

## Silicon N-Channel Power MOSFET

### Description

The IRF3205PC specifically designed for Automotive applications.

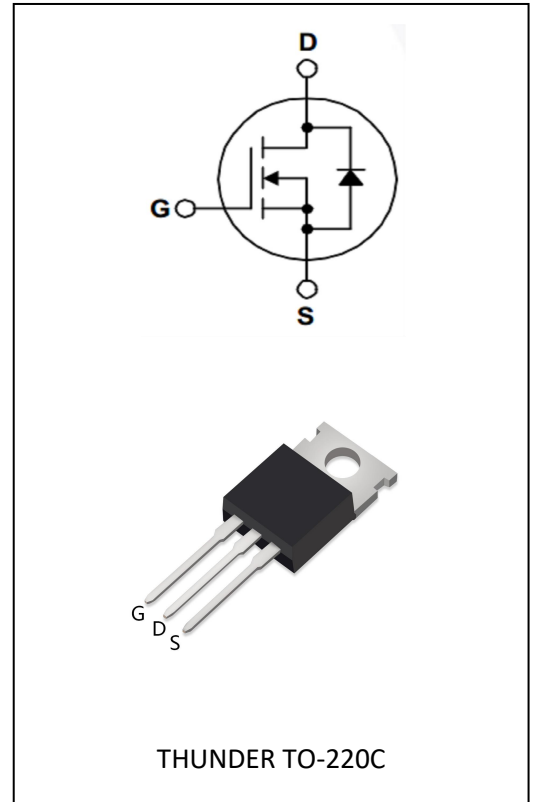
It utilizes the latest processing techniques to achieve low on-resistance per silicon area. This benefit combined with the fast switching speed and ruggedized device design provides the designer with an extremely efficient and reliable device for use in Automotive and a wide variety of other applications.

### General Features

- $V_{DS}=55V, I_D=110A$
- Low ON Resistance,  $R_{D(ON)} \leq 8.0m\Omega$
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

### Application

- Power switching application
- Adapter and charger



### Electrical Characteristics @ $T_a=25^\circ C$ (unless otherwise specified)

#### Absolute Maximum Ratings:

Symbol	Parameter	Value	Unit
$V_{DSS}$	Drain-to-Source Breakdown Voltage	55	V
$I_D$	Drain Current (continuous) at $T_c=25^\circ C$	110	A
$I_{DM}$	Drain Current (pulsed)	390	A
$V_{GS}$	Gate to Source Voltage	$\pm 20$	V
$P_{tot}$	Total Dissipation at $T_c=25^\circ C$	200	W
$T_j$	Max. Operating Junction Temperature	175	$^\circ C$
$E_{AS}$	Single Pulse Avalanche Energy	1500	mJ

**Electrical Characteristics:**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{DS}$	Drain-source Voltage	$V_{GS}=0V, I_D=250\mu A$	55	—	—	V
$R_{DS(on)}$	Static Drain-to-Source on-Resistance	$V_{GS}=10V, I_D=30A$	—	—	8.0	m $\Omega$
$V_{GS(th)}$	Gated Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	3.1	4.0	V
$I_{DSS}$	Drain to Source leakage Current	$V_{DS}=60V, V_{GS}=0V$	—	—	5.0	$\mu A$
$I_{GSS(F)}$	Gated to Source Forward Leakage	$V_{GS}=+20V$	—	—	100	nA
$I_{GSS(R)}$	Gated to Source Reverse Leakage	$V_{GS}=-20V$	—	—	-100	nA
$C_{iss}$	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=25V,$ $f=1.0MHz$	—	2180	—	pF
$C_{oss}$	Output Capacitance		—	770	—	pF
$C_{rss}$	Reverse Transfer Capacitance		—	169	—	pF

**Switching Characteristics:**

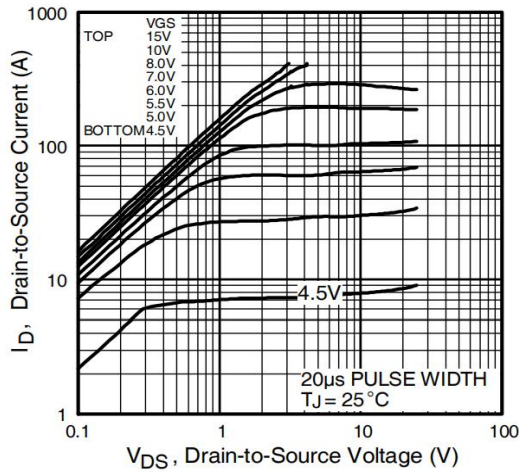
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=28V, I_D=50A,$ $R_G=3.6\Omega$	—	17	—	nS
$t_r$	Turn-on Rise Time		—	96	—	nS
$t_{d(off)}$	Turn-off Delay Time		—	58	—	nS
$t_f$	Turn-off Fall Time		—	58	—	nS
$Q_g$	Total Gate Charge	$V_{DS}=30V$	—	151	—	nC
$Q_{gs}$	Gate-Source Charge	$I_D=50A$	—	33	—	nC
$Q_{gd}$	Gate-Drain Charge	$V_{GS}=10V$	—	52	—	nC

