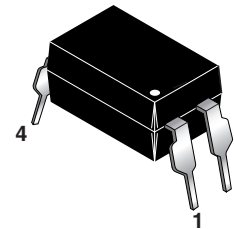


**FOD817 Series**

**DESCRIPTION**

The FOD817 Series consists of a gallium arsenide infrared emitting diode driving a silicon phototransistor in a 4-pin dual in-line package.



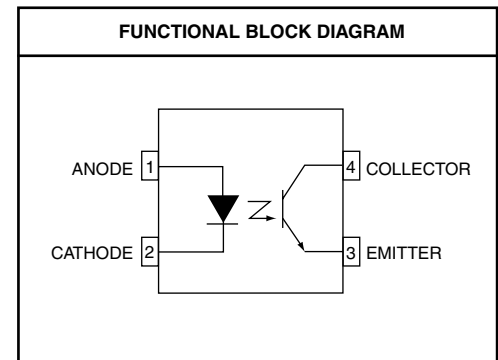
**FEATURES**

- Applicable to Pb-free IR reflow soldering
- Compact 4-pin package
- Current transfer ratio in selected groups:  
 FOD817: 50-600%  
 FOD817A: 80-160%  
 FOD817B: 130-260%  
 FOD817C: 200-400%  
 FOD817D: 300-600%
- C-UL, UL and VDE approved
- High input-output isolation voltage of 5000 Vrms

**APPLICATIONS**

FOD817 Series

- Power supply regulators
- Digital logic inputs
- Microprocessor inputs



<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_A = 25^\circ\text{C}$ Unless otherwise specified.)			
Parameter	Symbol	Value	Units
<b>TOTAL DEVICE</b>			
Storage Temperature	$T_{STG}$	-55 to +125	$^\circ\text{C}$
Operating Temperature	$T_{OPR}$	-30 to +100	$^\circ\text{C}$
Lead Solder Temperature	$T_{SOL}$	260 for 10 sec	$^\circ\text{C}$
Total Device Power Dissipation	$P_D$	200	mW
<b>EMITTER</b>			
Continuous Forward Current	$I_F$	50	mA
Reverse Voltage	$V_R$	6	V
LED Power Dissipation Derate above $25^\circ\text{C}$	$P_D$	70	mW
		0.93	mW/ $^\circ\text{C}$
<b>DETECTOR</b>			
Collector-Emitter Voltage	$V_{CEO}$	70	V
Emitter-Collector Voltage	$V_{ECO}$	6	V
Continuous Collector Current	$I_C$	50	mA
Detector Power Dissipation Derate above $25^\circ\text{C}$	$P_D$	150	mW
		2.0	mW/ $^\circ\text{C}$

**FOD817 Series**

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  Unless otherwise specified.)

**INDIVIDUAL COMPONENT CHARACTERISTICS**

Parameter	Test Conditions	Symbol	Min	Typ*	Max	Unit
<b>EMITTER</b>						
Input Forward Voltage	( $I_F = 20\text{ mA}$ )	$V_F$	—	1.2	1.4	V
Reverse Leakage Current	( $V_R = 4.0\text{ V}$ )	$I_R$	—	—	10	$\mu\text{A}$
Terminal Capacitance	( $V = 0, f = 1\text{ kHz}$ )	$C_t$	—	30	250	pF
<b>DETECTOR</b>						
Collector-Emitter Breakdown Voltage	( $I_C = 0.1\text{ mA}, I_F = 0$ )	$BV_{CEO}$	70	—	—	V
Emitter-Collector Breakdown Voltage	( $I_E = 10\text{ }\mu\text{A}, I_F = 0$ )	$BV_{ECO}$	6	—	—	V
Collector-Emitter Dark Current	( $V_{CE} = 20\text{ V}, I_F = 0$ )	$I_{CEO}$	—	—	100	nA

\*Typical values at  $T_A = 25^\circ\text{C}$ .

