IRF830
POWER MOSFET

GENERAL DESCRIPTION

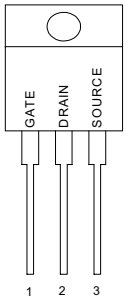
This Power MOSFET is designed for low voltage, high speed power switching applications such as switching regulators, conveters, solenoid and relay drivers.

FEATURES

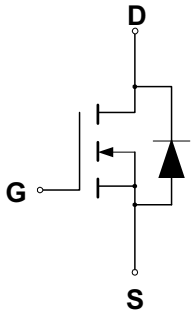
- Higher Current Rating
- Lower $r_{DS(ON)}$, Lower Capacitances
- Lower Total Gate Charge
- Tighter VSD Specifications
- Avalanche Energy Specified

PIN CONFIGURATION

TO-220/TO-220FP
Top View



SYMBOL



N-Channel MOSFET

ORDERING INFORMATION

Part Number	Package
IRF830	TO-220
IRF830FP	TO-220FP

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain to Current — Continuous	I_D	5.0	A
— Pulsed (Note 1)	I_{DM}	18	
Gate-to-Source Voltage — Continue	V_{GS}	±20	V
Total Power Dissipation	P_D	96	W
Derate above 25℃		0.77	W/℃
Single Pulse Avalanche Energy (Note 2)	E_{AS}	125	mJ
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to 150	℃
Thermal Resistance — Junction to Case	θ_{JC}	1.70	℃/W
— Junction to Ambient	θ_{JA}	62	
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds	T_L	300	℃

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, T_J = 25℃.

Characteristic		Symbol	IRF830 Min	IRF830 Typ	IRF830 Max	Units
Drain-Source Breakdown Voltage (V_{GS} = 0 V, I_D = 250 μA)		$V_{(BR)DSS}$	500			V
Drain-Source Leakage Current (V_{DS} = 500V, V_{GS} = 0 V)		I_{DSS}			25	μA
Gate-Source Leakage Current-Forward (V_{gsf} = 20 V, V_{DS} = 0 V)		I_{GSSF}			100	nA
Gate-Source Leakage Current-Reverse (V_{gsr} = -20 V, V_{DS} = 0 V)		I_{GSSR}			-100	nA
Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 250 μA)		$V_{GS(th)}$	2.0		4.0	V
Static Drain-Source On-Resistance (V_{GS} = 10 V, I_D = 2.7A) (Note 3)		$R_{DS(on)}$			1.5	Ω
Forward Transconductance (V_{DS} = 15V, I_D = 2.5 A) (Note 3)		g_{FS}	2.8			mhos
Input Capacitance	(V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz)	C_{iss}		520	730	pF
Output Capacitance		C_{oss}		170	240	pF
Reverse Transfer Capacitance		C_{rss}		11	20	pF
Turn-On Delay Time	(V_{DD} = 250 V, I_D = 5 A, R_G = 9.1Ω, V_{GS} = 10 V) (Note 3)	$t_{d(on)}$		7.0	10	ns
Rise Time		t_r		9.0	20	ns
Turn-Off Delay Time		$t_{d(off)}$		20	40	ns
Fall Time		t_f		10	20	ns
Total Gate Charge	(V_{DS} = 400V, I_D = 5A V_{GS} = 10 V) (Note 3)	Q_g		10		nC
Gate-Source Charge		Q_{gs}		2		nC
Gate-Drain Charge		Q_{gd}		3		nC
Internal Drain Inductance (Measured from the drain lead 0.25" from package to center of die)		L_D		4.5		nH
Internal Drain Inductance (Measured from the source lead 0.25" from package to source bond pad)		L_S		7.5		nH
SOURCE-DRAIN DIODE CHARACTERISTICS						
Reverse Recovery Charge	I_F = 5A, di/dt = 100A/μs , T_J = 25℃	Q_{rr}		1.8		μC
Forward Turn-On Time		t_{on}		**		
Reverse Recovery Time		t_{rr}		415		ns
Diode Forward Voltage	I_S = 5A, V_{GS} = 0 V	V_{SD}			1.5	V

