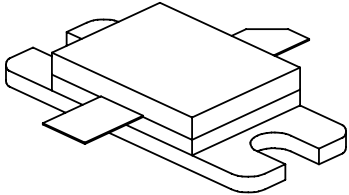





# 0405SC-1000M

1000Watts, 125 Volts, Class AB  
406 to 450 MHz  
Silicon Carbide SIT

## PRELIMINARY SPECIFICATION

<p><b>GENERAL DESCRIPTION</b></p> <p>The 0405SC-1000M is a <b>Common Gate N-Channel Class AB SILICON CARBIDE STATIC INDUCTION TRANSISTOR (SIT)</b> 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. <b>The device is an addition to a series of High Power Silicon Carbide Transistors from Microsemi PPG.</b></p>	<p><b>CASE OUTLINE</b> <b>55KT FET</b> <b>(Common Gate)</b> <b>1 = Drain</b> <b>2 = Gate</b> <b>3 = Source</b></p> 
<p><b>ABSOLUTE MAXIMUM RATINGS</b></p> <p><b>Voltage and Current</b> Drain-Source (<math>V_{DSS}</math>) 250V Gate-Source (<math>V_{GS}</math>) -1V</p> <p><b>Temperatures</b> Storage Temperature -65 to +150°C 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	$\mu A$
$I_{gss}$	Gate-Source Leakage Current	$V_{GS} = -20V, V_{DS} = 0V$			50	$\mu A$
$\theta_{JC}^1$	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
$\eta_d$	Drain Efficiency	F = 450 MHz, $P_{out} = 1000W$	50			%
$\psi$	Load Mismatch	F = 406 MHz, $P_{out} = 1000W$			10:1	
Po +1dB	Power Output – Higher Drive	F = 450 MHz, $P_{in} = 180 W$		1100		W
Vgs	Gate source Voltage	Set for $I_{dq(ave)} = 250mA$	3.0		10.0	Volts

