SD2918

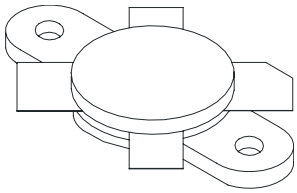
RF power transistor HF/VHF/UHF n-channel MOSFETs

Features

- Gold metallization
- Excellent thermal stability
- Common source configuration
- P_{OUT} = 30 W min. with 18 dB gain @ 30 MHz

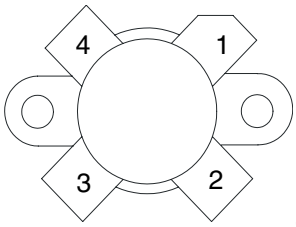
Description

The SD2918 is a n-channel MOS field-effect RF power transistor. It is intended for use in 50 V dc large signal applications up to 200 MHz.



M113
Epoxy sealed

Figure 1. Pin connection



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

Table 1. Device summary

Order code	Marking	Package	Packaging
SD2918	SD2918	M113	Plastic tray

Contents

1 Electrical data

1.1 Maximum ratings

Table 2. Absolute maximum ratings (T_{CASE} = 25 °C)

Symbol	Parameter	Value	Unit
$V_{(BR)DSS}$	Drain source voltage	125	V
V_{DGR}	Drain-gate voltage (R_{GS} = 1 MΩ)	125	V
V_{GS}	Gate-source voltage	± 20	V
I_D	Drain current	6	A
P_{DISS}	Power dissipation	175	W
T_J	Max. operating junction temperature	200	°C
T_{STG}	Storage temperature	-65 to +150	°C

1.2 Thermal data

Table 3. Thermal data

Symbol	Parameter	Value	Unit
R_{thJ-C}	Junction-case thermal resistance	1.0	°C/W
R_{thC-S}	Junction-heatsink thermal resistance(1)	0.3	

1. Determined using a flat aluminum or copper heatsink with thermal compound applied (dow corning 340 or equivalent).

2 Electrical characteristics

T_{CASE} = +25 °C

2.1 Static

Table 4. Static

Symbol	Test conditions			Min	Typ	Max	Unit
$V_{(BR)DSS}$	V_{GS} = 0 V	I_{DS} = 10 mA		125			V
I_{DSS}	V_{GS} = 0 V	V_{DS} = 50 V				1.0	mA
I_{GSS}	V_{GS} = 20 V	V_{DS} = 0 V				1	µA
$V_{GS(Q)}$	V_{DS} = 10 V	I_D = 10 mA		1.0		5.0	V
$V_{DS(ON)}$	V_{GS} = 10 V	I_D = 2.5 A				5.0	V
g_{FS}	V_{DS} = 10 V	I_D = 2.5 A		0.8			mho
C_{ISS}	V_{GS} = 0 V	V_{DS} = 50 V	f = 1 MHz		58		pF
C_{OSS}	V_{GS} = 0 V	V_{DS} = 50 V	f = 1 MHz		35.5		pF
C_{RSS}	V_{GS} = 0 V	V_{DS} = 50 0 V	f = 1 MHz		7.5		pF

2.2 Dynamic

Table 5. Dynamic

Symbol	Test conditions	Min	Typ	Max	Unit
P_{OUT}	V_{DD} = 50 V, I_{DQ} = 100 mA, f = 30 MHz, P_{IN}= 0.475 W	30		-	W
G_{PS}	V_{DD} = 50 V, I_{DQ} = 100 mA, f = 30 MHz, P_{out}= 30 W	18	22		dB
h_D	V_{DD} = 50 V, I_{DQ} = 100 mA, f = 30 MHz, P_{out}= 30 W	50	55		%
Load mismatch	V_{DD} = 50 V, I_{DQ} = 100 mA, f = 30 MHz, P_{out}= 30 W All phase angles	30:1		-	VSWR

