

GENERAL DESCRIPTION

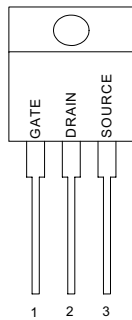
This Power MOSFET is designed for low voltage, high speed power switching applications such as switching regulators, converters, solenoid and relay drivers.

FEATURES

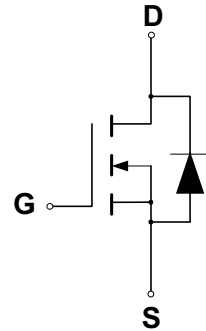
- ◆ Higher Current Rating
- ◆ Lower $r_{DS(ON)}$, Lower Capacitances
- ◆ Lower Total Gate Charge
- ◆ Tighter VSD Specifications
- ◆ Avalanche Energy Specified

PIN CONFIGURATION

TO-220
Top View



SYMBOL



N-Channel MOSFET

ORDERING INFORMATION

Part Number	Package
IRF730	TO-220

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain to Current – Continuous	I_D	6.0	A
– Pulsed (Note 1)	I_{DM}	21	
Gate-to-Source Voltage – Continue	V_{GS}	± 20	V
Total Power Dissipation	P_D	96	W
Derate above 25°C		0.77	W/°C
Single Pulse Drain-to-Source Avalanche Energy – $T_J = 25^\circ\text{C}$ ($V_{DD} = 100\text{V}$, $V_{GS} = 10\text{V}$, $I_L = 6\text{A}$, $L = 10\text{mH}$, $R_G = 25\Omega$)	E_{AS}	180	mJ
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C
Thermal Resistance – Junction to Case	θ_{JC}	1.70	°C/W
– Junction to Ambient	θ_{JA}	62	
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds	T_L	300	°C

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, $T_J = 25^\circ\text{C}$.

Characteristic	Symbol	IRF730			Units
		Min	Typ	Max	
Drain-Source Breakdown Voltage ($V_{GS} = 0\text{ V}$, $I_D = 250\ \mu\text{A}$)	$V_{(BR)DSS}$	400			V
Drain-Source Leakage Current ($V_{DS} = 400\text{V}$, $V_{GS} = 0\text{ V}$) ($V_{DS} = 400\text{V}$, $V_{GS} = 0\text{ V}$, $T_J = 125^\circ\text{C}$)	I_{DSS}			25 100	μA
Gate-Source Leakage Current-Forward ($V_{gsf} = 20\text{ V}$, $V_{DS} = 0\text{ V}$)	I_{GSSF}			100	nA
Gate-Source Leakage Current-Reverse ($V_{gsr} = -20\text{ V}$, $V_{DS} = 0\text{ V}$)	I_{GSSR}			-100	nA
Gate Threshold Voltage ($V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$)	$V_{GS(th)}$	2.0		4.0	V
Static Drain-Source On-Resistance ($V_{GS} = 10\text{ V}$, $I_D = 3\text{A}$) (Note 4)	$R_{DS(on)}$			1.0	Ω
Forward Transconductance ($V_{DS} = 50\text{V}$, $I_D = 3\text{ A}$) (Note 4)	g_{FS}	2.9			mhos
Input Capacitance	$(V_{DS} = 25\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1.0\text{ MHz}$)	C_{iss}	515	720	pF
Output Capacitance		C_{oss}	185	260	pF
Reverse Transfer Capacitance		C_{rss}	15	30	pF
Turn-On Delay Time	$(V_{DD} = 200\text{ V}$, $I_D = 6\text{ A}$, $R_G = 9.1\Omega$, $V_{GS} = 10\text{ V}$) (Note 4)	$t_{d(on)}$	7	10	ns
Rise Time		t_r	11	20	ns
Turn-Off Delay Time		$t_{d(off)}$	19	40	ns
Fall Time		t_f	10	20	ns
Total Gate Charge	$(V_{DS} = 320\text{V}$, $I_D = 6\text{A}$, $V_{GS} = 10\text{ V}$) (Note 4)	Q_g	9.5		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	$I_F = 6\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$, $T_J = 25^\circ\text{C}$ (Note 4)	Q_{rr}		1.6	μC
Forward Turn-On Time		t_{on}		**	
Reverse Recovery Time		t_{rr}		270	
Diode Forward Voltage	$I_S = 6\text{A}$, $V_{GS} = 0\text{ V}$, $T_J = 25^\circ\text{C}$ (Note 4)	V_{SD}		1.5	V

Note

- (1) Repetitive rating; pulse width limited by max. junction temperature
- (2) $V_{DD} = 50\text{V}$, starting $T_J = 25^\circ\text{C}$, $L=24\text{mH}$, $R_G = 25\Omega$, $I_{AS} = 4.5\text{A}$
- (3) $I_{SD} \leq 4.5\text{A}$, $di/dt \leq 75\text{A}/\mu\text{s}$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 150^\circ\text{C}$
- (4) Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$

