HTL7G06S009P

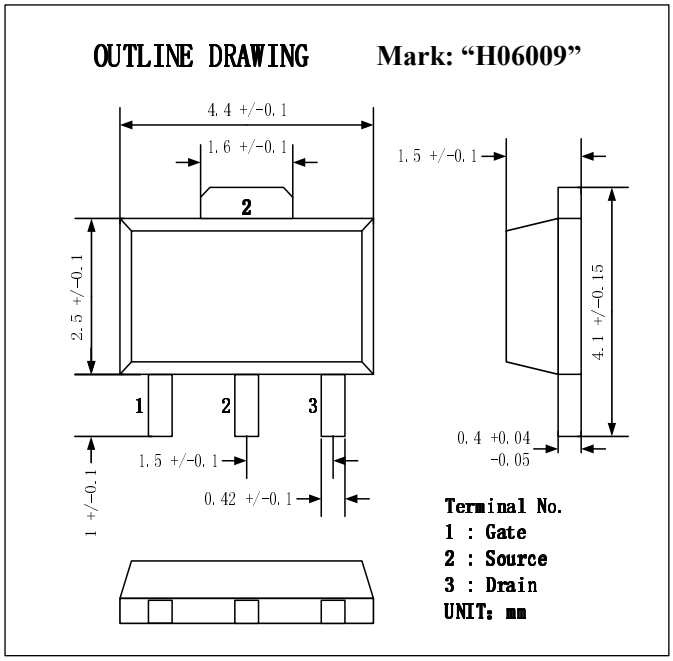
RoHS Compliant LDMOS RF Power Transistor

RoHS

1. DESCRIPTION

HTL7G06S009P is a MOSFET type transistor specifically designed for VHF/UHF RF amplifier applications.

This device has an internal monolithic Zener diode from gate to source for ESD protection.



2. FEATURES

- High power: P_{out} > 5W Typ. @ V_{DD} = 7.4V
- High Efficiency: η_d = 77% Typ. @ f = 465MHz
- Integrated gate protection diode

3. APPLICATION

- For output stage of high power amplifiers in VHF/UHF Band mobile radio sets.
- For drive stage of high power amplifiers in Universal Broadband.

4. ABSOLUTE MAXIMUM RATINGS

(Tc=25°C UNLESS OTHERWISE NOTED)

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Drain to source voltage	V_{DSS}	V_{gs} = 0V	20	V
Gate to source voltage	V_{GSS}	V_{ds} = 0V	-5 ~ 10	V
Operating Voltage	V_{DD}	-	9	V
Drain Current	I_D	-	3.2	A
Input Power	P_{in}	$Z_g = Z_l$ = 50 Ω	1500	mW
Storage temperature	T_{stg}	-	-55 ~ 150	℃
Operating Junction Temperature	T_J	-	-40 ~ 150	℃
Thermal resistance	$Z_{th(j-c)}$	Junction to case	12	℃/W

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5. ELECTRICAL CHARACTERISTICS

(Tc=25°C UNLESS OTHERWISE NOTED)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Breakdown Voltage	$V_{(BR)DDS}$	V_{GG} = 0V, I_D = 39.6uA	20	-	-	V
Zero Gate Voltage Drain Leakage Current	I_{DSS}	V_{DD} = 12V, V_{GG} = 0V	1	-	-	uA
Gate-Source Leakage Current	I_{GSS}	V_{DD} = 0V, V_{GG} = 10V	1	-	-	uA
Gate Threshold Voltage	V_{th}	V_{DD} = Vgg, Id = 39.6uA	0.8	2.0	2.8	V
Output Power	P_{out}	V_{DD} = 7.4V, P_{in} = 0.63W f = 465MHz, I_{dq} = 200mA		7.0		W
Drain Efficiency	η_d			77		%
Output Power	P_{out}	V_{DD} = 7.4V, P_{in} = 0.63W f = 520MHz, I_{dq} = 200mA		5.8		W
Drain Efficiency	η_d			68		%
Load Mismatch		V_{DD} = 7.4V, P_o = 5W F = 520MHz, I_{dq} = 200mA Load VSWR = 10:1 (All phases)	No Device Degradation			

