

Features

- $BV_{CEO} > -40V$
- $I_C = -200mA$ High Collector Current
- Pair of PNP Transistors That Are Intrinsicly Matched (Note 1)
- 2% Matching on Current Gain (h_{FE})
- 2mV Matching on Base-Emitter Voltage (V_{BE})
- Fully Internally Isolated in a Small Surface Mount Package
- **Totally Lead-Free & Fully RoHS Compliant (Notes 2 & 3)**
- **Halogen and Antimony Free. "Green" Device (Note 4)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 5)**

Mechanical Data

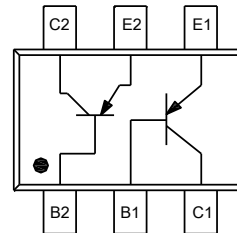
- Case: SOT363
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Finish. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.006 grams (Approximate)

Applications

- Current Mirrors
- Differential and Instrumentation Amplifiers
- Comparators



Top View



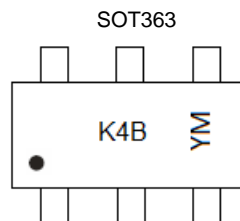
Device Schematic and Pin-Out Top View

Ordering Information (Notes 5 & 6)

| Part Number | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|----------------|------------|---------|--------------------|-----------------|-------------------|
| DMMT3906W-7-F | AEC-Q101 | K4B | 7 | 8 | 3,000 |
| DMMT3906WQ-7-F | Automotive | K4B | 7 | 8 | 3,000 |

- Notes:
1. Intrinsicly matched pair as this is built with adjacent die from the same wafer.
 2. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 3. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 4. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 5. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_compliance_definitions/.
 6. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



K4B = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: F = 2018)
 M = Month (ex: 2 = February)

Date Code Key

| Year | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | E | F | G | H | I | J | K | L | M | N | O | P |

| 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 |

Absolute Maximum Ratings (@T_A = +25°C unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|---------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CBO} | -40 | V |
| Collector-Emitter Voltage | V _{CEO} | -40 | V |
| Emitter-Base Voltage | V _{EBO} | -5.0 | V |
| Collector Current | I _c | -200 | mA |

Thermal Characteristics – Total Device (@T_A = +25°C unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 7) Total Device | P _D | 200 | mW |
| Thermal Resistance, Junction to Ambient (Note 7) | R _{θJA} | 625 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -65 to +150 | °C |

ESD Ratings (Note 8)

| Characteristic | Symbol | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge - Machine Model | ESD MM | 400 | V | C |

- Notes: 7. For a device mounted on minimum recommended pad layout with 1oz copper that is on a single-sided 1.6mm FR4 PCB; the device is measured under still air conditions whilst operating in a steady-state.
 8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics – Total Device

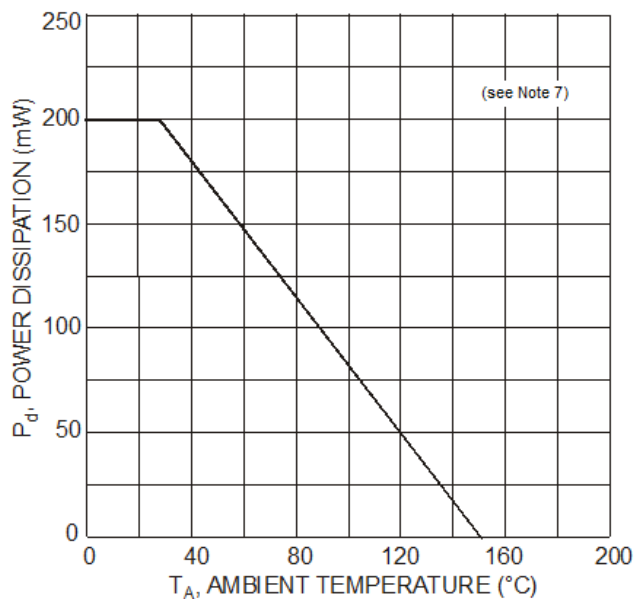


Fig. 1, Power Derating Curve (Total Device)