Note

(1) Repetitive rating; pulse width limited by max. junction temperature

(2) V_{DD} = 100V, V_{GS} = 10V, L=10mH, I_{AS} = 5A, R_G = 25Ω

(3) Pulse Test: Duty Cycle ≦2% , Pulse Width ≦300μs

** Negligible, Dominated by circuit inductance

TYPICAL ELECTRICAL CHARACTERISTICS

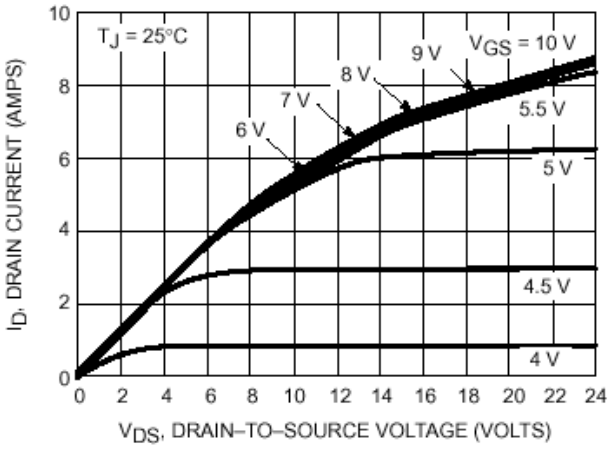


Figure 1. On–Region Characteristics

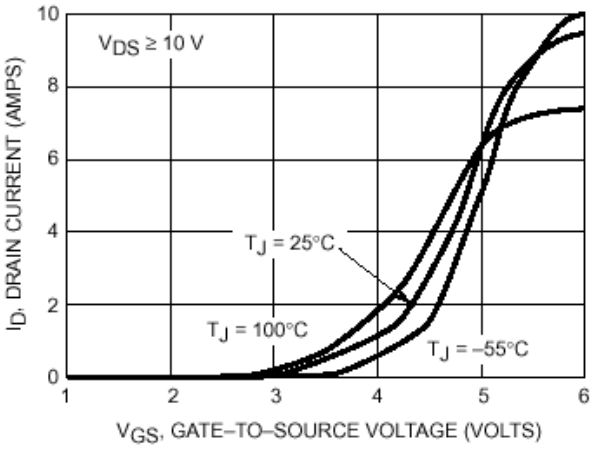


Figure 2. Transfer Characteristics

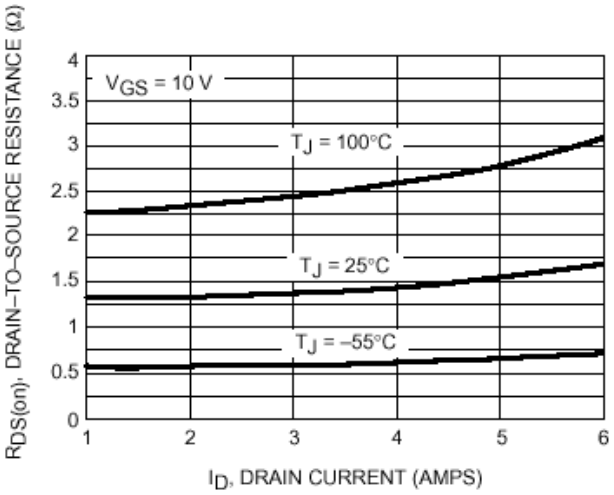


Figure 3. On–Resistance versus Drain Current and Temperature

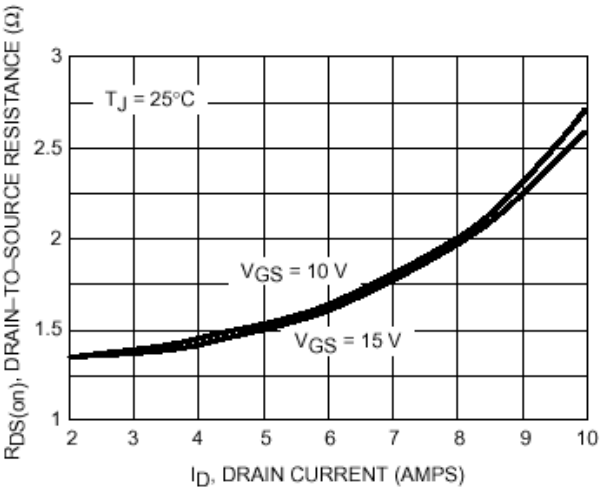


Figure 4. On–Resistance versus Drain Current and Gate Voltage

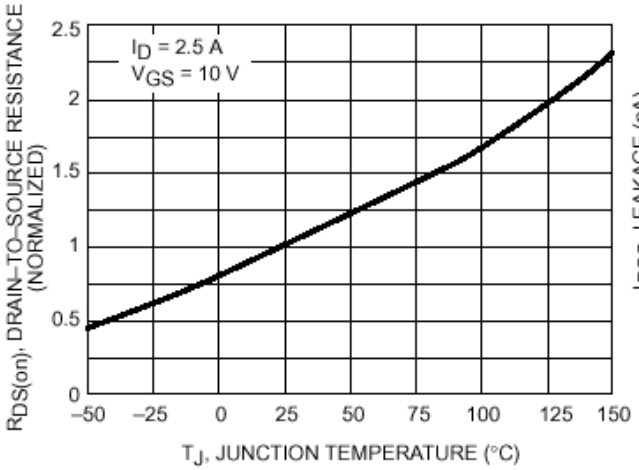


Figure 5. On–Resistance Variation with Temperature

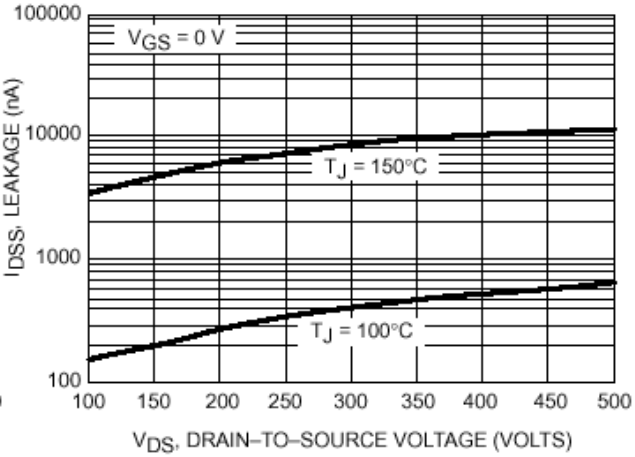
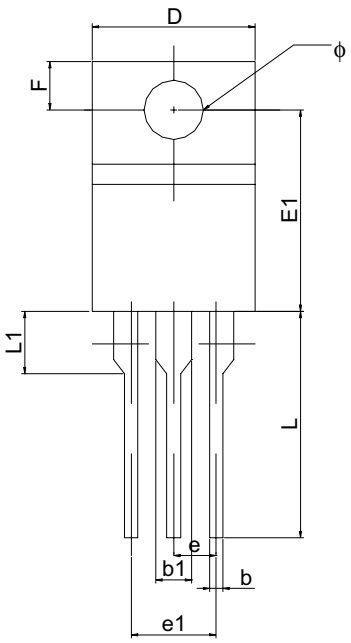


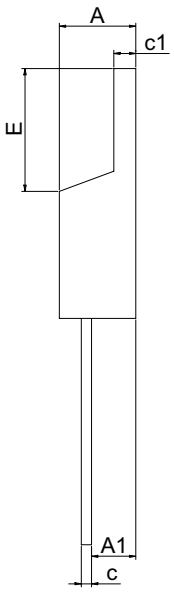
Figure 6. Drain–to–Source Leakage Current versus Voltage

PACKAGE DIMENSION

TO-220



Front View

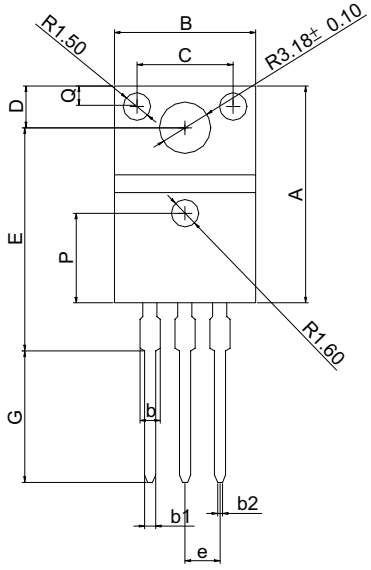


Side View

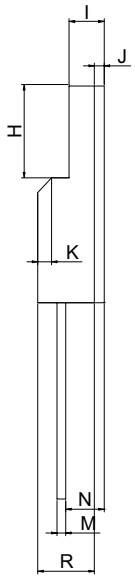
PIN 1: GATE
PIN 2: DRAIN
PIN 3: SOURCE

SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.47	---	4.67	0.176	---	0.184
A1	2.52	---	2.82	0.099	---	0.111
