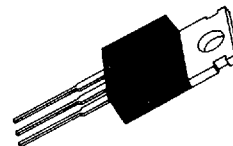


**IRFZ44/45**  
**IRFZ40/42**
**N-CHANNEL**  
**POWER MOSFETS**
**FEATURES**

- 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

TO-220


 IRFZ44/IRFZ45  
 IRFZ40/IRFZ42

2

**PRODUCT SUMMARY**

Part Number	$V_{DS}$	$R_{DS(on)}$	$I_D$
IRFZ44	60V	0.028 $\Omega$	35A
IRFZ45	60V	0.035 $\Omega$	35A
IRFZ40	50V	0.028 $\Omega$	35A
IRFZ42	50V	0.035 $\Omega$	35A

\* Current limited by wire &amp; 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	$V_{GS}$	$\pm 20$				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	$I_{GM}$	$\pm 1.5$				Adc
Single Pulsed Avalanche Energy (4)	$E_{AS}$	53				mJ
Avalanche Current	$I_{AS}$	35				A
Total Power Dissipation at $T_C=25^\circ C$	$P_D$	150				Watts
Derate above $25^\circ C$		1.2				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  $T_J=25^\circ C$

**IRFZ44/45**  
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**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	$\mu A$	$V_{DS}=\text{Max. Rating } V_{GS}=0V$ $V_{DS}=0.8\text{Max. Rating}, V_{GS}=0V, T_C=150^\circ\text{C}$
		—	—	1000	$\mu A$	
$I_{D(on)}$	On-State Drain-Source Current (2)	35	—	—	A	$V_{DS}\geq 1.2V, V_{GS}=10V$
$R_{DS(on)}$	Static Drain-Source	—	—	0.028	$\Omega$	$V_{GS}=10V, I_D=33A$
	On-State Resistance	—	—	0.035		
$g_{fs}$	Forward Transconductance (2)	15	—	—	$\text{U}$	$V_{DS}\geq 50V, I_D=33A$
$C_{iss}$	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	
$Q_{gs}$	Gate-Source Charge	—	—	21	nC	$V_{GS}=10V, I_D=52A, V_{DS}=0.8\text{Max. Rating}$ (Gate charge is essentially independent of operating temperature)
$Q_{gd}$	Gate-Drain ("Miller") Charge	—	—	58	nC	

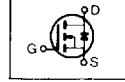
**THERMAL RESISTANCE**

$R_{thJC}$	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  $175^\circ\text{C}$   
 (2) Pulse test Pulse width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$   
 (3) Repetitive rating Pulse width limited by max junction temperature

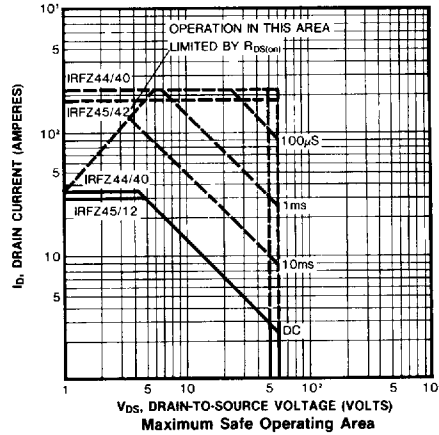
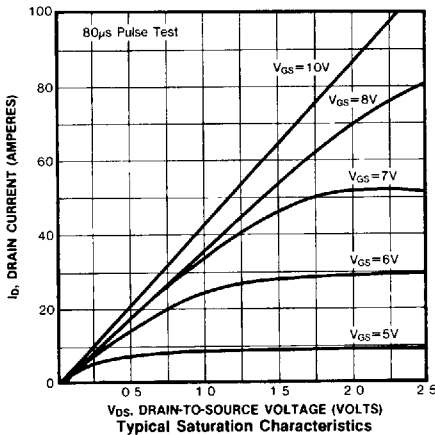
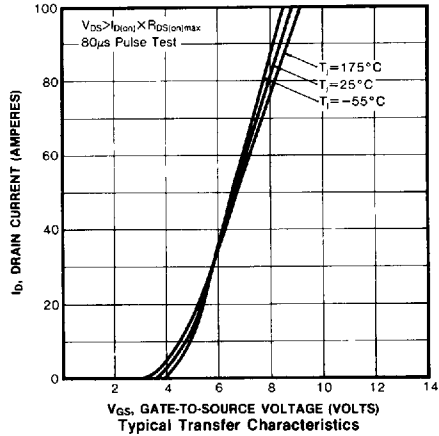
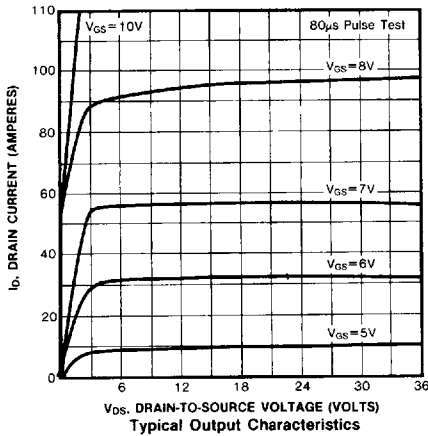
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	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	$T_J=25^\circ\text{C}$ , $I_F=35\text{A}$ , $dI_F/dt=100\text{A}/\mu\text{S}$



