# 10502

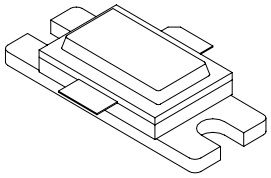
## 500 Watts, 50 Volts, Pulsed Avionics 1030 / 1090 MHz

## GENERAL DESCRIPTION

The 10502 is a high power COMMON BASE bipolar transistor. It is designed for pulsed systems in the frequency band 1030/1090 MHz, with the pulse width and duty required for MODE-S &TCAS applications. The device has gold thin-film metallization and diffused ballasting for proven highest MTTF. The transistor includes input and output prematch for broadband capability. Low thermal resistance package reduces junction temperature, extends life.

## CASE OUTLINE

**55SM-1**
**Common Base**



## ABSOLUTE MAXIMUM RATINGS

**Maximum Power Dissipation**

| | |
|---|---|
| Device Dissipation @ 25°C[1] | 1458 Watts |

**Maximum Voltage and Current**

| | | |
|---|---|---|
| BVces | Collector to Emitter Voltage | 65 Volts |
| BVebo | Emitter to Base Voltage | 3.5 Volts |
| Ic | Collector Current | 40 Amps |

**Maximum Temperatures**

| | |
|---|---|
| Storage Temperature | - 65 to + 200°C |
| Operating Junction Temperature | + 230°C |

**ELECTRICAL CHARACTERISTICS @ 25 °C**

| SYMBOL | CHARACTERISTICS | TEST CONDITIONS | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|
| $P_{out}$ | Power Output | F = 1030/1090 MHz | 500 | | | W |
| $P_g$ | Power Gain | $V_{cc}$ = 50 Volts | 8.5 | | | dB |
| $P_{out}$ | Power Input | PW = 32 μsec, DF = 2% | | | 70 | W |
| $\eta_c$ | Collector Efficiency | | 40 | | | % |
| $R_L$ | Return Loss | | -10 | | | dB |
| VSWR | Load Mismatch Tolerance[1] | F = 1090 MHz | 10:1 | | | |

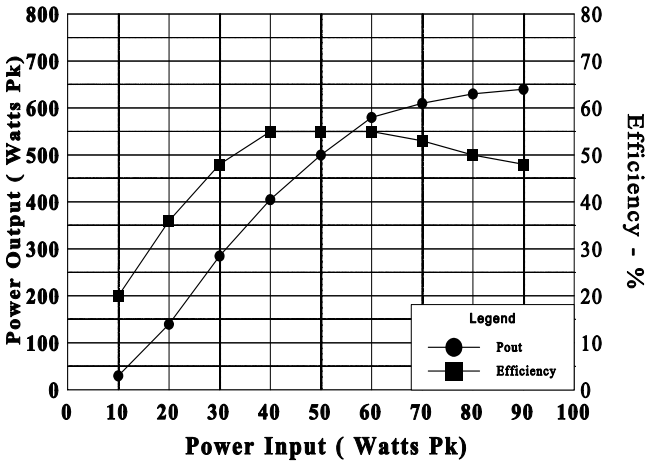
| | | | | | | |
|---|---|---|---|---|---|---|
| **BVebo** | Emitter to Base Breakdown | Ie = 50 mA | 3.5 | | | Volts |
| **BVces** | Collector to Emitter Breakdown | Ic = 100 mA | 65 | | | Volts |
| **$h_{FE}$** | DC - Current Gain | Ic = 5 A, Vce = 5 V | 20 | | | |
| **θjc[1]** | Thermal Resistance | | | | 0.12 | °C/W |

