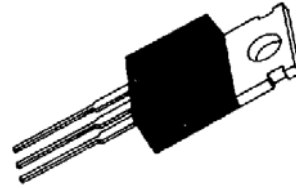


**FEATURES**

- Lower RDS(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**

**PRODUCT SUMMARY**

Part Number	V <sub>DS</sub>	R <sub>DS(on)</sub>	I <sub>D</sub>
IRFZ44	60V	0.028Ω	35A
IRFZ45	60V	0.035Ω	35A
IRFZ40	50V	0.028Ω	35A
IRFZ42	50V	0.035Ω	35A

\*Current limited by wire & pin diameter

**MAXIMUM RATINGS**

Characteristic	Symbol	IRFZ44	IRFZ45	IRFZ40	IRFZ42	Unit
Drain-Source Voltage (1)	V <sub>DSS</sub>	60		50		Vdc
Drain-Gate Voltage (R <sub>GS</sub> =1 0MΩ) (1)	V <sub>DGR</sub>	60		50		Vdc
Gate-Source Voltage	V <sub>GS</sub>	±20				Vdc
Continuous Drain Current Tc=25	I <sub>D</sub>	35	35	35	35	Adc
Continuous Drain Current Tc=100	I <sub>D</sub>	35	33	35	33	Adc
Drain Current – Pulsed (3)	I <sub>DM</sub>	210	190	210	190	Adc
Gate Current –Pulsed	I <sub>GM</sub>	±15				Adc
Single Pulsed Avalanche Energy (4)	E <sub>AS</sub>	53				mJ
Avalanche Current	I <sub>AS</sub>	35				A
Total Power Dissipation at Tc=25	P <sub>D</sub>	150		12		Watts W/
Operating and Storage Junction Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to 175				
Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds	T <sub>L</sub>	300				

Notes: (1) T<sub>J</sub>=25 to 175

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

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

(4) L=50μH, V<sub>dd</sub>=25V, R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25

**ELECTRICAL CHARACTERISTICS** (Tc=25 unless otherwise specified)

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage IRFZ44/45 IRFZ40/42	60 50	- -	- -	V	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA
V <sub>GS(th)</sub>	Gate Threshold Voltage	2.0	-	4.0	V	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA
I <sub>GSS</sub>	Gate-Source Leakage Forward	-	-	100	nA	V <sub>GS</sub> =20V
I <sub>GSS</sub>	Gate-Source Leakage Reverse	-	-	-100	nA	V <sub>GS</sub> =-20V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	-	-	250 1000	μA μA	V <sub>DS</sub> =Max. Rating V <sub>GS</sub> =0V V <sub>DS</sub> =0.8 Max. Rating, V <sub>GS</sub> =0V, Tc=150
I <sub>D(on)</sub>	On-State Drain-Source Current (2)	35	-	-	A	V <sub>DS</sub> ≥12V V <sub>GS</sub> =10V
R <sub>DS(on)</sub>	Static Drain-Source On-State Resistance	-	-	0.028 0.035	Ω	IRFZ44/40 IRFZ45/42 V <sub>GS</sub> =10V, I <sub>D</sub> =33A
g <sub>fs</sub>	Forward Transconductance (2)	15	-	-	Ω	V <sub>DS</sub> ≥50V, I <sub>D</sub> =33A
C <sub>iss</sub>	Input Capacitance	-	2450	-	pF	V <sub>GS</sub> =0V
C <sub>oss</sub>	Output Capacitance	-	740	-	pF	V <sub>DS</sub> =25V
C <sub>rss</sub>	Reverse Transfer Capacitance	-	360	-	pF	F=1.0MHz
t <sub>d(on)</sub>	Turn-On Delay Time	-	-	32	ns	V <sub>DD</sub> =0.5BV <sub>DSS</sub> , I <sub>D</sub> =52A, Z <sub>0</sub> =9.1Ω (MOSFET switching times are essentially independent of operating temperature)
t <sub>r</sub>	Rise Time	-	-	210	ns	
t <sub>d(off)</sub>	Turn-Off Delay Time	-	-	75	ns	
t <sub>f</sub>	Fall Time	-	-	130	ns	
Q <sub>g</sub>	Total Gate Charge (Gate-Source Pulse Gate-Drain)	-	-	100	nC	V <sub>GS</sub> =10V, I <sub>D</sub> =52A, V <sub>DS</sub> =0.8Max Rating (Gate charge is essentially independent of operating temperature)
Q <sub>gs</sub>	Gate-Source Charge	-	-	21	nC	
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge	-	-	58	nC	