**Source-Drain Diode Characteristics:**

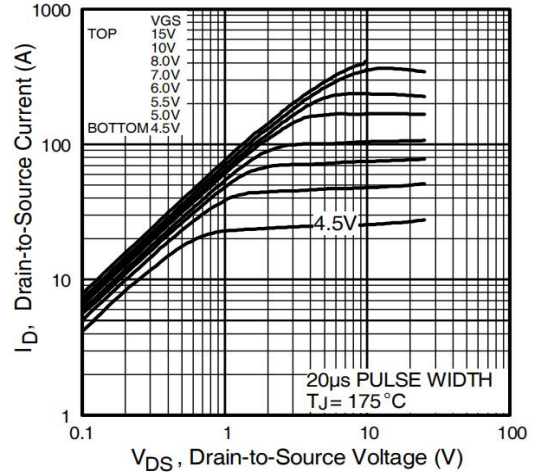
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{SD}$	S-D Current(Body Diode)		—	—	110	A
$I_{SDM}$	Pulsed S-D Current(Body Diode)		—	—	390	A
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_{DS}=50A$	—	—	1.3	V
$t_{rr}$	Reverse Recovery Time	$T_J=25^\circ C, I_F=50A$ $di/dt=100A/\mu s$	—	75	—	nS
$Q_{rr}$	Reverse Recovery Charge		—	160	—	$\mu C$
*Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 2\%$						

Symbol	Parameter	Typ.	Unit
$R_{\theta JC}$	Junction-to-Case	0.75	$^\circ C/W$

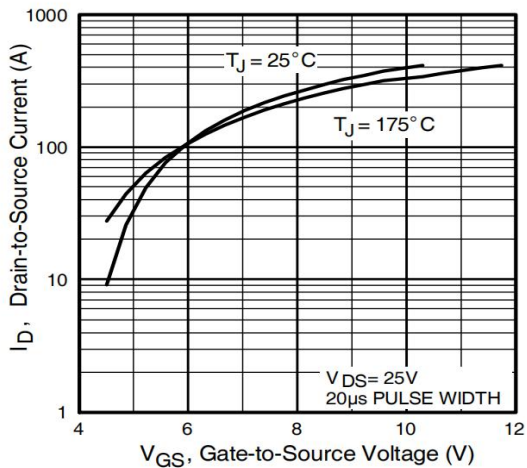
**Typical Characteristics**



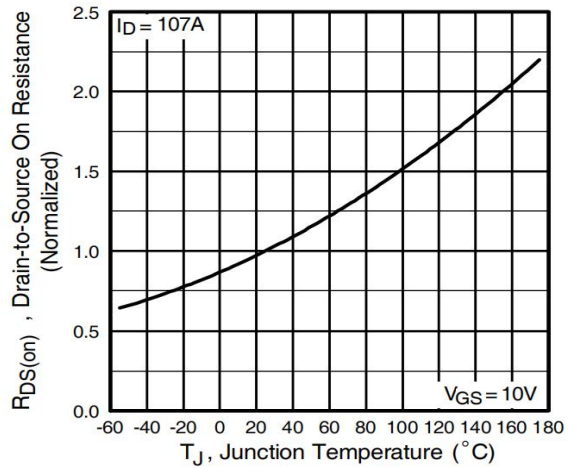
**Fig 1. Typical Output Characteristics**



