

# 6N137

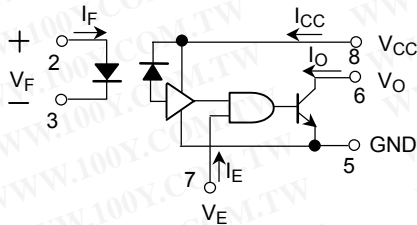
Digital Logic Isolation  
 Tele-Communication  
 Analog Data Equipment Control

The TOSHIBA 6N137 consist of a high emitting diode and a one chip photo IC. This unit is 8-lead DIP package.

- LSTTL / TTL compatible: 5V Supply
- Ultra high speed: 10MBd
- Guaranteed performance over temperature: 0°C to 70°C
- High isolation voltage: 2500Vrms min.
- UL recognized: UL1577, file no. E67349

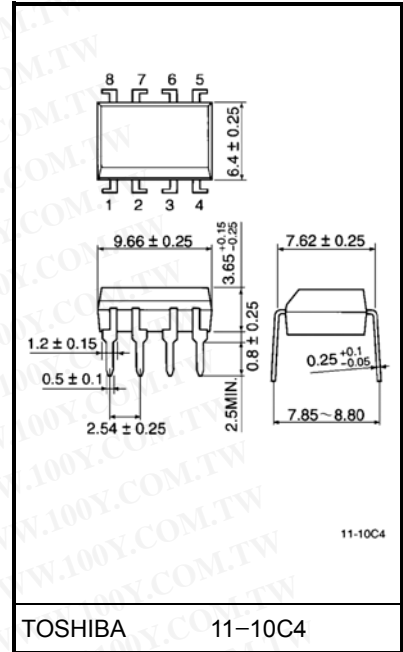
### Truth Table

Input	Enable	Output
H	H	L
L	H	H
H	L	H
L	L	H



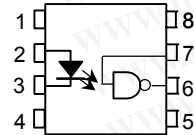
勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)

Unit in mm



Weight: 0.54g

### Pin Configurations (top view)



- 1 : N.C.
- 2 : Anode
- 3 : Cathode
- 4 : N.C.
- 5 : GND
- 6 : Output(Open collector)
- 7 : Enable
- 8 : Vcc

## Maximum Ratings

Characteristic		Symbol	Rating	Unit
LED	Forward current	$I_F$	20	mA
	Pulse forward current (Note 1)	$I_{FP}$	40	mA
	Reverse voltage	$V_R$	5	V
Detector	Output current	$I_O$	50	mA
	Output voltage	$V_O$	7	V
	Supply voltage (1 minute maximum)	$V_{CC}$	7	V
	Enable input voltage (not to exceed $V_{CC}$ by more than 500mV)	$V_{EH}$	5.5	V
	Output collector power dissipation	$P_O$	85	mW
Operating temperature range		$T_{opr}$	0~70	°C
Storage temperature range		$T_{stg}$	-55~125	°C
Lead solder temperature (10 s) (Note 2)		$T_{sol}$	260	°C

(Note 1) 50% duty cycle, 1ms pulse width.

(Note 2) Soldering portion of lead: Up to 2mm from the body of the device.

## Recommended Operating Conditions

Characteristic	Symbol	Min.	Max.	Unit
Input current, low level each channel	$I_{FL}$	0	250	μA
Input current, high level each channel	$I_{FH}$	7	20	mA
High level enable voltage	$V_{EH}$	2.0	$V_{CC}$	V
Low level enable voltage (output high)	$V_{EL}$	0	0.8	V
Supply voltage, output	$V_{CC}$	4.5	5.5	V
Fan out (TTL load)	N	—	8	—
Operating temperature	$T_a$	0	70	°C

勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)

## Precaution

Please be careful of the followings.

A ceramic capacitor(0.1μF)should be connected from pin 8 to pin 5 to stabilize the operation of the high gain linear amplifier. Failure to provide the bypassing may impair the switching property. The total lead length between capacitor and coupler should not exceed 1cm.