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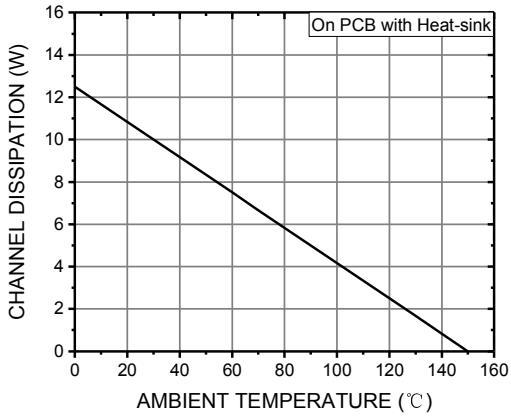
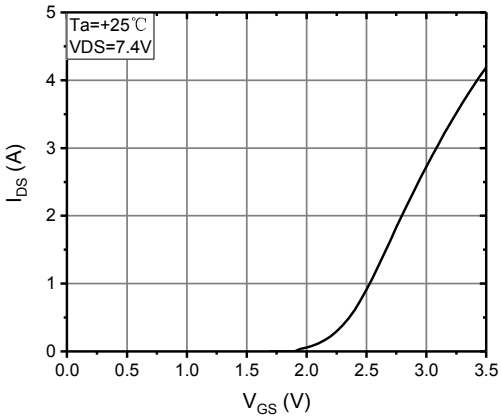
6. TYPICAL CHARACTERISTICS

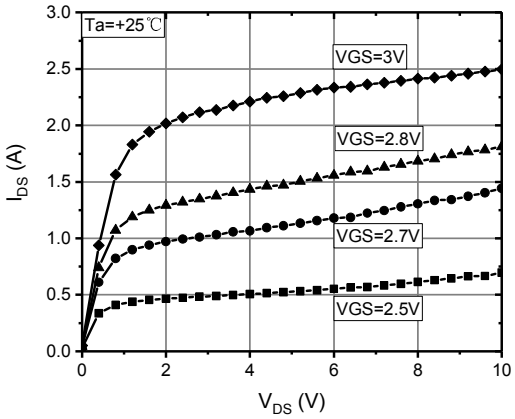
CHANNEL DISSIPATION VS. AMBIENT TEMPERATURE



