IRFZ44V 60A 60V N CHANNEL POWER MOSFET

APPLICATION

- DC motor control
- UPS
- Class D Amplifier

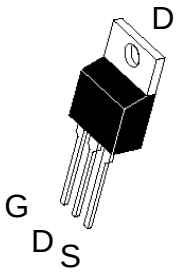
FEATURES

- Low ON Resistance
- Low Gate Charge
- Peak Current vs Pulse Width Curve
- Inductive Switching Curves

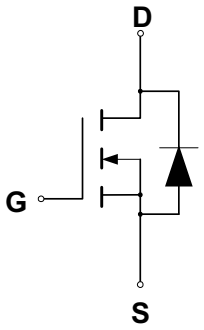
V_{DSS}	$R_{DS(ON)}$	I_D
60V	16.5mΩ	60A

PIN CONFIGURATION

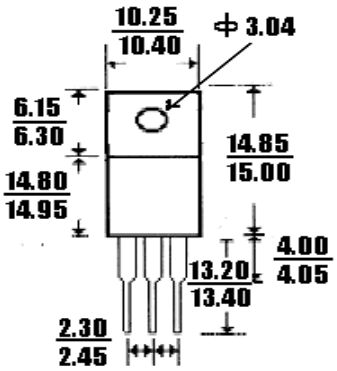
TO-220
Front View



SYMBOL



N-Channel MOSFET



DIMENSION IN MM

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain to Source Voltage (Note 1)	V_{DSS}	60	V
Drain to Current — Continuous Tc = 25℃, V_{GS}@10V	I_D	60	A
— Continuous Tc = 100℃, V_{GS}@10V	I_D	43	
— Pulsed Tc = 25℃, V_{GS}@10V (Note 2)	I_{DM}	241	
Gate-to-Source Voltage — Continue	V_{GS}	±20	V
Total Power Dissipation	P_D	150	W
Derating Factor above 25℃		1.0	W/℃
Peak Diode Recovery dv/dt (Note 3)	dv/dt	4.5	V/ns
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	℃
Single Pulse Avalanche Energy L=144μH,I_D=40 Amps	E_{AS}	500	mJ
Maximum Lead Temperature for Soldering Purposes	T_L	300	℃
Maximum Package Body for 10 seconds	T_{PKG}	260	℃
Pulsed Avalanche Rating	I_{AS}	60	A

THERMAL RESISTANCE

Symbol	Parameter	Min	Typ	Max	Units	Test Conditions
$R_{\theta JC}$	Junction-to-case			1.0	℃/W	Water cooled heatsink, P_D adjusted for a peak junction temperature of +175℃
$R_{\theta JA}$	Junction-to-ambient			62	℃/W	1 cubic foot chamber, free air

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ELECTRICAL CHARACTERISTICS

Unless otherwise specified, T_J = 25℃.

