

# MK0540 LDMOS TRANSISTOR

Document Number: MK0540  
Product Datasheet V3.0

## 400W, 28V High Power RF LDMOS FETs

### Description

The MK0540 is a 400-watt, highly rugged, unmatched LDMOS FET, designed for wide-band commercial and industrial applications with frequencies HF to 500MHz. It can be used in Class AB/B and Class C for all typical modulation formats.

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

$V_{DD} = 28$  Volts,  $I_{DQ} = 2000$  mA, CW.

Freq(MHz)	$G_P$ ( dB )	$P_{-1dB}$ (W)	Eff(%)
500	17	380	60

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

$V_{DD} = 28$  Volts,  $I_{DQ} = 1.2$  A, Two tone space 5MHz.

Freq(MHz)	$G_P$ ( dB )	$P_{OUT}$ (W)	Eff(%)	IMD3(dBc)
225	21	79	29	-25
300	19.3	89	28	-35
400	16.9	87	31	-39
500	17.2	89	43	-28

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

$V_{DD} = 28$  Volts,  $I_{DQ} = 1.3$  A, Two tone space 1MHz.

Freq(MHz)	$G_P$ ( dB )	$P_{OUT}$ (W)	Eff(%)	IMD3(dBc)
310	19	100	30	-32
330	20	100	30	-32
360	19.5	100	31	-34
390	18.7	100	33	-36
410	17.2	100	35	-36

### 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

- 2-30MHz (HF or Short wave communication)
- 30-88MHz (Ground communication)
- 54-88MHz (TV VHF I)
- 88-108MHz (FM)
- 118 -140MHz (Avionics)
- 136-174MHz (Commercial ground communication)
- 160-230MHz (TV VHF III)
- 30-512MHz (Jammer, Ground/Air communication)
- 470-860MHz (TV UHF)
- 100kHz - 1000MHz (ISM, instrumentation)

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	$V_{DS}$	+95	Vdc

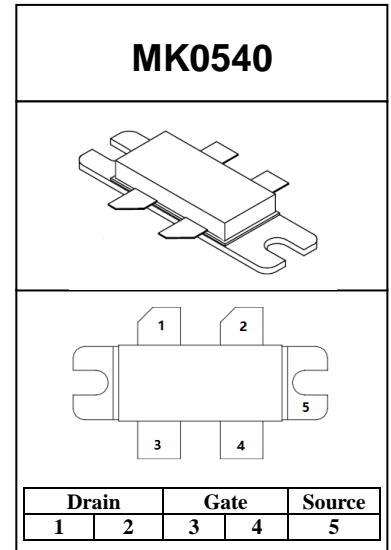


Figure 1. Pin Connection

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Gate--Source Voltage	$V_{GS}$	-10 to +10	Vdc
Operating Voltage	$V_{DD}$	+40	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 $T_c = 85^\circ\text{C}$ , $T_J = 200^\circ\text{C}$ , DC test	$R_{\theta JC}$	0.3	°C/W

**Table 3. ESD Protection Characteristics**

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

**Table 4. Electrical Characteristics** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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## DC Characteristics (per half section)

Drain-Source Voltage $V_{GS} = 0$ , $I_{DS} = 1.0\text{mA}$	$V_{(BR)DSS}$	95	98		V
Zero Gate Voltage Drain Leakage Current ( $V_{DS} = 75\text{V}$ , $V_{GS} = 0\text{V}$ )	$I_{DSS}$	—	—	1	$\mu\text{A}$
Zero Gate Voltage Drain Leakage Current ( $V_{DS} = 28\text{V}$ , $V_{GS} = 0\text{V}$ )	$I_{DSS}$	—	—	1	$\mu\text{A}$
Gate--Source Leakage Current ( $V_{GS} = 10$ , $V_{DS} = 0\text{V}$ )	$I_{GSS}$	—	—	1	$\mu\text{A}$
Gate Threshold Voltage ( $V_{DS} = 28\text{V}$ , $I_D = 650\mu\text{A}$ )	$V_{GS(th)}$	—	2.19	—	V
Gate Quiescent Voltage ( $V_{DD} = 28\text{V}$ , $I_D = 1.0\text{A}$ , Measured in Functional Test)	$V_{GS(Q)}$	—	3.0	—	V
Common Source Input Capacitance ( $V_{GS} = 0\text{V}$ , $V_{DS} = 28\text{V}$ , $f = 1\text{MHz}$ )	$C_{ISS}$		187		pF
Common Source Output Capacitance ( $V_{GS} = 0\text{V}$ , $V_{DS} = 28\text{V}$ , $f = 1\text{MHz}$ )	$C_{OSS}$		79		pF
Common Source Feedback Capacitance ( $V_{GS} = 0\text{V}$ , $V_{DS} = 28\text{V}$ , $f = 1\text{MHz}$ )	$C_{RSS}$		4.6		pF

**Functional Tests** (In Demo Test Fixture, 50 ohm system)  $V_{DD} = 28\text{Vdc}$ ,  $I_{DQ} = 2000\text{mA}$ ,  $f = 500\text{MHz}$ , CW Signal Measurements.

