8 PIN DIP HIGH SPEED 10MBit/s LOGIC GATE PHOTOCOUPLER

6N137 Series

Features:

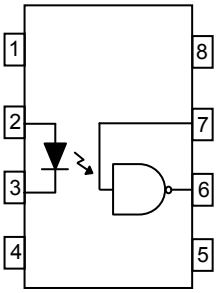
- High speed 10Mbit/s
- Fan out of 8 over -40 to 85℃
- Logic gate output
- High isolation voltage between input and output (Viso=5000 V rms)
- Compact small outline package
- Pb free and RoHS compliant.

Description

The 6N137series devices each of consist of an infrared emitting diodes, optically coupled to a Very high speed integrated photo detector logic gate with a strobable output.

They are packaged in an 8-pin DIP package and available in wide-lead spacing and SMD option.

Schematic



Applications

- Ground loop elimination
- LSTTL to TTL, LSTTL or 5 volt CMOS
- Line receiver, data transmission
- Data multiplexing
- Switching power supplies
- Pulse transformer replacement
- Computer peripheral interface

Pin Configuration

1, 4. N.C
2, Anode
3, Cathode
5, Gnd
6, Vout
7, V_E
8, V_{CC}

Truth Table (Positive Logic)

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

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Absolute Maximum Ratings (T_a=25°C)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	50	mA
	Enable input voltage Not exceed V_{CC} by more than 500mV	V_E	5.5	V
	Reverse voltage	V_R	5	V
	Power dissipation	P_D	100	mW
Output	Power dissipation	P_C	85	mW
	Output current	I_O	50	mA
	Output voltage	V_O	7.0	V
	Supply voltage	V_{CC}	7.0	V
Output Power Dissipation		P_O	100	mW
Isolation voltage *1		V_{ISO}	5000	V rms
Operating temperature		T_{OPR}	-55 ~ +85	°C
Storage temperature		T_{STG}	-55 ~ +125	°C
Soldering temperature *2		T_{SOL}	260	°C

Notes

*1 AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1 & 2 are shorted together, and pins 3 & 4 are shorted together.

*2 For 10 seconds.

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Electrical Characteristics (T_a= -40 to 85°C unless specified otherwise)

Input

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Forward voltage	V_F	-	1.4	1.8	V	I_F = 10mA
Reverse voltage	V_R	5.0	-	-	V	I_R = 10μA
Input capacitance	C_{IN}	-	60	-	pF	V_F=0, f=1MHz

Output

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
High level supply current	I_{CCH}	-	7	10	mA	I_F=10mA, V_E=0.5V, V_{CC}=5.5V
Low level supply current	I_{CCL}	-	9	13	mA	I_F=0mA, V_E=0.5V, V_{CC}=5.5V
High level enable current	I_{EH}	-	-0.6	-1.6	mA	V_E=0.5V, V_{CC}=5.5V
Low level enable current	I_{EL}	-	-0.8	-1.6	mA	V_E=2.0V, V_{CC}=5.5V
High level enable voltage	V_{EH}	2.0	-	-	V	I_F=10mA, V_{CC}=5.5V
Low level enable voltage	V_{EL}	-	-	0.8	V	I_F=10mA, V_{CC}=5.5V

Transfer Characteristics (T_a=- 40 to 85°C Unless otherwise specified)

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
High Level Output Current	I_{OH}	-	-	100	μA	V_{CC}=5.5V, V_O=5.5V, I_F=250uA, V_E=2.0V
Low Level Output Current	V_{OL}	-	0.35	0.6	V	V_{CC}=5.5V, I_{CL}=13mA, I_F=5mA, V_E=2.0V
Input Threshold Current	I_{FT}	-	2.5	5	mA	V_{CC}=5.5V, V_O=0.6V, V_E=2.0V, I_{OL}=13mA

* Typical values at T_a = 25°C

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Switching Characteristics (T_a=- 40 to 85°C, V_{CC}=5V, I_F=7.5mA unless specified otherwise)

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Propagation delay time to output High level	T_{PHL}	-	35	75	µS	C_L = 15pF, R_L=350Ω, TA=25°C
Propagation delay time to output Low level	T_{PLH}	-	40	75	µS	C_L = 15pF, R_L=350Ω, TA=25°C
Pulse width distortion	T_{PHL} -T_{PLH}	-	-	35	ns	C_L = 15pF, R_L=350Ω
Output rise time	tr	-	40	50	ns	C_L = 15pF, R_L=350Ω
Output full time	tf	-	10	30	ns	C_L = 15pF, R_L=350Ω
Enable Propagation Delay Time to Output High Level	t_{ELH}	-	15	-	ns	I_F = 7.5mA , V_{EH}=3.5V, C_L = 15pF, R_L=350Ω
Enable Propagation Delay Time to Output Low Level	t_{EHL}	-	15	-	ns	I_F = 7.5mA , V_{EH}=3.5V, C_L = 15pF, R_L=350Ω
Common Mode Transient Immunity at Logic High	CM_H	5000	-	-	V/µS	I_F = 0mA , V_{CM}=50Vp-p, V_{OH}=2.0V, R_L=350Ω, TA=25°C
Common Mode Transient Immunity at Logic Low	CM_L	5000	-	-	V/µS	I_F = 7.5mA , V_{CM}=50Vp-p, V_{OL}=0.8V, R_L=350Ω, TA=25°C

