



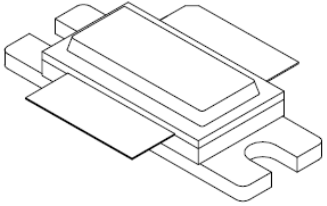
0405SC-2200M

2200Watts, 125 Volts, Class AB

406 to 450 MHz

Silicon Carbide SIT

PRELIMINARY SPECIFICATION

<p>GENERAL DESCRIPTION</p> <p>The 0405SC-2200M is a Common Gate N-Channel DEPLETION MODE Class AB SILICON CARBIDE (SiC) STATIC INDUCTION TRANSISTOR (SIT) capable of providing 2200 Watts of RF Peak 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 the series of High Power Silicon Carbide Transistors from Microsemi RF IS.</p>	<p>CASE OUTLINE 55TW-FET (Common Gate)</p> 								
<p>ABSOLUTE MAXIMUM RATINGS</p> <p>Voltage and Current</p> <table> <tr> <td>Drain-Source (V_{DSS})</td> <td>250V</td> </tr> <tr> <td>Gate-Source (V_{GS})</td> <td>-1V</td> </tr> </table> <p>Temperatures</p> <table> <tr> <td>Storage Temperature</td> <td>-65 to +150°C</td> </tr> <tr> <td>Operating Junction Temperature</td> <td>+250°C</td> </tr> </table>	Drain-Source (V_{DSS})	250V	Gate-Source (V_{GS})	-1V	Storage Temperature	-65 to +150°C	Operating Junction Temperature	+250°C	
Drain-Source (V_{DSS})	250V								
Gate-Source (V_{GS})	-1V								
Storage Temperature	-65 to +150°C								
Operating Junction Temperature	+250°C								

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	°C/W

FUNCTIONAL CHARACTERISTICS @ 25°C, $V_{dd} = 125V, I_{dq(ave)} = 120 mA, Freq = 406, 425, 450 MHz,$

