

PNP PRE-BIASED SMALL SIGNAL DUAL SURFACE MOUNT TRANSISTOR
Features

- Epitaxial Planar Die Construction
- Complementary NPN Types Available (DDC)
- Built-In Biasing Resistors
- "Lead Free", RoHS Compliant (Note 1)
- Halogen and Antimony Free "Green" Device (Note 2)
- Qualified to AEC-Q101 Standards for High Reliability

| Part Number | R1 (NOM) | R2 (NOM) |
|-------------|---------------|--------------|
| DDA124EU | 22K Ω | 22K Ω |
| DDA144EU | 47K Ω | 47K Ω |
| DDA114YU | 10K Ω | 47K Ω |
| DDA123JU | 2.2K Ω | 47K Ω |
| DDA114EU | 10K Ω | 10K Ω |

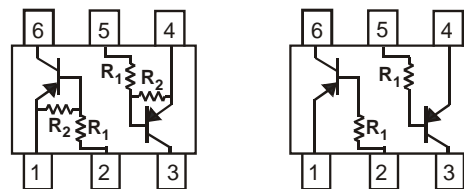
Mechanical Data

- Case: SOT363
- Case material: Molded Plastic. "Green" Molding Compound.
- Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish
- Weight: 0.006 grams (approximate)

| Part Number | R1 Only |
|-------------|---------------|
| DDA113TU | 1K Ω |
| DDA143TU | 4.7K Ω |
| DDA114TU | 10K Ω |



Top View



R1, R2

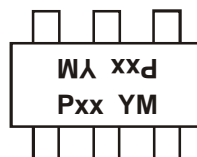
R1 Only

Device Schematic

Ordering Information (Notes 3 & 4)

| Product | Grade | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|----------------|------------|---------|--------------------|-----------------|-------------------|
| DDA124EU-7-F | Commercial | P17 | 7 | 8 | 3,000 |
| DDA124EUQ-7-F | Automotive | P17 | 7 | 8 | 3,000 |
| DDA124EUQ-13-F | Automotive | P17 | 13 | 8 | 10,000 |
| DDA144EU-7-F | Commercial | P20 | 7 | 8 | 3,000 |
| DDA144EUQ-7-F | Automotive | P20 | 7 | 8 | 3,000 |
| DDA114YU-7-F | Commercial | P14 | 7 | 8 | 3,000 |
| DDA114YUQ-7-F | Automotive | P14 | 7 | 8 | 3,000 |
| DDA123JU-7-F | Commercial | P06 | 7 | 8 | 3,000 |
| DDA114EU-7-F | Commercial | P13 | 7 | 8 | 3,000 |
| DDA114EUQ-7-F | Automotive | P13 | 7 | 8 | 3,000 |
| DDA113TU-7-F | Commercial | P01 | 7 | 8 | 3,000 |
| DDA143TU-7-F | Commercial | P07 | 7 | 8 | 3,000 |
| DDA143TUQ-7-F | Automotive | P07 | 7 | 8 | 3,000 |
| DDA143TUQ-13-F | Automotive | P07 | 13 | 8 | 10,000 |
| DDA114TU-7-F | Commercial | P12 | 7 | 8 | 3,000 |
| DDA114TUQ-7-F | Automotive | P12 | 7 | 8 | 3,000 |
| DDA114TUQ-13-F | Automotive | P12 | 13 | 8 | 10,000 |

- Notes:
1. No purposefully added lead.
 2. Diodes Inc's "Green" policy can be found on our website at <http://www.diodes.com>.
 3. For packaging details, go to our website at <http://www.diodes.com>.
 4. Products with Q-suffix are automotive grade. Automotive products are electrical and thermal the same as the commercial, except where specified.

