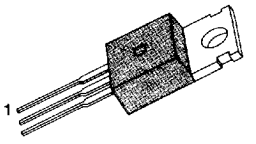
FEATURES

- **Lower $R_{DS(ON)}$**
- **Improved inductive ruggedness**
- **Fast switching times**
- **Rugged polysilicon gate cell structure**
- **Lower input capacitance**
- **Extended safe operating area**
- **Improved high temperature reliability**

TO-220



1. Gate 2. Drain 3. Source

PRODUCT SUMMARY

Part Number	V_{DS}	$R_{DS(on)}$	I_D
IRF730	400V	1.0Ω	5.5A
IRF731	350V	1.0Ω	5.5A

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	IRF730	IRF731	Unit
Drain-Source Voltage (1)	V_{DSS}	400	350	Vdc
Drain-Gate Voltage (R_{GS}=1.0MΩ)(1)	V_{DGR}	400	350	Vdc
Gate-Source Voltage	V_{GS}	±20		Vdc
Continuous Drain Current T_C=25 °C	I_D	5.5		Adc
Continuous Drain Current T_C=100 °C	I_D	3.5		Adc
Drain Current - Pulsed (3)	I_{DM}	22		Adc
Gate Current - Pulsed	I_{GM}	±1.5		Adc
Single Pulsed Avalanche Energy (4)	E_{AS}	290		mJ
Avalanche Current	I_{AS}	5.5		A
Total Power Dissipation @ T_C=25 °C	P_D	75		Watts
Derate above 25 °C		0.6		W/ °C
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-55 to +150		°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 150°C
(2) Pulse test : Pulse width ≤ 300μs, Duty Cycle ≤ 2%
(3) Repetitive rating : Pulse width limited by max. junction temperature
(4) L=17mH, V_{dd}=50V, R_G=25Ω , Starting T_J=25°C

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

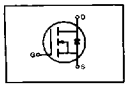
Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
BVDSS	Drain-Source Breakdown Voltage IRF730 IRF731	 400 350	 - -	 - -	 V V	VGS=0V, ID=250μA
VGS(th)	Gate Threshold Voltage	2.0	-	4.0	V	VDS=VGS, ID=250μA
IGSS	Gate-Source Leakage Forward	-	-	100	nA	VGS=20V
IGSS	Gate-Source Leakage Reverse	-	-	-100	nA	VGS=-20V
IDSS	Zero Gate Voltage Drain Current	-	-	250	μA	VDS=Max. Rating, VGS=0V
		-	-	1000	μA	VDS=0.8 Max. Rating, VGS=0V, Tc=125°C
RDS(on)	Static Drain-Source On Resistance(2)	-	-	1.0	Ω	VGS=10V, ID=3.0A
gfs	Forward Transconductance (2)	2.9	4.4	-	℧	VDS≥50V, ID=3.0A
Ciss	Input Capacitance	-	780	-	pF	
Coss	Output Capacitance	-	99	-	pF	VGS=0V, VDS=25V, f=1.0MHz
Crss	Reverse Transfer Capacitance	-	43	-	pF	
td(on)	Turn-On Delay Time	-	11	17	ns	VDD=0.5 BVDSS, ID=5.5A, ZO=12Ω
tr	Rise Time	-	19	29	ns	(MOSFET switching times are essentially
td(off)	Turn-Off Delay Time	-	37	56	ns	independent of operating temperature)
tf	Fall Time	-	16	24	ns	
Qg	Total Gate Charge (Gate-Source Plus Gate-Drain)	-	-	47	nC	VGS=10V, ID=5.5A, VDS=0.8 Max. Rating (Gate charge is essentially independent of
Qgs	Gate-Source Charge	-	5.5	-	nC	operating temperature)
Qgd	Gate-Drain ("Miller") Charge	-	19	-	nC	

THERMAL RESISTANCE

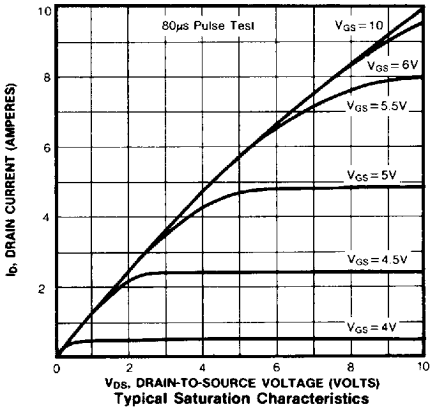
Symbol	Characteristics		All	Units	Remark
RthJC	Junction-to-Case	MAX	1.67	K/W	
RthCS	Case-to-Sink	TYP	0.50	K/W	Mounting surface flat, smooth, and greased
RthJA	Junction-to-Ambient	MAX	62.5	K/W	Free Air Operation

Notes : (1) TJ=25°C to 150°C
(2) Pulse test : Pulse width≤300μs, Duty Cycle≤2%
(3) Repetitive rating : Pulse width limited by max. junction temperature

