

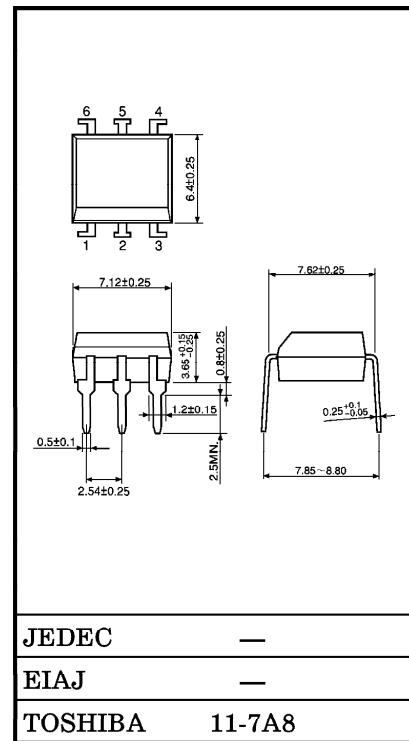
(4N35(Short))

AC LINE / DIGITAL LOGIC ISOLATOR.  
 DIGITAL LOGIC/DIGITAL LOGIC ISOLATOR.  
 TELEPHONE LINE RECEIVER.  
 TWISTED PAIR LINE RECEIVER.  
 HIGH FREQUENCY POWER SUPPLY FEEDBACK CONTROL.  
 RELAY CONTACT MONITOR.

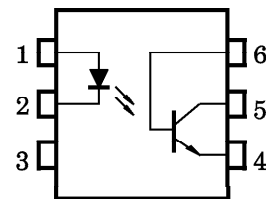
The TOSHIBA 4N35 (Short) through 4N37 (Short) consists of a gallium arsenide infrared emitting diode coupled with a silicon phototransistor in a dual in-line package.

- Switching Speeds :  $3\mu\text{s}$  (Typ.)
- DC Current Transfer Ratio : 100% (Min.)
- Isolation Resistance :  $10^{11}\Omega$  (Min.)
- Isolation Voltage : 2500Vrms (Min.)
- UL Recognized : UL1577, File No. E67349

Unit in mm



PIN CONFIGURATIONS (TOP VIEW)



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

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(4N35(Short))

**MAXIMUM RATINGS (Ta = 25°C)**

CHARACTERISTIC		SYMBOL	RATING	UNIT	
LED	Forward Current (Continuous)	$I_F$	60	mA	
	Forward Current Derating	$\Delta I_F / ^\circ\text{C}$	0.8*	mA / °C	
	Peak Forward Current (Note)	$I_{PF}$	3	A	
	Power Dissipation	$P_D$	100	mW	
	Power Dissipation Derating	$\Delta P_D / ^\circ\text{C}$	1.33*	mW / °C	
	Reverse Voltage	$V_R$	6	V	
DETECTOR	Collector-Emitter Voltage	$BV_{CEO}$	30	V	
	Collector-Base Voltage	$BV_{CBO}$	70	V	
	Emitter-Collector Voltage	$BV_{ECO}$	7	V	
	Collector Current (Continuous)	$I_C$	100	mA	
	Power Dissipation	$P_C$	300	mW	
	Power Dissipation Derating	$\Delta P_C / ^\circ\text{C}$	4.0*	mW / °C	
COUPLED	Storage Temperature	$T_{stg}$	-55~150	°C	
	Operating Temperature	$T_{opr}$	-55~100	°C	
	Lead Soldering Temperature (at 10s)	$T_{sold}$	260	°C	
	Total Package Power Dissipation	$P_T$	300	mW	
	Total Package Power Dissipation Derating	$\Delta P_T / ^\circ\text{C}$	3.3*	mW / °C	
	Input to Output Isolation Voltage (AC, 1 Minute)		$BV_S$	2500	Vrms
		4N35	$BV_S^{**}$	2500 / 3550	Vrms / Vpk
4N36		1750 / 2500			
4N37	1050 / 1500				

Note : Pulse width 1 $\mu$ s, 300pps

\* Above 25°C ambient.