**TRANSFER CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  Unless otherwise specified.)

DC Characteristic	Test Conditions	Symbol	Device	Min	Typ*	Max	Unit
Current Transfer Ratio	( $I_F = 5\text{ mA}, V_{CE} = 5\text{ V}$ ) (note 1)	CTR	FOD817	50	—	600	%
			FOD817A	80	—	160	%
			FOD817B	130	—	260	%
			FOD817C	200	—	400	%
			FOD817D	300	—	600	%
Collector-Emitter Saturation Voltage	( $I_F = 20\text{ mA}, I_C = 1\text{ mA}$ )	$V_{CE(SAT)}$		—	0.1	0.2	V
<b>AC Characteristic</b>							
Rise Time	( $I_C = 2\text{ mA}, V_{CE} = 2\text{ V}, R_L = 100\Omega$ ) (note 2)	$t_r$		—	4	18	$\mu\text{s}$
Fall Time	( $I_C = 2\text{ mA}, V_{CE} = 2\text{ V}, R_L = 100\Omega$ ) (note 2)	$t_f$		—	3	18	$\mu\text{s}$

**ISOLATION CHARACTERISTICS**

Characteristic	Test Conditions	Symbol	Min	Typ*	Max	Units
Input-Output Isolation Voltage (note 3)	$f = 60\text{ Hz}, t = 1\text{ min}$	$V_{ISO}$	5000			Vac(rms)
Isolation Resistance	( $V_{I-O} = 500\text{ VDC}$ )	$R_{ISO}$	$5 \times 10^{10}$	$10^{11}$		$\Omega$
Isolation Capacitance	( $V_{I-O} = 0, f = 1\text{ MHz}$ )	$C_{ISO}$		0.6	1.0	pf

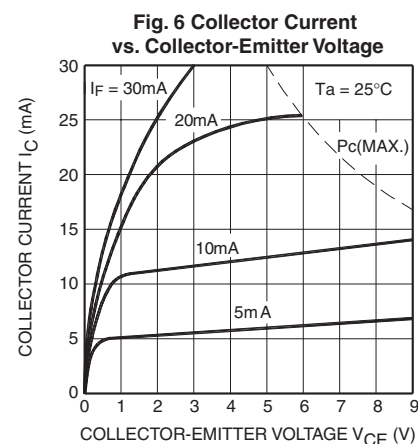
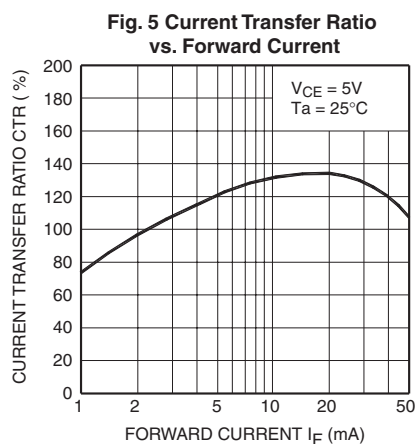
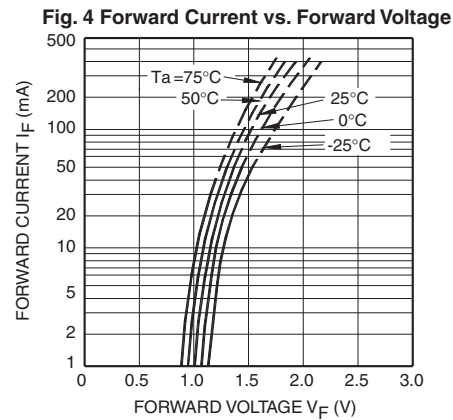
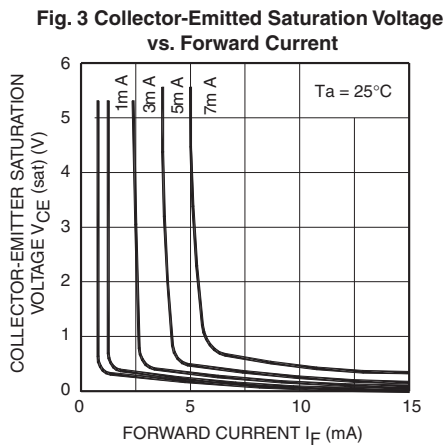
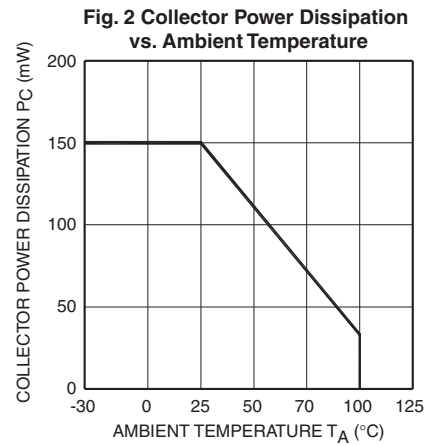
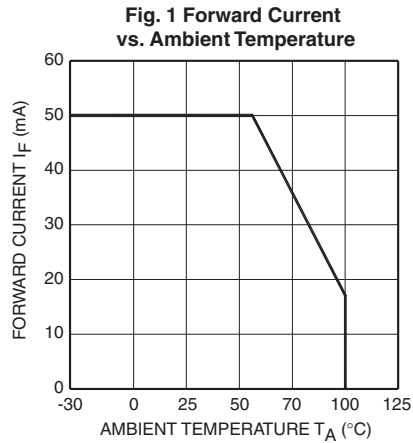
\*Typical values at  $T_A = 25^\circ\text{C}$ .

