



# POWER-MOS FET

## FIELD EFFECT POWER TRANSISTOR

# IRFD112,113

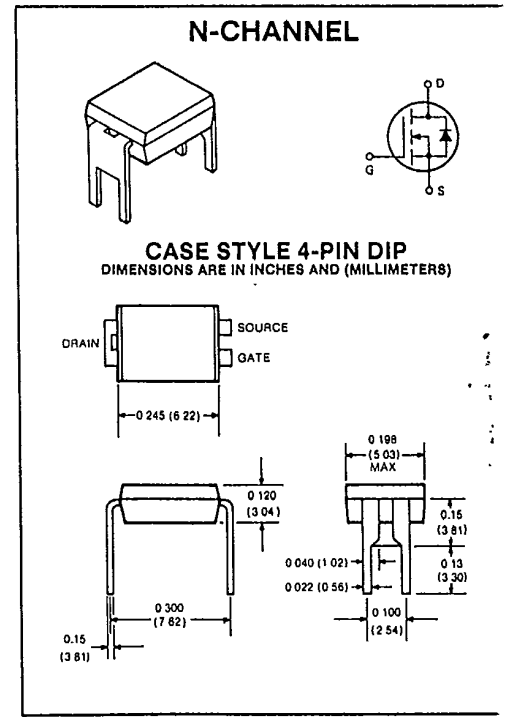
0.8 AMPERES  
100, 60 VOLTS  
 $R_{DS(ON)} = 0.8 \Omega$

This series of N-Channel Enhancement-mode Power MOSFETs utilizes GE's advanced Power DMOS technology to achieve low on-resistance with excellent device ruggedness and reliability.

This design has been optimized to give superior performance in most switching applications including: switching power supplies, inverters, converters and solenoid/relay drivers. Also, the extended safe operating area with good linear transfer characteristics makes it well suited for many linear applications such as audio amplifiers and servo motors.

### Features

- Polysilicon gate — Improved stability and reliability
- No secondary breakdown — Excellent ruggedness
- Ultra-fast switching — Independent of temperature
- Voltage controlled — High transconductance
- Low input capacitance — Reduced drive requirement
- Excellent thermal stability — Ease of paralleling



maximum ratings ( $T_A = 25^\circ C$ ) (unless otherwise specified)

RATING	SYMBOL	IRFD112	IRFD113	UNITS
Drain-Source Voltage	$V_{DSS}$	100	60	Volts
Drain-Gate Voltage, $R_{GS} = 1M\Omega$	$V_{DGR}$	100	60	Volts
Continuous Drain Current @ $T_A = 25^\circ C^{(1)}$ @ $T_A = 100^\circ C^{(1)}$	$I_D$	0.80 0.54	0.80 0.54	A A
Pulsed Drain Current <sup>(2)</sup>	$I_{DM}$	6.4	6.4	A
Gate-Source Voltage	$V_{GS}$	$\pm 20$	$\pm 20$	Volts
Total Power Dissipation @ $T_A = 25^\circ C$ Derate Above $25^\circ C$	$P_D$	1.2 9.6	1.2 9.6	Watts mW/ $^\circ C$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	-55 to 150	-55 to 150	$^\circ C$

### thermal characteristics

Thermal Resistance, Junction to Ambient <sup>(1)</sup>	$R_{\theta JA}$	105	105	$^\circ C/W$
Maximum Lead Temperature for Soldering Purposes: 1/8" from Case for 5 Seconds	$T_L$	300	300	$^\circ C$

(1) Device mounted to vertical pc board in free air with drain lead soldered to 0.20 in<sup>2</sup> minimum copper run area.  
(2) Repetitive Rating: Pulse width limited by max. junction temperature.

electrical characteristics ( $T_A = 25^\circ\text{C}$ ) (unless otherwise specified)

CHARACTERISTIC	SYMBOL	MIN	TYP	MAX	UNIT
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### off characteristics

Drain-Source Breakdown Voltage ( $V_{GS} = 0\text{V}$ , $I_D = 250\ \mu\text{A}$ )	IRFD112 IRFD113	$BV_{DSS}$	100 60	— —	— —	Volts
Zero Gate Voltage Drain Current ( $V_{DS} = \text{Max Rating}$ , $V_{GS} = 0\text{V}$ , $T_A = 25^\circ\text{C}$ ) ( $V_{DS} = \text{Max Rating} \times 0.8$ , $V_{GS} = 0\text{V}$ , $T_A = 125^\circ\text{C}$ )		$I_{DSS}$	— —	— —	250 1000	$\mu\text{A}$
Gate-Source Leakage Current ( $V_{GS} = \pm 20\text{V}$ )		$I_{GSS}$	—	—	$\pm 500$	nA