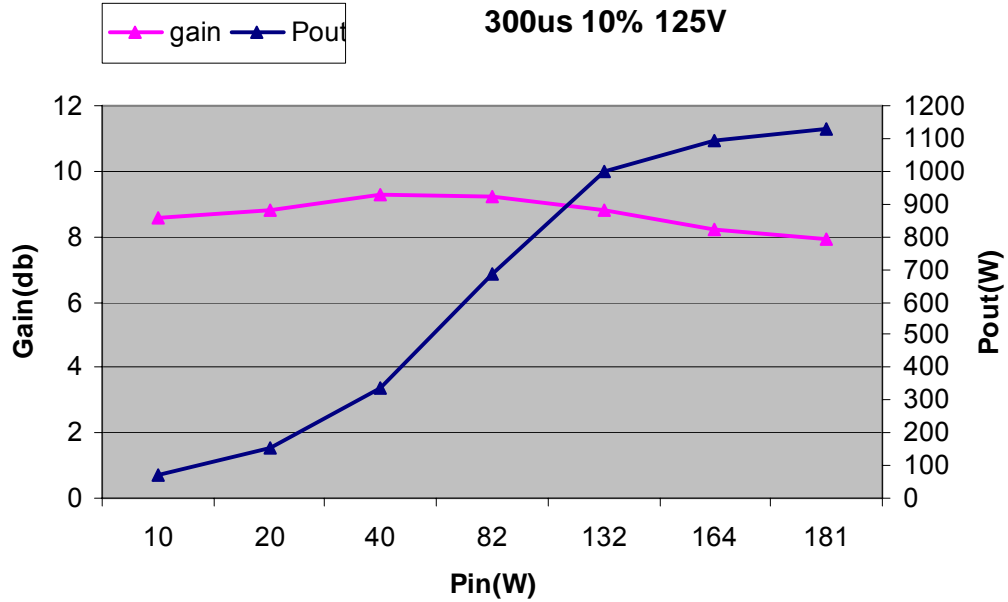
Feb 2009



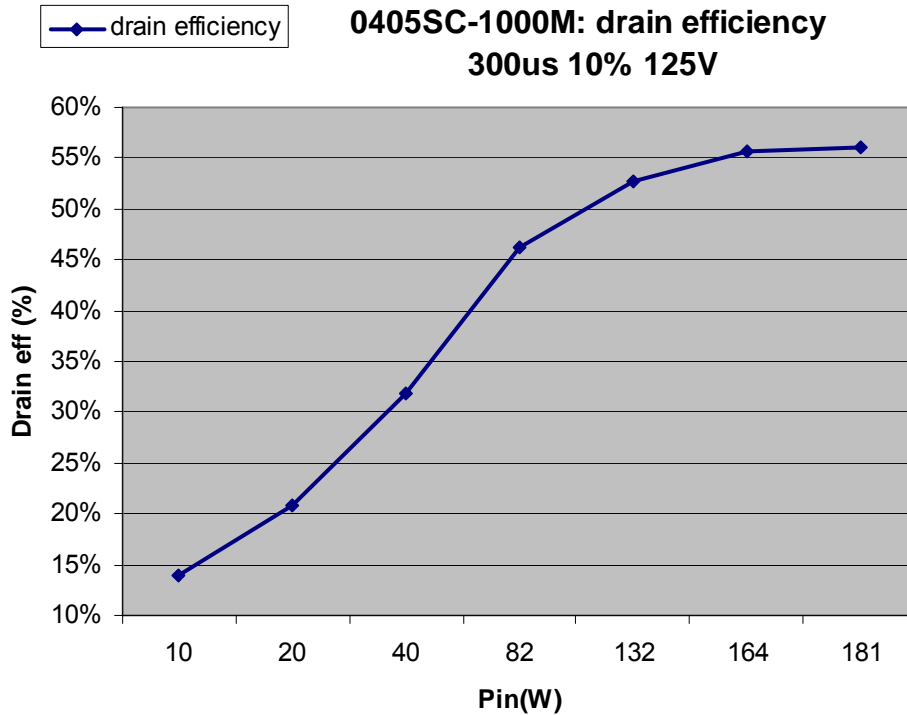
# 0405SC-1000M

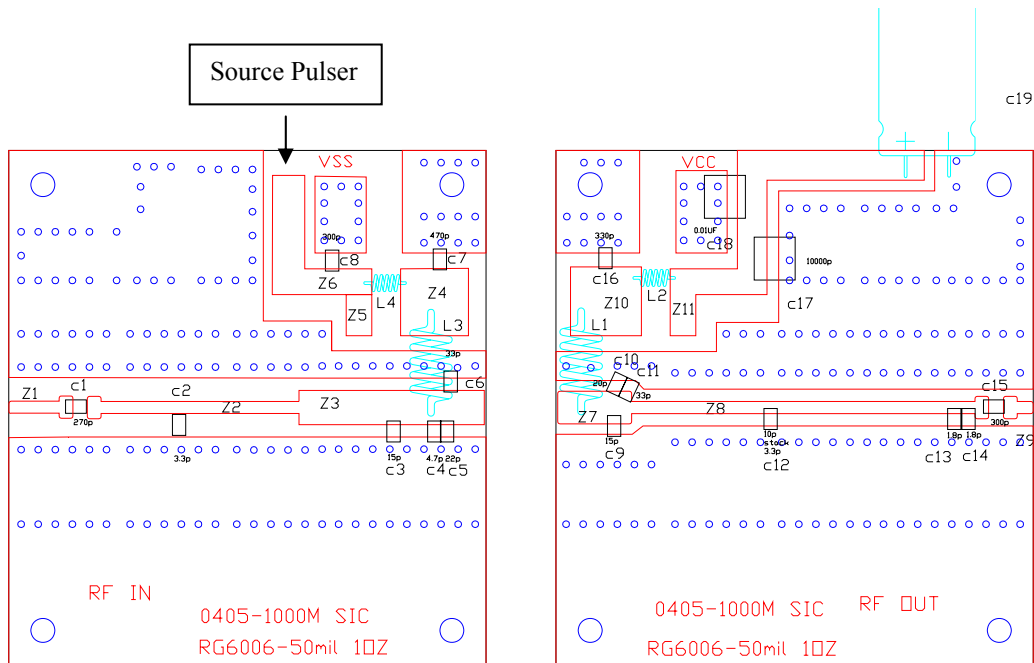
## Typical RF Performance Curve

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



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



**Test Circuit board**

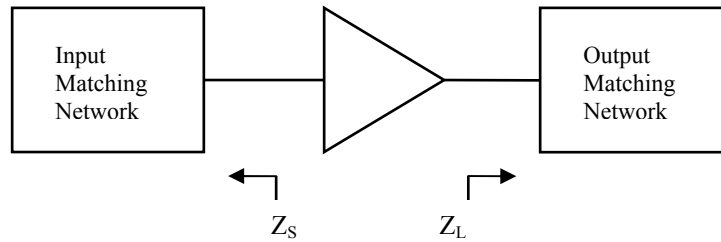
0405SC-1000M Test Circuit Components Designations and Values

Part	Description	Part	Description
C1, C15	270 pF chip capacitor (ATC 100B)	L1	5 turns 18AWG IDIA 0.2 in
C2	3.3 pF chip capacitor (ATC 100B)	L3	6 turns 18AWG IDIA 0.2 in
C3, C9	15 pF chip capacitor (ATC 100B)	L2, L4	Ferrite Coil inductor
C4	4.7 pF chip capacitor (ATC 100B)	Z1	70 x 296 mils (W X L)
C5	22 pF chip capacitor (ATC 100B)	Z2	70 x 1160 mils (W X L)
C6, C11	33 pF chip capacitor (ATC 100B)	Z3	200 x 1085 mils (W X L)
C7	470 pF chip capacitor (ATC 100B)	Z4	397 x 390 mils (W X L)
C8	300 pF chip capacitor (ATC 100B)	Z5	150 x 240 mils (W X L)
C10	20 pF chip capacitor (ATC 100B)	Z6	150 x 1276 mils (W X L)
C12	3.3+10 pF chip capacitor (ATC 100B)	Z7	190 x 433 mils (W X L)
C13, C14	1.8 pF chip capacitor (ATC 100B)	Z8	71 x 2011 mils (W X L)
C16	330 pF chip capacitor (ATC 100B)	Z9	71 x 94 mils (W X L)