			IRFZ44V			
Characteristic		**Symbol**	**Min**	**Typ**	**Max**	**Units**
OFF Characteristics						
Drain-to-Source Breakdown Voltage (V_{GS} = 0 V, I_D = 250 μA)		V_{DSS}	60			V
Breakdown Voltage Temperature Coefficient (Reference to 25℃, I_D = 250 μA)		$\Delta V_{DSS}/\Delta T_J$		0.069		mV/℃
Drain-to-Source Leakage Current (V_{DS} = 60 V, V_{GS} = 0 V, T_J = 25℃)		I_{DSS}			25	μA
(V_{DS} = 48 V, V_{GS} = 0 V, T_J = 150℃)					250	
Gate-to-Source Forward Leakage (V_{GS} = 20 V)		I_{GSS}			100	nA
Gate-to-Source Reverse Leakage (V_{GS} = -20 V)		I_{GSS}			-100	nA
ON Characteristics						
Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 250 μA)		$V_{GS(th)}$	1.0	2.0	3.0	V
Static Drain-to-Source On-Resistance (Note 4) (V_{GS} = 10 V, I_D = 60A)		$R_{DS(on)}$			16.5	mΩ
Forward Transconductance (V_{DS} = 15 V, I_D = 60A) (Note 4)		g_{FS}		36		S
Dynamic Characteristics						
Input Capacitance	(V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz)	C_{iss}		1430		pF
Output Capacitance		C_{oss}		420		pF
Reverse Transfer Capacitance		C_{rss}		88		pF
Total Gate Charge (V_{GS} = 10 V)	(V_{DS} = 30 V, I_D = 60 A, V_{GS} = 10 V) (Note 5)	Q_g		37.7		nC
Gate-to-Source Charge		Q_{gs}		8.4		nC
Gate-to-Drain ("Miller") Charge		Q_{gd}		9.8		nC
Resistive Switching Characteristics						
Turn-On Delay Time	(V_{DD} = 30 V, I_D = 60 A, V_{GS} = 10 V, R_G = 9.1Ω) (Note 5)	$t_{d(on)}$		12.1		ns
Rise Time		t_{rise}		64		ns
Turn-Off Delay Time		$t_{d(off)}$		69		ns
Fall Time		t_{fall}		39		ns
Source-Drain Diode Characteristics						
Continuous Source Current (Body Diode)	Integral pn-diode in MOSFET	I_S			60	A
Pulse Source Current (Body Diode)		I_{SM}			241	A
Diode Forward On-Voltage	(I_S = 60 A, V_{GS} = 0 V)	V_{SD}			1.5	V
Reverse Recovery Time	(I_F = 60A, V_{GS} = 0 V, d_i/d_t = 100A/μs)	t_{rr}		55		ns
Reverse Recovery Charge		Q_{rr}		110		nC

Note 1: T_J = +25℃ to +175℃

Note 2: Repetitive rating; pulse width limited by maximum junction temperature.

Note 3: I_{SD} = 60A, di/dt ≤100A/μs, V_{DD} ≤ BV_{DSS}, T_J = +175℃

Note 4: Pulse width ≤ 250μs; duty cycle≤2%

Note 5: Essentially independent of operating temerpature.

