



# DMMT3904W

## MATCHED NPN SMALL SIGNAL SURFACE MOUNT TRANSISTOR

**VOLTAGE** 40 Volts **POWER** 200 mWatts

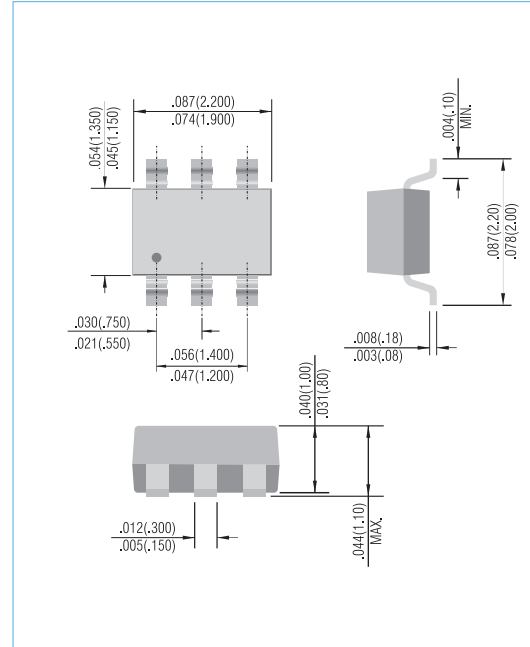
**SOT-363** Unit: inch ( mm )

### FEATURES

- NPN epitaxial silicon, planar design
- Collector-emitter voltage  $V_{CE} = 40V$
- Collector current  $I_C = 200mA$
- In compliance with EU RoHS 2002/95/EC directives

### MECHANICAL DATA

- Case: SOT-363, Plastic
- Terminals: Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 0.008 gram
- Marking: S4A

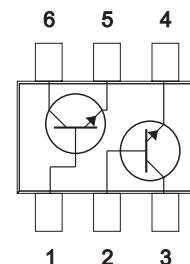


### ABSOLUTE RATINGS

| 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)                        | $P_{tot}$       | 200        | 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 | $^{\circ}C$   |

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

2: Device mounted on FR5 PCB: 1.0x0.75x0.62 in.



**Fig.108**



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## ELECTRICAL CHARACTERISTICS

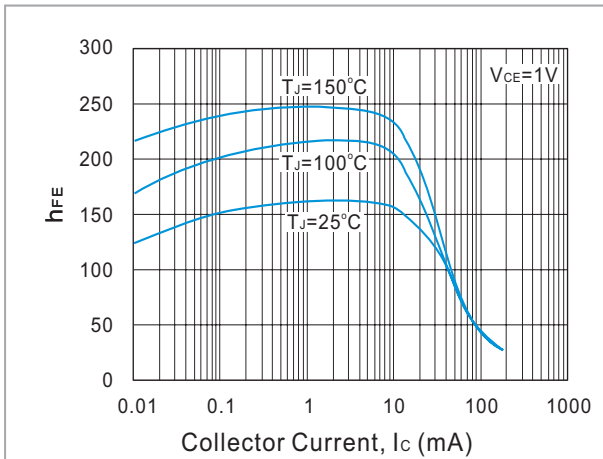
| PARAMETER                              | Symbol          | Test Condition  | MIN.                             | MAX.         | Units            |
|--|-----------------|---|----------------------------------|--------------|------------------|
| Collector - Base Breakdown Voltage     | $V_{(BR)CBO}$   | $I_C=10\mu A, I_E=0$                                      | 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                        | $h_{FE}$        | $I_C=0.1mA, V_{CE}=1.0V$                                  | 40                               | -            | -                |
|  |                 | $I_C=1.0mA, V_{CE}=1.0V$                                  | 70                               | -            |                  |
|  |                 | $I_C=10mA, V_{CE}=1.0V$                                   | 100                              | 300          |                  |
|  |                 | $I_C=50mA, V_{CE}=1.0V$                                   | 60                               | -            |                  |
|  |                 | $I_C=100mA, V_{CE}=1.0V$                                  | 30                               | -            |                  |
| 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                 | $h_{fe}$        |   | 0.5                              | 8            | $\times 10^{-4}$ |
| Small Signal 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          | -                |
| 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  $\leq 300 \mu s$ , Duty Cycle  $\leq 2.0\%$ .

