



FOD815 Series 4-Pin High Operating Temperature Photodarlington Optocoupler

Features

- Applicable to Pb-free IR reflow soldering
- Compact 4-pin package
- High current transfer ratio: 600% minimum
- C-UL, UL, and VDE approved
- High input-output isolation voltage of 5000Vrms
- Higher operating temperature (versus H11B815)

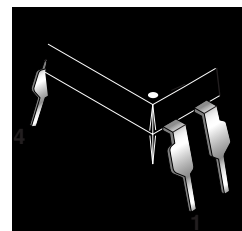
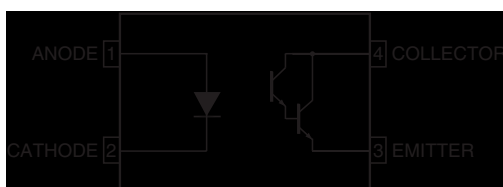
Applications

- Power supply regulators
- Digital logic inputs
- Microprocessor inputs

Description

The FOD815 consists of a gallium arsenide infrared emitting diode, driving a silicon photodarlington output in a 4-pin dual in-line package.

Functional Block Diagram



Absolute Maximum Ratings (T_A = 25°C Unless otherwise specified.)

| Symbol | Parameter | Value | Units |
|---------------------|-----------------------------|----------------|-------|
| TOTAL DEVICE | | | |
| T _{STG} | Storage Temperature | -55 to +125 | °C |
| T _{OPR} | Operating Temperature | -30 to +105 | °C |
| T _{SOL} | Lead Solder Temperature | 260 for 10 sec | °C |
| P _{TOT} | Total Power Dissipation | 200 | mW |
| INPUT | | | |
| I _F | Forward Current | 50 | mA |
| P | Power Dissipation | 70 | mW |
| OUTPUT | | | |
| V _{CEO} | Collector-Emitter Voltage | 35 | V |
| V _{ECO} | Emitter-Collector Voltage | 6 | V |
| I _C | Collector Current | 80 | mA |
| P _C | Collector Power Dissipation | 150 | mW |

Electrical Characteristics ($T_A = 25^\circ\text{C}$ Unless otherwise specified.)**Individual Component Characteristics**

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---------------|-------------------------------------|--------------------------------|------|------|------|---------------|
| INPUT | | | | | | |
| V_F | Forward Voltage | $I_F = 20\text{mA}$ | – | 1.2 | 1.4 | V |
| C_t | Terminal Capacitance | $V = 0, f = 1\text{kHz}$ | – | 50 | 250 | pF |
| OUTPUT | | | | | | |
| I_{CEO} | Collector Dark Current | $V_{CE} = 10\text{V}, I_F = 0$ | – | – | 1 | μA |
| BV_{CEO} | Collector-Emitter Breakdown Voltage | $I_C = 0.1\text{mA}, I_F = 0$ | 35 | – | – | V |
| BV_{ECO} | Emitter-Collector Breakdown Voltage | $I_E = 10\mu\text{A}, I_F = 0$ | 6 | – | – | V |

Transfer Characteristics ($T_A = 25^\circ\text{C}$ Unless otherwise specified.)

| Symbol | DC Characteristic | Test Conditions | Min. | Typ. | Max. | Unit |
|---------------|---------------------------------------|--|------|------|-------|---------------|
| I_C | Collector Current | $I_F = 1\text{mA}, V_{CE} = 2\text{V}$ | 6 | – | 75 | mA |
| CTR | Current Transfer Ratio ⁽¹⁾ | | 600 | – | 7,500 | % |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_F = 20\text{mA}, I_C = 5\text{mA}$ | – | 0.8 | 1 | V |
| f_C | Cut-Off Frequency | $V_{CE} = 5\text{V}, I_C = 2\text{mA}, R_L = 100\Omega, -3\text{dB}$ | 1 | 6 | – | KHz |
| t_r | Response Time (Rise) | $V_{CE} = 2\text{V}, I_C = 10\text{mA}, R_L = 100\Omega$ | – | 60 | 300 | μs |
| t_f | Response Time (Fall) | | – | 53 | 250 | μs |