3 Impedance data

Figure 2. Impedance data

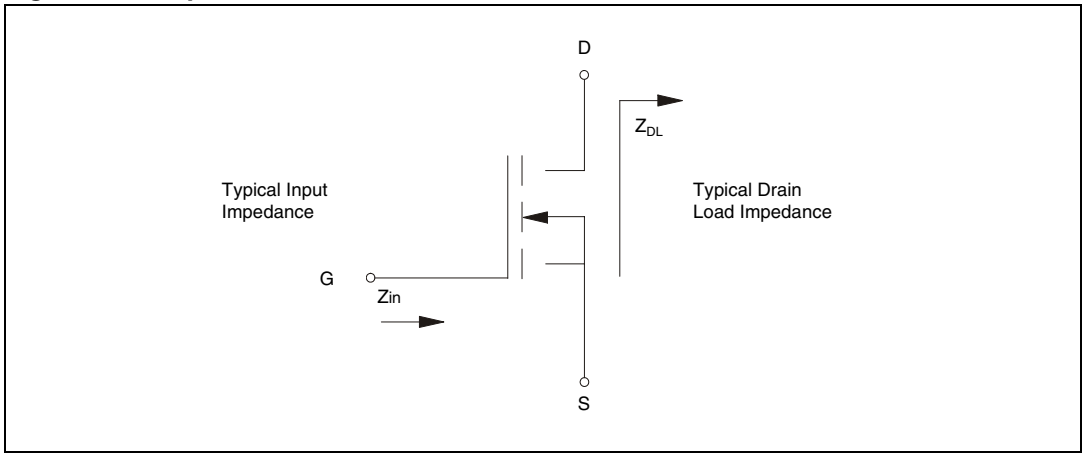


Table 6. Impedance data

Freq	Z_{IN} (Ω)	Z_{DL} (Ω)
30 MHz	24.4 - j 13.4	28.8 + j 7.2

4 Typical performances

Figure 3. Capacitance vs drain-source voltage

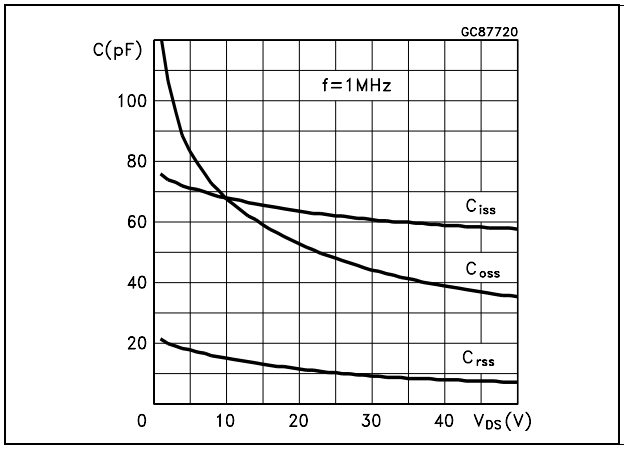


Figure 4. Maximum thermal resistance vs case temperature

