

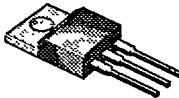
P-Channel Enhancement Mode Transistors

T-39-21

PRODUCT SUMMARY

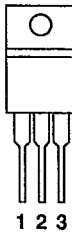
PART NUMBER	V _{(BR)DSS} (V)	r _{DS(ON)} (Ω)	I _D (A)
IRF9630	200	0.80	6.5
IRF9631	150	0.80	6.5
IRF9632	200	1.2	5.5
IRF9633	150	1.2	5.5

TO-220AB



- 1 GATE
- 2 DRAIN (Connected to TAB)
- 3 SOURCE

TOP VIEW



ABSOLUTE MAXIMUM RATINGS (T_C = 25°C Unless Otherwise Noted)¹

PARAMETERS/TEST CONDITIONS		SYMBOL	IRF				UNITS
			9630	9631	9632	9633	
Gate-Source Voltage		V _{GS}	± 20	± 20	± 20	± 20	V
Continuous Drain Current	T _C = 25°C	I _D	6.5	6.5	5.5	5.5	A
	T _C = 100°C		4.0	4.0	3.5	3.5	
Pulsed Drain Current ²		I _{DM}	26	26	22	22	
Avalanche Current (See Figure 9)		I _{AR}	6.5	6.5	6.5	6.5	
Repetitive Avalanche Energy ³	L = 0.1 mH	E _{AR}	2.1	2.1	2.1	2.1	mJ
Power Dissipation	T _C = 25°C	P _D	75	75	75	75	W
	T _C = 100°C		30	30	30	30	
Operating Junction & Storage Temperature Range		T _J , T _{slg}	-55 to 150				°C
Lead Temperature (1/16" from case for 10 sec.)		T _L	300				

THERMAL RESISTANCE RATINGS¹

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Case	R _{thJC}		1.67	K/W
Junction-to-Ambient	R _{thJA}		80	
Case-to-Sink	R _{thCS}	1.0		

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).
³Duty cycle ≤ 1%.

IRF9630/9631/9632/9633



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

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P-Channel Device – Negative Signs have Been Omitted for Clarity

PARAMETER	SYMBOL	TEST CONDITIONS	TYP	LIMITS		UNIT
				MIN	MAX	
STATIC						
Drain-Source Breakdown Voltage	IRF9630, 9632 IRF9631, 9633	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$		200 150	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}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 500 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	IRF9630, 9631 IRF9632, 9633	$I_{D(ON)}$	$V_{DS} = 10\text{ V}, V_{GS} = 10\text{ V}$		6.5 5.5	A
Drain-Source On-State Resistance ¹	IRF9630, 9631 IRF9632, 9633	$r_{DS(ON)}$	$V_{GS} = 10\text{ V}, I_D = 3.5\text{ A}$	0.50 0.80		0.80 1.20 Ω
	$V_{GS} = 10\text{ V}, I_D = 3.5\text{ A}$ $T_J = 125^\circ\text{C}$		1.0 1.6		1.6 2.4	
Forward Transconductance ¹		g_{fs}	$V_{DS} = 15\text{ V}, I_D = 3.5\text{ A}$	2.6	2.2	S
DYNAMIC						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	630		650	pF
Output Capacitance	C_{oss}		220		300	
Reverse Transfer Capacitance	C_{rss}		70		90	
Total Gate Charge ²	Q_g	$V_{DS} = 0.8 \times V_{(BR)DSS}, V_{GS} = 10\text{ V}, I_D = 8\text{ A}$	30		45	nC
Gate-Source Charge ²	Q_{gs}		3.4			
Gate-Drain Charge ²	Q_{gd}		16			
Turn-On Delay Time ²	$t_{d(on)}$	$V_{DD} = 100\text{ V}, R_L = 28\text{ }\Omega$ $I_D \simeq 3.5\text{ A}, V_{GEN} = 10\text{ V}, R_G = 25\text{ }\Omega$	6.5		50	ns
Rise Time ²	t_r		33		100	
Turn-Off Delay Time ²	$t_{d(off)}$		30		100	
Fall Time ²	t_f		21		80	
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_C = 25^\circ\text{C}$)						
Continuous Current	IRF9630, 9631 IRF9632, 9633	I_S			6.5 5.5	A
Pulsed Current ³	IRF9630, 9631 IRF9632, 9633	I_{SM}			26 22	
Forward Voltage ¹	IRF9630, 9631 IRF9632, 9633	V_{SD}	$I_F = I_S, V_{GS} = 0\text{ V}$		6.5 6.3	V
Reverse Recovery Time		t_{rr}	$I_F = I_S, dI_F/dt = 100\text{ A}/\mu\text{s}$	160		ns
Reverse Recovery Charge		Q_{rr}		1.6		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