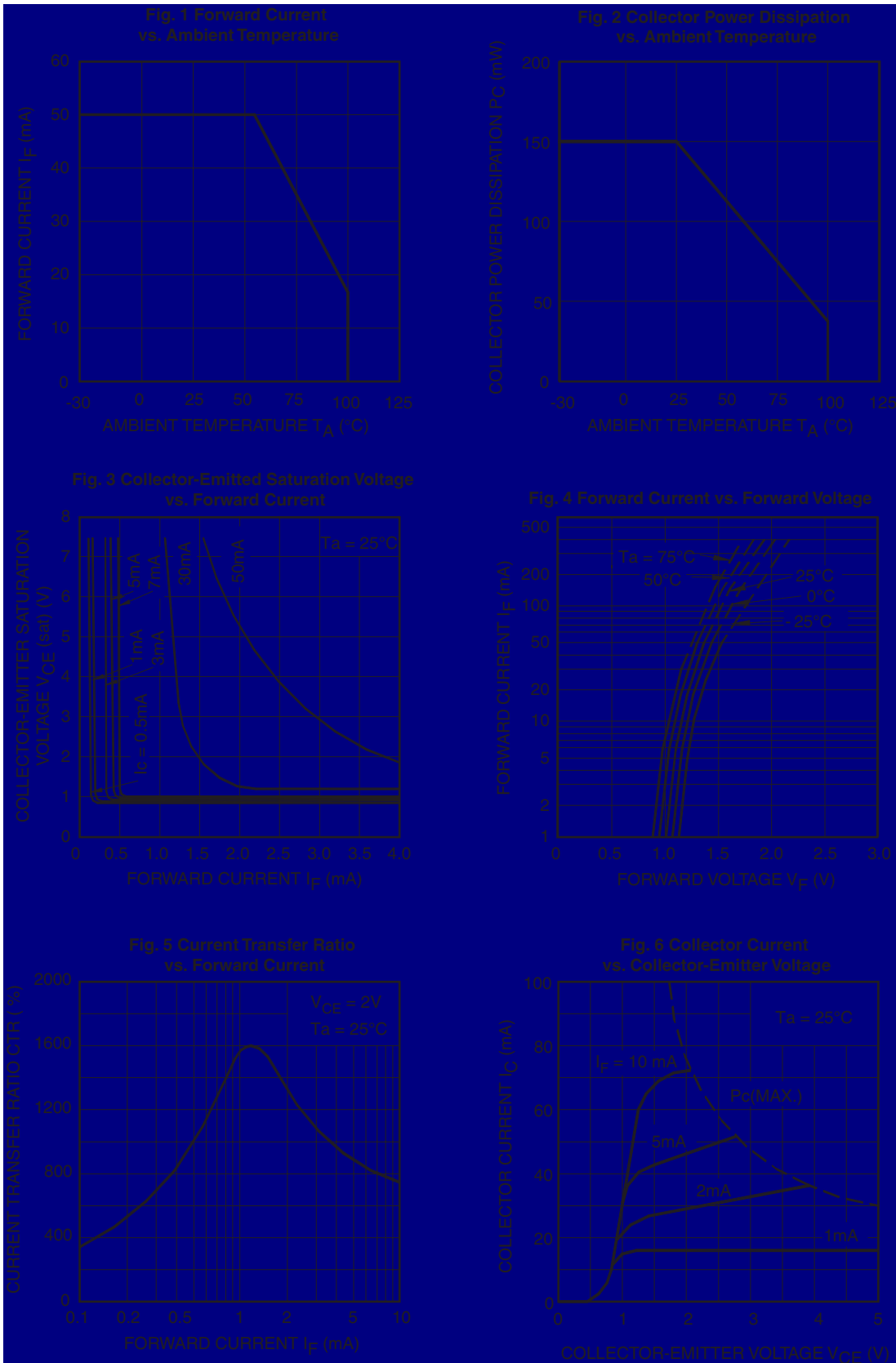
Isolation Characteristics

| Symbol | Characteristic | Test Conditions | Min. | Typ. | Max. | Units |
|-----------|--------------------------------|---|--------------------|--------------------|------|----------|
| V_{ISO} | Input-Output Isolation Voltage | $f = 60\text{Hz}, t = 1\text{min}, I_{I-O} \leq 2\mu\text{A}$ | 5000 | – | – | Vac(rms) |
| R_{ISO} | Isolation Resistance | DC500V 40~60% R.H. | 5×10^{10} | 1×10^{11} | – | Ω |
| C_f | Floating Capacitance | $V = 0, f = 1\text{MHz}$ | – | 0.6 | 1 | pF |

