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NEC Electronics Inc.

6N137
HIGH SPEED PHOTO COUPLER
NEPOC SERIES

Description

The 6N137 is a high speed photo coupler containing a GaAsP light emitting diode and an integrated detector consisting of a photo diode and a high gain linear amplifier that drives a Schottky clamped open collector output transistor in a plastic DIP (Dual In-line Package).

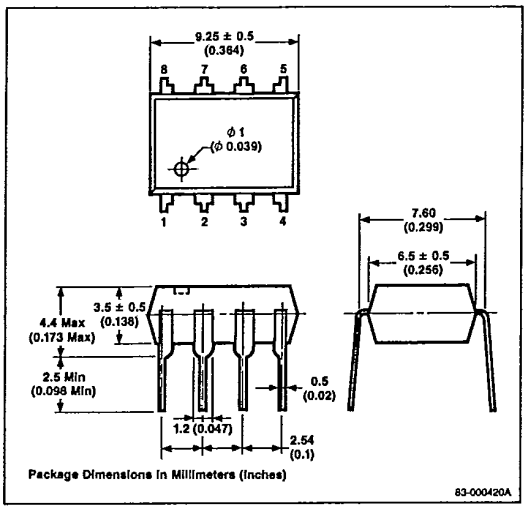
Features

- ☐ Ultra high speed (50ns typ)
- ☐ High isolation voltage (3000V_{DC} min)
- ☐ Low input current requirement (5mA)
- ☐ Economical, compact, plastic dual in-line package
- ☐ TTL compatible (5V supply)

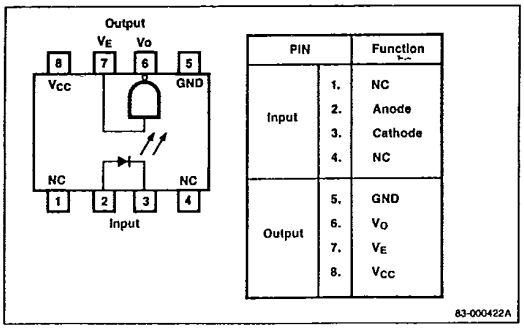
Applications

- ☐ Line receiver
- ☐ Floating power supply
- ☐ Computer and peripheral memory
- ☐ Replaceable with mechanical relays and reed relays
- ☐ Replaceable with pulse transformer

Package Dimensions



Pin Connection



PIN		Function
Input	1.	NC
	2.	Anode
	3.	Cathode
	4.	NC
Output	5.	GND
	6.	V_O
	7.	V_E
	8.	V_{CC}

Absolute Maximum Ratings

T_A = +25°C

Diode	
Reverse Voltage, V_R	5V
Forward Current, I_F	10mA
Detector	
Supply Voltage, V_{CC}	7V
Output Voltage, V_O	7V
Output Current, I_O	50mA
Enable Voltage, V_E	5.5V
Power Dissipation, P_D	85mW
Isolation Voltage, BV[1]	3000V_{DC}
Storage Temperature, T_{STG}	−55°C to +125°C
Operating Temperature, T_{OPT}	0°C to +70°C

5

6N137

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Electrical Characteristics
T_A = 0 to +75°C

Parameter	Symbol	Limits Min	Typ	Max	Unit	Test Conditions
Diode						
Forward Voltage	V_F		1.42	1.7	V	I_F = 10mA, T_A = 25°C
Reverse Current	I_R		0.01	10	μA	V_R = 5V, T_A = 25°C
Capacitance	C_T		60		pF	V = 0, f = 1.0MHz
Detector						
High Level Enable Current	I_{EH}		−0.8		mA	V_{CC} = 5.5V, V_{EH} = 2.0V
Low Level Enable Current	I_{EL}		−1.2	−2.0	mA	V_{CC} = 5.5V, V_{EL} = 0.5V
Coupled						
High Level Output Current	I_{OH}		30	250	μA	V_{CC} = 5.5V V_O = 5.5V, I_F = 250μA, V_E = 2.0V
Low Level Output Voltage	V_{OL}		0.4	0.6	V	V_{CC} = 5.5V, V_E = 2.0V, I_F = 5mA, I_O = 13mA
Low Level Supply Current	I_{CCL}		10	18	mA	V_{CC} = 5.5V, V_E = 2V, I_F = 10mA
High Level Supply Current	I_{CCH}		7	15	mA	V_{CC} = 5.5V, V_E = 0.5V, I_F = 0mA

