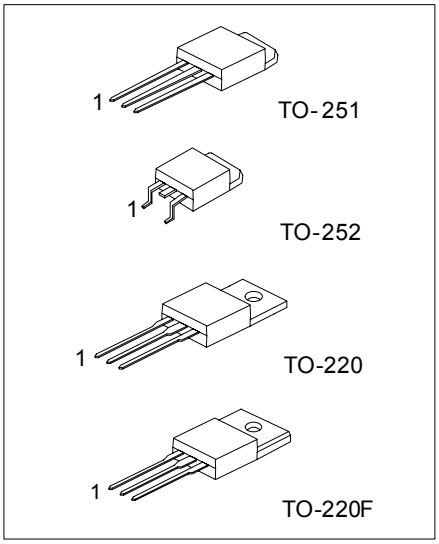
4.5Amps, 500 Volts
N-CHANNEL POWER MOSFET



*Pb-free plating product number: IRF830

■ DESCRIPTION

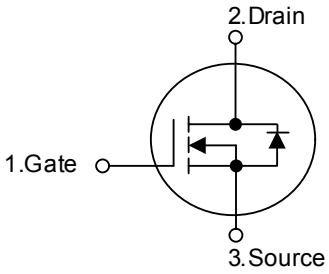
The YR IRF830 are N-Channel enhancement mode power field effect transistors (MOSFET) which are produced using YR's proprietary, planar stripe, DMOS technology.

These devices are suited for high efficiency switch mode power supply. To minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode the advanced technology has been especially tailored.

■ FEATURES

* $R_{DS(ON)}$ = 1.5 Ω @V_{GS} = 10 V
* Ultra low gate charge (typical 42 nC)
* Low reverse transfer capacitance (C_{RSS} = typical 25 pF)
* Fast switching capability
* Avalanche energy specified
* Improved dv/dt capability, high ruggedness

■ SYMBOL



■ ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	500	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V	4.5	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V	2.8	A
I_{DM}	Pulsed Drain Current[1]	18	A
P_D@T_C=25℃	Total Power Dissipation	74	W
	Linear Derating Factor	0.59	W/℃
E_{AS}	Single Pulse Avalanche Energy[2]	101	mJ
I_{AR}	Avalanche Current	4.5	A
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

■ THERMAL DATA

Symbol	Parameter		Value	Unit
Rthj-c	Thermal Resistance Junction-case	Max.	1.7	℃/W
Rthj-a	Thermal Resistance Junction-ambient	Max.	62	℃/W

■ ELECTRICAL CHARACTERISTICS T_C = 25℃ unless otherwise specified

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=1mA	500	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=2.7A	-	-	1.5	Ω
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	2	-	4	V
g_{fs}	Forward Transconductance	V_{DS}=10V, I_D=2.7A	-	2.4	-	S
I_{DSS}	Drain-Source Leakage Current (T_j=25°C)	V_{DS}=500V, V_{GS}=0V	-	-	25	uA
	Drain-Source Leakage Current (T_j=125°C)	V_{DS}=400V, V_{GS}=0V	-	-	250	uA
I_{GSS}	Gate-Source Leakage	V_{GS}=±20V	-	-	±100	nA
Q_g	Total Gate Charge[3]	I_D=3.1A	-	28	45	nC
Q_{gs}	Gate-Source Charge	V_{DS}=400V	-	4	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=10V	-	16	-	nC
$t_{d(on)}$	Turn-on Delay Time[3]	V_{DD}=250V	-	10	-	ns
t_r	Rise Time	I_D=3.1A	-	15	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=12Ω,V_{GS}=10V	-	41	-	ns
t_f	Fall Time	R_D=80.6Ω	-	20	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	710	1140	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	170	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	60	-	pF
R_g	Gate Resistance	f=1.0MHz	-	2	3.0	Ω

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[3]	T_j=25℃, I_S=4.5A, V_{GS}=0V	-	-	1.5	V
t_{rr}	Reverse Recovery Time[3]	I_S=3.1A, V_{GS}=0V,	-	370	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	3.9	-	uC

Notes:

1.Pulse width limited by Max. junction temperature.