**NOTES**

1. Current Transfer Ratio (CTR) =  $I_C/I_F \times 100\%$ .
2. For test circuit setup and waveforms, refer to page 4.
3. For this test, Pins 1 and 2 are common, and Pins 3 and 4 are common.

**FOD817 Series**

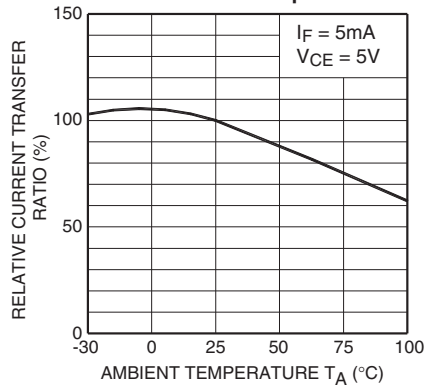
**Typical Electrical/Optical Characteristic Curves** ( $T_A = 25^\circ\text{C}$  Unless otherwise specified.)



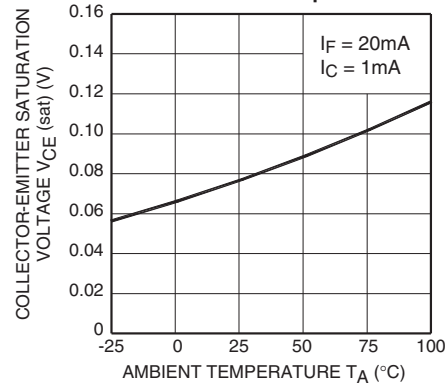
**FOD817 Series**

**Typical Electrical/Optical Characteristic Curves** ( $T_A = 25^\circ\text{C}$  Unless otherwise specified.)

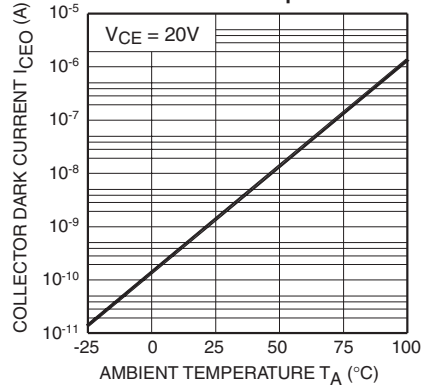
**Fig. 7. Relative Current Transfer Ratio vs. Ambient Temperature**



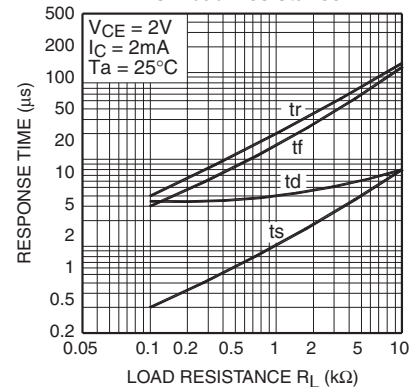
**Fig. 8 Collector-Emitter Saturation Voltage vs. Ambient Temperature**



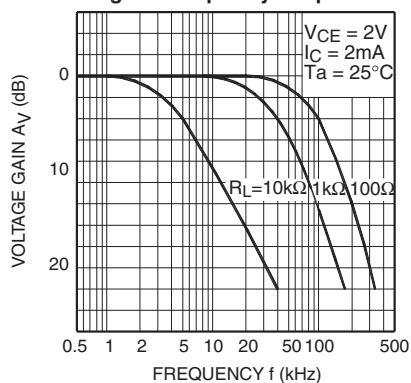
**Fig. 9 Collector Dark Current vs. Ambient Temperature**



