

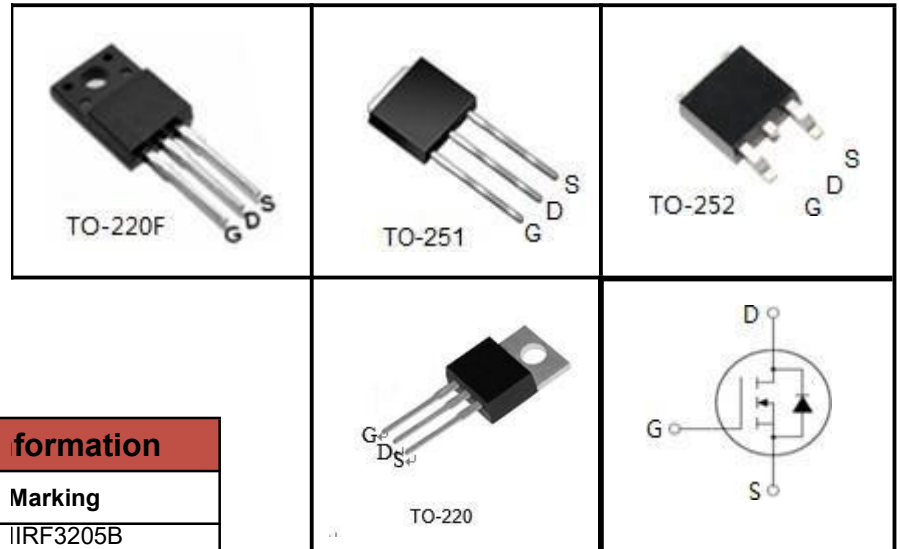
60V N-Channel MOSFET

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
IRF3205	TO-220	IRF3205B

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

Parameter	Symbol	Value				Unit
		TO-220F	TO-220	TO-251	TO-252	
Drain-Source Voltage ($V_{GS} = 0V$)	V_{DSS}	60				V
Continuous Drain Current	I_D	50				A
Pulsed Drain Current (note1)	I_{DM}	200				A
Gate-Source Voltage	V_{GSS}	± 20				V
Single Pulse Avalanche Energy (note2)	E_{AS}	2500				mJ
Avalanche Current (note1)	I_{AR}	50				A
Repetitive Avalanche Energy (note1)	E_{AR}	36				mJ
Power Dissipation ($T_C = 25^{\circ}C$)	P_D	83	110			W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+150				$^{\circ}C$

