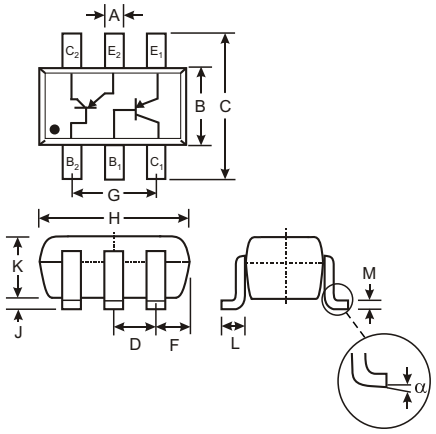
# DMMT3906W

## MATCHED PNP SMALL SIGNAL SURFACE MOUNT TRANSISTOR

## Features

- Epitaxial Planar Die Construction
- Intrinsically Matched PNP Pair (Note 1)
- Small Surface Mount Package
- 2% Matched Tolerance, $h_{FE}$, $V_{CE(SAT)}$, $V_{BE(SAT)}$
- **Lead Free/RoHS Compliant (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**




| SOT-363 | | |
|---|---|---|
| **Dim** | **Min** | **Max** |
| **A** | 0.10 | 0.30 |
| **B** | 1.15 | 1.35 |
| **C** | 2.00 | 2.20 |
| **D** | 0.65 Nominal | |
| **F** | 0.30 | 0.40 |
| **H** | 1.80 | 2.20 |
| **J** | | 0.10 |
| **K** | 0.90 | 1.00 |
| **L** | 0.25 | 0.40 |
| **M** | 0.10 | 0.25 |
| | 8° | |
| **All Dimensions in mm** | | |

## Mechanical Data

- Case: SOT-363
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Terminal Connections: See Diagram
- Marking (See Below): K4B
- Ordering & Date Code Information: See Below
- Weight: 0.015 grams (approximate)

## Maximum Ratings @ $T_A$ = 25 C unless otherwise specified

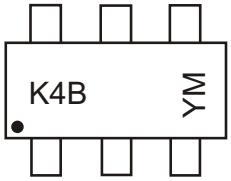
| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | -40 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | -40 | V |
| Emitter-Base Voltage | $V_{EBO}$ | -5.0 | V |
| Collector Current - Continuous | $I_C$ | -200 | mA |
| Power Dissipation (Note 3) | $P_d$ | 200 | mW |
| Thermal Resistance, Junction to Ambient (Note 3) | $R_{JA}$ | 625 | C/W |
| Operating and Storage Temperature Range | $T_j$, $T_{STG}$ | -55 to +150 | C |

## Ordering Information (Note 4)

| Device | Packaging | Shipping |
|---|---|---|
| DMMT3906W-7-F | SOT-363 | 3000/Tape & Reel |

Notes:
1. Built with adjacent die from a single wafer.
2. No purposefully added lead.
3. Device mounted on FR5 PCB: 1.0 x 0.75 x 0.62 in.; pad layout as shown on suggested pad layout document AP02001, which can be found on our website at http://www.diodes.com/datasheets/ap02001.pdf.
4. For Packaging Details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

## Marking Information




K4B = Product Type Marking Code
YM = Date Code Marking
Y = Year ex: T = 2006
M = Month ex: 9 = September

Date Code Key

| Year | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Code** | N | P | R | S | T | U | V | W | X | Y | Z |

