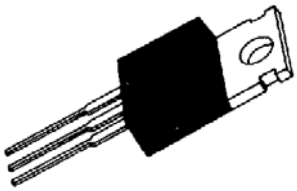
IRFZ44/45/40/42
N-CHANNEL POWER MOSFETS

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_{DS}	$R_{DS(on)}$	I_D
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_{DSS}	60		50		Vdc
Drain-Gate Voltage (R_{GS}=1 0MΩ) (1)	V_{DGR}	60		50		Vdc
Gate-Source Voltage	V_{GS}	±20				Vdc
Continuous Drain Current Tc=25°C	I_D	35	35	35	35	Adc
Continuous Drain Current Tc=100°C	I_D	35	33	35	33	Adc
Drain Current – Pulsed (3)	I_{DM}	210	190	210	190	Adc
Gate Current –Pulsed	I_{GM}	±15				Adc
Single Pulsed Avalanche Energy (4)	E_{AS}	53				mJ
Avalanche Current	I_{AS}	35				A
Total Power Dissipation at Tc=25°C	P_D	150 12				Watts W/°C
Operating and Storage Junction Temperature Range	T_J,T_{stg}	-55 to 175°C				°C
Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds	T_L	300				°C

Notes: (1) TJ=25°C to 175°C

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

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

(4)L=50μH, V_{dd}=25V, R_G=25Ω, Starting T_J=25°C

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

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage					V_{GS}=0V, I_D=250μA
	IRFZ44/45	60	-	-	V	
	IRFZ40/42	50	-	-		
$V_{GS(th)}$	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	μA	V_{DS}=Max. Rating V_{GS}=0V
		-	-	1000	μA	V_{DS}=0.8 Max. Rating, V_{GS}=0V, Tc=150°C
$I_{D(on)}$	On-State Drain-Source Current (2)	35	-	-	A	V_{DS}≥12V V_{GS}=10V
$R_{DS(on)}$	Static Drain-Source IRFZ44/40	-	-	0.028	Ω	
	On-State Resistance IRFZ45/42	-	-	0.035		V_{GS}=10V, I_D=33A
g_{fs}	Forward Transconductance (2)	15	-	-	Ω	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}=0.5BV_{DSS}, I_D=52A, Z_O=9.1Ω
tr	Rise Time	-	-	210	ns	(MOSFET switching times are essentially
$t_{d(off)}$	Turn-Off Delay Time	-	-	75	ns	independent of operating temperature)
tf	Fall Time	-	-	130	ns	
Qg	Total Gate Charge	-	-	100	nC	V_{GS}=10V, I_D=52A, V_{DS}=0.8Max Rating
	(Gate-Source Pulse Gate-Drain)					(Gate charge is essentially independent
Qgs	Gate-Source Charge	-	-	21	nC	of operating temperature)
Qgd	Gate-Drain (“Miller”) Charge	-	-	58	nC	

THERMAL RESISTANCE

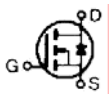
R_{thJC}	Junction-to-Case	Max	1.0	K/W	
R_{thCS}	Case-to-Sink	TYP	0.5	K/W	Mounting surface flat smooth, and greased
R_{thJA}	Junction-to-Ambient	MAX	80	K/W	Free Air Operation

