

4N47U/BU
4N48U/BU
4N49U/BU

JAN, JANTX, and
JANTXV OPTOCOUPERS
6 PIN LCC Package



11/18/2021

OC6011 REV. NC.1

Features:

- Certified to MIL-PRF-19500/548
- Hermetically Sealed for stability and reliability
- Rugged packaging for harsh environments
- Base lead provided for conventional transistor biasing, or for photodiode operation
- 1000V electrical isolation
- Gold Plated Leads
- Solder Dip is available as an option

Applications:

- Eliminates ground loops with signal ground isolation
- Level shifting
- Line receiver
- Switchmode Power Supplies
- Motor control
- Process Control input / output Isolation

DESCRIPTION

This high gain optocoupler utilizes a GaAlAs infrared LED that is optically coupled to a NPN silicon phototransistor. These two components are packaged together in a hermetically sealed 6 pin leadless chip carrier (LCC). The **4N47U**, **4N47BU**, **4N48U**, **4N48BU**, **4N49U** and **4N49BU** optocouplers are single channel devices that are supplied in JAN, JANTX, and JANTXV quality levels, and can also be screened to specific customer requirements.

ABSOLUTE MAXIMUM RATINGS

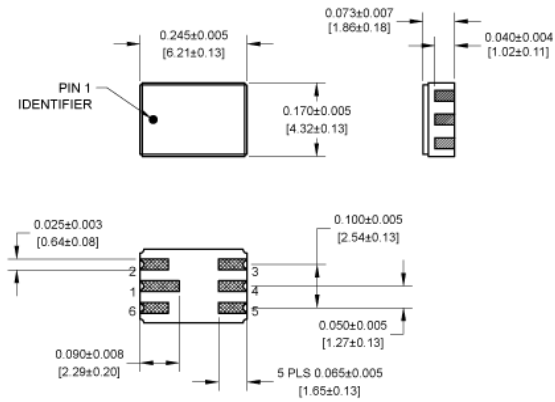
Input to Output Isolation Voltage.....	±1000 V
Input LED Continuous Forward Current (Note 1).....	40 mA
Input LED Power Dissipation	80 mW
Input LED Peak Forward Current (Value applies for $t_w \leq 1\mu s$, PRR < 300 pps)	1 A
Input LED Reverse Voltage	2 V
Collector-Emitter Voltage (Applies to emitter-base open-circuited & the input-diode equal to zero)	40 V
Collector-Emitter Voltage (Note 3) (Applies to emitter-base open-circuited & the input-diode equal to zero)	60 V
Collector-Base Voltage.....	45 V
Collector-Base Voltage (Note 3)	60 V
Emitter-Collector Voltage	7 V
Emitter-Base Voltage	7 V
Continuous Collector Current.....	50 mA
Continuous Transistor Power Dissipation (Note 2)	300 mW
Operating Free-Air Temperature Range	-55°C to +125°C
Storage Temperature Range	-65°C to +125°C
Lead Solder Temperature (10 seconds max.).....	240°C

Notes:

1. Derate linearly to 125°C free-air temperature at the rate of 0.67 mA/°C above 65°C.
2. Derate linearly to 125°C free-air temperature at the rate of 3 mW/°C above 25°C.
3. Denotes the breakdown voltages only for the 4N47BU, 4N48BU, and 4N49BU devices.

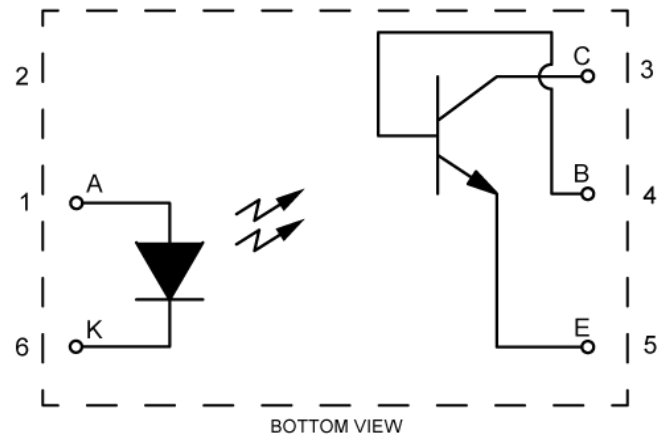
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Package Dimensions



ALL DIMENSIONS ARE IN INCHES [MILLIMETERS]

Schematic Diagram



Package Weight: 0.9 grams ± 0.05 grams
Lead Plating: Gold Plate 60 µin (1.524 µm) thick (typ.) over 120 µin (3.048 µm) thick (typ.) nickel plate

ELECTRICAL CHARACTERISTICS

T_A = 25°C unless otherwise specified.