| 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 |

## Electrical Characteristics @ $T_A$ = 25 C unless otherwise specified

| Characteristic | Symbol | Min | Max | Unit | Test Condition |
|---|---|---|---|---|---|
| **OFF CHARACTERISTICS (Note 5)** | | | | | |
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | -40 | | V | $I_C$ = -10 A, $I_E$ = 0 |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | -40 | | V | $I_C$ = -1.0mA, $I_B$ = 0 |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | -5.0 | | V | $I_E$ = -10 A, $I_C$ = 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 5)** | | | | | |
| DC Current Gain (Note 6) | $h_{FE}$ | 60<br>80<br>100<br>60<br>30 | 300 | | $I_C$ = -100µA, $V_{CE}$ = -1.0V<br>$I_C$ = -1.0mA, $V_{CE}$ = -1.0V<br>$I_C$ = -10mA, $V_{CE}$ = -1.0V<br>$I_C$ = -50mA, $V_{CE}$ = -1.0V<br>$I_C$ = -100mA, $V_{CE}$ = -1.0V |
| Collector-Emitter Saturation Voltage (Note 6) | $V_{CE(SAT)}$ | | -0.25<br>-0.40 | V | $I_C$ = -10mA, $I_B$ = -1.0mA<br>$I_C$ = -50mA, $I_B$ = -5.0mA |
| Base-Emitter Saturation Voltage (Note 6) | $V_{BE(SAT)}$ | -0.65 | -0.85<br>-0.95 | V | $I_C$ = -10mA, $I_B$ = -1.0mA<br>$I_C$ = -50mA, $I_B$ = -5.0mA |
| Base-Emitter Voltage Matching | $V_{BE}$ | | -1 | mV | $V_{CE}$ = -5V, $I_C$ = -2mA |
| **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 | pF | $V_{EB}$ = -0.5V, f = 1.0MHz, $I_C$ = 0 |
| Input Impedance | $h_{ie}$ | 2.0 | 12 | k | $V_{CE}$ = 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 | S | |
| 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, $I_C$ = -100 A, $R_S$ = 1.0k 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 | |
| Storage Time | $t_s$ | | 225 | ns | $V_{CC}$ = -3.0V, $I_C$ = -10mA, $I_{B1}$ = $I_{B2}$ = -1.0mA |
| Fall Time | $t_f$ | | 75 | ns | |

Notes: 5. Short duration pulse test used to minimize self-heating effect.
6. The DC current gain, $h_{FE}$, (matched at $I_C$ = -10mA and $V_{CE}$ = -1.0V) Collector-Emitter Saturation Voltage, $V_{CE\ (sat)}$, and Base-Emitter Saturation Voltage, $V_{BE(sat)}$ are matched with typical matched tolerances of 1% and maximum of 2%.

