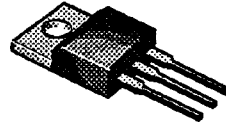


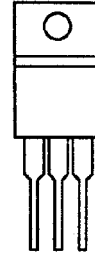
PRODUCT SUMMARY

PART NUMBER	$V_{(BR)DSS}$ (V)	$r_{DS(ON)}$ (Ω)	I_D (A)
IRF9530	-100	0.30	-12
IRF9531	-60	0.30	-12
IRF9532	-100	0.40	-10
IRF9533	-60	0.40	-10

TO-220AB



TOP VIEW



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

1 2 3

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

PARAMETERS/TEST CONDITIONS	SYMBOL	IRF				UNITS	
		9530	9531	9532	9533		
Gate-Source Voltage	V_{GS}	± 20	± 20	± 20	± 20	V	
Continuous Drain Current	$T_C = 25^\circ\text{C}$	12	12	10	10	A	
	$T_C = 100^\circ\text{C}$	7.5	7.5	6.5	6.5		
Pulsed Drain Current ²	I_{DM}	48	48	40	40	A	
Avalanche Current (See Figure 9)	I_{AR}	12	12	12	12		
Repetitive Avalanche Energy ³	$L = 0.1$ mH	E_{AR}	7.2	7.2	7.2	7.2	mJ
Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	75	75	75	75	W
	$T_C = 100^\circ\text{C}$		30	30	30	30	
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					

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 $\leq 1\%$.

IRF9530/9531/9532/9533



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

PARAMETER	SYMBOL	TEST CONDITIONS	TYP	LIMITS		UNIT	
				MIN	MAX		
STATIC							
Drain-Source Breakdown Voltage	IRF9530, 9532 IRF9531, 9533	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$		100 60	V	
Gate Threshold Voltage		$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$		2.0	4.0	
Gate-Body Leakage		I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 500	
Zero Gate Voltage Drain Current		I_{DSS}	$V_{DS} = V_{(BR)DSS}, V_{GS} = 0\text{ V}$			250	
			$V_{DS} = 0.8 \times V_{(BR)DSS}, V_{GS} = 0\text{ V}, T_J = 125^\circ\text{C}$			1000	
On-State Drain Current ¹	IRF9530, 9531 IRF9532, 9533	$I_{D(ON)}$	$V_{DS} = 10\text{ V}, V_{GS} = 10\text{ V}$		12 10	A	
Drain-Source On-State Resistance ¹	IRF9530, 9531 IRF9532, 9533	$r_{DS(ON)}$	$V_{GS} = 10\text{ V}, I_D = 6.5\text{ A}$	0.25 0.30		0.30 0.40	
	IRF9530, 9531 IRF9532, 9533		$V_{GS} = 10\text{ V}, I_D = 6.5\text{ A}$ $T_J = 125^\circ\text{C}$	0.40 0.48		0.48 0.64	
Forward Transconductance ¹		g_{fs}	$V_{DS} = 15\text{ V}, I_D = 6.5\text{ A}$	3.2	2.0	S	
DYNAMIC							
Input Capacitance		C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	625		700	
Output Capacitance		C_{oss}			280		450
Reverse Transfer Capacitance		C_{rss}			105		200
Total Gate Charge ²		Q_g	$V_{DS} = 0.8 \times V_{(BR)DSS}, V_{GS} = 10\text{ V}, I_D = 15\text{ A}$	26		45	
Gate-Source Charge ²		Q_{gs}			3.4		
Gate-Drain Charge ²		Q_{gd}			13.5		
Turn-On Delay Time ²		$t_{d(on)}$	$V_{DD} = 40\text{ V}, R_L = 6\ \Omega$ $I_D \approx 6.5\text{ A}, V_{GEN} = 10\text{ V}, R_G = 25\ \Omega$	9		60	
Rise Time ²		t_r			50		140
Turn-Off Delay Time ²		$t_{d(off)}$			60		140
Fall Time ²		t_f			40		140
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_C = 25^\circ\text{C}$)							
Continuous Current	IRF9530, 9531 IRF9532, 9533	I_S				12 10	
Pulsed Current ³	IRF9530, 9531 IRF9532, 9533	I_{SM}				48 40	
Forward Voltage ¹	IRF9530, 9531 IRF9532, 9533	V_{SD}	$I_F = I_S, V_{GS} = 0\text{ V}$			6.3 6.0	
Reverse Recovery Time		t_{rr}	$I_F = I_S, di_F/dt = 100\text{ A}/\mu\text{s}$	110		ns	
Reverse Recovery Charge		Q_{rr}			0.4		μC

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

²Independent of operating temperature.