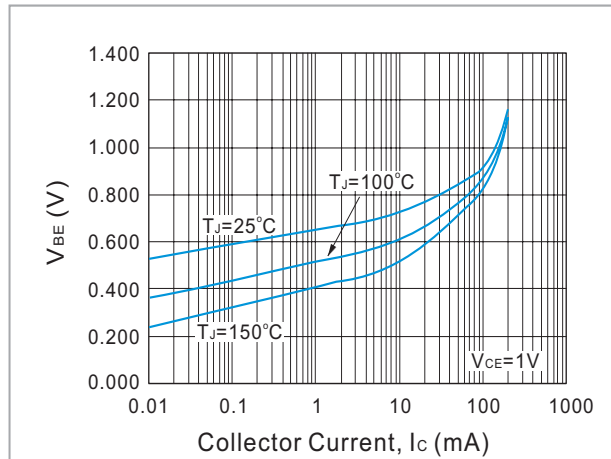


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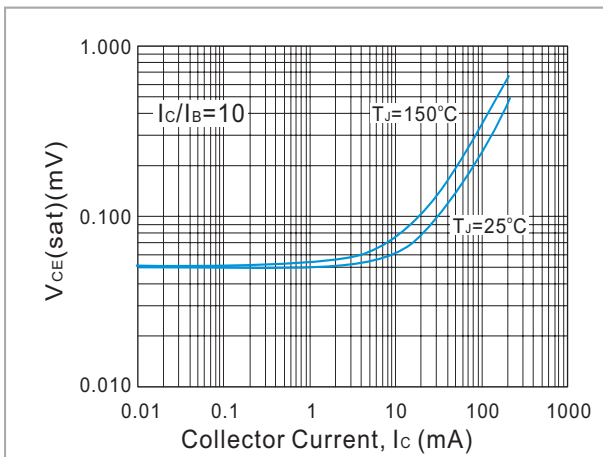
## ELECTRICAL CHARACTERISTICS CURVE



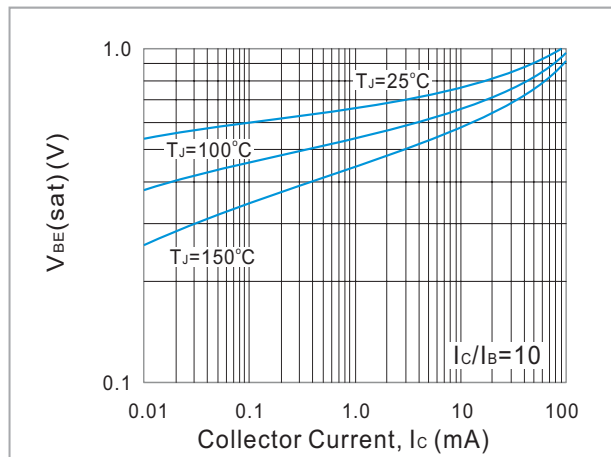
**Fig. 1. Typical  $h_{FE}$  vs. Collector Current**



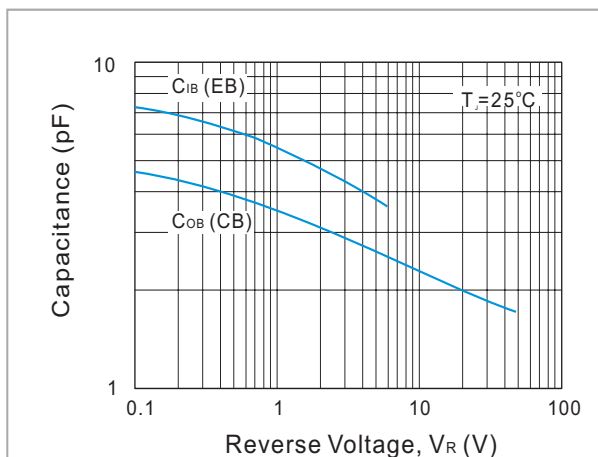
**Fig. 2. Typical  $V_{BE}$  vs. Collector Current**



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



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

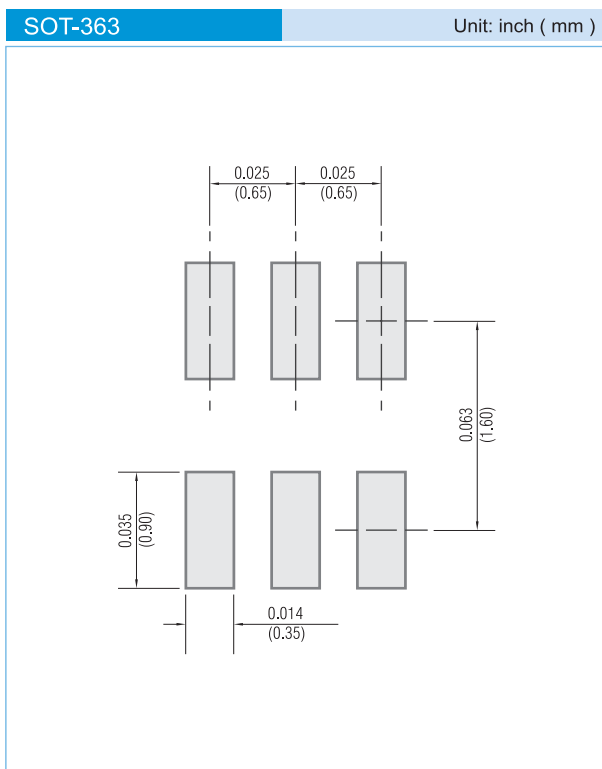


**Fig. 5. Typical Capacitances vs. Reverse Voltage**



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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

### LEGAL STATEMENT

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