



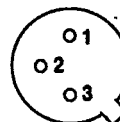
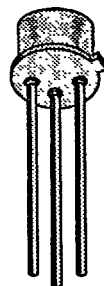
IRFF9130/9131/9132/9133

P-Channel Enhancement Mode Transistors

T-39-19

TO-205AF

BOTTOM VIEW



1 DRAIN
2 GATE
3 SOURCE

PRODUCT SUMMARY

PART NUMBER	$V_{(BR)DSS}$ (V)	$r_{DS(ON)}$ (Ω)	I_D (A)
IRFF9130	-100	0.30	-6.5
IRFF9131	-60	0.30	-6.5
IRFF9132	-100	0.40	-5.5
IRFF9133	-60	0.40	-5.5

ABSOLUTE MAXIMUM RATINGS ($T_C = 25^\circ\text{C}$ Unless Otherwise Noted)¹

PARAMETERS/TEST CONDITIONS		SYMBOL	IRFF				UNITS
			9130	9131	9132	9133	
Drain-Source Voltage		V _{DS}	100	60	100	60	V
Gate-Source Voltage		V _{GS}	± 20	± 20	± 20	± 20	
Continuous Drain Current	T _C = 25°C	I _D	6.5	6.5	5.5	5.5	A
	T _C = 100°C		4.1	4.1	3.5	3.5	
Pulsed Drain Current ²		I _{DM}	26	26	23	23	
Avalanche Current (See Figure 9)		I _A	6.5	6.5	5.5	5.5	
Power Dissipation	T _C = 25°C	P _D	25	25	25	25	W
	T _C = 100°C		10	10	10	10	
Operating Junction & Storage Temperature Range		T _J , T _{stg}	-55 to 150				°C
Lead Temperature (1/16" from case for 10 sec.)		T _L	300				

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THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Case	R_{thJC}		5.0	K/W
Junction-to-Ambient	R_{thJA}		175	

¹Negative signs for current and voltage ratings have been omitted for the sake of clarity.²Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, Figure 11).

IRFF9130/9131/9132/9133



ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ Unless Otherwise Noted)
P-Channel Device - Negative Signs Have Been Omitted for Clarity

T-39-19

PARAMETER		SYMBOL	TEST CONDITIONS	TYP	LIMITS		UNIT
					MIN	MAX	
STATIC							
Drain-Source Breakdown Voltage	IRFF9130, 9132 IRFF9131, 9133	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$		100 60		V
Gate Threshold Voltage		$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$		2.0	4.0	
Gate-Body Leakage		I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current		I_{DSS}	$V_{DS} = V_{(BR)DSS}, V_{GS} = 0\text{ V}$			250	μA
			$V_{DS} = 0.8 \times V_{(BR)DSS}, V_{GS} = 0\text{ V}, T_J = 125^\circ\text{C}$			1000	
On-State Drain Current ¹	IRFF9130, 9131 IRFF9132, 9133	$I_{D(ON)}$	$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$		6.5 5.5		A
Drain-Source On-State Resistance ¹	IRFF9130, 9131 IRFF9132, 9133	$r_{DS(ON)}$	$V_{GS} = 10\text{ V}, I_D = 3\text{ A}$	0.25 0.30		0.30 0.40	Ω
	IRFF9130, 9131 IRFF9132, 9133		$V_{GS} = 10\text{ V}, I_D = 3\text{ A}$ $T_J = 125^\circ\text{C}$	0.40 0.48		0.48 0.64	
Forward Transconductance ¹		g_{fs}	$V_{DS} = 15\text{ V}, I_D = 3\text{ A}$	2.8	2.5		S
DYNAMIC							
Input Capacitance		C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	625			pF
Output Capacitance		C_{oss}		280			
Reverse Transfer Capacitance		C_{rss}		105			
Total Gate Charge ²		Q_g	$V_{DS} = 0.5 \times V_{(BR)DSS}, V_{GS} = 10\text{ V}, I_D = 6.5\text{ A}$	22.5	15	45	nC
Gate-Source Charge ²		Q_{gs}		3.5	2	9	
Gate-Drain Charge ²		Q_{gd}		13	6	20	
Turn-On Delay Time ²		$t_{d(on)}$	$V_{DD} = 40\text{ V}, R_L = 13\text{ }\Omega$ $I_D \approx 3\text{ A}, V_{GEN} = 10\text{ V}, R_G = 25\text{ }\Omega$	9		60	ns
Rise Time ²		t_r		30		140	
Turn-Off Delay Time ²		$t_{d(off)}$		66		140	
Fall Time ²		t_f		34		140	
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_c = 25^\circ\text{C}$)							
Continuous Current	IRFF9130, 9131 IRFF9132, 9133	I_S			6.5 5.5		A
Pulsed Current ³	IRFF9130, 9131 IRFF9132, 9133	I_{SM}			26 22		
Forward Voltage ¹	IRFF9130, 9131 IRFF9132, 9133	V_{SD}	$I_F = I_S, V_{GS} = 0\text{ V}$		6.3 6.0		V
Reverse Recovery Time		t_{rr}	$I_F = I_S, dI_F/dt = 100\text{ A}/\mu\text{s}$	100			ns
Reverse Recovery Charge		Q_{rr}		0.4			μC