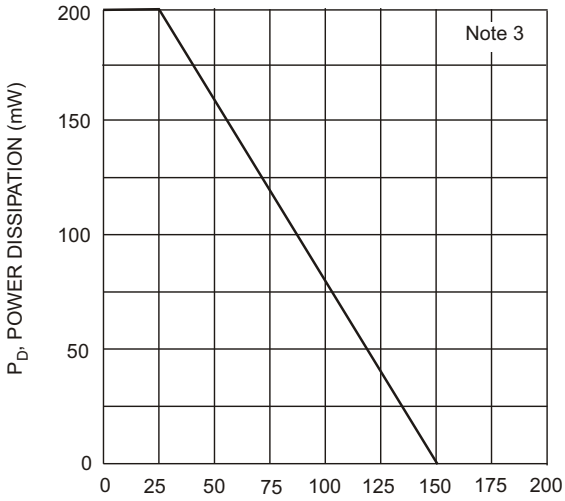



Fig. 1, Max Power Dissipation vs Ambient Temperature

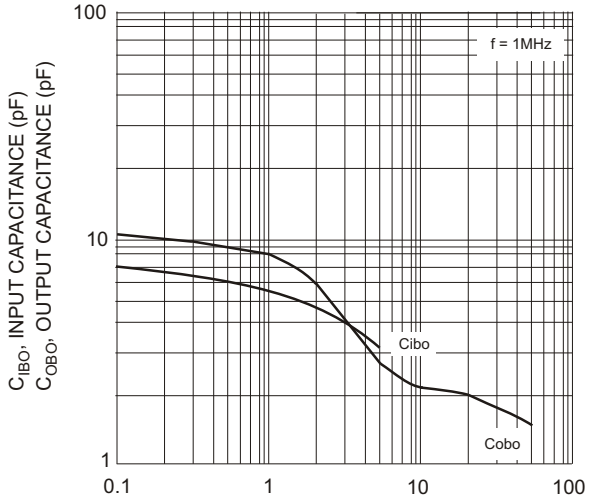



Fig. 2, Input and Output Capacitance vs. Collector-Base Voltage

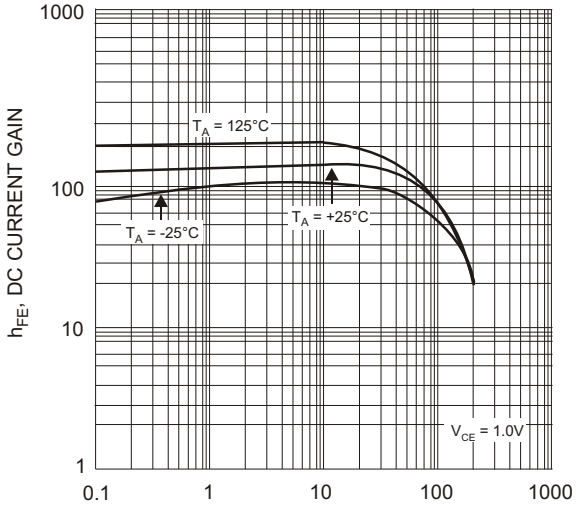



Fig. 3, Typical DC Current Gain vs Collector Current

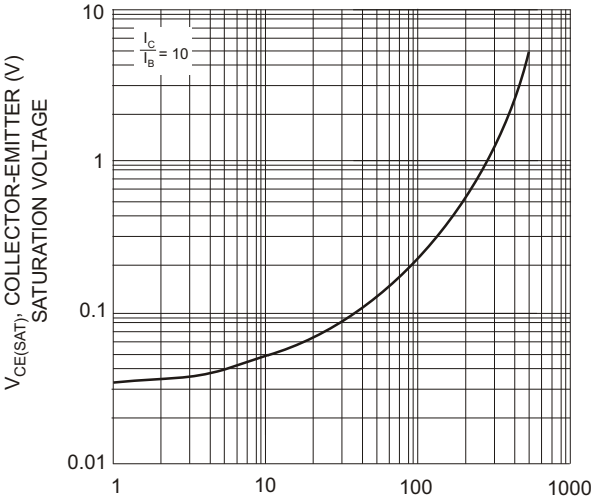



Fig. 4, Typical Collector-Emitter Saturation Voltage vs. Collector Current

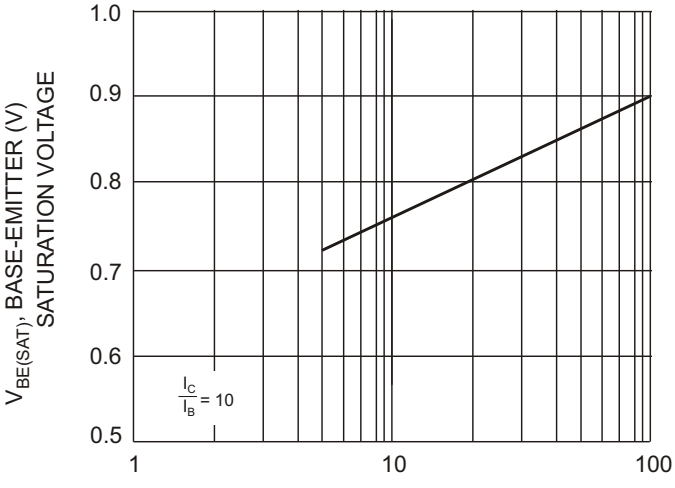



Fig. 5, Typical Base-Emitter Saturation Voltage vs. Collector Current

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