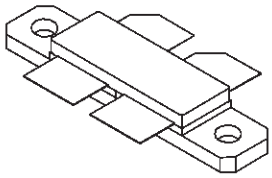
SD56120

RF POWER TRANSISTORS
The *LdmoST* FAMILY

PRELIMINARY DATA

N-CHANNEL ENHANCEMENT-MODE LATERAL MOSFETs

- EXCELLENT THERMAL STABILITY
- COMMON SOURCE CONFIGURATION, PUSH-PULL
- P_{OUT} = 100 W WITH 14 dB GAIN @ 860 MHz
- BeO FREE PACKAGE



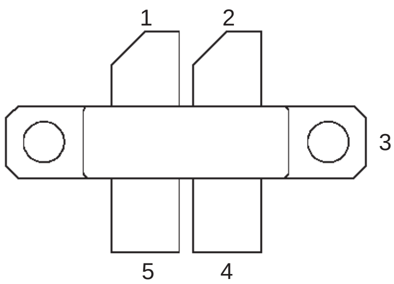
M246
epoxy sealed

ORDER CODE	BRANDING
SD56120	TSD56120

DESCRIPTION

The SD56120 is a common source N-Channel enhancement-mode lateral Field-Effect RF power transistor designed for broadband commercial and industrial applications at frequencies up to 1.0 GHz. The SD56120 is designed for high gain and broadband performance operating in common source mode at 28 V. It is ideal for broadcast applications from 470 to 860 MHz requiring high linearity.

PIN CONNECTION



1-2 Drain
4-5 Gate
3 Source

ABSOLUTE MAXIMUM RATINGS (T_{CASE} = 25°C)

Symbol	Parameter	Value	Unit
$V_{(BR)DSS}$	Drain-Source Voltage	65	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current	14	A
P_{DISS}	Power Dissipation (@ Tc = 70°C)	217	W
Tj	Max. Operating Junction Temperature	200	°C
T_{STG}	Storage Temperature	-65 to +150	°C

THERMAL DATA

$R_{th(j-c)}$	Junction -Case Thermal Resistance	0.6	°C/W

ELECTRICAL SPECIFICATION (T_{CASE} = 25°C)

STATIC (Per Section)

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	V_{GS} = 0 V I_{DS} = 1 mA	65			V
I_{DSS}	V_{GS} = 0 V V_{DS} = 28 V			1	µA
I_{GSS}	V_{GS} = 20 V V_{DS} = 0 V			1	µA
$V_{GS(Q)}$	V_{DS} = 28 V I_D = 200 mA	3.0		5.0	V
$V_{DS(ON)}$	V_{GS} = 10 V I_D = 3 A		0.7	0.8	V
G_{FS}	V_{DS} = 10 V I_D = 3 A		3		mho
C_{ISS}	V_{GS} = 0 V V_{DS} = 28 V f = 1 MHz		82		pF
C_{OSS}	V_{GS} = 0 V V_{DS} = 28 V f = 1 MHz		48		pF
C_{RSS}	V_{GS} = 0 V V_{DS} = 28 V f = 1 MHz		2.8		pF

