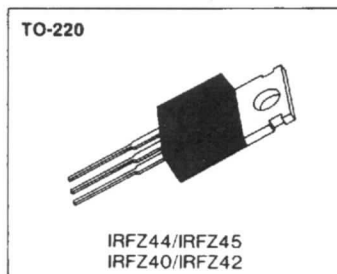


IRFZ44/45 IRFZ40/42

N-CHANNEL POWER MOSFETS

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_{DS}	60		50		Vdc
Drain-Gate Voltage ($R_{GS}=1\text{ M}\Omega$)(1)	V_{DGR}	60		50		Vdc
Gate-Source Voltage	V_{GS}	± 20				Vdc
Continuous Drain Current $T_C=25^\circ\text{C}$	I_D	35	35	35	35	Adc
Continuous Drain Current $T_C=100^\circ\text{C}$	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 $T_C=25^\circ\text{C}$ Derate above 25°C	P_D	150 1.2				Watts W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to 175°				$^\circ\text{C}$
Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds	T_L	300				$^\circ\text{C}$

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 $T_J=25^\circ\text{C}$

NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However, NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.



IRFZ44/45 IRFZ40/42

N-CHANNEL POWER MOSFETS

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

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
BV _{DSS}	Drain-Source Breakdown Voltage IRFZ44/45 IRFZ40/42	60 50	— —	— —	V	V _{GS} =0V, I _D =250μA
V _{GS(th)}	Gate Threshold Voltage	2.0	—	4.0	V	V _{DS} =V _{GS} , I _D =250μA
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 1000	μA μA	V _{DS} =Max. Rating V _{GS} =0V V _{DS} =0.8Max. Rating, V _{GS} =0V, T _C =150°C
I _{D(on)}	On-State Drain-Source Current (2)	35	—	—	A	V _{DS} ≥1.2V V _{GS} =10V
R _{DS(on)}	Static Drain-Source On-State Resistance	— —	— —	0.028 0.035	Ω	IRFZ44/40 IRFZ45/42 V _{GS} =10V, I _D =33A
g _{fs}	Forward Transconductance (2)	15	—	—	U	V _{DS} ≥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=1.0MHz
t _{d(on)}	Turn-On Delay Time	—	—	32	ns	V _{DD} =0.5 BV _{DSS} , I _D =52A, Z _O =9.1Ω (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} =0.8Max. 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°C to 175°C

(2) Pulse test Pulse width≤300μs, Duty Cycle≤2%

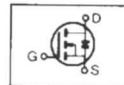
(3) Repetitive rating Pulse width limited by max. junction temperature

IRFZ44/45
IRFZ40/42

..-CHANNEL
POWER MOSFETS

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	—	—	35	A	Modified MOSFET integral reverse P-N junction rectifier
		—	—	35	A	
I_{SM}	Pulse-Source Current (3)	—	—	210	A	
		—	—	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

