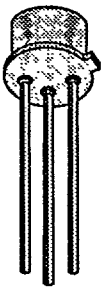
Siliconix incorporated

IRFF320/321/322/323

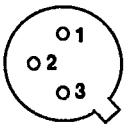
N-Channel Enhancement Mode Transistors

T-39-09

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)
IRFF320	400	1.8	2.5
IRFF321	350	1.8	2.5
IRFF322	400	2.5	2.0
IRFF323	350	2.5	2.0

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

PARAMETERS/TEST CONDITIONS		SYMBOL	IRFF 320	IRFF 321	IRFF 322	IRFF 323	UNITS
Drain-Source Voltage		V_{DS}	400	350	400	350	V
Gate-Source Voltage		V_{GS}	±20	±20	±20	±20	
Continuous Drain Current	T_C = 25°C	I_D	2.5	2.5	2.0	2.0	A
	T_C = 100°C		2.6	2.6	1.2	1.2	
Pulsed Drain Current[1]		I_{DM}	10	10	8	8	
Avalanche Current (See Figure 9)		I_A	2.5	2.5	2.0	2.0	
Power Dissipation	T_C = 25°C	P_D	20	20	20	20	W
	T_C = 100°C		8	8	8	8	
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				

4

THERMAL RESISTANCE RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Case	R_{thJC}		6.25	K/W
Junction-to-Ambient	R_{thJA}		175	

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

IRFF320/321/322/323

Siliconix incorporated

T-39-09

ELECTRICAL CHARACTERISTICS (T_J = 25°C Unless Otherwise Noted)

PARAMETER		SYMBOL	TEST CONDITIONS	TYP	LIMITS MIN	LIMITS MAX	UNIT
STATIC							
Drain-Source Breakdown Voltage	IRFF320, 322 IRFF321, 323	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 250 µA		400 350		V
Gate Threshold Voltage		$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA		2.0	4.0	
Gate-Body Leakage		I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current		I_{DSS}	V_{DS} = $V_{(BR)DSS}$, V_{GS} = 0 V			250	µA
			V_{DS} = 0.8 x $V_{(BR)DSS}$, V_{GS} = 0 V, T_J = 125°C			1000	
On-State Drain Current[1]	IRFF320, 321 IRFF322, 323	$I_{D(ON)}$	V_{DS} = 5 V, V_{GS} = 10 V		2.5 2.0		A
Drain-Source On-State Resistance[1]	IRFF320, 321 IRFF322, 323	$r_{DS(ON)}$	V_{GS} = 10 V, I_D = 1.25 A	1.5 1.8		1.8 2.5	Ω
	IRFF320, 321 IRFF322, 323		V_{GS} = 10 V, I_D = 1.25 A T_J = 125°C	3.0 3.6		3.5 5.0	
Forward Transconductance[1]		g_{fs}	V_{DS} = 15 V, I_D = 1.25 A	1.4	1.0		S
DYNAMIC							
Input Capacitance		C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	385			pF
Output Capacitance		C_{oss}		80			
Reverse Transfer Capacitance		C_{rss}		20			
Total Gate Charge[2]		Q_g	V_{DS} = 0.5 x $V_{(BR)DSS}$, V_{GS} = 10 V, I_D = 2.5 A	10	8.1	18	nC
Gate-Source Charge[2]		Q_{gs}		2.2	1.1	3.5	
Gate-Drain Charge[2]		Q_{gd}		5.1	3	9	
Turn-On Delay Time[2]		$t_{d(on)}$	V_{DD} = 200 V, R_L = 100 Ω I_D ≅ 2 A, V_{GEN} = 10 V, R_G = 25 Ω	8		40	ns
Rise Time[2]		t_r		8		50	
Turn-Off Delay Time[2]		$t_{d(off)}$		48		100	
Fall Time[2]		t_f		20		50	
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25°C)							
Continuous Current	IRFF320, 321 IRFF322, 323	I_S				2.5 2.0	A
Pulsed Current[3]	IRFF320, 321 IRFF322, 323	I_{SM}				10.0 8.0	
Forward Voltage[1]	IRFF320, 321 IRFF322, 323	V_{SD}	I_F = I_S, V_{GS} = 0 V			1.6 1.5	V
Reverse Recovery Time		t_{rr}	I_F = I_S, dI_F/dt = 100 A/µs	250			ns
Reverse Recovery Charge		Q_{rr}		0.15			µC

[1]Pulse test: Pulse Width ≤ 300 µsec, Duty Cycle ≤ 2%.
[2]Independent of operating temperature.
[3]Pulse width limited by maximum junction temperature (refer to transient thermal impedance data, Figure 11).