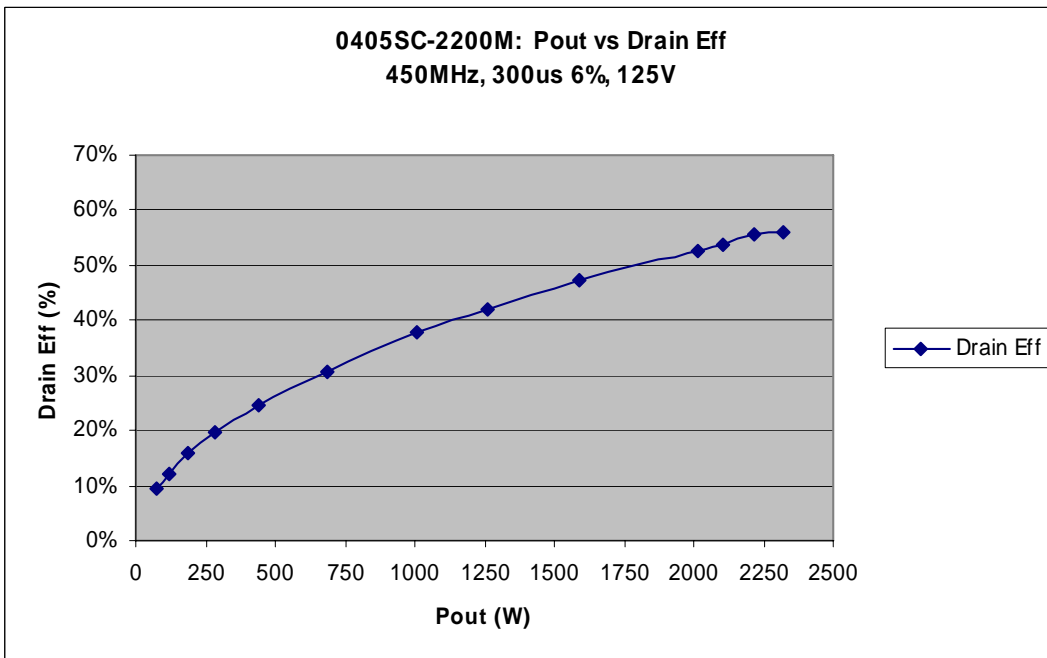
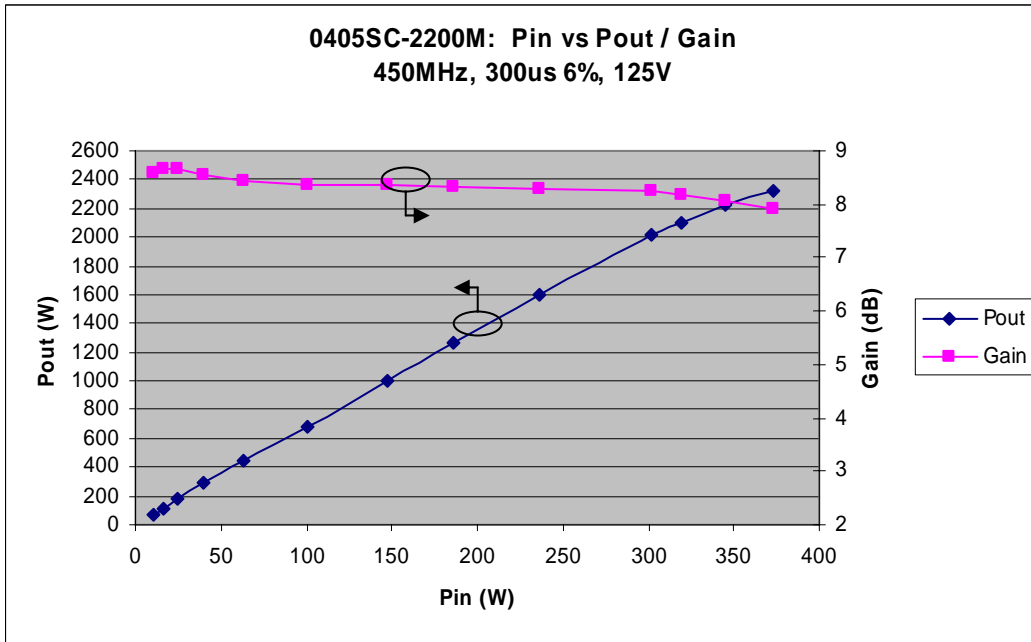
G_{PG}	Common Gate Power Gain	$P_{out} = 2200 W, Pulsed$	7.0	7.5		dB
P_{in}	Input Power	Pulse Width = 300us, DF = 6%		390	440	W
η_d	Drain Efficiency	F = 450 MHz, $P_{out} = 2200W$	50	55		%
ψ	Load Mismatch	F = 420 MHz, $P_{out} = 2200W$			10:1	
$P_o +1dB$	Power Output – Higher Drive	F = 450 MHz, $P_{in} = 490 W$		2450		W
V_{gs}	Gate source Voltage	Set for $I_{dq(ave)} = 120mA$	3.0		10.0	Volts