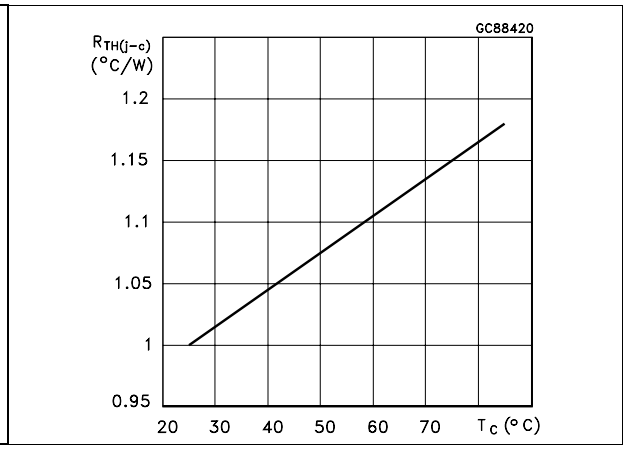


Figure 5. Drain current vs gate voltage

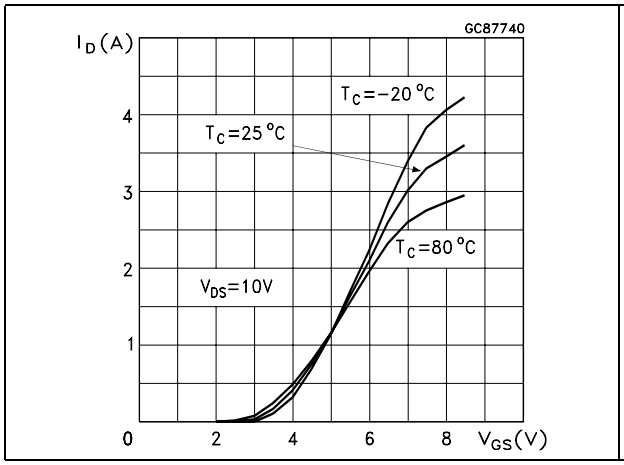


Figure 6. Gate-source voltages vs case temperature

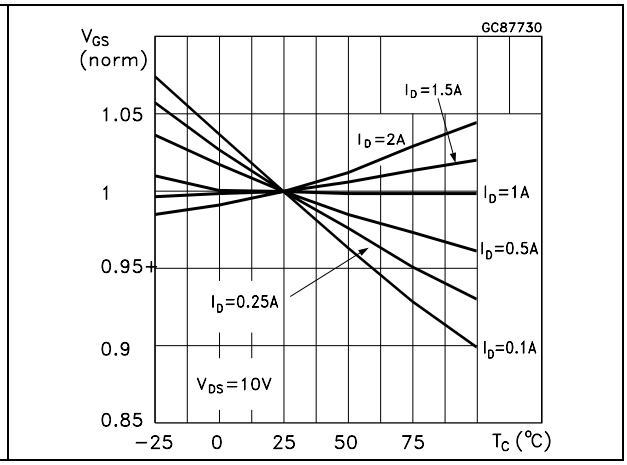


Figure 7. Output power vs input power

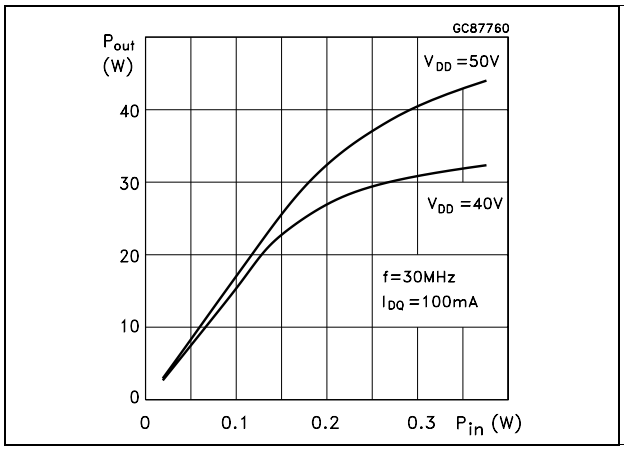


