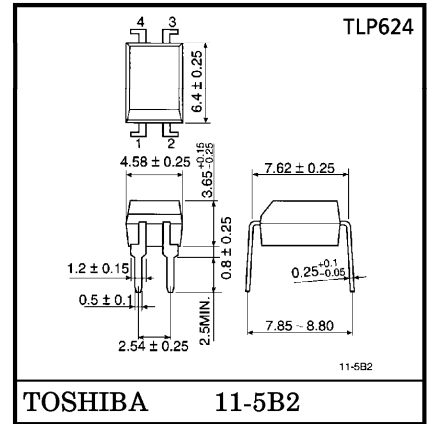


- 1, 3 : ANODE
- 2, 4 : CATHODE
- 5, 7 : EMITTER
- 6, 8 : COLLECTOR



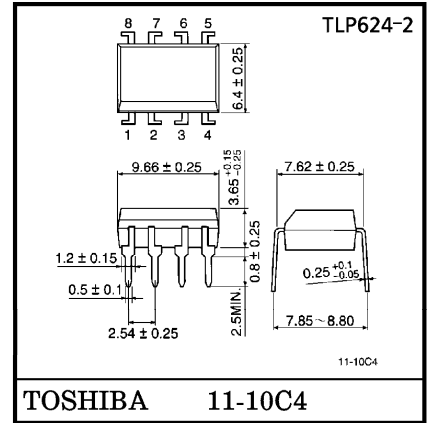
- 1, 3, 5, 7 : ANODE
- 2, 4, 6, 8 : CATHODE
- 9, 11, 13, 15 : EMITTER
- 10, 12, 14, 16 : COLLECTOR

Unit in mm



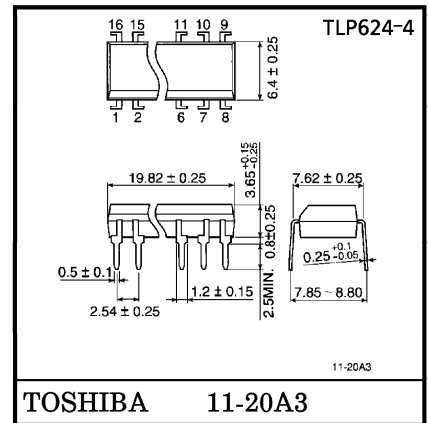
TOSHIBA 11-5B2

Weight : 0.26g



TOSHIBA 11-10C4

Weight : 0.54g



TOSHIBA 11-20A3

Weight : 1.1g

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING		UNIT
			TLP624	TLP624-2 TLP624-4	
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 (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}	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 (Ta ≥ 25°C, 1 Circuit)	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		P _{opr}	-55~100		°C
Lead Soldering Temperature		T _{sol}	260 (10s)		°C
Total Package Power Dissipation (1 Circuit)		P _T	250	150	mW
Total Package Power Dissipation Derating (Ta ≥ 25°C, 1 Circuit)		ΔP _T / °C	-2.5	-1.5	mW / °C
Isolation Voltage (Note 1)		BV _S	5000 (AC, 1min., RH ≤ 60%)		V _{rms}

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

RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V _{CC}	—	5	24	V
Forward Current	I _F	—	1.6	20	mA
Collector Current	I _C	—	1	10	mA
Operating Temperature	T _{opr}	-25	—	75	°C

INDIVIDUAL ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V_F	$I_F = 10\text{mA}$	1.0	1.15	1.3	V
	Reverse Current	I_R	$V_R = 5\text{V}$	—	—	10	μA
	Capacitance	C_T	$V = 0, f = 1\text{MHz}$	—	30	—	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 Dark Current	I_{CEO}	$V_{CE} = 24\text{V}$	—	10	100	nA
			$V_{CE} = 24\text{V}, T_a = 85^\circ\text{C}$	—	2	50	μA
Capacitance Collector to Emitter	C_{CE}	$V = 0, f = 1\text{MHz}$	—	12	—	pF	

