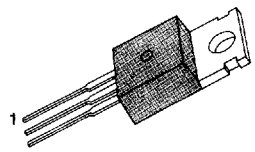
IRLZ24/20

N-CHANNEL LOGIC LEVEL MOSFET

FEATURES

- **Lower $R_{DS(ON)}$**
- **Excellent voltage stability**
- **Fast switching speeds**
- **Rugged polysilicon gate cell structure**
- **Lower input capacitance**
- **Extended safe operating area**
- **Improved high temperature reliability**
- **TO-220 Package**

TO-220



1. Gate 2. Drain 3. Source

PRODUCT SUMMARY

Part Number	BV_{DSS}	$R_{DS(on)}$	I_D
IRLZ24	60V	0.15Ω	14A
IRLZ20	50V	0.15Ω	14A

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	IRLZ24	IRLZ20	Unit
Drain-Source Voltage (1)	V_{DSS}	60	50	Vdc
Drain-Gate Voltage (R_{GS}=1MΩ)(1)	V_{DGR}	60	50	Vdc
Gate-Source Voltage	V_{GS}	±15		Adc
Continuous Drain Current T_C=25 °C	I_D	14.0		Adc
Continuous Drain Current T_C=100 °C	I_D	9.8		Adc
Drain Current - Pulsed (3)	I_{DM}	56		Adc
Total Power Dissipation @ T_C=25 °C	P_D	50		Watts
Derate Above 25 °C		0.33		W/ °C
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-55 to +175		°C
Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5 seconds	T_L	300		°C

Notes : (1) T_J=25°C to 175°C
(2) Pulse test : Pulse width ≤ 300μs, Duty Cycle ≤ 2%
(3) Repetitive rating : Pulse width limited by junction temperature

ELECTRICAL CHARACTERISTICS (Tc=25°C unless otherwise specified)

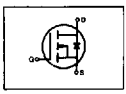
Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage					
	IRLZ24	60	-	-	V	V_{GS}=0V, I_D=250μA
	IRLZ20	50	-	-	V	
$V_{GS(th)}$	Gate Threshold Voltage	1.0	-	2.0	V	V_{DS}=V_{GS}, I_D=1mA
I_{GSS}	Gate-Source Leakage Forward	-	-	100	nA	V_{GS}=15V
I_{GSS}	Gate-Source Leakage Reverse	-	-	-100	nA	V_{GS}=-15V
I_{DSS}	Zero Gate Voltage Drain Current	-	-	250	μA	V_{DS}=Max. Rating, V_{GS}=0V
		-	-	1000	μA	V_{DS}=0.8 Max. Rating, V_{GS}=0V, Tc=125°C
$R_{DS(on)}$	Static Drain-Source On-Resistance(2)	-	-	0.15	Ω	V_{GS}=5.0V, I_D=7A
g_{fs}	Forward Transconductance (2)	2.0	-	-	℧	V_{DS}≥15V, I_D=7A
C_{iss}	Input Capacitance	-	750	-	pF	V_{GS}=0V, V_{DS}=25V, f=1.0MHz
C_{oss}	Output Capacitance	-	250	-	pF	
C_{rss}	Reverse Transfer Capacitance	-	120	-	pF	
$t_{d(on)}$	Turn-On Delay Time	-	-	40	ns	V_{DD}=0.5 BV_{DSS}, I_D=14A, Z_O=24Ω
t_r	Rise Time	-	-	260	ns	(MOSFET switching times are essentially
$t_{d(off)}$	Turn-Off Delay Time	-	-	200	ns	independent of operating temperature)
t_f	Fall Time	-	-	200	ns	
Q_g	Total Gate Charge	-	-	22	nC	V_{GS}=5V, I_D=14A, V_{DS}=0.8 Max. Rating
	(Gate-Source Plus Gate-Drain)					(Gate charge is essentially independent of
Q_{gs}	Gate-Source Charge	-	7	-	nC	operating temperature)
Q_{gd}	Gate-Drain Charge	-	7	-	nC	