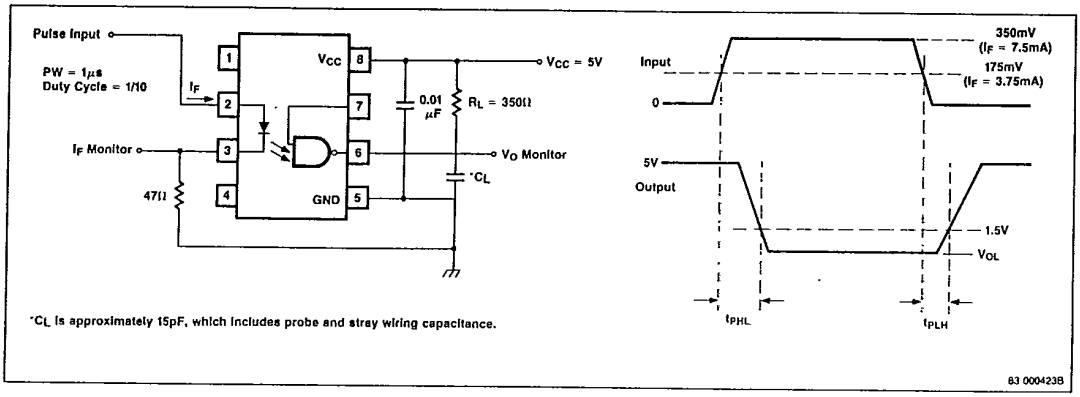
Electrical Characteristics (cont)
T_A = +25°C

Parameter	Symbol	Limits Min	Typ	Max	Unit	Test Conditions
Coupled						
Current Transfer Ratio	CTR		600		%	I_F = 5mA, V_{CC} = 5V R_L = 100Ω
Isolation Resistance	R_{I-2}		10^{12}		Ω	V_{IN-OUT} = 1kV
Isolation Capacitance	C_{I-2}		0.7		pF	V = 0, f = 1MHz
Propagation Delay Time to Low Output Level	t_{PHL}[2]		50	75	ns	I_F = 7.5mA, V_{CC} = 5V R_L = 350Ω, C_L = 15pF
Propagation Delay Time to High Output Level	t_{PLH}[2]		50	75	ns	
Propagation Delay Time of Enable to Low Output Level	t_{EHL}		15		ns	I_F = 7.5mA, V_{CC} = 5V R_L = 350Ω, V_{EH} = 3V C_L = 15pF
Propagation Delay Time of Enable to High Output Level	t_{ELH}		30		ns	

Notes: 1. Measuring conditions: DC voltage for 1 min at T_A = 25°C, RH = 60% between input (pins 1, 2, 3, 4 common) and output (pins 5, 6, 7, 8 common)

2. Measuring circuit

Measuring circuit



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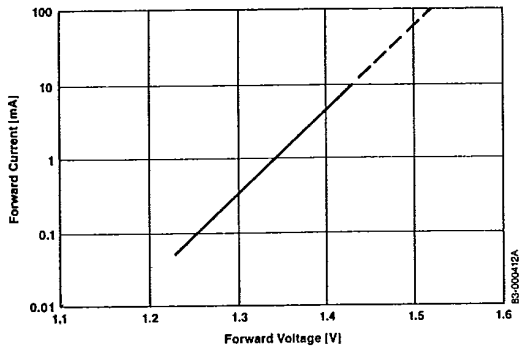
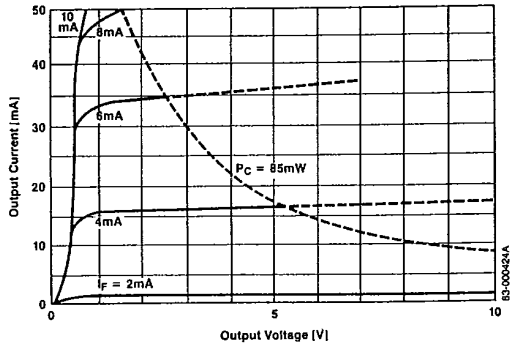
6N137