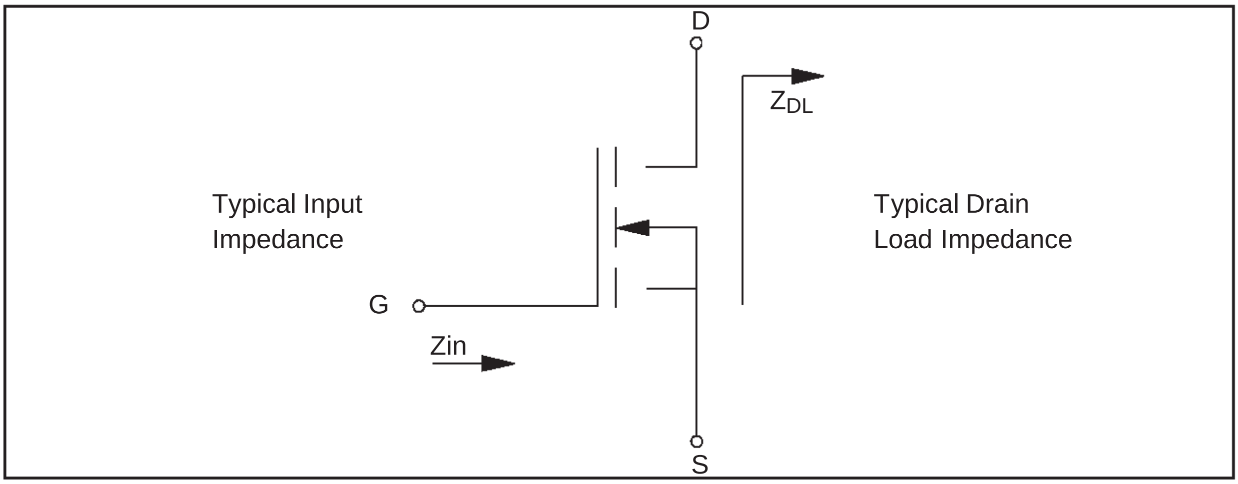
REF. 7194566A

DYNAMIC

Symbol	Test Conditions	Min.	Typ.	Max.	Unit
P_{OUT}	V_{DD} = 28 V I_{DQ} = 400 mA f = 860 MHz	100			W
G_{PS}	V_{DD} = 28 V I_{DQ} = 400 mA P_{OUT} = 100 W f = 860 MHz	14	16		dB
η_D	V_{DD} = 28 V I_{DQ} = 400 mA P_{OUT} = 100 W f = 860 MHz	50	60		%
G_{PS}	V_{DD} = 28 V I_{DQ} = 400 mA P_{OUT} = 100 W PEP		16		dB
η_D	V_{DD} = 28 V I_{DQ} = 400 mA P_{OUT} = 100 W PEP		50		%
IMD	V_{DD} = 28 V I_{DQ} = 400 mA P_{OUT} = 100 W PEP		-28		dB_t
Load mismatch	V_{DD} = 28 V I_{DQ} = 400 mA P_{OUT} = 100 W f = 860 MHz ALL PHASE ANGLES	5:1			VSWR

note: f1 = 860 MHz
PEP f2 = 860.1 MHz

IMPEDANCE DATA

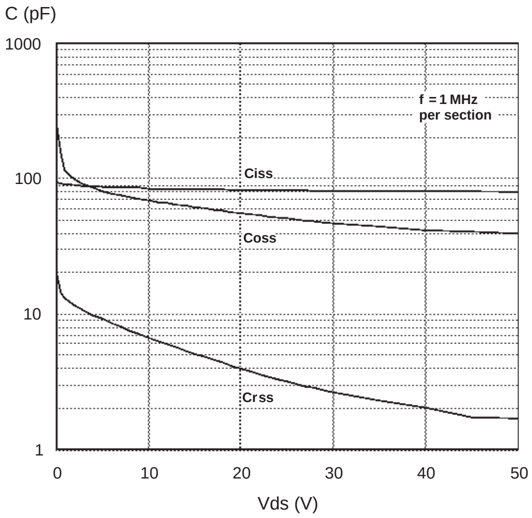


FREQ.	Z_{IN} (Ω)	Z_{DL}(Ω)
860 MHz	1.11 - j 2.63	3.01 + j 5.34

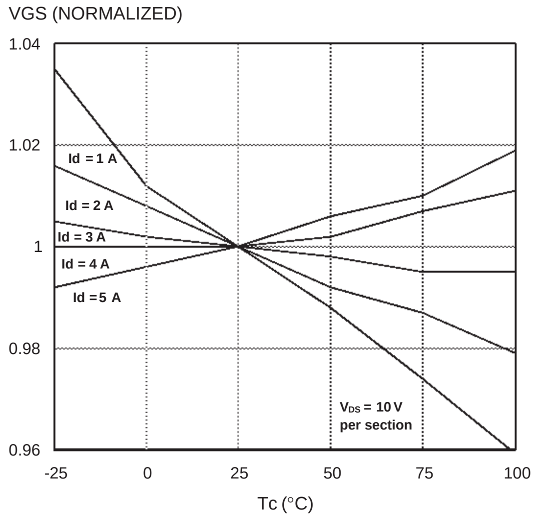
Measured drain to drain and gate to gate respectively.

