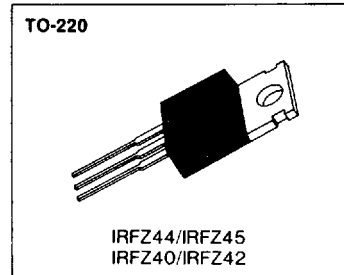


FEATURES

- 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



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		Vdc
Drain-Gate Voltage ($R_{GS}=1.0M\Omega$)(1)	V_{DGR}	60		50		Vdc
Gate-Source Voltage	V_{GS}	± 20				Vdc
Continuous Drain Current $T_C=25^\circ C$	I_D	35	35	35	35	Adc
Continuous Drain Current $T_C=100^\circ C$	I_D	35	33	35	33	Adc
Drain Current—Pulsed (3)	I_{DM}	210	190	210	190	Adc
Gate Current—Pulsed	I_{GM}	± 1.5				Adc
Single Pulsed Avalanche Energy (4)	E_{AS}	53				mJ
Avalanche Current	I_{AS}	35				A
Total Power Dissipation at $T_C=25^\circ C$ Derate above $25^\circ C$	P_D	150 1.2				Watts W/ $^\circ C$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to 175 $^\circ$				$^\circ C$
Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds	T_L	300				$^\circ C$

- Notes:** (1) $T_J=25^\circ C$ to $175^\circ C$
 (2) Pulse test. Pulse width $\leq 300\mu s$, Duty Cycle $\leq 2\%$
 (3) Repetitive rating: Pulse with limited by max junction temperature
 (4) $L=50\mu H$, $V_{dd}=25V$, $R_G=25\Omega$, Starting $T_J=25^\circ C$

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					$V_{GS}=0V, I_D=250\mu A$
	IRFZ44/45	60	—	—	V	
	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	$V_{DS}=\text{Max. Rating}, V_{GS}=0V$ $V_{DS}=0.8\text{Max. Rating}, V_{GS}=0V, T_C=150^\circ\text{C}$
		—	—	1000	μA	
$I_{D(on)}$	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	$V_{GS}=0V$
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	$V_{DD}=0.5 BV_{DSS}, I_D=52A, Z_\theta=9.1\Omega$ (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

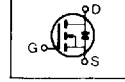
Notes: (1) $T_J=25^\circ\text{C}$ to 175°C

(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 (Body Diode)	IRFZ44/40	—	—	35	A	Modified MOSFET integral reverse P-N junction rectifier
		IRFZ45/42	—	—	35	A	
I_{SM}	Pulse-Source Current (3)	IRFZ44/40	—	—	210	A	
		IRFZ45/42	—	—	190	A	
V_{SD}	Diode Forward Voltage All		—	—	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

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