**THERMAL RESISTANCE**


R <sub>thJC</sub>	Junction-to-Case	Max	1.0	K/W	
R <sub>thCS</sub>	Case-to-Sink	TYP	0.5	K/W	Mounting surface flat smooth, and greased
R <sub>thJA</sub>	Junction-to-Ambient	MAX	80	K/W	Free Air Operation

 Notes: (1) T<sub>J</sub>=25 to 175

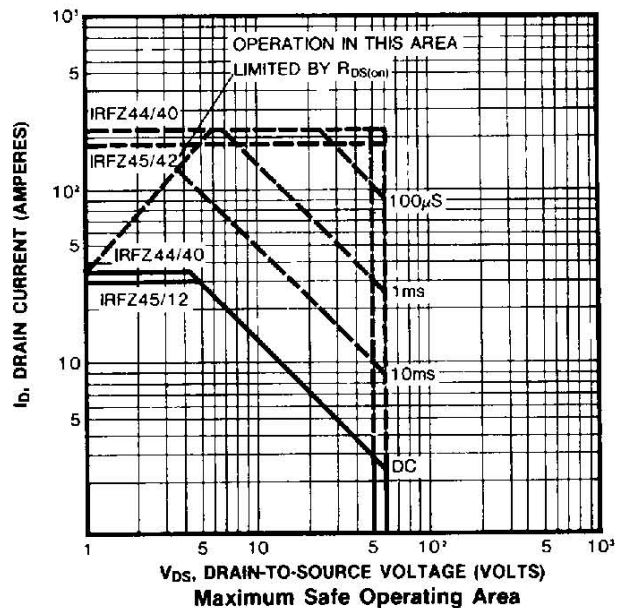
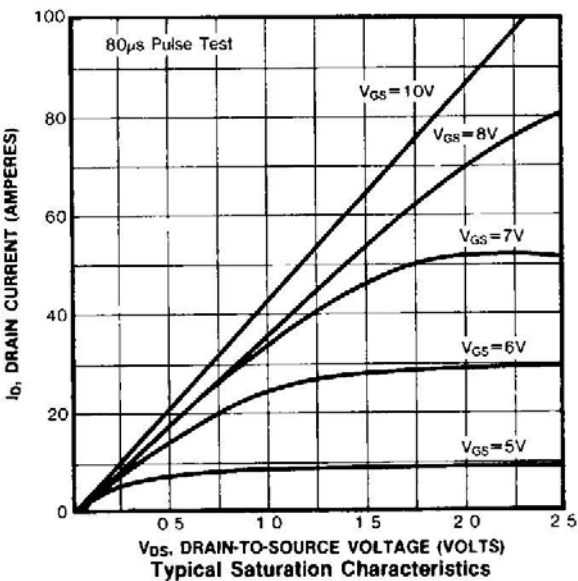
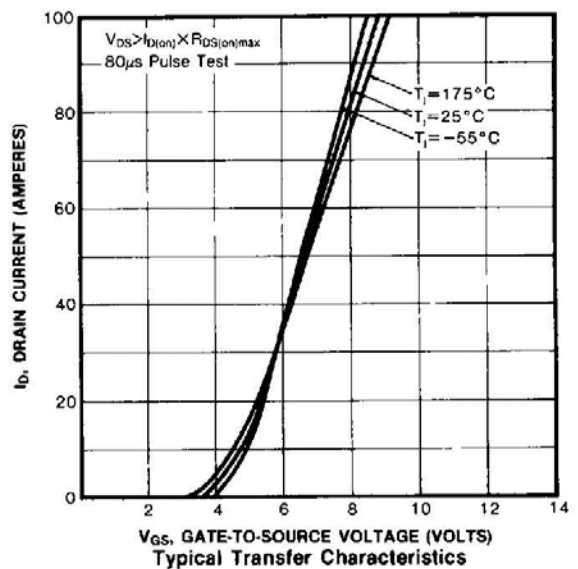
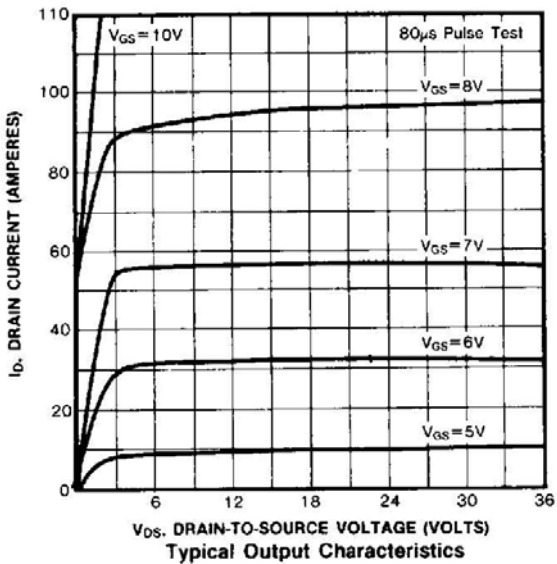
(2) Pulse test Pulse Width ≤ 300μs, Duty Cycle ≤ 2%