## Electrical Characteristics Over Recommended Temperature (Ta = 0~70°C unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	(**)Typ.	Max.	Unit
High level output current	I <sub>OH</sub>	V <sub>CC</sub> =5.5V, V <sub>O</sub> =5.5V I <sub>F</sub> =250μA, V <sub>E</sub> = 2.0V	—	1	250	μA
Low level output voltage	V <sub>OL</sub>	V <sub>CC</sub> =5.5V, I <sub>F</sub> =5mA V <sub>EH</sub> =2.0V I <sub>OL</sub> (sinking)=13mA	—	0.4	0.6	V
High level enable current	I <sub>EH</sub>	V <sub>CC</sub> =5.5V, V <sub>E</sub> =2.0V	—	-1.0	—	mA
Low level enable current	I <sub>EL</sub>	V <sub>CC</sub> =5.5V, V <sub>E</sub> =0.5V	—	-1.6	-2.0	mA
High level supply current	I <sub>CCH</sub>	V <sub>CC</sub> =5.5V, I <sub>F</sub> =0, V <sub>E</sub> =0.5V	—	7	15	mA
Low level supply current	I <sub>CCL</sub>	V <sub>CC</sub> =5.5V, I <sub>F</sub> =10mA V <sub>E</sub> =0.5V	—	12	18	mA
Resistance (input-output) (Note 3)	R <sub>I-O</sub>	V <sub>I-O</sub> =500V, Ta=25°C R.H.≤60%	—	10 <sup>12</sup>	—	Ω
Capacitance (input-output) (Note 3)	C <sub>I-O</sub>	f=1MHz, Ta=25°C	—	0.6	—	pF
Input forward voltage	V <sub>F</sub>	I <sub>F</sub> =10mA, Ta=25°C	—	1.65	1.75	V
Input reverse breakdown voltage	BV <sub>R</sub>	I <sub>R</sub> =10μA, Ta=25°C	5	—	—	V
Input capacitance	C <sub>IN</sub>	V <sub>F</sub> =0, f=1MHz	—	45	—	pF
Current transfer ratio	CTR	I <sub>F</sub> =5.0mA, R <sub>L</sub> =100Ω	—	1000	—	%

(\*\*) All typical values are at V<sub>CC</sub>=5V, Ta=25°C

(Note 3) Pins 1, 2, 3 and 4 shorted together and pins 5, 6, 7 and 8 shorted together.

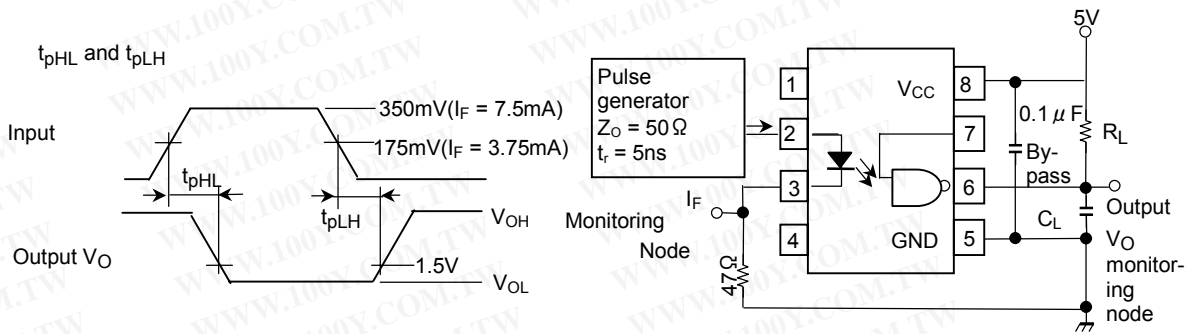
**勝特力材料 886-3-5753170**  
**勝特力电子(上海) 86-21-54151736**  
**勝特力电子(深圳) 86-755-83298787**  
**Http://www.100y.com.tw**

## Switching Characteristics (Ta = 25°C, VCC = 5V)

Characteristic	Symbol	Test Circuit	Test Condition	Min.	Typ.	Max.	Unit
Propagation delay time to high output level	t <sub>pLH</sub>	1	R <sub>L</sub> =350Ω, C <sub>L</sub> =15pF I <sub>F</sub> =7.5mA	—	60	75	ns
Propagation delay time to low output level	t <sub>pHL</sub>	1	R <sub>L</sub> =350Ω, C <sub>L</sub> =15pF I <sub>F</sub> =7.5mA	—	60	75	ns
Output rise-fall time (10–90%)	t <sub>r</sub> , t <sub>f</sub>	—	R <sub>L</sub> =350Ω, C <sub>L</sub> =15pF I <sub>F</sub> =7.5mA	—	30	—	ns
Propagation delay time of enable from V <sub>EH</sub> to V <sub>EL</sub>	t <sub>ELH</sub>	2	R <sub>L</sub> =350Ω, C <sub>L</sub> =15pF I <sub>F</sub> =7.5mA V <sub>EH</sub> =3.0V V <sub>EL</sub> =0.5V	—	25	—	ns
Propagation delay time of enable from V <sub>EL</sub> to V <sub>EH</sub>	t <sub>EHL</sub>	2	R <sub>L</sub> =350Ω, C <sub>L</sub> =15pF I <sub>F</sub> =7.5mA V <sub>EH</sub> =3.0V V <sub>EL</sub> =0.5V	—	25	—	ns
Common mode transient immunity at logic high output level	CM <sub>H</sub>	3	V <sub>CM</sub> =10V R <sub>L</sub> =350Ω V <sub>O(min.)</sub> =2V I <sub>F</sub> =0mA	—	200	—	V / μs
Common mode transient immunity at logic low output level	CM <sub>L</sub>	3	V <sub>CM</sub> =10V R <sub>L</sub> =350Ω V <sub>O(max.)</sub> =0.8V I <sub>F</sub> =5mA	—	-500	—	V / μs