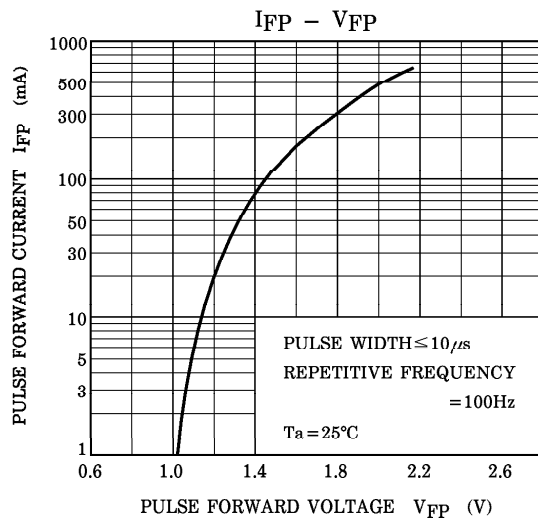
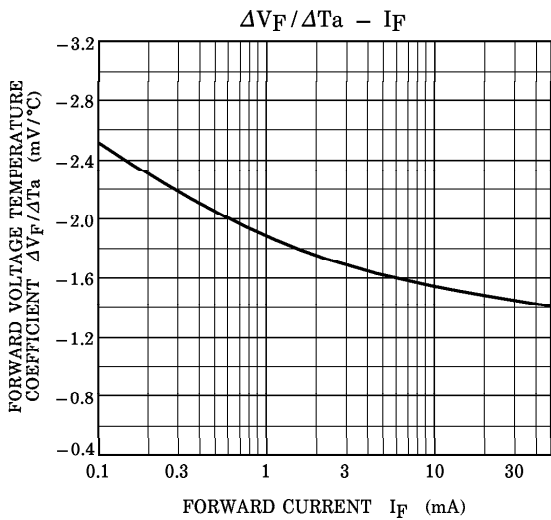
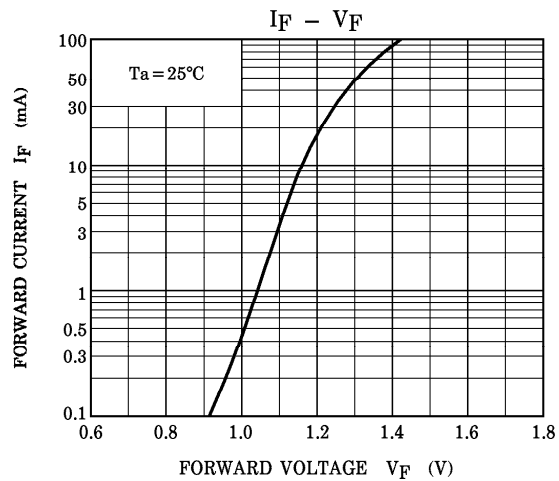
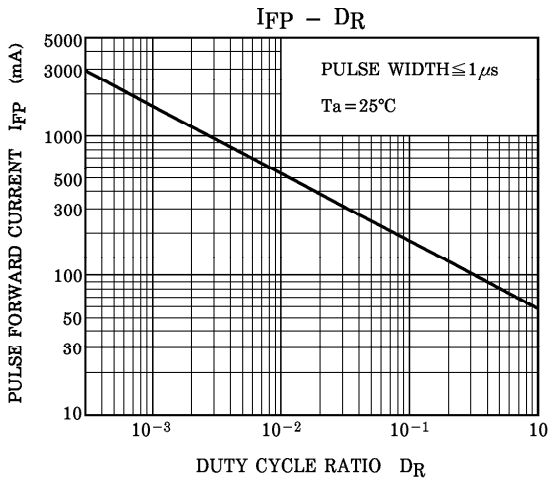
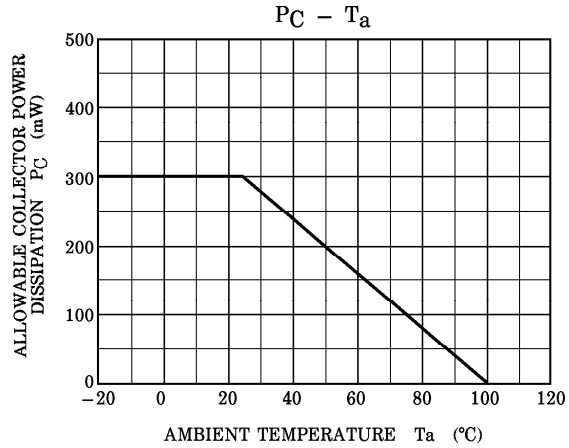
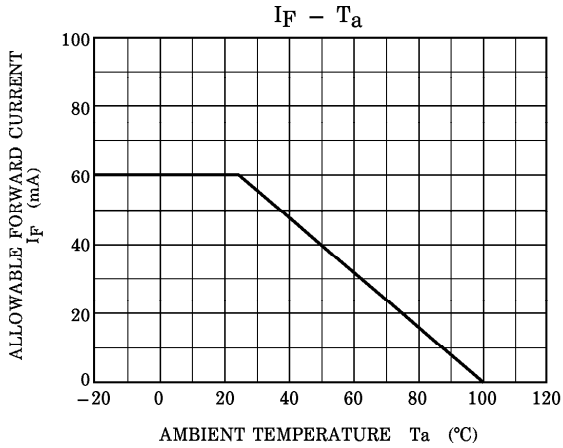
\*\* JEDEC registered maximum  $BV_S$ , however, TOSHIBA specifies a maximum  $BV_S$  of 2500V<sub>rms</sub>, 1 minute.

