

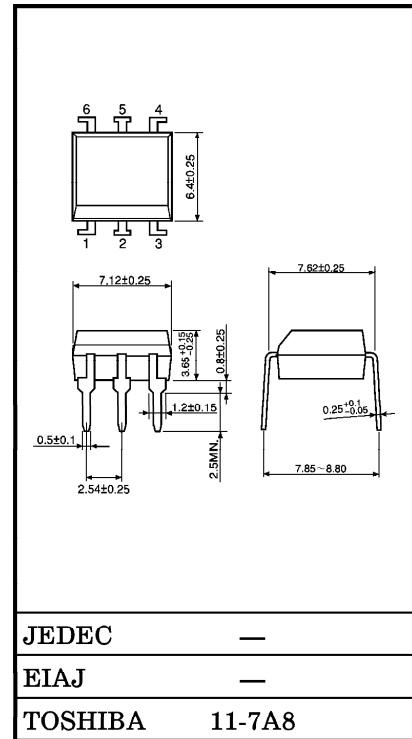
(4N35(Short))

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.

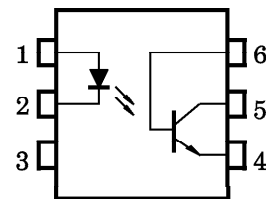
The TOSHIBA 4N35 (Short) through 4N37 (Short) consists of a gallium arsenide infrared emitting diode coupled with a silicon phototransistor in a dual in-line package.

- 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.

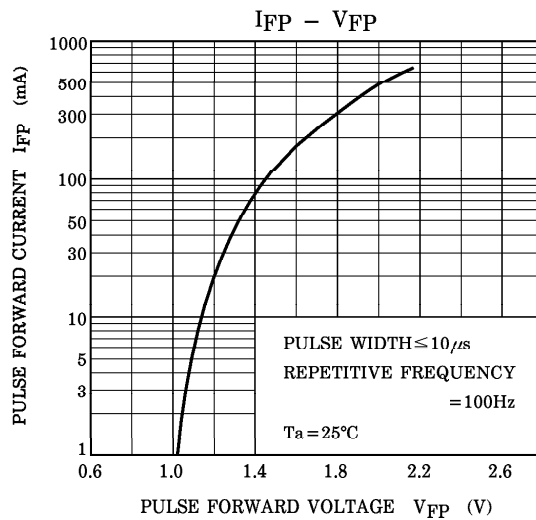
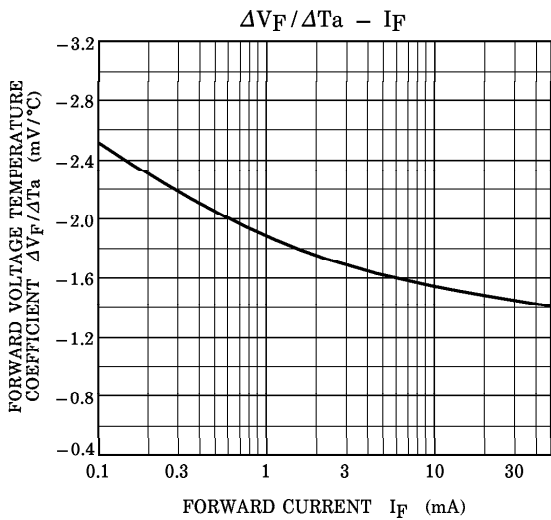
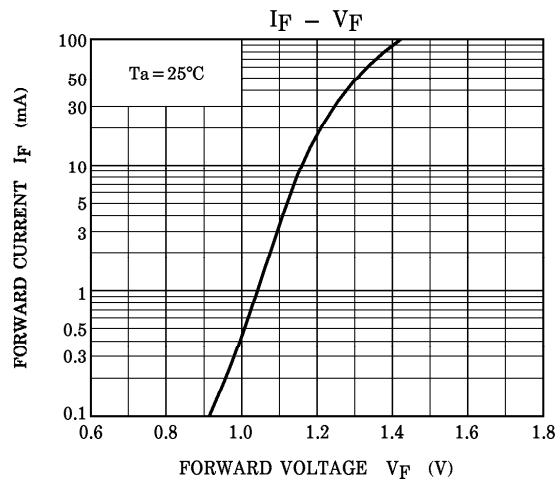
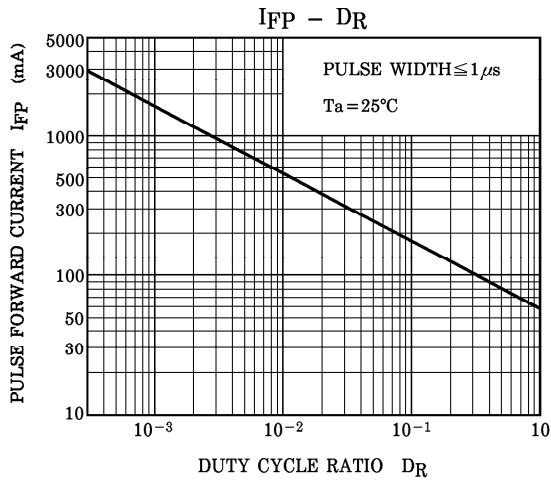
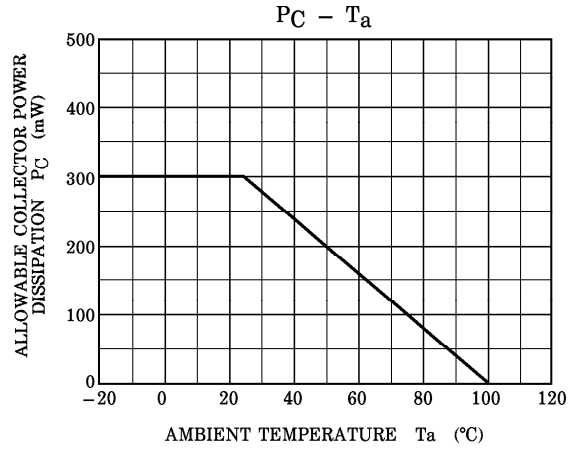
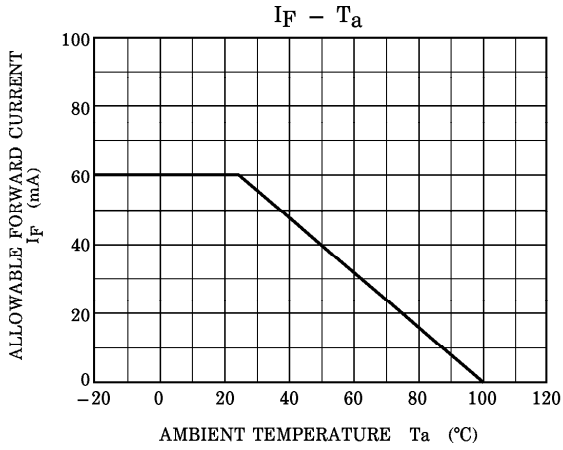
\*\* JEDEC registered maximum  $BV_S$ , however, TOSHIBA specifies a maximum  $BV_S$  of 2500V<sub>rms</sub>, 1 minute.

