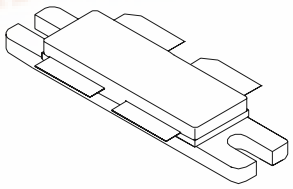
SD56150

RF POWER TRANSISTORS
The *LdmoST* FAMILY

PRELIMINARY DATA

N-CHANNEL ENHANCEMENT-MODE LATERAL MOSFETs

- EXCELLENT THERMAL STABILITY
- COMMON SOURCE CONFIGURATION, PUSH-PULL
- P_{OUT} = 150 W WITH 13 dB gain @ 860 MHz /32V
- BeO FREE PACKAGE
- INTERNAL INPUT MATCHING



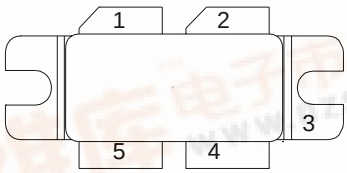
M252
epoxy sealed

ORDER CODE	BRANDING
SD56150	SD56150

DESCRIPTION

The SD56150 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 SD56150 is designed for high gain and broadband performance operating in common source mode at 32 V. Its internal matching makes it ideal for TV broadcast applications requiring high linearity.

PIN CONNECTION



1. Drain
2. Drain
3. Source
4. Gate
5. Gate

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	17	A
P_{DISS}	Power Dissipation (@ Tc = 70 °C)	236	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	0.55	°C/W

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

STATIC (Per Section)

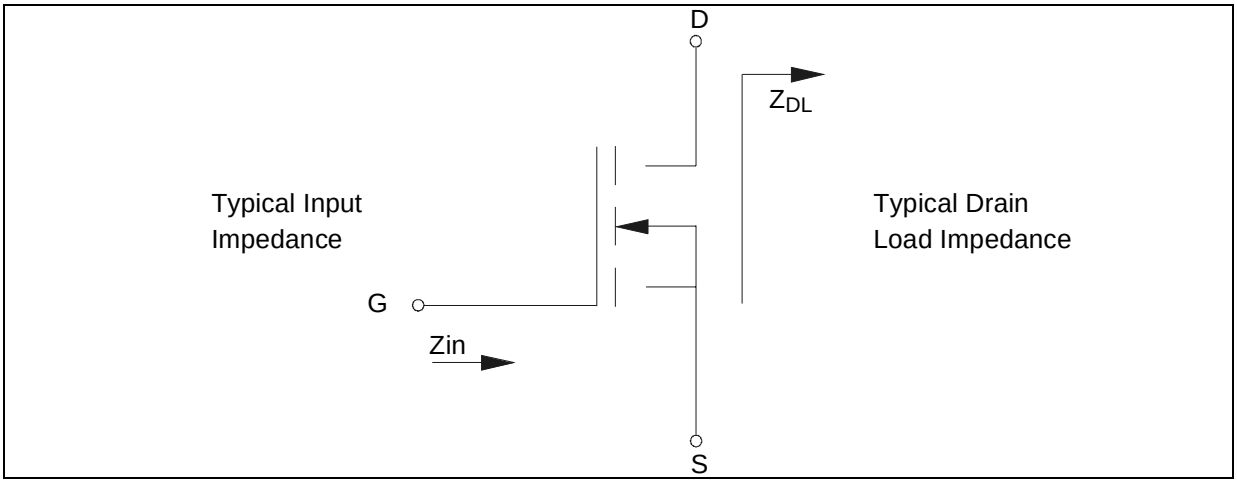
Symbol	Test Conditions			Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	V_{GS} = 0 V	I_{DS} = 10 mA		65			V
I_{DSS}	V_{GS} = 0 V	V_{DS} = 28 V				1	µA
I_{GSS}	V_{GS} = 20 V	V_{DS} = 0 V				1	µA
$V_{GS(Q)}$	V_{DS} = 28 V	I_D = 100 mA		2.0		5.0	V
$V_{DS(ON)}$	V_{GS} = 10 V	I_D = 3 A			0.5	0.8	V
G_{FS}	V_{DS} = 10 V	I_D = 3 A		2.5		4	mho
C_{ISS}*	V_{GS} = 0 V	V_{DS} = 28 V	f = 1 MHz		255		pF
C_{OSS}	V_{GS} = 0 V	V_{DS} = 28 V	f = 1 MHz		50		pF
C_{RSS}	V_{GS} = 0 V	V_{DS} = 28 V	f = 1 MHz		2.9		pF

* Includes Internal Input Moscap.