TYPICAL CHARACTERISTICS (25°C Unless Otherwise Specified)

T-39-09

Figure 23. Output Characteristics

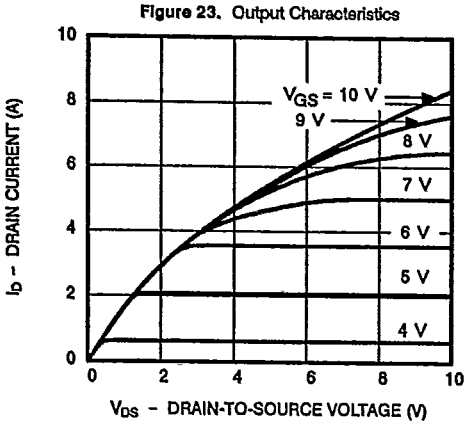


Figure 24. Transfer Characteristics

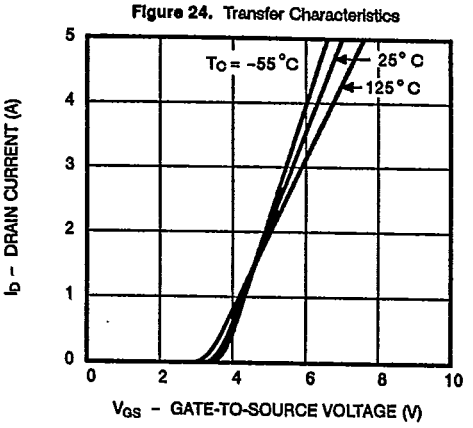


Figure 25. Transconductance

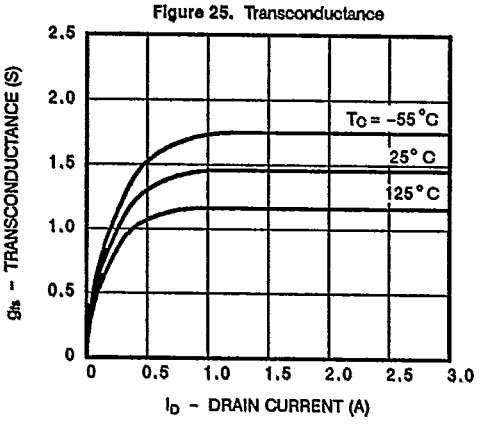


Figure 26. On-Resistance

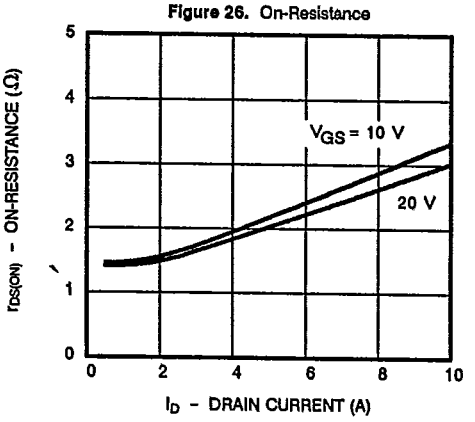


Figure 27. Capacitance

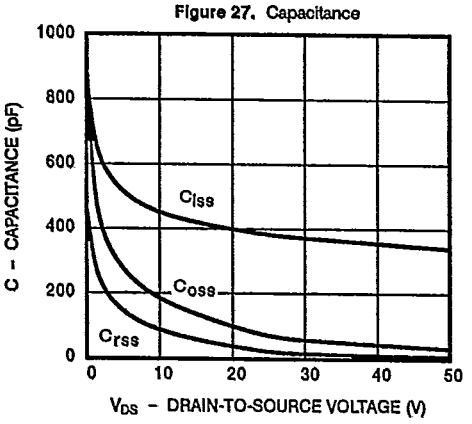
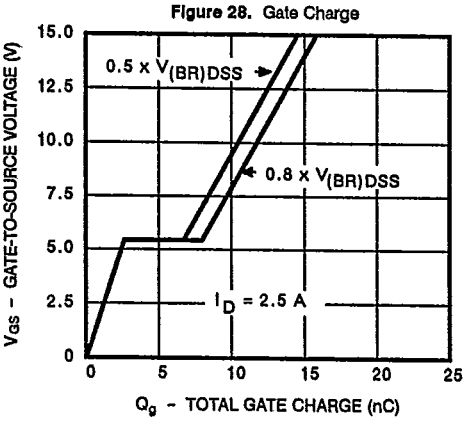


Figure 28. Gate Charge



4

IRFF320/321/322/323

Siliconix incorporated