2.Starting T_j=25°C , V_{DD}=50V , L=10mH , R_G=25Ω

3.Pulse test

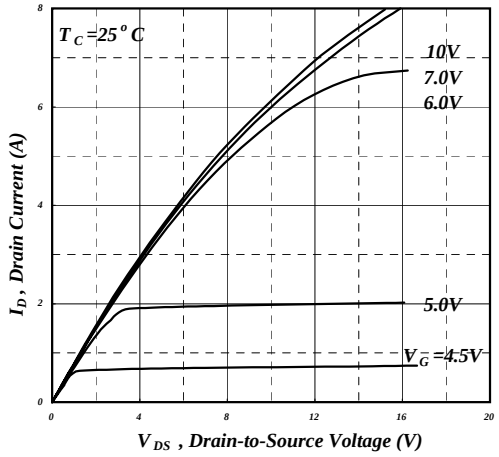


Fig 1. Typical Output Characteristics

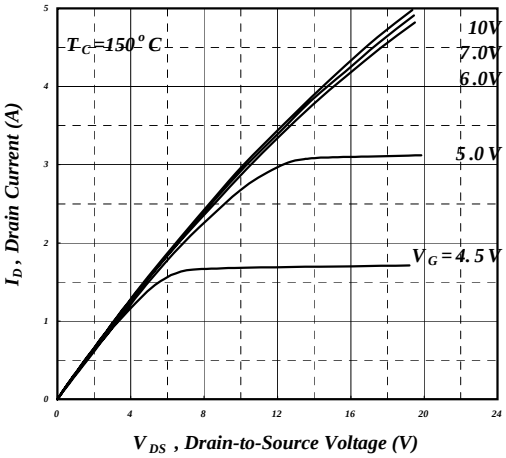


Fig 2. Typical Output Characteristics

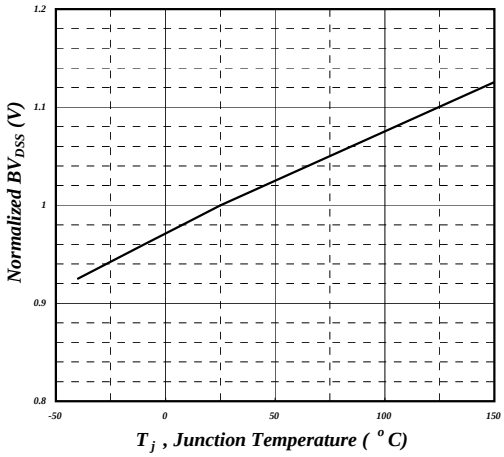


Fig 3. Normalized BV_{DSS} v.s. Junction Temperature

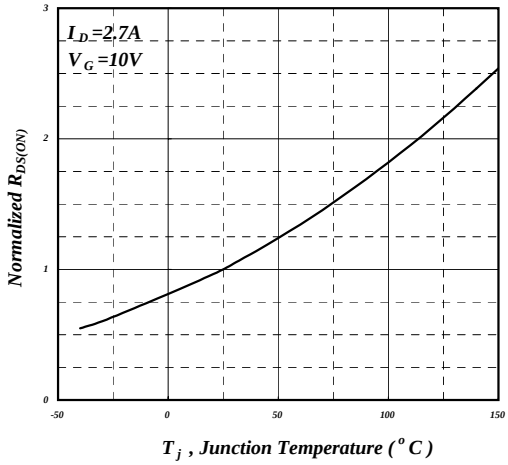


Fig 4. Normalized On-Resistance v.s. Junction Temperature

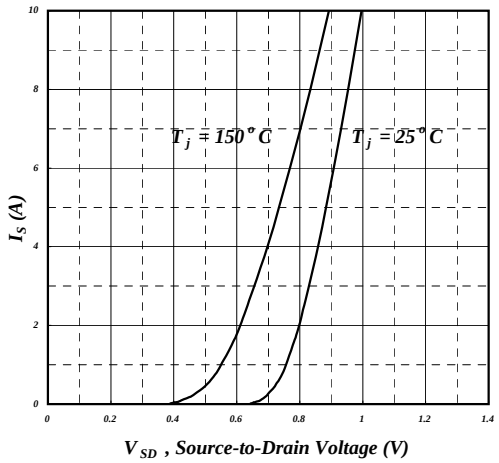


Fig 5. Forward Characteristic of Reverse Diode

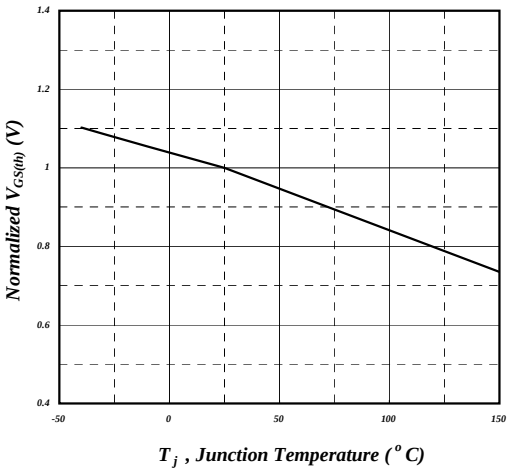


