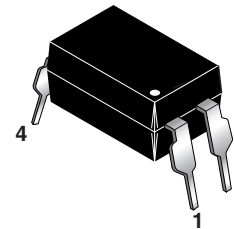


FOD817 Series

DESCRIPTION

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



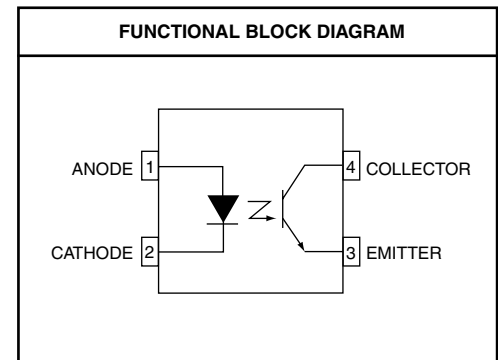
FEATURES

- 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



| ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ Unless otherwise specified.) | | | |
|---|-----------|----------------|----------------------|
| Parameter | Symbol | Value | Units |
| TOTAL DEVICE | | | |
| 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 |
| EMITTER | | | |
| Continuous Forward Current | I_F | 50 | mA |
| Reverse Voltage | V_R | 6 | V |
| LED Power Dissipation Derate above 25°C | P_D | 70 | mW |
| | | 0.93 | mW/ $^\circ\text{C}$ |
| DETECTOR | | | |
| 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°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 |
|-------------------------------------|--|------------|-----|------|-----|---------------|
| EMITTER | | | | | | |
| 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 | μA |
| Terminal Capacitance | ($V = 0, f = 1\text{ kHz}$) | C_t | — | 30 | 250 | pF |
| DETECTOR | | | | | | |
| 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 |
| AC Characteristic | | | | | | | |
| Rise Time | ($I_C = 2\text{ mA}, V_{CE} = 2\text{ V}, R_L = 100\Omega$) (note 2) | t_r | | — | 4 | 18 | μs |
| Fall Time | ($I_C = 2\text{ mA}, V_{CE} = 2\text{ V}, R_L = 100\Omega$) (note 2) | t_f | | — | 3 | 18 | μs |

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} | 5×10^{10} | 10^{11} | | Ω |
| Isolation Capacitance | ($V_{I-O} = 0, f = 1\text{ MHz}$) | C_{ISO} | | 0.6 | 1.0 | pf |

