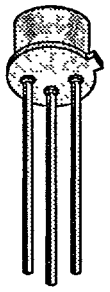
Siliconix incorporated

IRFF110/111/112/113

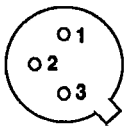
N-Channel Enhancement Mode Transistors

T-39-07

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)
IRFF110	100	0.6	3.5
IRFF111	60	0.6	3.5
IRFF112	100	0.8	3.0
IRFF113	60	0.8	3.0

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

PARAMETERS/TEST CONDITIONS		SYMBOL	IRFF 110	IRFF 111	IRFF 112	IRFF 113	UNITS
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	3.5	3.5	3.0	3.0	A
	T_C = 100°C		2.1	2.1	1.8	1.8	
Pulsed Drain Current[1]		I_{DM}	14	14	12	12	
Power Dissipation	T_C = 25°C	P_D	15	15	15	15	W
	T_C = 100°C		6	6	6	6	
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 RATINGS

THERMAL RESISTANCE	SYMBOL	TYPICAL	MAXIMUM	UNITS
Junction-to-Case	R_{thJC}		8.33	K/W
Junction-to-Ambient	R_{thJA}		175	

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

4

IRFF110/111/112/113

Siliconix incorporated

T-39-07

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

PARAMETER		SYMBOL	TEST CONDITIONS	TYP	LIMITS MIN	LIMITS MAX	UNIT
STATIC							
Drain-Source Breakdown Voltage	IRFF110, 112 IRFF111, 113	$V_{(BR)DSS}$	V_{GS} = 0 V, I_D = 250 µA		100 60		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]	IRFF110, 111 IRFF112, 113	$I_{D(ON)}$	V_{DS} = 5 V, V_{GS} = 10 V		3.5 3.0		A
Drain-Source On-State Resistance[1]	IRFF110, 111 IRFF112, 113	$r_{DS(ON)}$	V_{GS} = 10 V, I_D = 1.5 A	0.48 0.60		0.60 0.80	Ω
	IRFF110, 111 IRFF112, 113		V_{GS} = 10 V, I_D = 1.5 A T_J = 125°C	0.8 1.0		1.1 1.4	
Forward Transconductance[1]		g_{fs}	V_{DS} = 15 V, I_D = 1.5 A	1.8	1.0		S
DYNAMIC							
Input Capacitance		C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	180			pF
Output Capacitance		C_{oss}		60			
Reverse Transfer Capacitance		C_{rss}		10			
Total Gate Charge[2]		Q_g	V_{DS} = 0.5 x $V_{(BR)DSS}$, V_{GS} = 10 V, I_D = 3.5 A	7	5.5	7.5	nC
Gate-Source Charge[2]		Q_{gs}		1.9	0.8	3.5	
Gate-Drain Charge[2]		Q_{gd}		2.8	1.5	4.0	
Turn-On Delay Time[2]		$t_{d(on)}$	V_{DD} = 40 V, R_L = 26 Ω I_D ≅ 1.5 A, V_{GEN} = 10 V, R_G = 25 Ω	7		20	ns
Rise Time[2]		t_r		12		25	
Turn-Off Delay Time[2]		$t_{d(off)}$		15		25	
Fall Time[2]		t_f		9		20	
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (T_C = 25°C)							
Continuous Current	IRFF110, 111 IRFF112, 113	I_S				3.5 3.0	A
Pulsed Current[3]	IRFF110, 111 IRFF112, 113	I_{SM}				14 12	
Forward Voltage[1]	IRFF110, 111 IRFF112, 113	V_{SD}	I_F = I_S, V_{GS} = 0 V			2.5 2.0	V
Reverse Recovery Time		t_{rr}	I_F = I_S, dI_F/dt = 100 A/µs	65			ns
Reverse Recovery Charge		Q_{rr}		0.12			µC

[1]Pulse test: Pulse Width ≤ 300 µseo, 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-39-07