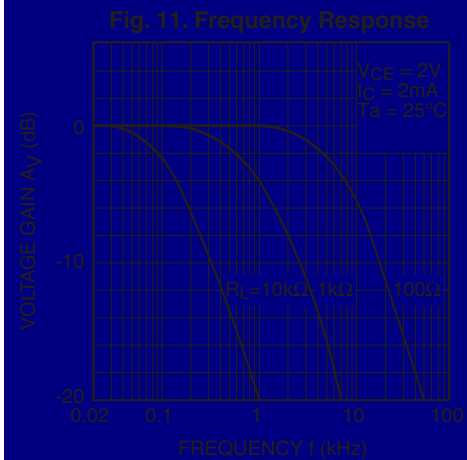
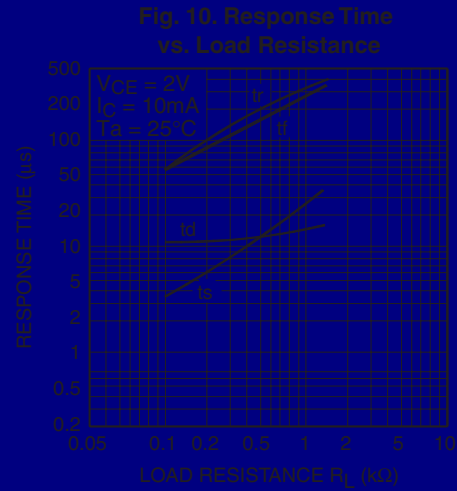
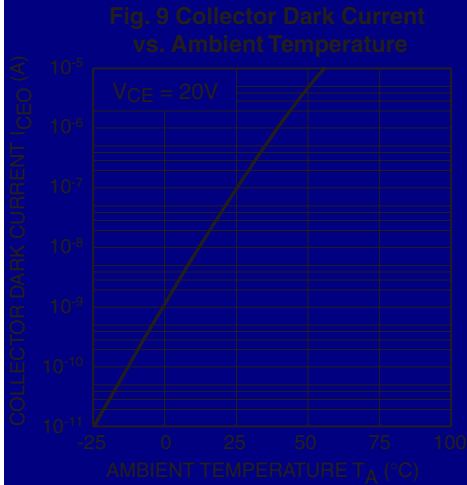
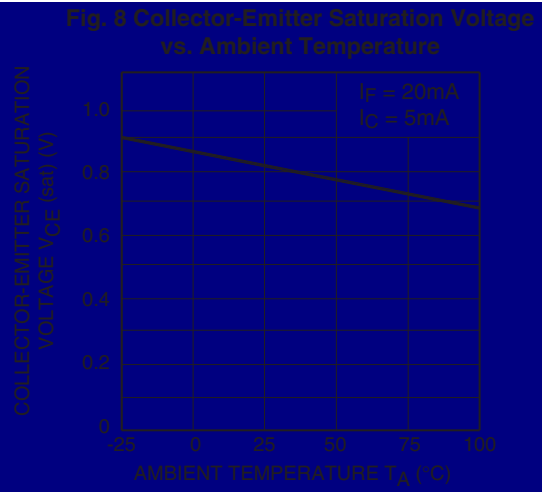
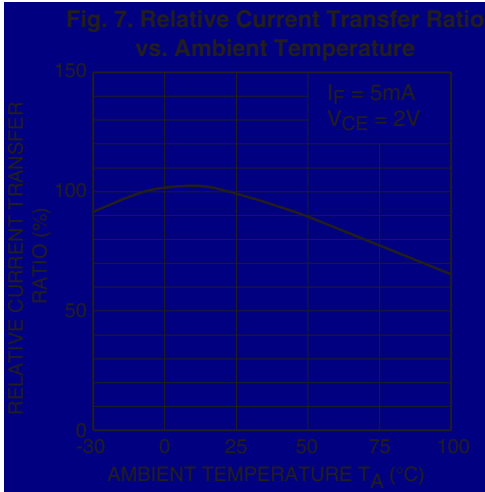
Note:

- Current Transfer Ratio (CTR) = $I_C/I_F \times 100\%$.

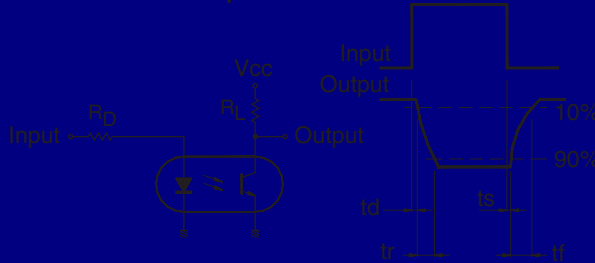
Typical Electrical/Optical Characteristic Curves ($T_A = 25^\circ\text{C}$ Unless otherwise specified.)