DYNAMIC

Symbol	Test Conditions				Min.	Typ.	Max.	Unit
P_{OUT}	V_{DD} = 32 V	I_{DQ} = 500 mA		f = 860 MHz	150			W
G_{PS}	V_{DD} = 32 V	I_{DQ} = 500 mA	P_{OUT} = 150 W	f = 860 MHz	13	16.5		dB
η_D	V_{DD} = 32 V	I_{DQ} = 500 mA	P_{OUT} = 150 W	f = 860 MHz	50	60		%
Load mismatch	V_{DD} = 32 V ALL PHASE ANGLES	I_{DQ} = 500 mA	P_{OUT} = 150 W	f = 860 MHz	10:1			VSWR

IMPEDANCE DATA

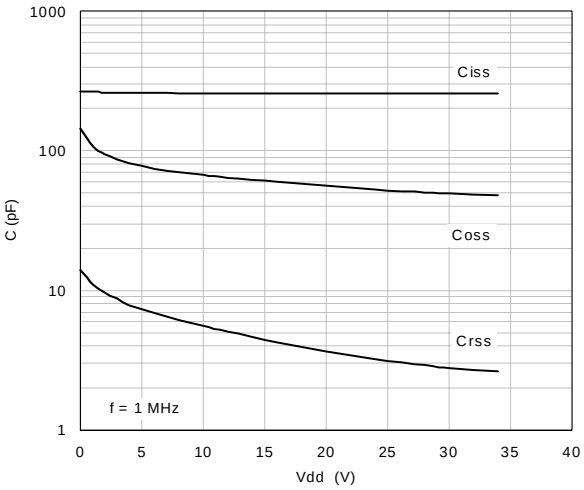


FREQ.	Z_{IN} (Ω)	Z_{DL}(Ω)
860 MHz	4.7 - j 5.5	3.6 + j 6.5
880 MHz	4.3 - j 6.9	3.9 + j 7.4
900 MHz	4.5 - j 8.8	4.4 + j 7.8

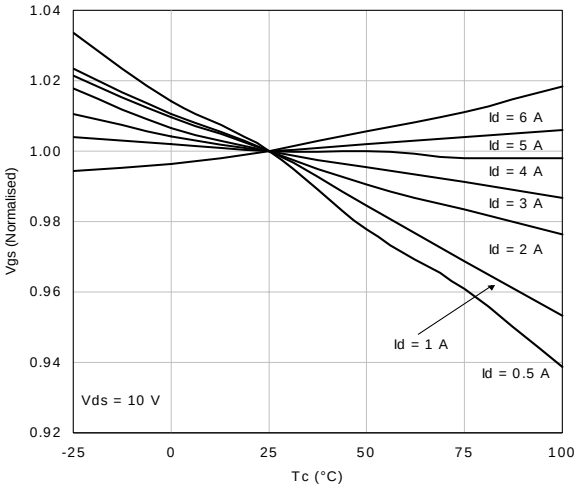
Measured drain to drain and gate to gate respectively.