Thermal Resistance

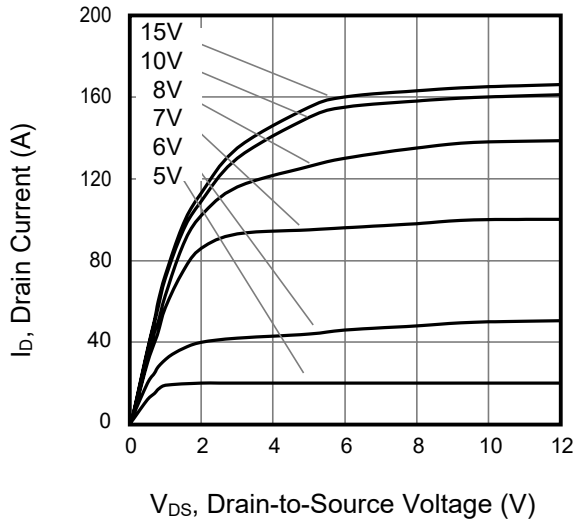
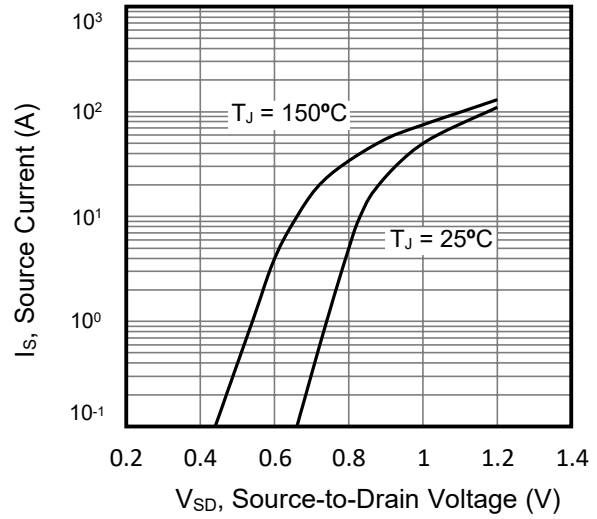
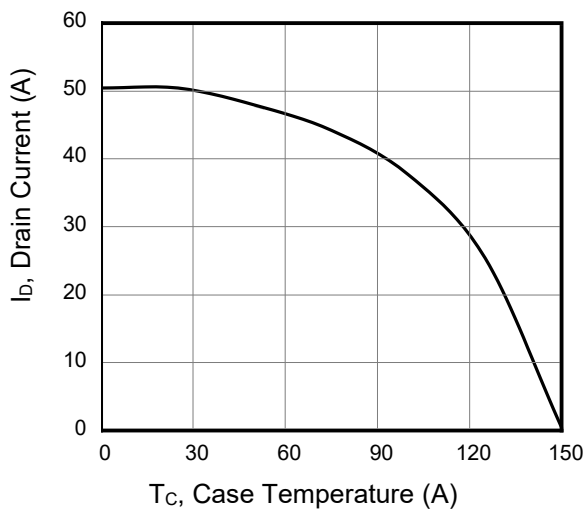
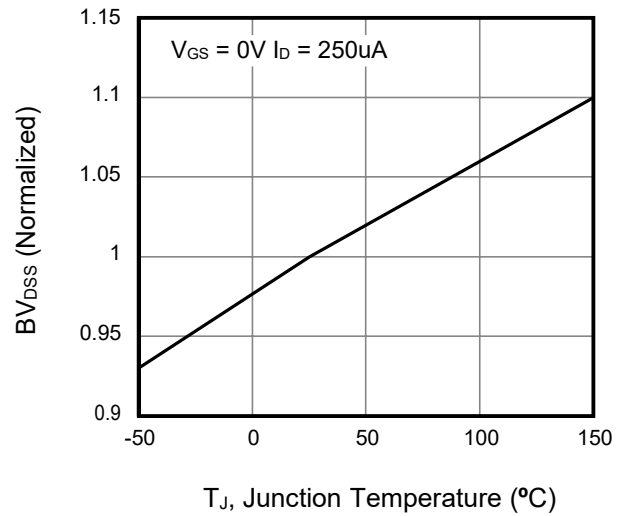
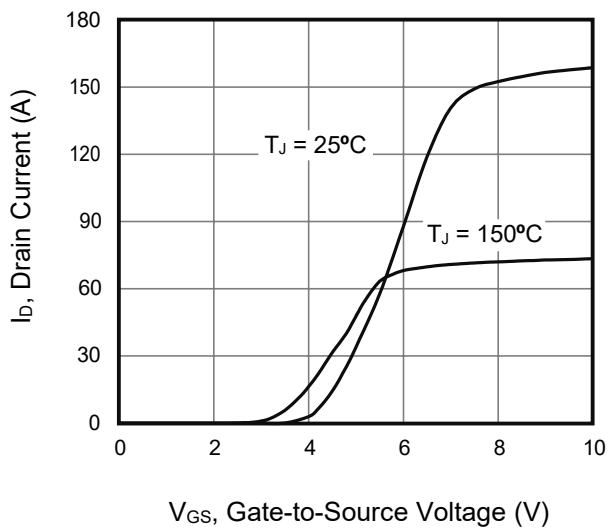
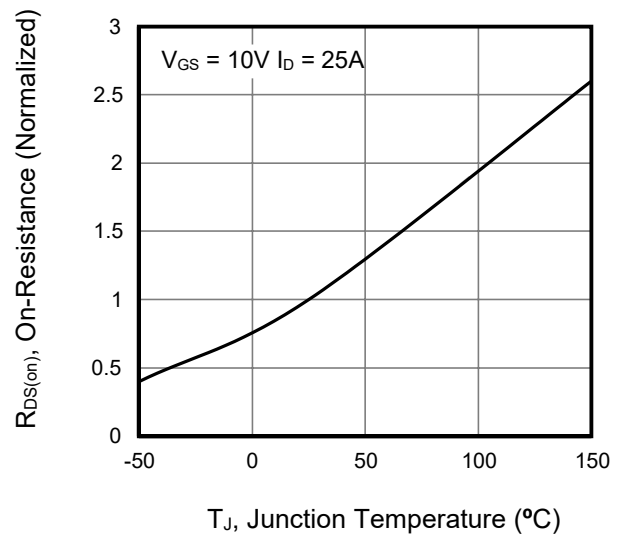
Parameter	Symbol	Value				Unit
		TO-220F	TO-220	TO-251	TO-252	
Thermal Resistance, Junction-to-Case	R _{thJC}	1.5	1.14			K/W
Thermal Resistance, Junction-to-Ambient	R _{thJA}	62.5	60			