COUPLED ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	I_C / I_F	$I_F = 1\text{mA}, V_{CE} = 0.5\text{V}$ Rank BV	100	—	1200	%
			200	—	1200	
Low Input CTR	I_C / I_F (low)	$I_F = 0.5\text{mA}, V_{CE} = 1.5\text{V}$ Rank BV	50	—	—	%
			100	—	—	
Collector-Emitter Saturation Voltage	V_{CE} (sat)	$I_C = 0.5\text{mA}, I_F = 1\text{mA}$	—	—	0.4	V
		$I_C = 1\text{mA}, I_F = 1\text{mA}$	—	0.2	—	
		Rank BV	—	—	0.4	

COUPLED ELECTRICAL CHARACTERISTICS (Ta = -25°C~75°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	I_C / I_F	$I_F = 1\text{mA}, V_{CE} = 0.5\text{V}$ Rank BV	50	—	—	%
			100	—	—	
Low Input CTR	I_C / I_F (low)	$I_F = 0.5\text{mA}, V_{CE} = 1.5\text{V}$ Rank BV	—	50	—	%
			—	100	—	

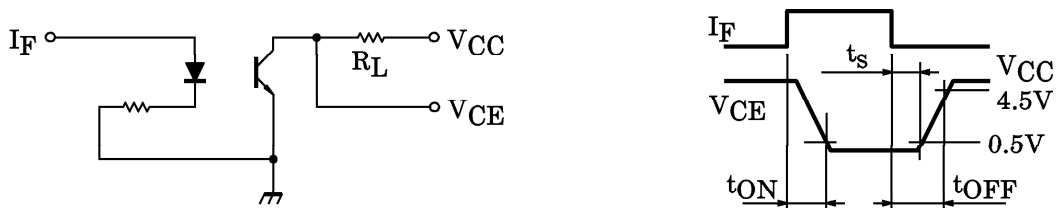
ISOLATION CHARACTERISTICS (Ta = 25°C)