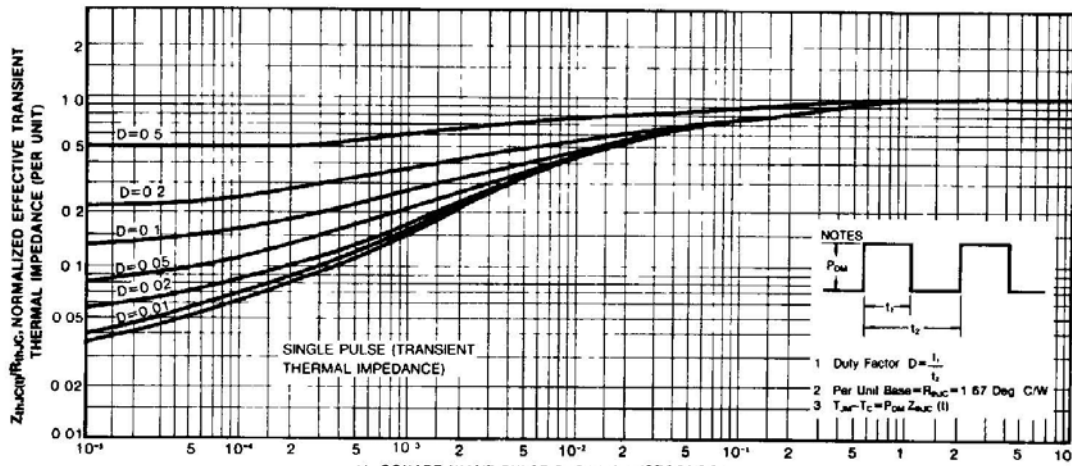
(3) Repetitive rating Pulse width limited by max junction temperature

### SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

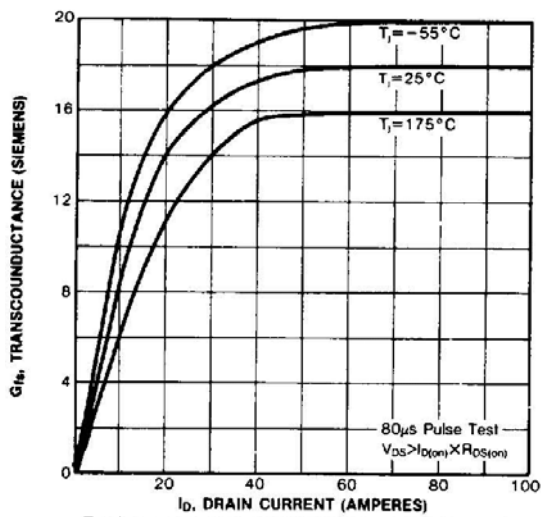
Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
$I_S$	Continuous Source Current (Body Diode)	-	-	35	A	Modified MOSFET integral reverse P-N junction rectifier 
$I_{SM}$	Pulse-Source Current (3)	-	-	210	A	
$V_{SD}$	Diode Forward Voltage All	-	-	25	V	$T_C=25^\circ\text{C}$ , $I_S=35\text{A}$ , $V_{GS}=0\text{V}$
$t_{rr}$	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  $175^\circ\text{C}$   
 (2) Pulse test Pulse width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$   
 (3) Repetitive rating Pulse with limited by max junction temperature