¹Pulse test: Pulse Width $\leq 300\text{ }\mu\text{sec}$, Duty Cycle $\leq 2\%$.

²Independent of operating temperature.

³Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, Figure 11).



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TYPICAL CHARACTERISTICS (25°C Unless Otherwise Specified)

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Figure 1. Output Characteristics

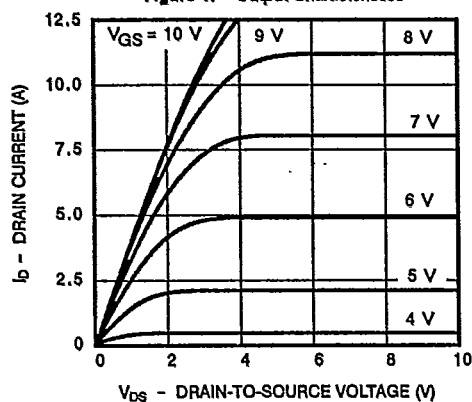


Figure 2. Transfer Characteristics

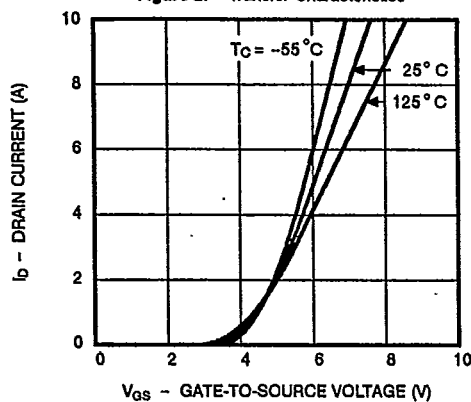


Figure 3. Transconductance

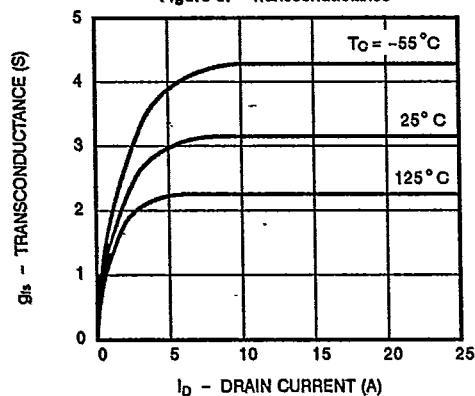


Figure 4. On-Resistance

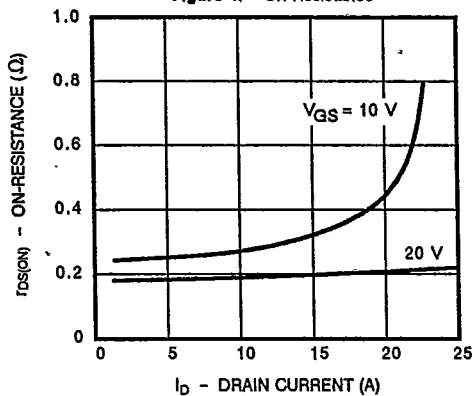


Figure 5. Capacitance