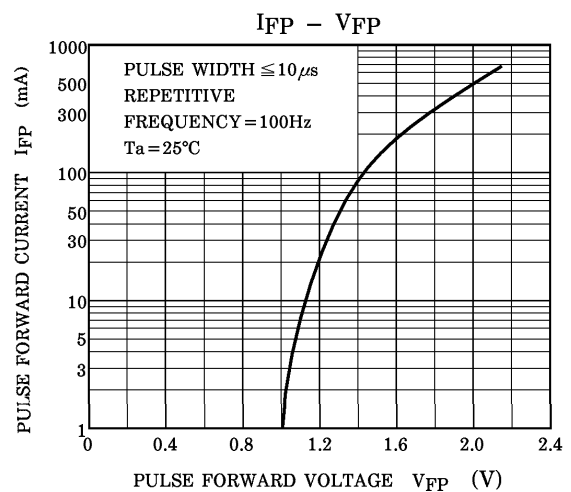
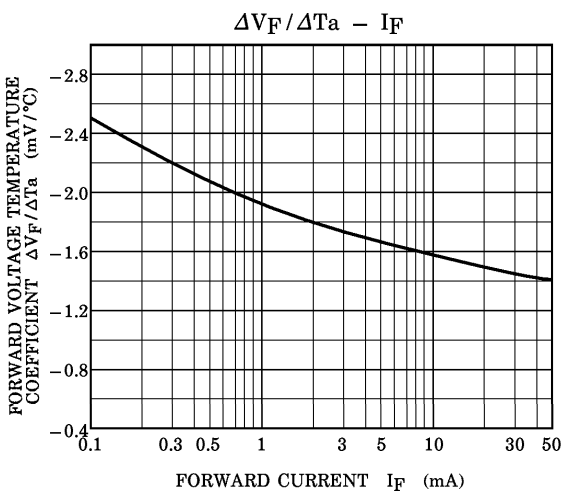
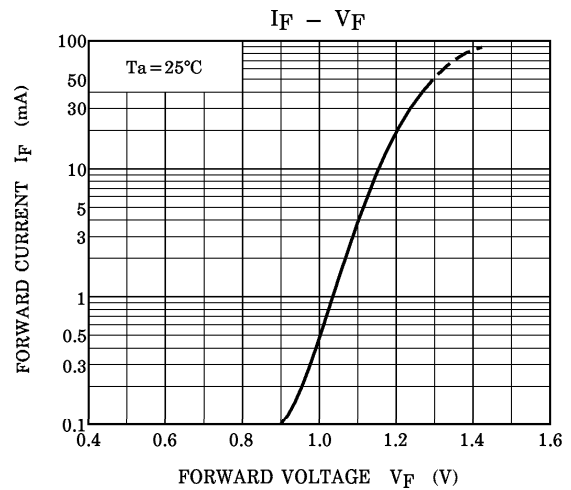
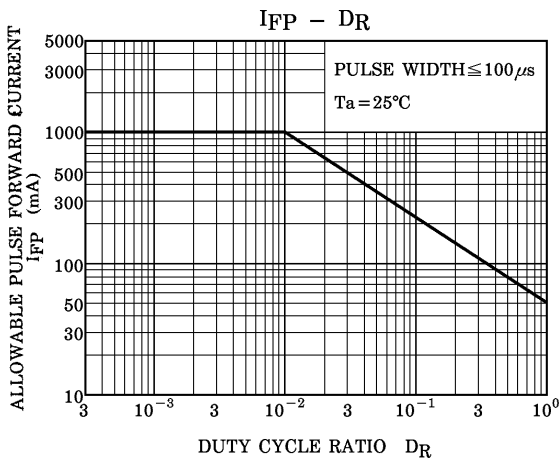
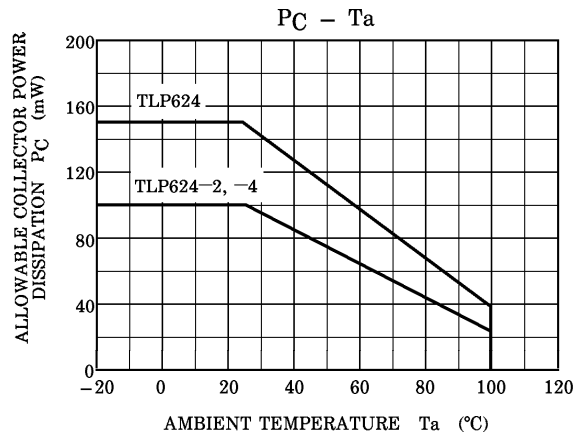
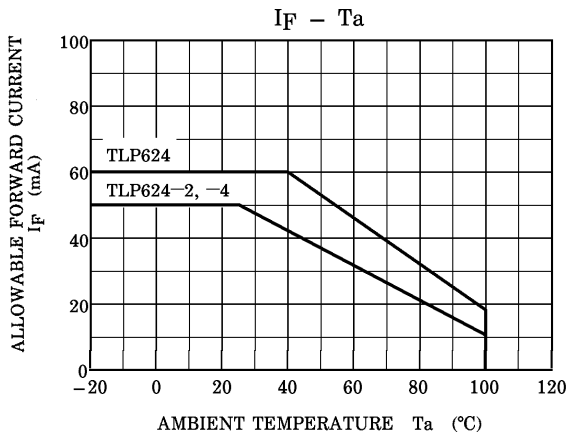
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance Input to Output	C _S	V _S = 0, f = 1MHz	—	0.8	—	pF
Isolation Resistance	R _S	V _S = 500V	5 × 10 ¹⁰	10 ¹⁴	—	Ω
Isolation Voltage	BV _S	AC, 1 minute	5000	—	—	V _{rms}
		AC, 1 second, in oil	—	10000	—	
		DC, 1 minute, in oil	—	10000	—	V _{dc}