TYPICAL PERFORMANCE

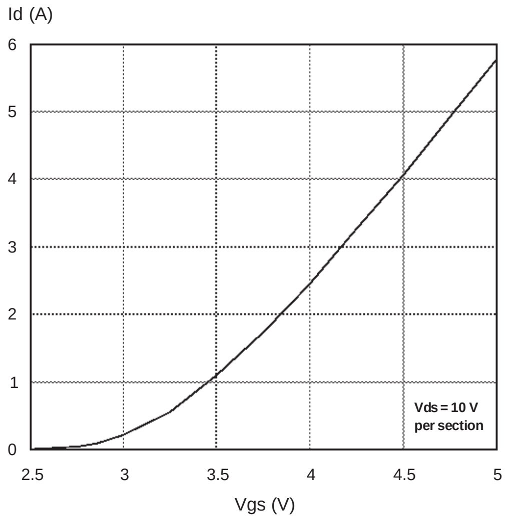
Capacitance vs. Drain Voltage (per section)



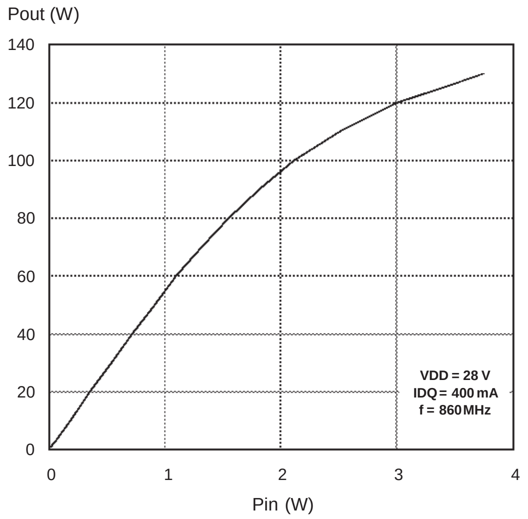
Gate-Source Voltage vs. Case Temperature