Notes: (1) TJ=25°C to 175°C

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

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

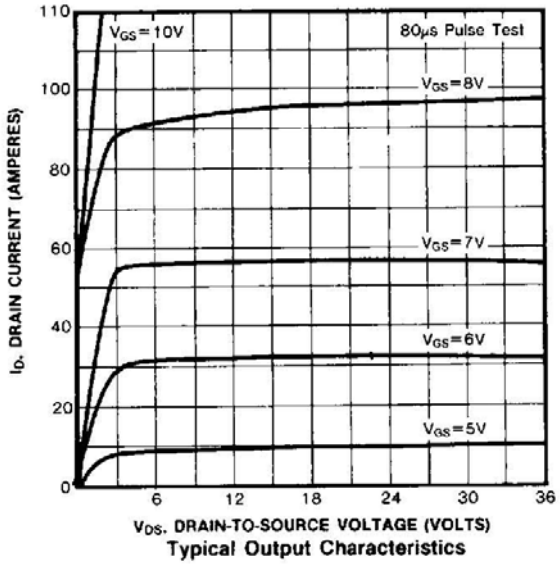
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic	Min	Typ	Max	Units	Test C onditions
Is	Continuous Source IRFZ44/40	-	-	35	A	Modified MOSFET integral reverse P-N junction rectifier 
	Current (Body Diode) IRFZ45/42	-	-	35	A	
I_{SM}	Pulse-Source Current IRFZ44/40	-	-	210	A	
	(3) IRFZ45/42	-	-	190	A	
V_{SD}	Diode Forward Voltage All	-	-	25	V	Tc=25°C, I_S=35A, V_{GS}=0V
t_{rr}	Reverse Recovery Time	-	-	250	ns	T_J=25°C, I_F=35A, dI_F/dt=100A/μS

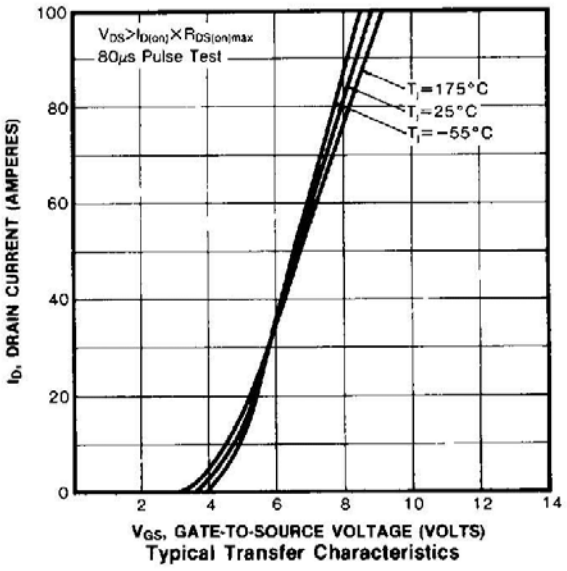
Notes: (1) TJ=25°C to 175°C

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

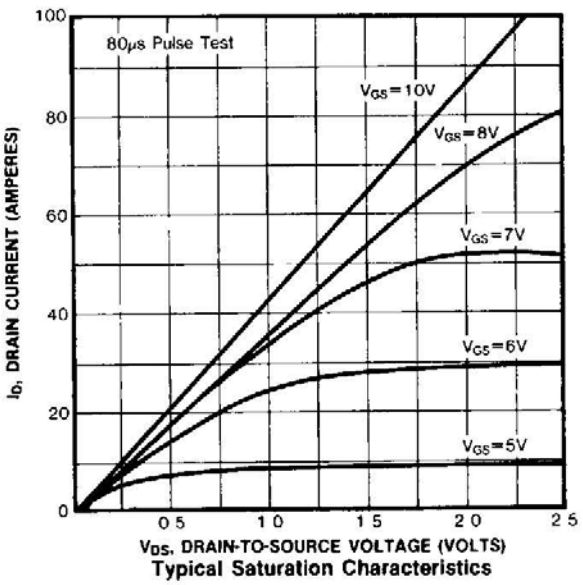
(3) Repetitive rating Pulse with limited by max junction temperature



