

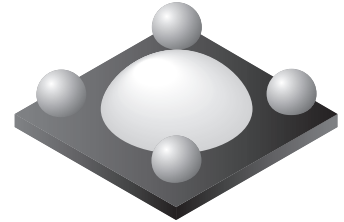
FODB100

FODB101

FODB102

DESCRIPTION

The FODB100, FODB101 and FODB102 single channel MICROCOUPLERS™ are all Pb-free, low profile miniature surface mount optocouplers in a Ball Grid Array (BGA) package. Each consists of an aluminum gallium arsenide (AlGaAs) infrared emitting diode driving a silicon phototransistor.



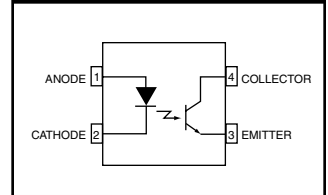
FEATURES

- Low profile package (1.20mm maximum mounted height)
- Land pattern allows for optimum board space savings
- High Current Transfer Ratio (CTR) at low IF
- Minimum isolation distance of 0.45mm
- High steady state isolation voltage of 2500V_{rms}
- Data rates up to 120Kbit/s (NRZ)
- Minimum creepage distance of 2mm
- Wide operating temperature range of -40°C to +125°C
- Available in tape and reel quantities of 3000 units
- Applicable to Pb-free Infrared Ray reflow (260°C max)
- UL, C-UL approved; VDE pending

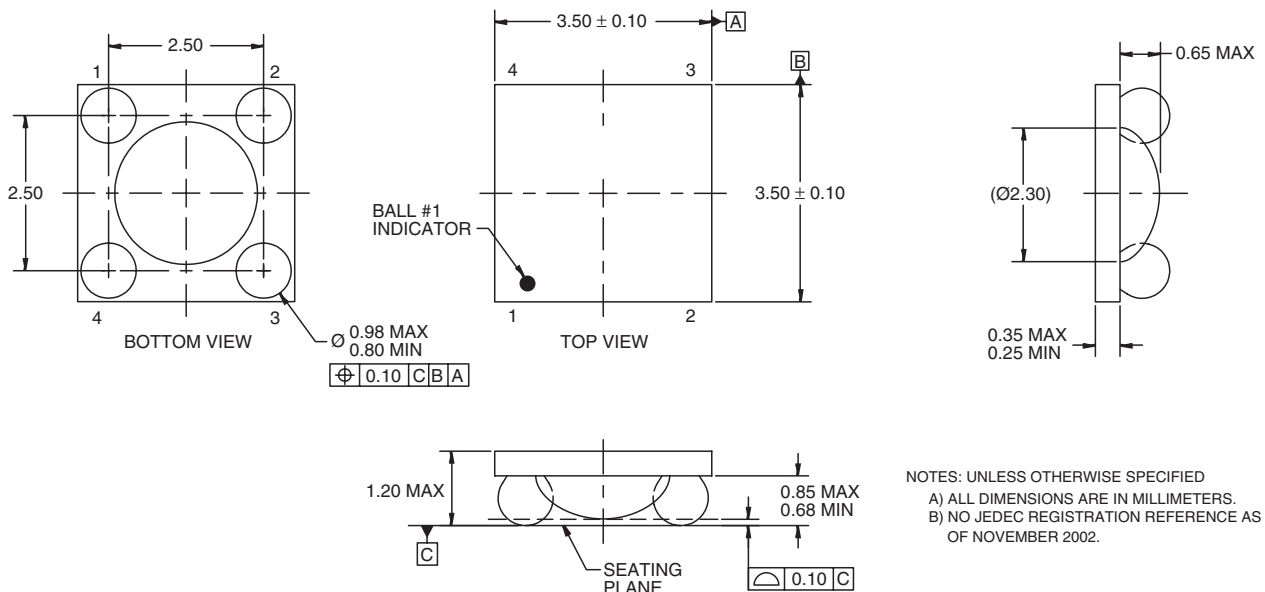
APPLICATIONS

- Primarily suited for DC-DC converters
- For ground loop isolation, signal to noise isolation
 - Communications – chargers, adapters
 - Consumer – appliances, set top boxes
 - Industrial – power supplies, motor control

