

**HEXFET® POWER MOSFET
SURFACE MOUNT (SMD-0.5)**

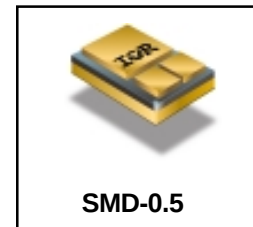
**IRF5NJ5305
55V, P-CHANNEL**

Product Summary

Part Number	BV _{DSS}	R _{DS(on)}	I _D
IRF5NJ5305	-55V	0.065Ω	-22A*

Fifth Generation HEXFET® power MOSFETs from International Rectifier utilize advanced processing techniques to achieve the lowest possible on-resistance per silicon unit area. This benefit, combined with the fast switching speed and ruggedized device design that HEXFET power MOSFETs are well known for, provides the designer with an extremely efficient device for use in a wide variety of applications.

These devices are well-suited for applications such as switching power supplies, motor controls, inverters, choppers, audio amplifiers and high-energy pulse circuits.



SMD-0.5

Features:

- Low R_{DS(on)}
- Avalanche Energy Ratings
- Dynamic dv/dt Rating
- Simple Drive Requirements
- Ease of Paralleling
- Hermetically Sealed
- Surface Mount
- Light Weight

Absolute Maximum Ratings

	Parameter		Units
I _D @ V _{GS} = -10V, T _C = 25°C	Continuous Drain Current	-22*	A
I _D @ V _{GS} = -10V, T _C = 100°C	Continuous Drain Current	-16	
I _{DM}	Pulsed Drain Current ①	-88	
P _D @ T _C = 25°C	Max. Power Dissipation	75	W
	Linear Derating Factor	0.6	W/°C
V _{GS}	Gate-to-Source Voltage	±20	V
E _{AS}	Single Pulse Avalanche Energy ②	160	mJ
I _{AR}	Avalanche Current ①	-16	A
E _{AR}	Repetitive Avalanche Energy ①	7.5	mJ
dv/dt	Peak Diode Recovery dv/dt ③	2.8	V/ns
T _J	Operating Junction	-55 to 150	°C
T _{STG}	Storage Temperature Range		
	Package Mounting Surface Temperature	300 (for 5 s)	
	Weight	1.0 (Typical)	g

* Current is limited by package

For footnotes refer to the last page

Electrical Characteristics @ T_j = 25°C (Unless Otherwise Specified)

	Parameter	Min	Typ	Max	Units	Test Conditions
BV _{DSS}	Drain-to-Source Breakdown Voltage	-55	—	—	V	V _{GS} = 0V, I _D = -250μA
ΔBV _{DSS} /ΔT _j	Temperature Coefficient of Breakdown Voltage	—	-0.049	—	V/°C	Reference to 25°C, I _D = -1.0mA
R _{DS(on)}	Static Drain-to-Source On-State Resistance	—	—	0.065	Ω	V _{GS} = 10V, I _D = -16A ④
V _{GS(th)}	Gate Threshold Voltage	-2.0	—	-4.0	V	V _{DS} = V _{GS} , I _D = -250μA
g _{fs}	Forward Transconductance	8.0	—	—	S (r)	V _{DS} = -25V, I _{DS} = -16A ④
I _{DSS}	Zero Gate Voltage Drain Current	—	—	-25	μA	V _{DS} = -55V, V _{GS} = 0V
		—	—	-250		V _{DS} = -44V, V _{GS} = 0V, T _J = 125°C
I _{GSS}	Gate-to-Source Leakage Forward	—	—	-100	nA	V _{GS} = -20V
I _{GSS}	Gate-to-Source Leakage Reverse	—	—	100		V _{GS} = 20V
Q _g	Total Gate Charge	—	—	70	nC	V _{GS} = -10V, I _D = -16A V _{DS} = -44V
Q _{gs}	Gate-to-Source Charge	—	—	17		
Q _{gd}	Gate-to-Drain ('Miller') Charge	—	—	30		
t _{d(on)}	Turn-On Delay Time	—	—	26	ns	V _{DD} = -28V, I _D = -16A, R _G = 6.8Ω
t _r	Rise Time	—	—	125		
t _{d(off)}	Turn-Off Delay Time	—	—	56		
t _f	Fall Time	—	—	74		
L _S + L _D	Total Inductance	—	4.0	—	nH	Measured from the center of drain pad to center of source pad
C _{iss}	Input Capacitance	—	1290	—	pF	V _{GS} = 0V, V _{DS} = -25V f = 1.0MHz
C _{oss}	Output Capacitance	—	495	—		
C _{rss}	Reverse Transfer Capacitance	—	203	—		