TYPICAL CHARACTERISTICS (Cont'd)

T-39-09

Figure 29. On-Resistance vs. Junction Temperature

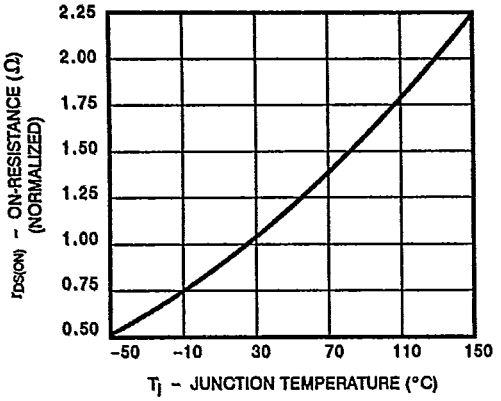
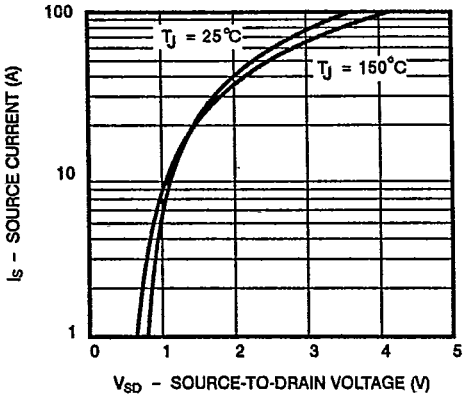


Figure 30. Source-Drain Diode Forward Voltage



THERMAL RATINGS

Figure 31. Maximum Avalanche and Drain Current vs. Case Temperature

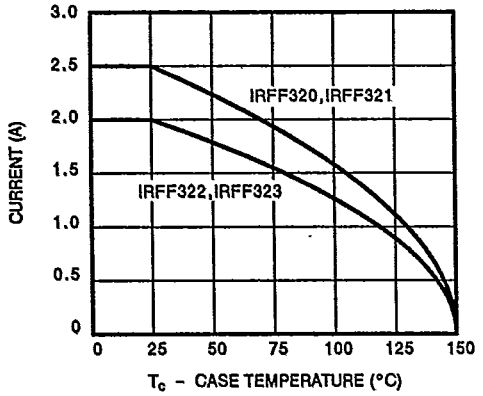
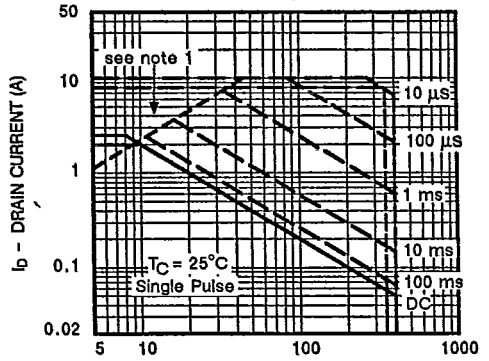


Figure 32. Safe Operating Area



[1]Operation in this area may be limited by $r_{DS(on)}$

Figure 33. Normalized Effective Transient Thermal Impedance, Junction-to-Case