SCHEMATIC



PACKAGE DIMENSIONS



FODB100

FODB101

FODB102

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Units
TOTAL PACKAGE			
Storage Temperature	T_{STG}	-55 to +150	$^\circ\text{C}$
Operating Temperature	T_{OPR}	-40 to +125	$^\circ\text{C}$
Junction Temperature	T_j	130	$^\circ\text{C}$
EMITTER			
Continuous Forward Current	I_F (avg)	30	mA
Reverse Input Voltage	V_R	6	V
Power Dissipation Derate linearly (above 25°C)	P_D	40	mW
		0.39	mW/ $^\circ\text{C}$
DETECTOR			
Continuous Collector Current		50	mA
Power Dissipation Derate linearly (above 25°C)	P_D	150	mW
		1.42	mW/ $^\circ\text{C}$
Collector-Emitter Voltage	V_{CEO}	75	V
Emitter-Collector Voltage	V_{ECO}	7	V

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

INDIVIDUAL COMPONENT CHARACTERISTICS

Parameter	Test Conditions	Symbol	Min	Typ**	Max	Unit
EMITTER						
Forward Voltage	($I_F = 2\text{ mA}$)	V_F	1.0		1.5	V
Reverse Current	($V_R = 6\text{ V}$)	I_R			10	μA
DETECTOR						
Breakdown Voltage Collector to Emitter	($I_C = 100\ \mu\text{A}$, $I_F = 0$)	BV_{CEO}	75			V
Emitter to Collector	($I_E = 100\ \mu\text{A}$, $I_F = 0$)	BV_{ECO}	7			
Collector Dark Current	($V_{CE} = 75\text{ V}$, $I_F = 0$)	I_{CEO}			100	nA
Capacitance	($V_{CE} = 0\text{ V}$, $f = 1\text{ MHz}$)	C_{CE}		8		pF

FODB100

FODB101

FODB102

TRANSFER CHARACTERISTICS ($T_A = 25^\circ\text{C}$)						
Characteristic	Test Conditions	Symbol	Min	Typ**	Max	Unit
Current Transfer Ratio ¹	($I_F = 1 \text{ mA}$, $V_{CE} = 5 \text{ V}$)	CTR	100			%
Saturated Current Transfer Ratio (Collector to Emitter)	($I_F = 1.6 \text{ mA}$, $V_{CE} = 0.4 \text{ V}$)	CTR _{CE(SAT)}	100			%
	($I_F = 1.0 \text{ mA}$, $V_{CE} = 0.4 \text{ V}$)		75			
Saturation Voltage	($I_F = 3.0 \text{ mA}$, $I_C = 1.8 \text{ mA}$) ($I_F = 1.6 \text{ mA}$, $I_C = 1.6 \text{ mA}$)	$V_{CE(SAT)}$			0.4	V
Rise Time (Non-Saturated)	($I_C = 2 \text{ mA}$, $V_{CE} = 5 \text{ V}$) ($R_L = 1\text{K}\Omega$)	t_r		1		μs
Fall Time (Non-Saturated)	($I_C = 2 \text{ mA}$, $V_{CE} = 5 \text{ V}$) ($R_L = 1\text{K}\Omega$)	t_f		5		
Propagation Delay High to Low	$I_F = 1.6 \text{ mA}$, $V_{CC} = 5.0 \text{ V}$ $R_L = 750\Omega$	T_{PHL}		3		μs
	$I_F = 1.6 \text{ mA}$, $V_{CC} = 5.0 \text{ V}$ $R_L = 4.7\text{K}\Omega$			12		
Propagation Delay Low to High	$I_F = 1.6 \text{ mA}$, $V_{CC} = 5.0 \text{ V}$ $R_L = 750\Omega$	T_{PLH}		5		μs
	$I_F = 1.6 \text{ mA}$, $V_{CC} = 5.0 \text{ V}$ $R_L = 4.7\text{K}\Omega$			19		

ISOLATION CHARACTERISTICS						
Characteristic	Test Conditions	Symbol	Min	Typ**	Max	Unit
Steady State Isolation Voltage ²	($R_H \leq 50\%$, $T_A = 25^\circ\text{C}$, $t = 1 \text{ sec}$)	V_{ISO}	2500			V(rms)
Resistance (input to output) ²	($V_{I-O} = 500\text{VDC}$)	R_{ISO}	10^{12}			Ω
Capacitance (input to output) ²	$f = 1\text{MHz}$	C_{ISO}		0.3	0.5	pF

Notes:

1. CTR bin (FODB100 only)

FODB101: 100% – 200%

FODB102: 150% – 300%

2. Pin 1 and Pin 2 are shorted as input and Pin 3 and Pin 4 are shorted as output.

TYPICAL PERFORMANCE CURVES

Fig. 1 Normalized CTR vs. Temperature (VCE = 2V)

