

FEATURES

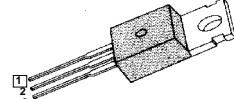
- ◆ Avalanche Rugged Technology
- ◆ Rugged Gate Oxide Technology
- ◆ Lower Input Capacitance
- ◆ Improved Gate Charge
- ◆ Extended Safe Operating Area
- ◆ Lower Leakage Current: 10 μ A (Max.) @ V_{DS} = 400V
- ◆ Lower R_{DS(ON)}: 1.408 Ω (Typ.)

BV_{DSS} = 400 V

R_{DS(on)} = 1.8 Ω

I_D = 3.3 A

TO-220



1.Gate 2. Drain 3. Source

Absolute Maximum Ratings

Symbol	Characteristic	Value	Units
V _{DSS}	Drain-to-Source Voltage	400	V
I _D	Continuous Drain Current (T _C =25°C)	3.3	A
	Continuous Drain Current (T _C =100°C)	2.1	
I _{DM}	Drain Current-Pulsed (1)	13	A
V _{GS}	Gate-to-Source Voltage	\pm 30	V
E _{AS}	Single Pulsed Avalanche Energy (2)	249	mJ
I _{AR}	Avalanche Current (1)	3.3	A
E _{AR}	Repetitive Avalanche Energy (1)	4.9	mJ
dv/dt	Peak Diode Recovery dv/dt (3)	4.0	V/ns
P _D	Total Power Dissipation (T _C =25°C)	49	W
	Linear Derating Factor	0.39	W/ $^{\circ}$ C
T _J , T _{STG}	Operating Junction and Storage Temperature Range	- 55 to +150	$^{\circ}$ C
T _L	Maximum Lead Temp. for Soldering Purposes, 1/8. from case for 5-seconds	300	

Thermal Resistance

Symbol	Characteristic	Typ.	Max.	Units
R _{θJC}	Junction-to-Case	--	2.57	$^{\circ}$ C/W
R _{θCS}	Case-to-Sink	0.5	--	
R _{θJA}	Junction-to-Ambient	--	62.5	

IRF720A

N-CHANNEL
POWER MOSFET

Electrical Characteristics ($T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
BV_{DSS}	Drain-Source Breakdown Voltage	400	--	--	V	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$
$\Delta BV/\Delta T_J$	Breakdown Voltage Temp. Coeff.	--	0.54	--	V/ $^\circ\text{C}$	$I_D=250\mu\text{A}$ See Fig 7
$V_{GS(\text{th})}$	Gate Threshold Voltage	2.0	--	4.0	V	$V_{DS}=5\text{V}, I_D=250\mu\text{A}$
I_{GSS}	Gate-Source Leakage , Forward	--	--	100	nA	$V_{GS}=30\text{V}$
	Gate-Source Leakage , Reverse	--	--	-100		$V_{GS}=-30\text{V}$
I_{DSS}	Drain-to-Source Leakage Current	--	--	10	μA	$V_{DS}=400\text{V}$
		--	--	100		$V_{DS}=320\text{V}, T_C=125^\circ\text{C}$
$R_{DS(\text{on})}$	Static Drain-Source On-State Resistance	--	--	1.8	Ω	$V_{GS}=10\text{V}, I_D=1.65\text{A}$ (4)
g_{fs}	Forward Transconductance	--	2.25	--	O	$V_{DS}=50\text{V}, I_D=1.65\text{A}$ (4)
C_{iss}	Input Capacitance	--	385	500	pF	$V_{GS}=0\text{V}, V_{DS}=25\text{V}, f=1\text{MHz}$ See Fig 5
C_{oss}	Output Capacitance	--	60	70		
C_{rss}	Reverse Transfer Capacitance	--	27	33		
$t_{d(on)}$	Turn-On Delay Time	--	12	35	ns	$V_{DD}=200\text{V}, I_D=3.3\text{A}, R_G=18\Omega$ See Fig 13 (4) (5)
t_r	Rise Time	--	17	45		
$t_{d(off)}$	Turn-Off Delay Time	--	51	110		
t_f	Fall Time	--	18	45		
Q_g	Total Gate Charge	--	19	26	nC	$V_{DS}=320\text{V}, V_{GS}=10\text{V}, I_D=3.3\text{A}$ See Fig 6 & Fig 12 (4) (5)
Q_{gs}	Gate-Source Charge	--	2.7	--		
Q_{gd}	Gate-Drain (. Miller.) Charge	--	11.1	--		

Source-Drain Diode Ratings and Characteristics

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
I_S	Continuous Source Current	--	--	3.3	A	Integral reverse pn-diode in the MOSFET
I_{SM}	Pulsed-Source Current (1)	--	--	13		
V_{SD}	Diode Forward Voltage (4)	--	--	1.5	V	$T_J=25^\circ\text{C}, I_S=3.3\text{A}, V_{GS}=0\text{V}$
t_{rr}	Reverse Recovery Time	--	230	--	ns	$T_J=25^\circ\text{C}, I_F=3.3\text{A}$
Q_{rr}	Reverse Recovery Charge	--	1.16	--	μC	$dI_F/dt=100\text{A}/\mu\text{s}$ (4)