PARAMETER	SYMBOL	MIN	MAX	UNITS	TEST CONDITIONS	NOTE
Input Diode Static Reverse Current	I _R		100	µA	V _R = 2 V	
Input Diode Static Forward Voltage	V _F	1.0	1.7	V	I _F = 10 mA	
		0.8	1.5			
		0.7	1.3			

OUTPUT TRANSISTOR

T_A = 25°C unless otherwise specified.

PARAMETER	SYMBOL	MIN	MAX	UNITS	TEST CONDITIONS	NOTE
Collector-Base Breakdown Voltage	V _{(BR)CBO}	45		V	I _C = 100 µA, I _B = 0, I _F = 0	
Collector-Base Breakdown Voltage	V _{(BR)CBO}	60		V	I _C = 100 µA, I _B = 0, I _F = 0	1
Collector-Emitter Breakdown Voltage	V _{(BR)CEO}	40		V	I _C = 1 mA, I _B = 0, I _F = 0	
Collector-Emitter Breakdown Voltage	V _{(BR)CEO}	60		V	I _C = 1 mA, I _B = 0, I _F = 0	1
Emitter-Base Breakdown Voltage	V _{(BR)EBO}	7		V	I _E = 100 µA, I _F = 0	
Off-State Collector Current	I _{C(OFF)}		100	nA	V _{CE} = 20 V, I _F = 0 mA, I _B = 0	
Off-State Collector Current	I _{C(OFF)}		100	µA	V _{CE} = 20 V, I _F = 0 mA, I _B = 0	
DC Current Gain	H _{FE}	100			V _{CE} = 5 V, I _C = 10 mA	

NOTES:

- Denotes the breakdown voltages only for the 4N47BU, 4N48BU, and 4N49BU devices.

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COUPLED CHARACTERISTICS
 $T_A = 25^\circ\text{C}$ unless otherwise specified.

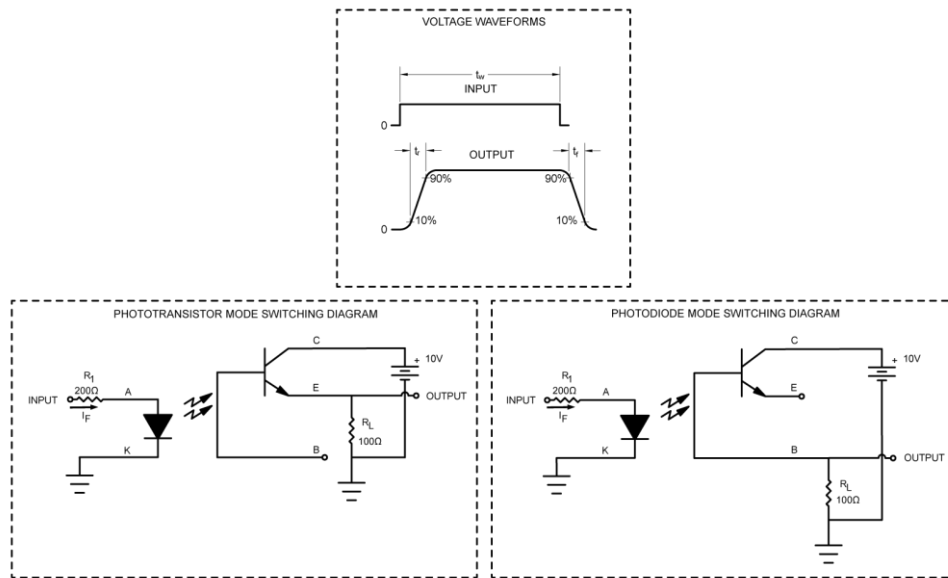
PARAMETER	SYMBOL	MIN	MAX	UNITS	TEST CONDITIONS	NOTE
On State Collector Current 4N47U/BU 4N48U/BU 4N49U/BU	$I_{C(ON)1}$	0.5 1.0 2.0	5.0 10.0	mA	$V_{CE} = 5\text{ V}, I_F = 1\text{ mA}, I_B = 0$	
On State Collector Current ALL	$I_{C(ON)2}$	5.0		mA	$V_{CE} = 5\text{ V}, I_F = 10\text{ mA}, I_B = 0$	
On State Collector Current +100C 4N47U/BU 4N48U/BU 4N49U/BU	$I_{C(ON)3}$	0.5 1.0 2.0		mA	$V_{CE} = 5\text{ V}, I_F = 2\text{ mA}, I_B = 0$	
On State Collector Current -55C 4N47U/BU 4N48U/BU 4N49U/BU	$I_{C(ON)4}$	0.5 1.0 2.8		mA	$V_{CE} = 5\text{ V}, I_F = 2\text{ mA}, I_B = 0$	
Current Transfer Ratio 4N47U/BU 4N48U/BU 4N49U/BU	CTR	50 100 200		%	$V_{CE} = 5\text{ V}, I_F = 1\text{ mA}, I_B = 0$	
Collector-Emitter Saturation Voltage 4N47U/BU 4N48U/BU 4N49U/BU	$V_{CE(SAT)}$		0.3 0.3 0.3	V	$I_F = 2\text{ mA}, I_C = 0.5\text{ mA}, I_B = 0$ $I_F = 2\text{ mA}, I_C = 1\text{ mA}, I_B = 0$ $I_F = 2\text{ mA}, I_C = 2\text{ mA}, I_B = 0$	2
Input to Output Internal Resistance ALL	R_{IO}	10^{11}		Ω	$V_{I-O} = \pm 1000\text{ V}$	1
Input to Output Capacitance ALL	C_{IO}		5	pF	$f = 1\text{ MHz}, V_{I-O} = 0\text{ V}$	1
Rise Time Phototransistor Operation ALL	t_r		20	μs	$V_{CC} = 10\text{ V}, I_F = 5\text{ mA}, R_L = 100\ \Omega, I_B = 0$	
Fall Time Phototransistor Operation ALL	t_f		20	μs	$V_{CC} = 10\text{ V}, I_F = 5\text{ mA}, R_L = 100\ \Omega, I_B = 0$	
Rise Time Photodiode Operation ALL	t_r		3	μs	$V_{CC} = 10\text{ V}, I_F = 5\text{ mA}, R_L = 100\ \Omega, I_B = 0$	
Fall Time Photodiode Operation ALL	t_f		3	μs	$V_{CC} = 10\text{ V}, I_F = 5\text{ mA}, R_L = 100\ \Omega, I_B = 0$	

