

## SILICON MICROWAVE POWER TRANSISTOR

### PRODUCT DATA SHEET

#### FEATURES:

- High Gain Bandwidth Product  
 $f_t = 8 \text{ GHz typ @ } I_C = 140 \text{ mA}$
- High Gain  
 $|S_{21}|^2 = 14.2 \text{ dB @ } 1.0 \text{ GHz}$   
 $8.2 \text{ dB @ } 2.0 \text{ GHz}$

#### PERFORMANCE DATA:

- Electrical Characteristics ( $T_A = 25^\circ\text{C}$ )

#### DESCRIPTION AND APPLICATIONS:

Bipolarics' B15V18008 is a high performance silicon bipolar transistor intended for power linear and Class C applications at VHF, UHF and microwave frequencies in 7.2 and 12V systems. Because of the innovative package design the B15V18008 can operate at up to 1.5W on a footprint less than 20 mm<sup>2</sup>. These applications include high intermod receivers, CATV and instrumentation amplifiers as well as drivers and gain stages in transmitters of pagers cellular telephone and PCN device.

#### Absolute Maximum Ratings:

| SYMBOL              | PARAMETERS                        | RATING     | UNITS |
|---------------------|-----------------------------------|------------|-------|
| $V_{CBO}$           | Collector-Base Voltage            | 25         | V     |
| $V_{CEO}$           | Collector-Emitter Voltage         | 15         | V     |
| $V_{EBO}$           | Emitter-Base Voltage              | 1.5        | V     |
| $I_C$               | Collector Current (continuous)    | 240        | mA    |
| $I_{C \text{ MAX}}$ | Collector Current (instantaneous) | 360        | mA    |
| $T_J$               | Junction Temperature              | 200        | °C    |
| $T_{STG}$           | Storage Temperature               | -65 to 150 | °C    |

| SYMBOL       | PARAMETERS & CONDITIONS<br>$V_{CE} = 8V, I_C = 120 \text{ mA}$ , Class A, unless stated | UNIT          | MIN. | TYP.        | MAX. |
|--------------|---|---------------|------|-------------|------|
| $f_t$        | Gain Bandwidth Product  | GHz           |      | 8.0         |      |
| $ S_{21} ^2$ | Insertion Power Gain:<br>$f = 1.0 \text{ GHz}$<br>$f = 2.0 \text{ GHz}$                 | dB<br>dB      |      | 14.2<br>8.2 |      |
| $P_{1dB}$    | Power output at 1dB compression:<br>$f = 1.0 \text{ GHz}$<br>$I_C = 150 \text{ mA}$     | dBm           |      | 30.0        |      |
| NF           | Noise Figure: $V_{CE} = 5V, I_C = 20 \text{ mA}$<br>$f = 1.0 \text{ GHz}$               | dB            |      | 1.6         |      |
| $h_{FE}$     | Forward Current Transfer Ratio: $V_{CE} = 5V, I_C = 30 \text{ mA}$                      |               | 30   | 100         | 300  |
| $I_{CBO}$    | Collector Cutoff Current : $V_{CB} = 8V$  | $\mu\text{A}$ |      |             | 0.8  |
| $C_{CB}$     | Collector Base Capacitance: $V_{CB} = 8V$<br>$f = 1\text{MHz}$                          | pF            |      | .75         |      |

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#### TYPICAL S PARAMETERS:

BIAS CONDITION:  $V_{CE} = 8 \text{ V}$ ,  $I_C = 150 \text{ mA}$

S-MATRIX:  $Z_S = 50.0 + j 0.0$   $Z_L = 50.0 + j 0.0$

| FREQ.<br>GHz | S11    |      | S21   |     | S12    |     | S22    |      | S21<br>dB |
|--------------|--------|------|-------|-----|--------|-----|--------|------|-----------|
|              | Mag    | Ang  | Mag   | Ang | Mag    | Ang | Mag    | Ang  |           |
| 0.20000      | 0.6456 | -156 | 17.78 | 124 | 0.0169 | 46  | 0.3090 | -102 | 25.0      |
| 0.40000      | 0.8128 | -136 | 12.02 | 102 | 0.0229 | 54  | 0.2630 | -136 | 21.6      |
| 0.60000      | 0.7843 | 176  | 8.317 | 92  | 0.0288 | 62  | 0.2511 | -145 | 18.4      |
| 0.80000      | 0.7952 | 174  | 6.456 | 87  | 0.0371 | 68  | 0.2600 | -155 | 16.2      |
| 1.00000      | 0.7943 | 172  | 5.128 | 83  | 0.0426 | 72  | 0.2371 | -155 | 14.2      |
| 1.20000      | 0.7943 | 162  | 4.365 | 78  | 0.0506 | 73  | 0.2630 | -159 | 12.8      |
| 1.40000      | 0.7478 | 156  | 3.715 | 72  | 0.0575 | 73  | 0.2630 | -169 | 11.4      |
| 1.60000      | 0.7943 | 154  | 3.198 | 70  | 0.0630 | 74  | 0.2722 | -164 | 10.1      |
| 1.80000      | 0.7762 | 151  | 2.851 | 66  | 0.0707 | 77  | 0.2884 | -168 | 9.1       |
| 2.00000      | 0.7673 | 148  | 2.570 | 63  | 0.0794 | 77  | 0.2851 | -168 | 8.2       |
| 2.20000      | 0.7852 | 139  | 2.213 | 58  | 0.0860 | 75  | 0.3235 | 178  | 6.9       |
| 2.40000      | 0.7762 | 136  | 1.995 | 59  | 0.0891 | 78  | 0.3090 | 180  | 6.0       |
| 2.60000      | 0.8222 | 132  | 1.883 | 54  | 0.1000 | 77  | 0.3845 | 176  | 5.5       |
| 2.80000      | 0.8222 | 131  | 1.698 | 51  | 0.1047 | 77  | 0.4265 | 172  | 4.6       |
| 3.00000      | 0.8413 | 129  | 1.640 | 49  | 0.1109 | 79  | 0.4073 | 177  | 4.3       |
| 3.20000      | 0.8317 | 128  | 1.513 | 45  | 0.1174 | 76  | 0.4073 | 169  | 3.6       |
| 3.40000      | 0.8413 | 125  | 1.412 | 46  | 0.1244 | 78  | 0.3801 | 168  | 3.0       |
| 3.60000      | 0.9120 | 117  | 1.364 | 37  | 0.1348 | 75  | 0.4677 | 162  | 2.7       |
| 3.80000      | 0.8128 | 114  | 1.188 | 17  | 0.1303 | 76  | 0.4168 | 156  | 1.5       |
| 4.00000      | 0.8709 | 118  | 1.230 | 18  | 0.1462 | 79  | 0.4365 | 167  | 1.8       |
| 4.20000      | 0.8609 | 111  | 1.071 | 30  | 0.1479 | 74  | 0.4415 | -154 | 0.6       |

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Unit: 0.001 INCH