THERMAL RESISTANCE

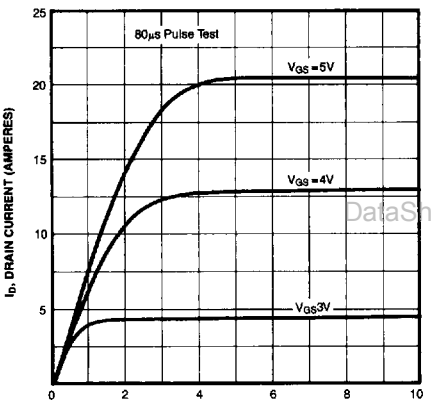
Symbol	Characteristics		All	Units	Remark
R_{thJC}	Junction-to-Case	MAX	3.0	K/W	
R_{thCS}	Case-to-Sink	TYP	0.5	K/W	Mounting surface flat, smooth, and greased
R_{thJA}	Junction-to-Ambient	MAX	62.5	K/W	Free Air Operation

Notes : (1) T_J=25°C to 175°C
(2) Pulse test : Pulse width≤300μs, Duty Cycle≤2%
(3) Repetitive rating : Pulse width limited by max. junction temperature

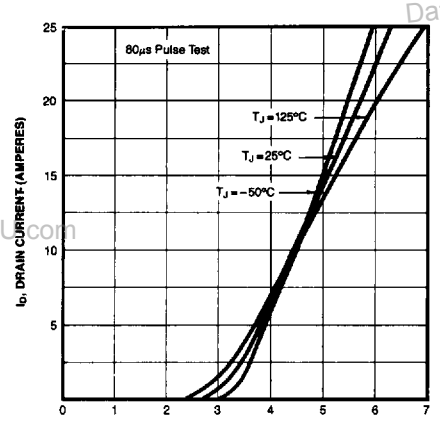
SOURCE-DRAIN DIODE RATING AND CHARACTERISTICS

Symbol	Characteristic	Min	Typ	Max	Units	Test Condition
I_S	Continuous Source Current (Body Diode)	—	—	14	A	Modified MOSFET symbol showing the integral reverse P-N junction rectifier 
I_{SM}	Pulse Source Current (Body Diode) (3)	—	—	56	A	
V_{SD}	Diode Forward Voltage (2)	—	—	1.8	V	T_J=25°C, I_S=14.0A, V_{GS}=0V
t_{rr}	Reverse Recovery Time	—	300	—	ns	T_J=25°C, I_F=14.0A, dI_F/dt=100A/μS

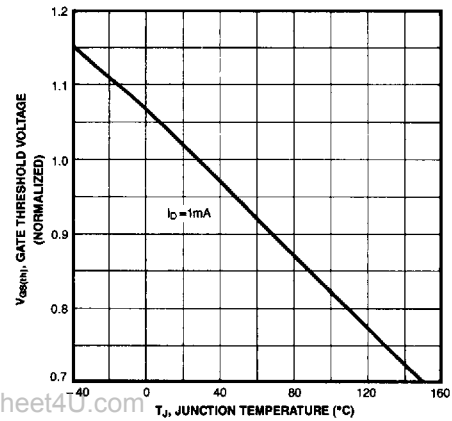
Notes: (1) T_J=25°C to 175°C
(2) Pulse test: Pulse width ≤ 300μs, Duty Cycle ≤ 2%
(3) Repetitive rating: Pulse width limited by max. junction temperature



