



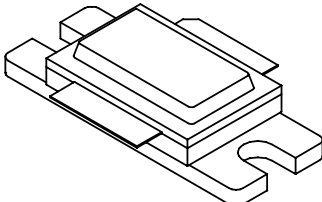

0405SC-1000M

1000Watts, 125 Volts, Class AB

406 to 450 MHz

Silicon Carbide SIT

PRELIMINARY SPECIFICATION

| | |
|---|--|
| <p>GENERAL DESCRIPTION</p> <p>The 0405SC-1000M is a Common Gate N-Channel Class AB SILICON CARBIDE STATIC INDUCTION TRANSISTOR (SIT) capable of providing 1000 Watts of RF power from 406 to 450 MHz. The transistor is designed for use in High Power Amplifiers supporting applications such as UHF Weather Radar and Long Range Tracking Radar. The device is an addition to a series of High Power Silicon Carbide Transistors from Microsemi PPG.</p> | <p>CASE OUTLINE 55ST FET (Common Gate)</p>  |
| <p>ABSOLUTE MAXIMUM RATINGS</p> <p>Voltage and Current</p> <p>Drain-Source (V_{DSS}) 250V</p> <p>Gate-Source (V_{GS}) -1V</p> <p>Temperatures</p> <p>Storage Temperature -65 to +150°C</p> <p>Operating Junction Temperature +250°C</p>  | |

ELECTRICAL CHARACTERISTICS @ 25°C

| SYMBOL | CHARACTERISTICS | TEST CONDITIONS | MIN | TYP | MAX | UNITS |
|--------------------|------------------------------|--------------------------------|-----|-----|------|---------------|
| I_{dss} | Drain-Source Leakage Current | $V_{GS} = -20V, V_{DG} = 125V$ | | | 750 | μA |
| I_{gss} | Gate-Source Leakage Current | $V_{GS} = -20V, V_{DS} = 0V$ | | | 50 | μA |
| θ_{JC}^{-1} | Thermal Resistance | | | | 0.15 | $^{\circ}C/W$ |

FUNCTIONAL CHARACTERISTICS @ 25°C, $V_{dd} = 125V, I_{dq(ave)} = 250 mA, Freq = 406, 425, 450 MHz,$

| | | | | | | |
|------------|-----------------------------|--------------------------------|-----|------|------|-------|
| G_{PG} | Common Gate Power Gain | $P_{out} = 1000 W, Pulsed$ | 8 | 8.5 | | dB |
| P_{in} | Input Power | Pulse Width = 300us, DF = 10% | | 140 | 155 | W |
| η_d | Drain Efficiency | F = 450 MHz, $P_{out} = 1000W$ | 50 | | | % |
| ψ | Load Mismatch | F = 406 MHz, $P_{out} = 1000W$ | | | 10:1 | |
| $P_o +1dB$ | Power Output – Higher Drive | F = 450 MHz, $P_{in} = 180 W$ | | 1100 | | W |
| V_{gs} | Gate source Voltage | Set for $I_{dq(ave)} = 150mA$ | 3.0 | | 10.0 | Volts |