** Negligible, Dominated by circuit inductance

TYPICAL ELECTRICAL CHARACTERISTICS

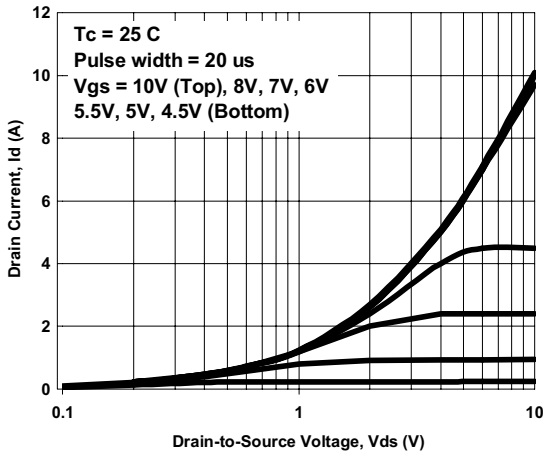


Figure 1. Id versus Vds Curve

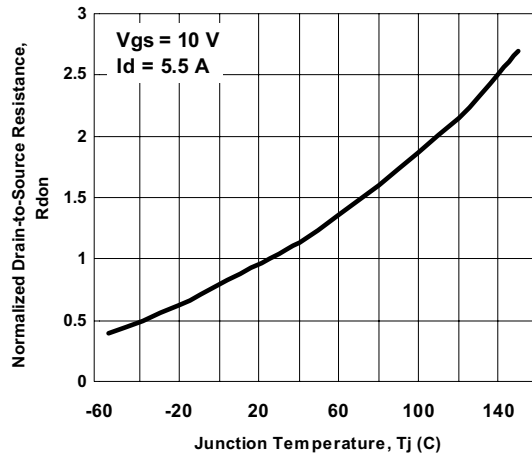


Figure 2. Rdon versus Tj Curve

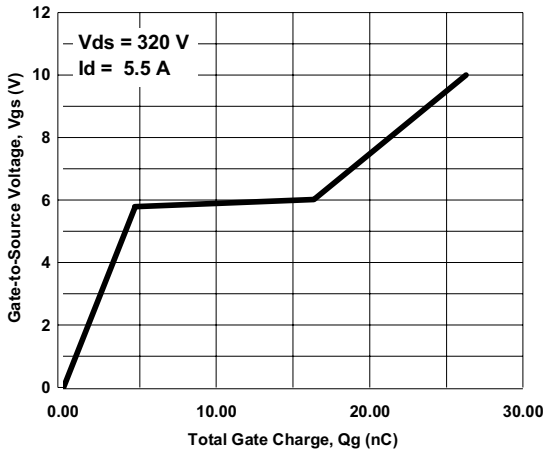


Figure 3. Vgs versus Qg Curve

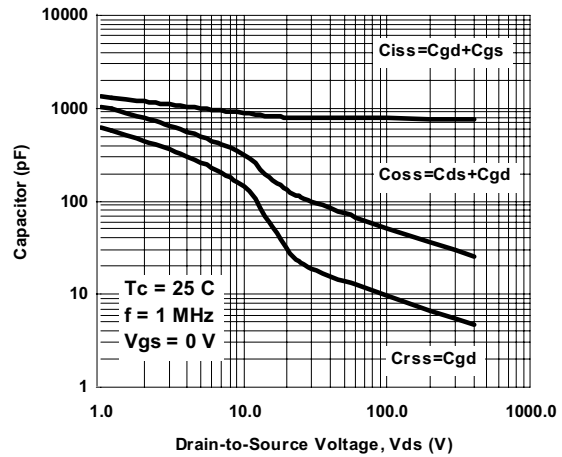


Figure 4. Capacitor versus Vds Curve

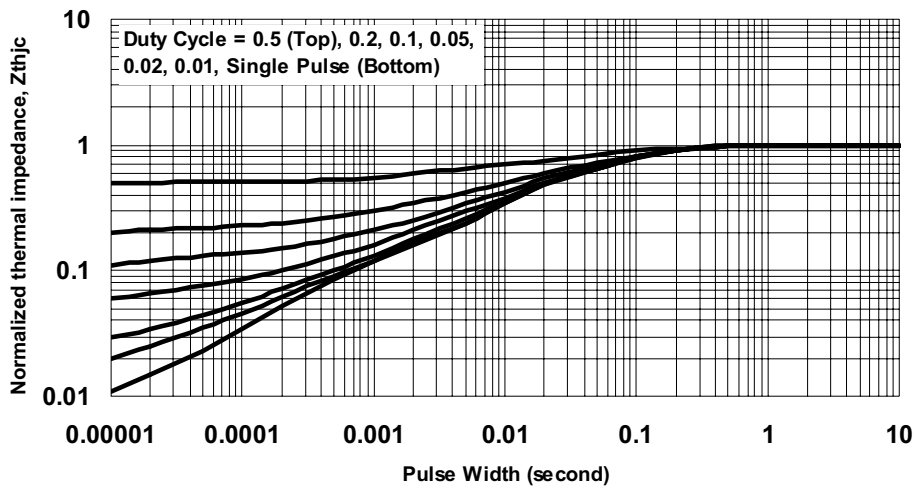


Figure 5. Transient thermal impedance Curve