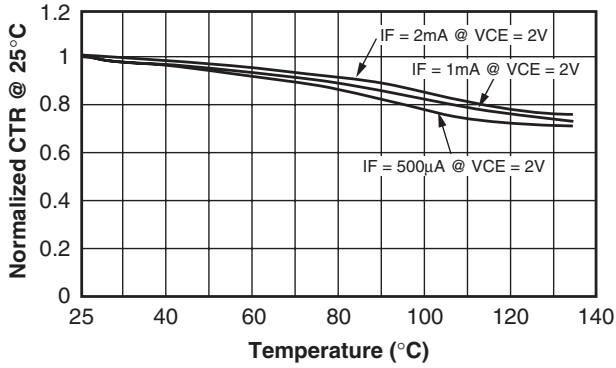


Fig. 2 Normalized CTR vs. Temperature (VCE = 5V)

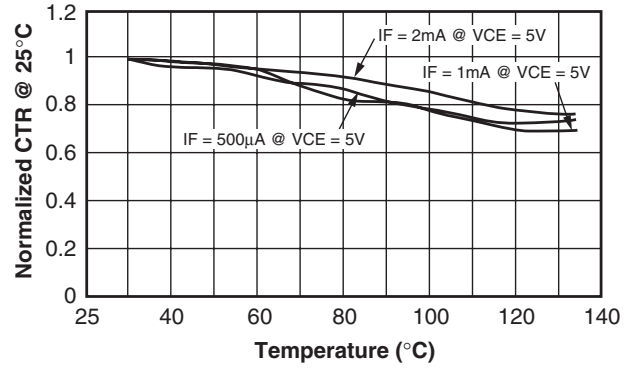


Fig. 3 Current Transfer Ratio vs. Collector to Emitter Voltage

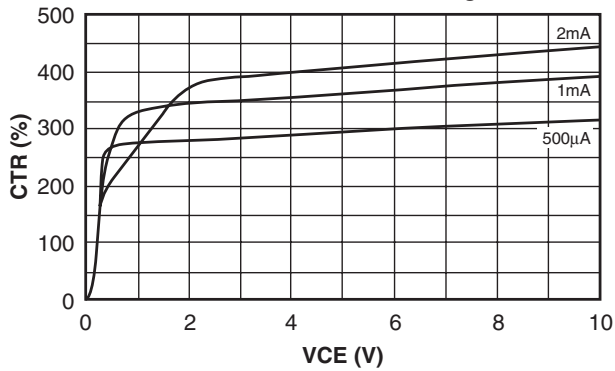


Fig. 4 Current Transfer Ratio vs. Collector Saturation Voltage

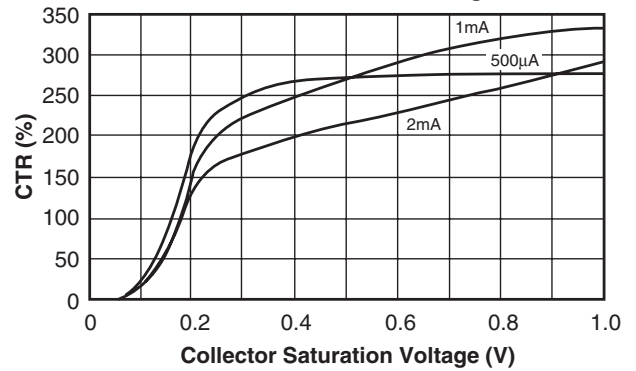
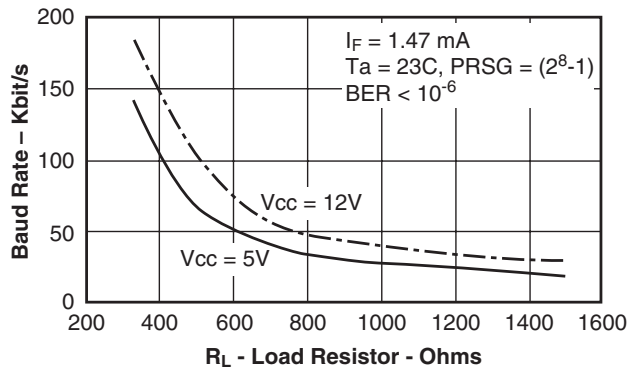
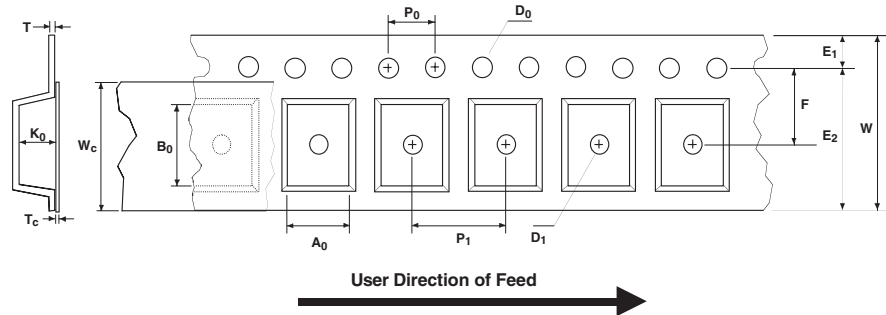