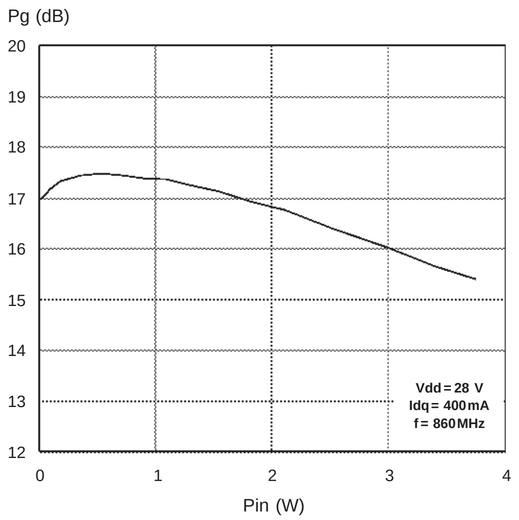
Drain Current vs. Gate Voltage



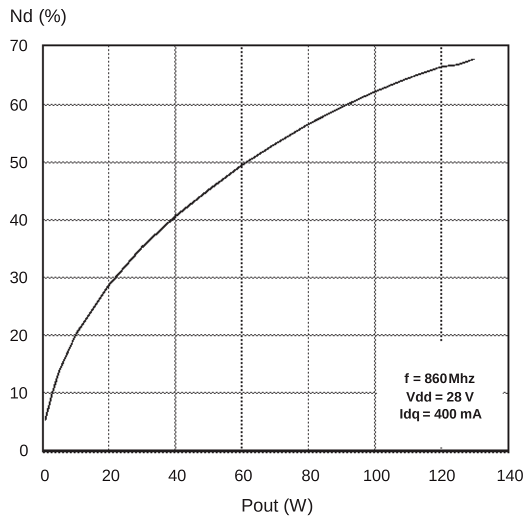
Output Power vs. Input Power



Power Gain vs. Input Power

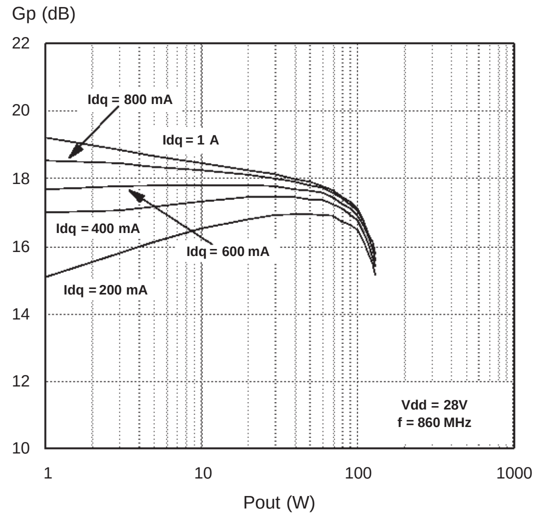


Efficiency vs. Output Power

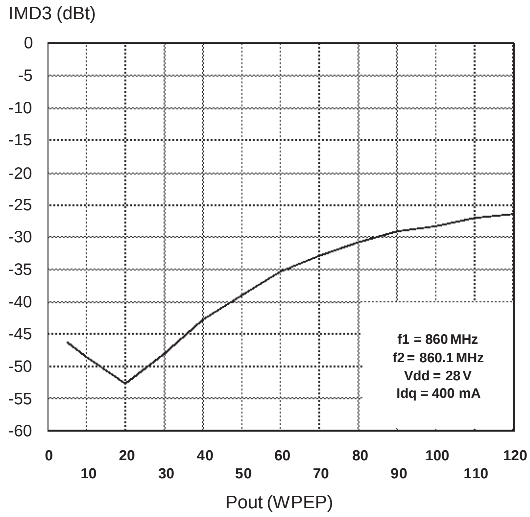


TYPICAL PERFORMANCE

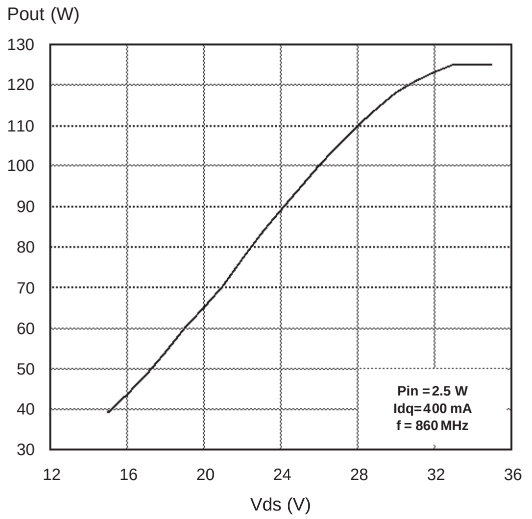
Power Gain vs. Output Power



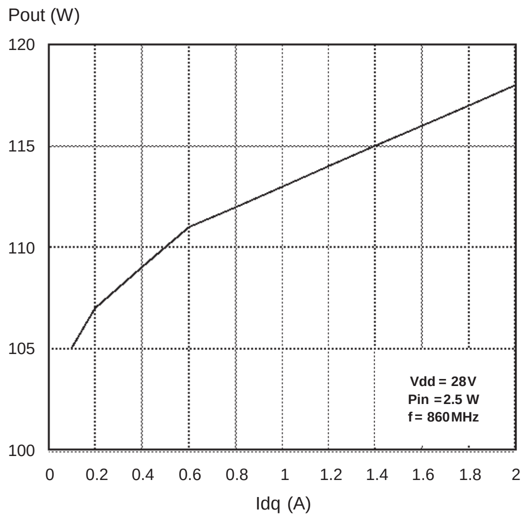
Intermodulation Distortion vs. Output Power