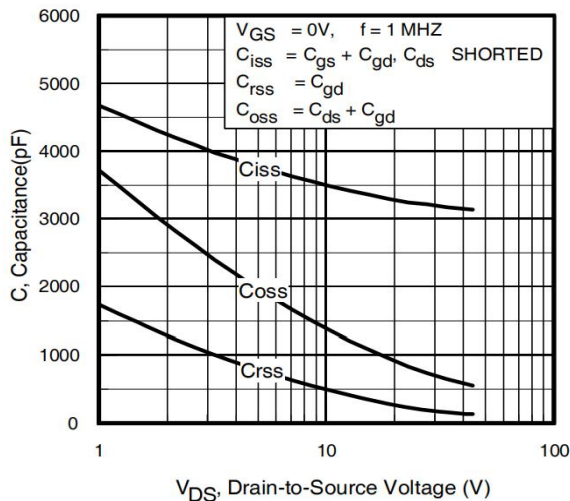
**Fig 2. Typical Output Characteristics**



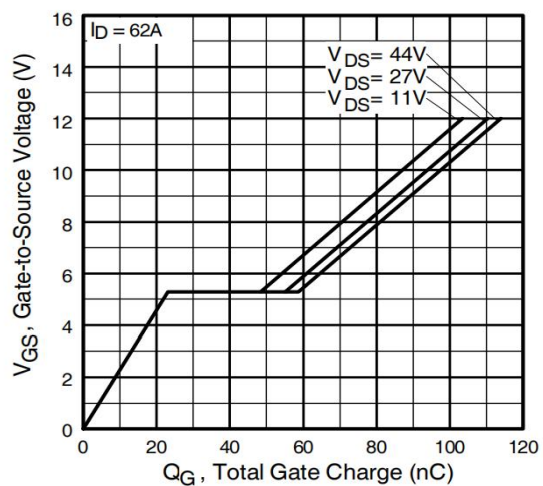
**Fig 3. Typical Transfer Characteristics**



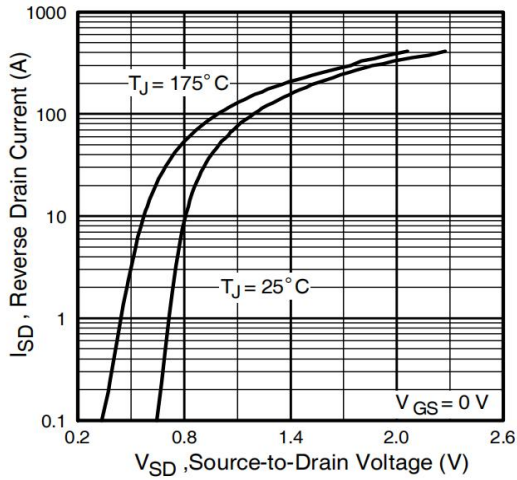
**Fig 4. Normalized On-Resistance Vs. Temperature**



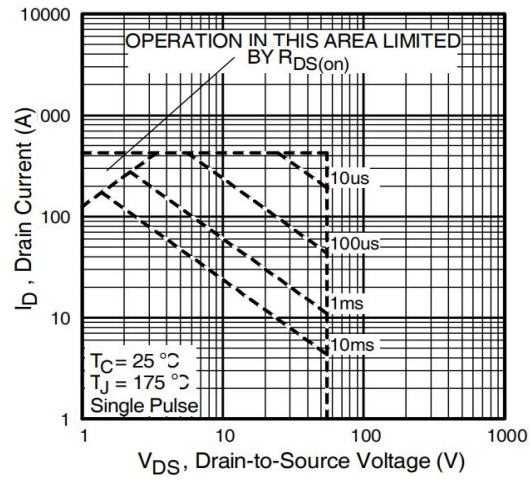
**Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage**



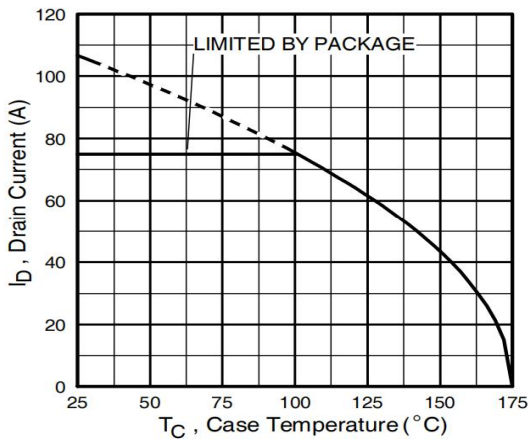
**Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage**



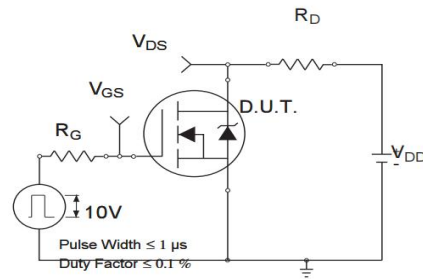
**Fig 7. Typical Source-Drain Diode Forward Voltage**



