IRFZ44N 55A 50V N CHANNEL POWER MOSFET

APPLICATION

- Buck Converter High Side Switch
- DC motor control , Ups ...etc , & other Application

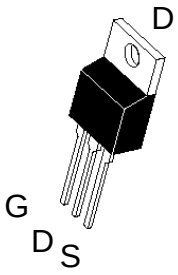
V_{DSS}	$R_{DS(ON)}$ Max.	I_D
55V	17.5mΩ	50A

FEATURES

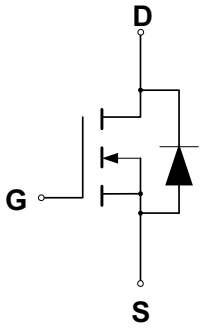
- Ultra Low ON Resistance
- Low Gate Charge
- Dynamic dv/dt Rating
- Inductive Switching Curves
- Peak Current vs Pulse Width Curve

PIN CONFIGURATION

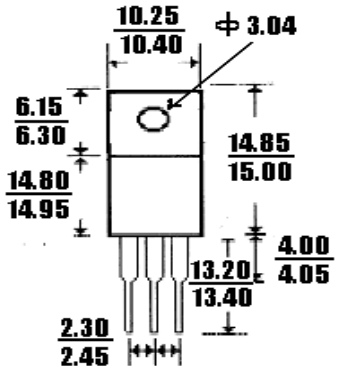
TO-220
Front View



SYMBOL



N-Channel MOSFET



DIMENSION IN MM

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain to Source Voltage	V_{DSS}	55	V
Drain to Current — Continuous Tc = 25℃, V_{GS}@10V	I_D	50	A
— Continuous Tc = 100℃, V_{GS}@10V	I_D	35	
— Pulsed Tc = 25℃, V_{GS}@10V (Note 1)	I_{DM}	160	
Gate-to-Source Voltage — Continue	V_{GS}	±20	V
Total Power Dissipation	P_D	94	W
Derating Factor above 25℃		0.63	W/℃
Peak Diode Recovery dv/dt (Note 3)	dv/dt	5.0	V/ns
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	℃
Repetitive Avalanche Energy (Note 1)	E_{AR}	9.4	mJ
Maximum Lead Temperature for Soldering Purposes	T_L	300	℃
Maximum Package Body for 10 seconds	T_{PKG}	260	℃
Avalanche Current (Note 1)	I_{AR}	25	A

THERMAL RESISTANCE

Symbol	Parameter	Min	Typ	Max	Units	Test Conditions
$R_{\theta JC}$	Junction-to-case			1.5	℃/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

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, T_J = 25℃.

Characteristic		Symbol	IRFZ44N Min	IRFZ44N Typ	IRFZ44N Max	Units
OFF Characteristics						
Drain-to-Source Breakdown Voltage (V_{GS} = 0 V, I_D = 250 μA)		V_{DSS}	55			V
Breakdown Voltage Temperature Coefficient (Reference to 25℃, I_D = 1mA)		$\Delta V_{DSS}/\Delta T_J$		0.058		V/℃
Drain-to-Source Leakage Current (V_{DS} = 55 V, V_{GS} = 0 V, T_J = 25℃)		I_{DSS}			25	μA
(V_{DS} = 44 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)		$V_{GS(th)}$	2.0		4.0	V
Static Drain-to-Source On-Resistance (Note 4) (V_{GS} = 10 V, I_D = 25A)		$R_{DS(on)}$			17.5	mΩ
Forward Transconductance (V_{DS} = 25 V, I_D = 25A) (Note 4)		g_{FS}	19			S
Dynamic Characteristics						
Input Capacitance	(V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz)	C_{iss}		1470		pF
Output Capacitance		C_{oss}		360		pF
Reverse Transfer Capacitance		C_{rss}		88		pF
Total Gate Charge	(V_{DS} = 44 V, I_D = 25 A, V_{GS} = 10 V) (Note 2)	Q_g		63		nC
Gate-to-Source Charge		Q_{gs}		14		nC
Gate-to-Drain (“Miller”) Charge		Q_{gd}		23		nC
Resistive Switching Characteristics						
Turn-On Delay Time	(V_{DD} = 28 V, I_D = 25 A, V_{GS} = 10 V, R_G = 12Ω) (Note 4)	$t_{d(on)}$		12		ns
Rise Time		t_{rise}		60		ns
Turn-Off Delay Time		$t_{d(off)}$		44		ns
Fall Time		t_{fall}		45		ns
Source-Drain Diode Characteristics						
Continuous Source Current (Body Diode)	Integral pn-diode in MOSFET	I_S			50	A
Pulse Source Current (Body Diode)	(Note 1)	I_{SM}			160	A
Diode Forward On-Voltage	(I_S = 25A, V_{GS} = 0 V) (Note 4)	V_{SD}			1.3	V
Reverse Recovery Time	(I_F = 25A, V_{GS} = 0 V,	t_{rr}		63	95.	ns
Reverse Recovery Charge	d_i/d_t = 100A/μs) (Note 4)	Q_{rr}		170	260	nC