Marking Information


Pxx = Product Type Marking Code (See Ordering Information)
 YM = Date Code Marking
 Y = Year (ex: T = 2006)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | O | N | D |

Maximum Ratings @T_A = 25°C unless otherwise specified

| Characteristic | | Symbol | Value | Unit |
|--|----------|---------------------|------------|------|
| Supply Voltage (1) to (6) and (4) to (3) | | V _{CC} | -50 | V |
| Input Voltage (1) to (2) and (4) to (5) | DDA124EU | V _{IN} | +10 to -40 | V |
| | DDA144EU | | +10 to -40 | |
| | DDA114YU | | +6 to -40 | |
| | DDA123JU | | +5 to -12 | |
| | DDA114EU | | +10 to -40 | |
| | DDA113TU | | +5V max | |
| | DDA143TU | | +5V max | |
| Output Current | DDA124EU | I _O | -30 | mA |
| | DDA144EU | | -30 | |
| | DDA114YU | | -70 | |
| | DDA123JU | | -100 | |
| | DDA114EU | | -50 | |
| | DDA113TU | | -100 | |
| | DDA143TU | | -100 | |
| DDA114TU | -100 | | | |
| Output Current | | I _{C(MAX)} | -100 | mA |

Thermal Characteristics @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 5) | P _D | 200 | mW |
| Thermal Resistance, Junction to Ambient Air (Note 5) | R _{θJA} | 625 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

Notes: 5. Mounted on FR4 PC Board with minimum recommended pad layout

Electrical Characteristics @T_A = 25°C unless otherwise specified

| Characteristic (DDA113TU & DDA143TU & DDA114TU only) | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|----------------------|------------|----------|----------|------|---|
| Collector-Base Breakdown Voltage | BV _{CBO} | -50 | --- | --- | V | I _C = -50μA |
| Collector-Emitter Breakdown Voltage | BV _{CEO} | -50 | --- | --- | V | I _C = -1mA |
| Emitter-Base Breakdown Voltage | BV _{EBO} | -5 | --- | --- | V | I _E = -50μA |
| Collector Cutoff Current | I _{CBO} | --- | --- | -0.5 | μA | V _{CB} = -50V |
| Emitter Cutoff Current | I _{EBO} | --- | --- | -0.5 | μA | V _{EB} = -4V |
| Collector-Emitter Saturation Voltage | V _{CE(sat)} | --- | --- | -0.3 | V | I _C /I _B = -2.5mA / -0.25mA DDA143TU I _C /I _B = -1mA / -0.1mA DDA114TU I _C /I _B = -10mA / -1mA DDA113TU |
| DC Current Transfer Ratio | h _{FE} | 100 160 | 250 - | 600 - | --- | I _C = -1mA, V _{CE} = -5V I _C = -1mA, V _{CE} = -5V DDA143TUQ |
| Input Resistor (R ₁) Tolerance | ΔR ₁ | -30 | --- | +30 | % | --- |
| Gain-Bandwidth Product (Note 6) | f _T | --- | 250 | --- | MHZ | V _{CE} = -10V, I _E = 5mA, f = 100MHZ |

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition | |
|--|--------------------------------|----------------------------------|------|--|------|--|---|
| Input Voltage | V _{I(off)} | DDA124EU | -0.5 | -1.1 | --- | V | V _{CC} = -5V, I _O = -100μA |
| | | DDA144EU | -0.5 | -1.1 | | | |
| DDA114YU | | -0.3 | --- | | | | |
| DDA123JU | | -0.5 | --- | | | | |
| DDA114EU | | -0.5 | -1.1 | | | | |
| Input Voltage | V _{I(on)} | DDA124EU | --- | -1.9 | -3.0 | V | V _O = -0.3, I _O = -5mA V _O = -0.3, I _O = -2mA V _O = -0.3, I _O = -1mA V _O = -0.3, I _O = -5mA V _O = -0.3, I _O = -10mA |
| | | DDA144EU | --- | -1.9 | -3.0 | | |
| | | DDA114YU | --- | --- | -1.4 | | |
| | | DDA123JU | --- | --- | -1.1 | | |
| | | DDA114EU | --- | -1.9 | -3.0 | | |
| Output Voltage | V _{O(on)} | --- | -0.1 | -0.3 | V | I _O /I _I = -10mA / -0.5mA I _O /I _I = -10mA / -0.5mA I _O /I _I = -5mA / -0.25mA I _O /I _I = -5mA / -0.25mA I _O /I _I = -10mA / -0.5mA | |
| Input Current | I _I | --- | --- | -0.36 -0.18 -0.88 -3.6 -0.88 | mA | V _I = -5V | |
| Output Current | I _{O(off)} | --- | --- | -0.5 | μA | V _{CC} = -50V, V _I = -0V | |
| DC Current Gain | G _I | 56 60 68 68 80 30 | --- | --- | --- | V _O = -5V, I _O = -5mA V _O = -5V, I _O = -5mA V _O = -5V, I _O = -5mA V _O = -5V, I _O = -10mA V _O = -5V, I _O = -10mA V _O = -5V, I _O = -5mA | |
| Input Resistor (R ₁) Tolerance | ΔR ₁ | -30 | --- | +30 | % | --- | |
| Resistance Ratio Tolerance | R ₂ /R ₁ | -20 | --- | +20 | % | --- | |
| Gain-Bandwidth Product | f _T | --- | 250 | --- | MHZ | V _{CE} = -10V, I _E = -5mA, f = 100MHZ | |

