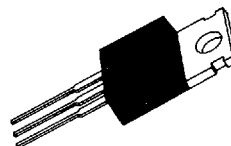


FEATURES

- Lower $R_{DS(on)}$
- Improved inductive ruggedness
- Fast switching times
- Rugged polysilicon gate cell structure
- Lower input capacitance
- Extended safe operating area
- Improved high temperature reliability

TO-220



IRFZ44/IRFZ45
IRFZ40/IRFZ42

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PRODUCT SUMMARY

Part Number	V_{DS}	$R_{DS(on)}$	I_D
IRFZ44	60V	0.028 Ω	35A
IRFZ45	60V	0.035 Ω	35A
IRFZ40	50V	0.028 Ω	35A
IRFZ42	50V	0.035 Ω	35A

* Current limited by wire & pin diameter

MAXIMUM RATINGS

Characteristic	Symbol	IRFZ44	IRFZ45	IRFZ40	IRFZ42	Unit
Drain-Source Voltage (1)	V _{DSS}	60		50		V _{dc}
Drain-Gate Voltage (R _{GS} =1 0MΩ)(1)	V _{DGR}	60		50		V _{dc}
Gate-Source Voltage	V _{GS}	±20				V _{dc}
Continuous Drain Current T _C =25°C	I _D	35	35	35	35	A _{dc}
Continuous Drain Current T _C =100°C	I _D	35	33	35	33	A _{dc}
Drain Current—Pulsed (3)	I _{DM}	210	190	210	190	A _{dc}
Gate Current—Pulsed	I _{GM}	±15				A _{dc}
Single Pulsed Avalanche Energy (4)	E _{AS}	53				mJ
Avalanche Current	I _{AS}	35				A
Total Power Dissipation at T _C =25°C Derate above 25°C	P _D	150 12				Watts W/°C
Operating and Storage Junction Temperature Range	T _J , T _{stg}	−55 to 175°				°C
Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds	T _L	300				°C

Notes: (1) $T_J=25^\circ\text{C}$ to 175°C

(2) Pulse test. Pulse width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$

(3) Repetitive rating: Pulse with limited by max junction temperature

(4) $L=50\mu\text{H}$, $V_{dd}=25\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$

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

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage	60	—	—	V	$V_{GS}=0V, I_D=250\mu A$
	IRFZ44/45 IRFZ40/42	50	—	—		
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	$V_{DS}=V_{GS}, I_D=250\mu A$
I_{GSS}	Gate-Source Leakage Forward	—	—	100	nA	$V_{GS}=20V$
I_{GSS}	Gate-Source Leakage Reverse	—	—	-100	nA	$V_{GS}=-20V$
I_{DSS}	Zero Gate Voltage Drain Current	—	—	250	μA	$V_{DS}=\text{Max. Rating}, V_{GS}=0V$
		—	—	1000	μA	$V_{DS}=0.8\text{Max. Rating}, V_{GS}=0V, T_C=150^\circ\text{C}$
$I_{D(on)}$	On-State Drain-Source Current (2)	35	—	—	A	$V_{DS}\geq 1.2V, V_{GS}=10V$
$R_{DS(on)}$	Static Drain-Source	—	—	0.028	Ω	$V_{GS}=10V, I_D=33A$
	On-State Resistance	—	—	0.035		
g_{fs}	Forward Transconductance (2)	15	—	—	U	$V_{DS}\geq 50V, I_D=33A$
C_{iss}	Input Capacitance	—	2450	—	pF	$V_{DS}=0V$
C_{oss}	Output Capacitance	—	740	—	pF	$V_{DS}=25V$
C_{rss}	Reverse Transfer Capacitance	—	360	—	pF	$f=1.0\text{MHz}$
$t_{d(on)}$	Turn-On Delay Time	—	—	32	ns	$V_{DD}=0.5BV_{DSS}, I_D=52A, Z_\theta=9.1\Omega$ (MOSFET switching times are essentially independent of operating temperature)
t_r	Rise Time	—	—	210	ns	
$t_{d(off)}$	Turn-Off Delay Time	—	—	75	ns	
t_f	Fall Time	—	—	130	ns	
Q_g	Total Gate Charge (Gate-Source Pulse Gate-Drain)	—	—	100	nC	$V_{GS}=10V, I_D=52A, V_{DS}=0.8\text{Max. Rating}$ (Gate charge is essentially independent of operating temperature)
Q_{gs}	Gate-Source Charge	—	—	21	nC	
Q_{gd}	Gate-Drain ("Miller") Charge	—	—	58	nC	

THERMAL RESISTANCE

R_{thJC}	Junction-to-Case	MAX	1.0	K/W	
R_{thCS}	Case-to-Sink	TYP	0.5	K/W	Mounting surface flat smooth, and greased
R_{thJA}	Junction-to-Ambient	MAX	80	K/W	Free Air Operation

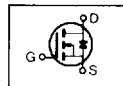
Notes: (1) $T_J=25^\circ\text{C}$ to 175°C

(2) Pulse test Pulse width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

(3) Repetitive rating Pulse width limited by max. junction temperature

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
I_S	Continuous Source Current	—	—	35	A	Modified MOSFET integral reverse P-N junction rectifier
	Current (Body Diode)			35	A	
I_{SM}	Pulse-Source Current	—	—	210	A	
	(3)			190	A	
V_{SD}	Diode Forward Voltage	—	—	2.5	V	$T_C = 25^\circ\text{C}$, $I_S = 35\text{A}$, $V_{GS} = 0\text{V}$
t_{rr}	Reverse Recovery Time	—	—	250	ns	$T_J = 25^\circ\text{C}$, $I_F = 35\text{A}$, $dI_F/dt = 100\text{A}/\mu\text{S}$



- Notes:** (1) $T_J = 25^\circ\text{C}$ to 175°C
 (2) Pulse test Pulse width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
 (3) Repetitive rating Pulse with limited by max junction temperature

2

