



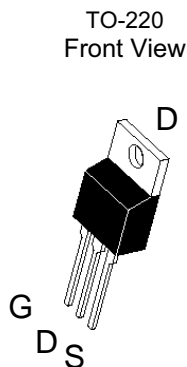
IRFZ44N 55A 50V N CHANNEL POWER MOSFET

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

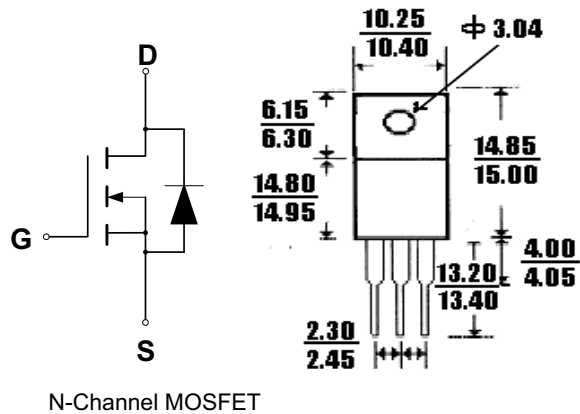
PIN CONFIGURATION



FEATURES

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

SYMBOL



ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain to Source Voltage	V_{DSS}	55	V
Drain to Current — Continuous $T_c = 25^\circ\text{C}$, $V_{GS}@10\text{V}$	I_D	50	A
— Continuous $T_c = 100^\circ\text{C}$, $V_{GS}@10\text{V}$	I_D	35	
— Pulsed $T_c = 25^\circ\text{C}$, $V_{GS}@10\text{V}$ (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°C		0.63	W/ $^\circ\text{C}$
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	$^\circ\text{C}$
Repetitive Avalanche Energy (Note 1)	E_{AR}	9.4	mJ
Maximum Lead Temperature for Soldering Purposes	T_L	300	$^\circ\text{C}$
Maximum Package Body for 10 seconds	T_{PKG}	260	$^\circ\text{C}$
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	$^\circ\text{C}/\text{W}$	Water cooled heatsink, P_D adjusted for a peak junction temperature of $+175^\circ\text{C}$
$R_{\theta JA}$	Junction-to-ambient			62	$^\circ\text{C}/\text{W}$	1 cubic foot chamber, free air



IRFZ44N 55A 50V N CHANNEL POWER MOSFET

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, $T_J = 25^\circ\text{C}$.

Characteristic		Symbol	IRFZ44N			Units
			Min	Typ	Max	
OFF Characteristics						
Drain-to-Source Breakdown Voltage ($V_{GS} = 0\text{ V}$, $I_D = 250\ \mu\text{A}$)		V_{DSS}	55			V
Breakdown Voltage Temperature Coefficient (Reference to 25°C , $I_D = 1\text{mA}$)		$\Delta V_{DSS}/\Delta T_J$		0.058		$\text{V}/^\circ\text{C}$
Drain-to-Source Leakage Current ($V_{DS} = 55\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 25^\circ\text{C}$) ($V_{DS} = 44\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 150^\circ\text{C}$)		I_{DSS}			25 250	μA
Gate-to-Source Forward Leakage ($V_{GS} = 20\text{ V}$)		I_{GSS}			100	nA
Gate-to-Source Reverse Leakage ($V_{GS} = -20\text{ V}$)		I_{GSS}			-100	nA
ON Characteristics						
Gate Threshold Voltage ($V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$)		$V_{GS(th)}$	2.0		4.0	V
Static Drain-to-Source On-Resistance (Note 4) ($V_{GS} = 10\text{ V}$, $I_D = 25\text{A}$)		$R_{DS(on)}$			17.5	$\text{m}\Omega$
Forward Transconductance ($V_{DS} = 25\text{ V}$, $I_D = 25\text{A}$) (Note 4)		g_{FS}	19			S
Dynamic Characteristics						
Input Capacitance	$(V_{DS} = 25\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1.0\text{ MHz}$)	C_{iss}		1470		pF
Output Capacitance		C_{oss}		360		pF
Reverse Transfer Capacitance		C_{rss}		88		pF
Total Gate Charge	$(V_{DS} = 44\text{ V}$, $I_D = 25\text{ A}$, $V_{GS} = 10\text{ V}$) (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	$(V_{DD} = 28\text{ V}$, $I_D = 25\text{ A}$, $V_{GS} = 10\text{ V}$, $R_G = 12\Omega$) (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 (Note 1)	I_S			50	A
Pulse Source Current (Body Diode)		I_{SM}			160	A
Diode Forward On-Voltage	$(I_S = 25\text{A}$, $V_{GS} = 0\text{ V}$) (Note 4)	V_{SD}			1.3	V
Reverse Recovery Time	$(I_F = 25\text{A}$, $V_{GS} = 0\text{ V}$, $dI/dt = 100\text{A}/\mu\text{s}$) (Note 4)	t_{rr}		63	95	ns
Reverse Recovery Charge		Q_{rr}		170	260	nC



