



JIANGSU CHANGJIANG ELECTRONICS TECHNOLOGY CO., LTD

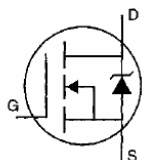
TO-220 Plastic-Encapsulate MOSFET

IRF830

MOSFET(N-Channel)

FEATURES

- . Dynamic dv/dt Rating
- . Repetitive Avalanche Rated
- . Fast Switching
- . Ease of Paralleling
- . Simple Drive Requirement



$V_{DSS} = 500\text{ V}$

$R_{DS(ON)} = 1.5\ \Omega$

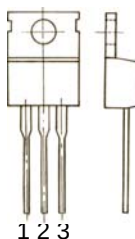
$I_D = 4.5\text{ A}$

TO-220

1. G

2. D

3. S



MAXIMUM RATINGS* $T_A = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Value	Units
I_D @ $T_C = 25^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10 V	4.5	A
I_D @ $T_C = 100^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10 V	2.9	A
I_{DM}	Pulsed Drain Current (note 1)	18	A
P_D @ $T_C = 25^\circ\text{C}$	Power Dissipation	74	W
	Linear Derating Factor	0.59	W/ $^\circ\text{C}$
V_{GS}	Gate-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy (note 2)	280	mJ
I_{AR}	Avalanche Current (note 1)	4.5	A
E_{AR}	Repetitive Avalanche Energy (note 1)	7.4	mJ
dv/dt	Peak Diode Recovery dv/dt (note 3)	3.5	V/ns
T_J	Junction Temperature	150	$^\circ\text{C}$
T_{stg}	Storage Temperature	-55-150	$^\circ\text{C}$

Thermal Resistance

	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case			1.7	$^\circ\text{C/W}$
$R_{\theta CS}$	Case-to-Sink, Flat, Greased surface		0.5		
$R_{\theta JA}$	Junction-to-Ambient			62	

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

Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\text{ }\mu\text{ A}$	500			V
Gate-Threshold Voltage	$V_{th(GS)}$	$V_{DS}=V_{GS}, I_D=250\text{ }\mu\text{ A}$	2		4	
Gate-body Leakage	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=500V, V_{GS}=0V$			25	$\mu\text{ A}$
		$V_{DS}=400V, V_{GS}=0V, T_J=125^\circ\text{C}$			250	
Drain-Source On-Resistance	$r_{DS(on)}$	$V_{GS}=10V, I_D=2.7A$ (note 4)			1.5	Ω
Forward Trans conductance	g_{ts}	$V_{DS}=50V, I_D=2.7A$ (note 4)	2.5			S
Diode Forward Voltage	V_{SD}	$I_S=4.5A, V_{GS}=0V$			1.6	V
Total Gate Charge	Q_g	$V_{DS}=400V, V_{GS}=10V, I_D=3.1A$ (Fig 6, Fig13)			38	nC
Gate-Source Charge	Q_{gs}				5	
Gate-Drain Charge	Q_{gd}				22	
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$ (Fig 5)		610		pF
Output Capacitance	C_{oss}			160		
Reverse Transfer Capacitance	C_{rss}			68		

