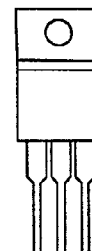
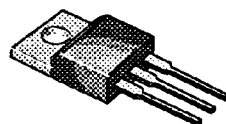


PRODUCT SUMMARY

PART NUMBER	$V_{(BR)DSS}$ (V)	$r_{DS(ON)}$ (Ω)	I_D (A)
IRF540	100	0.085	27
IRF541	60	0.085	27
IRF542	100	0.11	24
IRF543	60	0.11	24

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)

PARAMETERS/TEST CONDITIONS		SYMBOL	IRF				UNITS
			540	541	542	543	
Gate-Source Voltage		V_{GS}	± 20	± 20	± 20	± 20	V
Continuous Drain Current	$T_C = 25^{\circ}\text{C}$	I_D	27	27	24	24	A
	$T_C = 100^{\circ}\text{C}$		17	17	15	15	
Pulsed Drain Current ¹		I_{DM}	108	108	96	96	
Avalanche Current (See Figure 9)		I_{AR}	27	27	27	27	
Repetitive Avalanche Energy ²	L = 0.1 mH	E_{AR}	36	36	36	36	mJ
Power Dissipation	$T_C = 25^{\circ}\text{C}$	P_D	125	125	125	125	W
	$T_C = 100^{\circ}\text{C}$		50	50	50	50	
Operating Junction & Storage Temperature Range		T_J, T_{stg}	-55 to 150				$^{\circ}\text{C}$
Lead Temperature (¹ / ₁₆ " from case for 10 sec.)		T_L	300				

THERMAL RESISTANCE RATINGS

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

¹Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, Figure 11).

²Duty cycle $\leq 1\%$.

IRF540/541/542/543



ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ Unless Otherwise Noted)

PARAMETER		SYMBOL	TEST CONDITIONS	TYP	LIMITS		UNIT
					MIN	MAX	
STATIC							
Drain-Source Breakdown Voltage	IRF540, 542 IRF541, 543	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$		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}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 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	IRF540, 541 IRF542, 543	$I_{D(ON)}$	$V_{DS} = 10\text{ V}, V_{GS} = 10\text{ V}$		27 24		A
Drain-Source On-State Resistance ¹	IRF540, 541 IRF542, 543	$r_{DS(ON)}$	$V_{GS} = 10\text{ V}, I_D = 15\text{ A}$	0.50 0.09		0.085 0.110	Ω
	IRF540, 541 IRF542, 543		$V_{GS} = 10\text{ V}, I_D = 15\text{ A}$ $T_J = 125^\circ\text{C}$	0.10 0.15		0.15 0.19	
Forward Transconductance ¹		g_{fs}	$V_{DS} = 15\text{ V}, I_D = 15\text{ A}$	8	6.0		S
DYNAMIC							
Input Capacitance		C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	1500		1600	pF
Output Capacitance		C_{oss}		480		800	
Reverse Transfer Capacitance		C_{rss}		110		200	
Total Gate Charge ²		Q_g	$V_{DS} = 0.5 \times V_{(BR)DSS}, V_{GS} = 10\text{ V}, I_D = 27\text{ A}$	38		60	nC
Gate-Source Charge ²		Q_{gs}		10			
Gate-Drain Charge ²		Q_{gd}		17			
Turn-On Delay Time ²		$t_{d(on)}$	$V_{DD} = 30\text{ V}, R_L = 2\text{ }\Omega$ $I_D \simeq 15\text{ A}, V_{GEN} = 10\text{ V}, R_G = 4.7\text{ }\Omega$	10		30	ns
Rise Time ²		t_r		40		60	
Turn-Off Delay Time ²		$t_{d(off)}$		30		80	
Fall Time ²		t_f		12		30	
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_C = 25^\circ\text{C}$)							
Continuous Current	IRF540, 541 IRF542, 543	I_S				27 24	A
Pulsed Current ³	IRF540, 541 IRF542, 543	I_{SM}				108 96	
Forward Voltage ¹	IRF540, 541 IRF542, 543	V_{SD}	$I_F = I_S, V_{GS} = 0\text{ V}$			2.5 2.3	V
Reverse Recovery Time		t_{rr}	$I_F = I_S, dI_F/dt = 100\text{ A}/\mu\text{s}$	150			ns
Reverse Recovery Charge		Q_{rr}		0.5			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).