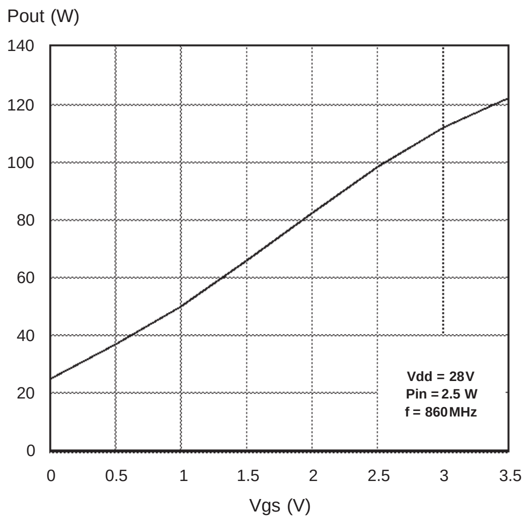
Output Power vs. Drain Voltage



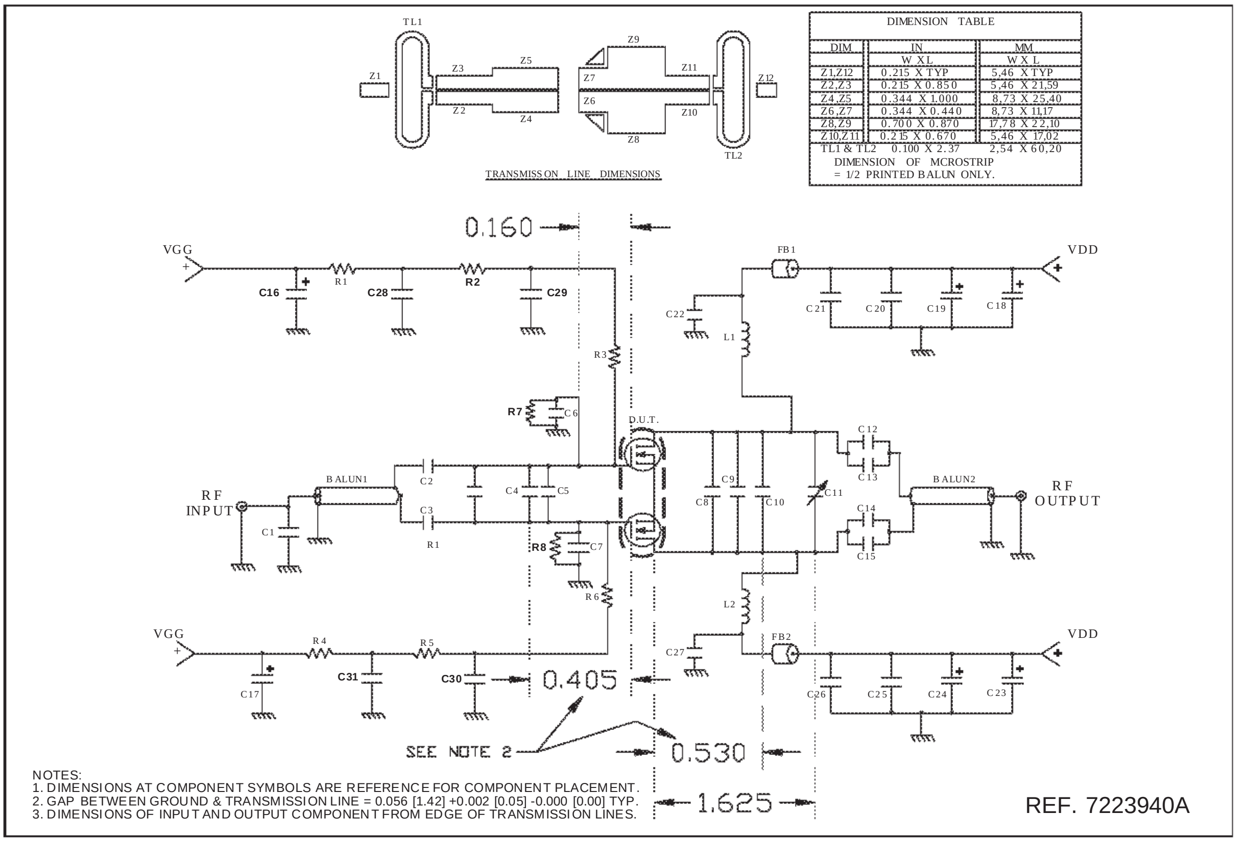
Output Power vs. Bias Current



Output Power vs. Gate-Source Voltage