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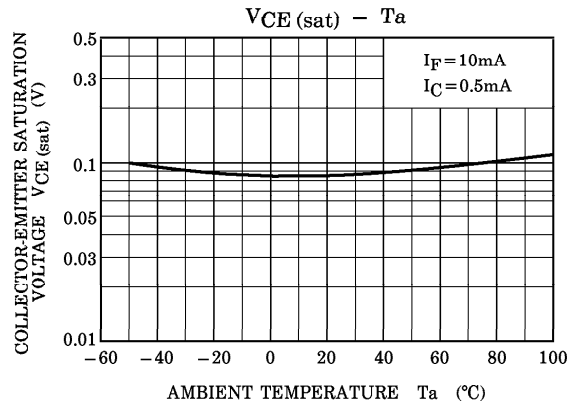
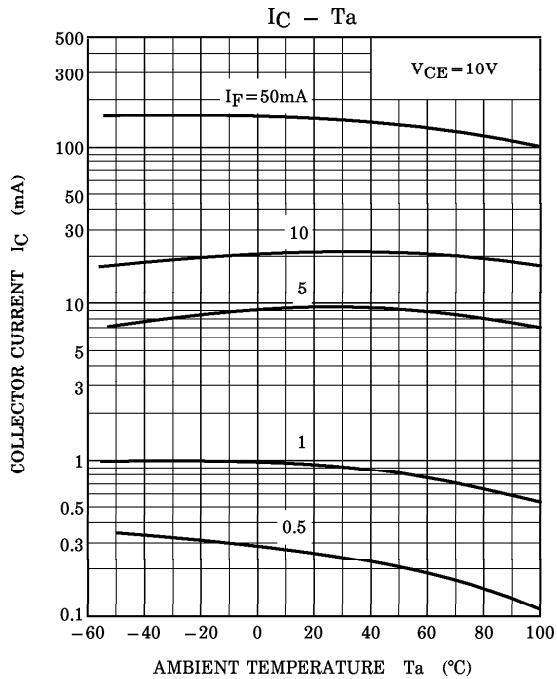
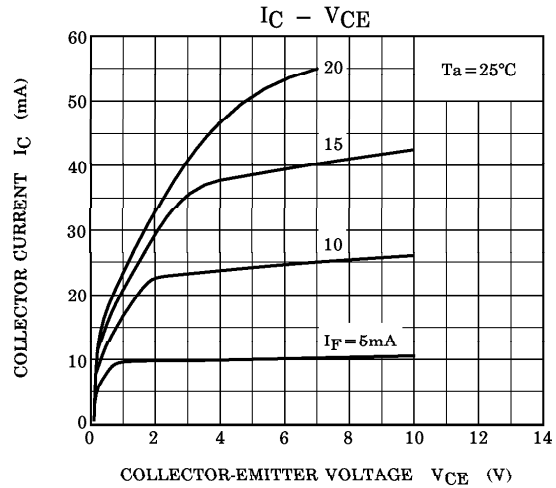
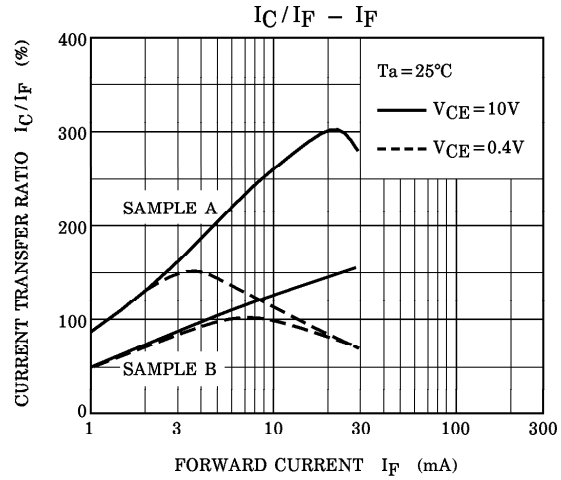
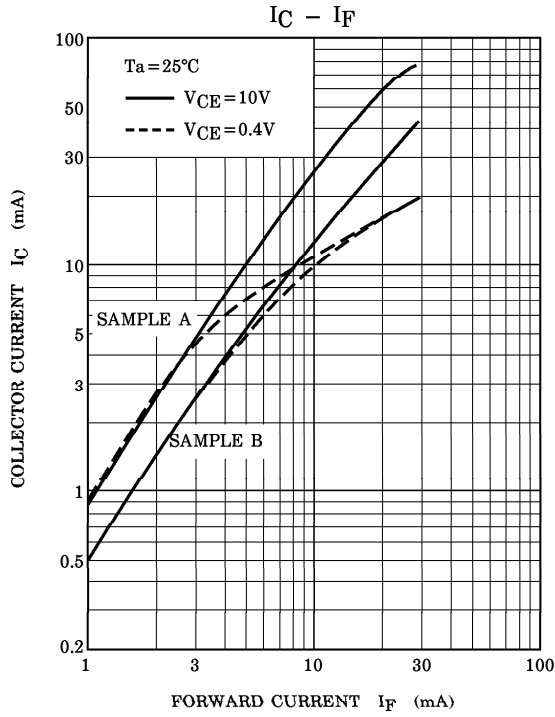
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
LED	Forward Voltage	V <sub>F</sub>	I <sub>F</sub> = 10mA	0.8	1.15	1.5	V	
			I <sub>F</sub> = 10mA, Ta = -55°C	0.9	—	1.7		
			I <sub>F</sub> = 10mA, Ta = 100°C	0.7	—	1.4		
Reverse Current	I <sub>R</sub>	V <sub>R</sub> = 6V	—	—	10	μA		
Capacitance	C <sub>D</sub>	V = 0, f = 1MHz	—	30	100	pF		
DETECTOR	DC Forward Current Gain	h <sub>FE</sub>	V <sub>CE</sub> = 5V, I <sub>C</sub> = 500μA	—	200	—	—	
	Collector-Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	I <sub>C</sub> = 10mA	30	—	—	V	
	Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	I <sub>C</sub> = 100μA	70	—	—	V	
	Emitter-Collector Breakdown Voltage	V <sub>(BR)ECO</sub>	I <sub>E</sub> = 100μA	7	—	—	V	
	Collector Dark Current	I <sub>CEO</sub>	V <sub>CE</sub> = 10V	—	1	50	nA	