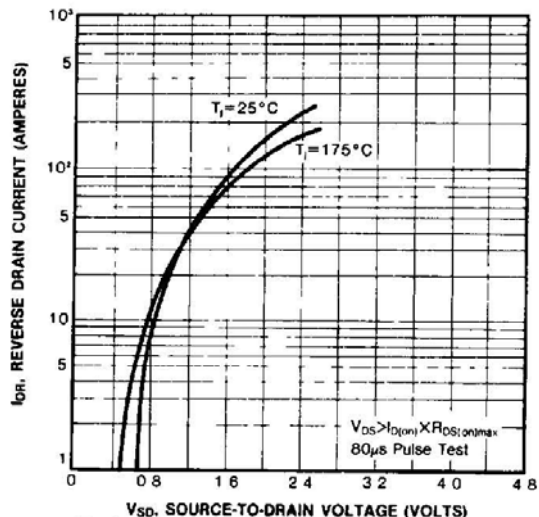




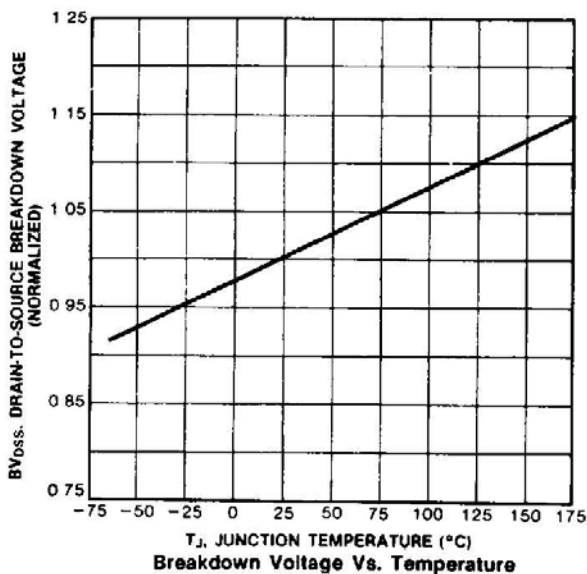
Maximum Effective Transient Thermal Impedance Junction-to-Case Vs. Pulse Duration



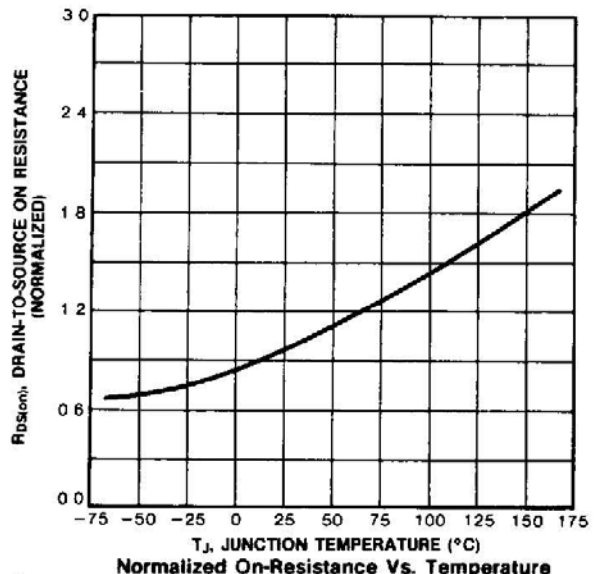
Typical Transconductance Vs. Drain Current



Typical Source-Drain Diode Forward Voltage



Breakdown Voltage Vs. Temperature



Normalized On-Resistance Vs. Temperature