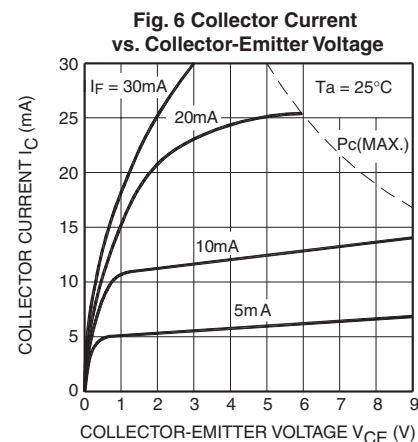
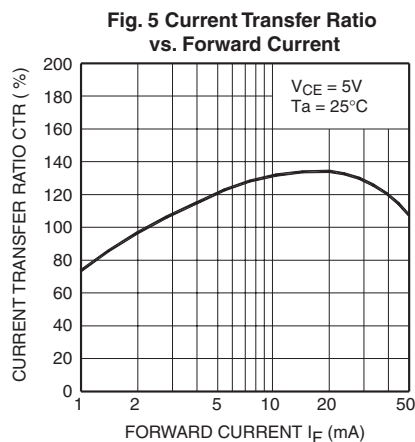
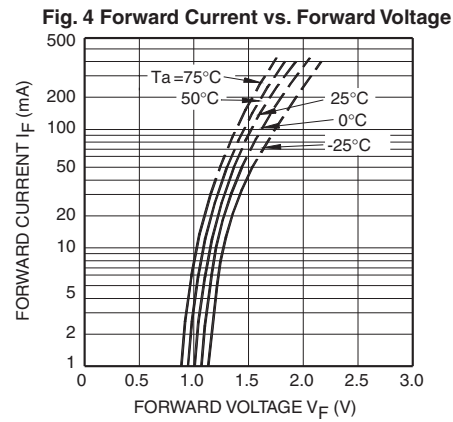
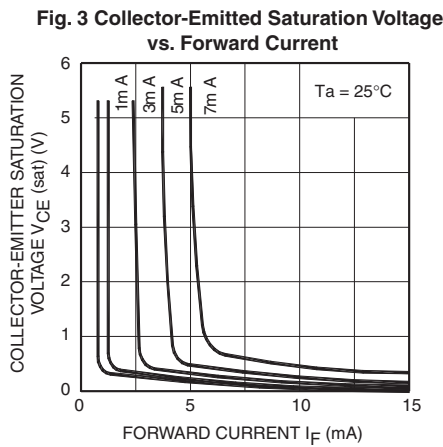
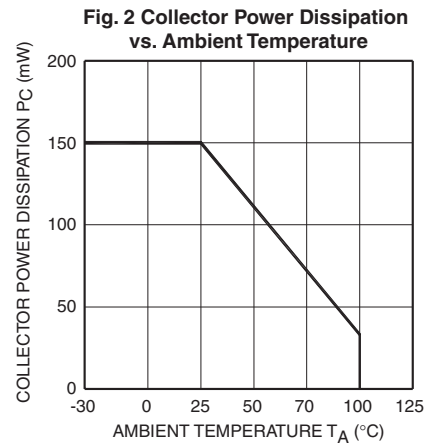
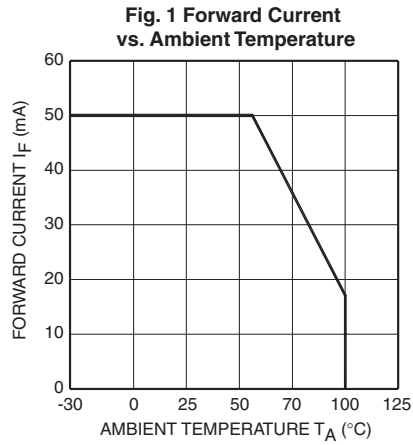
*Typical values at $T_A = 25^\circ\text{C}$.