TYPICAL PERFORMANCE

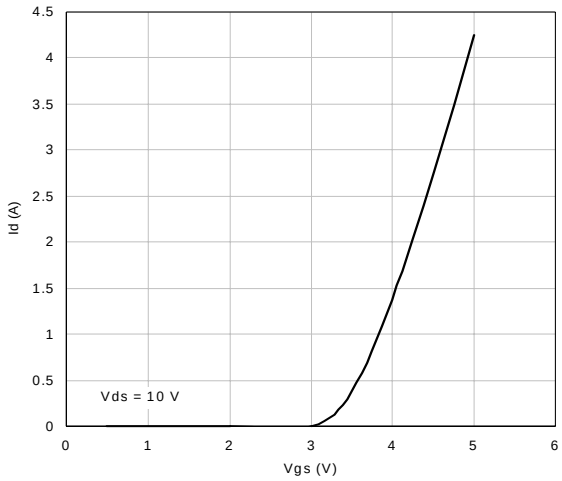
Capacitance vs. Drain Voltage



Gate Source Voltage vs. Case Temperature

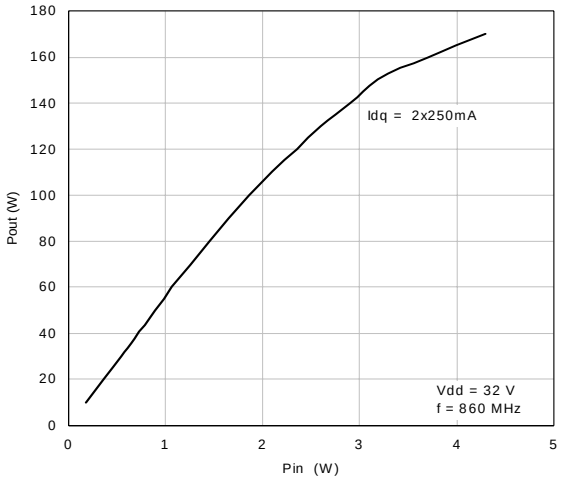


Drain Current vs. Gate-Source Voltage

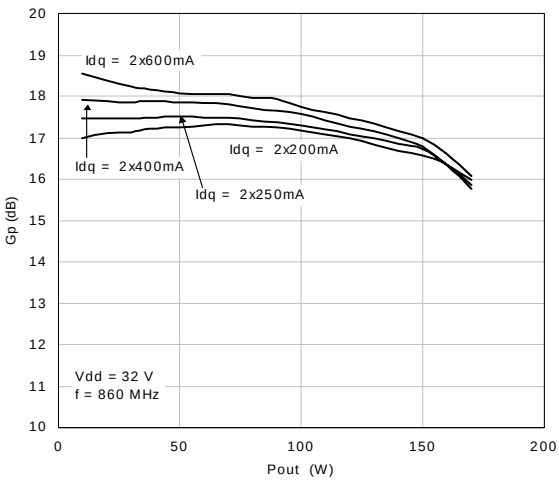


TYPICAL PERFORMANCE

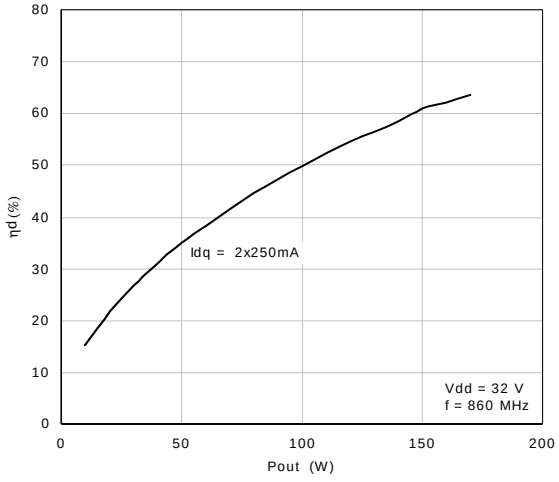
Output Power vs. Input Power