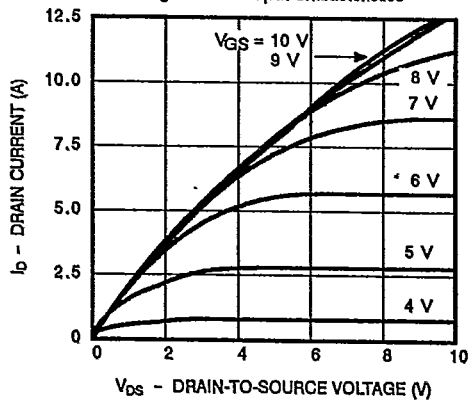


Figure 2. Transfer Characteristics

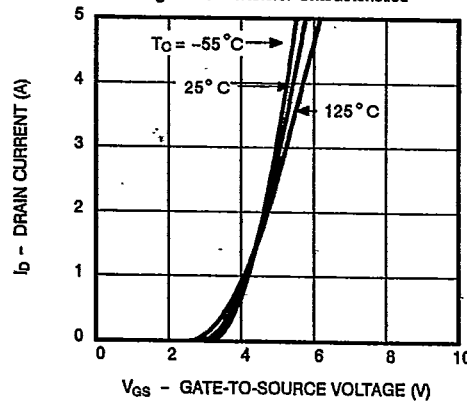


Figure 3. Transconductance

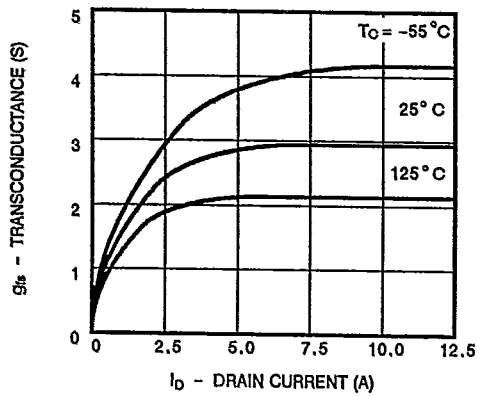


Figure 4. On-Resistance

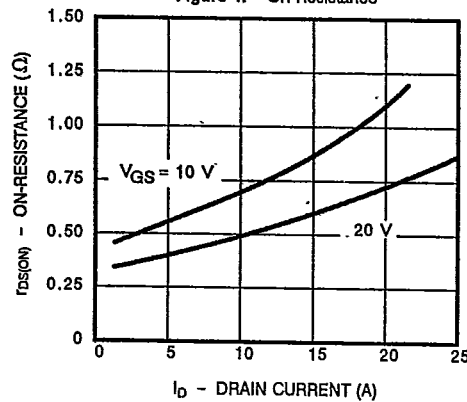


Figure 5. Capacitance

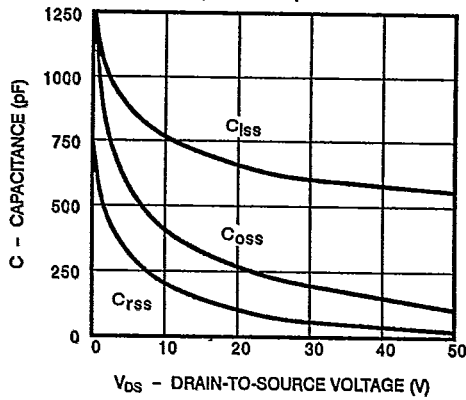
