

MC1140GS LDMOS TRANSISTOR

Document Number: MC1140GS
Product Datasheet V1.0

400W, P and L band High Power RF LDMOS FETs

Description

The MC1140GS is a 400-watt, Input pre-matched, high ruggedness, single ended LDMOS FETs, Designed for P band and L band application within 0.7 to 1.1GHz.

In typical avionics application within 1.03-1.09GHz, it can deliver more than 400W at 32V operation

- Typical RF Performance (On Innogration fixture with device soldered):

MC1140GS



MC1140GS Vgs=2.36V Vds=32V Idq=210mA Pulse width 12us 10%								
Freq(MHz)	Pout(dBm)	Pout(W)	IDS(A)	Pin(dBm)	Gain(dB)	Eff(%)	2th(dBc)	3th(dBc)
1030	57.87	612.35	3.46	41.98	15.89	58.88	-39.6	-47.5
1040	57.81	603.95	3.28	42.02	15.79	61.48	-37.4	-42.4
1050	57.67	584.79	3.11	42.01	15.66	63.02	-32.9	-38.3
1060	57.45	555.90	2.94	42	15.45	63.63	-39.0	-43.3
1070	57.03	504.66	2.7	41.06	15.97	63.34	-38.6	-46.0
1080	56.67	464.52	2.55	41.15	15.52	62.03	-39.4	-48.2
1090	56.37	433.51	2.43	41.23	15.14	61.02	-37.8	-54.0

Recommended driver: MU1502

Features

- High Efficiency and Linear Gain Operations
- Integrated ESD Protection
- Excellent thermal stability, low HCI drift
- Large Positive and Negative Gate/Source Voltage Range for Improved Class C Operation
- Pb-free, RoHS-compliant

Suitable Applications

- P band pulse or CW amplifier
- L band pulsed amplifier
- ISM applications

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DS}	+65	Vdc
Gate--Source Voltage	V_{GS}	-10 to +10	Vdc
Operating Voltage	V_{DD}	+32	Vdc
Storage Temperature Range	T_{stg}	-65 to +150	°C
Case Operating Temperature	T_c	+150	°C
Operating Junction Temperature	T_j	+225	°C

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case $T_{case}=25^{\circ}C$; $t_p=100\mu s$; $\delta=10\%$	$R_{\theta JC}$	0.12	°C/W

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Product Datasheet V1.0

Table 3. ESD Protection Characteristics

Test Methodology	Class
Human Body Model (per JESD22--A114)	Class 2

Table 4. Electrical Characteristics (TA = 25 °C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Zero Gate Voltage Drain Leakage Current (V _{DS} = 65V, V _{GS} = 0 V)	I _{loss}			100	μA
Zero Gate Voltage Drain Leakage Current (V _{DS} = 28 V, V _{GS} = 0 V)	I _{loss}			1	μA
Gate--Source Leakage Current (V _{GS} = 10 V, V _{DS} = 0 V)	I _{GSS}			1	μA
Gate Threshold Voltage (V _{DS} = 28V, I _D = 450 μA)	V _{GS(th)}		1.9		V
Gate Quiescent Voltage (V _{DD} = 28 V, I _D = 1A, Measured in Functional Test)	V _{GS(Q)}		2.75		V

Load Mismatch (In Innogration Test Fixture, 50 ohm system): V_{DD} = 28Vdc, I_{DQ} = 210 mA, f = 1090 MHz

VSWR 10:1 at 400W pulse CW Output Power	No Device Degradation
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TYPICAL CHARACTERISTICS

Figure 1. Network analyzer output S11/S21 (VDS=28V IDQ=500mA)