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

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	60	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 60V, V_{GS} = 0V, T_J = 25^{\circ}C$	--	--	5	μA
		$V_{DS} = 48V, V_{GS} = 0V, T_J = 125^{\circ}C$	--	--	100	
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 20V$	--	--	± 100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	--	4.0	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 25A$	--	14	22	m Ω
Dynamic						
Input Capacitance	C_{iss}	$V_{GS} = 0V,$ $V_{DS} = 25V,$ $f = 1.0MHz$	--	1489	--	pF
Output Capacitance	C_{oss}		--	608	--	
Reverse Transfer Capacitance	C_{rss}		--	275	--	
Total Gate Charge	Q_g	$V_{DD} = 48V, I_D = 50A,$ $V_{GS} = 10V$	--	60	--	nC
Gate-Source Charge	Q_{gs}		--	6	--	
Gate-Drain Charge	Q_{gd}		--	31	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 30V, I_D = 50A,$ $R_G = 25\Omega$	--	22	--	ns
Turn-on Rise Time	t_r		--	82	--	
Turn-off Delay Time	$t_{d(off)}$		--	52	--	
Turn-off Fall Time	t_f		--	93	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	$T_C = 25^{\circ}C$	--	--	50	A
Pulsed Diode Forward Current	I_{SM}		--	--	200	
Body Diode Voltage	V_{SD}	$T_J = 25^{\circ}C, I_{SD} = 25A, V_{GS} = 0V$	--	--	2	V
Reverse Recovery Time	t_{rr}	$V_{GS} = 0V, I_S = 50A,$ $di_F/dt = 100A/\mu s$	--	68	--	ns
Reverse Recovery Charge	Q_{rr}		--	4.2	--	μC

