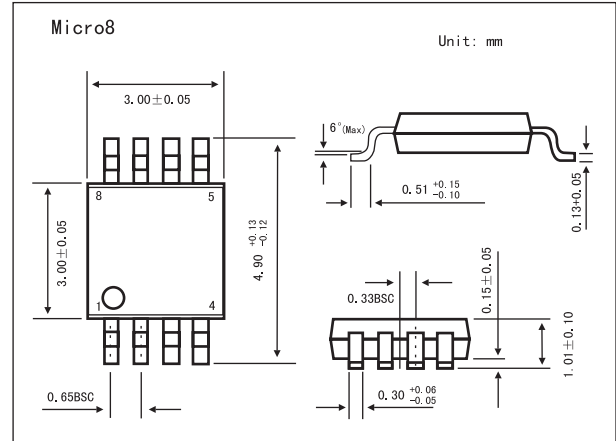
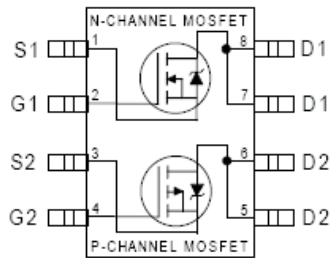


# HEXFET<sup>®</sup> Power MOSFET

## KRF7509

### ■ Features

- Generation V Technology
- Ultra Low On-Resistance
- Dual N and P Channel MOSFET
- Very Small SOIC Package
- Low Profile (<1.1mm)
- Available in Tape & Reel
- Fast Switching



### ■ Absolute Maximum Ratings Ta = 25°C

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	V <sub>DS</sub>	30	-30	V
Continuous Drain Current, V <sub>GS</sub> @ 10V @ Ta = 25°C	I <sub>D</sub>	2.7	-2	A
Continuous Drain Current, V <sub>GS</sub> @ 10V @ Ta = 70°C	I <sub>D</sub>	2.1	-1.6	
Pulsed Drain Current *1	I <sub>DM</sub>	21	-16	
Power Dissipation @Ta= 25°C	P <sub>D</sub>	1.25		W
Power Dissipation @Ta= 70°C		0.8		
Linear Derating Factor		10		m W/°C
Gate-to-Source Voltage	V <sub>GS</sub>	±20		V
Gate-to-Source Voltage Single Pulse tp<10 μ S	V <sub>GSM</sub>	30		
Peak Diode Recovery dv/dt *2	dv/dt	5.0		V/ns
Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to + 150		°C
Maximum Junction-to-Ambient *3	R <sub>θJA</sub>	100		°C/W

\*1 Repetitive rating; pulse width limited by max. junction temperature.

\*2 N-Channel I<sub>SD</sub> ≤ 1.7A, di/dt ≤ 120A/μ s, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>J</sub> ≤ 150°C

P-Channel I<sub>SD</sub> ≤ -1.2A, di/dt ≤ 160A/μ s, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>J</sub> ≤ 150°C

\*3 Surface mounted on FR-4 board, t ≤ 10sec.

