*6 Lake Street, Lawrence, MA 01841*
*1-800-446-1158 / (978) 620-2600 / Fax: (978) 689-0803*
**Website: http: //www.microsemi.com**

# *TECHNICAL DATA SHEET*

## NPN POWER SILICON SWITCHING TRANSISTOR

***Qualified per MIL-PRF-19500/455***

**DEVICES**

**2N5664** **2N5666** **2N5667**
**2N5665** **2N5666S** **2N5667S**
**2N5666U3**

**LEVELS**

**JAN**
**JANTX**
**JANTV**
**JANS**

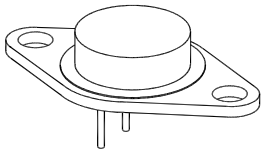
### ABSOLUTE MAXIMUM RATINGS *($T_C$ = +25°C unless otherwise noted)*

| Parameters / Test Conditions | Symbol | 2N5664<br>2N5666, S | 2N5665<br>2N5667, S | Unit |
|---|---|---|---|---|
| Collector-Emitter Voltage | $V_{CEO}$ | 200 | 300 | Vdc |
| Collector-Base Voltage | $V_{CBO}$ | 250 | 400 | Vdc |
| Emitter-Base Voltage | $V_{EBO}$ | 6.0 | | Vdc |
| Base Current | $I_B$ | 1.0 | | Adc |
| Collector Current | $I_C$ | 5.0 | | Adc |
| | | **2N5664<br>2N5665** | **2N5666, S<br>2N5667, S** | **2N5666U3** | |
| Total Power Dissipation 1/ @ $T_A$ = +25°C<br>@ $T_C$ = +100°C | $P_T$ | 2.5<br>30 | 1.2<br>15 | 1.5<br>35 | W |
| Operating & Storage Junction Temperature Range | $T_J$, $T_{stg}$ | -65 to +200 | | | °C |

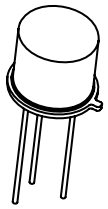
**Note:** 1) Consult 19500/455 for thermal derating curves.

### ELECTRICAL CHARACTERISTICS *($T_C$ = +25°C, unless otherwise noted)*

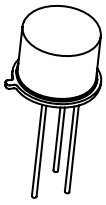
| Parameters / Test Conditions | | Symbol | Min. | Max. | Unit |
|---|---|---|---|---|---|
| **OFF CHARACTERTICS** | | | | | |
| Collector-Emitter Breakdown Voltage<br>$I_C$ = 10mAdc | 2N5664, 2N5666<br>2N5665, 2N5667 | $V_{(BR)CER}$ | 250<br>400 | | Vdc |
| Emitter-Base Breakdown Voltage<br>$I_E$ = 10µAdc | | $V_{(BR)EBO}$ | 6.0 | | Vdc |
| Collector-Emitter Cutoff Current<br>$V_{CE}$ = 200Vdc<br>$V_{CE}$ = 300Vdc | <br>2N5664, 2N5666<br>2N5665, 2N5667 | $I_{CES}$ | | 0.2<br>0.2 | µAdc |
| Collector-Base Cutoff Current<br>$V_{CB}$ = 200Vdc<br>$V_{CB}$ = 250Vdc<br>$V_{CB}$ = 300Vdc<br>$V_{CB}$ = 400Vdc | <br>2N5664, 2N5666<br><br>2N5665, 2N5667 | $I_{CBO}$ | | 0.1<br>1.0<br>0.1<br>1.0 | µAdc<br>mAdc<br>µAdc<br>mAdc |



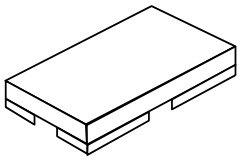
**TO-66 (TO-213AA)**
**2N5664, 2N5665**



**TO-5**
**2N5666, 2N5667**



**TO-39 (TO-205AD)**
**2N5666S, 2N5667S**



**U-3**
**2N5666U3**

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## NPN POWER SILICON SWITCHING TRANSISTOR