Figure 1. Maximum Effective Thermal Impedance, Junction-to-Case

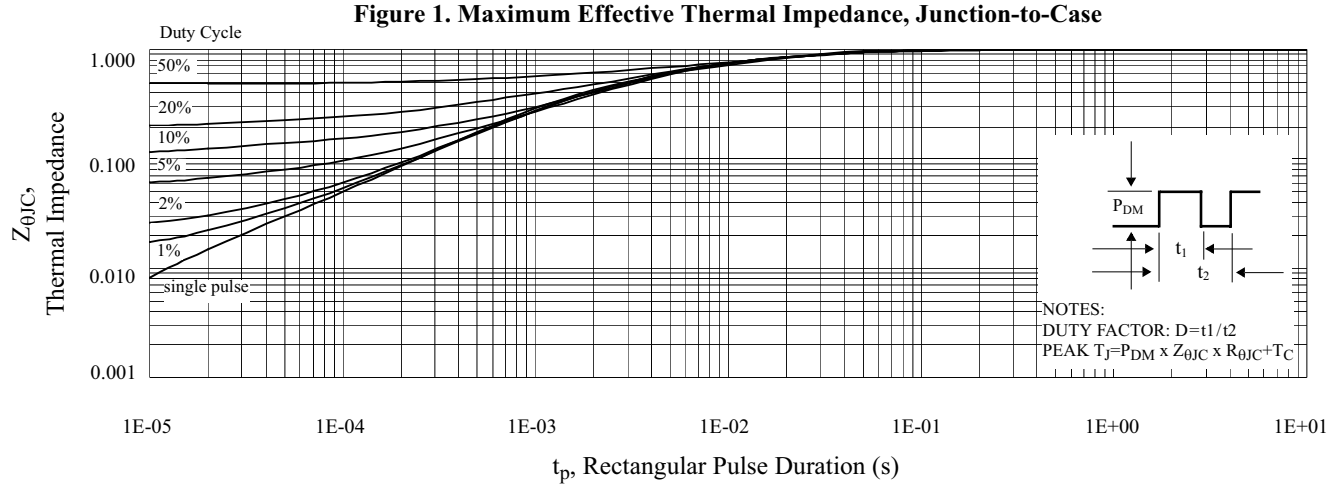


Figure 2. Maximum Power Dissipation vs Case Temperature

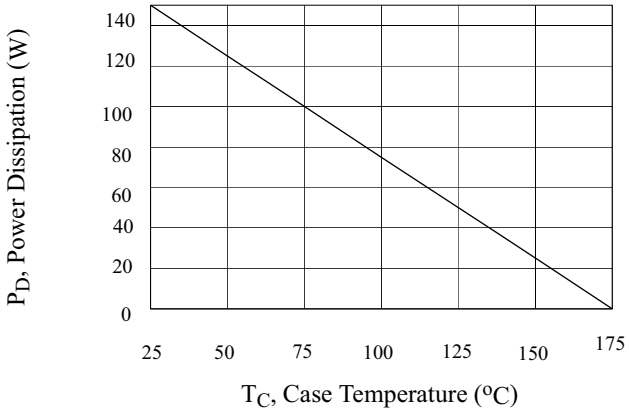


Figure 3. Maximum Continuous Drain Current vs Case Temperature

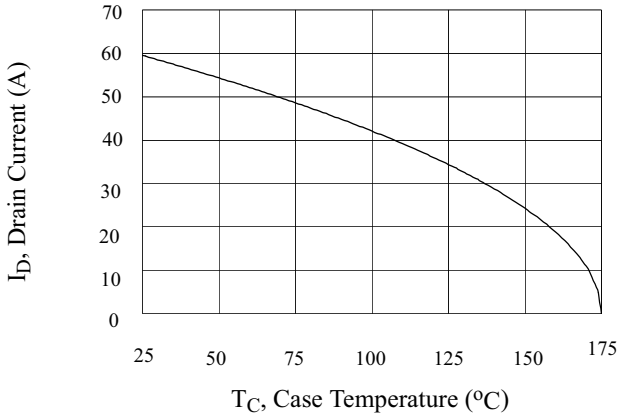


Figure 4. Typical Output Characteristics

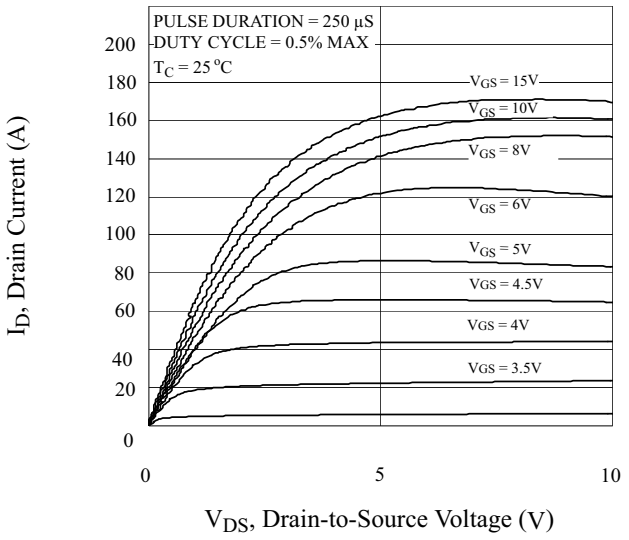


Figure 5. Typical Drain-to-Source ON Resistance vs Gate Voltage and Drain Current