NOTES:

- These parameters are measured between all phototransistor leads shorted together and with both input diode leads shorted together.
- This parameter must be measured using pulse techniques ($t_w = 100\ \mu\text{s}$ duty cycle $\leq 1\%$).

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TIMING DIAGRAMS



SELECTION GUIDE

MICROPAC PART NUMBER	JEDEC PART NUMBER	PART DESCRIPTION
66138-607	JAN4N47U	4N47U Optocoupler, JAN Screening Level
66138-608	JAN4N48U	4N48U Optocoupler, JAN Screening Level
66138-609	JAN4N49U	4N49U Optocoupler, JAN Screening Level
66138-617	JAN4N47BU	4N47BU Optocoupler, JAN Screening Level
66138-618	JAN4N48BU	4N48BU Optocoupler, JAN Screening Level
66138-619	JAN4N49BU	4N49BU Optocoupler, JAN Screening Level
66138-707	JANTX4N47U	4N47U Optocoupler, JANTX Screening Level
66138-708	JANTX4N48U	4N48U Optocoupler, JANTX Screening Level
66138-709	JANTX4N49U	4N49U Optocoupler, JANTX Screening Level
66138-717	JANTX4N47BU	4N47BU Optocoupler, JANTX Screening Level
66138-718	JANTX4N48BU	4N48BU Optocoupler, JANTX Screening Level
66138-719	JANTX4N49BU	4N49BU Optocoupler, JANTX Screening Level
66138-807	JANTXV4N47U	4N47U Optocoupler, JANTXV Screening Level
66138-808	JANTXV4N48U	4N48U Optocoupler, JANTXV Screening Level
66138-809	JANTXV4N49U	4N49U Optocoupler, JANTXV Screening Level
66138-817	JANTXV4N47BU	4N47BU Optocoupler, JANTXV Screening Level
66138-818	JANTXV4N48BU	4N48BU Optocoupler, JANTXV Screening Level
66138-819	JANTXV4N49BU	4N49BU Optocoupler, JANTXV Screening Level

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DEVICE ORDERING GUIDE

INCLUDED for JAN / JANTX / JANTXV:

- Certificate of Compliance
- Testing and Inspection per MIL-PRF-19500:
 - Burn-in
 - QCI-Group A testing
 - Some Group B Subtests
 - Periodic QCI-Group C testing

SUPPLEMENTAL OPTIONS for JAN (all devices are non-serialized):

1. Lead Solder Dip
2. Tape and Reel with Lead Solder Dip
3. Waffle Pack transport container

SUPPLEMENTAL OPTIONS for JANTX (all devices are non-serialized):

1. Lead Solder Dip
2. Tape and Reel with Lead Solder Dip
3. Waffle Pack transport container
4. Detailed Data Book Package:
 - QCI-Group A tests results
 - QCI-Group B tests results
 - Periodic QCI-Group C Data
 - Burn-In
5. Reserved
6. Reserved

SUPPLEMENTAL OPTIONS for JANTXV (all devices are non-serialized):

1. Lead Solder Dip
2. Tape and Reel with Lead Solder Dip
3. Waffle Pack transport container
4. Detailed Data Book Package:
 - QCI-Group A tests results
 - QCI-Group B tests results
 - Periodic QCI-Group C Data
 - Burn-In
5. Reserved
6. Reserved
7. Limited non-serialized production lot samples showing two X-RAY Views (top and side), requires Detailed Data Book Option #4 above
8. PIND – with Data (requires Detailed Data Book Option #4 above)