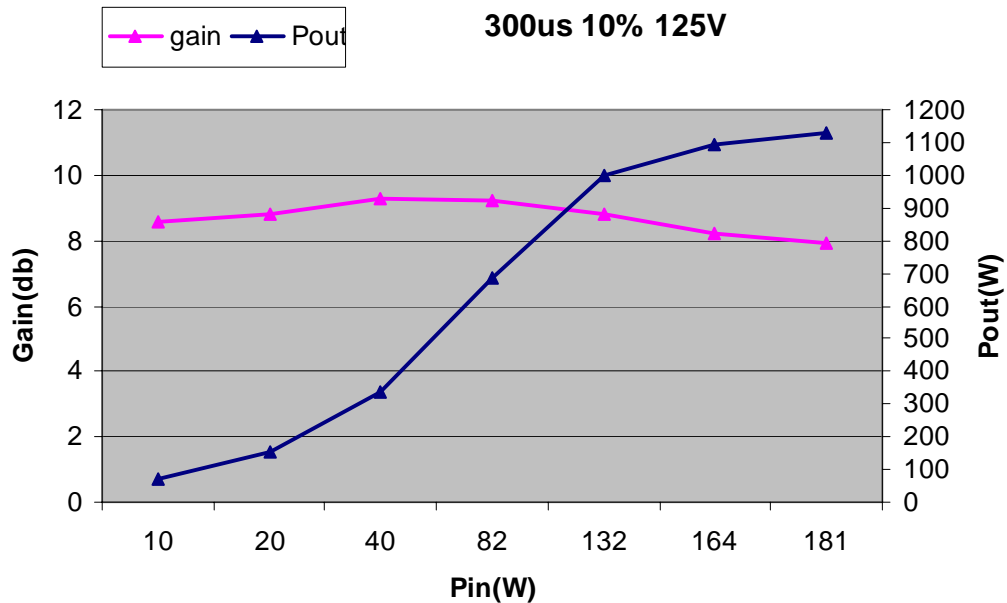
Rev F May 2010



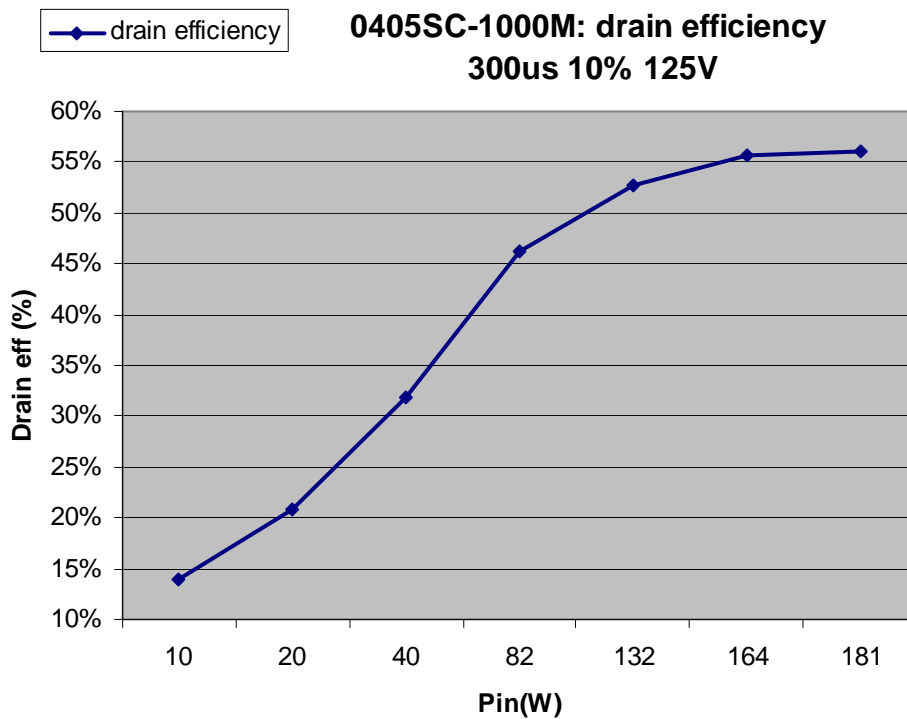
0405SC-1000M

Typical RF Performance Curve

0405SC-1000M: Gain & Pout
300us 10% 125V



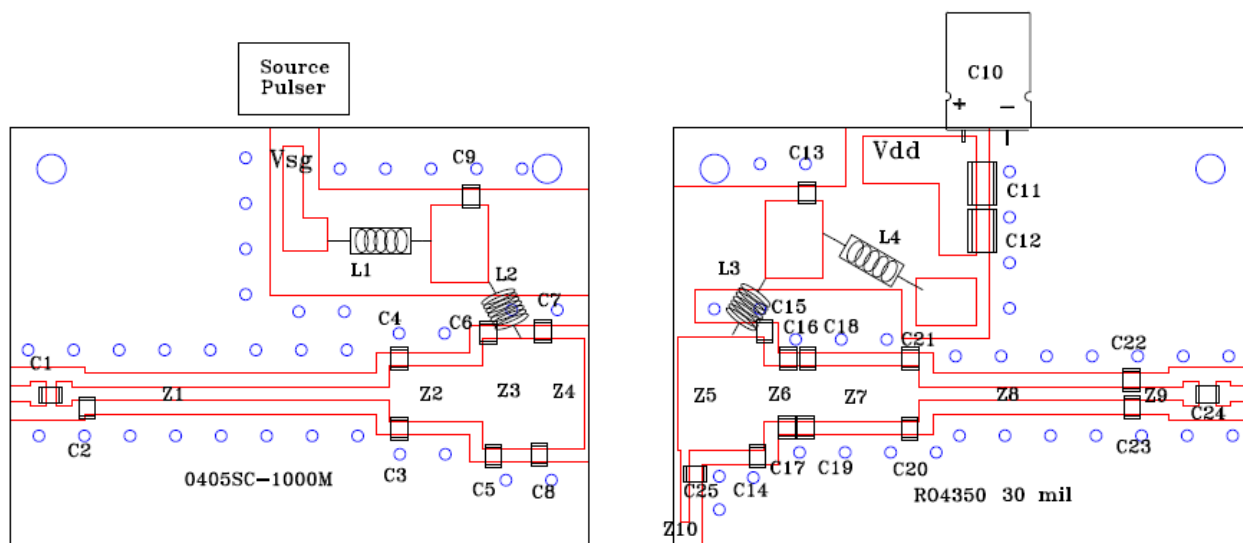
0405SC-1000M: drain efficiency
300us 10% 125V