SWITCHING TIME

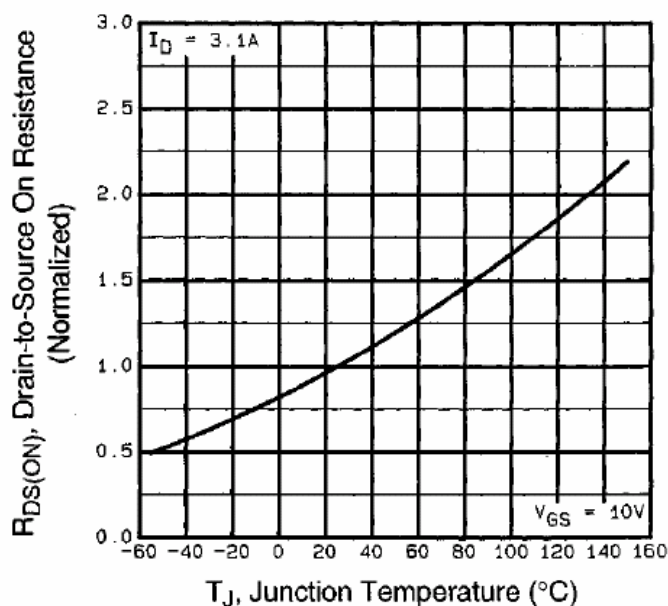
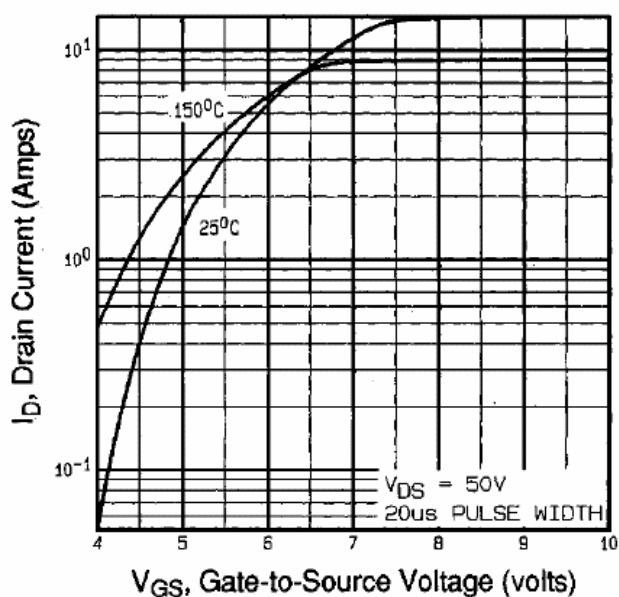
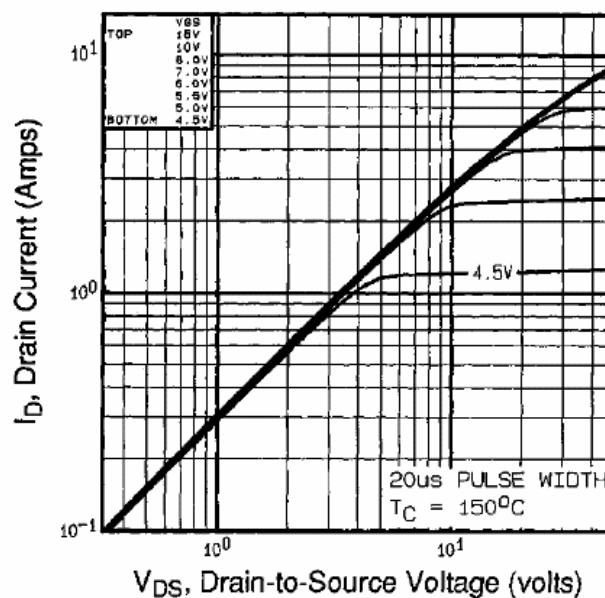
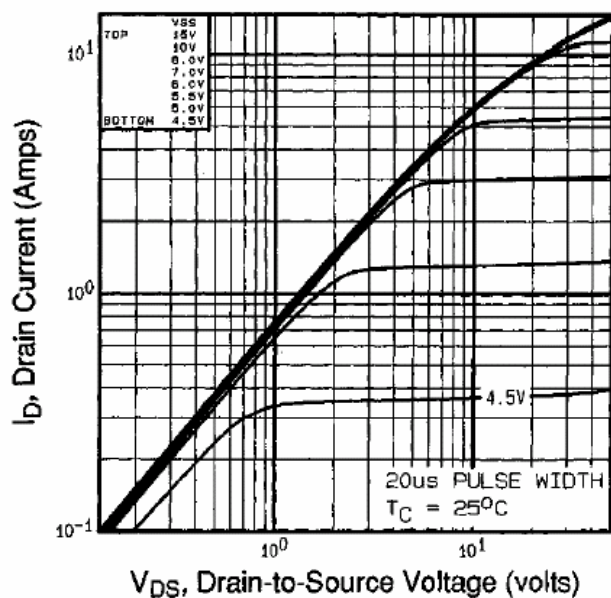
Turn-on Time	$t_{d(on)}$	$V_{DD}=250V, R_D=79\text{ }\Omega$ $I_D=3.1A,$		8.2		ns
	t_r			16		
Turn-off Time	$t_{d(off)}$	$R_G=12\text{ }\Omega$ (Fig 10)		42		

Notes:

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. $L = 24\text{mH}, I_{AS} = 4.5A, V_{DD} = 50V, R_G = 25\text{ }\Omega$, Starting $T_J = 25^\circ\text{C}$
3. $I_{SD} \leq 4.5A, di/dt \leq 300A/\mu\text{s}, V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$
4. Pulse Test : Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$