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

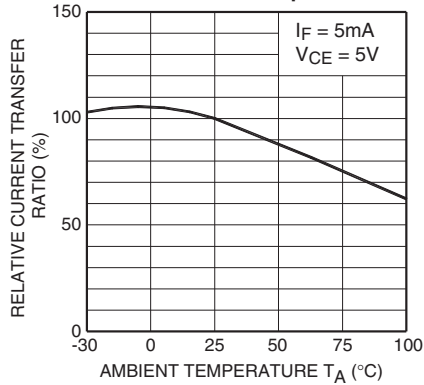


Fig. 8 Collector-Emitter Saturation Voltage vs. Ambient Temperature

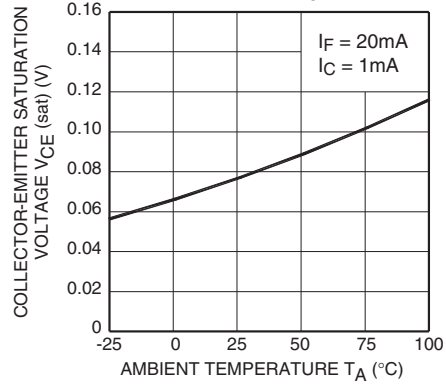


Fig. 9 Collector Dark Current vs. Ambient Temperature

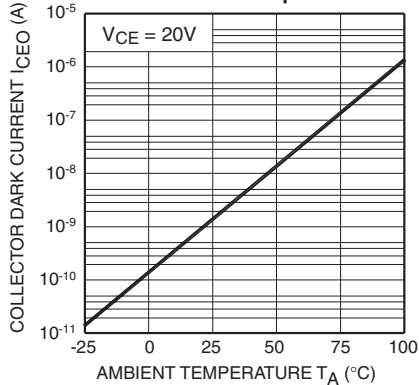


Fig. 10. Response Time vs. Load Resistance

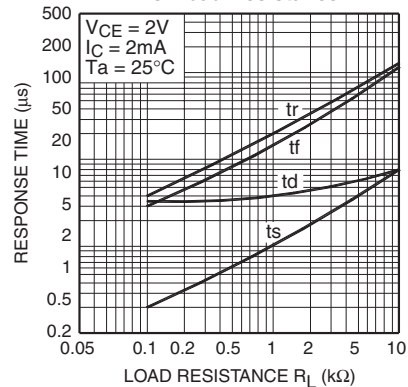
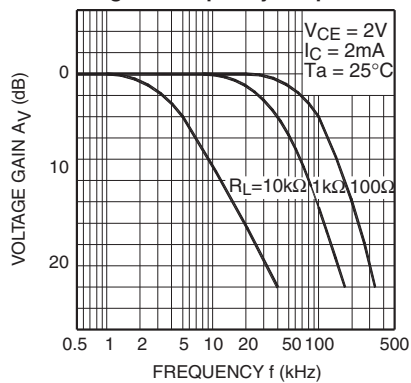
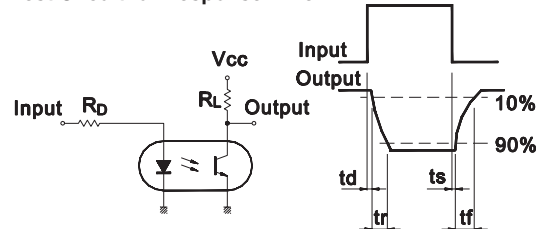


