

# DMMT3904W-AU

## MATCHED NPN SMALL SIGNAL SURFACE MOUNT TRANSISTOR

**VOLTAGE** 40 Volt **POWER** 225 mWatt

**SOT-363**

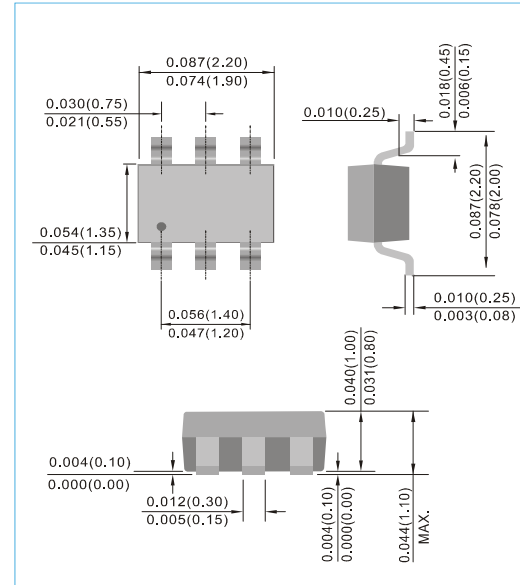
Unit : inch(mm)

### FEATURES

- NPN epitaxial silicon, planar design
- Collector-emitter voltage  $V_{CE} = 40V$
- Collector current  $I_C = 200mA$
- AEC-Q101 qualified
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

### MECHANICAL DATA

- Case: SOT-363, Plastic
- Terminals: Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 0.0002 ounces, 0.006 grams
- Marking: S4A



### ABSOLUTE RATINGS

| PARAMETER                                       | SYMBOL          | VALUE      | UNITS         |
|-------------------------------------------------|-----------------|------------|---------------|
| Collector - Base Voltage                        | $V_{CBO}$       | 60         | V             |
| Collector - Emitter Voltage                     | $V_{CEO}$       | 40         | V             |
| Emitter - Base Voltage                          | $V_{EBO}$       | 6.0        | V             |
| Collector Current - Continuous                  | $I_C$           | 200        | mA            |
| Power Dissipation (Note2)                       | $P_{TOT}$       | 225        | mW            |
| Thermal Resistance, Junction to Ambient (Note2) | $R_{\theta JA}$ | 625        | $^{\circ}C/W$ |
| Operating and Storage Temperature Range         | $T_J, T_{STG}$  | -55 to 150 | $^{\circ}C$   |

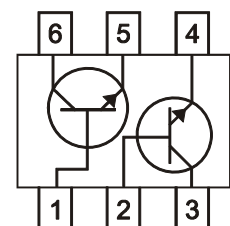


Fig.108(TOP VIEW)

Note:1.Built with adjacent die from a single wafer.

2.Device mounted on FR4 PCB: 70 x 60 x 1mm.

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## ELECTRICAL CHARACTERISTICS