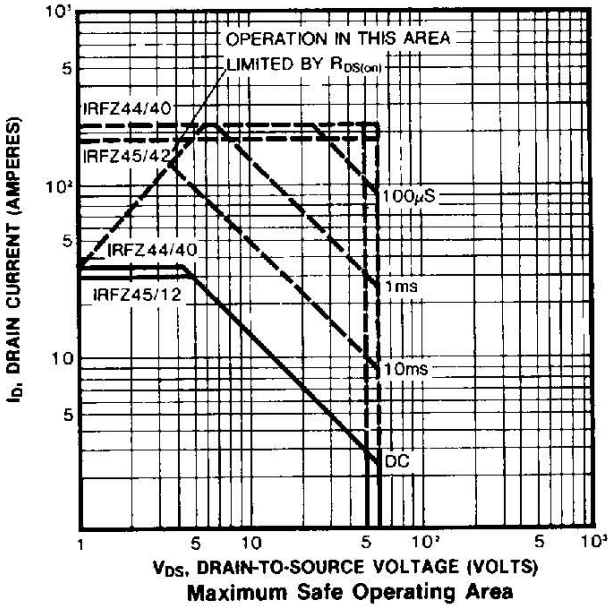
Typical Output Characteristics



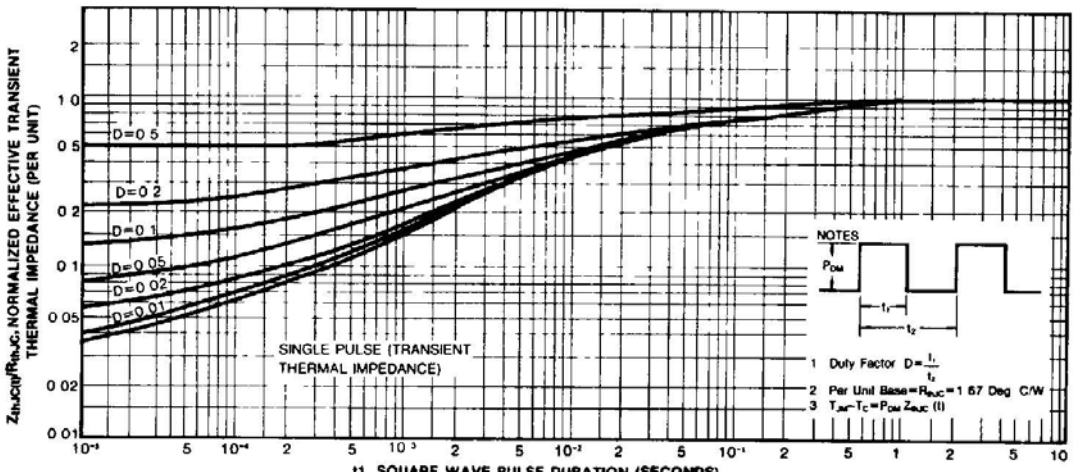
Typical Transfer Characteristics



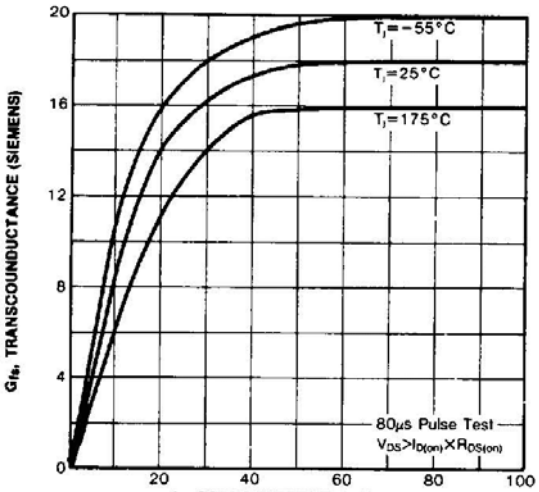
Typical Saturation Characteristics



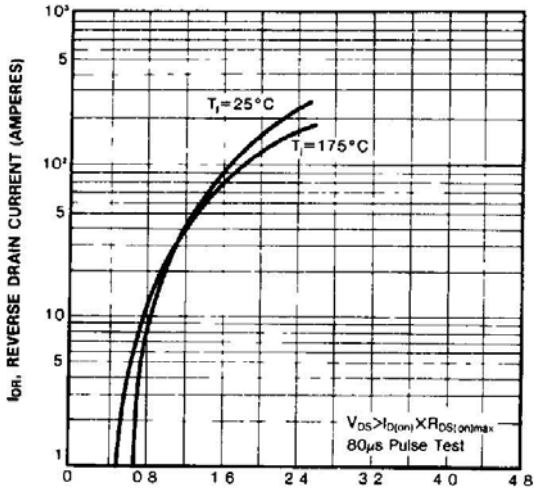
Maximum Safe Operating Area



