

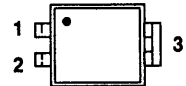
PRODUCT SUMMARY

PART NUMBER	$V_{(BR)DSS}$ (VOLTS)	$r_{DS(on)}$ (OHMS)	I_D (AMPS)
IRFD9220	200	1.5	0.60
IRFD9223	150	2.4	0.45



4-PIN DIP
(Similar to TO-250)

TOP VIEW



1 GATE
2 SOURCE
3 DRAIN

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

PARAMETERS/TEST CONDITIONS		Symbol	IRFD		Units
			9220	9223	
Drain-Source Voltage		V_{DS}	200	150	V
Gate-Source Voltage		V_{GS}	± 40	± 40	
Continuous Drain Current	$T_A = 25^{\circ}\text{C}$	I_D	0.60	0.45	A
	$T_A = 100^{\circ}\text{C}$		0.40	0.30	
Pulsed Drain Current ¹		I_{DM}	4.8	3.6	
Avalanche Current (see figure 9)		I_A	0.6	0.45	
Power Dissipation	$T_A = 25^{\circ}\text{C}$	P_D	1.0	1.0	W
	$T_A = 100^{\circ}\text{C}$		0.4	0.4	
Operating Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150		$^{\circ}\text{C}$
Lead Temperature (1/16" from case for 10 secs.)		T_L	300		

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	Symbol	Typ.	Max.	Units
Junction-to-Ambient	R_{thJA}	-	120	K/W

¹Pulse width limited by maximum junction temperature

²Negative signs for current and voltage values have been omitted for the sake of clarity

ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise noted) **P-Channel Device**
 Negative signs have been omitted for clarity

PARAMETERS/TEST CONDITIONS		Symbol	Min.	Typ.	Max.	Units
Drain-Source Breakdown Voltage $V_{GS} = 0, I_D = 250 \mu\text{A}$	IRFD9220 IRFD9223	$V_{(BR)DSS}$	200 150	— —	— —	V
Gate Threshold Voltage $V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$		$V_{GS(th)}$	2.0	—	4.0	
Gate-Body Leakage $V_{DS} = 0, V_{GS} = \pm 20 \text{ V}$		I_{GSS}	—	—	100	nA
Zero Gate Voltage Drain Current $V_{DS} = V_{(BR)DSS}, V_{GS} = 0$		I_{DSS}	—	—	250	μA
Zero Gate Voltage Drain Current $V_{DS} = 0.8 \times V_{(BR)DSS}, V_{GS} = 0, T_J = 125^\circ\text{C}$		I_{DSS}	—	—	1000	
On-State Drain Current ² $V_{DS} = 5.0 \text{ V}, V_{GS} = 10 \text{ V}$	IRFD9220 IRFD9223	$I_{D(on)}$	0.60 0.45	— —	— —	A
Drain-Source On-State Resistance ² $V_{GS} = 10 \text{ V}, I_D = 0.30 \text{ A}$	IRFD9220 IRFD9223	$r_{DS(on)}$	— —	1.0 2.0	1.5 2.4	Ω
Drain-Source On-State Resistance ² $V_{GS} = 10 \text{ V}, I_D = 0.30 \text{ A}, T_J = 125^\circ\text{C}$	IRFD9220 IRFD9223	$r_{DS(on)}$	— —	2.2 3.5	2.7 4.3	
Forward Transconductance ² $V_{DS} = 15 \text{ V}, I_D = 1.5 \text{ A}$		g_{fs}	1.0	1.4	—	S($^\circ\text{V}$)
Input Capacitance	$V_{GS} = 0$ $V_{DS} = 25 \text{ V}$ $f = 1 \text{ MHz}$	C_{iss}	—	310	400	pF
Output Capacitance		C_{oss}	—	110	125	
Reverse Transfer Capacitance		C_{rss}	—	40	45	
Total Gate Charge	$V_{DS} = 0.8 \times V_{(BR)DSS}$ $V_{GS} = 10 \text{ V}, I_D = 3.6 \text{ A}$ (Gate charge is essentially independent of operating temperature)	Q_g	—	16	22	nC
Gate-Source Charge		Q_{gs}	—	1.0	—	
Gate-Drain Charge		Q_{gd}	—	8.6	—	
Turn-On Delay Time	$V_{DD} = 100 \text{ V}, R_L = 333 \Omega$	$t_{d(on)}$	—	10	40	ns
Rise Time	$I_D = 0.3 \text{ A}, V_{GEN} = 10 \text{ V}$	t_r	—	23	50	
Turn-Off Delay Time	$R_G = 25 \Omega$	$t_{d(off)}$	—	45	50	
Fall Time	(Switching time is essentially independent of operating temperature)	t_f	—	31	40	