Figure 1. Output Characteristics

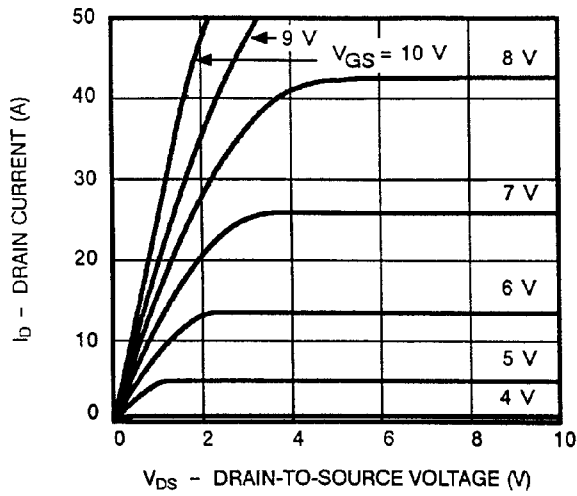


Figure 2. Transfer Characteristics

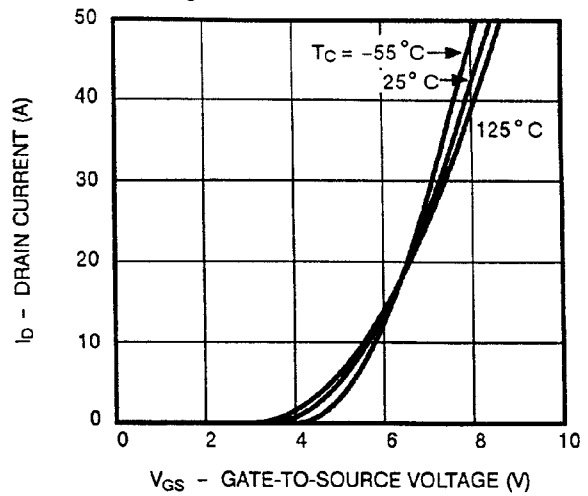


Figure 3. Transconductance

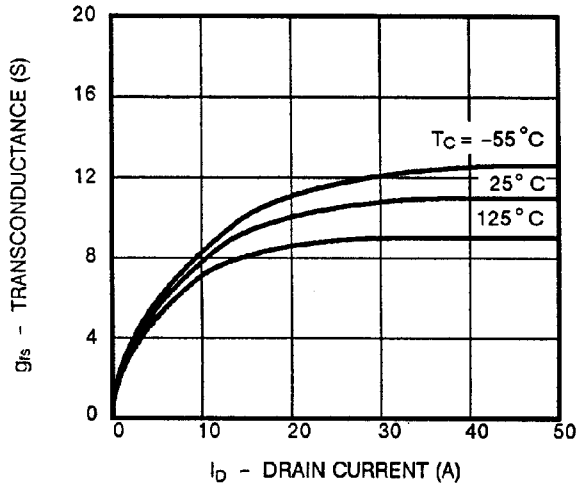


Figure 4. On-Resistance

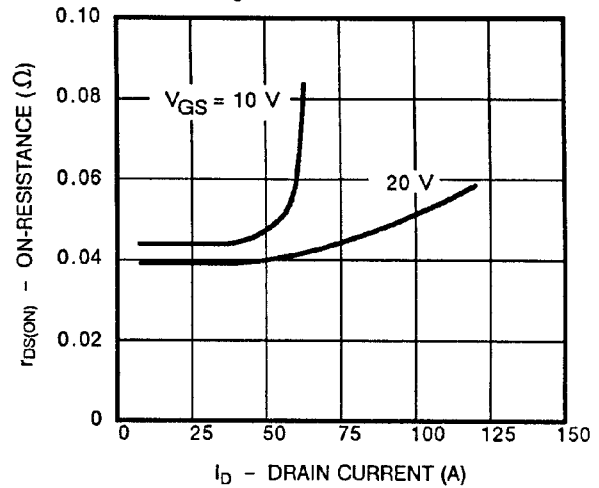


Figure 5. Capacitance

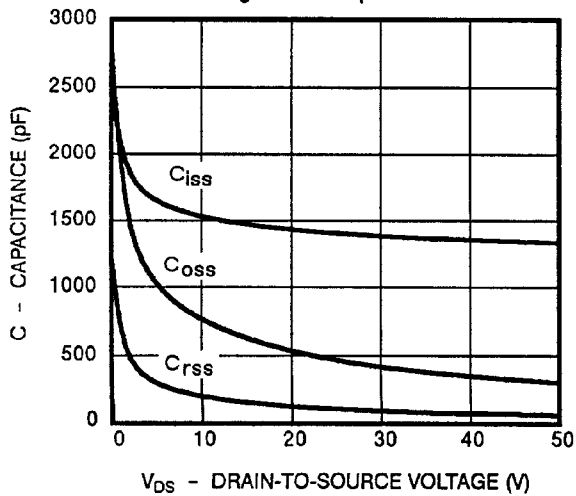
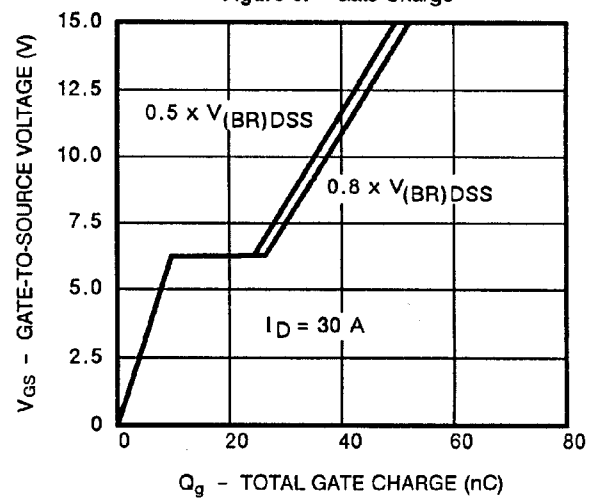