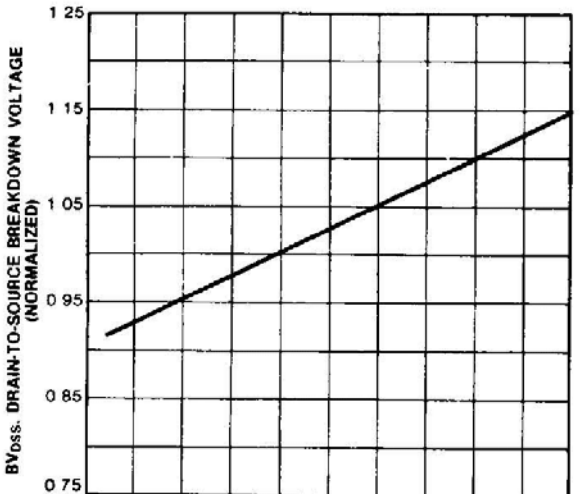
Maximum Effective Transient Thermal Impedance Junction-to-Case Vs. Pulse Duration



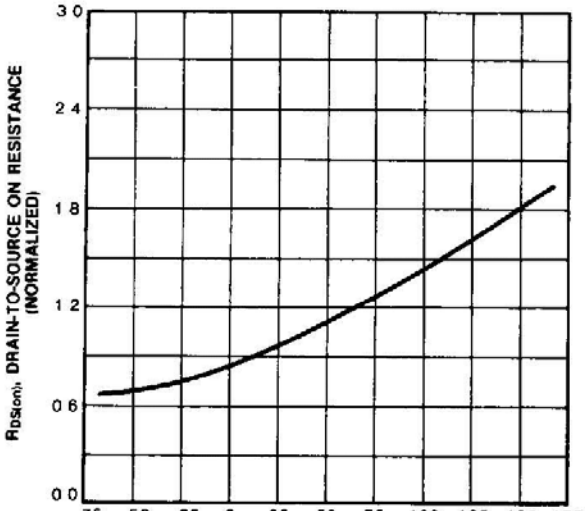
Typical Transcounductance Vs. Drain Current



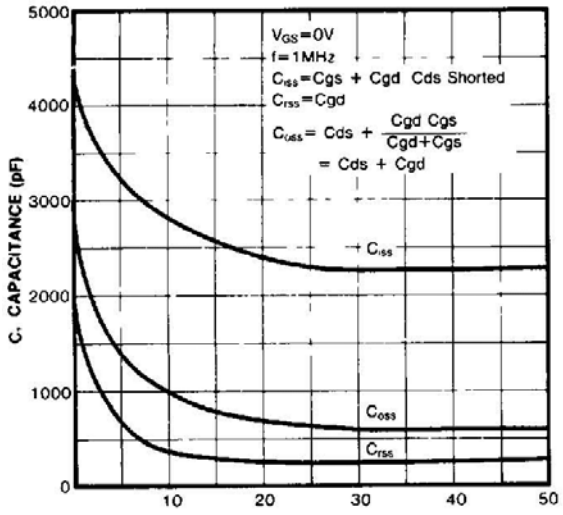
Typical Source—Drain Diode Forward Voltage