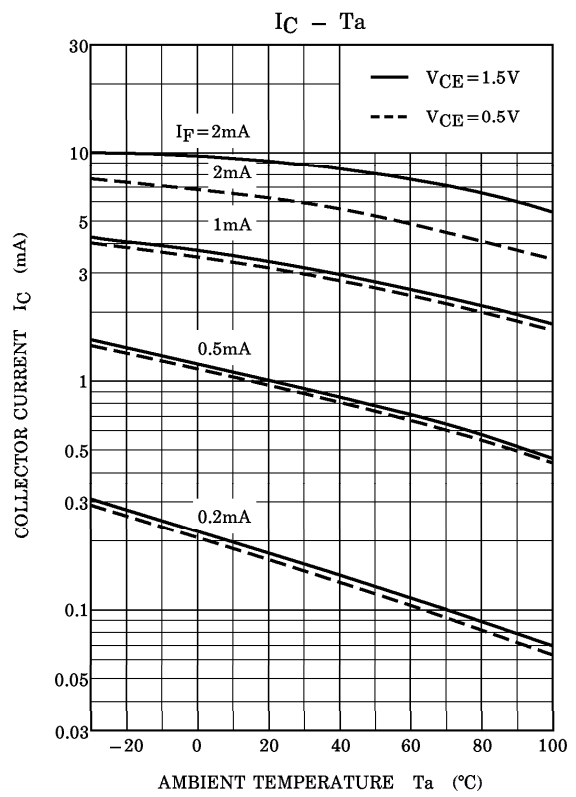
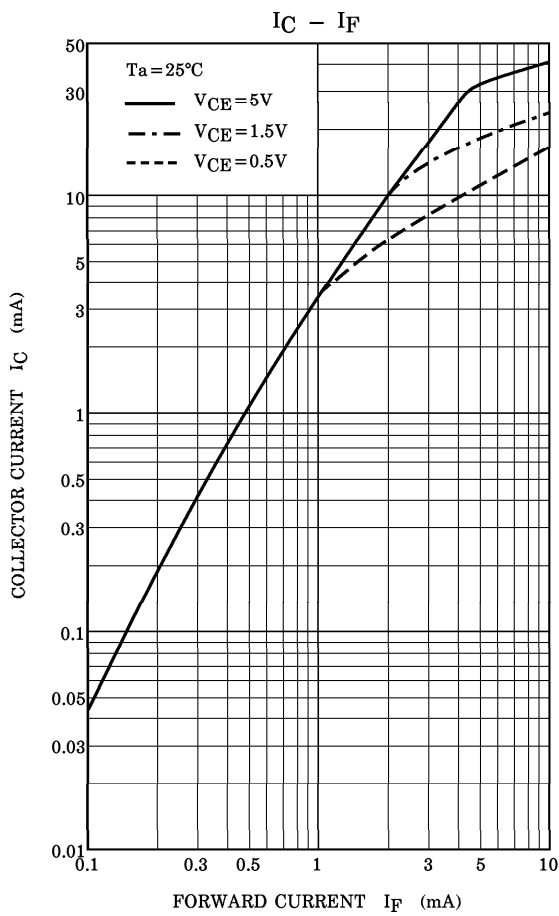
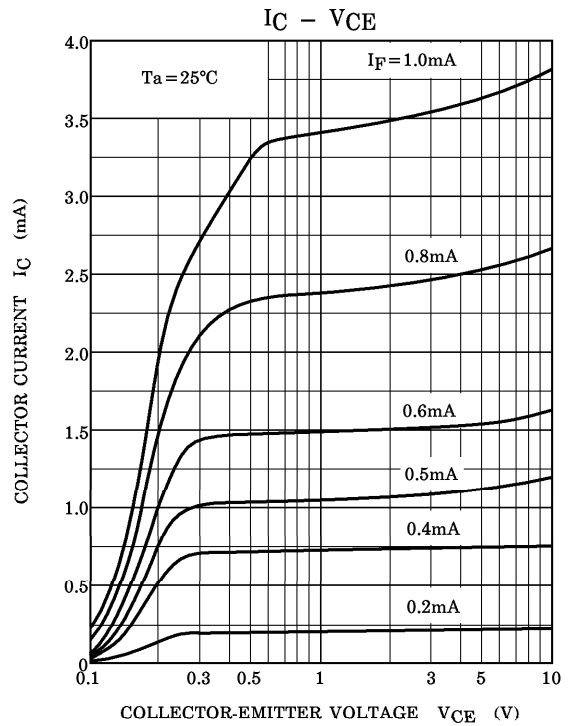
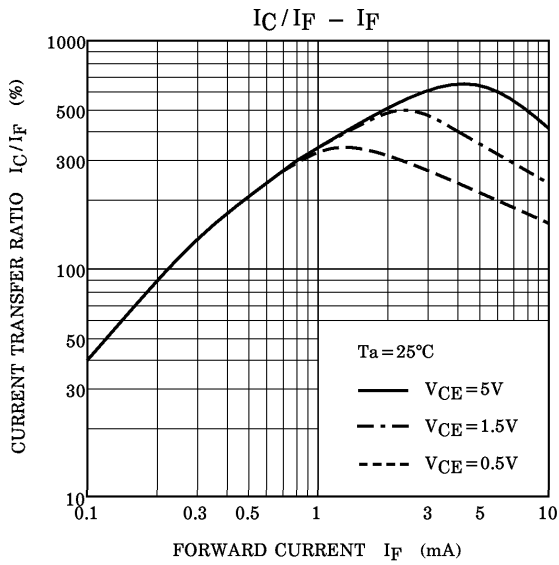
SWITCHING CHARACTERISTICS (Ta = 25°C)