### on characteristics\*

Gate Threshold Voltage ( $V_{DS} = V_{GS}$ , $I_D = 250\ \mu\text{A}$ )	$T_A = 25^\circ\text{C}$	$V_{GS(TH)}$	2.0	—	4.0	Volts
On-State Drain Current ( $V_{GS} = 10\text{V}$ , $V_{DS} = 10\text{V}$ )		$I_{D(ON)}$	0.8	—	—	A
Static Drain-Source On-State Resistance ( $V_{GS} = 10\text{V}$ , $I_D = 0.8\text{A}$ )		$R_{DS(ON)}$	—	0.60	0.80	Ohms
Forward Transconductance ( $V_{DS} = 10\text{V}$ , $I_D = 0.8\text{A}$ )		$g_{fs}$	0.56	0.75	—	mhos

### dynamic characteristics

Input Capacitance	$V_{GS} = 0\text{V}$	$C_{iss}$	—	145	200	pF
Output Capacitance	$V_{DS} = 25\text{V}$	$C_{oss}$	—	65	100	pF
Reverse Transfer Capacitance	$f = 1\ \text{MHz}$	$C_{rss}$	—	20	25	pF

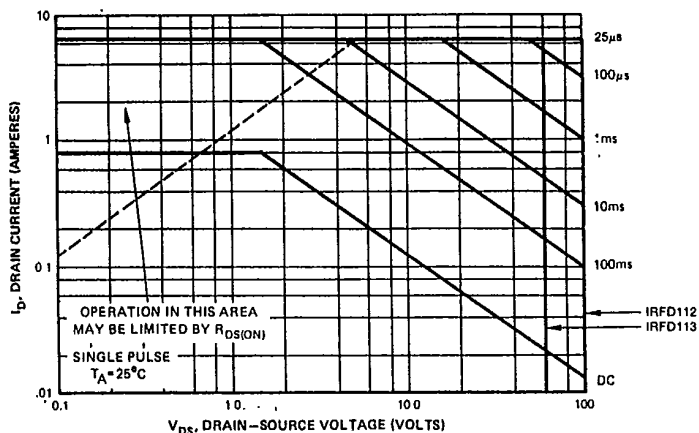
### switching characteristics\*

Turn-on Delay Time	$V_{DS} = 30\text{V}$	$t_{d(on)}$	—	15	—	ns
Rise Time	$I_D = 0.8\text{A}$ , $V_{GS} = 15\text{V}$	$t_r$	—	15	—	ns
Turn-off Delay Time	$R_{GEN} = 50\ \Omega$ , $R_{GS} = 12.5\ \Omega$	$t_{d(off)}$	—	30	—	ns
Fall Time	( $R_{GS}\ \text{EQUIV.} = 10\ \Omega$ )	$t_f$	—	10	—	ns

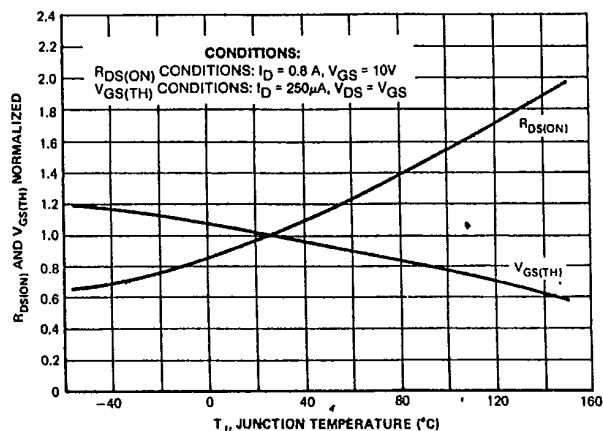
### source-drain diode ratings and characteristics\*

Continuous Source Current	$I_S$	—	—	0.8	A
Pulsed Source Current	$I_{SM}$	—	—	6.4	A
Diode Forward Voltage ( $T_A = 25^\circ\text{C}$ , $V_{GS} = 0\text{V}$ , $I_S = 0.8\text{A}$ )	$V_{SD}$	—	0.8	2.0	Volts
Reverse Recovery Time ( $I_S = 1.0\text{A}$ , $di_S/dt = 100\text{A}/\mu\text{s}$ , $T_A = 125^\circ\text{C}$ )	$t_{rr}$ $Q_{RR}$	—	90 0.2	—	ns $\mu\text{C}$

\*Pulse Test: Pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$



MAXIMUM SAFE OPERATING AREA



TYPICAL NORMALIZED  $R_{DS(ON)}$  AND  $V_{GS(TH)}$  VS. TEMP.