| PARAMETER                              | Symbol          | Test Condition                                                                                                                         | MIN.                        | MAX.                    | Units            |
|----------------------------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------------------|------------------|
| Collector - Base Breakdown Voltage     | $V_{(BR)CBO}$   | $I_C=10\mu A, I_E=0$                                                                                                                   | 60                          | -                       | V                |
| Collector - Emitter Breakdown Voltage  | $V_{(BR)CEO}$   | $I_C=1.0mA, I_B=0$                                                                                                                     | 40                          | -                       | V                |
| Emitter - Base Breakdown Voltage       | $V_{(BR)EBO}$   | $I_E=10\mu A, I_C=0$                                                                                                                   | 6.0                         | -                       | V                |
| Collector Cutoff Current               | $I_{CEX}$       | $V_{CE}=30V, V_{EB(off)}=3.0V$                                                                                                         | -                           | 50                      | nA               |
| Base Cutoff Current                    | $I_{BI}$        | $V_{CE}=30V, V_{EB(off)}=3.0V$                                                                                                         | -                           | 50                      | nA               |
| DC Current Gain                        | $h_{FE}$        | $I_C=0.1mA, V_{CE}=1.0V$<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>$I_C=100mA, V_{CE}=1.0V$ | 40<br>70<br>100<br>60<br>30 | -<br>-<br>300<br>-<br>- | -                |
| Collector - Emitter Saturation Voltage | $V_{CE(SAT)}$   | $I_C=10mA, I_B=1.0mA$<br>$I_C=50mA, I_B=5.0mA$                                                                                         | -                           | 0.2<br>0.3              | V                |
| Base - Emitter Saturation Voltage      | $V_{BE(SAT)}$   | $I_C=10mA, I_B=1.0mA$<br>$I_C=50mA, I_B=5.0mA$                                                                                         | 0.65<br>-                   | 0.85<br>0.95            | V                |
| Base - Emitter Voltage Matching        | $\Delta V_{BE}$ | $V_{CE}=5V, I_C=2mA$                                                                                                                   | -                           | 1                       | mV               |
| Output Capacitance                     | $C_{OBO}$       | $V_{CB}=5V, I_E=0, f=1MHz$                                                                                                             | -                           | 4.0                     | pF               |
| Input Capacitance                      | $C_{IBO}$       | $V_{CB}=0.5V, I_C=0, f=1MHz$                                                                                                           | -                           | 8.0                     | pF               |
| Input Impedance                        | $h_{ie}$        | $V_{CE}=10V, I_C=0mA, f=1.0KHz$                                                                                                        | 1.0                         | 10                      | k $\Omega$       |
| Voltage Feedback Ratio                 | $h_{re}$        |                                                                                                                                        | 0.5                         | 8                       | $\times 10^{-4}$ |
| SmallSignal Current Gain               | $h_{fe}$        |                                                                                                                                        | 100                         | 400                     | -                |
| Output Admittance                      | $h_{oe}$        |                                                                                                                                        | 1.0                         | 40                      | $\mu S$          |
| Current Gain-Bandwidth Product         | ft              | $V_{CE}=20V, I_C=10mA, f=100MHz$                                                                                                       | 300                         | -                       | MHz              |
| Noise Figure                           | NF              | $V_{CE}=5.0V,$<br>$I_C=100\mu A, RS=1.0k\Omega, f=1.0KHz$                                                                              | -                           | 5.0                     | dB               |
| Delay Time                             | td              | $V_{CC}=3V, V_{BE}=0.5V,$<br>$I_C=10mA, I_B=1.0mA$                                                                                     | -                           | 35                      | ns               |
| Rise Time                              | tr              | $V_{CC}=3V, V_{BE(off)}=0.5V,$<br>$I_C=10mA, I_B=1.0mA$                                                                                | -                           | 35                      | ns               |
| Storage Time                           | ts              | $V_{CC}=3V, I_C=10mA$<br>$I_{B1}=I_{B2}=1.0mA$                                                                                         | -                           | 200                     | ns               |
| Fall Time                              | tf              | $V_{CC}=3V, I_C=10mA$<br>$I_{B1}=I_{B2}=1.0mA$                                                                                         | -                           | 50                      | ns               |

Note 2: Pulse Test: Pulse Width < 300 us, Duty Cycle < 2.0%.

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## ELECTRICAL CHARACTERISTICS CURVE