## KRF7509

■ Electrical Characteristics T<sub>J</sub> = 25°C

Parameter	Symbol	Testconditions	Min	Typ	Max	Unit
Drain-to-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250 μA	N-Ch	30		V
		V <sub>GS</sub> = 0V, I <sub>D</sub> = -250 μA	P-Ch	-30		
Breakdown Voltage Temp. Coefficient	ΔV <sub>(BR)DSS</sub> /ΔT <sub>J</sub>	I <sub>D</sub> = 1mA, Reference to 25°C	N-Ch	0.059		V/°C
		I <sub>D</sub> = -1mA, Reference to 25°C	P-Ch	0.039		
Static Drain-to-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 1.7A*1	N-Ch	0.09	0.110	Ω
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 0.85A*1		0.14	0.175	
Static Drain-to-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = -10V, I <sub>D</sub> = -1.2A*1	P-Ch	0.17	0.20	
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -0.6A*1		0.30	0.40	
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA	N-Ch	1.0		V
		V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250 μA	P-Ch	-1.0		
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> = 10V, I <sub>D</sub> = 0.85A*1	N-Ch	1.9		S
		V <sub>DS</sub> = -10V, I <sub>D</sub> = -0.6A*1	P-Ch	0.92		
Drain-to-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V	N-Ch			μA
		V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V	P-Ch		1.0	
		V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125°C	N-Ch		-1.0	
		V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125°C	P-Ch		25	
Gate-to-Source Forward Leakage	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V	N-Ch		-25	
			P-Ch		±100	
Total Gate Charge	Q <sub>g</sub>	N-Channel I <sub>D</sub> = 1.7A, V <sub>DS</sub> = 24V, V <sub>GS</sub> = 10V	N-Ch	7.8	12	nC
			P-Ch	7.5	11	
Gate-to-Source Charge	Q <sub>gs</sub>	P-Channel	N-Ch	1.2	1.8	
			P-Ch	1.3	1.9	
Gate-to-Drain ("Miller") Charge	Q <sub>gd</sub>	I <sub>D</sub> = -1.2A, V <sub>DS</sub> = -24V, V <sub>GS</sub> = -10V	N-Ch	2.5	3.8	
			P-Ch	2.5	3.7	
Turn-On Delay Time	t <sub>d(on)</sub>	N-Channel V <sub>DD</sub> = 15V, I <sub>D</sub> = 1.7A, R <sub>G</sub> = 6.1 Ω	N-Ch	4.7		ns
			P-Ch	9.7		
Rise Time	t <sub>r</sub>	P-Channel R <sub>D</sub> = 8.7 Ω	N-Ch	10		
			P-Ch	12		
Turn-Off Delay Time	t <sub>d(off)</sub>	V <sub>DD</sub> = -15V, I <sub>D</sub> = -1.2A, R <sub>G</sub> = 6.2 Ω	N-Ch	12		
			P-Ch	19		
Fall Time	t <sub>f</sub>	R <sub>D</sub> = 12 Ω	N-Ch	5.3		
			P-Ch	9.3		
Input Capacitance	C <sub>iss</sub>	N-Channel V <sub>GS</sub> = 0V, V <sub>DS</sub> = 25V, f = 1.0MHz	N-Ch	210		pF
			P-Ch	180		
Output Capacitance	C <sub>oss</sub>	P-Channel	N-Ch	80		
			P-Ch	87		
Reverse Transfer Capacitance	C <sub>rss</sub>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = -25V, f = 1.0MHz	N-Ch	32		
			P-Ch	42		
Continuous Source Current (Body Diode)	I <sub>S</sub>		N-Ch		1.25	A
			P-Ch		-1.25	
Pulsed Source Current (Body Diode) *2	I <sub>SM</sub>		N-Ch		21	
			P-Ch		-16	

**KRF7509**■ Electrical Characteristics  $T_J = 25^\circ\text{C}$ 

Parameter	Symbol	Testconditions	Min	Typ	Max	Unit
Diode Forward Voltage	$V_{SD}$	$T_J = 25^\circ\text{C}$ , $I_S = 1.7\text{A}$ , $V_{GS} = 0\text{V}^{*1}$			1.2	V
		$T_J = 25^\circ\text{C}$ , $I_S = -1.8\text{A}$ , $V_{GS} = 0\text{V}^{*1}$			-1.2	
Reverse Recovery Time	$t_{rr}$	N-Channel		40	60	ns
		$T_J = 25^\circ\text{C}$ , $I_F = 1.7\text{A}$ , $di/dt = 100\text{A}/\mu\text{s}^{*1}$		30	45	
Reverse RecoveryCharge	$Q_{rr}$	P-Channel		48	72	nC
		$T_J = 25^\circ\text{C}$ , $I_F = -1.2\text{A}$ , $di/dt = -100\text{A}/\mu\text{s}^{*1}$		37	55	

\*1 Pulse width  $\leq 300\ \mu\text{s}$ ; duty cycle  $\leq 2\%$ .

\*2 Repetitive rating; pulse width limited by max. junction temperature.