IRFZ44N 55A 50V N CHANNEL POWER MOSFET

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

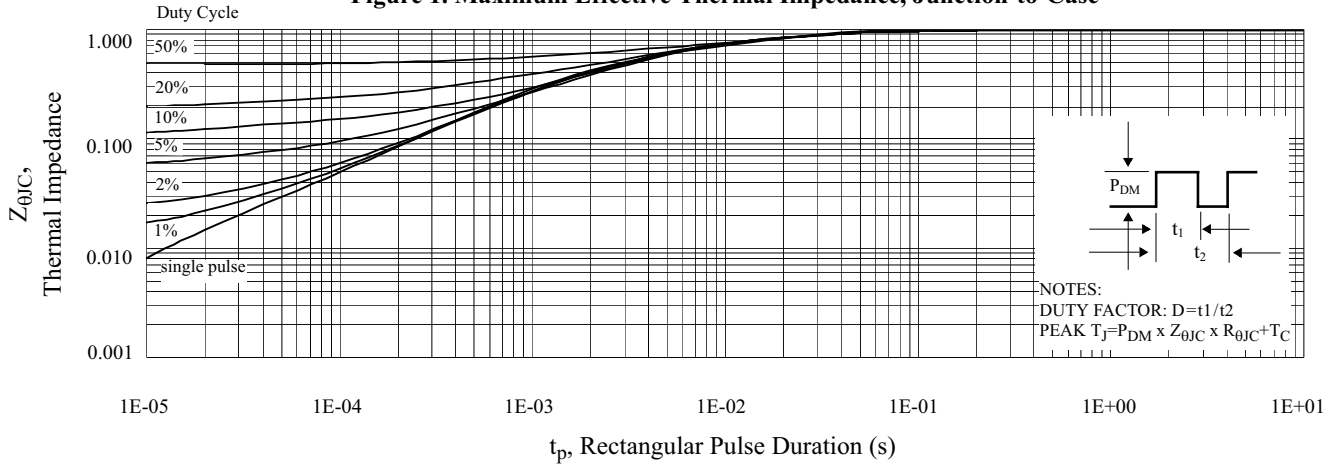


Figure 2. Maximum Power Dissipation vs Case Temperature

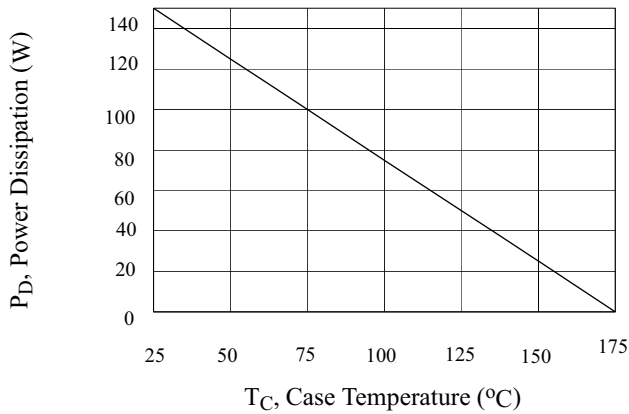


Figure 3. Maximum Continuous Drain Current vs Case Temperature