Source-Drain Diode Ratings and Characteristics

	Parameter	Min	Typ	Max	Units	Test Conditions
I _S	Continuous Source Current (Body Diode)	—	—	-22*	A	T _j = 25°C, I _S = -16A, V _{GS} = 0V ④
I _{SM}	Pulse Source Current (Body Diode) ①	—	—	-88		
V _{SD}	Diode Forward Voltage	—	—	-1.3	V	T _j = 25°C, I _F = -16A, di/dt ≥ 100A/μs V _{DD} ≤ -30V ④
t _{rr}	Reverse Recovery Time	—	—	100	ns	
Q _{RR}	Reverse Recovery Charge	—	—	250	nC	
t _{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible. Turn-on speed is substantially controlled by L _S + L _D .				

* Current is limited by package

Thermal Resistance

	Parameter	Min	Typ	Max	Units	Test Conditions
R _{thJC}	Junction-to-Case	—	—	1.67	°C/W	

Note: Corresponding Spice and Saber models are available on the G&S Website.

For footnotes refer to the last page

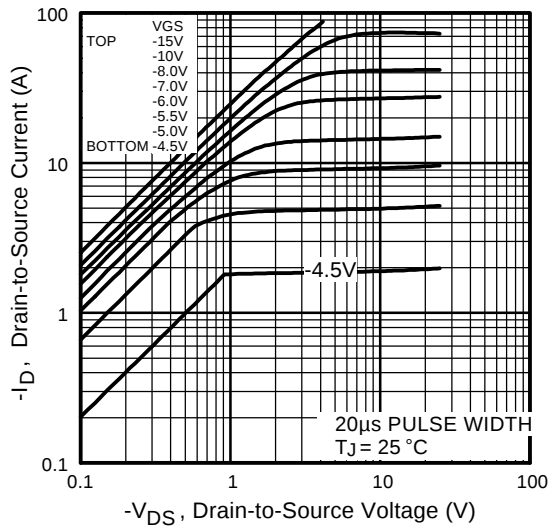