Fig. 5 Baud Rate vs. Load Resistor



TAPE AND REEL SPECIFICATIONS

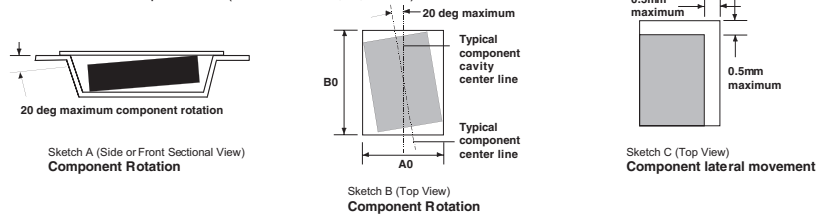
Embossed Carrier Tape Configuration



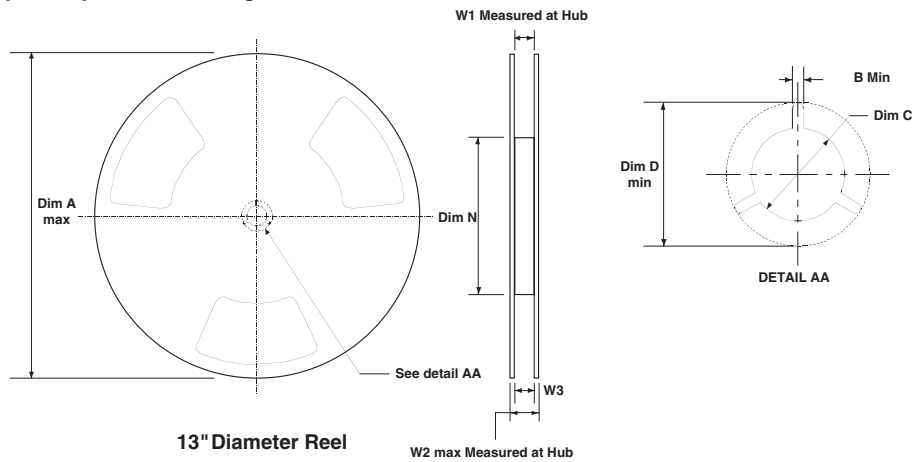
Dimensions are in millimeter

Pkg type	A ₀	B ₀	W	D ₀	D ₁	E ₁	E ₂	F	P ₁	P ₀	K ₀	T	W _c	T _c
Optocoupler (12mm)	3.80 ±0.10	3.80 ±0.10	12.0 +0.3/-0.1	1.50 +0.25/-0.00	1.50 +0.25/-0.00	1.75 ±0.10	10.25 min	5.50 ±0.05	8.0 ±0.1	4.0 ±0.1	1.40 ±0.10	0.279 ±0.02	9.2 ±0.3	0.06 ±0.02

Notes: A₀, B₀, and K₀ dimensions are determined with respect to the EIA/Jedec RS-481 rotational and lateral movement requirements (see sketches A, B, and C).



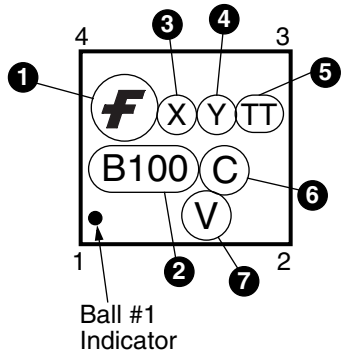
Optocoupler Reel Configuration



Dimension are in inches and millimeters

Tape Size	Reel Option	Dim A	Dim B	Dim C	Dim D	Dim N	Dim W1	Dim W2	Dim W3 (LSL-USL)
12mm	13" Dia	13.00 330	0.059 1.5	512 +0.020/-0.008 13 +0.5/-0.2	0.795 20.2	7.00 178	0.488 +0.078/-0.000 12.4 +2/-0	0.724 18.4	0.469 - 0.606 11.9 - 15.4