	Collector Dark Current	I <sub>CEO</sub>	V <sub>CE</sub> = 30V, Ta = 100°C	—	—	500	μA	
	Collector-Emitter Capacitance	C <sub>CE</sub>	V = 0, f = 1MHz	—	10	—	pF	
COUPLED	Current Transfer Ratio	I <sub>C</sub> / I <sub>F</sub>	I <sub>F</sub> = 10mA, V <sub>CE</sub> = 10V	100	—	—	%	
			I <sub>F</sub> = 10mA, V <sub>CE</sub> = 10V Ta = -55°C	40	—	—		
			I <sub>F</sub> = 10mA, V <sub>CE</sub> = 10V Ta = 100°C	40	—	—		
	Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	I <sub>F</sub> = 10mA, I <sub>C</sub> = 0.5mA	—	0.1	0.3	V	
	Capacitance Input to Output	C <sub>S</sub>	V <sub>S</sub> = 0, f = 1MHz	—	0.8	2.5	pF	
	Isolation Resistance	R <sub>S</sub>	V <sub>S</sub> = 500V, R. H. ≤ 60%	10 <sup>11</sup>	—	—	Ω	
	Input to Output Isolation Current (Pulse Width = 8ms)	4N35	I <sub>IO</sub>	V <sub>io</sub> = 3550Vpk	—	—	100	μA
		4N36		V <sub>io</sub> = 2500Vpk	—	—	100	
		4N37		V <sub>io</sub> = 1500Vpk	—	—	100	
	Turn-on Time	t <sub>on</sub>	V <sub>CC</sub> = 10V, I <sub>C</sub> = 2mA R <sub>L</sub> = 100Ω	—	3	10	μs	
Turn-off Time	t <sub>off</sub>	—		3	10			