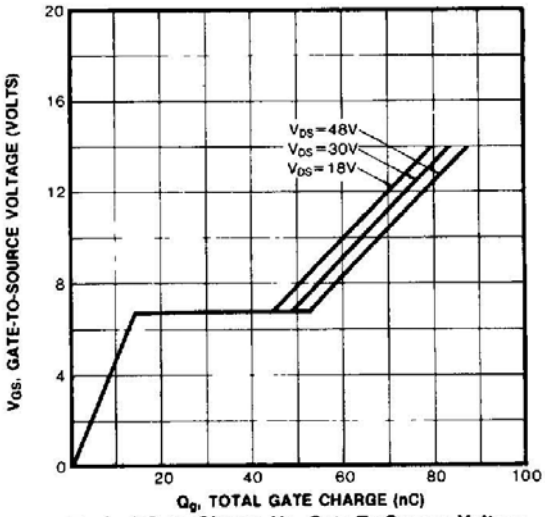
Breakdown Voltage Vs. Temperature



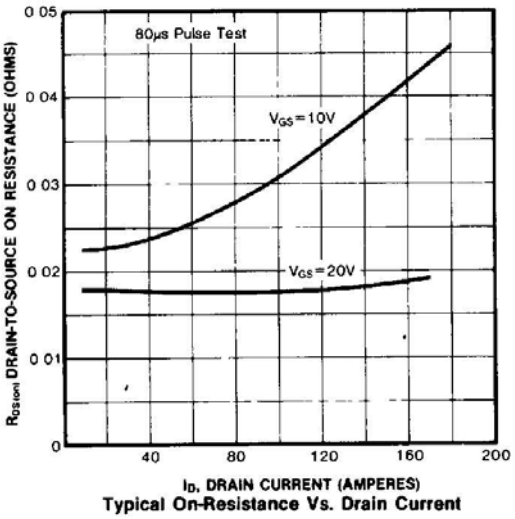
Normalized On-Resistance Vs. Temperature



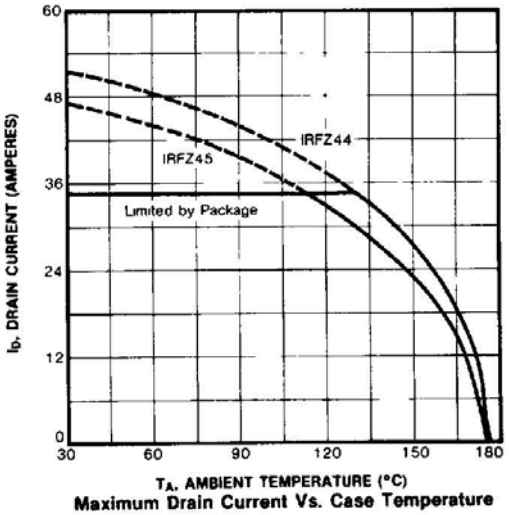
Typical Capacitance Vs. Drain to Source Voltage



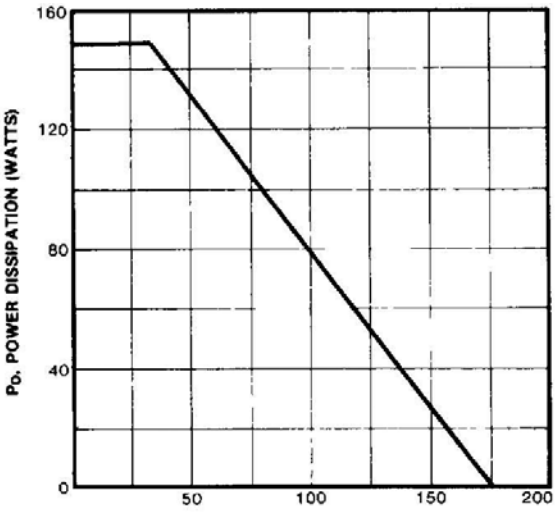
Typical Gate Charge Vs. Gate-To-Source Voltage



Typical On-Resistance Vs. Drain Current



Maximum Drain Current Vs. Case Temperature



Power Vs. Temperature Derating Curve