



FTO-4N47U
FTO-4N48U
FTO-4N49U

SINGLE CHANNEL OPTOCOUPLEDERS

(Direct Replacements for 4N47U/4N48U/4N49U)



Features:

- High Reliability
- Base lead provided
- Rugged package
- Stability over wide temperature
- +1000V ELECTRICAL isolation

Applications:

- Eliminate ground loops
- Level shifting
- Line receiver
- Switching power supplies
- Motor control

DESCRIPTION

The **FTO-47U to 49U** contains a gallium aluminum arsenide LED optically coupled to a silicon planar phototransistor. The optocoupler is built in a 6pin leadless chip carrier. This optocoupler is capable of transmitting signals between two galvanic sources. The potential difference between transmitter and receiver should not go over the maximum isolation voltage.

ABSOLUTE MAXIMUM RATINGS

Input to Output Voltage.....	±1kV
Emitter-Base Voltage	7V
Collector-Emitter Voltage (Value applies to emitter-base open-circuited & the input-diode equal to zero).....	40V
Collector-Base Voltage.....	45V
Reverse Input Voltage	2V
Input Diode Continuous Forward Current at (or below) 65°C Free-Air Temperature (see note 1).....	40mA
Peak Forward Input Current (Value applies for $t_w \leq 1\mu s$, PRR < 300 pps)	1A
Continuous Collector Current.....	50mA
Continuous Transistor Power Dissipation at (or below) 25°C Free-Air Temperature (see Note 2)	300mW
Storage Temperature	-65°C to +125°C
Operating Free-Air Temperature Range.....	-55°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 mW/°C above 65°C.
2. Derate linearly to 125°C free-air temperature at the rate of 3 mW/°C.

RECOMMENDED OPERATING CONDITIONS:

PARAMETER	SYMBOL	MIN	MAX	UNIT
Input Current, Low Level	I_{FL}	0	90	μA
Input Current, High Level	I_{FH}	2	10	mA
Supply Voltage	V_{CE}	5	10	V
Operating Temperature	T_A	-55	125	°C

SELECTION GUIDE

PART NUMBER	PART DESCRIPTION
FTO-4N47U-001	Single Channel optocoupler (-55° to +125°C operating temperature range)
FTO-4N47U-101	Single Channel optocoupler, with TX Processing (-55° to +125°C operating range)
FTO-4N48U-001	Optocoupler, TX Screening Level
FTO-4N48U-101	Single Channel optocoupler, with TX Processing (-55° to +125°C operating range)
FTO-4N49U-001	Optocoupler, Commercial (-55° to 125°C operating range)
FTO-4N49U-101	Single Channel optocoupler, with TX Processing (-55° to +125°C operating range)

FTO-4N47U, FTO-4N48U & FTO-4N49U

SINGLE CHANNEL OPTOCOUPLER

ELECTRICAL CHARACTERISTICS

INPUT DIODE

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

PARAMETER	SYMBOL	MIN	MAX	UNIT	TEST CONDITIONS
Input Diode Static Reverse Current	I_R		100	μA	$V_R = 2\text{V}$
Input Diode Static Forward Voltage -55°C	V_F	1.0	1.7	V	$I_F = 10\text{mA}$
Input Diode Static Forward Voltage $+25^\circ\text{C}$	V_F	0.8	1.5	V	$I_F = 10\text{mA}$
Input Diode Static Forward Voltage $+125^\circ\text{C}$	V_F	0.7	1.3	V	$I_F = 10\text{mA}$

OUTPUT TRANSISTOR

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

PARAMETER	SYMBOL	MIN	MAX	UNIT	TEST CONDITIONS
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	45		V	$I_C = 100\mu\text{A}, I_B = 0, I_F = 0$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	40		V	$I_C = 1\text{mA}, I_B = 0, I_F = 0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	7		V	$I_C = 0\text{mA}, I_E = 100\mu\text{A}, I_F = 0$
Off-State Collector Current $+25^\circ\text{C}$	$I_{C(OFF)}$		100	nA	$V_{CE} = 20\text{V}, I_F = 0\text{mA}, I_B = 0$
$+125^\circ\text{C}$	$I_{C(OFF)}$		100	μA	$V_{CE} = 20\text{V}, I_F = 0\text{mA}, I_B = 0$

COUPLED CHARACTERISTICS

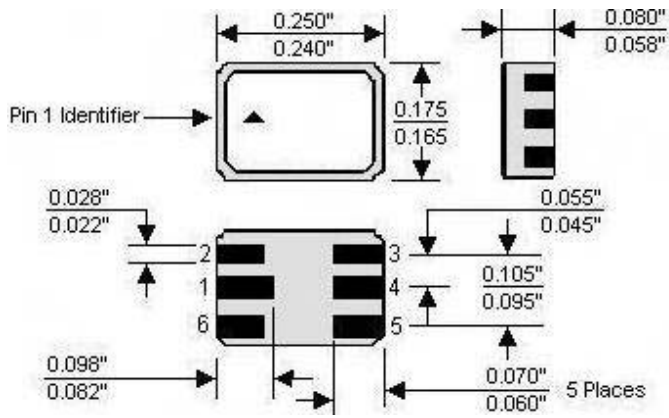
$T_A = 25^\circ\text{C}$ unless otherwise specified.

PARAMETER	SYMBOL	MIN	MAX	UNIT	TEST CONDITIONS
On State Collector Current FTO-4N47U FTO-4N48U FTO-4N49U	$I_{C(ON)}$	0.5 1 2.0	5 10	mA	$V_{CE} = 5\text{V}, I_F = 1\text{mA}$
On State Collector Current $+125^\circ\text{C}$ FTO-4N47U FTO-4N48U FTO-4N49U	$I_{C(ON)}$	0.5 1.0 2.0		mA	$V_{CE} = 5\text{V}, I_F = 2\text{mA}$
On State Collector Current -55°C FTO-4N47U FTO-4N48U FTO-4N49U	$I_{C(ON)}$	0.7 1.4 2.8		mA	$V_{CE} = 5\text{V}, I_F = 2\text{mA}$
Collector-Emitter Saturation Volt FTO-4N47U FTO-4N48U FTO-4N49U	$V_{CE(SAT)}$		0.3	V	$I_F = 2\text{mA}, I_C = 0.5\text{mA}, I_B = 0$ $I_F = 2\text{mA}, I_C = 1\text{mA}, I_B = 0$ $I_F = 2\text{mA}, I_C = 2\text{mA}, I_B = 0$
Input to Output Internal Resistance	R_{IO}	10^{11}		Ω	$V_{IN-OUT} = 1\text{Kv}, \text{Note 1}$
Input to Output Capacitance	C_{IO}		5	pF	$f = 1\text{MHz}, V_{IN-OUT} = 1\text{kV}$
Rise\Fall Time-Phototransistor	t_r/t_f		20	μs	$V_{CC} = 10\text{V}, I_F = 5\text{mA}, R_L = 100\Omega, I_E = 0$
Rise\Fall Time-Photodiode	t_r/t_f		0.85	μs	$V_{CC} = 10\text{V}, I_F = 5\text{mA}, R_L = 100\Omega, I_E = 0$

NOTES:

1. Measured between all phototransistor leads shorted together and with both input diode leads shorted together.

Package Dimensions



Schematic Diagram