Notes

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

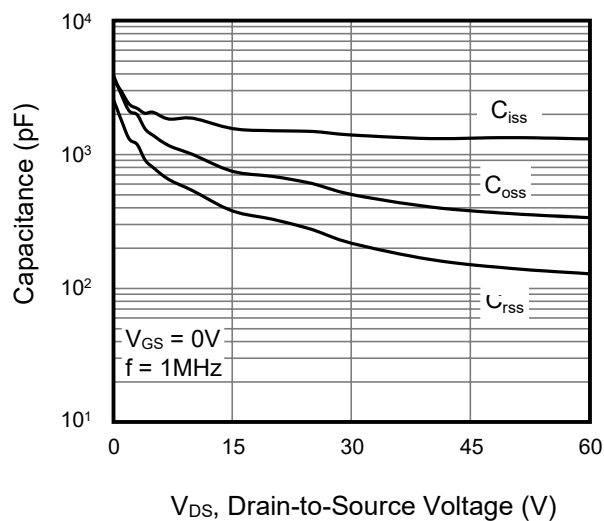


Figure 8. Gate Charge

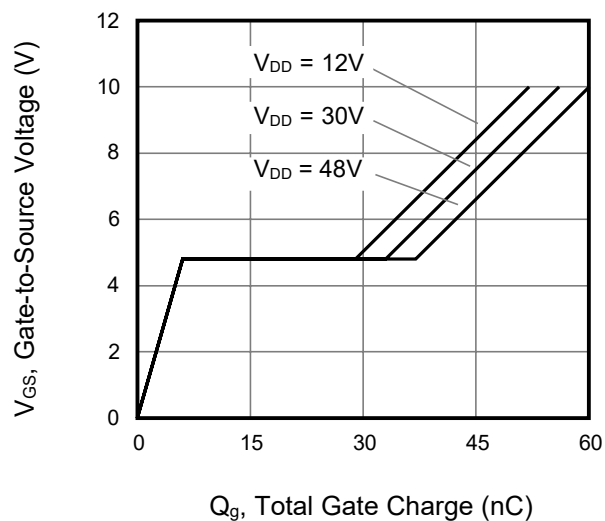
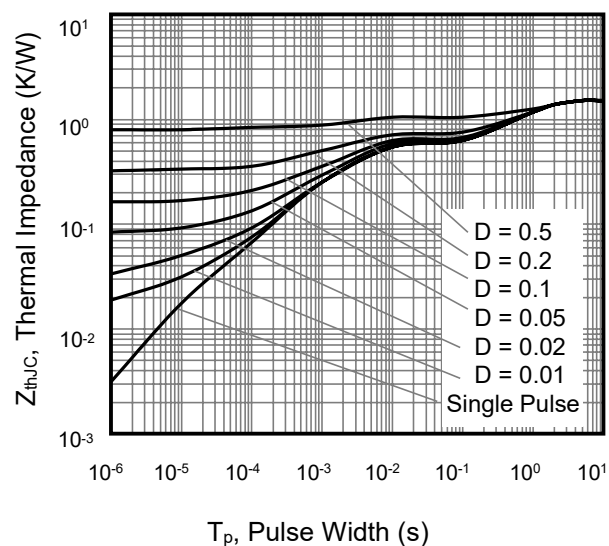
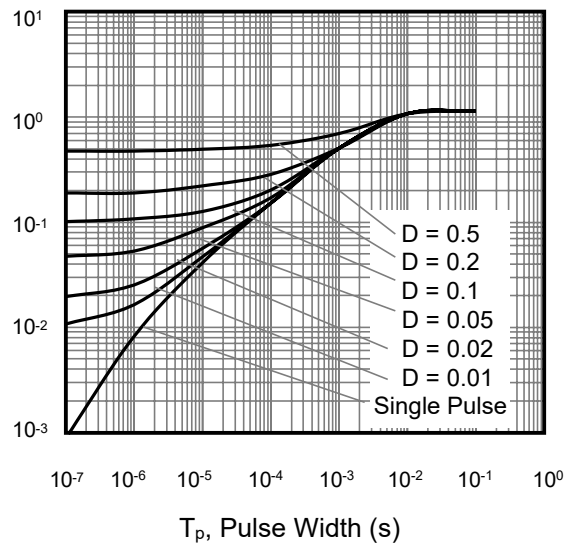
Figure 9. Transient Thermal Impedance
TO-220FFigure 10. Transient Thermal Impedance
TO-251, TO-252, TO-220

