

MC1725S LDMOS TRANSISTOR

Document Number: MC1725S
Product Datasheet V1.0

250W, L band High Power RF LDMOS FETs

Description

The MC1725S is a 250-watt, internally matched, single ended LDMOS FETs, designed for L band application within 1.4-1.7GHz. It can be used in Class AB/B and Class C for any pulse and CW signal.

• Typical Performance (On Innogration fixture with device soldered):

MC1725S $V_{ds}=28V$ $I_{dq}=100mA$ $V_{gs}=2.48V$ CW						
F(MHz)	Pin (dBm)	Pout (dBm)	Pout (W)	I(A)	Gain (dB)	Eff(%)
1400	43.2	54.30	269	18.00	11.1	53.4
1450	43.5	54.90	309	19.60	11.4	56.3
1500	42.1	54.78	301	18.80	12.7	57.1
1550	43.2	54.30	269	16.70	11.1	57.6
1600	43.4	54.00	251	15.40	10.6	58.3

*1.5-1.7GHz application data on next pages

MC1725S



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

- L band pulse or CW 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 $T_c=85^{\circ}C$, $T_j=200^{\circ}C$, DC test	$R_{\theta JC}$	0.2	°C/W

Table 3. ESD Protection Characteristics

Test Methodology	Class
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Human Body Model (per JESD22--A114)	Class 2
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Table 4. Electrical Characteristics (TA = 25 °C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
DC Characteristics					
Zero Gate Voltage Drain Leakage Current (V _{DS} = 65V, V _{GS} = 0 V)	I _{DSS}			100	μA
Zero Gate Voltage Drain Leakage Current (V _{DS} = 28 V, V _{GS} = 0 V)	I _{DSS}			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 = 100 mA, Measured in Functional Test)	V _{GS(Q)}		2.48		V

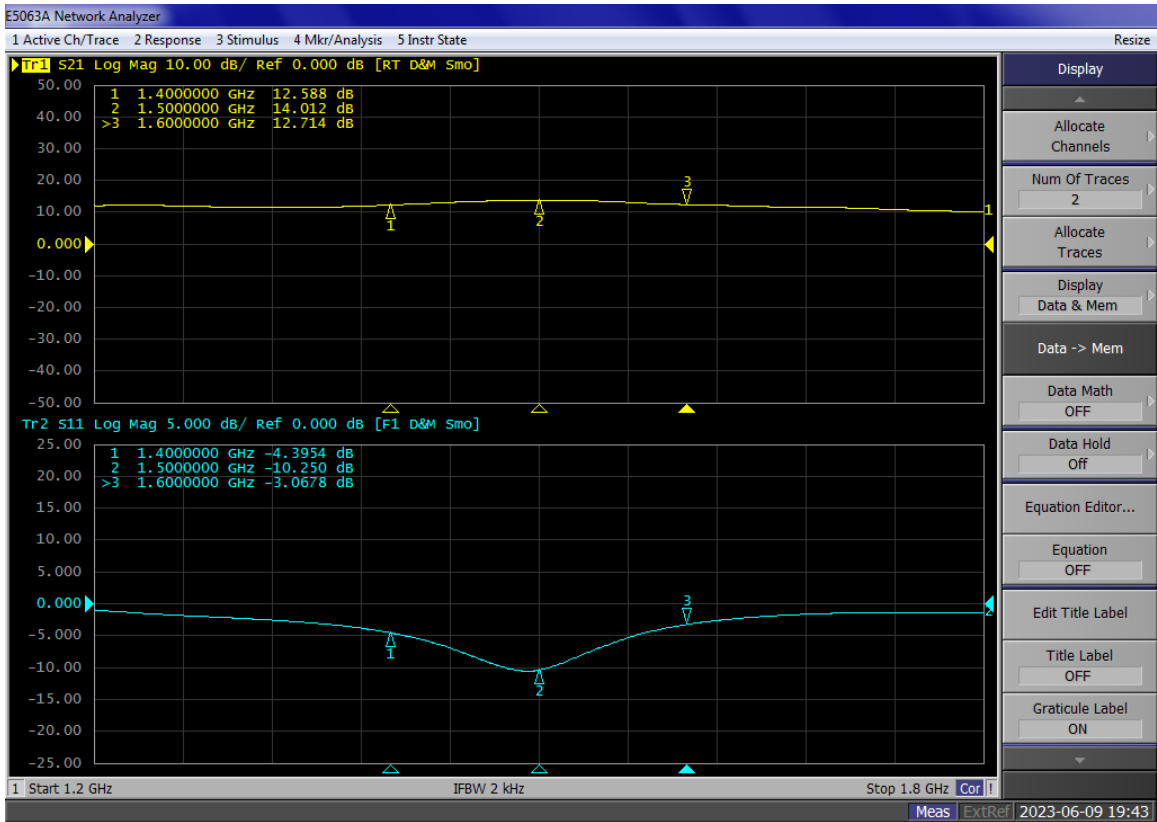
Load Mismatch (In Innogration Test Fixture, 50 ohm system): V_{DD} = 28 Vdc, I_{DQ} = 100 mA, f = 1600 MHz