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

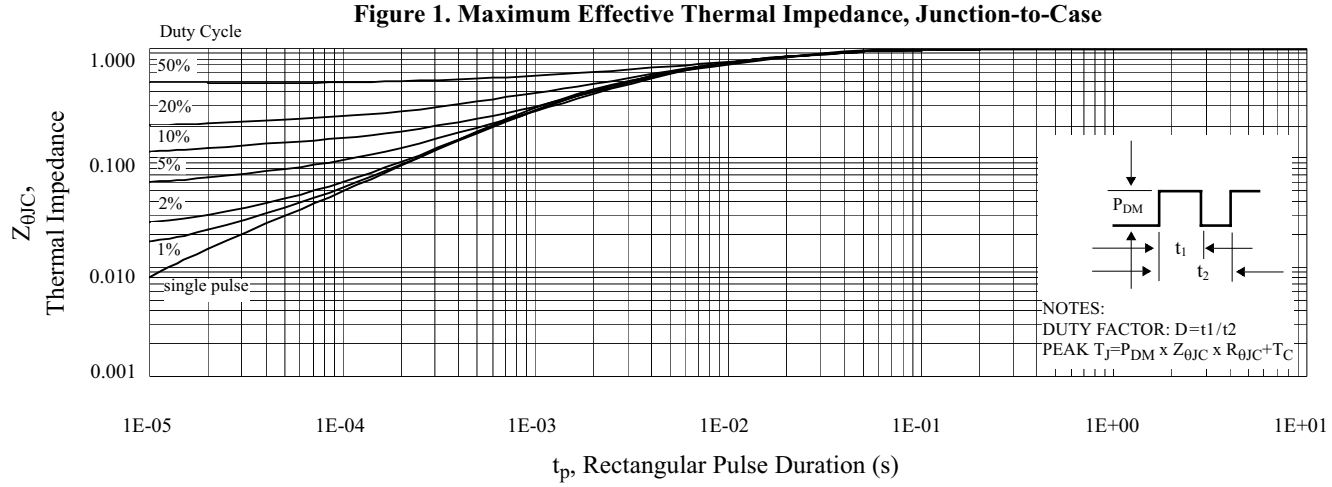


Figure 2. Maximum Power Dissipation vs Case Temperature

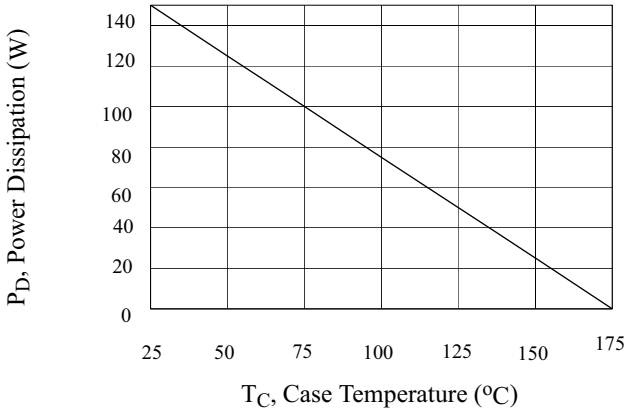


Figure 3. Maximum Continuous Drain Current vs Case Temperature

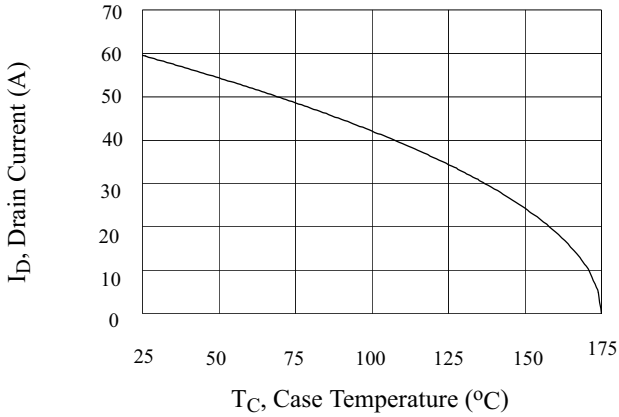


Figure 4. Typical Output Characteristics

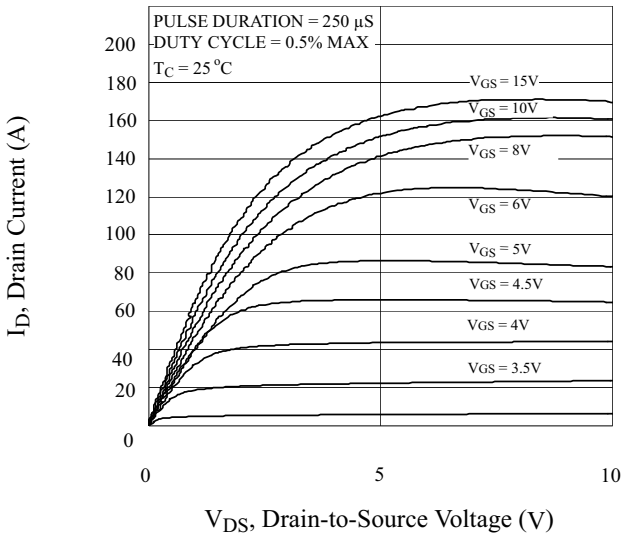


Figure 5. Typical Drain-to-Source ON Resistance vs Gate Voltage and Drain Current

