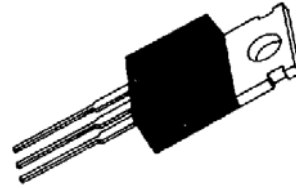


FEATURES

- 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	I _D	35	35	35	35	Adc
Continuous Drain Current Tc=100	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	P _D	150		12		Watts W/
Operating and Storage Junction Temperature Range	T _J , T _{stg}	-55 to 175				
Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds	T _L	300				

Notes: (1) T_J=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_{dd}=25V, R_G=25Ω, Starting T_J=25

ELECTRICAL CHARACTERISTICS (Tc=25 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} =0.8 Max. Rating, V _{GS} =0V, Tc=150
I _{D(on)}	On-State Drain-Source Current (2)	35	-	-	A	V _{DS} ≥12V 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	-	-	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 (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 to 175

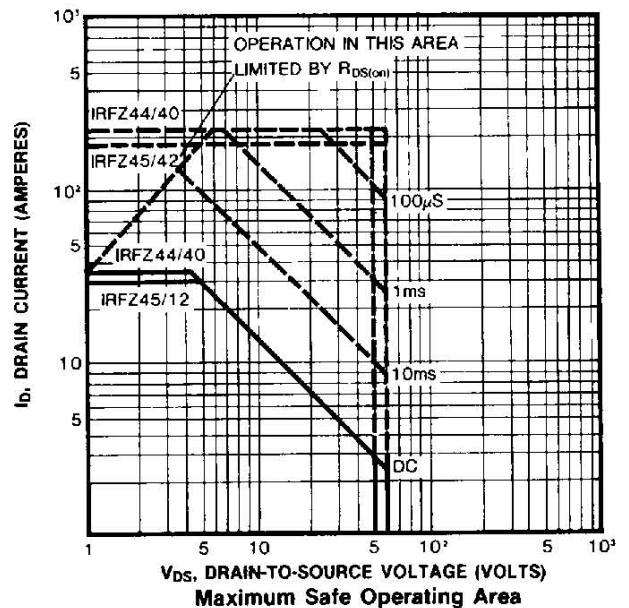
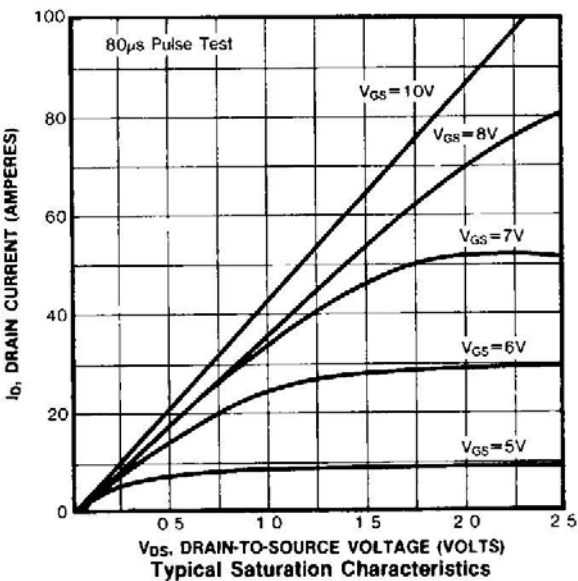
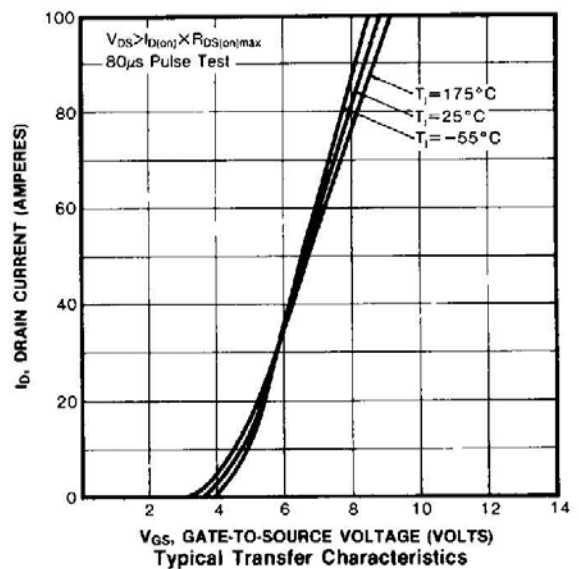
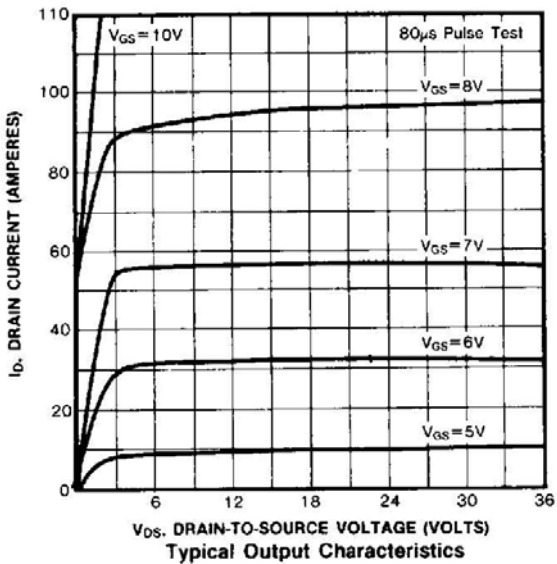
(2) Pulse test Pulse Width ≤ 300μs, Duty Cycle ≤ 2%