* Typical values at T_a = 25°C

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Typical Performance Curves

Fig.1 Input Diode Forward Voltage vs. Forward Current

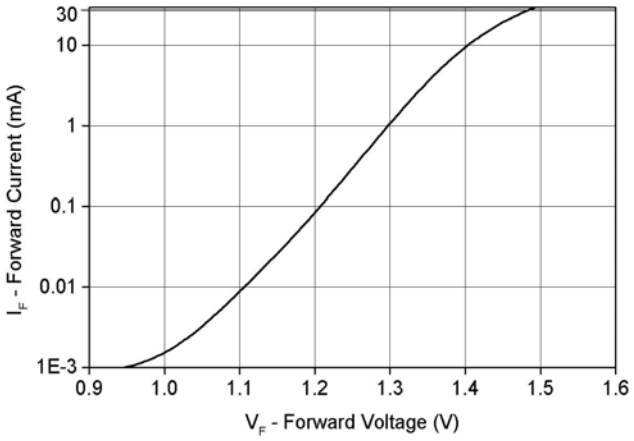

Fig.2 Low Level Output Voltage vs. Ambient Temperature

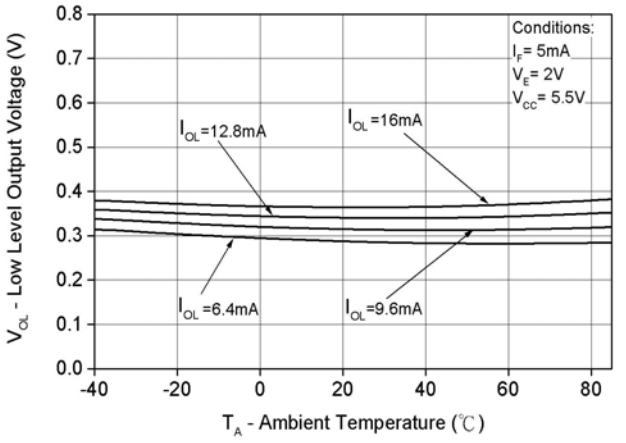

Fig.3 Low Level Output Current vs. Ambient Temperature

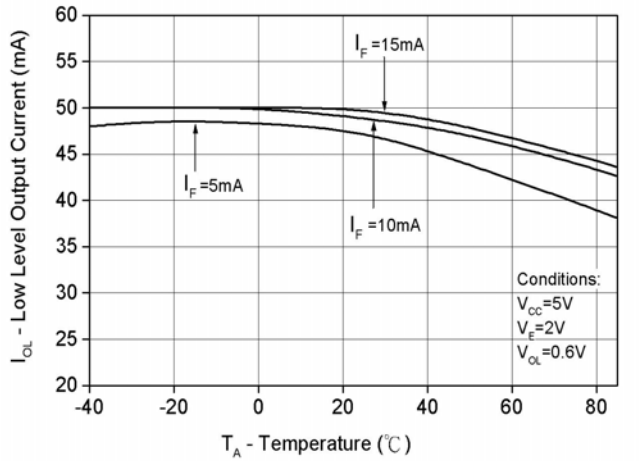

Fig.4 Input Threshold Current vs. Ambient Temperature

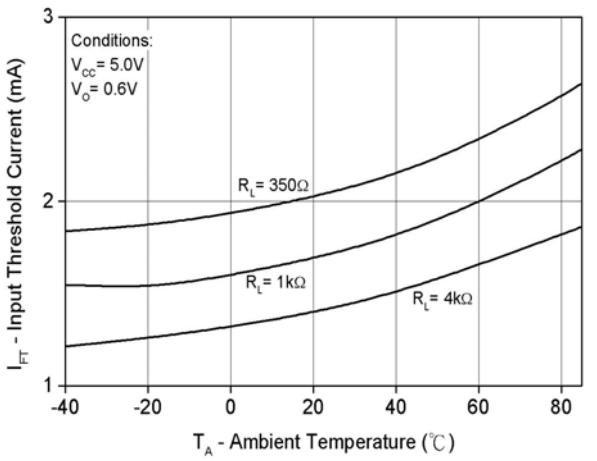

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Fig.5 Output Voltage vs. Input Forward Current