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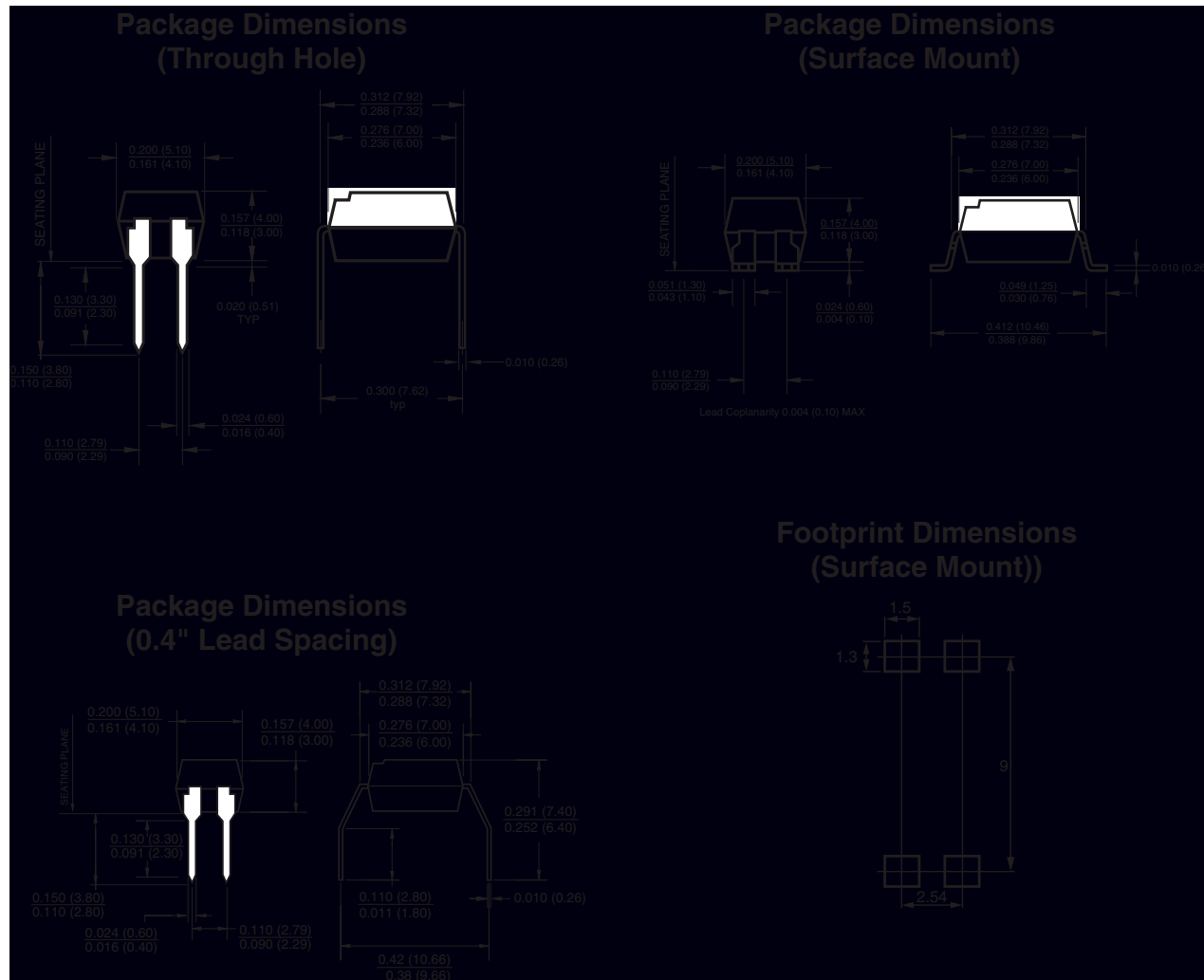


Test Circuit for Response Time



Test Circuit for Frequency Response



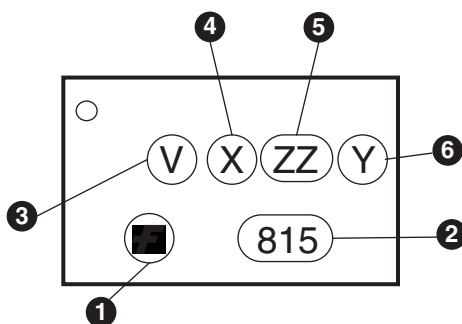


Note:
All dimensions are in inches (millimeters)