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

TYPICAL CHARACTERISTICS (25°C Unless Otherwise Specified)

Figure 1. Output Characteristics

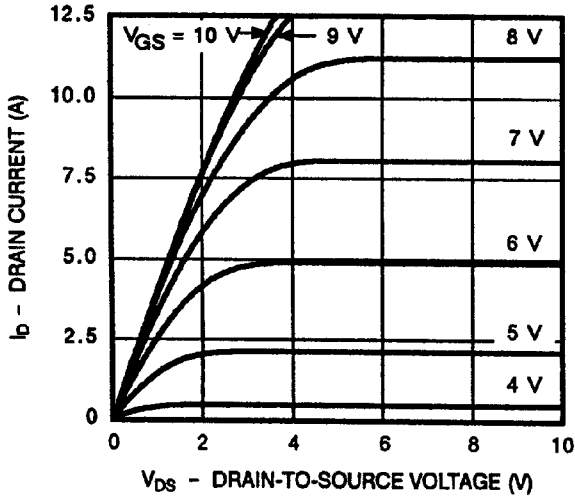


Figure 2. Transfer Characteristics

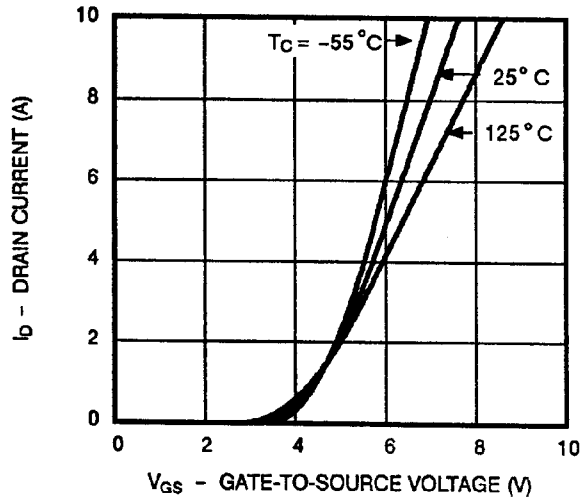


Figure 3. Transconductance

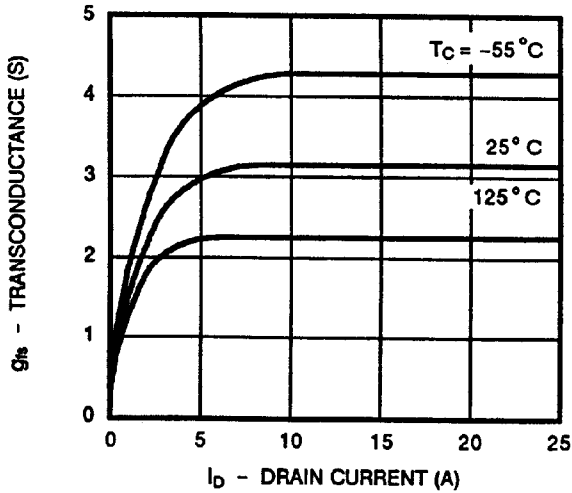


Figure 4. On-Resistance

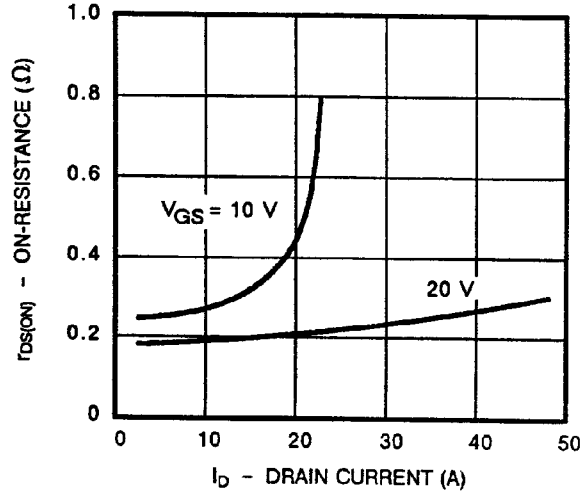


Figure 5. Capacitance

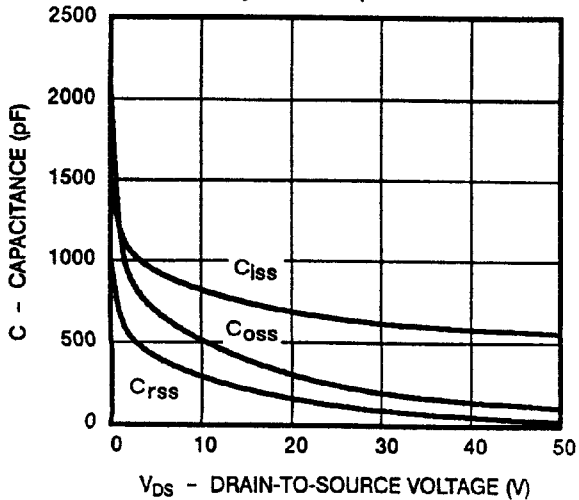
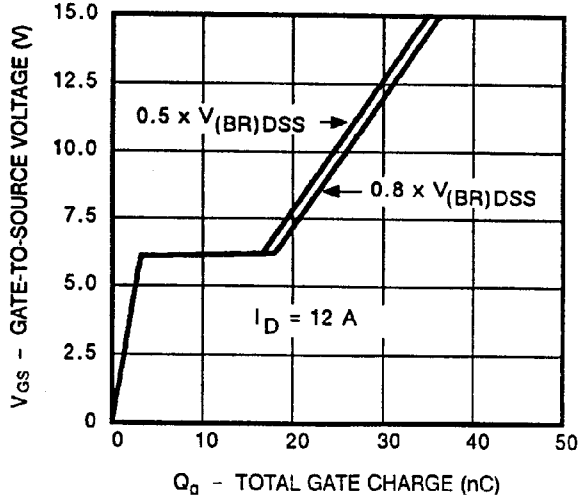