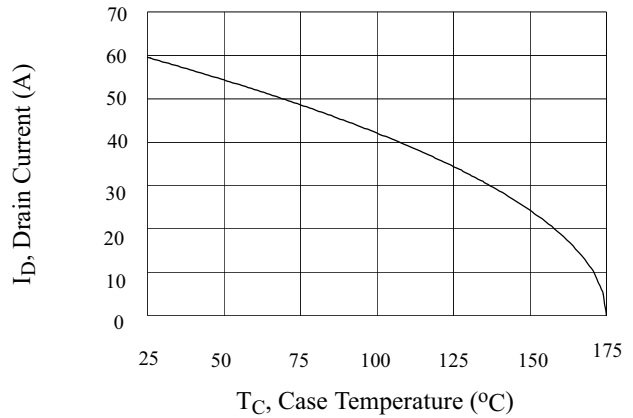


Figure 4. Typical Output Characteristics

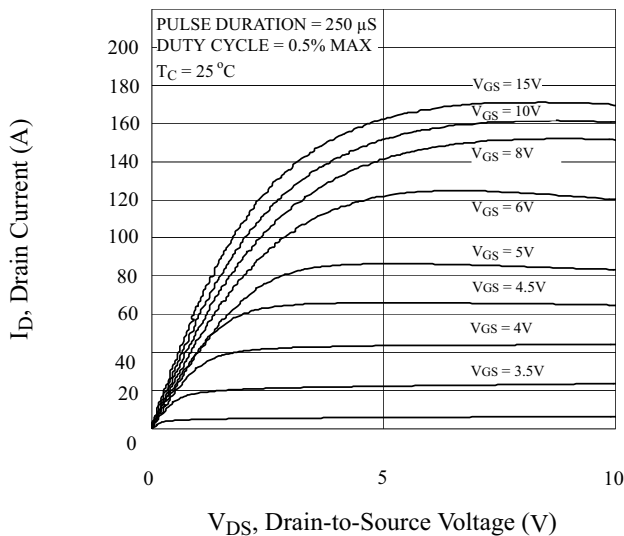
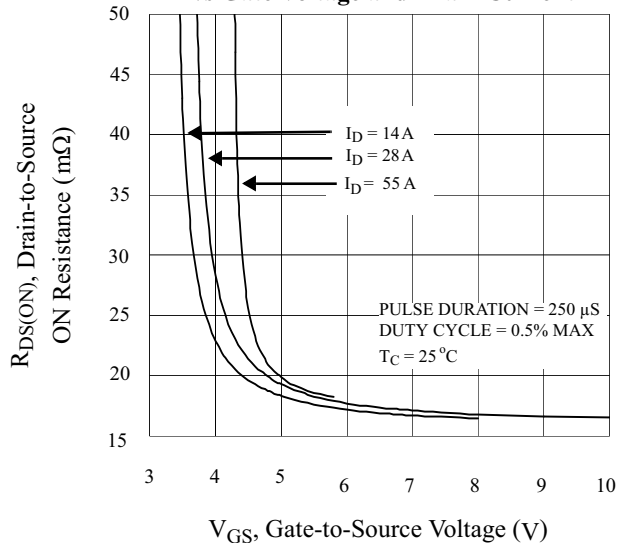


Figure 5. Typical Drain-to-Source ON Resistance vs Gate Voltage and Drain Current