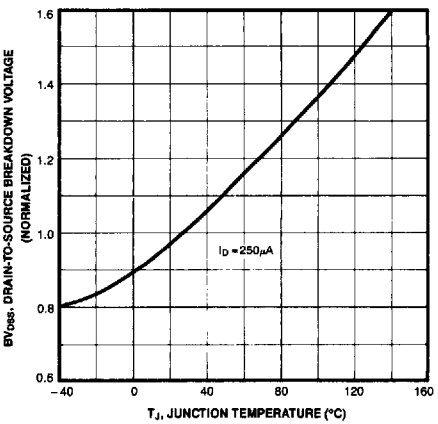
TYPICAL SATURATION CHARACTERISTICS



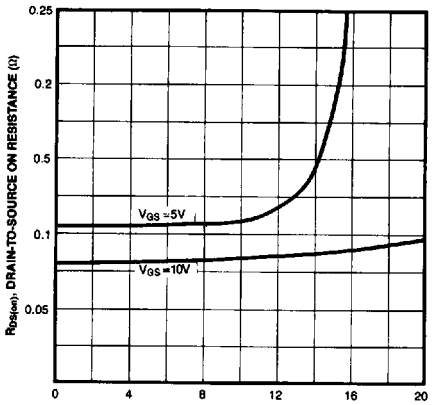
TYPICAL TRANSFER CHARACTERISTICS



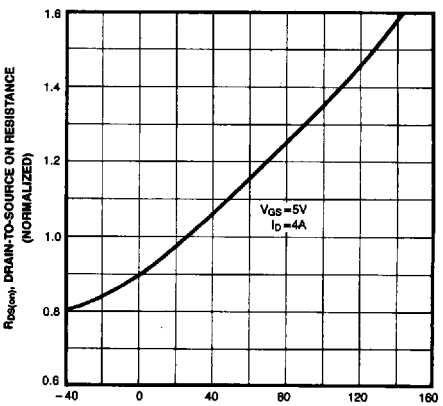
NORMALIZED $V_{(th)}$ VOLTAGE VS. TEMPERATURE



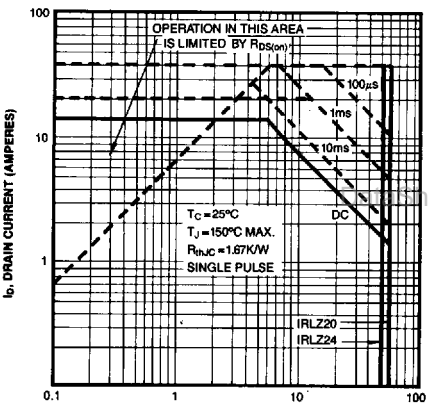
BREAKDOWN VOLTAGE VS. TEMPERATURE



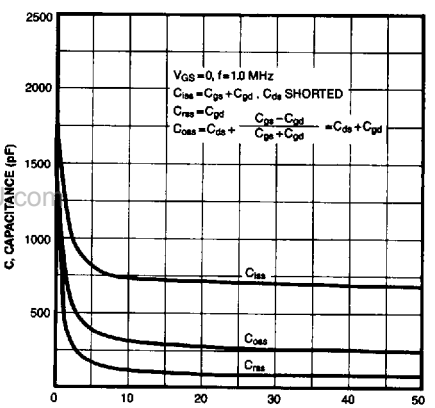
TYPICAL ON-RESISTANCE Vs. DRAIN CURRENT



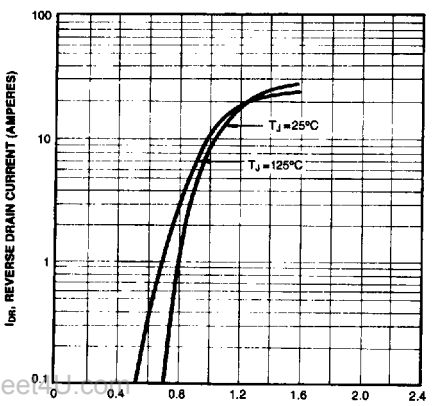
NORMALIZED ON-RESISTANCE Vs. TEMPERATURE



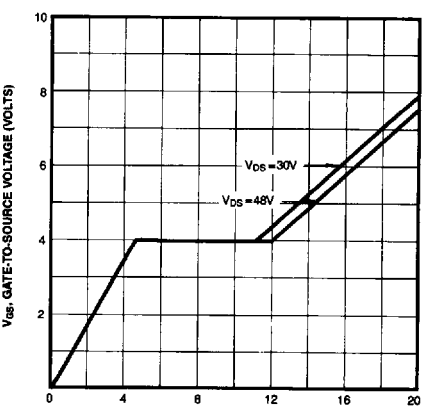
MAXIMUM SAFE OPERATING AREA



TYPICAL CAPACITANCE Vs. DRAIN TO SOURCE VOLTAGE



TYPICAL SOURCE—DRAIN DIODE FORWARD VOLTAGE



TYPICAL GATE CHARGE Vs. GATE CHARGE (nC)