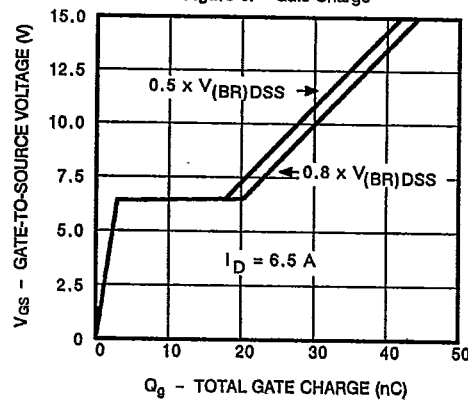
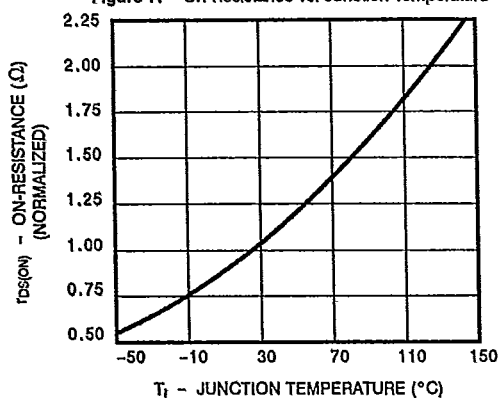
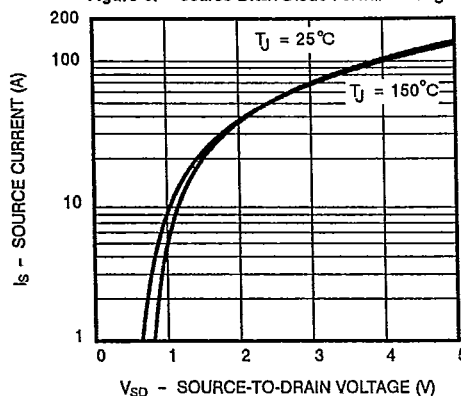
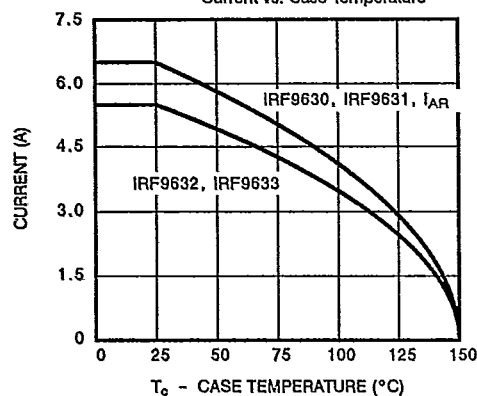
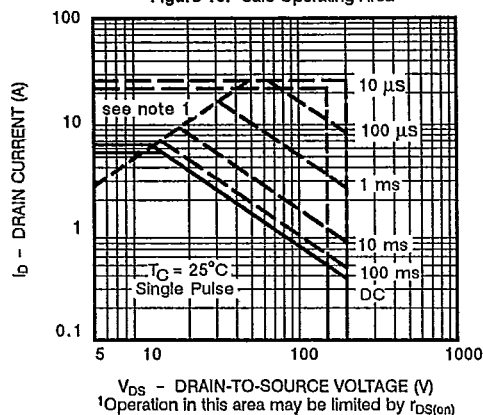


Figure 6. Gate Charge



IRF9630/9631/9632/9633**TYPICAL CHARACTERISTICS (Cont'd)****T-39-21****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**