IRFZ44N 55A 50V N CHANNEL POWER MOSFET

Figure 6. Maximum Peak Current Capability

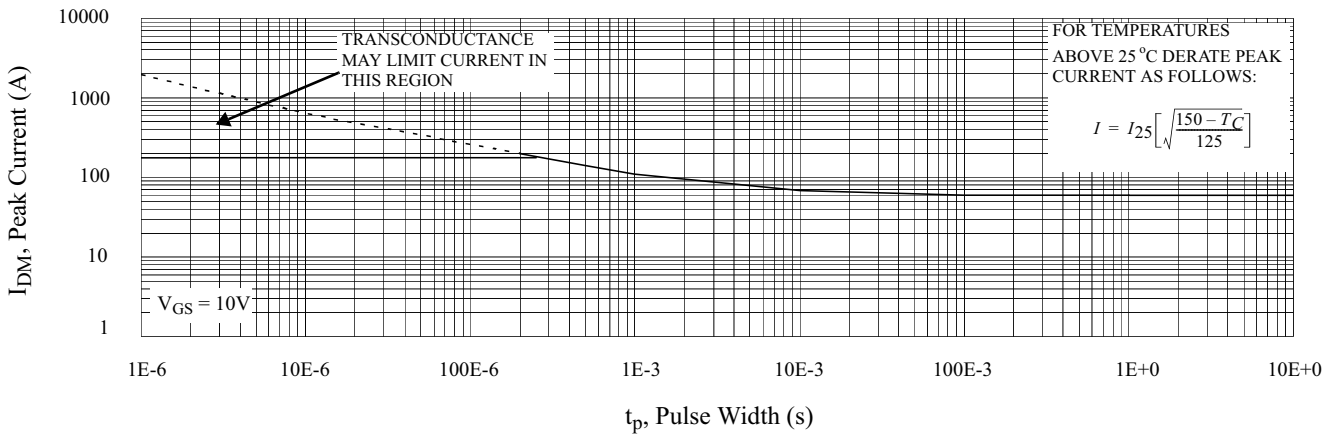


Figure 7. Typical Transfer Characteristics

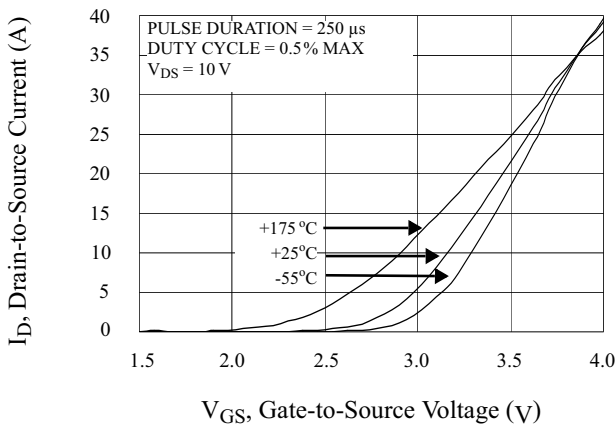


Figure 8. Unclamped Inductive Switching Capability

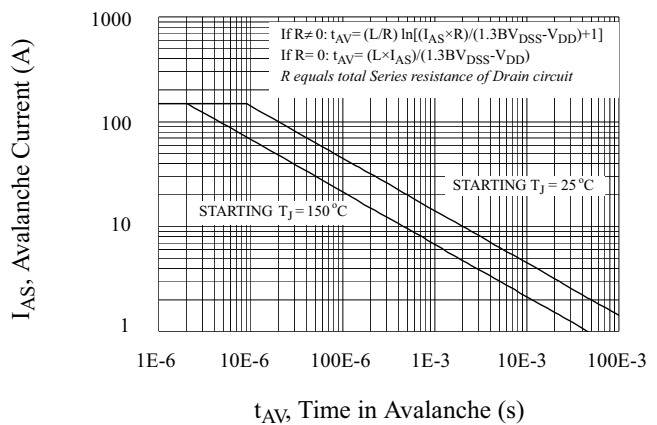


Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current

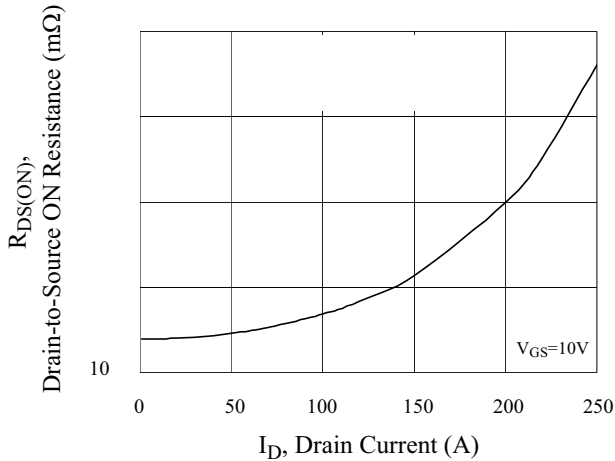
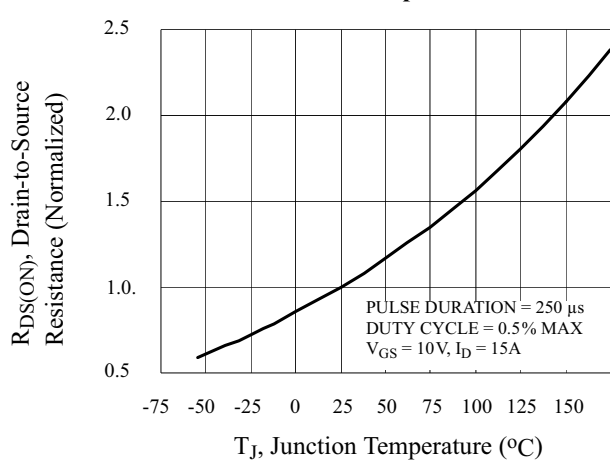


Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature





IRFZ44N 55A 50V N CHANNEL POWER MOSFET

Figure 11. Typical Breakdown Voltage vs Junction Temperature

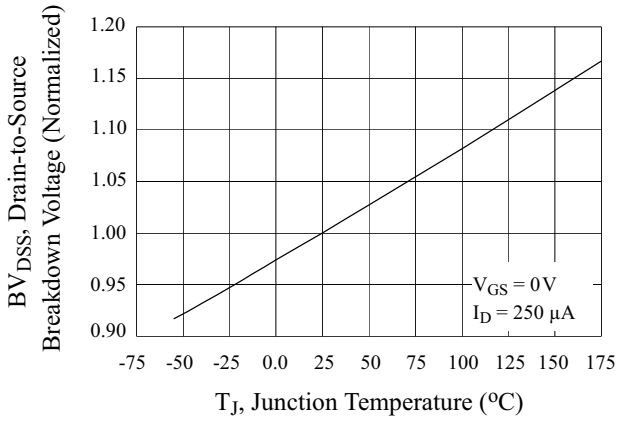


Figure 12. Typical Threshold Voltage vs Junction Temperature

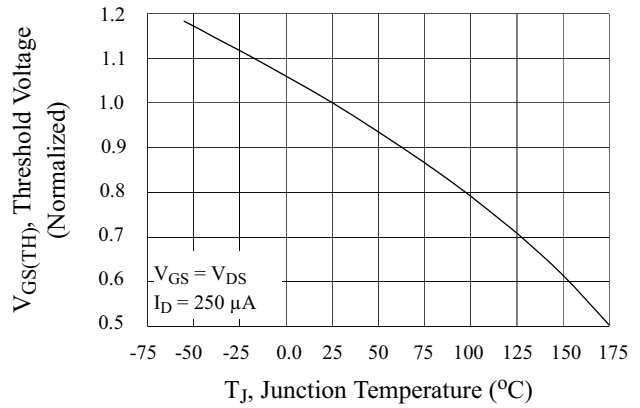


Figure 14. Typical Capacitance vs Drain-to-Source Voltage

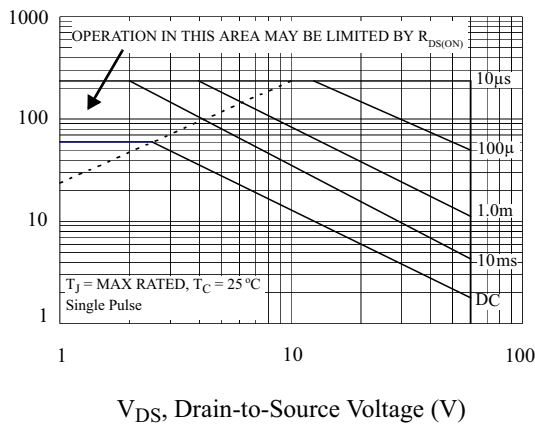
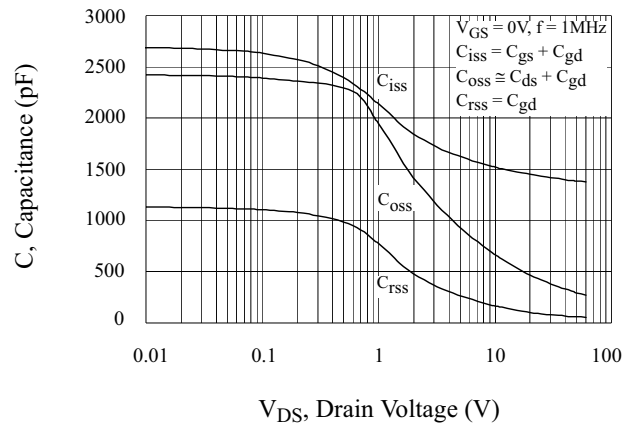


Figure 15. Typical Gate Charge vs Gate-to-Source Voltage

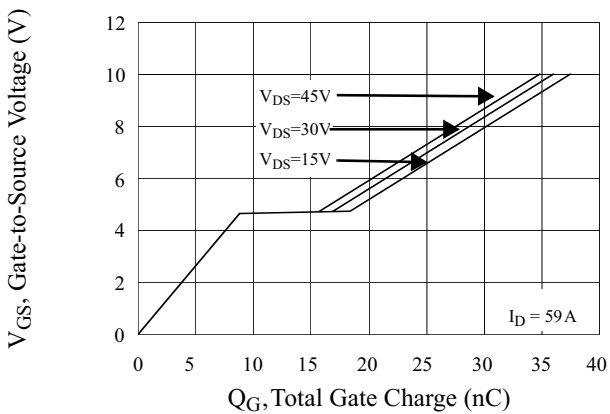


Figure 16. Typical Body Diode Transfer Characteristics