0405SC-1000M

Test Circuit board

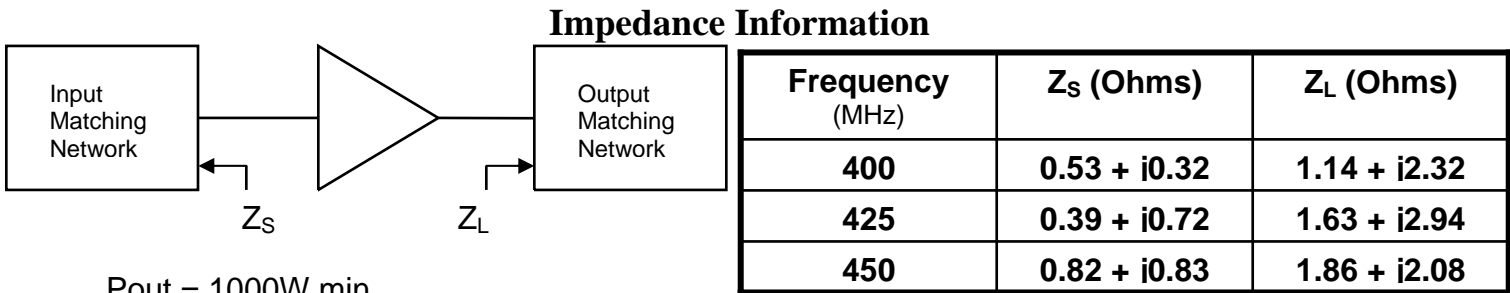


0405SC-1000M Test Circuit Component Designations and Values

| Part | Description | Part | Description |
|------------------------|--|-------|---------------------------------------|
| C1, C9, C13, C24, C25 | 330pF Chip Capacitor (ATC 100B) | Z1 | 65 x 1463 mils (W x L) |
| C2, C16, C19, C22, C23 | 10pF Chip Capacitor (ATC 100B) | Z2 | 270 x 450 mils (W x L) |
| C3, C17, C20, C21 | 33pF Chip Capacitor (ATC 100B) | Z3 | 530 x 273 mils (W x L) |
| C4 | 4.7pF Chip Capacitor (ATC 100B) | Z4 | 530 x 217 mils (W x L) |
| C5, C6, C7, C8 | 20pF Chip Capacitor (ATC 100B) | Z5 | 550 x 420 mils (W x L) |
| C10 | 1000uF 160V Electrolytic Capacitor | Z6 | 270 x 158 mils (W x L) |
| C11, C12 | 1uF Chip Capacitor | Z7 | 270 x 540 mils (W x L) |
| C14, C15, C18 | 18pF Chip Capacitor (ATC 100B) | Z8 | 65 x 1026 mils (W x L) |
| PCB | Rogers 4350, $\epsilon_r=3.48$, 30mils, 1oz | Z9 | 65 x 311 mils (W x L) |
| | | Z10 | 40 x 345 mils (W x L) |
| L2, L3 | 7 Turns, 18AWG, IDIA 0.2" | | |
| L1, L4 | Ferrite Coil Inductor | Note: | All Z length dimensions include bends |



0405SC-1000M



P_{out} = 1000W min
 V_{dd} = 125V, I_{dq} = 150mA (Avg)
 Pulse format: 300uS, 10% dc

CASE OUTLINE 55ST