Notes: 6. Transistor - For Reference Only

Typical Curves – DDA123JU

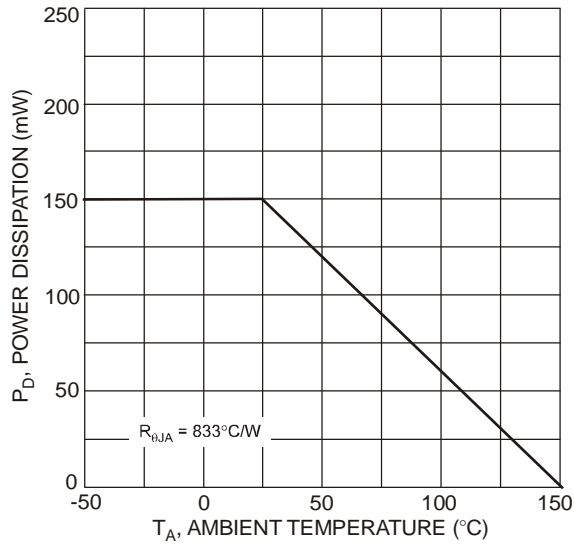


Fig. 1 Power Dissipation vs. Ambient Temperature

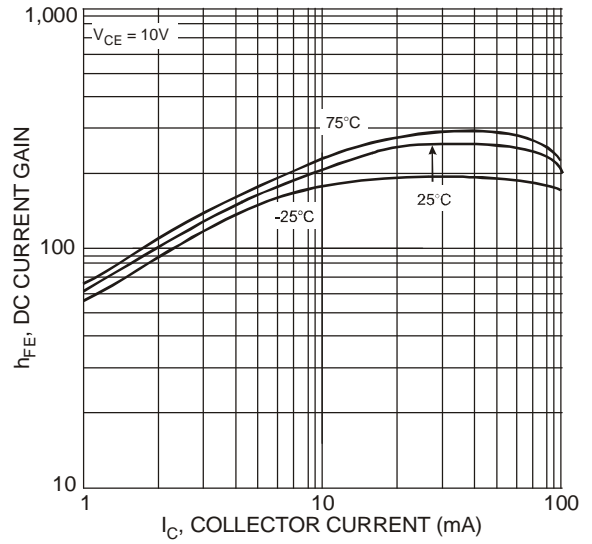


Fig. 2 Typical DC Current Gain vs. Collector Current

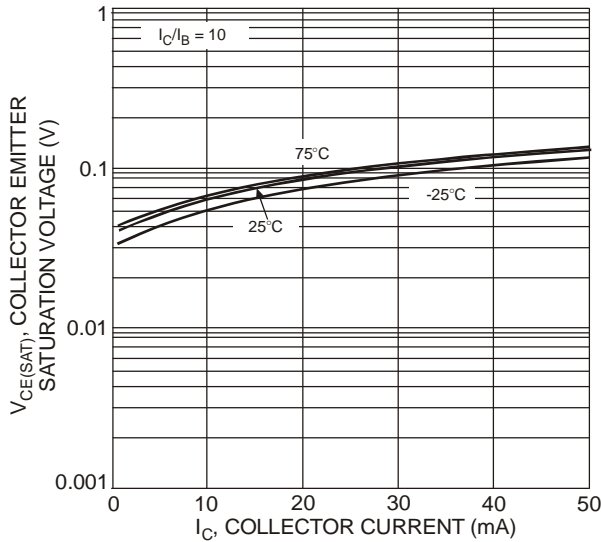


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

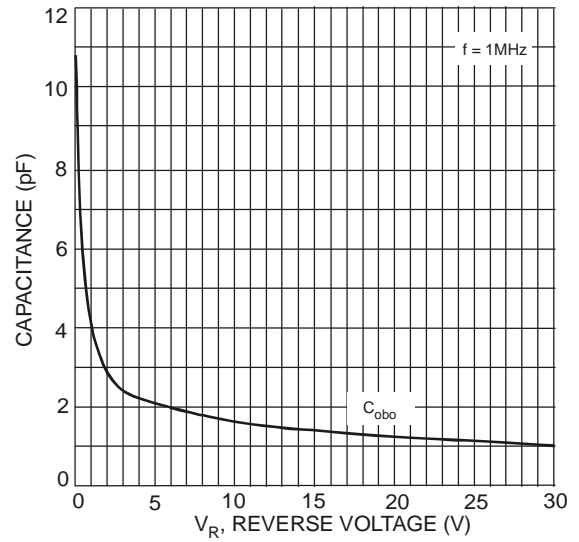


Fig. 4 Typical Capacitance Characteristics