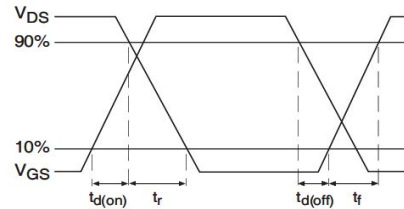
**Fig 8. Maximum Safe Operating Area**



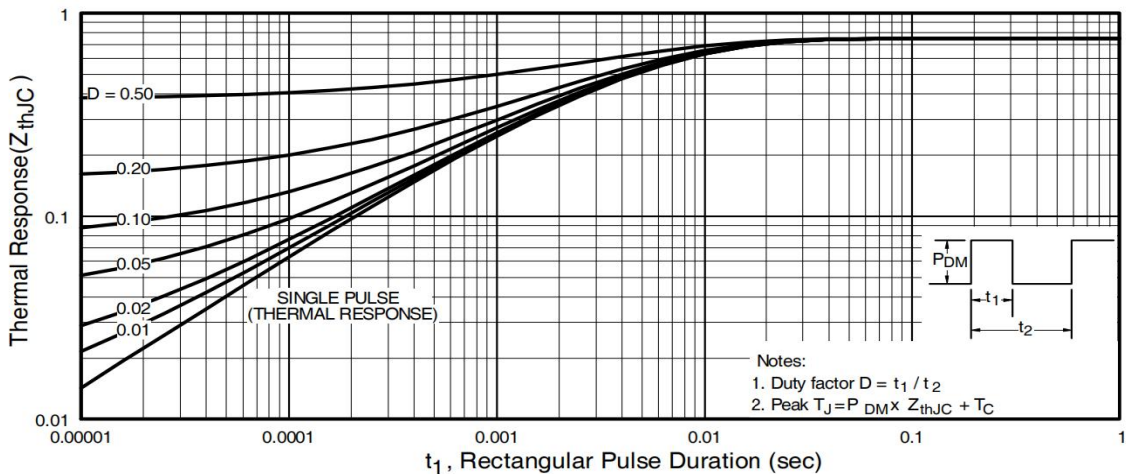
**Fig 9. Maximum Drain Current Vs. Case Temperature**



**Fig 10a. Switching Time Test Circuit**



**Fig 10b. Switching Time Waveforms**

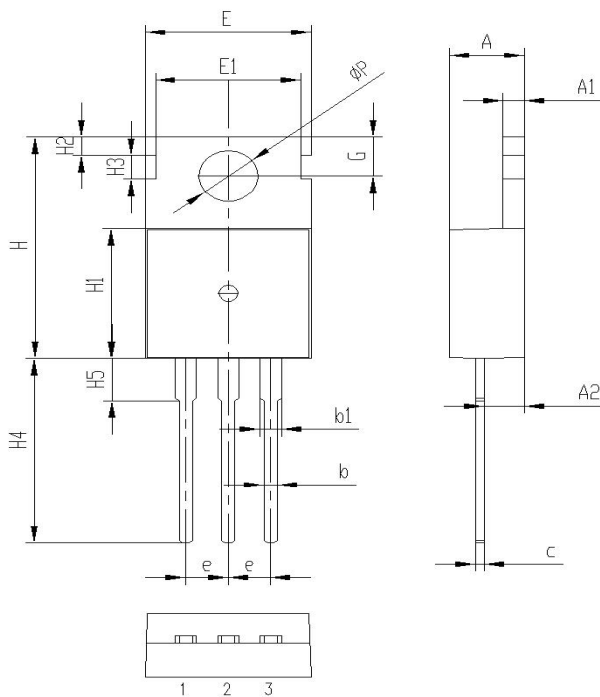


**Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case**

## Package Information

### TO-220C PACKAGE

#### 基本尺寸



Symbol	单位 mm		
	Min	Nom	Max
A	4.30	4.5	4.70
A1	1.20	1.30	1.40
A2	2.20	2.4	2.60
b	0.60	0.8	1.00
b1	1.20	1.30	1.40
c	0.40	0.5	0.60
e	2.44	2.54	2.64
E	9.80	10.0	10.2
E1	8.50	8.70	8.90
H	15.5	15.7	15.9
H1	9.00	9.2	9.40
H2	1.10	1.34	1.50
H3	1.50	1.7	1.90
H4	12.9	13.3	13.7
H5	2.80	3.0	3.20
G	2.60	2.8	3.00
ΦP	3.40	3.6	3.80

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