b	0.71	---	0.91	0.028	---	0.036
b1	1.17	---	1.37	0.046	---	0.054
c	0.31	---	0.53	0.012	---	0.021
c1	1.17	---	1.37	0.046	---	0.054
D	10.01	---	10.31	0.394	---	0.406
E	8.50	---	8.90	0.335	---	0.350
E1	12.06	---	12.46	0.475	---	0.491
e	---	2.54	---	---	0.100	---
e1	4.98	---	5.18	0.196	---	0.204
F	2.59	---	2.89	0.102	---	0.114
L	13.40	---	13.80	0.528	---	0.543
L1	3.56	---	3.96	0.140	---	0.156
ϕ	3.79	---	3.89	0.149	---	0.153

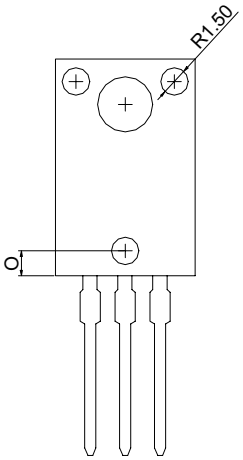
TO-220FP



Front View



Side View



Back View

SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	15.67	---	16.07	0.617	---	0.633
B	9.96	---	10.36	0.392	---	0.408
C	---	7.00	---	---	0.275	---
D	3.20	---	3.40	0.126	---	0.134
E	15.60	---	16.00	0.614	---	0.630
G	9.45	---	10.05	0.372	---	0.396
H	6.48	---	6.88	0.255	---	0.279
I	2.34	---	2.74	0.092	---	0.108
J	---	0.70	---	---	0.028	---
K	---	1.00	---	---	0.039	---
M	0.45	---	0.60	0.018	---	0.024
N	2.56	---	2.96	0.101	---	0.117
O	---	1.80	---	---	0.071	---
P	---	6.50	---	---	0.256	---
Q	---	1.50	---	---	0.059	---
R	4.50	---	4.90	0.177	---	0.193
b	---	---	1.47	---	---	0.058
b1	0.70	---	0.90	0.028	---	0.035
b2	0.25	---	0.45	0.010	---	0.018
e	---	2.54	---	---	0.100	---