SOURCE-DRAIN DIODE RATINGS & CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

PARAMETERS/TEST CONDITIONS	Symbol	Min.	Typ.	Max.	Units
Continuous Current	IRFD9220 IRFD9223	I_S	— —	0.60 0.45	A
Pulsed Current ¹	IRFD9220 IRFD9223	I_{SM}	— —	4.8 3.6	
Forward Voltage ² $I_F = I_S, V_{GS} = 0$	IRFD9220 IRFD9223	V_{SD}	— —	4.0 3.5	V
Reverse Recovery Time $I_F = I_S, dI_F/dt = 100 \text{ A}/\mu\text{s}$		t_{rr}	—	105	ns
Reverse Recovered Charge $I_F = I_S, dI_F/dt = 100 \text{ A}/\mu\text{s}$		Q_{rr}	—	0.23	μC

¹ Pulse width limited by maximum junction temperature

² Pulse test: Pulse width $\leq 300 \mu\text{sec}$, Duty Cycle $\leq 2\%$

PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 1: Typical Output Characteristics

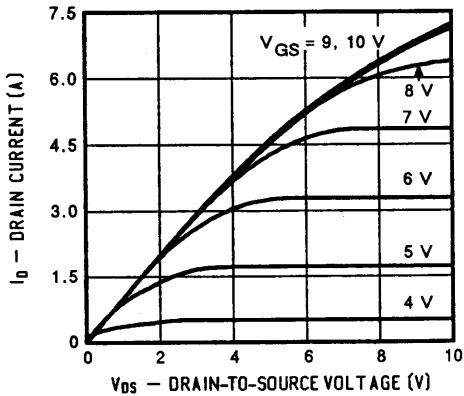