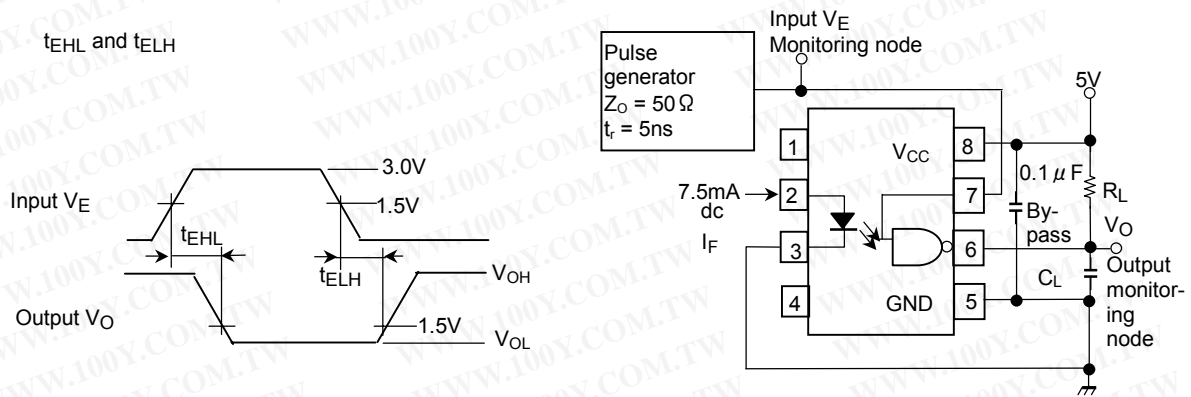
**勝特力材料 886-3-5753170**  
**勝特力电子(上海) 86-21-54151736**  
**勝特力电子(深圳) 86-755-83298787**  
[Http://www.100y.com.tw](http://www.100y.com.tw)

**Test Circuit 1.**



•  $C_L$  is approximately 15pF which includes probe and stray wiring capacitance.