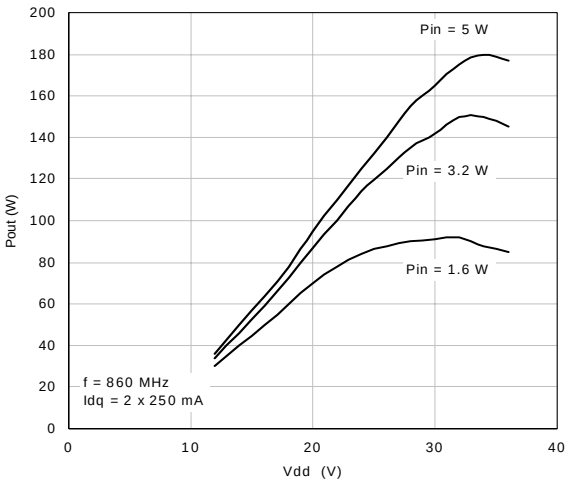
Power Gain vs. Output Power



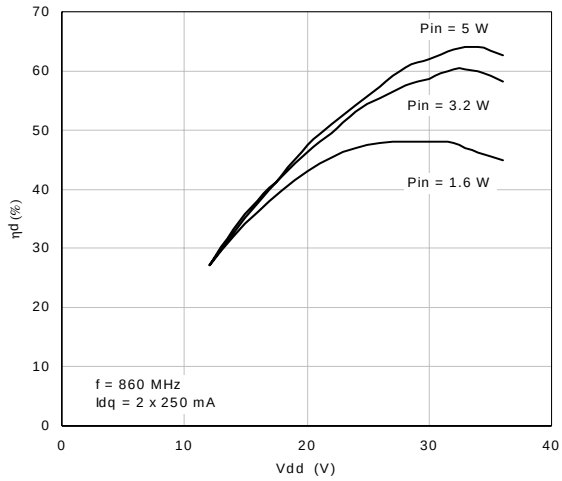
Efficiency vs. Output Power



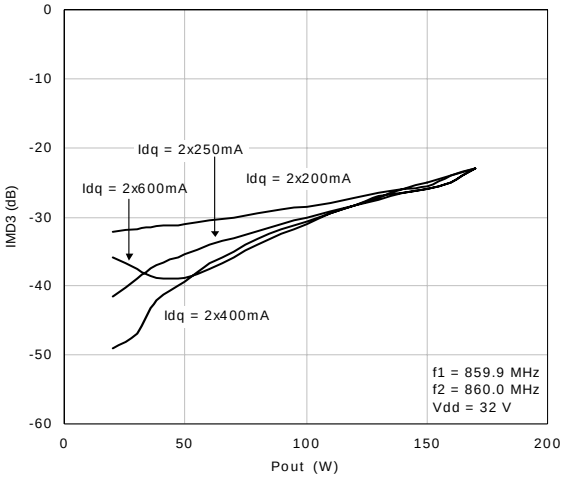
Output Power vs. Supply Voltage



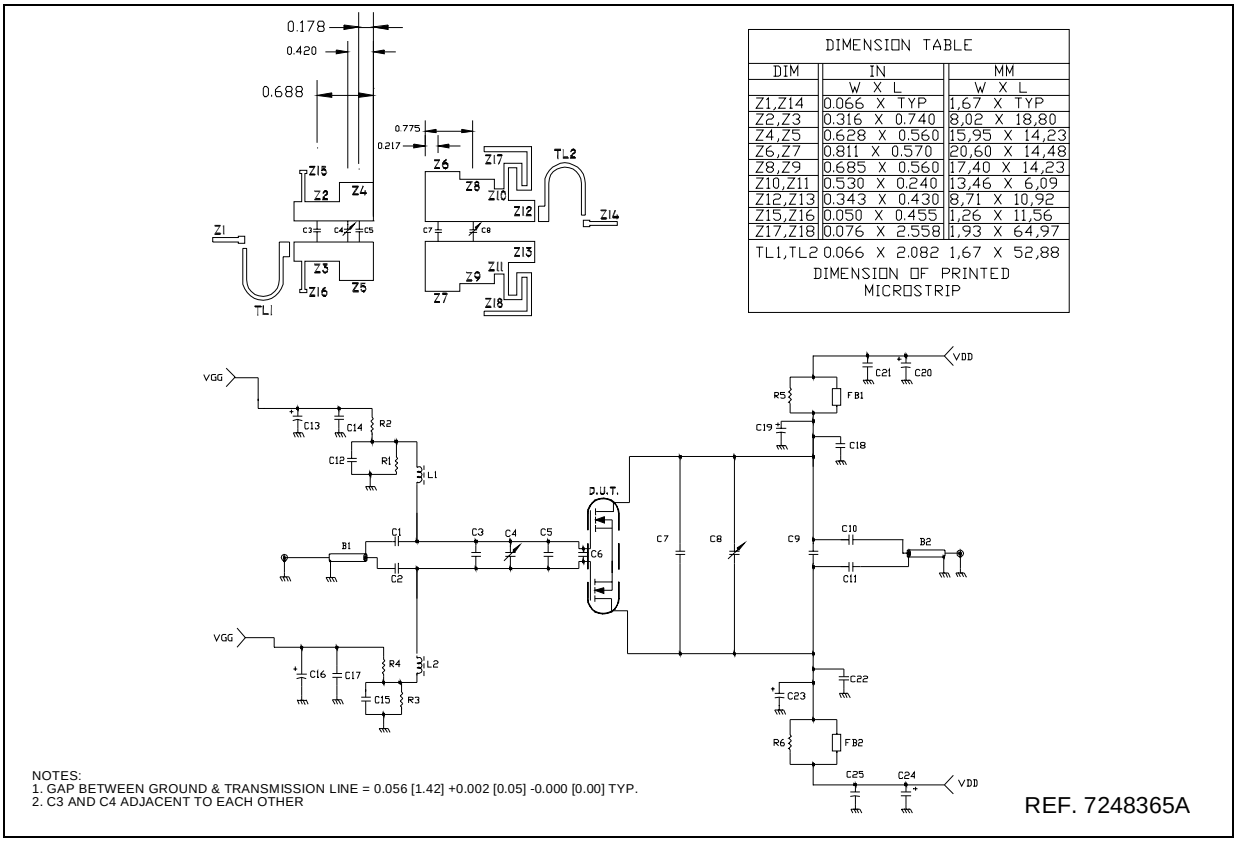
Efficiency vs. Supply Voltage



Intermodulation Distorsion vs. Output Power



TEST CIRCUIT SCHEMATIC



DIMENSION TABLE

DIM	IN	MM
	W X L	W X L
Z1,Z14	0.066 X TYP	1,67 X TYP
Z2,Z3	0.316 X 0.740	8,02 X 18,80
Z4,Z5	0.628 X 0.560	15,95 X 14,23
Z6,Z7	0.811 X 0.570	20,60 X 14,48
Z8,Z9	0.685 X 0.560	17,40 X 14,23
Z10,Z11	0.530 X 0.240	13,46 X 6,09
Z12,Z13	0.343 X 0.430	8,71 X 10,92
Z15,Z16	0.050 X 0.455	1,26 X 11,56
Z17,Z18	0.076 X 2.558	1,93 X 64,97
TL1,TL2	0.066 X 2.082	1,67 X 52,88