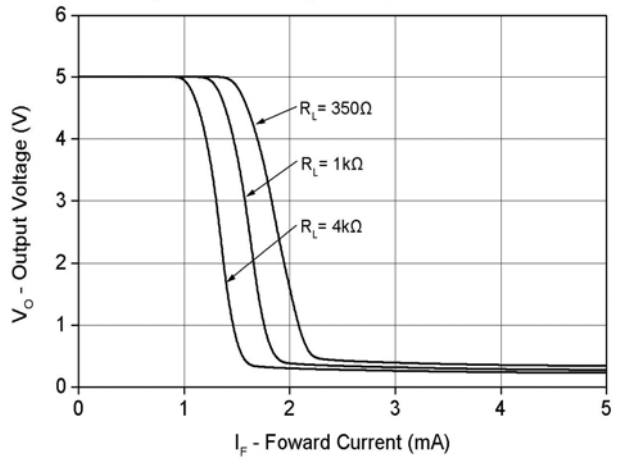

Fig.6 High Level Output Current vs. Temperature

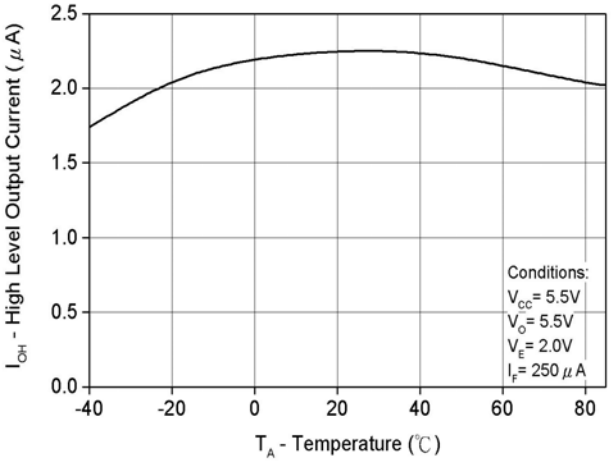

Fig.7 Switching Time vs. Forward Current

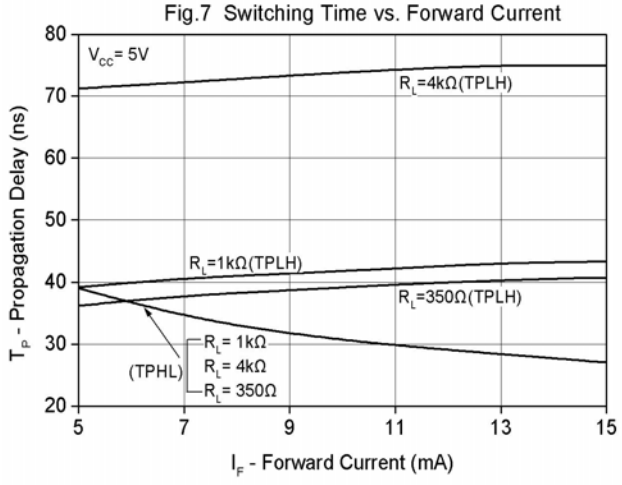

Fig.8 Switching Time vs. Temperature

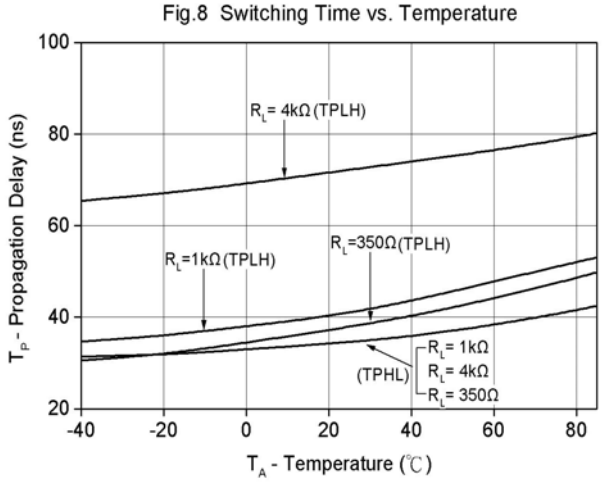

Fig.9 Pulse Width Distortion vs. Temperature