Typical Characteristics

IRF830



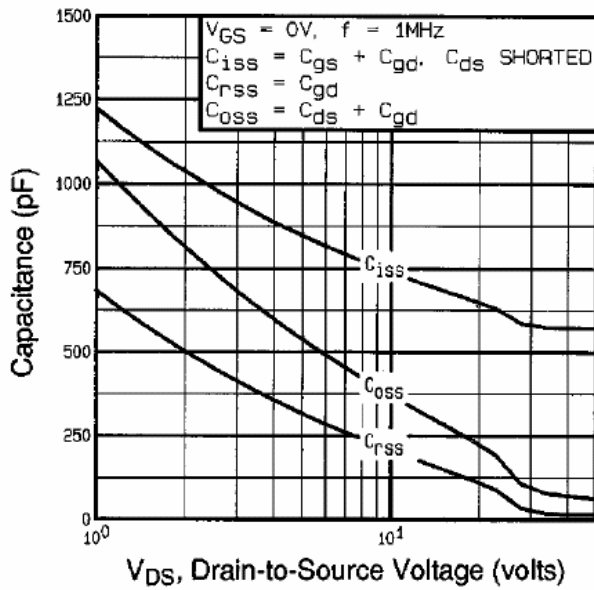


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

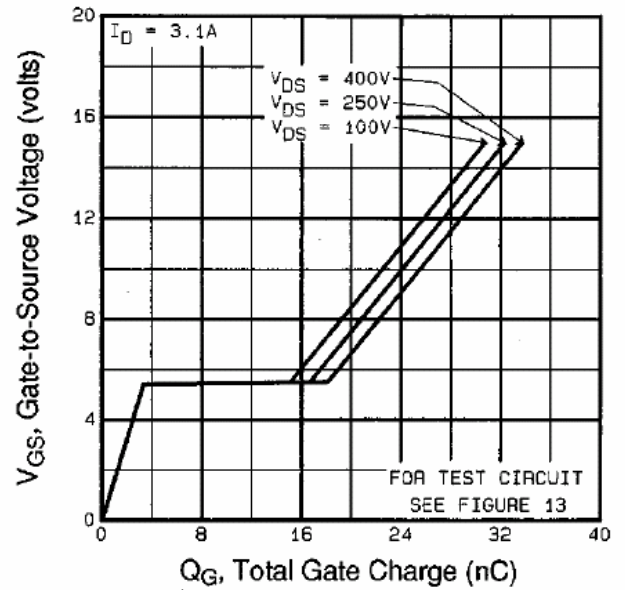


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

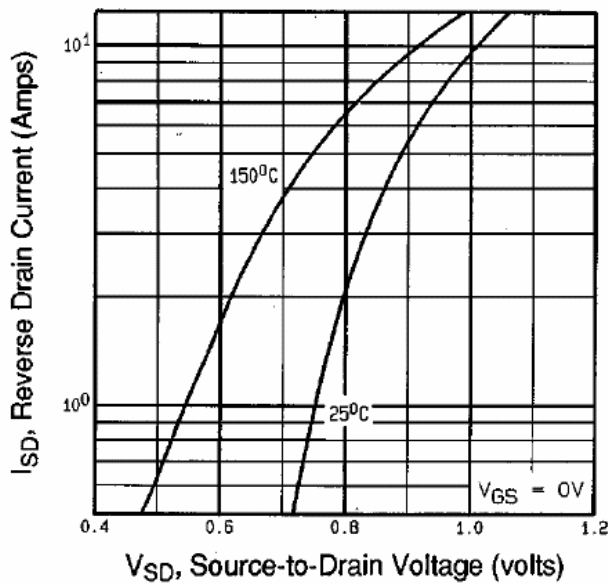


Fig 7. Typical Source-Drain Diode Forward Voltage

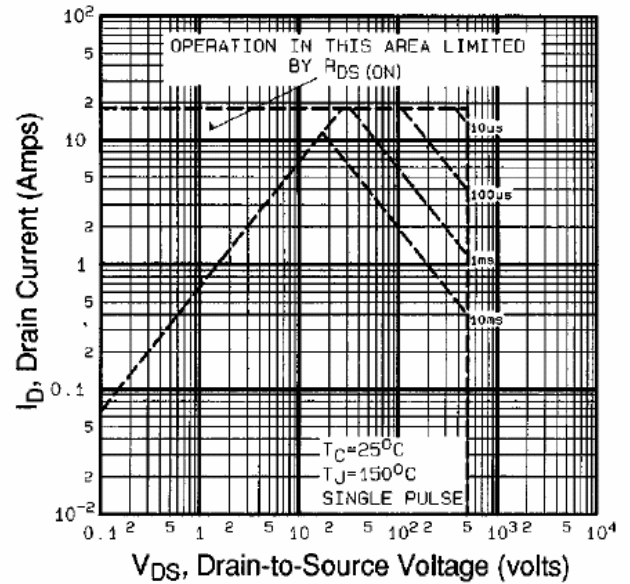


Fig 8. Maximum Safe Operating Area