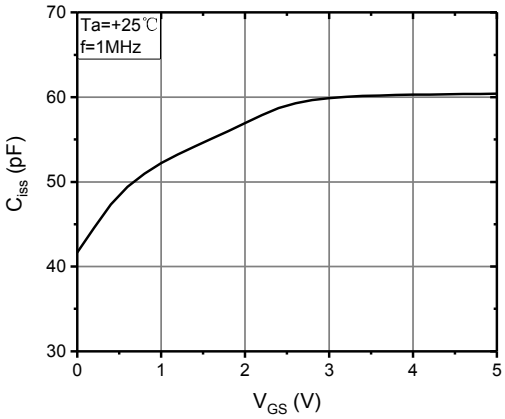
I_{DS} VS. V_{GS}



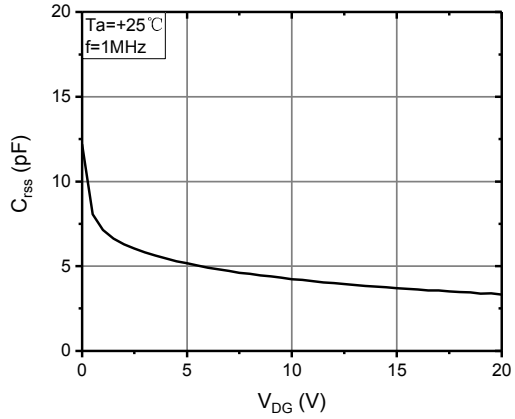
I_{DS} VS. V_{DS}



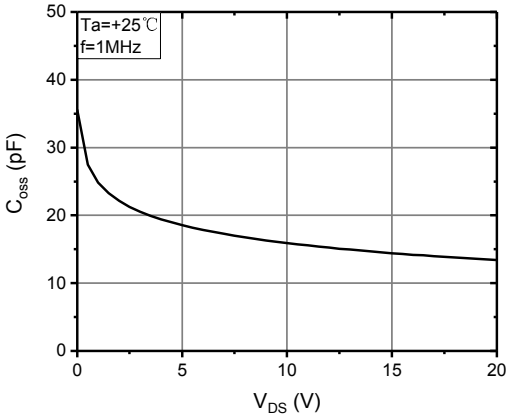
C_{iss} VS.V_{GS}



C_{rss} VS. V_{DS}



C_{oss} VS. V_{DS}



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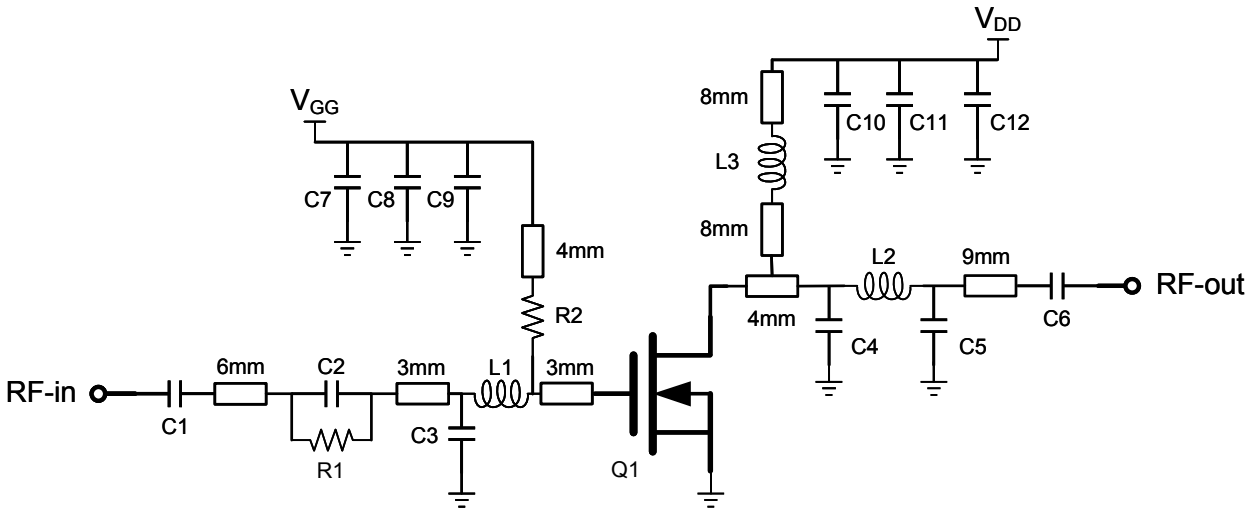
7. TEST CIRCUIT @V_{DD} = 7.4V, 450-550MHz

I_{DQ} = 200mA



Note: The characteristic impedance of all microstrip lines: 50ohm

Part	Description	P/N	Manufacturer
C1, C6	470 pF Chip Capacitors	GRM1885C1H471JA01	muRata
C2	1 nF Chip Capacitor	GRM1885C1H102JA01	muRata
C3	22 pF Chip Capacitor	GRM1885C1H220JA01	muRata
C4	33 pF Chip Capacitor	GRM1885C1H330JA01	muRata
C5	12 pF Chip Capacitor	GRM1885C1H120JA01	muRata
C9, C10	100pF Chip Capacitors	GRM1885C1H101JA01	muRata
C8, C11	1 nF Chip Capacitors	GRM1885C1H102JA01	muRata
C7, C12	10 uF Chip Capacitors	GRM32ER61H105KA12L	muRata
L1	2.7 nH Chip Inductor	GRM1885C1H272JA01	muRata
L2	W.D.: 0.3mm, I.D.: 1.0mm, 3 turns	-	Arbitrary
L3	W.D.: 0.5mm, I.D.: 2.0mm, 9 turns	-	Arbitrary
R1	100 Ω Chip Resistor	-	Arbitrary
R2	20 Ω Chip Resistor	-	Arbitrary
Q1	RF LDMOS	HTL7G06S009P	Kunshan Huatai Elec- tronics Ltd.
PCB	εr = 4.5	FR4	Arbitrary

