

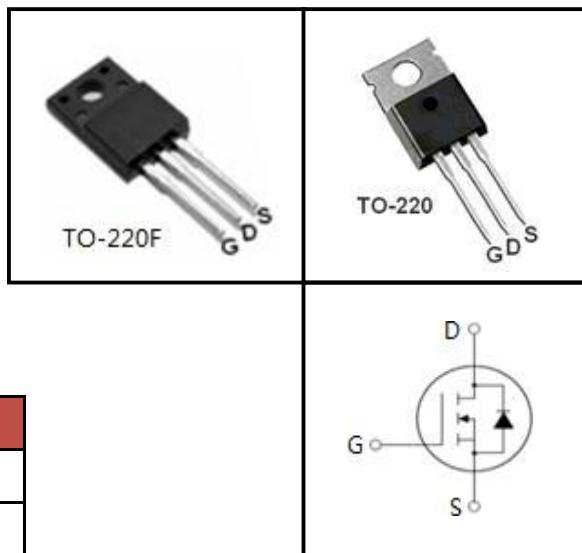
FEATURES

- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

APPLICATIONS

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)

Device Marking and Package Information		
Device	Package	Marking
IRF740	TO-220F	IRF740
IRF740	TO-220	IRF740



Absolute Maximum Ratings $T_C = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Value		Unit
		TO-220	TO-220F	
Drain-Source Voltage ($V_{GS} = 0\text{V}$)	V_{DSS}	400		V
Continuous Drain Current	I_D	10		A
Pulsed Drain Current (note1)	I_{DM}	40		A
Gate-Source Voltage	V_{GSS}	± 30		V
Single Pulse Avalanche Energy (note2)	E_{AS}	96		mJ
Avalanche Current (note1)	I_{AS}	4.4		A
Repetitive Avalanche Energy (note1)	E_{AR}	57		mJ
Power Dissipation ($T_c = 25^\circ\text{C}$)	P_D	63		W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+150		$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Value		Unit
		TO-220F	TO-220	
Thermal Resistance, Junction-to-Case	R_{thJC}	2.3	1.5	K/W
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62.5	60	

Specifications $T_J = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}} = 0\text{V}, I_D = 250\mu\text{A}$	400	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{\text{DS}} = 400\text{V}, V_{\text{GS}} = 0\text{V}, T_J = 25^\circ\text{C}$	--	--	1	μA
Gate-Source Leakage	I_{GSS}	$V_{\text{GS}} = \pm 30\text{V}$	--	--	± 100	nA
Gate-Source Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}} = V_{\text{GS}}, I_D = 250\mu\text{A}$	3.0	--	4.0	V
Drain-Source On-Resistance (Note3)	$R_{\text{DS}(\text{on})}$	$V_{\text{GS}} = 10\text{V}, I_D = 5\text{A}$	--	0.45	0.55	Ω
Dynamic						
Input Capacitance	C_{iss}	$V_{\text{GS}} = 0\text{V}, V_{\text{DS}} = 25\text{V}, f = 1.0\text{MHz}$	--	1050	--	pF
Output Capacitance	C_{oss}		--	112	--	
Reverse Transfer Capacitance	C_{rss}		--	8	--	
Total Gate Charge	Q_g	$V_{\text{DD}} = 320\text{V}, I_D = 10\text{A}, V_{\text{GS}} = 10\text{V}$	--	28	--	nC
Gate-Source Charge	Q_{gs}		--	9	--	
Gate-Drain Charge	Q_{gd}		--	7	--	
Turn-on Delay Time	$t_{\text{d}(\text{on})}$	$V_{\text{DD}} = 200\text{V}, I_D = 10\text{A}, R_G = 25\Omega$	--	39	--	ns
Turn-on Rise Time	t_r		--	20	--	
Turn-off Delay Time	$t_{\text{d}(\text{off})}$		--	138	--	
Turn-off Fall Time	t_f		--	34	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	$T_C = 25^\circ\text{C}$	--	--	10	A
Pulsed Diode Forward Current	I_{SM}		--	--	40	
Body Diode Voltage	V_{SD}	$T_J = 25^\circ\text{C}, I_{\text{SD}} = 5\text{A}, V_{\text{GS}} = 0\text{V}$	--	--	1.4	V
Reverse Recovery Time	t_{rr}	$V_{\text{GS}} = 0\text{V}, I_S = 10\text{A}, dI/dt = 100\text{A}/\mu\text{s}$	--	249	--	ns
Reverse Recovery Charge	Q_{rr}		--	1.87	--	μC