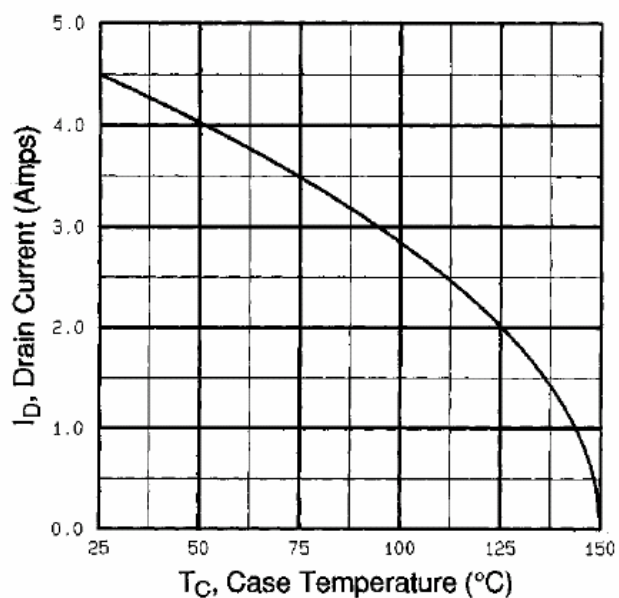


Fig 9. Maximum Drain Current Vs. Case Temperature

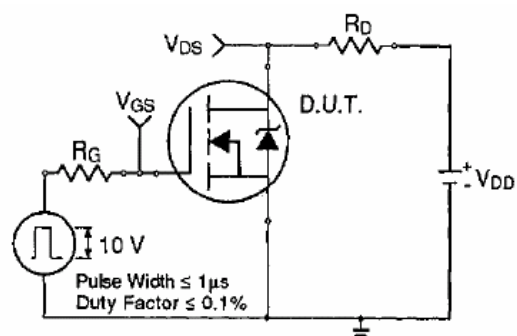


Fig 10a. Switching Time Test Circuit

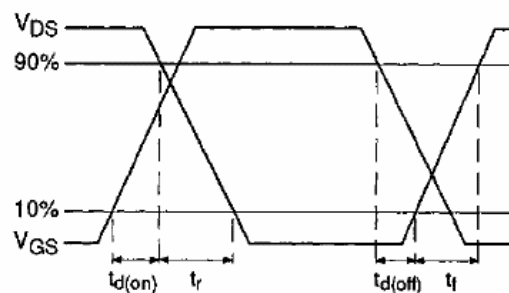


Fig 10b. Switching Time Waveforms

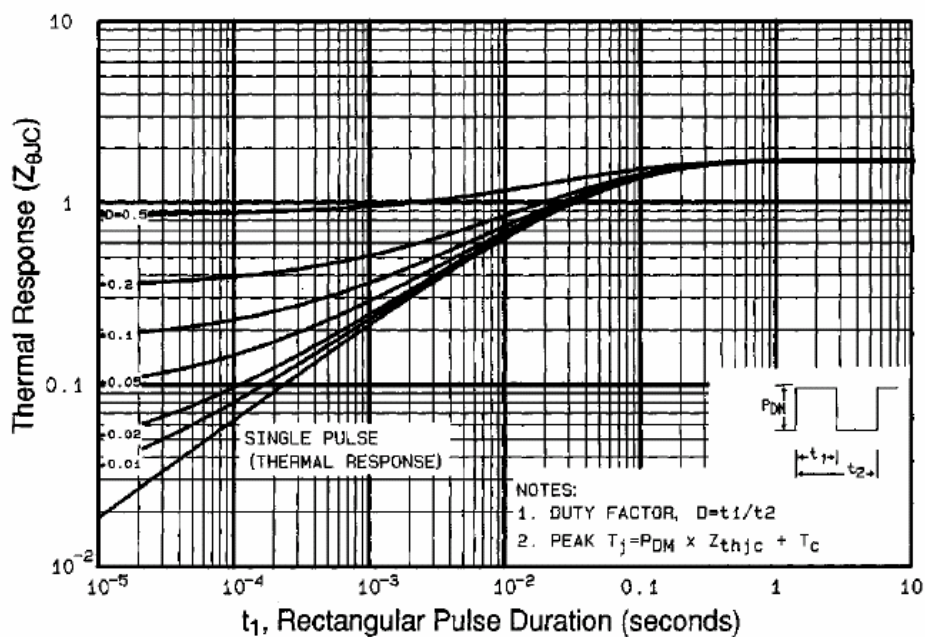


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

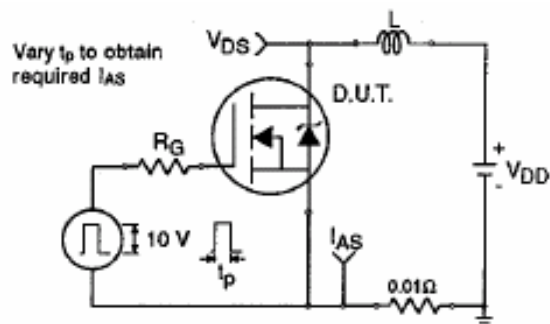