Figure 8. Output power vs input power at different T_C

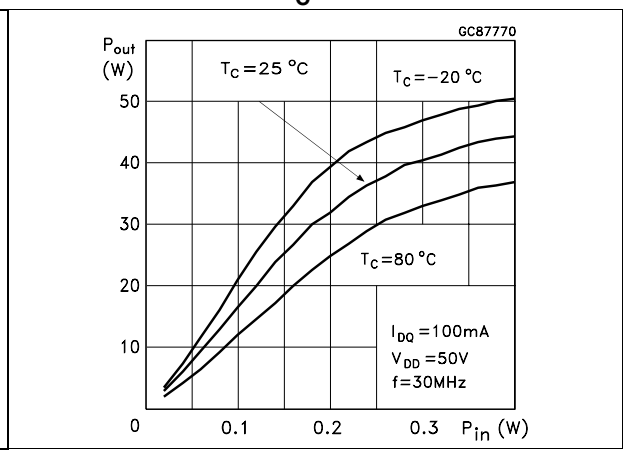


Figure 9. Output power vs supply voltage

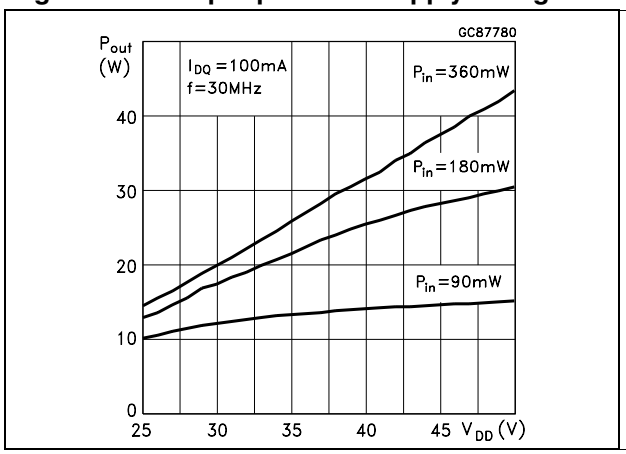


Figure 10. Output power vs gate voltage

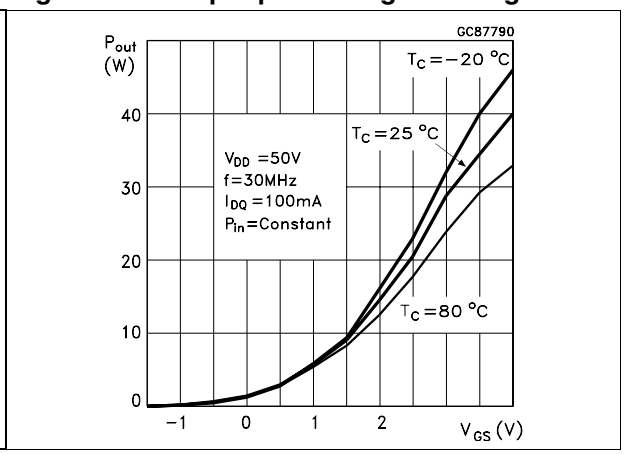
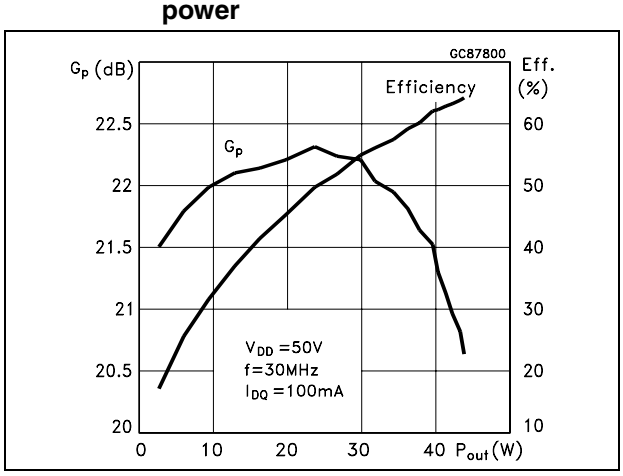