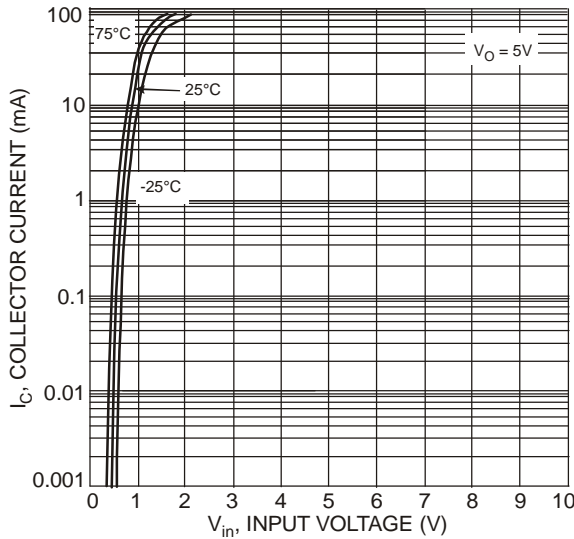


Fig. 5 Collector Current vs. Input Voltage

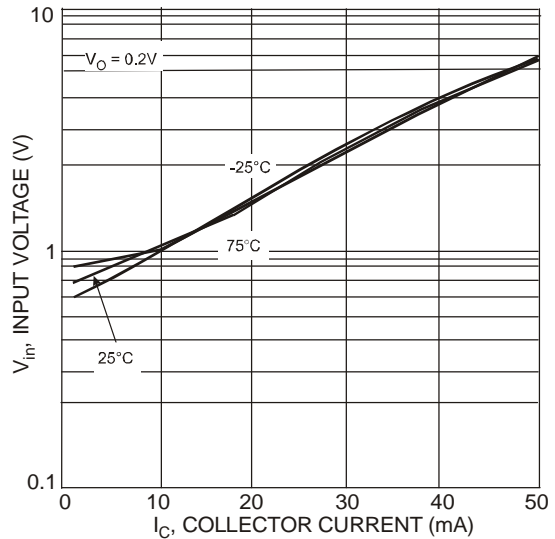


Fig. 6 Input Voltage vs. Collector Current

Typical Curves – DDA114TU

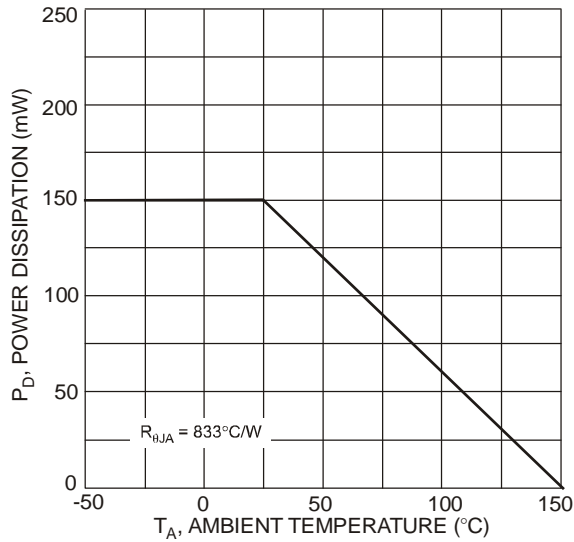


Fig. 1 Power Dissipation vs. Ambient Temperature

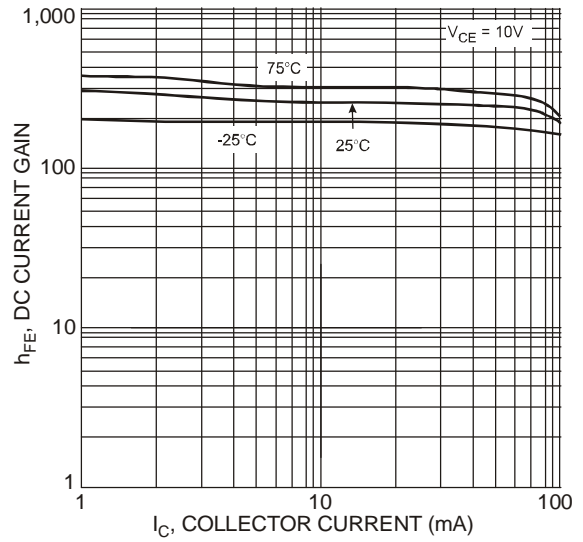


Fig. 2 Typical DC Current Gain vs. Collector Current

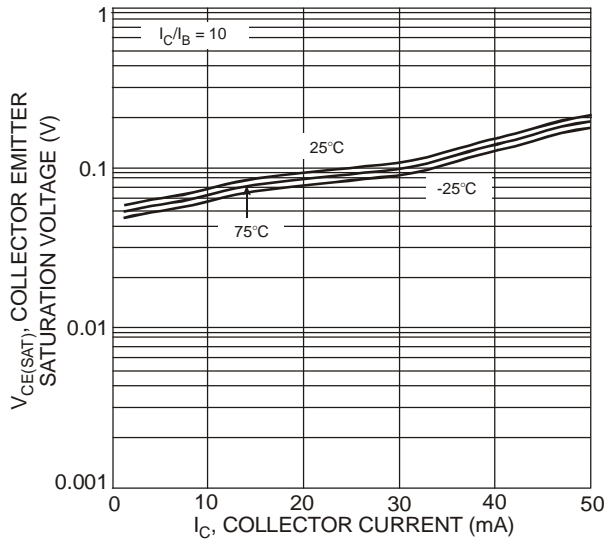