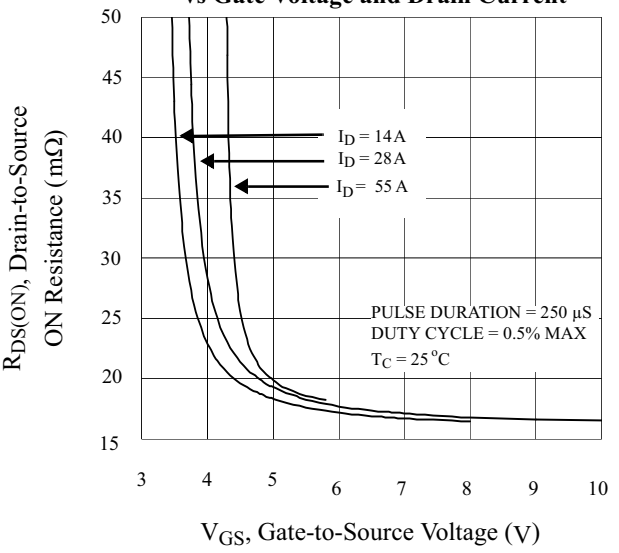


Figure 6. Maximum Peak Current Capability

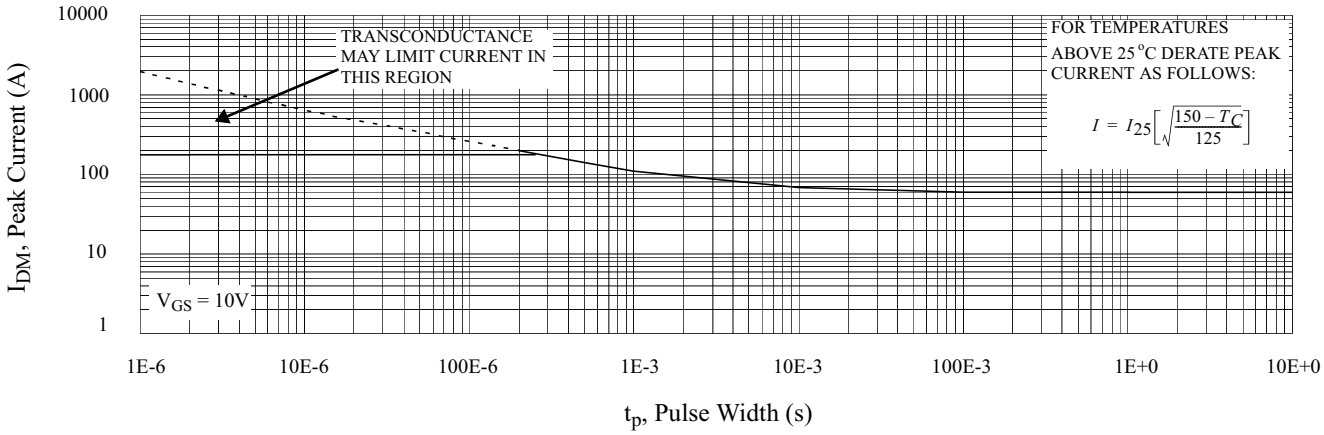


Figure 7. Typical Transfer Characteristics

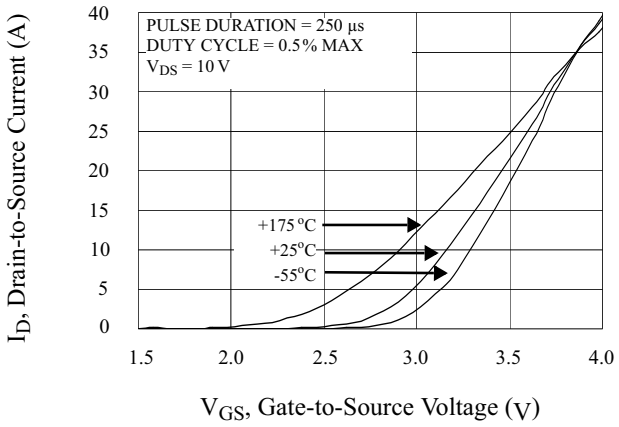


Figure 8. Unclamped Inductive Switching Capability

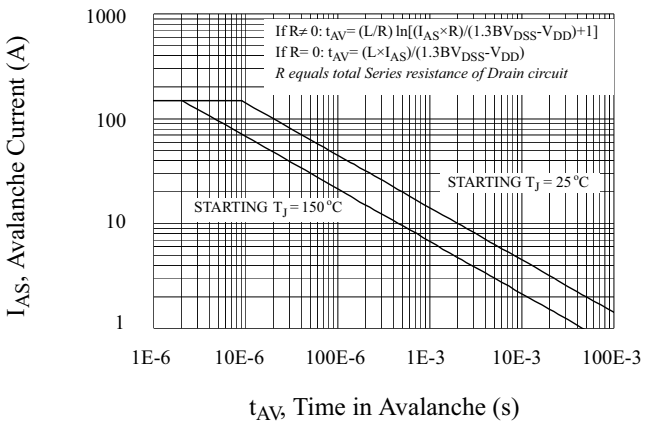


Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current