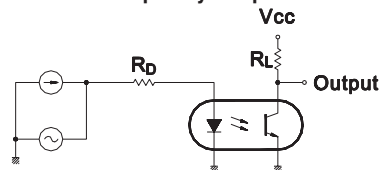
Fig. 11. Frequency Response



Test Circuit for Response Time

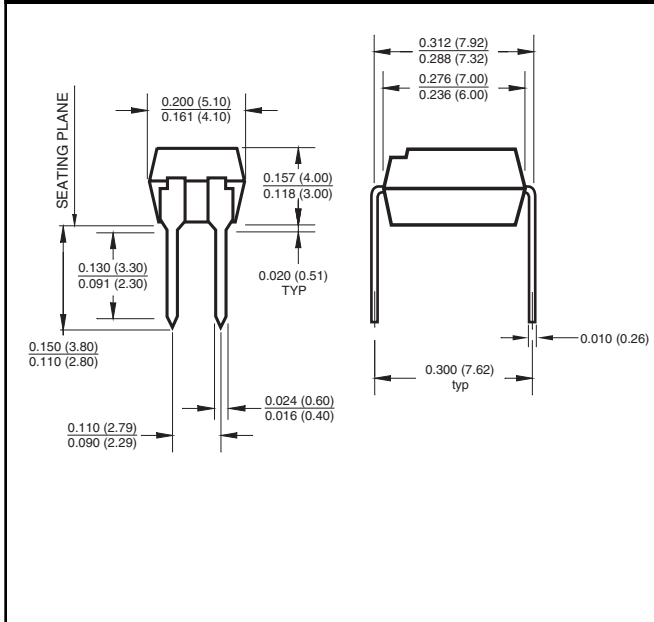


Test Circuit for Frequency Response

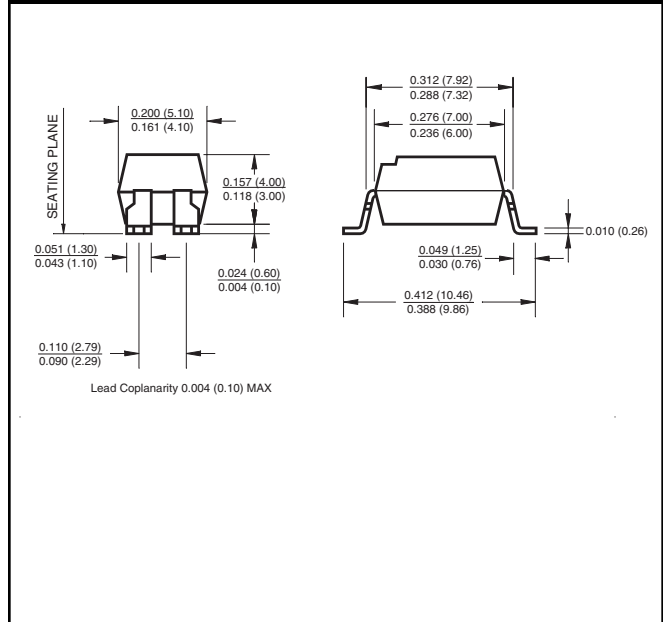


FOD817 Series

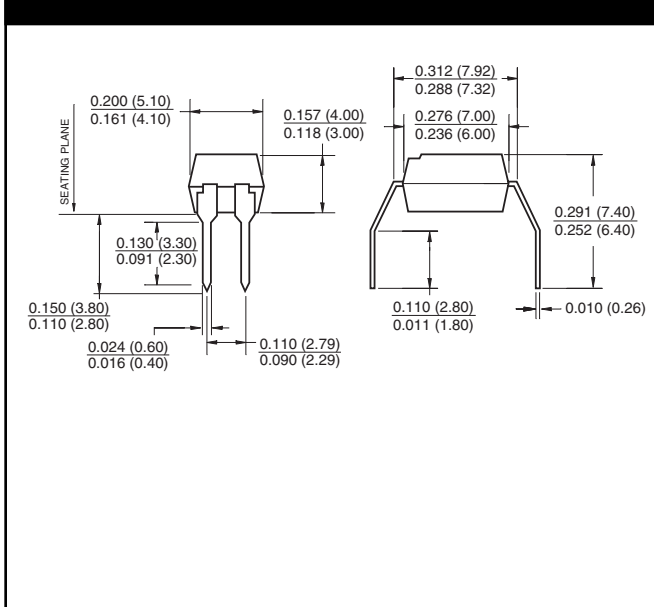
Package Dimensions (Through Hole)



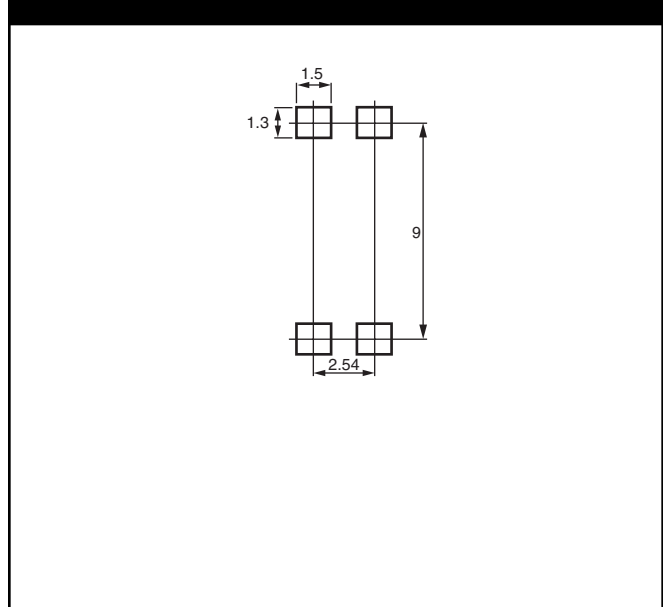
Package Dimensions (Surface Mount)



Package Dimensions (0.4" Lead Spacing)



Footprint Dimensions (Surface Mount)



NOTE

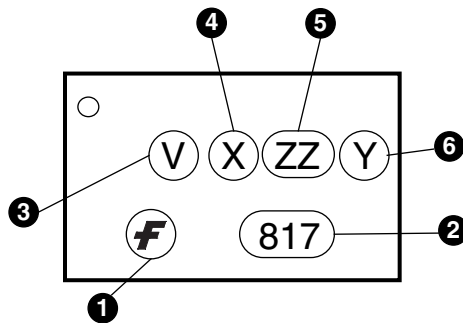
All dimensions are in inches (millimeters)