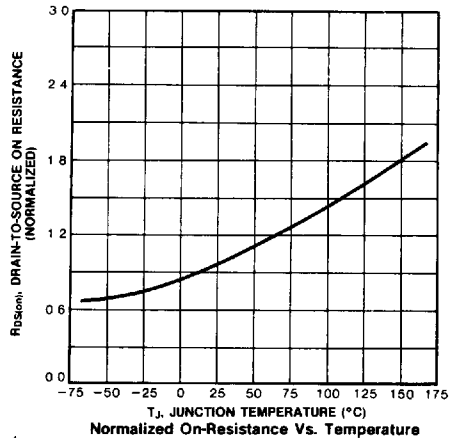
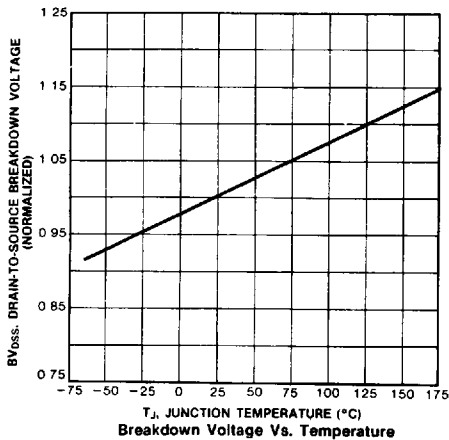
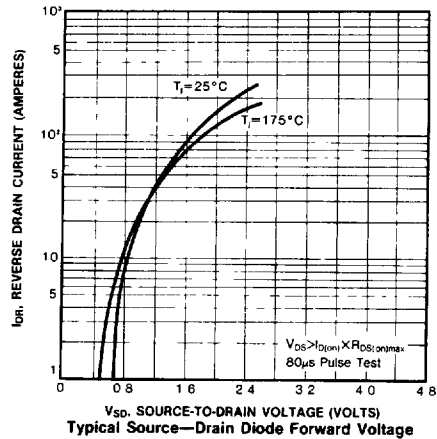
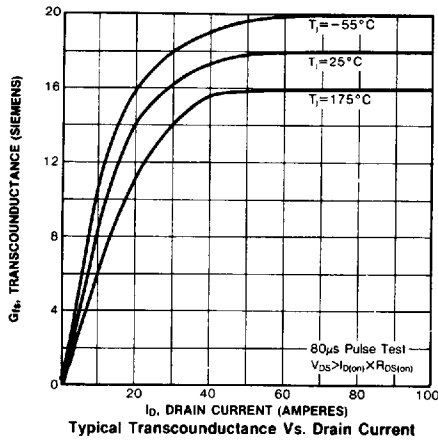
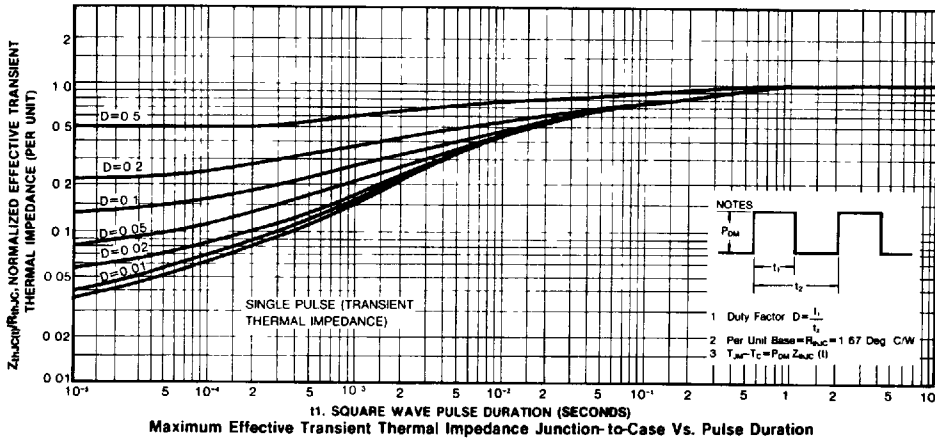
- Notes: (1)  $T_J=25^\circ\text{C}$  to  $175^\circ\text{C}$   
 (2) Pulse test Pulse width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$   
 (3) Repetitive rating Pulse with limited by max junction temperature