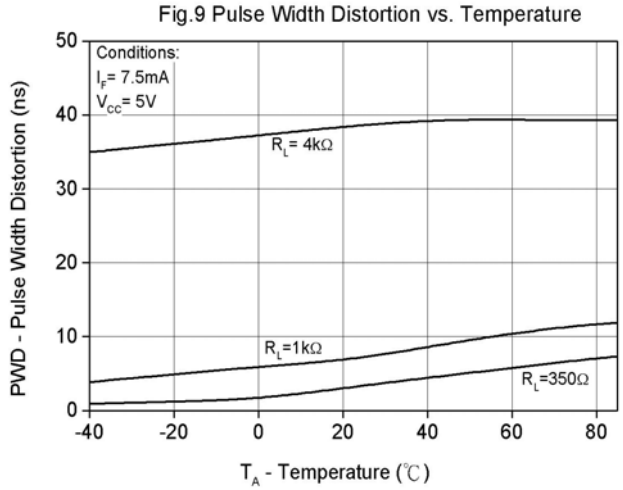

Fig.10 Rise and Fall Time vs. Temperature

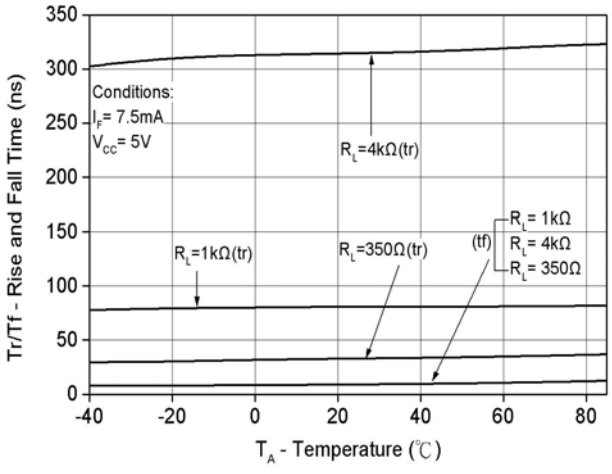

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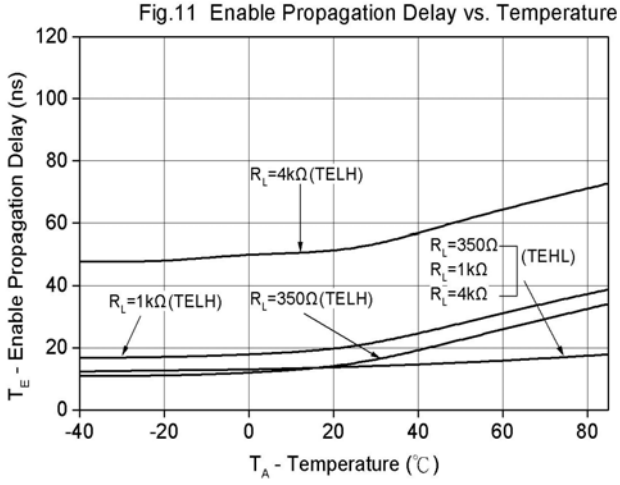
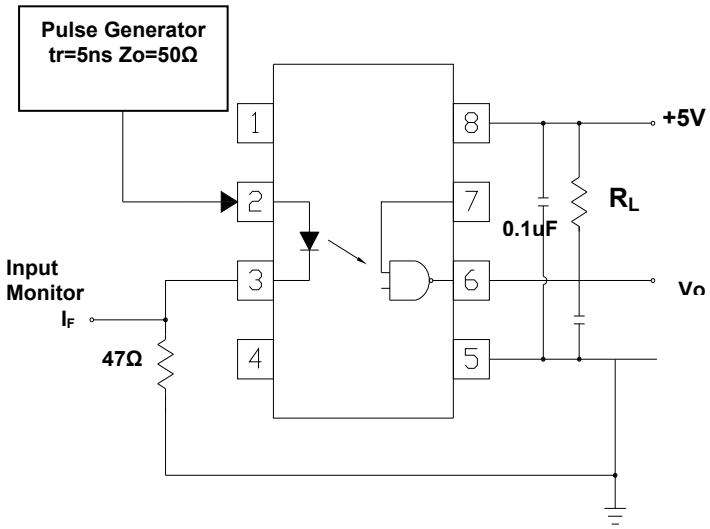
Fig.11 Enable Propagation Delay vs. Temperature