Power Gain	$G_p$	—	17	—	dB
Drain Efficiency@P1dB	$\eta_D$	—	60	—	%
1 dB Compression Point	$P_{-1dB}$	—	380	—	W
Input Return Loss	IRL	—	-7	—	dB

**Load Mismatch (In Innogration Test Fixture, 50 ohm system):**  $V_{DD} = 28\text{Vdc}$ ,  $I_{DQ} = 2000\text{mA}$ ,  $f = 500\text{MHz}$

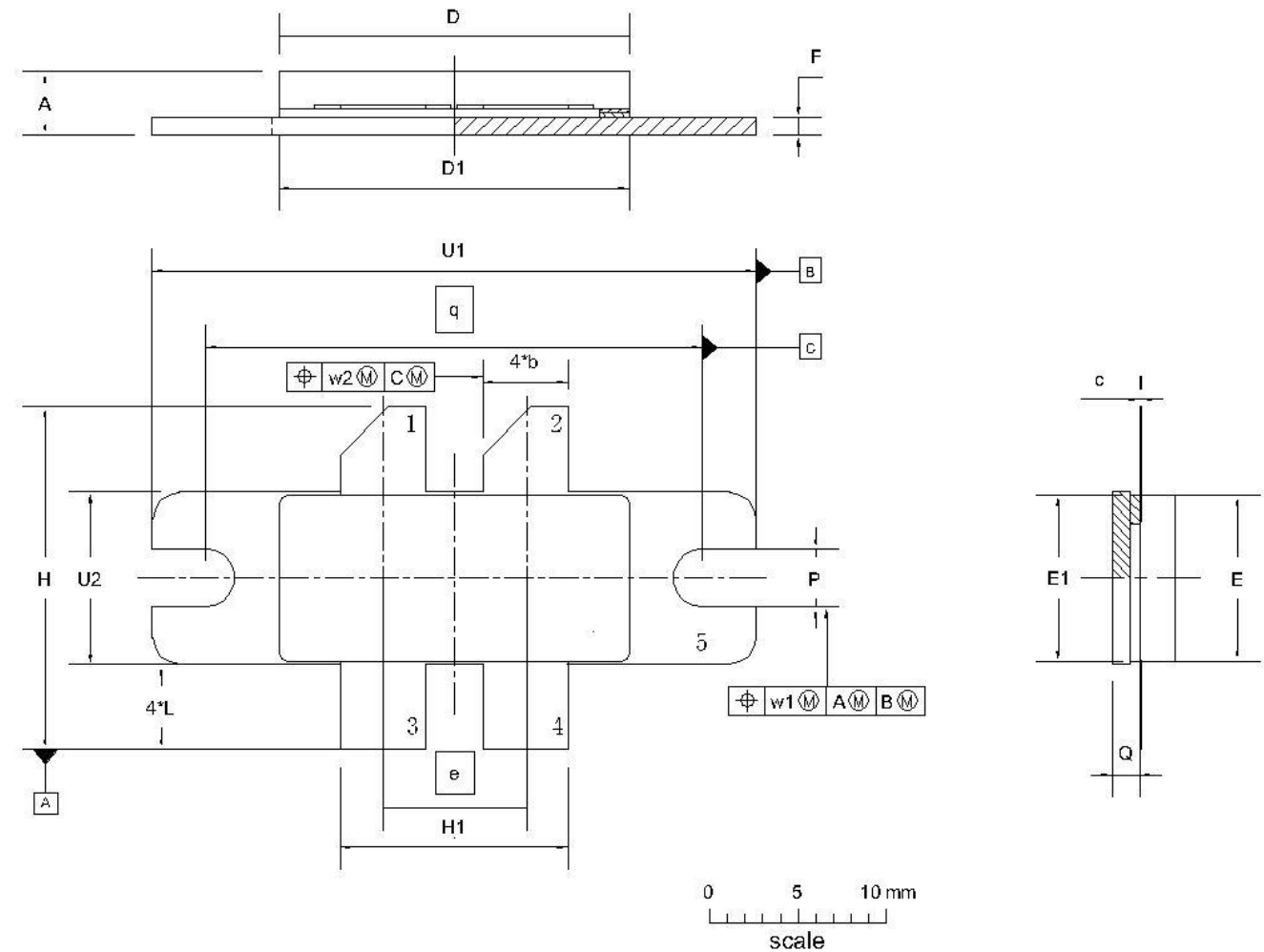
VSWR 20:1 at 380W pulse CW Output Power	No Device Degradation
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## Package Outline

Flanged ceramic package; 2 mounting holes; 4 leads



UNIT	A	b	c	D	D <sub>1</sub>	e	E	E <sub>1</sub>	F	H	H <sub>1</sub>	L	p	Q	q	U <sub>1</sub>	U <sub>2</sub>	W <sub>1</sub>	W <sub>2</sub>
mm	4.72	3.94	0.15	20.02	19.96	8.89	9.50	9.53	1.14	19.94	12.83	5.33	3.38	1.70	27.94	34.16	9.91	0.25	0.51
	3.43	3.68	0.08	19.61	19.66		9.30	9.25	0.89	18.92	12.57	4.32	3.12	1.45		33.91	9.65		
inches	0.186	0.155	0.006	0.788	0.786	0.35	0.374	0.375	0.045	0.785	0.505	0.210	0.133	0.067	1.100	1.345	0.390	0.01	0.02
	0.135	0.145	0.003	0.772	0.774		0.366	0.364	0.035	0.745	0.495	0.170	0.123	0.057		1.335	0.380		

OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-B4E					03/12/2013

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## Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2017/2/22	Rev 1.0	Preliminary Datasheet
2017/3/17	Rev 2.0	Product Datasheet
2017/3/17	Rev 3.0	Modification on typo of upper frequency from 1000MHz to 500MHz

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