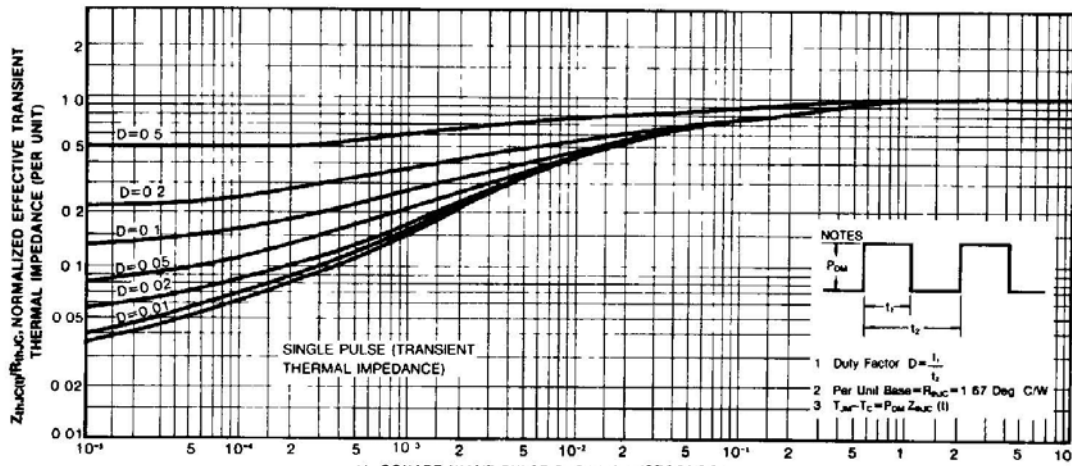
(3) Repetitive rating Pulse width limited by max junction temperature

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

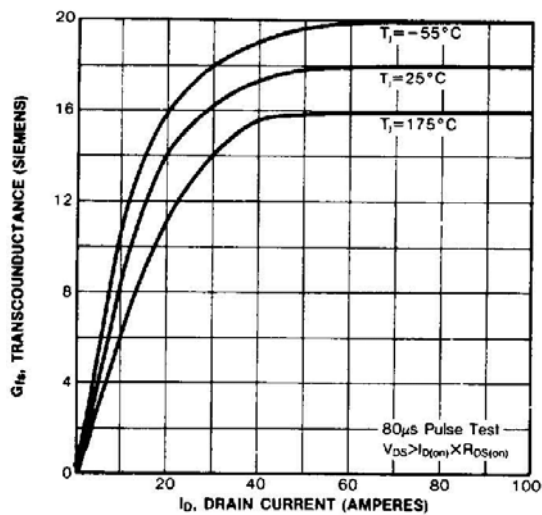
Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	-	-	35	A	Modified MOSFET integral reverse P-N junction rectifier 
I_{SM}	Pulse-Source Current (3)	-	-	210	A	
V_{SD}	Diode Forward Voltage All	-	-	25	V	$T_C=25^\circ\text{C}$, $I_S=35\text{A}$, $V_{GS}=0\text{V}$
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°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