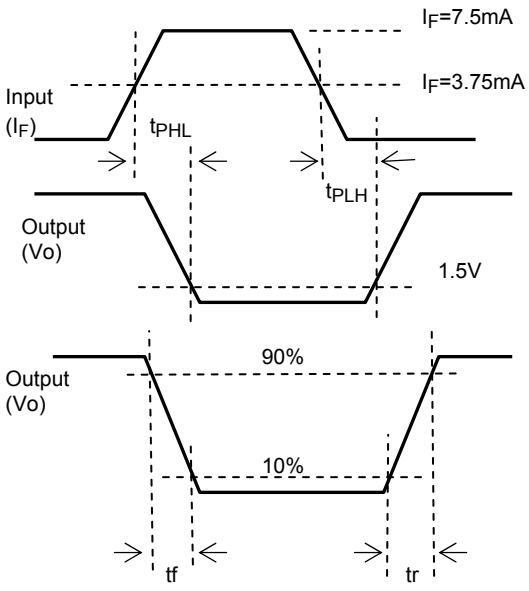


Fig. 12 Test circuit and waveforms for t_{PHL}, t_{PLH}, t_r, and t_f

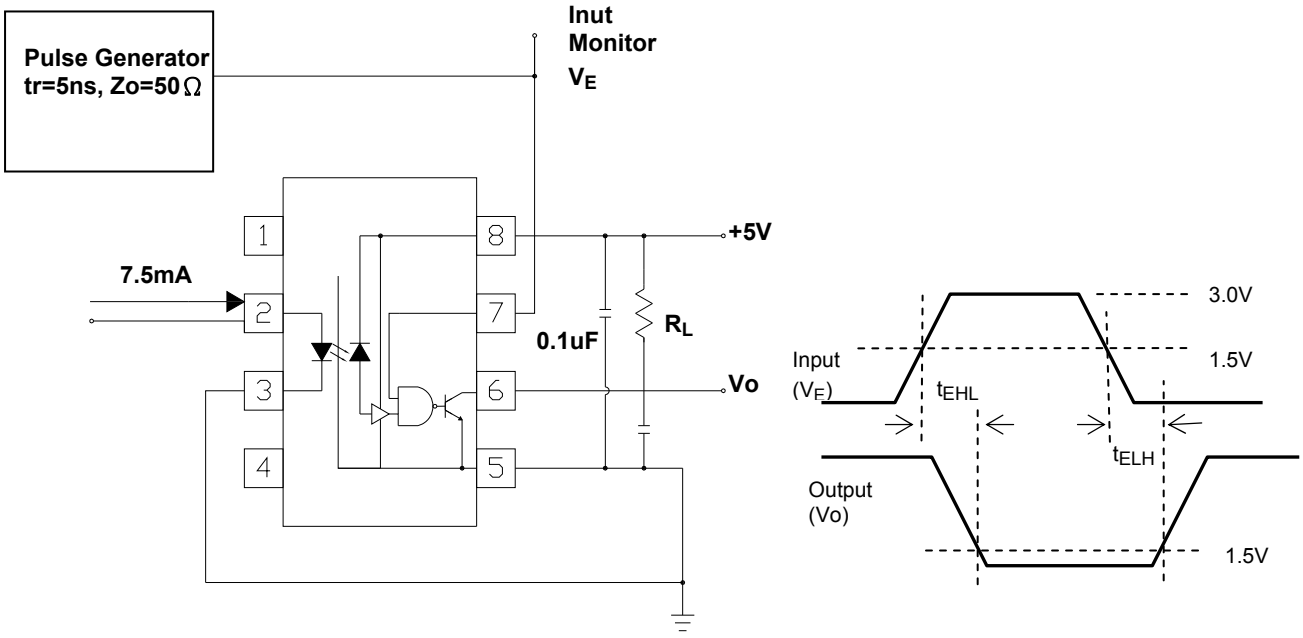


Fig. 13 Test circuit for t_{EHL} and t_{ELH}

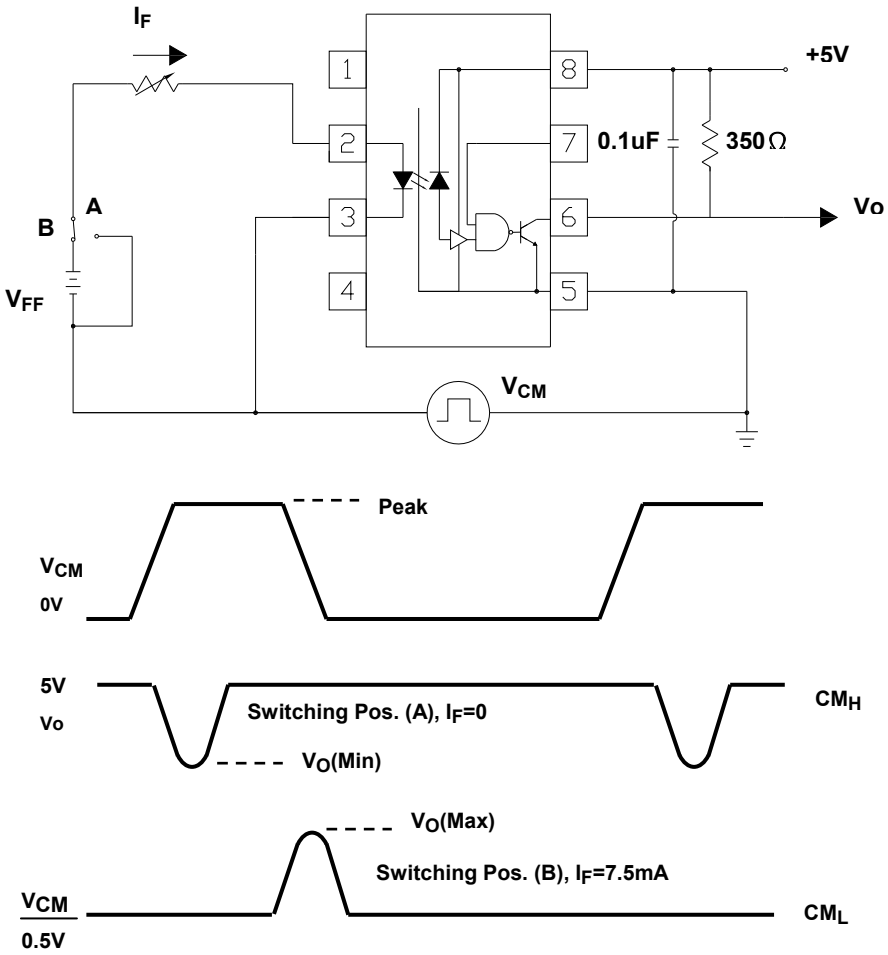


Fig. 14 Test circuit Common mode Transient Immunity

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Order Information

Part Number

6N137Y

Note