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $L = 10.0\text{mH}, V_{\text{DD}} = 50\text{V}, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
3. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty Cycle $\leq 1\%$

Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics ($T_J = 25^\circ\text{C}$)

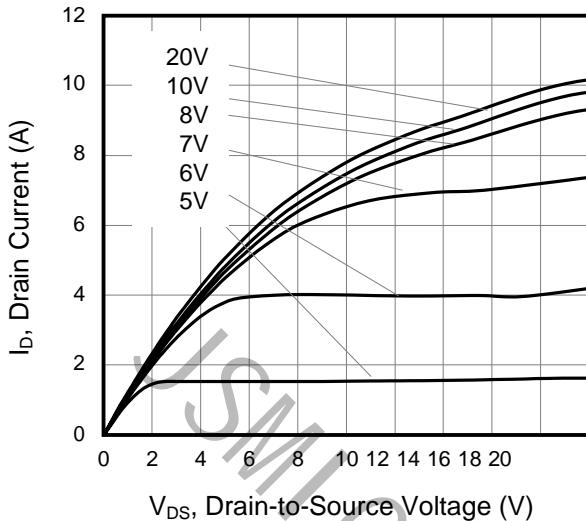


Figure 2. Body Diode Forward Voltage

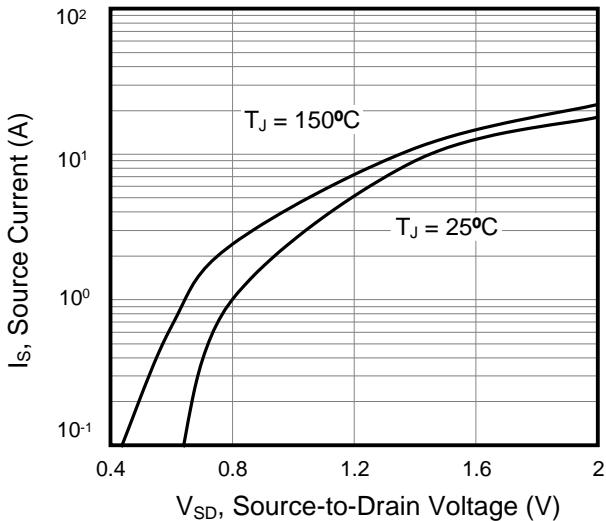


Figure 3. Drain Current vs. Temperature

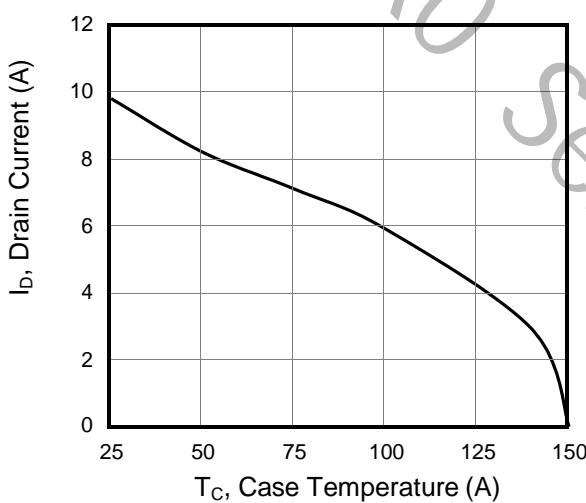


Figure 4. BV_{DSS} Variation vs. Temperature

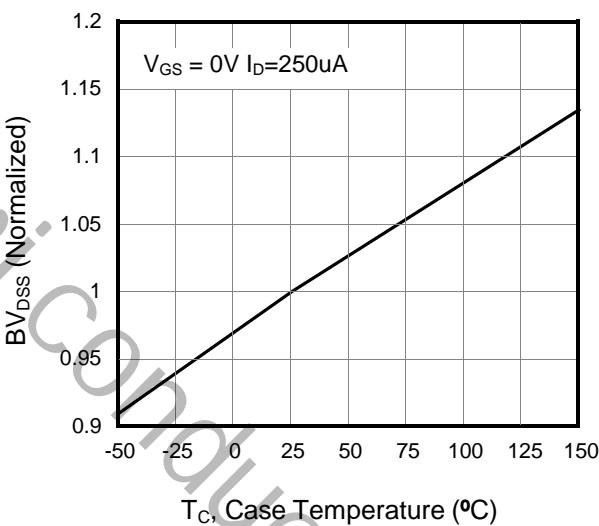


Figure 5. Transfer Characteristics

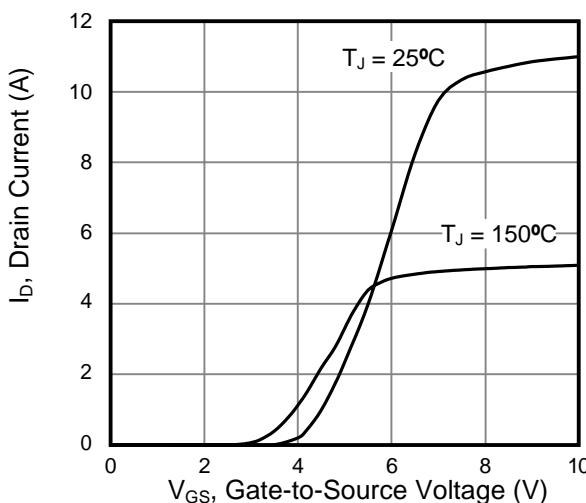
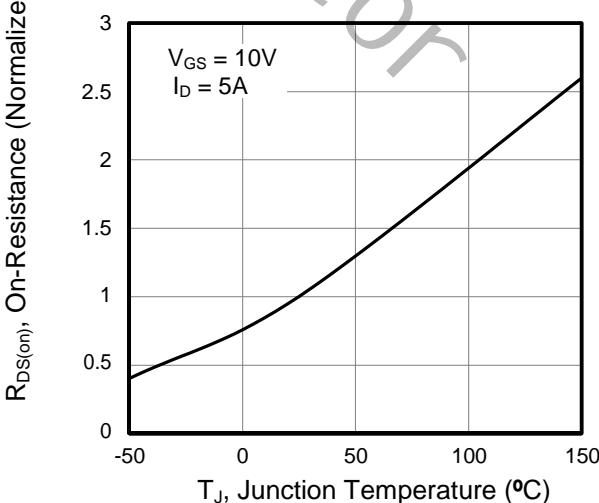