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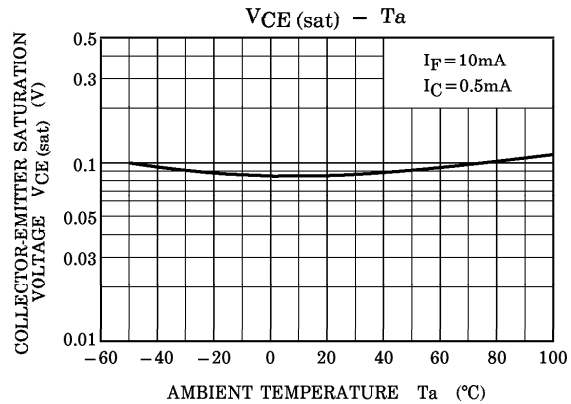
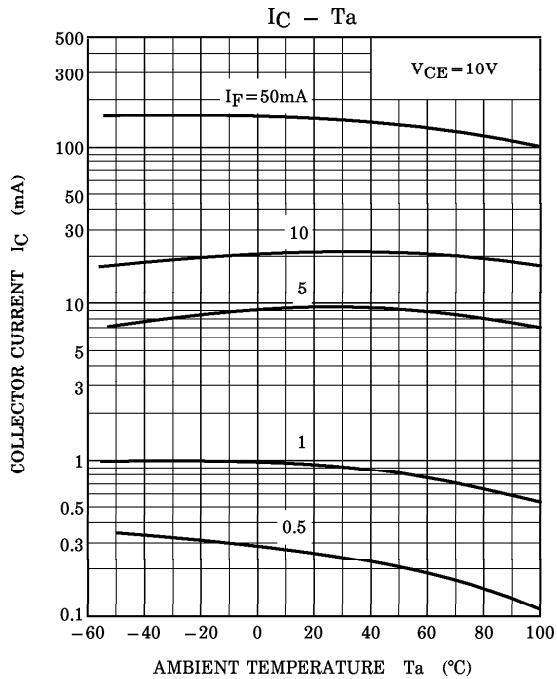
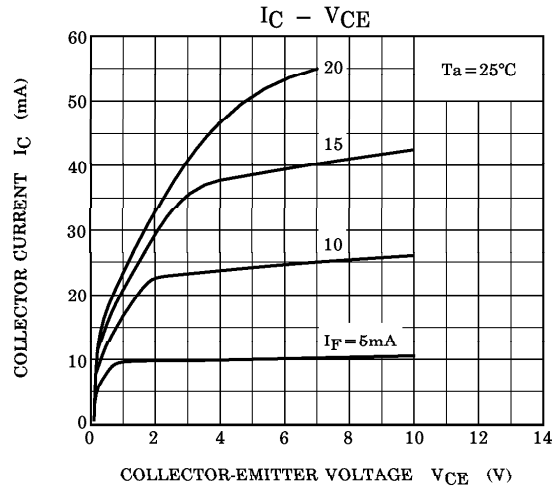
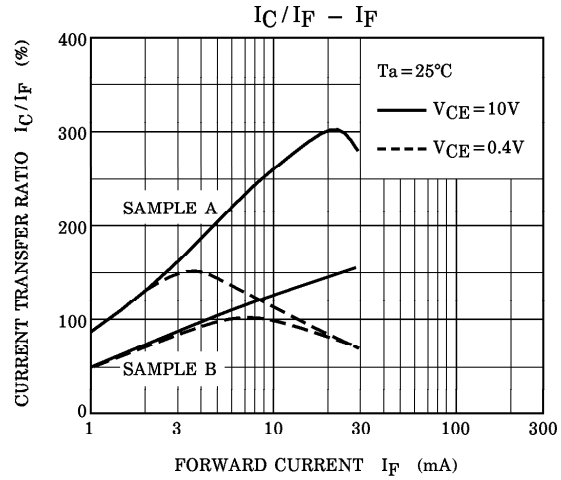
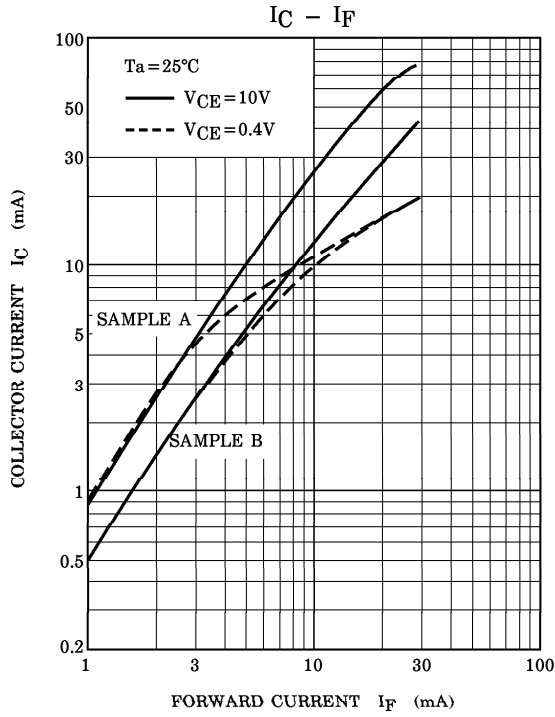
**ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
LED	Forward Voltage	$V_F$	$I_F = 10\text{mA}$	0.8	1.15	1.5	V	
			$I_F = 10\text{mA}, T_a = -55^\circ\text{C}$	0.9	—	1.7		
			$I_F = 10\text{mA}, T_a = 100^\circ\text{C}$	0.7	—	1.4		
	Reverse Current	$I_R$	$V_R = 6\text{V}$	—	—	10	$\mu\text{A}$	
	Capacitance	$C_D$	$V = 0, f = 1\text{MHz}$	—	30	100	pF	
DETECTOR	DC Forward Current Gain	$h_{FE}$	$V_{CE} = 5\text{V}, I_C = 500\mu\text{A}$	—	200	—	—	
	Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 10\text{mA}$	30	—	—	V	
	Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 100\mu\text{A}$	70	—	—	V	
	Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	$I_E = 100\mu\text{A}$	7	—	—	V	
	Collector Dark Current	$I_{CEO}$	$V_{CE} = 10\text{V}$	—	1	50	nA	