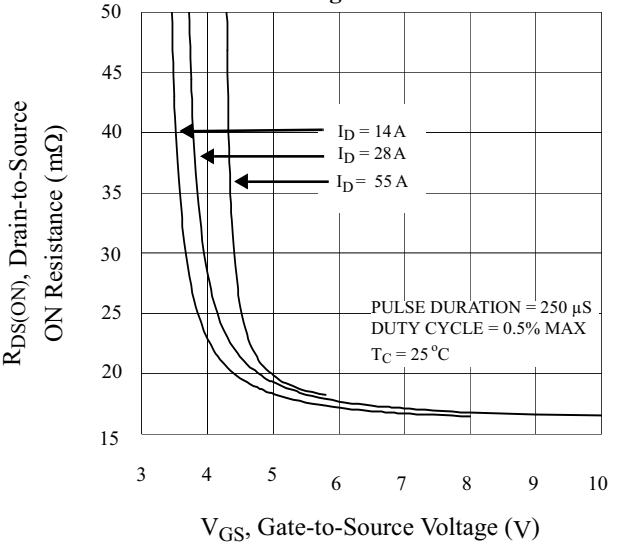


Figure 6. Maximum Peak Current Capability

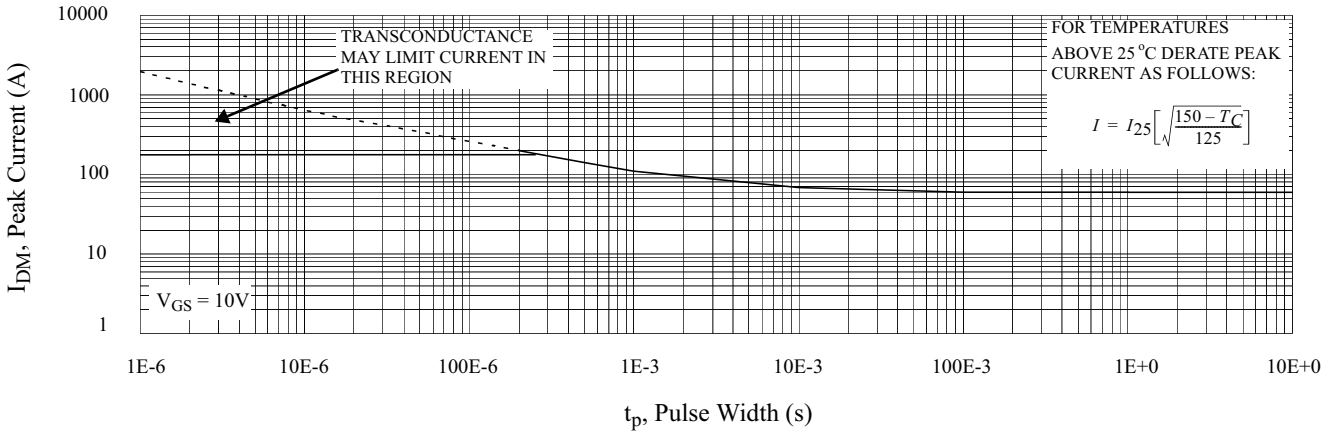


Figure 7. Typical Transfer Characteristics

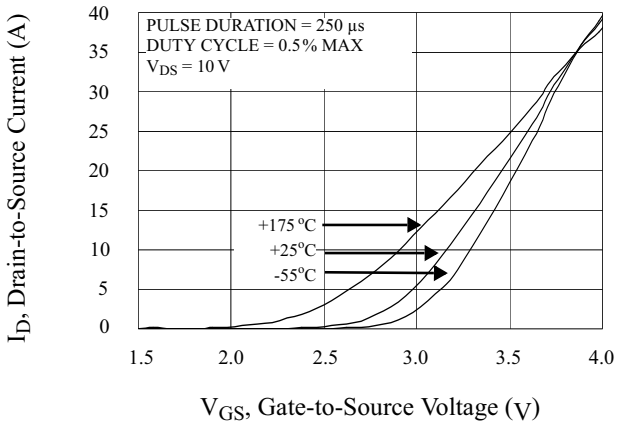


Figure 8. Unclamped Inductive Switching Capability

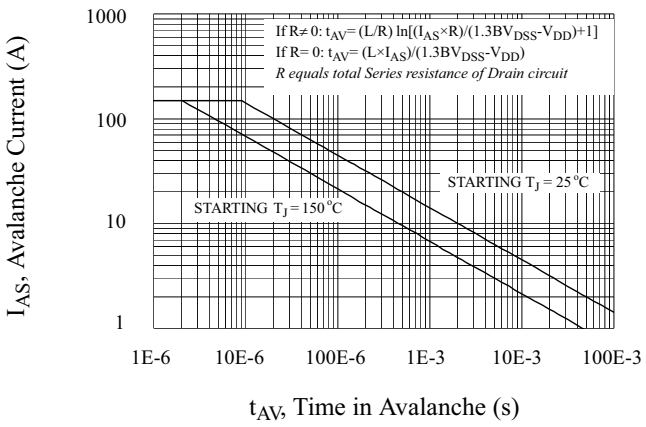


Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current