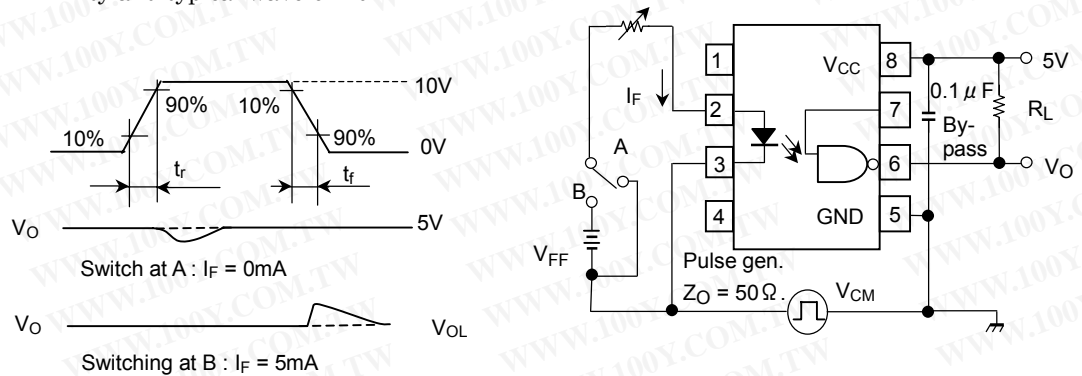
**Test Circuit 2.**



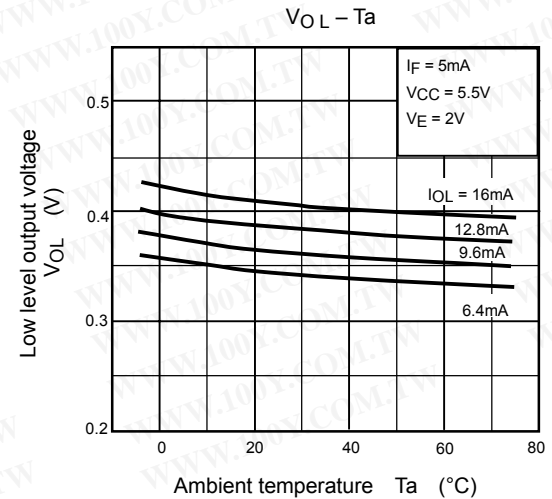
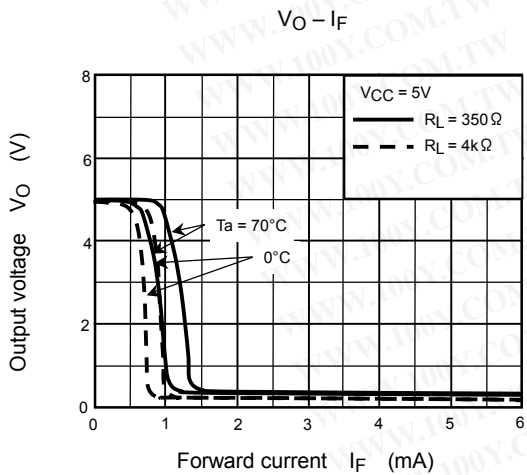
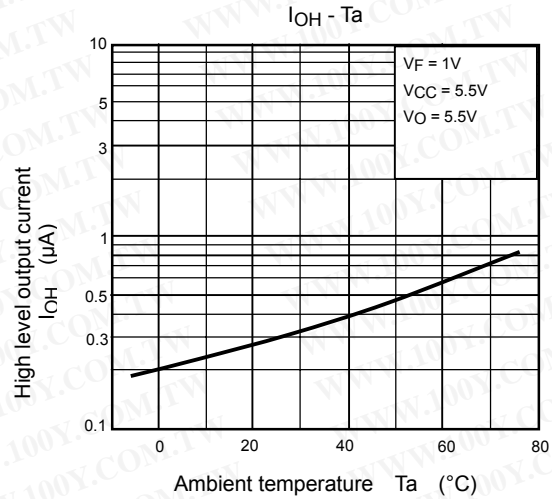
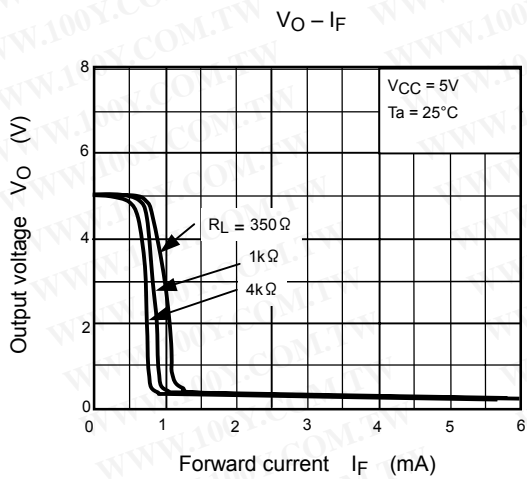
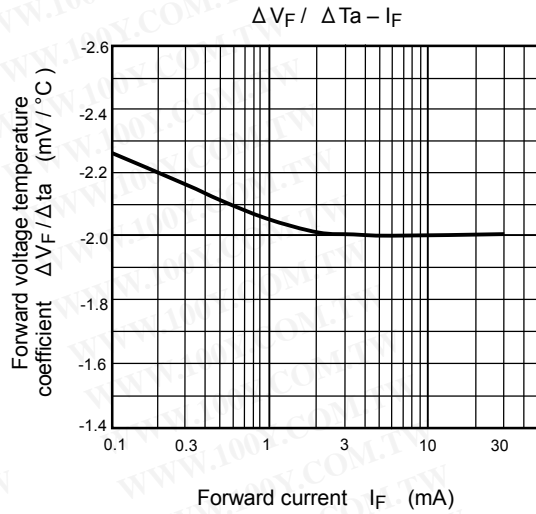
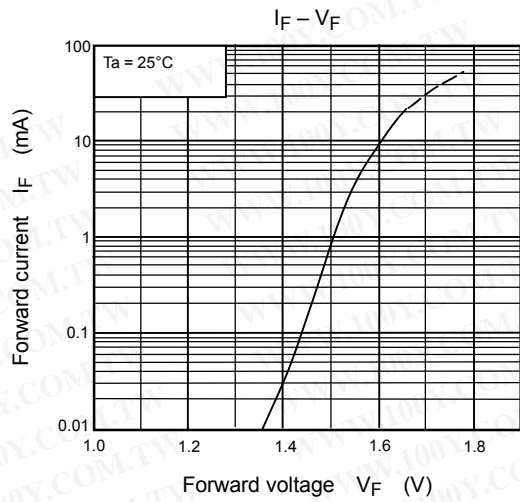
•  $C_L$  is approximately 15pF which includes prove and stray wiring capacitance.