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 |

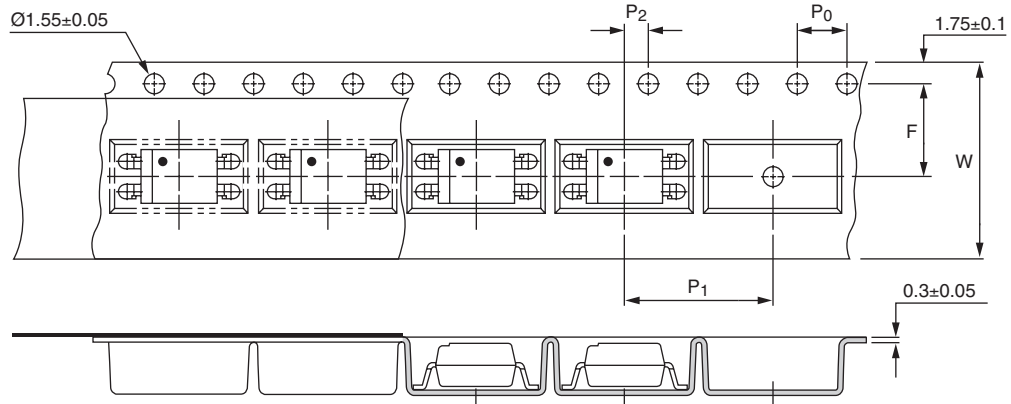
MARKING INFORMATION



| 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



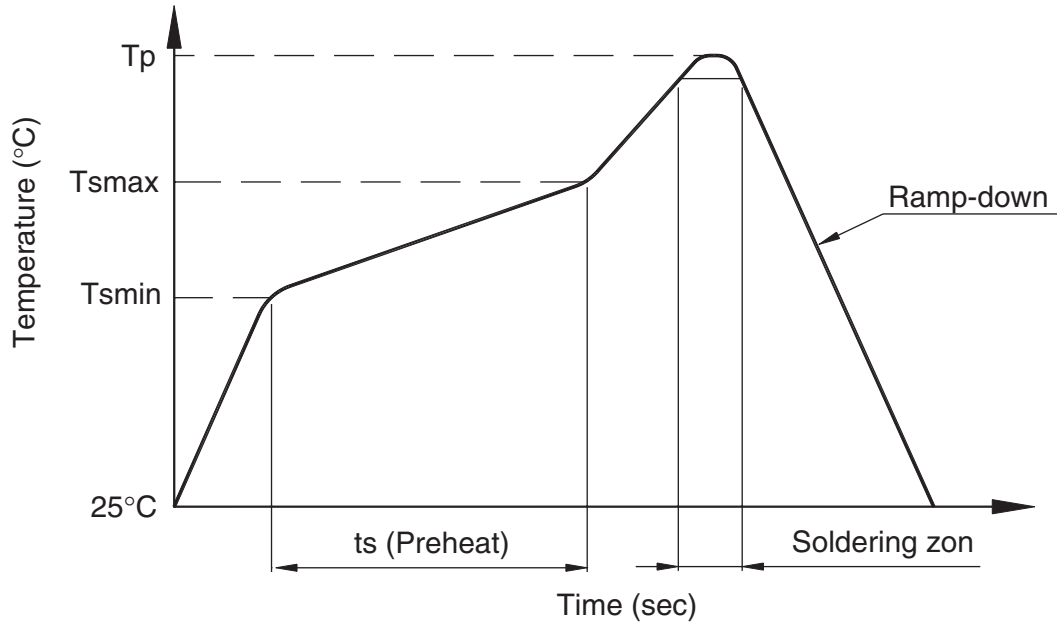
NOTE

All dimensions are in millimeters

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

FOD817 Series

Lead Free recommended IR Reflow condition



| Profile Feature | Pb-Sn solder assembly | Lead Free assembly |
|---------------------------------------|-------------------------------|-------------------------------|
| Preheat condition (Tsmin-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

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