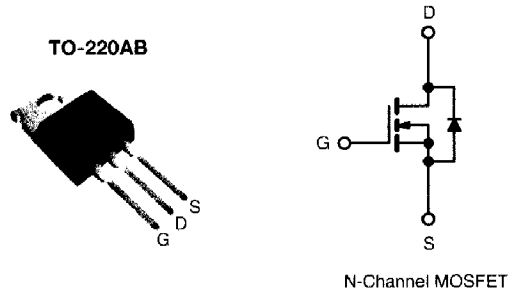


IRF510, SiHF510

PRODUCT SUMMARY	
V_{DS} (V)	100
$R_{DS(on)}$ (Ω)	$V_{GS} = 10\text{ V}$ 0.54
Q_g (Max.) (nC)	8.3
Q_{gs} (nC)	2.3
Q_{gd} (nC)	3.8
Configuration	Single

FEATURES

- Dynamic dV/dt Rating
- Repetitive Avalanche Rated
- 175 °C Operating Temperature
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements



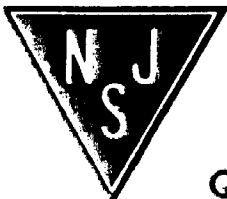
The TO-220AB package is universally preferred for all commercial-industrial applications at power dissipation levels to approximately 50 W. The low thermal resistance and low package cost of the TO-220AB contribute to its wide acceptance throughout the industry.

ORDERING INFORMATION	
Package	TO-220AB
Lead (Pb)-free	IRF510PbF
	SiHF510-E3
SnPb	IRF510
	SiHF510

ABSOLUTE MAXIMUM RATINGS ($T_C = 25\text{ }^\circ\text{C}$, unless otherwise noted)			
PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current	V_{GS} at 10 V	$T_C = 25\text{ }^\circ\text{C}$	A
		$T_C = 100\text{ }^\circ\text{C}$	
Pulsed Drain Current ^a	I_{DM}	20	
Linear Derating Factor		0.29	W/ $^\circ\text{C}$
Single Pulse Avalanche Energy ^b	E_{AS}	100	mJ
Repetitive Avalanche Current ^a	I_{AR}	5.6	A
Repetitive Avalanche Energy ^a	E_{AR}	4.3	mJ
Maximum Power Dissipation	$T_C = 25\text{ }^\circ\text{C}$	P_D	43
Peak Diode Recovery dV/dt ^c		dV/dt	5.5
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to + 175	$^\circ\text{C}$
Soldering Recommendations (Peak Temperature)	for 10 s	300 ^d	
Mounting Torque	6-32 or M3 screw		10
			1.1

Notes



- Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
- $V_{DD} = 25\text{ V}$, starting $T_J = 25\text{ }^\circ\text{C}$, $L = 4.8\text{ mH}$, $R_g = 25\text{ }\Omega$, $I_{AS} = 5.6\text{ A}$ (see fig. 12).
- $I_{SD} \leq 5.6\text{ A}$, $dI/dt \leq 75\text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DS}$, $T_J \leq 175\text{ }^\circ\text{C}$.
- 1.6 mm from case.



NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However, NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.

IRF510, SiHF510

THERMAL RESISTANCE RATINGS				
PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient	R_{thJA}	-	62	°C/W
Case-to-Sink, Flat, Greased Surface	R_{thCS}	0.50	-	
Maximum Junction-to-Case (Drain)	R_{thJC}	-	3.5	

SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}$, $I_D = 250\text{ }\mu\text{A}$	100	-	-	V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	Reference to $25\text{ }^\circ\text{C}$, $I_D = 1\text{ mA}$	-	0.12	-	V/°C
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	2.0	-	4.0	V
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 20\text{ V}$	-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 100\text{ V}$, $V_{GS} = 0\text{ V}$	-	-	25	μA
		$V_{DS} = 80\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 150\text{ }^\circ\text{C}$	-	-	250	
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 3.4\text{ A}^b$	-	-	0.54	Ω
Forward Transconductance	g_{fs}	$V_{DS} = 50\text{ V}$, $I_D = 3.4\text{ A}^b$	1.3	-	-	S
Dynamic						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1.0\text{ MHz}$, see fig. 5	-	180	-	pF
Output Capacitance	C_{oss}		-	81	-	
Reverse Transfer Capacitance	C_{rss}		-	15	-	
Total Gate Charge	Q_g	$V_{GS} = 10\text{ V}$, $I_D = 5.6\text{ A}$, $V_{DS} = 80\text{ V}$ $V_{DS} = 10\text{ V}$, see fig. 6 and 13 ^b	-	-	8.3	nC
Gate-Source Charge	Q_{gs}		-	-	2.3	
Gate-Drain Charge	Q_{gd}		-	-	3.8	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 50\text{ V}$, $I_D = 5.6\text{ A}$ $R_g = 24\text{ }\Omega$, $R_D = 8.4\text{ }\Omega$, see fig. 10 ^b	-	6.9	-	ns
Rise Time	t_r		-	16	-	
Turn-Off Delay Time	$t_{d(off)}$		-	15	-	
Fall Time	t_f		-	9.4	-	
Internal Drain Inductance	L_D	Between lead, 6 mm (0.25") from package and center of die contact 	-	4.5	-	nH
Internal Source Inductance	L_S		-	7.5	-	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	MOSFET symbol showing the integral reverse p - n junction diode 	-	-	5.6	A
Pulsed Diode Forward Current ^a	I_{SM}		-	-	20	
Body Diode Voltage	V_{SD}	$T_J = 25\text{ }^\circ\text{C}$, $I_S = 5.6\text{ A}$, $V_{GS} = 0\text{ V}^b$	-	-	2.5	V
Body Diode Reverse Recovery Time	t_{rr}	$T_J = 25\text{ }^\circ\text{C}$, $I_F = 5.6\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}^b$	-	100	200	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	0.44	0.88	μC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by L_S and L_D)				

Notes

- Repetitive rating; pulse width limited by maximum junction temperature (see fig. 11).
- Pulse width $\leq 300\text{ }\mu\text{s}$; duty cycle $\leq 2\%$.