Figure 6. On-Resistance vs. Temperature



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 7. Capacitance

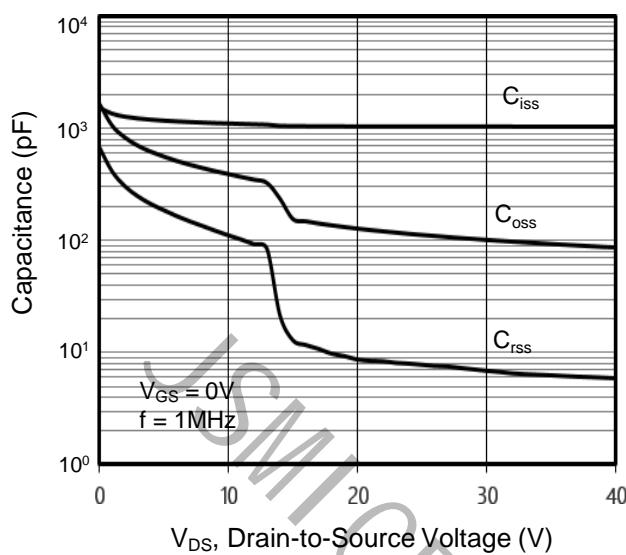


Figure 8. Gate Charge

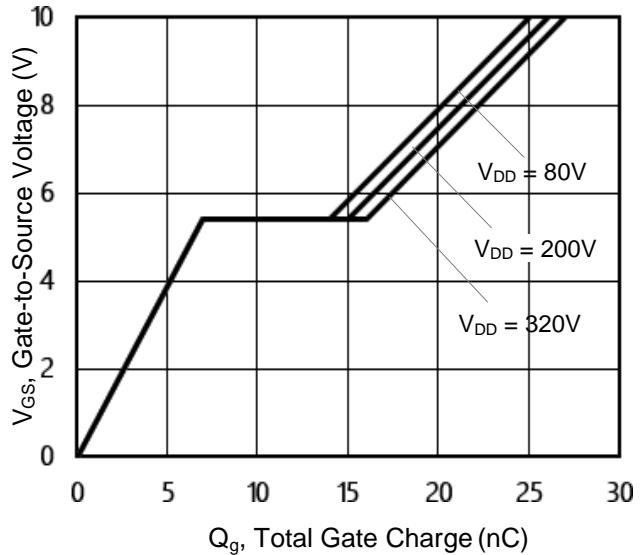


Figure 9. Transient Thermal Impedance

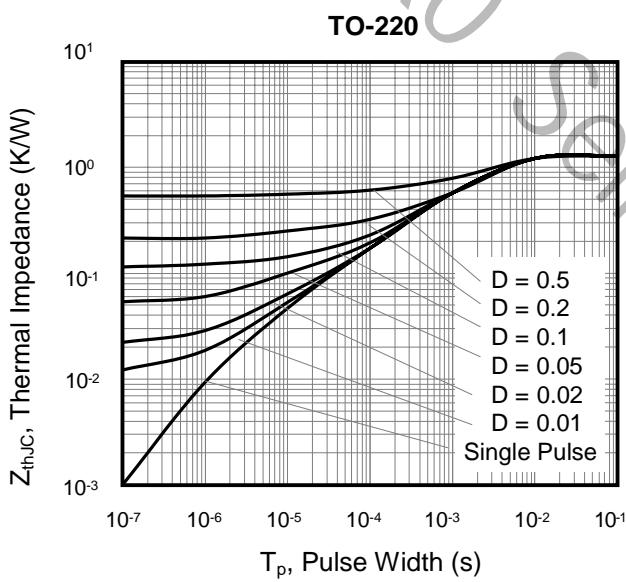