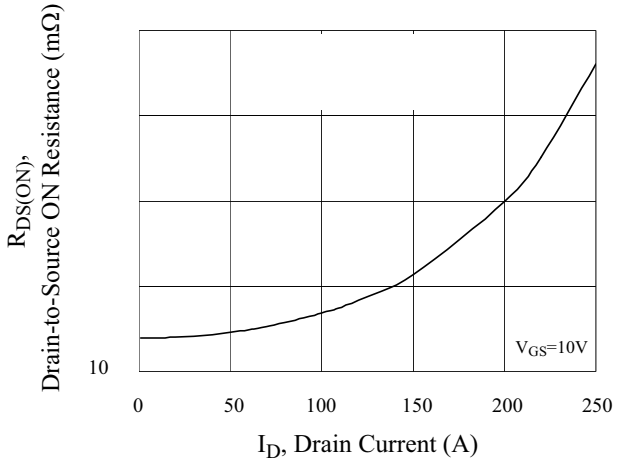


Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature

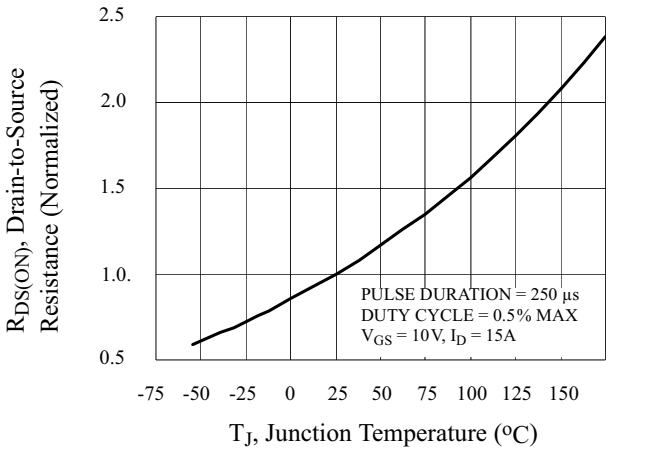


Figure 11. Typical Breakdown Voltage vs Junction Temperature

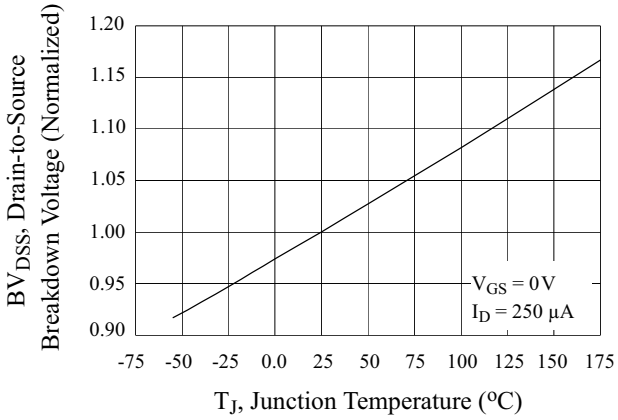
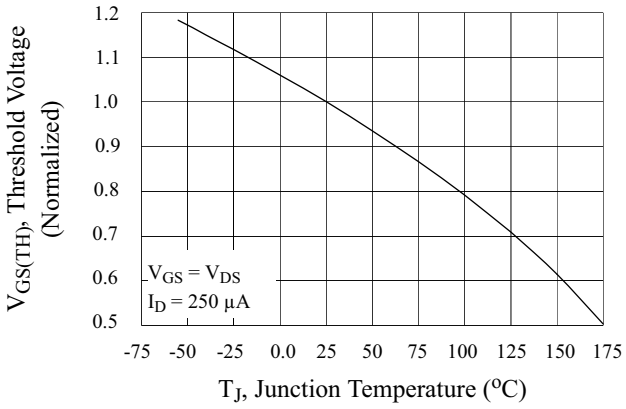