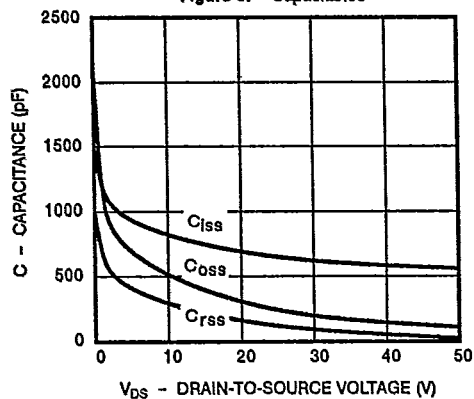
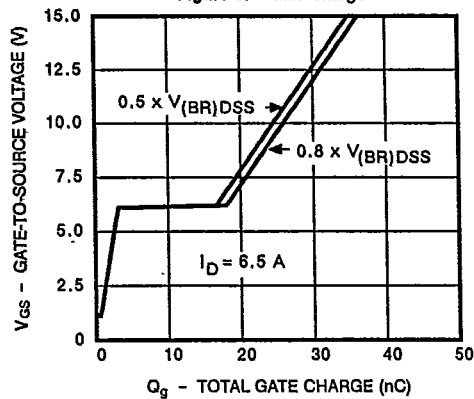


Figure 6. Gate Charge



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TYPICAL CHARACTERISTICS (Cont'd)

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Figure 7. On-Resistance vs. Junction Temperature

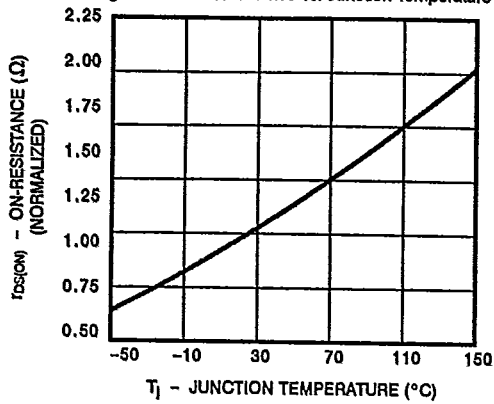
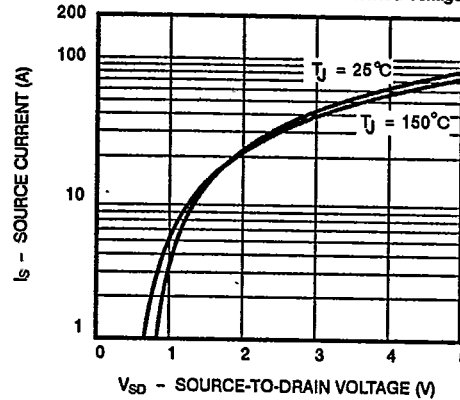


Figure 8. Source-Drain Diode Forward Voltage



THERMAL RATINGS

Figure 9. Maximum Avalanche and Drain Current vs. Case Temperature

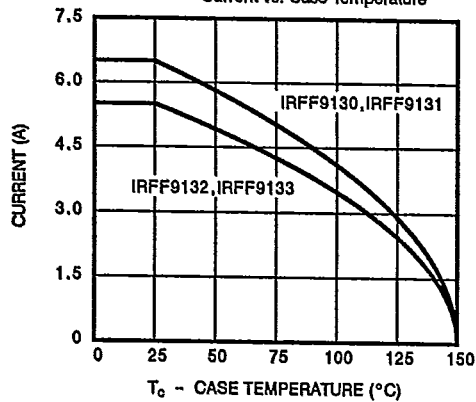


Figure 10. Safe Operating Area

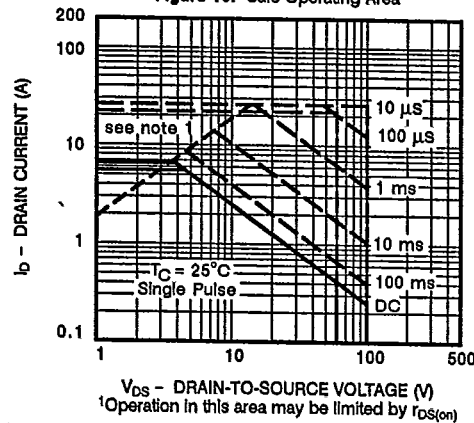


Figure 11. Normalized Effective Transient Thermal Impedance, Junction-to-Case