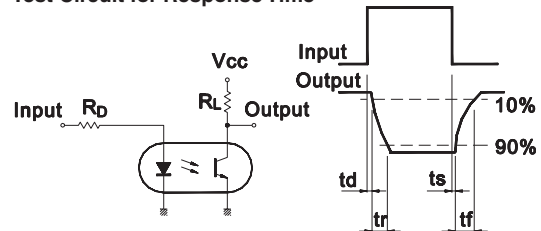
**Fig. 10. Response Time vs. Load Resistance**



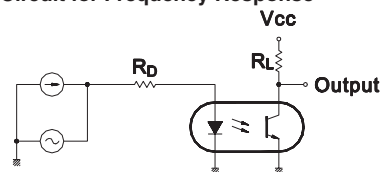
**Fig. 11. Frequency Response**



**Test Circuit for Response Time**

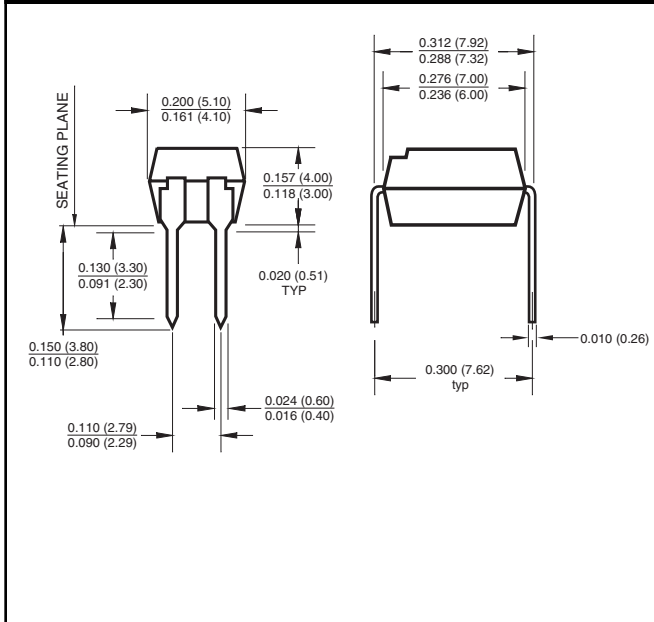


**Test Circuit for Frequency Response**

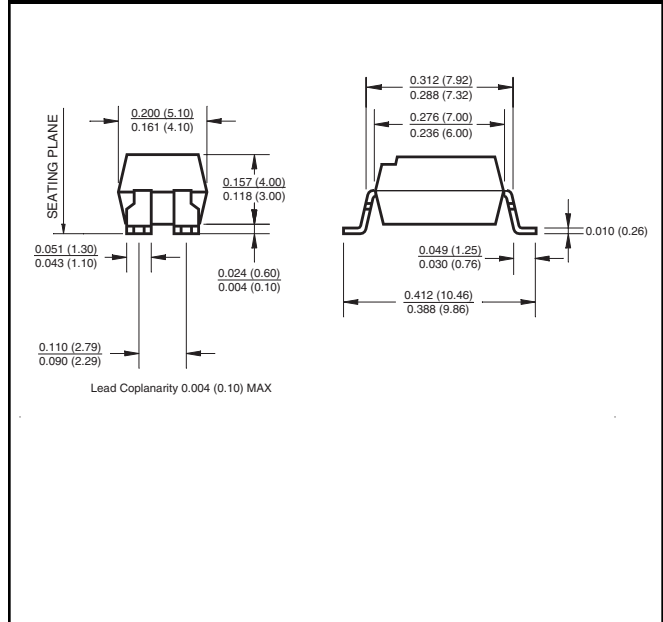


**FOD817 Series**

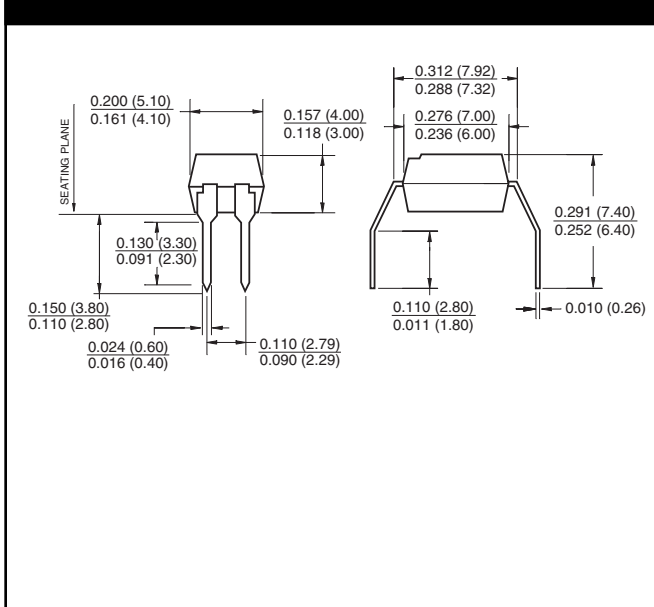
**Package Dimensions (Through Hole)**



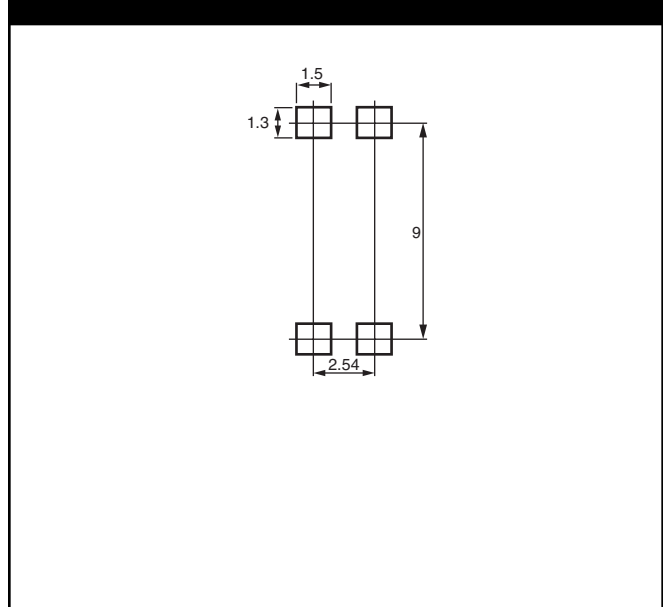
**Package Dimensions (Surface Mount)**



**Package Dimensions (0.4" Lead Spacing)**



**Footprint Dimensions (Surface Mount)**



**NOTE**

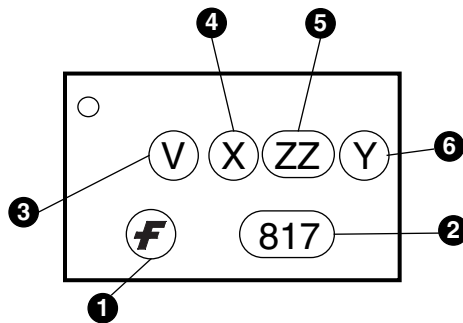
All dimensions are in inches (millimeters)

**FOD817 Series**

**ORDERING INFORMATION**

Option	Order Entry Identifier	Description
S	.S	Surface Mount Lead Bend
SD	.SD	Surface Mount; Tape and reel
W	.W	0.4" Lead Spacing
300	.300	VDE 0884
300W	.300W	VDE 0884, 0.4" Lead Spacing
3S	.3S	VDE 0884, Surface Mount
3SD	.3SD	VDE 0884, Surface Mount, Tape & Reel