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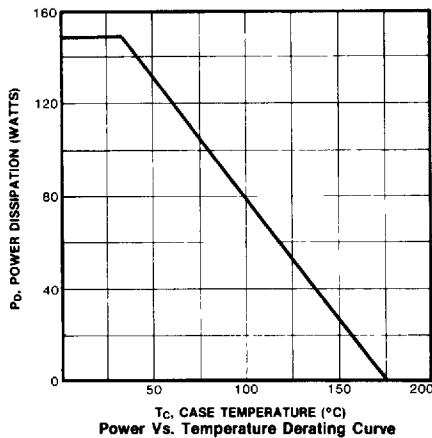
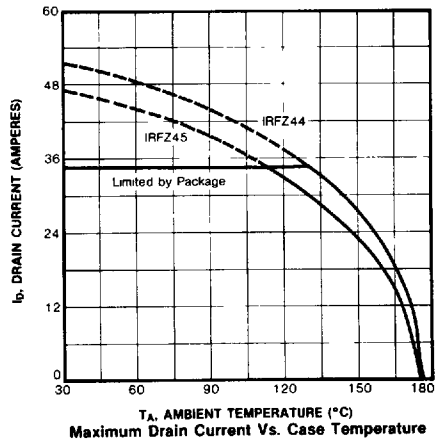
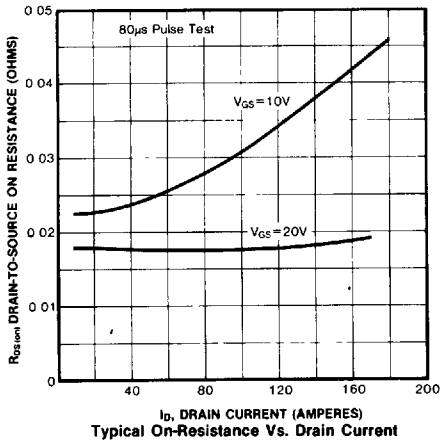
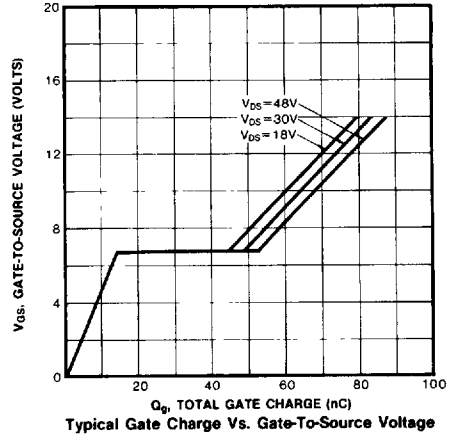
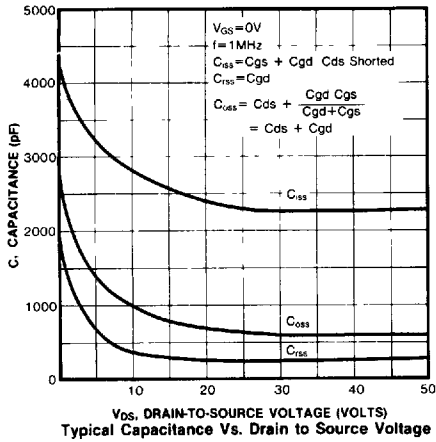
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2