Fig 1. Typical Output Characteristics

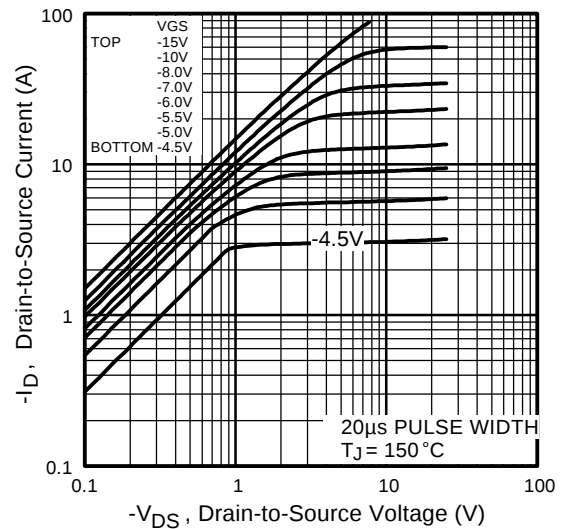


Fig 2. Typical Output Characteristics

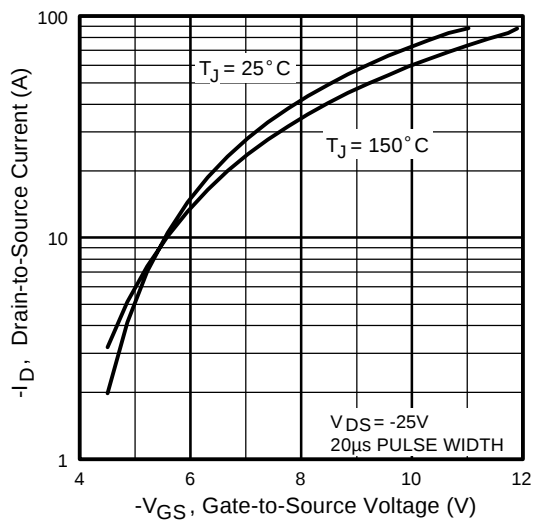


Fig 3. Typical Transfer Characteristics

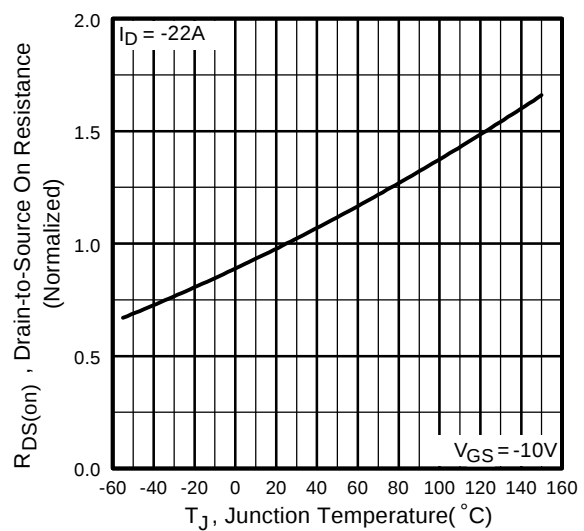


Fig 4. Normalized On-Resistance
Vs. Temperature

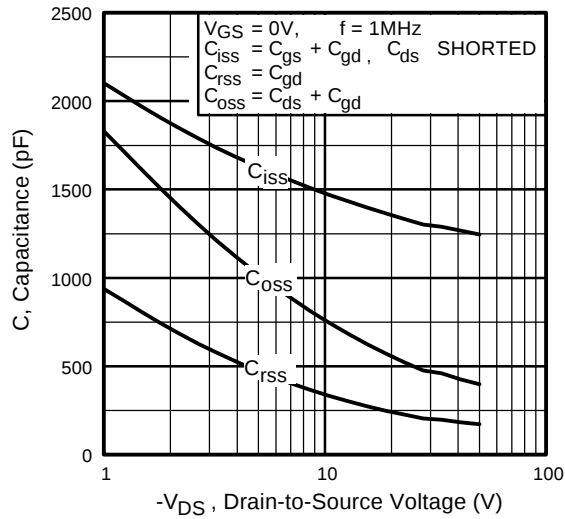


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

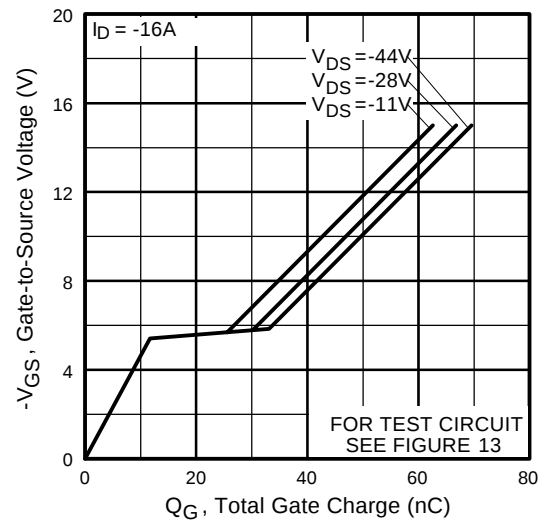


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

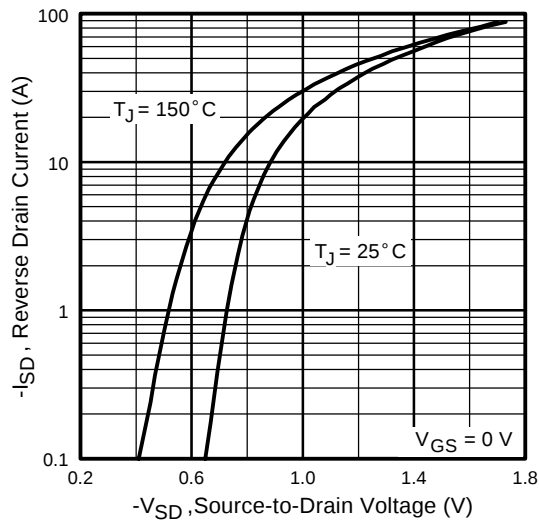


Fig 7. Typical Source-Drain Diode Forward Voltage

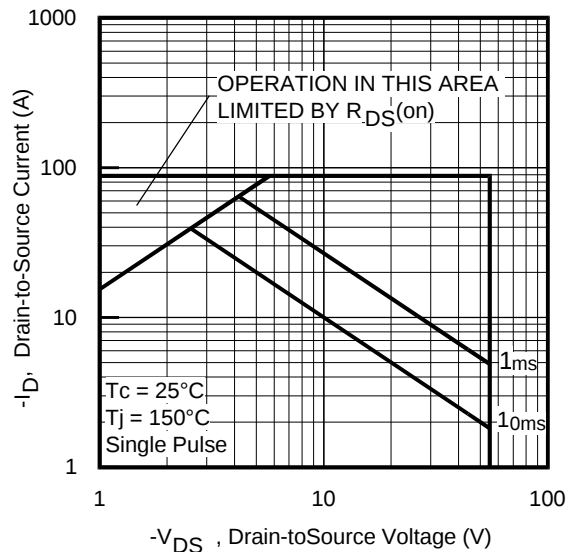


Fig 8. Maximum Safe Operating Area

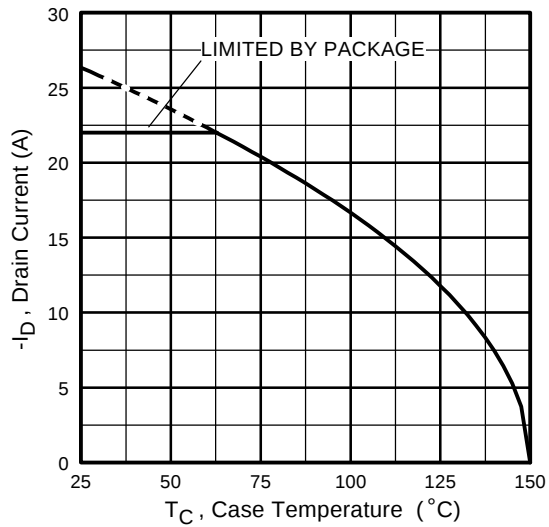


Fig 9. Maximum Drain Current Vs. Case Temperature

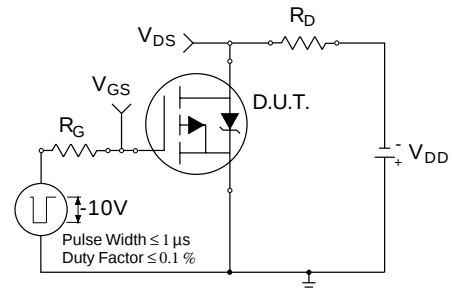


Fig 10a. Switching Time Test Circuit