C17	1000pF chip capacitor(ATC 900C)	Z10	415 x 401 mils (W X L)
C18	0.1uF chip capacitor(ATC 920C)	Z11	150 x 2404 mils (W X L)
C19	1000uF Electrolytic Capacitor	PCB	RG6006 $\epsilon_r=6.15$ , 50 mils, 1 oz
Note	All Z dimentions included bend		



## 0405SC-1000M

### Impedance Information



#### Typical Impedance Values

Frequency (MHz)	$Z_S(\Omega)$	$Z_L(\Omega)$
406	$1.33 - j1.30$	$2.14 + j0.67$
425	$1.35 - j 0.95$	$1.89 + j 0.98$
450	$1.33 - j 0.596$	$1.49 + j 1.43$

\*  $V_{DD} = 125V$ ,  $I_{DQ} = 250 \text{ mA}$ ,  $P_{out} = 1000W$

\* Pulse Format:  $300\mu s$ , 10% Long Term Duty Factor



**0405SC-1000M**

**Case Outline 55 KT FET**

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
DIM	MILLIMETER	± TOL	INCHES	±TOL
A	10.16	.13	.400	.005
B	20.32	.76	.800	.030
C	9.78	.13	.385	.005
D	12.70	.13	.500	.005
E	1.52R	.13	.060R	.005
F	1.52R	.13	.060R	.005
G	3.81	.13	.150	.005
H	5.84	MAX	.230	MAX
I	1.52	.13	.060	.005
J	17.78	.13	.700	.005
K	22.86	.13	.900	.005
M	3.05	.25	.120	.010
N	0.08	+.05 -.03	.003	+.002 -.001

**STYLE 1:**  
 PIN 1 = DRAIN  
 2 = GATE  
 3 = SOURCE

**STYLE 2:**  
 PIN 1 = DRAIN  
 2 = SOURCE  
 3 = GATE

	CAGE OPJR2	DWG NO. <b>55KT-FET</b>	REV <b>A</b>
		SCALE <b>2/1</b>	SHEET