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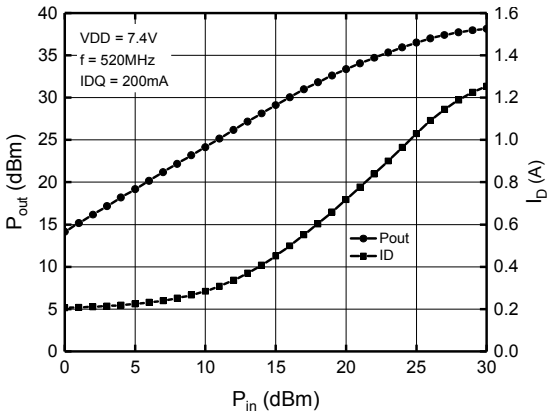
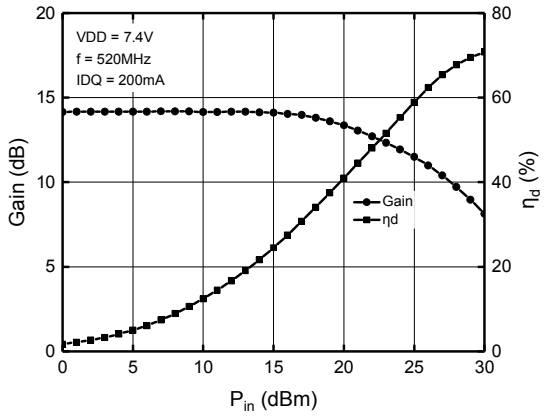
8. TYPICALCHARACTERISTICS @V_{DD} = 7.4V, 450-550MHz