Ordering Information

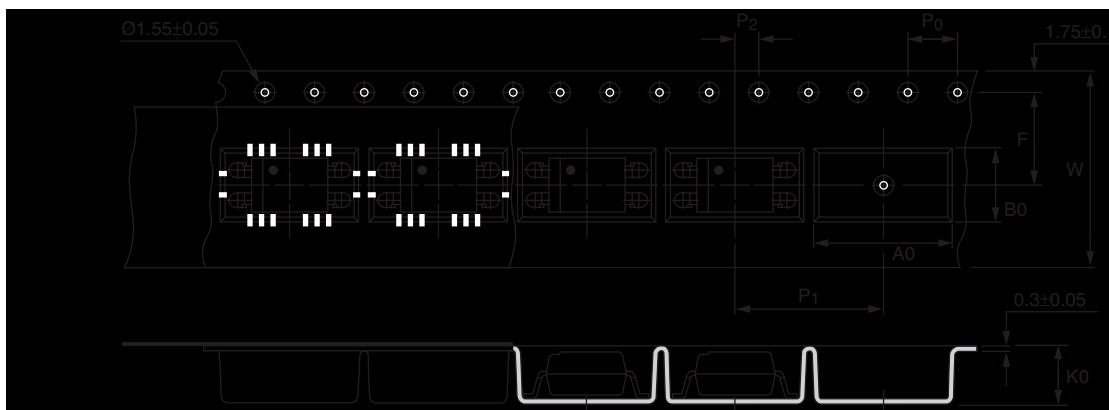
| Option | Order Entry Identifier | Description |
|--------|------------------------|--|
| S | .S | Surface Mount Lead Bend |
| SD | .SD | Surface Mount; Tape and reel |
| W | .W | 0.4" Lead Spacing |
| 300 | .300 | VDE Approved |
| 300W | .300W | VDE Approved, 0.4" Lead Spacing |
| 3S | .3S | VDE Approved,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

Carrier Tape Specifications

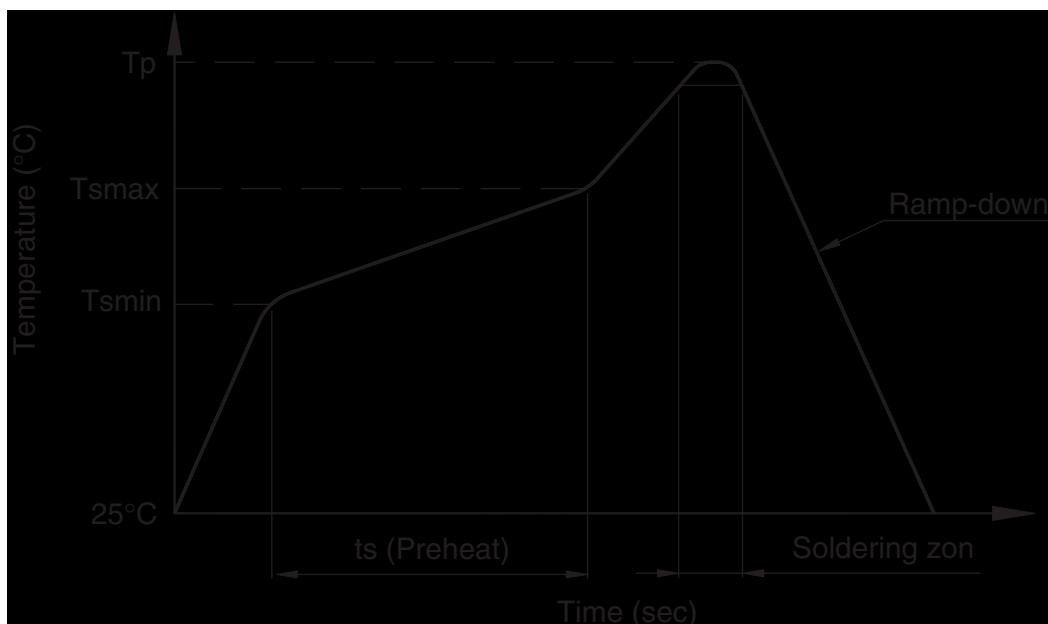


Note:

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) |
| Compartment | A ₀ | 10.45 ± 0.1 (.411) |
| | B ₀ | 5.30 ± 0.1 (.209) |
| | K ₀ | 4.25 ± 0.1 (.167) |

Lead Free Recommended IR Reflow Condition



| Profile Feature | Pb-Sn solder assembly | Lead Free assembly |
|---|-------------------------------|-------------------------------|
| Preheat condition (Tsmín-Tsmáx / 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 | 260 +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 |