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

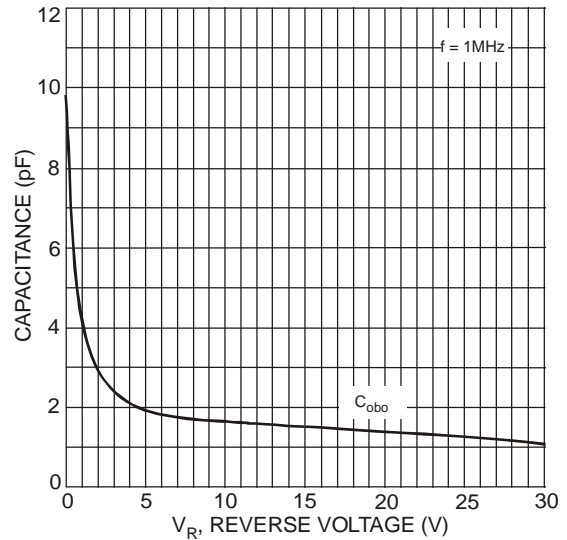


Fig. 4 Typical Capacitance Characteristics

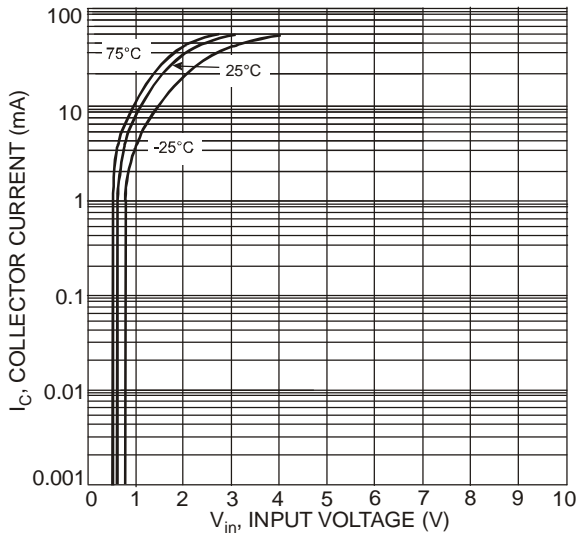


Fig. 5 Collector Current vs. Input Voltage

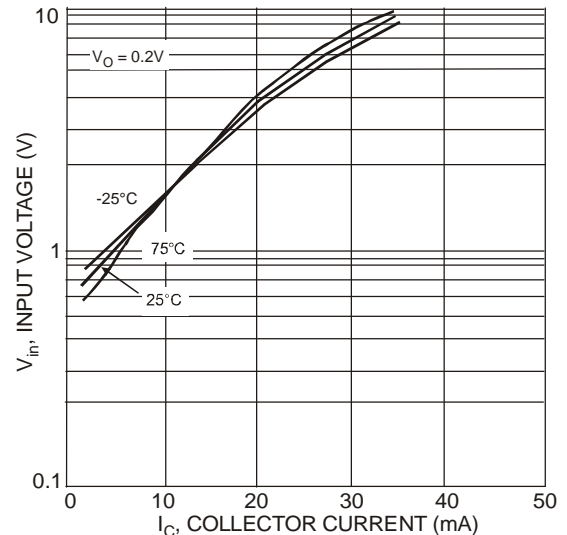
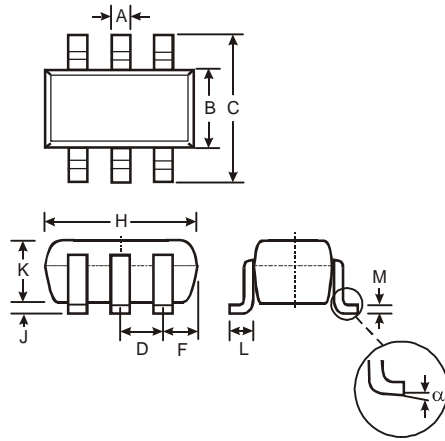


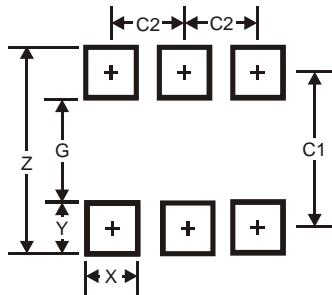
Fig. 6 Input Voltage vs. Collector Current

Package Outline Dimensions



| SOT363 | | |
|----------------------|----------|------|
| Dim | Min | Max |
| A | 0.10 | 0.30 |
| B | 1.15 | 1.35 |
| C | 2.00 | 2.20 |
| D | 0.65 Typ | |
| F | 0.40 | 0.45 |
| H | 1.80 | 2.20 |
| J | 0 | 0.10 |
| K | 0.90 | 1.00 |
| L | 0.25 | 0.40 |
| M | 0.10 | 0.22 |
| α | 0° | 8° |
| All Dimensions in mm | | |

Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| Z | 2.5 |
| G | 1.3 |
| X | 0.42 |
| Y | 0.6 |
| C1 | 1.9 |
| C2 | 0.65 |

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