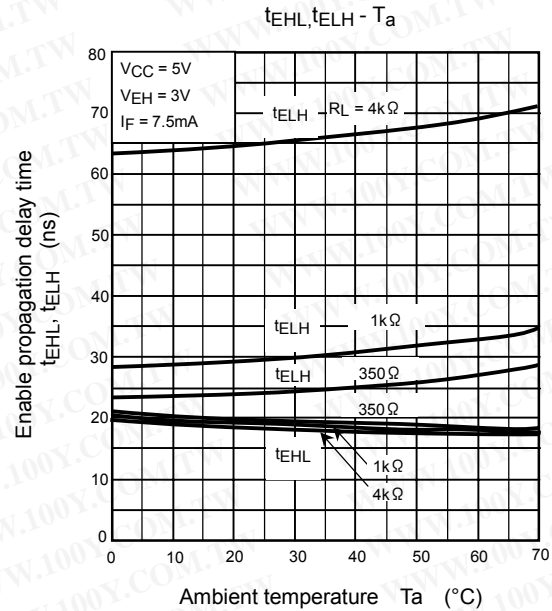
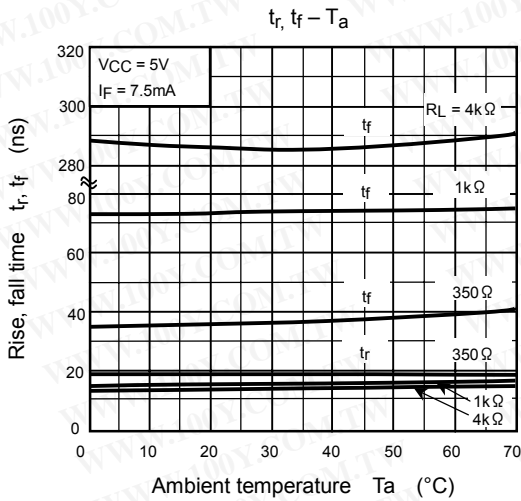
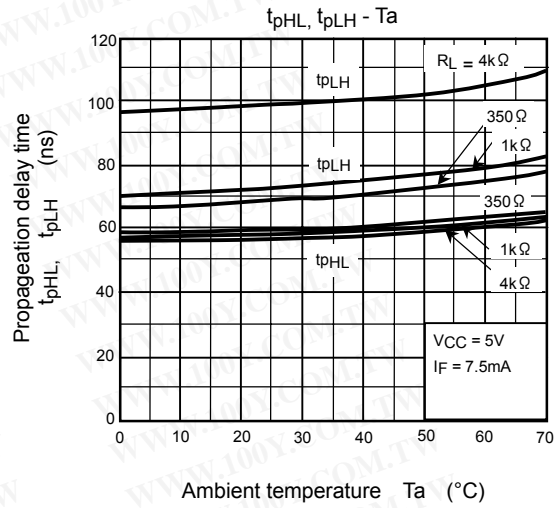
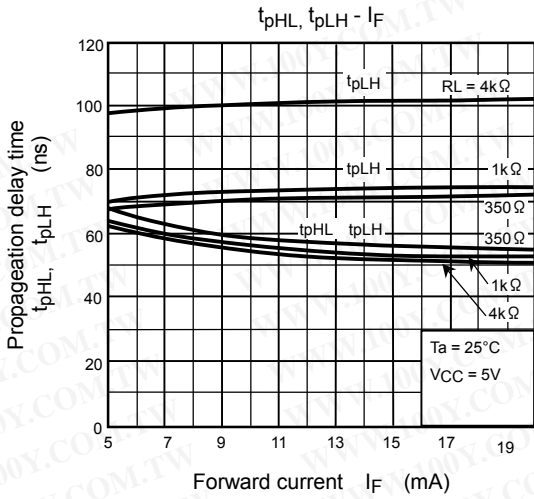
**Test Circuit 3.**

Transient immunity and typical waveforms



勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)





勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-54151736  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)