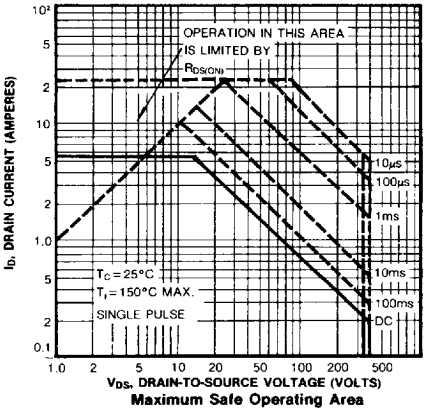
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	-	-	5.5	A	Modified MOSFET symbol showing the integral reverse P-N junction rectifier 
I_{SM}	Pulse Source Current (Body Diode) (3)	-	-	22	A	
V_{SD}	Diode Forward Voltage (2)	-	-	1.8	V	T_J=25°C, I_S=5.5A, V_{GS}=0V
t_{rr}	Reverse Recovery Time	-	310	660	ns	T_J=25°C, I_F=5.5A, dI_F/dt=100A/μS

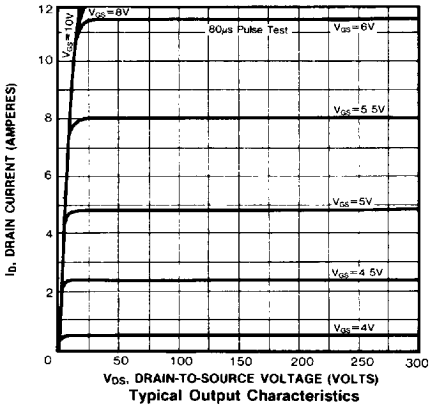
Notes : (1) T_J=25°C to 150°C
(2) Pulse test : Pulse width ≤ 300μs, Duty Cycle ≤ 2%
(3) Repetitive rating : Pulse width limited by max. junction temperature



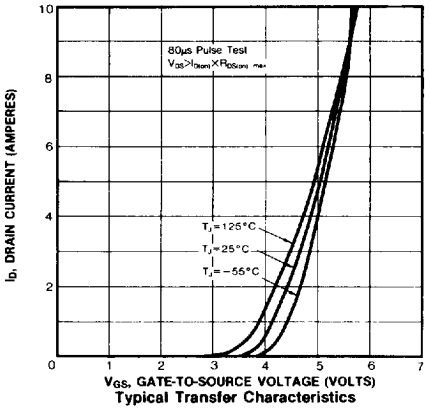
Typical Saturation Characteristics



Maximum Safe Operating Area



Typical Output Characteristics



Typical Transfer Characteristics

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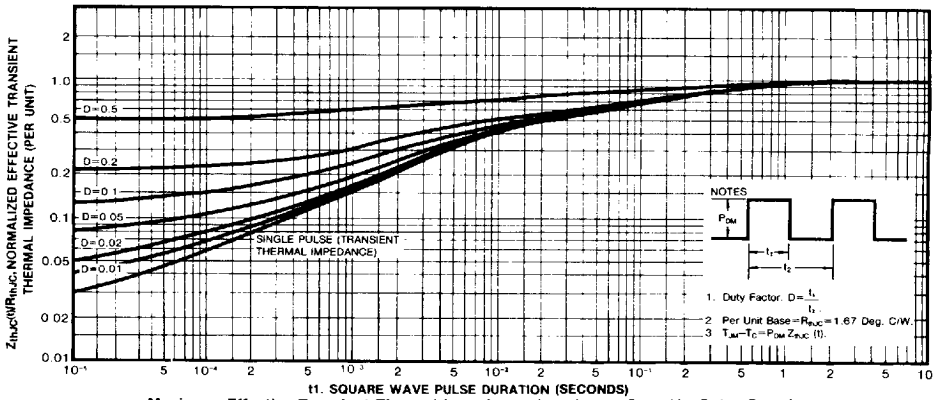
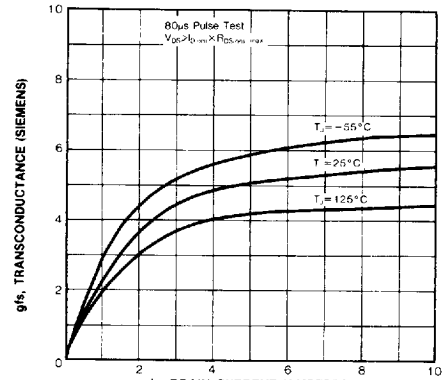
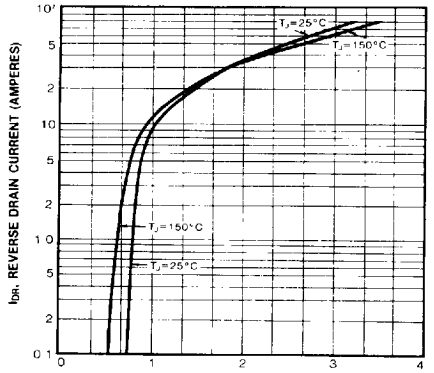