VSWR 10:1 at 250W pulse CW Output Power	No Device Degradation
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TYPICAL CHARACTERISTICS

1.4-1.6GHz

Figure 1. Network analyzer output S11/S21 (VDS=28V IDQ=1000mA)



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Figure 2. Test Circuit Component Layout

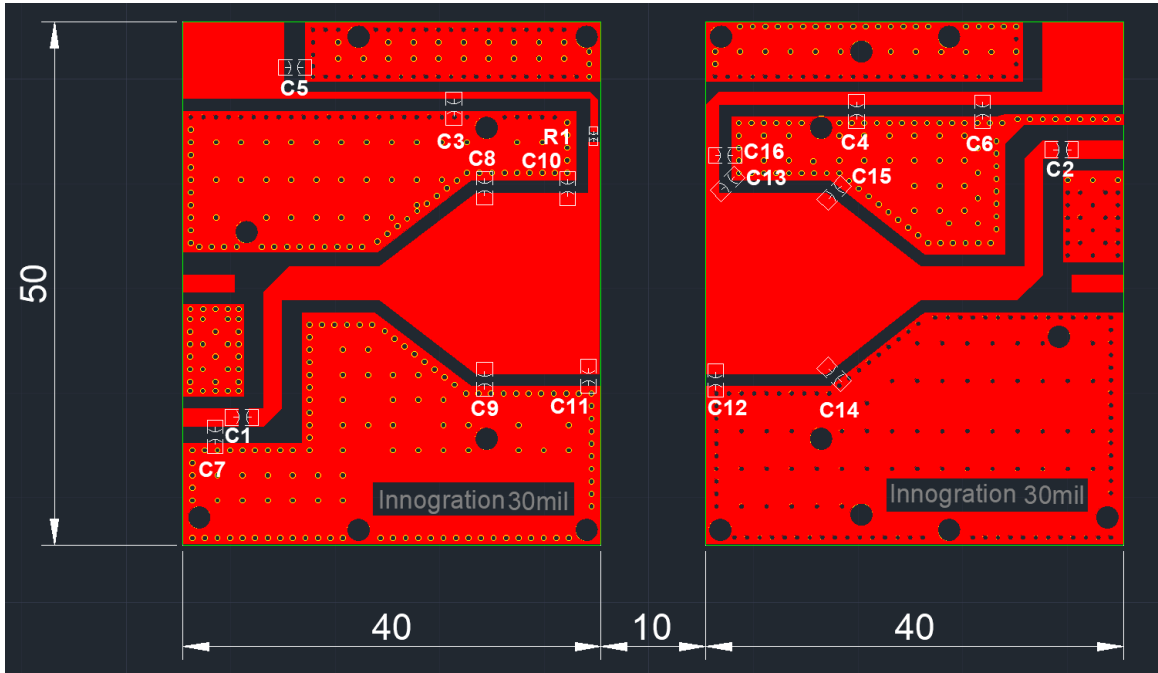


Table 5. Test Circuit Component Designations and Values

Component	Description	Suggestion
C1,C2,C3,C4	33pF	MQ101111
C5,C6,	10uF 100V	Ceramic multilayer capacitor
C7,C16	0.8pF	MQ101111
C8,C9	0.5pF	MQ101111
C10,C11	3.6pF	MQ101111
C12	4.3pF	MQ101111
C13	3.0pF	MQ101111
C14,C15	1.8pF	MQ101111
R1	8.2ohm 0603	Ceramic multilayer capacitor
PCB	30Mil Rogers4350	

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1.5-1.7GHz

Figure 3. Network analyzer output S11/S21 (VDS=28V IDQ=1000mA)