DIMENSION OF PRINTED MICROSTRIP

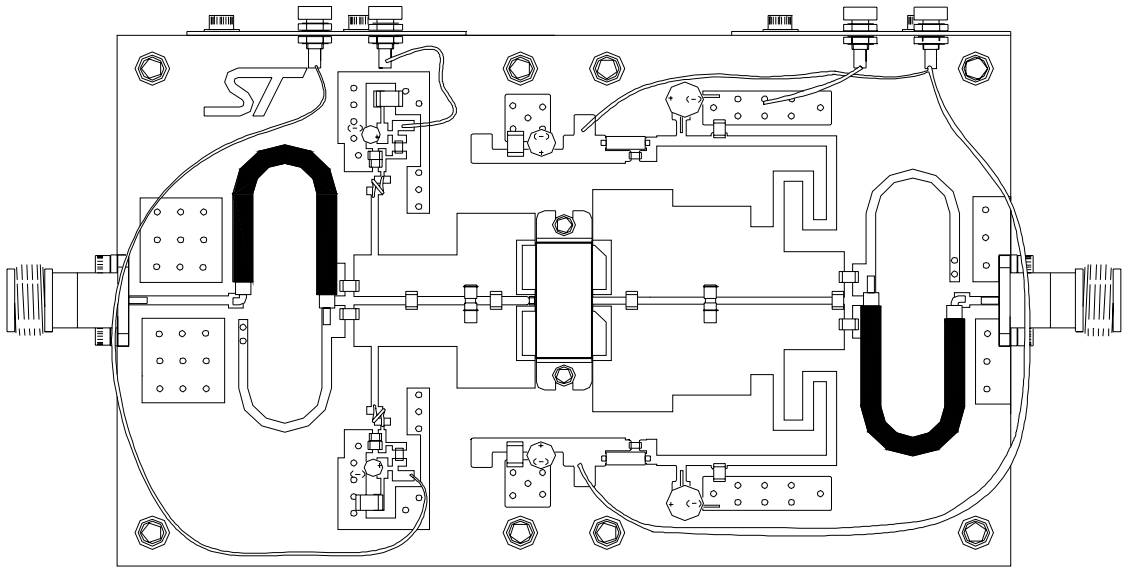
NOTES:
1. GAP BETWEEN GROUND & TRANSMISSION LINE = 0.056 [1.42] +0.002 [0.05] -0.000 [0.00] TYP.
2. C3 AND C4 ADJACENT TO EACH OTHER