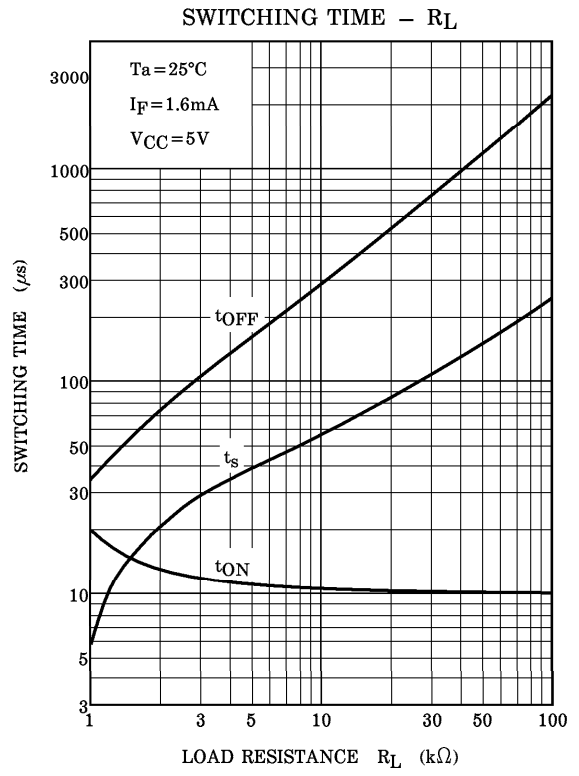
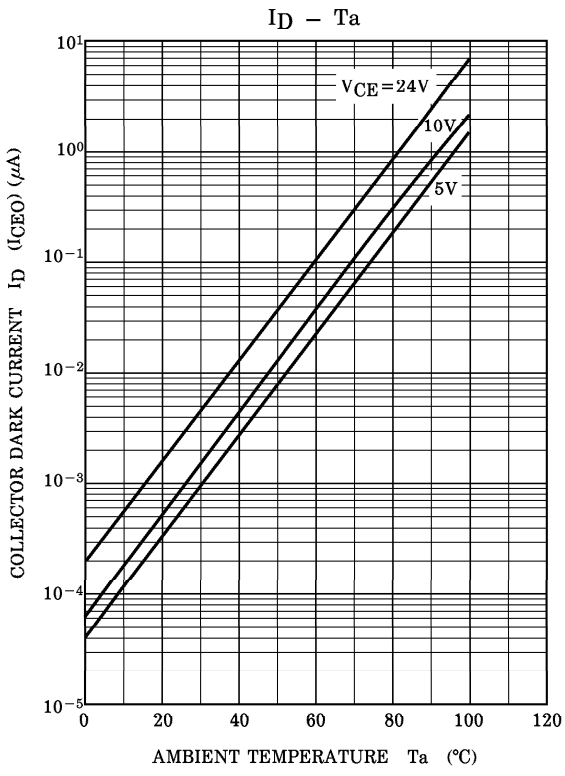
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	t _r	V _{CC} = 10V, I _C = 2mA R _L = 100Ω	—	8	—	μs
Fall Time	t _f		—	8	—	
Turn-on Time	t _{on}		—	10	—	
Turn-off Time	t _{off}		—	8	—	
Turn-on Time	t _{ON}	R _L = 4.7kΩ (Fig.1) V _{CC} = 5V, I _F = 1.6mA	—	10	—	μs
Storage Time	t _s		—	50	—	
Turn-off Time	T _{OFF}		—	300	—	

Fig. 1 SWITCHING TIME TEST CIRCUIT









RESTRICTIONS ON PRODUCT USE

000707EBC

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