Electrical Characteristics (@T_A = +25°C unless otherwise specified)

| Characteristic | Symbol | Min | TYP | Max | Unit | Test Condition |
|--|---|-----------------------------|-----|-------------------------|--------------------|--|
| OFF CHARACTERISTICS | | | | | | |
| Collector-Base Breakdown Voltage | BV _{CBO} | -40 | — | — | V | I _C = -100μA, I _E = 0 |
| Collector-Emitter Breakdown Voltage (Note 9) | BV _{CEO} | -40 | — | — | V | I _C = -1.0mA, I _B = 0 |
| Emitter-Base Breakdown Voltage | BV _{EBO} | -5.0 | — | — | V | I _E = -100μA, I _C = 0 |
| Collector Cutoff Current | I _{CEx} | — | — | -50 | nA | V _{CE} = -30V, V _{EB(OFF)} = 3.0V |
| Base Cutoff Current | I _{BL} | — | — | -50 | nA | V _{CE} = -30V, V _{EB(OFF)} = 3.0V |
| ON CHARACTERISTICS (Note 9) | | | | | | |
| DC Current Gain | h _{FE} | 60 80 100 60 30 | — | — — 300 — — | — | I _C = -100μA, V _{CE} = -1.0V I _C = -1.0mA, V _{CE} = -1.0V I _C = -10mA, V _{CE} = -1.0V I _C = -50mA, V _{CE} = -1.0V I _C = -100mA, V _{CE} = -1.0V |
| Collector-Emitter Saturation Voltage | V _{CE(SAT)} | — | — | -250 -400 | mV | I _C = -10mA, I _B = -1.0mA I _C = -50mA, I _B = -5.0mA |
| Base-Emitter Saturation Voltage | V _{BE(SAT)} | 0.65 — | — | -850 -950 | mV | I _C = -10mA, I _B = -1.0mA I _C = -50mA, I _B = -5.0mA |
| MATCHING CHARACTERISTICS | | | | | | |
| DC Current Gain Matching (Note 10) | h _{FE1} / h _{FE2} | — | 1 | 2 | % | I _C = -2mA, V _{CE} = -5V |
| Base-Emitter Voltage Matching (Note 11) | V _{BE1} - V _{BE2} | — | 1 | 2 | mV | I _C = -2mA, V _{CE} = -5V |
| Collector-Emitter Saturation Voltage (Note 10) | V _{CE(SAT)1} / V _{CE(SAT)2} | — | 1 | 2 | % | I _C = -10mA, I _B = -1.0mA |
| Base-Emitter Saturation Voltage (Note 10) | V _{BE(SAT)1} / V _{BE(SAT)2} | — | 1 | 2 | % | I _C = -10mA, I _B = -1.0mA |
| SMALL SIGNAL CHARACTERISTICS | | | | | | |
| Output Capacitance | C _{OBO} | — | — | 4.5 | pF | V _{CB} = -5.0V, f = 1.0MHz, I _E = 0 |
| Input Capacitance | C _{IBO} | — | — | 10.0 | pF | V _{EB} = -0.5V, f = 1.0MHz, I _C = 0 |
| Input Impedance | h _{IE} | 2.0 | — | 12 | kΩ | V _{CE} = 10V, I _C = 1.0mA, f = 1.0kHz |
| Voltage Feedback Ratio | h _{RE} | 0.1 | — | 10 | x 10 ⁻⁴ | |
| Small Signal Current Gain | h _{FE} | 100 | — | 400 | — | |
| Output Admittance | h _{OE} | 3.0 | — | 60 | μS | |
| Current Gain-Bandwidth Product | f _T | 250 | — | — | MHz | V _{CE} = -20V, I _C = -10mA, f = 100MHz |
| Noise Figure | NF | — | — | 4.0 | dB | V _{CE} = -5.0V, I _C = -100μA, R _S = 1.0kΩ, f = 1.0kHz |
| SWITCHING CHARACTERISTICS | | | | | | |
| Delay Time | t _D | — | — | 35 | ns | V _{CC} = -3.0V, I _C = -10mA, V _{BE(OFF)} = 0.5V, I _{B1} = -1.0mA |
| Rise Time | t _R | — | — | 35 | ns | V _{CC} = -3.0V, I _C = -10mA, I _{B1} = I _{B2} = -1.0mA |
| Storage Time | t _S | — | — | 225 | ns | |
| Fall Time | t _F | — | — | 75 | ns | |

- Notes:
9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.
 10. Is the ratio of one transistor compared to the other transistor.
 11. V_{BE1} - V_{BE2} is the absolute difference of one transistor compared to the other transistor.

Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$ unless otherwise specified.)

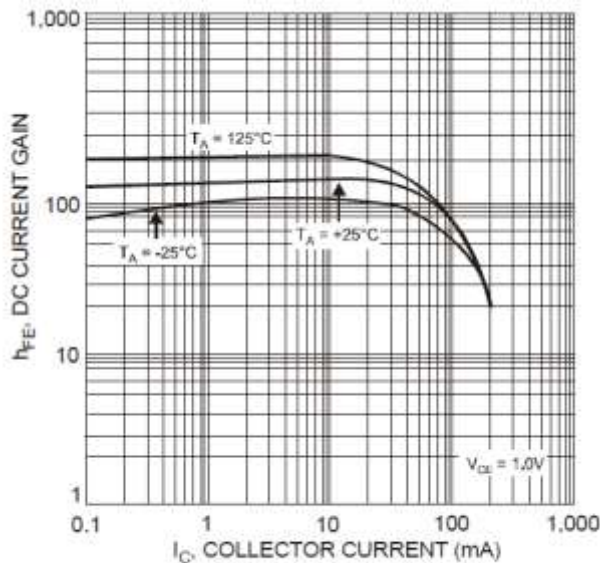


Fig. 3. Typical DC Current Gain vs. Collector Current

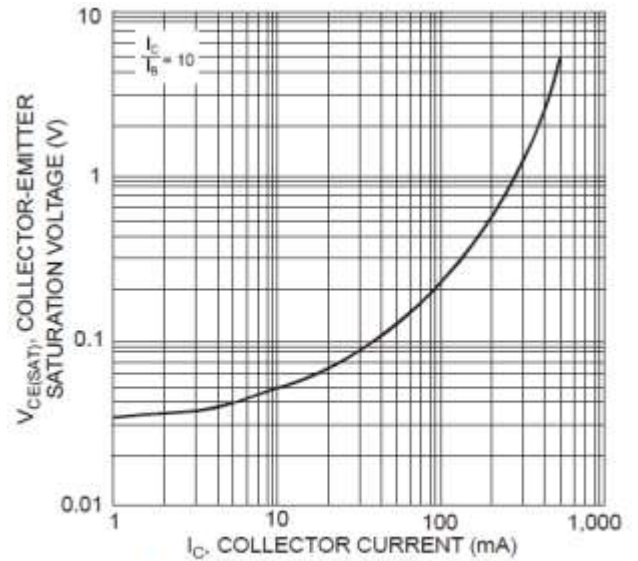


Fig. 4. Typical Collector-Emitter Saturation Voltage vs. Collector Current

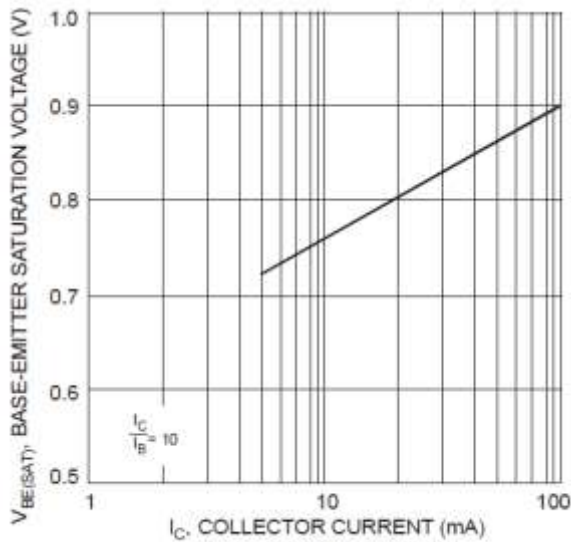


Fig. 5. Typical Base-Emitter Saturation Voltage vs. Collector Current

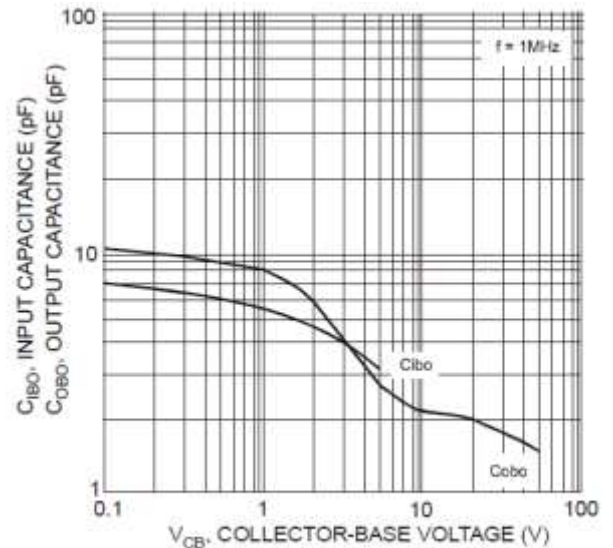
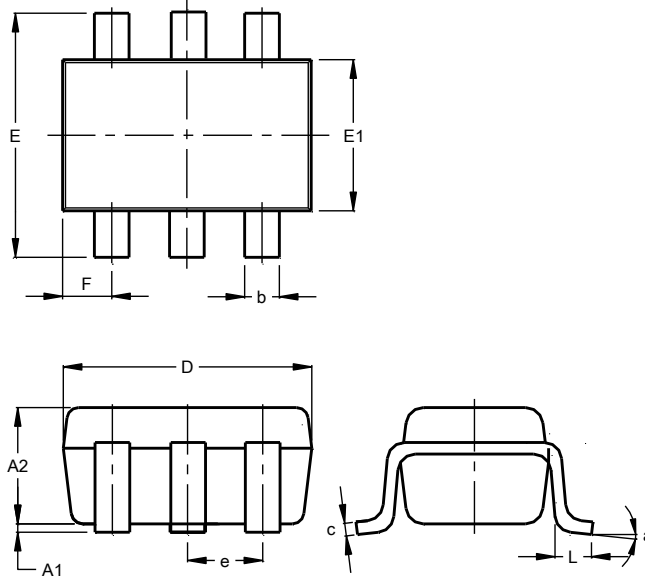


Fig. 2. Input and Output Capacitance vs. Collector-Base Voltage

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT363

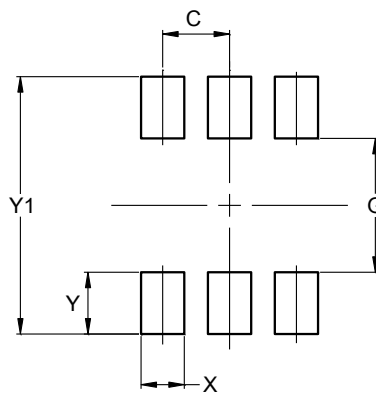


| SOT363 | | | |
|----------------------|-----------|------|-------|
| Dim | Min | Max | Typ |
| A1 | 0.00 | 0.10 | 0.05 |
| A2 | 0.90 | 1.00 | 1.00 |
| b | 0.10 | 0.30 | 0.25 |
| c | 0.10 | 0.22 | 0.11 |
| D | 1.80 | 2.20 | 2.15 |
| E | 2.00 | 2.20 | 2.10 |
| E1 | 1.15 | 1.35 | 1.30 |
| e | 0.650 BSC | | |
| F | 0.40 | 0.45 | 0.425 |
| L | 0.25 | 0.40 | 0.30 |
| a | 0° | 8° | -- |
| All Dimensions in mm | | | |

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT363



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 0.650 |
| G | 1.300 |
| X | 0.420 |
| Y | 0.600 |
| Y1 | 2.500 |

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