Y = Lead form option (G SM SM T+Ror none)

Option	Description	Packing quantity
None	Standard DIP-8	45 units per tube
G	Wide lead bend (0.4 inch spacing)	45 units per tube
SM	Surface mount lead form	45 units per tube
SM T+R	Surface mount lead form + tape & reel option	1000 units per reel

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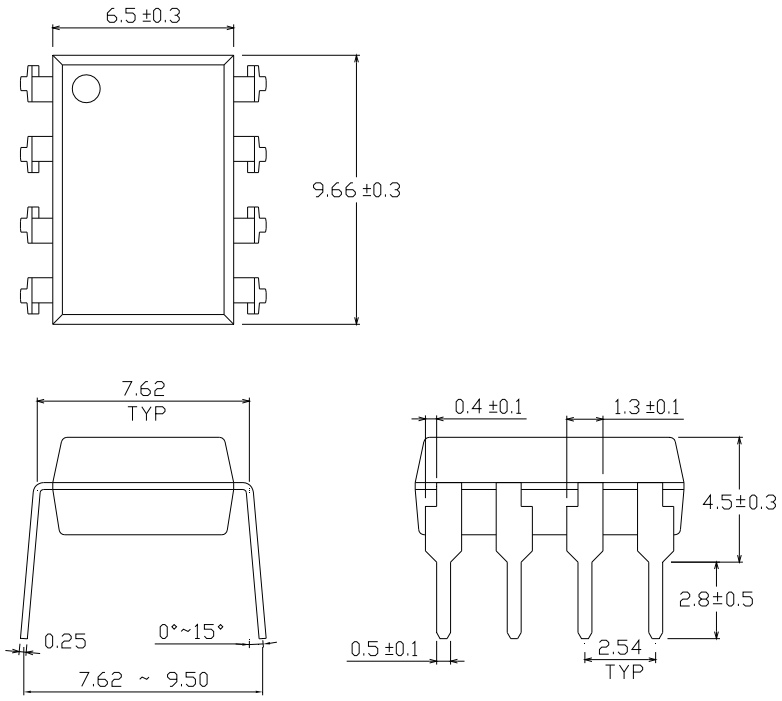
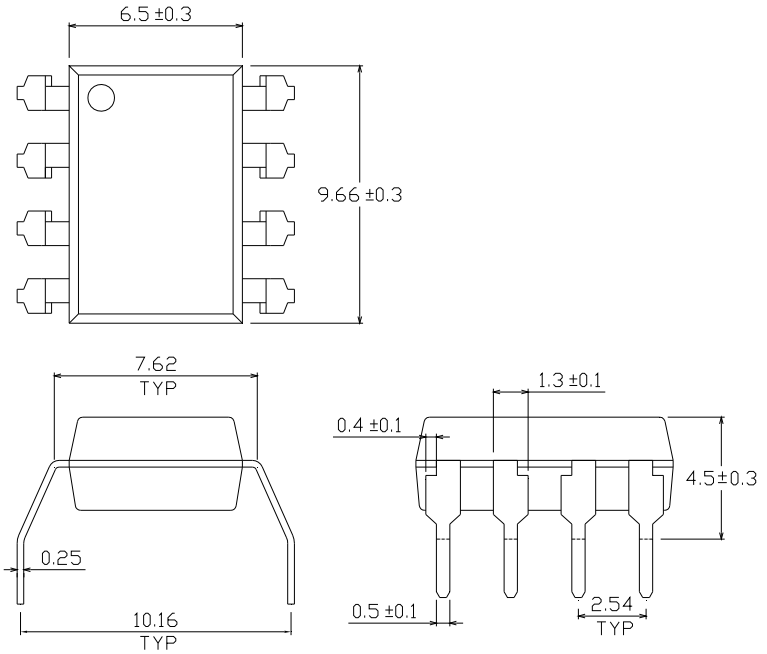
Package Drawing