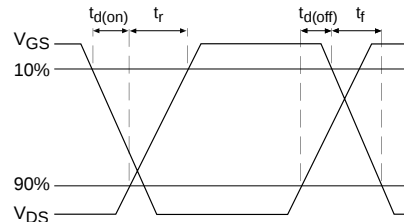


Fig 10b. Switching Time Waveforms

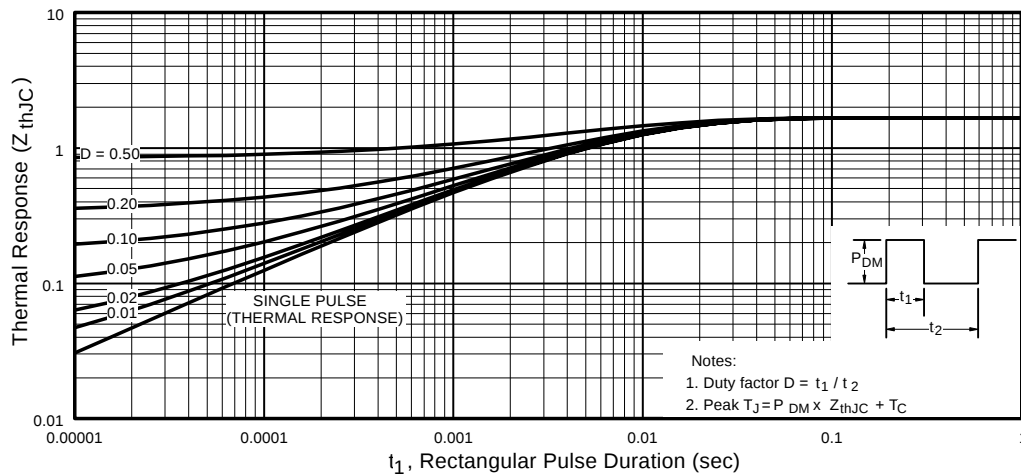


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

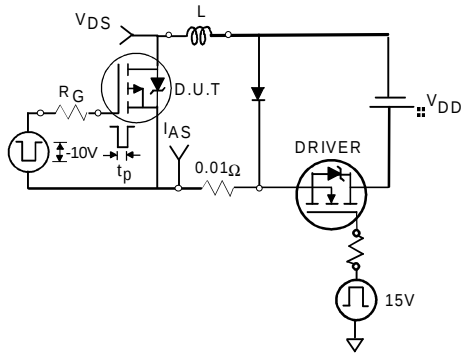


Fig 12a. Unclamped Inductive Test Circuit

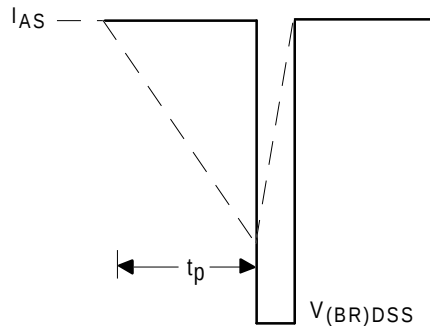


Fig 12b. Unclamped Inductive Waveforms

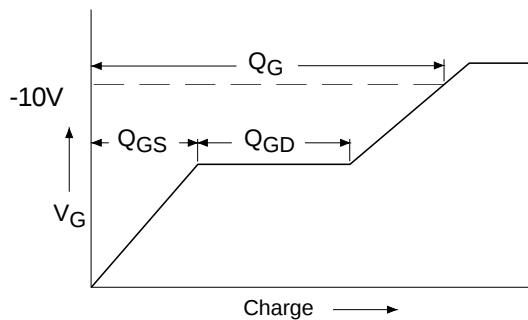


Fig 13a. Basic Gate Charge Waveform

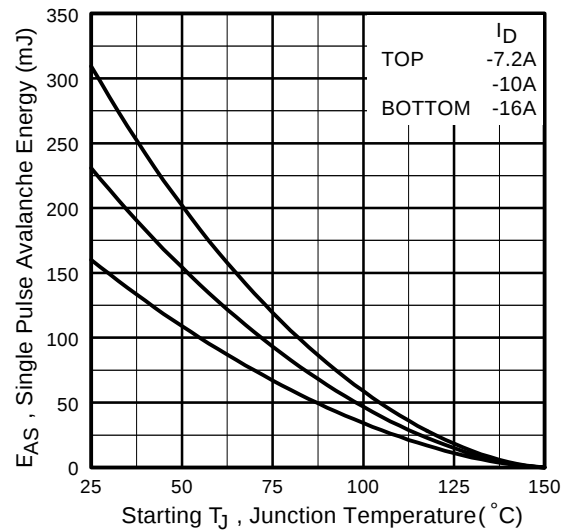


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

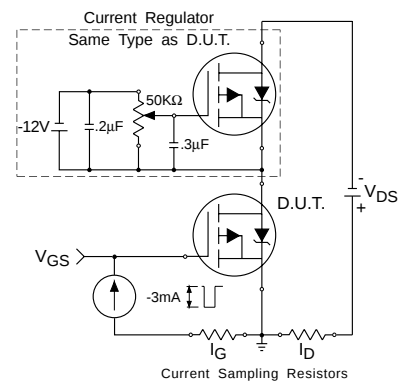


Fig 13b. Gate Charge Test Circuit

- ① Repetitive Rating; Pulse width limited by maximum junction temperature.
- ② $V_{DD} = -25\text{ V}$, Starting $T_J = 25^\circ\text{C}$, $L = 1.3\text{mH}$
Peak $I_{AS} = -16\text{A}$, $R_G = 25\Omega$