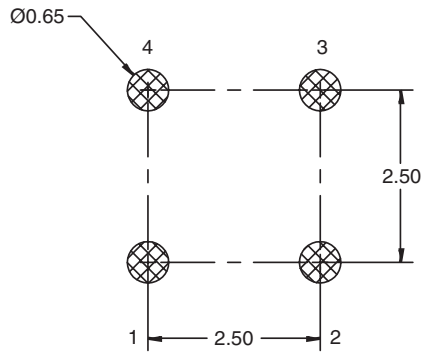
MARKING INFORMATION



Definitions	
1	Fairchild logo
2	Device number (FODB100)
3	One digit year code e.g. "4" for 2004
4	6-week date code character
5	Die Run Code
6	Assembly package code
7	VDE 0884 approved (Optional)

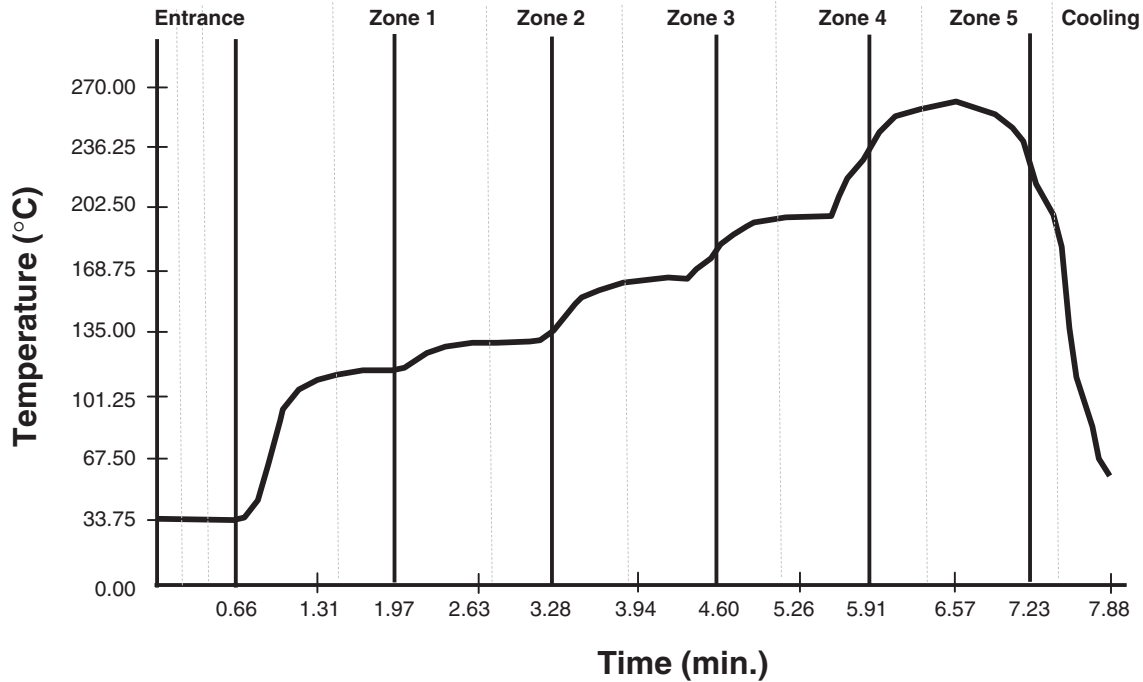
Note: The device number prefix of "FOD" will be omitted in the part number

RECOMMENDED FOOTPRINT DRAWING FOR PCB LAYOUT



- Note:**
1. All dimensions in millimeters (mm)
 2. It is recommended to use 6 mils of stencil thickness on PCB

RECOMMENDED INFRARED REFLOW SOLDERING PROFILE



Reflow Profile for Pb Free

	Convection Reflow
Average ramp-up rate (183°C to peak)	3°C/sec max
Preheat Temperature 125(±25)°C to 200°C	60-180°C
Temperature maintained above 220°C	60-150 sec
Time within 5°C of actual peak temperature	20-40 sec
Peak temperature range	260 ±5°C
Ramp down rate	6°C/sec max
Time 25°C to peak temperature	8min max

Note: Surface Mount Adhesives (SMA) isn't recommended to be used on the dome area (white dome).

FODB100

FODB101

FODB102

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