(Dimensions in mm)

Standard DIP Type



Option G Type



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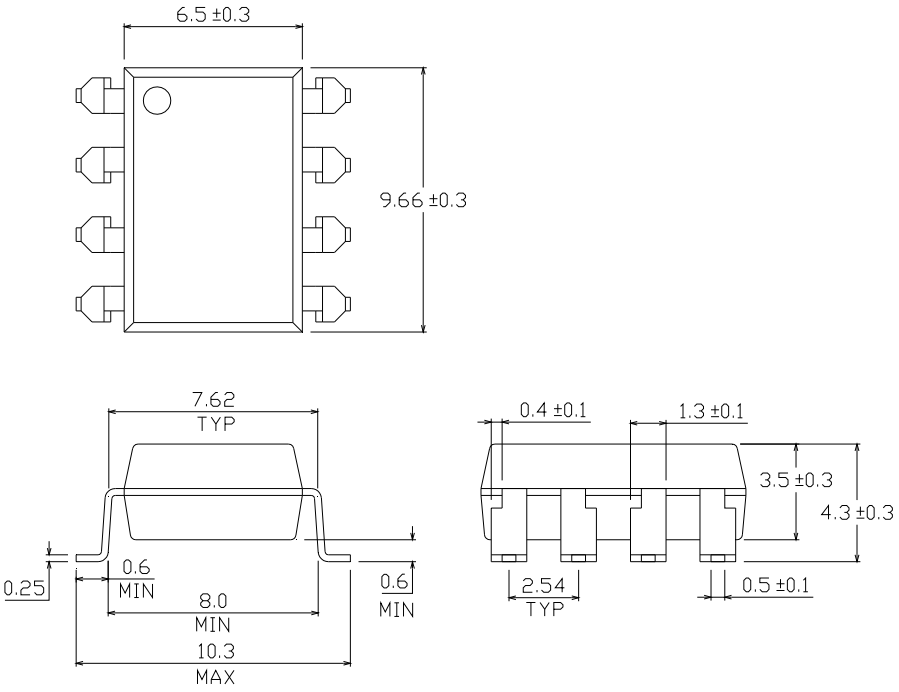
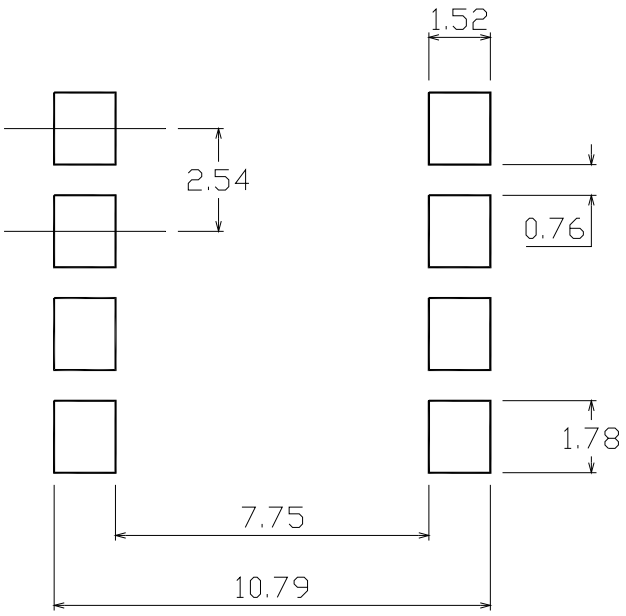
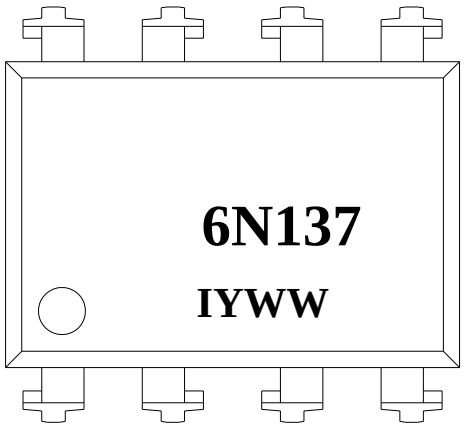
Option SM Type



Recommended pad layout for surface mount leadform



Device Marking



Notes

6N137	denotes Device Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
I	denotes Isocom