- ③ $I_{SD} \leq -16A$, $di/dt \leq -230 A/\mu s$,
 $V_{DD} \leq -55V$, $T_J \leq 150^\circ C$
 ④ Pulse width $\leq 300 \mu s$; Duty Cycle $\leq 2\%$

Technical drawing showing three views of a mechanical part with dimensions and tolerances in millimeters.

Front View (Left):

- Overall width: 7.64 [.301]
- Overall height: 10.28 [.405] / 10.04 [.395]
- Feature A: 7.40 [.291]
- Feature B: 10.28 [.405] / 10.04 [.395]

Side View (Middle):

- Overall width: 3.12 [.123] MAX.
- Feature C: 0.508 [.020] / 0.254 [.010]

Top View (Right):

- Overall width: 7.39 [.291] / 7.14 [.281]
- Overall height: 5.84 [.230] / 5.59 [.220]
- Feature 1: 3.17 [.125] / 2.93 [.115]
- Feature 2: 1.65 [.065]
- Feature 3: 1.91 [.075]
- Feature 4: 3X 7.62 [.030] MIN.
- Feature 5: 2X 2.54 [.100] / 2.29 [.090]
- Feature 6: 3.81 [.150]
- Feature 7: 0.102 [.004] 3 SURFACES
- Feature 8: 0.254 [.010]
- Feature 9: 0.254 [.010]
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PAD ASSIGNMENTS

1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. DIMENSION INCLUDES METALLIZATION FLASH.
5. DIMENSION DOES NOT INCLUDE METALLIZATION FLASH.

- 1 = DRAIN
2 = GATE
3 = SOURCE

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
IR EUROPEAN REGIONAL CENTRE: 439/445 Godstone Rd, Whyteleafe, Surrey CR3 0BL, UK Tel: ++ 44 (0)20 8645 8000
IR CANADA: 15 Lincoln Court, Brampton, Ontario L6T3Z2, Tel: (905) 453 2200
IR GERMANY: Saalburgstrasse 157, 61350 Bad Homburg Tel: ++ 49 (0) 6172 96590
IR ITALY: Via Liguria 49, 10071 Borgaro, Torino Tel: ++ 39 011 451 0111
IR JAPAN: K&H Bldg., 3F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo 171 Tel: 81 (0)3 3983 0086
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