Typical Characteristics
T_A = +25°C

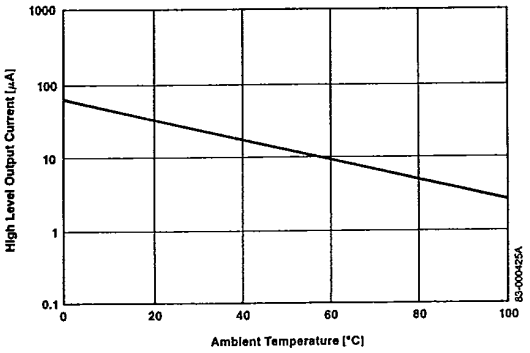
Forward Current vs Forward Voltage



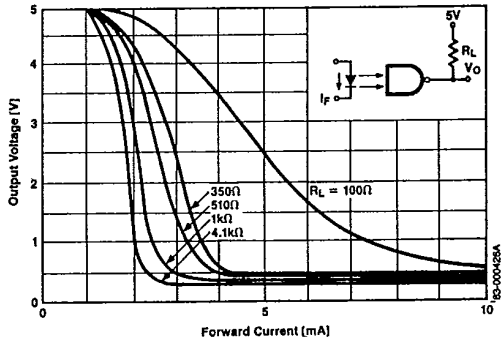
Output Current vs Output Voltage



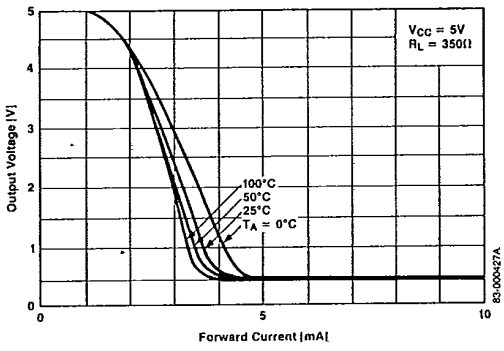
High Level Output Current vs Ambient Temperature



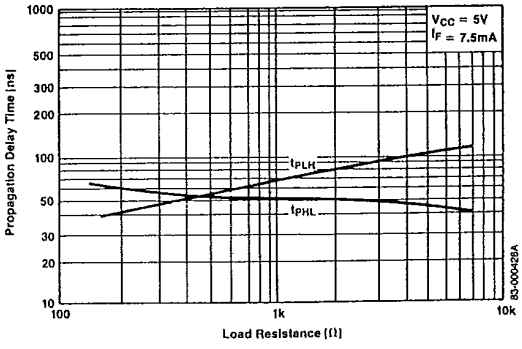
Output Voltage vs Forward Current



Output Voltage vs Forward Current



Propagation Delay Time vs Load Resistance



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6N137

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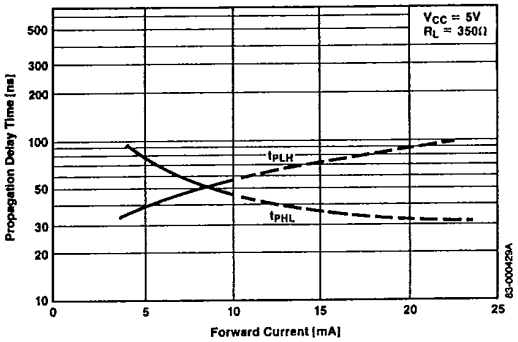
Typical Characteristics (cont)

$T_A = +25°C$

Propagation Delay Time vs Forward Current



Propagation Delay Time vs Ambient Temperature