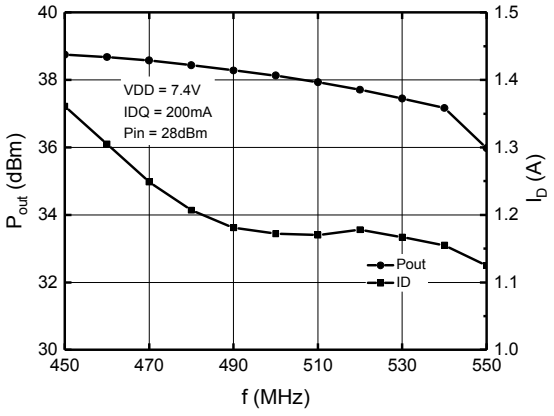
P_{out}, I_D VS. P_{in}



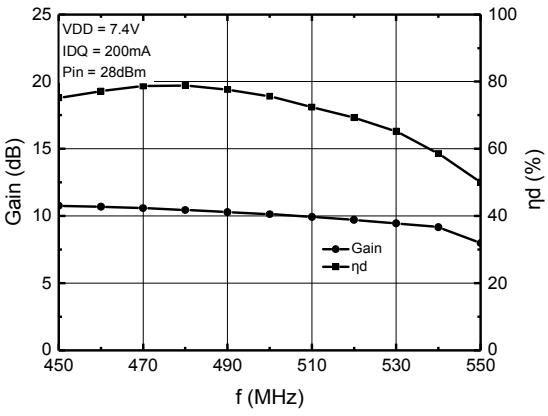
Gain, Eff VS. P_{in}



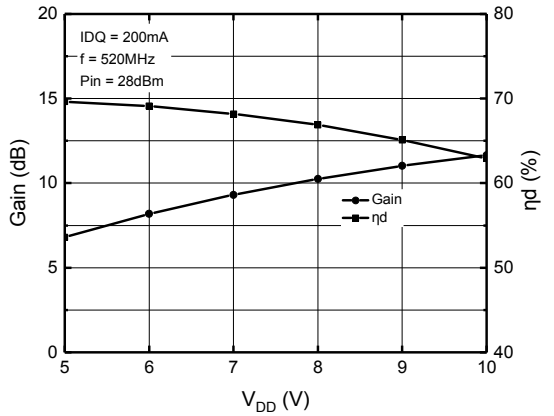
P_{out}, I_D VS. f



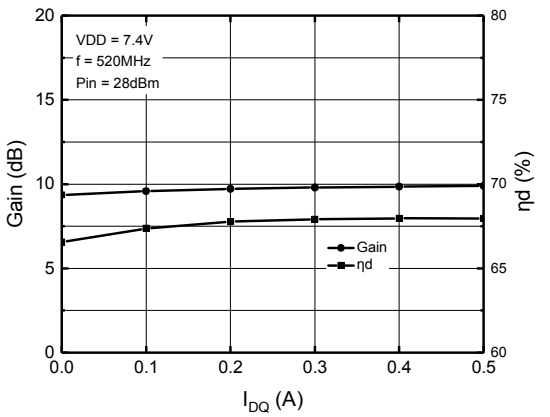
Gain, Eff VS. f



Gain, Eff VS. V_{DD}



Gain, Eff VS. I_{DQ}



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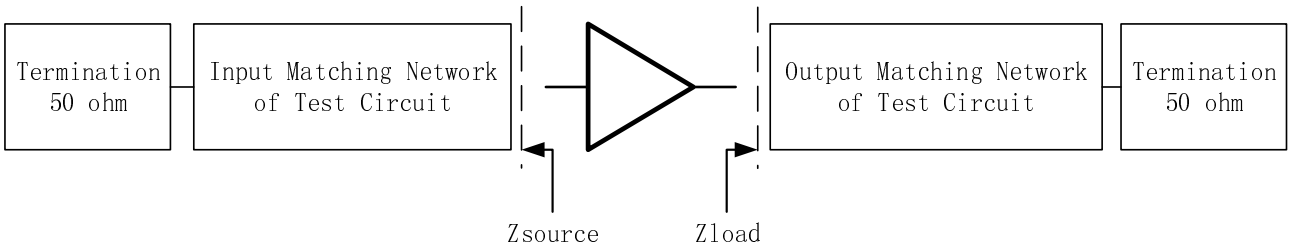
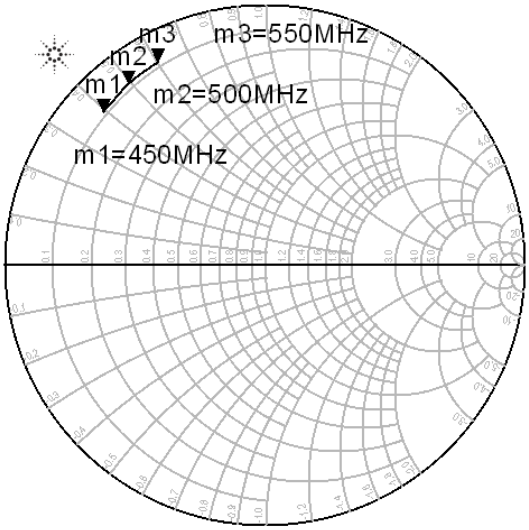
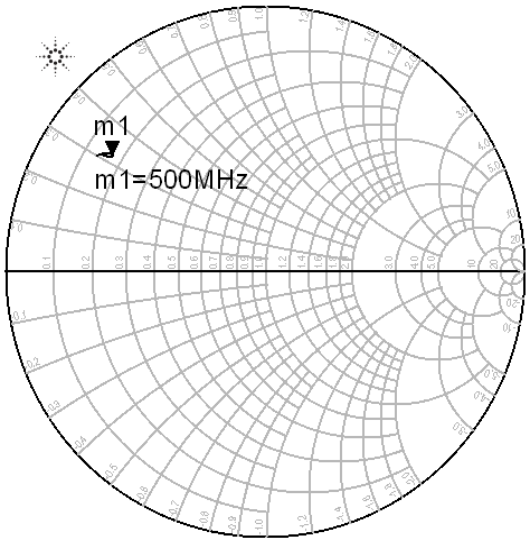
9. INPUT/OUTPUT IMPEDANCE VS. FREQ. CHARACTERISTICS





freq (450.0MHz to 550.0MHz)

@P_{in} = 0.63W, V_{DD} = 7.4V, I_{DQ} = 200mA	
f (MHz)	**Zsource (ohm)**
450	**4.508 + j19.881**
500	**4.250 + j24.905**
550	**4.232 + j30.047**



freq (450.0MHz to 550.0MHz)

@P_{in} = 0.63W, V_{DD} = 7.4V, I_{DQ} = 200mA	
f (MHz)	**Zload (ohm)**
450	**6.697 + j15.044**
500	**8.403 + j16.214**
550	**7.217 + j15.621**

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10. HTL7G06S009P S-PARAMETER DATA (V_{DD} = 7.4V, I_{DQ} = 200mA)