	Collector Dark Current	$I_{CEO}$	$V_{CE} = 30\text{V}, T_a = 100^\circ\text{C}$	—	—	500	$\mu\text{A}$	
	Collector-Emitter Capacitance	$C_{CE}$	$V = 0, f = 1\text{MHz}$	—	10	—	pF	
COUPLED	Current Transfer Ratio	$I_C / I_F$	$I_F = 10\text{mA}, V_{CE} = 10\text{V}$	100	—	—	%	
			$I_F = 10\text{mA}, V_{CE} = 10\text{V}$ $T_a = -55^\circ\text{C}$	40	—	—		
			$I_F = 10\text{mA}, V_{CE} = 10\text{V}$ $T_a = 100^\circ\text{C}$	40	—	—		
	Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_F = 10\text{mA}, I_C = 0.5\text{mA}$	—	0.1	0.3	V	
	Capacitance Input to Output	$C_S$	$V_S = 0, f = 1\text{MHz}$	—	0.8	2.5	pF	
	Isolation Resistance	$R_S$	$V_S = 500\text{V}, \text{R. H.} \leq 60\%$	$10^{11}$	—	—	$\Omega$	
	Input to Output Isolation Current (Pulse Width = 8ms)	4N35	$I_{IO}$	$V_{io} = 3550\text{Vpk}$	—	—	100	$\mu\text{A}$
		4N36		$V_{io} = 2500\text{Vpk}$	—	—	100	
		4N37		$V_{io} = 1500\text{Vpk}$	—	—	100	
	Turn-on Time	$t_{on}$	$V_{CC} = 10\text{V}, I_C = 2\text{mA}$ $R_L = 100\Omega$	—	3	10	$\mu\text{s}$	
Turn-off Time	$t_{off}$	—		3	10			

