MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

Advance Information

Small-Signal Field Effect Transistor

N-Channel Enhancement-Mode Silicon Gate TMOS

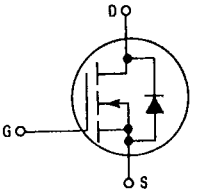
IRFF110
IRFF113

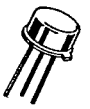
... designed for low voltage, high speed power switching applications such as switching regulators, converters, solenoid, relay drivers, inverters, choppers, audio amplifiers, and high energy pulse circuits.

- Silicon Gate for Fast Switching Speeds
- Low Drive Current Required
- Easy Paralleling
- No Second Breakdown
- Excellent Temperature Stability

TMOS™

N-CHANNEL
TMOS POWER FETs
$r_{DS(on)}$ = 0.6 OHM
100 VOLTS
$r_{DS(on)}$ = 0.8 OHM
60 VOLTS





CASE 79-05

3

MAXIMUM RATINGS

Rating	Symbol	IRFF110	IRFF113	Unit
Drain-Source Voltage	V_{DSS}	100	60	Vdc
Drain-Gate Voltage (R_{GS} = 1 mΩ)	V_{DGR}	100	60	Vdc
Gate-Source Voltage	V_{GS}	±20		Vdc
Drain Current Continuous Pulsed	I_D I_{DM}	3.5 14	3 12	Adc
Total Power Dissipation @ T_C = 25°C Derate above 25°C	P_D	15 0.12		Watts W/°C
Operating and Storage Temperature Range	T_J, T_{stg}	−55 to 150		°C

THERMAL CHARACTERISTICS

Thermal Resistance — Junction to Case — Junction to Ambient	$R_{\theta JC}$ $R_{\theta JA}$	8.33 175	°C/W
Maximum Lead Temperature 1.6 mm from Case for 10 s	T_L	300	°C

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Drain-Source Breakdown Voltage (V_{GS} = 0, I_D = 250 μA)	IRFF110 IRFF113	$V_{(BR)DSS}$	100 60	— —	Vdc
Zero Gate Voltage Drain Current (V_{DS} = Rated V_{DSS}, V_{GS} = 0)		I_{DSS}	—	250	μAdc

(continued)

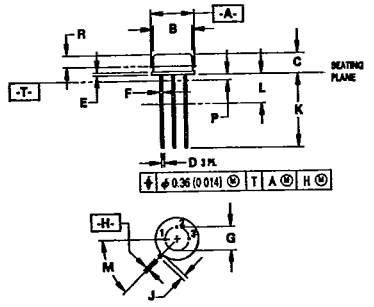
This document contains information on a new product. Specifications and information herein are subject to change without notice.

ELECTRICAL CHARACTERISTICS — continued (T_C = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Gate-Body Leakage Current, Forward (V_{GS} = 20 Vdc, V_{DS} = 0)		I_{GSSF}	—	100	μAdc
Gate-Body Leakage Current, Reverse (V_{GS} = −20 Vdc, V_{DS} = 0)		I_{GSSR}	—	−100	nAdc
ON CHARACTERISTICS*					
Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 250 μA)		$V_{GS(th)}$	2	4	Vdc
Static Drain-Source On-Resistance (V_{GS} = 10 Vdc, I_D = 1.5 Adc)	IRFF110 IRFF113	$r_{DS(on)}$	— —	0.6 0.8	Ohm
On-State Drain Current (V_{GS} = 10 Vdc, V_{DS} = 5 V)	IRFF110 IRFF113	$I_{D(on)}$	3.5 3	— —	A
Forward Transconductance (I_D = 1.5 A) IRFF110, IRFF111 V_{DS} = 5 V IRFF112, IRFF113 V_{DS} = 5 V		g_{fs}	1	—	mhos
DYNAMIC CHARACTERISTICS					
Input Capacitance	(V_{DS} = 25 V, V_{GS} = 0, f = 1 MHz)	C_{iss}	—	200	pF
Output Capacitance		C_{oss}	—	100	
Reverse Transfer Capacitance		C_{rss}	—	25	
SWITCHING CHARACTERISTICS*					
Turn-On Delay Time	(V_{DD} ≈ 0.5 Rated V_{DSS}, I_D = 1.5 A, R_{gen} = 50 ohms)	$t_{d(on)}$	—	20	ns
Rise Time		t_r	—	25	
Turn-Off Delay Time		$t_{d(off)}$	—	25	
Fall Time		t_f	—	20	
SOURCE DRAIN DIODE CHARACTERISTICS*					
Forward On-Voltage	IRFF110	V_{SD}	—	2.5	Vdc
	IRFF113	V_{SD}	—	2	Vdc
Forward Turn-On Time	(I_S = Rated $I_{D(on)}$, V_{GS} = 0)	t_{on}	—	Negligible	ns
Reverse Recovery Time		t_{rr}	—	200 (Typ)	ns

*Pulse Test Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.

OUTLINE DIMENSIONS



CASE 79-05

STYLE 6:
PIN 1. SOURCE
2. GATE
3. DRAIN
(CASE)

NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION J MEASURED FROM DIMENSION A MAXIMUM.
4. DIMENSION B SHALL NOT VARY MORE THAN 0.25 (0.010) IN ZONE R. THIS ZONE CONTROLLED FOR AUTOMATIC HANDLING.
5. DIMENSION F APPLIES BETWEEN DIMENSION P AND L. DIMENSION D APPLIES BETWEEN DIMENSION L AND K MINIMUM. LEAD DIAMETER IS UNCONTROLLED IN DIMENSION P AND BEYOND DIMENSION K MINIMUM.

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	9.02	9.29	0.355	0.366
B	8.01	8.50	0.315	0.335
C	4.20	4.57	0.165	0.180
D	0.44	0.53	0.017	0.021
E	0.44	0.88	0.017	0.035
F	0.41	0.48	0.016	0.019
G	5.08 BSC		0.200 BSC	
H	0.72	0.86	0.028	0.034
J	0.74	1.01	0.029	0.040
K	12.70	19.05	0.500	0.750
L	6.35	—	0.250	—
M	45° BSC		45° BSC	
P	—	1.27	—	0.050
R	2.54	—	0.100	—