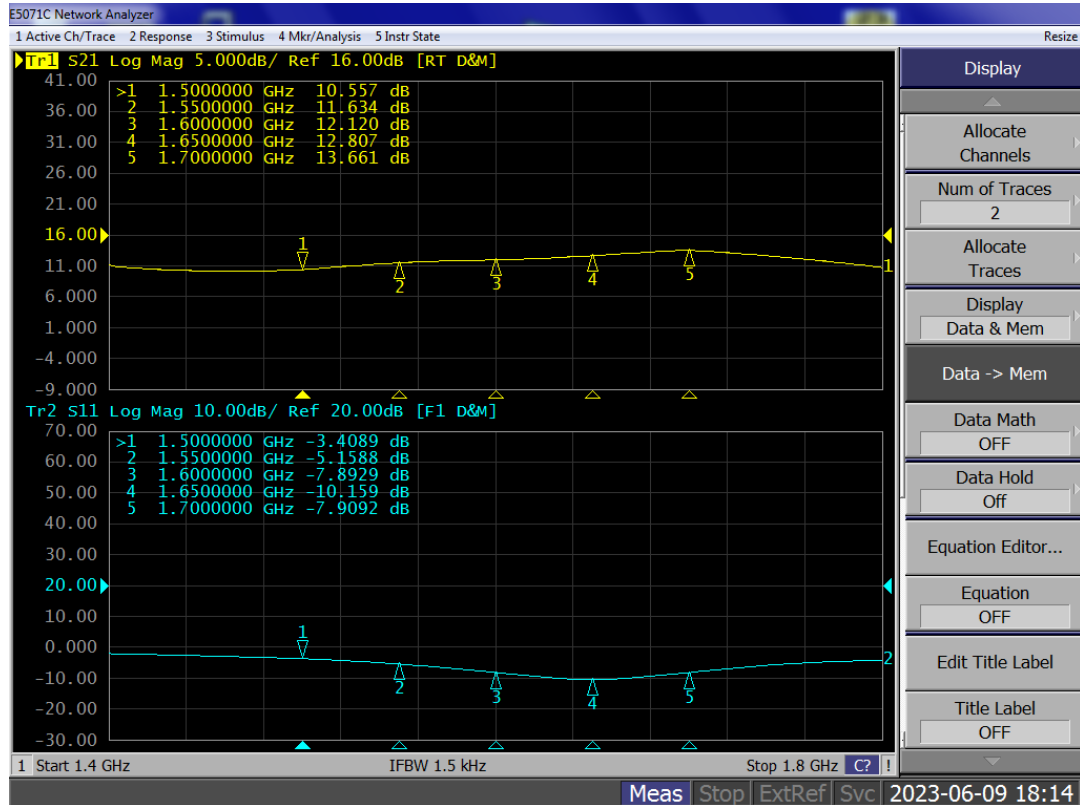


Table 6. RF performance across the band

MC1725S ^{VI} Vgs=2.50V Vds=28V Idq=100mA CW								
Freq (MHz)	Pout (dBm)	Pout (W)	Ids (A)	Pin (dBm)	Gain (dB)	Eff (%)	2nd (dBc)	3rd (dBc)
1500	54.08	255.9	17.08	43.28	10.80	53.50	-29.10	-18.40
1550	54.09	256.4	17.20	41.99	12.10	53.25	-40.60	-25.20
1600	54.06	254.7	17.15	41.64	12.42	53.04	-39.50	-29.80
1650	54.19	262.4	16.95	41.29	12.90	55.29	-39.60	-20.80
1700	54.25	266.1	15.80	42.75	11.50	60.14	-33.30	-18.60

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Figure 4. Test Circuit Component Layout