REF. 7248365A

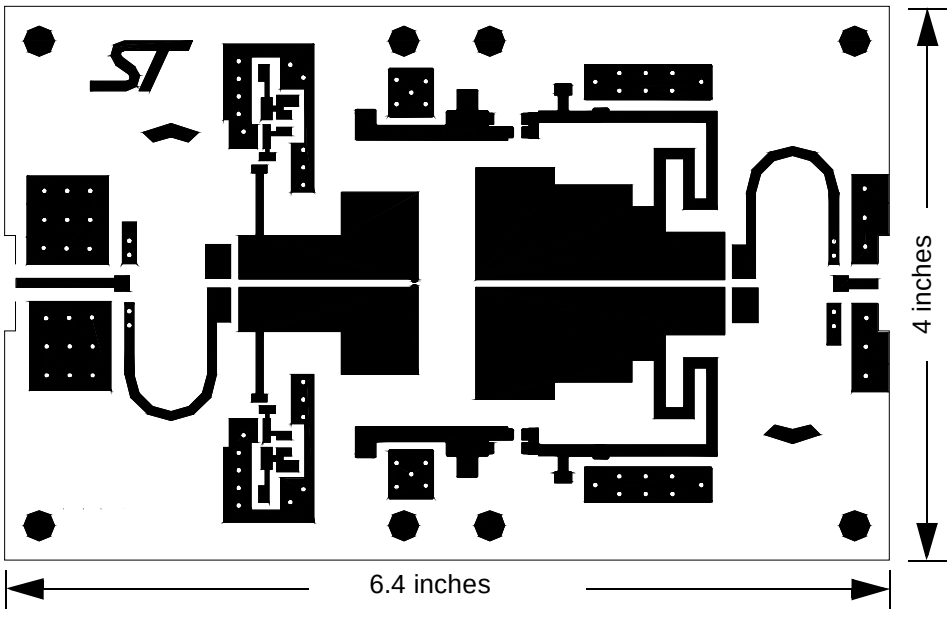
TEST CIRCUIT COMPONENT PART LIST

	DESCRIPTION
C1,C2, C10, C11	51 pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C3	9.1 pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C4, C8	0.6 - 4.5 pF GIGATRIM VARIABLE CAPACITOR
C5	10 pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C6	4.7 pF ATC 100A SURFACE MOUNT CERAMIC CHIP CAPACITOR
C7	13 pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C9	6.2 pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C12, C15, C18, C22	91 pF ATC 100B SURFACE MOUNT CERAMIC CHIP CAPACITOR
C13, C16, C20, C24	10 µF 50V ALUMINUM ELECTROLYTIC RADIAL LEAD CAPACITOR
C14, C17, C21, C25	0.1 µF 500V SURFACE MOUNT CERAMIC CHIP CAPACITOR
C19, C23	100 µF 63V ALUMINUM ELECTROLYTIC RADIAL LEAD CAPACITOR
R1, R2, R3, R4	200 OHM 1/4 W SURFACE MOUNT CHIP RESISTOR
R5, R6	1.8 OHM 1/4 W SURFACE MOUNT CHIP RESISTOR
L1, L2	CHIP INDUCTOR 10 nH SURFACE MOUNT COIL
FB1, FB2	SURFACE MOUNT EMI SHIELD BEAD
B2, B1	BALUN, 25 OHM, SEMI-RIDGE OD 0.141 2.365 LG COAXIAL CABLE OR EQUIVALENT
PCB	WOVEN GLASS REINFORCED / CERAMIC FILLED 0.030” THK εr = 3.48, 2 Oz ED CU BOTH SIDES

TEST FIXTURE

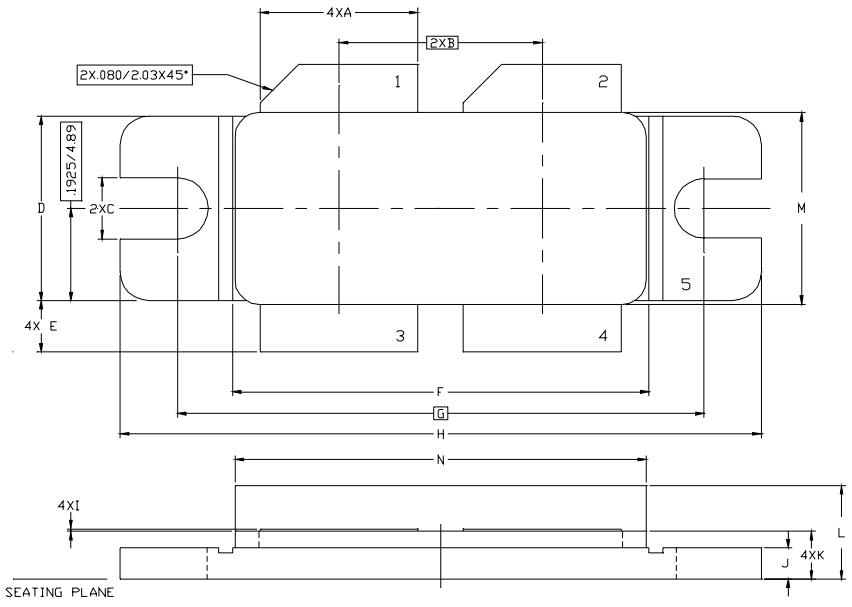


TEST CIRCUIT PHOTOMASTER



M252 (.400 x .860 4L BAL N/HERM W/FLG) MECHANICAL DATA

DIM.	mm			Inch		
	MIN.	TYP.	MAX	MIN.	TYP.	MAX
A	8.13		8.64	.320		.340
B		10.80			.425	
C	3.00		3.30	.118		.130
D	9.65		9.91	.380		.390
E	2.16		2.92	.085		.115
F	21.97		22.23	.865		.875
G		27.94			1.100	
H	33.91		34.16	1.335		1.345
I	0.10		0.15	.004		.006
J	1.52		1.78	.060		.070
K	2.36		2.74	.093		.108
L	4.57		5.33	.180		.210
M	9.96		10.34	.392		.407
N	21.64		22.05	.852		.868



Controlling dimension: Inches

1022783C