Figure 10. Transient Thermal Impedance

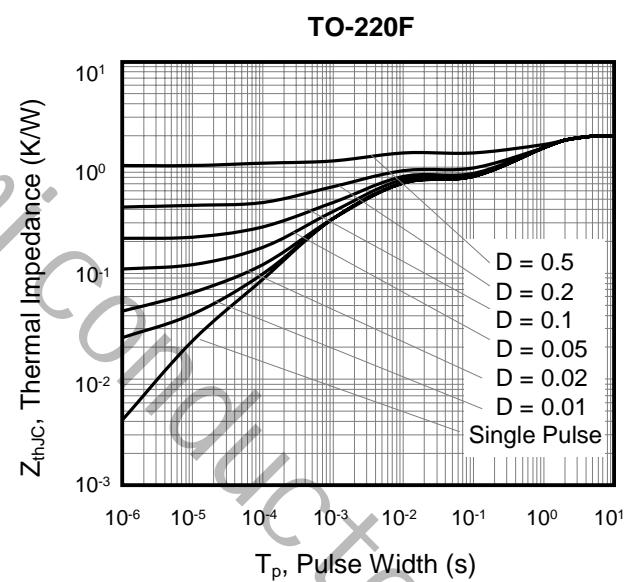
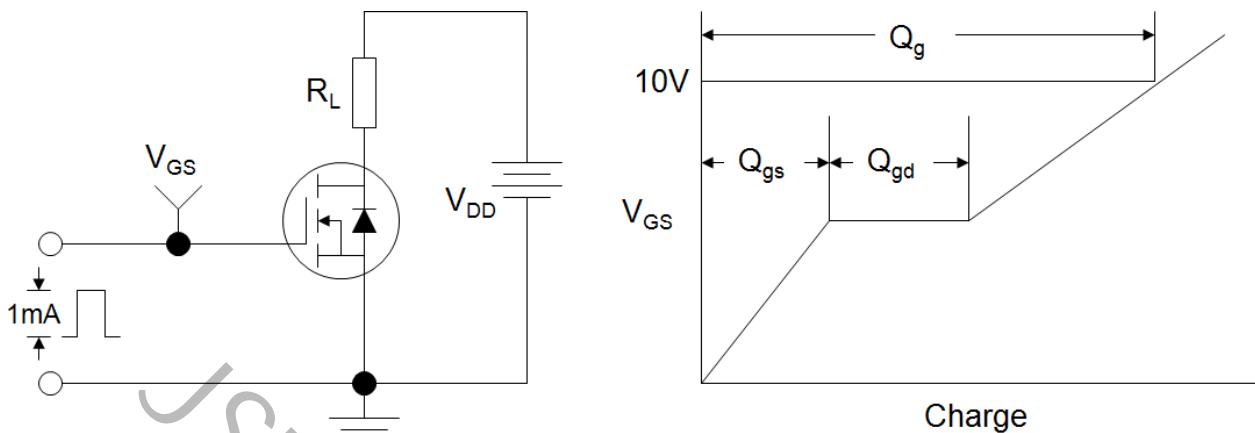
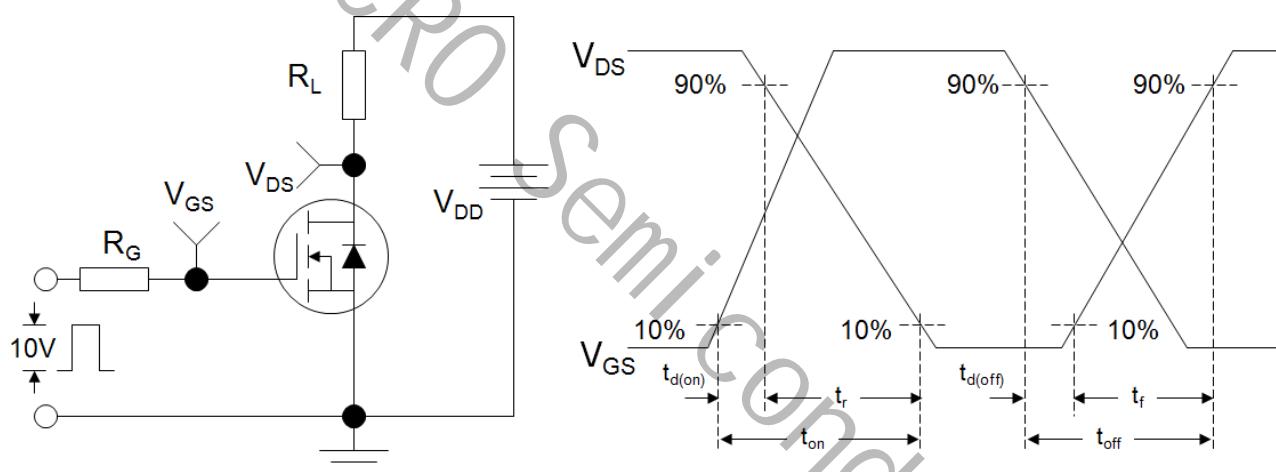


Figure A: Gate Charge Test Circuit and Waveform

Figure B: Resistive Switching Test Circuit and Waveform

Figure C: Unclamped Inductive Switching Test Circuit and Waveform