Rev A1
May 2010



0405SC-2200M

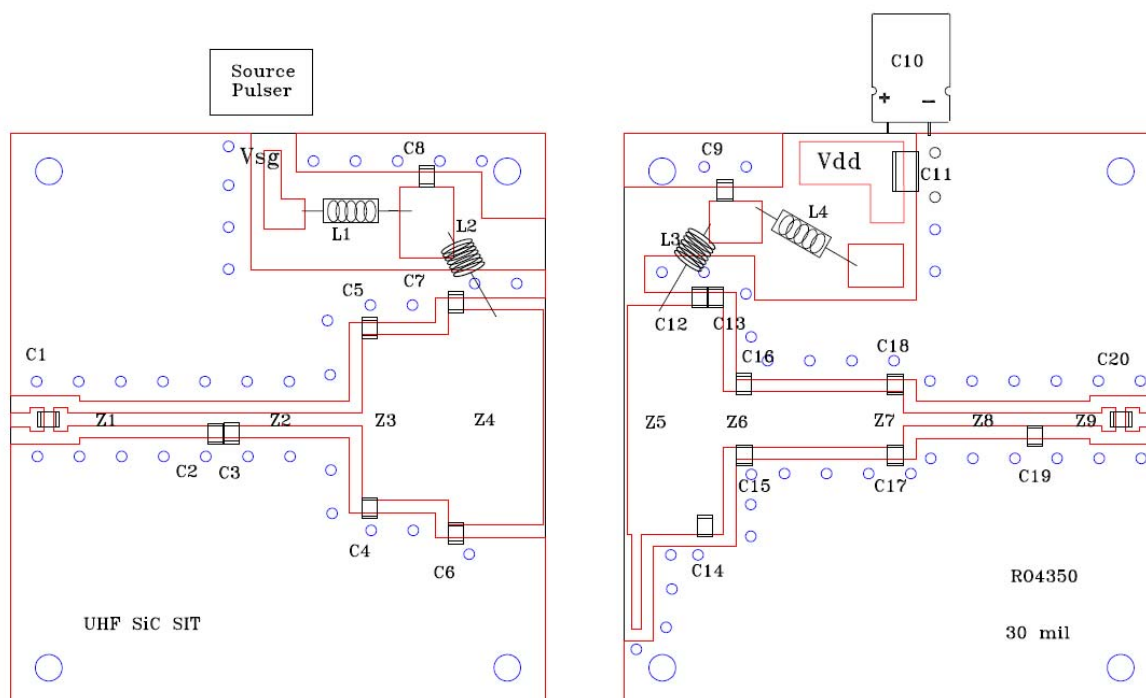
Typical RF Performance Curve





0405SC-2200M

Test Circuit board



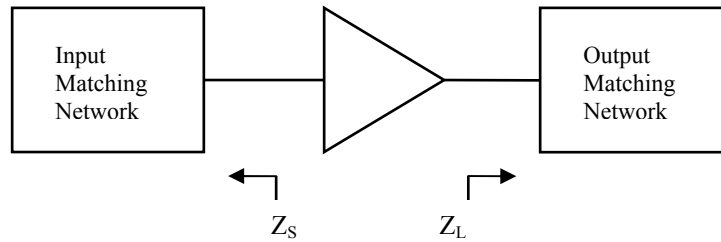
0405SC-2200M Test Circuit Component Designations and Values

Part	Description	Part	Description
C1, C8, C9, C20	330pF Chip Capacitor (ATC 100B)	L2, L3	7 Turns, 18AWG, IDIA 0.2"
C2	3.9pF Chip Capacitor (ATC 100B)	L1, L4	Ferrite Coil Inductor
C3	12pF Chip Capacitor (ATC 100B)		
C4	6.8pF Chip Capacitor (ATC 100B)	Z1	65 x 890 mils (W x L)
C5	2.2pF Chip Capacitor (ATC 100B)	Z2	65 x 720 mils (W x L)
C6, C7	33pF Chip Capacitor (ATC 100B)	Z3	865 x 450 mils (W x L)
C10	1000uF 160V Electrolytic Capacitor	Z4	1125 x 500 mils (W x L)
C11	1uf Chip Capacitor	Z5	1200 x 500 mils (W x L)
C12, C13, C14	24pF Chip Capacitor (ATC 100B)	Z6	290 x 105 mils (W x L)
C15	15pF Chip Capacitor (ATC 100B)	Z7	290 x 835 mils (W x L)
C16, C17	22pF Chip Capacitor (ATC 100B)	Z8	65 x 687 mils (W x L)
C18	10pF Chip Capacitor (ATC 100B)	Z9	65 x 420mils (W x L)
C19	8.2pF Chip Capacitor (ATC 100B)		
PCB	Rogers 4350, $\epsilon_r=3.48$, 30mils, 1oz	Note:	All Z length dimensions include bends



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Impedance Information



Typical Impedance Values

Frequency (MHz)	$Z_S(\Omega)$	$Z_L(\Omega)$
406	$0.86 - j1.97$	$0.75 - j0.49$
425	$0.93 - j1.76$	$0.87 - j0.25$
450	$1.05 - j1.51$	$1.11 + j0.04$

* $V_{DD} = 125V$, $I_{DQ} = 120mA$ avg, $P_{out} = 2200W$

* Pulse Format: $300\mu s$, 6% Long Term Duty Factor



0405SC-2200M

Case Outline 55TW FET