FIGURE 2: Typical Transfer Characteristics

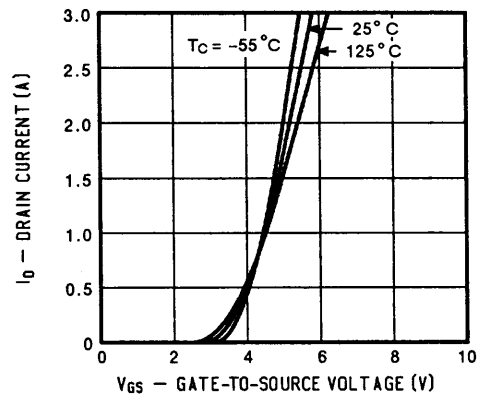


FIGURE 3: Typical Transconductance

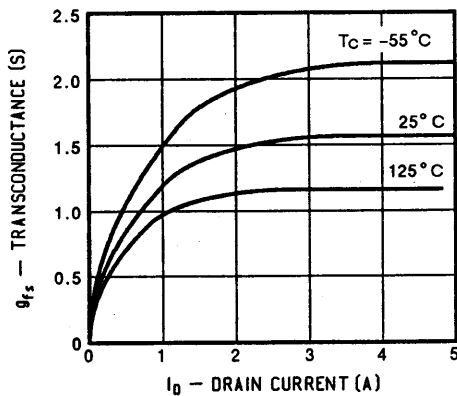


FIGURE 4: Typical On-Resistance

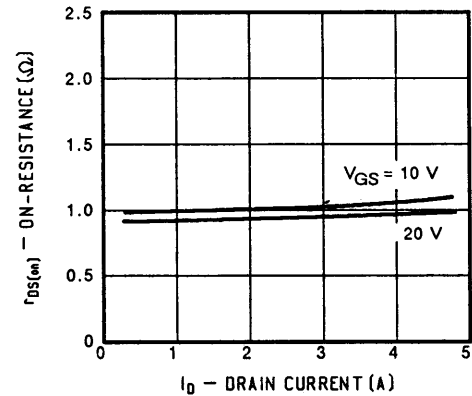


FIGURE 5: Typical Capacitance

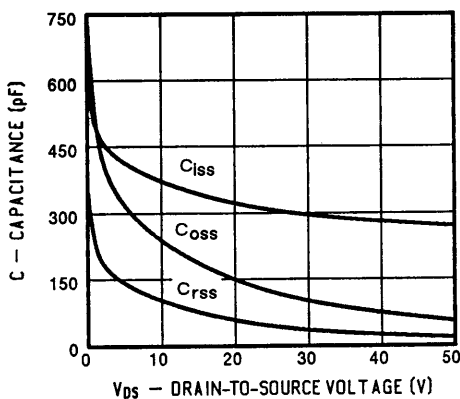
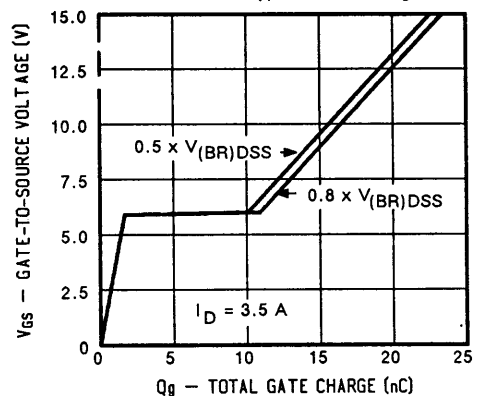


FIGURE 6: Typical Gate Charge



PERFORMANCE CURVES (25°C Unless otherwise noted)

FIGURE 7: On-Resistance vs. Junction Temperature

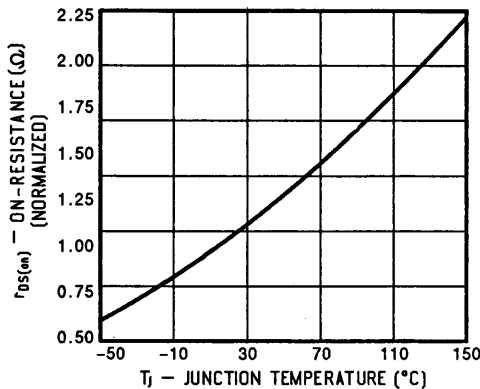


FIGURE 8: Typical Source-Drain Diode Forward Voltage

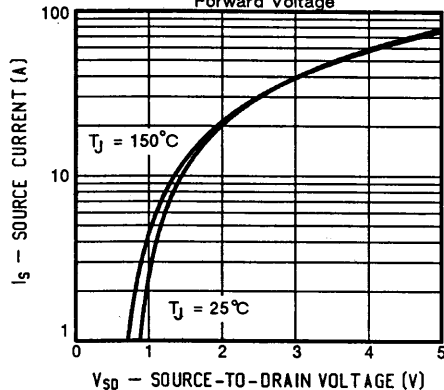


FIGURE 9: Maximum Avalanche and Drain Current vs. Ambient Temperature

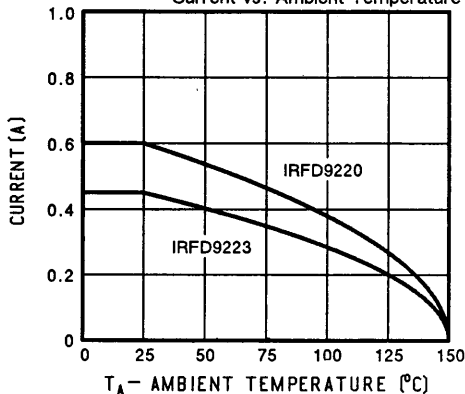


FIGURE 10: Safe Operating Area