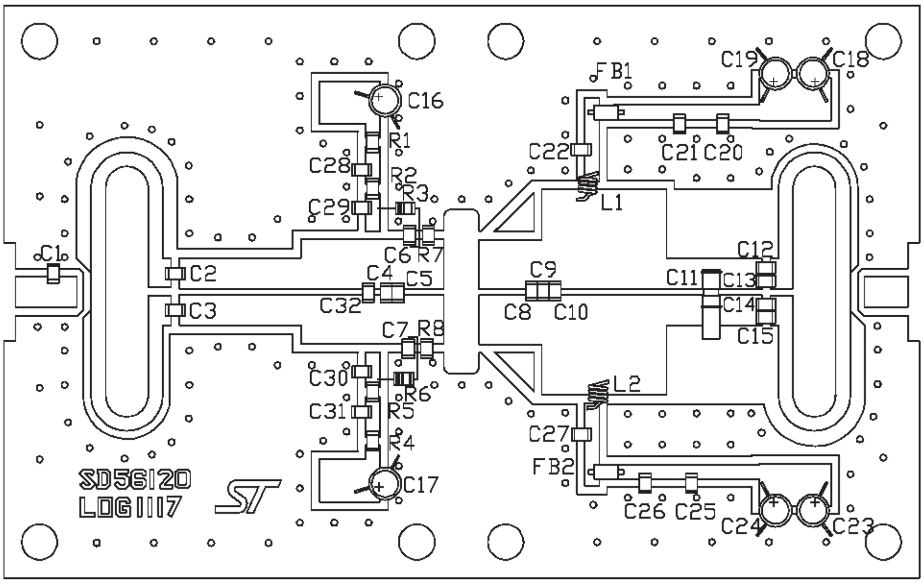
860 MHz TEST CIRCUIT SCHEMATIC



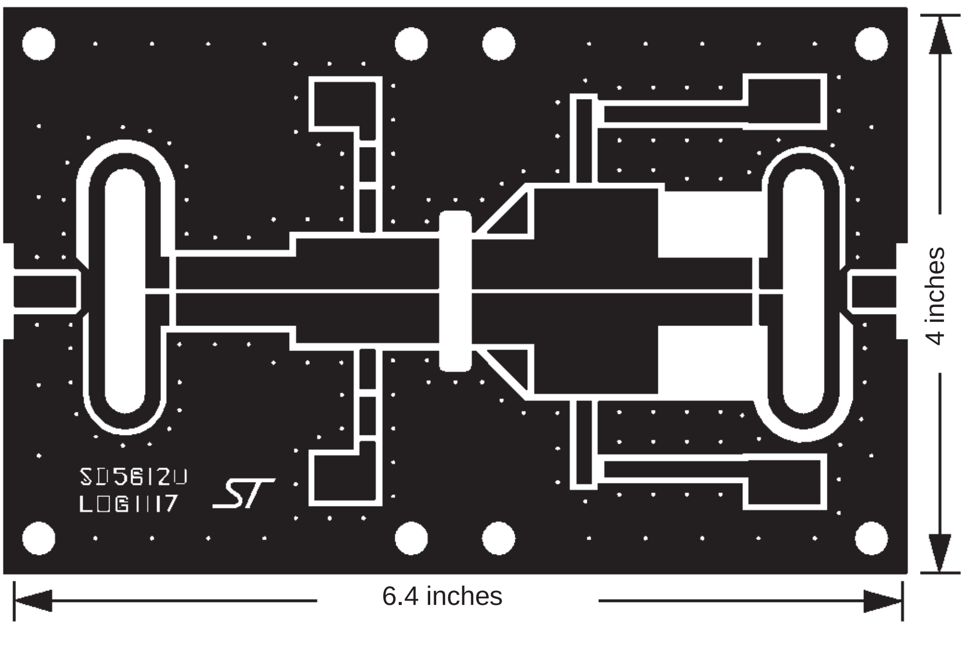
860 MHz TEST CIRCUIT COMPONENT PART LIST