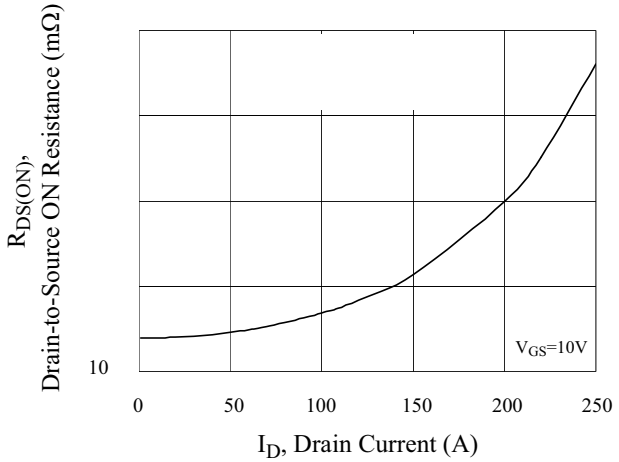


Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature

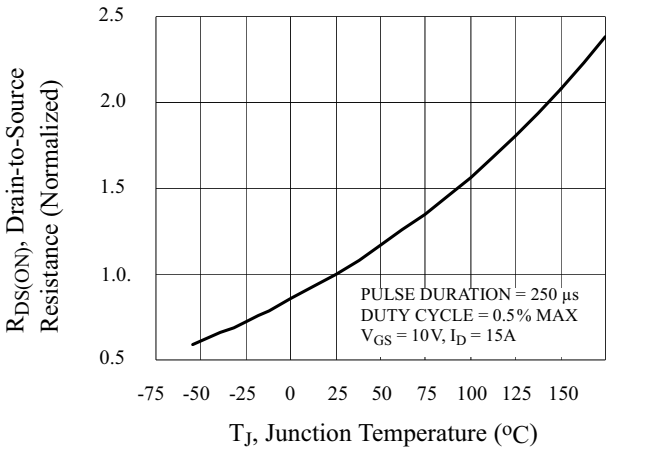


Figure 11. Typical Breakdown Voltage vs Junction Temperature

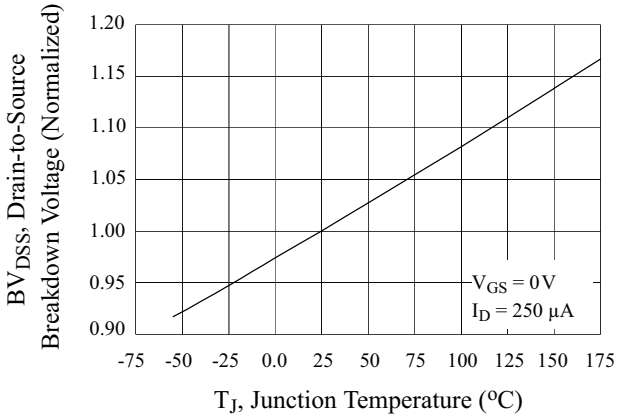
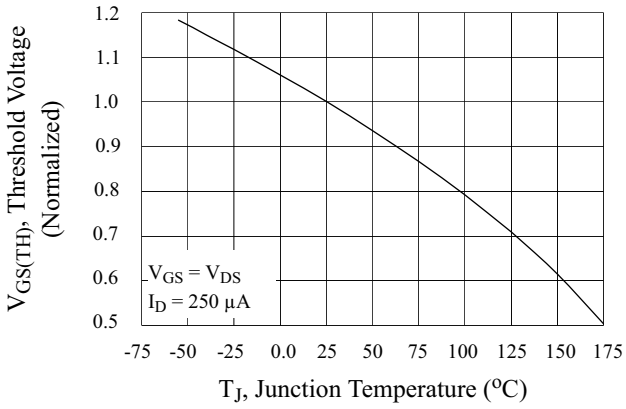