Freq	S11		S21		S12		S22	
(MHz)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)	(mag)	(ang)
100	1.104	-172.7	8.863	43.7	0.031	-48.4	0.810	80.6
150	0.988	176.5	5.560	3.3	0.028	-88.2	0.834	16.6
200	0.947	168.1	4.116	-33.7	0.027	-123.8	0.844	-45.1
250	0.928	161.4	3.245	-69.2	0.026	-158.4	0.840	-105.0
300	0.917	155.5	2.665	-103.8	0.026	167.9	0.833	-164.6
350	0.909	149.7	2.257	-137.8	0.025	134.6	0.830	137.1
400	0.904	144.2	1.959	-171.3	0.024	101.9	0.827	78.8
430	0.902	141.0	1.816	168.8	0.023	84.9	0.823	44.5
470	0.899	136.8	1.663	141.9	0.024	58.9	0.830	-2.4
500	0.898	133.8	1.560	121.7	0.023	39.8	0.832	-37.9
550	0.896	128.6	1.408	88.0	0.023	7.1	0.830	-96.6
600	0.893	123.5	1.277	54.6	0.023	-25.1	0.826	-155.0
650	0.891	118.4	1.162	21.6	0.022	-56.6	0.819	147.0
700	0.889	113.5	1.070	-11.1	0.021	-86.5	0.817	89.8
750	0.886	108.5	0.995	-43.8	0.021	-118.1	0.823	32.7
800	0.884	103.6	0.933	-76.6	0.021	-150.1	0.826	-24.6
850	0.882	98.8	0.879	-109.7	0.021	-179.2	0.818	-82.5
900	0.879	93.9	0.828	-143.0	0.021	147.9	0.811	-141.4
950	0.876	89.0	0.776	-176.1	0.020	115.1	0.808	159.8
1000	0.870	84.3	0.728	151.2	0.020	83.9	0.805	101.9
1050	0.863	79.7	0.686	118.9	0.020	52.2	0.803	45.1
1100	0.859	75.5	0.653	86.9	0.019	21.7	0.801	-11.5
1150	0.859	71.2	0.630	54.6	0.019	-8.8	0.798	-69.1
1200	0.861	66.7	0.609	21.9	0.019	-40.7	0.799	-127.3
1250	0.862	62.1	0.587	-11.0	0.019	-72.3	0.794	174.0
1300	0.862	57.5	0.564	-43.9	0.019	-103.9	0.792	115.6
1350	0.861	52.8	0.543	-76.5	0.019	-135.4	0.792	58.0
1400	0.859	48.2	0.526	-108.9	0.018	-166.5	0.796	0.5
1450	0.857	43.6	0.513	-141.5	0.019	163.4	0.796	-57.3
1500	0.854	39.1	0.501	-174.5	0.018	129.1	0.787	-116.3

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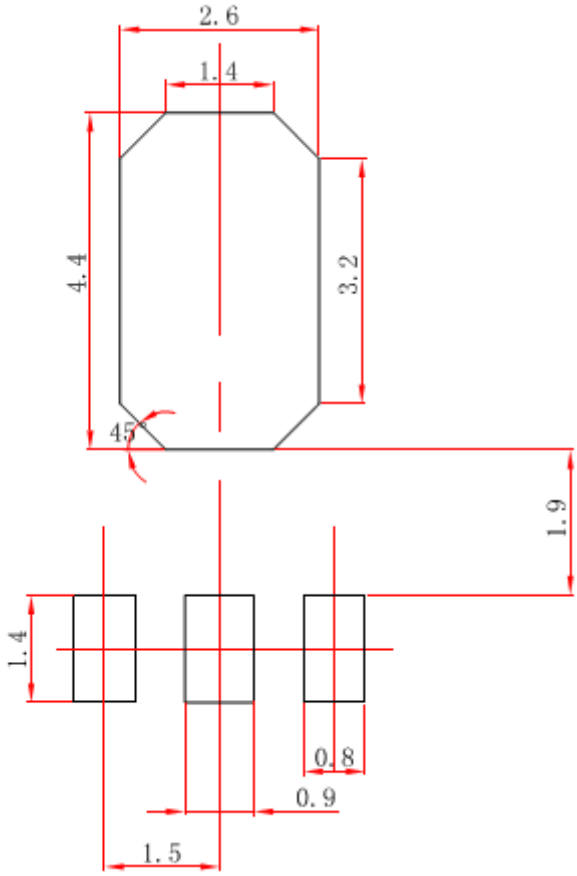
11. RECOMMENDED PCB PAD LAYOUT



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