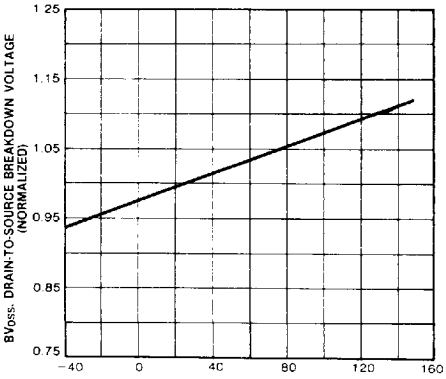
Maximum Effective Transient Thermal Impedance Junction-to-Case Vs. Pulse Duration



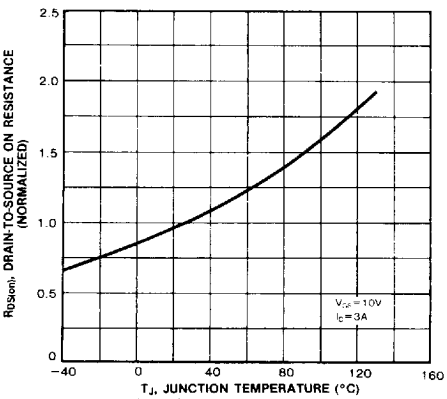
Typical Transcounductance Vs. Drain Current



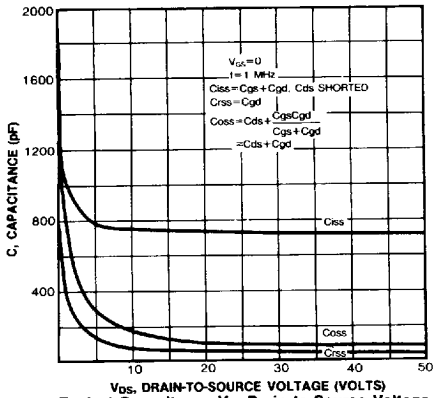
Typical Source—Drain Diode Forward Voltage



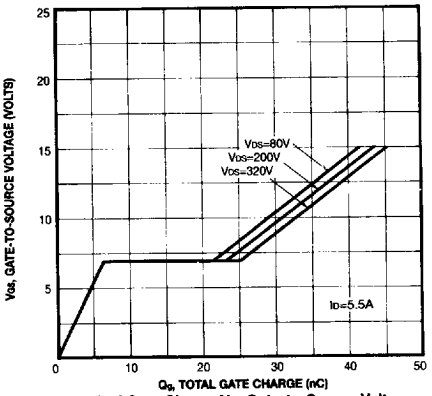
Breakdown Voltage Vs. Temperature



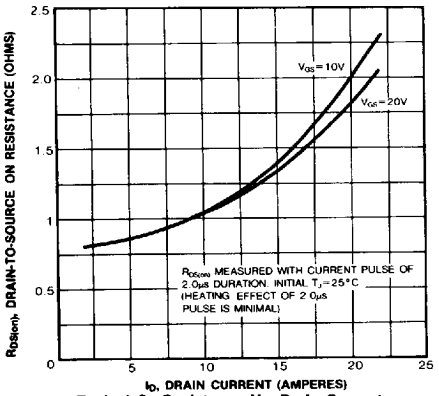
Normalized On-Resistance Vs. Temperature



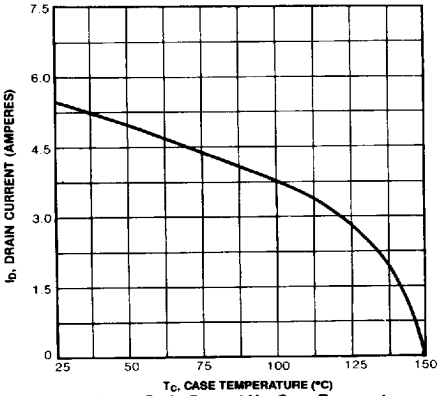
Typical Capacitance Vs. Drain to Source Voltage



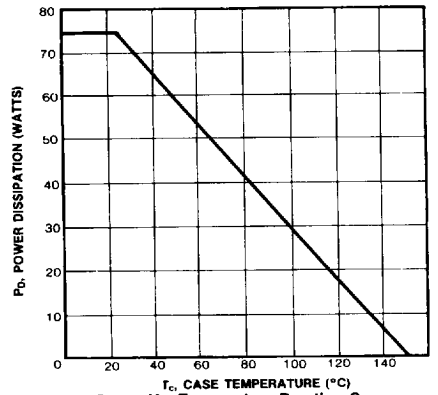
Typical Gate Charge Vs. Gate-to-Source Voltage



Typical On-Resistance Vs. Drain Current



Maximum Prain Current V_S, Case Temperature



Power Vs. Temperature Derating Curve

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