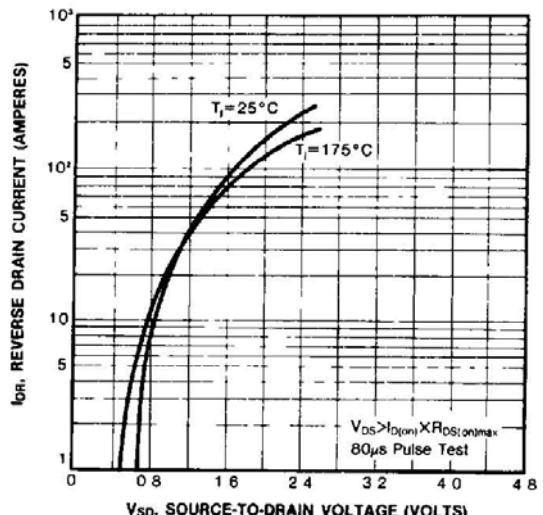




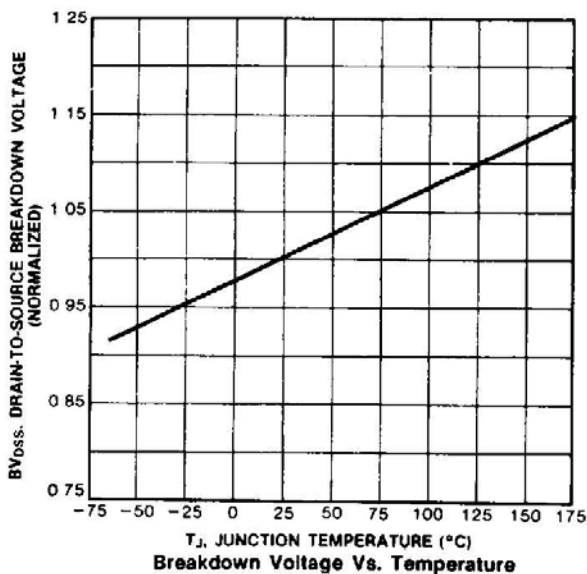
Maximum Effective Transient Thermal Impedance Junction-to-Case Vs. Pulse Duration



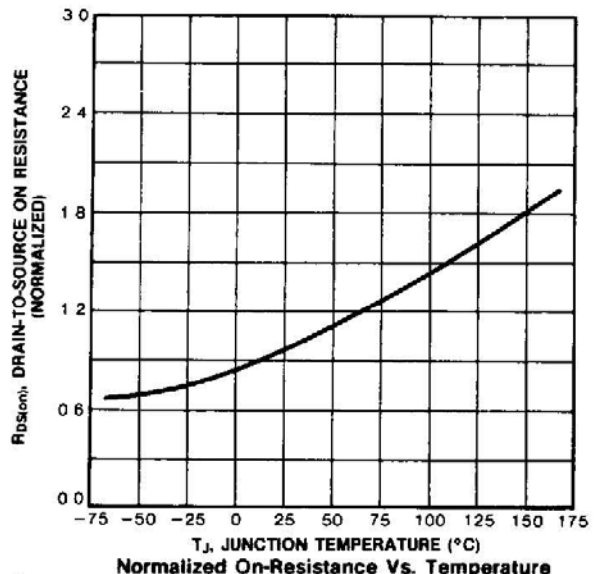
Typical Transconductance Vs. Drain Current



Typical Source-Drain Diode Forward Voltage



Breakdown Voltage Vs. Temperature



Normalized On-Resistance Vs. Temperature