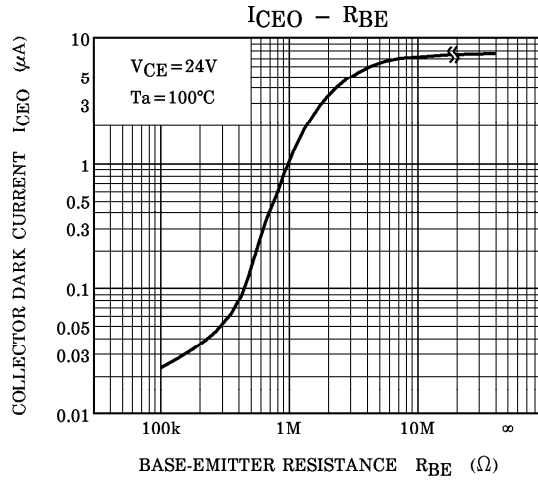
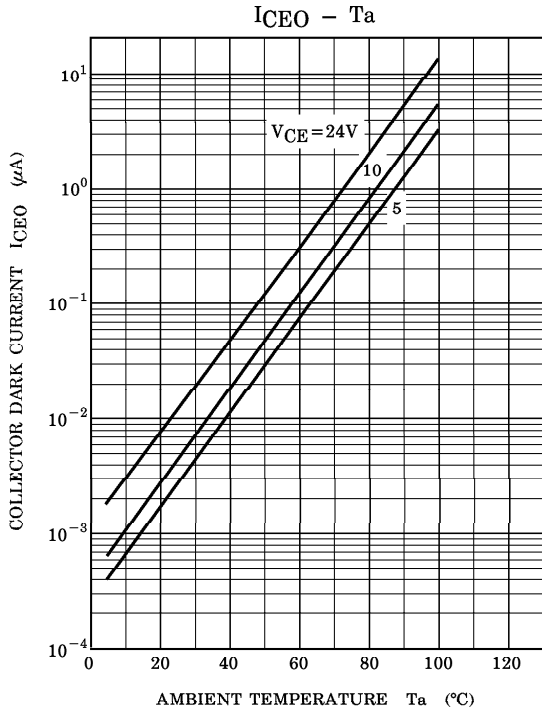
(4N35(Short))



(4N35(Short))



(4N35(Short))



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