Figure 6. Gate Charge



TYPICAL CHARACTERISTICS (Cont'd)

Figure 7. On-Resistance vs. Junction Temperature

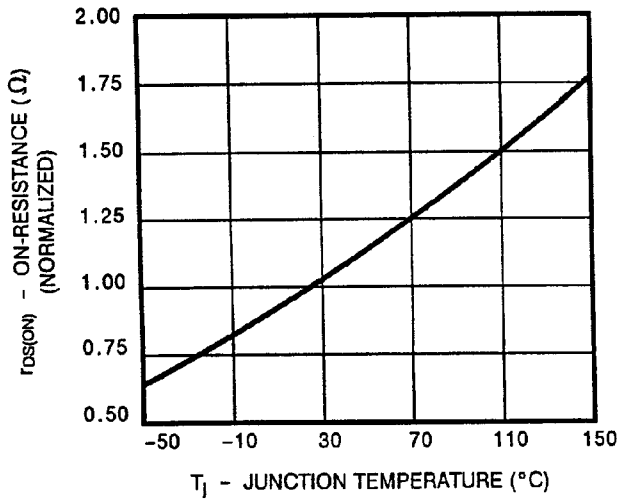
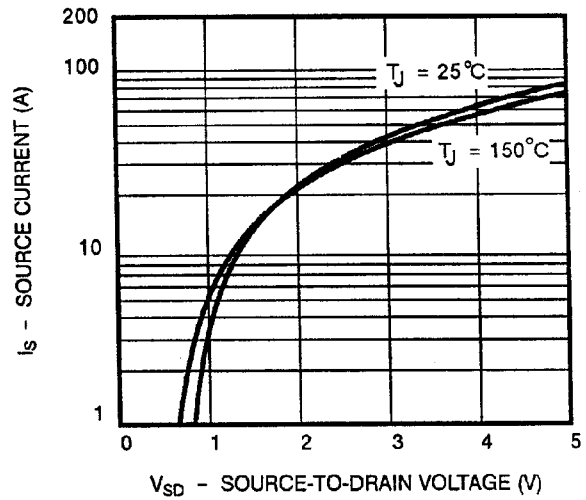


Figure 8. Source-Drain Diode Forward Voltage



THERMAL RATINGS

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

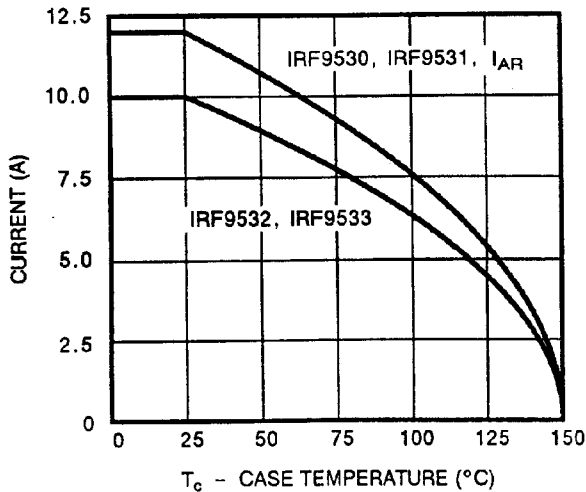


Figure 10. Safe Operating Area

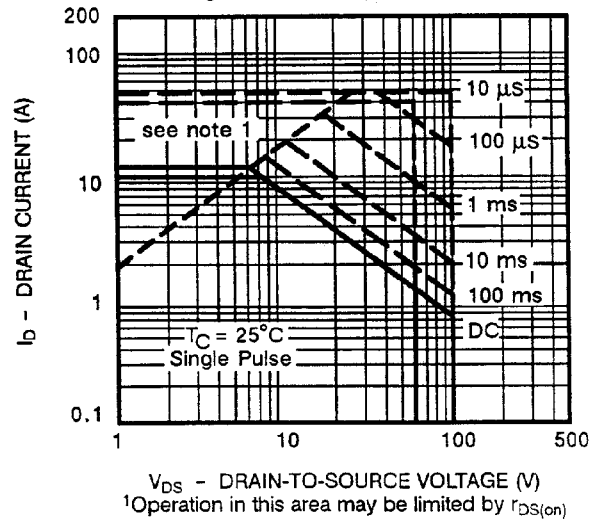


Figure 11. Normalized Effective Transient Thermal Impedance, Junction-to-Case