Figure 12. Typical Threshold Voltage vs Junction Temperature



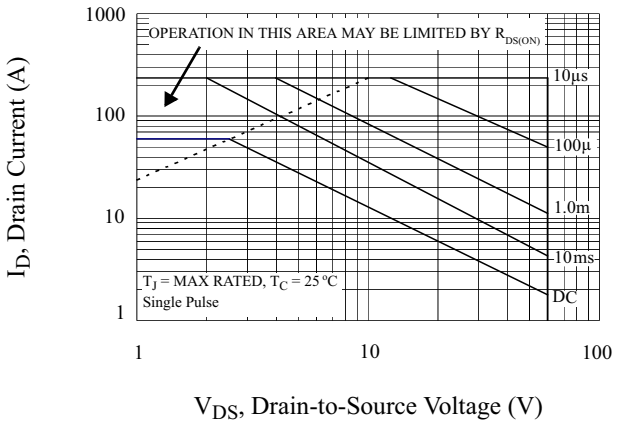


Figure 14. Typical Capacitance vs Drain-to-Source Voltage

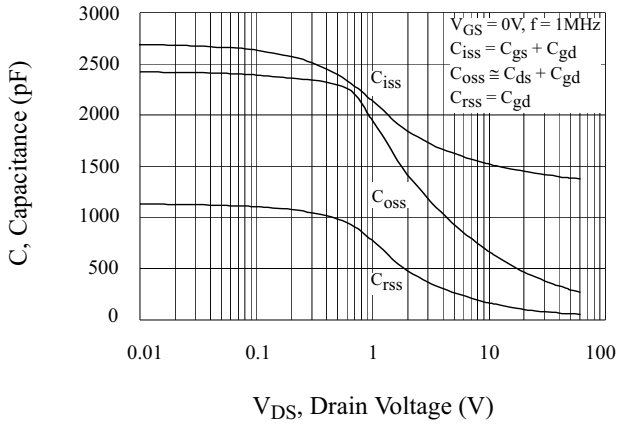


Figure 15. Typical Gate Charge vs Gate-to-Source Voltage

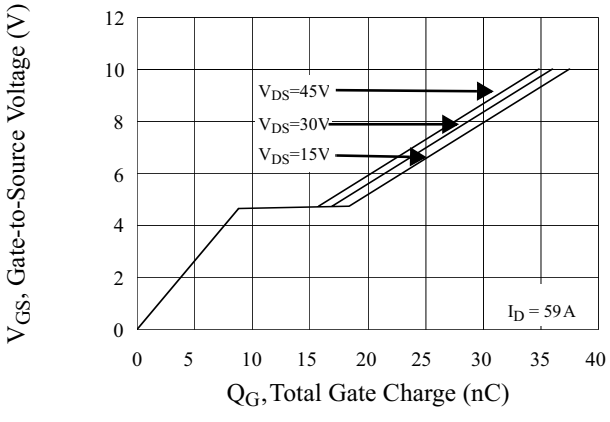


Figure 16. Typical Body Diode Transfer Characteristics