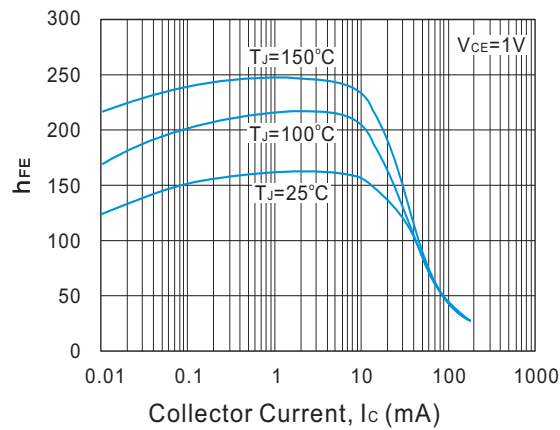


Fig. 1. Typical  $h_{FE}$  vs. Collector Current

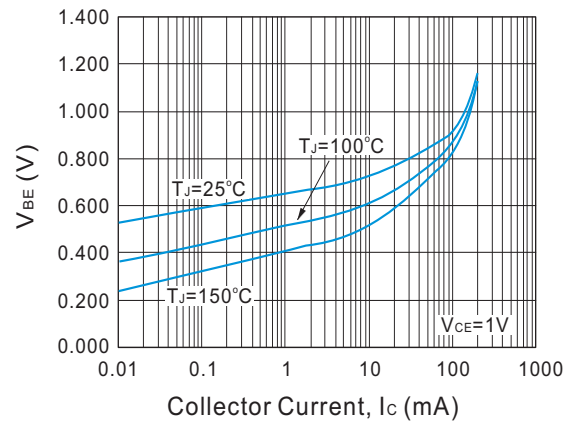


Fig. 2. Typical  $V_{BE}$  vs. Collector Current

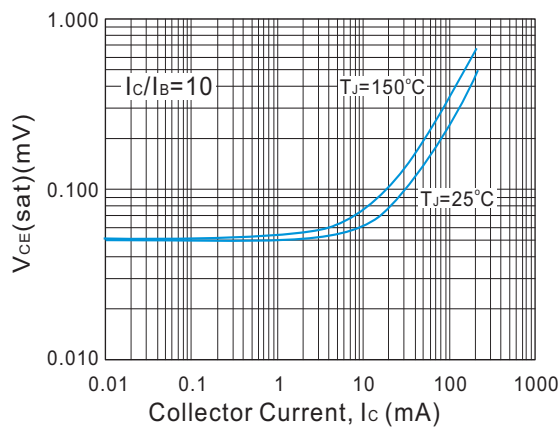


Fig. 3. Typical  $V_{CE(sat)}$  vs. Collector Current

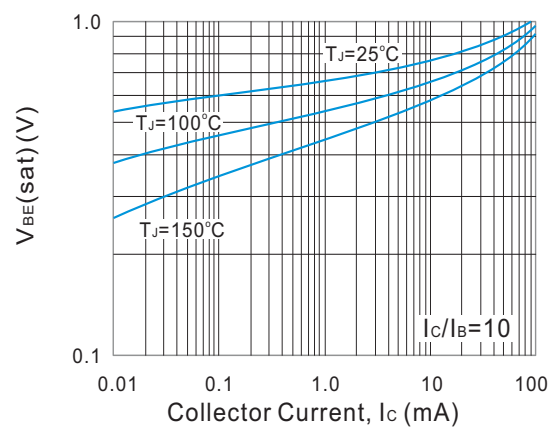


Fig. 4. Typical  $V_{BE(sat)}$  vs Collector Current

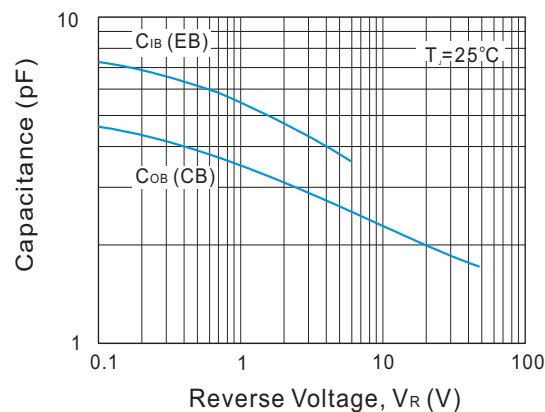
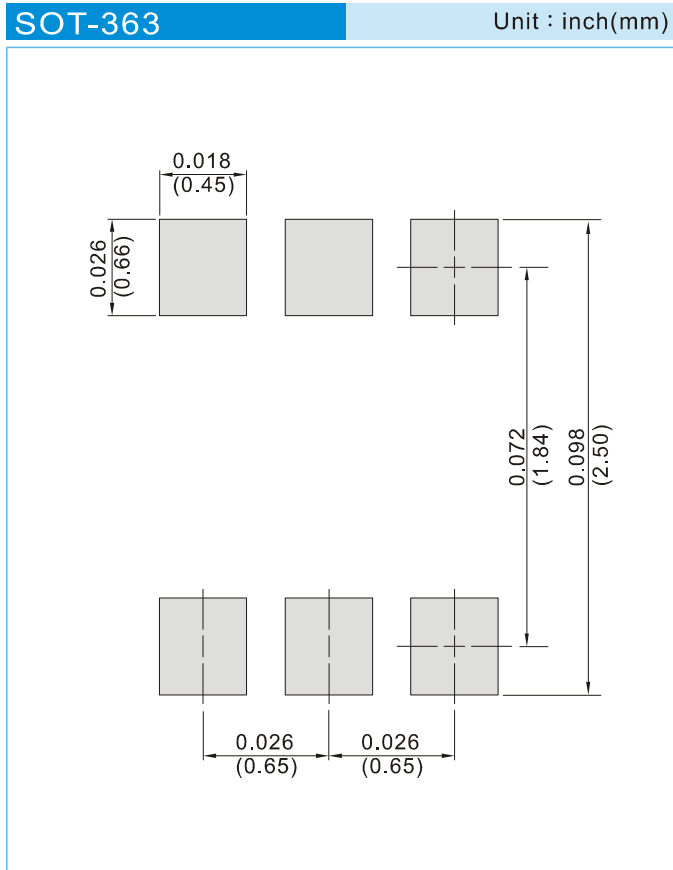


Fig. 5. Typical Capacitances vs. Reverse Voltage

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## MOUNTING PAD LAYOUT



## ORDER INFORMATION

- Packing information  
T/R - 10K per 13" plastic Reel  
T/R - 3K per 7" plastic Reel

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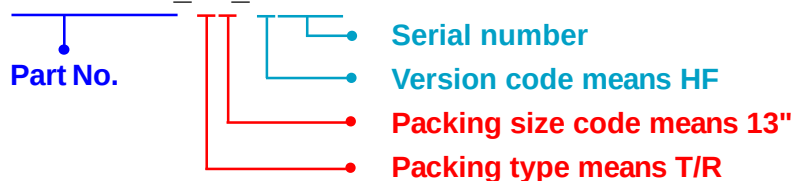
## Part No\_packing code\_Version

DMMT3904W-AU\_R1\_000A1

DMMT3904W-AU\_R2\_000A1

For example :

RB500V-40\_R2\_00001



| Packing Code XX                      |                      |                                  |                      | Version Code XXXXX |                      |                                       |
|--------------------------------------|----------------------|----------------------------------|----------------------|--------------------|----------------------|---------------------------------------|
| Packing type                         | 1 <sup>st</sup> Code | Packing size code                | 2 <sup>nd</sup> Code | HF or RoHS         | 1 <sup>st</sup> Code | 2 <sup>nd</sup> ~5 <sup>th</sup> Code |
| Tape and Ammunition Box (T/B)        | A                    | N/A                              | 0                    | HF                 | 0                    | serial number                         |
| Tape and Reel (T/R)                  | R                    | 7"                               | 1                    | RoHS               | 1                    | serial number                         |
| Bulk Packing (B/P)                   | B                    | 13"                              | 2                    |                    |                      |                                       |
| Tube Packing (T/P)                   | T                    | 26mm                             | X                    |                    |                      |                                       |
| Tape and Reel (Right Oriented) (TRR) | S                    | 52mm                             | Y                    |                    |                      |                                       |
| Tape and Reel (Left Oriented) (TRL)  | L                    | PANASERT T/B CATHODE UP (PBCU)   | U                    |                    |                      |                                       |
| FORMING                              | F                    | PANASERT T/B CATHODE DOWN (PBCD) | D                    |                    |                      |                                       |



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