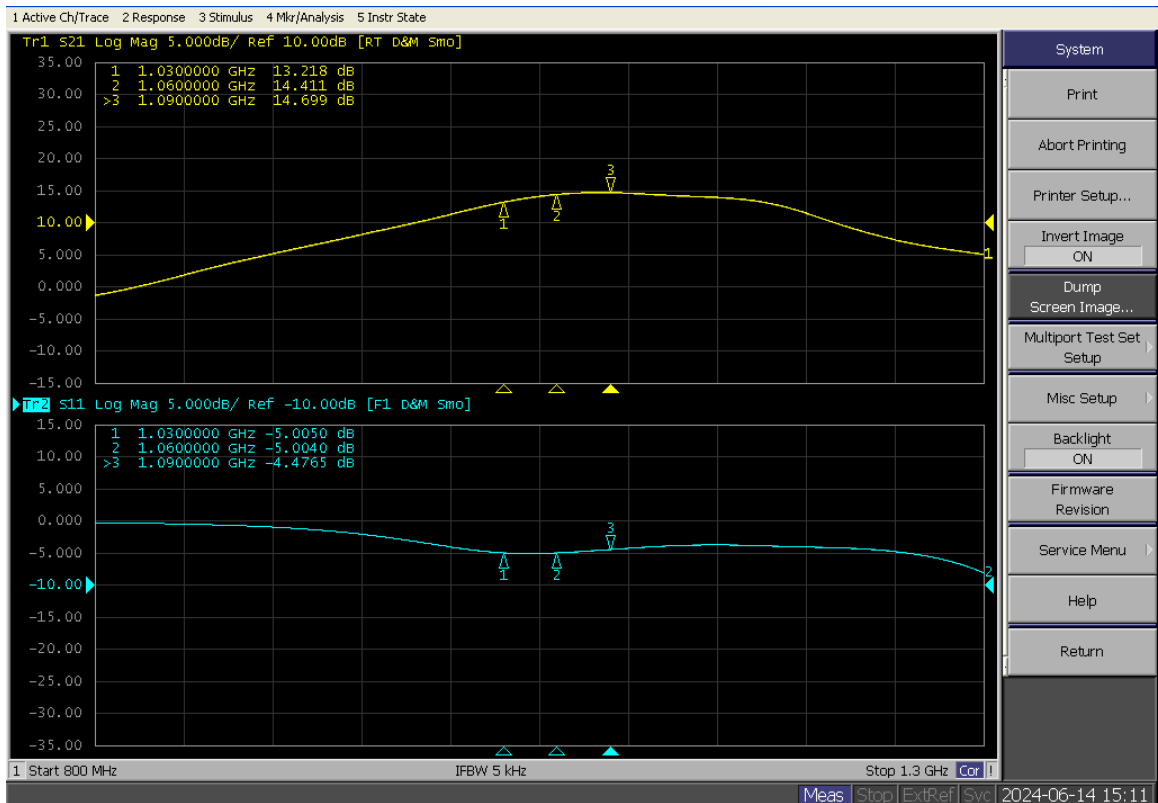


Figure 2. Test Circuit Component Layout

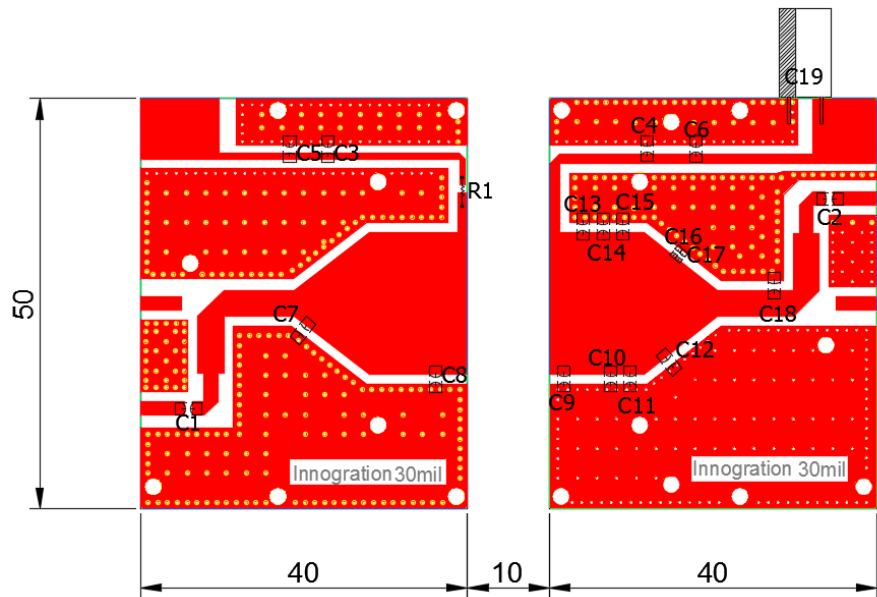


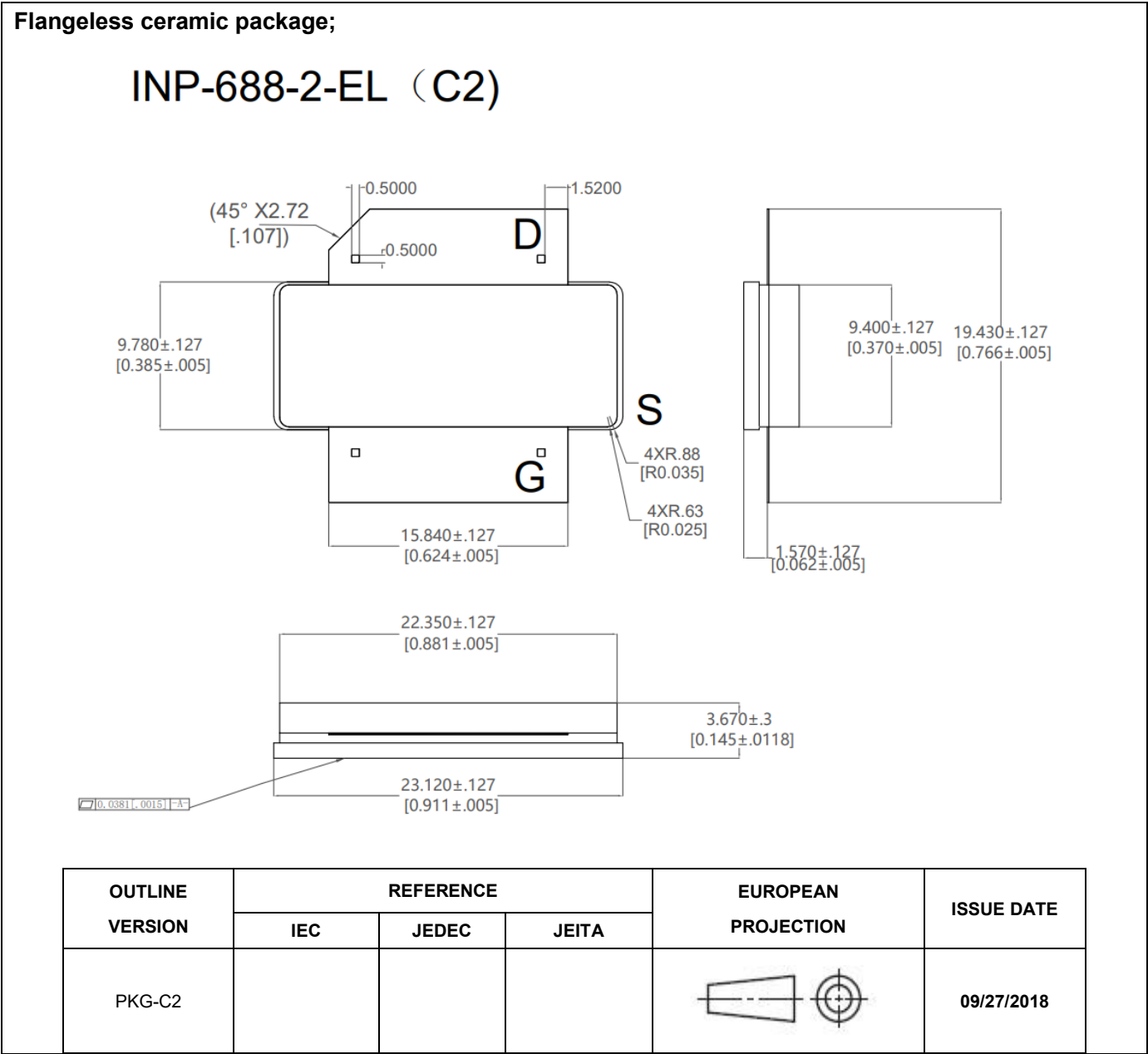
Table 5. Test Circuit Component Designations and Values

Component	Description	Suggestion
C1,C2	36pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ301111
C3,C4	68pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ301111
C5,C6	10uF/100V	Ceramic Multilayer Capacitor
C7,C8	6.8pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ301111
C9,C13,C14	3pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ301111
C10	1.5pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ301111
C11	3.9pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ301111
C12	1.8pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ301111
C15	8.2pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ101111
C16,C17	0.3pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ300805
C18	1.5pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ101111
C19	2200uF/63V	Electrolytic Capacitor
R1	10 Ω /0805	Chip Resistor
PCB	30Mil Rogers4350	

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Package Outline



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Product Datasheet V1.0

Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2024/6/15	Rev 1.0	Product Datasheet

Application data based on HL-24-23

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