Figure 12. Typical Threshold Voltage vs Junction Temperature



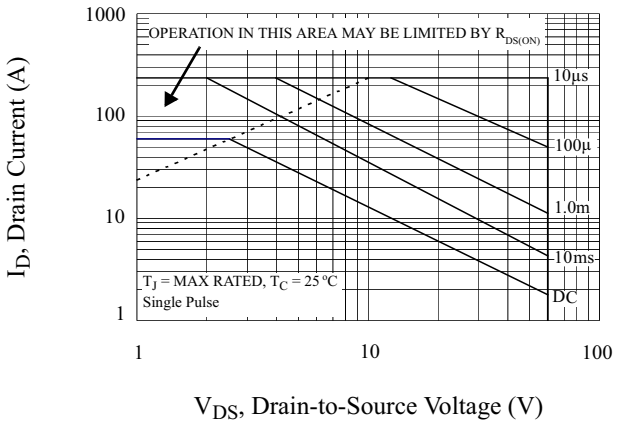


Figure 14. Typical Capacitance vs Drain-to-Source Voltage

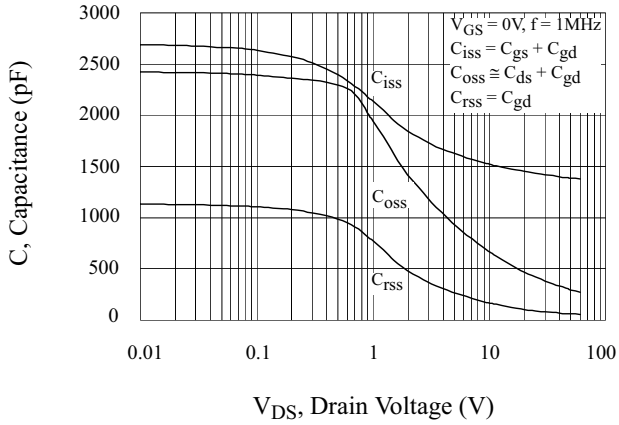


Figure 15. Typical Gate Charge vs Gate-to-Source Voltage

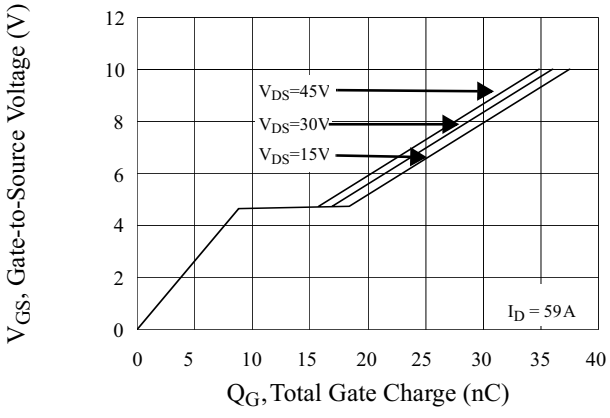


Figure 16. Typical Body Diode Transfer Characteristics