Figure 11. Power gain and efficiency vs output power



5 Test circuit and BOM list

Figure 12. 30 MHz test circuit schematic

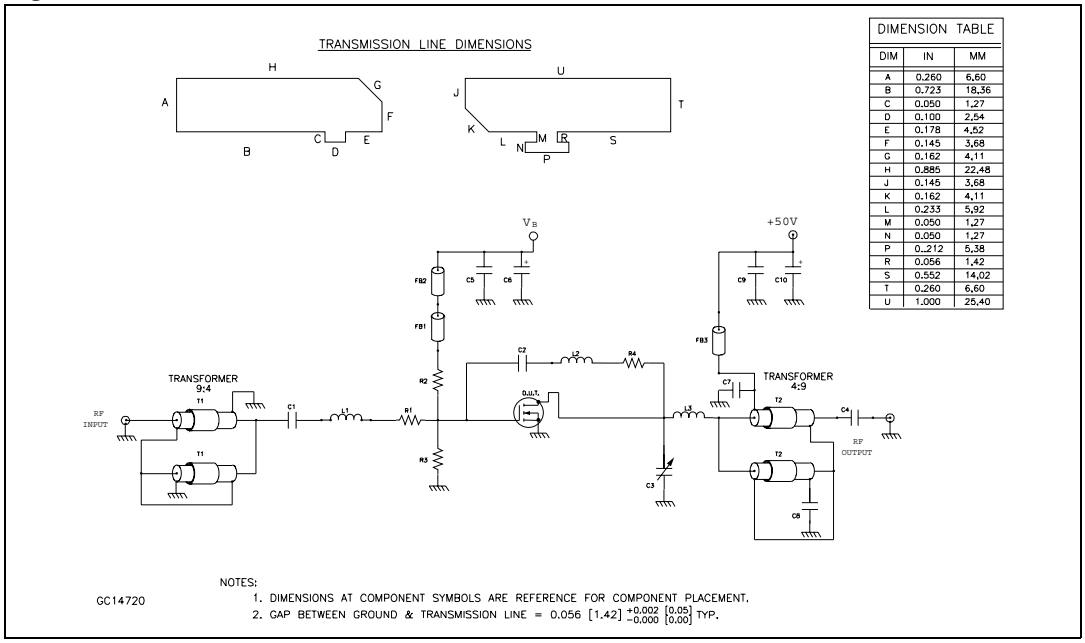


Table 7. Bill of material

Component	Part n.	Supplier	Description
R4	CR2512-1W-101JB	VENKEL	100 Ω, 1 W surface mount chip resistor
R3	29SJ901	XICON	160 Ω, 1 W carbon film axial-lead resistor
R2	29SJ901	XICON	160 Ω, 1 W carbon film axial-lead resistor
R1	CR2512-1W-3R9JT	VENKEL	3.9 Ω, 1 W surface mount chip resistor
FB3	2843000102	FAIR-RITE CORP.	Multi-aperture core
FB2	2743021447	FAIR-RITE CORP.	Shield bead surface mount EMI
FB1	2743021447	FAIR-RITE CORP.	Shield bead surface mount EMI
L3	8073	BELDEN	Inductor, 3 turns air wound #14AWG, ID= 0.375[9.53], poly coated magnet wire
L2	1557	ALPHA	Inductor, 7 turns around shield bead (PT# Fair-rite 2643801102) #16AWG hook up wire.
L1	8073	BELDEN	Inductor, 4 turns air wound #14AWG, ID= 0.375[9.53], poly coated magnet wire

Table 7. Bill of material (continued)

Component	Part n.	Supplier	Description
C10	SKA100M160	MALLORY	10 µF/160 V axial-lead aluminium electrolytic capacitor
C9	C1812X7R501-103KNE	VENKEL	0.01 µF/500 V surface mount ceramic chip capacitor
C8	C1812X7R501-103KNE	VENKEL	0.01 µF/500 V surface mount ceramic chip capacitor
C7	C1812X7R501-103KNE	VENKEL	0.01 µF/500 V surface mount ceramic chip capacitor
C6	RVS-50V100M-R	ELNA	10 µF/50 V vertical surface mount chip aluminium electrolytic capacitor
C5	C1812X7R501-103KNE	VENKEL	0.01 µF/500 V surface mount ceramic chip capacitor
C4	ATC200B103KW50X	ATC	10000 pF ATC 200B surface mount ceramic chip capacitor
C3	463	ARCO	20-180 pF type ST46 standard 3 turns variable capacitor
C2	ATC200B103KW50X	ATC	10000 pF ATC 200B surface mount ceramic chip capacitor
C1	ATC200B103KW50X	ATC	10000 pF ATC 200B surface mount ceramic chip capacitor
T2			Transformer: 4:9, 75.0 Ω, o.d. 0.090 1” LG. coaxial cable 5 turns around shield bead (PT#2643801002 FAIR-RITE CORP.)
T1			Transformer: 9:4, 75.0 Ω, o.d. 0.090 1” LG. coaxial cable 5 turns around shield bead (PT#2643801002 FAIR-RITE CORP.)
PCB	G0300M1026	ROGERS CORP.	Woven fiberglass reinforced PTFE 0.030” THK, ε_r = 2.55, 2Oz ED Cu both sides