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

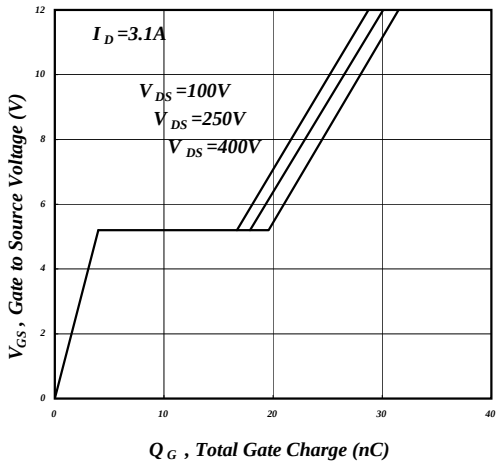


Fig 7. Gate Charge Characteristics

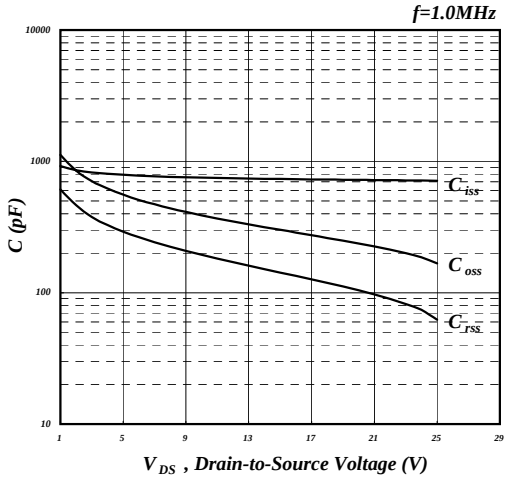


Fig 8. Typical Capacitance Characteristics

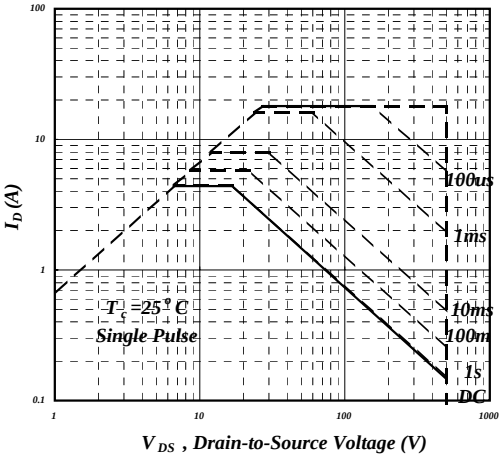


Fig 9. Maximum Safe Operating Area

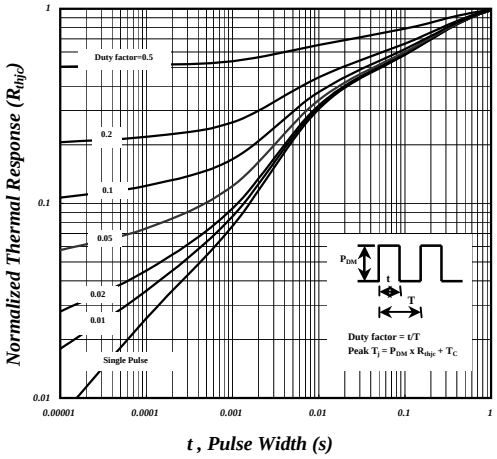


Fig 10. Effective Transient Thermal Impedance

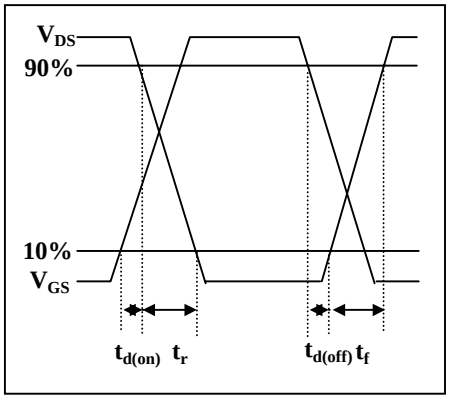


Fig 11. Switching Time Waveform

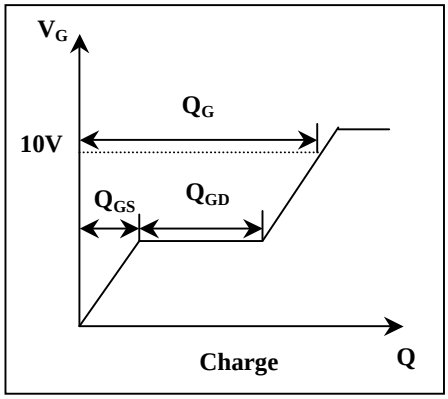


Fig 12. Gate Charge Waveform