Figure A: Gate Charge Test Circuit and Waveform

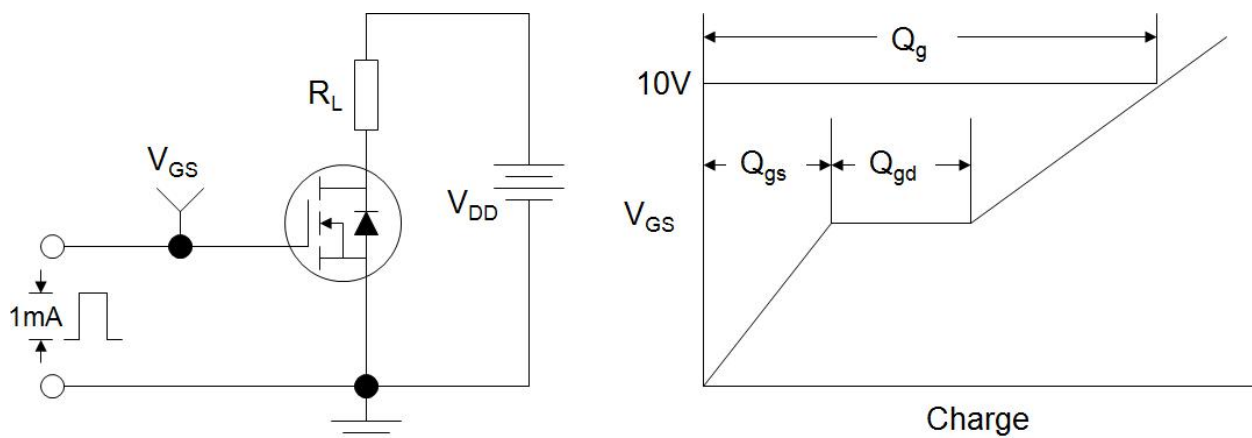


Figure B: Resistive Switching Test Circuit and Waveform

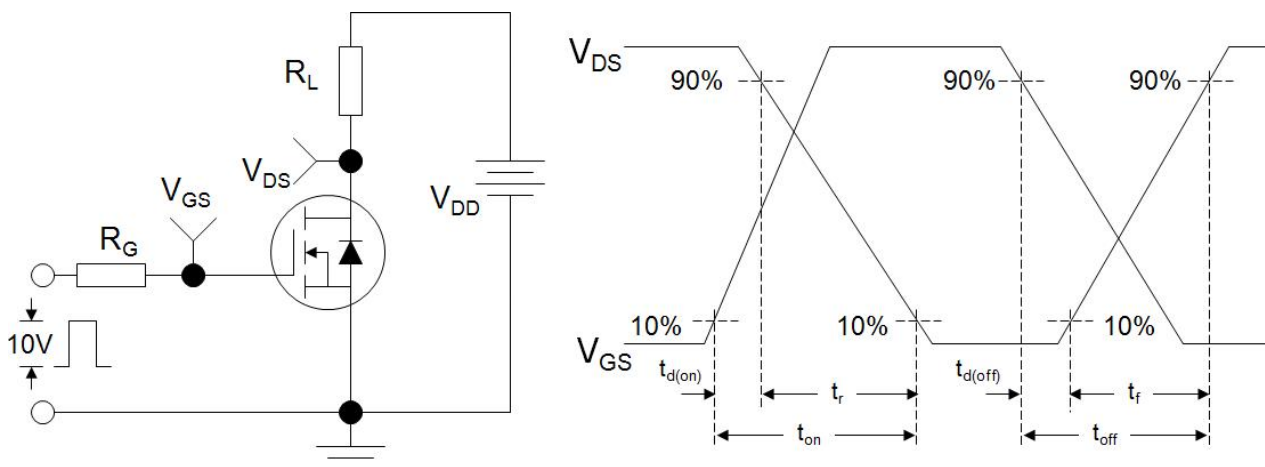


Figure C: Unclamped Inductive Switching Test Circuit and Waveform