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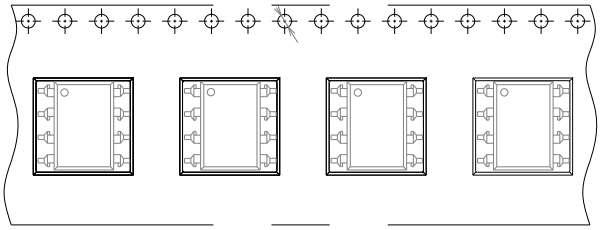
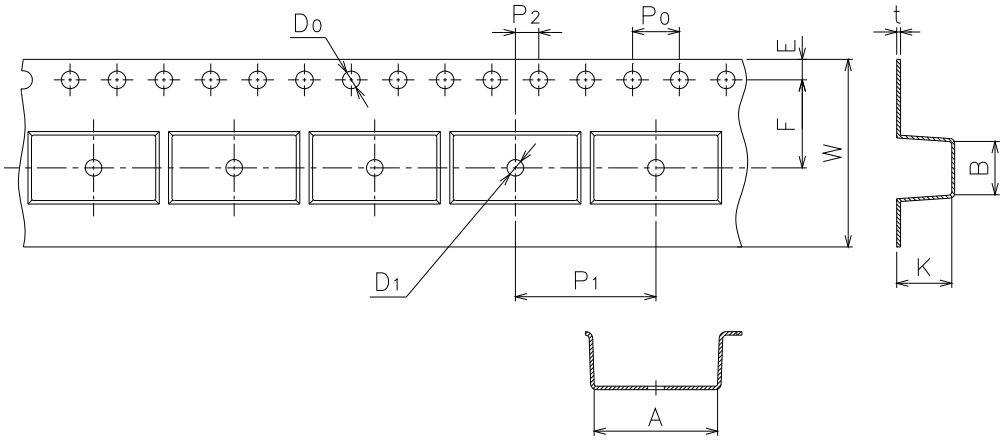
Tape & Reel Packing Specifications

Option T+R



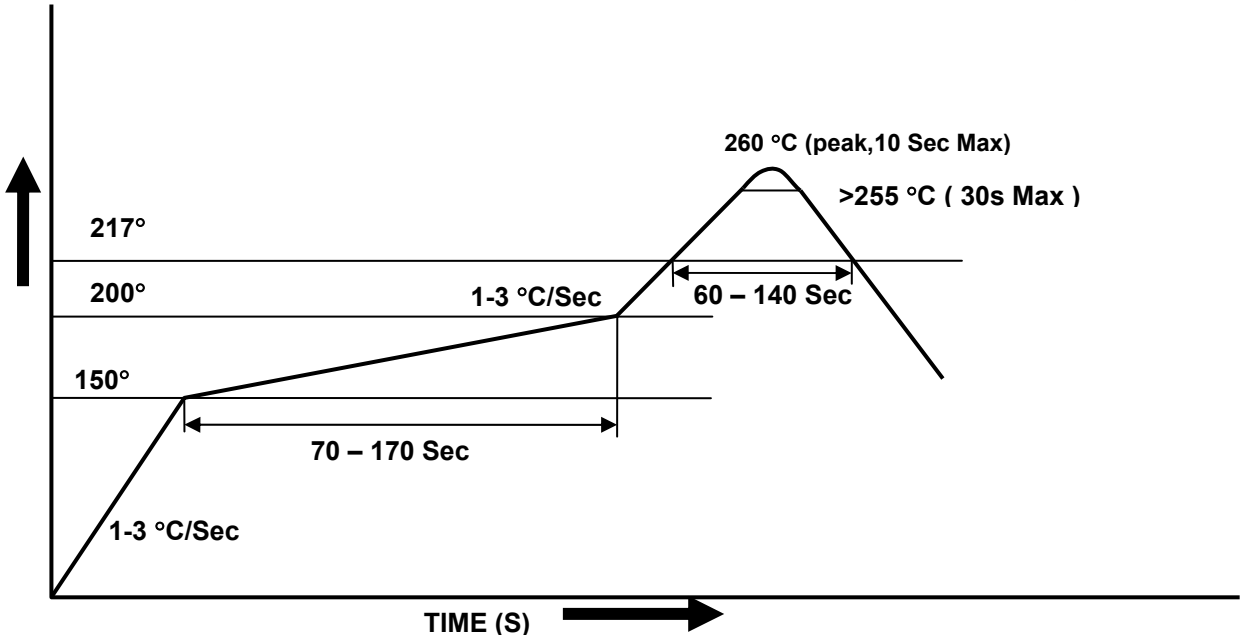
Direction of feed from reel

Tape dimensions



Dimension No.	A	B	Do	D1	E	F
Dimension(mm)	10.4±0.1	10.0±0.1	1.5±0.1	1.5±0.1	1.75±0.1	7.5±0.1
Dimension No.	Po	P1	P2	t	W	K
Dimension(mm)	4.0±0.1	12.0±0.1	2.0±0.1	0.4±0.1	16.0+0.3/ -0.1	4.5±0.1

Solder Reflow Temperature Profile



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