6 Circuit layout

Figure 13. 30 MHz test circuit photomaster

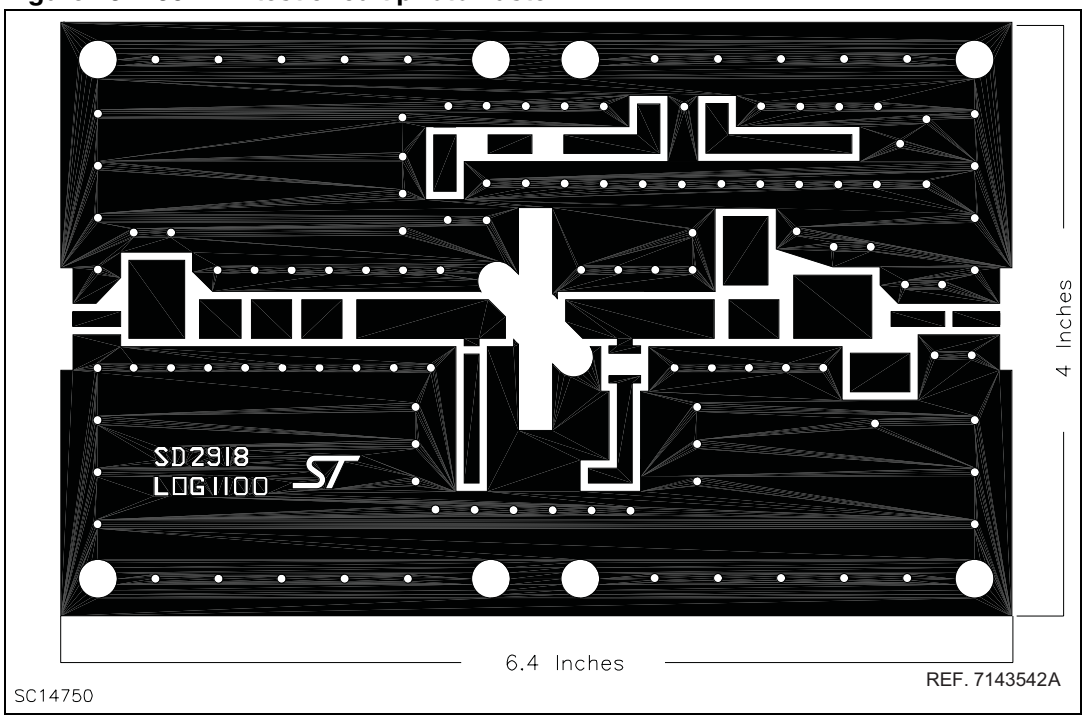
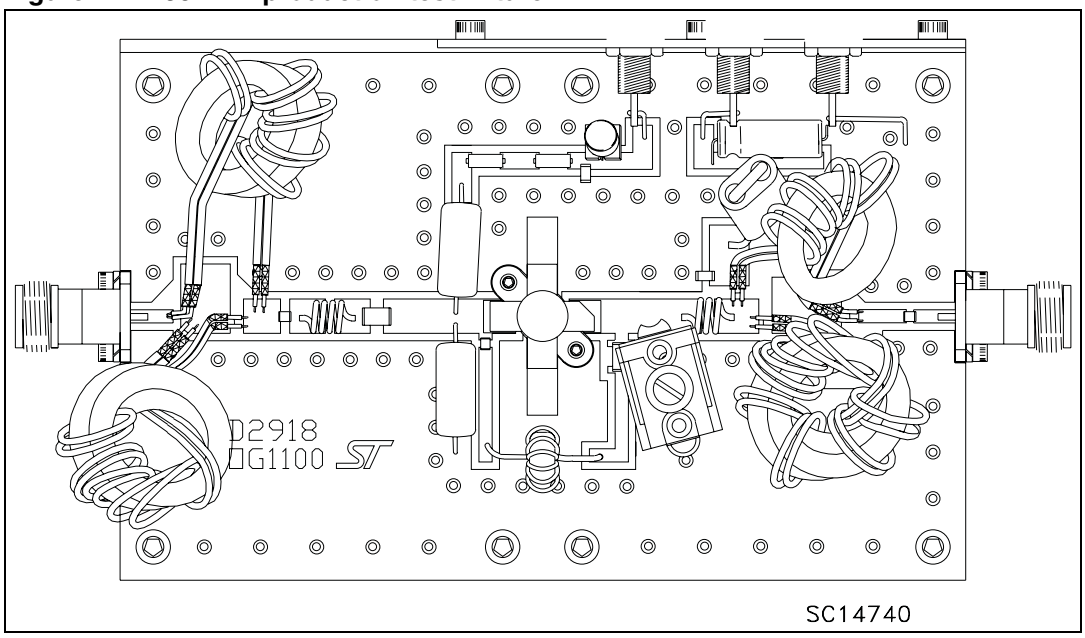