Note 1: At rated output power and pulse conditions

Rev. - Sep 1998

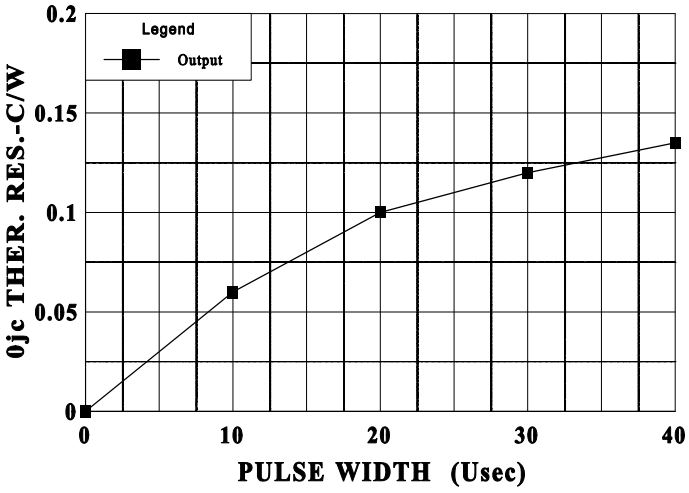
**Power Output & Efficiency vs Pin**

1090 MHz, 50 V, PW 0.5us, 50%, 128 us,




**THERMAL RESISTANCE VS PULSE WIDTH**

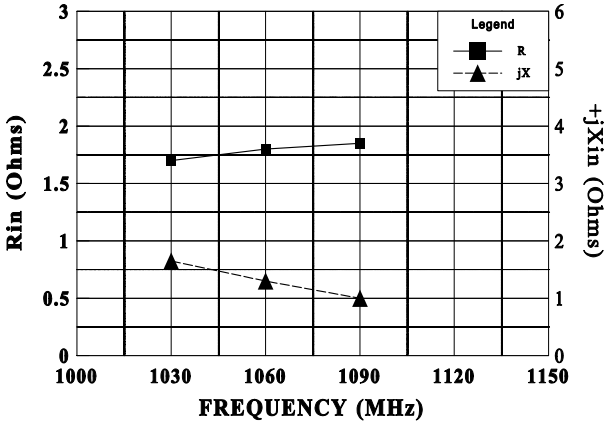
Vcc - 50 V, Tf = 30 C




***Burst Width = 128 μs, L.T.D. = 1%***

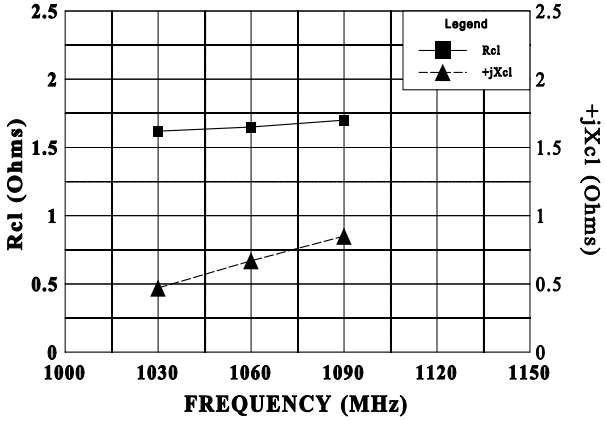
**SERIES INPUT IMPEDANCE VS FREQUENCY**

Vcc = 50 V, Pi = 65W, 32 us, 2%



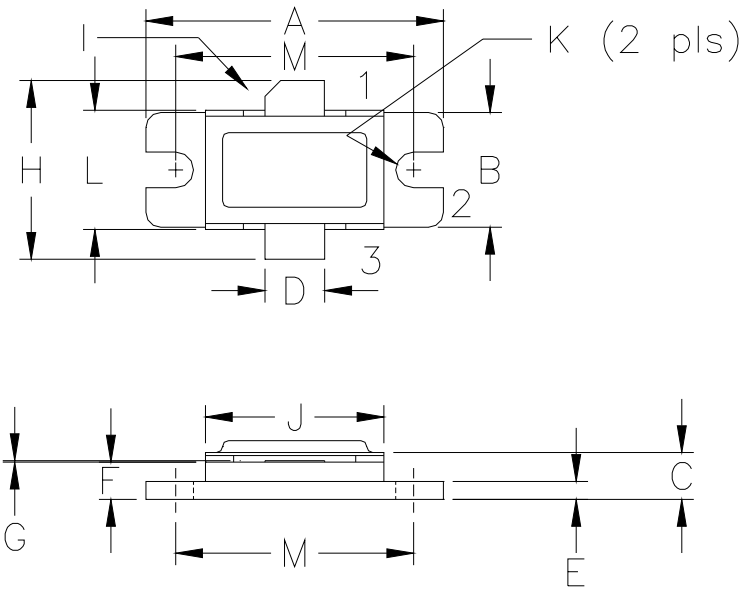

**SERIES LOAD IMPEDANCE VS FREQUENCY**

Vcc = 50 V, Pin = 65 W, 32 us, 2%



**10502**

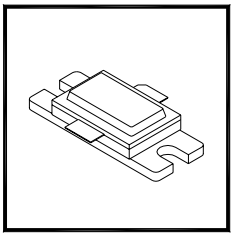
| REVISIONS | | | | |
|---|---|---|---|---|
| ZONE | REV | DESCRIPTION | DATE | APPROVED |




| DIM | MILLIMETER | TOL | INCHES | TOL |
|---|---|---|---|---|
| A | 25.40 | .25 | 1.000 | .010 |
| B | 9.78 | .25 | .385 | .010 |
| C | 3.61 | .19 | .142 | .007 |
| D | 5.08 | .13 | .200 | .005 |
| E | 1.53 | .13 | .060 | .005 |
| F | 3.18 | .13 | .125 | .005 |
| G | 0.08 | +.05/-.00 | .003 | +.002/ -.000 |
| H | 19.05 | 0.51 | .750 | .020 |
| I | 45° | 5° | 45° | 5° |
| J | 15.24 | .25 | .600 | .010 |
| K | 3.05 DIA | .13 | .120 DIA | .005 |
| L | 10.15 | .13 | .400 | .005 |
| M | 20.32 | .25 | .800 | .010 |

STYLE 1:
PIN 1 = COLLECTOR
2 = BASE
3 = EMITTER

STYLE 2:
PIN 1 = COLLECTOR
2 = EMITTER
3 = BASE



GHz TECHNOLOGY
RF – MICROWAVE SILICON POWER TRANSISTORS

DWG NO. 55SM