Figure 11. Output Characteristics

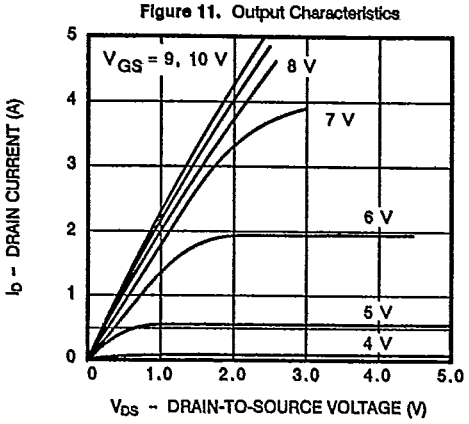


Figure 12. Transfer Characteristics

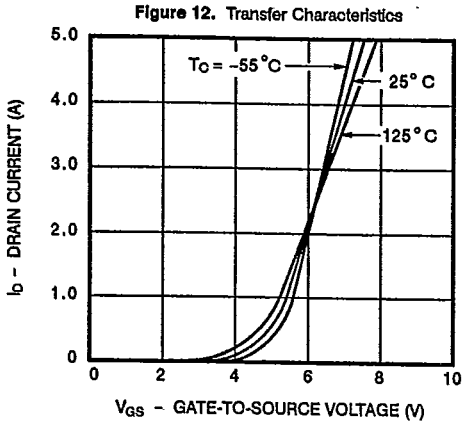


Figure 13. Transconductance

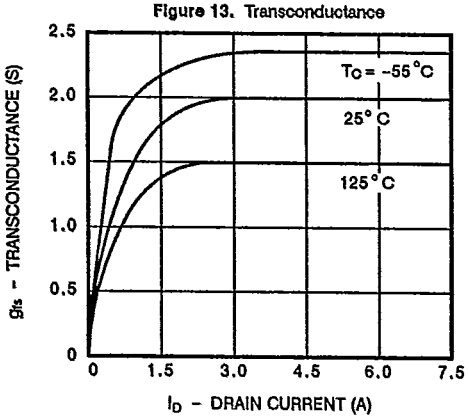


Figure 14. On-Resistance

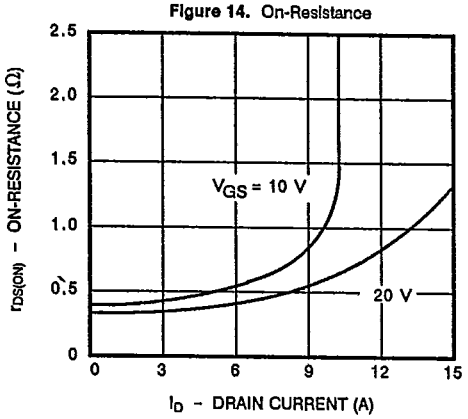


Figure 15. Capacitance

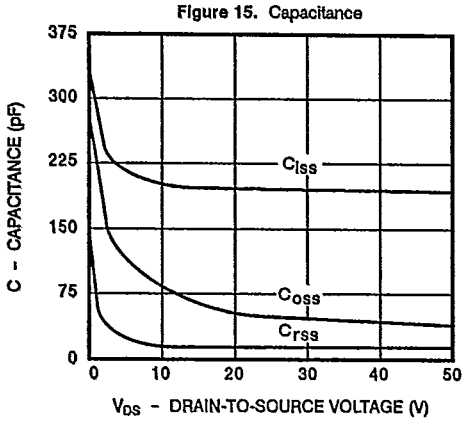
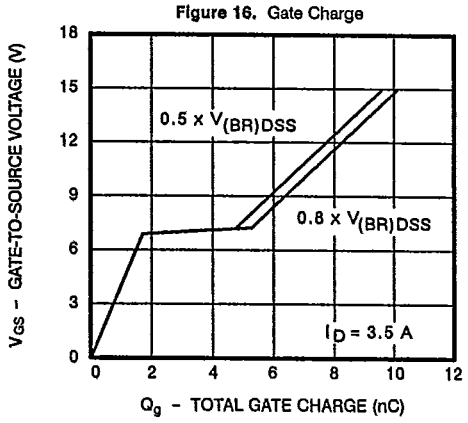


Figure 16. Gate Charge



4

IRFF110/111/112/113

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T-39-07

TYPICAL CHARACTERISTICS (Cont'd)

Figure 17. On-Resistance vs. Junction Temperature

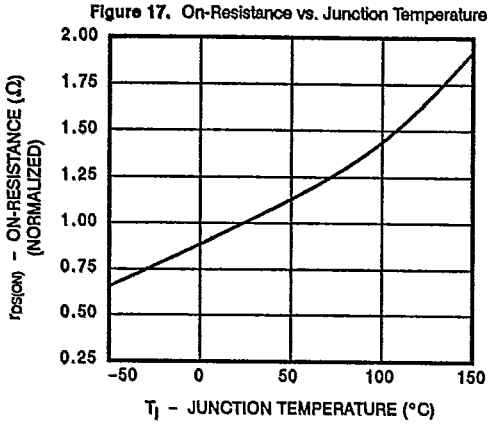
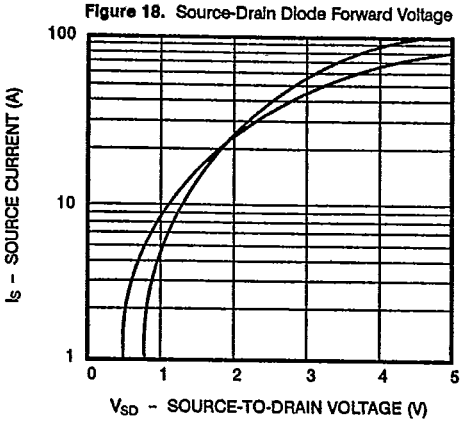


Figure 18. Source-Drain Diode Forward Voltage



THERMAL RATINGS

Figure 19. Maximum Drain Current vs. Case Temperature

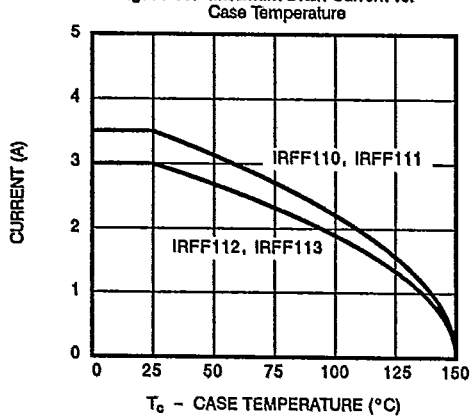
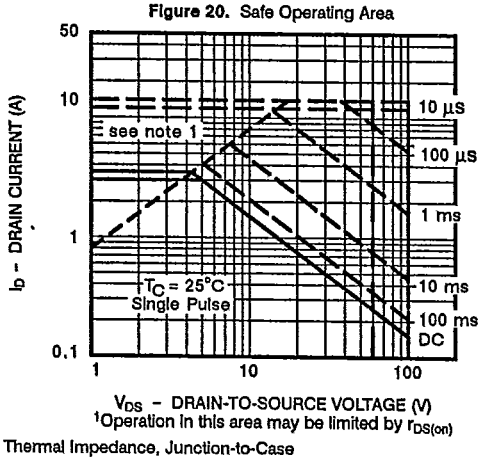


Figure 20. Safe Operating Area



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

Figure 21. Normalized Effective Transient Thermal Impedance, Junction-to-Case