Figure 6. Gate Charge



IRF540/541/542/543



TYPICAL CHARACTERISTICS (Cont'd)

Figure 7. On-Resistance vs. Junction Temperature

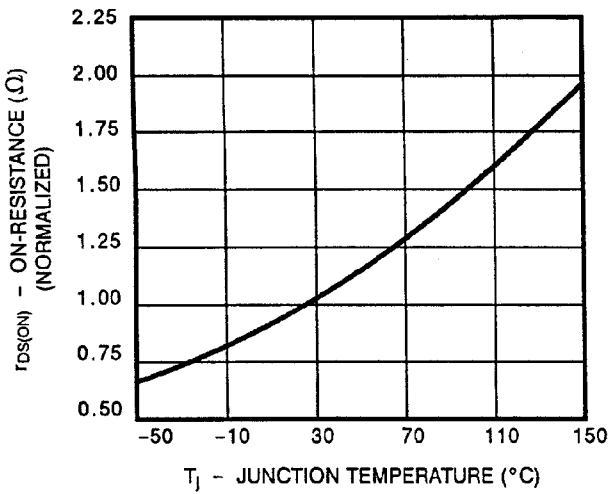
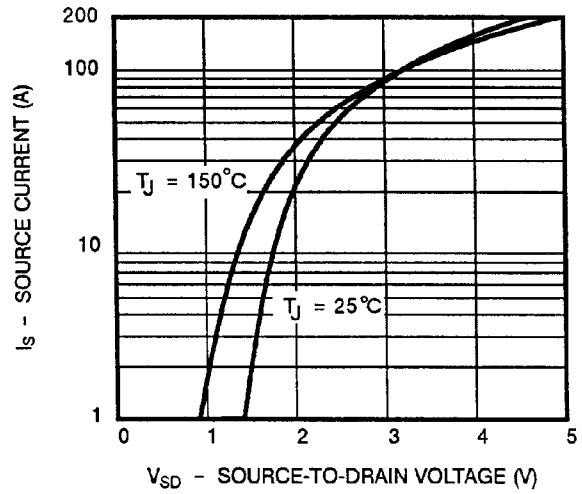


Figure 8. Source-Drain Diode Forward Voltage



THERMAL RATINGS

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

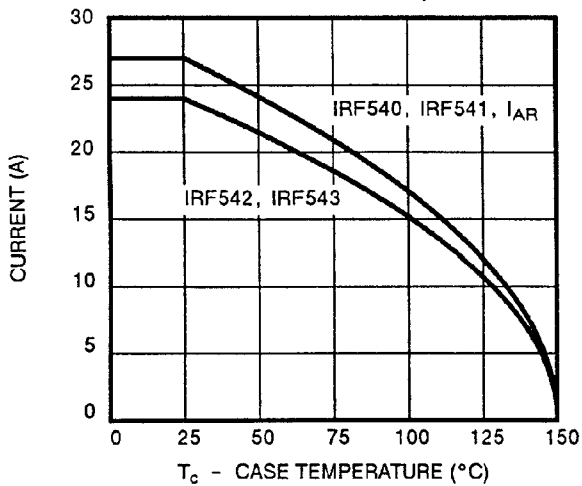


Figure 10. Safe Operating Area

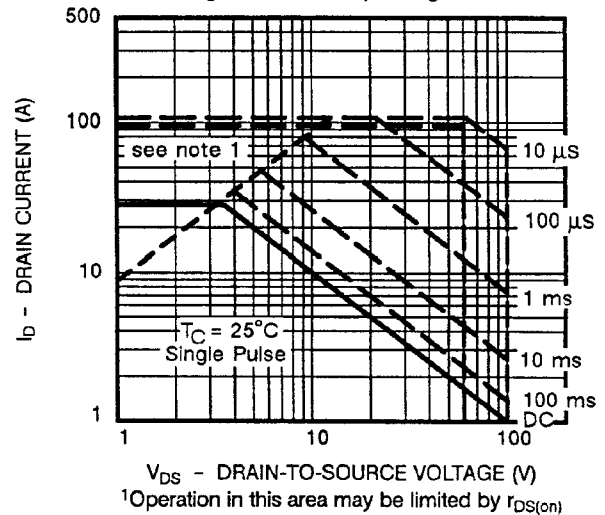


Figure 11. Normalized Effective Transient Thermal Impedance, Junction-to-Case