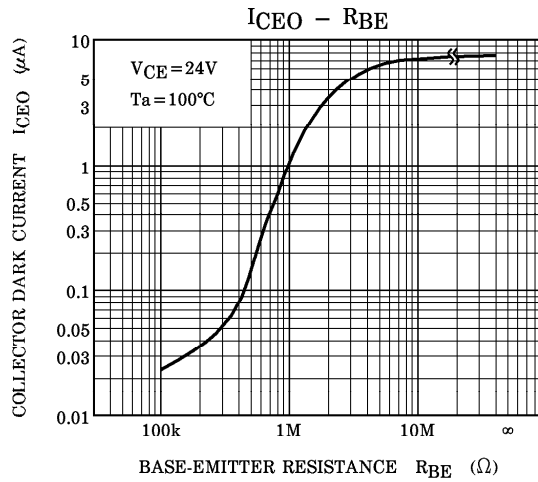
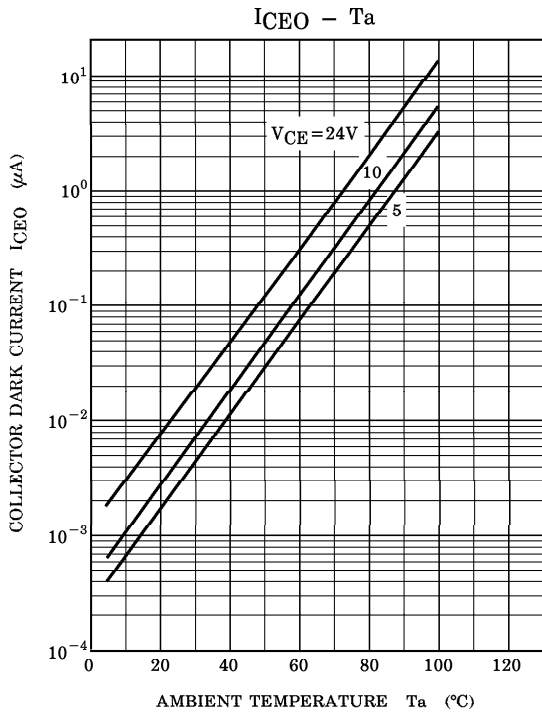
(4N35(Short))



(4N35(Short))



(4N35(Short))



**SWITCHING CHARACTERISTICS -  $R_{BE}$   
 (SATURATED OPERATION)**