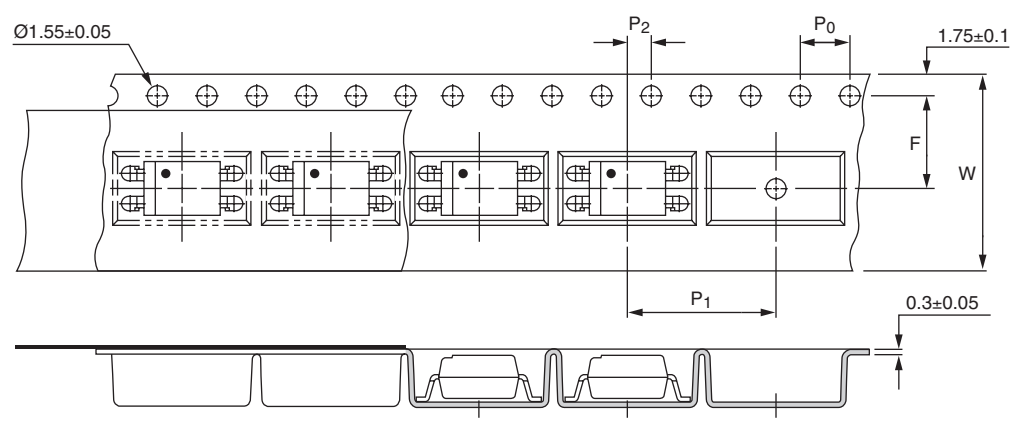
**MARKING INFORMATION**



Definitions	
1	Fairchild logo
2	Device number
3	VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table)
4	One digit year code
5	Two digit work week ranging from '01' to '53'
6	Assembly package code

**FOD817 Series**

**Carrier Tape Specifications**

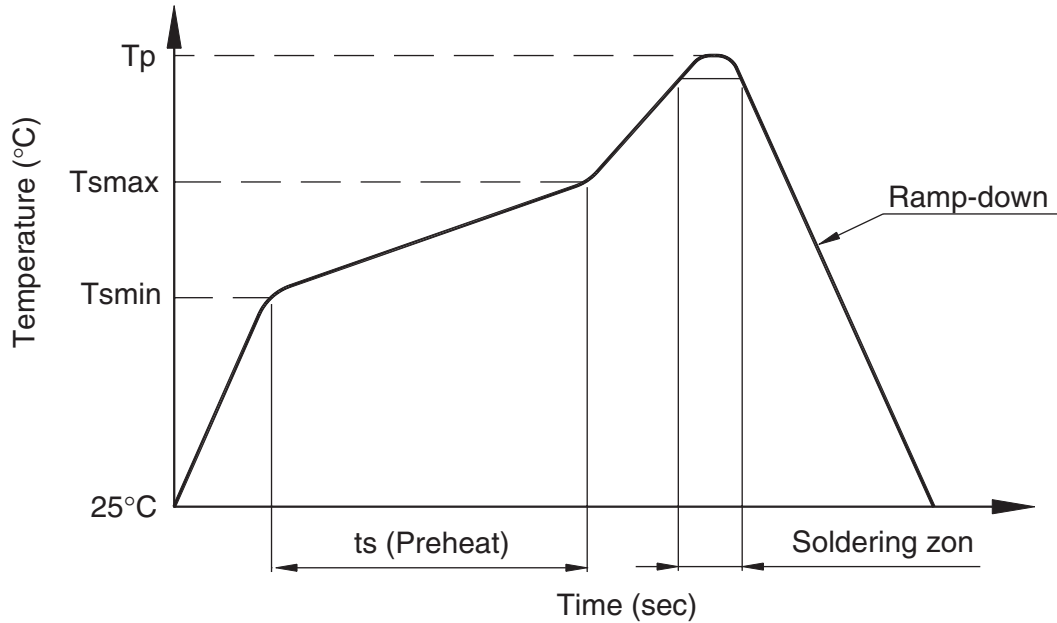


**NOTE**  
All dimensions are in millimeters

Description	Symbol	Dimensions in mm (inches)
Tape wide	W	16 ± 0.3 (.63)
Pitch of sprocket holes	P <sub>0</sub>	4 ± 0.1 (.15)
Distance of compartment	F	7.5 ± 0.1 (.295)
	P <sub>2</sub>	2 ± 0.1 (.079)
Distance of compartment to compartment	P <sub>1</sub>	12 ± 0.1 (.472)

**FOD817 Series**

**Lead Free recommended IR Reflow condition**



Profile Feature	Pb-Sn solder assembly	Lead Free assembly
Preheat condition (Tsmmin-Tsmmax / ts)	100°C ~ 150°C 60 ~ 120 sec	150°C ~ 200°C 60 ~ 120 sec
Melt soldering zone	183°C 60 ~ 120 sec	217°C 30 ~ 90 sec
Peak temperature (Tp)	240 +0/-5°C	250 +0/-5°C
Ramp-down rate	6°C/sec max.	6°C/sec max.

**Recommended Wave Soldering condition**

Profile Feature	For all solder assembly
Peak temperature (Tp)	Max 260°C for 10 sec



---

## **FOD817 Series**

---

### **DISCLAIMER**

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

### **LIFE SUPPORT POLICY**

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.