COMPONENT	DESCRIPTION
C32	.6 - 4.5 pF VARIABLE CAPACITOR
C31, C28	.01 µF ATC 200B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C29, C30	62 pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C27, C22	270 pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C26, C21	1200 pF ATC 700B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C25 ,C20	0.1 µF 500V SURFACE MOUNT CERAMIC CHIP CAPACITOR
C24, C19, C17, C16	10 µF 50V ALUMINUM ELECTROLYTIC RADIAL LEAD SURFACE MOUNT CAPACITOR
C23, C18	100 µF 63V ALUMINUM ELECTROLYTIC RADIAL LEAD CAPACITOR
C15, C14, C13, C12	47 pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C11	0.8 - 8 pF GIGATRIM VARIABLE CAPACITOR
C10	3.0 pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C9, C8	4.3 pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C7, C6, C5	10 pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C4	2.0 pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C3, C2	20 pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C1	1.3 pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
R7, R8	100 OHM 1/4 W SURFACE MOUNT CHIP RESISTOR
R6, R3	22 OHM 1/4 W CARBON LEADED RESISTOR
R5, R2	4.7 OHM 1/4 W CARBON LEADED RESISTOR
R4, R1	82 OHM 1/4 W CARBON LEADED RESISTOR
B2, B1	BALUN, 50 OHM SUCOFORM, OD 0.141 2.37 LG COAXIAL CABLE OR EQUIVALENT
L2, L1	INDUCTOR, 6 TURN AIR-WOUND #18AWG ID=0.130[3,30] MAGNET WIRE
FB2, FB1	SURFACE MOUNT EMI SHIELD BEAD
PCB	ULTRALAM 2000. 0.030" THK εr = 2.55, 2 Oz ED CU BOTH SIDES

860 MHz PRODUCTION TEST FIXTURE

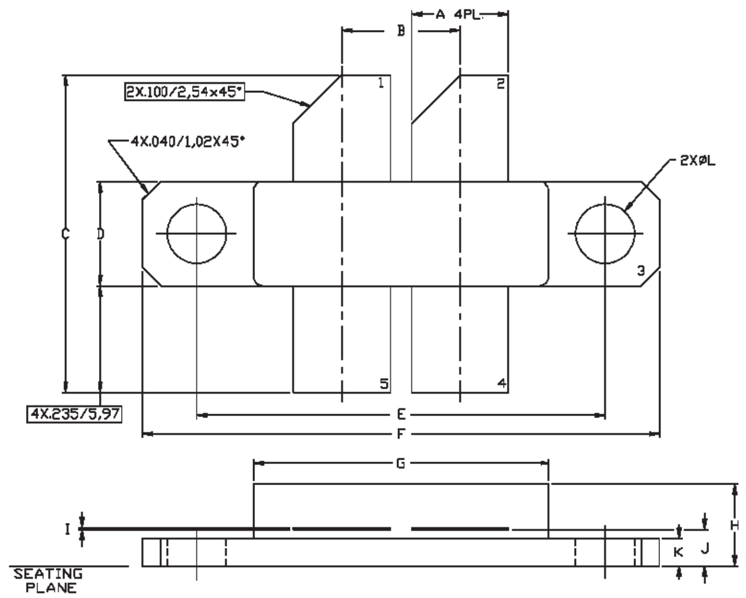


860 MHz TEST CIRCUIT PHOTOMASTER



M246 (.230 x .650 WIDE 4/L BAL N/HERM W/FLG) MECHANICAL DATA

	mm			Inch		
	MIN.	TYP.	MAX	MIN.	TYP.	MAX
A	5.33		5.59	.210		.220
B	6.48		6.73	.255		.265
C	17.27		18.29	.680		.720
D	5.72		5.97	.225		.235
E		22.86			.900	
F	28.83		29.08	1.135		1.145
G	16.26		16.76	.640		.660
H	4.19		5.08	.165		.200
I	0.08		0.15	.003		.006
J	1.83		2.24	.072		.088
K	1.40		1.65	.055		.065
L	3.18		3.43	.125		.135



Controlling dimension: Inches

Ref. 7145054A

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