Notes:

- (1) Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
- (2) $L=40\text{mH}, I_{AS}=3.3\text{A}, V_{DD}=50\text{V}, R_G=27\Omega$, Starting $T_J=25^\circ\text{C}$
- (3) $I_{SD} \leq 3.3\text{A}, di/dt \leq 110\text{A}/\mu\text{s}, V_{DD} \leq BV_{DSS}$, Starting $T_J=25^\circ\text{C}$
- (4) Pulse Test: Pulse Width = $250\mu\text{s}$, Duty Cycle $\leq 2\%$
- (5) Essentially Independent of Operating Temperature

Fig 1. Output Characteristics

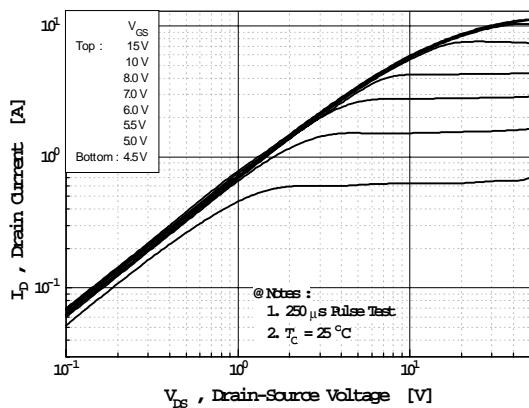


Fig 2. Transfer Characteristics

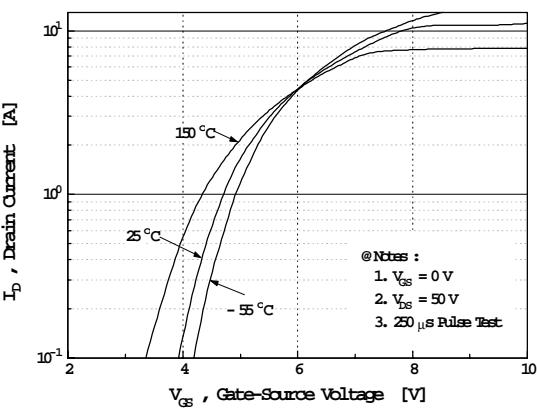


Fig 3. On-Resistance vs. Drain Current

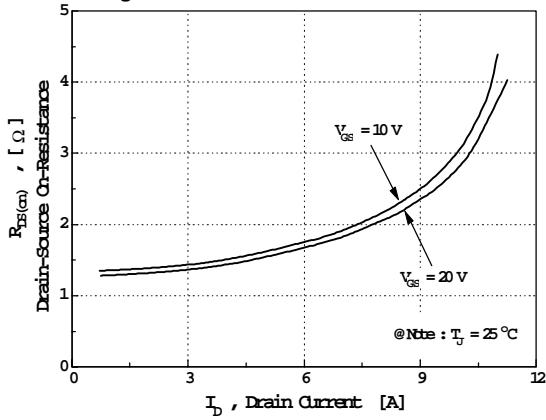


Fig 4. Source-Drain Diode Forward Voltage

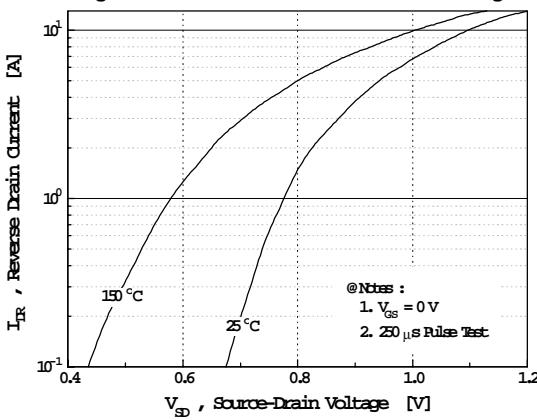


Fig 5. Capacitance vs. Drain-Source Voltage

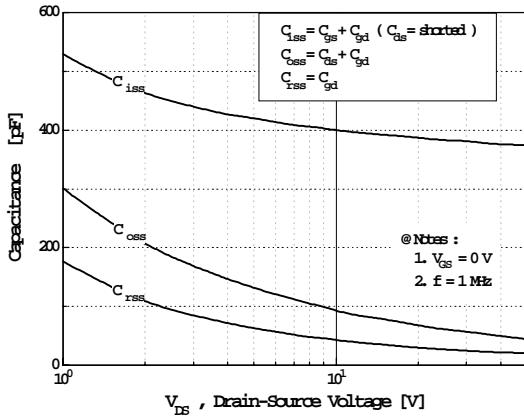


Fig 6. Gate Charge vs. Gate-Source Voltage