Fig 12a. Unclamped Inductive Test Circuit

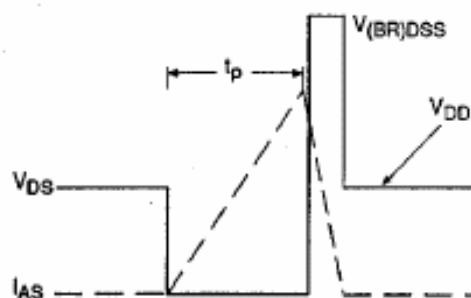


Fig 12b. Unclamped Inductive Waveforms

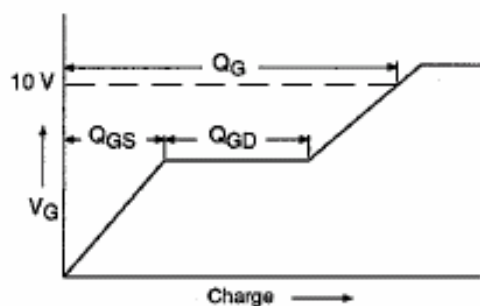


Fig 13a. Basic Gate Charge Waveform

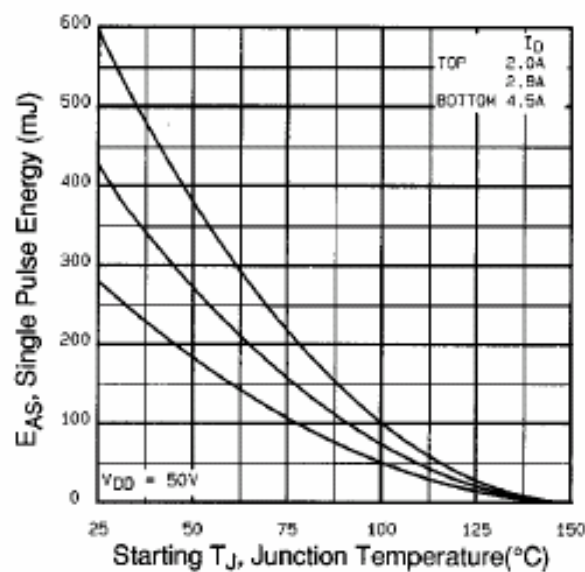


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

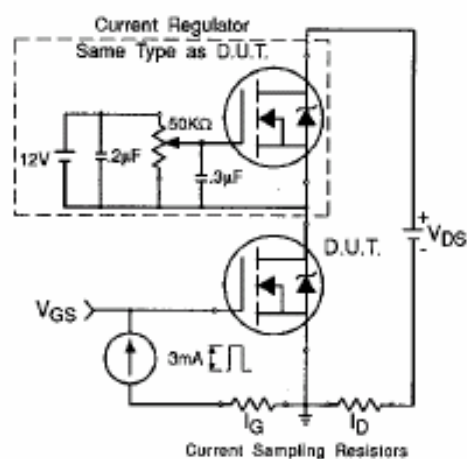


Fig 13b. Gate Charge Test Circuit