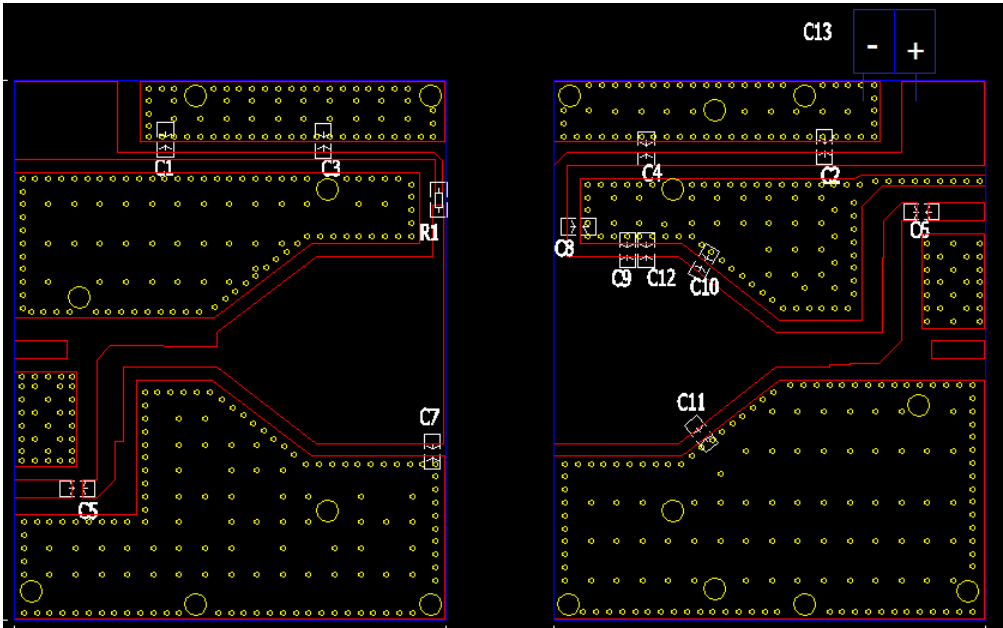


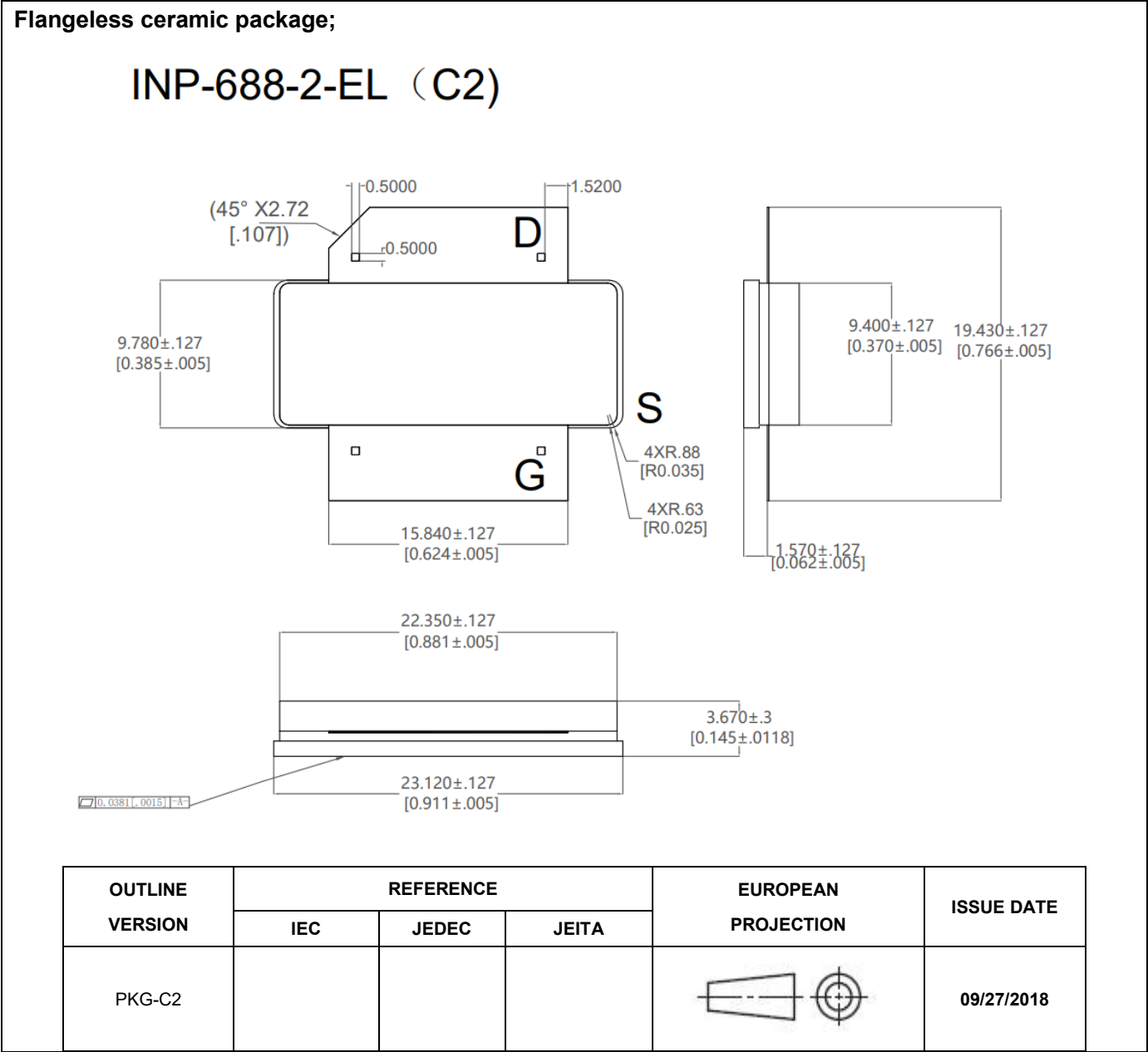
Table 7. Test Circuit Component Designations and Values

Component	Description	Suggestion
C1,C2	10uF	10uF/100V
C3,C4	100pF	MQ101111
C5,C6	33pF	MQ101111
C7	2pF	MQ101111
C8	1pF	MQ101111
C9,C10,C11	0.3pF	MQ101111
C12	3.3pF	MQ101111
C13	2200uF/63V	Electrolytic Capacitor
R1	51 Ω	Chip Resistor
PCB	30mil Rogers 4350B	

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Package Outline



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Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2023/6/12	Rev 1.0	Product Datasheet

Application data based on SXY-23-23/TC-23-36

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