Figure 14. 30 MHz production test fixture



7 Package mechanical data

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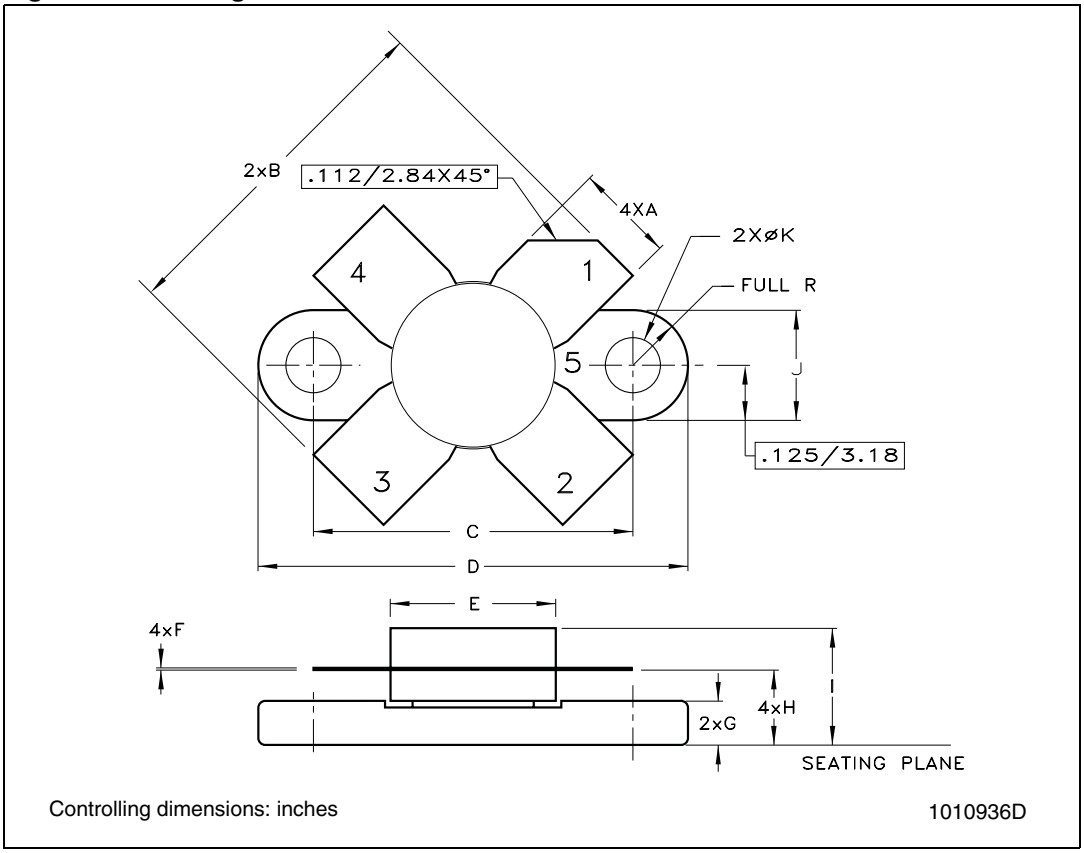
Table 8. M113 (.380 DIA 4/L N/HERM W/FLG) mechanical data

Dim.	mm.			Inch		
	Min	Typ	Max	Min	Typ	Max
A	5.59		5.84	0.220		0.230
B	19.81		20.83	0.780		0.820
C	18.29		18.54	0.720		0.730
D	24.64		24.89	0.970		0.980
E	9.40		9.78	0.370		0.385
F	0.10		0.15	0.004		0.006
G	2.16		2.67	0.085		0.105
H	4.06		4.57	0.160		0.180
I			7.14			0.281
J	6.22		6.48	0.245		0.255
K	3.05		3.30	0.120		0.130

Figure 15. Package dimensions



Controlling dimensions: inches

1010936D

8 Revision history

Table 9. Document revision history

Date	Revision	Changes
21-Jun-2004	1	First release
05-Nov-2009	2	Updated marking on *Table 1*.

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