***Qualified per MIL-PRF-19500/455***

### ELECTRICAL CHARACTERISTICS (con't)

| Parameters / Test Conditions | | Symbol | Min. | Max. | Unit |
|---|---|---|---|---|---|
| **ON CHARACTERTICS** | | | | | |
| Forward-Current Transfer Ratio | | | | | |
| $I_C$ = 0.5Adc, $V_{CE}$ = 2.0Vdc | 2N5664, 2N5666 | $h_{FE}$ | 40 | | |
| | 2N5665, 2N5667 | | 25 | | |
| $I_C$ = 1.0Adc, $V_{CE}$ = 5.0Vdc | 2N5664, 2N5666 | | 40 | 120 | |
| | 2N5665, 2N5667 | | 25 | 75 | |
| $I_C$ = 3.0Adc, $V_{CE}$ = 5.0Vdc | 2N5664, 2N5666 | | 15 | | |
| | 2N5665, 2N5667 | | 10 | | |
| $I_C$ = 5.0Adc, $V_{CE}$ = 5.0Vdc | All Types | | 5.0 | | |
| Collector-Emitter Saturation Voltage | | | | | |
| $I_C$ = 3.0Adc, $I_B$ = 0.3Adc | 2N5664, 2N5666 | | | 0.4 | |
| $I_C$ = 3.0Adc, $I_B$ = 0.6Adc | 2N5665, 2N5667 | $V_{CE(sat)}$ | | 0.4 | Vdc |
| $I_C$ = 5.0Adc, $I_B$ = 1.0Adc | All Types | | | 1.0 | |
| Base-Emitter Saturation Voltage | | | | | |
| $I_C$ = 3.0Adc, $I_B$ = 0.3Adc | 2N5664, 2N5666 | | | 1.2 | |
| $I_C$ = 3.0Adc, $I_B$ = 0.6Adc | 2N5665, 2N5667 | $V_{BE(sat)}$ | | 1.2 | Vdc |
| $I_C$ = 5.0Adc, $I_B$ = 1.0Adc | All Types | | | 1.5 | |

### DYNAMIC CHARACTERISTICS

| | | | | |
|---|---|---|---|---|
| Forward Current Transfer Ratio<br>$I_C$ = 0.5Adc, $V_{CE}$ = 5.0Vdc, f = 10MHz | $\|h_{fe}\|$ | 2.0 | 7.0 | |
| Output Capacitance<br>$V_{CB}$ = 10Vdc, $I_E$ = 0, 100kHz ≤ f ≤ 1.0MHz | $C_{obo}$ | | 120 | pF |

### SWITCHING CHARACTERISTICS

| Parameters / Test Conditions | | Symbol | Min. | Max. | Unit |
|---|---|---|---|---|---|
| Turn-On Time<br>$V_{CC}$ = 100Vdc; $I_C$ = 1.0Adc; $I_{B1}$ = 30mAdc | | $t_{on}$ | | 0.25 | µs |
| Turn-Off Time | | | | | |
| $V_{CC}$ = 100Vdc; $I_C$ = 1.0Adc; $I_{B1}$ = -$I_{B2}$ = 50mAdc | 2N5664, 2N5666 | $t_{off}$ | | 1.5 | µs |
| | 2N5665, 2N5667 | | | 2.0 | |

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## NPN POWER SILICON SWITCHING TRANSISTOR

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**SAFE OPERATING AREA**

**DC Tests**
$T_C$ = 100°C, 1 Cycle, t ≥ 1.0s, $t_r + t_f$ = 10µs

**Test 1**

| | |
|---|---|
| $V_{CE}$ = 6.0Vdc, $I_C$ = 5.0Adc | 2N5664 , 2N5665 |
| $V_{CE}$ = 3.0Vdc, $I_C$ = 5.0Adc | 2N5666, 2N5667 |

**Test 2**

| | |
|---|---|
| $V_{CE}$ = 32Vdc, $I_C$ = 0.75Adc | 2N5664 |
| $V_{CE}$ = 40Vdc, $I_C$ = 0.75Adc | 2N5665 |
| $V_{CE}$ = 29Vdc, $I_C$ = 0.4Adc | 2N5666 |
| $V_{CE}$ = 37.5Vdc, $I_C$ = 0.4Adc | 2N5667 |

**Test 3**

| | |
|---|---|
| $V_{CE}$ = 200Vdc, $I_C$ = 29mAdc | 2N5664 |
| $V_{CE}$ = 200Vdc, $I_C$ = 19mAdc | 2N5666 |
| $V_{CE}$ = 300Vdc, $I_C$ = 21mAdc | 2N5665 |
| $V_{CE}$ = 300Vdc, $I_C$ = 14mAdc | 2N5667 |

(2) Pulse Test: Pulse Width = 300µs, Duty Cycle ≤ 2.0%